

# SCALE

**Features:**

- Equipped with a display for weight information and error indication - max 255 kg. (562lbs).
- 2-hand control - safety via Enable button plus Function button.
- Accuracy adjustment of the measured weight with 100 or 500 grams accuracy (0.2205 or 1.102 pounds/lbs).  
As default the setting is 500 grams (1.102 pounds/lbs) accuracy. This setting will be the approved setting according to EN60601-1 / 45501. According to the standards the 100 gram setting is not an approved setting but serves as a guidance only.
- Auto compensation of the patient weight. E.g. this feature enables the staff to add or remove items from the bed, e.g. a pillow - without affecting the weight of the patient. Max. auto compensation with +/- 100kg. The auto compensation is reset by unplugging the mains supply or zeroing the bed.  
If a battery is present the system can be "woken-up" by activating a handset or similar.
- Reset/Zero adjustment of the weight of the bed to omit the weight of a mattress. Use of the function must be made before the patient enters the bed and before the patient weight is measured. Max. adjustment level is 50 kg.
- Out of bed detection is possible. With this function enabled a signal is given when the patient leaves the bed. The alarm will be activated when leaving the bed (corresponding to 50% loss of the patient weight). The volume setting is indicated via 3 LEDs, one for each volume level.
- Weight Unit selection. Two versions are available - one for kg and one for lbs.  
The reason is that two measurement units in one device cannot be approved according to EN45501. E.g. 'lbs' as a measurement unit is not allowed in EU because of standards and legal restrictions.
- Compatible with CB16 OBL, CB6/16 OBF and CB20 (not CB6 OBL).
- Two standard front covers are available.
- Ergonomically shaped and easy to operate. The same housing platform as for the ACO is used for the SCO display.
- High-strength plastic housing protects the electronics.



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IMPROVING EFFICIENCY

The SCALE system is an overall LINAK article description for weight measuring comprising a display device (SCO = Scale Control Openbus™) and a calculation device for load measuring (QLCI = Quad Load Cell Interface). It is developed for the OpenBus™ product range (not CB6 OBL).

The SCALE item 'SCO' is the user interface to carry out the measurements.

The QLCI item 'QLCI' is a 'black box' with advanced electronics to calculate measurements obtained from third party suppliers of load cell devices.

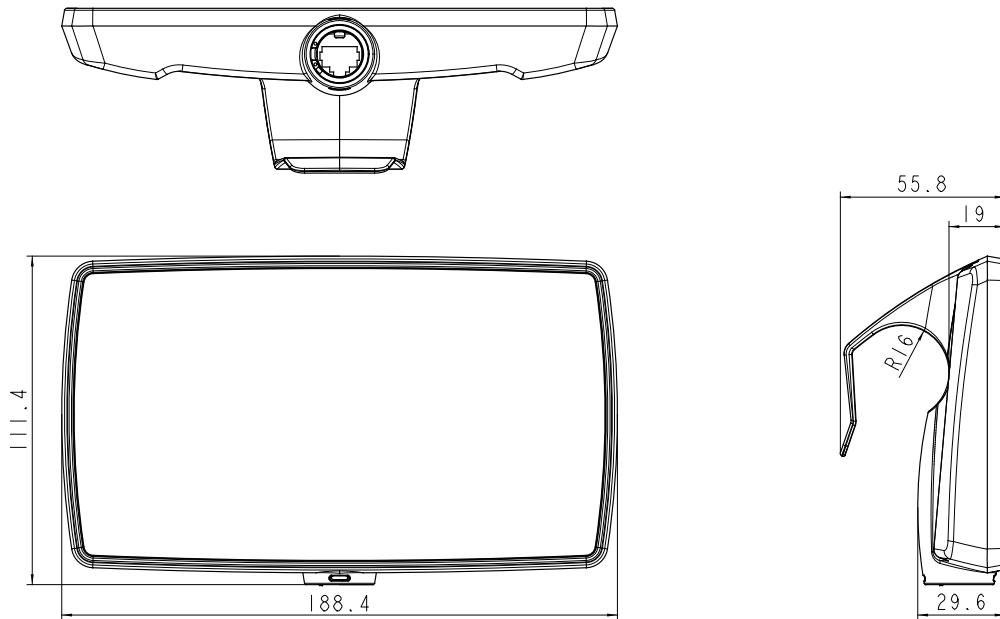
The SCALE system provides complete weight measuring equipment made for the Hospital and Care environment, typically connected and mounted in a hospital bed.

