Document Number: 9200241
Revision: 1v3

Kinesys Libra Node

Operating Manual
[ORIGINAL]

A programmable load cell interface

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The contents of this manual are believed to be correct at the time of printing. In a commitment to a policy of continuous development and improvement, TAIT reserves the right to change the specification of the product or its performance, or the contents of this manual, without notice.

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1. Introduction

1.1 Product description

The Kinesys Libra Node is device that connects load cells and other sensors to the Kinesys Libra load monitoring system, via an interface such as Libra Pro or Libra Basic. The Libra Node gives users the flexibility to configure devices with Libra products to suit individual needs and situations.

1.2 Parts list

The Libra Node kit contains the following parts.

Item	Part No.	QTY	Notes
Libra Node	2060414	1	
Phoenix Connector, 2x2	6432006	1	For connecting extra sensors
Phoenix Connector, 3x1	6432007	1	For connecting LEDs
Phoenix Connector	6430033	1	For connecting a load sensor
Instruction Sheet (one page)	9200321	1	

The following parts are length dependent and ordered as individual items.

Item	Part No.
For tail XLR cables only:	
Data In Cable Assembly, XLR-M Tail	CBL-54-001
Data Through XLR Cable Asembly, XLR-F Tail	CBL-55-001
For panel mount XLR cables only:	
Data In Cable Assembly, XLR-M Panel Mount	CBL-52-001
Data Through XLR Cable Asembly, XLR-F Panel Mount	CBL-53-001

All cable assemblies come with a 3x2 Phoenix connector for connection to the Libra Node.

1.3 Scope and purpose

This manual explains the setup and operation of the Libra Node.

The equipment described in this manual may only be operated by personnel qualified to do so. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with this and associated equipment.

1.4 Support requests

For technical support on this product, please use the following contact details:

support@taittowers.com
Tel: +44(0) 20 8481 9850

To resolve your support request as quickly as possible, please provide the following information, if available, when contacting Kinesys:

- Site name, address, machine location details and your contact details.
- As much detail as possible on the behaviour observed, including any unusual changes in behaviour that are different from normal operation and any environmental conditions that may be a factor (e.g. fluctuations in temperature and water damage).
- Details on the behaviour that should have been expected.
- The exact steps required that produce the issue.
- Any solutions to fix the issue that you have already tried.
- Any workarounds that you have found.
- Equipment item numbers and serial numbers, such as those displayed on the identification plates/labels.
- Version numbers of any software being used.
- Any screen shots, photographs or videos of the issue.

2. Safety information

2.1 Safety warnings

IF IN DOUBT ABOUT ANY ASPECT OF MOVING OBJECTS, ALWAYS SEEK PROFESSIONAL ADVICE BEFORE OPERATION.

Make sure this Operating Manual is always kept in a complete and fully readable condition and that it is always accessible to all operators of the equipment.

General warnings

- **Only personnel fully familiar with the procedures outlined in this manual are permitted to set up, calibrate and operate the Libra Node.**
- **Do a full risk assessment of the location where you intend to use the Libra Node and all other connected devices.**
- **Make sure you know the locations of the emergency stop buttons of all devices and systems connected to the Libra Node.**
- **Do not modify the Libra Node in any way, unless explicitly advised by the manufacturer.**
- **Do not use any spare parts other than those supplied by the manufacturer.**
- **Do not use the Libra Node if it does not appear to be in 100% working order.**

Electrical safety warnings

- **If terminating wires in the Libra Node, only use pinouts provided in this manual.**

This product uses semiconductors which can be dangerous due to electrostatic discharge (ESD). When handling the product, the following precautions must be taken.

ESD warnings

- **Do not open the protective conductive packaging until you are at an approved anti-static workstation.**
- **Always use a conductive wrist strap attached to an earth bonding point when handling the Libra Node.**
- **Always use an approved anti-static mat to cover the work surface when handling the Libra Node.**
- **Always discharge yourself by touching a grounded bare metal surface or approved anti-static mat before picking up ESD components.**

2.2 Visible damages

If any damage or breakages are detected during operation or during tests, do not use the Libra Node until it has been fully repaired and a qualified person has checked and approved it, or until it has been replaced.

2.3 Spare parts

Only original fixing components, spare parts, and accessories listed in manufacturer's spare parts catalogue are acceptable for use. The manufacturer's guarantee is given for those spare parts only. The manufacturer cannot be held responsible for any damages due to the use of non-original parts or accessories.

3. Installation

3.1 Cable types

In most cases, multiple Libra Node units will be connected in a daisy chain configuration using XLR cables.

Two types of cable are available to order - tail and panel mount. Both types use the same pinout and connector. Panel mount cables feature a flange at one end that can be mounted to a suitable flat surface.

