

HAZ-SCANNER

User Guide

V.7.7



HAZ-SCANNER System – Tripod Mounting

Table of Contents

Definitions	3-4
Quick Start Guide	4-8
HAZ-SCANNER Systems Description	5-10
HAZ-SCANNER Operation	11
Power Considerations	12-13
HAZCOMM-PRO Software Functions	14-16
Set Date Instructions	16-17
Date Format Change	18-19
Help/Registration Form	20
HAZ-SCANNER Front Panel Logging	21
Retrieve Data	22-25
View Uploaded Data	26-29
Graphing Data	29-31
View Current Data	32
Sensor Alarms	32-33
Reports	34
Setting Alarms	35-37
HAZCOMM-PRO Navigation	38
HAZCOMM-PRO Find Feature	39-42
Thumb Drive Management	43-49
Troubleshooting	50-52
Particulate Sensor Calibration	53-58
Gas Sensor Calibration	59-62
Particulate Sensor Accessories	63-67
Tripod Mounting	68-69
Accessories Installation and Use	70-76
Powering Options – Installation and Use	78-91
Optional Meters	92-106
Wireless Systems Installation	107-112
Wireless Systems Configuration	113-114
Wireless Systems Powering	115-117
Wireless Antennas	118
Sensor Specifications	119-131
Contact Information	132
Appendix	133-138

Definitions

HAZCOMM-PRO: Custom software for the control and monitoring of HAZ-SCANNER instruments. HAZCOMM-PRO software provides the ability to monitor HAZ-SCANNER instruments' real time sensor data, create custom graphical displays and generate detailed reports.

HAZ-SCANNER: An Environmental Devices Corporation instrument capable of measuring potentially harmful gases and particulates in addition to other existing environmental conditions.

Header: Detailed HAZCOMM-PRO information regarding the instrument's data set. Users may enter information related to the data set in the Header menu screen. Information about data sets may contain the following details:

- Latitude and Longitude
- Date
- Time
- Elevation
- Descriptive site comments
- Name of person collecting data
- Address/location of site
- Sensor lists
- Logger ID
- Set alarm levels
- Additional information

Note: The Header may be printed on reports or may be printed separately.

Logger: The HAZCOMM-PRO logger contains information regarding the existing profile of HAZ-SCANNER instruments, including sensors, serial number, the ability to perform HAZ-SCANNER functions such as logging data, graphing etc.

Logger ID: The serial number of the instrument.

Header ID: A unique number identifier assigned by the user.

Layout: The Layout is a pull down HAZCOMM-PRO menu pointing to special HAZCOMM-PRO features. The Layout menu is primarily intended for use when troubleshooting or calibrating HAZ-SCANNER instruments. Please use the software **Navigation** buttons to access most software features.



Dashboard: A real-time display of current instrument sensor data. This display is regularly updated to reflect changes in sensor data and alarm activity based on user alarm threshold settings.

Quick Start Guide

Computer Requirements

Specifications

- Windows XP or higher operating system, i.e., Windows Vista, 7, 8, 8.1, 10
- Hard drive with at least 500 MB (Megabytes) of free disk space
- 2 GB of RAM (memory)
- PC or Mac computers with one available serial data COM port or an external Serial-to-USB adapter (used for connecting to devices with serial data interfaces)

Install HAZCOMM-PRO Software

Step 1: Create a new folder named “**Hazscanner**” in the C:\ root drive (Windows).

Step 2: Unzip the contents of the supplied thumb drive to the Hazscanner folder created in Step 1 (Windows) or to your Applications folder (Mac).

Step 3: Create an ‘**Uploads**’ folder on desktop or preferred directory.

Step 4: Open the file location where the HAZCOMM-PRO software was extracted and open the “**HAZ-SCANNER**” folder. Highlight the **Hazscanner.exe** file. Right click on this file and select “**Create Shortcut**”. **Use this shortcut to execute the HAZCOMM-PRO software application.**

Step 5: Please copy the contents of the EDC supplied thumb drive to a new folder on the computer and store the original thumb drive for safekeeping. Do not remove the serial number label from the thumb drive.


Note: Always ensure your Serial-to-USB adapter is connected to a computer USB port before launching the HAZCOMM-PRO software. A valid computer serial port must be configured prior to starting the HAZCOMM-PRO software.

Start HAZCOMM-PRO Software (username is **admin**, password is **admin**).

