

CUBISCAN[®] 100-T



Operations and technical manual

Version 1.2

Quantronix, Inc.
Cubing and Weighing Systems

314 South 200 West
Farmington, Utah 84025
U. S. A.

Phone: 801.451.7000
Website: <http://www.Cubiscan.com>



Cubiscan 100-T operations and technical manual

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CAUTION

The Cubiscan 100-T should only be serviced by qualified personnel.
Observe precautions for handling electrostatic sensitive devices when setting up or operating the Cubiscan 100-T.



WARNING

Disconnect all power to the Cubiscan 100-T before servicing or making any connections.
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The Cubiscan 100-T is to be used to determine freight charges of rigid, non-sound-absorbing, cuboidal objects only. Dimensions shown on the display are of the smallest cuboidal shape in which the object may be enclosed.

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What's new in version 1.2?

- Updated parts list.

This document was created with the purpose of providing the most accurate and complete information. If you have comments or suggestions for improving this manual, contact Cubiscan at manual@cubiscan.com.

Manual updated December 3, 2021.

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CHAPTER 1

PRODUCT DESCRIPTION

The Cubiscan 100-T is a precision volume measuring and weighing instrument for use in applications in which precise weighing and measuring is required.

The Cubiscan 100-T design is unique because it combines parcel dimensional measuring and weighing into one operation. The collected data is formatted and transmitted to a host computer via a serial RS-232, Ethernet, or USB port. The collected data is also displayed on the control panel.

The Cubiscan 100-T has three sensors (ultrasonic transducers) that determine the length, width, and height of an object placed on its measuring surface. The object is simultaneously weighed by a precision aluminum load cell. The load cell and sensors are controlled by a proprietary Cubiscan controller. The controller, load cell, and support circuitry are located in the base of the Cubiscan 100-T.

The Cubiscan 100-T has been designed for use in industrial environments. The load cell, frame, and sensor housing are made of forged and machined aluminum. A mobile cart and useful accessories such as a portable power supply are available to create a completely mobile cubing, weighing, and identification workstation.

The Cubiscan 100-T is easy to assemble, set up, operate, and maintain. Its simple design and extreme accuracy coupled with intelligent, self-contained circuitry make the Cubiscan 100-T a valuable weighing and measuring tool.

The Cubiscan 100-T was calibrated at the factory, but may require recalibration due to handling during shipping. For complete calibration instructions for the Cubiscan 100-T, see "CALIBRATION" on page 34.



Figure 1
Cubiscan 100-T

Specifications

Electrical

Voltage:	100-240 VAC, 47-63 Hz
Current:	1.05 A maximum current draw, 0.15 A typical
Power Supply:	External switching +12V DC @ 3.75 A

Measuring Capacities

Minimum Package Dimensions: 0.5 x 0.5 x 0.5 in
(1.0 x 1.0 x 1.0 cm)

Maximum Package Dimensions: 24 x 24 x 36 in
(60 x 60 x 90 cm)

Dimension Increment: 0.1 in (0.2 cm)

Maximum Package Weight: 100 lb (50 kg)

Weight Increment: 0.05 lb (0.02 kg)

Environmental

Operating Temperature: 14° to 104° F
(-10° to 40° C)

Humidity: 0 to 90% non-condensing

Physical

Measuring Surface: 24 x 24 in (61 x 61 cm)

Total Footprint Required: 30 x 30 in (76 x 76 cm)

Height: 46 in (117 cm)

Shipping Weight: 70 lb (32 kg)

Net Weight: 57 lb (26 kg)

Shipping Dimensions: 34 x 46.5 x 8.5 in (86 x 118 x 22 cm)

User Interface

Minimum PC Specifications:
Windows 11 or newer, Pentium II processor, 20 megabytes of disk space,
screen resolution setting of 800 x 600

Cubiscan's QBIT™ software can be used to interface with the Cubiscan 100-T.

Display:

Integrated TFT LCD touchscreen displays L, W, H, weight, unit of measure, and diagnostic codes

Outputs:

Serial for computer (1)

Serial for scanner/printer (1)

Ethernet for computer (1)

USB-A for scanner (1)

USB-B for computer (1)

Firmware required:

Version 1.600B01 or higher.

CHAPTER 2

SETUP

This chapter provides instructions for assembling and setting up the Cubiscan 100-T. Perform the steps to set up the Cubiscan 100-T in the following order:

- Unpack the Cubiscan (page 5)
- Place the Cubiscan where you will be using it (page 6)
- Assemble the Cubiscan (page 7)
- Remove the shipping bolts (page 12)
- Level the Cubiscan (page 13)
- Connect power to the Cubiscan and place the sound dampening cover and base cover on the base (page 15)
- Turn on the Cubiscan 100-T (page 16)
- Connect the Cubiscan to a computer or network (optional) (page 16)
- Connect the Cubiscan to a barcode scanner (optional) (page 19)
- Install the Qbit software (optional) (page 21)

Unpacking



Examine the container and the Cubiscan 100-T carefully for any damage. If, after unpacking, you discover any damage to the Cubiscan 100-T, contact the carrier immediately.

The Cubiscan 100-T is shipped in a single container with all components. Refer to the list below to identify the components.

- Base
- Side panels (right side panel has standoffs, left side panel has wrap-around edge)
- Base cover
- White sound dampening pad
- (3) sensors in aluminum housings with mounting screws and washers
- AC power cord
- USB cable

Calibration cube
Operations and Technical Manual (in PDF form on the flashdrive)
Bag with tare strips, two bent and one square

Accessories and tools packed with the Cubiscan 100-T include the following:

(6) M5 x 0.8 x 14 screws (for sensor mounting)
(6) M5 split washers (for sensor mounting)
(5) M5 x 0.8 x 12 screws (for spine mounting)
2.5 mm Allen wrench
4.0 mm Allen wrench
5.0 mm Allen wrench
6.0 mm Allen wrench

If any of the components or accessories are missing or defective, contact Cubiscan or your system integrator.



A power strip (not included) is recommended for turning power off and on.

Placement



The Cubiscan 100-T is designed to be operated in a warehouse environment; however, for proper operation the following conditions should be met if possible.

- Do not subject the Cubiscan to extremes in temperature or humidity. Locate the Cubiscan as far from open freight doors as possible. Heaters or air conditioners should not blow directly on the Cubiscan.
- Protect the Cubiscan from static electricity, especially the control panel.
- Place the Cubiscan on a flat, sturdy surface as free from vibration as possible. Excess vibration can reduce the accuracy of the Cubiscan 100-T scale.
- The Cubiscan's platform is free-floating—it is resting on a spring (load cell). Maintain a minimum of one-inch clearance at the back and sides of the Cubiscan. Do not rest objects against or set objects on the Cubiscan when not in use.
- If a computer is used, place it as close to the Cubiscan as possible. The operator needs to use the keyboard or mouse on the computer while cubing and weighing packages using the Cubiscan 100-T.
- Orient the Cubiscan so the control panel faces the operator.

An optional cart and portable power supply are available from Cubiscan to create a completely mobile cubing, weighing, and identification workstation.

Assembling the Cubiscan 100-T

This section provides instructions for assembling the Cubiscan 100-T by taking the following steps:

- Attach the side panels to the base (page 8)
- Route the height sensor cable through the corner channel where the right and left panels meet (page 9)
- Attach the sensors to the frame (page 10)
- Connect the RJ-45 connectors on the sensor cables to the sensors (page 10)

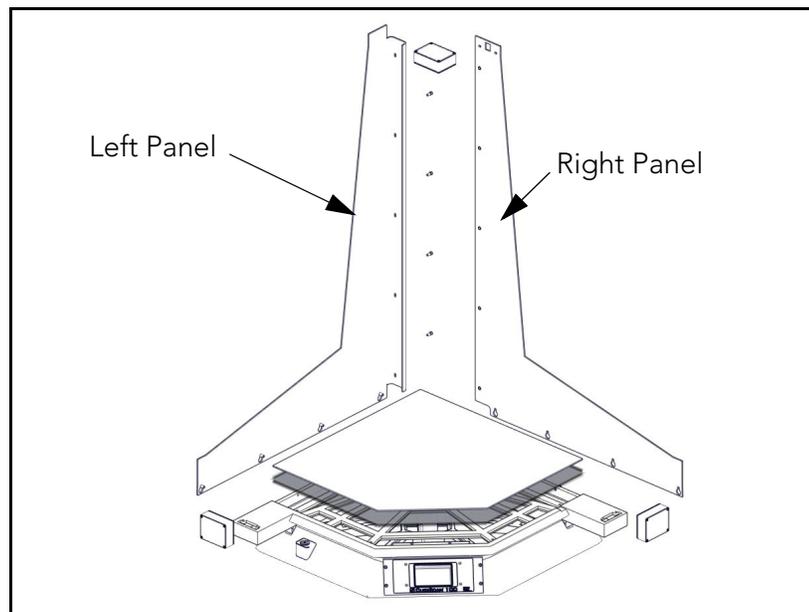


Figure 2
Cubiscan 100-T assembly overview

Attaching the side panels

The left and right side are determined when facing the front of the Cubiscan. The left side panel has a wrap-around edge and the right side panel has standoffs that extend from the edge. Each side panel has five tapered holes that align with the mounting screws. Figure 3 shows the panels aligned but not attached. Figure 4 shows the panels attached.

NOTE >

Do not remove the four (total of eight) mounting screws along each side of the Cubiscan base.

Take the following steps to attach the two side panels to the Cubiscan 100-T base.

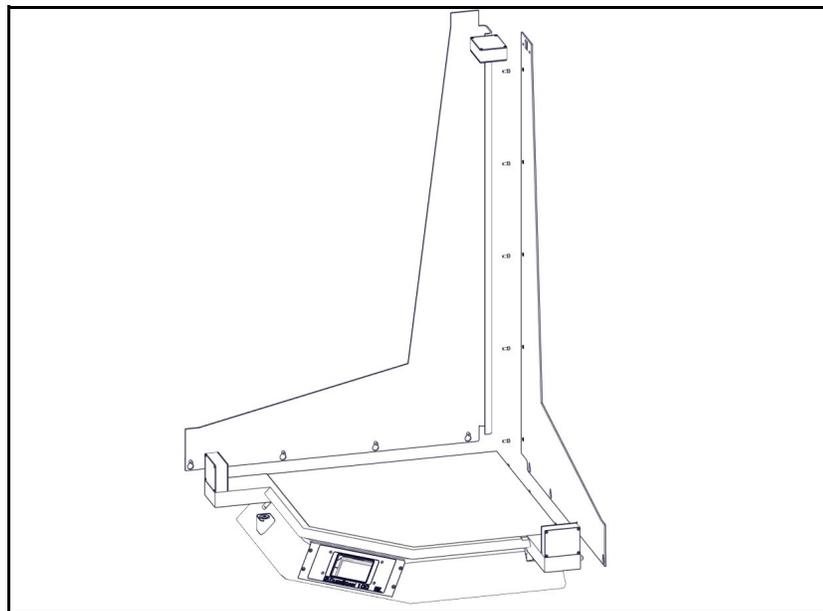


Figure 3
Side panels aligned (not attached)

1. Loosen the eight bolts that attach the panels at the base.
2. Align the tapered holes along the right side panel's bottom edge with the four mounting screws on the right side (when facing the front of the Cubiscan) of the Cubiscan base.
3. Push the panel into place so that the widest part of the holes are over the screws, and let the screws slide into the narrow part of the holes.
4. Using the 5.0 mm Allen wrench, tighten all of the screws except the one closest to the front (you will tighten it later).

5. Align the tapered holes along the left side panel's bottom edge with the four mounting screws on the left side (when facing the front of the Cubiscan) of the Cubiscan base. The back edge of the panel will wrap around the back edge of the right panel.
6. Push the panel into place so that the widest part of the holes are over the screws, and let the screws slide into the narrow part of the holes.
7. Using the 5.0 mm Allen wrench, tighten all of the screws except the one closest to the front (you will tighten it later).

