User's Manual for
MiniScan® EZ

The world's true measure of color

HunterLab

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Caution: If the equipment is used in a manner not specified by the HunterLab, the overall safety may be impaired. The instrument is for indoor use only and not suitable for a wet location.

Caution: There is a potential of a UV Light hazard in using this instrument. Please avoid looking directly at the light. The frequency of this flashing light is in the range of sensitivity for those prone to epileptic seizures.

Safety Notes

For your safety when using the MiniScan EZ, you should pay attention to the safety statements in this User's Manual.

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Setting up the MiniScan EZ

The MiniScan EZ spectrophotometer is a versatile color measurement instrument that can be used on products of virtually any size, and in industries as diverse as paint and textiles. Because of its compact design and portability, MiniScan EZ can be used to measure objects that would be difficult to position at the measurement port of a larger color instrument normally found in a laboratory, and in locations other than a laboratory.

Figure 1. MiniScan

==Note: Use of this equipment in a manner not specified by the manufacturer may impair the protection afforded by the equipment.==

==Note: Take care not to drop the MiniScan EZ. If it is dropped, have it evaluated for damage before operation.==

MiniScan EZ is available in four different models based on viewing area and geometry. The label on the bottom of the instrument provides this information, which is outlined below.

Model	Geometry	Viewing Area
MSEZ-4500L	45°/0°	Large
MSEZ-4500S	45°/0°	Small
MSEZ-4000L	Diffuse/8° (Sphere)	Large
MSEZ-4000S	Diffuse/8° (Sphere)	Small

Standard Accessories

The following accessories are included with the MiniScan EZ and can be found in the provided carrying case:

- Dust Cover

- Calibration Cylinder with calibrated white tile, black glass or light trap and green check tile

- Rechargeable Batteries

- USB Cable

- Certificate of Traceability

Figure 2. MiniScan EZ Carrying Case

DUST COVER

This accessory screws on over the sample port to protect the instrument's optics when it is not in use.

Figure 3. Dust Cover

Calibration Cylinder

The Calibration Cylinder houses the NIST traceable white calibrated tile that is placed at the sample port during standardization to set the top of scale, the black glass or light trap that is placed at the sample port during standardization to set the zero, and the green check tile that is used to assess long-term instrument performance during the green tile test.

Figure 4. Calibration Cylinder

Rechargeable BATTERIES

A set of 6 rechargeable AA batteries and a charger (with 110V plug and 220V adapter) are provided for continuing use of the MiniScan EZ.

Figure 5. Rechargeable Batteries

This is used for connecting the MiniScan EZ to a computer.

Figure 6. USB Cable

TILE DATA SHEET

This provides NIST-traceable calibrated values for the standard white tile and values read at factory for the green tile.

Installation

Before operating the MiniScan EZ, you need only install the batteries. You may also wish to connect it to a computer or to an optional component, such as a printer. Instructions are provided below.

1. Unpack the carrying case and remove wrappings and cable ties. Inspect for damage and notify the carrier and HunterLab immediately if any is discovered. Save the packing materials in case it becomes necessary to return the instrument to the factory.

2. Open the battery compartment on the bottom of the MiniScan EZ.

Figure 7. Insert batteries

3. Install the 6 AA batteries, observing the positive (+) and negative (-) polarity guides inside the battery compartment.

4. Close the battery compartment.

> *Note: The MiniScan EZ can use six standard AA alkaline batteries or six rechargeable AA NiMH batteries. Do not mix battery types in the instrument. To recharge the NiMH batteries, remove them from the instrument and recharge them using the supplied charger.*

5. If the instrument is to be used connected to a computer, printer, or other USB device, plug the hexagonal (Mini-A) end of the USB cable into the USB port on the MiniScan EZ. Some device cables may require use of a Standard-A to Mini-A adapter.

Figure 8. Connecting the USB Cable

6. Plug the flat end of the USB cable into the appropriate USB port on the computer or device. If connecting to a computer, Windows' plug and play feature should automatically find and install the MiniScan EZ. Then the "Found new hardware" message disappears. Other devices, such as the printer, bar code reader, and keyboard, are automatically detected by the MiniScan EZ.

7. Turn the MiniScan EZ on by pressing the center (*Go*) button on the button pad.
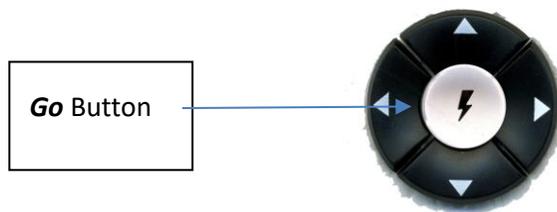
Go Button

Figure 9. Go Button

The Basics of MiniScan EZ Operation

Commands are given to the MiniScan EZ using the five buttons on its button pad, instructional prompts and measurements and are displayed on the 160 x 160-pixel liquid crystal display (LCD) screen. When an item is to be measured using the MiniScan EZ, the area of interest should be placed flush at the sample port with the side of the sample to be measured toward the instrument. The sample must completely cover the sample port.
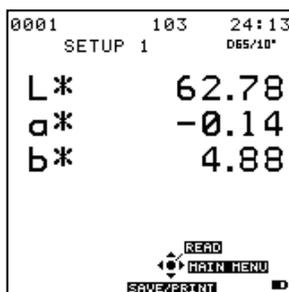
Figure 10. Screen Display

When the read command is given using the button pad, the xenon flash lamp illuminates the sample, and the light reflected and captured by the detector is evaluated. The calculated measurement is then shown on the LCD. Up to 800 readings and 100 product setups may be stored in the MiniScan EZ's memory.

The Button Pad and LCD Display

The five buttons on the button pad can be loosely defined as the left, right, up, and down buttons, with the circular *Go* (lightning bolt) button housed in the center of the arrows. These buttons perform slightly different functions depending on the current operation.

Figure 11. Button Pad

Consult the miniature map of the button pad shown at the bottom of the LCD display for the relevant definitions of the buttons.

In addition to operational prompts and the button pad map, the LCD display also contains a battery power indicator in the lower right corner of the screen. As available battery power decreases, pixels are removed from the interior of the battery indicator until only the outline remains, indicating battery power will run out soon.

Figure 12. Battery Power Indicator

Across the top of each measurement screen are numbers indicating (left to right) the datalog number for this reading if it was saved to the MiniScan EZ's memory, the lamp flash count since the batteries were last replaced, and the number of hours and minutes since the instrument was last standardized.
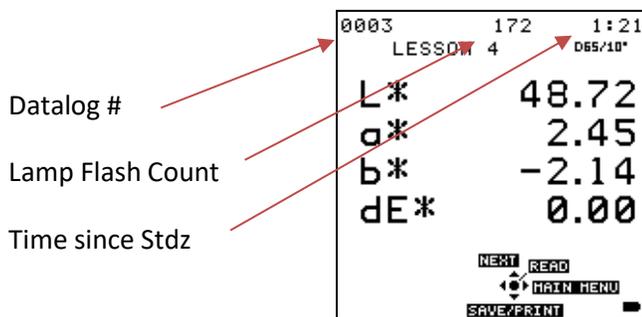
Figure 13. Top of Screen

Menus

All MiniScan EZ functions may be accessed through its main menu. The main menu command leads to prompts (such as for standardization and reading), setup screens (for product setup and global options), or an additional menu (such as the Diagnostics, Saved Readings, and Setup Maintenance choices).

When Return is shown as an available button command on the main menu screen, you may choose *Return* to go back to the last screen used before the instrument shut down.

Figure 14. Main Menu

When *Off* is shown as an available button command on the main menu screen, you may choose Off to immediately turn the instrument off.

About Your Instrument

Information specific to your instrument may be viewed on the About Your Instrument screen, which can be obtained by choosing **ABOUT** from the main menu. Your instrument model, serial number, firmware version, and total flash count for this instrument lamp are displayed.
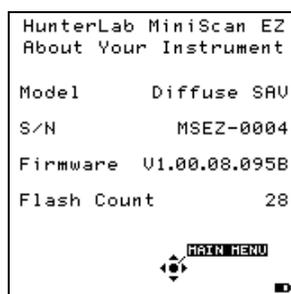
Figure 15. About Your Instrument

Taking a Simple Measurement

STANDARDIZATION

Standardization sets the top and bottom of scale for the neutral axis. During standardization, the bottom of the scale (zero) is set first. For this, you simulate the case where all the source light is absorbed by the sample. This is done by placing the black glass or light trap that is contained in the calibration 'can' at the sample port. The top of the scale is then set by scaling the light which is reflected from the calibrated white tile also in the calibration can. Messages on the LCD screen prompt you through the standardization process as described below.

