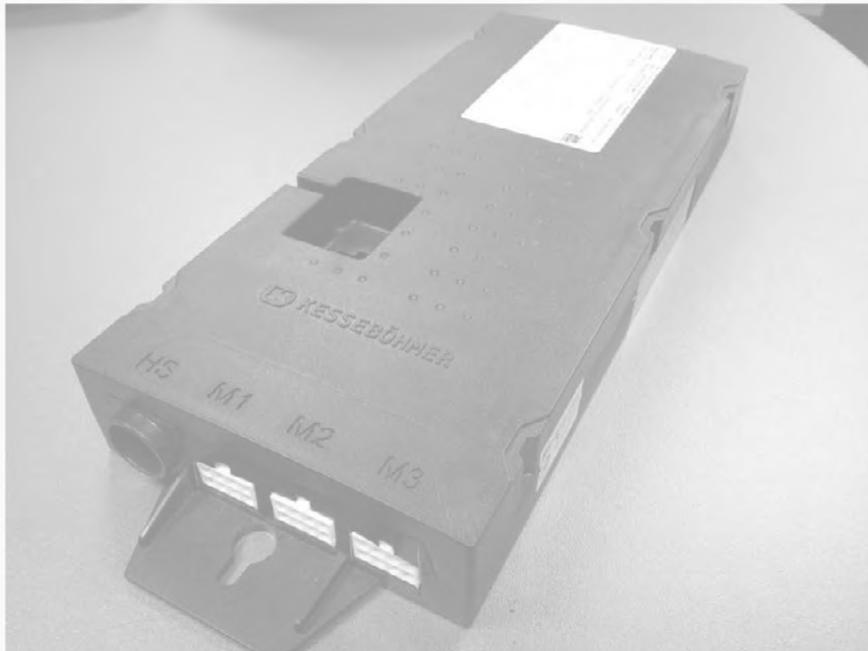


INSTALLATION GUIDE
Electric Height Adjustment

April 1, 2017

TUOHY

Control unit for
an Electric
Height-Adjustable
Desk



liECO+

Firmware-Version 1.1
Document Rev0

 **KESSEBÖHMER**

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1 Preface

Dear Customer,

Thank you for choosing a **liECO+** control unit for electric height-adjustable desks from **Kesseböhmer Ergonomietechnik**. You are now in possession of a state-of-the-art product that complies with all the relevant safety requirements.

1.1 *Intended Use*

liECO+ control units may only be used for the intended purpose, i.e. to control electric height-adjustable desks. Only motors that meet Kesseböhmer Ergonomietechnik's specifications (e.g. duty cycle, current consumption) may be used to drive the lifting devices. The control units must be installed, put into operation and their function checked by qualified personnel. Using them to control other motors or installing them in products other than electric height-adjustable desks is only permissible with the prior written consent of Kesseböhmer Ergonomietechnik. Their basic function is upward and downward adjustment of the desktop, which can be controlled with all the handswitches available.

1.2 *liECO+ control unit functionality*

The liECO+ control units incorporate the following features (the availability of some of the features depends on the handswitch used):

- Control unit with 3 motor channels
- High efficient switch mode power supply (SMPS)
- Low standby power consumption, low field emission
- Control units with US and EU input voltage available
- Up to 2 motor groups
- Electronic collision protection
- Virtual End-switches
- Safety area
- Low speed area
- Plug detection and automatic detection of the number of connected drives (depending on used actuators)
- Configurable reset conditions
- DATA-connector for sensors and cascading
- Additional functions are available, depending on the handswitch model used (e.g. saving desktop positions, adjusting the desktop to saved positions, etc.)
- A wide selection of handswitches is available for the control units

1.3 Target group and previous knowledge

This user manual addresses the following people:

- Technicians who assemble and put electric height-adjustable desks into operation (by installing motors and control units, configuring control units, etc.)
- Furniture assembly, service and maintenance personnel who put electric height-adjustable desks into operation in showrooms or at the customer's

The following is required for installing, operating and configuring electric height-adjustable desks with liECO+ control units:



- Basic mechanical and electrical skills (with suitable qualifications)
- Reading the user manual

1.4 Symbols used in safety instructions

This user manual contains safety instructions with symbols drawing your attention to possible dangers and residual risks. They indicate the following:



Danger: this warning symbol advises you of imminent danger to people's lives and health.

Failure to observe this warning may result in health problems, serious injuries and damage to property.



Caution: this warning advises you of **possible dangers from electric current**.

Failure to observe this warning may cause injuries and damage to property.



Note: this symbol advises you of important information that must be noted for operating the liECO+ control unit safely.



Danger: this warning advises you of a possible risk of body parts being trapped or pinched in exceptional cases.

Failure to observe this warning may result in health problems, serious injuries and damage to property.



Note: You must read the user manual.

1.5 Package contents

The liECO+ control unit is supplied together with the following components as standard:

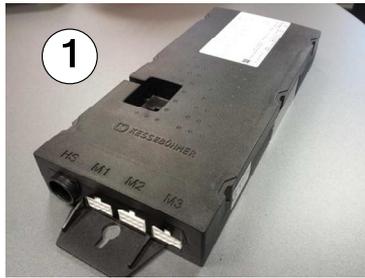


Figure 1: Package contents

- ① liECO+ control unit



Note: power cords can be ordered separately.

1.6 Unpacking

The liECO+ control unit comes packed in a cardboard box. To unpack, proceed as follows:

1. Remove the cardboard and plastic film from the control unit components.
2. Check the package contents.
3. Dispose of the packaging materials.
4. Keep the user manual at hand for the operators.



