CubiScan® 50-PS

Operations and Technical Manual

Version 1.0

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Cubing and Weighing Systems

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CubiScan® 50-PS Operations and Technical Manual

Manual updated August 5, 2004.

CAUTION

The CubiScan 50-PS should only be serviced by qualified personnel.
Observe precautions for handling electrostatic sensitive devices when setting up or operating the CubiScan 50-PS.

WARNING

Disconnect all power to the CubiScan 50-PS before servicing or making any connections.

Quantronix New Product Limited Warranty

Statement of Warranty. Subject and according to the Terms and Conditions set forth below, Quantronix, Inc., (hereafter referred to as "Quantronix") warrants to the Buyer that its new product is in accordance with Quantronix' published specifications (or those agreed upon with Buyer in writing) at the time of sale or lease and that such product shall be free from defects in material and workmanship for a period of **one year** from, as applicable: the date of sale or the Commencement Date under a written equipment lease or rental agreement (the "Warranty Period"). For purposes of this warranty, the term "Buyer" shall mean and refer only to the party which originally—whether from Quantronix directly, or from a distributor, agent, or reseller authorized by Quantronix—purchases, or leases under a written equipment lease or rental agreement, the Quantronix product which is the subject of this warranty.

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Quantronix reserves the right to incorporate improvements in material and design of its products without notice and is not obligated to incorporate the same improvements in equipment previously manufactured.

Conditions Which Void Warranty. This agreement shall not apply to equipment or components which has/have:

A. Been the subject of repairs or modifications not authorized by Quantronix.
B. Not been operated under normal use and service according to that for which it was intended.
C. Not been operated or maintained in accordance with Quantronix' printed instructions.

D. Been subject to misuse, negligent handling, improper installation, accident, damage by fire, submersion, or act of God.
E. Had serial numbers altered, defaced, or removed.
F. Been sold, loaned, leased, subleased, or in any other way transferred to or placed within the control of any party other than the Buyer.
G. Been operated beyond capacity.

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Chapter 1
Product Description

The CubiScan 50-PS is a small static cubing system designed to measure and weigh parts and components with great precision and accuracy. Using sophisticated photo-optic sensing technology, the 50-PS is able to measure “naked” freight, including a wide variety of non-cuboidal objects, to an accuracy of 0.05 inches (1 mm).

It has a maximum measurement range of 18 x 13.5 x 13.5 inches (450 x 345 x 345 mm) and a net weight capacity of 33 pounds (15 kg). Dimensional measurement resolution is 0.05 inches (1 mm), weighing resolution is 0.005 lbs (2 g) for items weighing up to 10 lbs (5 kg) and 0.01 lbs (5 g) for items weighing more than 10 lbs (5 kg).

The CubiScan 50-PS uses AC 100~230V (50/60 Hz) power. It has two serial communication ports.

You can use a computer monitor (not supplied) with the CubiScan 50-PS to image measured items. Though not required, a monitor is highly recommended, especially when measuring irregularly shaped objects. After each measurement is taken, the monitor displays an image of the shape of the scanned object outlined with a rectangle that marks the calculated dimensions of the object. For irregularly shaped objects in particular, this allows you to see exactly how the measurements are calculated. In addition, sometimes particles on the glass, such as paper or dust debris, may be scanned as part of the object. When this happens, the calculated size can be inaccurate. Such errors are usually obvious on the monitor.

The CubiScan 50-PS is equipped with casters that, when combined with useful accessories such as a mobile cart, a monitor shuttle arm, and a portable power supply, allow for independent and completely mobile operation.

The CubiScan 50-PS utilizes advanced sensing technology that is safe for operators and freight.

A one year factory warranty on parts and labor is included; extended warranty contracts are also available.

Figure 1
CubiScan 50-PS

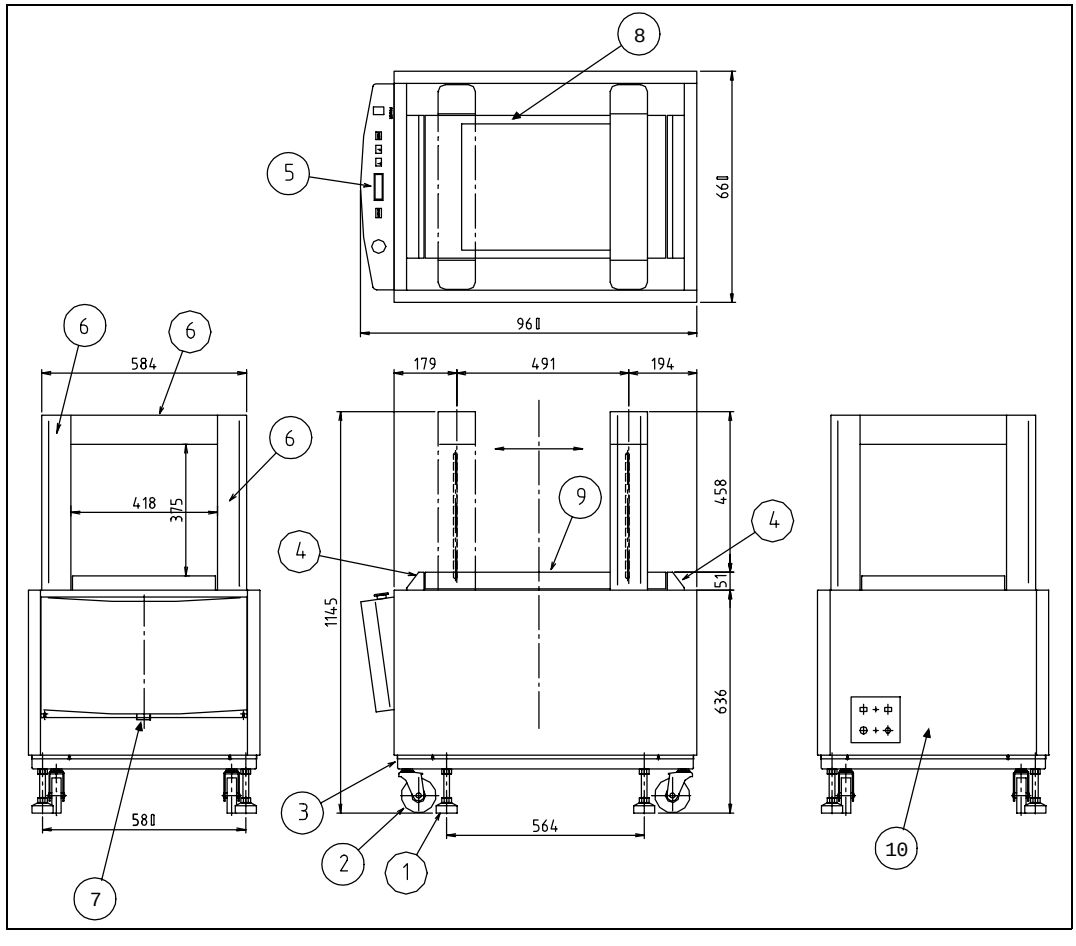


Figure 2
CubiScan 50-PS Drawings

1	Leveling leg	6	Scanning gate
2	Caster	7	VGA monitor connector
3	Base	8	Glass frame
4	Guard block	9	Glass scanning table
5	Operation panel	10	Rear panel

Principle of Operation

Infrared photo sensors (transmitters and receivers) are arranged at even intervals along the sides, top, and bottom of the scanning gate. A beam is formed between each of the photo transmitters and receivers creating a measurement curtain to determine an object's height and width. Length is determined as the scanning gate moves over the object. An encoder integrated into the scanning gate mechanism records the scanning gate's movement in 1mm intervals while the item is scanned.

A load cell on which the glass scanning table is mounted measures the weight of the product as it is dimensionally measured.

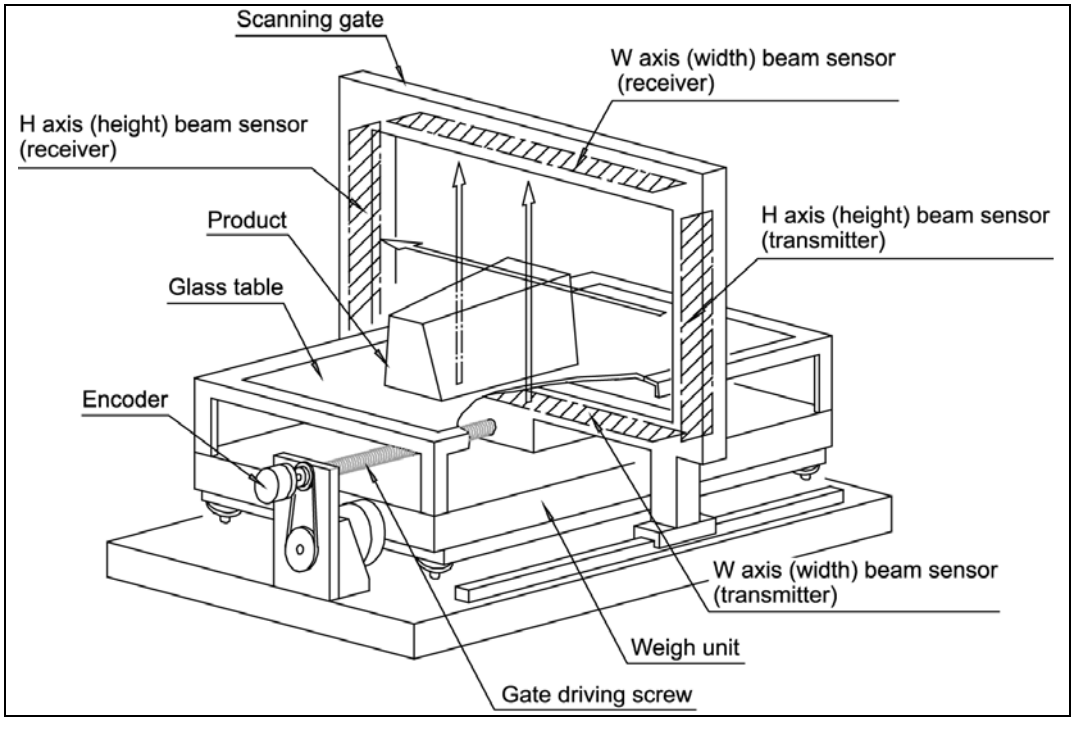


Figure 3
Dimensional Measuring Scheme

Specifications

Electrical

Voltage:	100 – 230 VAC, 50 – 60 Hz
Power consumption:	less than 300VA
Fuse:	250 VAC, 3A (ϕ 6-pipe fuse)

Measurement Ranges

Length:	0.1 in to 18 in (2 mm to 450 mm)
Width:	0.1 in to 13.5 in (2 mm to 345 mm)
Height:	0.1 in to 13.5 in (2 mm to 345 mm)
Measurement Increment:	0.05 in (1 mm)
Measurement Time:	4 – 8 seconds
Weight Capacity:	0.005 lbs to 33 lbs (0.002 kg to 15 kg)

Weight Increment:

up to 10 lbs (5 kg):	0.005 lbs (2 g)
more than 10 lbs (5kg):	0.01 lbs (5 g)

Environmental

Operating Temperature:	32° to 104° F (0° to 40° C)
Humidity:	38% to 85% RH non-condensing

Physical

Length:	38 in (955 mm)
Width:	29 in (726 mm)
Height:	45 in (1152 mm)
Table Height:	26.5 in (673 mm)
Weight:	265 lbs (120 kg)

Other

Data Output:	2 EIA RS-232-C serial communications ports
Measuring Sensor:	Infrared light beam
Weight Sensor:	Load cell
Monitor Requirements:	VGA 800 x 600 screen resolution

Chapter 2
Unpacking and Setup

This chapter provides instructions for unpacking and setting up the CubiScan 50-PS.