It is recommended that the MiniScan EZ be standardized at least once every four hours. The instrument will automatically prompt for standardization after the Standardization Interval set in Global Options has elapsed, so it is a good idea to enter 4 hours as the Standardization Interval. Also standardize the MiniScan EZ any time there is a significant change (greater than 5°F) in ambient temperature. For example, if you move your MiniScan EZ from your air-conditioned office to an outdoor site that is 90°F, you should standardize again outdoors after the instrument has had a chance to stabilize under the new temperature.

It is very important that the standards used in standardization be treated carefully. They must be clean and in good condition if standardization is to be successful.

STANDARDIZATION PROCESS

Standardization of a MiniScan EZ is performed as follows:

1. Remove the calibration cylinder from the carrying case.

2. Check that the tiles are clean and that the light trap is free of dust and scratches. If they are dirty (including marked with fingerprints), clean them as described in *Maintaining and Testing MiniScan EZ*.

Figure 16. Calibration Cylinder

==Note: If your MiniScan EZ is a 45°/0° model, your cylinder will contain a black glass. If it is a diffuse/8° (sphere) model, it will contain a light trap.==

3. Select *STANDARDIZE* from the MiniScan EZ's main menu by moving the cursor highlight to its position using the up and down arrow buttons and then pressing the center (*GO*) button. The Standardization screen appears, prompting you to place the black glass or light trap.

Figure 17. Begin Standardization

4. Remove the end cap of the calibration cylinder that covers the black glass and press the nose cone of the MiniScan EZ to the shiny side of the glass. Check that the sample port is flat against the black glass.

Figure 18. Reading the Calibration Cylinder

OR

Remove the end cap of the calibration cylinder that covers the light trap and cover the MiniScan EZ's sample port with the light trap. Check that the light trap completely covers the port.

5. Press the center button (***GO***). The MiniScan EZ reads the glass or trap and sets the instrument zero.

6. When it is finished, the screen prompts you to place the white tile.

Figure 19. Prompt to Read the White Tile

7. Replace the black glass or light trap with the white tile, which is contained in the calibration can's end cap. Press the nose cone of the MiniScan EZ to the white side of the tile. Check that the sample port is flat against the tile.

Figure 20. Reading the White Tile

8. Press the center button (***GO***). The MiniScan EZ reads the white tile and sets the top of scale. When it is finished, the screen indicates that the instrument has been successfully standardized.

9. Press ***MAIN MENU*** (right arrow) to return to the main menu.

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Figure 21. Standardization is Complete

READING INDIVIDUAL SAMPLES

Complete the following steps to take individual (non-averaged) readings using the MiniScan EZ:

Note: These instructions apply when AVERAGE in the product setup is set to OFF.

1. Select **READ** from the MiniScan EZ's main menu. Move the cursor highlight to its position using the up and down arrow buttons and then press the center (**GO**) button.

2. The first Reading screen appears, asking to select the setup to use. To read using the last product setup that was used, press **NO** (down arrow) and skip to Step 4. If you want to select the setup for use from the list of setups, press **YES** (up arrow), and the Select setup to use screen appears.
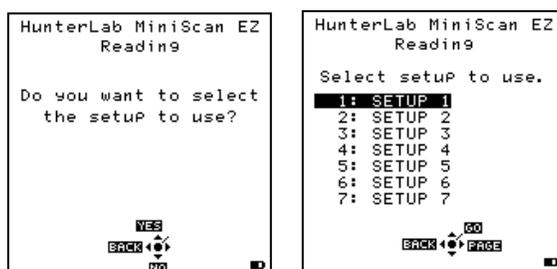
Figure 22. Selecting a Setup

3. Scroll through the list of setups using the up and down arrow buttons until the setup you wish to use is highlighted, then press the center button (**GO**) to move to that setup.

4. The first reading screen appears, which prompts you to read the standard (if the product setup uses a working standard) or sample.

Figure 23. Place Standard at Port

5. Place the standard or sample at the sample port with the side to be measured toward the port. Make sure that the item is flat against the port and completely covers it.

Figure 24. Reading a Standard or Sample

6. Press the center (*GO*) button to read. The standard or sample is read and its values (as configured in the product setup) displayed on the screen.

Figure 25. Reading on Screen

Note: If you have a bar code reader installed, scan your bar code now, and the ID will appear beneath the color measurement.

7. The keypad buttons have now changed slightly, as shown on the keypad map at the bottom of the screen.
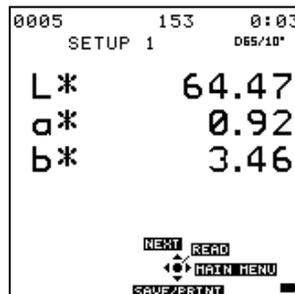
Figure 26. Keypad Buttons

8. Press **SAVE/PRINT** (down arrow) to save the reading in the MiniScan EZ's memory and print the reading (if a USB printer is connected.) An example of a printout is shown below.
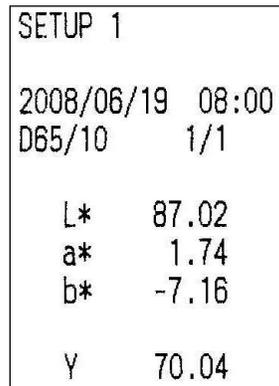
```
SETUP 1

2008/06/19  08:00
D65/10      1/1

   L*     87.02
   a*      1.74
   b*     -7.16

   Y      70.04
```

Figure 27. Example of a Printout

9. Press **READ** (center button) to take another reading in this product setup.

10. Press **NEXT** (up arrow) if it is an option to move to the next data view for this product setup.

11. Press **MAIN MENU** (right arrow) to return to the main menu.

Defining Standard, Sample and Tolerances

PRODUCT STANDARD

A product standard (or 'standard') is an object that represents the ideal target color for the product. This object is the one to which others will be compared and deemed acceptable or unacceptable. The product standard may either be a physical item that you measure using the MiniScan EZ or a set of color values that you enter the MiniScan EZ's memory.

SAMPLE

A sample is an object that will be measured with the MiniScan EZ and compared to the product standard. The color of the sample is generally like the color of the product standard.

TOLERANCES

Tolerances are limits that indicate how different a sample can be from the product standard and still be acceptable. Positive and negative tolerances may be set for each color scale and index parameter chosen for display. Then, the MiniScan EZ can show a pass or fail indicator after a sample is read. Samples that differ from the standard by no more than the entered tolerance are said to pass. Samples that exceed the tolerance for one or more parameter are said to fail.

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Configuring Options and Setups

Configuring the instrument's various options and setups, such as the language, screen angle, and date and time, and product setups, is a convenient way to store operating parameters for multiple products. This chapter describes how to configure and maintain the instrument options and product setups.

A product setup is a set of parameters that describe the operation of the MiniScan EZ for a specific product. Up to 100 setups may be stored in the instrument's memory. The parameters that must be defined for each product include the color scale for display, target color values for the product, and the acceptable tolerances applied to the standard values. Each product setup is saved in the MiniScan EZ memory with a setup number and name.

The instrument options and product setups are retained in the MiniScan EZ's memory even when the instrument is turned off.

Product Setups

Product Setup is selected from the main menu by moving the cursor highlight to the Product Setup position using the *up and down arrow* buttons and then pressing the center (*Go*) button. The Product Setup screen appears. On this screen, you can choose to select the product setup from a list (*YES*) or configure the last setup used (*NO*).

Figure 28. Select Product Setups

If Yes is chosen, the Select setup to configure screen is shown. Move the cursor highlight to the number of the setup you wish to configure using the *UP* and *DOWN ARROW* buttons or by scrolling through the pages using the right arrow button (*PAGE*). Then press the center (*GO*) button to select.

Figure 29. Select Setup to Configure

Configure each desired parameter by moving the cursor highlight to its position using the *UP* and *DOWN ARROW* buttons. When the parameter is highlighted, press the *RIGHT ARROW* button to scroll through the available choices for the parameter. When the choice desired is displayed, stop scrolling. You may

then move on to configure more parameters in the same manner, if desired. When all parameters are as desired, press the **CENTER** (Main Menu) button to accept the settings and return to the main menu or **LEFT ARROW** (Back) to select another setup to configure. The product setup parameters that may be configured are as follows:

Figure 30. Product Setup Menu

Setup Name ▶

Press the **RIGHT ARROW** button to obtain the Product Name screen on which you may enter any descriptive name for the product setup. Up to 15 characters may be entered using all the letters and numbers, as well as the space character.

As shown on the button pad map at the bottom of the screen, use the **UP** and **DOWN ARROW** buttons to scroll up (+) and down (-) through the list of available characters. Press the **CENTER** button to add a space character. Press the **RIGHT ARROW** button to move to the next character in the name. Press the **LEFT ARROW** button when the entire name has been entered.
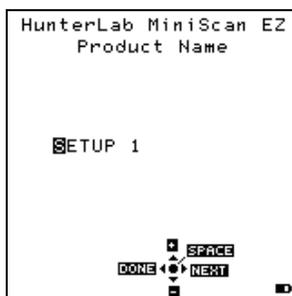
Figure 31. Naming a Setup

STANDARD

Four types of standards are available for selection depending on the measurements you wish to make and the data you wish to see. Press the right arrow button to move through the list of available standard types. These are Working, Physical, Numeric and Hitch.