The equipment enables the staff to carry out measurements with the patient staying in bed - whereas existing methods require the patient to leave the bed. Working with disabled patients may make the usual weighing methods a struggle to overcome for the patient. Sometimes using the current weight measurement methods may be even impossible.

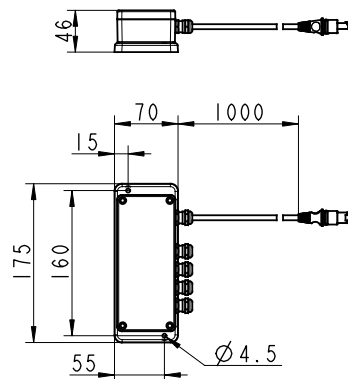
... continued

- Cleaning is made fast and easy because of rounded contours and assembly of the cover onto a low edged surface
  - Protection class, SCO: IPX6  
Protection class, QLCI: IPX4 (IPX6 is a future option)
  - Colour of the panel: Grey RAL 7035
  - Connection to CB or MJB via a 6-wire "modular jack" cable
- Options:**
- Version for heavy weight applications, 460 kg (1014 lbs); this version has a lower resolution than the 255 kg version.

**Scale dimensions:**



**QLCI dimensions:**

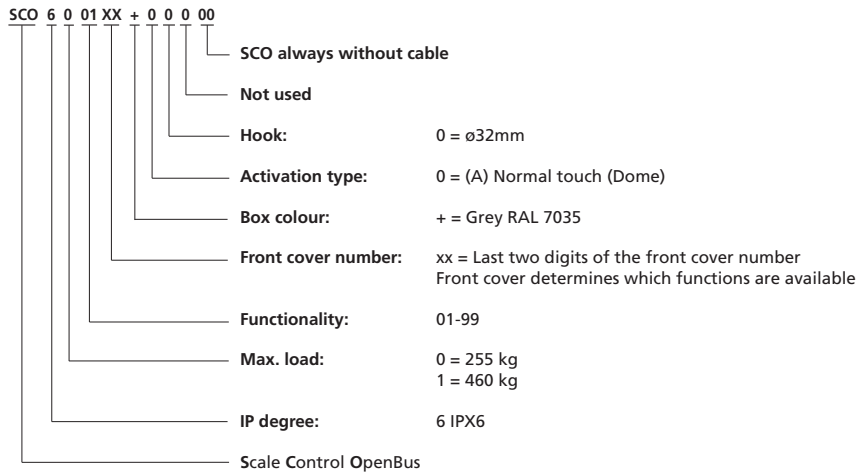


**Specifications :**

		<b>Scale system (SCO / QLCI)</b>	
C.	Colour	SCO: Light grey (RAL 7035) QLCI: Top/bottom = RAL 7001 Base = RAL 7035	
	Control concept	OpenBus™	Via 6-pole cable
	Compatibility	CB16 OBL, CB6/CB16 OBF, CB20	
	Current consumption	SCO: 8 V power request: 0.5 mA 40 V permanent supply: 38 mA QLCI: 8 V power request: < 10 mA 40 V permanent supply: < 19 mA	
M.	Measuring range	Max. 255 Kg (562 lbs) or 460 Kg (1014 lbs) load on application (Swl)	Load version 460 kg is Optional SWL = Safe Working Load
W.	Load cells	4 pcs. of load cells required (Type: 3mv/v); company Zemic LINAk item >> No.: TR-1081 109 Name: H8C-C3-500KG-3BG-SC (Other alternatives exist)	MUST BE 'OIML' APPROVED FOR APPROVED SYSTEMS (OIML = International Organisation Of Legal Metrology)

