Model HI-6113

Laser Data Interface
and Probe Measurement System

User Manual

ETS·LINDGREN™

An **ESCO Technologies** Company

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Revision Record | MANUAL, HI-6113 | Part #H-600098, Rev. H

Revision	Description	Date
A	Initial Release	June, 2005
B	Edits to all sections for updated HI-6113 design; Field Probe content moved to *EMC Field Probes User Manual*; reorganized content, updated format	October, 2006
C	Added *Appendix B: EC Declaration of Conformity*; Updated descriptions of l and r commands in *Appendix A: Operating Protocols*	December, 2006
D	Updated ProbeView™ Laser information	November, 2007
E	Updated download information; rebrand	September, 2008
F	Added *Notes, Cautions, and Warnings*; added *General Safety Considerations*	March, 2011
G	Updated USB driver installation information	October, 2011
H	Updated LASER HOT description in *HI-6113 Indicators*.	November, 2012

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Notes, Cautions, and Warnings

→	**Note:** Denotes helpful information intended to provide tips for better use of the product.
CAUTION	**Caution**: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.
WARNING	**Warning**: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.

→ See the ETS-Lindgren *Product Information Bulletin* for safety, regulatory, and other product marking information.

General Safety Considerations

Class 1M	**LASER HAZARD.** Laser power up to 150 mW at 830 nm may be accessible at the fiber connector of the laser. However, the laser beam itself is not hazardous as the interlock ensures that the exposure time will be less than 30 ms.

INVISIBLE LASER RADIATION – DO NOT
VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
154 mW at 830 nm
CLASS 1M LASER PRODUCT PER
IEC 60825-1:993+A1:1997+A2:2001
EN 60825-1:1994+A11:1996+A2:2001
CDRH Class I LASER PRODUCT

See the ETS-Lindgren *Product Information Bulletin* for safety, regulatory, and other product marking information.

1.0   Introduction

System Description

The **ETS-Lindgren HI-6113 Laser Data Interface and Field Probe Measurement System** consists of:

- HI-61XX Series Field Probe

- HI-6113 Laser Data Interface

- Universal input DC power supply

- Fiber optic cables

- ProbeView™ Laser software download—To download ProbeView Laser, see page 23

See *Minimum Computer Requirements* on page 10 for the computer specifications required to install and operate the HI-6113.

The HI-61XX Series Field Probe contains a photo-voltaic converter that provides power to the probe circuitry when sufficient light power is received by the converter. The light power is generated by a laser in the HI-6113, and is transmitted to the converter through an optical fiber cable assembly. This duplex fiber cable is also used for communication between the Field Probe and the HI-6113.

The HI-6113 is an automated laser controller that accepts commands from the software running on the computer and then returns the requested data. Upon receiving the command to turn on the system, the HI-6113 initiates a startup sequence that turns on the laser, which provides power to the Field Probe. The Field Probe, when powered up and running, continuously sends data to the HI-6113. The HI-6113 returns data to the computer software upon request in either unprocessed raw form or processed form, depending on the requested data format. The USB interface provides the data communication between the computer software and the HI-6113.

The Field Probe system incorporates a safety interlock mechanism that turns off the laser if the HI-6113 does not receive data from the probe within a specified time frame. The safety mechanism is intended to prevent injury from the laser if the HI-6113 issues a command to turn on the laser while the fiber optic cables are disconnected, improperly connected, cut, or damaged.

The universal input power supply provides 5 volts DC power to the HI-6113.

Minimum Computer Requirements

To install ProbeView Laser and operate the Field Probe and HI-6113, you must have an Intel® Pentium® III computer with one USB port, installed with one of the Microsoft® Windows® operating systems; see page 18 for a list of supported operating systems. An externally powered USB hub may be required for computers without a USB port.

➡ Due to the graphics in ProbeView Laser, a 300 MHz processor or better is desirable. A slower machine will run ProbeView Laser, but the sample rates will be slower. Toggling off the bar and scatter graphs may increase sample rate performance.

Sample Setup (computer not included)

ETS-Lindgren Product Information Bulletin

See the ETS-Lindgren *Product Information Bulletin* included with your shipment for the following:

- Warranty information

- Safety, regulatory, and other product marking information

- Steps to receive your shipment

- Steps to return a component for service

- ETS-Lindgren calibration service

- ETS-Lindgren contact information

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2.0   Maintenance

CAUTION

Before performing any maintenance, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

Maintenance of the HI-6113 is limited to external components such as cables or connectors.

If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.

Laser Probes and Maintenance of Fiber Optics

The fiber optic connectors and cables used with laser-powered probes can be damaged from airborne particles, humidity and moisture, oils from the human body, and debris from the connectors they plug into. Always handle connectors and cables with care, using the following guidelines.

Before performing any maintenance, disconnect the fiber optic cables from the unit and turn off power.

