METTLER TOLEDO

CNS810

Dimensioner
Owner's Manual

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

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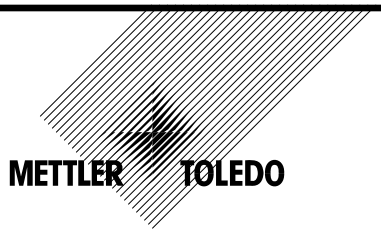

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PRECAUTIONS

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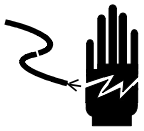
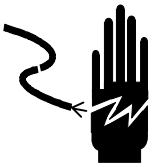


WARNING!

FOR CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLET ONLY. DO NOT REMOVE THE GROUND PRONG.

WARNING!

THE CNS810 IS NOT TO BE USED IN HAZARDOUS (EXPLOSIVE) AREAS.



WARNING!

WHEN THIS EQUIPMENT IS INCLUDED AS A COMPONENT PART OF A SYSTEM, THE RESULTING DESIGN MUST BE REVIEWED BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE CONSTRUCTION AND OPERATION OF ALL COMPONENTS IN THE SYSTEM AND THE POTENTIAL HAZARDS INVOLVED. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN BODILY HARM AND/OR PROPERTY DAMAGE.

WARNING!

TO AVOID ELECTRIC SHOCK, ASSURE THAT THE POWER TO THE CNS810 IS DISCONNECTED BEFORE PERFORMING ANY INSTALLATION OR SERVICE OPERATION. TURN THE POWER SWITCH TO THE OFF (0) POSITION AND REMOVE THE LINE CORD.

CAUTION

TO AVOID ELECTROSTATIC SHOCK AND DAMAGE TO SENSITIVE COMPONENTS, USE ELECTROSTATIC PROTECTION WHEN THE I/O ACCESS PANEL IS REMOVED. NEVER REMOVE THE TOP COVER OF THE CNS810 BECAUSE THERE ARE NO USER SERVICEABLE COMPONENTS INSIDE.

CAUTION

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT AND/OR BODILY HARM.

WARNING!

NEVER PLUG THE DISPLAY INTO THE CNS810 WHEN THE POWER IS ON.

CAUTION

NEVER LOOK DIRECTLY INTO THE LASER EXIT WINDOW. TURN THE POWER SWITCH TO THE OFF (0) POSITION BEFORE INSPECTING THE LASER EXIT WINDOW.

CAUTION

DO NOT REMOVE THE TOP COVER OF THE CNS810. THERE ARE ELECTRICAL, MECHANICAL, AND LASER HAZARDS BEHIND THE COVER.

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Chapter 1.0

Introduction

This chapter covers

- Electrical Safety
- Laser Safety
- Electrostatic Precautions
- General Precautions

The CNS810 is a high performance instrument for automatically measuring the dimensions of rectangular packages and boxes. The CNS810 employs a laser-based rangefinder technology to scan the package, creating an image from hundreds of thousands of data points. The image is analyzed and the length, width and height are displayed or sent to a host computer.

The CNS810 is specifically configured to automate the slow and error-prone processes of manual measuring applications. Easily integrated with scales, bar code readers and other devices, the CNS810 becomes the foundation of a complete data capture system. Fast, simple and accurate, it is ideally suited for parcel drop-off centers, mail rooms and shipping docks, or anywhere frequent package measurements are required.

About this manual:

This is a Technical Manual intended for the installation, configuration, and operation of the CNS810 Static Dimensioner. Some technical skills and tools are required for installation and configuration including:

- Mechanical assembly experience with hand tools and a bubble level
- Personal Computer network configuration, web browsing, and serial or Ethernet communications experience

This is not a Service Manual and does not contain adequate information to service the equipment. Please refer to section 8.5 for service.

Electrical Safety

WARNING!

TO AVOID ELECTRIC SHOCK, ASSURE THAT THE POWER TO THE CNS810 IS DISCONNECTED BEFORE PERFORMING ANY INSTALLATION OR SERVICE OPERATION. TURN THE POWER SWITCH TO THE OFF (0) POSITION AND REMOVE THE LINE CORD.

Laser Safety

Figure 1-1: CNS810 Compliance Label

The following recommendations apply concerning laser safety:

- Do not mount the CNS810 such that the laser beam is aimed directly toward a workstation, door, stairway, or other location where the laser beam may hit the eyes of people unaware of the presence of the CNS810.
- If possible, mount beam stops outside the measuring area of the CNS810 to stop the laser beam from reaching beyond its useful area.
- Avoid direct viewing into the laser beam unless absolutely necessary.
- Never look into the laser beam with any type of optical magnification instrument such as binoculars, magnifying glasses, or SLR camera view finders.
- Do not remove the top cover of the CNS810. There are no user serviceable components inside.

Electrostatic Precautions

CAUTION

TO AVOID ELECTROSTATIC SHOCK AND DAMAGE TO SENSITIVE COMPONENTS, USE ELECTROSTATIC PROTECTION WHEN THE I/O ACCESS PANEL IS REMOVED. NEVER REMOVE THE TOP COVER OF THE CNS810 BECAUSE THERE ARE NO USER SERVICEABLE COMPONENTS INSIDE.

General Precautions

To avoid other general hazards, the following recommendations should be observed:

- Do not open the top cover on the CNS810 or attempt to service it, unless you are trained and qualified to do so.
- The cabinet and the instruments contain several RJ45 connectors for internal use. It is illegal to connect any of these to any external public telecommunication network.
- All data and signal cables connected to the instrument must be shielded by a metal shield, and the shield must be properly connected to a metal housing around the connector. Failure to provide proper shielding of any data or signal cable will invalidate the EMC approvals of the instrument.
- Do not use the instrument in an environment that contains explosive materials.

Chapter 2.0

Specifications

This chapter covers
- CNS810 Specifications

This section includes detailed technical specifications for the CNS810 (See Table 2-1) and describes packages that can be accurately measured with the CNS810.

CNS810 Specifications

Table 2-1: Specifications

Environmental Specifications	
Power Requirements	115V/60 Hz, 1.5 Amps
Fuse Type	4A/125V
Operating Temperature Range	32 to 104° F (0 to 40° C)
Relative Humidity	20% to 95% non-condensing
Size (Length x Width x Height)	16.5 x 43.3 x 66.7 cm (6.5 x 17.0 x 26.3 in.)
Weight	14 kg (31 lb)
Dimensioning Specifications*	
Typical Scan Time	3 seconds
Resolution	0.25 cm (0.1 in.)
Accuracy	± 0.5 cm (± 0.2 in.)
Minimum Package Size (LWH)	5 x 5 x 5 cm (1 x 1 x 1 in.)
Maximum Package Size (LWH)	115 x 75 x 90 cm (45 x 30 x 28 in.)
Compliance Specifications	
Safety	UL/CSA 60950-1-03 (ITE)
Emissions	FCC Part 15 Class A
US FDA	CFR 1040.10 Class 2 Laser
NTEP	CoC [05-121P]
Measurement Canada	AM-5567C

*** Note:** Specifications for Legal-for-Trade applications may vary.

Interface Specifications	
CS2200LX Display	D1 port, DB9M with DC power
Serial, RS232	SER1/SER3/SER4 ports, DB9M
Ethernet, 100 BaseT	NET 1/NET 2, RJ45
Universal Serial Bus	USB1/USB2 (Not currently used)
Monitor	VGA, DB15F (Not currently used)
Keyboard	KEYB, PS2 (Not currently used)
Binary I/O	BIN I/O, TTL (Not currently used)
Mechanical Specifications	
Mounting holes:	4x M6 bottom (recommended)
	2x M6 back, 2x M6 front

Notes on Mounting

- Use M6 mounting holes in bottom when mounting the CNS810 on rubber dampeners or other flexible mounts. Figure 2-1 provides a mounting diagram.
- Unused mounting holes must be sealed.
- Measurements are provided in mm (in.).

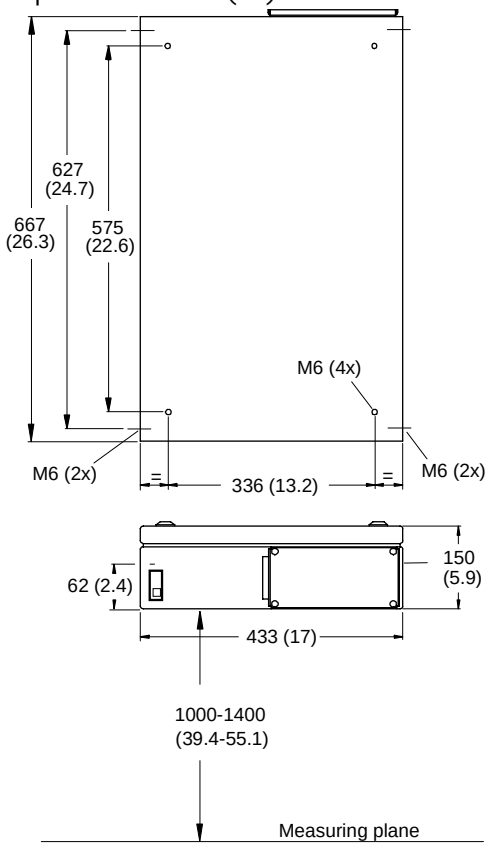


Figure 2-1: Mounting Diagram

Chapter 3.0

Installation

This chapter covers

- Work Surfaces
- Service Access
- Mounting Height
- Stand Assembly
- Electrical Connections

Proper installation is critical for accurate measurements. Follow the instructions in this section to complete the physical installation of the CNS810 over the work surface.

Work Surfaces

The CNS810 can measure with the specified accuracy when properly mounted above a:

- Flat table
- Scale with a flat platter, roller top or ball top
- Roller table
- Conveyor

The surface must be flat and level. Peak-to-valley variations must be less than 1 mm. Larger irregularities will increase the error in the height measurement.

Matte (non-glossy) surfaces are recommended. It is best to avoid highly polished or reflective surfaces. Glossy surfaces often will be OK; however, because glossy surface finishes may vary, not all glossy surfaces can be used. Therefore, the installer must verify that the CNS810 operates correctly when used with any glossy surface. If the automatic calibration process can be completed without problems, the surface in question is acceptable. If not, another surface type should be considered. Stainless steel and painted metal surfaces may be acceptable.

For ball and roller tables, the top of the ball or roller defines the reference surface. This reference surface must be flat with less than 1 mm variations. Rollers with aluminum, rubber, or plastic surfaces are OK. Steel rollers may develop high-gloss polished spots from regular use and therefore should be checked regularly.

Tools Required

In addition to a standard tool kit, the following tools are required for installation of the CNS810:

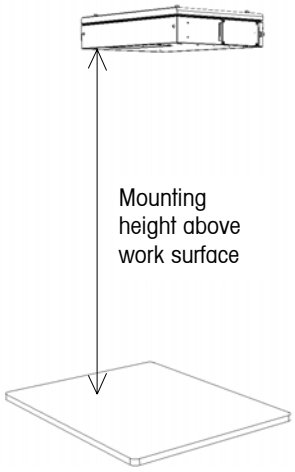
- #2 Phillips screwdriver
- 13mm wrench or socket
- 10mm wrench or socket
- Tape measure, inch and centimeter markings
- Bubble level

Mounting Height

The mounting height above the tabletop or scale determines the maximum dimensions that can be measured. When using a scale on top of the table, the distance between the scale top and the CNS810 represents the mounting height. Refer to Table 3-1 for the typical measuring area relative to the mounting height.

Table 3-1: Mounting Height and Measuring Area

Mounting Height cm (in.)	Measured Length cm (in.)	Measured Width cm (in.)	Measured Height cm (in.)
140 (55)	90 (35) 115 (45)	75 (30) 75 (30)	90 (35) 70 (28)
120 (47)	90 (35) 115 (45)	75 (30) 75 (30)	70 (28) 50 (20)
100 (39)	90 (35)	75 (30)	50 (20)



The maximum allowed length and width measurements in Legal-for-Trade applications are 115 x 75 cm (45 x 30 in.). The height measurement is calculated by the CNS810 during calibration based on the mounted height and the desired length and width settings. Two different length settings are shown with the corresponding height limits.

Mounting height above the floor should also be limited to 244 cm (96 in.).

Stand Assembly

Before Assembly

Before installing the dimensioner on its stand, remove the four M5 screws securing the connector cover using a #2 Phillips screwdriver. Remove the cover as shown in Figure 3-1, and take out the power cord and the AC power cord retainer clip. Install the retainer clip on the power entry module.

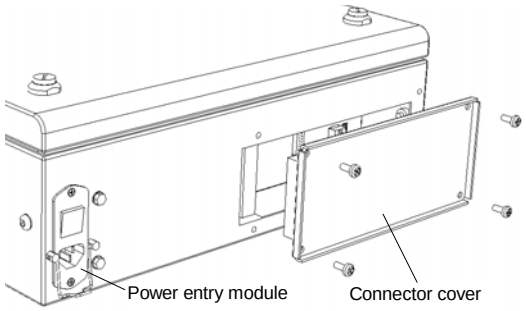


Figure 3-1: Power Entry and Connector Cover

Leave the cover off until connections are made, as detailed in the Connector Descriptions section, later in this chapter.

Stand Assembly

For proper stand assembly, refer to the document that came with the mounting stand. The tabletop option for the stand will have separate instructions for assembly.

After the stand is assembled and upright, mount the CNS810 on the upper brackets using the M6 screws and brackets included with the stand kit.

If the tabletop option is included, adjust the feet on the stand to level the tabletop left-to-right and back-to-front. Measure the distance from all four sides of the CNS810 to the tabletop. If these measurements are within 1.3 cm (0.5 in.), the CNS810 is properly mounted. Otherwise, it may be necessary to adjust the upper brackets of the stand.

Note: The CNS810 must be parallel to the tabletop to within 1.3 cm (0.5 in.).

Electrical Connections

This section explains the electrical connections to the CNS810. Before removing the cover to the Connector Panel, turn the power switch to the Off (0) position and remove the AC line cord. Most applications will use only a few of the available connections.

CAUTION

BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO OR DESTRUCTION OF THE EQUIPMENT AND/OR BODILY HARM.

Note: Never operate the CNS810 without the connector panel in place and secured. Dust can enter the unit and obscure the optical path by accumulating on mirrors, lenses, windows, and other components.

Connector Panel

All Input/Output connectors are located under a protective cover (Figure 3-1) on the side of the CNS810.

Each connector is clearly labeled on the panel (Figure 3-2). Cables connected to the D-shell connectors should be secured with two side screws.

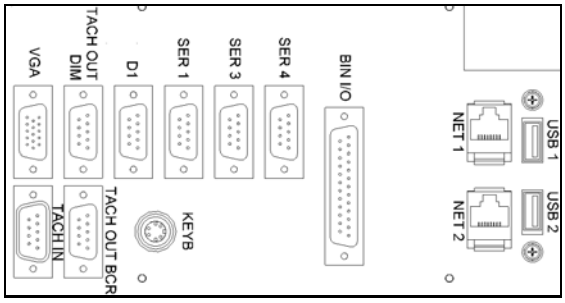


Figure 3-2: Connector Panel Layout

Connector Descriptions

D1: DB9M RS232 Serial Connector with DC Power

A model CS2200LX digital display may be connected to this port to show measurement results and status codes during measurement. The default settings are: 9600 baud, 7-bit character, even parity, and 1 stop bit.

WARNING!

NEVER PLUG THE DISPLAY INTO THE CNS810 WHEN THE POWER IS ON.

This is also the console port which may be used for configuration and advanced debugging by a Mettler Toledo Certified Service Technician. In console mode, the port will default to 38,400 baud, 8-bit character, no parity and 1 stop bit.

SER 1, 3, and 4: DB9M RS232 Serial Connectors

These connectors are general-purpose serial ports that are available to the entire system. They are not dedicated to one specific part of the hardware/software of the system.

It is not possible to log on to the system or change any part of the legal relevant part of the system through these connections.

NET 1 and NET 2: RJ45 100Mbit Ethernet Connectors

These connectors are typically identical and can be configured freely, but the following configuration is standard:

- Net 1 is typically used for host communications and is reconfigured during installation for the user's Local Area Network. The default IP Address is 192.168.127.14 with a Subnet Mask of 255.255.255.0. If the IP Address is changed, it is good practice to note the address on a label near the connector panel.
- Net 2 is typically used by service technicians for calibration, configuration, diagnostics, and upgrades. The default IP Address is 192.168.2.101 with a Subnet Mask of 255.255.255.0. This IP address would not be changed unless used with other peripheral equipment.

KEYB: MiniDIN PS/2 Keyboard Connector

This connection is for custom applications that require a standard QWERTY keyboard for operator control and data entry. The keyboard is typically not used when the CNS810 is connected to a host computer running a manifest or database application.

BIN I/O: DB25F Connector

This connector contains a number of binary input and output lines. In the standard configuration the system has five input lines and five output lines. Typical use of these lines is for status lights and reading switch settings.

USB 1 and USB 2: USB-A Connectors

These two connectors provide USB ports for standard peripheral devices. The USB bus can provide 500 mA and has a current limiting circuit.

VGA: DB15F Connector

This connector provides standard VGA signals to an external monitor.

TACH OUT DIM

Has no function on CNS810.

TACH OUT BCR

Has no function on CNS810.

TACH IN

Has no function on CNS810.

Typical System Connections

Make the Cable Connections

With the power Off (0), attach the cables as shown in Figure 3-3.