**Scale**

**Ordering example:**

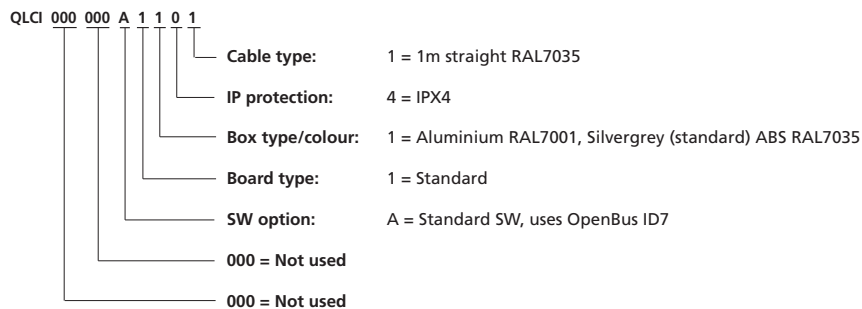


**Cable compatibility**

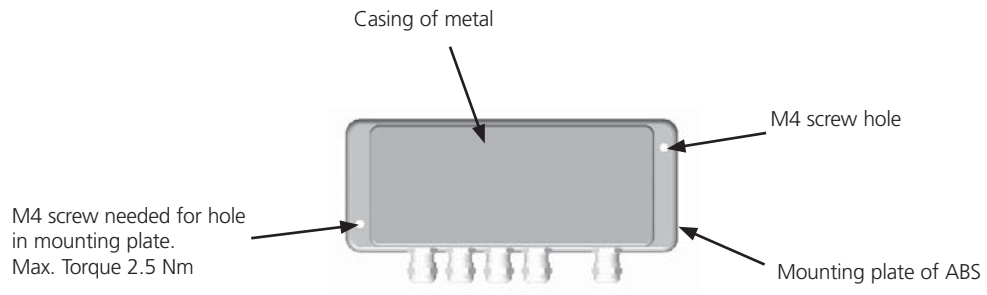
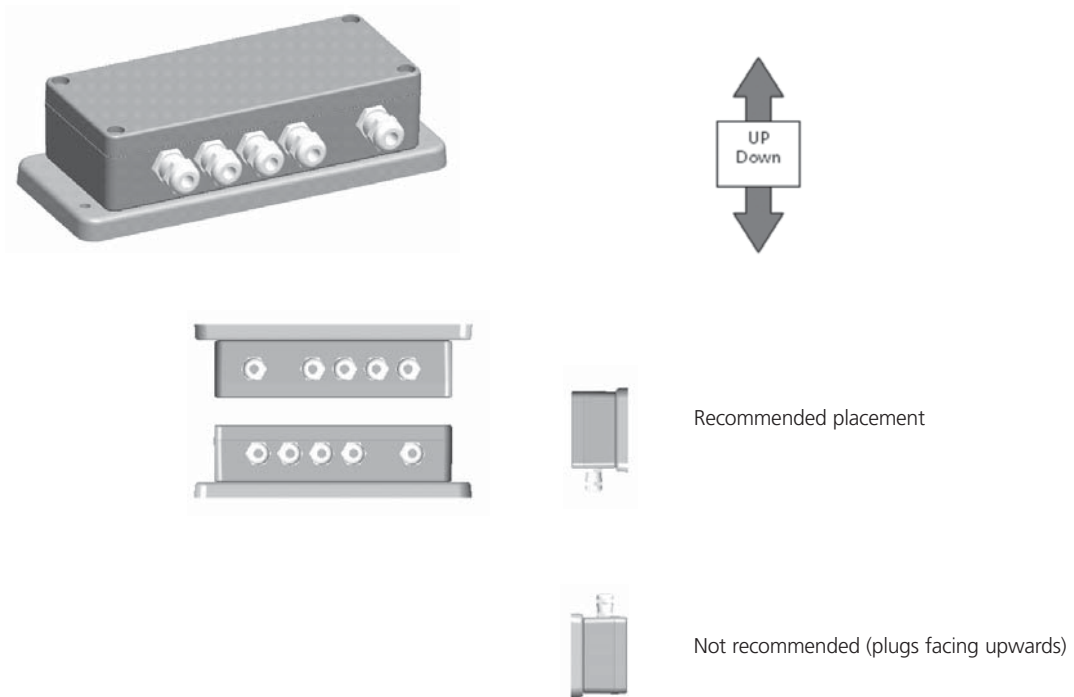
0964461-xxxx: Modular jack modular jack 6-wire, RAL7035 - in different lengths

**QLCI**

**Ordering example:**



## Illustration of mounting instruction, QLCI



There must be no contact from application or metal to aluminum box.