Note: ensure eco-friendly disposal of the packaging materials (separate the plastic parts and cardboard for collection).

1.7 Safety instructions

This user manual contains safety instructions that draw your attention to any possible risks, thus enabling safe operation of the liECO+ control unit. Please observe these warnings and instructions at all times.

In this section you will find general safety instructions that do not refer to any particular steps or procedures. You will find the work-specific safety instructions in the relevant section of the manual. Additional warnings are given on the liECO+ control unit itself.

1.7.1 General safety instructions



Note: you must read the user manual carefully before installing or operating the liECO+ control unit.



Caution: do not open the liECO+ control unit under any circumstances. There is a danger of electric shock.



Caution: the liECO+ control unit is not designed for continuous operation. Changing the desktop position without interruption must not exceed the duty cycle indicated on the nameplate.



Caution: the liECO+ control unit may only be operated with mains voltage as specified on the type plate.

liECO+ control units are also available for the mains voltages used in other countries. Detailed information is provided in the corresponding datasheet!



Caution: only use a Kesseböhmer Ergonomietechnik power cord. Check that it is not damaged. Do not ever operate the liECO+ control unit if the power cord is damaged.



Danger: it is not allowed to connect self-constructed products to Kesseböhmer Ergonomietechnik motor controls. To prevent damage of the unit, use only components suitable for Kesseböhmer Ergonomietechnik motor controls.



Caution: before connecting and disconnecting handswitches, you must unplug the power cord.



Danger: in the event of a malfunction (e.g. if the control unit keeps adjusting the desk because a movement key has jammed), please unplug the unit immediately.



Danger: do not expose the liECO+ control unit to moisture, drips or splashes.



Danger: when changing the desktop position (especially without using pinch protection), there is a risk of pinching. You must therefore ensure that no people or objects are located in the hazardous area or can reach into it.



Danger: when changing the desktop position, there may in exceptional cases be a risk of pinching in spite of the safety features. You must therefore always ensure that no people or objects are located in the hazardous area or reach into it.



Danger: do not modify or make any changes to the control unit, the controls themselves or handswitches.



Danger: do not operate the liECO+ control unit in a potentially explosive atmosphere.



Danger: in the event of a fault (motor or component), whenever the desktop attempts to adjust the height it may move slightly before the safety cut-out is triggered. Please note that there is a potential risk of pinching in this case.



Danger: the electronic collision protection is not enabled during all resets (see chapter 4.2.4). Please note that there is a potential risk of pinching in this case.



Danger: this device is not intended for use by individuals (including children) with limited physical, sensory or mental abilities or with a lack of experience and/or lack of expertise, unless they are supervised by a person responsible for their safety or have received instructions from that person on how to use the control unit.



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



Danger: children must be supervised at all times to ensure that they do not play with the control unit.



Danger: children shall not play with the appliance.



Caution: if the control unit's power cord is damaged, it must be replaced by the manufacturer or customer service or similarly qualified person in order to prevent any risks.



Caution: only clean the liECO+ control unit with a dry or slightly moist cloth. Before cleaning, you must always unplug the power cord.



Danger: cleaning and user maintenance shall not be made by children without supervision.

1.7.2 Important notes for OEMs

What we mean by OEMs are companies that purchase liECO+ control units from Kesseböhmer Ergonomietechnik and install them in their own products (e.g. electric height-adjustable desks).



Note: for reasons of EU conformity and product safety, we advise you to provide users of your products with a manual in the relevant EU language.



Note: when you ship your finished products, enclose a user manual containing all the safety instructions that consumers need to handle your product safely.



Note: the user manual for your finished product must contain the following note: you must read the user manual before you operate the product (electric height-adjustable desk).

Advise your customers that the user manual must be kept at hand in close proximity to the product (electric height-adjustable desk).



Danger: conduct a risk analysis of your product (electric height-adjustable desk) so that you can respond to any potential residual risks (e.g. by changing design features or adding notes to the user manual and/or placing warnings on your product).



Note: ensure that no unauthorized individuals (e.g. small children, people under the influence of drugs, etc.) can tamper with your product or the control unit.

1.7.3 Important note for service



Danger: only use original accessories. Parts may only be replaced by qualified service technicians, otherwise the warranty/guarantee shall be null and void.



Danger: in the event of a fault, please contact customer service immediately. Only original spare parts may be used for repairing the control units. Parts may only be replaced by qualified service technicians, otherwise the warranty/guarantee shall be null and void.

2 liECO+ installation instructions

Mount the liECO+ control unit on the underside of the desktop. You will need the following tools for mounting:

- Cross-tip screwdriver
- Pencil
- Drill (for drilling holes)



Caution: the power cord must be unplugged while the liECO+ control unit is being mounted.



Caution: When installing the liECO+ and putting it into operation, be sure that the liECO+ is acclimatized to the temperature and humidity values for operation, shown in the datasheet!

To mount the liECO+ control unit, proceed as follows:



Note: we recommend using the drill template to help with mounting. You will find the template in section 0. If you do not wish to use it, please follow the mounting instructions carefully.