Choose **WORKING** when reading several different standards and samples in a single measurement session. A working standard is measured immediately prior to measuring its corresponding samples. Its measurement values will be overwritten the next time you read a standard using this product setup.

Choose **PHYSICAL** when an actual product specimen is available that represents the target color to which samples will be compared. A physical standard is measured and stored in the product setup for as long as desired.

Choose **NUMERIC** when an actual product specimen does not exist for measurement, but the target color values are known from previous measurements. The color values for a numeric standard are entered and stored in the product setup.

Choose **HITCH** when you wish to alter the readings made on the MiniScan EZ to better correlate to another color measurement instrument. A specific standard with known color values from the other (reference) instrument will then be read with the MiniScan EZ and that reading manually adjusted within the product setup to match the reference instrument. The modified standard is stored in the product setup for as long as desired.

Average

Select **OFF** if you wish to make only one reading of each standard and sample. To average several readings into a single measurement, indicate the number of readings to be averaged (up to 20).

Press the **RIGHT ARROW** button to move through the list of available choices.

VIEWS ▶

The settings made under Views indicate what will be shown on the MiniScan EZ's LCD screen after a measurement is made. Press the **RIGHT ARROW** button to obtain the Data Views screen. Up to eight different views may be displayed for each measurement made with the MiniScan EZ.

Figure 32. Select A Views
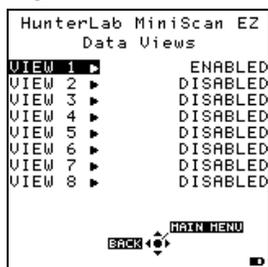
Use the **UP** and **DOWN ARROW** buttons to highlight the desired view number. Then press the **RIGHT ARROW** button to obtain the Data View screen for that view.

The parameters that may be set are as follows:

1. **View:** Use the **UP** and **DOWN ARROW** buttons to move to the View parameter, then toggle between **ENABLED** (view on) and **DISABLED** (view off) using the **RIGHT ARROW** button.

Note: View 1 is always automatically enabled and may not be disabled.

Figure 33. View 1 Enabled

2. **Display:** Use the down arrow button to move down to the Display parameter, then scroll through your choices using the right arrow button. Your display choices are as follows:

   a. **ABSOLUTE** causes raw color scale values (such as L, a, and b) to be displayed for the most recent standard or sample read.
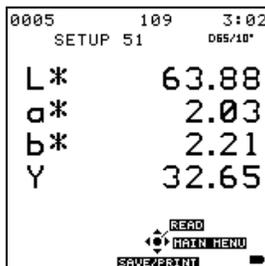
Figure 34. Absolute Values

   b. **DIFFERENCE** causes the most recent sample read to be compared to the standard and the difference in color between them (such as dL, da, db) to be displayed.

Figure 35. Difference Display
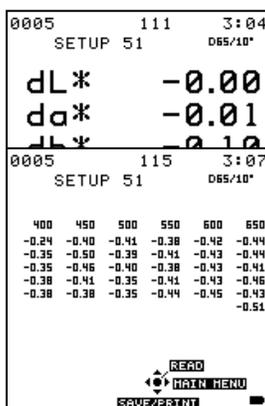
   c. **SPECTRAL DATA** shows the raw reflectance values for each wavelength read by the instrument to be displayed for the most recent standard or sample.

Figure 36. Spectral Data

   d. **SPECTRAL DIFFERENCE** displays the difference between the standard and the most recent sample in raw reflectance values at each wavelength.
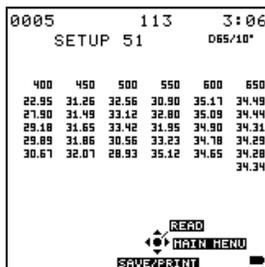
Figure 37. Spectral Difference Display

e. **SPECTRAL PLOT** displays the raw reflectance values for each wavelength plotted for the most recent standard or sample.
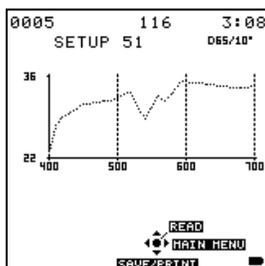
Figure 38. Spectral Plot Display

f. **DIFF PLOT**, displays the difference between the standard and the most recent sample plotted in raw reflectance values.
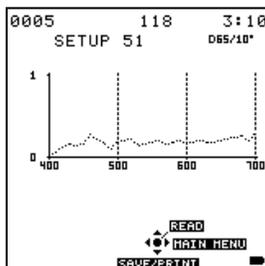
Figure 39. Difference Plot Display

g. **COLOR PLOT** displays the sample's location in color space relative to the standard. The standard is plotted in the center of the a-b and L plots.
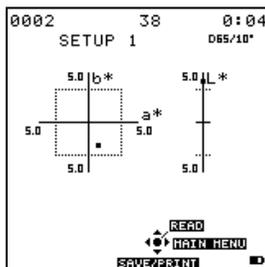
Figure 40. Color Plot Display

ILL/OBS:

Choose the illuminant/ observer combination under which color values will be calculated. Use the down arrow button to move down to the Ill/Obs parameter, then scroll through your choices using the right arrow button.

Note: Refer to the Measurement Values chapter for a description of each illuminant and observer.

COLOR SCALE:

Choose the color scale you wish to see. Use the down arrow button to move down to the Color Scale parameter, then scroll through your choices using the right arrow button.

Note: Refer to the Measurement Values chapter for a description of each color scale.

COLOR INDEX:

Choose the color index you wish to see. Use the down arrow button to move down to the Color Index parameter, then scroll through your choices using the right arrow button. Some indices may not display until both a standard and a sample are read.

Note: Refer to the Measurement Values chapter for a description of each color index.

CMC/SHADE SORT:

The CMC/Shade Sort parameter applies only if the color index chosen is dEc or SSN. Use the **DOWN ARROW** button to move down to the CMC/Shade Sort parameter, then press the **RIGHT ARROW** button to obtain the CMC/Shade Sort screen.

As shown on the button pad map at the bottom of the screen, use the **UP** and **DOWN ARROW** buttons to scroll up (+) and down (-) through the numbers for the digit that is currently highlighted. Press the **RIGHT ARROW** button to move to the next digit in the value and then to move from the commercial factor to the l:c ratio and then to the Shade Blocks. Press the **LEFT ARROW** button when the needed values have been entered.

Figure 41. Shade Sort Parameters

Note: Refer to the "Measurement Values" chapter for a description of each the CMC index values and the definition of shade blocks.

Press the **LEFT ARROW** button (Back) twice to return to the Product Setup screen.

Table 1.

Summary of Measurement Values on MiniScan EZ

Illuminant/Observer	Scales	Differences	Indices
A/2, A/10	CIE Lab	dL*a*b*	Y
C/2, C/10	CIE LCh	dL*C*h	YID
D50/2, D50/10	Hunter Lab	dLab	YI E313
D55/2, D55/10	XYZ[1]	dXYZ	WI E313
D65/2, D65/10	Yxy[1]	dYxy	Tint
D75/2, D75/10			Z%
F02/2, F02/10			457 Brightness
F07/2, F07/10			Metamerism Index
F11/2, F11/10		*	SMA
			SW
			Opacity
			GSC
			GSS
			dE*
			dEc
			dE
			dC*
			dC
			Shade Sort Number

STANDARD VALUES ▶

The Standard Values parameter is only relevant when the Standard Type is physical, numeric, or hitch. When Standard Values is highlighted, press the **RIGHT ARROW** button to move to the Standard Values configuration screen.

For a **PHYSICAL** standard, place the standard at the sample port and press the center button (**READ**) to read the standard and place its measurement values (in the selected color scale) in the product setup. Then press the left arrow button (**DONE**) to return to the product setup configuration screen.

For a **NUMERIC** standard, change the highlighted digit of the selected color scale value using the **UP** and **DOWN ARROW** buttons. When the desired digit is shown, press **NEXT** to move to the next digit. When all digits are as desired, press **DONE** to return to the product setup configuration screen.

```
HunterLab MiniScan EZ
     Standard Values

Read or enter standard
        values.

  L*    ▮94.36
  a*     -0.59
  b*      0.61

              ▪ READ
        DONE ◀◈▶ NEXT
              ▪
```
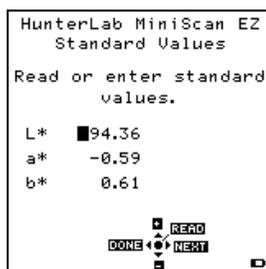
Figure 42. Numeric Standard Entry

For a **HITCH** standard, place the hitch standard (with known values from a reference instrument) at the sample port and press the center button (**READ**) to read the standard and place its measurement values (in the selected color scale) in the product setup. Then, change the highlighted digit of the selected color scale value to match the corresponding digit of the known values from the reference instrument using the **UP** and **DOWN ARROW** buttons. When the desired digit is shown, press **NEXT** to move to the next digit. When all digits match the corresponding digit from the reference instrument's reading, press **DONE** to return to the product setup configuration screen.