NOTE > Do not attach the five screws that hold the side panels together at the back. You will attach them later.

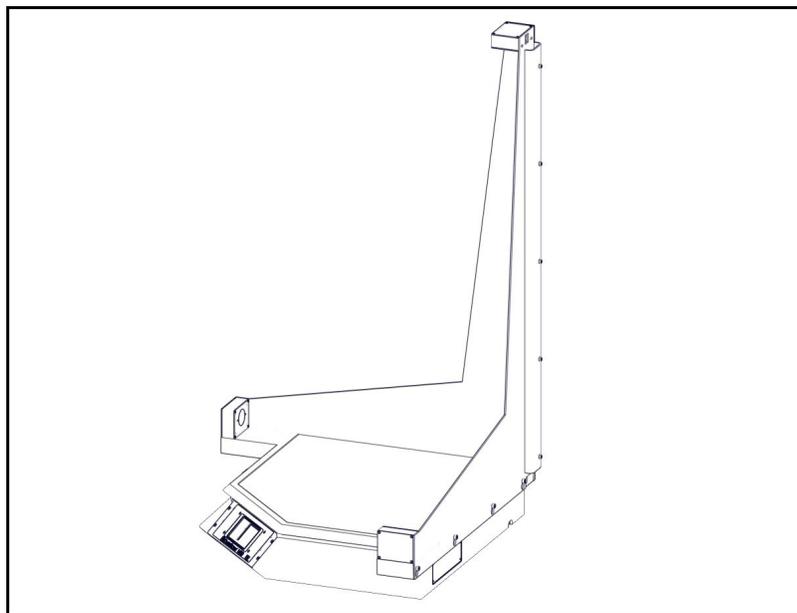


Figure 4
Side panels attached

Routing the height sensor cable

The height sensor cable (gray cable with an RJ-45 connector) is coiled and tied inside the base frame. Do the following to route the cable to the top of the Cubiscan.

1. Untie the cable and route the end of it through the hole in the back corner of the base.
2. Moving to the outside of the Cubiscan, pull the length of the cable out through the hole.

NOTE > Do not pull the cable too tightly. Because the height sensor cable crosses between the scale platform and the base, if the cable is too tight, the resulting tension may restrict scale movement.

The screws that hold the two panels together should not be attached. If they are, you need to remove them.

3. Slip the cable between the panels into the channel that is formed at the corner (see Figure 5).



Figure 5

Routing the height sensor cable between the side panels

4. Route enough of the cable through the channel so the connector extends from the top. Use a tie or bend the cable to keep it from falling back into the channel. Do not apply pressure to the other end of the cable.
5. Attach the five M5 x 0.8 x 12 screws to the back vertical corner where the two panels come together. Verify that the cable is free and the connector still extends from the top, and then tighten the screws.

Attaching the sensors

Though the height, width, and length sensors are each the same type of sensor, they have been calibrated to position. The height sensor is labeled **Top**, the length sensor is labeled **Left**, and the width sensor is labeled

Right. Take the following steps to attach the three sensors to the Cubiscan frame.

**WARNING**

Do not touch the gold foil screens on the front of the sensors.

1. Place the width sensor, labeled **Right**, on the right, front corner of the base (see Figure 6). You will need to push the side panel out slightly to place the sensor in the correct position. If you tightened the front-most screw, you need to loosen it.
2. Align the threaded holes in the bottom of the sensor casing with the holes in the base frame.
3. Insert the M5 hex-head screws with split washer up through the frame and thread them into the sensor casing.
4. Attach the length sensor, labeled **Left**, on the left front corner, in the same manner.

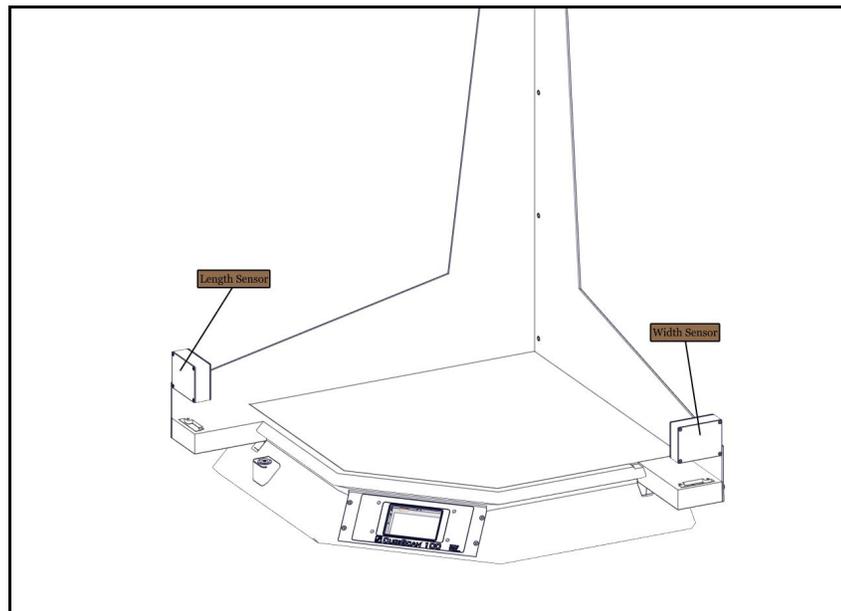


Figure 6

Attaching the length (left) and width (right) sensors

5. Place the height sensor, labeled **Top**, at the top of the corner where the side panels meet (see Figure 7), and align the screw holes.

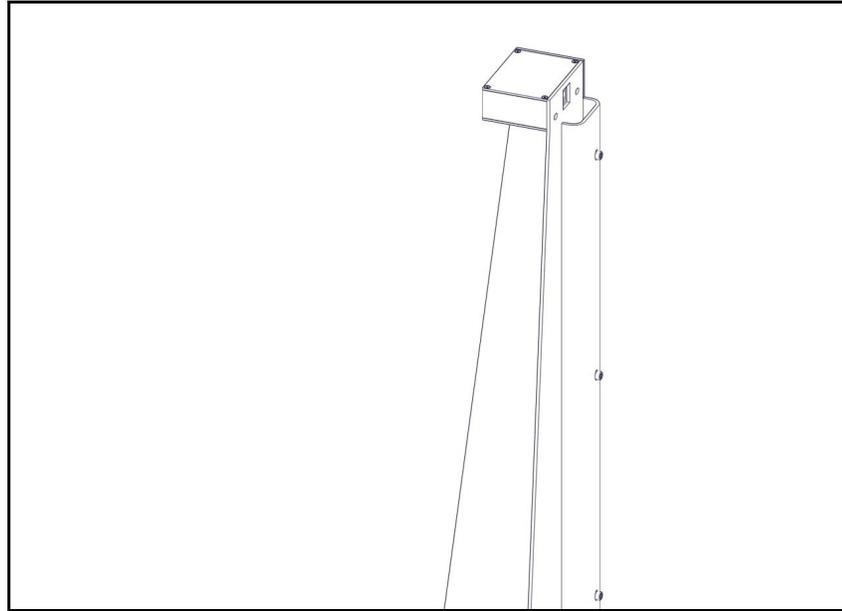


Figure 7
Attaching the height (top) sensor

6. Insert the M5 hex-head screws with split washers through the holes in the back of the corner, and thread them into the sensor casing.
7. Connect the RJ-45 connector at each sensor location to the connector on the back of the sensor.
8. Tighten the front screws that hold the side panels to the base, and verify that all screws are securely tightened.

Removing the shipping bolts



Three shipping bolts are located on the Cubiscan base to anchor the load cell to the base during shipping. The shipping bolts are fastened through the frame arm and the base leg. The pointers in Figure 8 show the bolt locations.

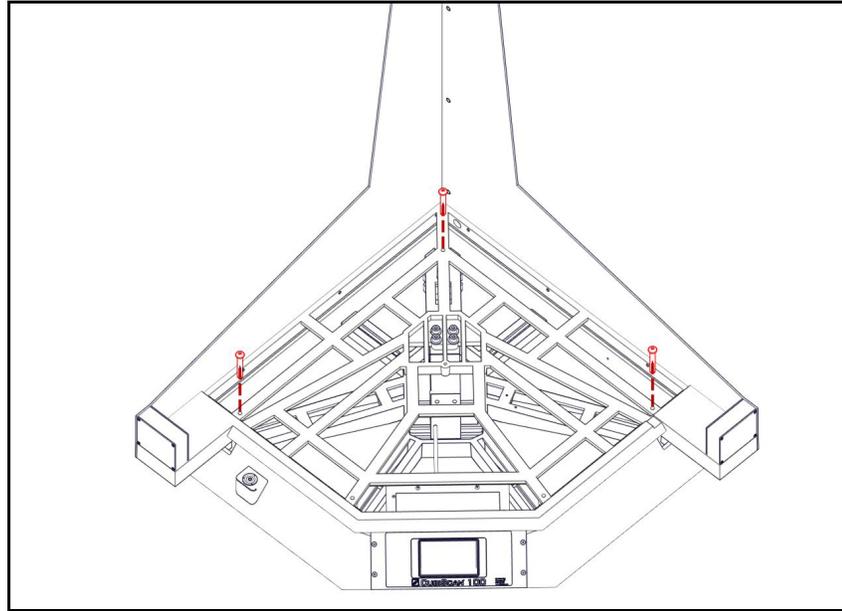


Figure 8
Shipping bolt locations

1. After the Cubiscan is assembled, use the 6.0 mm Allen wrench to remove the shipping bolts.
2. Proceed to the next section for information on leveling the Cubiscan. Do not place the sound dampening pad and base cover on the base until you have leveled the Cubiscan and connected all cables, as described in the following sections.

NOTE > *The bolts protect the load cell from damage during shipment. Retain the shipping bolts and reattach them if you move the Cubiscan or ship it to a different location.*

Leveling

After assembling the Cubiscan and removing the shipping bolts, take the following steps to level the Cubiscan base.

1. Locate the five leveling legs under the base. Their positions are indicated by the pointers in Figure 9 below.

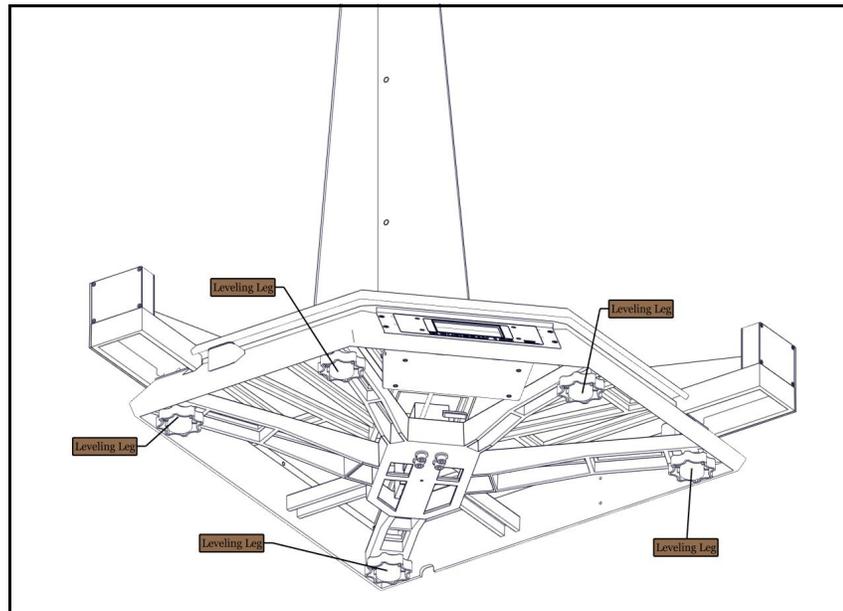


Figure 9
Leveling leg positions

2. Figure 10 shows the location of the leveling bubble. Look at the leveling bubble and determine if the Cubiscan 100-T is level.