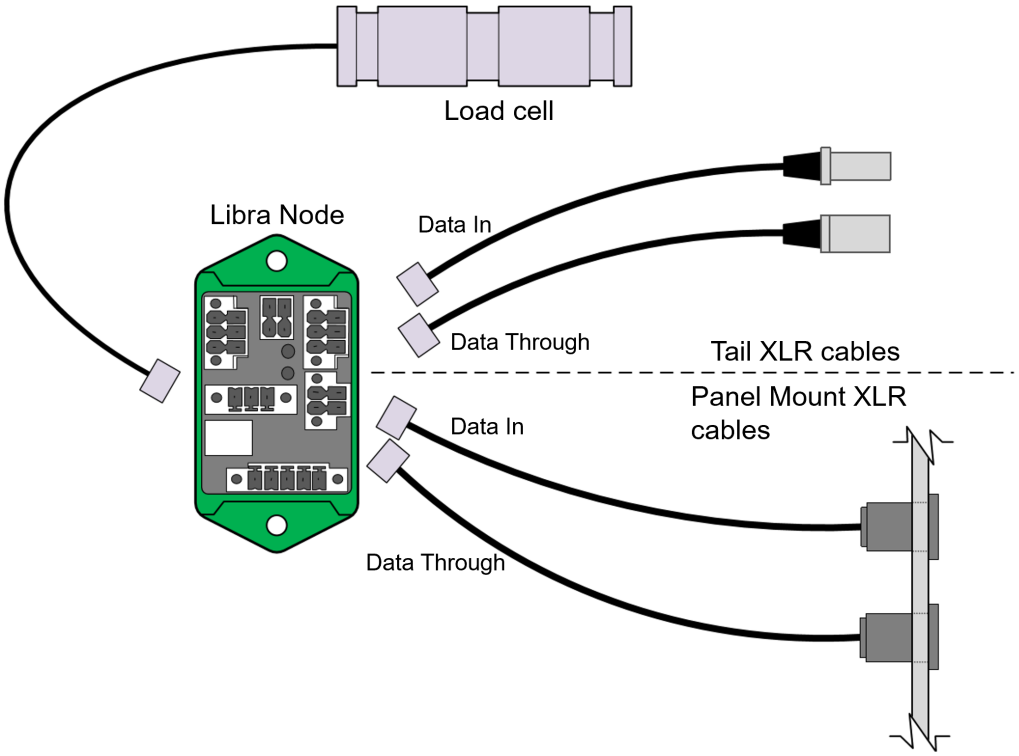
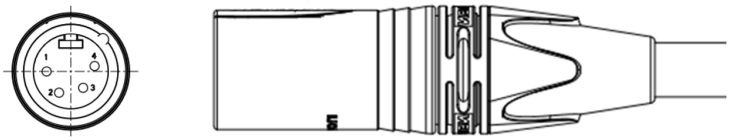
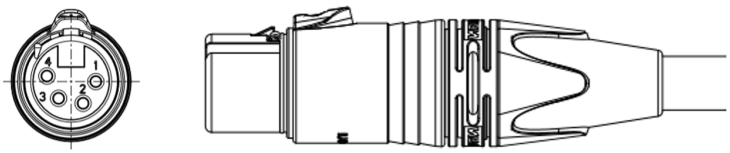


Figure 1. Cable types

3.1.1 Tail XLR cables



Libra Node tail XLR-M – Data In
(Part No. CBL-54-001)



Libra Node tail XLR-F – Data Through
(Part No. CBL-55-001)

Figure 2. Tail XLR cables

3.1.2 Panel mount cables

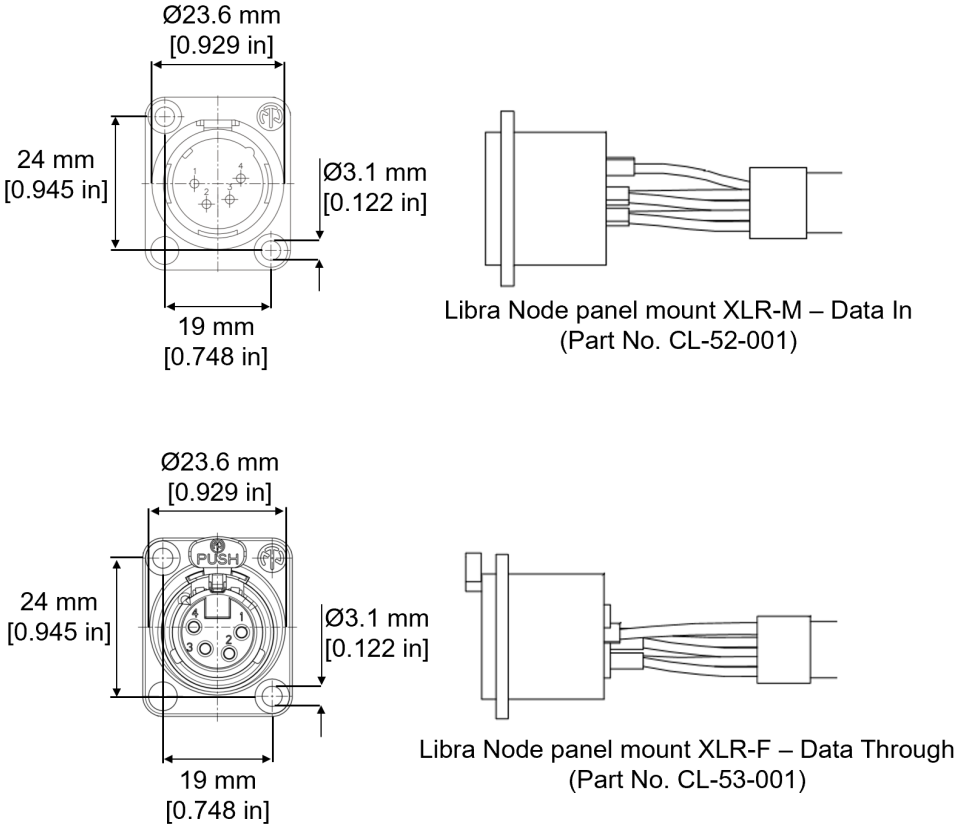


Figure 3. Panel mount XLR cables and dimensions

3.2 Mounting holes

To mount the Libra Node in a suitable location, two 4.7 mm holes are provided. The rear of the Libra Node can also be attached to a suitable flat surface using cable ties.

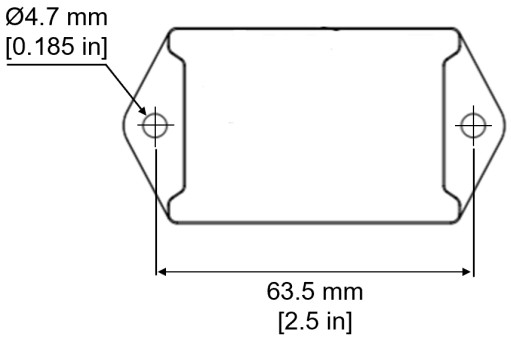


Figure 4. Mounting holes

4. Connections

4.1 Connecting the Data In/Data Through cables

Install the Data In/Data Through XLR cables to the two Phoenix connectors at the top of the device. Each Phoenix connector comes already supplied with the cable. Note that the connectors on the ends of the Data In and Data Through cables are interchangeable and can be installed to either position.

