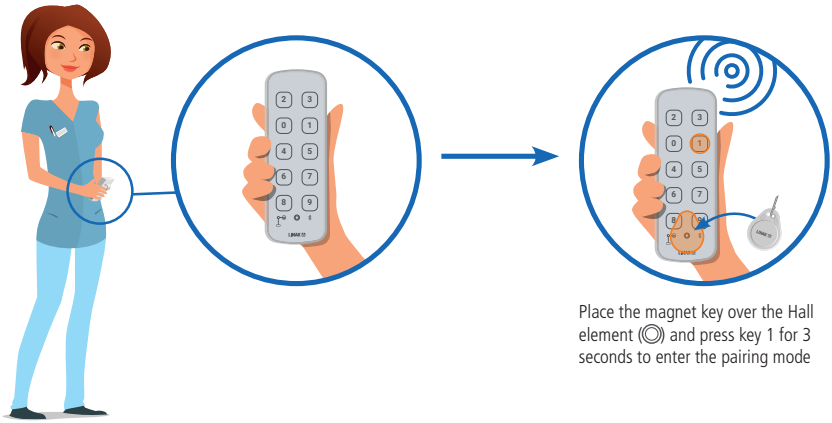
Pairing Bluetooth devices

Direct pairing

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

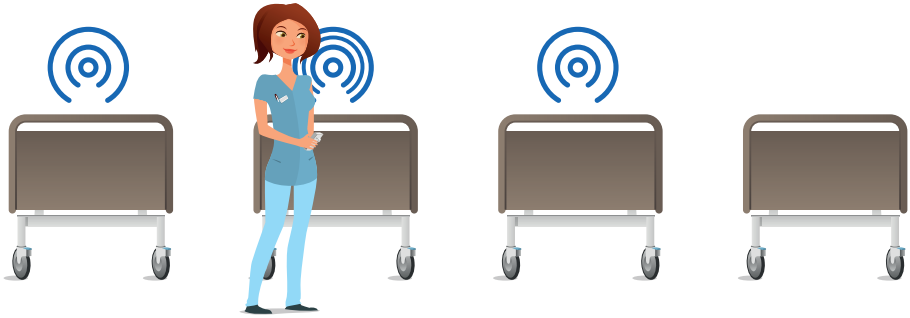
1. Enter pairing mode
2. Move the hand control closer to the control box you want to pair with
3. Pair the hand control with the control box

Entering Pairing Mode



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

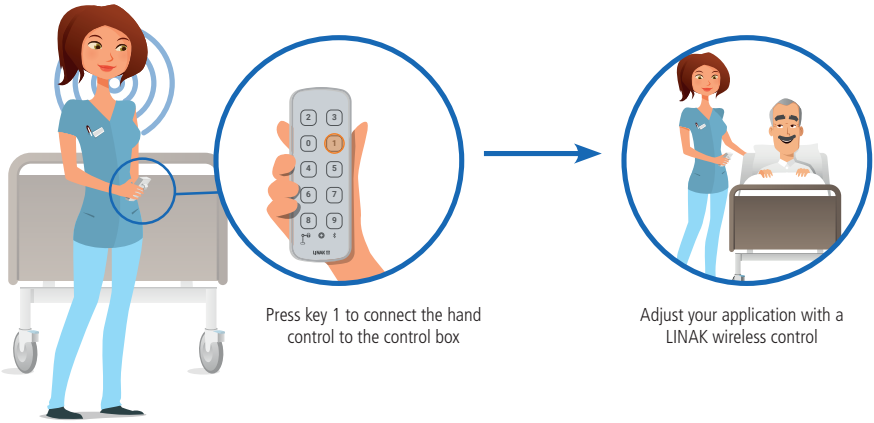
When in pairing mode, the control box buzzer will begin to beep, and the LED will begin to blink. The control unit LED will also begin to blink with the same frequency as the nearest control box.



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.



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.

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 and 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

Warning

- 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.

19. HD80 JUMBO (MEDLINE® CARELINE®)

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 and 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.

20. HL70 (MEDLINE® CARELINE®)

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. The HL70 is an alternative to the HB70 combined with an attendant Control Panel (ACM, ACL, etc.)

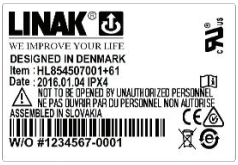
Usage:

- 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: Max. 3000 meters
- Compatible with many LINAK control boxes
- Approvals: IEC 60601-1
  IEC 60601-1-6
  ANSI/AAMI ES60601-1
  CSA 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.

21. HL80 (MEDLINE® CARELINE®)



The HL80 hand control has an optimised ergonomic design and switch activations.

The HL80 is a lockable hand control, which makes it possible to lock or unlock one or several functions.

It is available in several different standard versions with a variation of bed symbols for easy interaction with end-users.

Usage:

- Approvals: IEC60601-1, ANSI/AAMI ES60601-1 and CAN/CSA-22.2 No 60601-1

Warnings

- When using the locking function on HL80 check that the hand control switches are actually locked.
- Locking function on HL80 only locks the actual hand control .
- Do not sit or lie on the hand control . It can cause unintended movement of the application.
- Locking of a single channel at HL80 do not neccesarily prevent that channel from activation, if the same channel are covered by another hand control button (e.g. at simultaneous drive) or another control unit.
- 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

- Violent use of the key on HL80 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.
- Clean the hand control regularly to ensure good hygiene standards.
- When a defective HL80 is replaced, check that the new HL80 has exactly the same specification and fuctionality.
- 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 magnet:

- 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.

22. LS (MEDLINE® CARELINE® TECHLINE®)

There are two types of LINAK limit switches, for actuators type LA22, LA30, LA30S , LS, and LSD.

The LS type gives a signal in two fixed end positions, but requires a control unit to stop the actuator when the microswitches are activated.

23. LSD (MEDLINE® CARELINE® TECHLINE®)

The LSD type controls the stroke length of the actuator between two fixed end positions by cutting off the current to the motor.

7. Information on specific JUMBO™

1. BAJ (MEDLINE® CARELINE®)

The battery pack BAJ has been specially developed for use with the JUMBO system.
They are easy to exchange through an integrated snap system, and can easily be mounted on the mounting brackets.

Usage:

- BAJ is a part of the JUMBO system. It is compatible with CBJ1/CBJ2, CHJ2, CBJ Care and COBO
- Duty cycle: 10 % or 2 min. continuous use then 18 min. not in use
- Ambient temperatures: +5 °C to +40 °C
- Storage temperature: -15 °C to +40 °C
- Relative humidity: 20% to 80% - non-condensing
- Atmospheric pressure: 700 to 1060 hPa
- Height above sea level: Max. 3000 meters
- Flammability rating: UL94-V0
- Approvals: IEC60601-1, ANSI/AAMI ES60601, CAN/CSA-22.2 No 60601-1

Charging:

BAJ can be charged by

- Charger CHJ2
- Control box CBJ1/2, CBJ Care, COBO
- BAJ with integrated DC plug can also be charged by use of the external charger CH01

Warning

Check at regular intervals that the ventilation hole is undamaged and intact. The construction of the ventilation stub permits battery gasses to get out, but it does not permit penetration of water.

2. BAJL Li-Ion (MEDLINE® CARELINE®)

The BAJL Li-Ion battery pack has been specially developed for use with the JUMBO system for patient lifts and sit to stand lifts. It is a low-weight battery with reliable and high performance.

Usage:

- Compatibility: CBJ Care, COBO, CHJ2 and CH01
- Duty cycle:
  BAJL003xxxxxxxx: 10 % (2/18 min.) at max. current draw 10 Amp (ambient temperature ≤ 30 °C)
  10 % (2/18 min.) at max. current draw 8 Amp or
  5% (1/19 min.) at max. current draw 10 Amp (ambient temperature > 30 °C)
  BAJL004xxxxxxxx: 10 % (2/18 min.) at max. current draw 10 Amp (standard ambient temperature recommendations)
- Charging: Via JUMBO wall charger CHJ2 or via JUMBO control box with integrated charger
- Charging state: Maximum 30% when shipped from LINAK
- Recharging during storage: Recharge the battery 6 months at the latest after production date stated on the label
- Operating temperature: +5 °C to +40 °C
- Charging temperature: +10 °C to +40 °C
- Charging time: Type 3: 3 to 4 hours - Type 4: 6 to 8 hours
- Storage temperature: -10 °C to +40 °C (+10 °C to +25 °C - recommended)
  The batteries must be stored in an applicable storage room without direct sunlight.
- Relative humidity: 20% to 80% - non-condensing
- Atmospheric pressure: 700 to 1060 hPa (3000 m)
- Height above sea level: Max. 3000 meters
- Approvals: IEC60601-1:2005 3rd edition,
  ANSI / AAMI ES60601-1:2005, 3rd edition,
  CAN / CSA-22.2 No 60601-1:2008,
  IEC62133 2nd edition,
  UL2054, 2nd edition
  PSE (pending)
  UN38.8, 6th edition (needed for transport of lithium batteries)

Mounting
Do not mount the battery upside down.
Please follow the mounting instructions of the control box e.g. CBJ Care or COBO.

Standby mode
When the BAJL Li-Ion is not being used for a longer period - more than a week - or when it is on stock, it enters into a standby mode to save power and protect the battery from deep discharge.

- Please connect the charger for approx. 15 seconds to exit the standby mode before use.
- There is no audio signal to indicate the standby mode or to indicate exit of standby mode.

After exit of the standby mode
If there is still no power on, the battery needs to be charged. After charging, the hand control and/or the control box will indicate the battery capacity level again

Deep discharge protection
The BAJL Li-Ion has a deep discharge protection to extend the battery lifetime. The deep discharge protection is activated when the battery is discharged.

- Please connect the charger for approx. 15 seconds to exit the deep discharge mode before use.

