Vista®
Supplemental Manual for EasyMatch®QC

The world's true measure of color
HunterLab

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Preface

Copyrights and Trademarks

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.

Legal Disclaimers: Instrumental – Visual Evaluation

The HunterLab Vista Colorimetric Spectrophotometer is designed for precision color and appearance measurement. It measures numerical color and related data in absolute and relative terms. HunterLab cannot guarantee the accuracy, completeness, efficacy, and timeliness of the data due to inherent uncertainties in instrumental readings, variations in sample presentation, and potential inconsistencies in human color perception. It is strongly advised that each user verify the instrumental data with meticulous visual evaluation.

Disclaimer of Liability: Utilization of Data, Metadata, and Information

Hunter Associates Laboratory, Inc (including its employees, agents and assignees) assumes no responsibility for consequences from the use of the data derived from its colorimetric spectrophotometer or from the information contained herein or in any respect for the content of such information including but not limited to errors or omissions, the accuracy or reasonableness of factual or scientific assumptions, studies or conclusions, the defamatory nature of statements, ownership of copyright or other intellectual property rights and the violation of property, privacy or personal rights of others. Hunter Associates Laboratory, Inc. is not responsible for and expressly denies all liability for damages of any kind arising out of use, reference to or reliance on such data and/or information. No guarantees or warranties, including but not limited to any express or implied warranties of merchantability or fitness for any particular use or purpose made by Hunter Associates Laboratory, Inc. with respect to such data and/or information.

Contents

Setting Up the Vista

The Vista is a transmittance-only spectrophotometer with a wavelength range from 400 to 700 nanometers (nm). The instrument can simultaneously measure transmittance color and haze of liquids and non-opaque films.

The on-board software (EasyMatch Essentials) is preloaded with most scales and indices, including Pt-Co/Hazen/APHA, Gardner Color, 3 Pharmacopoeia Standards, and more. The touch screen display is customizable with multiple data views including color data, color view, spectral data, spectral plot and trends and standardization is done with one press of the screen. The footprint is compact and data output can be made to a USB or through the Ethernet port (computer connection for EasyMatch QC).

Figure 1. Front of Vista

Note: Use of this equipment in a manner not specified by the manufacturer may impair the protection afforded by the equipment. Danger of electric shock if liquids are spilled and fire if volatile or flammable liquids are spilled. Use care when measuring liquid samples.

Selecting a Space for the Vista

The following illustrates a successful installation. Set up the HunterLab Vista in a laboratory setting with controlled, consistent temperature and humidity. It is recommended that access to the rear connectors be maintained. The selected workspace should be free of drafts and characterized by proper room lighting. Place the spectrophotometer on a stable and vibration-isolated surface to minimize vibrations that could affect measurements. Input power from the utility company must be 'perfect' power, i.e., constant voltage, current and frequency without harmonics.

Laboratory Environment

The HunterLab Vista Spectrophotometer is a high-precision laboratory instrument. Laboratory grade environments are required and should be maintained to ensure precise and accurate measurements. This includes environmental factors and conditions such as temperature humidity, atmospheric pressure, and cleanliness. The environment should be free of

contaminants such as airborne dust and/or particulate matter and aerosols to avoid contamination of the precision equipment.

Samples

Implement protocols for handling and preparing samples to minimize contamination to the inside of the instrument.

Personnel

Train laboratory personnel on clean practices, including wearing appropriate attire, using cleanroom-like protocols and being mindful of their actions to prevent contamination.

Power Required

Voltage: 100-240 VAC, 3.75A, 47/63 Hz; Single Phase; 60 VA maximum.

Installation Category (Over Voltage): II

Safety

- Do not view the instrument LED's directly as it may be damaging to the eyes.
- Do not submerge the instrument in water.
- Do not take the instrument apart as there are 'no user serviceable parts' in the instrument.
- Do not disassemble the instrument and attempt to clean the optical components.
- Do not open the instrument or remove any covers except using the instructions given in this User's Manual or under the direction of HunterLab Technical Support.
-

Note: Failure to comply with these conditions and protocols set forth in this document may adversely affect the instrument performance.

For more information, please refer to **SPECIFICATIONS**.

Cleaning the Vista

Clean the outside surfaces of the Vista using a soft cloth. Do not spray liquids directly on the instrument. . Care should be taken to avoid degradation of optical surfaces. Refer to **MAINTENANCE** for more detail.

Getting Started

Unpack your Box

Place the Vista on the bench. Remove wrappings and cable ties. Inspect for damage and notify the carrier and HunterLab immediately if any is discovered.

Retain the packaging in case of needing to return the instrument return to HunterLab.

Note: The Vista should be lifted from under the base plate, near the center of the unit. It should not be carried by grasping any part of the plastic housing.

The Vista is simple to set up and attach to your computer. The following instructions guide you through the initial installation of your Vista system.

1. Unpack all cartons and remove wrappings and cable ties. Inspect for damage and notify the carrier and HunterLab immediately if any is discovered. Save the packing material in case it becomes necessary to return the instrument to the factory.
2. Place the Vista on a flat working surface where the measurements will be made. Place the computer near the sensor.
3. Ensure that the on/off switch on the back of the sensor is set to off.
4. Connect the power cord to the sensor and plug it into a power outlet.

CAUTION: Use only the power cord included with this instrument or a replacement obtained from HunterLab. Be certain that the power cord is in good condition before connecting it. The Vista is grounded using the grounding portion of this power cord. Only plug this cord into a properly grounded power outlet. Do not use an inappropriate adapter to plug the instrument into an ungrounded outlet or electric shock may occur. More information on the wiring of the power cord can be found in the Vista Specifications section of this chapter.

Note. Since the Vista uses a USB cable to communicate with the computer, select the highest number COM Port No. offered.

Transmittance Compartment

The transmittance compartment located in the middle of the sensor is used for measuring the transmitted color of transparent solids or liquids. The transmittance compartment door can be closed or open while standardizing and taking measurements.

Automated Haze Measurement

The Vista can perform haze measurements automatically using the haze mechanism inside of the instrument. To accomplish HAZE, first standardize on TTRAN (Total Transmittance) and Haze. Then select Haze under indices. For more information, see Standardization for Haze Measurements.

Power Jack

- The instrument is supplied with a 24 VDC (3.75A) power supply. The power supply is plugged into the back of the instrument as shown along with the Ethernet port and the USB port.

CAUTION: Use only the power supply included with this instrument or a replacement obtained from HunterLab. Be certain that the power supply is in good condition before connecting it. The Vista is grounded using the grounding portion of this power supply. Only plug this supply into a properly grounded power outlet. Do not use an inappropriate adapter to plug the instrument into an ungrounded outlet or electric shock may occur. More information on the wiring of the power supply can be found in the Vista Specifications section of this chapter.

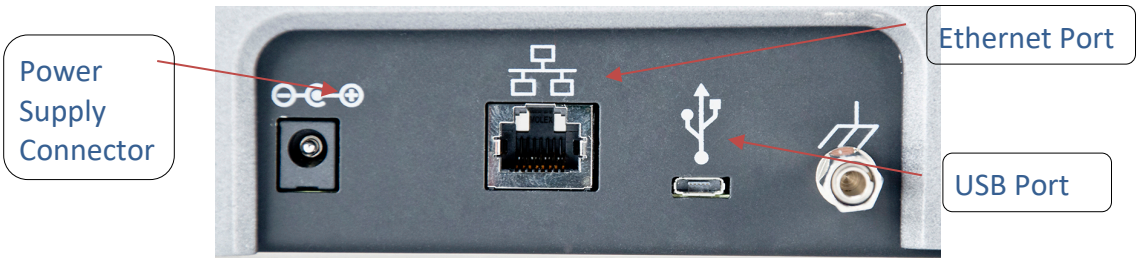


Figure 2. Rear View with Connectors

CAUTION: ***Use only the power cord included with this instrument or a replacement obtained from HunterLab. Be certain that the power cord is in good condition before connecting it.***

Ethernet Port

This port is used to connect the Vista to:

- Computer or to a network with the purpose of sending data (ASCII) to a server
- Connect with EasyMatch QC and EasyMatch QC Electronic Records
- Remote Support
- Network printer
- Email data

For more information see Appendix A.

Vista Installation

The Vista is simple to set up and attach to your computer. The following instructions guide you through the initial installation of your Vista system.

1. Ensure that the on/off switch on the back of the sensor is set to off.
2. Connect the power supply to the sensor and plug it into a power outlet.

Note: Refer to the Vista Specifications section of this chapter for recommendations concerning the power line and its conditioning.

3. Connect the ethernet cable to the computer and to the Vista ethernet port.

Note. Since the Vista uses an ethernet cable to communicate with the computer, select the highest number COM Port No. offered.

Power Switch

- To turn the instrument on, press the rocker switch on the back of the instrument.

Front and Rear USB Connectors

- There are two USB connectors on the Vista. Both can be used for exporting jobs and workspaces, backing up the instrument data and updating software. If the user wants to connect multiple devices at the same time, a USB hub can be plugged in to the front of the instrument.

Figure 3. USB Port on Front of Instrument

Vista Options and Sample Devices

For the latest information, please refer to support.hunterlab.com.

Note: Use of this equipment in a manner not specified by the manufacturer may impair the protection afforded by the equipment. Danger of electric shock if liquids are spilled and fire if volatile or flammable liquids are spilled. Use care when measuring liquid samples.