If terminating the wires, use the pinout shown below.

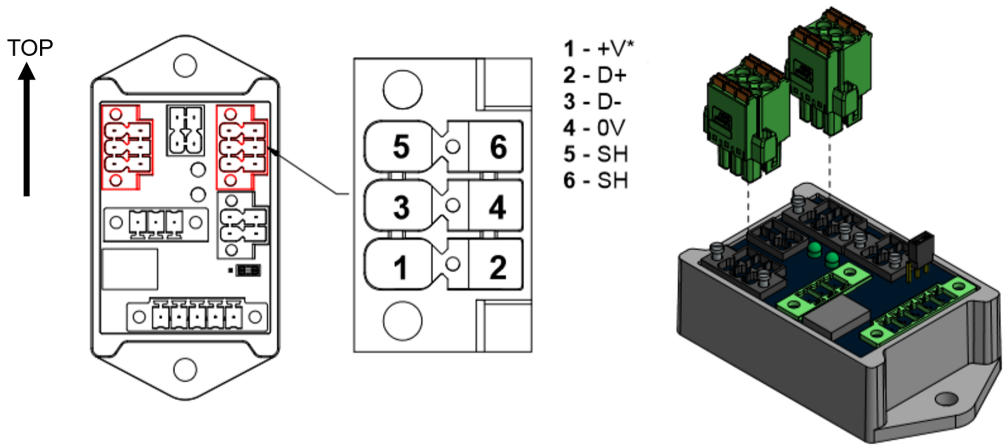


Figure 5. Data In/Data Through connectors

* +V can be 7-28 V, but this voltage must be compatible with the sensors and LEDs powered through the Libra Node. 24 V is suggested as standard as this is the power provided by Libra Basic and Libra Pro.

4.2 Connecting a load sensor

To connect a load sensor, install the Loadcell/bridge Phoenix connector (P/N 6430033) to the connection at the bottom of the device. To terminate the wires use the pinout shown below.

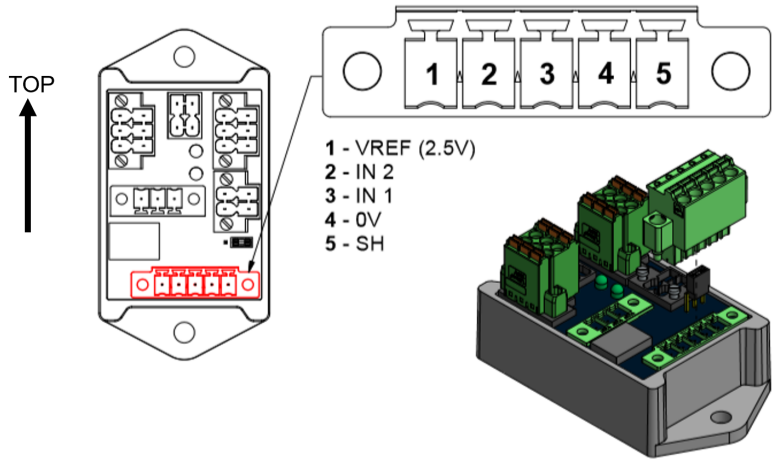


Figure 6. Load cell/bridge connector

4.3 Connecting 24 V LEDs

The Libra Node has the option to connect two extra LEDs which can be programmed to provide feedback to the user.

To connect the LEDs install the LED Phoenix connector (P/N 6432007) to the socket at the centre-left position. The pinout for this connector is shown below. Pin 1 has the supply voltage, and pins 2 and 3 should be connected to the cathode (-ve pin) of the LED.

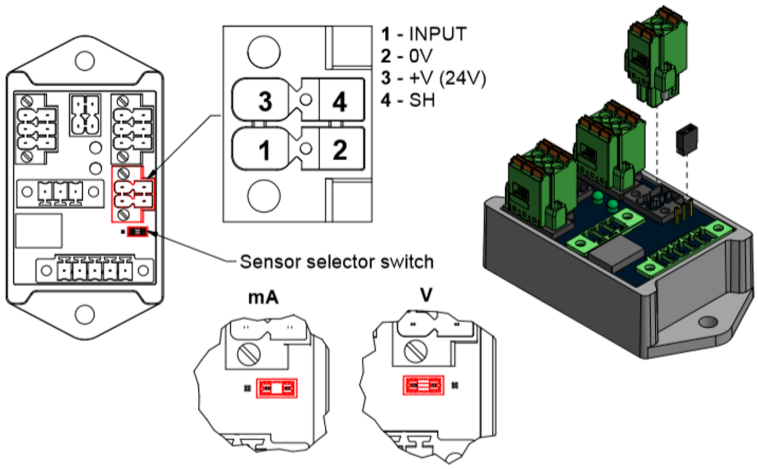


Figure 7. LED connector

4.4 Connecting alternative sensors

To connect a different type of sensor, such as an anemometer, install the 2x2 Phoenix connector (P/N 6430033) to the socket at the centre-right position. The pinout for this connector is shown below.

Note that the sensor selector switch can be moved to the right position for 4.20 mA, or the left position for 0-10 V input.

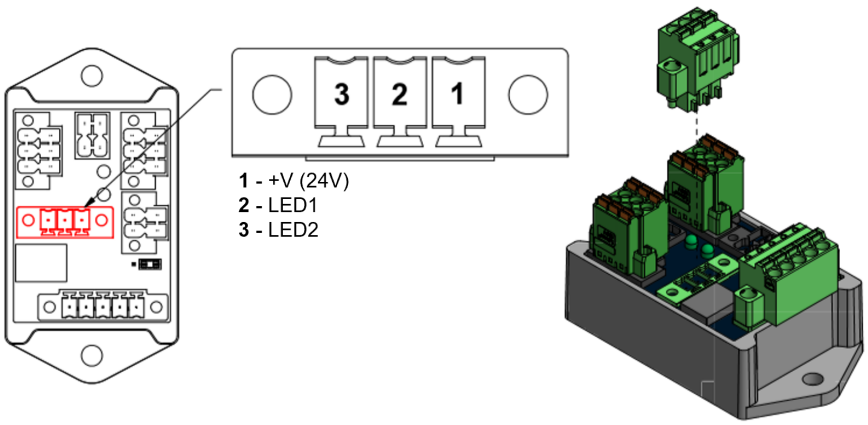


Figure 8. Alternative sensor connector

5. Setup

Setup and calibration of the Libra Node and connected devices must only be performed by competent and trained personnel.