When disconnecting fiber optic cables, apply the included dust caps to the ends to maintain their integrity.

Before connecting fiber optic cables, clean the connector tips and in-line connectors.

Before attaching in-line connectors, clean them with moisture-free compressed air.

Failure to perform these tasks may result in damage to the fiber optic connectors or cables.

Replacement and Optional Parts

Following are the part numbers for ordering replacement or optional parts for the HI-61XX Series Field Probe.

Part Description	Part Number
Laser Data Interface Probe Kit Manual	H-600098
Cable Assembly, Fiber, FC-FC, ST-ST	H-491263-xx (*xx* = length in meters)
ST to ST Inline Connector	708027
FC to FC Inline Connector	H-23861521000
Tripod, Dielectric, Field Probe	H-491009
Probe Stand	H-491269

Service Procedures

For the steps to return a system or system component to ETS-Lindgren for service, see the *Product Information Bulletin* included with your shipment.

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3.0   Quick Start to Operation

CAUTION

Before connecting any components, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.

Download and Install the Software

Download ProbeView™ Laser software from www.ets-lindgren.com, and then install it on the host computer. For download and installation steps, see *ProbeView Laser Software* on page 23.

Connect the Hardware

1. Remove the protective caps from the fiber optic cables for the HI-61XX Series Field Probe and clean the connectors with the provided cleaning kit.

➔ When disconnecting and connecting the fiber cables, always clean the ends prior to re-connecting.

2. Remove the protective caps from the HI-6113 Laser Data Interface and use compressed air to dislodge any obstruction within the connectors.

3. Connect the fiber optic cables by matching **ST** to **ST** and **FC** to **FC**. Both connectors are keyed.

4. Connect the standard end of the USB cable to an available USB port on the host computer.

5. Connect the mini-USB end of cable to the HI-6113.

6. Connect the DC power supply to the HI-6113. The power LED on the HI-6113 should indicate green, and Microsoft® Windows® will recognize and acknowledge the HI-6113.

7. The USB driver for the HI-6113 automatically downloads and installs when the HI-6113 is plugged into a computer that is connected to the Internet and that is installed with one of the following supported Microsoft Windows operating systems:

- Windows XP operating system

- Windows Vista® Client operating system

- Windows Vista Client x64 operating system

- Windows 7 Client operating system

- Windows 7 Client x64 operating system

➡ If you use an operating system not listed, please contact ETS-Lindgren.

If your computer is not connected to the Internet, or it is connected but the automatic installation failed or was cancelled, you will need to download the drivers from www.ets-lindgren.com and manually install them on your computer.

- Go to www.ets-lindgren.com.

- On the **Resources** menu, click **Software/Firmware**.

- In the **Software** column, click **USB Virtual Comm Port Driver** (the name of the zip file may vary slightly). Save the zip file to the desired location on your computer.

- Extract the files from the downloaded zip file.

- In the same section on the ETS-Lindgren website where the driver is located, click the link to download the installation instructions. Follow those instructions to install the USB driver on your computer.

Run a Warm Up Period

Prior to starting a test, allow time for the Field Probe to warm up. Depending on the ambient temperature, 5 to 10 minutes of run time are required for a sufficient warm up period.

Run the System

For information on starting and using ProbeView Laser, see *Running ProbeView Laser* on page 24.

Field Probe Operating Protocols

For information on operating protocols, including command structure, commands, and error codes, see *Appendix A: Operating Protocols* on page 43.

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4.0   HI-6113 Indicators

WARNING

Use of controls or adjustments, or performance of procedures other than those specified may result in hazardous radiation exposure.

CAUTION

Before connecting any components, follow the safety information in the ETS-Lindgren Product Information Bulletin included with your shipment.

➜   For complete information on the HI-61XX Series Field Probe, see the separate Field Probe manual.

The HI-6113 Laser Data Interface contains the laser for powering the Field Probe, and also handles the communication between the probe and the host computer.

The first two LEDs on the front of the device indicate the status of the laser:

- **LASER HOT (red)**

  - **Constant On—**This is a warning that the laser is running too hot and the system should be checked. Dirty fiber ends, poor inline connections, or damaged fiber cables are among the causes of a **LASER HOT** warning. The system should be shut down as soon as possible, and the cause of the additional heat investigated. Continuing to run in a **LASER HOT** state will reduce the life of the HI-6113.

  - **Flash—**This is an indication that the laser current is approaching 0.8 mA. During the initialization phase of the startup process the HI-6113 provides the probe with more light and then rolls back the power to a normal level. In these instances the user may see **LASER HOT** flash on; this is normal operation.

- **LASER OK (blue)—**This is the normal status when probe communication is established and the HI-6113 is providing laser light to the Field Probe for power.

- **RECEIVE (amber)** and **TRANSMIT (white)—**These are illuminated during normal use. **RECEIVE** indicates the communication between the Field Probe and the HI-6113, and **TRANSMIT** indicates the communication between the host computer and the HI-6113.