Unpacking

The CubiScan is shipped in a single container that contains all components. Refer to Figure 4 on the next page to identify the packing components.

Do the following to unpack the CubiScan 50-PS.

1. Remove all packing materials. Remove all broken pieces of foam to prevent it from working its way into the unit.

   The scanning gate is secured by four transport fittings. A fitting is mounted on each side of the gate on the left and on each side of the gate on the right.

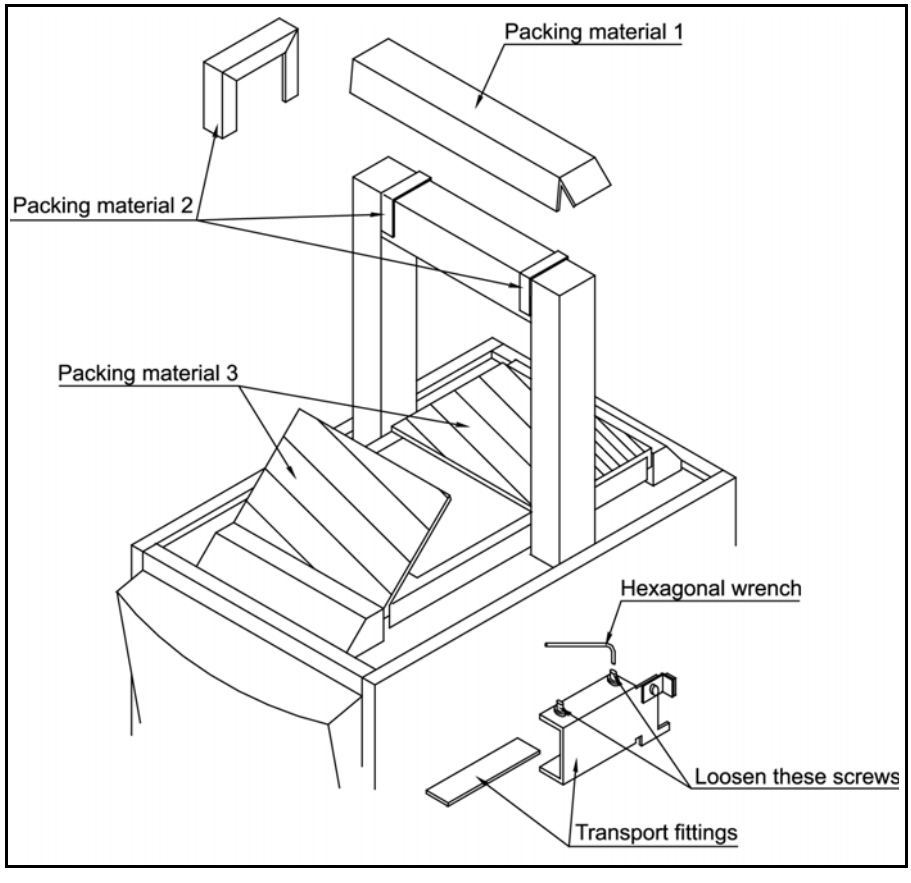


Figure 4
CubiScan 50-PS Packing Components

2. See Figure 4, above, and Figure 7 on page 14 for details on the transport fittings. Use a 2 mm Allen wrench (provided) to loosen the screws that secure each fitting and remove it.

   Keep the transport fittings, and reattach them if you ever need to transport the CubiScan 50-PS.

Placement of the CubiScan 50-PS

The CubiScan 50-PS 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 or sudden changes of ambient temperature. Locate the CubiScan as far from open freight doors as possible. Heaters or air conditioners should not blow directly on the CubiScan.
- Direct sunlight can interfere with the sensor arrays in the measurement gate. Do not operate the CubiScan in direct sunlight.
- Protect the CubiScan from static electricity, especially the control panel.
- Protect the CubiScan from variations in electrical voltage (if this problem exists, you should use a high quality surge protector).
- Do not subject the CubiScan to excessive vibration. Significant or persistent vibration, especially floor vibration, reduces the accuracy of the CubiScan.
- The CubiScan's scanning gate moves back and forth during each measurement. Maintain enough clearance around the CubiScan so that nothing interferes with the measuring gate.
- The glass scanning table is mounted on top of a load cell, which is used to record weight. Do not rest objects against or set objects on the CubiScan when it is not in use.
- If a computer monitor is used with the CubiScan (recommended), place it as close to the CubiScan as possible. The operator needs to be able to see images on the screen while taking measurements.

- The CubiScan, especially the glass scanning table, needs to be kept clean. The CubiScan should not be placed in an excessively dusty environment.
- Orient the CubiScan so that the control panel faces the operator.

NOTE ☞ *A surge protector (not included) is recommended to protect the unit from voltage spikes.*

Leveling the CubiScan 50-PS

The CubiScan has four casters and four leveling legs. The casters are supplied so the CubiScan can be moved. Before operating the CubiScan, lower the leveling legs and level the CubiScan.

NOTE ☞ *Never operate the CubiScan 50-PS while it is sitting on its casters. The CubiScan needs to be sitting on its leveling legs and be level when taking measurements.*

Figure 5 shows the caster and leveling leg locations and how they are arranged.

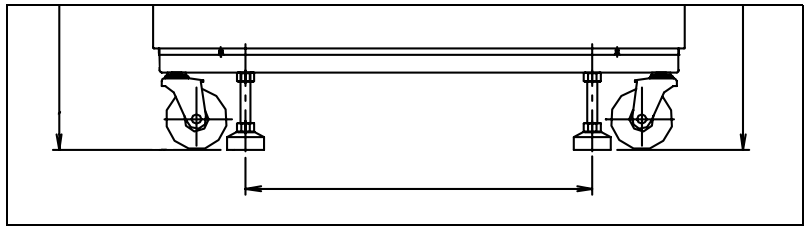


Figure 5
Casters and Leveling Legs

Do the following to lower the leveling legs and level the CubiScan.

1. Obtain two 24 mm wrenches (not provided) to adjust the leveling legs.

2. At each leg, use a 24 mm wrench to loosen the top nut, which is the locking nut.

3. At each leg, turn the bottom nut (or the foot) to adjust the height of the leg. As a starting point, lower each leg far enough that the CubiScan is supported by the legs and not the casters. Near the end of the adjustment, you (or a helper) will need to lift the corner of the CubiScan slightly so you can turn the leg freely.

4. Looking down through the glass surface, locate the leveling bubble (refer to Figure 6 for the location).

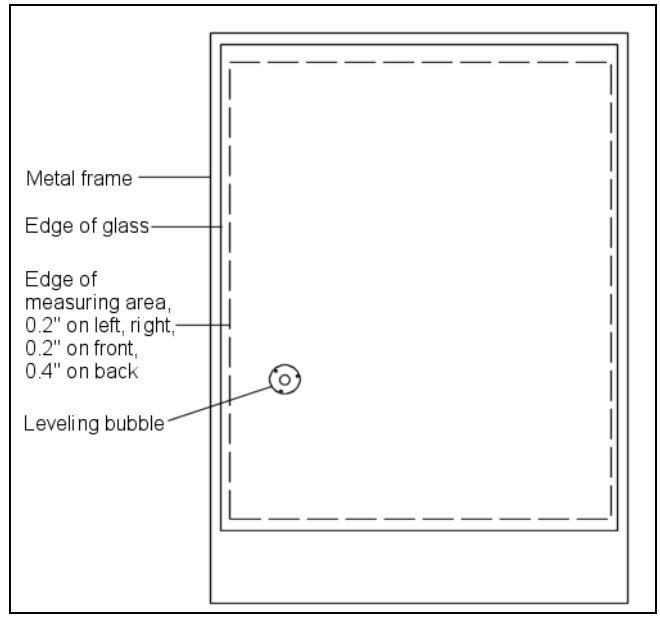


Figure 6
Location of Leveling Bubble

5. Adjust the height of each leg until the bubble is centered within the inner circle of the leveling bubble.

6. Once level, make certain that all four legs are resting securely on the floor. If necessary, re-adjust one or more of the legs, then recheck the level to verify that the CubiScan is still level.

7. On each leg, turn the locking nut up until it comes into contact with the frame.

8. Place one wrench on the bottom nut and one on the locking nut. Tighten the locking nut while you keep the bottom nut from turning. If the bottom nut turns, the CubiScan may no longer be level.

9. After you have locked all four nuts, check the leveling bubble to verify that the unit is still level. If necessary, loosen one or more locking nuts and repeat the leveling process.

Moving the CubiScan 50-PS

Do the following to raise the leveling legs so the CubiScan can be rolled on its casters.

1. At each leg, use a 24 mm wrench to loosen the top nut, which is the locking nut. Move it several turns down the bolt to get it out of your way.

2. At each leg, you (or a helper) will need to lift the corner of the CubiScan slightly so you can turn the leg freely. Once the caster can touch the floor, set the CubiScan down on the caster.

3. Raise each leg high enough so that it will not touch the floor while the unit is being moved.

4. At each leg, turn the locking nut upward until it comes into contact with the frame.

5. Place one wrench on the bottom nut and one on the locking nut. Tighten the locking nut as you keep the bottom nut from turning.

Transporting the CubiScan 50-PS

If you plan to transport the CubiScan 50-PS by truck or forklift, it is important that the scanning gate be secured to prevent damage. You secure the scanning gate using the transport fittings, which were attached to the unit when shipped from the factory.

Take the following steps to secure the scanning gate.

1. Cover the glass surface with a piece of corrugated cardboard that fits all the way to the edges.

2. Loosen the stopper using a Phillips screwdriver (not supplied) on each transport fitting, and insert the transport fitting in the scanning gate frame as shown in Figure 7. One fitting is mounted to each side of the gate on both sides of the CubiScan (four fittings in all).

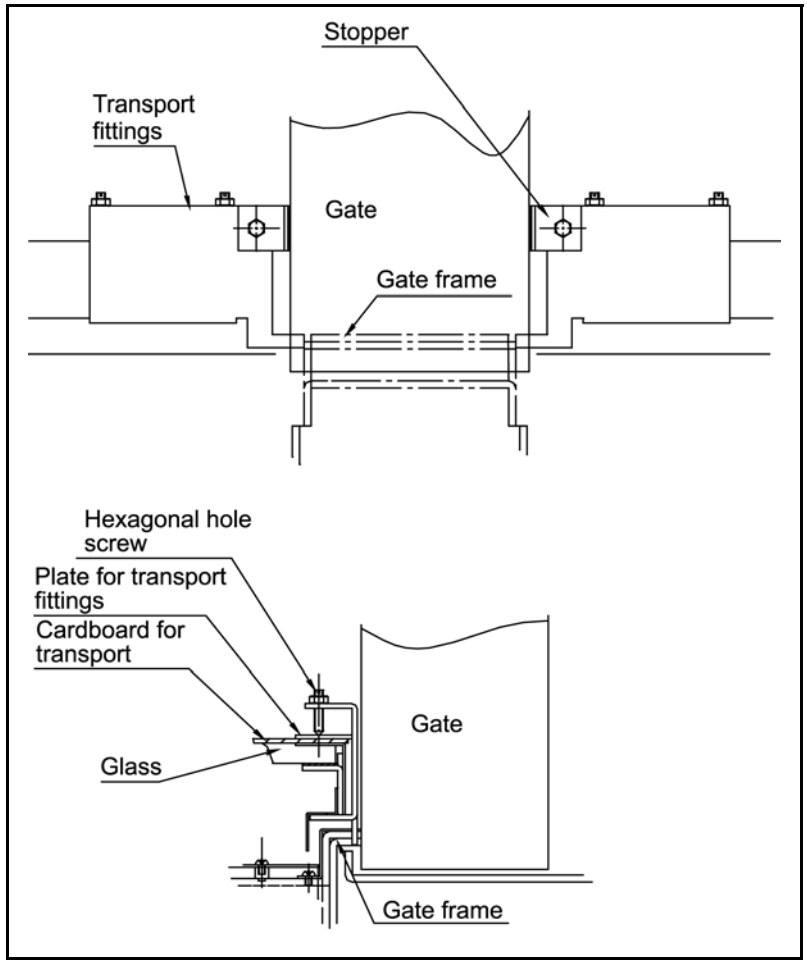


Figure 7
Setup for Transporting the CubiScan

3. Rotate the locking nut to the top of each screw.

4. Tighten the Allen head screw using the 2 mm wrench (provided) until the clamping surface of the fitting comes in contact with the cardboard. Continue tightening the screw until the corrugated cardboard flattens. DO NOT APPLY PRESSURE TO THE GLASS!