TOLERANCES ▶

When Tolerances is highlighted, press the **RIGHT ARROW** button to move to the Tolerances configuration screen, on which you may set tolerances in the chosen color scale and color index.

Figure 43. Enter Tolerances

```
HunterLab MiniScan EZ
      Tolerances

Enter +/- tolerances.
          +          -
  dL*   ▯.00       0.00
  da*   0.00       0.00
  db*   0.00       0.00
  dY    0.00       0.00
              ▪
        DONE ◀◈▶ NEXT
              ▪
```
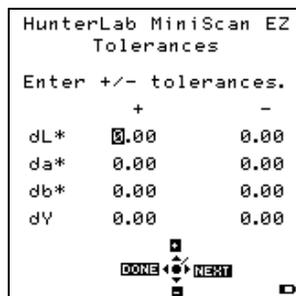
Change the highlighted digit of the selected color scale tolerance value using the **UP** and **DOWN ARROW** buttons. When the desired digit is shown, press **NEXT** to move to the next digit. Press **DONE** to return to the product setup configuration screen.

AUTOSEARCH

Select **YES** if you wish to include this product setup when using the automatic standard searching feature, which transfers you to the most appropriate product setup (based on the standard's color values) each time a sample is read. Select **NO** if you do not which to include this product setup in automatic standard searching. Press the right arrow button to toggle between **YES** and **NO**.

Press the **LEFT ARROW** button (**BACK**) to accept the parameters just set and select another Product Setup to configure or the center button (**MAIN MENU**) to accept the parameters just set and return to the Main Menu.

Global Options

Global Options is selected from the main menu by moving the cursor highlight to the **GLOBAL OPTIONS** position using the **UP** and **DOWN ARROW** buttons and then pressing the center (**GO**) button. The Global Options screen appears.

Configure each parameter by moving the cursor highlight to its position using the up and down arrow buttons. When the desired parameter is highlighted, press the **LEFT** or **RIGHT ARROW** button to scroll through the available choices for the parameter. When the appropriate choice is displayed, stop scrolling. You may then move on to configure more options in the same manner.

Figure 44. Global Options Menu

When all options are as desired, press the center (**MAIN MENU**) button to accept the settings and return to the main menu.

The global options that may be configured are as follows:

LANGUAGE

MiniScan EZ can display screens and prompts in English, French, German, Italian, and Spanish.

DISPLAY SETTINGS ▶

When Display Settings is highlighted, and the **RIGHT ARROW** button is pressed, a submenu appears. In this submenu, you may set the following parameters:

Figure 45. Display Settings Menu

1. **Screen angle:** You may rotate the text on the MiniScan EZ screen so that it may be easily read from any side of the instrument. Each press of the **RIGHT ARROW** button increases the displayed value 90°.
   a. 0° keeps the text in its normal orientation (right-side up when the handle is toward the user).

    b. 90° rotates the text so it can be read from the left side of the instrument. This may be the preferred angle if you are right-handed.

    c. 180° flips the text upside down.

    d. 270° rotates the text so it can be read from the right side of the instrument. This may be the preferred angle if you are left-handed.

Note that the functions of the buttons also rotate when the screen text rotates (i.e., what was previously the up arrow will become the down arrow if you flip the text upside down).

2. **Backlight:** Press the *RIGHT ARROW* button to increase the brightness of the LCD's backlight or the *LEFT ARROW* button to decrease the brightness. Values between 0 and 100 may be selected in increments of 5.

3. **Contrast:** Press the *RIGHT ARROW* button to increase the LCD's contrast or the *LEFT ARROW* button to decrease the contrast. Values between 0 and 100 may be selected in increments of 2.

4. **Display Dim:** Press the *RIGHT ARROW* button to increase the time that must elapse (in seconds) after the last button press before the LCD backlight automatically dims. Press the *LEFT ARROW* button to decrease that time. Values between 10 and 50 seconds may be selected in increments of 10. When the backlight dims, the display may still be read, and the press of any button on the button pad causes the backlight to turn back on.

5. **Display Off:** Press the *RIGHT ARROW* button to increase the time that must elapse (in minutes) after the last button press before the MiniScan EZ's LCD automatically turns itself off. Press the *LEFT ARROW* button to decrease that time. Values between 1 and 4 minutes may be selected in increments of 1. When the display turns off, the press of any button on the button pad causes the display to turn back on.

Note: The MiniScan EZ will turn off entirely once 5 minutes elapse since the last button press.

Press *BACK* (the center button) to return to the Global Options screen.

SETUPS LOCKED?

Choose *YES* if you wish to lock your product setups so that changes cannot be made to them. Choose *NO* if you wish changes to the product setups to be allowed. Each press of the right arrow button toggles between YES and NO.

AUTOSAVE

Choose *YES* if you wish each measurement to be automatically saved to the instrument's datalog as it is made. Choose *NO* if you wish to save measurements manually, only on demand. Each press of the right arrow button toggles between YES and NO.

Note: When Autosave is used in conjunction with averaging, individual readings are not automatically stored. The user may manually store individual readings.

STDZ INTERVAL

Indicate the amount of time that must elapse (in hours) after the last standardization before the instrument prompts for re-standardization. Press the **RIGHT ARROW** button to increase the number of hours or the **LEFT ARROW** button to decrease the number. Values between 1 and 16 may be selected in increments of 1. A value of 4 is suggested – meaning that after 4 hours, the instrument will prompt for re-standardization. The choice of **OFF** is also available (disabling prompting for standardization), but its use is not recommended.

AUTOSEARCH ▶

One of the features of the MiniScan EZ is that it allows you to automatically find the closest physical, numeric, or hitch standard stored in the instrument's memory to a sample read.

When **AUTOSEARCH** is highlighted and the **RIGHT ARROW** button is pressed, a submenu appears. In this submenu, may set the following parameters:

> **Color Diff:**
>
> If you do not wish to use the autosearch feature, set this parameter to (...). If you do wish to use this feature, select a color difference index to compare the sample and standard when looking for the closest standard. The choices are dE, dE*, and dEcmc. This index and the illuminant/observer set in each product setup searched will be used for the comparison Each press of the right arrow button changes the color difference index to the next one available.

Figure 46. AutoSearch Menu
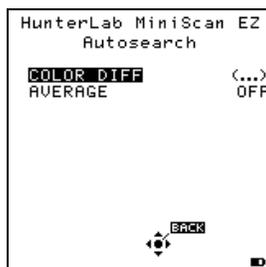
> **Average**:
>
> To average, select the number of readings to average before the comparison to available standards is made. Press the **RIGHT ARROW** button to increase the number of readings or the **LEFT ARROW** button to decrease the number. Values between 2 and 20 may be selected in increments of 1.
>
> To remove the averaging feature for autosearching, set this parameter to **OFF.** Press **BACK** (the center button) to return to the Global Options screen.

DATE/TIME ▶

When **DATE/TIME** is highlighted and the **RIGHT ARROW** button is pressed, a submenu appears. In this submenu, you may set the current date and time. Refer to the button pad map at the bottom of the screen. Press **NEXT** each time you wish to move to another parameter to set. Press **+** to increase the value of the current parameter or **-** to decrease it.

Year is set first, then month, then day, followed by the hour and minutes. Press **SET** to accept the entered date and time and leave the Date/Time screen. Press **BACK** to discard the entered date and time and leave the Date/Time screen.

Figure 47. Enter Date/Time

Setup Maintenance

Setup Maintenance is selected from the main menu by moving the cursor highlight to its position using the **UP** and **DOWN ARROW** buttons and then pressing the center (**GO**) button. The Setup Maintenance menu appears.

Figure 48. Setup Maintenance Menu

Select the desired command from the menu by moving the cursor highlight to its position using the **UP** and **DOWN ARROW** buttons and then pressing the **RIGHT ARROW** button. The available commands are described below.

RESET ALL SETUPS ▶

RESET ALL SETUPS first gives a confirmation message then, if **GO** is selected, returns all product setups to their default (factory) values.

Figure 49. Confirmation Message

Note: You will not be able to restore the default setups if the setups are locked in Global Options.

PRINT ALL SETUPS ▶

This command causes the product setup parameters to be output through the USB port for all the product setups. If the USB cable is connected to a printer, the parameters will be printed. If the USB cable is connected to a computer or other device, it will be sent there.