Setup and calibration of the Libra Node is done using an application called Libra Setup. Please contact support@taittowers.com for the application download links.

This manual applies to Libra Setup version v2.0.9.

To use Libra Setup make sure the connected Libra Basic or Libra Pro is powered on and the Libra Node is connected and mounted correctly as detailed in this manual. Connect the computer via USB for Libra Basic or via an Ethernet cable for Libra Pro.

5.1 Login window

Once the software is loaded, the main application will appear on screen which consists of the Login, Settings and Status windows.

The application will load in either Locked mode, User mode or Service mode. In Locked mode and User mode, the Calibration and Checking windows cannot be accessed. In Service mode, all features are unlocked. The application will load in Locked mode when no user ID or password are entered.

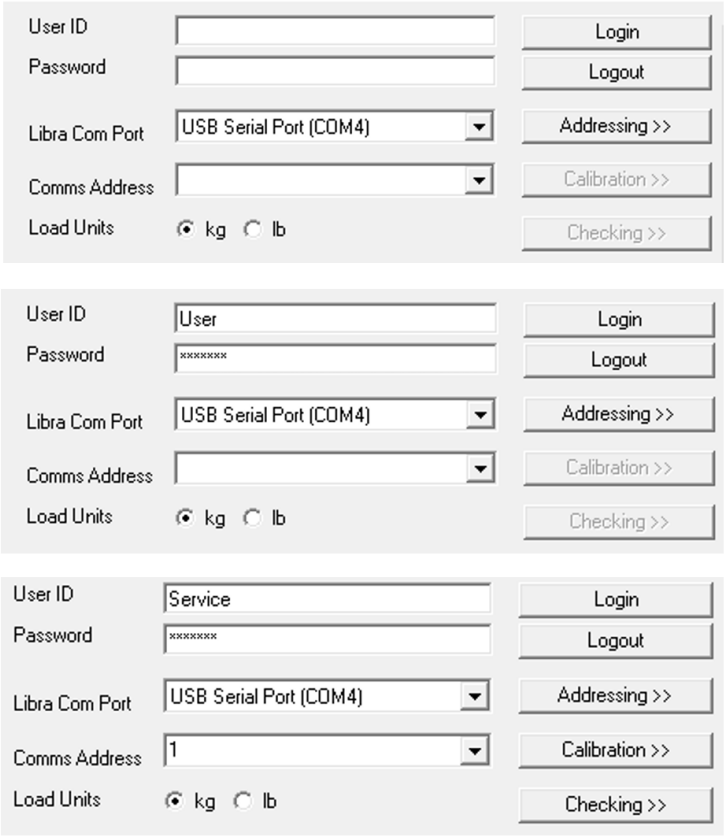


Figure 9. Login window (Locked mode / User mode / Service mode)

- If not already detected, select the correct COM port from the drop-down list (if connected via Libra basic) or the TCPIP (if connected via Libra Pro).
- If the comms address is known, type the number into the Comms Address field. Alternatively, click the Addressing button to search available addresses (see section 6 for details). Once a search is complete, available addresses will then be selectable from the drop-down list.
- If in Service mode, click the Calibration button to begin the calibration (see section 7 for details).
- If in Service mode, click the Checking button to check the Libra Node against a reference measurement (see section 8 for details).
- Select either the kg or lb radio button to operate in that unit of measurement.

5.2 Status window

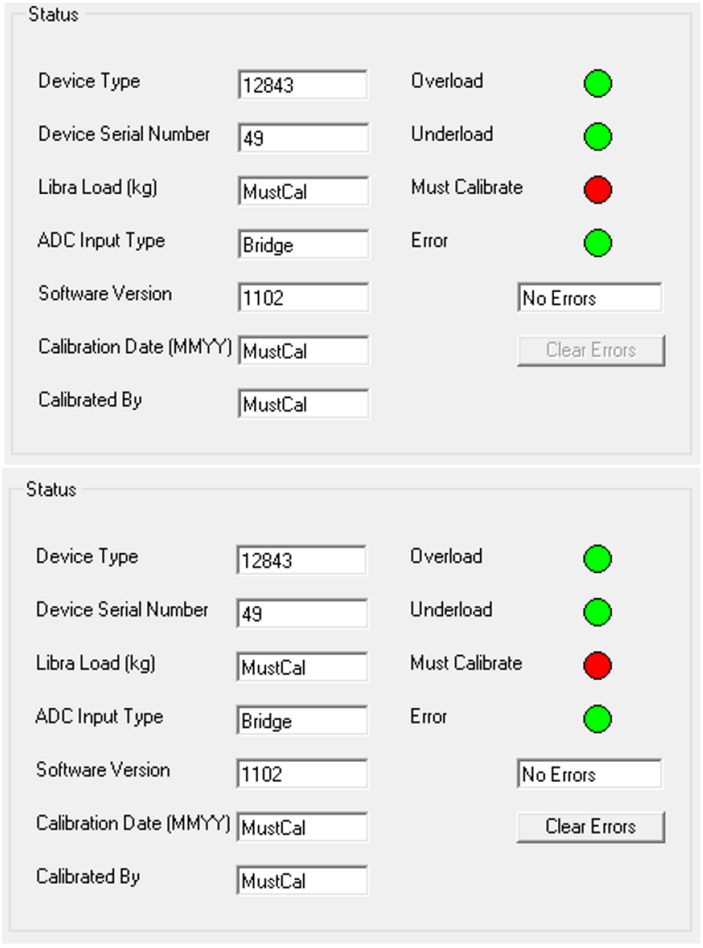


Figure 10. Status window (Locked mode / User or Service modes)

The Status window shows various status details and error indicators of the Libra Node.