5. Rotate the locking nut down to the base and tighten it.

6. Push the stopper against the gate frame and tighten it using a Phillips screwdriver.

Connecting a Monitor (Optional)

You can connect a VGA monitor to the CubiScan 50-PS so that measurements are graphically represented on the monitor as an item is measured. Though not required, using a monitor is highly recommended, especially when measuring irregularly shaped objects. After each measurement is taken, the monitor displays an image of the shape of the scanned object outlined with a rectangle that represents the calculated dimensions of the object. For irregularly shaped objects in particular, this allows you to see exactly how the measurements are calculated.

Sometimes particles on the glass, such as paper or dust debris, may be scanned as part of the item. When this happens, the calculated size may be inaccurate, often by a considerable amount. Such errors are usually obvious and can be quickly detected when observing the image on the monitor.

To install a monitor, locate the CubiScan's VGA monitor connector on the front of the unit two-thirds of the way down and facing downwards (refer to #7 in Figure 2 on page 3). Connect the monitor cable and secure it by tightening the two screws.

The monitor can be configured to display a top view or a side view of the object being scanned. The default is top view. For information on changing to side view, refer to page 62.

Connecting a Data Output Cable (Optional)

You can transfer measurement data to a computer through the RS-232-C serial communications port on the back of the CubiScan. You use COM1 on the CubiScan for data output.

Refer to Appendix A “Communication Protocol” on page 73 for command protocol and setup parameters.

To connect a data output cable to the CubiScan, do the following.

CAUTION

Disconnect power from the CubiScan 50-PS and the computer before connecting the serial cable.

1. Route a RS-232 serial communications cable to the back of the CubiScan 50-PS. The cable should be routed and secured so it is not vulnerable to damage or being pulled loose.

2. Locate the connection panel on the back of the CubiScan.

3. Connect one end of the serial cable to the port labeled COM1 (see Figure 8).

Figure 8
Back Panel Connectors

4. Connect the other end of the serial cable to the computer's serial 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 Appendix A "Communication Protocol" on page 73.

Changing the Power Cord

The CubiScan 50-PS supports any power source between 100 and 230 VAC, 50/60 Hz. The CubiScan's power supply adjusts to the connect voltage automatically. The unit is shipped with a standard U. S. style, three-prong power connector.

If the CubiScan is shipped to a location outside the U. S., the appropriate power cord is included but you need to exchange it with the U. S. style cord.

WARNING

Disconnect power to the CubiScan 50-PS before changing the power cord.

Do the following to change the power cord on the CubiScan 50-PS.

1. If connected to power, unplug the AC power cord.

   The power cord comes out of the housing of the connector panel on the back of the CubiScan, as shown in the figure below.

2. Loosen the locking nut on the power connector (see Figure 9).

Figure 9
Power Cord Connection, Back Panel

3. Unscrew the two Phillips head screws at the bottom of the left side panel (facing the front of the CubiScan control panel), and remove the panel (Figure 10 shows one of the screws).

Figure 10
Panel Retaining Screw

4. To remove the panel, lift up on it until the top edge is free, and then pull it toward you. Set the panel out of the way.

5. Remove the back panel following the same procedure.

6. Identify the white wire coming from the power cord, and disconnect it. Note its connection location.

7. Locate the black wire from the power cord, and disconnect it by removing the wire nut. Keep the wire nut.

8. Identify the green wire from the power cord, and disconnect it by removing the nut that holds it to the grounding bolt, and keep the nut.

   Refer to the following two figures for wire locations on the connector panel.

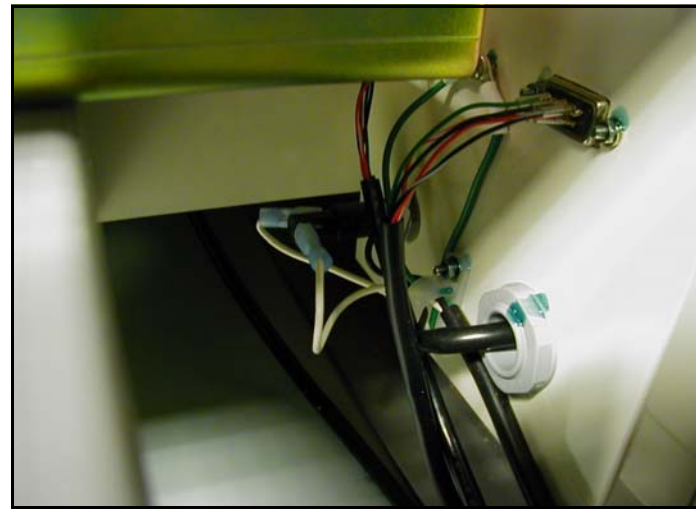


Figure 11
Back of Connector Panel

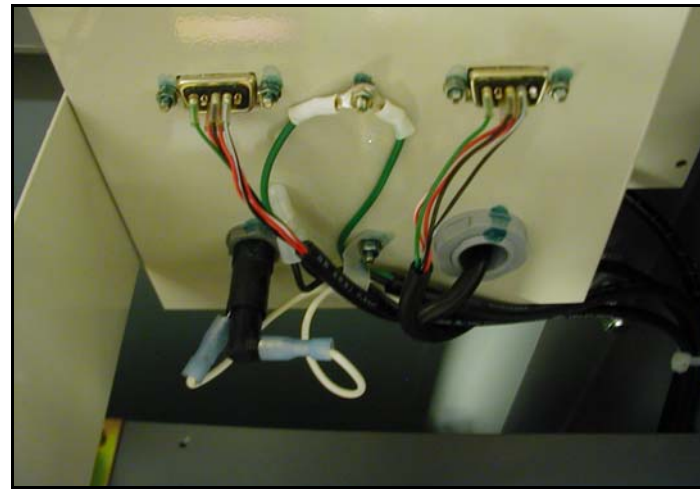


Figure 12
Back of Connector Panel

9. Remove the old power cord from the panel by pulling the fitting and wires out the hole.

10. Remove the locking nut from the old power cord and place it on the replacement power cord.

11. Guide the cord ends through the power entry hole in the panel.

12. Reattach the white, black and green wires.

13. Verify that all wires are connected in the proper locations and that the connections are secure.

14. With the retaining fitting on the cord pressed firmly into the hole in the panel, twist the locking nut onto the fitting, and turn it clockwise until tight.

15. Connect the new power cord to an AC power source (a surge protector is recommended).

Turning On the CubiScan

Specific procedures must be followed each time you turn on the CubiScan 50-PS. Refer to Chapter 3 “Operation” on page 23 for instructions on starting and operating the CubiScan 50PS.

Chapter 3
Operation

This chapter provides instructions for starting and operating the CubiScan 50-PS.

NOTE ☞ *If you need to change the measurement units (i.e., in/mm, lb/g) or other settings before taking measurements, refer to "Adjustment Mode" on page 46.*

WARNING

The scanning gate moves across the glass scanning table when the CubiScan 50-PS is first turned on or any time the **[START]** button is pressed. Do not place your hands or fingers on the surface across which the gate moves (along the sides of the scanning table). Do not place any part of your body in the path of the gate. **Injury may result**.
The scanning table is made of reinforced glass that is strong enough for routine use. To prevent glass breakage, do not drop or throw objects on the glass, sit on the glass, or hit the glass. **If the glass breaks, injury may result**.
Always place hard items (e.g., metal, glass, rock, etc.) and heavy items that you are measuring gently on the glass scanning table to avoid damage to the glass. **If the glass breaks, injury may result**.
When placing a heavy item on the glass scanning table, set it down carefully in the center of the scanning table to avoid damage to the glass or to the load cell. **If the glass breaks, injury may result**.

CAUTION

Place large items in the middle of the scanning table and make certain the scanning gate will clear the item before you press **[START]** or damage to the gate may result.
Do not place items on the glass scanning table in excess of 33 lbs (15 kg), which is the capacity of the scale.
Do not get water or liquid on the CubiScan 50-PS. The cabinet is not water resistant. Do not spray water on the cabinet when cleaning the CubiScan. Do not place drinks anywhere on the top surface of the CubiScan.
Do not place an item or stack of items that is taller or wider than the gate on the scanning table. The gate may be damaged.
Do not bump or hit the scanning gate even when it is not moving. It can be damaged.
When moving the CubiScan on its casters, avoid excessive vibration or jolts.

Starting the CubiScan

Specific procedures must be followed each time you start the CubiScan 50-PS, as follows.

1. Remove any objects from the CubiScan .

2. Clean the glass scanning table. You can remove particles, dust, or paper debris with a chemically treated dry cloth or fine-bristled brush. Clean smudges, stains, or fingerprints with a glass cleaner. Apply the cleaner to the cloth rather than spraying it on the glass to avoid getting liquid inside the CubiScan.

3. Clean the glass surface any time particles of dust or debris collect. Scanning errors can be caused by particles on the glass.

NOTE ☞ *Be careful not to scratch the glass surface. Damage to the glass may cause scanning errors.*

4. To turn on the CubiScan 50-PS, press the **[Power]** switch on the control panel (see "Control Panel" on page 27).

   The control panel's backlight turns on, and the start-up procedure/diagnostics begins with the screen shown below.

   ```
   CUBISCAN 50-PS

                  PSXXXX
                XXXX/XX/XX
   ```

   The following screen is displayed when the scanning gate reaches its starting position.

   ```
   SEARCH ZERO POSITION

   --- PUSH [START] SW.
   ```

5. Press **[START]** to continue the start-up procedure.

NOTE ☞ *Do not place anything on the CubiScan or touch any part of the CubiScan until the start-up procedure is complete.*

Several screens of data are displayed as the CubiScan performs various internal tests, including zeroing and automatic sensitivity adjustment. As the tests are performed, the scanning gate moves back and forth across the scanning table. When the following screen is displayed, the start-up procedure is complete.

```
NORMAL SCAN MODE


M=          0g
```

The screen (above) identifies the selected scanning mode (NORMAL or MAX). It also identifies whether or not the CubiScan has a correct zero setting (a zero weight when the scanning table is empty). If the "M" (mass or weight) value equals 0 (zero) grams (g) or pounds (lb), the CubiScan is correctly zeroed.

6. If the value shown is not 0, press the **[T]** button on the control panel to "zero" the CubiScan.

7. At this point, you can do any of the following:

   - **Take a measurement**. Place an item in the central area of the glass scanning table and press **[START]** to measure it. It will be measured using the scanning mode shown on the display. Refer to "Cubing and Weighing" on page 28 for instructions on taking a measurement.
   - **Change the scanning mode.** Press **[MODE]** one or more times until NORMAL SCAN MODE or MAX SCAN MODE is displayed. Refer to "Normal Mode" on page 33 and "Maximum Mode" on page 33 for information. Normal Mode is most commonly used.
   - **Change reading sensitivity or the gate's starting position**. Press **[MODE]** one or more times until CHECK MODE is displayed. Check Mode gives you three options to adjust the scanning sensitivity and to change the start/end location for the scanning gate. If you are receiving measurement errors or you want the gate to start on the opposite side of the scanning table, select this option. Refer to "Check Mode" on page 34 for information.