1. Position the control unit where you want it under the desktop.
2. Mark the drill holes with a pencil.

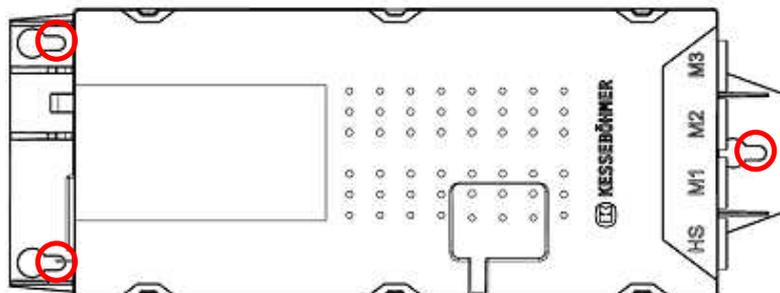


Figure 2: Installation step 2

3. Pre-drill these three holes.
4. Screw the screws halfway into the 3 holes
5. Mount the control unit with the 3 screws. The screw heads fit to the bigger diameters of the mounting holes.
6. Slide the control unit to the body stop of the 3 holes with the smaller diameter (see Figure 2)
7. Tighten the screws properly.



Note: Kesseböhmer Ergonomietechnik recommends lens head screws DIN7981C 4,8xL with a lens head diameter of 9,5mm. The length L of the screw should fit to the used desktop. The tightening torque depends on the wood, but 2Nm shall not be exceeded.

3 Commissioning

Commissioning involves the procedures required to ensure that the height of an electric height-adjustable desk can be adjusted with the liECO+ control unit. Requirements for commissioning:

- The liECO+ control unit must be mounted (as described in section 2)
- The table legs for adjusting the desktop must be mounted



Danger: only qualified technicians may commission the control unit. Qualified technicians have the necessary electrical engineering training and are familiar with this user manual.



Caution: When installing the liECO+ and putting it into operation, be sure that the liECO+ is acclimatized to the temperature and humidity values for operation, shown in the datasheet!

3.1 liECO+ sockets

The liECO+ control unit (it can drive up to three motors) has the following sockets:

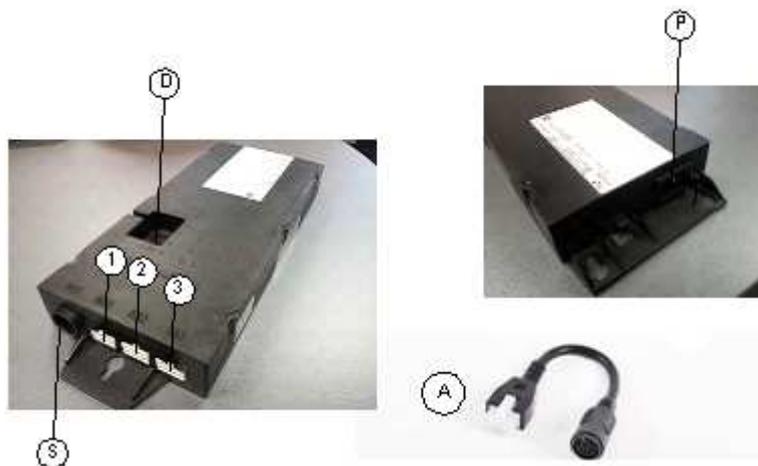


Figure 3: Sockets

- ① Motor socket 1 (M1)
- ② Motor socket 2 (M2)
- ③ Motor socket 3 (M3)
- S Handswitch socket (HS)
- P Mains socket
- D LogicConnector DATA for sensors, squeeze lines and cascading
- A Adapter cable LOG-CBL-ADAP-DIN-MOLEX for motors with DIN-connectors (optional)



Note: if your motors are equipped with connectors of the type DIN 41524 (8-pin with 262° angled pin alignment) and if your control box has MOLEX motor sockets, you need for each motor the adapter cable LOG-CBL-ADAP-DIN-MOLEX (shown with the letter A in Figure 3)



Caution: Use 3-pole mains cables only!

3.2 Commissioning procedure



Caution: the power cord must be unplugged while the liECO+ control unit is being commissioned.

To commission a liECO+ control unit, proceed as follows.

3.2.1 Connect drives

Plug the motor cables into the relevant 8-pin motor sockets (M1, M2, and M3).



Note: when connecting the motor cables, you must check the parameters of the control unit.



Danger: during commissioning a system with single-end-limit switches (connection of upper and lower signal limit switches in series) or when changing a motor on such a system, the motors must not be extended to their highest position. (upper limit switch active)

3.2.2 Connect handswitch

Plug the handswitch into the 7-pin socket (HS).



Note: you can choose from a wide range of handswitches for the liECO+ control unit. Information about available handswitches can be found in the latest product catalogue and on the website www.kesseboehmer-ergonomietechnik.com.

3.2.3 Connect optional components

If your control unit has an **earthing cable lug**, attach a cable to a metal part of the desk.

The DATA-Connector is activated in the liECO+, therefore you can connect accessories like sensors.



Danger: when components like sensors shall be disconnected from the DATA-connector, be sure to unlock the 8pin connector on the cable properly! There is a fixing hook on this connector which must be pressed.

3.2.4 Connect mains supply



Caution: before you plug in the power cord, check the following again:

- The mains supply voltage must be as specified on the type plate
- All the components must be plugged into the right sockets
- The earthing cable must be connected if necessary

When the power cord is plugged in, the liECO+ control unit is operational.