If the battery is completely discharged, the charging will be started at a very small rate to protect the battery. This small charging rate is not sufficient to turn on the light in the charger, and therefore the user may believe that the system has not yet started. Depending on the battery state, it may take several hours to get to the normal charging state. The orange light of the control box will not be turned on as the operation is analogue. It is therefore not possible to see that the charging has started, however, only at a low level.

If any of the lithium ion batteries built into LINAK products is found to be defective under warranty, LINAK will provide a new product to the OEM. 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 lithium ion cell and any use of LINAK products. Moreover, LINAK explicitly disclaims lost profits, 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.

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

Recommendations:

- Do not exceed the storage temperature as it will shorten the lifetime and performance.
- Adhere to the battery storage temperature or else the lifetime and performance will be reduced.
- Allow the battery to settle to room temperature before use or charging.
- Only use correct LINAK charger (CHJ2, CH01, integrated charger in JUMBO control box or COBO).
- Adhere to the duty cycle or else the lifetime and performance will be reduced.
- BAJL Li-Ion is intended for use in indoor applications, however not in indoor pool environments.
- Recharge the battery before storage if it has been completely discharged.
- Unintentional use of the emergency button, e.g. short activation and deactivation of the emergency button after operating the actuators, can lead to an error indication of remaining battery capacity. The battery capacity will however be shown correctly approx. 20 seconds after activation of the emergency button.
- The BAJL goes into sleep mode approximately 20 seconds after the CBJ Care enters into sleep mode. If the CBJ Care is reactivated within this period, it can lead to a wrong remaining battery capacity indication. The remaining battery capacity will however be shown correctly approx. 20 seconds after the reactivation of the CBJ Care.

Safety feature
BAJL Li-ion contains several mechanisms to protect itself 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 has returned to normal operating range. Overheating may occur by extensive use at high temperature or by exceeding the duty cycle.

Battery safety
LINAK li-ion batteries for medical use are designed and manufactured to be safe through the product lifetime. LINAK has performed various tests of the batteries in normal use, abuse situations and failure situations to verify the design and production methods. These tests have not shown any unacceptable risks.

The batteries are also UL-tested to have an independent organisation verify the safety of the design and to obtain a safety certificate.
This means that UL regularly inspects the factory to check that standards are complied with.
UL has tested in accordance with the following standards:
UN38.3, 6th edition - Battery Transportation Safety
IEC62133 Battery Safety
UL2054, 2nd edition - Standard for Household and Commercial Batteries

Warnings

ALL LI-ION BATTERY USERS MUST READ THESE IMPORTANT BATTERY SAFETY INSTRUCTIONS AND WARNINGS BEFORE USING LI-ION BATTERIES.
Failure to read and follow these safety instructions and warnings may result in fire, personal injury, and equipment damage if the batteries are charged and/or used improperly.

Lithium ion batteries differ from the lead acid technology as they have a built-in deep discharge protection.

- In case of continuous use despite warnings, a power loss might occur due to the battery deep discharge protection. In this event, there may be no warning and the application may not be able to move when expected.
- The combination of CBJ1 or CBJ2 with BAJL might not be able to complete a full cycle after the low battery audio signal.
- The risk analysis for the final application must allow for the ensurance of alternative means to make movement, for instance quick release or manual lowering.
- Do not open, disassemble or modify the battery housing as cell or circuitry damage may develop excessive heat.
- Discontinue the battery use immediately if the battery emits an unusual smell, feels hot, changes colour or shape, shows signs of damage or corrosion or appears abnormal in any other way.
- In case the battery turns hot, disconnect and remove the battery from the room. If not possible to remove the battery, then evacuate the room.
- Defective or damaged lithium ion batteries or batteries that produce excessive heat or fire are not allowed for transportation.
- For safety reasons, please adhere to the indicated charging, storage, and operation temperature as extreme temperatures (low or high) might ignite the batteries and cause fire.
- The mounting instructions must be followed in order to avoid exposing batteries to water.
- The customer is responsible for determining that charger and host device work properly.
- Recharge batteries every 6 months at a minimum.
- Dispose of batteries in accordance with local regulations.

DO NOT:

- heat, burn or short circuit the batteries
- expose the batteries to high impact
- crush or puncture the batteries
- charge or store the batteries near combustible material
- charge the batteries without supervision
- expose the batteries to water or other liquids

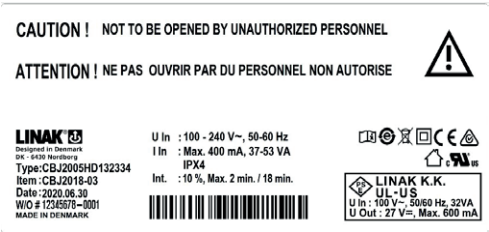
Any of the above mentioned can cause fire or injury.

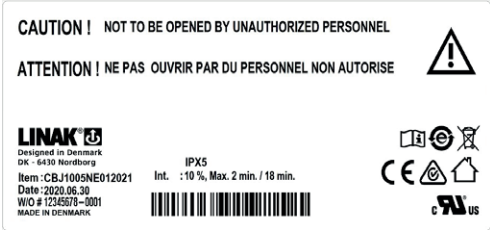
LINAK® will remedy defective Li-Ion batteries built into LINAK products in accordance with the terms stipulated in the LINAK Li-Ion battery disclaimer available on the LINAK website. LINAK explicitly disclaims all other remedies and liability.

Compatibility:

Please be aware that BAJL Li-ion is not compatible with:

- CBJ1, CBJ2 – incl. pool lift versions
- COBO20





The control boxes CBJ1 and CBJ2 are part of the battery driven JUMBO system. JUMBO is a modular system combining an actuator, a control box (CBJ1, CBJ2), a battery (BAJ1) and a charger (CHJ2) in a flexible solution, specially developed for patient lifts.
The complete system is medically approved and contains a series of features which meet the patients need for a safe and comfortable lift, e.g. CBJ1 and CBJ2 are equipped with a soft-start/stop function, emergency lowering function etc.

CBJ1 and CBJ2 are available in a special edition that can be used in the harsh conditions in the pool environment both outdoor and indoor.

Usage:

- CBJ1/CBJ2 with internal charger: Nominal current draw max. 400 mA
  Power consumption (standby) max. 2.5 W
  Power consumption (charging) max. 19 W
- Duty cycle: max. 10 % or 2 min. continuous use then 18 min. without use
- Ambient temperature: +5 °C to +40 °C
- Storage temperature: -10 °C to +50 °C
- Relative humidity: 20% to 80% - non-condensing
- Height above sea level: Max. 3000 meters
- Approvals: IEC60601-1, ANSI/AAMI ES60601, CAN/CSA-22.2 No 60601-1
- For one or two actuators (lift and leg spreader actuator)

Recommendations

- The mains cable must always be ordered separately when ordering a CBJ1, CBJ2 with an internal charger.
- Use only original LINAK mains cables to ensure proper connection to internal charger.
- When charging, the CBJ1, CBJ2 will not be able to operate any actuators.
- By use of charger CH01 it is possible to activate the actuators when charging. However, this is not recommended as it can damage the control box or the charger CH01.
- When the CBJ1, CBJ2 with LCD display option is combined with the battery BAJ Li-Ion, the LCD display can indicate empty battery even if the battery capacity is not low. The acoustic alarm will always be activated at low battery capacity independent of display indication.

Warning

- In order to avoid injury, the emergency-stop should be activated in (all) transport and cleaning situations.
- BAJ Li-Ion batteries differ from BAJ1 lead acid as they have built-in discharge protection.
  If the user continues to use the battery despite warning signals, loss of power might happen due to the battery deep discharge protection. In this event, there may be no warning and the application may not be ableto move when expected.
- The combination of CBJ1 or CBJ2 with BAJL might not be able to complete a full cycle after low battery warning.

Current cut-off for CBJ1

CBJ1	CH1				CH1				Leg spreader CH2	
	Up		Down		Up		Down			
	Min.	Max.	Max.	Min.	Min.	Max.	Max.	Min.	Min.	Max.
CBJ1001N	6.3	8.3	5	3.3	*	*	*	*	-	-
CBJ1001H	9	11.5	7	4.7	6.3	8.8	7	4.7	-	-
CBJ1002N	6.3	8.3	5	3.3	*	*	*	*	2	2.9
CBJ1002H	9	11.5	7	4.7	6.3	8.8	7	4.7	2	2.9
CBJ1004H	5.25	6.3	3.85	2.75	5.2	7.1	5	3.3	4.7	6.2
CBJ1005N	6.3	8.3	5	3.3	*	*	*	*	4.7	6.2
CBJ1005H	9	11.5	7	4.7	6.3	8.8	7	4.7	4.7	6.2

*Current cut-off depends on motor type due to pulse width modulation.

When plugging a mono jack plug into channel 1 the current cut-off will be as the high speed table.

Current cut-off for CBJ2

CBJ2	CH1		Leg spreader CH2	
	Min.	Max.	Min.	Max.
CBJ2001N	7	9	-	-
CBJ2001H	9.8	11.8	-	-
CBJ2002N	7	9	2	2.9
CBJ2002H	9.8	11.8	2	2.9
CBJ2003H	4.9	5.9	-	-
CBJ2004H	4.9	5.9	4.7	6.2
CBJ2005N	7	9	4.7	6.2
CBJ2005H	9.8	11.8	4.7	6.2
CBJ2006H	9.8	11.8	-	-
CBJ2007H	9.8	11.8	2	2.9
CBJ2008H	9.8	11.8	4.7	6.2

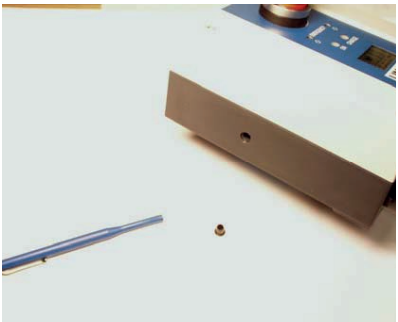
The minimum and maximum values stated above refer to the tolerance range, not the adjustment range.