NOTE ☞ *If you need to change the measurement units (i.e., in/mm, lb/g), refer to "Adjustment Mode" on page 46 for information.*

Control Panel

All controls and displays for the CubiScan 50-PS are located on the control panel at the front of the unit.

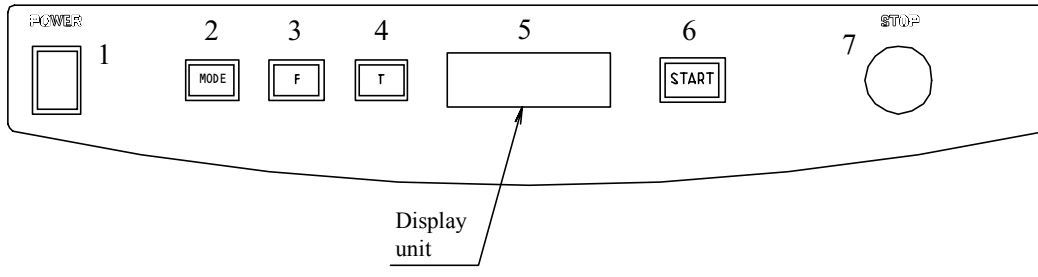


Figure 13
CubiScan 50-PS Control Panel

(1) **[POWER]** The CubiScan is turned on when the switch is pushed toward the "POWER" label.

(2) **[MODE]** Press this button repeatedly to cycle through setting and adjustment options (see "Selecting an Operation Mode" on page 32 for information).

(3) **[F]** When in Check Mode or Adjustment Mode, press this button to display options and select settings.

(4) **[T]** Press this button to reset the zero adjustment for weight. Make sure the glass scanning table has no objects on it before you press **[T]**.

(5) **Display** Liquid crystal display. Measurements, error messages, status, and other information is shown on the display.

(6) **[START]** Press to measure the item currently on the glass scanning table. The **[START]** switch is illuminated when the CubiScan is ready for scanning. Also, during start-up and while in Check/Adjustment Mode,

press **[START]** when you are prompted to do so by a message on the display.

(7) **[STOP]** Press **[STOP]** if the scanning gate is moving and must be stopped immediately. Pressing the **[STOP]** switch aborts the scan at once. To reset the CubiScan and return the scanning gate to its starting position, press **[START]**. When the scanning gate has returned to its start position, the **[START]** button light comes on, and you can start a new measurement.

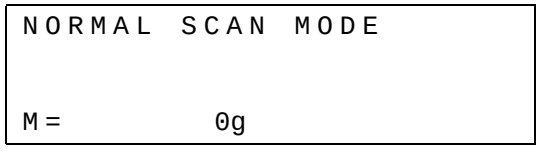
Cubing and Weighing

This section explains how to scan and weigh an item with the CubiScan 50-PS. Refer to "Starting the CubiScan" on page 24 for information on turning on the CubiScan, going through the start-up procedure, and selecting an operation mode.

NOTE ☞ *Do not place anything other than the item being measured on the glass scanning table (e.g., cup, glass, can, etc.). Do not touch or bump the CubiScan while a measurement is in progress.*

Do the following to take a measurement.

1. The screen identifies the selected scanning mode (NORMAL or MAX). It also identifies whether or not the CubiScan has a correct zero setting (a zero weight when the scanning table is empty).



If the “M” (mass or weight) value equals 0 (zero) grams (g) or pounds (lbs), the CubiScan is correctly zeroed and ready to take a measurement.

If the value is not 0, press the **[T]** button on the control panel to zero the CubiScan.

2. Place the item to be measured on the central area of the scanning table. Remember that the scanning table is glass—always place items on the glass gently.

 **WARNING**	Always place hard items (e.g., metal, glass, rock, etc.) and heavy items gently on the glass scanning table to avoid damage to the glass. **If the glass breaks, injury may result**.

3. Press **[START]** on the control panel**.**

   The scanning gate passes over the item and then moves back to its starting position. Dimensions and weight are calculated and displayed as shown below:

```
L  =  xxx  mm          <NOR>
W  =  xxx  mm
H  =  xxx  mm
M  =  xxx  g
```

4. If you are using a monitor with your CubiScan 50-PS, view the scanned image on the monitor to verify that the measurement is correct. The image on the monitor confirms which points on the item were scanned to get length and width values. Sometimes paper debris or particles on the glass may get scanned as part of the image. This should be apparent in the monitor image. If this happens, clean the glass and scan the item again.

Sensitivity and Gain Errors

If some measurements are not recording accurately or you are getting errors, try adjusting one of the following:

- Update the automatic sensor gain adjustment, which balances the sensors with the room lighting. Refer to “Check Mode” on page 42 for instructions. This adjustment is made during the start-up procedure, but if room lighting changes, it may need to be made again.
- **C**hange the manual gain-up adjustment, which increases the gain adjustment manually to compensate for semi-transparent items or persistently dirty glass. Refer to “Check Mode” on page 42 for instructions.

If you are using a monitor with your CubiScan 50-PS, it can help you determine the cause of the problem. The most difficult items to scan are those with hard to identify edges or surfaces, especially translucent surfaces. Such surfaces include items made of clear plastic or glass or items wrapped in bubble-wrap or clear tape. The image on the monitor confirms which points on the item were scanned to get length and width values. If points are missed by the scan, you can see it in the image on the monitor. You can correct this type of problem by changing the manual gain-up setting. Refer to “Check Mode” on page 42 for information.

Measuring Area of Scanning Table

The glass scanning table defines the measuring area of the CubiScan 50-PS, but there is a small margin around the edge of the glass where items cannot be scanned.

The margin around the edge of the glass to avoid is as follows:

- Left and right sides
  0.2 inch (5 mm)
- Front
  0.2 inch (5 mm)
- Back
  0.4 inch (10 mm)

The following illustration shows the scanning glass and the margins described above.

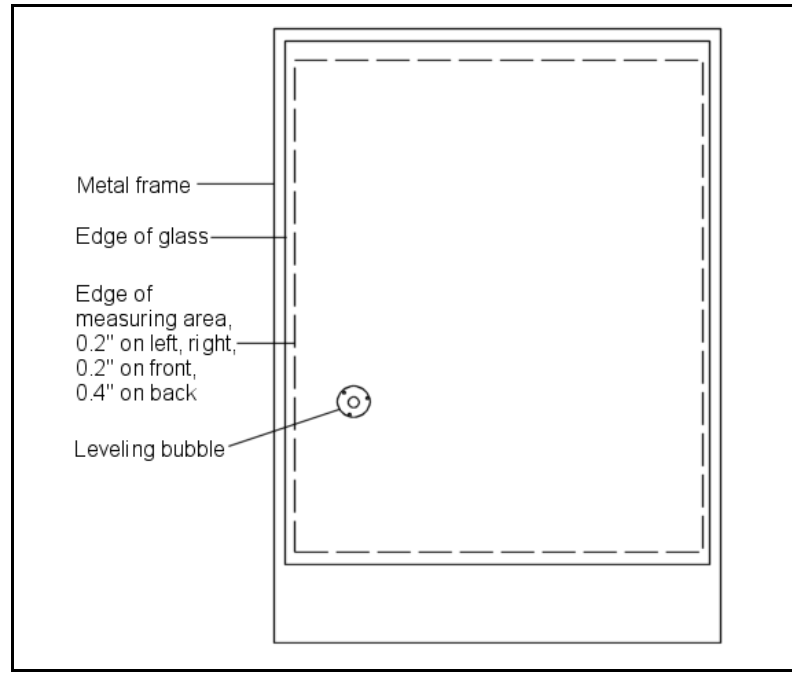


Figure 14
Measuring Area on CubiScan Scanning Table

Items Unable to Scan

The CubiScan 50-PS cannot scan items with the following properties:

- Items with water or moisture collected on their surfaces (as from condensation). There is also a danger of electrical shock from moisture on the CubiScan.
- Any soft material that does not hold its shape.
- Items that are transparent. Items that are translucent can often be scanned if the sensor gain adjustment is adjusted to compensate, but a transparent item cannot be scanned.

WARNING

Always place hard items (e.g., metal, glass, rock, etc.) and heavy items gently on the glass scanning table to avoid damage to the glass and to the load cell. **If the glass breaks, injury may result**.

Selecting an Operation Mode

Press the **[MODE]** button to cycle through the following three mode settings:

- Normal Scan Mode (see “Normal Mode” below)
- Max Scan Mode (see “Maximum Mode” on page 33)
- Check Mode (see “Check Mode” on page 34)

NOTE ☞ *Use Check Mode to change the adjustment that balances the sensors with the room lighting and to change the scanning gate’s starting position.*

Normal Mode

Normal Mode is the default mode and the most commonly used measurement mode. In Normal Mode, length and width are measured at their minimum possible values. If an item is placed on the scanning table at an angle or out of square with the scanning gate, the angle is detected and the item is scanned as if it is square with the scanning gate.

The following examples show normal or minimum dimensions for rectangular and non-rectangular items scanned at an angle.

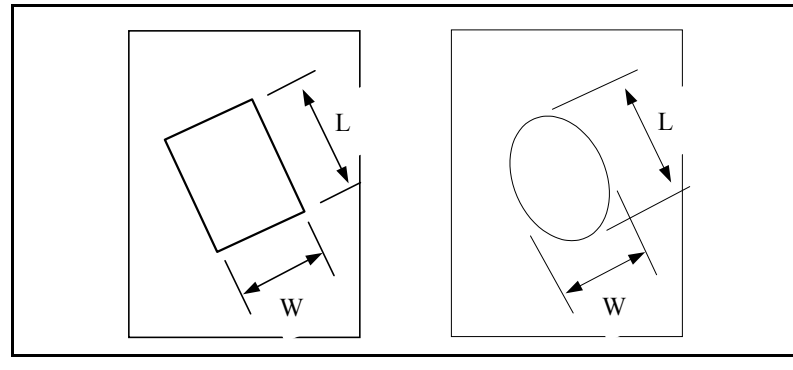


Figure 15
Items Measured at an Angle in Normal Mode

NOTE ☞ *If you are scanning items that are not rectangular in shape, it is recommended that you use an optional computer monitor so that the calculated dimensions can be visually confirmed (as shown above).*

Maximum Mode

In Maximum Mode, length and width are measured at their maximum possible values. When an item is placed on the scanning table at an angle or out of square with the scanning gate, the measurement is based on the item's diagonal or out-of-square orientation.

The following examples show maximum dimensions for rectangular and non-rectangular items scanned at an angle.

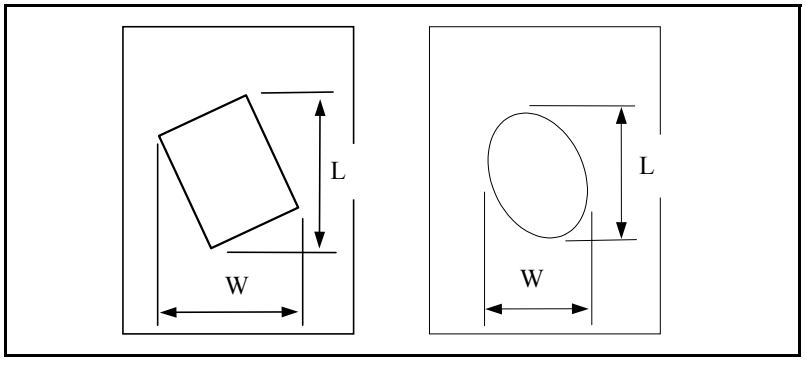


Figure 16
Items Measured at an Angle in Maximum Mode

Check Mode

Use Check Mode to make adjustments if you are receiving measurement errors or if you want the scanning gate to start on the opposite side of the scanning table.