Vista Installation with EasyMatch QC

Install EasyMatch QC Software

Complete the following steps:

1. Log into the system using an account that has 'Administrator' privileges for the PC — network or local.
2. Insert the installation CD into the CD-ROM drive. If the system is setup to automatically run CD programs, the menu will appear and you may skip to Step 5. Otherwise, continue with Step 3.
3. Select the Easy Match QC Icon or from Windows, go to ***START > RUN >EZMQC_MENU*** and ***OPEN***. The following screen will be shown.

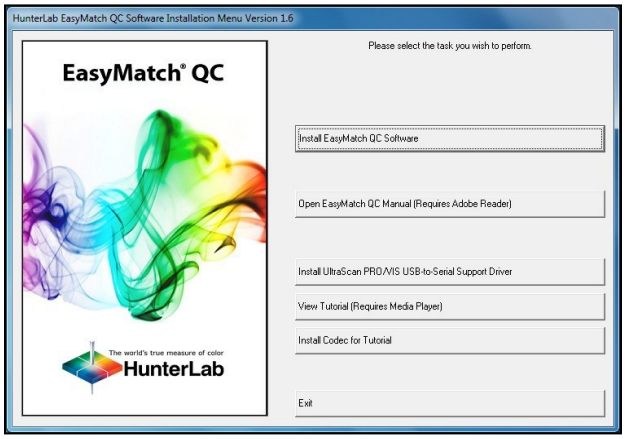


Figure 4. EasyMatch QC Installation

4. Select ***INSTALL EASYMATCH QC SOFTWARE*** and follow the screen prompts.
5. Select ***SOFTKEY LICENSE*** as the type of key to use with the software.

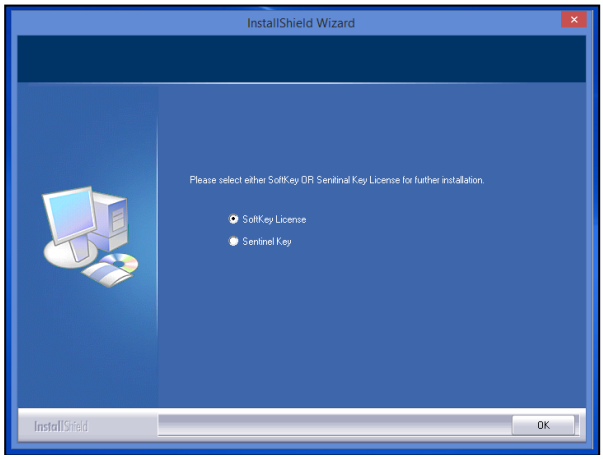


Figure 5. Software Key License

6. When the EasyMatch QC installation is finished, select the ***OPTION BUTTON*** next to **YES, I WANT TO RESTART MY COMPUTER NOW** and then ***FINISH*** to restart the computer and log

back in.

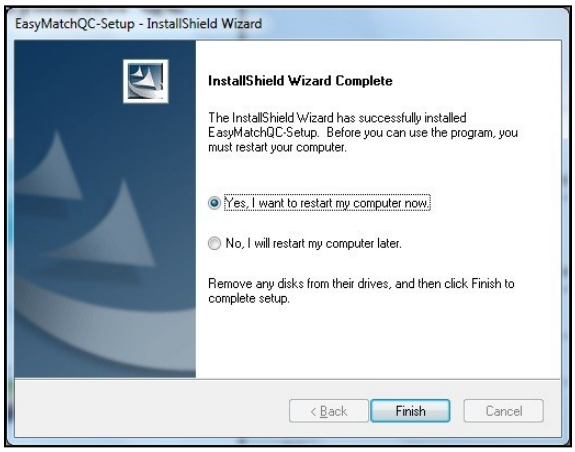


Figure 6. Completed Install

7. The CD can now be removed.

Activate the SoftKey License

1. From the Desktop, select the EasyMatch QC Icon or from the Windows Start menu, choose the following to open the software:

START > PROGRAMS > HUNTERLAB > EASYMATCH QC

2. A warning message to activate the license will be displayed as shown in Figure 5.

Note: EasyMatch QC functions are unavailable before key activation.

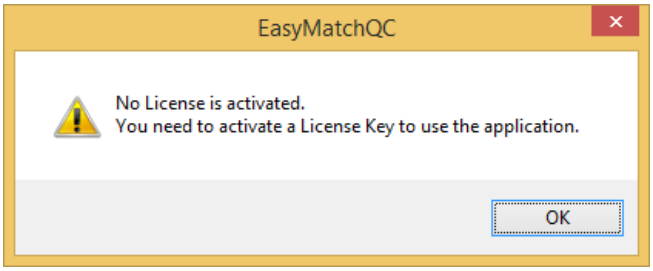


Figure 7. No License Warning

3. The SoftKey License is uniquely associated with the sensor serial number and is provided on a thumb drive supplied with EasyMatch QC or via email from HunterLab.
4. Go to ***HELP> LICENSE REGISTRATION > ACTIVATION***.
5. Select ***ACTIVATE LICENSE***.

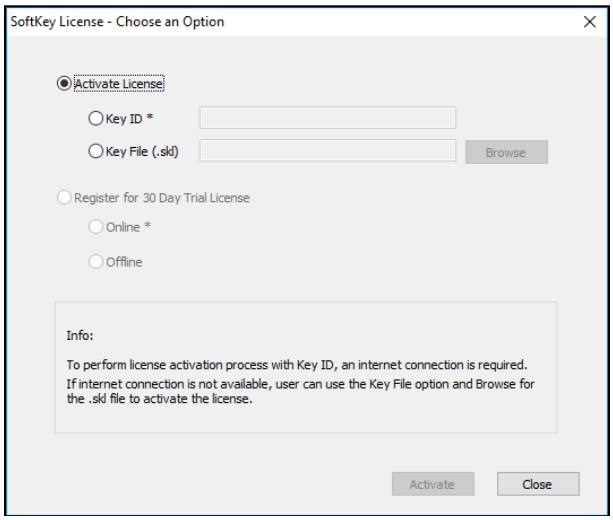


Figure 8. Activate License

- Option ***#1: Key ID.***

  This method is for copying the ID from an email or writing down the 32-digit code. This requires an internet connection.

  a. From the ***CHOOSE AN OPTION*** page (Figure 5), select **KEY ID**.
  b. Paste-in or type-in the License Key ID and click ***ACTIVATE***.
  c. An acknowledgement will be displayed showing the activation status.

- ***Option #2: Key File (.skl)***

  This method is for using the SoftKey License (.skl file) on the thumb drive.

  a. Place the thumb drive with the SoftKey License in the USB port.
  b. From the ***CHOOSE AN OPTION*** page (Figure 5), select **KEY FILE** (.skl).
  c. Browse the USB to find the SoftKey License (.skl) file, then click ***ACTIVATE***.
  d. An acknowledgement will be displayed showing the activation status.

- ***Option #3: Sentinel Key***

  a. If the user has a HunterLab USB hardware key, then it can be used with a new sensor on the same computer. Return to Install the Software, Step 5 (Figure 3) and select the Sentinel Key to continue.

- ***Option #4: 30-day trial***

  a. Fill out the registration form provided for the 30-day trial. Connect to the internet. HunterLab will approve the trial and email the SoftKey license back. Follow the directions for Option #1 or #2 to complete.

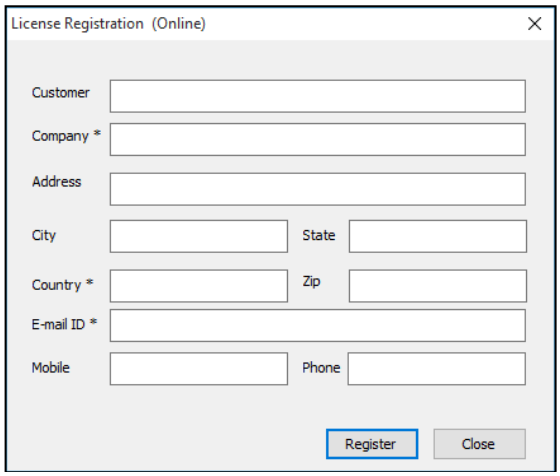


Figure 9. Request 30-day Trial

Auto-Exporting Data from Vista to an external data collection system.

There are three methods to connect the Vista to a computer:

- Method 1: For direct Connection between Vista and Computer with Ethernet Cable (no network required).
- Method 2: For Direct Connection between Vista ad Computer with RS-232 Ethernet Adapter (No Network required)
- Method 3: Through Network (Ethernet Cable)

Method #1: Direct Connection between Vista and Computer using an Ethernet Cable

Materials Needed

- Vista Firmware needed: 1.01.0014 and above
- Other Hardware needed: Ethernet cable & USB Ethernet adapter.

Figure 10. Ethernet Cable

Figure 11. Ethernet Adapter

Connect Vista to Computer

- Plug Ethernet cable (Figure 111) into RJ-45 Ethernet connection at rear of Vista. Plug the other end of the cable into Ethernet Adapter.

Figure 12. Rear View of Vista

- Plug the other end of the Ethernet Adapter into the computer.

Configure the Vista

- Requires Essentials Rev 14 or higher.
- Configure the IP address on the computer. Open the Command Prompt in the PC by typing in 'ipconfig' and check the auto configuration IPv4 Address and Subnet Mask.