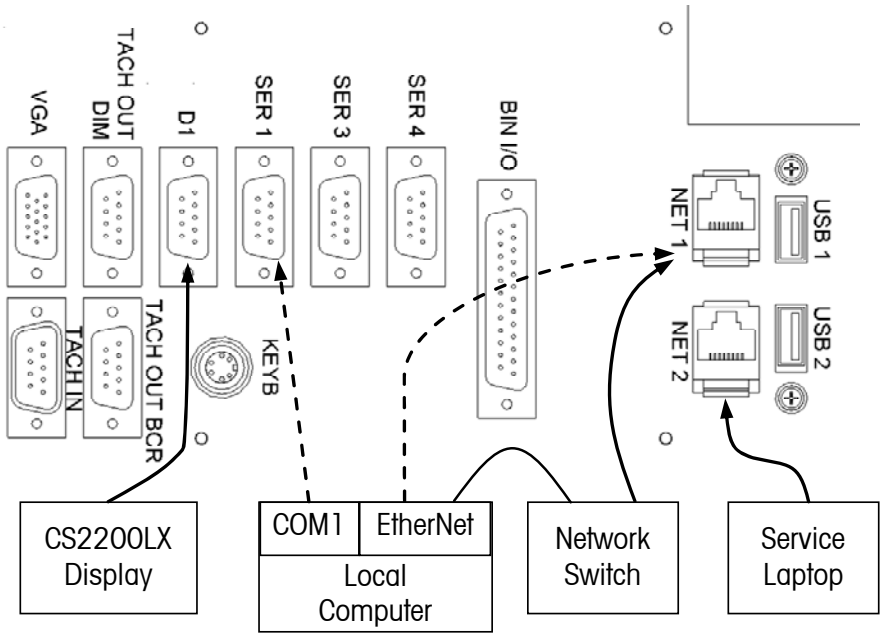


Figure 3-3: Cable Connections

- If using the CS2200LX Display, connect it to the D1 port using the cable attached to the Display. Tighten the two locking screws.
- Connect the Local Host Computer to the SER 1 or NET 1 port.
  - For a serial connection, attach the supplied serial cable to the SER 1 port on the CNS810 and to the COM1 or COM2 port on the Host Computer. Tighten the thumb screws on both ends of the cable.
  - For a LAN connection, attach an Ethernet patch cable between the NET 1 connector on the CNS810 and the network switch or hub. This cable is not provided.

Note: The host computer must be on the same subnet as the CNS810

  - For a Direct PC Ethernet connection, attach an Ethernet crossover cable to the NET 1 connector on the CNS810 and the Ethernet port on the PC. An Ethernet crossover cable is provided for the service laptop connections, but can be used for this connection.
- Connect the service laptop to the NET 2 port using the supplied Ethernet crossover cable. Leave this cable attached to NET 2 for future use.

Connector Cover

Replace the Cover

Arrange the cables so that they exit to the left side of the connector panel. Neatly lay the cables across the foam threshold and hold them in place with your left hand. The cables should be separated (not touching each other) at the threshold. Put the cover in place and tighten all four screws. The cover should form a dust-tight seal.

Note: Never operate the CNS810 without the connector cover in place. Dust that enters through the access panel can attach to internal optical components and degrade the performance of the CNS810.

AC Line Cord Installation

Install the AC Line Cord

Note: Before you begin, turn the power switch to the Off (O) position and verify the AC line cord is not plugged into an AC outlet.

Plug the AC line cord into the power entry module to the left of the connector cover. Secure the line cord with the wire bail.

Cable Routing

Route the Cables

Bundle the AC line cord with the other I/O cables and route them along the supporting limb of the stand. Secure the cables at the back of the stand so that they do not hang or droop across the measurement field. Accumulate excess cabling at the back of the CNS810 or below the tabletop. Secure cables to the stand with wire ties.

Chapter 4.0

Establish a Network Connection

This chapter covers

- PC Connection
- PC configuration
- Log in to Service Interface
- Main Web Page
- System Status Pages

The first step in setting up the CNS810 is connecting it to your PC and accessing its service interface as described below. The CNS810 service interface consists of several Web pages with menus that enable you to select different service functions. These Web pages can be accessed by a standard Web browser like Internet Explorer when your PC is connected to the CNS810 via Ethernet.

The following sections describe how to connect to the CNS810 and access its service interface. You will need the following tools:

- PC with Web browser and Ethernet adapter
- Crossed Ethernet cable / Ethernet cable

PC Connection

A PC can be connected to the CNS810 with the Ethernet crossover cable provided. Plug one end of the cable into the NET 2 port on the CNS810 and the other end into the Ethernet port on the PC or laptop.

An alternative connection method is to use a hub or switch with standard Ethernet patch cables between the CNS810 and the hub and between the PC and the hub.

Note: Do not use the Ethernet crossover cable provided with the unit in this alternative configuration.

See Figure 3-4 for a graphical representation of the two types of connection.

PC Configuration

The CNS810 uses a static IP address, which means it is assigned a specific address on a known subnet. For the CNS810 to communicate directly with your computer, the computer must also be assigned a static IP address on the same subnet. Proxy servers in your Web browser must be disabled. If you are not familiar with the process of changing the network settings on your computer, consult your local PC support person or follow the directions in the following pages.

Note: Do not use an address which is already in use by another device on the network.

Set the Correct IP Address on Your PC

1. In Windows XP, open **Control Panel**; click **Network.** Click **Network Connections**. Click **Local Area Connection**. Click **Properties**. You should view a list of installed network devices and services as shown in Figure 4-1. Be careful to select the correct network device under **Connect Using** if more than one network device is installed.

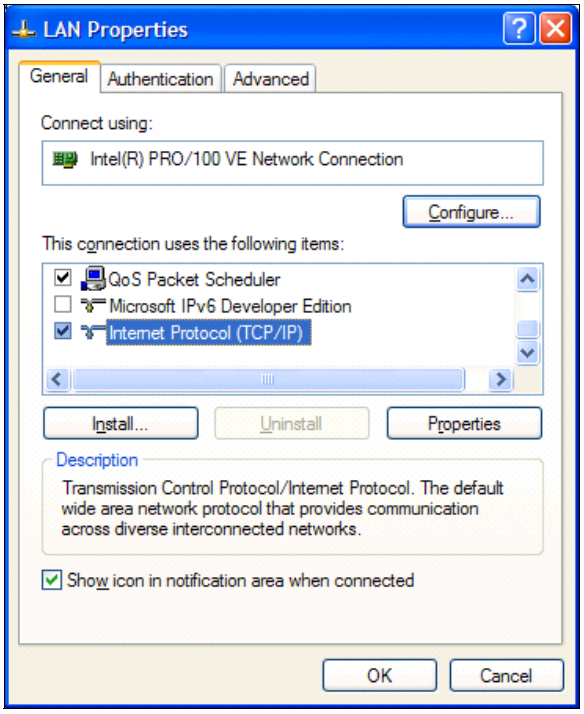


Figure 4-1: Selecting the Correct Network Device

2. Select **Internet Protocol (TCP/IP)** and click **Properties**. (See Figure 4-2.) Write down all settings before making any changes. Restore these settings when the CNS810 configuration is complete.

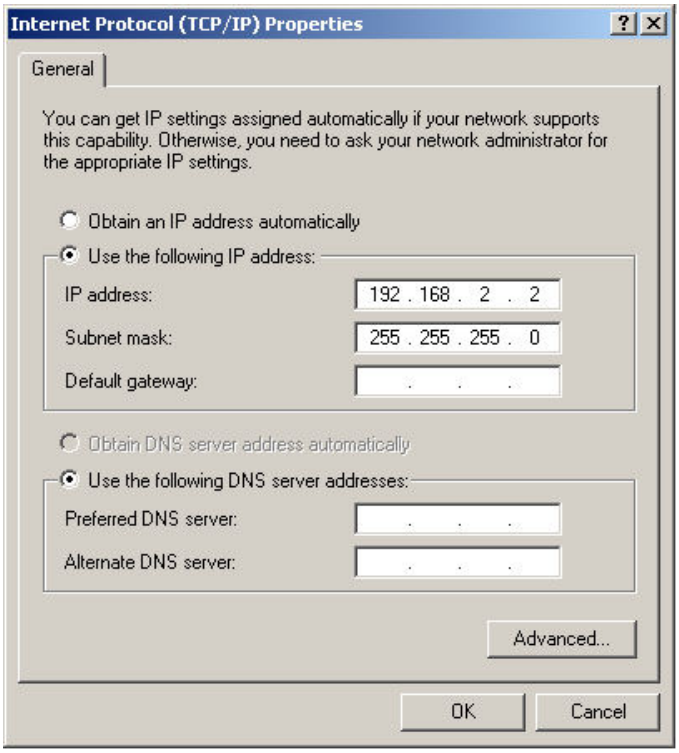


Figure 4-2: TCP/IP Properties

3. Click **Use the following IP address** and enter an address on the same subnet as the CNS810 unit. When connecting to NET 2, choose 192.168.2.2 for example. The first three octets must be the same as the CNS810 and the last octet must be an address that is not currently being used on the network.

Note: Do not use an address which is already in use by another device on the network.

4. The subnet mask should be 255.255.255.0. It is not necessary to enter the Default gateway address.
5. Click **OK** to save the changes.
6. Click **OK** or **Close** to restart the network port on the PC.

7. An optional test of the connection would be to "Ping" the CNS810 from a Command Prompt window. At the C:\> prompt, type "ping 192.168.2.101" and press ENTER. You should see a screen similar to Figure 4-3.

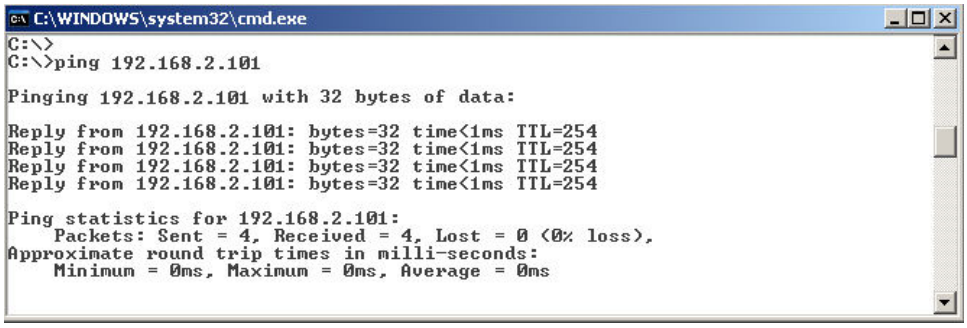


Figure 4-3: Ping Connection Test

8. If the CNS810 does not respond, type "ipconfig" at the C:\>prompt and press ENTER to verify that the PC LAN settings are correct as shown in Figure 4-4.

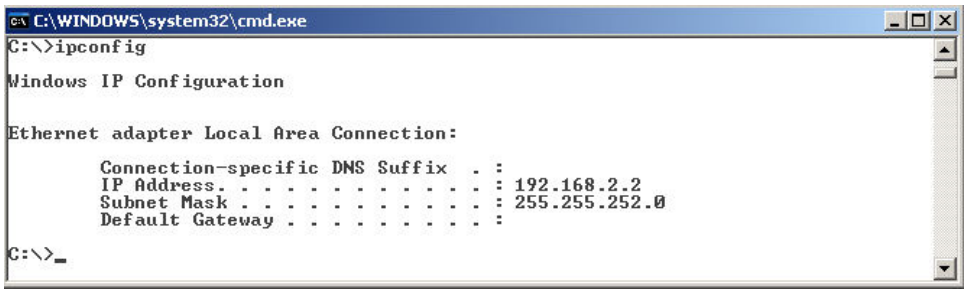


Figure 4-4: PC LAN Settings

Disable the Proxy Server

Your Internet browser must **not** use a proxy server to connect to the CNS810. The following describes how to disable the proxy server.

1. In Internet Explorer on the **Tools** menu, click **Internet Options**.
2. In the dialog box (see Figure 4-5), click the **Connections** tab.

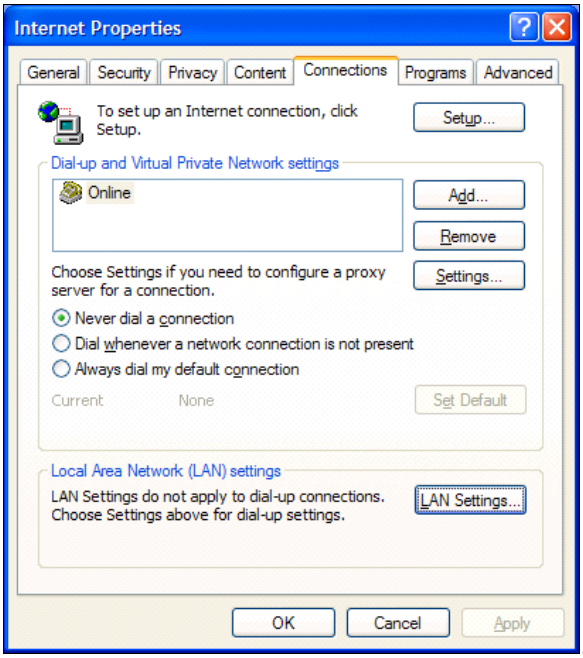


Figure 4-5: Internet Explorer Connections Properties

3. Click **LAN Settings**.

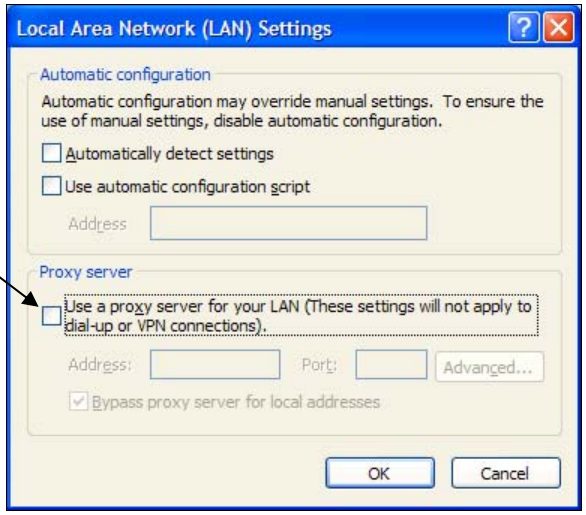


Figure 4-6: LAN Settings

4. Ensure the **Use a proxy server** check box is cleared as shown in Figure 4-6.

Log in to the Service Interface

Follow the procedure below to log on to the service interface of the CNS810.

1. Type the IP address of the actual dimensioner in the browser's URL field and press ENTER.
2. The log-in Web page of the CNS810 Service Interface should be displayed (Figure 4-7).

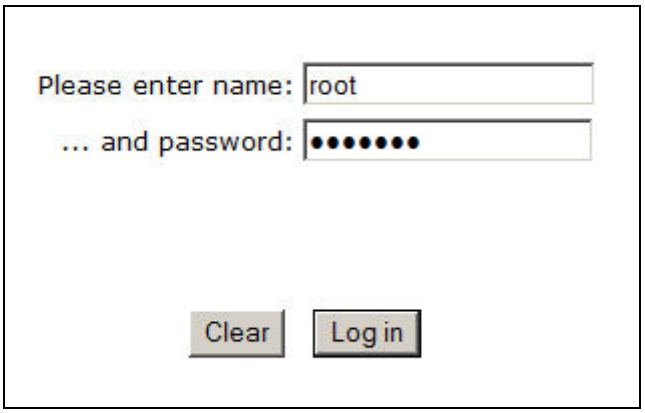


Figure 4-7: Log-in Web Page of the CNS810 Service Interface

3. Type the username "root" in the username field.
4. Type the password "ilifont" in the password field.
5. Press ENTER or click **Log in.** The Service Interface home page (Figure 4-8) will appear.

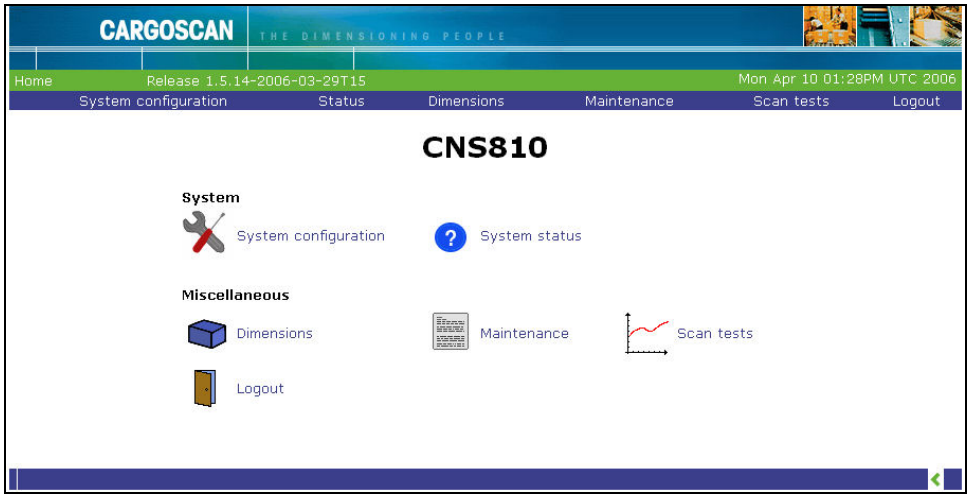


Figure 4-8: CNS810 Service Interface Home Page

If you are not able to log on to the unit as the root user, the system may be sealed or the root password may have been changed. Sealing the system is required in Legal-for-Trade application. Refer to Chapter 6 for sealing and unsealing procedures.

Main Web Page

When you are properly logged on to the unit, the Home page acts as a center or main menu of the pages of the web interface. Figure 4-9 shows the header information and links found in the Home page.

Figure 4-9: Web Page Header

All Web pages have a header with the following information and links:

- **Home link**—Returns to the main page and refreshes the main page
- **Version information**—Release number of software (1.5.14) /selected profile (standard_hostem) / username for current session (root)
- **Date and time**—Displays current date and time settings
- **Tabs**—Links to other Web pages and functions
  - **System configuration**—Link to all the configuration pages
  - **Status**—Link to the System status page
  - **Dimensions**—Test page for starting a scan and reviewing the results
  - **Maintenance**—Install software updates, capture and restore system settings
  - **Scan tests**—Service and diagnostic pages for analyzing raw scan data
  - **Logout**—Exit the Web pages

The **Status** web pages are described in the following section. Other web pages are described in subsequent chapters.