3.2.5 System configuration (example)

The figure below shows the socket assignment for a configuration example. This configuration consists of:

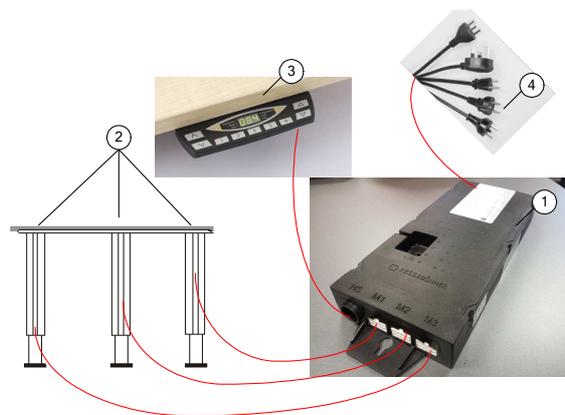


Figure 4: Configuration example

- ① 1 liECO+ control unit
- ② 3 motors (hidden in the table legs)
- ③ 1 handswitch
- ④ 1 mains cable 3-pole

3.2.6 Reset at first use

You need to do a reset at the first use to be able to commission the product.

The reset function is synchronizing all columns to the same level to ensure that the desktop will be adjusted in parallel to the ground level and the standard configured control box is storing all connected components, like drives and connected sensors, in that mode.

As soon as the reset has been completed, all changes in configuration will be detected and interpreted as a failure. The system will not be adjustable anymore as long as the stored condition will be recovered.



Danger: during the reset, the pinch protection function is not active. You must therefore ensure that no people or objects are located in the hazardous area or can reach into it.

In the case that external or leg integrated sensors (e.g. inside the BN-Drive) have been connected, you will have to wait for at least 5 seconds after finalizing the reset (without any keypress) to allow the control box to detect and activate these sensors. You will hear a double-click noise after success.



Danger: if the automatic detection won't be completed, the sensors will be inactive.

The reset procedure is described in chapter 4.2.4.

4 Operating the liECO+ control unit

To ensure safe operation of the liECO+ control unit, please observe the following safety instructions:



Caution: keep children away from electric height-adjustable desks, control units and handswitches. There is risk of injury and electric shock.



Caution: unplug the power cord during a thunderstorm or if you do not intend to use the desk for a longer period. The control unit might otherwise be damaged by power surges.

4.1 Basic functions



Note: the liECO+ control unit offers an extensive range of functions. The availability of some functions depends however on the handswitch used.

This section describes the basic functions available with every handswitch designed for use with liECO+ control units.



Note: the 2 basic functions upward and downward movement are available for both motor groups separately. Please read the manual of the used handswitch to see which buttons are linked to which motor group!

4.1.1 Upward desktop movement

This function enables you to adjust the desktop upwards. To change its position, proceed as follows:



Press the **desktop up** key.

Keep pressing the key until the required desktop height is reached.



Note: the desktop will continue moving upwards until you release the key or the maximum height is reached.

4.1.2 Downward desktop movement

This function enables you to adjust the desktop downwards. To change its position, proceed as follows:



Press the **desktop down** key.

Keep pressing the key until the required desktop height is reached.



Note: the desktop will continue moving downwards until you release the key or the minimum height is reached.

4.2 Advanced functions



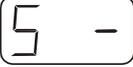
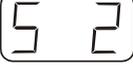
Note: you can only use the following functions of the liECO+ control unit if you have a handswitch with memory position keys and a S key.

4.2.1 Saving a desktop position

This function allows you to save a defined desktop height. One desktop height can be saved per memory position key. To save a position, proceed as follows:



Note: if you are switching on the liECO+ control unit for the first time, all the saved positions are set to the lowest desktop height (minimum desktop position).

1.  Adjust the desktop to the position you want to save.
 The display will show the desktop height (e.g. 73cm).
2.  Press the **S** key.
 The display will read **S -**.
3.  Press the required **memory position key** (e.g. 2).
 The display will read **S 2**.
4. The set desktop position will now be saved to the selected memory position key.
 You will hear an audible double click and after about 2 seconds the saved desktop position will be displayed.



Note: using saved desktop positions is only available for handswitches with memory keys. The design of the memory keys varies, depending on the handswitch model used.



Note: it is software parameter dependent which motor group can save/recall memory positions. If both motor groups are capable of saving memory positions, the current position of both groups will be stored (even if they are different). When recalling a stored position in this case, both groups start their movement at the same time, even if their movement direction is different.

4.2.2 Adjusting the desktop to a saved position

You can use this function to adjust the desktop to a saved height. To change to a saved position, proceed as follows:



Note: availability of the double click function depends on the software configuration of the control unit.

Option A (without double click function)

1.  Press the required **memory position key** (e.g. 2) and hold it down.

The desktop will move until it reaches the saved position. If you release the key before the saved position is reached, the desktop will stop and the saved desktop position will not be reached.

2. The desktop has reached the saved position. Now release the memory position key.



The display will read the current (saved) desktop position.

Option B (with double click function)

1.  Double click the required **memory position key** (e.g. 2).

2. After the double click, the desktop will automatically adjust to the saved position.



The display will show the current (saved) desktop position.



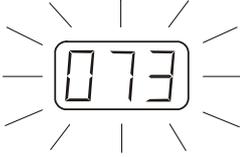
Danger: when you change the desktop position automatically (especially without using pinch protection), there is a higher risk of pinching. You must therefore ensure that no people or objects are located in the hazardous area or reach into it.



Note: if you press another key while the desktop is changing automatically to a saved position, it will stop immediately. You then have to reactivate automatic desktop adjustment to a preset position.

4.2.3 Changing the desktop height displayed

This function enables you to change the height shown on the display, but not the actual position of the desktop. Proceed as follows:

1.  Press the **S** key.
 The display will read **S -**.
2.  Press the **desktop down key** (down arrow) for approx. 5 seconds.
 The display will start flashing.
3.   Adjust the height displayed by pressing the **desktop down key** (down arrow) or **desktop up key** (up arrow).
4.  Press the **S** key.
 The height display is now set to the new desktop position entered.