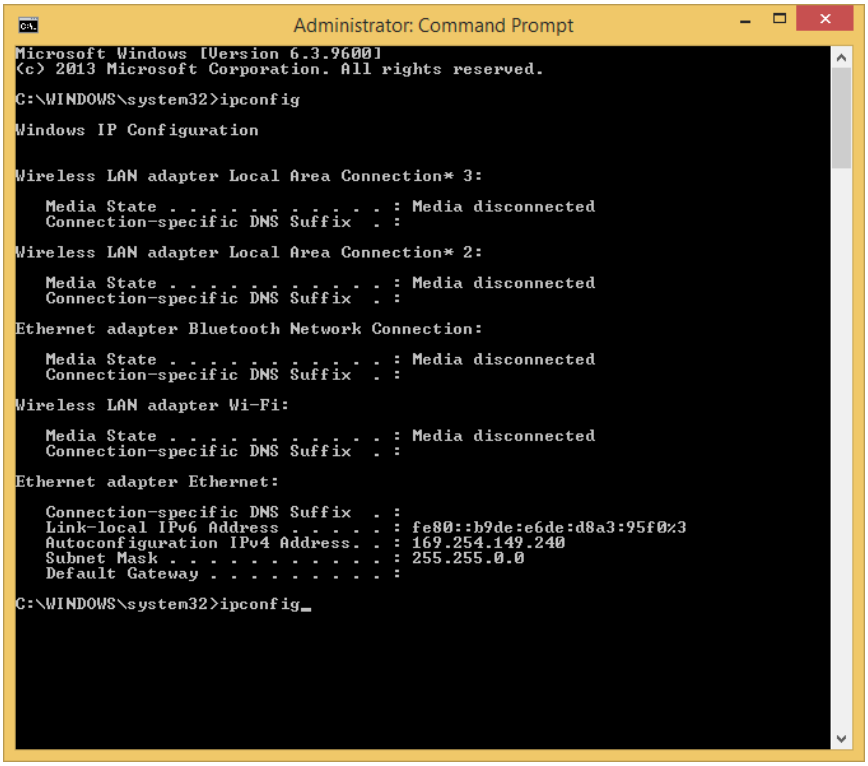


Figure 13. Computer IP Address

- Configure IP address in Vista. Open Vista Essentials and go to ***JOBS MENU > PREFERENCES*** and select ***CONFIG NETWORK SETTINGS***. **Uncheck** the box next to **USE DHCP FOR ETHERNET CONFIGURATION**. Enter a valid IP address for the Ethernet port. In this example, the following parameters are selected.

IP Address:	***192.168.0.110***
Subnet Mask:	***255.255.255.0***
Gateway:	***192.168.0.1***
Preferred DNS:	***192.168.0.1***
Alternate DNS:	***192.168.0.1***

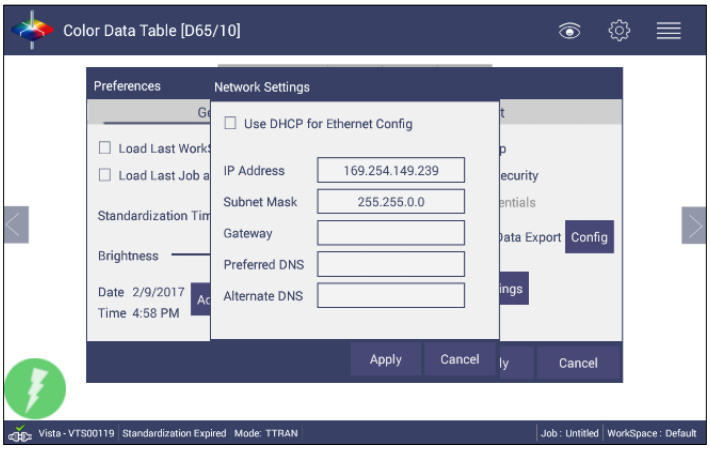


Figure 14. Assign IP Address to Vista

- Press ***APPLY*** on the Ethernet Configuration.

- Check ***AUTOMATIC NETWORK DATA EXPORT*** and click to configure. For a direct connection between the Vista and the computer with an Ethernet cable, set up the Vista as a server. Port Number is 10001.

Configure the Computer Using HyperTerminal Software

- From the computer, open HyperTerminal.
  1. Enter the name for the connection
  2. Connect using TCP/IP (Winsock)
  3. Set computer as client by entering the IP address of Vista which is recorded above. Put the port number as '10001'.

Send Data from the Vista.

- Configure the Vista for the Color Data Screen.
  1. Go to ***WORKSPACE > COLOR SCALES*** to select Color Scales, Indices & Illuminant/Obs.
  2. Go to ***WORKSPACE > STANDARDIZE*** to standardize the instrument.
  3. Read Sample and View the Data on the Computer.

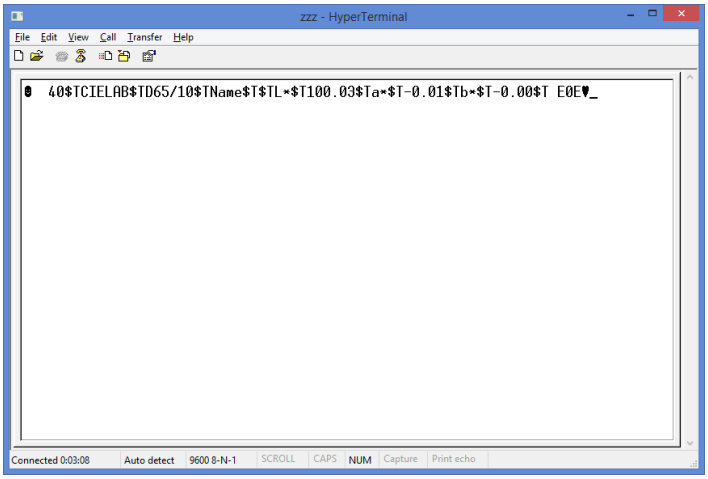


Figure 15. Data from Vista through Ethernet Connection

The data string is shown as follows:

<STX><PACKET SIZE>$T<SCALE-LABEL>$T<ill/Obs>$T<LABEL NAME1> <$T><VALUE1> $T<LABEL NAME2><$T><VALUE2><$T><LABEL NAME3> $T<VALUE3>$T <LABEL NAME N><$T> <VALUE N>$T<CHKSUM><ETX>
Where, <STX> is the Start of Text (value =0x02)
<ETX> is the End of Text (value =0x03)
$T is the default delimiter.
<SCALE-LABEL> is the Scale Label (e.g. CIELAB)
<ill/Obs> is the Ill/Obs name (e.g. D65/10)
<PACKET SIZE> is the Total size (HEX String) of the Packet excluding the <STX> and <ETX>
<LABEL NAME> is the label name (e.g. L*, a*, b*, dE* etc.)
<VALUE> is the value for the preceding Label Name
<CHKSUM> is the Checksum (HEX String) - the sum of all the ASCII values in the total packet play load starting from <PACKET-SIZE> and till <CHKSUM>.

Method #2: Direct Connection between Vista and Computer with RS-232 Ethernet Adapter.

Materials Needed:

- Vista Essentials 1.01.0014 and above
- Hardware needed: Ethernet cable, Crossover adapter, Ethernet to RS-232 Connector, RS-232 to USB (optional).

Figure 16. Ethernet Cable

Figure 17. Crossover Adapter

Figure 18. Ethernet to RS-232 Converter for Connection via Serial Port

Figure 19. RS-232 to USB Converter for Connection via USB Port

Configure Ethernet to RS-232

- Set up Ethernet to the RS-232 Adapter with a static IP address and Port Number such as an IP address of 192.168.0.100 and port 10001.

Connect Vista to the Computer

- Plug the Ethernet cable into the RJ-45 Ethernet connection on the Vista. Plug the other end of the cable into the Crossover Adapter.
- Plug the Crossover Adapter into the Ethernet port of Ethernet to RS-232 Adapter.
- Plug Ethernet to RS-232 Adapter into the serial port of the computer or into RS-232 to USB converter for connection to USB port. Plug power into Ethernet to RS-232 adapter.

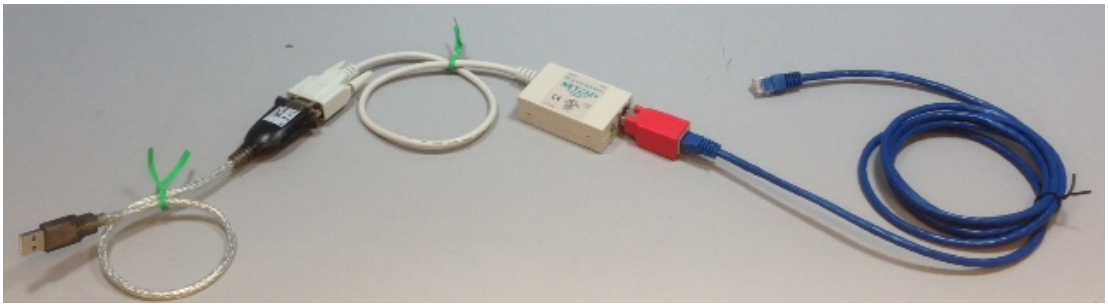


Figure 20. Cable Configuration for Direct Computer Connection

Configure the Vista (Requires Essentials Rev 14 or higher)

- Configure the Ethernet port of Vista. Go to ***JOBS > PREFERENCES*** > ***CONFIGURE NETWORK SETTINGS.*** Uncheck **DHCP FOR ETHERNET CONFIG** and enter a valid IP address for the Ethernet port. In this example, the following ethernet parameters are selected.