Step 1: The HAZ-SCANNER instrument battery should be charged for 24 hours (**LED = Green**) and the HAZ-SCANNER system powered **ON** at least 15 minutes prior to use. Connect the battery charger to the instrument if necessary. The logon username is **admin** and the password is **admin**.

Step 2: In the HAZCOMM-PRO **Preferences** menu, check to ensure the correct serial port is selected as shown below.

Set Serial Port Preferences

Port Name 

Second Port Name (optional)

Port Radio (optional)

Note: If the correct Serial-to-USB adapter serial port is not displayed, click on the **Port Name** box and select the correct serial port. Click **Cancel** when the **Change ports** dialog appears.

Step 3: From the HAZCOMM-PRO **main** screen, click **Connect** to enable communications between the HAZCOMM-PRO software and one or more HAZ-SCANNER instruments as shown below.

Main
Preferences
Header
Data
Report
Help

EPAS - Serial Number: 914011

Open Data File



Connect

Remove Data

Print Labels

View Current Data



HAZ
SCANNER



Environmental
Devices
Corporation

4 Wilder Drive, Building 15
Plaistow, NH 03865
ph: (800) 234-2589
www.hazdust.com

Logger OK ☐

Serial #

Logging (0 or 1)

Current Header

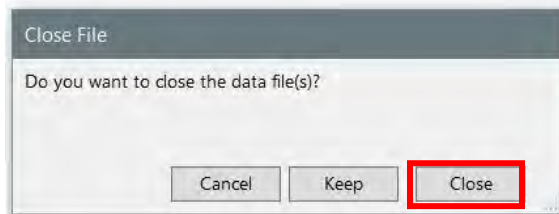
HazScanner v.7.05

HAZ-SCANNER Connect Control

HAZ-SCANNER User Guide – Version V.7.7

Step 4: When establishing a connection to a HAZ-SCANNER instrument you will be asked if you prefer to keep the existing data file. The choices are:

- **Cancel** – And save file if the data file was from a viewing data action
- **Keep** – Only if data file was not previously saved (not recommended)
- **Close** – You will be prompted to save the data file (recommended)



HAZCOMM-PRO Data File Choice Dialog

Step 5: Once the HAZCOMM-PRO software is communicating with one or more HAZ-SCANNER instruments, start instrument logging by clicking the “**Start Logging**” control as shown below.



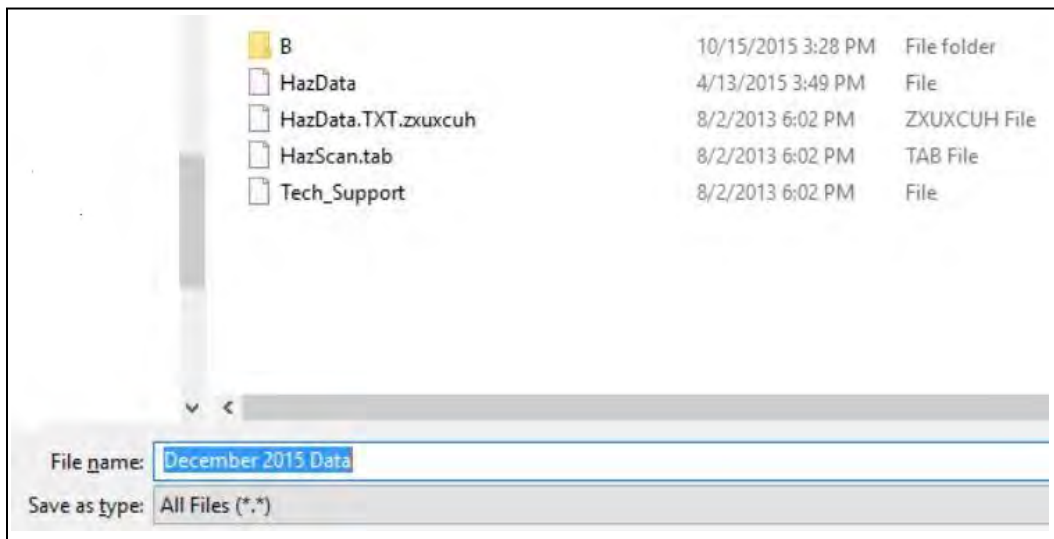
HAZCOMM-PRO Start Logging Control

HAZ-SCANNER User Guide – Version V.7.7

Note: After starting instrument logging, wait a few moments to enable the instrument to log sensor data before proceeding.