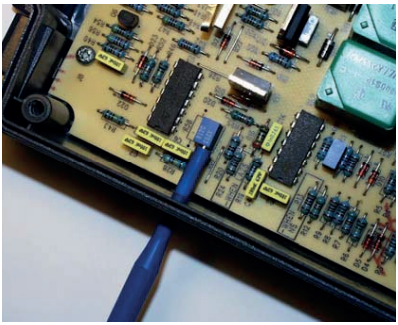
The current cut-off tolerance is +/- 0.2 A depending on the ambient temperature (20 °C)

To avoid injury, all control boxes with variable current cut-off are preset to < 4 A, unless otherwise specified.

Adjustment instructions for the JUMBO application.

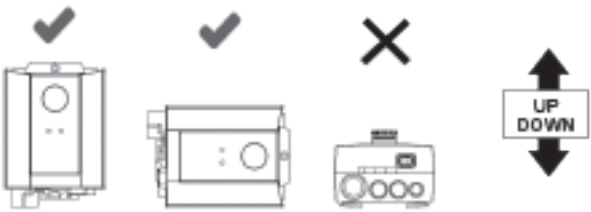
Tool	For the adjustment you must use a trimming screwdriver, which can be purchased from LINAK A/S. It is also possible to use other types of trimming screwdrivers for the adjustment. **Ordinary screwdrivers cannot be used, as they will damage the potentiometer slot.** When you receive the JUMBO from LINAK A/S it is adjusted to min. current cut-off.
1.	Connect the JUMBO control box to the actuator.
2.	Load the actuator with the required load.
3.	Turn the potentiometer completely clockwise.
4.	Run the actuator in the loaded direction at the same time turn the potentiometer anticlockwise until the actuator stops.
5.	Turn the potentiometer 3 times clockwise.
6.	Check JUMBO can lift the loaded actuator.
7.	Insert the plugs article no. 0009020 (Light grey (RAL7035) or 0009019 (Dark grey (RAL7016) to ensure IP protection





Only the end with the lowered notch must be used for adjustment of the potentiometer.

Mounting the CBJ1, CBJ2



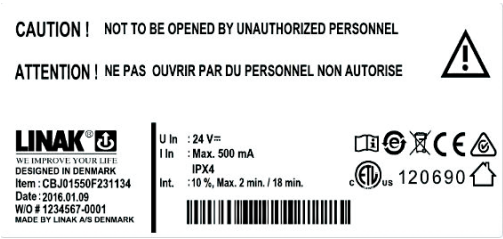
Special care should be taken when mounting the CBJ1, CBJ2.

As long as the CBJ1, CBJ2 is mounted correctly then the CBJ1, CBJ2 complies to IPX5.
If the CBJ1, CBJ2 is mounted incorrectly, then water will gather around the screw holes resulting in non-compliance with IPX5! CBJ1, CBJ2 with variable current cut-off: the protection plugs must always be inserted to ensure IP protection after adjustment.

When using the control box with emergency stop, the stop button must be activated in cleaning situations in order to comply with IPX5.
The battery pack BAJ1 must not be removed in cleaning situations, doing so could result in non-compliance with IPX5.

If the CBJ1, CBJ2 is fitted with option B, D and F (DC power connector), the protection plug ex. 00918174 must always be inserted to ensure IP protection, if the port is not used. IP rating only applies when the battery is connected to the control box.

4. CBJ-Care (MEDLINE® CARELINE®)



The control box CBJ Care is part of the JUMBO system. JUMBO is a modular system combining an actuator, control box (CBJ Care), battery (BAJ1, BAJL), wall charger (CHJ2), control box prepared for external charger by use of wall-plug charger CH01, and a hand control in a flexible solution, specially developed for patient lifts.

The complete system contains a series of features which meet the patient's need for a safe and comfortable lift.

CBJ Care is available in 3 versions, one with LEDs, one with a display and a third without display and LEDs.

It is possible to have control buttons on the front cover to have an easy control option if the hand control is missing. Furthermore it is possible to have 3 channels via a T-cable in channel 1. The 3rd channel for tilt function adds value for the patient and the caregiver.

Usage:

- CBJ Care with internal charger: Nominal current draw max. 400 mA
  Power consumption (standby) max. 2.5 W
  Power consumption (charging) max. 19 W
- Duty cycle: Max. 10 % or 2 min.continuous use then 18 min. without use
- Ambient temperature: +5° to +40°
- Storage temperature: -10° C to +50° C
- Relative humidity: 20% to 80% - non-condensing
- Atmospheric pressure: 700 to 1060 hPa
- Approvals: IEC60601-1, IEC60601-1-6
  ANSI / AAMI ES60601-1,
  CAN/CSA-22.2 No 60601-1

Instructions for uses

- Before start-up we recommend to reset the service counters – days and cycles until next service visit. To reset press the up and down button on the control box or the hand control for 5 seconds. An audio signal will confirm the resetting.
- When charging, the CBJ Care will not be able to operate any actuators.
- It is not possible to use other battery types than BAJ1 or BAJL with the CBJ Care.
- Use only original LINAK mains cables to ensure proper connection to internal charger.
- The green battery indicator (100% to 50% capacity remaining) will light up during charging even though the battery is not fully charged.
  It is necessary to use the "*CHARGE*" LED to indicate whether or not the battery is fully charged (when using internal charger).
  The CHARGE indicator will light up during charging and turn off when the battery is fully charged.
- When resetting the CBJ Care or updating other settings than using learn mode, the CBJ Care must not be disconnected from the battery and the emergency stop must not be activated within a time span of at least 10 seconds. This is to ensure the correct storage of the new values to the memory banks of the CBJ Care.

Recommendations

Hot Plugging:
Removing or adding any OpenBus™ cables is not allowed when the control box is on power via mains supply or battery!
If necessary anyway, follow the below procedure:
1. Remove mains or battery and wait 5 sec.
2. Mount or dismount the required cables

If this procedure is NOT followed it may result in a damaged OpenBus™ driver circuit.
The risk of a damaged circuit increases if the accessory has a high start current (in rush current).

Emergency lowering/lifting:
By use of BAJ1, the lifting arm can be lowered by pressing e.g. a pen in the hole or use the control buttons, if present.

This is a permitted method of lowering/lifting.

The emergency lowering/lifting "*buttons*" work as normal hand control buttons (you do not get extended functionality by using these when the battery is low).

By use of BAJL, please be aware that loss of power might happen due to the battery deep discharge protection.
This will only happen by continuous use of the battery despite warning.

Warnings
In order to avoid injury, the emergency-stop should be activated in (all) shipping situations.

Functionality – JUMBO Care with display

Below you find information about what to read-out on the display version of JUMBO Care. Basically the functionality for the display version is the same as the diode version, but more information can be read out on the display.

Driving information

As long as a hand control button function is activated driving information will be shown on the display. Either lifting arm up, lifting arm down, legs in or legs out or tilt of sling.

The only exception to this is when the battery is flat (stage 3 and 4 – see below). At that point the battery information will be shown instead.

Battery information

The battery discharging will be shown in four stages:

	Battery state 1:	The battery is ok, no need for charging (100 - 50 %)
	Battery state 2:	Battery needs charging. (50 - 25 %)
	Battery state 3:	Battery needs charging. (Less than 25 %) Buzzer sound is provided when a button is pressed in this battery state.
	Battery state 4: (BAJ1 lead acid)	The battery needs charging. At this stage some of the functionality of the lift is lost. At this battery stage, it is not possible to drive the lifting arm up or down. Furthermore, an audio signal will sound when a control button is activated (17 V or lower). The symbol will switch between the two pictures for 10 seconds. The battery symbol is shown when the box is active until power down (2 minutes after use).
	Battery state 4: (BAJL li-ion)	When using CBJ Care with display together with a BAJL battery, the display will not show the *"Battery state 4"* symbol. The BAJL deep discharge protection overrules the *"battery state 4"*. Consequently, the CBJ Care shuts down, and the empty battery symbol is not shown.

- The battery level is measured via voltage level. This means that it is possible to experience e.g. that the battery switches from state 1 to state 2 and back to state 1.

Charging of battery:

When the mains cable is plugged in and a control button is activated the symbol to the left is shown on the display until power down 2 minutes later. The purpose of the symbol is to tell the user that it is not possible to use the lift when it is plugged in to the mains.

Short circuit:

If there is a short circuit the control box will show the short circuit symbol with a recommendation to check the connections. The symbol will be shown until the short circuit has been repaired.

Service:

The control box will show the service symbol when it is time for service. The standard setting is after 12 months / 8000 cycles. After each power down, the first time that the service symbol is shown the control box will provide an audio sound (100 milli seconds) so that the user gets a reminder about checking the display.

The 'SERVICE' text will blink 3 times, then a static service symbol will be shown (10 seconds in total). Even though it is time for service the system will still be functional and work as normal.

Overload Channel 1 only:

When overload occurs (according to the pre- defined current cut off limit) the overload symbol will be shown on the display. The 'MAX' text will blink 3 times and the overload symbol will be shown for 10 seconds in total.

Service information read-out

Basic service information can be read out on the display. To get the service information on the display please press the lifting arm up button (only ½ second press). The information will be shown for ½ minute or until other buttons are activated.

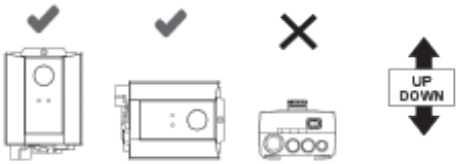
------> Total cycles done on channel 1
------> Total work done on channel 1
------> Total number of overloads (channel 1)
------> Days since last service/Days between services

If "*No days*" are chosen for service interval then the display will show Days since last service /-.