Note: this procedure does not alter the actual position of the desktop. It only changes the height displayed.



Note: this function is only available for handswitches with integrated display.



Note: this function is available for both motor groups separately. Please read the manual of the used handswitch to see which buttons are linked to which motor group!

4.2.4 Manual Reset

When the actual desktop position no longer corresponds to the height displayed or you wish to use a configured control unit on another identical electric height-adjustable desk, you have to reset the actuators.



Note: depending on the actuator type, the reset is done to the lowest position or towards the central stroke position.



Danger: the electronic collision protection is not enabled during all resets. Please note that there is a potential risk of pinching in this case.



Note: if the error code **E72** is shown on the handswitch display and the control box clicks three times, the reset is not finished successfully. Before you can retry the reset, the control box needs to be disconnected from mains. Re-connect it to mains after at least 5 seconds.

To reset the **first motor group**, proceed as follows:

1.  Press the **S key** for more than 5 seconds, if you have a handswitch with memory function.

resp.



Press the **desktop down and desktop up simultaneously** for 5 seconds if you have a handswitch without memory function.

Thus you start the reset mode of the control unit.

2.  Press the **S key**, if you have a handswitch with memory function. Keep the button pressed until the desktop reaches its reset position.

resp.



Press the **desktop down and desktop up simultaneously** if you have a handswitch without memory function. Keep the buttons pressed until the desktop reaches its reset position.

3. Release the button(s). The electric height-adjustable desk can now be used again normally.



Note: this function is only available for motor group 1!



Note: during step 2 of the procedure above, the shown key (combination) must stay pressed the whole regardless of the movement direction of the table during the reset.

To reset the **second motor group**, proceed as follows.

1.  Press the **desktop down key of the second motor group**.
Keep pressing it until the desktop has reached the lowest position (programmed desktop position).

2.  Press the **desktop down key of the second motor group** again and keep pressing it.

After about 5 seconds, the desktop will slowly move further until it reaches the reset position.

3. Release the **desktop down key of the second motor group**. The electric height-adjustable desk can now be used again normally.



Note: you can reset the first motor group too as shown above. Therefore, use the **desktop down button of the first motor group**.

Please read the manual of the used handswitch to see which buttons are linked to which motor group!



Note: when the **commissioning of the control unit** is done, the second motor group can only be reset if the first motor group is already reset!



Note: during step 2 of the procedure above, the shown key (combination) must stay pressed the whole regardless of the movement direction of the table during the reset.

4.3 Software dependent functions



Note: prior to shipping, the liECO+ control unit is parameterized with the software. The following functions are only available if the control unit has been configured accordingly.

4.3.1 Slow speed ranges

This function (low speed area) automatically slows down the desktop during adjustment before it reaches the following positions:

- Highest and lowest desktop positions
- All saved positions (for example: memory-positions, container-stop-position)

4.3.2 Safety area

This function triggers a safety stop at a defined desktop position (configured with the software). The safety stop functions as follows:

1.  Press the **desktop down key** (and hold it down). The desktop will move to the start of the safety area.
2. The desktop movement will stop just before the safety area.
3.  Press the **desktop down key** again. The desktop will then move to the lowest position.



Note: you cannot save desktop positions in safety areas.



Note: this function is available for both motor groups separately. Please read the manual of the used handswitch to see which buttons are linked to which motor group!

4.3.3 Container- and Shelf-Stop positions

These 2 features can be used to limit the movement area of the desktop (e.g. if a container is placed underneath the desktop). A container stop position can be defined in the lower half of the movement area, a shelf stop position in the upper half. If a container stop position is set, this position will be the lower limit position. If a shelf stop position is set, this position will be the new upper limit position. To **store** a container stop / shelf stop position, go on as shown below:

1.  or  Move the desktop to the position where the container stop/ shelf stop position shall be stored. Do so by pressing the **desktop down** or **desktop up key** until you reach the desired position.

Note:

A container stop position can only be stored in the lower half of the movement area and a shelf stop in the upper half.

2.  resp.  and  Press the **S key** if you have a handswitch with memory function. Press the **desktop down and desktop up simultaneously** if you have a handswitch without memory function.



On the display (handswitch with memory function) **S -** will be displayed.

3.  Press **desktop up** within 5 seconds and keep it pressed for 5 seconds. The liECO+ will click **twice** when the container stop/ shelf stop position is stored.

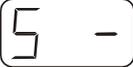


Note: These steps have to be done for a container stop and a shelf stop position separately!

To **deactivate** the container stop/ shelf stop position go on as shown below:

1.  or  Move the desktop to any position in the lower half to deactivate the container stop. / Move the desktop to any position in the upper half to deactivate the shelf stop.
Do so by pressing the **desktop down** or **desktop up** key until you reach the desired position.

2.  resp.  and  Press the **S key** if you have a handswitch with memory function. Press the **desktop down and desktop up simultaneously** if you have a handswitch without memory function.

3.  On the display (handswitch with memory function) **S –** will be displayed.

3.  Press **desktop down** within 5 seconds, keep it pressed for at least 5 seconds and release it. The button must not be pressed longer than 10s. The liECO+ will click **once** when the container stop/ shelf stop position is deactivated.



Note: These steps have to be done for a container stop and a shelf stop position separately!



Note: this function is only available for motor group 1!