Use Check Mode to do the following:

- Update the automatic sensor gain adjustment (balance the sensors with the room lighting).
- **C**hange the manual gain-up adjustment (increase the gain adjustment manually to compensate for semi-transparent items or persistently dirty glass).
- **C**hange the scanning gate's starting position (front or back).

Refer to "Check Mode" on page 42 for information on using Check Mode.

Chapter 4
Maintenance

This chapter provides information on the care and maintenance of the CubiScan 50-PS. Routine maintenance and careful handling will help keep the CubiScan 50-PS in good operating condition and prevent service calls or repairs.

WARNING

The scanning gate moves across the glass scanning table when the CubiScan 50-PS is first turned on or any time the **[START]** button is pressed. Do not place your hands or fingers on the surface across which the gate moves (along the sides of the scanning table). Do not place any part of your body in the path of the gate. **Injury may result**.
The scanning table is made of reinforced glass that is strong enough for routine use. To prevent glass breakage, do not drop or throw objects or items to be measured on the glass, sit on the glass, or hit the surface of the glass with your hands, tools, or objects. Set heavy objects very gently on the glass, and do not place any objects on the scanning table heavier than 33 lbs (15 kg). **If the glass breaks, injury may result**.
Disconnect power before removing the side panels to grease the CubiScan fittings. Injury may result from electrical shock and from moving parts if a panel is removed while power is on.

CAUTION

Do not get water or liquid on the CubiScan 50-PS. The cabinet is not water resistant. Do not spray water on the cabinet when cleaning the CubiScan. Do not place drinks anywhere on the top surface of the CubiScan.
Repairs to the CubiScan 50-PS should only be made by authorized personnel.
Do not bump or hit the scanning gate even when it is not moving. It can be damaged.
When moving the CubiScan on its casters, avoid excessive vibration or jolts.

Cleaning

For optimum performance of the CubiScan 50-PS, perform the following routine cleaning procedures.

Clean the Glass Scanning Table Daily

Each day, before turning on the CubiScan, clean the glass scanning table. You can remove particles, dust, or paper debris with a chemically treated dry cloth or a fine-bristled brush. Clean smudges, stains, or fingerprints with a glass cleaner. Apply the cleaner to the cloth rather than spraying it on the glass to avoid getting liquid inside the CubiScan.

Clean the glass surface any time particles of dust or debris collect. Scanning errors can be caused by particles on the glass.

NOTE ☞ *Be careful not to scratch the glass surface. Damage to the glass can cause scanning errors.*

Clean the Sensor Arrays

You should routinely clean the scanning gate and photo beam sensors. The photo sensors are located on the left, right, and top surfaces of the scanning gate. Use canned air or a soft-bristled brush to clean the surface of the sensor arrays. You can try cleaning them weekly, and if you receive scanning errors that may be caused by dust on the sensors, clean them more often.

Greasing

There are two mechanisms inside the CubiScan 50-PS cabinet that require lubrication: the scanning gate and the gate driving screw. With normal use, greasing the mechanisms annually is sufficient. If your CubiScan is subjected to heavy use, more frequent greasings may be required.

The scanning gate mechanism is lubricated via two grease fittings, one located on each side of the CubiScan. Use Alvania grease No. 2 (AV2 lithium soap group), or another grease suitable for bearings, with a grease gun.

WARNING

Disconnect power to the CubiScan 50-PS before servicing.

Do the following to grease both mechanisms.

1. Turn off the CubiScan, and unplug the AC power cord from the outlet before starting this procedure.

2. Remove the two Phillips head screws at the bottom of each panel (Figure 17 shows one of the screws).

Figure 17
Panel Retaining Screw

3. To remove the panel, lift up on it until the top edge is free, and then pull it toward you. Set each panel out of the way.

4. Locate the grease fittings on each side of the CubiScan (in the same location on each side). Figure 18 shows the right side grease fitting.

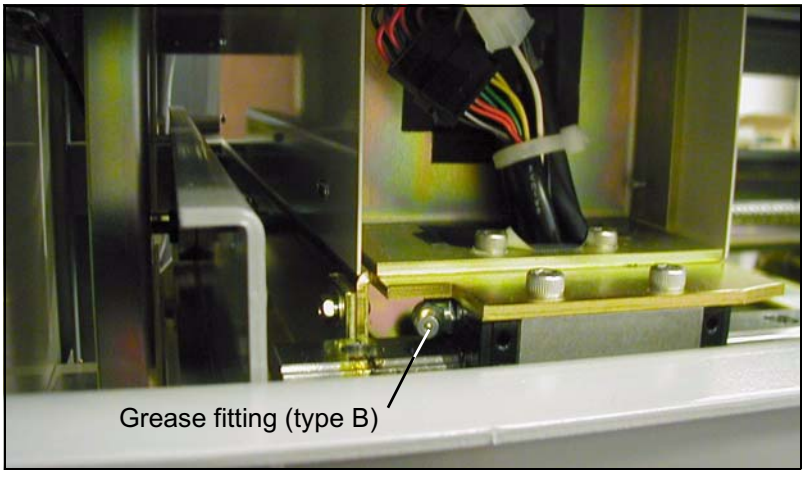


Figure 18
Right Side Grease Fitting

5. Attach the grease gun to the fitting and insert grease. Stop when the reservoir is full and grease begins to ooze out. Wipe away the excess grease.

6. Locate the gate driving screw as shown in Figure 3 on page 4.

7. Use a rag to wipe the old grease off the gate driving screw.

8. Apply new grease to the gate driving screw, rubbing it over the full length of the screw.

9. While the cabinet is open, remove any foreign objects, and use a clean rag to wipe away any accumulated dirt and dust.

10. Replace the side panels. Place each panel against the side and lower it onto the top bracket.

11. With the panel properly attached at the top, the screw holes should be aligned. Reattach the two screws to each panel.

Changing the Fuse

If the CubiScan will not power on, you may need to change the fuse. Before changing the fuse, refer to Chapter 6 “Troubleshooting” on page 65 to help you determine the cause of the problem.

The CubiScan uses a type SAU-3A fuse, part number 92OE05.

To change the fuse, take the following steps.

1. Locate the fuse on the connector panel on the back of the Cubi-Scan, as shown below.

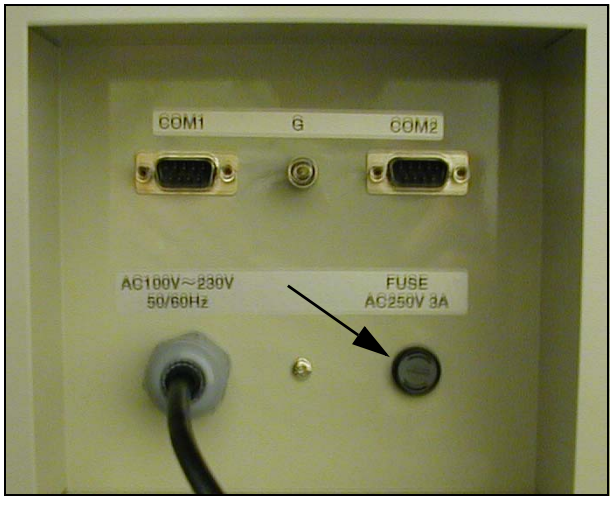


Figure 19
CubiScan Fuse Location

2. Insert a flat head screwdriver into the center slot of the fuse cover.

3. Rotate the fuse cover 1/8th of a turn counterclockwise until it springs out.

4. Remove the old fuse from the cover.

5. Insert the new fuse in the cover.

6. Place the fuse cover back in the fuse drawer.

7. With the screwdriver, push and rotate the cover clockwise until it locks into place.

Chapter 5
Adjustments and Calibration

This chapter provides instructions for changing the initial settings, making periodic adjustments, performing scale calibration, and running operation tests on the CubiScan 50-PS.

You perform adjustments and calibration using the functions available in Check Mode and Adjustment Mode.

Check Mode can be accessed any time the CubiScan is turned on. Three common adjustment options are available in Check Mode, including gain adjustments and the scanning gate's start position. If you are receiving measurement errors or you want the gate to start on the opposite side of the scanning table, use the options in Check Mode. Refer to "Check Mode" on page 42 for information.

All adjustment and calibration functions are available in Adjustment Mode (including the three Check Mode options). To access Adjustment Mode, you must turn off the CubiScan and perform a special start-up sequence when you turn it back on. Refer to "Adjustment Mode" on page 46 for information.

Changing Measurement Units

You can change whether the CubiScan calculates measurements in pounds or grams, inches or millimeters using the Unit Change adjustment (see page 57 for instructions).

Adjusting Gain

Gain adjustments determine the brightness of light required to recognize that an item has broken the light beam between the LED transmitters and receivers. The LED receivers must be adjusted so they can distinguish between ambient light (room lighting) and the light being emitted by the LED transmitters. The CubiScan automatically adjusts this level during the start-up procedure, but if lighting changes (either brighter or dimmer) during the session, the accuracy of the scans may be compromised. If you detect a significant change in the room lighting, or if measurement errors are occurring (easiest to detect if you have a monitor) you can add to the automatic gain setting. If sensors are not registering correctly, there will either be missing data or too much data. If you have a monitor, this is noticeable in the graphic image on the screen.

Update the automatic setting first, which is the adjustment performed during start-up (refer to page 44). This is normally sufficient. The manual adjustment (refer to page 45) is only needed if the ambient light is such that the automatic adjustment isn't sufficient to prevent some errors.

Calibrating the Scale

The CubiScan 50-PS is calibrated at the factory; however, you may need to recalibrate the scale in certain circumstances. The Scale Calibration option in Adjustment Mode is used to calibrate the scale. Refer to page 57 for information.

Check Mode

Three common adjustment options are available in Check Mode, which can be accessed any time the CubiScan is turned on. These include:

01) SENSOR GAIN ADJUST
    Update the automatic sensitivity adjustment. This is the adjustment made during start-up and normally only needs to be

updated if the ambient light (room light) has changed. Always try this option before changing the Gain Up setting.

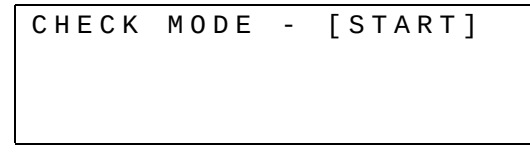
02) GAIN UP SET
Manually add to the automatic gain adjustment. This is sometimes needed to compensate for the type of item you are scanning. Manual adjustment is only required if the automatic adjustment isn't sufficient to prevent some errors. If you are measuring semi-transparent items, the gain-up should be set to 2. For opaque or non-transparent items, the gain-up should be set to 3 (default) or 4 if dirt on the glass is an ongoing problem.

03) GATE ORG POSITION
Change the scanning gate's starting position (front or back).

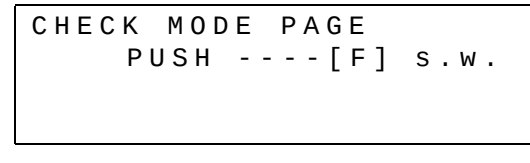
Refer to "Adjustment Mode" on page 46 for information on all other adjustment and calibration functions.

Do the following to access the Check Mode options:

1. Press **[MODE]** on the control panel one or more times until CHECK MODE is displayed.



2. Press **[START]** to access the CHECK MODE page.



3. Press **[F]** repeatedly to cycle through the available options. When the option you want is displayed, press **[START]** to select it.

1) SENSOR GAIN ADJUST

Select this option to update the automatic sensor gain adjustment. The following screen is displayed.

```
01) SENSOR GAIN ADJUST

      PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
01) SENSOR GAIN ADJUST

[T] sw -- GAIN + [*]
[START] SW -- ADJUST
```

   The manual gain-up adjustment is shown on the right (GAIN). In the image above, the value is replaced with an asterisk (*). To change the gain-up value, press **[T]** to select a setting of 2, 3, or 4. This value is added to the automatic sensor gain adjustment.