System Status Web Pages

The **Status** Web page provides live hardware and software status including:

- **Event log**—Shows the last 10 logged event messages (Figure 4-10)

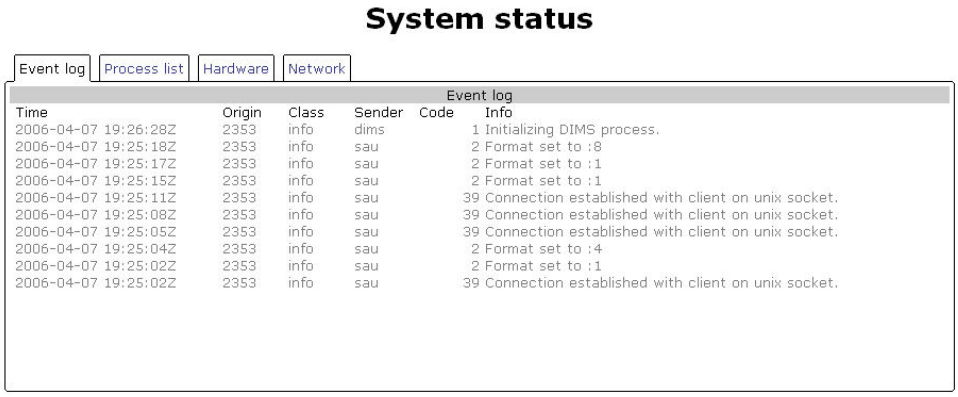


Figure 4-10: Dimensioner Status: Event Log

- **Process list**—The control center for software installed on the CNS810 (Figure 4-11)

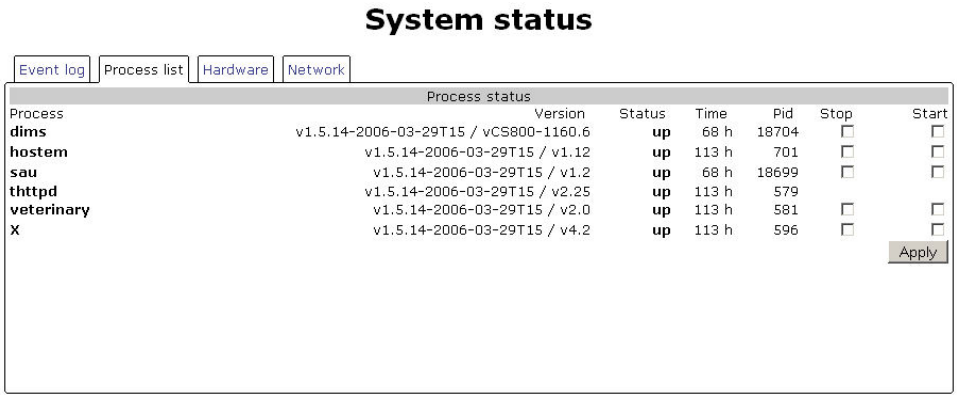


Figure 4-11: Dimensioner Status: Process List

- **Hardware**—Shows values of voltages, temperatures and polygon lap time, as well as status of the binary input and setting of binary outputs (Figure 4-12)

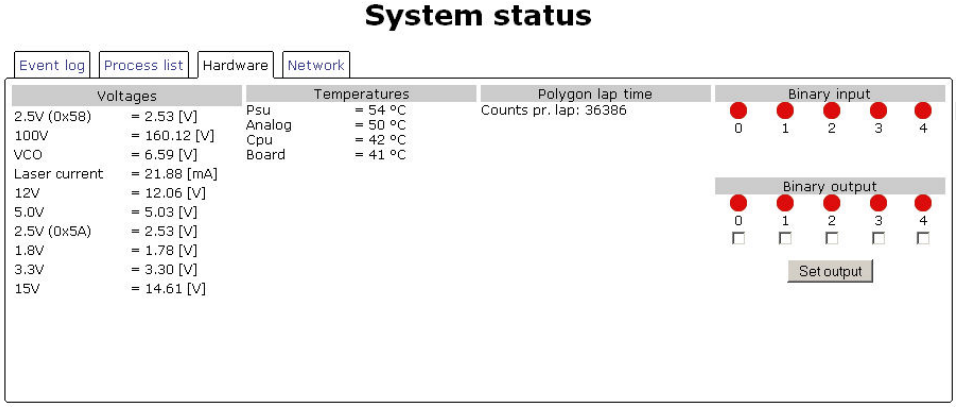


Figure 4-12: Dimensioner Status: Hardware

- **Network information**—Shows current network configuration (Figure 4-13)

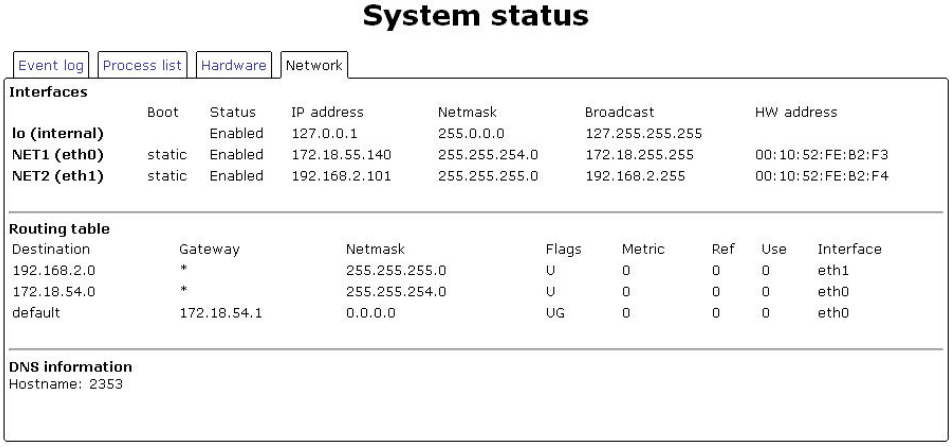


Figure 4-13: Dimensioner Status: Network

Chapter 5.0

System Configuration

This chapter covers

- Dimensioner Calibration
- Package Reporting
- Host Emulator Configuration
- Backup Settings
- Labeling

This chapter will guide you through all the operations needed to configure the system to measure packages. Your PC should be connected to the CNS810 and logged on to the Service Interface with your Web browser. (See Chapter 4.) Carry out the following instructions in consecutive order to configure the system. Figure 5-1 shows the **System configuration** Web page.

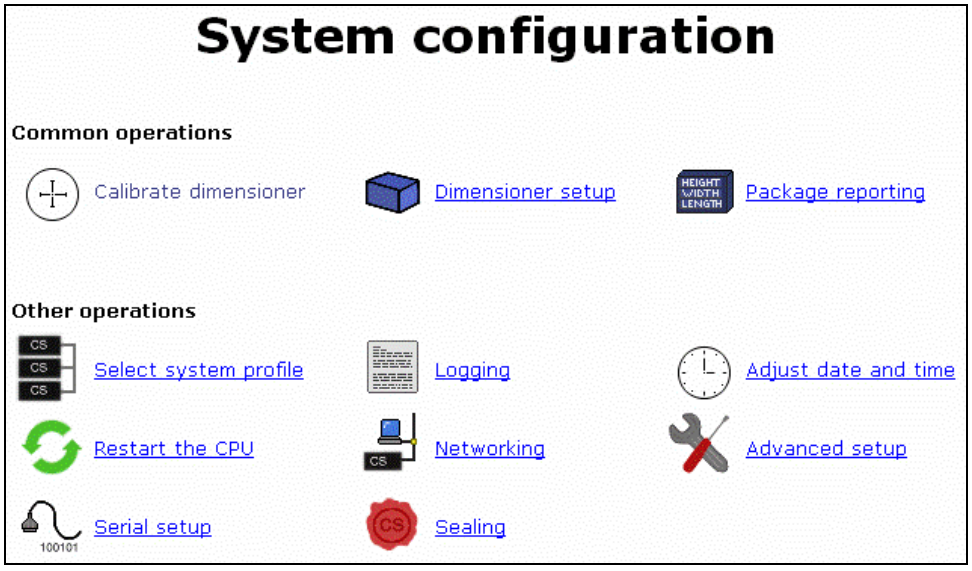


Figure 5-1: System Configuration Web Page

Calibrate the Dimensioner

First access the **Calibrate dimensioner** menu (Figure 5-2).

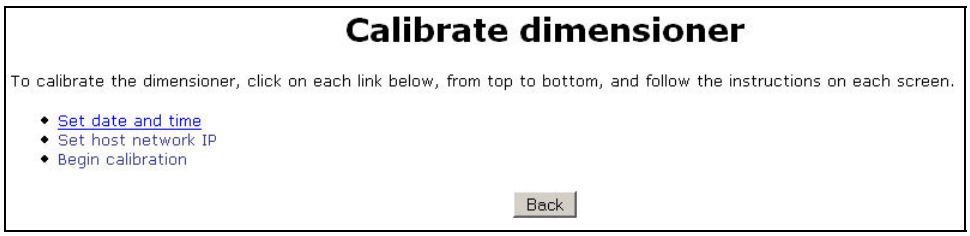


Figure 5-2: System Configuration Web Page

The following items should be completed from this page:

- Check that the date and time are set correctly
- Set host IP (network) address
- Find mounting parameters for final calibration

The following sections describe how to carry out these operations.

Set Date and Time

The **Date and time configuration** Web page (as shown in Figure 5-3) is used for adjusting the date, time, and local time zone of the CNS810. Change the date and time to the correct values. The time should be set in the selected time zone.

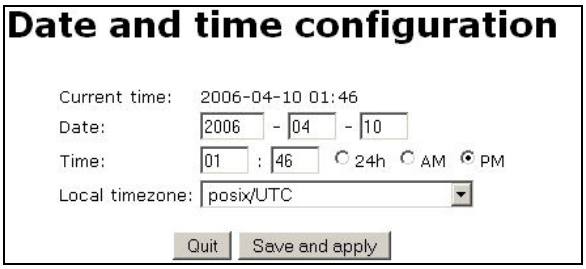


Figure 5-3: Date and Time Configuration Web Page

When you have selected the correct values, click **Save and apply**.

Configure the Network

You can change the IP address of one of the network interfaces on the CNS810 by clicking **Set host network IP**, to access the **Network configuration** page. (See Figures 5-4, 5-5 and 5-6. This page can also be accessed by clicking **Networking** on the **System configuration** page.) The page has three tabs.

The **NET 1** port (Figure 5-4) is typically used to connect the CNS810 to a Local Area Network. Contact your network administrator to obtain a "fixed IP address" on the subnet for the CNS810.

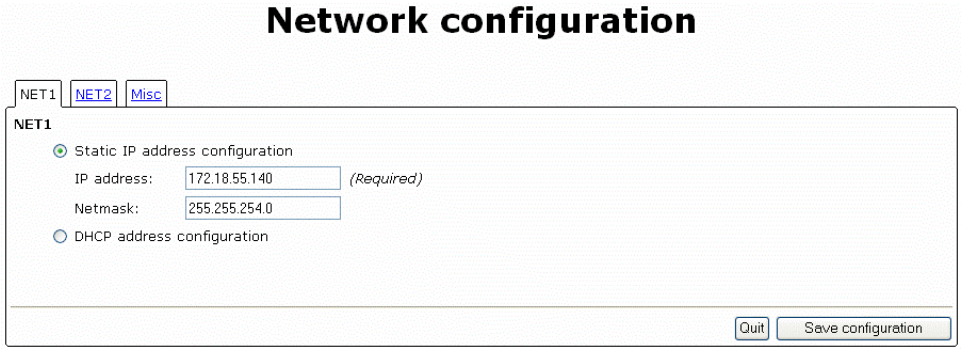


Figure 5-4: Network Configuration Page, NET1 Tab

The **NET 2** port (Figure 5-5) is typically used for service and calibration. If this port is currently being used to configure the CNS810, you will need to change the PC's IP address after changing the NET 2 port address.

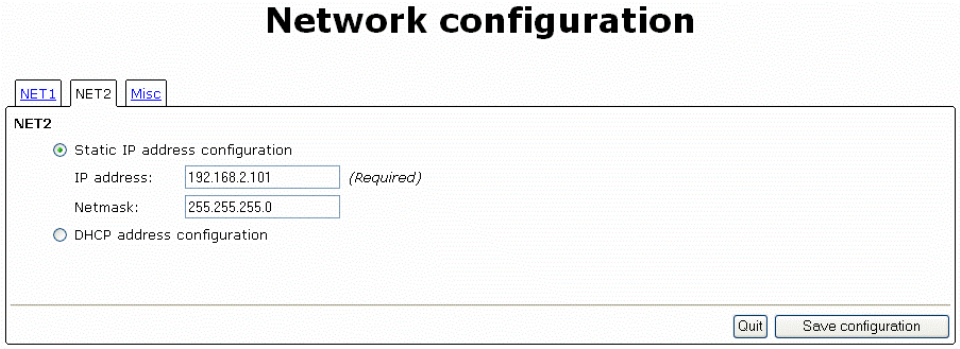


Figure 5-5: Network Configuration Page, NET2 Tab

On either of these pages, type the desired IP address and subnet mask into the appropriate fields. Alternatively, select DHCP address configuration. When changes are complete, click **Save configuration**. Changes will take effect when the CNS810 is rebooted. If you do not wish to enter a new IP address, click **Quit**.

When either IP address is changed, label the port with the new IP address and Subnet Mask.

The **Misc** tab (Figure 5-5) allows Host and Domain names to be set, Name Servers to be specified, and a Default Gateway to be identified. If DHCP address configuration is enabled on the NET1 and NET2 pages, these fields may be filled in automatically.

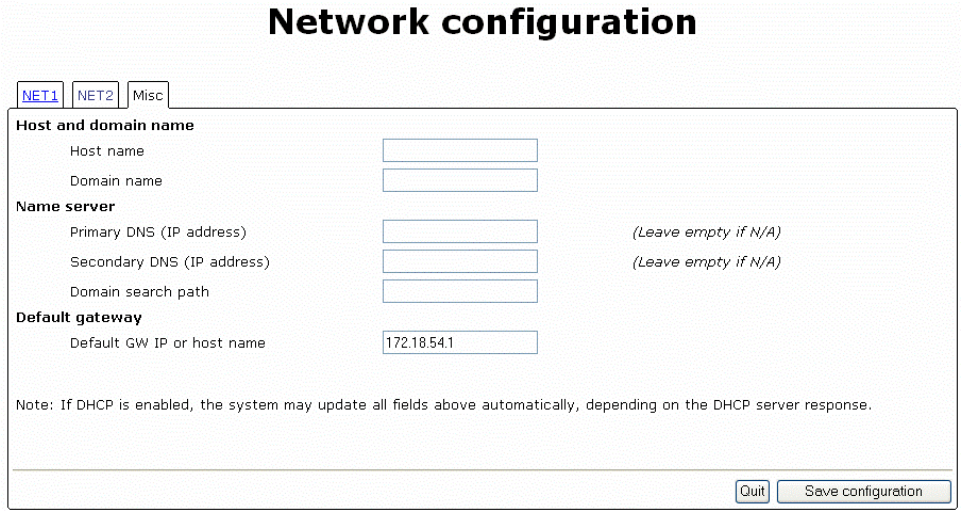


Figure 5-6: Network Configuration Page, Misc Tab

To leave the page without saving changes, click **Quit**. Otherwise, click **Save configuration** to save changes. Changes will take effect when the CNS810 is rebooted.

Find Mounting Parameters (Calibrate)

For the CNS810 to measure packages, it needs to measure its installed position relative to its surroundings. During the Find Mounting Parameters part of the calibration, the CNS810 scans the area and computes its distance and its angle from the measurement surface.

The "Measurement surface" is the surface on which packages are placed for measurement. This surface can be a scale, a table, or a set of rollers.

The calibration process consists of completing a procedure described in a sequence of five Web pages. A step-by-step guide follows.

Guide to the Calibration Process

Clear the measurement surface of any items and ensure that the measurement area is positioned the way it normally will be during measurement. A scale can be placed on the tabletop, but it must be centered under the CNS810.

When using a roller or ball transfer surface, place a board or box on top of the rollers or balls. The board or box will serve as a reference object, and should have a non-reflective white surface. In particular, the surface should **not** be black. The thickness in millimeters of the board or box must then be entered in the textbox at the bottom of the Web page. (See Figure 5-7.) The typical calibration board would be 3/4-inch (18 mm) thick and approximately 24 in. (610 mm) square. Properly label and store the calibration board for future use.

Calibration Web Page 1

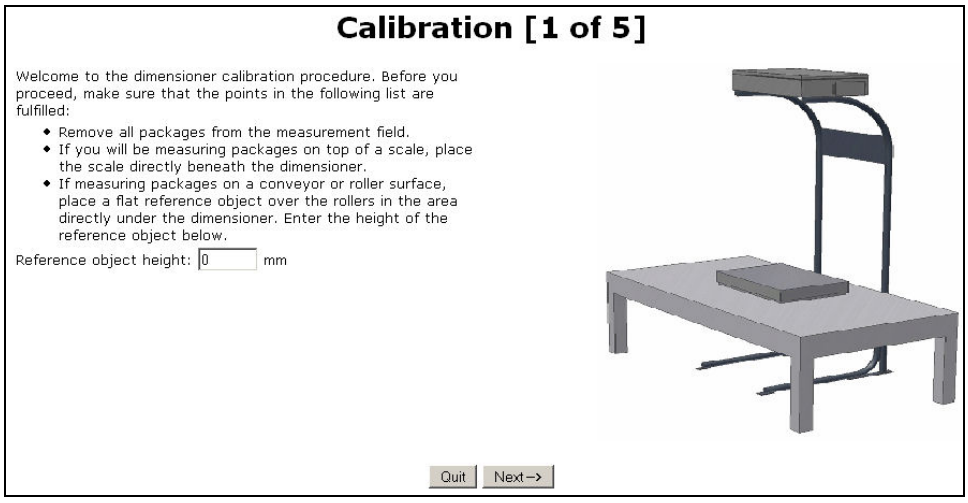


Figure 5-7: Calibration Web Page 1 of 5

When the measurement surface is ready, click **Next** to continue.

Calibration Web Page 2

At the **Calibration** [2/5] Web page an image is displayed showing what the dimensioner can see. (See Figures 5-8 through 5-13.) The green color in the image identifies the area that the system will use as the reference surface for height measurements. If your measurement area is a scale, then only the scale should be green—not the entire tabletop.

A red rectangle identifies a central point within the dimensioner's view. This red rectangle should be located inside the green reference surface. If the red rectangle is not inside the reference surface, move either the surface or the dimensioner.

Note: The red rectangle does not need to be in the middle of the measurement surface, only inside its borders.

Click **Acquire new scan** if the scale or measurement surface or CNS810 is repositioned or click **Next** to continue calibrating. The following figures provide some examples of situations you might encounter.

Note: The images show raw data, so straight lines can appear curved.

Figure 5-8 shows an example of **correct** positioning: The table below the dimensioner is green and the red rectangle is within the table. The table is our measurement surface.