- **POWER (Green)—**This indicates that the HI-6113 is using power from the DC power supply. This should be lit as soon as the HI-6113 is connected to the power supply.

5.0 ProbeView Laser Software

The ProbeView™ Laser software provides real-time display, logging, and analysis of Field Probe data. It displays a variety of test information, both numerically and graphically.

Download and Install ProbeView Laser

See *Minimum Computer Requirements* on page 10 for the computer specifications required to install and operate the Laser Data Interface and Field Probe Measurement System.

1. Go to www.ets-lindgren.com.

2. On the **Resources** menu, click **Software/Firmware**.

3. In the **Software** column, click **ProbeView Laser**.

4. Save the ProbeView Laser zip file to the desired location.

5. Navigate to the location of the saved ProbeView Laser zip file, and click to open.

6. Click **setup.exe**. ProbeView Laser installs in **C:\Program Files\ProbeView**.

The first time the HI-6113 is used with the host computer, you may need to download and install the USB driver. For more information, see *Connect the Hardware* on page 17.

Start ProbeView Laser

1. **Start ProbeView Laser.** Click **Start**, **All Programs**, **ProbeView**, and then click **ProbeView Laser**.

2. **Verify the communications port.** Connecting the HI-6113 Laser Data Interface to a USB port automatically assigns the communication port number. To change which communication port is assigned to the HI-6113:

   - Plug the HI-6113 into a USB port on the computer.

   - Open the **Device Manager**.

   - Click **Ports (COM & LPT)**.

   - Click the name of the USB device.

   - Click the **Port Settings** tab.

   - Click **Advanced**.

   - Click **COM Port Number** and select the desired COM port.

   - Click **OK**, and then click **OK**.

➔ If the communications port is not set up, the software will indicate the default port is not correct. See *Communications Menu* on page 31 for information on selecting the correct port.

3. **Receive information from the Field Probe.** Click the start button located on the right side of the menu bar. Some of the LEDs on the HI-6113 flash as information transfers to the HI-6113. When complete, a message will indicate that the Field Probe is connected, and field readings will display.

   Select the bar graph icon on the menu to change the peak graph to the manual commands menu. The area is used to control the HI-6113, and includes additional commands and system information.

4. ProbeView Laser will continue to look for a Field Probe until one is detected. Automatic testing will be done to determine the type of Field Probe that is attached. If the HI-6113 is connected to the selected communication port, the LEDs on the HI-6113 will flash.

ProbeView Laser Main Screen

The main screen displays the field strength or power density readings of the Field Probe. The data is displayed as numeric values and graphs.
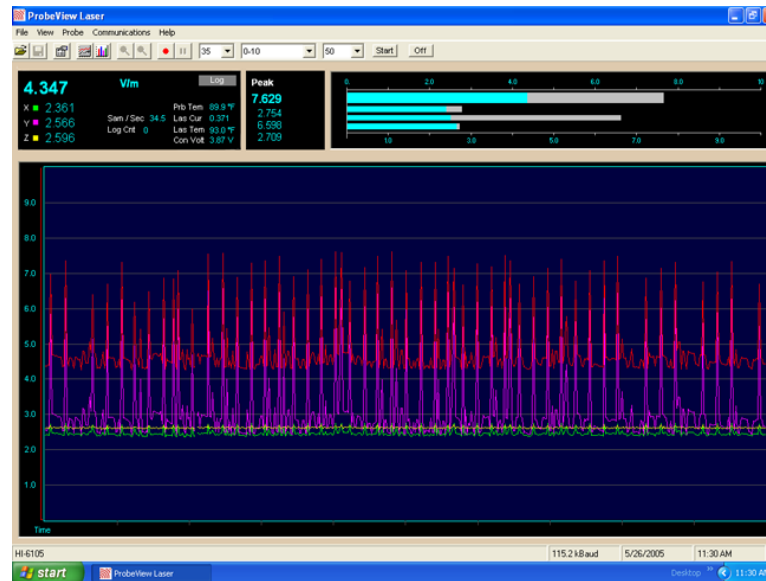
ProbeView Laser Menus

ProbeView Laser commands are organized into a series of menus: **File**, **View**, **Probe**, **Communications**, and **Help**. The following example screens assume a Field Probe is active and collecting data.