The Libra Load field displays the current measured output at the load cell. If calibration is required, this field will display "MustCal". If general calibration is required, the Calibration Date and Calibrated By fields will display "MustCal".

The ADC Input Type will display one of the three input types; Bridge, 4-20mA or 0-10V.

5.2.1 Error indicators

On the right side of the Status window there are four green/red indicators, with red indicating a fault condition:

- **Overload** - red indicates the attached load is above the maximum permitted value.
- **Underload** - red indicates the attached load is below the minimum permitted value.
- **Must Calibrate** - red indicates that the device must be calibrated.
- **Error** - red indicates a software error has been detected.

Below the Error status indicator, a text field displays information on the error status. If no errors are present and the indicator is green, the field will display "No Errors". If there are no device comms present and the indicator is grey, the field will display "CommsTimeout".

A red error indicator is unlikely to occur during normal operation. However, if an error is present the text in the field will display one or more letters that indicate different error types. This letter convention is as follows:

- **R** = RAM error
- **A** = Address error
- **L** = LED code error
- **C** = ADC code error
- **W** = Alarm invalid write

5.3 Settings window

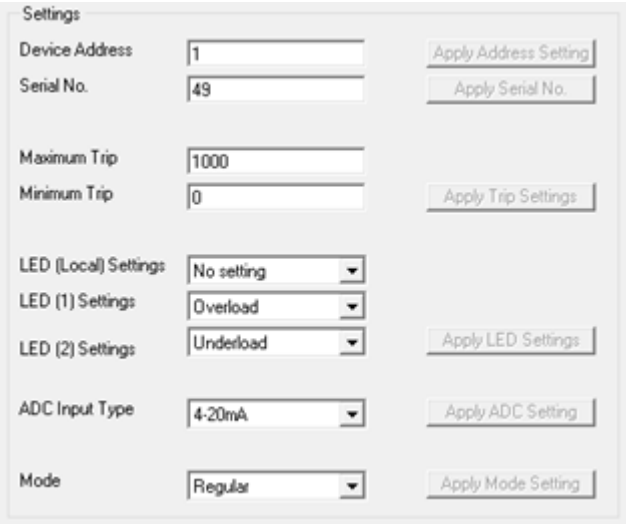


Figure 11. Settings window (Locked mode)

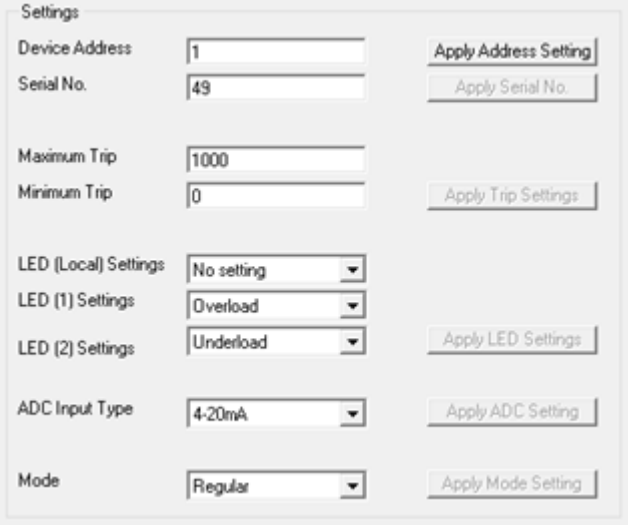


Figure 12. Settings window (User mode)

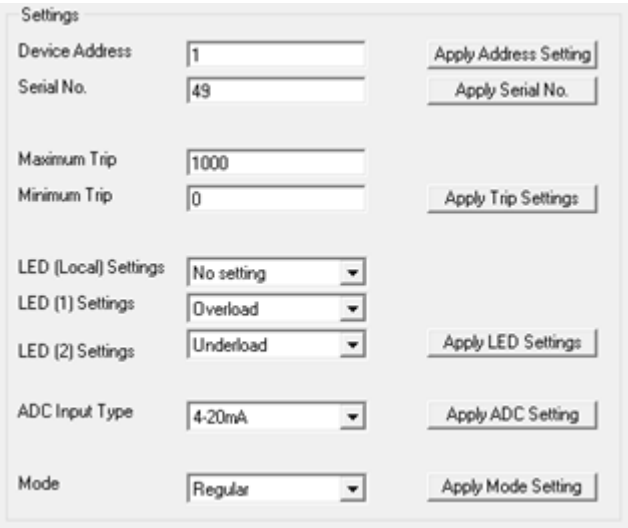


Figure 13. Settings window (Service mode)

The Libra Node can be programmed using the Settings window. Each setting can be applied by clicking the relevant button on the right. In Locked mode, all buttons are greyed out. In User mode, the only available button is the "Apply Address Setting" button.

- **Device Address** - change the comms address of the Libra Node.
- **Serial Number** - change the serial number of the Libra Node.
- **Maximum/Minimum Trip** – specify the upper and lower allowable load limits. These values tell the Libra Node whether an overload or underload has been detected.
- **LED settings (Local, 1 and 2)** – assign a characteristic to each LED, which can be selected using the drop-down menu.
- **ADC Input Type** – selects one of the three input types (Bridge, 4-20mA or 0-10V).
- **Mode** – when LEDs are connected, these can be configured in three ways:

  - **Regular** - the LEDs behave as configured in the LED settings.
  - **Stealth** - overrides all LEDs and turns them off.
  - **Ident** - flashes the LEDs to indicate which Libra Node you are currently communicating with

6. Addressing

The Addressing tab can be expanded to the right by clicking the Addressing button on the Login window. The Addressing tab allows users to search for Libra Nodes by either their comms address or serial number. "Quick Scan" will search by comms address and "Deep Scan" will search by serial number - the latter is useful for detecting Libra Nodes that may have the same comms address.

A quick scan should take no more than 30 seconds, whereas a deep scan can take up to 30 minutes. However, these times can be reduced by setting the number of Libra Nodes to find or changing the range of addresses/serial numbers to scan.