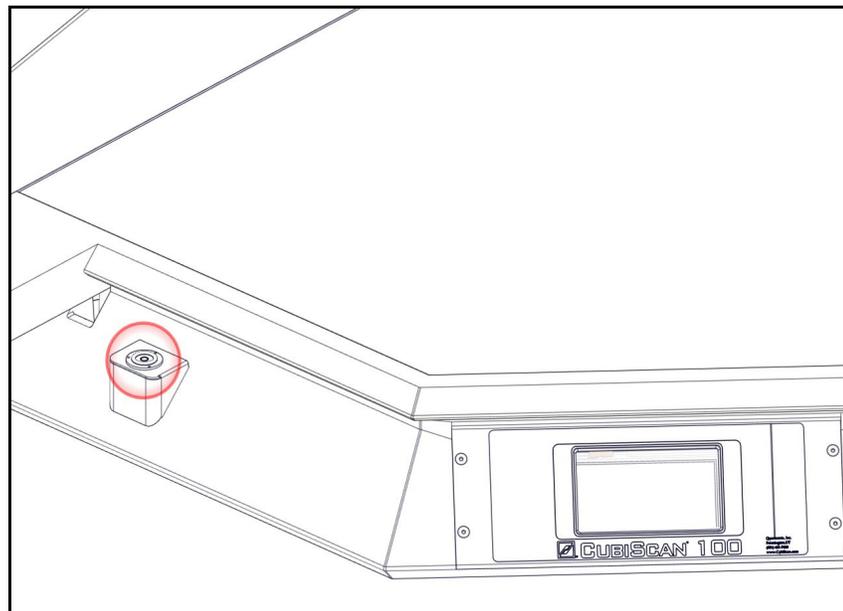


Figure 10
Leveling bubble location

A close-up of the bubble level is shown below.

3. If the base is not level, adjust the legs up or down until the bubble is centered in or touching the center circle of the level. To adjust the height of a leg, lift the base slightly and turn the threaded leg. Looking toward the leg, turn it clockwise to lower it and counterclockwise to raise it.

NOTE 

When you are finished leveling the Cubiscan, verify that all five of the Cubiscan's legs are resting on the supporting surface. If the Cubiscan does not sit flat, it may wobble or vibrate during measurements, which can cause errors.

4. Proceed to the following sections for information on connecting a computer (optional), a barcode scanner (optional), and power to the Cubiscan. Do not place the sound dampening pad and base cover on the base until you have connected all cables.

Connecting Power



The Cubiscan 100-T uses an external AC power adapter. Take the following steps to connect power to the Cubiscan.

1. Locate the AC power adapter, which is bundled inside the Cubiscan base. The DC power cord from the power adapter is attached to the controller box.
2. Locate the AC power cord (supplied), and connect it to the AC power adapter.
3. Route the AC power cord under the Cubiscan base so it cannot be crushed, bent, or pulled loose.
4. Connect the other end of the AC power cord to a standard power strip equipped with an ON/OFF switch.
5. Place the white sound dampening pad and then the black base cover on the top of the base. When properly inserted, the cover should rest flush with the edge of the base.
6. Use the power strip switch to turn the Cubiscan on and off (see "Turning on the Cubiscan" on page 16).

Turning on the Cubiscan



Specific procedures must be followed each time you turn on the Cubiscan 100-T, as follows:

1. Make sure there are no packages or other objects on the Cubiscan platform.
2. Turn on the Cubiscan 100-T via the power strip (see “Connecting Power” on page 15).

The Cubiscan performs self-calibration and diagnostic procedures that take about five seconds. Do not touch the Cubiscan platform during these five seconds.

Connecting to a computer or network



To operate the Cubiscan 100-T, you can connect it to a computer or a network, or you can use the control panel, as follows:

- Connect it via a USB to USB cable. Use Qbit software on the computer to run the Cubiscan 100-T.
- Connect it to a host system via a standard 10-BaseT Ethernet TCP/IP port.
- Connect it to a PC using a serial RS-232 cable.

USB connection

Complete the following steps to connect the Cubiscan 100-T to a computer using a USB connection. The USB connection method is the recommended method, and all materials needed for communicating with a computer are supplied.

1. Place the computer in its permanent location, generally close to the Cubiscan. (Refer to “Placement” on page 6 for more information.)
2. Route the USB cable under the base so it cannot be crushed, bent, or pulled loose.

3. The Cubiscan controller is located just behind the control panel at the front of the base. Connect one end of the USB cable to the USB connector on the back of the Cubiscan controller, as shown below.

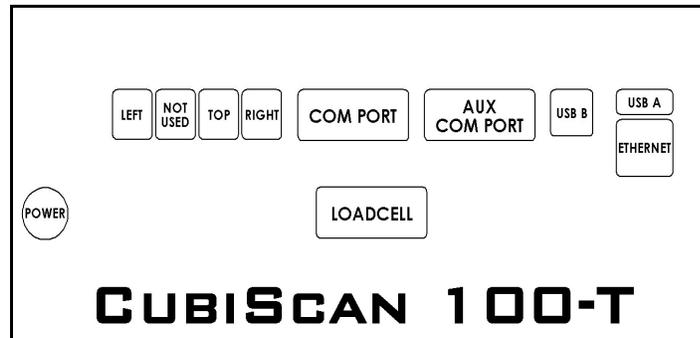


Figure 11
Back of controller

4. Locate a free USB port on your computer and connect the other end of the USB cable to the port.

When you have completed these steps, the Cubiscan 100-T should communicate with a computer.

Ethernet connection

Complete the following steps to connect the Cubiscan 100-T to a computer using an Ethernet connection.

1. Place the computer in its permanent location, generally close to the Cubiscan. (Refer to "Placement" on page 6 for more information.)
2. Route the Ethernet cable under the base so it cannot be crushed, bent, or pulled loose.
3. The Cubiscan controller is located just behind the control panel at the front of the base. Connect one end of the Ethernet cable to the Ethernet connector on the back of the Cubiscan controller, as shown below. Push the connector in until it locks. There should be an audible snap when it locks.

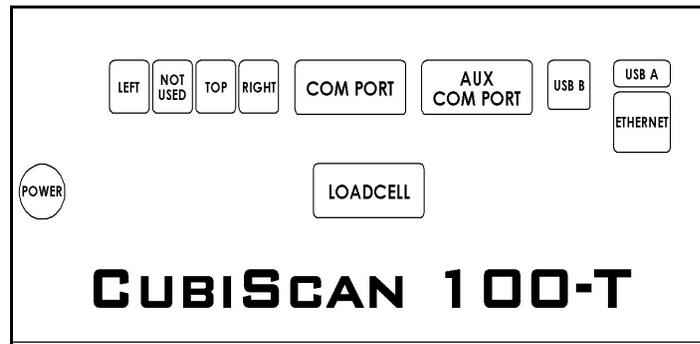


Figure 12
Back of controller

4. Insert the connector on the other end of the cable into the computer's network socket until it locks.
5. Refer to APPENDIX A "COMMUNICATIONS PROTOCOL" for information on the TCP/IP command protocol and setup parameters. Contact Cubiscan if you need additional assistance.

For information on the Ethernet cable pin-outs, refer to Ethernet cable pin assignments on page 67.

Serial connection

Complete the following steps to connect the Cubiscan 100-T to a computer using a serial connection.

1. Place the computer in its permanent location, generally close to the Cubiscan. (Refer to "Placement" on page 6 for more information.)
2. Route the RS-232 serial communications cable through the opening in the base so it cannot be crushed, bent, or pulled loose.
3. The Cubiscan controller is located just behind the control panel at the front of the base. Connect one end of the serial cable to the serial connector on the back of the Cubiscan controller, as shown below.

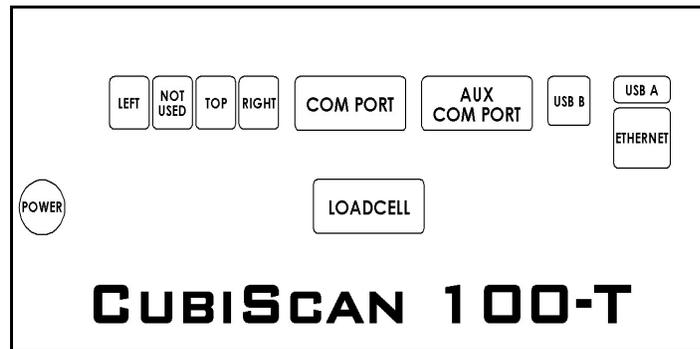


Figure 13
Back of controller

4. Locate a free serial port on the back of your computer and connect the other end of the serial cable to the port.
5. To secure the serial cable, tighten the screws (two on each connector) at both ends of the cable. It is important that the cable be secure.

For information on the serial cable pin-outs, refer to cable pin assignments on page 66.

Connecting to a barcode scanner (optional)

The Cubiscan 100-T has an additional USB port for connecting to a barcode scanner. To connect the Cubiscan to a barcode scanner, complete the following steps.

NOTE >

This barcode connection option is for non-Qbit software users. If you are using Qbit software, you will connect the barcode scanner directly to the PC.

1. Route the barcode scanner USB cable under the Cubiscan base so it cannot be crushed, bent, or pulled loose.
2. The Cubiscan controller is located just behind the control panel at the front of the base. Connect the free end of the USB cable to the barcode

scanner connector on the back of the Cubiscan controller, as shown below.

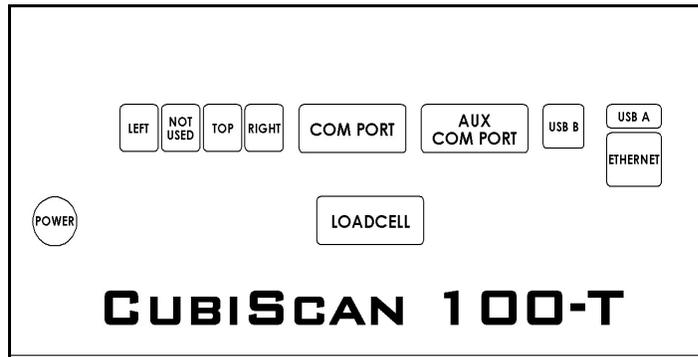


Figure 14
Back of controller

3. Once the barcode scanner is connected to the Cubiscan 100-T, you need to turn the barcode feature on. On the Cubiscan 100-T touchscreen, go to **CONFIGURE > Operation**.
4. Check the **Enable Barcode** box, as shown below. Make sure that the **Enable Expanded Protocol** box is also checked. This option must be enabled for the barcode to work properly.



Figure 15
Barcode enabled

A new barcode field will appear on the home screen and the barcode data will be included in the data packet.

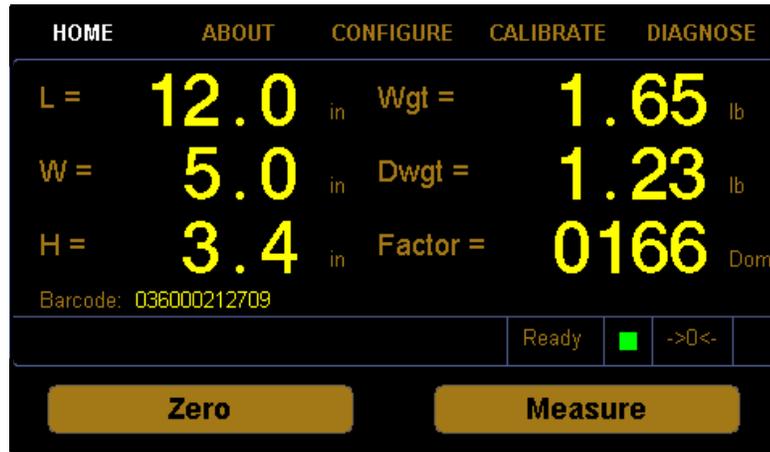


Figure 16
Home screen barcode enabled

Installing Qbit (optional)

A flash drive is available containing the Qbit application, which can be used to operate the Cubiscan 100-T.