FILE MENU
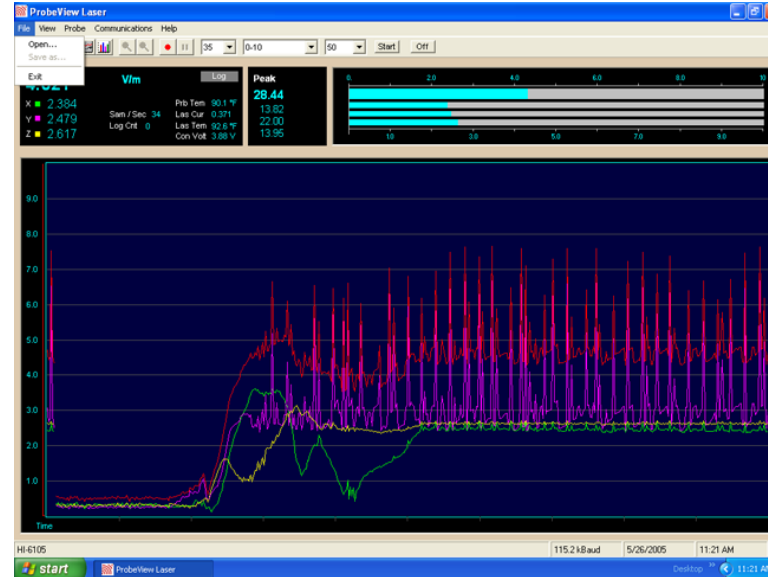
File Menu	Description
Open	Select and open a file that was previously logged and saved by ProbeView Laser.
Save As	Saves logged data to a file. ProbeView Laser, by default, will assign **csv** as the file type. This is a comma-separated values file that may be opened in several data analysis programs, including Excel.
Exit	Exit ProbeView Laser.

VIEW MENU

View Menu	Description
Moving Average (Human Exposure)	Monitors the human exposure to EMF. Readings are sampled at one per second, and divided by the number of samples in the selected moving average period. When the moving average is started or reset, all the samples begin at zero. For every second during the first period of the selected moving average period, one of the zeros is replaced with a reading. At the end of the first period of the selected moving average period, the oldest reading is replaced with a new reading. This continues until the moving average is reset, which begins a new moving average.

View Menu	Description
Bar Graph	Displays the field intensity or power density for each axis and the combined field intensity of the X, Y, and Z axes.
Scatter Graph	Displays the data in graph form. Live probe data will not be plotted unless **Scatter Graph Live** is enabled.
Scatter Graph Live	After probe data is logged it may be viewed in the graph. Live probe samples are not plotted while viewing previously logged data. This function toggles back to view live probe data. Data is not saved unless logging is turned on.
Header Notes	Displays information about previously logged data that was saved and then reloaded into ProbeView Laser. The **Header Notes** are saved with the data when it is exported to a **csv** file.
Options	Sets screen colors, averaging, and so on.

PROBE MENU
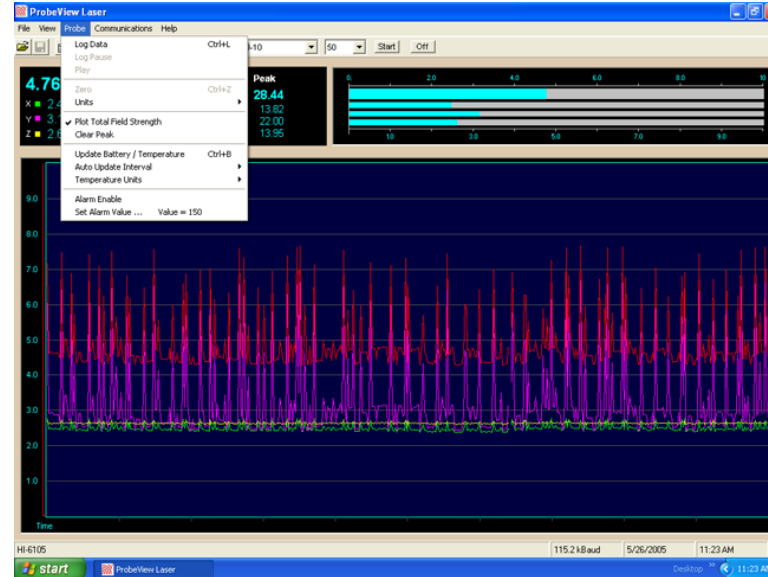
Probe Menu	Description
Log Data	Activates the program to record data from the probe. Data not saved during a previous logging session will be lost. Use **Log Pause** to append existing data.
Log Pause	Pauses probe data logging.
Play	Plays previously recorded data. Data must be reloaded to reply.
Zero	Zeros the probe. Make sure that the probe is in a zero field environment before pressing this button. This feature cannot be accessed while data logging is active. **Note:** Some probes do not support zeroing.

Probe Menu	Description
Units	Sets the units of measure in which data will be viewed and collected. The available units are probe-dependent.
Plot Total Field Strength	Disables plotting of the total field strength. Only the orthogonal values are plotted.
Clear Peak	Clears the peak values. The peak values are automatically cleared at the start of a new log session. The user is not allowed to clear the peak values manually during logging.
Update Battery/Temperature	Causes the probe to immediately update current battery status and temperature information.
Auto Update Interval	Updates the battery status and temperature at the selected interval: **Off**, **5 minutes**, **30 minutes**, or **60 minutes**. Battery status and temperature are not updated during logging.
Temperature Units	Fahrenheit or Celsius
Alarm Enable	Enables an audio alarm to indicate a preset field level has been exceeded.
Set Alarm Value	Sets the value that will trigger the audio alarm.