Recommendations for use of learn mode function:

- The purpose of using learn mode function is to adjust the lift to no more than 1.5 times the max. load. The actuator will not stop exactly at the load it has been adjusted to as the actuator uses less current when its components have been run in. When the max. current value has been registered using the learn mode function, the control box will be able to use max. current +10 %. This ensures that the lift is capable of lifting the set load, however it cannot lift more than 1.5 times of the set load.
- When registering current limits, be aware to use a defined set of actuator and control box
- The ambient temperature must be approx. 20 ºC
- The difference between the highest and lowest load must not be more than max. 10 %
- To activate the learn mode function, use the special hand control (HB7x235-00)
- If an actuator or CBJ Care is exchanged, it is necessary to reset the max. load to ensure the correct cut-off value for the new system
- Always use fully charged batteries for learn mode procedures
- A max. cut-off value of 11 Amp can be registered (stored)
- The tolerance for preset current cut-off is: +/- 1 Amp
- The current cut-off value can be reset by means of the learn mode function, however this is not in accordance with EN10535

Mounting of CBJ Care



Special care should be taken when mounting the CBJ Care.

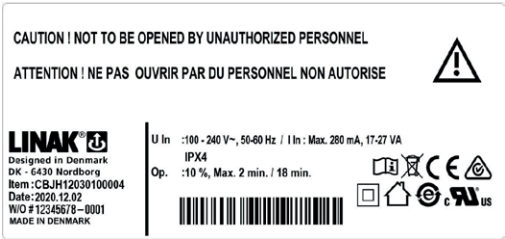
As long as the the CBJ Care is mounted correctly then the CBJ Care complies to IPX4. If the CBJ Care is mounted incorrectly then water will gather around the screw holes resulting in non-compliance with IPX4!

If the control box is equipped with emergency stop, the stop button must be activated in cleaning situations in order to comply with IPX4.

The battery pack BAJ1 or BAJL must NOT be removed in cleaning situations, doing so could result in non-compliance with IPX4.

If the CBJ Care is fitted with external charger option (DC power connector), the protection plug ex. 00918174 must always be inserted to ensure IP protection, if the port is not used.

IP rating only applies when the battery is connected to the control box.



The CBJ-Home is a specially developed solution for patient lifts. The complete system consists of a control box and a battery enclosed in a single elegant module.

The system is approved according to medical safety standards and contains a series of features ensuring a safe comfortable lift, e.g. the CBJ-Home is equipped with a soft-start function, electrical emergency lowering, emergency stop etc.

Usage:

- CBJ Home with internal charger: Nominal current draw max. 280 mA
  Power consumption (standby) max. 1.3 W
  Power consumption (charging) max. 12 W
- Duty cycle: Max. 10 % or 2 min. continuous use then 18 min. without use
- Ambient 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

Recommendations

- If emergency stop is pressed whilst charging, the batteries will not be charged.
- When charging, the CBJ Home will not be able to operate any actuators.
- For recharging the batteries, use charger CH01 (charger has to be ordered separately).
- Note: Always mount the CBJ Home with the channel sockets facing downwards.
- The CBJ Home is not intended for use with "*buffer*" type actuators such as LA28.
- The actuator must always be fitted with an exchangeable cable (mini-fit) socket.
- Actuators on channel 1 must always be with spline.
- The mains cables must always be ordered separately when ordering a CBJ with an internal charger.
- Use only original LINAK mains cables to ensure proper connection to internal charger.
- Always use fully charged batteries for learning mode procedures.
- Only an authorised LINAK service centre should change a battery in a CBJ Home. If a CBJ Home is opened and a battery is changed by unauthorised personnel, there may be a risk of malfunction.
- When using the control box with emergency stop button, the stop button must be released before charging batteries or before the application is put into operation.
- It cannot be guaranteed that the actuator will stop exactly at the weight that is stored as the motors in the actuators will use less current when run in. Though it will never reach the 1.5 times max. load as the norm states.
- Tolerance for current cut off is: +/-10 %
- The maximum cut-off value that can be registered (stored) is 8 Amp.
- If an actuator or CBJ Home is exchanged it will be necessary to reset the max. load to ensure the correct cut-off value for the new system as a whole.
- The registration function can only be activated by using a specially produced hand control (HB7X161-00). A standard hand control cannot activate the function.
- To operate the "*Learn mode*" function in External charger versions produced before February 2010 press the "R" button when "*learning*" (the lifting arm actuator will operate automatically). With all other versions (and future versions with external charger) both the "R" button and the "*lifting arm*" button need to be pressed.
- It is possible to use the "*learn mode*" function for channel 2: To operate the learn mode function for channel 2, press the "R" button and the "*leg". spread out*" button at the same time. Run actuator with load and full cycle to record maximum current during a cycle.

Warning

- In order to avoid injury, the emergency stop should be activated in (all) transport situations.
- When "*learn mode*" is used, and channel 2 is pressed instead of channel 1, the CBJ Home will learn a new current limit of nearly 0 Amp. This will make it impossible to run the actuator with channel 2 until a new learn mode has been programmed.

Mounting information:

The CBJ-Home is mounted by means of 2 screws:
Type ISO4762-M6x90-8.8 (not supplied by LINAK)

Spares information:

The cable lock kit consists of the following 3 items:

- 2 x screws
- 1 x blind plug for ch. 2 if not in use
- Cable Lock

All the cable lock items are included when ordering the kit, article number: 0898001-B.

The mounting screws for the control box and the charger must be tightened with a maximum torque of 1 Nm.

6. COBO (MEDLINE® CARELINE®)

The COBO is an interface box specially developed for use together with the JUMBO battery pack (BAJ1/BAJ2 and BAJL Li-Ion) and the CU20 control unit. It is also possible to connect other 24V lead acid customer batteries or fixed power supply.

Safety:
The COBO has a monitoring circuit for the FET transistor. If the FET is damaged the CU20 will go into fatal error mode. In this case the COBO is defective and must be replaced.

Usage:
- COBO with internal charger: Nominal current draw max. 400 mA
  Power consumption (standby) max. 2.5 W
  Power consumption (charging) max. 19 W
- Compatibility: LINAK Batteries BAJ1, BAJ2 (24 V, 2.9 AH) or other 26 - 28 V power sources via customer battery connection.
  LINAK Lithium Ion battery (BAJL Li-Ion)
- Duty cycle: 10 % 2 minutes running and 18 minutes rest
- Operating temperature: +5 °C - +40 °C
- Storage temperature: -10 °C - +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: The COBO is EMC designed and approved in accordance with IEC60601-1, ANSI/AAMI ES606011 and CAN/CSA-22.2 No 60601-1

Functionality:
COBO with internal charger has a green and a yellow light.

Diode colour	Functionality
Green is on	COBO is connected to mains
Yellow is on	COBO is charging. The yellow LED is constantly on until batteries are fully charged.

The CU20 will shut down after 2 minutes to save power.

Accessories depending on V-permanent when the system is inactive will not work.

The CU20 controls whether or not activation should be allowed during charging.

Please note that the CU20 SW must ensure that there is no movement during charging when using COBO with internal charger.

Guidelines regarding emergency STOP and battery state re-calibration:
- The emergency stop button is not designed to be used as an on/off button.
- When using the emergency stop button, the system may shortly not be ready for use:
  - In normal situations waiting time for restarting the system is less than 5 seconds
  - In situations of shortly activating and then deactivating the emergency stop, the waiting time for battery state re-calibration can be up to 30 seconds.
- If a handset key is pressed during the re-calibration period, the control box may indicate with an audio signal, that the SW measures the battery condition. The user must wait until the re-calibration is finalized to be able to operate the system again.

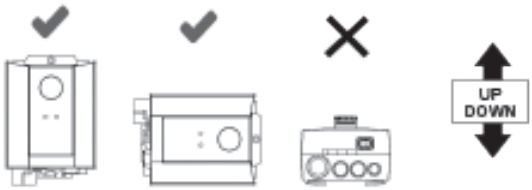
Mounting
Special care should be taken when mounting the COBO.
As long as the COBO is mounted correctly then the COBO complies to IPX5 (IPX4 with internal charger).
If the COBO is mounted incorrectly then water will gather around the screw holes resulting in non-compliance with IPX5 (IPX4 with internal charger).

When using the control box with emergency stop, the stop button must be activated in cleaning situations in order to comply with IPX5.

The battery pack BAJ1 or BAJL must not be removed in cleaning situations, doing so could result in non-compliance with IPX5.

If the COBO is fitted with option EC (DC poser connector), the protection plug ex. 00918174 must always be inserted to ensure IP protection, if the port is not used.

IP rating only applies when the battery is connected to the control box.



Recommendations

- Choose CU200XXXXX2XXXX if positioning/memory function is to be used.
- It is recommended that the COBO is serviced according to the relevant national norms for the applications in which it is used, however all electrical parts must be checked at least once a year.
- The COBO should be cleaned regularly, in order to maintain good hygiene. It is not allowed to use chemicals to clean the box.
- Only use COBO together with CU20.
- When specifying special CU20 software, be sure to set "*Operation allowed during charging*" to YES, if customer batteries or fixed power supply is used.

Warnings

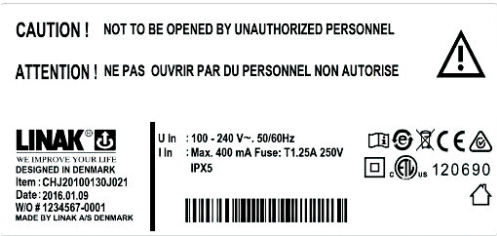
- Pay attention to the polarity of the customer battery cable - red is positive voltage.
- In order to avoid injury, the emergency stop should be activated in (all) transport situations.
- If 24V lead acid customer batteries or fixed power supply is used, the supply source must comply with *"Means Of Patient Protection"* and *"Means Of Operator Protection"* in accordance with the Medical Safety Standard.
- If 24V lead acid customer batteries or fixed power supply are used, the customer must ensure that EMC values are kept in accordance with regulations.
- The CU20 power port/channel 7 cannot be used with COBO.
- Max 1 ACT can be connected to the COBO system.
- The COBO is not to be used in agricultural or maritime applications or be connected directly to a vehicle battery.

7. CH01 (MEDLINE® CARELINE®)

For charging the batteries of CB08-XA and all JUMBO control boxes, directly connected to the control box or via the hand control HB40A.