The *Qbit User Guide*, located on the flash drive, provides instructions for installing and using Qbit. You can also download the user guide from the Cubiscan website at www.cubiscan.com.

Setup checklist

Before using the Cubiscan 100-T for the first time, verify the following:

- Have the Cubiscan 100-L and the computer (if applicable) been placed in the proper operating environment? (page 6)
- Has the Cubiscan been fully assembled? (page 7)
- Have the three sensors been attached to the Cubiscan, and have the sensor cables been connected to the sensors? (page 10)
- Have all screws, bolts, and nuts been tightened?

- Have the shipping bolts been removed? (page 12)
- Has the base of the Cubiscan been leveled? (page 13)
- Is the Cubiscan free moving? The Cubiscan should not be pushed up against a wall and no object, cable, etc., should be resting on it or against it. (page 6)
- Has the AC power adapter been connected correctly? (page 15)
- Has the Cubiscan 100-T been set up to communicate with a computer (if applicable)? (page 16)
- (Optional) Has the barcode scanner been connected properly? (page 19)
- If you are using Qbit to operate the Cubiscan 100-T, has the application been copied onto your computer's hard-disk drive? (Refer to the *Qbit User Guide* for information.)
- Does the Cubiscan require recalibration? The Cubiscan 100-T was calibrated at the factory, but *may* require recalibration due to handling during shipping. Refer to page 34 for information on calibrating the Cubiscan 100-T. If you are using Qbit software, check the status of the Cubiscan before operating it. Refer to the *Qbit User Guide* for information on checking the Cubiscan's status.

CHAPTER 3

OPERATION

This chapter provides instructions for operating the Cubiscan 100-T.



The platform of the Cubiscan should be kept clean and free of objects that are not being measured.

Before you begin



Follow the procedures below to turn on the Cubiscan. The Cubiscan should be turned on before you start Qbit (if applicable).

1. Make sure there are no packages or objects on the Cubiscan platform.
2. Turn on the Cubiscan 100-T via the power strip. The Cubiscan performs self-calibration and diagnostic procedures that take about five seconds. Do not touch the Cubiscan platform during these five seconds.



Do not lean on or touch the Cubiscan platform or the package while a package is being cubed and weighed. Any kind of contact with the platform during the measurement process can alter the weight or sensor reading.



You should occasionally verify that the zero settings on the Cubiscan are correct. To do this, take a measurement with nothing on the scale and see if all values recorded are zero. The Cubiscan's empty weight and measurements can be reset to zero (zeroed) at any time (refer to the Qbit User Guide or to "Zeroing the Cubiscan 100-T" on page 26).



WARNING

Disconnect all power to the Cubiscan 100-T before servicing or making any connections.

Cubing and weighing using Qbit for windows

Refer to the *Qbit User Guide* for instructions on cubing and weighing and other functions in Qbit. The *Qbit User Guide* is provided on flash drive or you can download it from the Cubiscan website at www.cubiscan.com.

NOTE > For information on measuring odd-shaped packages, refer to “Measuring odd-shaped packages” on page 26.

Cubing and weighing using the touchscreen

All controls and displays for the Cubiscan 100-T are located on the touchscreen at the front of the base. If a computer is not connected, you can use the control panel to cube and weigh packages. Measurements and weight are displayed on the touchscreen.



Figure 17
Cubiscan 100-T Touchscreen

L= These display the measured dimensions in inches (in) or centimeters (cm) as selected.
W=
H=

Wgt= This displays the measured weight in pounds (lb) or kilograms (kg) as selected.

- Dwgt=** This displays the dimensional weight in pounds (lb) or kilograms (kg) as selected.
- Factor=** This displays the dimensional factor currently being used to calculate the dimensional weight. This option can be turned on or off.
- Ready (indicator)** This indicates that the Cubiscan 100-T is ready for cubing and weighing.
- >0<-** This indicates that the scale platform is empty and ready to receive a package. This indicator must be lit before you can place a package on the platform. When you place a package on the platform, the indicator goes off.
- Zero (button)** Tap this key to reset the sensors and scale to “zero” (make sure the platform is empty). Refer to “Zeroing the Cubiscan 100-T” on page 26.
- Measure (button)** Tap this key to prompt a measurement. The weight and dimensions of the object on the platform will be displayed on the screen.

Take the following steps to cube and weigh a package using the touchscreen to control the Cubiscan.

1. Verify that the Cubiscan platform is empty. The **->0<-** indicator should be lit, and **0.00** should be displayed in the **Wgt=** field. Except for the **Factor** field, the rest of the display should be clear.
2. Place the package or object to be cubed and weighed on the platform and slide it against the back corner until it is in contact with both side panels. The **->0<-** indicator light should go out.

NOTE 

Do not lean on or touch the Cubiscan platform or the package while a package is being cubed and weighed. Any kind of contact with the platform during the measurement process can alter the weight or sensor reading.

3. Press **Measure**. The length, width, height, weight, and dim weight of the package are displayed. The factor used to determine the dim weight is also displayed.
4. Remove the package from the platform. Wait for the **->0<-** indicator to light before placing the next package on the platform.

If the **->0<-** does not light, it means that the scale needs to be zeroed. To zero the scale, make sure that the platform is free of all objects, then press **Zero**.

Measuring odd-shaped packages

The Cubiscan 100-T is designed to measure dimensions on “cube-like” packages (packages that are square or rectangular) with a distinct width, length, and height. Packages that have odd shapes or irregular surfaces may be measured using the Cubiscan 100-T; however, the dimensions will be determined by the closest straight edge or corner and may not accurately represent the actual width, height, and length of the package.

When measuring objects with irregular or porous surfaces that do not reliably reflect sound, it may be necessary to place a rigid sheet of plastic or metal against the irregular side or sides so the sensors can record the dimensions. For example, when measuring books, a rigid sheet should be placed against the paper edge of the books.

NOTE >

If rigid sheets are used when measuring objects, tare values should be entered to compensate for the thickness and weight of the sheet. Set tare values using the Options function on the Tools menu of Qbit (refer to the Qbit User Guide).

Zeroing the Cubiscan 100-T

Tap the **[Zero]** button on the touchscreen to “zero” the Cubiscan 100-T (set all empty measurements and weight to zero). The weight of the platform and the measurement from each sensor to the platform sides when the platform is empty must be set to zero for the Cubiscan 100-T to operate properly. The Cubiscan 100-T tries to zero itself automatically every five seconds when it is not in the Measure mode. However, you may need to use this option in the following circumstances.

- If, during a long measuring session, environmental conditions (temperature and humidity) have changed noticeably.
- If you suspect that the last zeroing was in error (something was on the platform).

NOTE >

Make certain that the platform is free of all objects before using Zero. If not, the zero reading will not be accurate.

CHAPTER 4 CONFIGURATION

This chapter provides instructions for using the Cubiscan 100-T touchscreen to set up the height, width, and length measurements, configure the units, dimensional weight factor, and other settings.

If you have a computer connected to the Cubiscan 100-T with Qbit installed, you can use Qbit to set up the measurement and dimensional weight units, perform calibration, and other functions. Refer to the Qbit User Guide for instructions on measuring and other functions in Qbit. The Qbit User Guide is provided on the flash drive with the Qbit application, or you can download it from the Cubiscan website at www.cubiscan.com.

System configuration



The following options can be used to configure your Cubiscan 100-T. The options available on the configure menu are Operation, Units, Ethernet, and Other.

Operation

This section discusses the options available on the operation menu. Complete the following steps to access the operation menu.

1. From the home screen, tap **CONFIGURE**.



Figure 18
Home screen

2. The configuration menu is displayed at the bottom of the screen. Select the **Operation** option if it is not already selected.

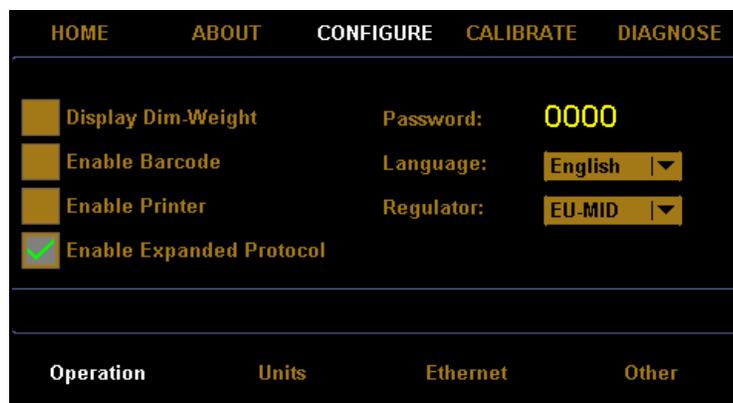


Figure 19
Configure operation

Display Dim-Weight

Check this box if you want the dim weight and factor to be displayed on the home screen.

Enable Barcode

Check this box if you want to enable a barcode scanner to work with the Cubiscan 100-T. If this box is enabled a new barcode field will appear on the home screen. The **Enable Expanded Protocol** box must also be checked for the barcode option to work.

Enable Printer

Check this box if you want to enable a printer to work with the Cubiscan 100-T. When this box is enabled a label will be printed each time a measurement is taken.

Enable Expanded Protocol Enabling the expanded protocol allows more information to be sent in a data packet. When this option is disabled, the Cubiscan 100-T is backwards compatible with the Cubiscan 100-T. When the expanded protocol is enabled it includes, among other things, the packet number, date and time, length, width, height, weight, dimensional weight, the dimensional factor, and barcode information.

This option must also be enabled when enabling a barcode scanner.

Password This field displays the current password.

To set a password, tap the digits displayed in the password field. Enter your preferred password. When the Cubiscan 100-T is first turned on the password must be entered before access is granted to the Configure, Calibrate, and Diagnose menus.

If the password is set to all zeros, no password is required to access the Cubiscan 100-T.

Language Select your preferred language from the drop-down box.

Regulator This setting determines many different regulatory settings that are unique to each country and/or regulatory agency.

If you need your Cubiscan to operate within the requirements of a certain regulatory agency, select it from the drop-down list.

Units

This section discusses the options available on the operation menu. Complete the following steps to access the operation menu.

1. From the home screen, tap **CONFIGURE**.



Figure 20
Home screen

- The configuration menu is displayed at the bottom of the screen. Select the **Units** option if it is not already selected.



Figure 21
Configure units

Units In this field you can select the units that will be used. The options are inches (in), centimeters (cm), pounds (lb), or kilograms (kg).

Dim-Factor In this field you can select the dim factor that will be used. The options are domestic and international.

Machine ID In this field you can enter a unique ID for your Cubiscan 100-T. This can be helpful if you have more than one Cubiscan on site.

Factors In this field you can view or change the current dim factor values.

The following table displays the default dimensional weight factors used by the Cubiscan.

Dimensional factor	Domestic	International
Cubic inches per pound	166	139
Cubic inches per kilogram	366	306
Cubic centimeters per pound	2720	2278
Cubic centimeters per kilogram	6000	5000

Ethernet

This section discusses the options available on the Ethernet menu. Complete the following steps to access the Ethernet menu.