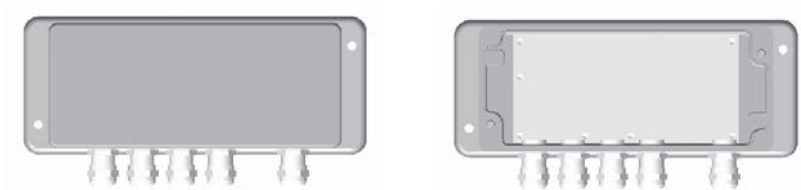
A minimum distance of 2 mm between metal parts MUST be kept!

The base plate of ABS is prepared for this requirement with countersunk screw holes. Any screw used must therefore fit into the hole, i.e. the head of the screw must not be too big.

## Mounting instructions for weighing cells

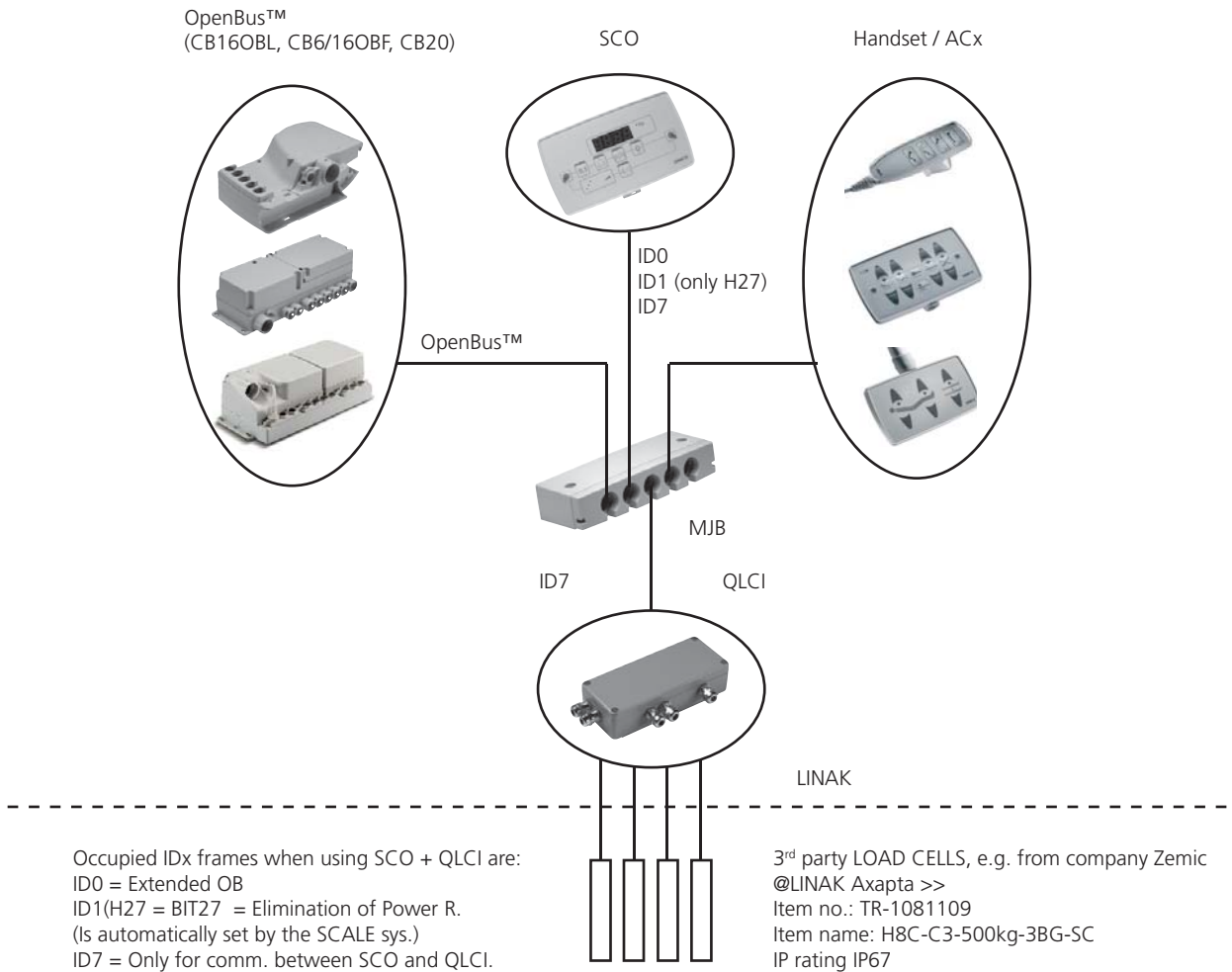
Remove the rubber band and remove the lid.