4.3.4 Plug detection

The liECO+ control unit can detect whether a motor is plugged into the relevant motor socket. In addition, the control unit detects whether a motor has been replaced (the availability of this function depends on the type of the control and the used motors). If a motor is missing or if it is replaced, the liECO+ will click three times. Additionally the corresponding error code will be displayed if the handswitch is equipped with a display (For the error code list, see chapter 7.2). To rectify the error, proceed as follows:

1. **Possible situations:**
 - A motor is disconnected from the liECO+ when the control box is connected to mains.



The error code **E36, E37 or E38** is shown on the display, depending on the disconnected motor.

2. Disconnect the mains supply of the liECO+ and wait at least 5 seconds.
3. Re-connect the missing motor.
4. Connect the mains supply of the liECO+ again.
5. Make a **manual reset** (see chapter 4.2.4).



Note: the availability of the plug detection feature is depending on the motor group settings in the software parameters of the liECO+ and on the used motors. Please contact Kesseböhmer Ergonomietechnik for further information!

4.3.5 Auto Detect Number of Drives

The liECO+ is able to auto-detect the number of drives, this enables you to decide during the commissioning process of the electric height-adjustable desk if for instance a 2 leg desk or a 3 leg desk shall be controlled without changing the parameters. To operate the liECO+ after changing the motor group configuration again, proceed as follows:

1. **Possible situations:**
 - Commissioning/first usage of liECO+
 - After a reset to factory settings (S0 menu)



The error code **E70** is shown on the display.

2. Disconnect the mains supply of the liECO+ and wait at least 5 seconds.
3. Connect the desired number of motors to the liECO+.
4. Connect the mains supply of the liECO+ again.
5. Make a **manual reset** (see chapter 4.2.4).



Note: the availability of the auto-detection feature is depending on the motor group settings in the software parameters of the liECO+ and on the used motors. Please contact Kesseböhmer Ergonomietechnik for further information!

4.3.6 Duty cycle monitoring

Duty cycle monitoring means that when the control unit has been operating for a defined period, it is switched off for a set time (e.g. after 2 minute of continuous operation, the control unit is automatically disabled for the next 18 minutes – the current stroke can always be finished).

4.3.7 Change the displayed desktop position (cm or inch)

With this function it is possible to change the displayed desktop position from centimeters to inches or the other way around. The desktop position itself is not affected by this function.

- 


 Press the keys **memory position 1, 2** and the **desktop up key** at the same time. Keep the key combination pressed for about 10 seconds. Then release the keys.



The display will show **S and a number**, e.g. **S 7**.

- 
 Press the **desktop up key** until the display reads S 5.



The display will show **S 5**.

- 
 Press the **S key**.

If the display was set to centimeters, it will be changed to inches now.

If the display was set to inches, it will be changed to centimeters now.



Note: the menu timeout is 5 seconds, this means that the menu will close automatically without storing new settings if the user does not press a key for 5 seconds.



Note: after starting the menu, the display will read **S and any number**, for instance **S 7**. The number depends on the parameters of the control unit.

4.3.8 Reset control unit to factory settings

With this function you can reset the control unit to its factory settings.

- 


 Press the keys **memory position 1, 2** and the **desktop up key** at the same time. Keep the key combination pressed for about 10 seconds. Then release the keys.



The display will show **S and a number**, e.g. **S 5**.

- 
 Press the **desktop up key** until the display reads S 0.



The display will show **S 0**.

- 
 Press the **S key**.

The control unit will be reset to its factory settings. The control unit is now in the same state as it is when the commissioning is done.



Note: the menu timeout is 5 seconds, this means that the menu will close automatically without storing new settings if the user does not press a key for 5 seconds.



Note: after starting the menu, the display will read **S and any number**, for instance **S 5**. The number depends on the parameters of the control unit.



Danger: if one or more motors are changed in a system, the control box must be reset to factory settings and a manual reset has to be performed!

5 Collision protection

5.1 *Electronic collision protection*

The electronic collision protection is a protection system developed to state-of-the-art. It also substantially reduces the risk of fingers being trapped or pinched.



Danger: in spite of the electronic collision protection being in place, there may still be a risk of pinching in exceptional cases, as it is not only the control unit, but also the interaction between the mechanical and electronic systems that is responsible for cutting out the motor. In addition, the mechanical components, motor and ambient conditions all affect cut-out sensitivity.

Kesseböhmer Ergonomietechnik cannot therefore eliminate this residual risk completely or accept any liability.



Note: the sensitivity and the cutoff value of the electronic collision protection depend on the whole system (mechanical and electrical components). To evaluate the capability of a height adjustable table, please contact Kesseböhmer Ergonomietechnik!



Note: without a mechanical brake, cut-out sensitivity may be reduced under load. However, if there is no load on the desktop, the electronic collision protection will function properly even without a brake.



Note: as soon as the electronic collision protection has stopped the electric height-adjustable desk from moving, you can then only adjust the desktop in the opposite direction (the safety feature initially prevents you from adjusting the desk in the same direction as triggered it).

5.2 Squeeze lines

A squeeze line can be mounted on the electric height-adjustable desk. When the desk moves and the squeeze line is touched by an obstacle (e.g. a user or an object), the control box stops the movement immediately and performs a Drive-Back into the opposite direction.



Note: the movement direction that shall be monitored by the squeeze line can be chosen by parameters.



Danger: to ensure proper functionality of the squeeze line, it must be installed by qualified technicians only!



Danger: the squeeze line is equipped with a wire break monitoring. Therefore, do not disconnect a squeeze line when operating a liECO+ control unit!