1. From the home screen, tap **CONFIGURE**.

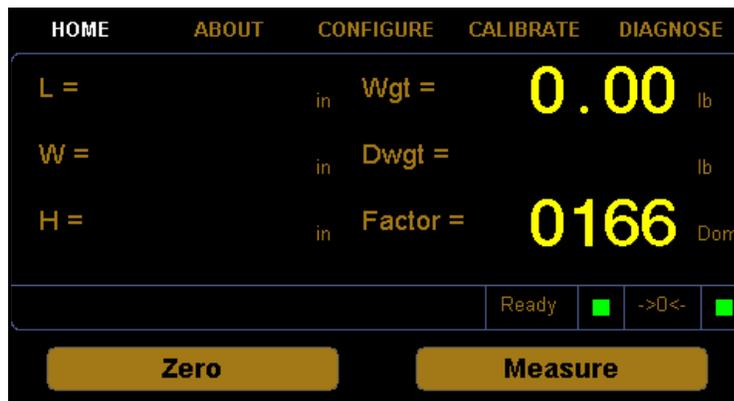


Figure 22
Home screen

2. The configuration menu is displayed at the bottom of the screen. Select the **Ethernet** option if it is not already selected.

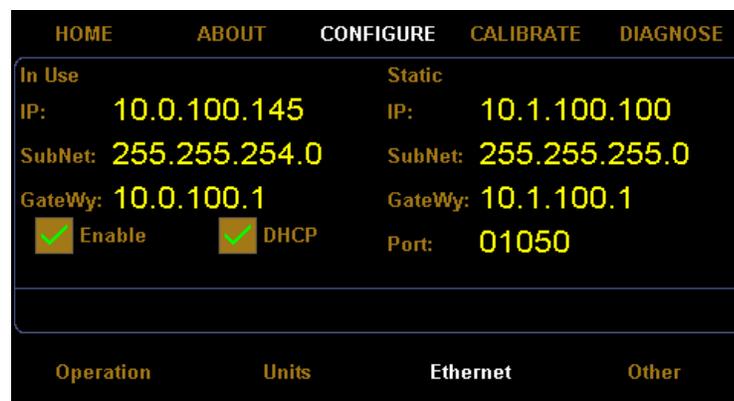


Figure 23
Configure Ethernet

In use

This section describes the various settings and options of the Ethernet in use.

- IP** This is the current IP address.
- SubNet** This is the current subnet mask.
- GateWy** This is the current gateway setting.
- Enable** Check this box to enable or disable the in use Ethernet.

DHCP Check this box to enable or disable the DHCP.

Static

This section describes the various settings and options of the static Ethernet.

IP This is the static IP address.

SubNet This is the static subnet mask.

GateWy This is the gateway setting.

Port This is the port setting.

Other

This section discusses the options available on the Other menu. Complete the following steps to access the Other menu.

1. From the home screen, tap **CONFIGURE**.



Figure 24
Home screen

- The configuration menu is displayed at the bottom of the screen. Select the **Other** option if it is not already selected.

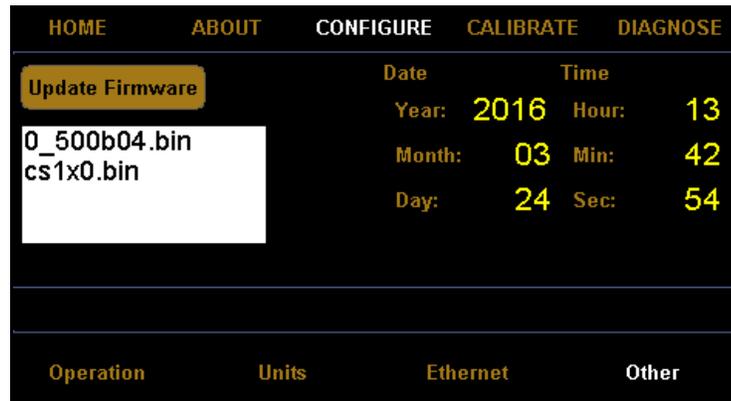


Figure 25
Configure Ethernet

- Update firmware** Tap this button to update the firmware. The field below the button displays all firmware files that are saved on the SD card. If you would like to update the Cubiscan 100-T to a certain firmware file, select it in the list displayed and tap **[Update Firmware]**.
- Reset** Tap this button to reboot the system and update the firmware. The system must be rebooted each time the firmware is updated.
- Date/Time** This displays the current date and time.

CHAPTER 5

CALIBRATION

This chapter provides instructions for calibrating the Cubiscan 100-T. The Cubiscan 100-T is calibrated at the factory; however, some circumstances in which recalibration may be required include the following:

- Calibrate the Cubiscan 100-T if you have problems cubing and weighing after assembly and setup.
- Calibrate the Cubiscan if it is subjected to any type of mechanical shock or collision with a heavy object.
- Calibrate the Cubiscan as part of a regular maintenance schedule. If the Cubiscan is used heavily, scale calibration should be performed monthly and sensor calibration yearly.

NOTE

If an error message appears during calibration, power the Cubiscan off and back on and start calibration over (refer to CHAPTER 5 “CALIBRATION” for more information).

Before you begin



Before calibrating the Cubiscan 100-T, remove all packages or other material from the platform, and blow any dust off the sensor screens. Refer to page 44 for information on cleaning the sensors.

All controls and displays for the Cubiscan 100-T are located on the touchscreen at the front of the base. For information on the controls and indicators, refer to “Cubing and weighing using the touchscreen” on page 24.

If you want to calibrate using Qbit, refer to the *Qbit User’s Guide*.

NOTE

The calibration cube should be kept clean and undamaged—you will need it each time you calibrate the Cubiscan 100-T.

Calibrating the scale

To perform the calibration, you will need the following:

- Official test weight in the range of 50-100 pounds (25-50 kg) (it is recommended that you calibrate with the maximum weight)

Calibrating without an accurate known weight can make all future weight readings inaccurate. To calibrate the scale using the touchscreen, proceed as follows.

NOTE >

When calibrating the scale, the Cubiscan 100-T must be stable with no movement of the platform such as that caused by vibration or air movement.

1. At the home screen, tap **CALIBRATE**.



Figure 26
Home screen

2. The calibration menu is displayed at the bottom of the screen. Select the **Scale** option if it is not already selected. If the weight units

displayed are correct for the test weight you are using, tap **[Next]** to begin the scale calibration.

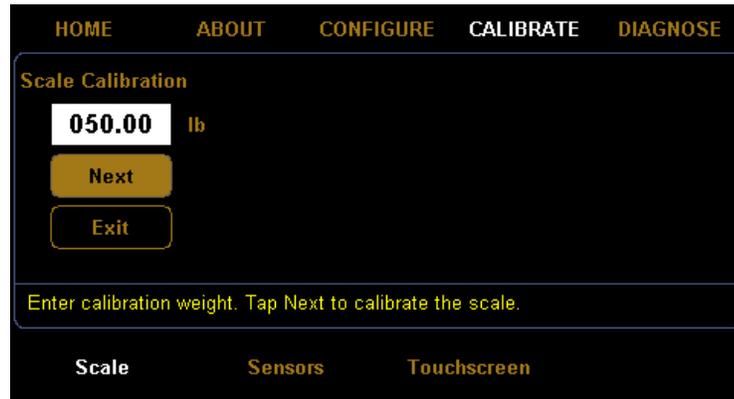


Figure 27
Scale calibration menu

3. Make sure there is nothing on the Cubiscan 100-T platform, then tap **[Next]**.

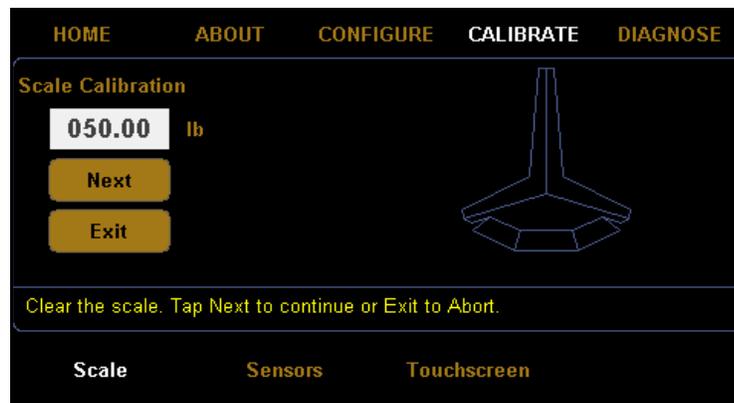


Figure 28
First scale calibration screen

- The following screen is displayed. Place the calibration weights on the Cubiscan 100-T platform.

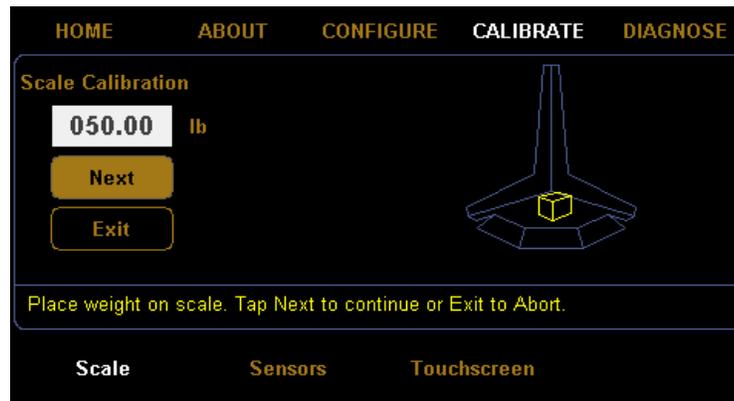


Figure 29
Second scale calibration screen

- Tap **[Next]** to continue, and the following screen is displayed.

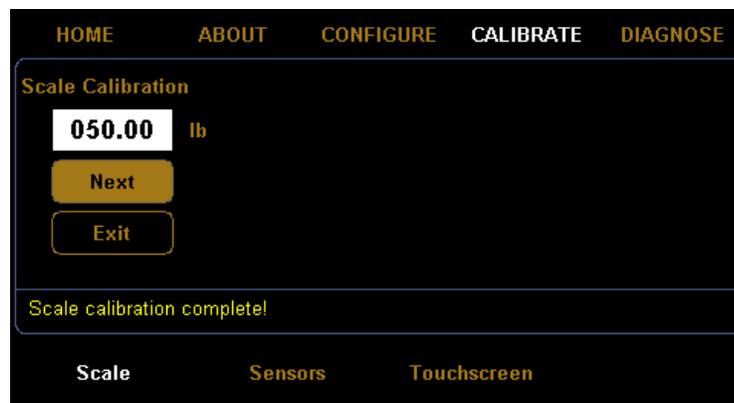


Figure 30
Scale calibration complete

- You have now finished calibrating the scale. Tap **HOME** to return to the home screen or if you would like to try calibrating the scale again, tap **[Next]**.

Calibrating the ultrasound sensors



To perform the calibration, you will need the following:

- 12" x 5" x 3.6" calibration cube, supplied with the Cubiscan

To calibrate the sensors using the touchscreen, proceed as follows.

1. At the home screen, tap **CALIBRATE**.



Figure 31
Home screen

2. The calibration menu is displayed at the bottom of the screen. Select the **Sensors** option if it is not already selected. Tap **[Next]** to begin the sensor calibration.