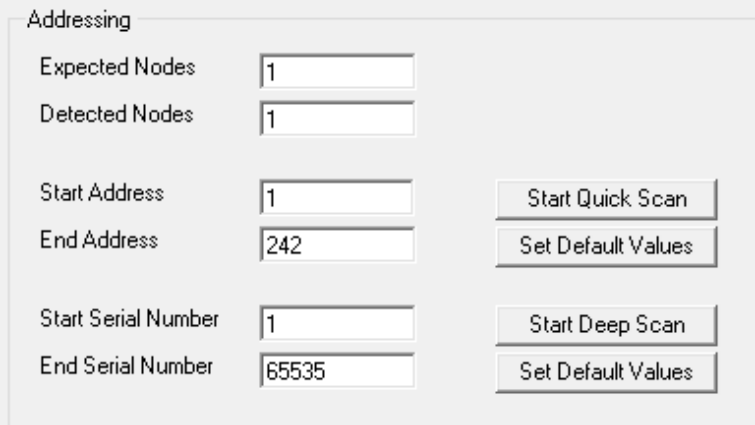


Figure 14. Addressing tab

6.1 Quick scan

1. Enter the expected number of Libra Nodes to be found.
2. If the range of comms addresses is known, enter the lowest value in the Start Address field and the highest value in the End Address field. If the range of comms address numbers is not known, click the Set Default Values button to use the minimum and maximum default values.
3. Click the Start Quick Scan button to begin the quick scan. The number of Libra Nodes detected in the scan will appear in the Detected Nodes field.

6.2 Deep scan

1. Enter the expected number of Libra Nodes to be found.
2. If the range of serial numbers is known, enter the lowest number in the Start Serial Number and the highest number in the End Serial Number field. If the range of serial numbers is not known, click the Set Default Values button to use the minimum and maximum default values.
3. Click the Start Deep Scan button to begin the quick scan. The number of Libra Nodes detected in the scan will appear in the Detected Nodes field.
4. When the scan is complete, detected Libra Nodes will appear as a list in the table below the data entry area.
5. To sort the list in numerical order, double click the column headings. Double clicking will change the order from ascending to descending. This can be done for both the Serial Number and Address columns.

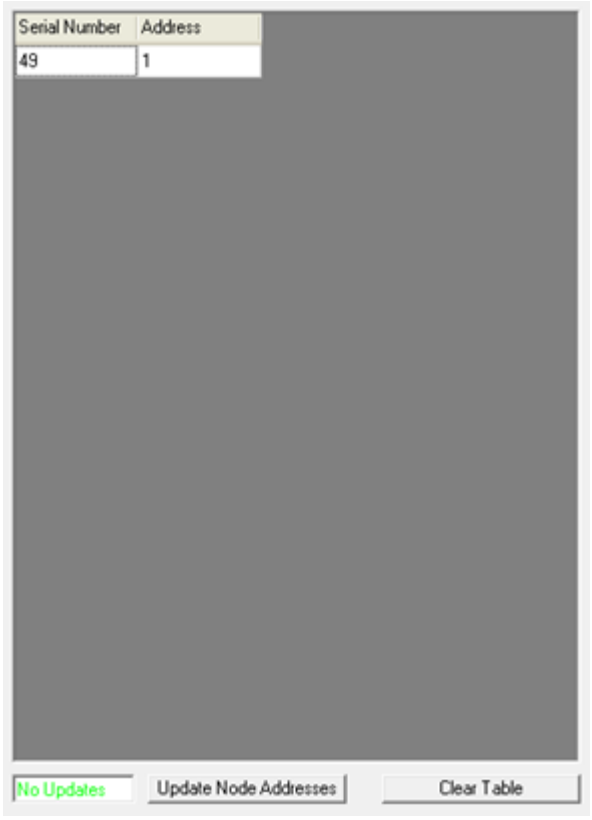


Figure 15. Addressing table

6.3 Change an address

1. Click the address number field in the table and enter the new number. The text field at the bottom of the display then changes from ‘No Updates’ in green to ‘Updates’ in red.
2. Click the Update Node Addresses button to complete the change. Once updated, the text field will return to ‘No Updates’ in green.
3. To clear the table and begin a new scan click the Clear Table button.
4. Once the scan is complete the available addresses can be selected from the Comms Address drop-down list on the Login window.

7. Calibration

Calibration of the Libra Node must only be performed by competent and trained personnel, so that previously entered data is not accidentally deleted or overwritten.

The Calibration tab is only available in Service mode. The Calibration tab can be expanded to the right by clicking the Calibration button on the Login window when in Service mode.

When setting up inputs to the Libra Node for the first time, a calibration must be performed so that the output of the load cell can be matched to different loads. The higher the number of calibration points, the more accurate the calibration will be, as illustrated below.

Note that it is not necessary to set the calibration points in equal increments. You may, for example, want to focus the calibration more towards the maximum load.