Danger: in spite of collision protection sensors being in place, there may still be a risk of pinching in exceptional cases, as it is not only the control unit, but also the interaction between the mechanical and electronic systems that is responsible for cutting out the motor. In addition, the mechanical components, motor and ambient conditions all affect cut-out sensitivity.

As the control unit manufacturer, Kesseböhmer Ergonomietechnik cannot therefore eliminate this residual risk completely or accept any liability.

Squeeze lines are connected to the Kesseböhmer Ergonomietechnik as shown below:

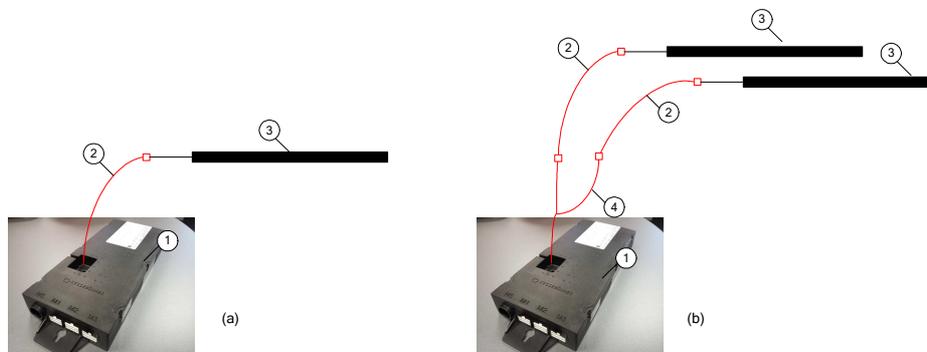


Figure 5: connection of (a) one squeeze line and (b) two squeeze lines

- ① Control unit liECO+
- ② Adapter cable MOLEX-RJ45
- ③ Squeeze line
- ④ Split cable DATA-Y-SENSOR-KB



Note: if the squeeze line configuration (e.g. number of squeeze lines, monitored drive direction) shall be changed, the control unit needs new parameters.

5.3 Leg integrated collision sensors

In TopMotion Safety drives by Kesseböhmer collision sensors are integrated. These sensors can be used together with a liECO+ control unit. If the control unit is parameterized for the BN-Drive, the collision sensors are automatically detected when the control unit gets commissioned. The liECO+ checks if the collision sensors are present and activates them. During this procedure, you will have to

wait for at least 5 seconds after finalizing the reset (without any keypress) to allow the control box to detect and activate these sensors. You will hear a double-click noise after success.



Danger: if the automatic detection won't be completed, the sensors will be inactive.

5.4 Activate squeeze lines or sensors



Note: external sensors and squeezes lines must be activated by parameters.



Note: a control unit with activated DATA-connector is necessary to operate an external sensor or a squeeze line.



Caution: the power cord must be unplugged while all other electrical connections (to motors, sensors, handswitch, etc.) to the liECO+ are being set up!

1. Disconnect the mains supply from the liECO+ control unit.
2. Connect the external sensor or the squeeze line to the DATA-connector.
3. Re-connect the mains supply to the liECO+ control unit.
4. Wait at least 5 seconds after connection the mains supply. **During this time, do not press any key on the handswitch!** The external sensor or squeeze line is recognized by the control unit and the safety system will be activated. You will hear an audible double click when the control unit and the safety system is operable.



Note: if the control unit is parameterized for “Reset at first use” for commissioning, the reset has to be performed before the safety system is activated by the control unit.

5.5 Drive back



Note: drive back is only active if collision protection is activated by parameters.

After a safety function is triggered by electronic collision protection, the desktop automatically moves a defined distance in the opposite direction. This immediately prevents any possible risk of pinching.



Danger: in spite of collision protection being in place, there may still be a risk of pinching in exceptional cases, as it is not only the control unit, but also the interaction between the mechanical and electronic systems that is responsible for cutting out the motor. In addition, the mechanical components, motor and ambient conditions all affect cut-out sensitivity.

As the control unit manufacturer, Kesseböhmer Ergonomietechnik cannot therefore eliminate this residual risk completely or accept any liability.

6 Cascading

Cascading enables you to operate up to 12 motors synchronously by connecting multiple control units.



Note: It has to be set in advance by parameter if a control unit will be used for cascading and how many control units are parts of the cascaded system. Deviation to the behavior of a single motor control is possible.



Note: for more information on cascading see the user manual for cascading of control units. User manuals It can be found in the download area of the homepage www.kesseboehmer-ergonomietechnik.de.

7 Appendix

In this section you will find detailed information on the following topics:

- Possible faults and remedies
- Error messages on the handswitch display
- Click codes

7.1 Possible faults and remedies

Drives not working

Possible cause	Remedy
Power cord is not connected	Plug the power cord into the control unit
Drives are not connected	Plug the motor cables into the control unit
Poor plug contact	Plug the motor cables, power cord and handswitch in properly
Control unit is defective	Contact customer service
Handswitch is defective	Replace the handswitch

Drives only operating in one direction

Possible cause	Remedy
Mains power breakdown or mains power is plugged off during movement	Manual Reset *)
Control unit is defective	Contact customer service
Handswitch is defective	Replace the handswitch
Drive is defective	Contact customer service

*) if movement is only possible downwards

Control unit or handswitch is not working

Possible cause	Remedy
Power cord is not connected	Plug the power cord into the control unit
Handswitch is not connected	Plug in the handswitch
Control unit is defective	Contact customer service
Power cord is defective	Contact customer service
Handswitch is defective	Replace the handswitch
Poor plug contact	Plug the motor cables, power cord and handswitch in properly

7.2 Error messages on the handswitch display



The display reads **HOT**.