Note: A new header should be created if you have turned logging **OFF** since the last data upload otherwise the data file will not include a time gap. If you are not logging and there is no new data in the HAZ-SCANNER instrument you may use the old header or you may prefer to append the new data to the last upload. Under the **View Current Data** section you will find instructions how to create reports from multiple headers.

Step 6: To upload instrument data, use the HAZCOMM-PRO main screen “**Retrieve Data**” control. Depending on the size of the stored data file, this action may take a few moments to complete. You will be asked to provide the file location where the data will be stored. Select the **Uploads** folder as shown below and provide a meaningful filename or accept the default filename.

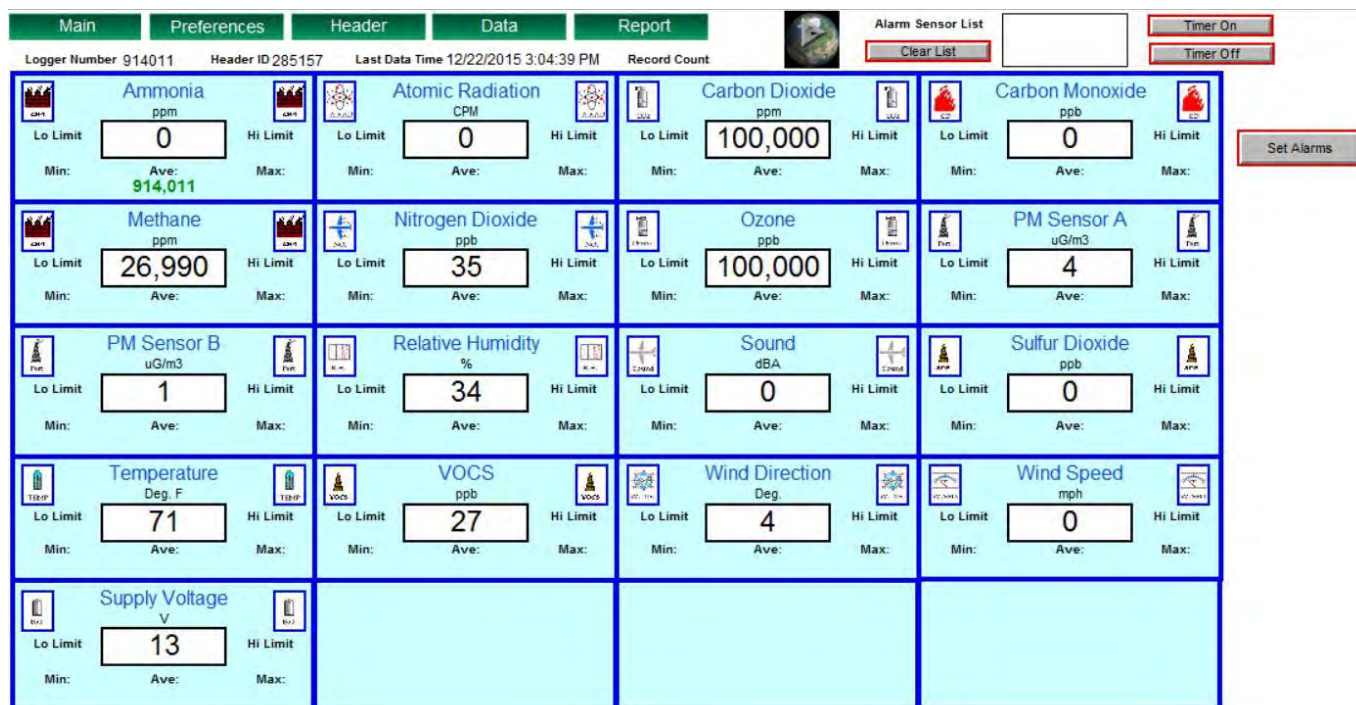


Storing Retrieved Data in the Uploads Folder

Note: You will be asked if you wish to erase instrument data once the current data is stored. It is recommended that once data is retrieved from the instrument, instrument data should be erased.

Step 7: To display current sensor data, click on the main screen “**View Current Data**” control. Current instrument sensor data will be displayed as shown below. Displayed instrument data in the ‘dashboard’ display will be refreshed in one minute intervals. It is normal for the display to flash while retrieving instrument data.