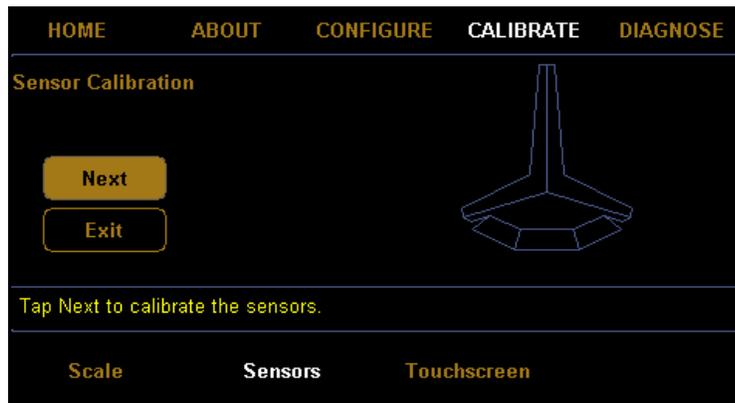


Figure 32
Sensors calibration menu

3. Make sure there is nothing on the Cubiscan 100-T platform, and tap **[Next]** to continue.



Figure 33
First sensor calibration screen

4. The following screen is displayed. Place the calibration cube on the platform in the left position, as shown below.

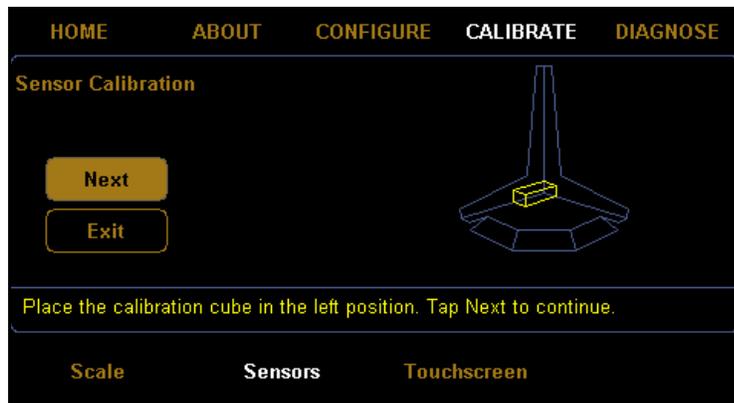


Figure 34
Second sensor calibration screen

5. Tap **[Next]** to continue, and the following screen is displayed.

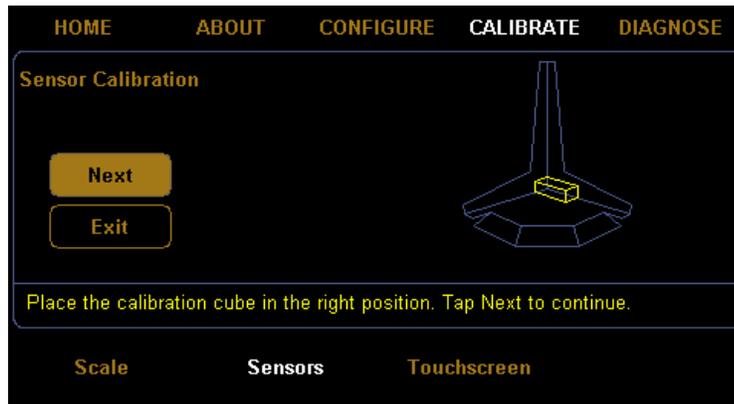


Figure 35
Third sensor calibration screen

6. Place the calibration cube on the platform in the right position, as shown above.
7. Tap **[Next]** to continue, and the following screen is displayed.

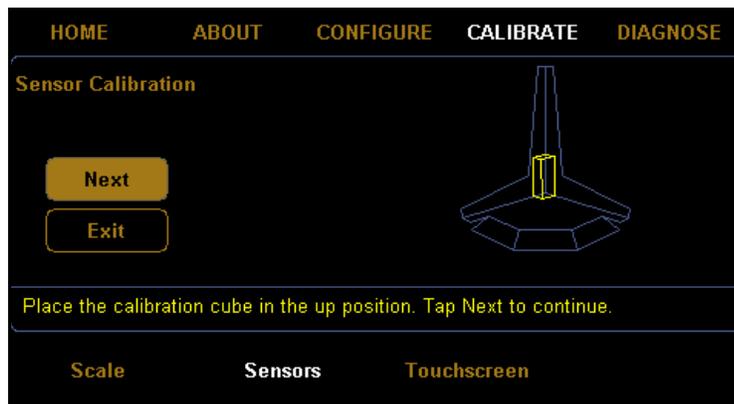


Figure 36
Fourth sensor calibration screen

8. Place the calibration cube on the platform in the up position, as shown above.

9. Tap **[Next]** to complete the sensor calibration. The following screen is displayed.

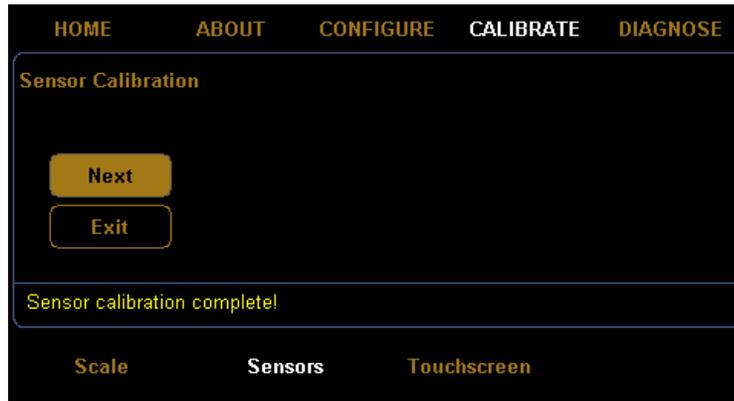


Figure 37
Sensor calibration complete

10. You have now finished calibrating the sensors. Tap **HOME** to return to the home screen or if you would like to try calibrating the sensors again, tap **[Next]**.

Calibrating the touchscreen



If you are having problems selecting functions on the touchscreen, you may need to recalibrate it. You should recalibrate any time it becomes difficult to select options on the screen.

Take the following steps to calibrate the touchscreen.

1. At the home screen, tap **CALIBRATE**.



Figure 38
Home screen

2. The calibration menu is displayed at the bottom of the screen. Select the **Touchscreen** option if it is not already selected.

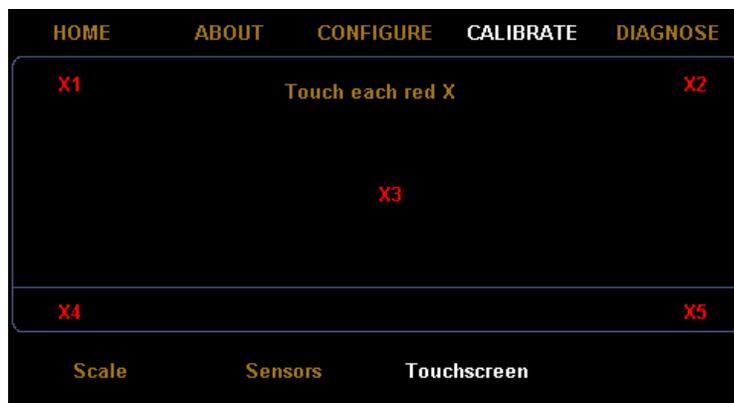


Figure 39
Touchscreen calibration

3. Tap each red **X** until it turns green.

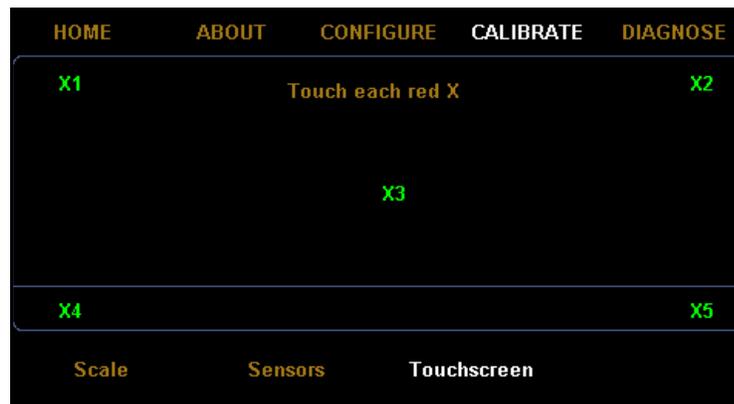


Figure 40
Touchscreen calibration complete

4. When each **X** has turned green, the touchscreen calibration is complete. Tap **HOME** to return to the home screen.

CHAPTER 6

MAINTENANCE

This chapter provides information on the care and maintenance of the Cubiscan 100-T. Routine maintenance and careful handling will help keep the Cubiscan 100-T in good operating condition and prevent service calls or repairs.

Precautions

The Cubiscan should not be subjected to extremes in temperature or humidity, nor should it be subjected to excessive vibration. For environmental recommendations, see "Placement" on page 6.

Do not put packages on the platform that are known to be over 100 pounds (50 kg). All objects, especially heavy ones, should be placed on the platform gently. Shock loading will occur if an object is dropped or thrown onto the platform. This puts unnecessary and potentially damaging pressure on the load cell.

The Cubiscan has been designed to accept overload without damage. However, rough handling and abuse, over time, can cause the load cell to lose much of its spring action. In addition, severe shock loading can cause permanent zero shift, making the scale inoperable.

Cleaning the sensors

The sensors should be kept clean. While dust normally won't interfere with sensor operation, they should be cleaned routinely to prevent the possibility of interference. To clean, gently blow dust from the gold foil surface.

**CAUTION**

The gold foil screen on the front of the sensor is delicate. Do not use high pressure air or water lines to clean the surface of the gold foil and do not touch it with fingers, tools, or brushes. Doing so may result in damage.

Removing the controller box



If you suspect a problem with the Cubiscan 100-T controller, first review the Troubleshooting chapter and take any recommended action. If the problem persists, contact Cubiscan Technical Assistance at 801.451.7000 for assistance.

If Cubiscan recommends removing the controller box and returning it for service, proceed as follows.

1. Turn off the power switch (on the power strip), and disconnect the power cord from the power strip.
2. Remove the base cover from the Cubiscan base. The cover is recessed and can simply be lifted out.
3. Remove the white sound dampening pad.
4. Place the cover and white pad in a safe location where they will not get stepped on or bent.
5. Locate the controller box (the metal box directly behind the control panel) inside the base.
6. Disconnect all connectors that are attached to the controller box, as follows:
 - To remove a sensor connector, press the tab on the connector to release it, and pull it straight out.
 - To remove the Ethernet cable connector, press the tab on the connector to release it, and pull it straight out.
 - To remove the load cell connector, turn the screws to loosen the connector, and pull it straight out.
 - To remove the power connector, take hold of the connector close to the panel, and pull it straight out using even pressure.

- To remove a serial cable, loosen the screws (with a screwdriver if necessary), and pull the cable connector out using even pressure.
7. Remove the four Allen head screws on the corners of the controller box mounting plate using the 2.5 mm Allen wrench. The control panel is in the center of the mounting plate, and the mounting plate is attached to the front of the Cubiscan base.

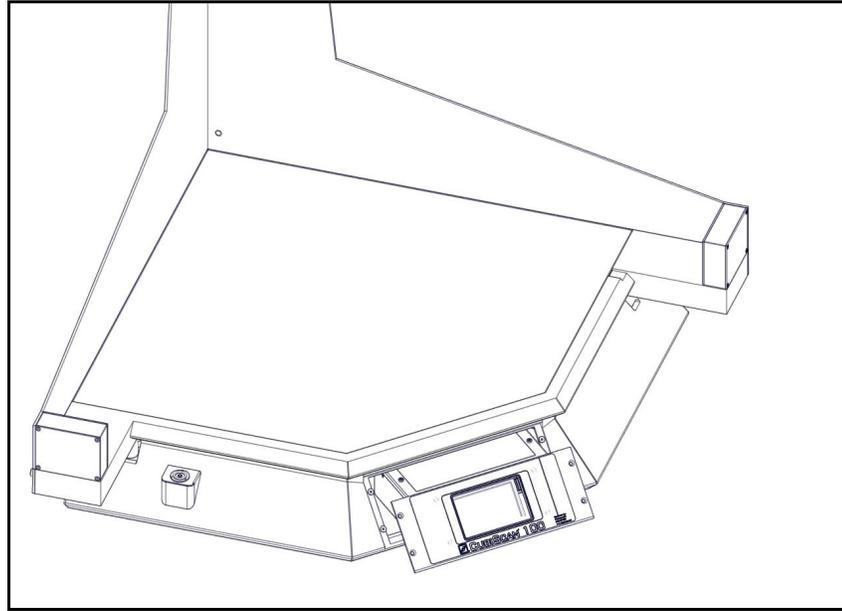


Figure 41
Removing the controller box

8. Verify that all cables have been removed from the controller box, then pull the box out through the front panel.

CHAPTER 7

TROUBLESHOOTING

This chapter provides assistance in identifying and solving common problems with the Cubiscan 100-T. If you encounter problems not covered in this chapter, or if a defect is suspected, contact your system integrator or call Cubiscan Technical Assistance at 801.451.7000 for assistance.