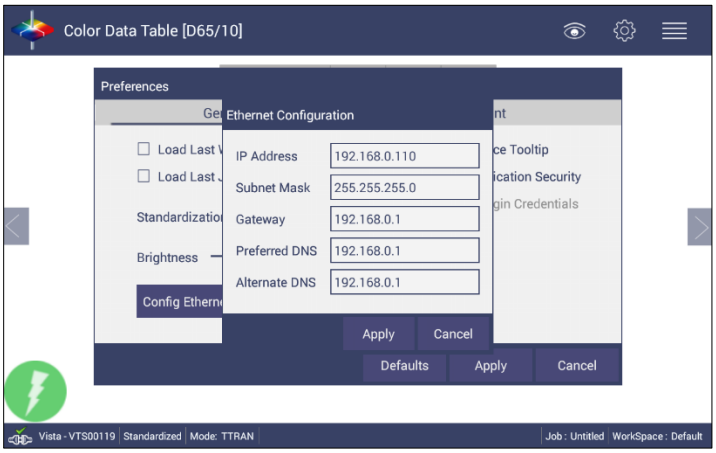


Figure 21. Configuration Parameters for Ethernet

- Press ***APPLY*** on the Ethernet Configuration and then **APPLY** on the Preferences Page to complete.
- Go to ***JOBS > PREFERENCES*** and select ***AUTOMATIC NETWORK DATA EXPORT*** to configure.

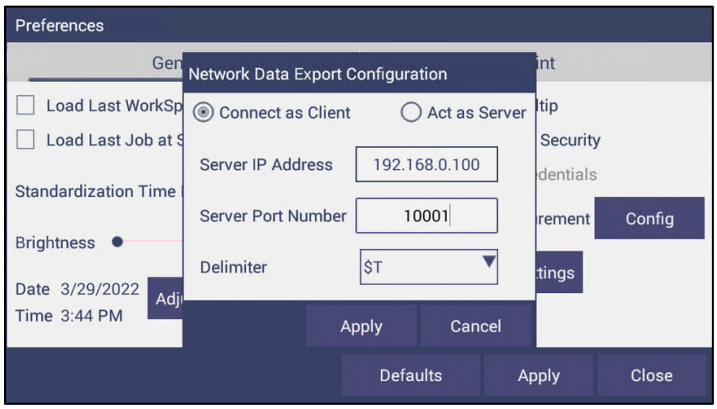


Figure 22. Preferences > Automatic Network Data Export

- For a direct connection between Vista and data collection computer, set up the Vista as a ***CLIENT***.
- Set the **IP ADDRESS** to match the settings of the Ethernet to RS-232 Converter or as shown in the example - 192.168.0.100 and the **PORT** as 10001.
- Press ***APPLY*** and then press ***APPLY*** on the Preferences screen to continue.

Configure the Computer

- Connection configurations differ depending on data collection software. I this example, **HYPERTERMINAL** is used to demonstrate connectivity.
- The data collection computer is set up as a **SERVER**.

- Connection parameters are as follows:

    1. Select the Com Port for USB or Serial port connection.
    2. **Bits per second: 9600**
    3. **Data Bits: 8**
    4. **Parity: None**
    5. **Stop Bits: 1**
    6. **Flow Control: None**

Send Data from the Vista

- Read Samples.

    1. Standardize the instrument.
    2. Go to ***WORKSPACE > COLOR SCALES*** to select Color Scales, Indices & Illuminant/Obs.
    3. Please sample at the port and select ***READ***.
    4. Data is transferred to the computer.

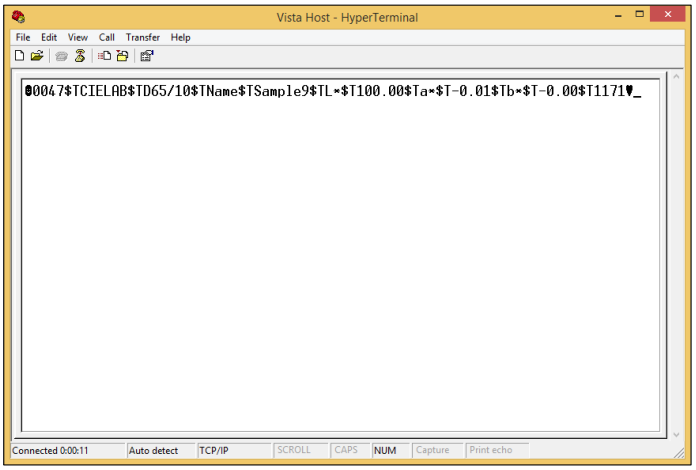


Figure 23. Data from Vista through Ethernet Connection

The data string is shown as follows:

<STX><PACKET SIZE>$T<SCALE-LABEL>$T<ill/Obs>$T<LABEL NAME1><$T><VALUE1> $T<LABEL NAME2><$T><VALUE2><$T><LABEL NAME3>$T<VALUE3>$T . <LABEL NAME N><$T> <VALUE N>$T<CHKSUM><ETX>

Where, <STX> is the Start of Text (value =0x02)

<ETX> is the End of Text (value =0x03)

$T is the default delimiter.

<SCALE-LABEL> is the Scale Label (e.g. CIELAB)

<ill/Obs> is the ill/Obs name (e.g. D65/10)

<PACKET SIZE> is the Total size (HEX String) of the Packet excluding the <STX> and <ETX>

<LABEL NAME> is the label name (e.g. L*, a*, b*, dE* etc.)

<VALUE> is the value for the preceding Label Name

<CHKSUM> is the Checksum (HEX String) - the sum of all the ASCII values in the total packet play load starting from <PACKET-SIZE> and till <CHKSUM>.

Method #3 – To export data through Network

Connect Vista to a Network.

You can connect Vista to a network hub using the Ethernet cable. The computer must be connected to the same network as the Vista.

1. To connect Vista to a network, go to ***WORKSPACES > PREFERENCES > CONFIG NETWORK SETTINGS***.
2. Select Ethernet configuration and check **USE DHCP FOR ETHERNET CONFIG**. Write down the IP address showing in the Ethernet Setting dialog. In addition, you can check the IP address of Vista in ***JOBS > ABOUT > INFO***.
3. Go to ***WORKSPACE > PREFERENCES*** and check **AUTO NETWORK DATA EXPORT** measurement. Go to **CONFIG** and choose Vista as **SERVER** and **PORT NUMBER** as 10001.
4. Choose a delimiter to mark your data.

Configure the Computer

- Set the Computer as **CLIENT**.
- Enter the **IP ADDRESS** of the Vista.
- Enter the **PORT NUMBER** as 10001.

=\ dd the Sensor

1. Upon initial startup, the following message will be displayed: ***SENSOR NOT YET INSTALLED***. ***PLEASE INSTALL A SENSOR TO TAKE MEASUREMENTS***. This message will remain until you proceed to the Install/ Configure command in the Sensor menu and install a new sensor.
2. The Sensor Manager appears first:

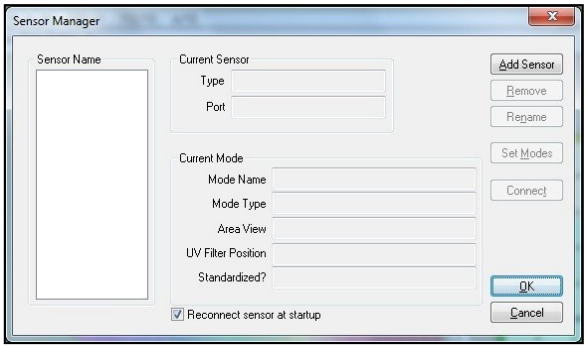


Figure 24. Sensor Manager

3. Select ***ADD SENSOR*** to install a new sensor. The Setup Sensor screen allows selection of the instrument model and the communications port. Select ***NEXT*** when ready.