Cause	Remedy
The liECO+ control unit is fitted with overheating protection. Overheating has caused it to stop the control unit.	Wait until the control unit has cooled down and HOT is no longer displayed. The liECO+ control unit is then operational again.



The display reads **E** + an error code.

Cause	Remedy
There is an internal fault in the liECO+ control unit.	Proceed as indicated in the following list.

Code	Description	Remedy
00	Internal Error Channel 1	Unplug the power cord and contact the customer service.
01	Internal Error Channel 2	
02	Internal Error Channel 3	
12	Defect Channel 1	Unplug the control unit. Fix the external short circuit. Or Plug in the correct motor to the motor socket that shows the error. Start the control unit again.
13	Defect Channel 2	
14	Defect Channel 3	
24	Overcurrent Motor M1	Remove jammed objects from the driving area. Desk might be overloaded → Remove load from desk.
25	Overcurrent Motor M2	
26	Overcurrent Motor M3	
48	Overcurrent Motor Group 1	Contact customer service
49	Overcurrent Motor Group 2	
60	Collision protection	
62	Overcurrent Control Unit	
36	Plug detection in Motor socket M1	Plug in the correct motor to the motor socket that shows the error. Reset all motors.
37	Plug detection in Motor socket M2	
38	Plug detection in Motor socket M3	
61	Actuator changed	Remove load from desktop. Reset all motors. If error occurs after reset again, contact customer service.
55	Synchronization lost motor group 1	
56	Synchronization lost motor group 2	
67	High voltage	Unplug the power cord and contact the customer service
70	Motor configuration changed	See chapter 4.3.5
71	Anti-Pinch configuration changed	See chapter 5 to activate sensors If error occurs again, contact customer service.
72	Reset not successfully finished	Unplug the control unit and wait at least 5 seconds. Start the control unit again.
73	Drive defective (Signals sent to the control unit to show the drive state are not valid, Reset signal and drive position are not corresponding)	Reset all motors. If error occurs again, contact customer service.

Number	Description	Remedy
81	Internal error	<p>Make a manual reset</p> <p>Unplug the power cord and plug it in again after a few seconds.</p> <p>If this error occurs frequently, unplug the power cord and contact the customer service.</p>
93	<p>Connection error in the cascaded network</p> <p>(The error appears on the display for 15 seconds and then the control unit goes into reset mode with the display flashing 000)</p>	<p>Check all the cable connections and try to reset the motors.</p> <p>If you cannot reset the motors, disconnect all the control units from the power supply. Wait for at least 5 seconds and then reconnect all the control units to the power supply. Try again to reset the motors.</p> <p>If you still cannot reset the motors, please contact customer service.</p>



Note: for more information on cascading see the user manual for cascading of control units. User manuals It can be found in the download area of the homepage www.kesseboehmer-ergonomietechnik.de



Note: the **PowerFail detection** identifies mains power breakdowns and saves all relevant data before the voltage falls below a critical threshold.

In some exceptional cases, this storage is not possible and the error **E81** is shown on the handswitch display (if available) and the liECO+ clicks three times.

To rectify this error, a **manual reset** is necessary (see chapter 4.2.4)



Note: if the mains power breaks down or is disconnected from the control unit during movement of the drives, a manual reset might be necessary.



Note: if the error code **E73** is shown on the handswitch display and the control box clicks three times, a technical problem with the drives has been detected. Before you can re-use the control unit, it needs to be disconnected from mains. Re-connect it to mains after at least 5 seconds. If the error occurs repetitive, the defect of the drives is implied.

7.3 Click codes

When the control unit is switched on, the liECO+ uses its relays to inform the user acoustically about the system state and the reason why the control unit was switched off before. The table below shows which number of clicks corresponds to certain information.

Number of clicks	State information
2x with short interval	Normal operation: No problems detected
2x with long interval	Reset mode: The system was put into reset mode. This signal will be put out every time an invalid key is pressed in reset mode.
1x	Emergency operation: The system is in Safe-State, movement is not possible. Check error codes on the display of the handswitch.
3x with short interval	Sensor inactive: A safety sensor is not connected to the control unit or defective and therefore collision protection is not active.
3x with long interval	Duty cycle exceeded: The control unit cannot be used since it is in a cool-down state.
4x – 6x	Last shutdown incomplete / forced reset: Check error codes on the display of the handswitch.



Note: click codes that occur when you store a memory position or when you store or deactivate a container-stop or shelf-stop position are shown in the particular chapters.

8 Further information

8.1 End of life disposal

When you no longer require the liECO+ control unit, please note the following for disposal:



Note: The liECO+ control unit is electrical or electronic equipment according to directive 2002/96/EC and therefore marked with the symbol depicted on the left.



Note: ensure eco-friendly disposal of all the control unit components (separate the plastic and electronic parts for collection).

Also ensure eco-friendly disposal of all the other components (drives, cables, etc.).



Note: this product is RoHS compliant according to directive 2002/95/EC!



Note: this product is REACH compliant according to directive 2006/121/EC (Edict 1907/2006)

8.2 *Technical data*



Note: you can find the technical data of your control unit in the appropriate datasheet.

8.3 *Optional products*



Note: information about available optional products can be found in the latest product catalogue and on the website www.kesseboehmer-ergonomietechnik.com

8.4 *Manufacturer*

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