For charging of the batteries in battery box BAJ2 (JUMBO system) and CBJH.

8. CHJ2 (MEDLINE® CARELINE®)



The charger CHJ2 has been specially designed for use as a wall-charger for the JUMBO system.

The CHJ2 charger is a Switch Mode Power Supply (SMPS) version which makes charging of the batteries more efficient.

BAJ1 and BAJL (standard) battery pack have a reduced charging time.

Mains voltage from 100 V AC - 240 V AC (50/60 Hz) is possible on same charger.

The charger indicates whether the charger is connected to the mains (green LED) or whether the battery is being charged (yellow LED).

Medically approved.

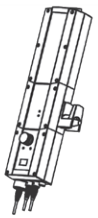
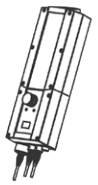
Usage:

- Nominal current draw: Max. 400 mA
- Power consumption (standby): Max. 2.5 W
- Power consumption (charging): Max. 19 W
- Ambient temperatures: + 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 and CAN / CSA-22.2 No 60601-1

9. MBJ1/2/3 (MEDLINE® CARELINE®)

Depending on of what your JUMBO system consists you need to use one of the following three mounting brackets. IP protection is only valid when the JUMBO system is mounted vertically.

All three brackets include matching screws (IPX1, IPXX and IPX5 are delivered with stainless screws). The mounting screws for the control box, charger must be tightened with a maximum torque of 1 Nm.

		**MBJ1** For use together with CBJ1 or CBJ2 or CBJC, CHJ2 and BAJ1 or BAJ2. I. e. when combining control box, charger and battery pack MBJ1 has to be used.
		**MBJ2** For use together with CBJ1 or CBJ2 or CBJC, and BAJ1 or BAJ2. I. e. when combining control box and battery pack MBJ2 has to be used.
		MBJ3 For use together with CHJ2 and BAJ1 or BAJ2. I. e. when combining charger and battery pack MBJ3 has to be used.

8. Information on specific accessories

If the actuator is to be equipped with accessories, these must be specified when ordering the actuator from LINAK. There are the following possibilities:

1) TR6/TR7 External transformer
If the TR6 or TR7 fixed cable connection becomes damaged the transformer must be replaced.

1. BA16 Lead acid (MEDLINE® CARELINE®)

The battery box BA16 is developed for use together with the LINAK CA and CO control box series to support power backup.

Usage:
- Compatibility: Battery back-up for COxx and CAxx
- Duty cycle: 10%, 2 minutes continuous use followed by 18 minutes not in use
- Charging: Via integrated charger
- Charging time: Approx. 6 hours
- Recharging during storage:
  Battery recharging no later than 6 months after production date stated on the label
- Operating temperature: +5 °C to +40 °C
- Storage temperature: -10 °C to +50 °C
  The batteries must be stored in an applicable storage room to avoid direct sunlight
- Relative humidity: 20% to 80% - non-condensing
- Atmospheric pressure: 700 to 1060 hPa
- Height above sea level: Max. 3000 meters
- Service: Battery replacement
- Approvals (pending): IEC60601-1, ANSI/AAMI ES60601-1, CAN/CSA-22.2 No. 60601-1
  UL tested in accordance with UL60601-1 (pending)

LED functionality:

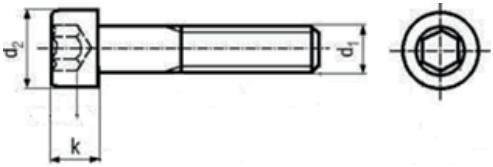
LED	Indication of operation
Solid yellow	Charging (battery not ready)
No LED light	Fully charged (battery ready)
Flashing yellow	Error during charging

Buzzer functionality:
The buzzer will make a warning when a button on the hand control is pressed and the battery capacity is low. The buzzer can also be activated by an intelligent control box to signal other conditions. This must be specified in the control box software.

Mounting instructions:

BA16 must be mounted with M4 screws due to the battery weight.
Make sure the surface touching the BA16 mounting surface is flat and use all 4 screws.

The diameter of the screw cap must be maximum 8mm.

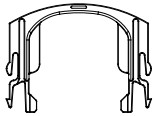


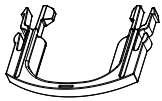
d_1	M4
$d_{2\,max}$	8
k	4

According to ISO 2009

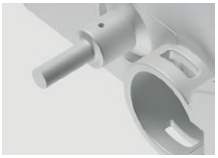
Cable

Cable	Mini-fit (4 pole) with angle to Mini-fit (4 pole) straight For cable details see chapter 4.1.4/see cable configurator
Cable lock	0273044





Recommendations:



- Do not exceed the storage temperature as it will shorten the product life and reduce performance.
- Allow the battery to settle to room temperature before use.
- Do not exceed the duty cycle 2/18 as it will shorten the life, reduce performance, and eventually activate overcurrent protection.
- BA16 is not intended for use in outdoor applications.
- If the battery is completely discharged, then recharge the battery before storage.
- Inspect at regular intervals that the ventilation aperture is positioned correctly and is intact throughout its length.

Safety feature

- BA16 contains overcurrent protection for safety and to protect itself from being damaged due to excessive use.
- When current protection is activated, no power output will be available.

Warnings

- Loss of power might happen due to activation of overcurrent protection. In this event, there may be no warning and the application may not be able to move when expected.
- Defective or damaged batteries may leak acid and adequate precautions must be taken during handling and transportation.
- Do not open the battery case as damage to the cell or circuitry may develop excessive heat.
- It is important for users to read the guidelines in the "*User Manual Linear Actuators and Electronics*".
- Do not short circuit the battery.
- Use the specified internal charger only.
- If disposed to fire, the battery may explode.
- The battery box BA16 itself may not be combined with an external charger.

If product caution is not clearly visible on the final application at low light intensity, the above mentioned warnings must be integrated in the application manufacturer manual.

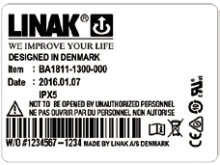
The application manufacturer must test the application and ensure that neither intended nor unintended use exceeds the battery specification. The application manufacturer must assure other means of movement, e.g. quick release or manual lowering in case of battery failure.

Compatibility:
The BA16 has a built-in charger and is therefore not able to operate with control boxes with charger. Be aware that the BA16 is only compatible with CAxx and COxx.

BA16 safety:
LINAK batteries for medical use are designed and manufactured to be safe throughout the product life. LINAK has performed various battery tests in normal use, abuse, and failure situations to verify design and production methods. These tests have not shown any unacceptable risks.

The batteries are UL-tested to verify the safety of the design and to obtain a safety certificate from an independent organisation. This means that UL regularly inspects the factory to check that standards are complied with.

2. BA18 (MEDLINE® CARELINE®)



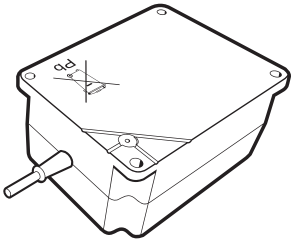
The BA18 is a cost-effective lead acid battery without integrated charger that can be used in combination with CO53 and with the long-established control box range, of which many are now legacy products.

Usage:

- Compatibility: CO53, CB6P2
  Legacy products : CB6,CB7, CB9, CB12, CB14, CB18, CB6S
  NOTE: (only specific versions may be compatible)
- Ambient temperature: +5°to +40°C
- Charging: Via LINAK control box with integrated charging circuit
- Charging time: Approx. 6 hours depending on built-in control box charger
- Recharging during storage: Battery recharging no later than 6 months after production date stated on the label
- Operating 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)
- Meters above sea level: Max. 3000 meters
- Approvals: IEC60601-1, ANSI/AAMI ES60601-1, CAN/CSA-22.2 No. 60601-1

To ensure free passage of gasses when the battery is mounted on a flat surface the back side of the battery has been supplied with venting channels see below figure.

Venting channels and membrane on BA18:



Check with regular intervals that the venting channels are unblocked.

Warnings:

- The battery case is only to be opened by authorised staff as incorrect handling may compromise the IP protection.
- Take care to always keep the venting channels free. Mounting plates must be rigid to prevent blocking of the venting channels.
- Do not use third party chargers.

Recommendations:

- Allow the battery to settle to room temperature before use.
- The batteries must be stored in an applicable storage room to avoid direct sunlight.

3. BA19 Lead acid (MEDLINE® CARELINE®)

The BA19 lead acid backup battery has been developed specifically for use with the new control boxes CA30/CA40 and CO61. It is a compact and cost-efficient battery with built-in charger and cable management.

Usage:

- Compatibility: Battery backup for CA/CO control box platform
- Duty cycle: 10%, 2 minutes continuous use followed by 18 minutes not in use
- Charging: Via integrated charger
- Charging time: Approx. 6 hours
- Recharging during storage: Battery recharging no later than 6 months after production date stated on the label
- Operating temperature: + 5 °C to + 40 °C
- Storage temperature: - 5 °C to + 40 °C
  The batteries must be stored in an applicable storage room to avoid direct sunlight
- Relative humidity: 20% to 80% - non-condensing
- Atmospheric pressure: 700 to 1060 hPa (3000 m)
- Height above sea level: Max. 3000 meters
- Service: Battery cells cannot be replaced as the battery cover cannot be closed properly afterwards
- Approvals (pending): IEC60601-1:2005 3rd edition,
  ANSI/AAMI ES60601-1: 2005, 3rd edition
  CAN/CSA-22.2 No. 60601-1:2008

LED functionality:

What does the LED indicate?

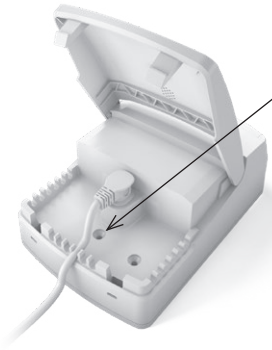
LED	Indication of operation
Solid orange	Charging (battery not ready)
No LED light	Fully charged (battery ready)
Flashing yellow	Error during charging

Buzzer functionality:

The buzzer will make a warning when a button on the hand control is pressed and the battery capacity is low.