Note: You will need to open a receiving device (computer) to receive setup parameters.

PRINT ONE SETUP ▶

PRINT ONE SETUP first gives a screen on which you must select the product setup you wish to print.

Select the desired setup from the list by moving the cursor highlight to its position using the **UP** and **DOWN ARROW** buttons and then pressing the center (**PRINT**) button. The setup parameters are then output through the USB port. If the USB cable is connected to a printer, the parameters will be printed. If the cable is connected to a computer or other device, it will be sent there.

Figure 50. Select Setup to Use

Note: You will need to open a receiving device to output setup parameters.

An example printout is shown below.

Figure 51. Setup Output to Printer

CLONE ALL SETUPS ▶

CLONE ALL SETUPS appears in the Setup Maintenance menu only when two MiniScan EZs are connected via the standard MiniScan EZ USB cable and a Standard-A to Mini-A adapter. When Clone All Setups is

chosen on one of the MiniScan EZs, the full set of 100 product setups are sent from the initiating instrument to the second connected instrument. This process takes several minutes.

Press **CANCEL** to stop the setup cloning while it is in progress.

Reading, Storing and Printing Data

This chapter describes the various steps you will perform in the course of normal instrument operations, including reading, and storing and printing data.

Reading with Averaging

Complete the following steps to take and average multiple readings using the MiniScan EZ:

> *Note: These instructions apply when Average in the product setup is set to a value other than OFF.*

1. Select **READ** from the MiniScan EZ's main menu. Move the cursor highlight to its position using the **UP** and **DOWN ARROW** buttons and then press the center (**GO**) button.

2. The first Reading screen appears, asking if you want to select the setup to use. To read using the last product setup that was used, press **NO** (down arrow) and skip to Step 4. To select the setup for use from the list of setups, press **YES** (up arrow), and the Select setup to use screen appears.

Figure 52. Select a Setup

3. Scroll through the list of setups using the up and down arrow buttons until the setup you wish to use is highlighted, then press the center button (**GO**) to move to that setup. The first reading screen appears, which prompts you to place the standard for reading 1 of n (or sample for reading 1 of n).
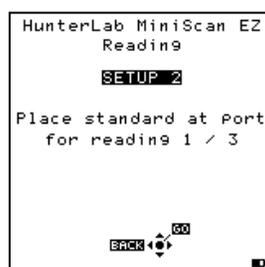
Figure 53. Prompt to Read Standard with Averaging

4. Place the standard or sample at the sample port with the side to be measured toward the port. Make sure the item is flat against the port and completely covers it.

Figure 54. Reading a Standard or Sample

5. Press the center (**GO**) button to read. The standard or sample is read and its values (as configured in the product setup) displayed on the screen.
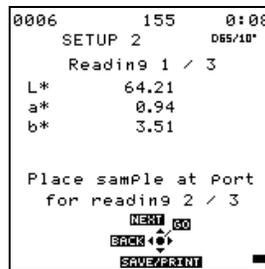
Figure 55. Reading 1 of 3

Note: The meanings of the keypad buttons have now changed slightly, as shown on the keypad map at the bottom of the screen.

6. Press **SAVE/PRINT** (down arrow) to both save the reading in the MiniScan EZ's memory and print the reading (if a USB printer is connected).

7. Press **GO** (center button) to make the next reading in the averaging sequence. (You may wish to rotate or reposition the sample before doing so.)

8. After all readings in the averaging sequence have been made, the meanings of the keypad buttons will change again.
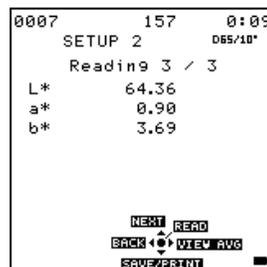
Figure 56. All Readings for Average Taken

9. Press **SAVE/PRINT** (down arrow) to both save the reading in the MiniScan EZ's memory and print the reading (if a USB printer is connected).

10. Press **NEXT** (up arrow) if it is shown to move to the next data view in the product setup.

11. Press **VIEW AVG** (right arrow) to show the average of all the measurements made in the averaging sequence.
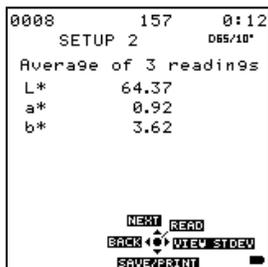
Figure 57. View the Average

Note: If you have a bar code reader installed, scan your bar code now, and the ID will appear beneath the average color values.

12. Press **READ** (center button) to take another reading in this product setup.

13. Once the average is displayed, you may press **VIEW STD DEV** (right arrow) to show the standard deviation of all the measurements made in the averaging sequence. Once the standard deviation is displayed, you may press **MAIN MENU** (right arrow) to return to the main menu.
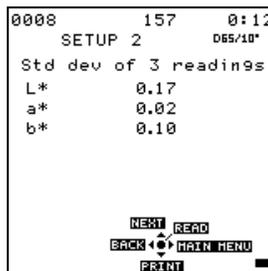
Figure 58. View Std Dev

Working with Saved Readings

Readings stored in the MiniScan EZ's memory during the read process may be viewed, printed, and deleted later, if desired.

To work with saved readings, select **SAVED READINGS** from the main menu by moving the cursor highlight to its position using the **UP** and **DOWN ARROW** buttons and then pressing the center (**GO**) button. The Saved Readings menu appears.

Choose the desired function by scrolling using the **UP** and **DOWN ARROW** buttons until it is highlighted and then pressing the **RIGHT ARROW** button. The various functions perform as described below.

DELETE ALL READINGS ▶

Select **DELETE ALL READINGS** using the up/down arrows. When you press **GO** (center button), all the measurements stored in the MiniScan EZ's memory are erased.

Figure 59. Delete All Readings

When complete, a confirmation message is shown. To continue and delete, press **GO**; to undo, press **BACK**.
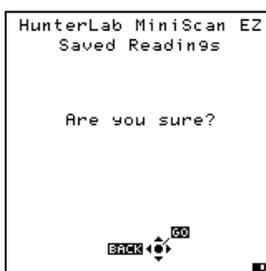
Figure 60. Confirmation Message

PRINT ALL READINGS ▶

Select the **PRINT ALL READINGS** using the **UP AND DOWN** arrows. This function outputs all the measurements stored in the MiniScan EZ's memory to the connected device (computer or printer) attached to the MiniScan EZ's USB port. When complete, you are returned to the Saved Readings menu.

VIEW SAVED READINGS ▶

VIEW SAVED READINGS allow you to view and scroll through the readings saved in the MiniScan EZ's memory. The first reading stored in memory (which was assigned an ID of 0001 by default) will be shown first.
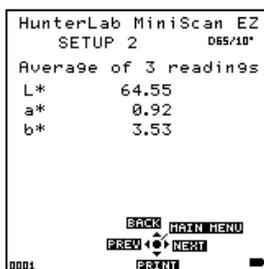
Figure 61. View Saved Readings

Press **PRINT** (down arrow) to output the saved reading currently shown to the device (such as a computer or printer) connected to the MiniScan EZ's USB port.

Press **NEXT** (right arrow) to move forward to the next saved reading or **PREV** (left arrow) to move back to the previous saved reading.

Press **BACK** (up arrow) to return to the Saved Readings menu or **MAIN MENU** (center button) to return to the main menu.

FILTER BY SETUP ▶

FILTER BY SETUP allows you to view readings saved in the MiniScan EZ's memory by choosing the product setup used to measure the readings of interest. The Saved Readings screen that allows you to choose the appropriate setup is shown first.

Scroll through the setups using the **UP** and **DOWN ARROW** buttons until the setup you want is highlighted, then press **GO** (center button). You may also scroll through the list of setups by advancing a page at a time using the **PAGE** (right arrow) button.

View, print, and move through the readings saved for this setup in the same way described above for View Saved Readings.

Figure 62. View Saved Readings

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Sample Preparation and Presentation

The MiniScan EZ spectrophotometer is a versatile color measurement instrument than can be used on products of virtually any size and in industries as diverse as paint and textiles. Because of its compact design, it can be used to measure objects that would be difficult to position at the sample port of a larger color instrument. However, careful attention to proper sample presentation and presentation is required for consistent and accurate color measurements.

It is important to select samples appropriately, use an established measurement method, and handle all samples in a consistent manner. The guidelines in this chapter will help you while taking measurements.

Selecting Samples

Choose samples that are representative of the material used. If samples are non-representative of the batch or are spoiled, damaged, or irregular, then the result may be biased. When choosing a sample, select randomly and examine the sample to avoid biased results. If your sampling procedure is adequate, another sample selected from the same batch should result in comparable measured values.

Preparing Samples

Prepare samples in the same manner each time they are measured. Follow standard methods if they exist, such as ASTM or TAPPI methods.