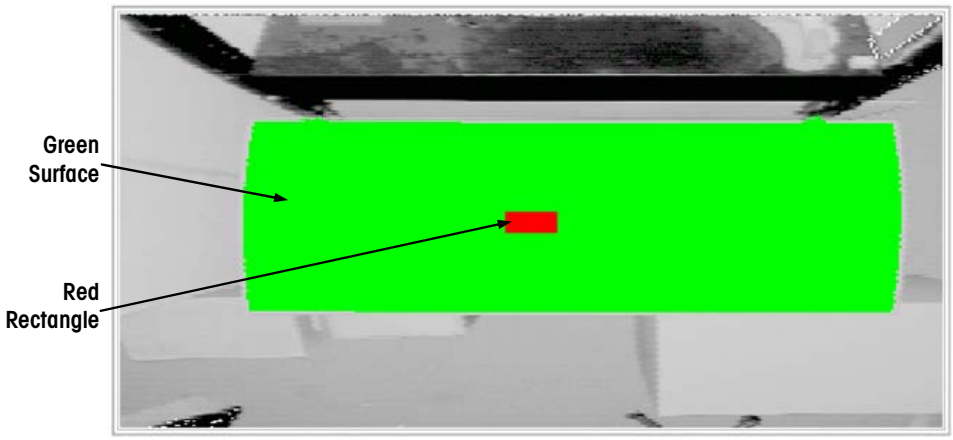


Figure 5-8: Image Showing Correct Positioning and Detection of the Surface

Figure 5-9 shows an **incorrect** view. The system has mistaken a nearby surface for part of the table. This surface must be moved or screened off before doing another scan. To screen off an improperly included area, the included surface can be moved, or a box added to change its height relative to the tabletop.

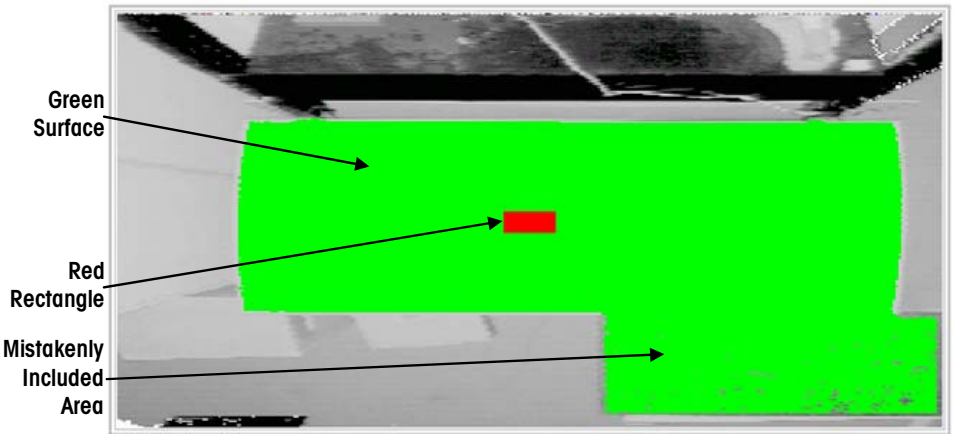


Figure 5-9: Image Showing Incorrect Detection of the Surface

Figure 5-10 shows the problem in Figure 5-9 **corrected**. This image is the same as the last, but here the nearby surface has been screened off by a box and only the correct surface is detected.

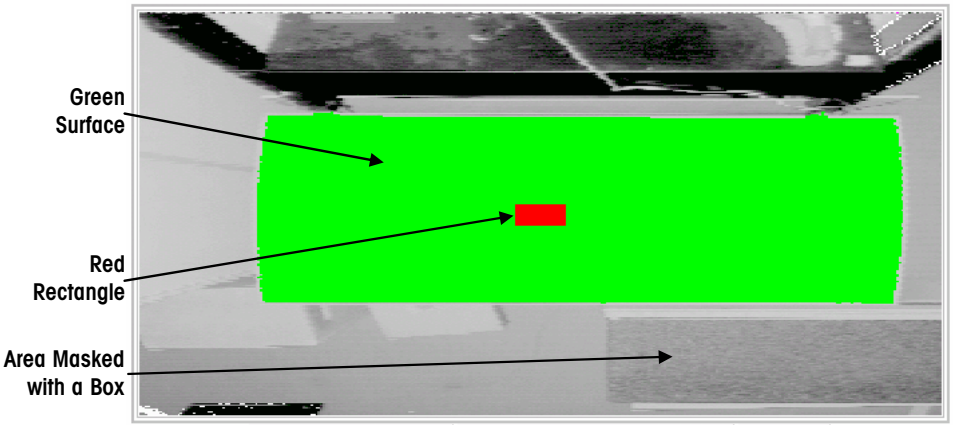


Figure 5-10: Image Showing Correction and Correct Detection of the Surface

Figure 5-11 shows a **correct** identification of the measurement area. The measurement area is now a scale placed on top of the table. The scale is correctly colored green and the red rectangle is within the scale.

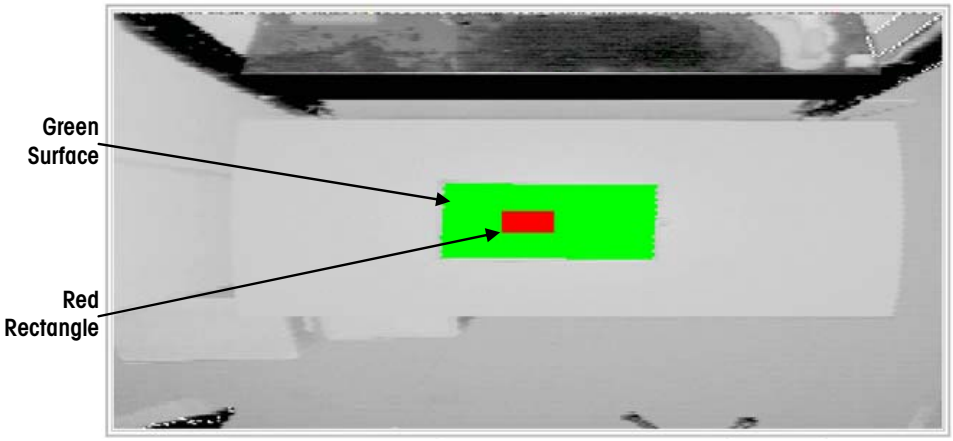


Figure 5-11: Image Showing the Correct Placement of a Scale

Figure 5-12 shows an example of **incorrect** placement of the scale. It has been placed to the right of the red rectangle instead of under it, and the system detects the table instead of the scale. In this case the scale must be moved so that it is under the red rectangle.

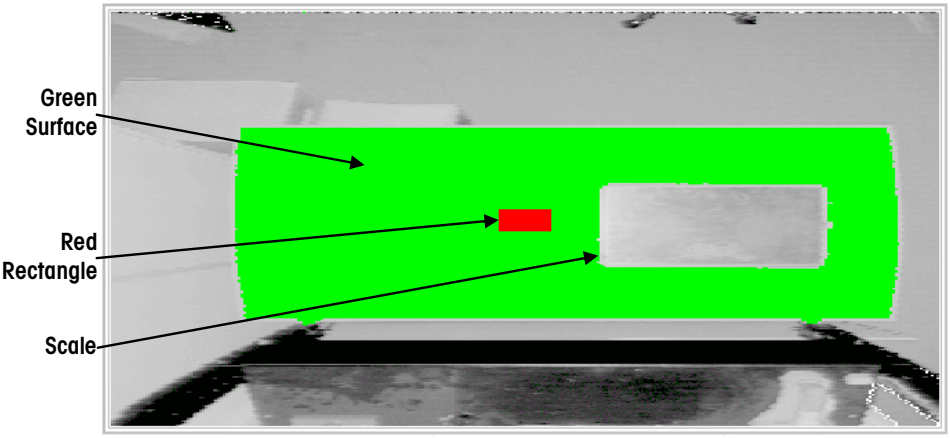


Figure 5-12: Image Showing the Incorrect Placement of the Scale

Figure 5-13 shows **incorrect** identification of the measurement surface. Because of reflections from the scale surface, only parts of the scale have been detected. Cover the top of the scale with a piece of non-reflective paper to reduce reflection.

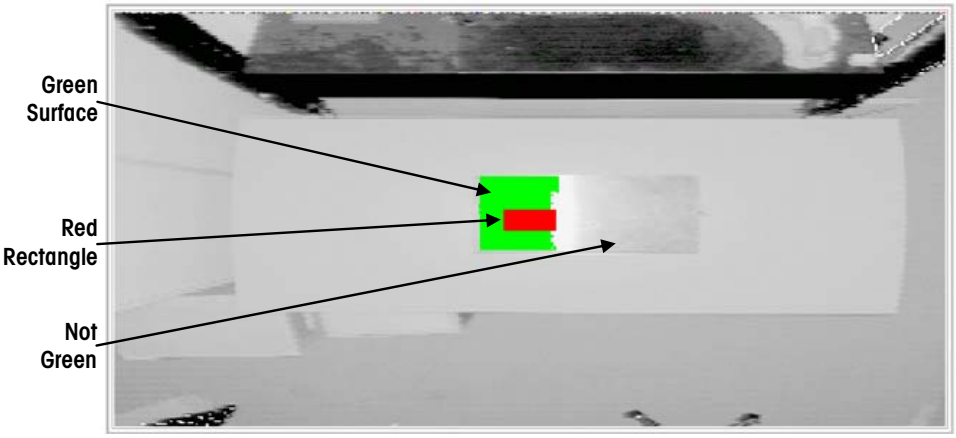


Figure 5-13: Image Showing Incorrect Detection of the Scale

Calibration Web Page 3

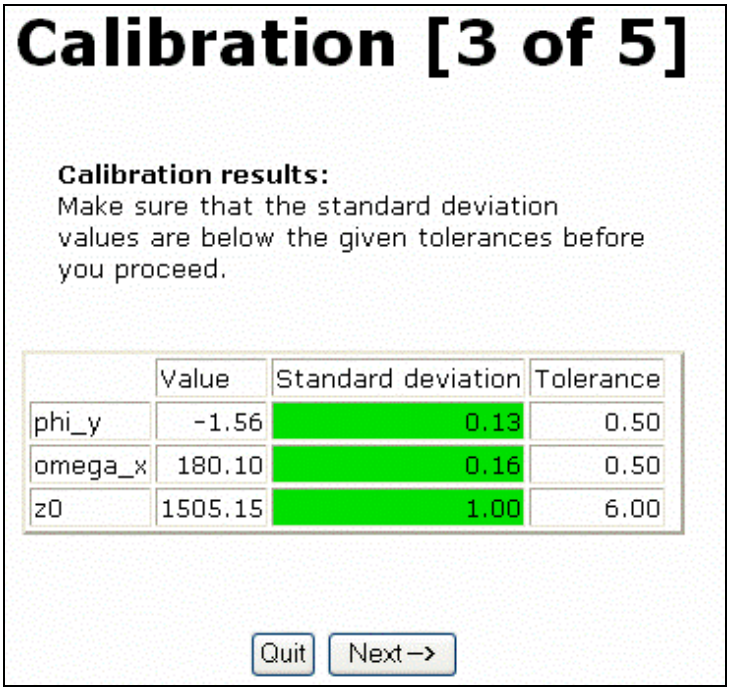


Figure 5-14: Calibration Web Page 3 of 5

When the calibration process is finished, the results will be displayed on the **Calibration [3/5]** Web page as in Figure 5-14. The computed parameters Phi_y, omega_x, and z0, are internal angles and distances that describe the geometry of the dimensioner in relation to the measurement surface. For each of these values the system computes the standard deviation, which should be less than the standard tolerance.

If all standard deviations are green, click **Next** to continue the calibration.

If the deviation exceeds the tolerance, the box where the standard deviation is displayed will be red. If any red values are displayed, click **Back to the calibration menu** and start the calibration again.

Calibration Web Page 4

When you have accepted the calibration parameters, set the size of the measurement field. An image from the dimensioner will be displayed at the left of the **Calibration [4/5]** Web page, as in Figure 5-15. On the right of the Web page will be input boxes (**Set new length**, **Set new width**) where you can enter the size in millimeters of the measurement field. The two boxes called **Adjust right** and **Adjust down** enable you to move the position of the measurement field along or across the table.

The measurement field has the shape of a rectangle. Clicking **Apply** shows the position of the measurement field in the image as a green rectangle. If illegal values are entered, the rectangle will turn red, and an error message appears.

- A positive number in the **Adjust right** field moves the measurement area to the right; a negative number moves it to the left.
- A positive number in the **Adjust down** field moves the measurement area toward the operator; a negative number moves it away.

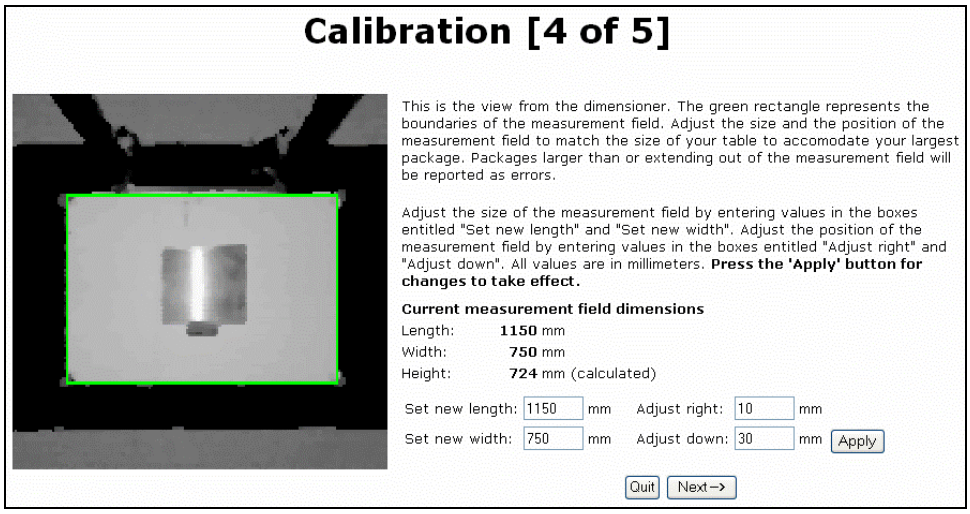


Figure 5-15: Calibration Web Page 4 of 5

Enter the desired length and width of the measurement field in millimeters and click **Apply**.

The measurement field can be larger than the tabletop, but should not include any objects near the table. For example, the CNS810 stand should not be visible inside the measurement field.

The **height** value is calculated from the mounting height of the CNS810 and the parameters entered on this page. If the calculated value is below an acceptable limit, it may be necessary increase the distance between the CNS810 and the tabletop or scale.

When the size and position of the measurement field have been properly adjusted, click **Save and continue** to complete the calibration process.

Calibration Web Page 5

The last Calibration Web page shown in Figure 5-16 summarizes all the resulting parameters.

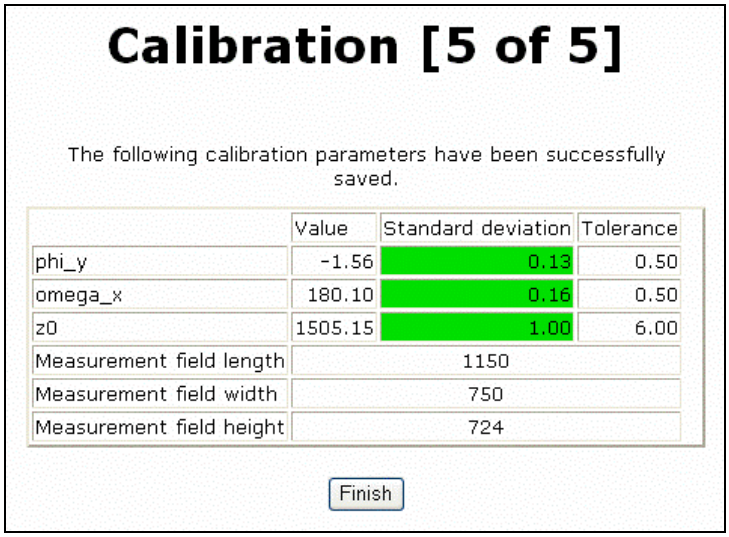


Figure 5-16: Calibration Web Page 5 of 5

This page indicates that the calibration was successful.

Before you start to measure packages, review the remaining sections of this chapter to configure various operating and reporting parameters.

Once calibration and setup are complete, complete the Acceptance Test Worksheet found in Chapter 6 to confirm that the CNS810 is performing to specification. At that point, the system is ready to be used in production.

Package Reporting

Use this Web page to configure the information displayed for the operator and sent to the host computer. (See Figure 5-17.) Click **Package Reporting** from the **System Configuration** Web page.

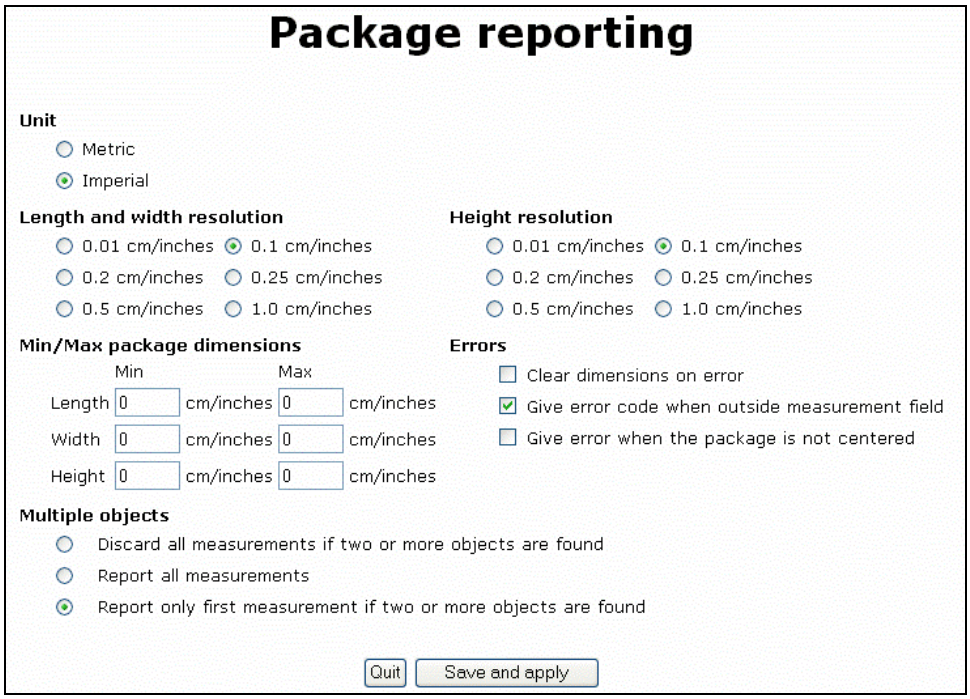


Figure 5-17: Package Reporting Web Page

Under **Unit**, click **Metric** to display measurements in centimeters, or **Imperial** to display measurements in inches.