   "3" is the normal setting. If you are measuring semi-transparent items, set the gain-up to "2." At this level, even some glass items will block enough light to be scanned. For opaque or non-transparent items, you can set the gain higher, which reduces the sensitivity to dust and dirt on the glass scanning table.

2. Press **[START]** to start the automatic gain adjustment process and to apply the new gain-up value if you changed it. An automatic test for each LED (emission test) is run. This is the same as the test run during start up.

   It takes a minute or more to run the automatic gain adjustment test. During this process, nothing should touch or bump the CubiScan.

2) GAIN UP SET

Select this option to manually change the sensor gain adjustment. The following screen is displayed.

```
02) GAIN UP SET

      PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
02) GAIN UP SET

[T] sw -- GAIN + [*]
[START] -- GAIN SET
```

   The manual gain-up adjustment is shown on the right (GAIN). In the image above, the value is replaced with an asterisk (*). To change the gain-up value, press **[T]** to select a setting of 2, 3, or 4. This value is added to the automatic sensor gain adjustment.

   "3" is the normal setting. If you are measuring semi-transparent items, set the gain-up to "2." At this level, even some glass items will block enough light to be scanned. For opaque or non-transparent items, you can set the gain higher, which reduces the sensitivity to dust and dirt on the glass scanning table.

Value	Item
+2	Translucent or semi-transparent objects
+3	Normal scanning
+4	Helps to compensate for dust or paper particles on the glass scanning table

2. Press **[START]** to apply the gain-up value to the current automatic gain setting.

3) GATE ORG POSITION

Select this option to change the originating or starting position of the scanning gate. The following screen is displayed.

```
03) GATE ORG POSITION

NORMAL POSITION
      PUSH [START]
```

The current gate position is shown (e.g., “NORMAL POSITION”). Press **[START]** to select the alternate position. The options are:

- NORMAL POSITION (gate starts and ends at front of scanning table)
- REVERSE POSITION (gate starts and ends at back of scanning table) often used when scanning large items frequently

Adjustment Mode

Adjustment Mode contains options for changing the initial settings, making periodic adjustments, performing calibration, and running operation tests on the CubiScan 50-PS. The three options in Check Mode are also available in Adjustment Mode. To access Adjustment Mode, you must turn off the CubiScan and perform a special start-up sequence when you turn it back on.

The options available in Adjustment Mode are as follows:

01) SENSOR GAIN ADJUST
Reset the automatic gain adjustment. (page 49)

02) GAIN UP
Change the amount to be added to the automatic gain adjustment to compensate for transparency, dust problems, etc. (page 51)

03) EMISSION TEST
Test each sensor. This test is also run as part of the sensor gain adjustment. (page 52)

04) GAIN DATA DISPLAY (H)
View the gain adjustment for each sensor's measuring height. (page 53)

05) GAIN DATA DISPLAY (W)
View the gain adjustment for each sensor's measuring width. (page 54)

06) STATIC DISPLAY
Place the CubiScan in a static measurement condition (gate not moving). (page 56)

07) UNIT CHANGE
Change the measurement units between mm/in, g/lb. (page 57)

08) SCALE CALIBRATION
Start the scale calibration procedure. (page 57)

09) SCAN CHECK
Verify that the scanning gate moves properly. (page 60)

10) GATE ORG POSITION
Change the scanning gate starting position. (page 61)

11) SLIDE ON/OFF TEST
Test the actuator that shifts sensor scanning positions during measurement. (page 61)

12) VIEW SELECT (TOP/SIDE)
Change the view on the optional monitor (top or side of item being measured). (page 62)

13) L POS. & GATE MOVE
Move the position of the scanning gate to test movement of the scanning gate and rotary encoder. (page 63)

14) TOTAL COUNT
Display the measurement count and reset count to zero. (page 64)

Do the following to access Adjustment Mode.

1. Turn off the CubiScan.

2. Hold down the **[T]** and **[F]** buttons, and press the **[Power]** switch on. Continue to hold down the **[T]** and **[F]** buttons until the following screen appears.

```
CUBISCAN 50-PS

                PSXXXX
              XXXX/XX/XX
```

The scanning gate moves, and the following screen is displayed when the scanning gate reaches it starting position.

```
SEARCH ZERO POSITION

--- PUSH [START] SW.
```

3. Press **[START]** to continue the start-up procedure.

NOTE ☞ *Do not place anything on the CubiScan or touch the scanning gate or scanning table until the start-up procedure is complete.*

The following screen is displayed.

```
PARTS SCAN
READY (NORMAL MODE)

M=
```

4. Press **[MODE]** until the Check Mode screen is displayed.

```
CHECK MODE - [START]
```

5. Press **[START]** to access the Check Mode page.

```
CHECK MODE PAGE
     PUSH ----[F] s.w.
```

6. Press **[F]** to cycle through the available options. When the option you want is displayed, press **[START]** to select it.

Refer to the following sections for instructions on each option.

1) SENSOR GAIN ADJUST

Select this option to update the automatic sensor gain adjustment. The following screen is displayed.

```
01) SENSOR GAIN ADJUST

     PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
01) SENSOR GAIN ADJUST

[T] sw -- GAIN + [*]
[START] SW -- ADJUST
```

The manual gain-up adjustment is shown on the right (GAIN). In the image above, the value is replaced with an asterisk (*). To change the gain-up value, press **[T]** to select a setting of 2, 3, or 4. This value is added to the automatic sensor gain adjustment.

"3" is the normal setting. If you are measuring semi-transparent items, set the gain-up to "2." At this level, even some glass items will block enough light to be scanned. For opaque or non-transparent items, you can set the gain higher, which reduces the sensitivity to dust and dirt on the scanning table.

2. Press **[START]** to start the automatic gain adjustment process and to apply the new gain-up value if you changed it. An automatic test for each LED (emission test) is run. This is the same as the test run during start up.

It takes a minute or more to run the automatic gain adjustment test. During this process, nothing should touch or bump the CubiScan.

NOTE ☞ *If an* **H87** *error message is displayed, press* **[START]** *to continue the adjustment. (The H87 LED is the bottom height LED that emits just above the glass.)*

3. When finished, the display returns to the starting screen for the option. You can do any of the following:
   - Press **[START]** to return to the same option.
   - Press **[F]** to advance to the next option.
   - Turn the CubiScan off and back on to return to normal operation mode.

2) GAIN UP SET

Select this option to manually change the sensor gain adjustment. The following screen is displayed.

```
02) GAIN UP SET

      PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
02) GAIN UP SET

[T] sw -- GAIN + [*]
[START] -- GAIN SET
```

   The manual gain-up adjustment is shown on the right (GAIN). In the image above, the value is replaced with an asterisk (*). To change the gain-up value, press **[T]** to select a setting of 2, 3, or 4. This value is added to the automatic sensor gain adjustment.

   "3" is the normal setting. If you are measuring semi-transparent items, set the gain-up to "2." At this level, even some glass items will block enough light to be scanned. For opaque or non-transparent items, you can set the gain higher, which reduces the sensitivity to dust and dirt on the glass scanning table.

Value	Item
+2	Translucent or semi-transparent objects
+3	Normal scanning
+4	Helps to compensate for dust or paper particles on the glass scanning table

2. Press **[START]** to apply the gain-up value to the current automatic gain setting.

3. When finished, press **[F]** to advance to the next option, or turn the CubiScan off and back on to return to normal operation mode.

3) EMISSION TEST

Select this option to test each sensor and verify that it is working properly. This test is also run as part of the Sensor Gain Adjustment and during the start-up procedure.

NOTE ☞ *You should clean the sensors before running this test, as dirt on a sensor may cause measuring errors. Refer to "Clean the Sensor Arrays" on page 37 for information.*

When you select the option, the following screen is displayed.

```
03) EMISSION TEST


      PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
03) EMISSION TEST

H SENSOR NO = ***
```

The test runs for both height and width sensors 1 to 176, and the progress of each test is noted on the screen.

If an error occurs, it is shown on the bottom line of the display, and the sensor that errored is not scanned. Dirt on either the LED transmitter or the receiver can cause on error. If you have not already cleaned the sensors, clean them and run the test again. Refer to "Clean the Sensor Arrays" on page 37 for information.

2. If an error occurs, the test stops. Press **[START]** to resume the test. The sensor is retested before proceeding. If the transmitter and receiver are both clean and the error repeats, the sensor may be defective.

   A transmitter error is identified as “Tx ON ERROR.”

   A receiver error is identified as “Rx ON ERROR.”

3. When finished, the display returns to the starting screen for the option. You can do any of the following:

   - Press **[START]** to return to the same option.
   - Press **[F]** to advance to the next option.
   - Turn the CubiScan off and back on to return to normal operation mode.

4) GAIN DATA DISPLAY (H)

Select this option to view the gain adjustment made to each height sensor position to bring the sensor into parity with the level of the last sensor gain adjustment. The gain is made on the sensor receiver side to compensate for variations in LED output and other factors so that all receivers are recording LED light at the same intensity. These values do not include the Gain Up Set value. The Gain Data Display is for information only.

When you select the option, the following screen is displayed.

```
04) GAIN DATA DISPLAY
                   (H)

      PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
04) GAIN DATA DISPLAY
NEXT NO -- [START] sw.
001   1 2 1 2 3 2 3 2
009   2 3 2 2 3 2 2 2
```

   Height sensor positions are identified by numbers ranging from 001 to 352. This includes two scanning positions for each sensor pair (the second position is software interpreted to increase resolution). For more information, refer to “11) SLIDE ON/ OFF TEST” on page 61.

   Height sensor positions are shown eight at a time in two rows. In the first row, the gain value is shown for positions 001 through 008. The second row shows the gain values for sensors 009 through 016. Only the first position number is shown in each row.

2. Press **[START]** to display the values for the next group.

3. Continue to press **[START]** until all groups are displayed, with the last row beginning with position number 345.

4. When finished, the display returns to the starting screen for the option. You can do any of the following:

   - Press **[START]** to return to the same option.
   - Press **[F]** to advance to the next option.
   - Turn the CubiScan off and back on to return to normal operation mode.

5) GAIN DATA DISPLAY (W)

Select this option to view the gain adjustment made to each width sensor position to bring the sensor into parity with the level of the last sensor gain adjustment. The gain is made on the sensor receiver

side to compensate for variations in LED output and other factors so that all receivers are recording LED light at the same intensity. These values do not include the Gain Up Set value. The Gain Data Display is for information only.

When you select the option, the following screen is displayed.

```
05) GAIN DATA DISPLAY
                    (W)

      PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
05) GAIN DATA DISPLAY
NEXT NO -- [START] sw.
001   1  2  1  2  3  2  3  2
009   2  3  2  2  3  2  2  2
```

   Width sensor positions are identified by numbers ranging from 001 to 352. This includes two scanning positions for each sensor pair (the second position is software interpreted to increase resolution). For more information on the two scanning positions, refer to “11) SLIDE ON/OFF TEST” on page 61.

   Width sensor positions are shown eight at a time in two rows. In the first row, the gain value is shown for positions 001 through 008. The second row shows the gain values for sensors 009 through 016. Only the first position number is shown in each row.

2. Press **[START]** to display the values for the next group.

3. Continue to press **[START]** until all groups are displayed, with the last row beginning with position number 345.

4. When finished, the display returns to the starting screen for the option. You can do any of the following:

- Press **[START]** to return to the same option.
- Press **[F]** to advance to the next option.
- Turn the CubiScan off and back on to return to normal operation mode.