After installation, most problems are caused either by incorrect cabling or because the system setup is not correct. If you are having problems with the Cubiscan 100-T, first verify that all cables attached to the controller box inside the base (serial communications cables, sensor cables, power cord, Ethernet cable, load cell cable) are fully seated and secure (locking rings, clips, or screws). Then, verify that the setup is correct.

Problems with your computer may affect operation of the Cubiscan 100-T system. If you have trouble starting Qbit or if you encounter problems with your computer (including computer related error messages), refer to your computer manual or contact your computer representative or dealer for assistance.

Frequent computer errors may be caused by dust or static electricity. It is important that your computer be kept as clean and static free as possible. consult your computer manual for information.

If problems continue, review the following sections for more information.

No response when you turn power on



If there is no response when you power on the Cubiscan 100-T, do the following:

1. Verify that the power strip is "live" and that the AC power cord is properly and securely connected to the power adapter and to the power strip.
2. Verify that the DC power cord is securely connected to the power connector on the back of the Cubiscan.

Readings are not accurate



If you suspect that the Cubiscan 100-T readings are inaccurate, do the following:

1. Zero the scale by making sure the platform is free of all objects and then selecting **Zero** from the toolbar or Tools menu in Qbit. (If a computer is not connected, press **[Zero]** on the touchscreen.)

If the Cubiscan does not return to zero or is slow to return to zero, level the Cubiscan and make certain that all five leveling legs are resting on the supporting surface. Refer to "Assembling the Cubiscan 100-T" on page 7.

2. Move the Cubiscan if it is located close to open freight doors or where hot air is blowing on it. Extreme changes in temperature and humidity can affect the accuracy of the Cubiscan 100-T. Refer to "Placement" on page 6.
3. Recalibrate the Cubiscan. Refer to "CALIBRATION" on page 34.

Computer error messages



The following error messages generated by Qbit indicate a communication problem between the Cubiscan and the computer.

No communications with Cubiscan This message indicates that no communication is taking place between the computer and the Cubiscan 100-T.

Transmission error This message indicates that erroneous data or garbled data is being sent from the Cubiscan.

If you receive one of these messages, verify the following.

1. Is the Cubiscan turned on and securely connected to power?
2. Is the USB, serial, or Ethernet cable securely connected?
3. Is there a problem with the Cubiscan 100-T? Perform the Status function in Qbit to check the status of the Cubiscan.

4. Is there a problem with the computer or network? Troubleshoot the computer, or contact your network administrator.

About



This section describes the About menu of the Cubiscan 100-T. The About menu contains useful information and records of the Cubiscan 100-T.

Version

This section discusses the options available on the version menu. Complete the following steps to access the version menu.

1. Tap **ABOUT** at the home screen.



Figure 42
Home screen

- The about menu is displayed at the bottom of the screen. Select the **Version** option if it is not already selected.



Figure 43
About version

- MAC** This field displays the Media Access Control (MAC) address.
- MDMI** This field displays the Multiple Dimensional Measuring Instrument (MDMI) status. This status can either be sealed or unsealed.
- NAWI** This field displays the Non-Automatic Weighing Instrument (NAWI) status. This status can either be sealed or unsealed.
- Firmware** The fields listed under the firmware heading list the firmware being used for that specific part. Firmware information is displayed for the main, scale, kernel, left sensor, top sensor, and right sensor.

Scale-Audit

This section discusses the options available on the scale-audit menu. Complete the following steps to access the scale-audit menu.

1. Tap **ABOUT** at the home screen.



Figure 44
Home screen

2. The about menu is displayed at the bottom of the screen. Select the **Scale-Audit** option if it is not already selected.

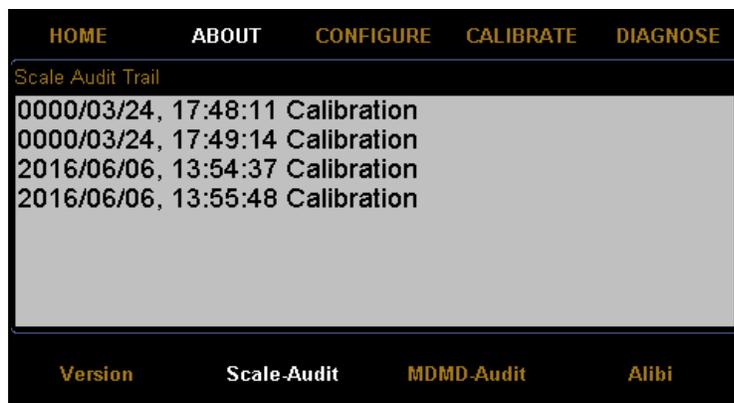


Figure 45
About Scale-Audit

Scale Audit Trail This field displays the scale calibration history.

MDMD-Audit

This section discusses the options available on the MDMD-Audit menu. Complete the following steps to access the MDMD-Audit menu.

1. Tap **ABOUT** at the home screen.



Figure 46
Home screen

2. The about menu is displayed at the bottom of the screen. Select the **MDMD-Audit** option if it is not already selected.

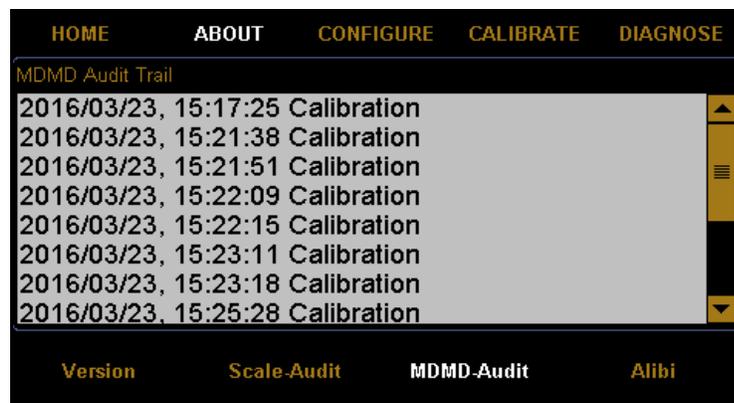


Figure 47
About MDMD-Audit

MDMD Audit Trail This field displays the sensor calibration history.

Alibi

This section discusses the options available on the Alibi menu. Complete the following steps to access the Alibi menu.

1. Tap **ABOUT** at the home screen.



Figure 48
Home screen

2. The about menu is displayed at the bottom of the screen. Select the **Alibi** option if it is not already selected.

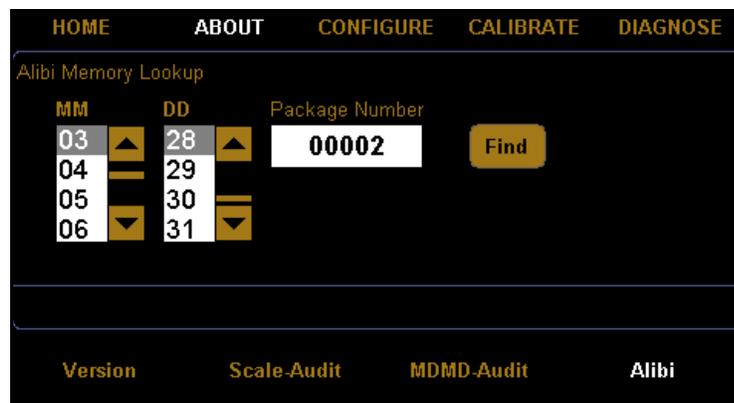


Figure 49
About alibi

From this screen you can look up measurement data. Measurement data is stored for at least 90 days.

MM Enter the month of the measurement you are looking for.

DD Enter the day of the measurement you are looking for.

Package Number Enter the package number of the measurement you are looking for. The package number automatically starts at 00001. You can find the package number of each measurement in the expanded protocol data packet, along with the Machine ID that is unique to each Cubiscan.

Find Tap this button to look up the measurement data after you have entered the month, day, and package number information.

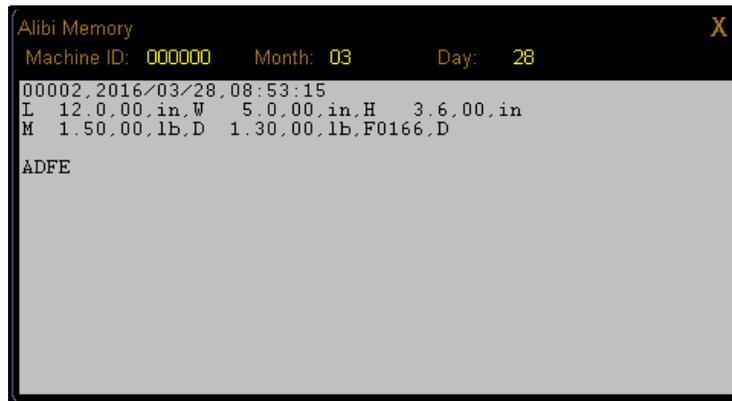


Figure 50
Alibi memory

Diagnostics

This section describes the diagnostic capabilities of the Cubiscan 100-T.

Scale diagnostics

Complete the following steps to view the scale diagnostics.

1. From the home screen, tap **DIAGNOSE**.



Figure 51
Home screen

- The diagnostic menu is displayed at the bottom of the screen. Select the **Scale** option if it is not already selected.



Figure 52
First scale diagnostic screen

From this screen you can view the diagnostic scale values.

- LDW** This field displays the dead weight count.
- LWT** This field displays the full weight count.
- Motion** This field displays the motion status of the scale.
0=No motion
1=Motion
- Wgt** This field displays the current weight.
- COZ** This field displays the center of zero.
- AZM** This field displays the auto zero tracker.
- Zero** This field displays whether there is weight on the scale or not.
0=Weight on scale
1=No weight on scale

Tare This field displays the zero adjustment count. This value should typically be near zero.

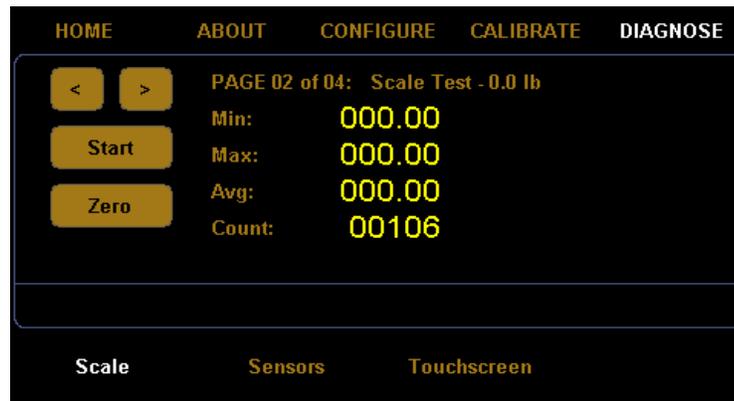


Figure 53
Second scale diagnostic screen

3. Tap the [**>**] button until you reach the first scale test screen.

Scale diagnostic screens two through four are for factory scale testing at various weights (0, 25, and 50 lbs). To begin the test, place the appropriate weight on the platform, and tap [**Start**].



Tap the left arrow button [**<**] to navigate left through the diagnostic scale screens.



Tap the right arrow button [**>**] to navigate right through the diagnostic scale screens.