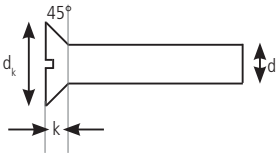
The buzzer can also be activated by the control box to signal other conditions. This must be specified in the control box software.

Mounting instructions:



BA19 must be mounted with attachment screw and mounting bracket (see below) due to the battery weight.

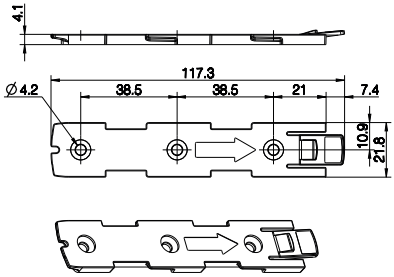
Screw M4 countersunk torque 1.1 Nm +/- 0.1 Nm.



d	M4
d_k	8.4
k	2.7

According to ISO 2009

Mounting bracket (frame flat) - article no. 1015W1001:



Recommendations:

- Do not exceed the storage temperature as it will shorten the product life and reduce performance.
- Allow the battery to settle to room temperature before use.
- Do not exceed the duty cycle 2/18 as it will shorten the life, reduce performance, and eventually activate overcurrent protection.
- BA19 is not intended for use in outdoor applications.
- If the battery is completely discharged, then recharge the battery before storage.

Safety feature

- BA19 contains overcurrent protection for safety and to protect itself from being damaged due to excessive use.
- When current protection is activated no power output will be available.

Warnings

- Loss of power might happen due to activation of overcurrent protection. In this event, there may be no warning and the application may not be able to move when expected.
- Defective or damaged batteries may leak acid and adequate precautions must be taken during handling and transportation.
- Do not open the battery case as damage to the cell or circuitry may develop excessive heat.
- It is important for users to read the guidelines in the "*User Manual Linear Actuators and Electronics*".
- Do not short circuit the battery.
- Use the specified charger only.
- If disposed to fire, the battery may explode.

If product caution is not clearly visible on the final application at low light intensity, the above mentioned warnings must be integrated in the application manufacturer manual.

The application manufacturer must test the application and ensure that neither intended nor unintended use exceeds the battery specification. The application manufacturer must assure other means of movement, e.g. quick release or manual lowering in case of battery failure.

Compatibility:
The BA19 has a built-in charger and is therefore not able to operate with control boxes with charger. Be aware that the BA19 is compatible with CA30, CA40, CA63, CO41, CO61, CO65 and CO71.

4. BA21 Li-Ion (MEDLINE® CARELINE®)

The BA21 Li-Ion back-up battery pack has been specially developed for use with the new control boxes COxx and CAxx, e.g. CO61 and CA40, etc. It is a low weight battery with built-in charger and high performance and safety.

Features and Options

Weight:	0.7 kg
Housing colour:	Light grey (RAL 7035)
Protection class:	IPX6 Washable DURA™
Packaging:	Every battery is packed individually and is fitted with lithium caution (transportation requirement)
Classification:	Internally powered

Usage:

- Compatibility: Battery back-up for CO and CA control boxes
- Duty cycle: 10%, 2 minutes continuous use followed by 18 minutes
- Charging: With integrated charger in battery
- Charging time: Approx. 10 hours
- Recharging during storage: First recharge of the battery must be no later than 12 months after production date stated on the label. Hereafter the battery must be recharged at least every 12 months.
- Operating temperature: +5 °C to +40 °C
- Storage temperature: -10 °C to +40 °C (+10 °C to +25 °C recommended) The batteries must be stored in an applicable storage room without direct sunlight.
- 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, IEC62133, UL2054, UN38.3 (needed for transport of lithium batteries)

LED functionality:

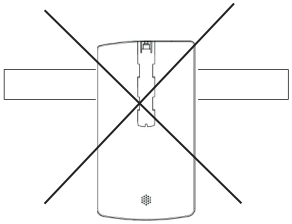
LED	Indication of operation
Solid yellow	Charging
No LED light	Fully charged
Flashing yellow	Error during charging

Buzzer functionality:

The buzzer will make a warning when a button on the hand control is pressed and the battery capacity is low. The buzzer can also be activated by the control box to signal other conditions. This must be specified in the control box software.

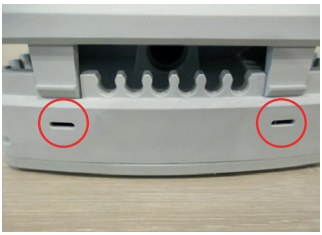
Mounting instructions:

The Battery Pack BA21 can be mounted in several ways on the bed/the application, either separately or together with the control box CO61. It is however not allowed to mount the battery in vertical position with the mounting clip pointing upwards - see illustration :

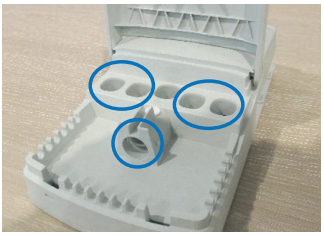


- Disconnect the mains cable to the application at the power outlet.
- Remove the power cable from the control box by inserting a screwdriver into the locking clip marked.

- Release the control box off the application by pressing the tab on the mounting clip.



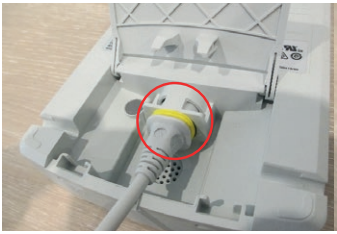
- Open the lid to the control box by releasing the locking clips.

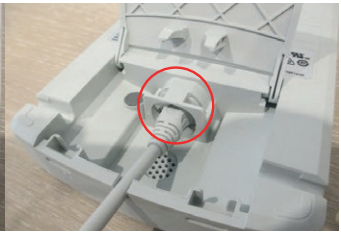


- If you disconnect any actuator cables or hand control cables, please take note of the correct ports.

- Open the lid to the battery box by releasing the locking clips.

- Open the lid for access.



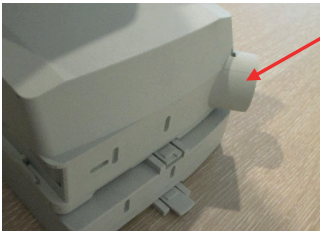


- Insert the battery connection cable supplied in the battery port.
- Ensure that it is fully connected.

- Close the lid, ensuring that the locking clips engage fully when securing the lid.

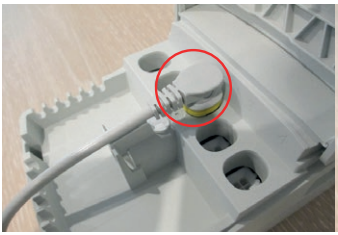
- Connect the battery to the application, ensuring that the locking clip is fully engaged.

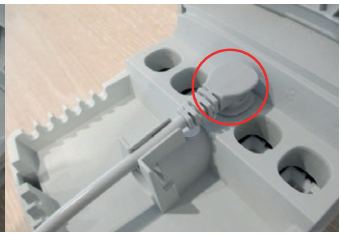
- Connect the battery to the application, ensuring that the locking clip is fully engaged.



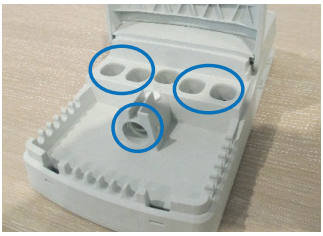
- Connect the control box to the battery, ensuring that the locking clip is fully engaged.

- If the clips are not engaged fully, the tab will be sticking out as indicated.

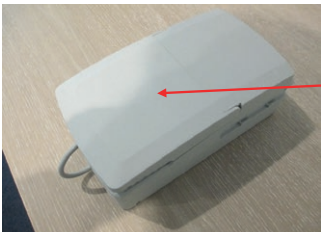




- Insert the battery connection cable into the battery port in the control box.
- Ensure that it is fully connected.



- Reconnect any actuator cables or hand control cables to the correct ports.



- Close the control box lid, ensuring that the locking clips fully engage.

- Reconnect the mains cable to the control box, ensuring that the locking clip engages.
- Turn on or reconnect the mains outlet.

Deep discharge protection

- The BA21 Li-Ion has a deep discharge protection to protect the battery life. The deep discharge protection is activated when the battery is discharged.
- Charge the battery to exit the deep discharge mode. Ensure that the battery is sufficiently charged before use.

If the battery is completely discharged, the charging will be started at a very small rate to protect the battery. In this case the yellow LED will be flashing. If the battery does not stop flashing and start charging normally within 12 hours (LED ON), the battery is defect and must be disposed according to disposal instructions.

If any and all of the lithium ion batteries built into LINAK products are found to be defective under warranty, LINAK will provide a new product to the OEM. 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 lithium ion cell and any use of LINAK products. Moreover, LINAK explicitly disclaims lost profits, 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.

Transportation

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

Recommendations:

- Charge the battery fully before first use.
- Adhere to the battery storage temperature or else the lifetime and performance will be reduced.
- Allow the battery to settle to room temperature before use or charging.
- Adhere to the duty cycle or else the lifetime and performance will be reduced.
- BA21 Li-Ion is neither intended for use in outdoor applications, pool environments nor other harsh environments.
- Recharge the battery before storage if it has been completely discharged.
- Unintentional use of the emergency button, for instance short activation and deactivation of the emergency button after operating the actuators, can lead to an error indication of remaining battery capacity. The battery capacity will however be shown correctly approx. 20 seconds after activation of the emergency button.
- Only charge with applicable LINAK control boxes.

Safety feature

BA21 Li-Ion contains several mechanisms to protect itself 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 has returned to normal operating range. Overheating may occur by extensive use at high temperature or by exceeding the 1/19 duty cycle.

BA21 safety

LINAK Li-Ion batteries for medical use are designed and manufactured to be safe through the product life. LINAK has performed various tests of the batteries in normal use, abuse and failure situations to verify the design and production methods. These tests have not shown any unacceptable risks.