Sample Presentation

Present the samples to the instrument in a repeatable manner. Results obtained depend on the condition of the samples and their presentation. If you establish a method so that the same procedure is used each time specific samples or types of samples are measured, then you will have a valid basis for comparison of measured results. This also ensures repeatability of results when measuring the same sample. Make a checklist so that operators may simply check each step. The checklist will also help in the training of new operators.

There are variety of techniques that can be used in handling various forms of objects and materials so that the most valid and repeatable measurement of their appearance results. For example, when measuring the color of a sample, such as fabric, that is translucent, the sample should be folded into multiple layers to make it appear more opaque.

When taking readings, make sure that the MiniScan EZ sample port is flat against the sample surface. This may be difficult if the sample is curved or irregularly shaped. Look at the instrument from all angles to make sure the port makes as much contact as possible with the product.

When measuring thin, soft materials (such as fabric or paper) place a hard, flat surface behind the product to ensure proper contact with the sample port and to ensure that it does not pillow into the sample port. Average several readings when measuring samples that are textured, patterned, or irregular in color.

Figure 64. Measuring Thin, Soft Materials

Examples of ways to measure several types of samples are given below.

DIRECTIONAL SAMPLES

Directionality can be minimized by averaging several measurements with rotation of the sample between readings. Examination of the standard deviation displayed with the averaging function can guide you in selecting the appropriate number of readings to average.

NON-OPAQUE SAMPLES

Non-opaque samples must have consistent backings. A white uncalibrated tile is recommended. If the sample is such that it can be folded to give multiple layers, such as tissue or fabric, the number of layers for each sample should be noted.

Figure 65. Measuring Non-Opaque Samples

TRANSLUCENT SAMPLES

Light trapped in a translucent sample can distort the color. The thickness of the sample presented should be chosen to maximize the haze or color difference and the sample should be backed with a white tile, if possible, to eliminate the effects of ambient (room) light.

Figure 66. Using a White Tile Backing

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Maintaining and Testing MiniScan EZ

The MiniScan EZ requires very little maintenance; just recharge/replace the batteries as needed, keep the tiles, black glass, and light trap clean, and take reasonable precautions to prevent entry of contaminants into the sample port.

This chapter describes the maintenance necessary to keep your instrument functioning properly and tests that you may run to assess its performance. .

> *Note: The MiniScan EZ contains hazardous voltages and no user-replaceable parts. It should be disassembled only by HunterLab personnel.*

Recharging/Replacing the Batteries

When the battery level indicator on the MiniScan EZ screen has decreased to outline only, you should replace the batteries with fresh or recharged ones

Figure 67. Battery Level

> *Note: The MiniScan EZ can use six standard AA alkaline batteries or six rechargeable AA NiMH batteries. Do not mix battery types in the instrument. To recharge the NiMH batteries, remove them from the instrument and recharge them using the supplied charger.*

Cleaning the MiniScan EZ

Clean the outside surfaces of the MiniScan EZ using a soft cloth. Do not spray liquids directly on the instrument.

Maintaining the Instrument Standards

Before you standardize the MiniScan EZ each time, inspect the white tile and black glass (if included) for dust and fingerprints. If you have a light trap, inspect it for dust and scratches. Do the same for the green tile prior to running the green tile test. Keep the calibration cylinder closed and in the carrying case when it is not being used. If a tile is lost or damaged, contact HunterLab as described in 'When You Need Assistance' concerning replacement.

Clean the tiles and black glass using a soft nylon bristle brush and a solution of warm water and a laboratory grade detergent such as SPARKLEEN. Rinse the tiles in a stream of warm tap water. Blot them dry using a clean, non-optically brightened, lint-free paper towel.

Note: SPARKLEEN is manufactured by Fisher Scientific Co., Pittsburgh, PA 15219 and may be ordered from them using catalog number 4-320-4. One tablespoon of SPARKLEEN should be added to every gallon of water.

Replacing the Lamp

Lamp replacement requires a trained technician. Contact the HunterLab Customer Experience Team to arrange for lamp replacement. Please read 'When You Need Assistance', prior to contacting HunterLab.

Diagnostics

Diagnostics is selected from the main menu by moving the cursor highlight to its position using the up and down arrow buttons and then pressing the center (*GO*) button. The Diagnostics menu appears.

Figure 68. Diagnostics Menu

Choose the desired function by scrolling using the up and down arrow buttons until it is highlighted and then pressing the right arrow button. The various functions perform as described below.

WHITE REPEATABILITY ▶

The White Repeatability screens first prompt you through a normal standardization for the instrument. When standardization is complete, you are then prompted to leave the white tile in position at the sample port and to press the center button (*GO*).

Figure 69. White Repeatability Standardization

Twenty readings of the white tile are automatically made, and the results of each reading is shown. You may cancel the test at any time by pressing *CANCEL*.

Figure 70. White Repeatability Result

When all readings are complete, the result, as well as whether the instrument passes or fails the test, is shown. The specification is that dE* must be less than or equal to 0.05 for the instrument to pass the test.

Press **PRINT** to print the result (if a printer is connected to the instrument's USB port). An example printout is shown below.
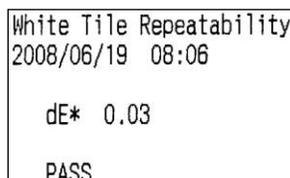
Figure 71. White Repeatability Print Out

Press **DIAGS MENU** to return to the Diagnostics menu. Press **MAIN MENU** to return to the main menu.

GREEN TILE CHECK ▶

The first Green Tile Check screen allows you to compare the values in your MiniScan EZ's memory to the values read at factory printed on the back of your green check tile. If the values match, press the center button (**GO**) to continue. If the values in the instrument's memory require revision, change the highlighted digit of the selected color scale value using the up and down arrow buttons. When the desired digit is shown, press **NEXT** to move to the next digit. When all digits are as desired, press **GO** to continue. You may also press **BACK** to cancel the test.

You are next prompted through a normal standardization for the instrument. When standardization is complete, you are then prompted to place the green tile at the sample port and to press the center button (Go).

Figure 72. Verifying the Green Tile Values

One reading of the green tile is made, and then the result, as well as whether the instrument passes or fails the test, is shown. The specification is that dX, dY, and dZ must all be less than or equal to 0.30 for the instrument to pass the test.

Press **PRINT** to print the result (if a printer is connected to the instrument's USB port). Press **DIAGS MENU** to return to the Diagnostics menu. Press **MAIN MENU** to return to the main menu.

SIGNAL LEVELS ▶

The Signal Levels diagnostic first prompts you to place a sample at the measurement port. Normally this will be the white tile, but you may be instructed otherwise by HunterLab's Customer Experience Team. Place the sample and press **GO**.

Figure 73. Measure Signal Levels

The sample and monitor channels are plotted on a graph for examination by HunterLab's Customer Experience Team.

Figure 74. View Signal Levels
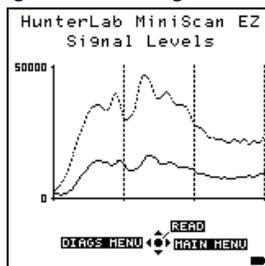
The purpose of this test is to verify that both the sample and monitory signal levels are within the correct operating range and to see channel dropouts should any occur. Press **READ** to read again. Press **DIAGS MENU** to return to the Diagnostics menu. Press **MAIN MENU** to return to the main menu.

SELF TEST ▶

The **DIAGNOSTICS MENU** contains a fourth function named **SELF TEST**. When this function is selected, communications tests between the MiniScan EZ's subsystems are run. If successful, the versions of the firmware present would be displayed. Also shown is the value of the checksum of the instrument's calibration data as four hexadecimal digits. The value of the checksum of the calibration data should remain constant unless the white tile's assigned reflectance is updated, or the instrument is serviced. You should keep a record of the checksum's value. If it changes for unexplained reasons, then the instrument may not function correctly.
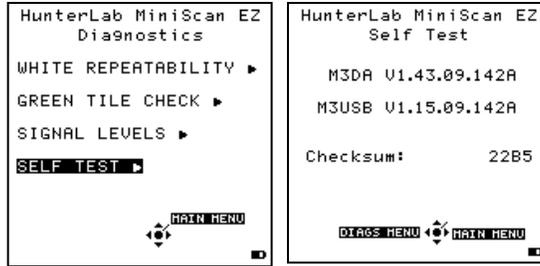
Figure 75. Diagnostics Self-Test

Press **DIAGS MENU** to return to the Diagnostics menu. Press **MAIN MENU** to return to the main menu.

Specifications

The specifications and characteristics of your instrument are given in this chapter.

Note: Every attempt at accuracy is made, but specifications are subject to change without notice.

For best performance, your instrument should be placed where there is ample workspace with medium or subdued illumination and no drafts. The operating conditions (temperature and humidity ranges) are given in the Operating Conditions section below.