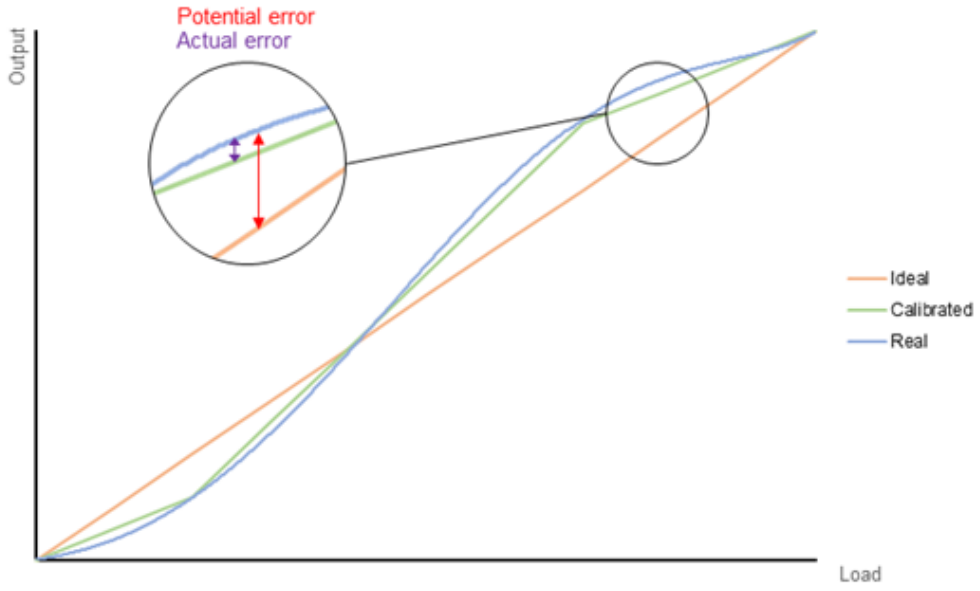


Figure 16. Example load data

7.1 Start the calibration

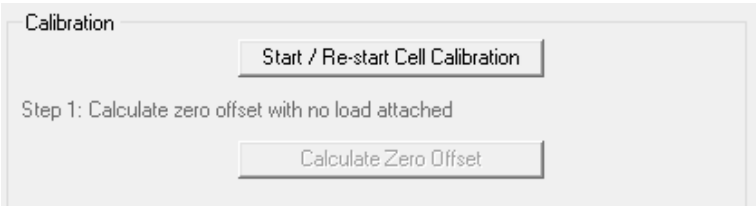


Figure 17. Start the calibration

1. Click the Start / Re-Start Cell Calibration button and then enter the serial number on the subsequent pop-up window. The serial number must be entered in order to prevent inadvertent alteration and can be found in the Device Serial Number field on the Status section.
2. Make sure the load cell is in its zero state (no load attached) and then click the Calculate Zero Offset button to set the zero-state value.

Note: if a mistake is made when entering values during the subsequent steps, click the Start / Re-Start Cell Calibration button to restart the calibration.

7.2 Set calibration parameters

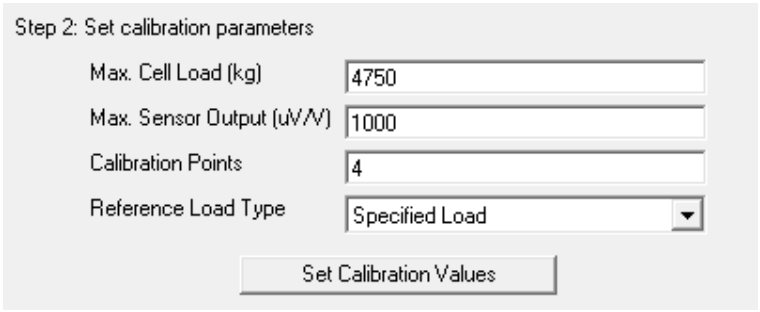


Figure 18. Set calibration parameters

1. Enter the maximum load of the load cell, as obtained from the manufacturer's datasheet, into the Maximum Cell Load field.
2. Enter the maximum output of the load cell, as obtained from the manufacturer's datasheet, into the Maximum Sensor Output field.
3. Enter the the desired number of calibration points into the Calibration Points field; the more points entered, the more accurate the calibration will be. Note that it is not necessary for the calibration points to be set in equal increments, as you may want the calibration to be more focused around a certain load.
4. Select the Load Type from the drop-down list. There are three options:

    - **Specified Load**: manually type in each load value
    - **Reference Libra**: uses a calibrated Kinesys Libra device (Libra Cell or Libra Node) on the same network as a reference device.
    - **Reference Device**: uses a calibrated device connected via a serial port as a reference, e.g. a Libra Cell connected through a Libra Basic or Libra Pro.

5. Click the Set Calibration Values button.

7.3 Attach reference loads

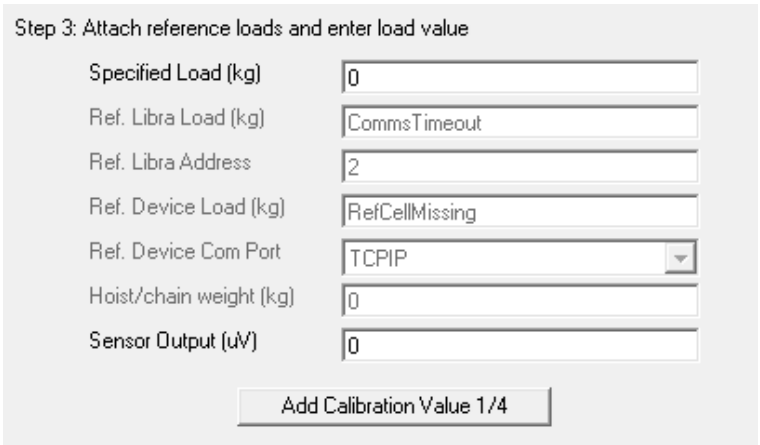


Figure 19. Attach reference loads

Note: the editable fields depend on which option was selected from the drop-down list in section 7.2.

7.3.1 Using specified loads

1. Enter the smallest load value in the Specified Load field. This must be greater than 0.
2. Attach this load to the load cell. The value in the Sensor Output field should change at this point.
3. Click the Add Calibration Value button. The value displayed in the button now increases by one (in the example shown in Figure 19) it would go from 1/4 to 2/4).
4. Continue to enter and attach the remaining loads until all calibration points have been added (in the example shown in Figure 19, until the button reads 4/4).

7.3.2 Using a reference Node / reference load cell data

1. Enter the unladen load value of the reference measurement in the Hoist/chain weight field.
2. Either enter the reference Libra address in the Ref. Libra Address field or the reference cell's COM port in the Ref. Device Com Port field.
3. Once the correct address has been entered, a reading should appear in either the Ref. Libra Load field or Ref. Device Load field.
4. Attach the first load. Click the Add Calibration Value button. The value displayed in the button now increases by one (in the example shown in Figure 19) it would go from 1/4 to 2/4).
5. Continue to enter and attach the remaining loads until all calibration points have been added (in the example shown in Figure 19, until the button reads 4/4).