The batteries are UL-tested to have an independent organisation verify the safety of the design and to obtain a safety certificate. This means that UL regularly inspects the factory to check that standards are complied with.

UL has tested in accordance with the following standards:

UN38.3 Battery Transportation Safety

IEC62133 Battery Safety

UL2054 Standard for Household and Commercial Batteries

Compatibility:

The BA21 has a built-in charger which means that it cannot operate with control boxes with charger, e.g. CB6 and similar. The BA21 is compatible with CA30, CA40, CA63, CO41, CO53, CO61, CO65 and CO71.

Warnings:

All Li-Ion battery users must read these important battery safety instructions before using Li-Ion batteries. Failure to read and follow Li-Ion safety instructions and warnings may lead to personal injury and equipment damage if the battery is charged and/or used improperly.

Lithium ion batteries differ from the lead acid technology as they have a built-in deep discharge protection.

- In case of continuous use despite warnings, a power loss might occur due to the battery deep discharge protection. In this event, there may be no warning and the application may not be able to move when expected.
- The application manufacturer must test the application and ensure that intentional and unintended operations do not exceed the battery specification limits. The risk analysis for the final application must allow for the ensurance of alternative means to make movement, for instance quick release or manual lowering.
- 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's manual for the medical device.
- Do not open, disassemble or modify the battery housing as cell or circuitry damage may develop excessive heat.
- Discontinue the battery use immediately if the battery emits an unusual smell, feels hot, changes colour or shape, shows signs of damage or corrosion or appears abnormal in any other way.
- In case the battery turns hot, disconnect and remove the battery from the room. If not possible to remove the battery, then evacuate the room.
- Defective or damaged lithium ion batteries or batteries that produce excessive heat or fire are not allowed for transportation.
- For safety reasons, please adhere to the indicated charging, storage, and operation temperature as extreme temperatures (low or high) might ignite the batteries and cause fire.
- The mounting instructions must be followed in order to avoid exposing batteries to water.
- The customer is responsible for determining that charger and host device work properly.
- Recharge batteries every 12 months at a minimum.
- Dispose of batteries in accordance with local regulations.

DO NOT:

- heat, burn or short circuit the batteries
- expose the batteries to high impact
- crush or puncture the batteries
- charge or store the batteries near combustible material
- charge the batteries without supervision
- expose the batteries to water or other liquids

Any of the above mentioned can cause fire or injury.

LINAK® will remedy defective Li-Ion batteries built into LINAK products in accordance with the terms stipulated in the LINAK Li-Ion battery disclaimer available on the LINAK website. LINAK explicitly disclaims all other remedies and liability.

5. CS16 (TECHLINE®)

The CS16 electronic limit switch is connected between the LINAK® actuator and a non-LINAK power supply, where it cuts out the current to the actuator in end position of if an obstacle is encountered. The PCB contains a variable current limit setting and is available in different versions, depending on the actuator with which it is to be used.

The CS16 should be connected between the linear actuator and the power supply, where it will switch off the power when the actuator reaches end position or if the actuator is overloaded.

As the CS16 are open PCB's, they have to be installed in an encapsulation to prevent damage. (LINAK® offers one type of encapsulation for CS16)**.**

Adjustment of CS16

The CS16 has a rotary potentiometer for adjusting the value of the cut-off current. To obtain the correct cut-off current, connect the CS16 and turn the potentiometer as far as it will go/anticlock wise to set the maximum cut-off current.

Then subject the actuator to the maximum load it will be exposed to in the application. At the same time turn the potentiometer clockwise, reducing the cut-off current, until the actuator stops (not in end position).

Then turn the potentiometer approx. quarter of a turn anti-clockwise and the system is ready for use.

As the CS16 is a open PCB's, it have to be installed in an encapsulation to prevent damage. (LINAK® offers one type of encapsulation).

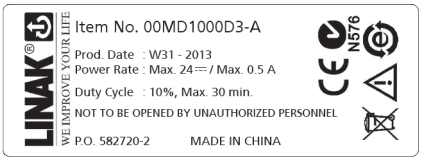
6. DJB (MEDLINE® CARELINE®)

The DIN Junction Box is designed for use where there is a need for more than 1 or 2 controls to be connected to a control box.
The DIN Junction Box is constructed for connection of up to 4 controls with 8-pin DIN plugs. Furthermore, the box is constructed so that all channels for connetion are placed on the same side of the box.
This gives the box a clean design and makes it easy to mount e.g. in a bed frame.

Usage:

- Compatibility: CB8, CB9, CB12, CBJ and OpenBus™ control boxes
- Operating 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
- Operational meters above sea level: Max. 3000 meters
- Latex free: Yes
- Approvals: IEC 60601-1
  ANSI/AAMI ES60601-1
  CSA CAN/CSA-C22.2 NO. 60601-1
  IEC 62366

7. Massage Motor Medical (MEDLINE® CARELINE®)



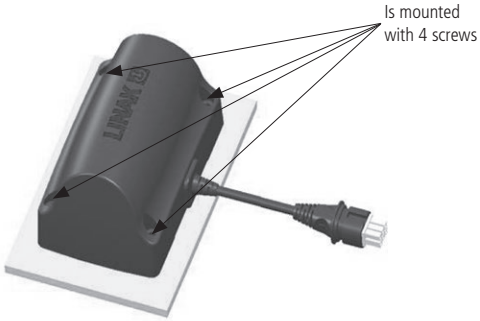
The massage motor can be added to all kinds of couches and tables, chairs or beds for treatment and examination. It enables comfort, relaxation and tension release for patients and clients. The massage motors are directly connected to the actuator port at the control box – no extra wiring at the application, simple and easy mounting.

Usage:

- Compatibility: CB6 OBMe, CB16 OBF, (CB20 pending) MJB006-0x to be used for OpenBus™ impulse drive
- Duty cycle: 10 %, 30 min. max.
- Operating 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: Medical approvals to be determined

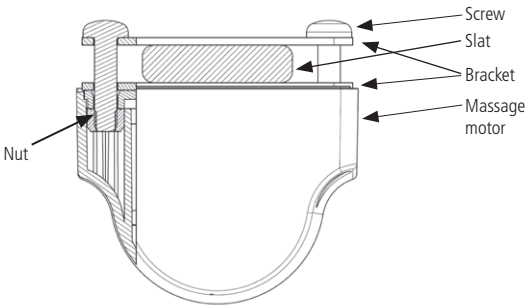
Mounting:

Massage motor on a plate



Mounting of the screw with max. torque 2 Nm

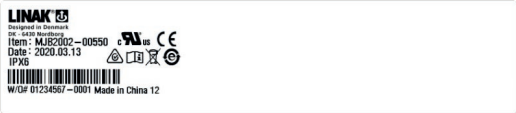
Mounting of massage motor by using brackets:



The massage unit is mounted with 4 x M6 roundheaded machine screws with flat underside. 15 to 20 mm long + the thickness of the bracket. Torque max. 2-3 Nm.

2 brackets must be used - one on each side of the slat.

8. MJB2 (MEDLINE® CARELINE®)



The MJB2 is a compact 2-port repeater designed for use together with analogue or OpenBus™ control boxes. It is optimised for use in systems where 1 extra port is needed for easy connection of a hand control, a foot switch or an accessory like the UBL. It is easy to integrate in a wide range of healthcare applications such as hospital beds, surgery tables, and treatment chairs.

Usage:

- Usage temperature: +5 °C to +40 °C
- Storage temperature: -10 °C to +50 °C
- Compatibility: Connection to LINAK OpenBus and analogue control boxes
- Relative humidity: 20% to 80% – not condensing
- Atmospheric pressure: 700 to 1060 hPa
- Latex free: Yes
- Approvals: IEC 60601-1
  ANSI/AAMI ES60601-1
  CAN/CSA-22.2 No 60601-1

Recommendations

- Always use locking mechanism and O-ring.
- Unused socket(s) must be fitted with blind plug(s) to ensure the IP degree.
- When mounting, a screw torque 0.8-0.9 Nm is recommended.
- Hot-plugging: removing or adding any OpenBus™ cables is not allowed when the control box is powered by mains supply.
  If still required, follow this procedure:
  1. Remove mains and wait for 5 seconds
  2. Connect or disconnect the required cables
  Non-observance of this procedure may lead to a damaged OpenBus driver curcuit.
  The risk of a damaged circuit increases, if the accessory shows a high starting current or inrush current.

Warnings

- Using a wrong type of MJB2, for instance 10 wires in an OpenBus system, can lead to unintended movement or no movement.
- Using wrong screws or the wrong torque can lead to cracks in the housing.
- The cable is not to be exposed to high pull force or sideway traction.

The modular junction box MJB5 Plus is designed for use together with OpenBus™ control boxes.
The MJB5 Plus makes it possible to connect multiple hand controls and attendant controls. It can even be used for charging or to connect the Under Bed Light and 3rd party products.

MJB5 Plus Port Repeater, version 000:
The MJB5 Plus version 000 is used where there is a need for more ports than available in the control box.
It is possible to connect multiple MJB5 Plus boxes obtaining unlimited extra connections to the control box.

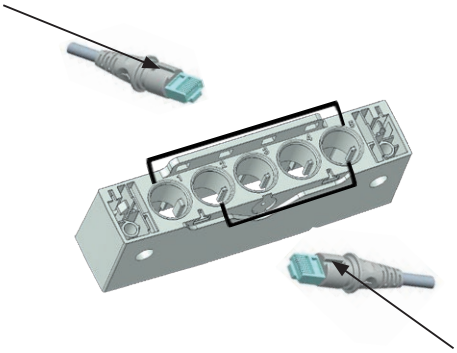
Usage:

• Compatibility:	All OpenBus products
• 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
• Operational meters above sea level:	Max. 3000 meters
• Latex free:	Yes
• Approvals:	IEC60601-1, IEC60601-1-6 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

MJB5 Plus Port Repeater usage:
Compatibility: All OpenBus products and CA control boxes.