Operating Conditions

MiniScan EZ can be stored in an area with a temperature range of -20°C to 65°C (-5°F to 150°F) for up to 3 weeks and can be operated under temperature conditions of 10°C to 40°C50 (°F to 104°F). For specification-level performance, the recommended temperature range is 21-28°C (70 -82° F). It may be operated under relative noncondensing humidity conditions of 10% to 90%. Do not leave MiniScan EZ in an area where temperature or humidity extremes are possible.

Physical Characteristics

Weight	2.25 lb (1 kg)
Dimensions	5.5" high x 4.3" wide x 10.5" long (14 cm x 11 cm x 26.7 cm)
Communications Interface	USB to computer or printer
RFI Compliance	FCC Class A (Commercial), IEC, or equivalent
Safety Compliance	UL, CSA, IEC, or equivalent

Conditions of Illumination

 and Viewing

Light Source	Pulsed xenon
Source UV Content	Match to D65 with CIE rating of CC or better
Lamp Life	>1 million flashes
45°/0° Illumination	Circumferential using a cylindrical mirror
Integrating Sphere (diffuse/8° instruments only)	2.5-inch (63.5 mm) diameter, coated with SpectraFlect
Detection	2-channel polychromator with 256-element scanned array (half for sample channel, half for monitor)
Port Diameters/ View Diameters	
45°/0°	LAV: 1.25" (31.8 mm)/1" (25 mm) SAV: 0.25" (6 mm)/0.20" (5 mm)
Diffuse/8°	LAV: 1" (25 mm)/0.8" (20 mm) SAV: 0.6" (14.3 mm)/0.3" (8 mm)

System Power

Power Input	Disposable or rechargeable AA batteries
Battery Life	>4,000 readings per charge

Instrument Performance

Spectral Data	Range: 400-700 nm Reporting Interval every 10 nm
Bandwidth at Half-height	10 nm
Wavelength Accuracy	≤0.75 nm
Photometric Range	0-150% reflectance
Photometric Resolution	0.01% reflectance
Measurement Speed (at 23°C)	≤1.5 seconds
Measurement Storage Capacity	750 readings 100 product setups

Regulatory Notice

A copy of the Declaration of Conformity according to ISO/IEC Guide 22 and EN 45014 follows.

<table>
<tr><td colspan="2" style="background:cyan">DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN 45014</td></tr>
</table>

Manufacturer's Name: Hunter Associates Laboratory, Inc.

Manufacturer's Address: 11491 Sunset Hills Road
                                         Reston, Virginia U.S.A. 20190

Declares that the Product:

Product Name: MiniScan EZ

Model: MSEZ-4500L, MSEZ-4500S, MSEZ-4000L, MSEZ-4000S.

Conforms to the following Standards:

IEC 61326-1:2005 (CISPR 11:2003: A1:2004, EN 61000-4-2:1995, and EN 61000-4-3:2006 + A1:2008)

EN 61010-1:2001

Supplementary Information:

This product herewith complies with the requirements of the EMC Directive 2004/108/EC and Council Directive 98/34/EEC and carries the CE mark accordingly.

(1) This product was tested using an IBM-compatible computer.

European Contact: Your local Hunter Associates Laboratory representative or
Christian Jansen
Griesbraeustrasse 11
82418 Murnau
Germany
Telephone: +49 (0) 8841 9464
Fax: +49 (0) 8841 99472

Options and Sample Devices

There are many options and devices available for positioning samples at the measurement port of the MiniScan EZ and for making the instrument easier to use. HunterLab part numbers are provided for your convenience in ordering.

EXTERNAL PRINTER (HL#A13-1014-259)

The external thermal printer connects to the MiniScan EZ's USB port via Standard-A to Mini-A adapter (HL#A21-1013-859) and prints measurement data or product setup parameters on request. The communications cable supplied with the printer must be used to connect the printer to the MiniScan EZ. The printer is automatically detected by the MiniScan EZ once connected.

Figure 76. External Printer

KEYBOARD (HL#A13-1014-294)

The optional flexible keyboard connects to the MiniScan EZ's USB port via Standard-A to Mini-A adapter (A21-1013-859) to allow easy entry of any alphanumeric information (such as setup names) required.

1. The **up, down, left, and right arrow keys** on the keyboard correspond to the same buttons on the MiniScan EZ button pad.

2. The **Enter** key on the keyboard emulates the center (**Go**) button on the MiniScan EZ's button pad.

3. Numbers and letters may be typed on the keyboard as usual. The keyboard is automatically detected by the MiniScan EZ once connected.

Figure 77. Keyboard

BAR CODE SCANNER (HL#A13-1014-254)

The optional bar code scanner connects to the MiniScan EZ's USB port via Standard-A to Mini-A adapter (HL#A21-1013-859) to allow scanning of a bar code for the ID tag of a reading after the reading is made. The bar code reader is automatically detected by the MiniScan EZ once connected.

Figure 78. Bar Code Reader

STANDARD-A TO MINI-A USB ADAPTER (HL#A21-1013-859)

The optional Standard-A to Mini-A USB adapter allows USB devices—such as printers, keyboards, and the bar code scanner—to connect to the MiniScan EZ's Mini-A USB port. It can also be used to connect two MiniScan EZ instruments together.

Figure 79. Mini USB

USB MASS STORAGE DEVICES

MiniScan EZ instruments can interface directly with thumb drives and other USB mass storage devices commonly available for use on personal computers. The instrument is designed to be compatible with most devices formatted to use the FAT16 file system which provides up to 2 GB of disk space. Mass storage devices can be connected to the USB Mini-A receptacle using a USB Mini-A plug to USB Standard A- receptacle adapter (HunterLab Part Number A21-1013-859 or equivalent).

These are some of the thumb drives found to be compatible with the MiniScan EZ firmware:

- Imitation 2GB Pocket Flash Drive

- Verbatim 1GB Store 'n' Go USB Drive

- Edge 1GB diskGO Flash Drive

- Kingston 2GB DataTraveler 100

Using a thumb drive you can transfer and/or archive product setups and measurements. The reflectance of the instrument's white standard can also be updated using files provided by HunterLab.

Operation

Attach the thumb drive to the MiniScan EZ using the appropriate adapter cable, the instrument will double-beep to acknowledge the connection. Then a short session to query information from the drive will begin. During this, the status indicator light should blink. If successful, the MiniScan EZ will double-beep again. If communications fail, a single beep is emitted. In this case, try disconnecting and reconnecting the thumb drive.

Caution: never disconnect the thumb drive from the MiniScan EZ until its status indicator light has stopped blinking. Otherwise, data loss might occur.

Thumb drive information

If a thumb drive has been inserted and is recognized, the MiniScan EZ will beep 2 times. Pressing the *RIGHT ARROW* key from the *MAIN MENU* displays a Thumb Drive Information screen showing certain characteristics of the drive.


```
HunterLab MiniScan EZ
     Thumb Drive Info
Boot Sector    00001F80
FAT            00001FA0
Root Folder    000021A0
Data Area      000021C0

Sectors        003D5880

FAT Size           0100
Root Size          0020
Cluster Size       0040
Sector Size        0200
              MAIN MENU
            ◄ ♦ ►IMPORT
               ▼
```

Figure 80. Thumb Drive Info

The values may differ depending on the type of drive attached, but on a properly identified drive all the fields should have non-zero values.

Archiving product setups

From the *MAIN MENU*, press the *UP* and *DOWN ARROW* keys until *SETUP MAINTENANCE* is selected then press the *CENTER* button. Select the function *PRINT ALL SETUPS* and press the *RIGHT ARROW* keys. The instrument will immediately start writing data to disk while indicating how many product setups have been copied so far.

Pressing the *LEFT ARROW* key (labeled *CANCEL*) will stop the copying process and close the file. Data copied thus far will be retained. The file containing the product setups, named '*PRODUCTS.MS3*', is created in the root folder.

Archiving Measurements

From the *MAIN MENU*, press the *UP* and *DOWN* arrow keys until *SAVED READINGS* is selected then press the *CENTER* button. Select the function, *PRINT ALL READINGS* and press the *RIGHT*

ARROW key. The instrument will immediately start writing data to disk while indicating how many measurements have been copied so far.

Pressing the *LEFT ARROW* key (labeled *CANCEL*) will stop the copying process and close the file. Data copied thus far will be retained.

The file containing the measurements, named **DATALOG.MS3**, is created in the root folder.

File Import Menu

From the *MAIN MENU* access the **THUMB DRIVE INFORMATION** screen by pressing the *RIGHT ARROW* key. Pressing the right arrow key (now labeled *IMPORT*) again, results in the **FILE IMPORT MENU.**

Caution: Do not attempt to import files not created by a MiniScan EZ instrument.