Under **Length and width resolution**, click the desired resolution increment size.

Note: If 0.25 cm/in. is selected, the last two digits on the display can only be 00, 25, 50, or 75.

The **Height resolution** can be different, but it is typically the same as the **length and width resolution**.

The **Min/Max package dimensions** are used to generate Scan Code messages (listed in Table 7-1) sent to the operator or the host computer. When these values are set to zero, the scan code messages for Under Minimum and Over Maximum dimensions are not produced. Here are some general rules to consider:

- For Legal for Trade applications, set the **Min package dimensions** to the approved minimum value.
- For Weights and Measures approved applications, the **Max package dimensions** values are determined by the mounting height of the CNS810. The values entered here may be less than or equal to the values shown in Table 3-1.
- The Length is always the longest dimension.

- These settings can be used to sort packages by size.

Errors configures the Scan Code messages that are displayed and sent to the host computer.

- **Clear dimensions on error** will fill all measurement fields with zero under any error conditions.
- **Give error codes when outside measurement area** will report boundary error messages when selected.
- **Give error when package is not centered** is used to ensure the highest accuracy of measurements.

In most cases, all three parameters should be selected.

In **Multiple objects,** you can click **Discard all measurements if two or more objects are found**, **Report all measurements,** or **Report only the first measurement**. Usually, **Discard all measurements…** is selected.

Click **Save and apply** to save any changes or **Quit** to cancel and return to the **System configuration** page.

Fine Tuning

On the **Dimensioner setup** web page, the operator may set parameters altering the behavior of the dimensioner, or fine tune calibrated values (Figure 6-1).

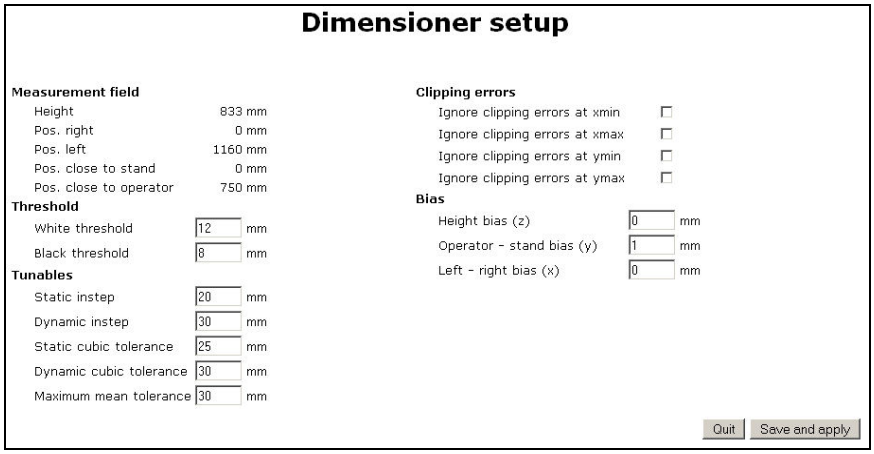


Figure 6-1: Dimensioner Setup Web Page

- **Measurement field:** The field of view is set during calibration, and its values may be viewed, but not changed, from this page.
- **Threshold:** Three different threshold values are used to segregate packages from the tabletop. All three can be adjusted here. For white packages, the white threshold is used. For darker packages, the sum of the white threshold and the black threshold is used.
- **Tunables:** Certain variables set by the operation mode may be fined tuned in this section. Static instep is the distance from the edge of the package at which the height measurement is taken. Static cubic tolerance is the amount of variation allowed in the height of the package before status code "00400" is

triggered. For packages that bulge or have banding, it may be necessary to increase this value. Other properties should not be changed from their default values.

- **Clipping errors:** In some applications there is no need to display codes for packages near the measurement field boundaries. For example, if a guardrail is installed on the back of a conveyor section, the package positioning is limited at the back. You can check the box for ymin to eliminate scan code "20000."
- **Bias:** If the system consistently measures a few millimeters above or below the actual measurement, a small adjustment may be added to the reported measurements. Negative entries reduce the reported measurement and positive values increase the reported measurement. Entries are typically less than 10 mm (0.4 in.).

Dimensions

The **Dimensions** web page (Figure 6-2) is used to monitor package datagrams generated by the measuring software during operations. It is possible to initiate a new measurement from this page by clicking **Measure package**.

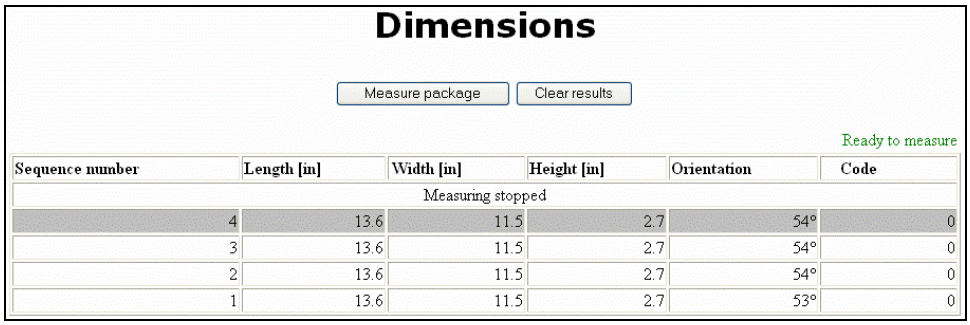


Figure 6-2: Dimensions Web Page

When **Measure package** is clicked, the CNS810 will scan the measurement area and, when the scan is complete, display a new row of data at the top of the table.

Logging out

When leaving the CNS810, click **Logout** from the Web page header (Figure 4-9) before disconnecting the computer. This prevents unauthorized persons from entering the CNS810. When logged out, or the computer is rebooted, or for some reason the current web session is no longer considered valid, the operator is returned to the log-in Web page.

Configuration of Host Emulator

"Hostem" is a code module that communicates the results of a scan to an external device or host computer via a serial or network connection. Complete the following steps to configure the host emulator. Refer to Figure 5-18 as a guide.

Entering Setup Parameters

From the **System configuration** menu, click **Advanced Setup**

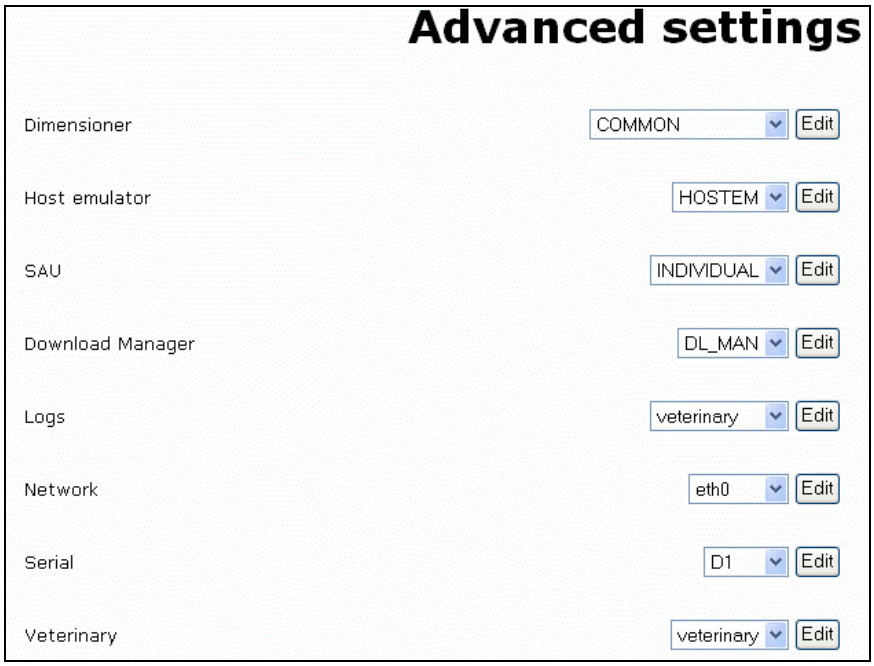
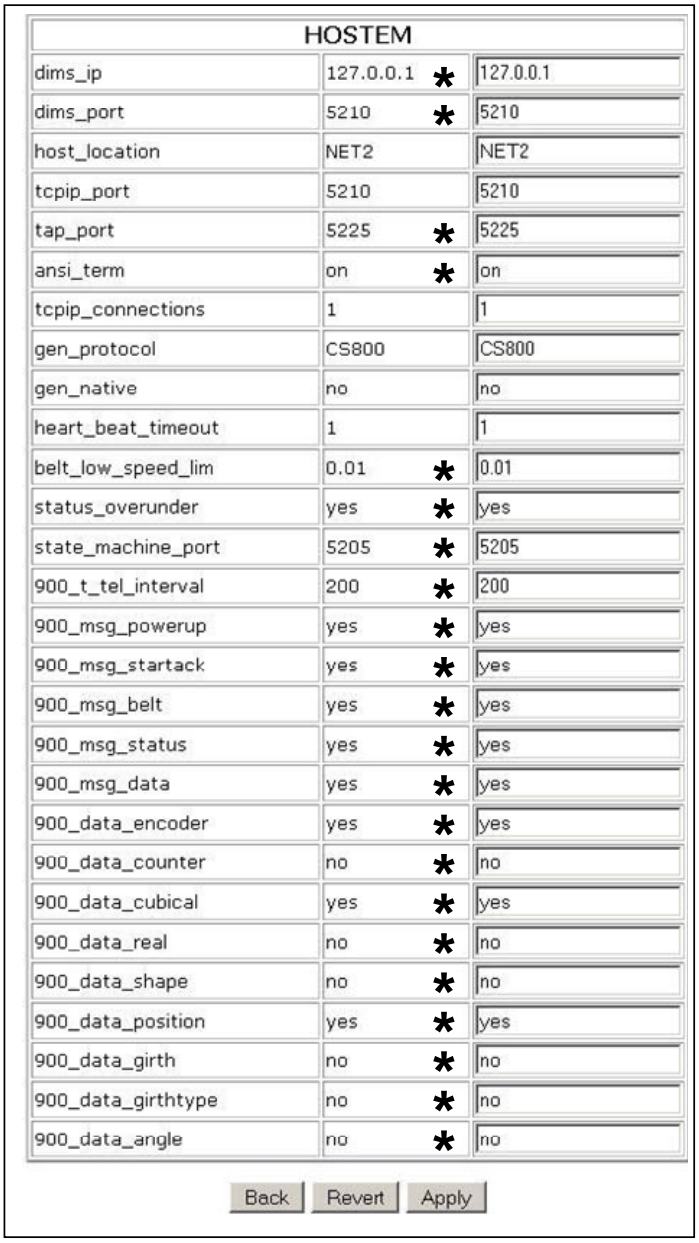


Figure 5-18: Advanced Settings Web Page

Under **Host emulator**, click **Edit**. This opens a page displaying table with all parameters, as shown in Figure 5-19.



HOSTEM

dims_ip	127.0.0.1	*	127.0.0.1
dims_port	5210	*	5210
host_location	NET2		NET2
tcpip_port	5210		5210
tap_port	5225	*	5225
ansi_term	on	*	on
tcpip_connections	1		1
gen_protocol	CS800		CS800
gen_native	no		no
heart_beat_timeout	1		1
belt_low_speed_lim	0.01	*	0.01
status_overunder	yes	*	yes
state_machine_port	5205	*	5205
900_t_tel_interval	200	*	200
900_msg_powerup	yes	*	yes
900_msg_startack	yes	*	yes
900_msg_belt	yes	*	yes
900_msg_status	yes	*	yes
900_msg_data	yes	*	yes
900_data_encoder	yes	*	yes
900_data_counter	no	*	no
900_data_cubical	yes	*	yes
900_data_real	no	*	no
900_data_shape	no	*	no
900_data_position	yes	*	yes
900_data_girth	no	*	no
900_data_girthtype	no	*	no
900_data_angle	no	*	no

Back Revert Apply

Figure 5-19: Host Emulator Parameters

Parameters indicated with an asterisk (*) should never be changed from their default values. Some of the other parameters must be configured for the host computer interface. In this section, a valid entry is required for each parameter.

The **host_location** parameter sets the port that is used to communicate with the host computer. Valid selections are **SER1**, **SER3**, **SER4**, **NET1** or **NET2**.

Normally, **SER4** would be entered to select serial communications over serial port 4, or **NET1** would be entered to select TCP/IP communications over Ethernet port 1. Configure the Serial and Network ports from the **System Configuration** page (Figure 5-1).

Tcip_port is the network port number that will be used by the remote computer to establish a sockets connection. This is normally left at its default setting.

The **tcpip_connections** parameter determines how many simultaneous network connections can be made with the CNS810. Valid selections are 1 or 2. This is normally set to 1.

The **gen_protocol** parameter selects the data message format for the host communications. Valid selections are CS5120, CS900 or CS800. The most common selection will be CS800. Refer to Appendix A for protocol details.

The **gen_native** parameter enables some system level error message reporting. Valid selections are yes and no. This is normally set to no.

The **heart_beat_timeout** parameter sets the frequency that Heartbeat messages are sent from the CNS810. Valid selections are 1-60 seconds or -1 to disable the heartbeat. For TCP/IP host communications over NET1 or NET2, the value should remain at 60 seconds to maintain the connection with the host computer. For serial communications over SER1, SER3, or SER4, the heartbeat can be disabled or set to any value acceptable to the host application.

All other parameters should not be changed from their default values.

Backup Settings

As a last step of setting up the CNS810, backup the system settings:

1. From the **Maintenance** Web page (Figure 5-20), click **Backup settings to PC.**

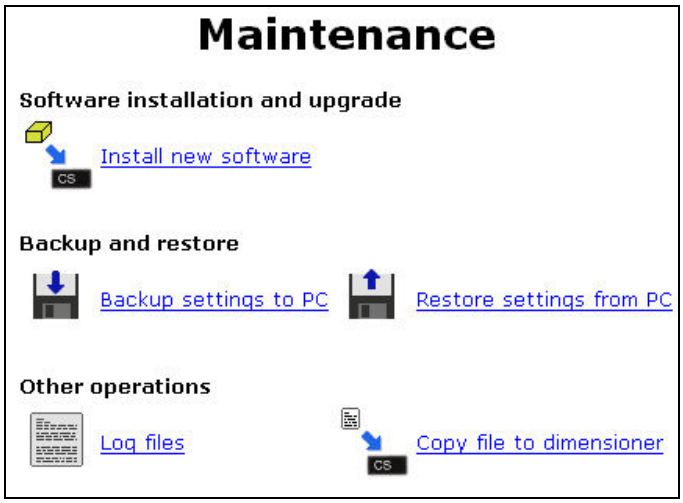


Figure 5-20: Maintenance Web Page

2. In the dialog box that appears, click **Save to disk**, and click **OK.**
3. Select a location on your own file system to store it to and click **Save.**

The CNS810 software configuration is now backed up.

Labeling

Included with the CNS810 is a set of labels like the ones shown in Figure 5-21, that help the operator to visualize the size of the measurement field. These are used to mark the corners and edges of the measurement field on the tabletop or roller top. Use the two stickers at the right to mark the maximum height on the stand columns or on the wall behind the tabletop.

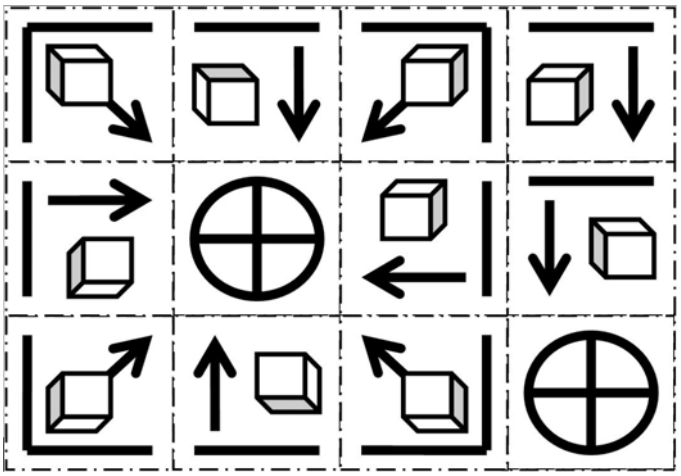


Figure 5-21: Labels for Marking the Measurement Area

Chapter 6.0

Acceptance Tests and Legal-for-Trade Applications

This chapter covers
- Acceptance Testing
- Legal-for-Trade Sealing
- Legal-for-Trade Markings

This chapter describes how to test the performance of the CNS810 and how to configure it for Legal-for-Trade applications.

Acceptance Testing

This section describes how to test of the system to ensure that the CNS810 has been installed and configured correctly, and is performing to specifications. Complete this test prior to putting the CNS810 into production and repeat it periodically as required by your Quality Assurance Policies.

Photocopy the Acceptance Test Worksheet on page **Error! Bookmark not defined.**. Complete this sheet and keep it with the CNS810 for future reference.

Zero Calibration

Remove all packages from the measurement field. If a roller or ball transfer is being used, place the original board used to calibrate the CNS810 on the rollers. Press the ZERO button on the display. After a few seconds, "CALib PASS" should be displayed. Remove the calibration board or box, if used.

Repeatability

Measure a test package on the scale or in the center of the table. Press the SCAN key on the Display or click the **Measure package** button on the **Dimensions** Web page. Repeat this five times and log the dimensions. Verify each measurement is within one division of the actual dimensions of the package. Note that one division is determined by the resolution selections on the **Package reporting** Web page (Figure 5-17). For example: If the length resolution is set to 0.2 in., a 10-inch long package can measure 9.8, 10.0, or 10.2 in. long.

Eccentricity

Measure a test package in sequence at each of the four sides of the scale or table. The package should be off-center, but within the measurement field. If a scale is on the tabletop, the package must be on the scale. For each position, press the SCAN key on the Display or click the **Measure package** button on the **Dimensions** Web page.

Log the measurements from all four positions plus one measurement from the center of the scale or tabletop. Verify each height measurement is within one division of the center height measurement. Note that from left-to-right or front-to-back, the height measurements may be different by two divisions.

Measurement Field Limits

Place a test package with one side beyond the edge of the measurement field. Press the SCAN key on the Display or click the **Measure package** button on the **Dimensions** Web page. Verify that the appropriate Scan Code, described in Table 7-1, is given for each condition.