See instruction for mounting of cable for load cells and calibration inside the lid.



**Discription of the LINAK Scale system:**

**How to connect the Scale:**



The SCALE system occupies certain frames (IDx) in the OpenBus™ frame setup. Normally these do not interfere with bits used in conventional standard or special OpenBus™ application software (HB and ACx addressing are placed in ID1 and ID2). See the illustration above. Therefore, take care to avoid conflicts with H27 when specifying Handsets / Attendant Controls.



**Using SCALE system.**

Weight systems are subject to vital legal restrictions. The LINAK SCALE system will be approved acc. to EN45501. The used load cells must be OIML approved as well (is not included in the LINAK approval). As an example the above mentioned Zemic load cells are OIML approved.

**Approvals:**

LINAK and UL International DEMKO A/S are currently in the process of certifying the SCO/QLCI articles. We are applying for two approvals.

**A.** As the SCALE system is an optional part of a LINAK actuator system we are applying to have it tested and approved according to the "General Medical Equipment" standard EN/IEC60601-1 (with CB16 OBL, CB6/16 OBF and CB20) - this is pending at the moment.

**B.** A part approval according to EN45501 (the European Standard for non-automatic weighing instruments).

The part approval will cover the SCO and QLCI devices only - LOAD CELLS ARE NOT INCLUDED IN THE LINAK APPROVAL.

This approval is applied for in order to support customers in obtaining their approval.

Provided the OEM customers manufacturing procedure and quality system describes how to handle a first time verification of parts used in 'non-automatic weighing' systems (see explanation below) they receive a fully approved EN45501 system when 'first-time' calibrating LINAK SCO & QLCI devices in combination with OIML (International Organization Of Legal Metrology) approved load cells as e.g. the Zemic types.

If they use load cells which are not OIML approved they must apply for an approval of a 'non-automatic weighing instrument' device consisting of the SCO, QLCI and load cells.

The EN45501 has been received.

**An OEM application approval according to EN45501**

Typically the SCALE will be classified as a "non-automatic weight" system.

If a LINAK SCALE system is applied to a bed AND classified as such, the SCALE system MUST be "First-Time" verified and sealed.

The verification and sealing is typically carried out in one of two ways:

**1. Verification by the Bed manufacturer himself.**

It prescribes that the manufacturer is certified to carry out the verification.

The certification can be obtained through a Notified Body that performs auditing and approval of the procedures and the quality system in the manufacturing company.

An example from Denmark:

'DS Certificering' is the only Notified Body in Denmark, certified to carry out approvals of quality systems for manufacturing and calibration of 'non-automatic weight' systems.

Within Europe it is however possible to use any other Notified Body from one of the EU member states.

When certified the Bed manufacturer obtains a type approval certificate to prove they are certified to manufacture and calibrate their own "non-automatic weight" system.

**2. Verification by "First-Time" verification Bodies.**

In Denmark there are three Notified Bodies available for the verification and sealing of the application:

Force Technology, Dansk Kalibreringsteknik and Trescal.