6) STATIC DISPLAY

Select this option to place the CubiScan in a static measurement condition. Measurements are then taken with the scanning gate stopped in the center of the scanning table. When you select the option, the following screen is displayed.

```
06) STATIC DISPLAY


     PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
06) STATIC DISPLAY
W  =  *.*
H  =  *.*
M  =  *.*
```

2. If the scanning gate is not positioned over the glass scanning table, use function 13) L POS. & GATE MOVE (see page 63) to move it over the center of the scanning table.

   Width, height, and weight fields are shown on the display. Length is not displayed because gate movement is required to calculate length.

3. Slide an item under the scanning gate. You can move the item to different positions under the gate, including at an angle. The display shows the dimensions for the item's current position. If your hand moves under the scanning gate, it will be included in the dimensions.

4. Press **[START]** to end the static display mode. The scanning gate returns to its starting position.

5. When finished, you can do any of the following:

   - Press **[START]** to place the CubiScan back in static display mode.
   - Press **[F]** to advance to the next option.
   - Turn the CubiScan off and back on to return to normal operation mode.

7) UNIT CHANGE

Select this option to switch the measurement units between pounds or grams, inches or millimeters. The following screen is displayed.

```
07) UNIT CHANGE

  [ mm ] [ g ]
     PUSH [START]
```

1. Press **[START]** to change the measurement units from mm/g to inch/lb or from inch/lb to mm/g.

2. When finished, press **[F]** to advance to the next option, or turn the CubiScan off and back on to return to normal operation mode.

8) SCALE CALIBRATION

Select this option to calibrate the CubiScan 50-PS scale. The CubiScan 50-PS is calibrated at the factory; however, some circumstances in which recalibration may be required include the following:

- If you have problems with weight measurements after assembly and setup.
- If the CubiScan is subjected to any type of mechanical shock or bump or if weight (M) measuring errors occur.
- As part of a regular maintenance schedule. If the CubiScan is used heavily, calibration should be performed monthly.

Before calibrating the CubiScan 50-PS, remove all objects or other material from the scanning table, clean the glass, and blow or brush any dust from the sensor arrays. Refer to Chapter 4 “Maintenance” on page 35 for information on cleaning the glass and sensors.

To perform the calibration, you will need an official test weight of 33 pounds (15 kg), which is the maximum weight capacity of the CubiScan 50-PS.

When you select the option, the following screen is displayed.

```
08) SCALE CALIBRATION


          PUSH [START]
```

1. Make sure nothing is on the scanning table, and press **[START]**. The following screen appears.

```
08) SCALE CALIBRATION
       on 0
   wait stability
```

2. The scale is zeroed in preparation for calibration, and the following screen is displayed.

```
08) SCALE CALIBRATION
       on F.S.
   full weight on
```

3. (F. S. refers to Full Scale.) If the CubiScan is set to metric units (grams), place a test weight weighing 15 kg on the center of the glass scanning table. If the CubiScan is set to English units (lbs), place a test weight weighing 33 lbs. on the center of the glass scanning table.

WARNING

When placing a heavy object on the glass scanning table, set it down carefully in the center of the scanning table to avoid damage to the glass or to the load cell. **If the glass breaks, injury may result**.

The following screen appears.

```
08) SCALE CALIBRATION
       on F.S.
   wait stability
```

4. When the scale is stable, the measured weight is shown on the display.

```
08) SCALE CALIBRATION
       on F.S.

M = *****
```

5. Confirm that the weight shown is the same as the test weight. If not, remove the weight and press **[START]** to perform calibration again.

6. The calibration is not valid until the weight shown is the same as the test weight. You can repeat the test a few times, but if you cannot get an accurate reading, there may be a mechanical problem with the scale. Contact Quantronix for assistance.

7. When finished, the display returns to the starting screen for the option. You can do any of the following:

   - Press **[START]** to return to the same option.
   - Press **[F]** to advance to the next option.
   - Turn the CubiScan off and back on to return to normal operation mode.

9) SCAN CHECK

Select this option to verify that the scanning gate moves properly. The following screen is displayed.

```
09) SCAN TEST


      PUSH [START]
```

1. Press **[START]** and the following screen appears.

```
09) SCAN TEST

         [ GATE IN ]
      PUSH [START]
```

2. Press **[START]**, and the gate moves to the front of the glass scanning table and then returns to the starting position and stops. If an error message is displayed, note the error and refer to Chapter 6 “Troubleshooting” on page 65 for information.

3. When finished, the display returns to the starting screen for the option. You can do any of the following:

- Press **[START]** to return to the same option.
- Press **[F]** to advance to the next option.
- Turn the CubiScan off and back on to return to normal operation mode.

10) GATE ORG POSITION

Select this option to change the originating or starting position of the scanning gate. The following screen is displayed.

```
10) GATE ORG POSITION

NORMAL POSITION
      PUSH [START]
```

1. The current gate position is shown (e.g., "NORMAL POSITION"). Press **[START]** to select the alternate position. The options are:

   - NORMAL POSITION (gate starts and ends at front of scanning table)
   - REVERSE POSITION (gate starts and ends at back of scanning table) often used when scanning large items frequently

2. When finished, press **[F]** to advance to the next option, or turn the CubiScan off and back on to return to normal operation mode.

11) SLIDE ON/OFF TEST

During the measurement process, the scanning gate moves in one direction, stops, and then returns to its original position. At the stopping point, midway through the measurement process, the internal LED rings (height and width) shift by half the distance between the LEDs. This allows the CubiScan to scan with twice the resolution.

Select the Slide On/Off Test option to verify that the actuator that shifts the LED rings is working properly.

The following screen is displayed.

```
11) SLIDE ON/OFF TEST


      PUSH [START]
```

1. Press **[START]** several times to turn on and off the actuator that shifts the LED rings. This tests the actuator hardware to verify that it is working properly.

2. When finished, press **[F]** to advance to the next option, or turn the CubiScan off and back on to return to normal operation mode.

12) VIEW SELECT (TOP/SIDE)

When a monitor is used with the CubiScan 50-PS, it can display a top view or a side view of the object being measured. A top view is shown by default. Select this option to switch between a top view and a side view. The following screen is displayed.

```
12) VIEW SELECT
      TOP/SIDE
         TOP
    PUSH [START]
```

1. Press **[START]** to change the view orientation from top to side or from side to top.

2. When finished, press **[F]** to advance to the next option, or turn the CubiScan off and back on to return to normal operation mode.

13) L POS. & GATE MOVE

Select this option to manually move the position of the scanning gate, which tests the movement of the gate as well as the rotary encoder. The following screen is displayed.

```
13) L POS. & GATE MOVE


      PUSH [START]
```

1. Press **[START]** and the following screen is displayed. The current position of the gate is shown in the second line on the right.

```
L POS.   & GATE MOVE
L POSITION       ** mm
FWD-- [START]
REV-- [T]+[START]
```

2. Press and hold **[START]** to move the gate away from the control panel. Release the **[START]** button to stop the gate at its current position.

3. Press and hold **[T]** and **[START]** to move the gate towards the control panel. Release the buttons to stop the gate at its current position.

   As the gate moves, the rotary encoder provides the current position of the gate with values of 25 mm to 525 mm.

4. When finished, press **[F]** to advance to the next option, or turn the CubiScan off and back on to return to normal operation mode.

14) TOTAL COUNT

An internal counter records the total number of times the CubiScan has performed a measurement. Select this option to display the total count and to reset the count to zero if desired. The following screen is displayed.

```
14) TOTAL COUNT


     PUSH [START]
```

1. Press **[START]** and the following screen is displayed.

```
14) TOTAL COUNT
COUNT          *********

CLEAR--[T]+[START]
```

2. Press and hold **[T]** and **[START]** to reset the count to zero.

3. Press **[F]** to return to the first Total Count screen.

4. When finished, press **[F]** to advance to the next option, or turn the CubiScan off and back on to return to normal operation mode.

Chapter 6
Troubleshooting

This chapter provides assistance in identifying and solving problems with the CubiScan 50-PS. If you encounter problems not covered in this chapter, or if a defect is suspected, contact your system integrator or call Quantronix 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 50-PS, first verify that all cables attached to the back panel (serial communications cables and power cord) are fully seated and secure (locking rings or screws). Then, verify that the setup is correct.

For specific troubleshooting information, refer to the following sections.

Error Messages

Errors identified by the CubiScan are displayed on the control panel. Each error is identified by its dimension, as shown below (e.g., M = ERR-10 means an error occurred with the weight measurement.)

```
L  =  ERR-**
W  =  ERR-**
H  =  ERR-**
M  =  ERR-**
```

Error message	Cause	Action
L = ERR-10 W = ERR-10 H = ERR-10	No item scanned (no item in scanning gate or item too small)	An item must be larger than 0.1 inch (2 mm) (L x W x H). If the item is larger than this, try scanning it again.
L = ERR-13 W = ERR-13 H = ERR-13	Over scanning range	An item must be smaller than 18 x 13.5 x 13.5 inches (450 x 345 x 345 mm). If the item is smaller than this, place it in the center of the glass scanning table and scan it again.
		The item may be too close to the edge of the glass (see page 30 for limits). Place the object in the center of the glass scanning table.
M = ERR-01	Unstable weight	Take the measurement again, making certain that nothing disturbs the item or the CubiScan, such as touching it, vibration, or wind.
M = ERR-02	Weigh data shows a minus value	With the scanning table empty, press **[T]** to zero the scale, then scan again.
M = ERR-13	Item too heavy	The item weight exceeds the scale maximum 33 lbs (15 kg). Scan again to confirm. PLACE AND REMOVE HEAVY OBJECTS WITH CARE OR GLASS BREAKAGE MAY RESULT!
M = ERR-14	No data from scale	No power at scale mechanism, or abnormal condition in internal data transfer. Refer to the tables beginning on page 68 for more information.

Scanning Gate Errors

Error message	Cause	Action
MOTOR MOVE ERROR!	Scanning gate cannot finish the scan (one way) in time	Check to see if something has come in contact with the scanning gate during the scan, or for any signs of something stopping the gate. Press **[START]** to restart the CubiScan and rescan the item.
MOTOR DRIVER ERROR!	Error at the scanning gate driver	Inspect the gate on both sides for any objects that might be causing a bind, or for any other indication of a problem. If an object is binding the gate, carefully remove it, keeping in mind that there could be pressure on the object. If you can find no problem with the gate or after the problem is corrected, press **[START]** to restart the CubiScan and rescan the item.

Troubleshooting by Symptom

The following table describes symptoms, possible causes, and the action you should take to correct the problem. The table provides part failure descriptions for information only; ONLY AUTHORIZED PERSONNEL SHOULD REPAIR THE CUBISCAN 50-PS.

Symptom	Possible cause	Action
Power will not turn on.	Fuse is burned out	Change the fuse on the back panel (type SAU-3A, part no. 92OE05). Refer to “Changing the Fuse” on page 39. If the fuse fails again, contact Quantronix.

Symptom	Possible cause	Action
LCD backlight is not on.	CubiScan is not turned on	Turn on the CubiScan.
	Power cord is damaged or not plugged in	Check the power cord and plug. If the CubiScan is receiving power but does not power on, the power supply may have failed.
LCD backlight is not on after start-up.	Internal power circuit failure	Contact Quantronix.
LCD backlight is on, but characters are not displayed.	LCD unit failure	Contact Quantronix.
	LCD cable assembly is pulled out or broken	Contact Quantronix.
	CPU board failure	Contact Quantronix.
LED of **[START]** switch is not lit.	**[START]** switch failure or bad wiring	Contact Quantronix.
Scanning gate does not move when **[START]** switch is pressed.	CPU board failure	Contact Quantronix.
	P1 power supply failure	Contact Quantronix.
	Timing belt defect	Contact Quantronix.
	Motor unit failure	Contact Quantronix.
	Motor failure	Contact Quantronix.
Scanning gate moves when **[START]** is pressed, but then stops.	Encoder board failure (E1005E1 or E1005E2 board)	Contact Quantronix.
	Encoder cable damage	Contact Quantronix.
	Bad position of the original position limit switch	Contact Quantronix.
[STOP] switch does not stop the scanning gate.	Limit switch wiring damaged or broken	Contact Quantronix.
	Bad stop circuit	Contact Quantronix.
	[STOP] switch defect	Contact Quantronix.