Host Communications

For systems that send the dimensions to a host computer, the serial or Ethernet communications configuration should be verified. Connect the provided serial or Ethernet crossover cable to a Windows-based computer. Open the Hyperterminal application and configure for a connection as described in the configuration of the Host Emulator as described in Chapter 5.

If the Heartbeat message is turned on, it will be transmitted periodically and should be received by the Hyperterminal. Press the SCAN key on the display or click the **Measure package** button on the **Dimensions** Web page. A Measurement message will be transmitted and should be received by the Hyperterminal.

Once verified, this connection can be moved to the host computer and re-verified. The host computer may also be configured to initiate the measurement process.

Acceptance Test Worksheet

Date: _____/_____/_____

Serviced By: _____

Complete this worksheet before putting the CNS810 into production after installation or service.

Configuration Parameters

NET 1 IP Address: _____._____._____._____

Subnet: _____._____._____._____ (Host Port)

Gateway: _____._____._____._____

NET 2 IP Address: _____._____._____._____

Subnet: _____._____._____._____ (Service Port)

Gateway: _____._____._____._____

SER4 Baud: _____ Character: _____ Parity: _____ Stop: _____

Host connected to: ☐ SER4 ☐ NET1 Port: ____ ☐ None

Host connection verified with: ☐ HyperTerminal ☐ Host ☐ None

Zero Calibration

Measurement surface: ☐ Table ☐ Ball Top or Rollers ☐ Flat Scale

(If surface has rollers or ball top, a flat calibration board or box must be placed on top prior to zero calibration.)

Calibration board or box dimensions: L = _____W = _____H = _____ ☐ Not Applicable

CAL Results: ☐ Pass ☐ Fail

Note: For the Repeatability and Eccentricity Tests, refer to the value of the **Resolution** parameter found on the **Package reporting** Web page

Repeatability Test

Center 1	L = _____	W = _____	H = _____
Center 2	L = _____	W = _____	H = _____
Center 3	L = _____	W = _____	H = _____
Center 4	L = _____	W = _____	H = _____
Center 5	L = _____	W = _____	H = _____
Max Difference:	_____	_____	_____

Note: Verify that Max Difference is within + or – one Resolution unit.

Eccentricity Test

Center	L = _____	W = _____	H = _____
Left	L = _____	W = _____	H = _____
Right	L = _____	W = _____	H = _____
Front	L = _____	W = _____	H = _____
Back	L = _____	W = _____	H = _____

Note: For each of L, W & H, verify that max difference between **Center** and all other positions is within + or – one Resolution unit. Note that between left-to-right and front-to-back that max difference may be two Resolution units.

Measurement Field Limits

Outside on the Left generates Code 00002: ☐ Yes ☐ No

Outside on the Right generates Code 00001: ☐ Yes ☐ No

Outside on the Back generates Code 20000: ☐ Yes ☐ No

Outside on the Front generates Code 40000: ☐ Yes ☐ No

Legal-for-Trade Sealing

In Legal-for-Trade applications, the CNS810 must be sealed after inspection by the local Weights and Measures inspector. The CNS810 is certified for Category 3 electronic sealing, which can be accomplished in two steps:

1. **Protecting the boot process**. This ensures that it is impossible to halt the boot process and load unauthorized software into the system. This is set at the factory via a switch on the controller board. See Protecting the Boot Process for details.
2. **Sealing system configuration**. The system provides a Web interface to electronically seal the system. When electronically sealed, an Audit Trail of all parameter changes is generated.

Sealing the System

1. Using a Web browser, log on to the service port as the "root" user.
2. Click **System configuration**.
3. Click the **Sealing** link to go to the System sealing Web page, shown in Figure 6-1.

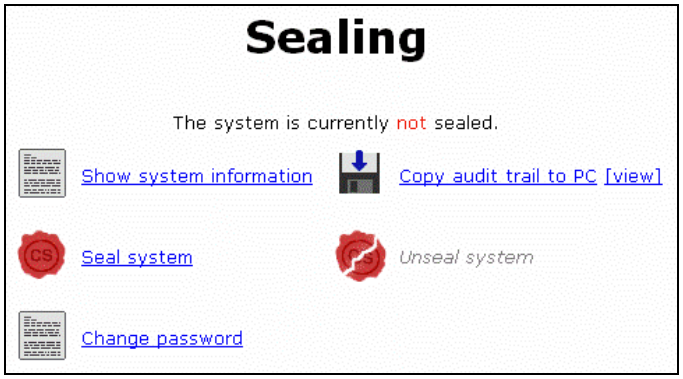


Figure 6-1: System Sealing Web Page

4. Click **Seal system** to go to the **Seal system** Web page shown in Figure 6-2.

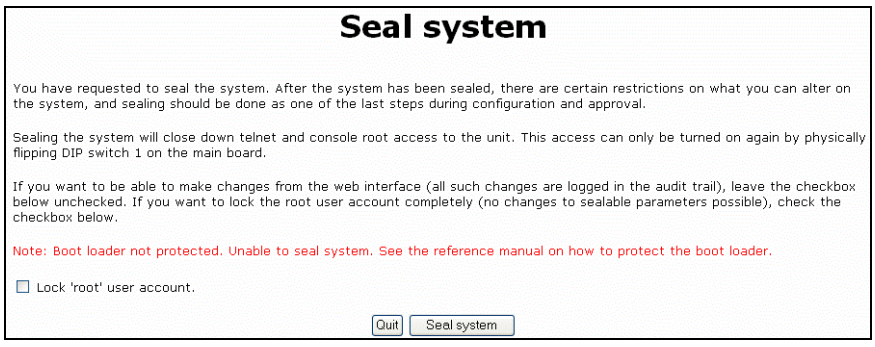


Figure 6-2: Seal System Web Page

If the Boot Loader is not protected, a note is clearly displayed. If this note appears, refer to Protecting the Boot Process.

Select **Lock root user account** only if you want to prevent the system configuration from being changed. This is not necessary because all changes are logged in the audit trail. If this box is selected, you are required to change the DIP switch position on the controller board to make any configuration changes.

Click **Seal System** to complete the electronic sealing process, or click **Back to menu** to cancel the sealing process.

System Information

Clicking Show system information in the main Sealing page opens a page like the one shown in Figure 6-3. This page details specific information about this dimensioner, including its current software version and any installed additional software or updates.

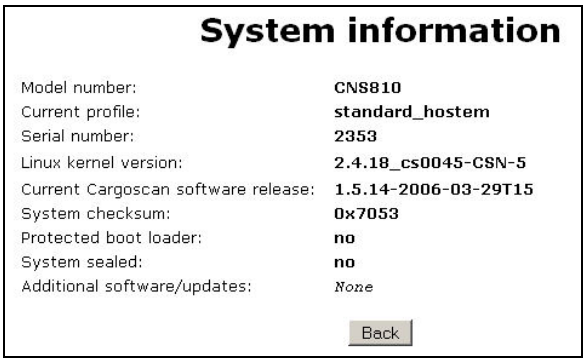


Figure 6-3: System Information Web Page

Audit Trail

In the U.S. and Canada, the system is approved as a Category 3 measuring device. This means that the system must include an event logger which will log all relevant changes made to the system when it is sealed. **Copy audit trail to PC** can be used to download the last events (all changes or the 1000 latest events), The audit train can also be shown directly in the browser if the [**view**] link is pressed instead.

Protecting the Boot Process

The boot process can be halted by inputs on the console port during the period between turning the power on and the start of the boot process. Position 1 on DIP switch SW2 on the CPU board is used to select between the following modes:

ON: System is not sealed.

In this position the delay is three seconds during which it is possible to halt the boot process. When the boot process is halted, it is possible to access the boot loader and to give commands to start booting from external devices. In this way, new software can be loaded into the system.

OFF: System is sealed.

In this position there is no delay and the boot process starts immediately from the internal Flash memory of the system.

The DIP witch SW2 is located on the CPU board as shown in Figure 6-4. The CNS810 cover must be taken off to access the switch.

By default, SW2 position1 is set in the OFF (sealed) position when shipped.

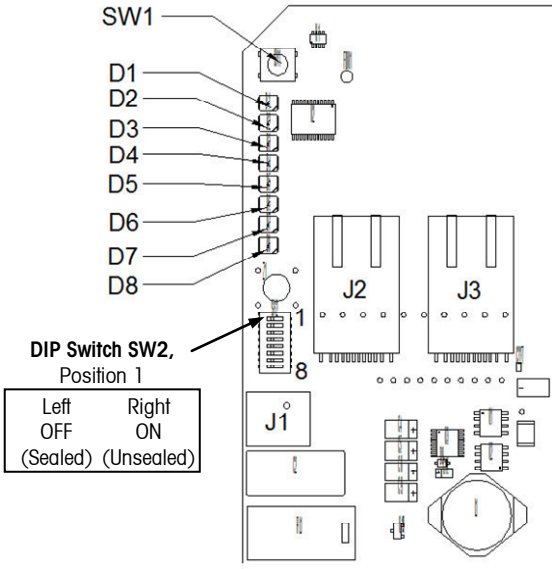


Figure 6-4: Detail of CPU Board

Note: The SW2 switch is not easily accessible or visually inspected, and changing the setting is difficult. The System information page provides information equivalent to doing a visual inspection of the switch. If the instrument responds "Sealed: No," after the sealing procedure is finished, the switch setting is incorrect and a representative from Mettler Toledo must be called to change the setting.

Password

If the root account is not locked upon sealing, change the password for the root account using the **Change password** dialog box in Figure 6-5. Changing the password lowers the risk of parameter changes being made by accident, or tampering by unauthorized personnel.

Figure 6-5: Change Password Dialog Box

Unseal the System

To unseal the system, the physical switch protecting the boot loader must be in the "ON" position. Unsealing the system will, amongst other things, unlock the root account. Unsealing can be done by the service user on the Unseal system Web page shown in Figure 6-6.

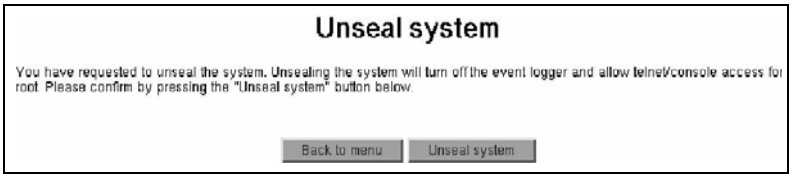


Figure 6-6: Unseal System

Markings for CS2200LX Display

Locate the label set that came with the CNS810. Find the label that includes the maximum dimensions and the increment size selected on the **Package reporting** Web page. Place this label on the lower left corner of the Display as shown in Figure 6-7.

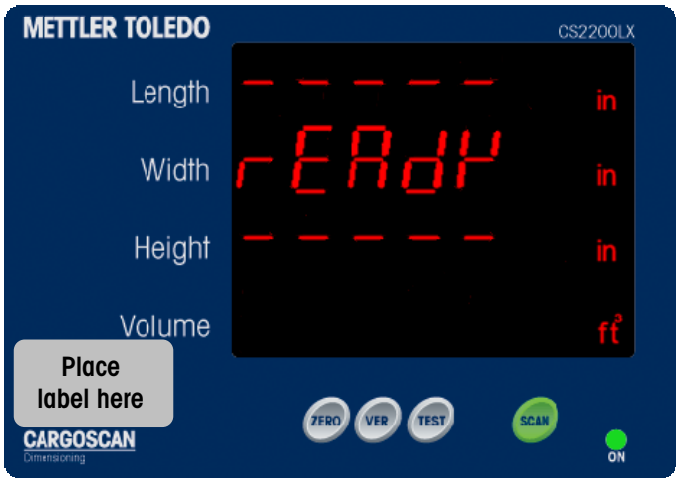


Figure 6-7: Label Placement

Chapter 7.0

User's Guide

This chapter covers

- System Description
- CS2200LX Interface
- Using the CNS810
- Placing Packages Properly
- Making Measurements
- Status Codes and Error Messages
- Version Information
- Segment Test
- Status Code Descriptions

The CNS810 is an easy-to-use dimensioning device that can measure rectangular objects. The dimensions are shown on a display and can be sent to a computer program. This document describes how to operate the dimensioning system.

System Description

A typical system (Figure 7-1) consists of the dimensioner, a stand and a display. Several different displays are available, with different capabilities. The following sections describe use of the system with a standard CS2200LX Display. A more sophisticated display, called the Programmable Display Module, allows data from multiple devices (such as a scale and bar code reader) to be integrated and communicated to a host computer.

The dimensioner can be positioned over an existing workstation with or without a scale, over a conveyor, or over a scale with a roller or ball top.

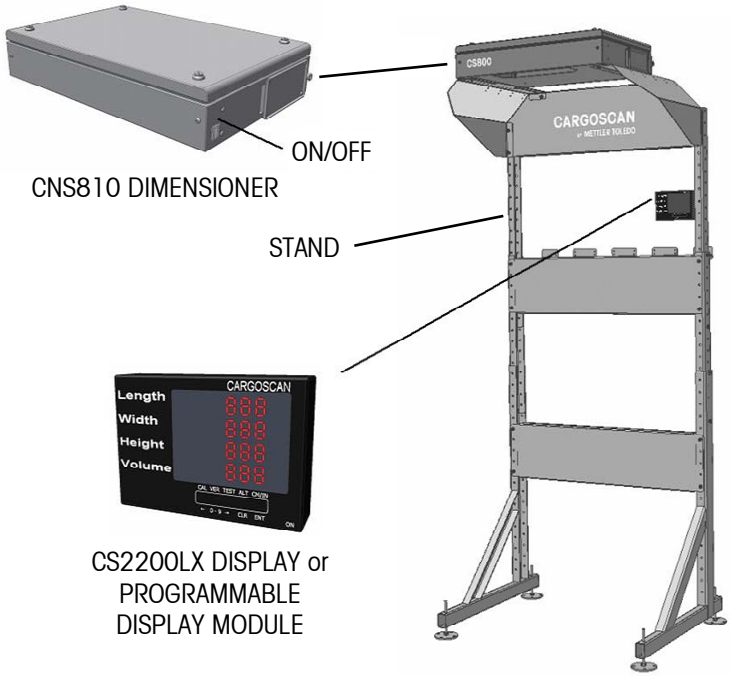


Figure 7-1: System Components

CS2200LX Interface

Figure 7-2 shows the components of the CS2200LX Interface.

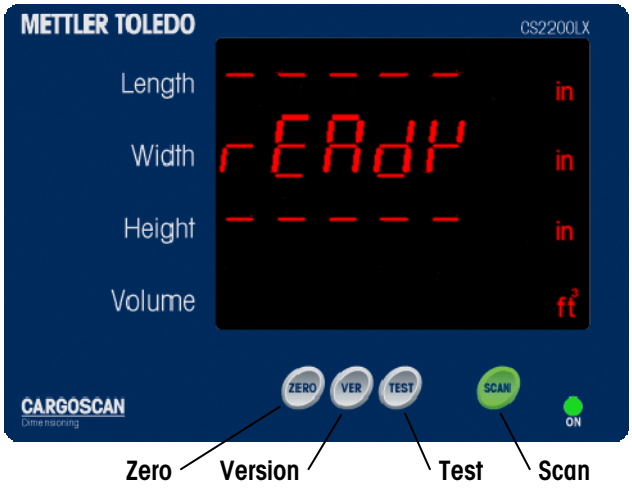


Figure 7-2: CS2200LX Interface

How to Use the CNS810

Starting the Device

Turn on the CNS810 using the ON/OFF switch on the side of the dimensioner. The dimensioner will need about two minutes to start. During this time, the display will be blank. The startup procedure includes a display segment test. When the test is complete, the display will show "rEAdY," as shown in Figure 7-3.

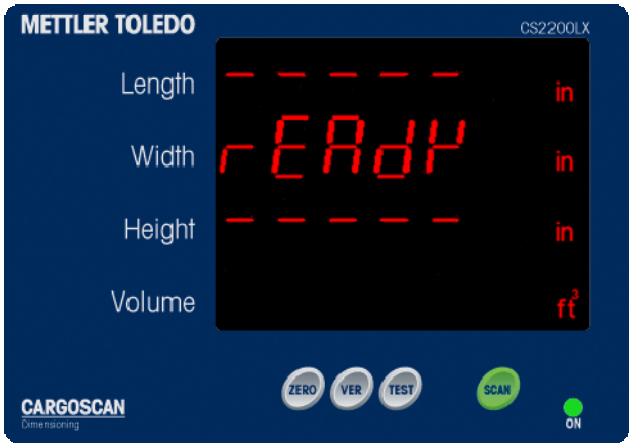


Figure 7-3: Display Screen After Startup Test Completes

Zero Verification

Zero the CNS810 before each shift or at startup. Remove all packages from the measurement field. **If a roller top scale or conveyor section is being used, place the calibration board or box on top**. This should be the same board used in the initial calibration. Press the ZERO button on the display to zero the CNS810. During the zeroing procedure the display shows "CALib," as shown in Figure 7-4.

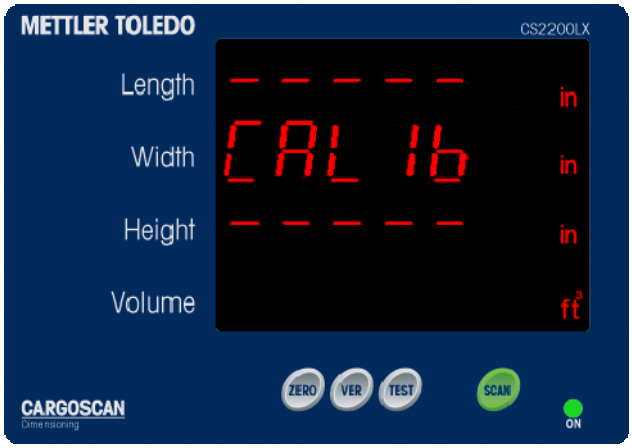


Figure 7-4: Display Screen During Zeroing

Zeroing Successful

If the Zero function is completed successfully, the display shows "CALib PASS," as shown in Figure 7-5. After a few seconds the display will go back to show "rEAdY."