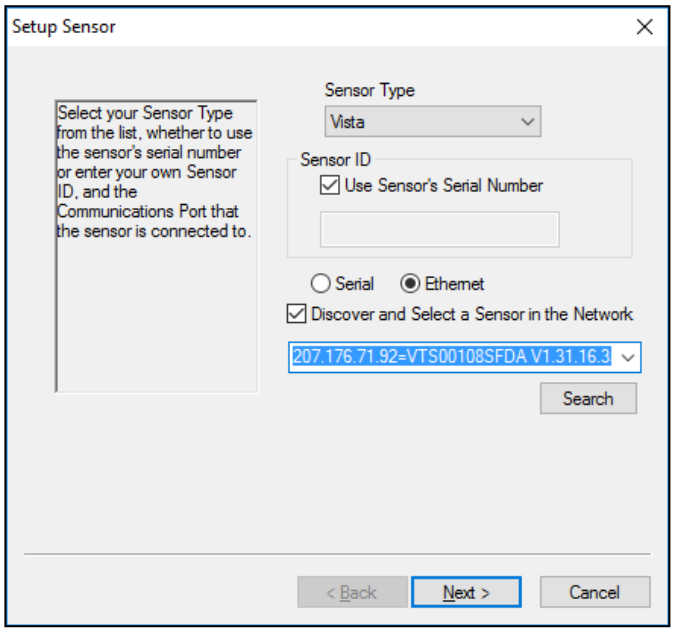


Figure 25. Setup Sensor

4. Next, configure a ***STANDARDIZATION MODE*** for the sensor. The Vista will support TTRAN and RTRAN.

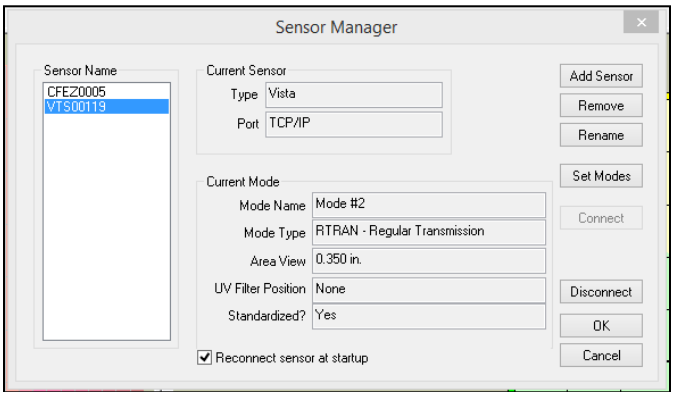


Figure 26. Setup Mode

5. Select the option next to ***STANDARDIZE NOW*** to proceed immediately to standardization upon completion of sensor configuration. Select ***NEXT*** to complete the installation.

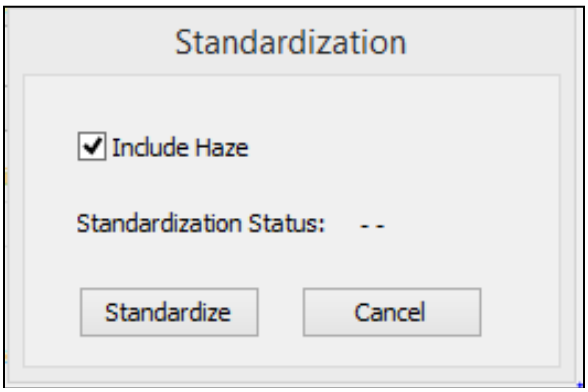


Figure 27. Standardization Menu

Taking Sample or Standard Measurements

Sensor > Standardization

The Vista must be standardized on a regular basis to keep it operating properly. Standardization sets the top and bottom of the photometric scale. During standardization, the bottom of the scale is set first but is automatically read on the Vista. The top-of-scale is set using a blank cell or empty transmittance compartment.

Two transmittance modes of measurement available with the Vista:

TTRAN: Total Transmittance – sample against the sphere opening

RTRAN: Regular Transmittance – sample close to the lens

The instrument can be standardized at any time by selecting ***SENSOR MENU >*** or by clicking the ***STANDARDIZE*** button on the default toolbar. It is recommended that the instrument perform standardization at least once every eight hours.

When the instrument is to be used for transmittance measurements of liquids, a clear liquid (distilled water for water-based samples, toluene or benzene for resins, or mineral oil for oils) in a cell of the desired size should be used to set the top of the scale.

Place the cell in the transmittance compartment against the ***sphere*** for measuring total transmittance. Place it as close to the ***lens*** as possible when measuring regular transmittance.

Note: Closing the transmittance compartment door while making transmittance measurements is a best practice for this instrument. However, it is not necessary to eliminate ambient room light with the Vista.

Selecting Measurement Parameters

In the **COLOR DATA TABLE** View, right-click to select ***CONFIGURE*** to apply indices, color scales, Illuminant/Observers and differences to the measurement.

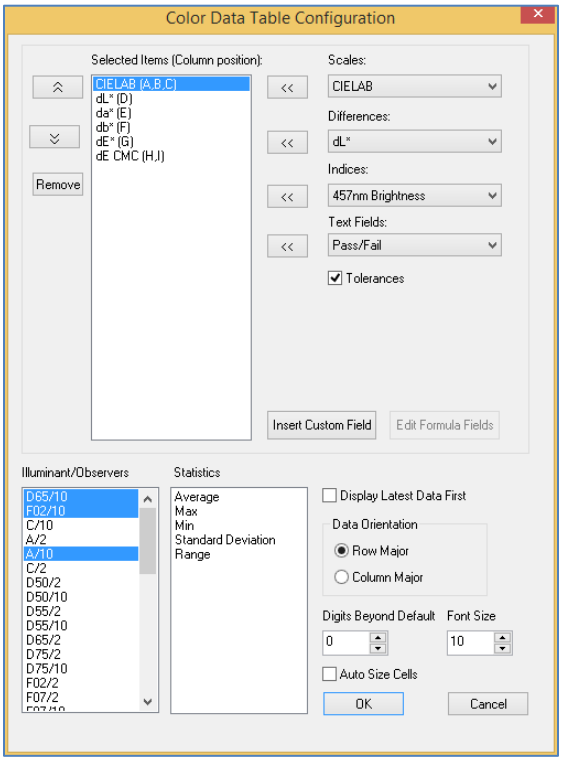


Figure 28. Color Data Table Configuration

Measurements > Read Standard

The ***MEASUREMENTS > READ STANDARD*** command initiates reading of a standard. Place the standard before initiating the ***READ STANDARD*** command. If Prompt for standard name was checked in ***OPTIONS > NAMING CONVENTIONS***, you will then be prompted to enter a name for the standard (as well as a Product ID and Extra ID, if you wish). You may simply accept the name defined using the ***NAMING CONVENTIONS*** command, if desired. The measurement is then accepted and added to the current job. The keyboard shortcut for this command is ***F2***.

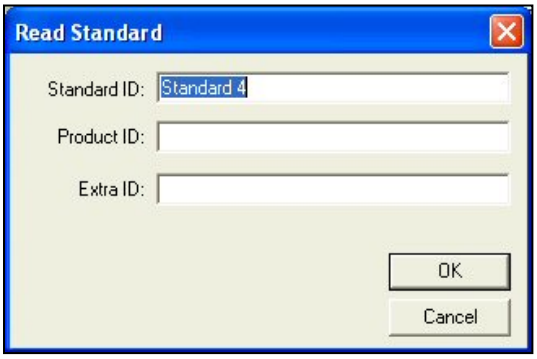


Figure 29. Enter Standard ID

Measurements > Read Sample

The ***MEASUREMENTS > READ SAMPLE*** command initiates reading of a sample. Place the sample before initiating the ***READ SAMPLE*** command. If Prompt for sample name was checked in ***OPTIONS > NAMING CONVENTIONS***, you will then be prompted to ***ENTER A NAME*** for the sample (as well as a Product ID and Extra ID, if you wish) and to choose the standard with which the sample should be linked. ('Standard Empty' is a choice if you do not want to link to a standard.) You may simply accept the name defined using the ***NAMING CONVENTIONS*** command and the suggested standard, if desired. The measurement is then accepted and added to the current job. The keyboard shortcut for this command is ***F3***.

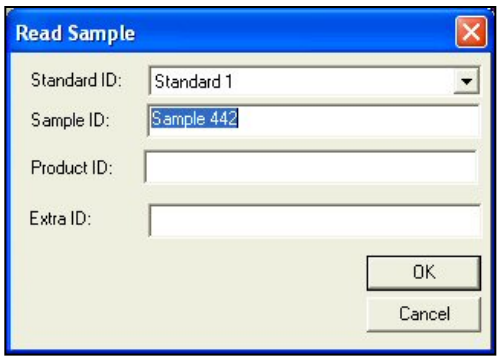
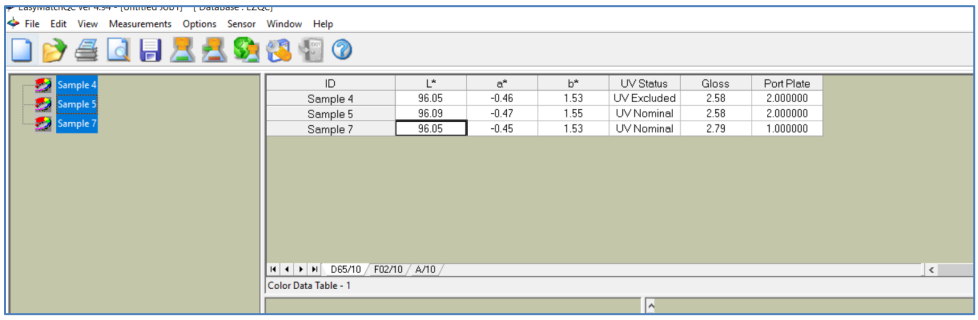


Figure 30. Enter Sample ID

Results are displayed.

Figure 31. Measurement Results



Visual Inspection

Visually inspect the sample to confirm that the instrument readings agree with visual assessment.

Haze Measurements

A transmittance haze measurement is a ratio of the diffuse light to the total light transmitted by a specimen. Useful measurements of haze can be made on the HunterLab Vista instrument listed above, although the results do not conform exactly to ASTM method D1003 because of differences in instrument geometry. Haze is calculated as follows:

$$\text{Haze} = \frac{Y_{\text{Diffuse Transmission}}}{Y_{\text{Total Transmission}}} \text{ x } 100$$

Haze measurements can be made only in a transmittance mode on a benchtop sphere instrument (UltraScan PRO, UltraScan VIS or Vista).