COMMUNICATIONS MENU
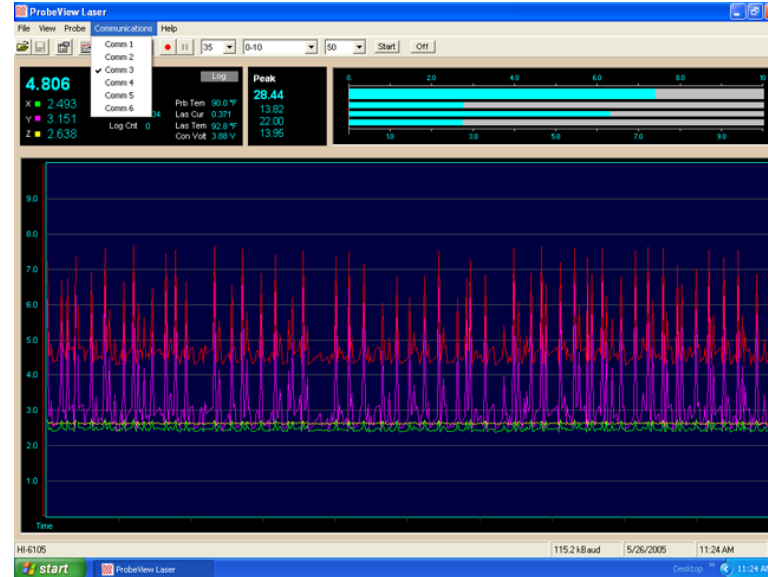
Communications Menu	Description
Comm. 1	Select communication port 1.
Comm. 2	Select communication port 2.
Comm. 3	Select communication port 3.
Comm. 4	Select communication port 4.
Comm. 5	Select communication port 5.
Comm. 6	Select communication port 6.

Once selected, the port number is written to **probeviewII.cfg**, and the communication port number is set as the default.

HELP MENU

Help About: Provides information about the software revision and probe in use.
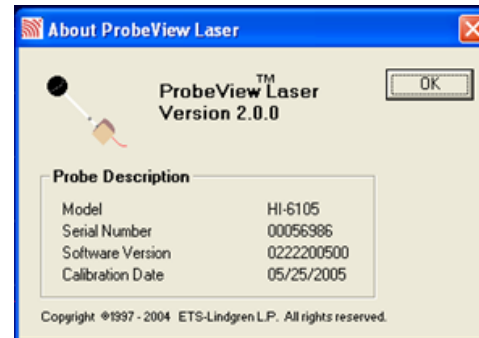
Probe Interaction Screen

These areas may be displayed in the ProbeView Laser main screen:
Moving Average, **Bar Graph** and **Scatter Graph**. The **Peak** screen and
Probe Status screen are always active.

Probe Status Screen	Description
Field	Combined value of the X, Y, and Z axes. This value is the square root of the sum of the squares when working with linear units.
X	Value from X-axis reading.
Y	Value from Y-axis reading.
Z	Value from Z-axis reading.
Units	Units of field strength or power density. Right-click this label to scroll through available units.

Probe Status Screen	Description
Sam/Sec	Samples per second.
Log Cnt	Total number of data points that have been logged or recorded.
Log	A red icon indicates that data is being recorded. Normal operation is gray.
Prb Tem	Internal temperature of the probe.
Las Cur	Laser Current
Las Tem	Laser Temperature
Con Volt	Converter Voltage

Communication Status
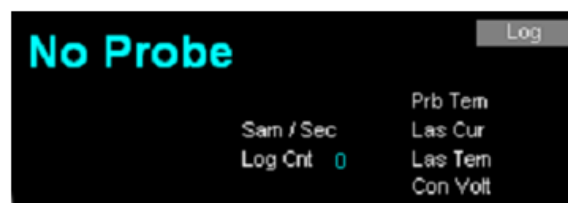
Communication Status	Description
No Probe	Probe is not connected properly or there is a problem with the fiber.

FIELD INTENSITY

The total field strength or power density is shown at the top in the large font. In a non-squared unit, this reading is the square root of the sum of the squares of the X, Y, and Z axes. The orthogonal components for the X, Y, and Z axes are displayed in a smaller font.

UNITS

The units of field strength or power density available for the attached probe. Clicking on the **Units** label scrolls through the available units.

 The units cannot be changed while logging.

TEMPERATURE

The temperature returned from the Field Probe. Units may be switched between Fahrenheit and Celsius using the menu. The temperature may be updated by clicking the **Prb Tem** label.