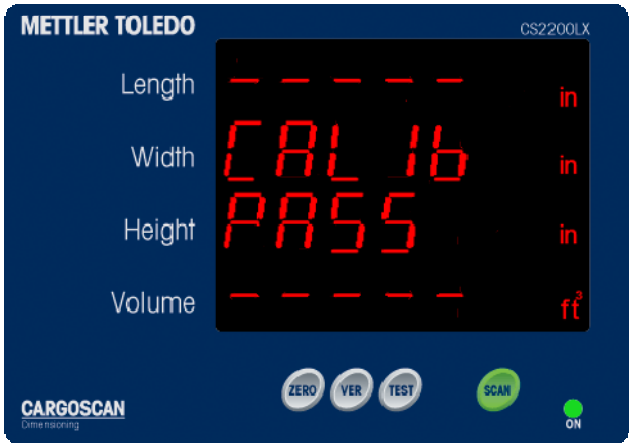


Figure 7-5: Zeroing Completed Successfully

Zeroing Unsuccessful

If the Zero function fails, the display shows "CALIb Error" or "CALIb FAIL," as shown in Figure 7-6. This is usually resolved by re-calibrating the unit (refer to Chapter 5). Report the problem to your supervisor and do not use the dimensioner.

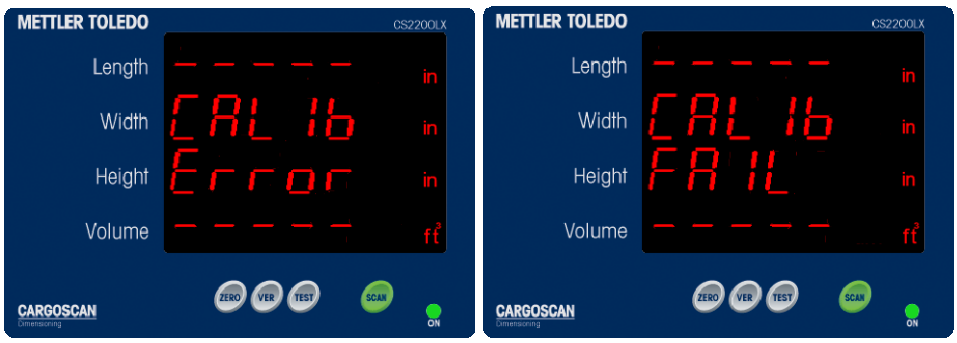


Figure 7-6: Zeroing Was Unsuccessful

Placing the Package

The CNS810 measures only rectangular packages. Figure 7-7 shows the proper shape of a package the CNS810 can measure. The CNS810 will generate a warning code if it is unable to accurately dimension the package.

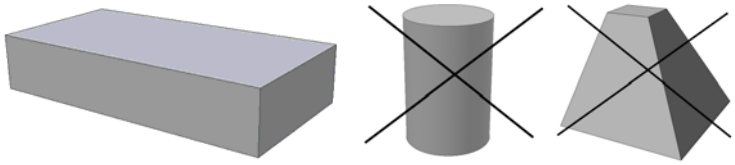


Figure 7-7: Shapes the CNS810 Can and Cannot Measure

Place one package with the largest and most stable side down like the left picture in Figure 7-8.

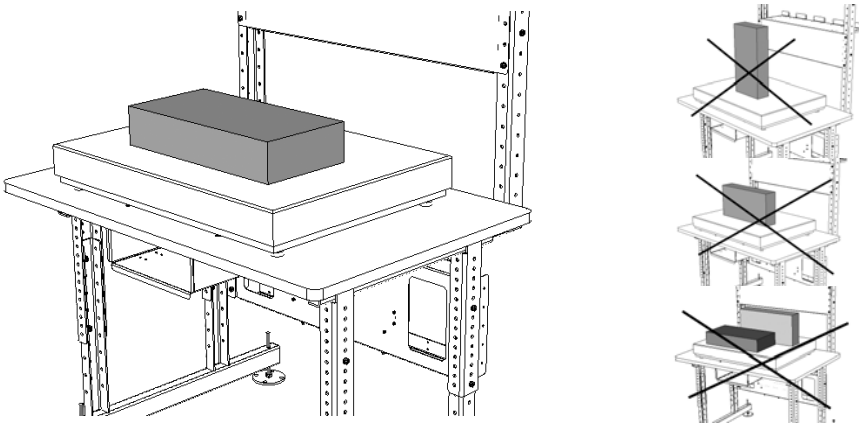


Figure 7-8: Correct and Incorrect Placement of Packages

Center the package under the scanner window as shown in Figure 7-9. Dimensions are shown in mm. The window should be at approximately the center of the tabletop or scale. Errors will occur if the package extends too far to the sides.

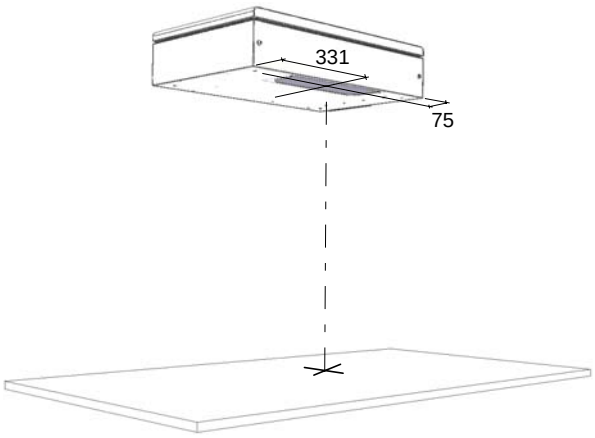


Figure 7-9: The CNS810 Scanner Window

Figure 7-10 shows the correct and incorrect placements of packages under the scanner window.

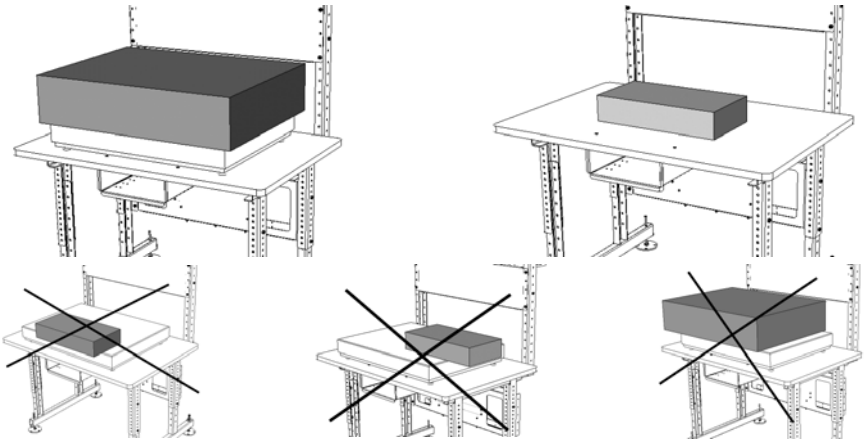


Figure 7-10: Proper Placement of Packages Under Scanner Window

Start Measurement

When the package is in place, press the SCAN button to start the measuring process. The display will show "SCAn" during the scan process. (See Figure 7-11.) During this time, only the package to be measured must be in the dimensioner's field of view.

Step back and keep hands out of the measurement field. The measurement will take about three seconds.

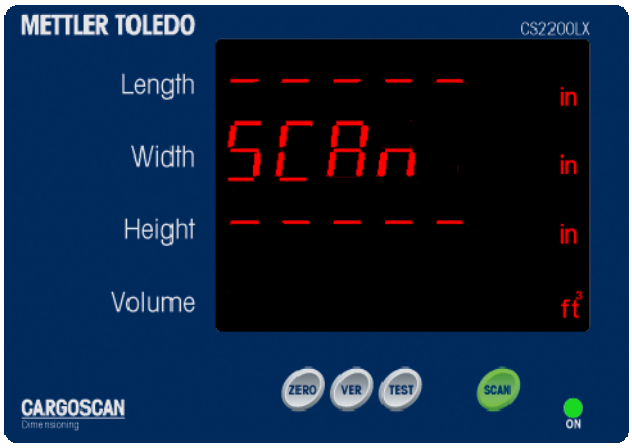


Figure 7-11: Measurement in Progress

Measuring Successful

If the measuring process was successful, the display will show the actual dimensions of the package as shown in Figure 7-12. The package can be removed and the system is ready for the next package.

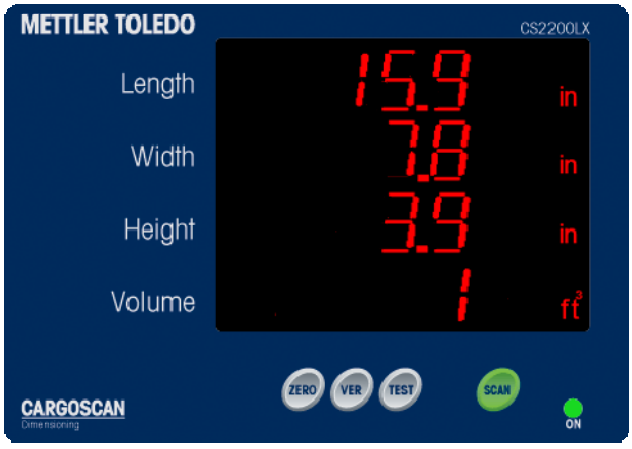


Figure 7-12: Successful Measurement

Status Codes and Error Messages

The CNS810 will display status codes or error messages when it is unable to determine the measurements of a package. Status codes usually indicate a problem with the placement of the package. Error messages usually indicate a hardware or software problem that prevents the unit from functioning properly.

Status Messages

There are two status messages that are not presented as codes (Figure 7-13). If no package is detected in the measurement field the display will show "nOnE." If more than one package is in the measurement field, the display will show "n-ObJ."

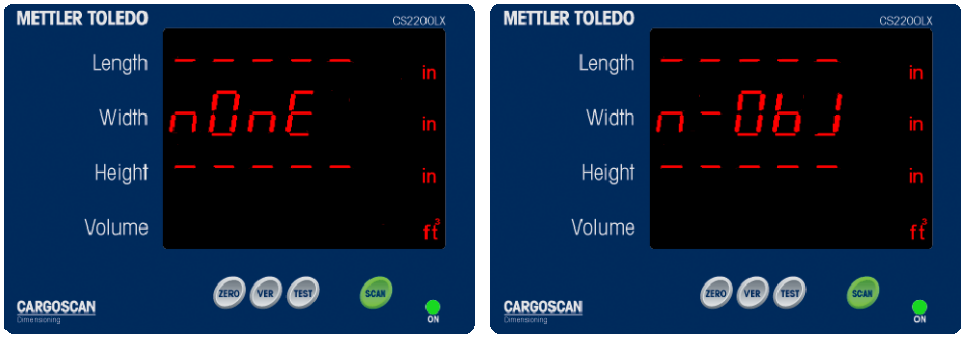


Figure 7-13: No or Multiple Packages Detected

Status Codes

When the CNS810 detects a problem with the size or position of a package, it generates a coded message to describe the problem. An example of a coded message is shown in Figure 7-14. The messages are described in detail in Table 7-1. The operator should take appropriate steps to correct the problem if possible, and scan the package again. Some issues cannot be corrected by the operator and should be called to the attention of a supervisor.

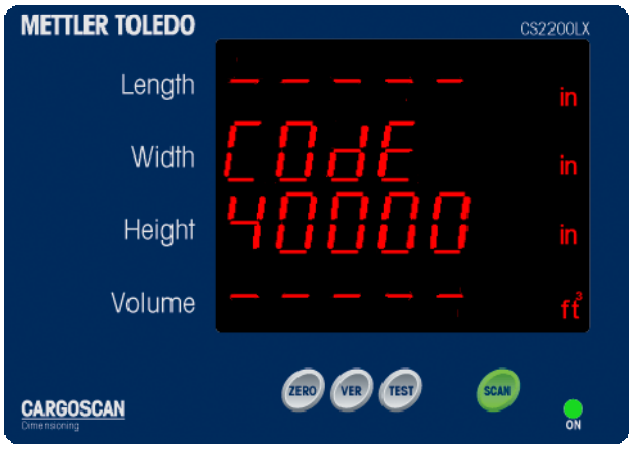


Figure 7-14: A Status Code Message

Error Code Message

Error messages are usually caused by hardware or software failures. Figure 7-15 shows an error message. These problems cannot be resolved by the operator. Contact a supervisor or technical support person when an "Error" message occurs.

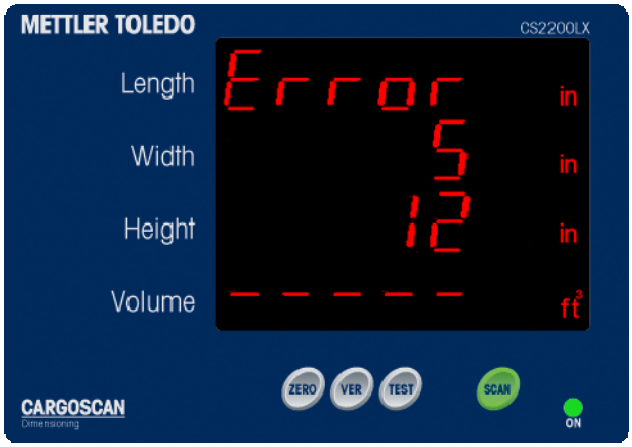


Figure 7-15: An Error Message

Version Information

Press the VER key to display the software version numbers as shown in Figure 7-16. The first three lines of numbers indicate the dimensioner software version (in this case 1.5.14). The last line indicates the version of the display software. Include these numbers with any type of trouble report. After a few seconds, the display will return to "rEAdY."

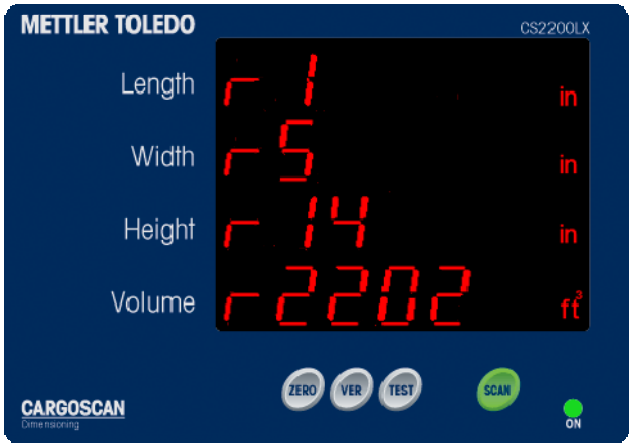


Figure 7-16: Software Version Numbers

Segment Test

Perform a display segment test at system startup to observe that all individual segments are illuminated properly like the display shown in Figure 7-17. A segment test can be triggered by pressing the TEST button on the display. Following the test, the display should return to "rEAdY."

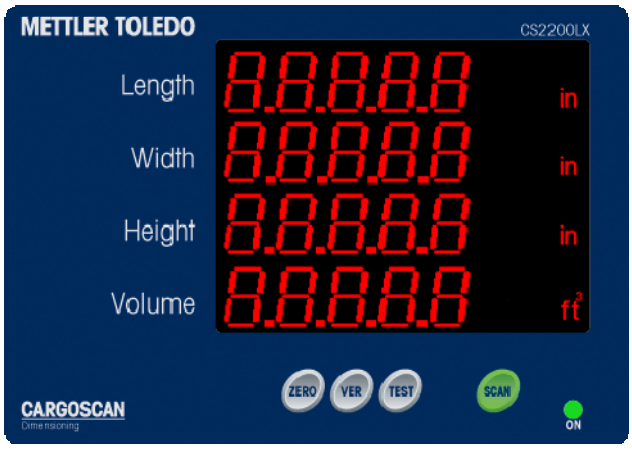


Figure 7-17: Display Segment Test

Status Code Descriptions

For every object that is measured, the system reports the dimensions and a status code. The status code is a five-digit code. Each digit represents a certain measurement condition. A zero in all digits represents an OK measurement. A non-zero value indicates one or more measurement conditions. All non-zero codes are shown on the display.

Multiple codes can be displayed at the same time. For example, code "40001" would indicate the package is outside the measurement field on the front and right sides (too close to the operator and too far to the right). Table 7-1 lists common status codes.

If a status code appears that is not shown in the table below, report it to a supervisor or technical support person.

Table 7-1: Status Codes

Code	Description
2xxxx	Package is positioned too far back
4xxxx	Package is positioned too far forward
6xxxx	Package is too wide to measure
8xxxx	Package is not positioned near the center

Code	Description
xx1xx	Height is less than minimum setting
xx2xx	Height is larger than maximum setting
xx4xx	Package does not meet rectangular requirements
xxx1x	Width is less than minimum setting
xxx2x	Length is larger than maximum setting
xxxx1	Package is positioned too far right
xxxx2	Package is positioned too far left
xxxx3	Package is too long to measure
xxxx4	Package is too long to measure

Chapter 8.0

Maintenance

This chapter covers

- General Care
- Saving and Restoring Settings
- Diagnostic Log Files
- Installing Software
- Service and Support

The CNS810 is a highly reliable instrument, and it requires little maintenance. This section covers general maintenance concerns and tools available via the service Web pages.

General Care

The following practices will keep your CNS810 system providing accurate measurements.

Zero Verification

Periodically, check the CNS810 for zero calibration. Do this at the beginning of each shift or at the beginning of each day.

- When working with a flat table and no scale, remove all objects from the tabletop and press the ZERO button on the display.
- When working with a flat table with a scale, remove all objects from the scale and tabletop, verify the scale is in the proper position, and press the ZERO button on the display.
- When working with a conveyer or ball deck, remove all objects from the measurement field and place the designated reference object beneath the dimensioner. Press the ZERO button on the display.

The dimensioner will scan the measurement field and verify the calculation in a few seconds. The display should indicate "CALib PASS." If the display reports "CALib FAiL" or "CALib Error," repeat the web calibration procedure.

Note: Whenever the dimensioner is moved or the work surface is modified in any way, completely recalibrate the CNS810 using the Web pages. (Refer to Chapter 5.)

Stand Stability

Ensure that the stand is stable and in a fixed location relative to the work surface. All four of the adjusting feet should be in contact with a solid floor so the stand does not teeter. Always keep the jam nuts locked. Anchor the stand to the floor when possible.

If the stand is not stable or has been moved, repeat the calibration process using the Web pages.

Work Surface Stability

Regardless of the type of work surface, it should be flat, stable, and parallel to the CNS810. Make sure that all the legs supporting the work surface are touching the floor and that the work surface remains stable.

When a scale is included on the tabletop, make sure the position of the scale has not moved from the calibration position. Also make sure the scale does not teeter and the jam nuts are locked on all four feet.