Symptom	Possible cause	Action
Scanning gate moves slowly.	Timing belt defect	Contact Quantronix.
	Too much load on motor	Turn off power to stop the motor and push the scanning gate slowly by hand.
	Something is obstructing the scanning gate's movement	Check for an object jamming or being dragged by the scanning gate.
Abnormal noise when the scanning gate is moving, or abnormal vibration of the scanning table.	Something is obstructing the scanning gate	Check for an object jamming or being dragged by the scanning gate.
Length and width scan values are abnormal.	Scratch or dust on the glass surface of the scanning table	Clean the glass surface of the scanning gate (see page 36). If glass is scratched or damaged, replace the glass.
	Dust or dirt on sensors	Clean the photo sensor arrays (see page 37).
	Sensitivity requires adjustment	Reset the automatic sensor gain adjustment (see page 44).
		Change the gain-up adjustment to a value of +4 (see page 45).
	Bad positioning of W axis photo sensor board (receiver) or bad board	Contact Quantronix.
Height scan values are abnormal.	Dirt or dust on glass scanning table or on the sensors	Clean the glass and the sensors in the gate (see "Cleaning" on page 36).
	Bad position of H axis sensor (receiver) or board defect	Contact Quantronix.

Symptom	Possible cause	Action
Weight results (M) are abnormal or receiving errors.	CubiScan is not level or not all legs are in contact with the floor	Level the CubiScan (see "Leveling the CubiScan 50-PS" on page 10).
	Scanning table is in contact with a wall or other object	Make sure that nothing is touching the CubiScan.
	Scale requires calibration	Calibrate the scale (see page 57).
	Scanning table is in contact with the CubiScan body	Adjust the scanning table. Contact Quantronix.
	Scanning gate does not return to the proper position	Contact Quantronix.
Measured values of L, W, and H differ slightly from their actual size, or measurements vary for the same item.	Sensitivity requires adjustment	Reset the automatic sensor gain adjustment (see page 44).
		Change the gain-up adjustment to a value of +2, +3, or +4 (see page 45).
		Clean the W axis photo receiver sensor (upper inside). See page 37
	Bad motion of solenoid	Contact Quantronix.
	Bad height adjustment of scanning table glass surface	Contact Quantronix.
Measurement data is not received via computer's serial port.	Wrong baud rate setting	Change the baud rate of the computer's port. The standard baud rate is 9600.
	Bad wiring of output connector	Contact Quantronix.

Resetting CubiScan to Factory Settings

Perform the following steps to return the CubiScan to its initial factory settings. This may be helpful if you made changes that you did not intend to make or if you want to restore the settings or as a troubleshooting measure.

1. Turn off power to the CubiScan.

2. Remove all items from the scanning table.

3. Press the **[Power]** switch and the **[MODE]** switch at the same time to power on the CubiScan.

4. Hold down the **[MODE]** switch until the following screen appears.

5. Release the **[MODE]** switch.

The CubiScan is reset to its original factory settings, which are:

- Manual gain-up adjustment value = 3
- Original position of scanning gate = Front (NORMAL)

NOTES

Appendix A
Communication Protocol

This appendix contains the cable pin assignments and command set description for the interface between the CubiScan 50-PS and a host computer via a serial RS-232 connection.

Serial (RS-232-C) Cable Pin Assignments

The CubiScan 50-PS COM1 serial port uses the EIA RS-232-C communications protocol. The data are serially transmitted ASCII characters.

The following table shows the serial connector pin assignments. All other pins are not connected.

Serial - DB9 Connector Pinout			
Terminal Number	**Function**	**Symbol**	**Input/Output**
2	RS-232C Rxd	RX	Input
3	RS-232C Txd	TX	Output
5	Signal Ground	SG	
7	Request To Send	RTS	Output
8	Clear To Send	CTS	Input

The following table shows the parameters for asynchronous communications through the RS-232 serial cable.

Asynchronous Communication Parameters	
Baud Rate	9600
Parity	None
Data Bits	8
Start Bits	1
Stop Bits	1

CubiScan 50-PS Command Set

This section describes the commands recognized by the CubiScan 50-PS (input and output).

All command packets begin with an STX (start of text) and end with an ETX (end of text). For example:

<STX><HEADER><DATA><ETX>

Measurement Data Transmission

(Output from CubiScan 50-PS)

Pos	Len	Description	Type	Range	ASCII
1	1	Start of Text	Control	(STX)	02h
2	1	Header	Alpha	(D)	44h
3	4	Measure Number	Numeric	0001-9999	

Pos	Len	Description	Type	Range	ASCII
7	2	Measure Mode	Character	00 = normal mode 01 = max mode 02 = test mode	
9	1	Length Header	Character	L	4Ch
10	5	Length	Numeric	00.00 - 99.99	
15	2	Length Units	Character	in or mm	
17	2	Length Status	Character	00 = Valid 10 = Object too small or not detected 13 = Object too large	
19	1	Width Header	Character	W	57h
20	5	Width	Numeric	00.00 - 99.99	
25	2	Width Units	Character	in or mm	
27	2	Width Status	Character	00 = Valid 10 = Object too small or not detected 13 = Object too large	
29	1	Height Header	Character	H	48h
30	5	Height	Numeric	00.00 - 99.99	
35	2	Height Units	Character	in or mm	
37	2	Height Status	Character	00 = Valid 10 = Object too small or not detected 13 = Object too large	
39	1	Weight Header	Character	M	4Dh
40	6	Weight	Numeric	00.000 - 99.999	
46	2	Weight Units	Character	lb or g	

Pos	Len	Description	Type	Range	ASCII
48	2	Weight Status	Character	00 = Valid 01 = Weight unstable 02 = Weight negative 13 = Object too heavy 14 = Weight cannot be measured	
50	1	Volume Header	Character	V	56H
51	11	Volume	Numeric	0.000 – 9999999.999	
62	2	Volume Units	Character	m3 = Cubic meters, f3 = Cubic feet	
64	2	Volume Status	Character	00 = Valid 10 = Dimension error	
66	2	Check Sum Data	Control	XX[1]	
68	1	End of Text	Control	(ETX)	03h

1. See “Checksum Calculation” on page 79.

Error Occurred

(Output from CubiScan 50-PS)

Pos	Len	Description	Type	Range	ASCII
1	1	Start of Text	Control	(STX)	02h
2	1	Error Header	Alpha	(E)	45h
3	3	Error Code	Alpha	305 = Gate movement error	
6	1	End of Text	Control	(ETX)	03h

Measurement Started Signal

(Output from CubiScan 50-PS)

Pos	Len	Description	Type	Range	ASCII
1	1	Start of Text	Control	(STX)	02h
2	1	Measure Start Header	Alpha	(B)	22h
3	1	Measure Start Command	Alpha	(1)	31h
4	1	Measure Start Command	Alpha	(1)	31h
5	1	End of Text	Control	(ETX)	03h

Measure Start

(Input to CubiScan 50-PS)

Pos	Len	Description	Type	Range	ASCII
1	1	Start of Text	Control	(STX)	02h
2	1	Measure Start Header	Alpha	(b)	62h
3	1	Measure Start Command	Alpha	(3)	33h
4	1	Measure Start Command	Alpha	(1)	31h
5	1	End of Text	Control	(ETX)	03h

Error Reset

(Input to CubiScan 50-PS)

Pos	Len	Description	Type	Range	ASCII
1	1	Start of Text	Control	(STX)	02h
2	1	Error Reset Header	Alpha	(b)	62h
3	1	Error Reset Command	Alpha	(3)	33h
4	1	Error Reset Command	Alpha	(9)	39h
5	1	End of Text	Control	(ETX)	03h

Normal Measure Mode

(Input to CubiScan 50-PS)

Pos	Len	Description	Type	Range	ASCII
1	1	Start of Text	Control	(STX)	02h
2	1	Normal Measure Header	Alpha	(b)	62h
3	1	Normal Measure Command	Alpha	(4)	34h
4	1	Normal Measure Command	Alpha	(2)	32h
5	1	End of Text	Control	(ETX)	03h

Max Measure Mode

(Input to CubiScan 50-PS)

Pos	Len	Description	Type	Range	ASCII
1	1	Start of Text	Control	(STX)	02h
2	1	Max Measure Header	Alpha	(b)	62h
3	1	Max Measure Command	Alpha	(4)	34h
4	1	Max Measure Command	Alpha	(3)	33h
5	1	End of Text	Control	(ETX)	03h

Checksum Calculation

A checksum is a hexadecimal, 2-digit (2-character) ASCII code that is the last byte of the total result (2-byte, 4-digit hexadecimal) of hexadecimally added character code from character number 2 through character number 65.

For example:

Character No…...: 2 3 49
Output Character.: A 0 0
Hex Code ……...: 41h + 30h + ...+ 30h = 1023 h

Checksum data = “2,” “3”
The checksum data goes in position 66 and 67.

NOTES

Appendix B
Parts List

Following is a list of parts that can be purchased for the CubiScan 50-PS as spare parts or if replacement is necessary.

The “Category” column identifies the replacement requirements of each part, as follows:

A	Will need replacement if broken or scratched.
B	No replacement is required in normal use, but should be replaced after extended use.
C	No replacement is required in normal use, but the part plays an important function.

Part No.	Part Name	Qty/Unit	Category
Q0193300	CS50-PS, Plate, Glass, N28	1	A
Q0193400	CS50-PS, Solenoid Asy, N25	4	B
Q0193500	CS50-PS, CBL, RIBN, N03	2	B
Q0193600	CS50-PS, PCB Asy, PH Receiver, Main, N01	2	B
Q0193700	CS50-PS, PCB Asy, PH Receiver, Sub, N02	2	B
Q0193800	CS50-PS, PCB Asy, LED Emitter, N04	2	B
Q0193900	CS50-PS, PCB Asy, Encoder Emitter, N09	1	B
Q0194000	CS50-PS, PCB Asy, Encoder Receiver, N10	1	B
Q0194100	CS50-PS, Fuse, SAU-3A, N22	1	B

Part No.	Part Name	Qty/Unit	Category
Q0194200	CS50-PS, Switch, Mode F T, N21	3	B
Q0194300	CS50-PS, Switch, Start, N20	1	B
Q0194400	CS50-PS, Motor Asy, N13	1	B
Q0194500	CS50-PS, Power Supply, P3, N16	1	B
Q0194600	CS50-PS, Power Supply, P1, N14	1	B
Q0194700	CS50-PS, Power Supply, P2, N15	1	B
Q0194800	CS50-PS, PCB Asy, LCD Display, N17	1	B
Q0194900	CS50-PS, Belt, Timing, N27	1	B
Q0195000	CS50-PS, PCB Asy, Scale Sub, N07	1	C
Q0195100	CS50-PS, PCB Asy, Scale Main, N06	1	C
Q0195200	CS50-PS, PCB Asy, LCD, Scale, N12	1	C
Q0195300	CS50-PS, PCB Asy, CPU, N05	1	C
Q0195400	CS50-PS, PCB Asy, VGA Interface, N11	1	C
Q0195500	CS50-PS, Load Cell Asy, 72KG, N26	1	C
Q0195600	CS50-PS, Switch, Limit, Gate, N18	6	C
Q0195700	CS50-PS, Switch, Power, N23	1	C
Q0195800	CS50-PS, Switch, Limit, Zero Pnt, N19	1	C
Q0195900	CS50-PS, Relay, Stop, N24	2	C
Q0196000	CS50-PS, PCB Asy, Temp Sensor, N08	1	C