In order to measure and display haze values, follow the steps outlined below:

1. Select ***OPTIONS > READ METHOD***.
2. Select ***HAZE*** from the dialog box that appears. The screen changes to allow additional options.

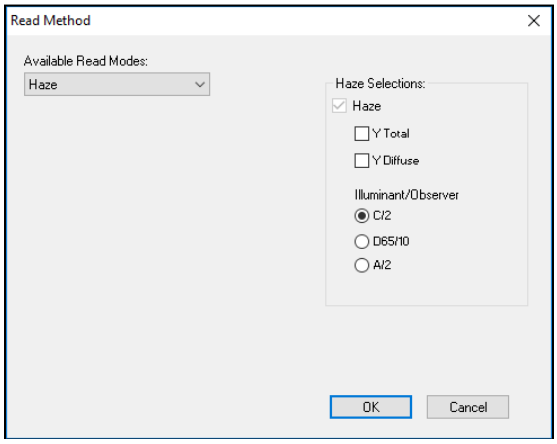


Figure 32. Read method: Haze

3. Haze is automatically selected for display in your Color Data Table. Check the boxes next to Y Total and/or Y Diffuse to also show these components of the haze calculation. Click the radio button next to the illuminant/observer combination you wish to use. Then click ***OK***.
4. Standardize the instrument in TTRAN mode. Go to ***SENSOR > SET MODES*** and select ***TTRAN***. Next, select ***HAZE*** using the check box. Then press ***STANDARDIZE*** to initiate.

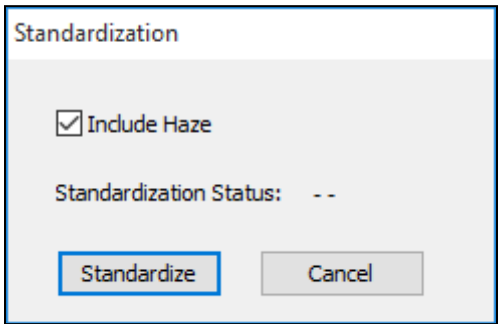


Figure 33. Haze Standardization Check Box

5. Read the standard or sample by choosing ***MEASUREMENTS > READ STANDARD*** OR ***MEASUREMENTS > READ SAMPLE***, clicking the ***READ STANDARD*** or ***READ SAMPLE*** button on the toolbar, or pressing ***F2*** or ***F3***. The following prompt appears.
6. Place your sample against the transmittance port next to the sphere. Click ***READ***.
7. The instrument reads. You may be prompted to enter an ID for the measurement as usual. After you do so, Haze and the other parameters you chose to display will be shown in your Color Data Table.

ID	L*	a*	b*	Haze % C/2	Y Total C/2	Y Diffuse C/2
Haze sample	94.96	0.00	2.88	10.78	87.73	9.46

Figure 34. Haze Readings Reported

Vista Maintenance and Testing

The Vista is engineered to be virtually maintenance free. This section outlines the few parts of the sensor that are to be maintained for the instrument to function properly.

Cleaning the Vista

Weekly

Clean the exterior of the sensor and mounting. The Vista is NOT waterproof, but the exterior of the case may be wiped with a damp cloth. Keep the glass cover under the port plate free of dust, smears, and fingerprints.. Lift the light cover to access the transmittance compartment. The inside may be cleaned with a lens brush or with a small amount of soapy water on a lint-free cloth or towel.

Note: Do not spray directly into the instrument chamber.

Monthly

If a Hitch Standard has been used, then compare hitch standard values for the Vista to those of the off-line colorimeter. Re-hitch the Vista if necessary or desired.

As Needed

Perform Diagnostics.

System Warm-Up

If power to any of the system components has been turned off, it must be restored to all components before operation can resume. When restoring power to system components:

- Restore power to the instrument and computer (if included).
- Allow at least thirty minutes of warm-up time.
- Standardize.
- Select the desired product setup and begin operation.

Haze Standard Care

The Assigned % Haze for this standard is a combination of the surface and internal scattering properties of this material. To maintain the surface properties, it is important that the surfaces of this standard are not damaged during normal usage. If the surface is contaminated, a cotton cloth moistened with isopropyl alcohol, or a laboratory glass cleaner such as Sparkleen can be used to gently wipe the surface. After wiping allow it to dry for a minimum of 60 minutes.

Didymium Standard Care

Check the filter for fingerprints, dust, and other contaminants. If necessary, gently clean the didymium filter with a cotton cloth moistened with Sparkleen. After wiping allow the filter to dry for at least one hour.

Diagnostics using EasyMatch QC

Performance Diagnostics for Repeatability and Didymium Filter Test for Wavelength Accuracy are included with EasyMatch QC Version 4.93 and above. To begin, select Sensor > Diagnostics and select Repeatability or Didymium Filter Test.

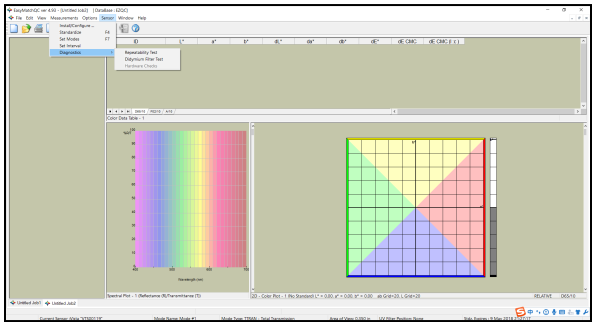


Figure 35. Diagnostics Menu

Repeatability

Each of the 30 measurements must pass the tolerance of dE* < 0.025. If any of the measurements fail, then the test will fail.

To begin, clear the transmittance compartment and press Start when ready to initiate standardization.

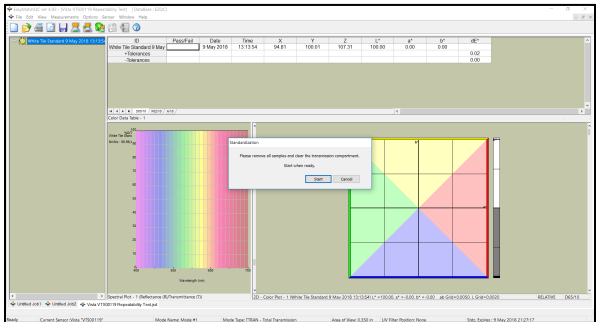


Figure 36. Repeatability Start

When standardization is complete, press ***FINISH*** to begin Repeatability.

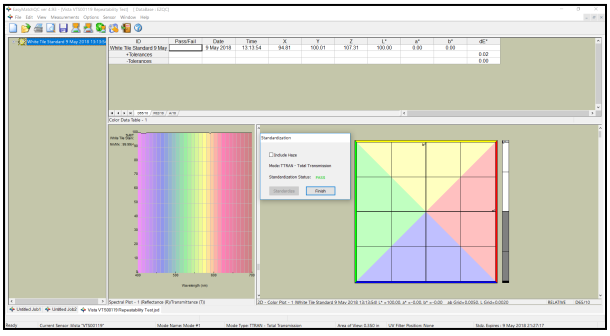


Figure 37. Press Finish to Initiate Repeatability

Repeatability results on 30 readings is shown below.

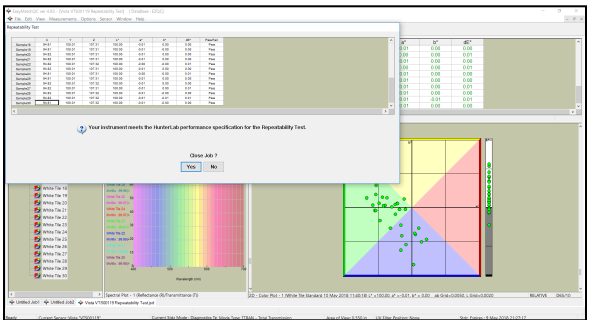


Figure 38. Repeatability Results

Didymium Filter Test

The Didymium filter test operates in a similar manner to the Repeatability Test. Remove all samples from the transmittance compartment and begin standardization in RTRAN.

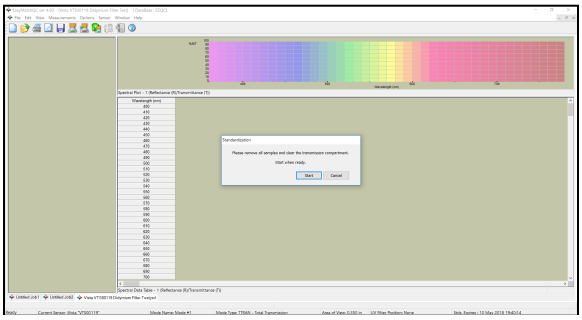


Figure 39. Standardization for Didymium Filter Test

Insert the Didymium Filter at the lens port and press ***OK*** to start the test.

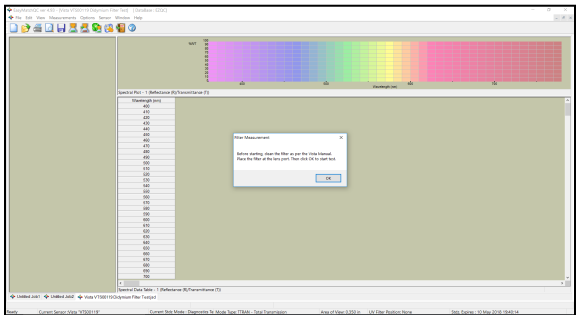


Figure 40. Insert Didymium Filter at Lens Port

Enter the values for the 430nm and 570nm reading from the tile data sheet.