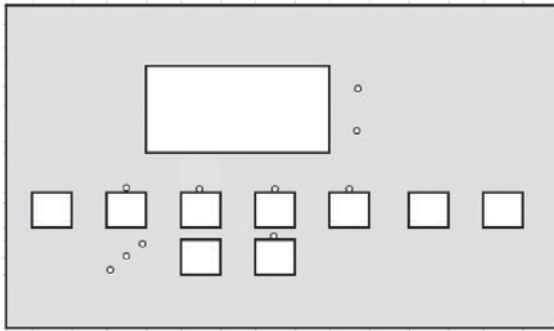
Again any other Notified Body from an EU member state can be used.

"First-Time" verification can take place at either the manufacturer or at the destination of use.

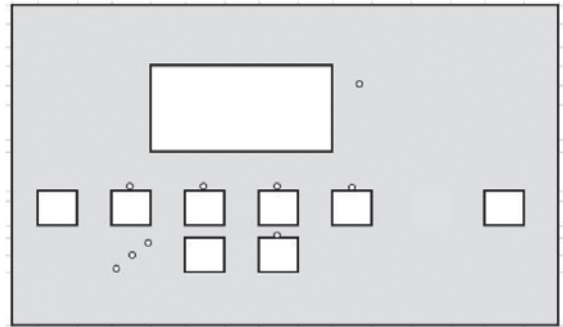
**Requirements in both situations:**

- The Type Approval Certificate number MUST be marked on the label on the weight unit.
- The Type Approval Certificate must be issued according to and including reference to the Directive for "non-automatic weights" 2009/23/EC (new non-modified version of 90/384/EEC).

**Available Functionality:**

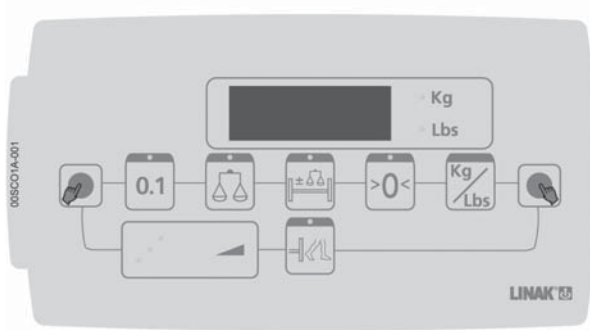


01 Layout  
SW no.: 01010006

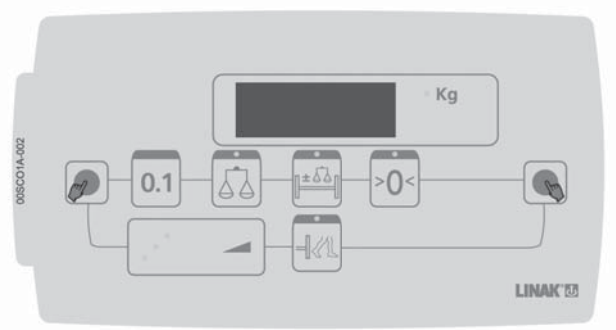


02 Layout  
SW no.: 01010006

**Standard FPP front covers (for functionality 01, 02)**



Front cover 00SCO1A-001



Front cover 00SCO1A-002

**Functionality buttons.**



**[Enable] button:**

To activate and navigate the panel and all its functions, push the enable button and a selected function button simultaneously. This is a safety feature to avoid unintended usage.



**[Accuracy] button:**

By default the system is set to 500g accuracy, but by activating this button the accuracy changes to 100g. The approval covers 500g as default. 100g only serves as a guidance (not approved according to EN45501). The LED above the button will light when 100g accuracy is chosen by pressing the button. The 0.1 status automatically times out and changes to 500g default indication after 5 sec. (the time out setting is required by the test house!). Toggling the accuracy to 0.1 (100g) guiding measure can only take place when a stable load is present (when the display is no longer flashing).