PROBE INFORMATION

The probe type is displayed in the lower left status bar. Additional information may be available by selecting the **Help** menu.

PEAK

Shows the maximum field value since the last time the value was cleared. To clear this value, click on the **Peak** label or the Bar Graph. The peak values will be automatically reset at the start of logging. The peak field values cannot be cleared manually during data logging.

BAR GRAPH

Displays the data for the probe that is currently in use.

Bar Graph Display	Definition
Field	The combined X, Y, and Z values.
X-Data	Value displayed by X-Value.

Bar Graph Display	Definition
Y-Data	Value displayed by Y-Value.
Z-Data	Value displayed by Z-Value.

Using Excel with ProbeView Laser

The data is saved as a **csv** file type (comma separated values) for analysis by a variety of software. For example, Excel recognizes this format to allow easy loading of the data.

Click on the **csv** data file you want to view. By default, the data is stored to the application path **C:\Program Files\ProbeView Laser**. When data in excess of 32k samples is saved, the data is saved in multiple files containing 32k samples each.

Options Window
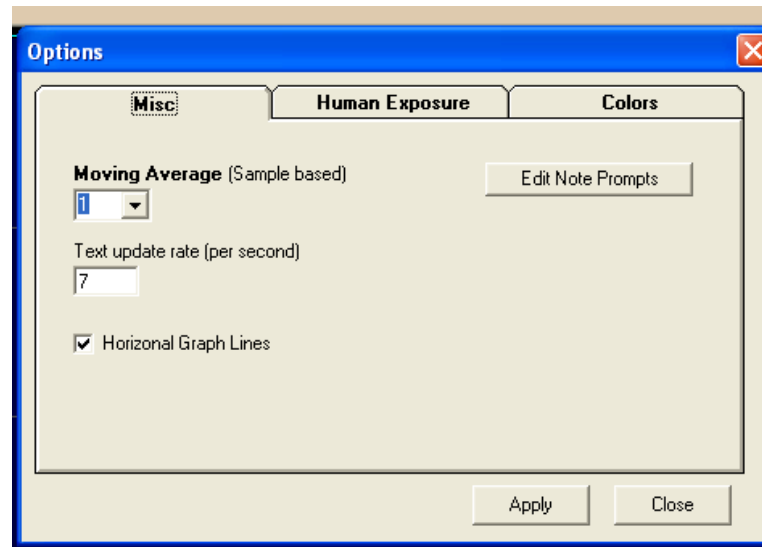
MOVING AVERAGE

ProbeView Laser may be set to provide a moving average of up to 50 samples. A setting of **1** indicates no averaging.

TEXT UPDATE RATE

Allows the user to set the text update rate in the **Probe-Status-Box** to a readable rate. With an HI-61XX Series Field Probe, ProbeView Laser can acquire more than 70 samples per second. If every sample were displayed in text format, fast sample rates would become unreadable.

ANNOTATING LOGGED DATA

ProbeView Laser will prompt the user for information about the logged data that is saved. These prompts are configurable. To configure the prompts:

- Select the **Options** window.

- Click the **Misc** tab.

- Select **Edit Note Prompts**. The **prompt**, **prompt-identifier**, and **last-user-entry** are stored as a single line in the file.

The **prompt** is the text preceding the first comma.

The text preceding the first comma is the **prompt-identifier**, which is written to the saved data file with the user response to the prompt.

The **last-user-entry** is the last response the user gave to the prompt. It is also saved in the prompt file.

COLORS
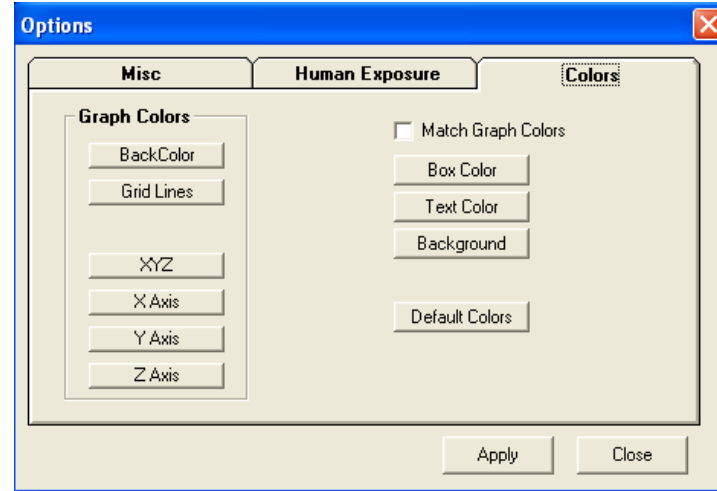
ProbeView Laser colors may be customized to personalize the display. Some color combinations are not recommended. Avoid using light colors as the **Box-Color**; the white text in the **Probe-Status-Area** is not changeable. Avoid using red or yellow as the **Text-Color**, because red and yellow are used to indicate over and under range condition.