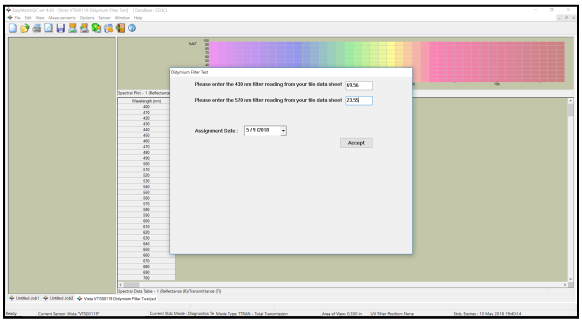


Figure 41. Enter Tile Data

View the results.

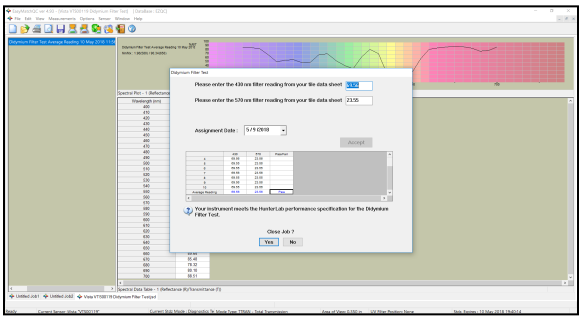


Figure 42. Didymium Results Reported

Diagnostics on the Vista

Performance Diagnostics are included with the Essentials software version 1.01.0021 and higher. Go to ***WORKSPACE > DIAGNOSTICS*** and refer to the Vista Essentials manual for additional information. For updated Essentials software, refer to support.hunterlab.com.

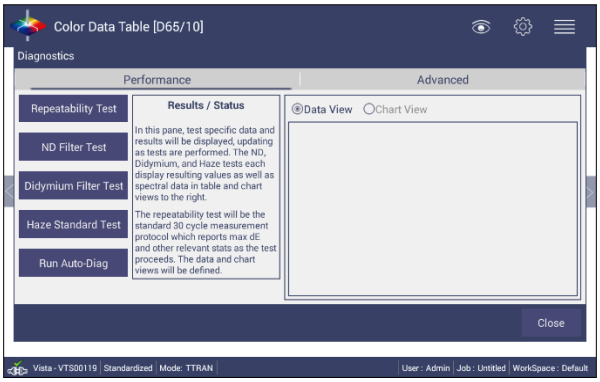


Figure 43. Performance Diagnostics

Vista Specifications

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

Note: Do not leave Vista in an area where temperature or humidity extremes are possible.

Operating Conditions

Operating Temperature	10°C - 40°C (50°F - 104°F)
Operating Humidity	10% to 90% relative, non-condensing
Storage Temperature	-21°C - 66°C (-5°F - 150°F)

Physical Characteristics

Weight	6.35kg (14lbs)
Dimensions (Height x width x length)	177.8mm x 485.8mm x 228.6mm (7in x 19.13in x 9.0in)
Sample Compartment Cover	Removable to accommodate large samples
Base to Measurement Port Distance	63.5mm (2.5in)
Sample Compartment Height with Door closed (Height x width x length)	108mm x 101.6mm x 187.3mm (4.25in x 40in x 7.375in)
Communications Interface	1- USB Micro OTG to printer, Keyboard, Mouse 2- Front Panel USB: 2.0 bidirectional for data export/import via thumb drive 3- Ethernet RJ45 for Save, Print, Email capability, LIMS and SPC systems 4- Remote access support tool
Safety Compliance	CE, IEC 61326-1
System Power	100-240 VAC/1.5A, 47-63 Hz, 60W

Conditions of Illumination and Viewing

Light Source	Full spectrum LED array; LED life – 5 years typical
Dual Beam Spectrophotometer	256 element diode array and high resolution, concave holographic grating
Geometry	Tt/0° or Td/0° per ASTM 1164, CIE 15-2018
Sphere	76 mm (3 in) coated with Spectralon™
Port Size/Measured Area	18.5 mm (0.73 in) illuminated/ 9.8 mm (0.39 in) measured
Transmittance Modes	Total (TRAN), Regular (RTRAN), Haze

Instrument Performance

Spectral Data	Range: 400-700 nm Reporting Interval (nm): 10 nm
Spectral Resolution	<3 nm
Effective Bandwidth	10nm equivalent triangular
Measurement Path length	Up to 100 mm
Photometric Range	0-150%
Measurement Interval	<3 seconds
Measurement Speed (at 23°C)	≤2.5 seconds; 4 flashes
Inter-instrument Agreement	ΔE* ≤ 0.15 CIE L*a*b* (Avg) on Transmittance Filter Set; ΔE* ≤ 0.25 CIE L*a*b* (Max) on Transmittance Filter Set ±0.30% at 10% TH (Haze)
Colorimetric Repeatability	ΔE* ≤ 0.02 on air w/30 readings
Spectral Repeatability	Standard deviation within 0.1%

Measurement

Data Views	EZ view, Color Data Table, Color Plot, Spectral Data, Spectral Plot, Trend Plot
Color Scales	CIE L*a*b*, Hunter Lab, CIE L*C*h, CIE Yxy, CIE XYZ and differences
Color Difference Indices	ΔE*, ΔE, ΔC, ΔE CMC, ΔE 2000
Indices & Metrics	APHA/PtCo/Hazen, ADMI, Saybolt, Gardner, ASTM D1500, Iodine, ICUMSA, EBC, ASBC, ASBC Turbidity, Chinese Acid Wash, Lovibond® RYBN, AOCS RY, FAC, YI E313 Yellowness, YI D1925, WI E313, CIE Y Transmittance, Pharmacopeia -US, Japanese, Chinese, EU, EP Opalescence Haze NTU Pass/Fail Color Indication, Time/Date Stamp, Auto-Naming, Auto-Saving, Data backup and recovery.
Data Storage	8GB or >1 million data records
Illuminants	D65, C, A, D50, D55, D75, F02, F07, F11, TL84, ULT30, ULT35
Observers	2° and 10°
Languages	English, Japanese and Simplified Chinese
Display	Touch screen, High resolution 1280x800
External Software	EasyMatch QC and EasyMatch QC-Electronic Records

LOVIBOND® is a registered trademark of Tintometer Ltd. UK.

Standard Accessories

Standard Accessories	Didymium diagnostic filter, Certificate of compliance, power supply, Vista Quick Start Guide, Stylus, USB Flash Drive, Cleaning Cloth,

Standards Conformance

Standards Conformance	CIE 15:2004, ISO 7724/1, ASTM E1164, DIN 5033, Teil 7 and JIS Z 8722 Condition E, G

Regulatory Notice

A copy of the Declaration of Conformity for the Vista follows.

HunterLab
ISO 9001 Certified

Declaration of Conformity

EU / EMC Directive:	**2014/30/EU**
Standard to which Conformity is Declared:	**IEC 61326-1: 2012 / EN: 2013**
Manufacturer:	**Hunter Associates Laboratory, Inc.** **11491 Sunset Hills Rd, Reston, VA, USA**
European Representative: Representative's Address:	**Christian Jansen** **Griesbraeustrasse 11, 82418 Murnau, Germany**
Type of Equipment:	**Transmission Spectrophotometer**
Model No.:	**Vista**

I, the undersigned, hereby declare that the equipment specified above conforms to the Directive(s) and Standard(s) above

Place: *Reston, VA, USA*

Date: *May 25, 2016*

Signature: Tim Barrett

Full Name: *Tim Barrett*

Position: *Systems Engineer*

Vista Options and Sample Holders

Self-Centering Sample Holder (D02-1017-193)

The self-centering sample holder takes the guess work out of cell placement for total and regular transmittance, ensuring precision and accuracy every time. Compatible with cells up to 50mm wide.

Universal Adapter Base Plate (D02-1017-223)

This universal adapter base plate with (2) accessory mounting bolts is designed to accommodate third-party sample holders. Measuring 5” x 3.75” (127 mm x 95.25 mm) this base plate has 20 individual 0.25” (6.35 mm) threaded holes that are spaced in a 1” x 1” (25.4 mm x 25.4 mm) grid pattern.

Multi-Function Sample Holder (D02-1017-192)

This multi-function sample holder is designed to measure color, and transmittance haze compliant with ASTM D1003 Procedure B. The reversible design allows both total and regular transmittance measurements by either placing and holding the sample directly against the sphere or the receptor port, ensuring precision, accuracy and consistency of sample placement for films, plastics and liquids. This Sample Holder is also the base unit for other optional Cell Holders and Accessories.

Cell holder for 20mm Flow through Cell (D02-1017-715)

This cell holder magnetically attaches to Total Transmittance port of Vista. Accepts 20mm pathlength by 51mm diameter flow through cell. (HunterLab part # C04-1001-959)

Cell holder for 10mm Flow through Cell (D02-1018-678)

This cell holder magnetically attaches to Total Transmittance port of Vista. Accepts 10mm pathlength by 51mm diameter flow through cell. (HunterLab part # C04-1001-958)

Thin Film Holder (L02-1017-749)

Thin film holder is designed to allow easy preparation and presentation of thin transparent and translucent films for measurement of transmitted color and Haze.