Tap the [**Start**] button to start the diagnostic test. After the test has started, this button will read [**Stop**]. Tap this button to stop the test.



Tap the [**Zero**] button to zero the scale. Make sure nothing is on or touching the platform when you zero the scale, or all future scale readings will be inaccurate.

Min This field displays the minimum weight detected during the scale test.

Max This field displays the maximum weight detected during the scale test.

Avg This field displays the average weight detected during the scale test.

Count This field displays the count accrued during the scale test.

Sensor diagnostics

Complete the following steps to view the sensor diagnostics.

1. From the home screen, tap **DIAGNOSE**.



Figure 54
Home screen

2. The diagnostic menu is displayed at the bottom of the screen. Select the **Sensors** option if it is not already selected.

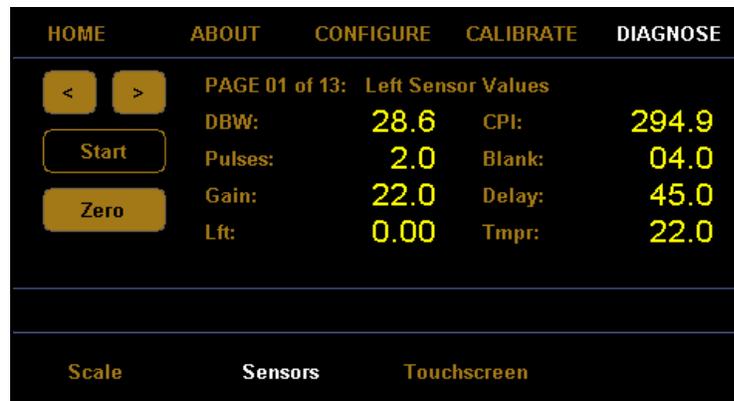


Figure 55
First sensor diagnostic screen

Sensor diagnostic screens one through three display information for the left, right, and top sensor. From the example shown you can view the left sensor diagnostic values. To view the values for the right and top sensors, tap the [>] button.

DBW This field displays the Distance to the Back Wall (DBW).

Pulses This field displays the number of pulses the sensor has received.

- Gain** This field displays the gain step distance and affects the sensor sensitivity.
- Lft** This field displays the distance in inches of how far sound waves travel from the sensor before they are interrupted. (Lft stands for left sensor, Rgt stands for right sensor, and Top stands for top sensor.)
- CPI** This field displays the Counts Per Inch (CPI).
- Blank** This field displays the blanking zone, which is the dead zone in front of the sensor.
- Delay** This field displays the internal timing parameter in milliseconds.
- TMPR** This field displays the internal temperature of the sensor.

3. Tap the [**>**] button until you reach the left sensor test screen.

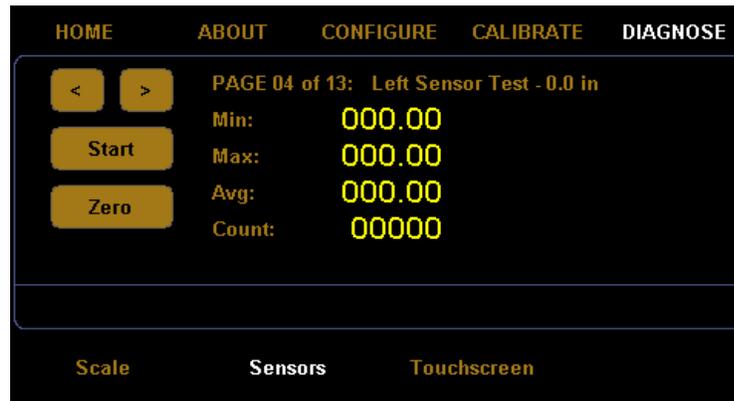


Figure 56
Fourth sensor diagnostic screen

Sensor diagnostic screens four through thirteen are for factory sensor testing at various sensors and lengths (0, 12, and 24 inches). To begin the test, place the calibration cube in the appropriate position on the platform.



Tap the left arrow button [**<**] to navigate left through the diagnostic sensor screens.



Tap the right arrow button [**>**] to navigate right through the diagnostic sensor screens.



Tap the [**Start**] button to start the diagnostic test. After the test has started, this button will read [**Stop**]. Tap this button to stop the test.

- Zero** Tap the **[Zero]** button to zero the scale. Make sure nothing is on or touching the platform when you zero the scale, or all future scale readings will be inaccurate.
- Min** This field displays the minimum length detected during the sensor test.
- Max** This field displays the maximum length detected during the sensor test.
- Avg** This field displays the average length detected during the sensor test.
- Count** This field displays the count accrued during the sensor test.

Touchscreen diagnostics

Complete the following steps to view the touchscreen diagnostics.

1. From the home screen, tap **DIAGNOSE**.

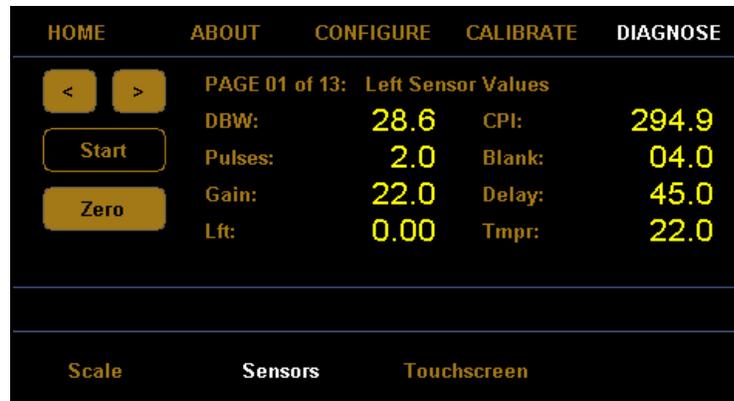


Figure 57
First sensor diagnostic screen

- The diagnostic menu is displayed at the bottom of the screen. Select the **Touchscreen** option if it is not already selected.



Figure 58
Touchscreen diagnostics

From this screen you can view the touchscreen calibration values.

CHAPTER 8

CUBISCAN 100-LFT

This chapter provides information on the legal for trade configuration of the Cubiscan 100-T, which is called the Cubiscan 100-LFT.

About LFT mode



A Cubiscan 100-T may be configured as a legal for trade (LFT) instrument. Once it is sealed, the firmware cannot be updated or modified. Various other settings may also not be changed, in order to conform with legal for trade requirements.

Switch to LFT mode



Complete the following instructions to switch the Cubiscan 100-T into LFT mode. Only a certified technician can switch and seal a Cubiscan into LFT mode.

Select regulator

Under **CONFIGURE > Operation** select your preferred Regulator mode. This setting will cause the Cubiscan to operate within the requirements of the selected regulatory agency. Once the Cubiscan has been sealed, you will not be able to change the Regulator mode.

Select machine ID

Under **CONFIGURE > Units** enter your preferred Machine ID. Each Machine ID must be unique. You will not be able to change the Machine ID when the Cubiscan is sealed.

Calibrate

Before sealing the Cubiscan, you must calibrate the scale and sensors. See "Calibrating the scale" on page 35 and "Calibrating the ultrasound sensors" on page 37. You will not be able to calibrate the scale or sensors after switching into LFT mode.

Software sealing switches

The sealing switches are located on the main controller.

1. Power the Cubiscan off.
2. Using a 7/64" Allen wrench, unscrew the four screws holding the controller in place.
3. Gently pull the controller out of the Cubiscan until you see the switches on the right side of the controller.
4. Slide the switches all the way towards the touchscreen. You may need to use a screwdriver to slide the switches forward.



Figure 59
Sealing switches

5. Power the Cubiscan on.

Physical seals

Once you have switched into LFT mode, the Cubiscan must be sealed to prevent tampering.

Complete the following steps to seal the Cubiscan.

1. Place sealing labels where the red box indicates as shown in the images below.
2. Place one seal on each sensor (three total) as shown in Figure 60.

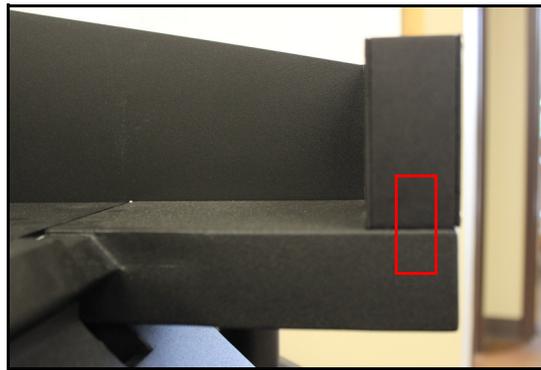


Figure 60
Sensor sealing labels



Figure 61
Controller sealing labels

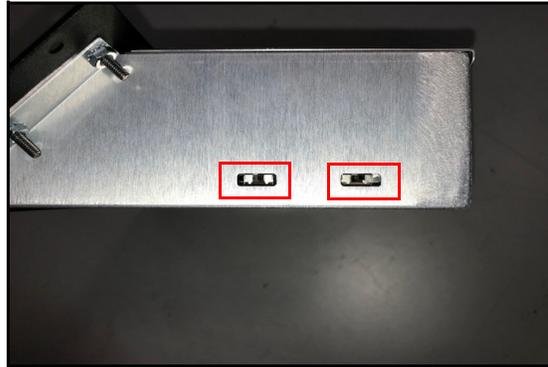


Figure 62
Slider switch sealing labels



Figure 63
Front sealing label

3. Lift the Cubiscan platform to access this area shown below.

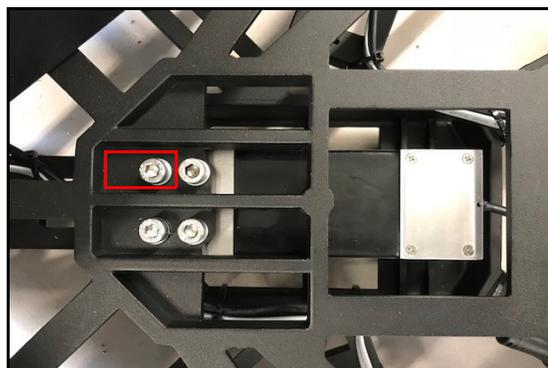


Figure 64
Sealing label under platform

4. Tilt the Cubiscan up to access this area underneath the Cubiscan.

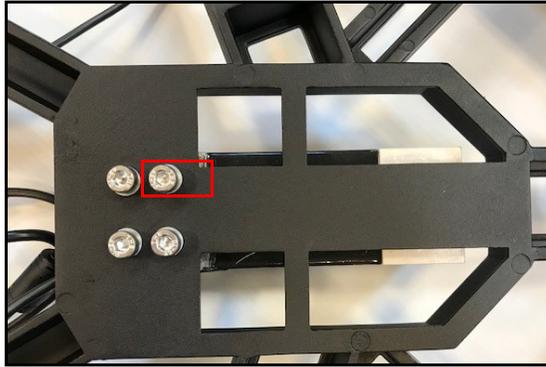


Figure 65
Cubiscan base sealing label

5. Make sure all labels have properly adhered. Once you have placed all labels, the Cubiscan is ready to run in LFT mode.

APPENDIX B

PARTS LIST

Following is a list of parts that can be purchased for the Cubiscan 100-T as spare parts or if replacement is necessary.

Part No.	Description	Quantity/Unit
10273	Cal Cube 12 x 5 x 3.6	1
11317	Length & Width Sensor Cables 2 FT	2
11323	Height Sensor Cable 5.625 FT	1
12780	Ultrasound Sensor ASY	3
14334	CS1x0 Motherboard	1
14547	Display Cable	1
14602	Power Supply, 12 VDC, 3.75A	1
15023	Digital Load Cell	1
15157	Controller ASY 100-T	1
15955	Display Kit (Touchscreen)(Blue) Kernel Version 0.26 or 0.27	1