The **Bar Graph** colors may be set to match the individual colors set in the **Graph Colors** frame by checking **Match Graph Colors**.

Human Exposure
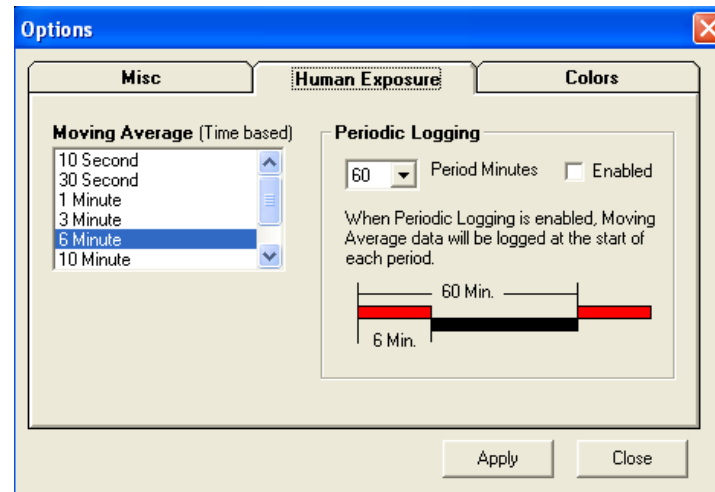
Time based averaging is available to measure human exposure to EMF. Data samples are collected at one-second intervals for a specific time period. The samples are averaged over that time period, also known as the **Threshold Limit Value**.

Miscellaneous

SAMPLE LIMIT

ProbeView Laser has a 512,000 data points limit before the data needs to be saved to a file. The log function will disengage automatically if this limit is reached. No other indication will be given.

AUTO UPDATE INTERVAL

Sets the time interval at which the probe temperature, laser current and temperature values are updated. These values can be updated immediately by clicking on the **Temp** label.

➜   These values are not updated during data logging.

Sample Rate

The sample rate is controlled with a list on the toolbar. The actual sample rate that is achieved depends on the features that are enabled and the type of probe. The actual sample rate may also vary depending on the speed of the computer and how busy it is performing other operations. The **Sam/Sec** label indicates the actual sample rate.

→ Avoid other tasks during data logging, or the sample rate may vary. Irregular time stamp intervals in the recorded data can occur if this is ignored.

Zoom-In / Zoom-Out

The **Zoom-Out** button becomes active after data has been recorded or data has been loaded from a file. To view the data after a recording session, click the **Zoom-Out** button. The graph is capable of displaying a maximum of 32,000 data samples. To view data in excess of 32k samples, the data needs to be saved to a file. The data will be saved in multiple files of 32k samples each. These files can be individually loaded for later viewing.

To use the Zoom-In function, click the **Zoom-In** button, then click the graph and hold down the mouse button. Drag the mouse pointer down and to the right to select the area, and then release the button when the appropriate area is selected. The Zoom-In function only zooms the horizontal axis, not the vertical. Click the **Scatter-Graph-Live** button to return to viewing live probe data.

Human Exposure (Health and Safety)

To use this feature, select the **View** menu and enable **Moving Average**. The **Moving-Average-Box** will display on the main screen. Enabling **Moving Average** changes the log function to record one sample per second over the selected time period (for example, a six-minute average will average and record 360 data samples). Click the **Log** icon to measure and record the time-based-exposure to EMF. An elapsed timer will display the time of exposure along with the moving average. The **Elapsed Time** label will flash when the selected time interval is reached.

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Appendix A: Warranty

➡️ See the *Product Information Bulletin* included with your shipment for the complete ETS-Lindgren warranty for your HI-6113.

DURATION OF WARRANTIES FOR HI-6113

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to three years.

Product Warranted	Duration of Warranty Period
HI-6113 Laser Data Interface and Field Probe Measurement System	3 Years

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Appendix B: Operating Protocols

Communication Protocol

Data Type:	RS-232 Serial
Data Mode:	Asynchronous
Word Length:	8 bit
Parity:	N
Stop Bits:	1
Data Rate:	115,200 baud

Information Transfer Protocol

The HI-61XX Series Field Probe responds to commands from another device; it transmits no data without first receiving instructions to do so.

COMMAND STRUCTURE

See the following pages for detailed information regarding the command structure to the Field Probe. When the Field Probe completes the command, it responds with a string consisting of:

- A start character (":")

- The command letter

- Data (if required)

- <CR> (a carriage return)

If the command does not require the probe to return any data, the probe simply responds with the start character (":") then the command letter and a carriage return. If an error occurs, the Field Probe responds with an error code.

COMMANDS

All probe commands return **:E7** when the probe is turned off.