Macro Cell Holder for Haze Measurement (D02-1017-344)

This cell holder is precisely designed to hold glass and plastic macro analytical cells with outside path length dimensions not exceeding 12.32 (path length) x 12.50mm (0.484 x 0.492 inches) for repeatable total transmittance and haze measurements. Requires D02-1017-192 Multi-Function Sample Holder. A starter kit of three PMMA plastic cells is included with this cell holder.

Semi-Micro Cell Holder for Haze Measurement (D02-1017-390)

This cell holder positions semi-micro analytical plastic cells with outside path length dimensions not exceeding 12.42 (path length) x 12.50mm (0.489 x 0.492 in.) for repeatable total transmittance and haze measurements. Requires D02-1017-192 Multi-Function Sample Holder. A starter kit of three PMMA plastic cells is included with this cell holder.

Ultra-Micro Cell Holder (Plastic Cells) (D02-1017-391)

This cell holder positions ultra-micro analytical plastic cells with outside path length dimensions not exceeding 12.50 (path length) x 12.50mm (0.492 x 0.492 in.) for repeatable total transmittance measurements. Requires D02-1017-192 Multifunction Sample Holder. A starter kit of three PMMA plastic cells is included with this cell holder.

Semi-Micro Cell Holder (Glass Cells) (D02-1017-429)

This cell holder positions semi-micro analytical glass cells with outside path length dimension not exceeding 12.47 (path length) x 12.50mm (0.492 x 0.492 inches) for repeatable total transmittance measurements. Requires D02-1017-192 Multifunction Sample Holder. Suggested cell suppliers include Hellma 104-20-20 and Starna 1-SOG-10.

Haze Standard Holder (D02-1017-544)

Provides a holder for positive placement of four inch round haze standards.

Round Vial & Preform Holder (L02-1017-471)

This preform holder is an accessory that requires the Multi-Function Sample Holder (D02-1017-192), securely positioning the preform either vertically or horizontally for accurate transmittance color measurement. It is not intended for Haze measurements of preforms.

Precision Cell Holder Baseplate (D02-1017-224)

The Precision Cell Holder base plate is required for use with the Precision Cell holders for such measurements as ASTM D1500, Saybolt, Gardner, APHA, YI and Transmittance Color. Note: This accessory is not compliant with the measurement of Haze ASTM D1003.

Precision Cell Holder for Plastic Macro Cells (D02-1016-913)

This cell holder is designed to precisely position 10mm macro plastic cells with max outside path length dimensions not exceeding 12.42 x 12.50mm (0.489 x 0.492 in.) for repeatable regular transmittance measurements. Used in combination with the Cell Holder Base Assembly (Vista PN# D02-1017-224), sold separately. A starter kit of three PMMA plastic cells is included with this cell holder.

Precision Cell Holder for Macro Cells (D02-1017-048)

This cell holder is designed to precisely position 10mm macro glass and plastic cells with max outside path length dimensions not exceeding 12.50 x 12.50mm (0.492 x 0.492 in) for repeatable regular transmittance measurements. Used in combination with the Cell Holder Base Assembly (Vista PN# D02-1017-224), sold separately. Hellma part number 100-10-20 and Starna part number 1-g-10 cells have been validated with this cell holder.

Precision Cell Holder - Semi-Micro Cells (D02-1017-050)

This cell holder is designed to precisely position 10mm semi-micro plastic and glass cells with max outside path length dimensions not exceeding 12.42 x 12.50mm (0.489 x 0.492 in.) for repeatable regular transmittance measurements. Used in combination with the Cell Holder Base Assembly (Vista - D02-1017-224), sold separately.

Precision Cell Holder - Ultra-Micro Plastic Cell (D02-1017-051

This cell holder is designed to precisely position10mm ultra-micro plastic and glass cells with max outside path length dimensions not exceeding 12.50 x 12.50mm (0.492 x 0.492 in.) for repeatable regular transmittance measurements. Used in combination with the Cell Holder Base Assembly (Vista - D02-1017-224), sold separately. Brand cells, part number 759200D have been validated with this cell holder.

Glass Cell Holder, 10 mm to 50 mm (D02-1017-122)

This cell holder is designed to precisely position 10 to 50mm glass cells for accurate positioning and repeatable transmittance color measurements. Requires Precision Cell Holder Base Assembly (D02-1017-224, sold separately).

Vial Holder, 25mm Nominal Path Length (D02-1017-576)

This cell holder is designed to precisely position a standard vial with a max outside path length of 27.75 mm (1.09”) for repeatable 25mm nominal path length transmittance measurements. The regular 24mm vial holder D02 1017 576 can only be used for color, not for Haze. Requires Precision Cell Holder Base Assembly (D02-1017-224, sold separately). Vials are purchased by the customer from third party suppliers.

24mm Vial Holder for Haze (D02-1018-759)

This specially designed holder incorporates an optical design that enables the simultaneous measurements of both color and haze of liquid samples in 24mm round vials. This holder is used in combination with Precision Cell Holder Baseplate (D02-1017-224, sold separately). Vials are purchased by the customer from third purchased by the customer from third party suppliers.

Holder for ISO 2R and 4R Vials (D02-1017-129)

Vial holder for ISO 2R (4 mL) and 4R (6 mL) vials (14mm nominal path length). This precision holder positions a standard vial for measurement. Used in combination with the Precision Cell Holder Base Assembly (D02-1017-224, sold separately). This assembly provides accurate positioning for repeatable transmittance color measurements. The simple design ensures proper distance and alignment of the cell or sample, eliminating inconsistencies from cell to cell and user to user. Compatible with cells up to 50mm wide.

ISO 2R/4R Vial Holder for Haze (D02-1018-077)

Vial holder for ISO 2R (4 mL) and 4R (6 mL) vials (14mm nominal path length). The regular round vial holder cannot be used for Haze/NTU measurements. This special 2R/4R vial holder for Haze/NTU has a lens inserted so that user can do color and haze measurement at the same time for samples in round vials. This holder is used in combination with Multifunction Sample Holder (D02-1017-192, sold separately). Vials are purchased by the customer from third party suppliers.

Didymium Diagnostic Filter for Vista (D02-1017-167)

Replacement diagnostic filter used for wavelength verification of the instrument. Didymium filter comes in a holder that magnetically mounts to the receptor side of the sample compartment. Instrument must be returned to Service Center if Factory Read Values are required. (Included with instrument)

Haze Standard Holder (D02-1017-544)

Provides a holder for positive placement of four inch round haze standards.

Haze Check Standard for Vista (D02-1019-161)

This diagnostic standard is used for verification of haze measurement. The haze standard comes in a holder that magnetically mounts to the sphere side of the sample compartment.

ND 50% T Diagnostic Filter (D02-1017-419)

This diagnostic filter is used for performance verification of the instrument. (50% transmittance). The neutral density filter comes in a holder that magnetically mounts to the receptor side of the sample compartment. (Must be purchased at the time of Instrument order to include Factory Read values.)

ND 90% T Diagnostic Filter (D02-1017-480)

Neutral Density filter, 90% Transmittance. The neutral density filter comes in a holder that magnetically mounts to the receptor side of the sample compartment. (Must be purchased at the time of Instrument order to include Factory Read values.)

HunterLab 2 GB USB 2.0 Flash Drive (A10-1013-423)

2 GB USB 2.0 flash drive formatted for customer use with customized code for Setup backup and CSV Datalog export.

USB Barcode Scanner (A13-1018-566)

Barcode Scanner scans product IDs directly into the instrument

USB Cable (Standard A receptacle to Micro A) (A21-1016-453)

USB Cable, (Standard A receptacle to Micro B plug,100mm long) to allow connections to USB devices such as A13-1014-254 bar code scanner, A13-1014-294 keyboard, and A13-1014-259 USB Printer

Vista Grounding Wire Assembly (D02-1017-515)

This optional accessory provides a ground wire with banana plug connector and spade lug terminal to allow grounding of Vista instrument to facility electrical ground. This accessory is useful for users who need additional instrument grounding such as: ESD protection, high static environments, and inter-connection with other systems.

USB Wireless Keyboard and Mouse (L02-1017-434)

Provides a wireless Keyboard and mouse with USB Dongle for easy entry of measurement identifiers. Dongle can plug into the front or rear USB ports. (Rear port requires a USB A to USB micro adapter.)

Cover Glass Kit (L02-1017-505)

The Cover Glass kit provides 10 user-replaceable 1”x1” glass sphere port covers and 2 re-usable gaskets. The cover glass assembly helps to prevent liquids and volatiles from entering the instrument sphere thus reducing service and repair needs. Installation instructions are included with the kit.
*Note: Though minimal, the use of this accessory may affect absolute haze values.

When You Need Assistance

If you need for technical or sales assistance on applications, troubleshooting, , service, warranty, accessory pricing and more, please contact the office nearest you:

For the Americas, Support@hunterlab.com
For Asia, AsiaSupport@hunterlab.com
For Europe, EuropeSupport@hunterlab.com
For India, Middle East and Africa, IMEASupport@hunterlab.com
For all other regions, Support@hunterlab.com

Additionally, our global support website offers 24/7 assistance with a library of information on various color measurement and appearance topics such as applications, instrument operation, and troubleshooting. The HunterLab global support website is located at **support.hunterlab.com**.

For personalized assistance, go to support.hunterlab.com and locate the **Create A Ticket** button on the menu. A subsequent form gathers information on your request for response from our Customer Experience Teams around the globe.

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