If the work surface is not stable or has been moved, repeat the calibration process using the Web pages.

Clean Laser Exit Window

In dusty environments, clean the laser exit window on the CNS810 periodically.

CAUTION

NEVER LOOK DIRECTLY INTO THE LASER EXIT WINDOW. TURN THE POWER SWITCH TO THE OFF (0) POSITION BEFORE INSPECTING THE LASER EXIT WINDOW.

If the laser exit window is dusty or dirty, use a standard glass cleaner and a soft cloth to remove the dirt from the exterior surface of the laser exit window. Spray the glass cleaner on the cloth and gently wipe the window from side-to-side.

Note: Never spray a glass cleaner directly on the glass and never use a paper towel to clean the laser exit window. The window should be clear of streaks and smudges.

Saving and Restoring Settings

When the CNS810 configuration is completed and verified, back up all the configuration files.

- Click **Backup Settings** from the Maintenance Web page.
- Click **Save it to disk**, and click **OK**.
- Select a location to store it to, and click **SAVE**.

All the CNS810 system configuration parameters are now backed up.

To restore the CNS810 configuration from a previously saved backup:

- Click **Restore settings** from the Maintenance Web page.
- Browse for the backup file and click **OK**.
- Click **Restore**, and the settings are restored.

To activate the restored parameters, reboot the CNS810 from the Web page, or do a power cycle.

Diagnostic Log Files

Diagnostic log files are used to debug systems behaving abnormally. Logging should be turned off during normal operation since it may slow operation of the unit, or cause the system to run out of memory if the size or number of logs is too great. Use the default value unless instructed otherwise by a Mettler Toledo service representative.

Enabling a Log

From the **System configuration** Web page, click **Logging**. The **Log configuration** Web page will appear as in Figure 8-1. From the log configuration menu, specify which process(es) you want to monitor by selecting the appropriate check box(es). The file size and number of files for each process can be adjusted, but the default values are recommended. Click **Save and apply changes**.

To disable the logs, clear all the **Enable** boxes and click **Save and apply changes**.

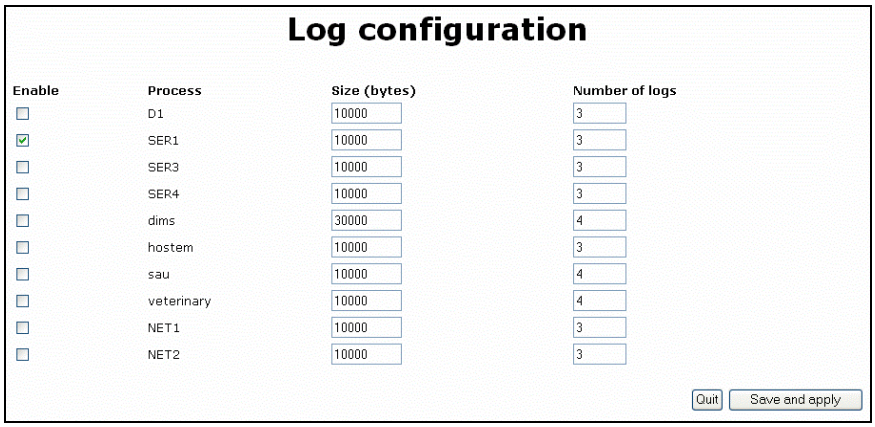


Figure 8-1: Log Configuration Web Page

In Figure 8-1, with the SER1 process selected the results will be saved in three files with a maximum of 10,000 bytes each. As soon as one log file is full, the system will create a new one and start writing to it. When the third log file is full, the oldest file will be deleted and a new log file started.

Extracting a Log

From the **Home** Web page, click the **Logs** tab which takes you to the Log files menu, as shown in Figure 8-2. From this menu, you can view or download the logs from the CNS810.

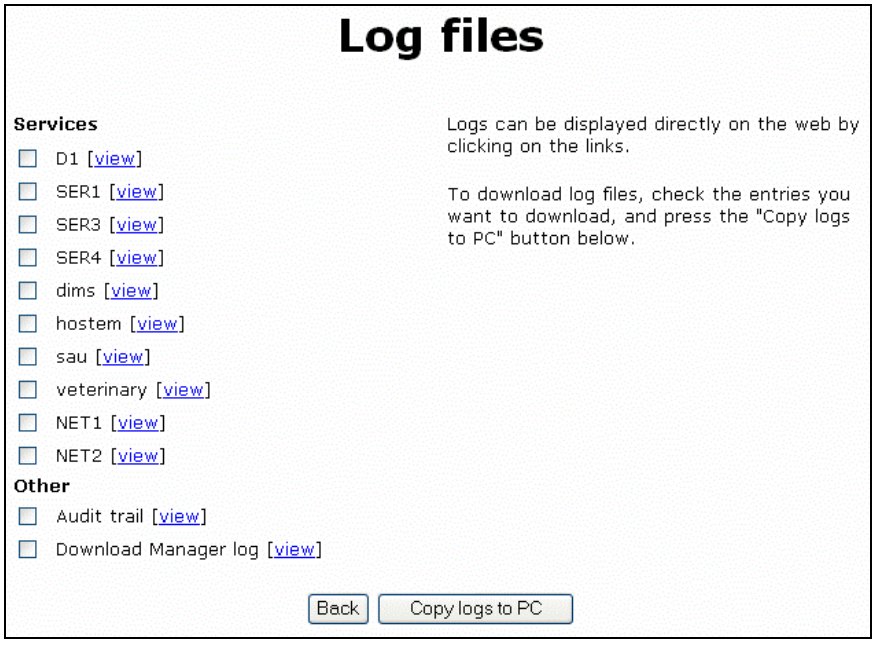


Figure 8-2: Log Files Web Page

To view a log, click on the log's name.

To download a log file to your PC:

1. Select the check box beside the log file(s) to extract.
2. Click **Download selected logs**.
3. Click **Save** when prompted.
4. Select a location for the log file on your file system, and click **Save**.

The file is stored as a tar.gz compressed file on your file system. Make this file available to your Mettler Toledo service representative for analysis.

Installing Software

You can install software updates by clicking **Install new software** from the **Maintenance** Web page. (See Figure 8-3.) Follow the three steps listed on this link to install new software. Please note that after you click **Install**, the system will be busy for a few seconds. Click **Install** only once.

A message will appear when the installation is completed. The CNS810 must be rebooted from the **System configuration** Web page or the power cycled.

Figure 8-3: Install New Software Web Page

Scan Tests

Scan tests may be run by clicking the **Scan tests** link at the top of any Web page. The Scan tests page is shown in Figure 8-4.

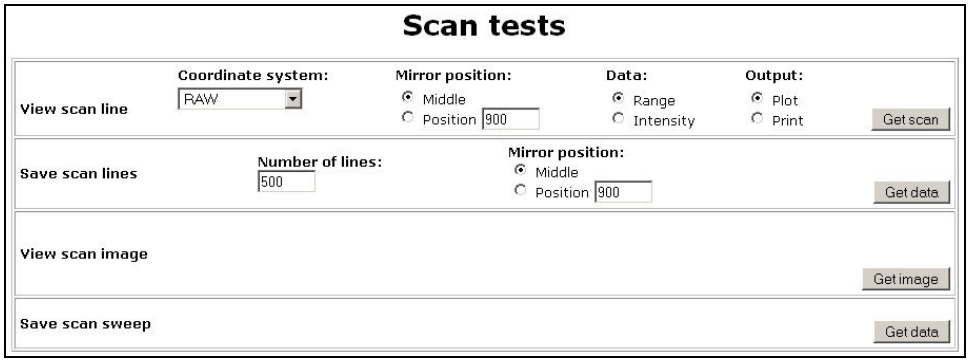


Figure 8-4: Scan Tests Web Page

The **Get scan** button in the **View scan** line generates a single-line scan across the measurement field. A typical scan is shown in Figure 8-5.

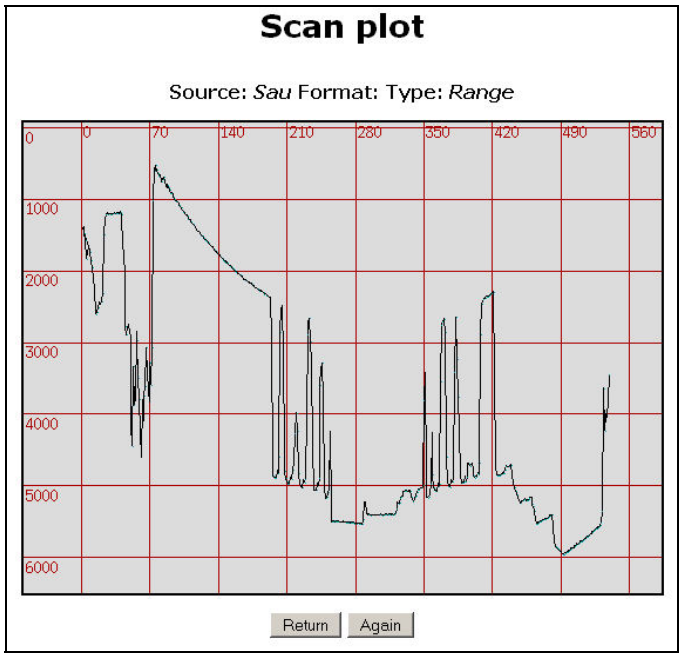


Figure 8-5: Scan Line Plot

The Get image button in the View scan image section generates a scan (Figure 8-6) showing the measurement field as currently seen by the dimensioner.

Figure 8-6: Scan View

Service and Support

If you encounter problems with the CNS810 during installation or operation, contact your Mettler Toledo Inc. sales representative or call **1-800-507-9858 for Technical Support**. Please have the following information available:

- Model and serial number from the data tag on the side of the unit
- Software version from the display or Web page
- Error or Status codes with conditions that led to their display
- A detailed description of the problem

There are no user serviceable components inside the CNS810. It must be serviced at the Mettler Toledo Inc. Service Depot in Columbus, OH.

CAUTION

DO NOT REMOVE THE TOP COVER OF THE CNS810. THERE ARE ELECTRICAL, MECHANICAL, AND LASER HAZARDS BEHIND THE COVER.

Should a problem occur that cannot be resolved on site, return the CNS810 to the Service Depot. Please contact Technical Support to obtain an Equipment Return Authorization (ERA) number and shipping instructions.

Note: Only ship the CNS810 in the original factory carton. If the carton or special inserts are missing, contact technical support to arrange for replacement.

Appendix A

Host Communications Protocol

This appendix covers
- Format
- Messages

You can configure the CNS810 to communicate with a host computer via a serial or Ethernet connection. The following ports can be used: SER1, SER3, SER4, NET 1, NET 2. The default is NET 2. (See Configuration of Host Emulation in Chapter 5 for Hostem Setup.) The protocol described below is for gen_protocol = "CS800" in the Hostem configuration.

The parameters listed in Table A-1 are used to establish a TCP/IP SOCKETS connection from the host computer. The connection is maintained by the "Heartbeat" reply from the CNS810 when there are no dimensions or status data to send.

Table A-1: Parameters to Establish a TCP/IP SOCKETS Connection

Parameter	Description	Default
tcpip_port	TCP/IP port number	5210
tcpip_connections	Number of simultaneous connections	2

Format

Host Command Format

<STX><ID><ETX>

- **STX**: Start of text character (0x02)
- **ID**: Data message identifier, 1 alphabetic character as described in the section Host Commands to CNS810.
- **ETX**: End of text character (0x03)

There is no checksum, no sequence byte, and no Carriage Return in this message.

CNS810 Reply Message Format

<STX><SEQ><ID><PAR><ETX><CSH><CSL><CR>

- **STX**: Start of text character (0x02)
- **SEQ**: Sequence byte initialized to 0 for the first message and incremented by 1 for each new message. When reaching 9 the sequence byte is reset to 0 for the next message transmitted.
- **ID**: Data message identifier, 1 character as described in section Reply Message From CNS810.
- **PAR**: Data message parameters, 25 characters as described in section Reply Message From CNS810.
- **ETX**: End of text character (0x03)
- **CSH**: High byte of checksum
- **CSL**: Low byte of checksum
  - Checksum is calculated as sum of all characters in <ID> and <PAR>
  - Sum of all bytes with parity bit masked off is calculated module 256
  - Checksum is ASCII-coded into the two checksum bytes
  - Example: A checksum of 0x4A is encoded as:
    - CSH = '4' = 0x34
    - CSL = 'A' = 0x41
- **CR**: Carriage return (0x0D)

Messages

Host Commands to CNS810

This protocol sends all data using a fixed length reply message. Table A-2 lists the host commands.

Table A-2: Host Commands to CNS810

ID	Description	Response
D	Start measuring	'D' telegram when measurement is finished
R	Retransmit last message	Results in the last message that was sent being retransmitted
V	Request software version	Results in an immediate Version answer telegram
Z	Start zeroing	Verify Zero pass or fail

Example of a Host message requesting a measurement:

- <STX>D<ETX>

Reply Message From CNS810

The messages listed in Table A-3 are used to acknowledge queries and to send spontaneous information.

Table A-3: Reply Messages From CNS810

ID	Functions and Options	Data String
D	Transmitted whenever dimensions for an object are available	SSSSSSULLLLLLWWWWWWHHHHHH • **S**: 6 digit dimensioning status, see below • **U**: Units of measurements — = 'I' for Imperial — = 'M' for metric • **L**: 6 digit length in cm/in. with 1 decimal • **W**: 6 digit width in cm/in. with 1 decimal • **H**: 6 digit width in cm/in. with 1 decimal (decimal point '.' Included)
H	Heartbeat for TCP/IP protocol	FFFFFFFFFFFFFFFFFFFFFFFF • **F**: 25 digit filler of '0'
M	General numerical message transmitted spontaneously when an event occurs.	NNNNNNSSSSSSFFFFFFFFFFFF • **N**: 6 digit status number • **S**: 6 digit source of status number • **F**: 13 digit filler of '0'
V	Transmitted after version request	VVVVVVVVDDDDFFFFFFFFFFF • **V**: 9 digit software version representing — AAABBBCCC as major/minor/release • **D**: 4 digit display version (0000 = none) • **F**: 12 digit filler of '0'
Z	Zeroing is finished	NNNNNNSSSSSSFFFFFFFFFFFF • **N**: 6 digit status number • **S**: 6 digit source of status number • **F**: 13 digit filler of '0'

The dimensions message contains the status of the measurement, the units of measurement and the measurement Length, Width and Height. Under normal conditions (as in the example below), **status** will be all zeroes. Refer to Dimensioning Status Codes below for non-zero values. The **units** field will be "I" for inches or "M" for centimeters. The **dimensions** are provided in the increment size specified in the **Package reporting** Web page. The D-messages are sent from the CNS810, 3-5 seconds after the D-command.

Example: <STX>1D000000I0015.20012.6004.8<STX><CSH><CSL><CR>

Heartbeat Codes

The Heartbeat code is sent periodically to verify or maintain the communications between the CNS810 and the host computer.

The **heart_beat_timeout** can be configured from 1 to 60 seconds or it can be disabled (-1), via the **Hostem** Web page (Figure 5-19).

Table A-4: Heartbeat Codes

H-code	Explanation
00	Ready
01	Busy
02	Measuring
03	Calibration

Example: <STX>1H02000000000000000000000000<ETX><CSH><CSL><CR> indicates that a measurement is in process.

Message Codes

Message codes provide other information about the measurement system including error codes. The most common codes are listed in Table A-5. If you see an error code not listed below, report it to the service or support organization.

The first 6 characters indicate a message code as listed below. The next 6 characters indicate the source of the message.

Table A-5: Message Codes

M-code	Explanation
009 999	General, unspecified error
M-source	**Explanation**
000 000	Veterinary code module
000 003	SAU code module
000 005	DIMs code module

Example: <STX>1M00999900000500000000000000<ETX><CSH><CSL><CR> indicates a general error.

M-messages can be sent from the CNS810 at any time.

Version Codes

The first nine characters of the version reply from the CNS810 represent the software revision number. The first three characters represent the Major revision level, the next three represent the Minor revision number, and the last three represent the release number.

The next four characters of the version reply represent the display version. If no display is attached, these characters will all be zero.

Example: <STX>2V001005014220200000000000000<ETX><CSH><CSL><CR> indicates the CNS810 software revision is 1.5.14 and the display version is 2202.

Version codes are returned immediately following a V-command.

Zero Codes

The first six characters of the Zero reply from the CNS810 represent the status of the zero test. Table A-6 lists zero codes.

Table A-6: Zero Codes

Z-code	Explanation
000 000	Zero is verified. No problems found.
000 001	Zero function failed. Unable to verify zero setting.
000 002	Zero error. Requires recalibration via Web pages.

Example: <STX>2Z000001000000000000000000000<ETX><CSH><CSL><CR> indicates the CNS810 was unable to verify zero. Failure to place the calibration board or box on a roller top, or a package in the measurement field, could cause this error.

Zero codes are returned approximately 30 seconds following a Z-command.

Dimensioning Codes

Measurement status codes are generally 6-digit codes. Each digit represents certain measurement conditions. A zero in all digits represents an OK measurement. A nonzero value indicates a single or combined set of measurement codes, thus a value of xxxxx3 represents the combination of xxxxx1 and xxxxx2. If you see a code that is not listed in Table A-7, report it as an error.

Table A-7: Dimensioning Codes

D-code	Explanation
xxx xx1	Object was outside measurement field on the right side
xxx xx2	Object was outside measurement field on the left side
xxx x1x	Length or width is under minimum defined by set-up

D-code	Explanation
xxx x2x	Length or width is over maximum defined by set-up
xxx 1xx	Height is below minimum height defined by set-up
xxx 2xx	Height is above the maximum defined by set-up
xxx 4xx	The Object does not meet requirements for a cubic object as defined by set-up
x2x xxx	Object placed outside the measurement field, too close to the stand
x4x xxx	Object placed outside the measurement field, too close to the operator
x8x xxx	Object not placed near the center of the measurement field
100001	More than one package found in the measurement field
100002	No package found in the measurement field

Example: <STX>1D000500I0012.00010.20000.8<ETX><CSH><CSL><CR> indicates the package is too short to measure and it does not meet the requirements for a rectangle (the sum of codes xxx 4xx and xxx 1xx). This is probably a letter pack.

Note: Depending on the parameters in the Package Reporting configuration, the dimensions may be all zeros when this error is reported.

Dimension responses are returned within five seconds after the D-command is issued.

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