Command	Description	Response
B<CR>	Read probe converter voltage	*:Bxx.xx<CR>*
BP	Read probe converter voltage in hexadecimal format	*:B64N* • *N*=safe operating level • *F*=fail level Voltage reported as 0–64; 64 corresponds to 100%

→ The **BP** command is provided for backward compatibility and should not be used to monitor the converter voltage, which always responds with *:B64N<CR>*.

Command	Description	Response
D3	Read probe data	*:Dx.xxxyy.yyzzz.zB<CR>* • *xxxx*, *yyyy*, *zzzz*= 4-digit axis values with floating decimal point • *B*=battery flag, *N* or *F*
D5	Read probe data	*:Dx.xxxyy.yyzzz.zcccc.B<CR>* • *xxxx*, *yyyy*, *zzzz*= 4-digit axis values with floating decimal point • cccc=composite field value with floating decimal point • *B*=battery flag, *N* or *F*

Command	Description	Response
I	Identification command	*:I6105<sr><sn><cd>B<CR>* • *sr*=10-character software revision • *sn*=8-character serial number • *cd*=8-character calibration date • *B*=battery flag, *N* or *F*

The Identification command, **I**, may also be used as the first command sent. The command will turn on the laser. Once communication between the probe and the HI-6113 is established, the return string will be sent. Subsequent **I** commands immediately send the return string.

Command	Description	Response
TC	Read temperature in Centigrade	*:Txxxx.<CR>*
TF	Read temperature in Fahrenheit	*:Txxxx.<CR>*
<Null><CR>	Send the ASCII null character	*:N<CR>*

<Null><CR> is a special command that can be used as the initial command to the Field Probe **after** it is turned on.

HI-6113 LASER DATA INTERFACE COMMANDS

HI-6113 Command	Description	Probe Response
i	Laser data interface identification string	*:i6113<sr><sn><CR>* • *sr*=10-character software revision • *sn*=8-character serial number
n	Read laser current	*:nx.xxx.<CR>*
o	Laser OFF command	*:o* The laser and all LEDs except the green Power LED will turn off
r	Laser ON command	*:r* The blue Laser LED will illuminate immediately, then the yellow Receive LED will illuminate a few seconds after, indicating the probe is ready for operation

➜ The Laser ON command, **r**, should be the first command sent.

HI-6113 Command	Description	Probe Response
tc	Read temperature in Centigrade	*:txxxx.<CR>*
tf	Read temperature in Fahrenheit	*:txxxx.<CR>*

Error Codes

If an error occurs, the probe will respond with one of the following strings. These strings begin with a colon and end with a carriage return.

E1   Communication error (for example, overflow)

E2   Buffer full error; too many characters contained between the start character and carriage return sequence

E3   Received command is invalid

E4   Received parameter is invalid

E5   Hardware error (for example, EEPROM failure)

E6   Parity error

E7   Probe commands are not available unless the Field Probe is powered on. To power on the probe, send the Laser ON command, **r**. For more information on the **r** command, see page 46.

E9   Received command is invalid

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Appendix C: EC Declaration of Conformity

ETS · LINDGREN
An ESCO Technologies Company

CE

Declaration of Conformity

We, ETS-Lindgren, L.P., 1301 Arrow Point Drive, Cedar Park, TX, 78613, USA, declare under sole responsibility that the:

Model/Part Number: HI-6105/ HI-6113

Model/Part Name: Electric Field Probe/Laser Data Interface

Date of Declaration: April 30, 2005

to which this declaration relates, meets the requirements and is in conformity with the relevant EC Directives listed below using the relevant section(s) of the following EC harmonized standards and other normative documents;

Applicable Directive(s):

Low Voltage Directive (LVD), 73/23/EEC and its amending directives

Electromagnetic Compatibility Directive (EMC), 89/336/EEC and its amending directives

Applicable harmonized standard(s) and/or normative document(s):

EN 50082-1:1997 Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial and light industry
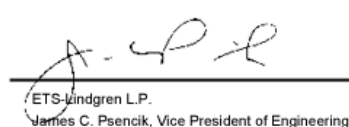
EN 55011: Electromagnetic emissions requirements for Industrial, Scientific and Medical (ISM) Equipment

EN 61010-1:1993 Safety requirements for electrical equipment for measurement, control, and laboratory use

Authorized Signatories:

ETS-Lindgren L.P.
Bryan Sayler, General Manager

ETS-Lindgren L.P.
James C. Psencik, Vice President of Engineering

The authorizing signatures on this Declaration of Conformity document authorizes ETS-Lindgren, L.P. to affix the CE mark to the indicated product. CE marks placed on these products will be distinct and visible. Other marks or inscriptions liable to be mistaken with the CE mark will not be affixed to these products.

ETS-Lindgren, L.P. has ensured that technical documentation shall remain available on premises for inspection and validation purposes for a period ending at least 10 years after the last product has been manufactured.