Modular plug cable, narrow/wide alignment grooves:

Modular plug with wide alignment groove.
To be used with LINAK products.
Can be connected to all ports in the MJB5 Plus, both ports with narrow and wide alignment grooves.



Modular plug with narrow alignment groove.
To be used with 3rd party products.
Can only be connected to ports in the MJB5 Plus with narrow slit. This is to prevent 3rd party products to interfere with the OpenBus™ connections.

Unlocking of cable locking mechanism

If a cable needs to be replaced or added, we recommend to open the cable locking mechanism as described below and demonstrated in our video on LINAK.com - MJB5 Plus section brochures and manuals.

Video guide available on
www.linak.com

1. Insert a pin or screwdriver with a diameter of 3.5 to 4 mm.

2. Pull downwards until a click sound is heard. Repeat this for the other locking hole.

3. The cable mechanism is now unlocked.

Locking of cable mechanism

Video guide available on
www.linak.com

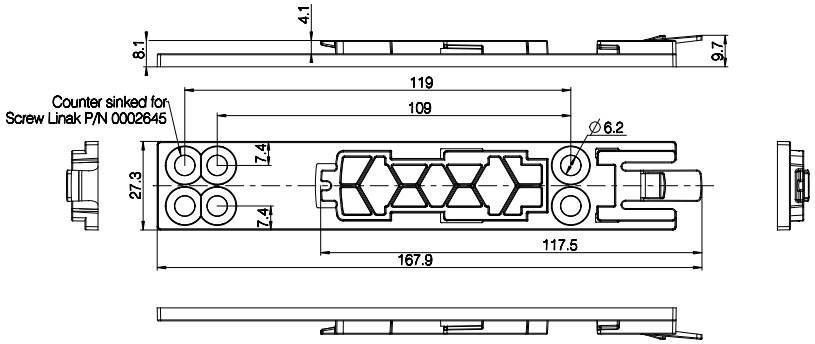
1. Align the locking mechanism with the MJB5 Plus.

2. Press the cable locking mechanism down until you hear a click sound.

3. Slide the mechanism forward until you hear another click sound.

4. MJB5 Plus with a locked cable mechanism.

Multi-flexible mounting bracket for MJB5 Plus - article no. 1015W1010-A



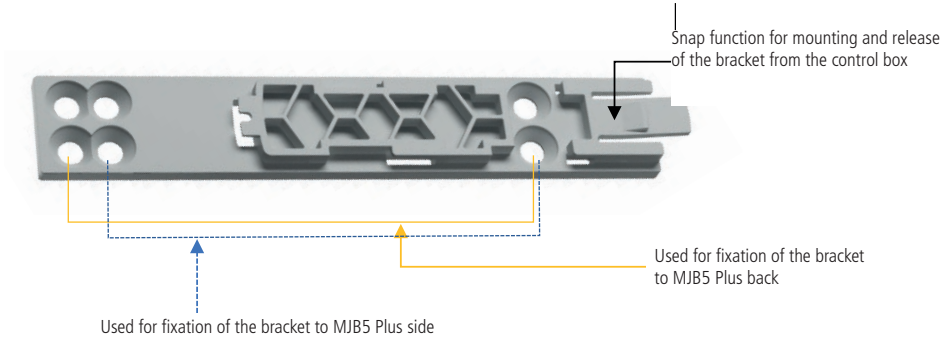
Drawing no.: 0835012

Mount the bracket on the side or the back of the MJB5 Plus.

If it is necessary to dismount the MJB5 Plus from the application, we recommend to use the bracket for mounting.

Use special screws type WN1423 K60x16, ordering no. 0002645.

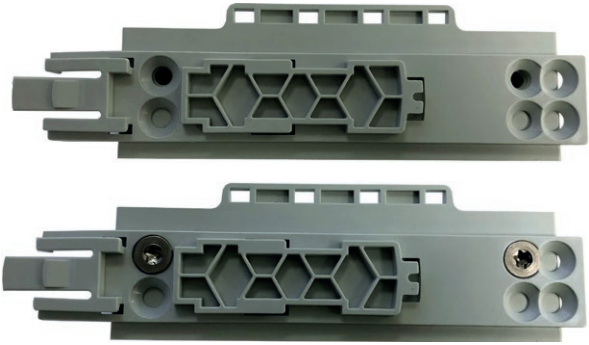
The screws must be mounted with a torque of maximum 1,0 Nm. The screw head will then be flush with the bracket.



The bracket is very flexible for mounting but we recommend one of the following fiixations.

Bracket fixation to the MJB5 Plus back:

Bracket fixation to the MJB5 Plus side:



The MJB5 Plus bracket is for mounting on the CO and CB OpenBus control boxes.

Mounting examples

MJB5 Plus with bracket mounted on the side.
MJB5 Plus mounted on the side of the control box.

MJB5 Plus with bracket mounted on the back.
MJB5 Plus mounted on the side of the control box.

Recommendations:

- The MJB must be mounted on an even surface
- The locking surface must be free of other material
- Always use locking mechanism and O-ring
- Sockets not used must be fitted with blind plugs to ensure the IP degree
- HOT PLUGGING
  Removing or adding any OpenBus cables are not allowed when the control box is powered by mains supply!
  If needed anyway follow the below procedure:
  1. Remove mains and wait 5 sec.
  2. Mount or dismount the required cables
  If this procedure is NOT followed it may result in a damaged OpenBus driver circuit.
  The risk of a damaged circuit increases if the accessory has a high start current (in rush current).
- When using USB cable (0834000) or modular plug cable (0964399) with open end, it is up to the customer to maintain the IP degree.
- Do not use 2 MJB5 Plus variants with same device ID on the OpenBus™.
  This will cause conflicts and the SDT is not able to identify the different products attached.
- Before the final functional test in the production, is it important that the system is re-powered. This is to make sure that all items have been detected on the OpenBus.
- We recommend that the end user makes a regular test procedure, in order to prevent failures and hazardous situations on the system, e.g. squeezed cables. The MJB5 Plus is not able to detect defective 3rd party products.
- LINAK only takes responsibility for LINAK products, not 3rd party products.
  Please pay attention to the "Patient Environment" Clause 3.79 - IEC60601-1.
- There can be a risk of conflict with other OpenBus accessories, such as HB, etc. it is therefore recommended to make a system/bit overview.
- When connecting 3rd party products to LINAK systems, the customer must take necessary precautions against Electrostatic Discharge (ESD). Exposure to harmful ESD must be avoided.
- 3rd party products must be designed with the following isolation:
  Minimum 1 MOPP (creepage distance/clearance according to IEC 60601-1).

The modular junction box MJB5 Plus is designed for use together with OpenBus™ control boxes.

The MJB5 Plus makes it possible to connect multiple hand controls and attendant controls. It can even be used for charging or to connect the Under Bed Light and 3rd party products.

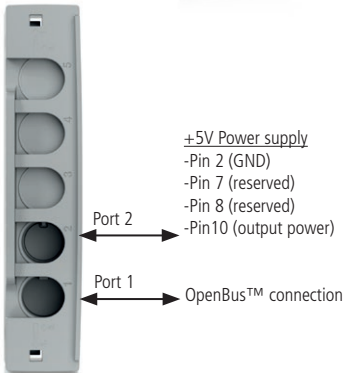
MJB5 Plus with Switch Mode Power Supply (SMPS)
5V SMPS, version 502-010.
The SMPS is to be used where there is a need for power supply near the bed. For example, to charge electronical devices.

It is also possible to connect a bedside lamp from our 3rd party supplier. This will be connected directly to the MJB5 Plus port 2 via a modular plug. The SMPS indicates with an LED on the hand control whether the power supply is switched on or off.

Usage:

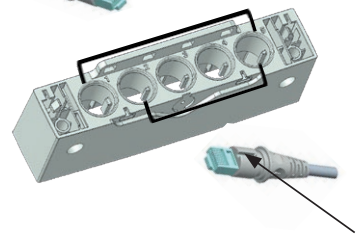
• Compatibility:	All OpenBus products
• Operation temperature:	+5 °C to +40 °C
• Storage temperature:	-10 °C to + 50 °C
• Relative humidity:	20% to 80% non-condensing
• Atmospheric pressure:	700 to 1060 hPa
• Operational meters above sea level:	Max. 3000 meters
• Latex free:	Yes
• Approvals:	IEC60601-1, IEC60601-1-6 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

Standard functionality:
Port 1 is to be connected to the OpenBus control box.
The electronic device must be connected to PORT 2. The power on port 2 can be switched on/off via the patient control (key 1) or the attendant control (key 2), the status is indicated on the OpenBus. Switching on/off the power supply is useful, for instance when the SMPS is used together with a bedside lamp. If an error occurs, this is indicated on the OpenBus. As standard, it is switched off.



Modular plug cable, narrow/wide alignment grooves:

Modular plug with wide alignment groove.
To be used with LINAK products.
Can be connected to all ports in the MJB5 Plus, both ports with narrow and wide alignment grooves.



Modular plug with narrow alignment groove.
To be used with 3rd party products.
Can only be connected to ports in the MJB5 Plus with narrow slit. This is to prevent 3rd party products to interfere with the OpenBus™ connections.

Unlocking of cable locking mechanism

If a cable needs to be replaced or added, we recommend to open the cable locking mechanism as described below and demonstrated in our video on LINAK.com - MJB5 Plus section brochures and manuals.

Video guide available on
www.linak.com

1. Insert a pin or screwdriver with a diameter of 3.5 to 4 mm.

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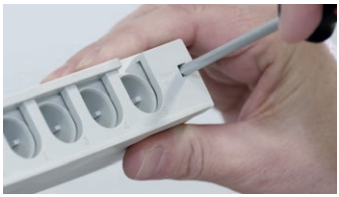
3. The cable mechanism is now unlocked.

Locking of cable mechanism



Video guide available on
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1. Align the locking mechanism with the MJB5 Plus.

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