**[Scale] button:**

To measure the weight push the enable button and the scale button simultaneously. Max. measurement area 0 - 255 kg. The scale system calculates the maximum weight according to the formula:  
Weight max = SWL - Auto Compensation - Zeroing = Actual weight of the patient on the display.

- SWL = 255 kg (optional 460 kg)
- Auto compensation range = 0 - 100 kg
- Zeroing range = 0 - 50 kg

Example of display indication:  
Max. patient weight = 255 kg - 100 - 40 = 115 kg.  
I.e. Max. 115 kg can be measured

The LED above the button will light when button is activated.



**[Auto] button (Auto compensation):**

With the patient already is in the bed, this feature enables the staff to add or remove items from the bed - e.g. a pillow - without any influence on the weight of the patient.

Max. auto compensate range is +/- 100kg.

Auto compensation can be reset by unplugging the mains (back to default) or zeroing the bed.



Compensation procedure:

1. At first activation of buttons "Enable + Auto Compensation" the current weight is saved. The display says "AUTO" - and the LED for the button 'Auto Compensation' is flashing. When the LED stops flashing the weight is stable and the objective to compensate for can be added or removed.
2. Repeating the activation of the buttons will compensate for the added/removed load. When the LED is no longer flashing, the procedure is finished and the display is empty. By renewed activation of the "Enable + Scale" buttons the display will show the weight measured before the compensation was done - which equals the weight of the patient. If 'AUTO' compensation is enabled the "AUTO" LED will light when making a measurement via the "Enable + Scale" button. **To benefit from auto-compensation it is important that this button is activated each time weight is added or removed from the bed.**

**Reset/Zero button - MUST be carried out before the patient enters the bed:**



To reset the scale, push this button. I.e. if a mattress is put in the bed, but you do not want to measure its weight, you can reset the scale after the mattress has been put into the bed. Limit of zeroing is 50 kg. See example at "SCALE" button above. If "AUTO" compensation is enabled, it will be cancelled after a reset has been carried out.



**[Out of bed alarm] button** (only active if connected to mains):

By default this feature is disabled. This feature becomes active by activating the button with the patient in the bed. If the patient leaves the bed afterwards you get a constant buzzer alarm - as long as the volume level is set to at least level 1, and the button LED changes from green to red. The alarm is activated by 50% loss of weight on the load cells. Note that the signal can be transferred to a hospital network via a gateway unit.



**[Out of bed Volume adjustment] button:**

Adjust volume of the buzzer in 3 levels by pushing the volume button. The levels will be shown by the LEDs.



**[Unit] button - Kg/Lbs:**

The measure can be set in Kilo/Kg or in Pounds/Lbs

For EU customers the front cover that includes this button should not be ordered since it is prohibited to use Pounds / Lbs units in Europe.



**Display:**

To show the weight and info of the system, the display shows the data. The LED will light up for the chosen unit. Error codes can also be shown in the display. (see other pages for error codes)

**NOTE re. all buttons on the SCO:**

- When calculation or adjustment of weight is on-going, the display indication will be flashing until e.g. the weight calculation is stable. Approx. 20 sec. after the display shows a stable value it will turn-off.
- The LED above a button will illuminate when the chosen button is activated.
- Activation of any button on the SCO will result in a beep, if the CB had a fatal error previously. The beep sound has no influence on the measuring result, i.e. the SCALE system is independent of fatal errors on the control box.

**NOTE re. use of Enable + SCALE button during manufacturing:**



If pressing the Enable + Scale buttons simultaneously for 10 sec. the SCO display will constantly display the weight. This may be a useful feature during the manufacturing and test process - because otherwise the SCO display will time out after approx. 20 sec. during normal operation.

The function can only be reset by un-plugging the mains.

## TEST DEVICE

In case the SCALE system does not perform as expected due to a failure, a test device will be available. The device is able to simulate an output similar to the load cell output thereby providing a well-defined input to the SCO/QLCI device. If you get the expected output from SCO/QLCI it shows that it is working satisfactorily and the problem should instead be found in the load cell parts. If not, it indicates there might be a problem with the SCO/QLCI. I.e. it provides information about which supplier to contact in case of a failure.

Regarding calibration, please contact LINAK for further information.

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