7.4 Check calibration against attached reference loads

This step involves progressively removing the load that has been added in order to make sure the calibration is correct and accurate.

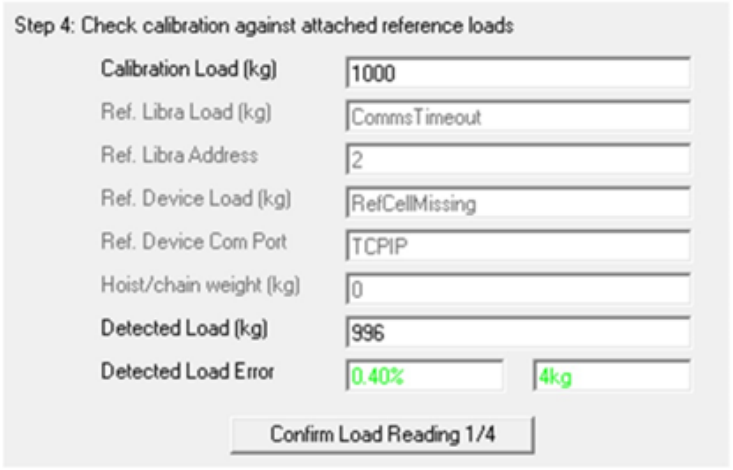


Figure 20. Check calibration against attached reference loads

Note: the editable fileds depend on which option was selected from the drop-down list in section 7.2.

7.4.1 Using specified loads

1. Enter the largest load value in the Calibration Load field. If continuing from section 7.3, this load should still be attached. Re-attach the load if it is not.
2. Make sure the value in the Detected Load field matches the value in the Calibration Load field. If the values are within an acceptable range, the Detected Load Error field will display a percentage close to 0.00 and the text will be green. If the values are too far apart, the percentage will increase and the text will turn red, indicating that the calibration has failed.
3. Click the Confirm Load Reading button to complete the calibration of the load point. The value displayed in the button now increases by one (in the example shown in Figure 20, from 1/4 to 2/4).
4. Continue to enter and remove the remaining loads until all calibration points have been verified (in the example shown in Figure 20, until the button reads 4/4).

7.4.2 Using a reference Node / reference load cell data

1. Either enter the reference address in the Ref. Libra Address field or the reference cell's COM port in the Ref. Device Com Port field.
2. Once the correct address has been entered, note the value displayed in either the Ref. Libra Load field or Ref. Device Load field. If continuing from section 7.3, this load should still be attached. Re-attach the load if it is not.
3. Click the Confirm Load Reading button to complete the calibration of the load point. The value displayed in the button now increases by one (in the example shown in Figure 20, from 1/4 to 2/4).
4. Remove loads in reverse order from which they were added, checking that the reference measurement matches that of the calibrated Libra Node. Continue until all calibration points have been verified (in the example shown in Figure 20, until the button reads 4/4).

Whether using specified or reference loads, once the final load has been verified, a pop-up window will appear confirming that the calibration is complete. The "Must Calibrate" indicator in the Status area will also turn from red to green. If any measurements cannot be verified, the calibration has failed and must be restarted.

8. Checking

The Checking tab is only available in Service mode and can be expanded to the right by clicking the Checking button on the Login window. This feature allows users to check the load data against a reference measurement.

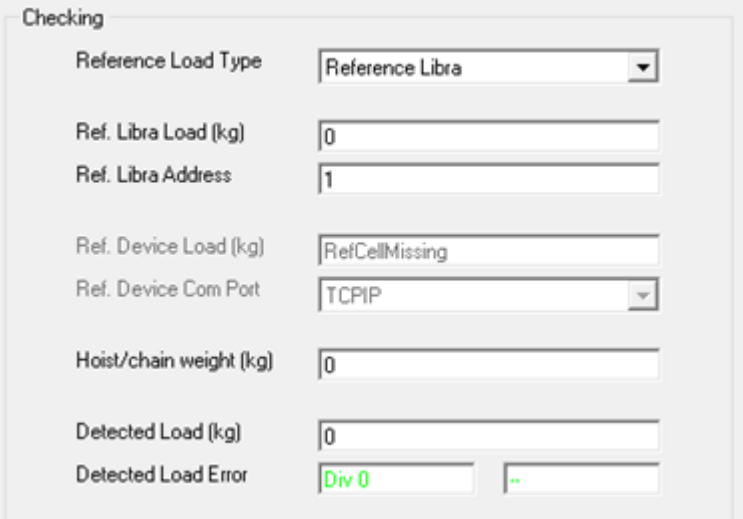


Figure 21. Checking tab

1. From the drop-down list, select either:

   - **Reference Libra**: uses a calibrated Kinesys Libra device (Libra Cell or Libra Node) on the same network as a reference.
   - **Reference Device**: uses a calibrated device connected via a serial port as a reference, e.g. a Libra Cell connected through a Libra Basic or Libra Pro.

2. Enter the Libra address in the Ref. Node Address field or the reference device's COM port in the Ref. Cell Port field.
3. If the reference cell is also holding the weight of the Node and any associated hoist/chain, enter the hoist/chain weight to provide a tare value and compensate for the extra weight.
4. Attach a load. The values shown in the Ref. Load and Detected Load fields should both change to the same value.
5. The percentage error between the reference load and detected load will be displayed in the Detected Load Error field. A green text percentage indicates an acceptable error value; a red text percentage indicates the difference is too large indicating that calibration must be carried out.

9. Product specifications

Feature	Specification
Dimensions (L x W X H)	76 mm x 35.5 mm x 38 mm (3.0 in x 1.4 in x 1.5 in)
Weight	51.4 g (0.11 lbs)

10. Service & End of Life

In the event of a product being considered beyond economic repair it should be disposed of with care and in line with local legislation on disposal of Waste Electrical and Electronic Equipment (WEEE).

In Europe WEEE shall be disposed of in accordance with European Union Directive 2012/19/EU.

In most regions of the world, similar legislation exists to ensure that WEEE is handled separately to maximise reuse of materials and avoidance of landfill.