Transferring product setups

To transfer product setups to the instrument a file named **PRODUCTS.MS3** must exist in the root folder of the thumb drive, then from the *FILE IMPORT MENU* select the *IMPORT SETUPS* function and press the *RIGHT ARROW* key. The MiniScan EZ will display the progress of the import and beep twice once the transfer is complete.

Transferring measurements

To transfer readings to the instrument's datalog, a file named **DATALOG.MS3** must exist in the root folder of the thumb drive. From the *FILE IMPORT MENU* select the *IMPORT READINGS* function and press the *RIGHT ARROW* key. The MiniScan EZ will display the progress of the import and beep twice once the transfer is complete.

WHITE TILE REPLACEMENT OR RECALIBRATION

Assigned reflectance values for your instrument's white tile can be provided by HunterLab in a file named **WHITE.MS3**. This file must be placed in the root folder of the thumb drive. To update the instrument, select the *IMPORT WHITE TILE* function from the *FILE IMPORT* menu and press the *RIGHT ARROW* key.

45/0 FIBER PACKAGE ADAPTER (HL#C02-1002-030)

This option provides a special nose cone assembly and three removable adapters for measuring 6-inch (152-mm), 10-inch (254-mm), and 12-inch (305-mm) cylindrical fiber or yarn package diameters. To use the assembly, snap the appropriate port adapter onto the nose cone of the MiniScan EZ. Position the port adapter over the cylindrical fiber or yarn package and proceed with measurements. Take care to position the MiniScan EZ so that it will not move during readings. Averaging is recommended when measuring fibers or yarns with large diameters.

Figure 81. Nose Cone Adapters

Figure 82. Inserting the Nose Cone Adapter

Figure 83. Using the Nose Cone Adapter

SKEIN HOLDER (HL# 02-7396-00)

The skein holder is available only for 45°/0° MiniScan EZ models. This is a device for measuring yarn skeins. Wind the yarn around the skein holder in multiple taut layers until it is effectively opaque and is as flat as possible. Secure it in place with the detachable arms on the sides of the skein holder. Place the skein holder on a flat surface or the calibration tile holder and press the MiniScan EZ's sample port flat against the sample. Make several measurements of the skein, rotating the holder 90° between measurements and averaging the readings for the result.

Figure 84. Skein Holder

45/0 LAV NOSE CONE WITH LOWER GLASS ASSEMBLY (HL#A02-1014-374) OR NOSE CONE WITH LOWER POLYCARBONATE ASSEMBLY (HL# D02-1014-427)

This option includes a special nose cone with a removable glass or plastic port cover assembly. The nose cone (black) portion is intended for permanent use on the instrument and should not be removed. Replacement cover assemblies (the lower portion of the device) are available from HunterLab. The assembly is sealed but is not to be considered waterproof. The nose cone/lower cover is generally in place when the MiniScan EZ is shipped from the factory. However, if installation is required, place the assembly over the instrument port and secure it using three Phillips-head screws. If the glass or plastic cover is to be replaced, remove the three machine screws with lock washers, replace the window and the O-ring, and secure it using the machine screws.

Figure 85. Nose Cone with Glass or Polycarbonate

420-nm UV Filter Assembly (HL# D02-1014-436)

This option provides a 420-nm UV filter in a replaceable assembly for the 45/0 LAV MiniScan EZ. The UV filter may be replaced when necessary, however, the instrument is not to be used without the UV filter assembly in place.

Note: The special nose cone required for use of this part is not included but may be purchased separately.

To install the UV filter assembly, secure it to the instrument nose cone using three 4-40 pan-head screws with split-lock washers. Replacement UV filter assemblies are available from HunterLab and are marked *UV* to differentiate them from cover glass assemblies. To replace the UV filter assembly, remove the screws and lift the assembly off the nose cone. Place the new UV filter assembly on the nose cone and replace the screws.

EasyMatch QC Software

(HL#EZMQC-OPT) EasyMatch QC is a Windows-based computer program that performs numerical calculations on data measured by the MiniScan EZ, stores sample measurements, and provides graphical representations of data. Measurements may be made and stored in the MiniScan EZ memory and then uploaded into the software, or the MiniScan EZ may be directly controlled by the software. Instructions for EasyMatch QC are provided in its separate User's Manual.

Instrument Replacement, Repair, Problems, and Questions

The following HunterLab policies are described in this chapter:

- When You Need Assistance

- Service on Your Instrument

- Warranty

- Shipping Claims

When You Need Assistance

If you need technical advice concerning a specific application or are encountering issues with an instrument or software, please consult the HunterLab support website: **support.hunterlab.com**. Here you will find articles that address applications, operations, instrument accessories, troubleshooting, and more. This support site is available 24/7. If you still need additional assistance you can submit a support request directly into our system from this page via the Create a Support Request button at the top.

The Create a Support Request button allows you to work directly with the Customer Experience Team to: obtain pricing information on instruments and parts, order items, arrange for on-site service of your instrument, coordinate the return of your instrument for service, obtain technical support, or get any other queries resolved.

Service on Your Instrument

HunterLab offers complete repair service for all supported instruments. If your instrument is experiencing issues or you require a certificate of calibration service, please contact the HunterLab Customer Experience team. Often remote troubleshooting can resolve most issues. If repair is required, your instrument will need to be returned to HunterLab for service by a trained technician.

HunterLab offers an on-site preventative maintenance program where in a HunterLab Service technician will come to your location to perform this maintenance. For more information regarding this program and to find when a technician will be in your region, please contact the Customer Experience Team to obtain onsite information.

When contacting the HunterLab Customer Experience Team for a Certificate of Calibration service or repair on your instrument, you will be provided with a customer data sheet. This sheet will request all pertinent information including instrument serial number, shipping and billing address, point of contact, and return shipping information. Please return the completed customer data sheet along with the purchase order for the certificate of calibration service to your Customer Experience representative. The Customer Experience Team will need both items prior to a service return order (SRO) number being issued for the certificate of calibration service.

Once the Customer Experience Team issues a SRO number they will also provide shipping instructions for the specific instrument.

Warranty

HunterLab warrants that all instruments it manufactures are free from defects in material and workmanship under normal use. This warranty is limited to repairing or replacing any defective hardware or software that may cause the instrument to perform outside of its specified tolerances. This warranty is one year from date of shipment of new instruments and two months from the date of shipment of repaired instruments. Note that printers and computers are covered under the original manufacturer's warranty.

The warranty is void if the user has made unauthorized repairs, improper installation, operated, or subjected the instrument to conditions outside of the operating conditions specified in the product documentation.

The HunterLab warranty does not cover consumable items such as lamps, fuses, batteries, etc. An instrument registration card is available online at https://www.hunterlab.com/ras-registration.html. It is important that the instrument owner fills this out on receipt of equipment.

Shipping Claims

All materials are sold F.O.B. from Reston, Virginia (unless otherwise specified) and HunterLab responsibility ends upon delivery to the first carrier. All claims for loss or damage must be rendered by the consignee against the carrier within fifteen days of receipt of goods. A copy of this notice must also be forwarded to HunterLab within five days of its receipt.

BREAKAGE OR DAMAGE

Per the contract terms and conditions of the carrier, the responsibility of the shipper ends at the time and place of shipment. The carrier then assumes full responsibility. Perform the following procedures in the case that your instrument arrives broken or damaged.

- *Freight or Express*

    - Notify your local carrier.

    - Hold the damaged goods with their container and packaging for inspection by the examining agent. Do not return any goods to HunterLab prior to inspection by and authorization of the carrier.

    - File a claim against the carrier. Substantiate this claim with the examining agent's report. A certified copy of our invoice is available upon request. The original B/L is attached to our original invoice. If the shipment is prepaid, write for a receipted transportation bill.

    - Advise HunterLab regarding replacement.

- *Parcel Post Shipment*

    - Notify HunterLab at once in writing, giving details of the loss or damage. This information is required for filing a claim.

    - Hold the damaged goods with their container and packaging for possible inspection by postal authorities.

    - Advise HunterLab regarding replacement.

- *United Parcel Service*

    - Contact your local UPS office regarding damage and insurance claims. Each UPS office has a different method of handling these occurrences and yours will advise you of its procedures.

    - Retain the container and packaging.

    - Notify HunterLab at once for replacement.

SHORTAGE

Perform the following procedure if your order appears to be missing items.

- Check the packing list notations. The apparent shortage may be a backordered item and may be marked as an intentional short-ship.

- Re-inspect the container and packing material, particularly to locate smaller items.

- Ascertain that the item was not removed by unauthorized personnel prior to complete unpacking and checking.

- Notify HunterLab immediately of the shortage in writing.

INCORRECT SHIPMENT

Perform the following procedure if material received does not correspond with your order.

- Notify HunterLab immediately, referencing your order number and item.

- Hold incorrect items until return shipping instructions are received.

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