HAZ-SCANNER User Guide – Version V.7.7



Current Instrument Sensor Data Dashboard Display

Note: Current sensor data will be refreshed approximately once each minute while logging and once every 6 seconds when not logging.

End of Quick Start Section

HAZ-SCANNER Systems Description

Features

Each HAZ-SCANNER system is manufactured according to the customer's sensor specifications. Although individual systems may include different numbers and types of sensors and meters, the software is self-configuring and determines which sensors and meters are installed at any given time.

There is very little the user needs to know about the instrument data logger in terms of its operation since the system is designed as 'Plug and Play.' Users will not have to set up sensors on specific channels or provide any technical sensor data. The Plug and Play feature refers to replacing sensors originally purchased from the manufacturer. If new sensors are added to the system, the instrument needs to be returned to Environmental Devices Corporation for modification. The HAZ-SCANNER logger is self-configuring and all relevant calibration data and other technical specifications are stored in battery-backed up memory before each unit is shipped. Turning the system ON and OFF has no effect on data stored in memory; however, calibration settings are reset to factory settings when the machine is powered **OFF** and **ON** unless reprogrammed by the end user. Environmental Devices Corporation recommends annual factory service and calibration.

The HAZ-SCANNER system has an exclusive self-zeroing feature which cycles on every 60 minutes. This feature may be triggered more often with a change in temperature. You can determine when this action is occurring because the internal pump will generate a different sound. The self-zeroing operation requires 6 to 8 minutes to complete. During these clean air purge events the instrument sensors store the last valid readings.

Introduction

The portable HAZ-SCANNER™ system is portable and easily deployable as an ambient air quality monitor to measure and document critical U.S. EPA criteria pollutants including nitrogen oxide, sulfur dioxide, ozone, carbon dioxide, particulates, VOCs, Nitrogen dioxide and more. The HAZ-SCANNER instrument provides direct readings in real-time with data logging capabilities.

Environmental Devices Corporation will build your system to provide up to 14 simultaneous critical air measurements in one battery-operated instrument. The HAZ-SCANNER™ Monitoring System has been designed to provide accurate data measurements through a simple, intuitive user interface. This document will facilitate your ability to collect data with a minimum of effort. To analyze instrument data, refer to this document. Don't like reading manuals? Please take a quick look at the **Quick Start Guide** above to assist in getting you up and running quickly.

1. Wind (speed/direction) (optional)
2. Remote access to data (shown in picture is high gain antenna) – other antenna options are available
3. HAZ-SCANNER

Internal Gas Sensors:

- CO and NO2 Standard with Basic Kit
- Special sensors available

4. Peripheral Monitors (optional)
 - Sound
 - Rain
 - Atomic Nuclear Radiation
 - Solar Irradiance
 - Wind Speed and Direction



Note: For data from any **external meters** to be collected by the HAZ-SCANNER system, external meters must be turned on and connected or you must press the status button on the external meter display panels before starting the HAZ-SCANNER system. You cannot connect any new sensors while the HAZ-SCANNER system is logging data.

Several of the meters may be disconnected and used independently of the HAZ-SCANNER system. Of course, without being connected, these sensors will only display data on their built-in LCD displays; no data is stored in memory for later data retrieval. The hand-held meters are normally mounted on a tripod. These meters are turned on using their own switch and are typically powered by 9V replaceable batteries. See individual meter instructions in this document for further information.

HAZ-SCANNER Instrument Operation

Note: HAZ-SCANNER front panel controls should only be used in stand-alone applications and not at the same time the instrument is connected to and controlled by HAZCOMM-PRO software.

This section describes use of the HAZ-SCANNER front panel user interface and instrument use.

Turn the HAZ-SCANNER instrument **ON** if it is not powered. The instrument should be powered **ON** at least 15 minutes before collecting data. Turning the instrument **OFF** resets alarms, limits and spans.

To turn the instrument **ON**, first momentarily press the **Red Power Button** then hold the **Green Start Button** for at least 5 seconds.

Scroll through the display using the scroll keys to verify proper sensor operation.



Power Considerations

Charge the instrument's battery for 24 hours prior to initial use. The average battery power run time is 7-10 hours depending on concentration, alarm conditions and HAZ-SCANNER configuration. The HAZ-SCANNER instrument will shut **OFF** automatically when the internal battery voltage level falls below 10 volts causing data collection to cease in order to preserve data integrity. Data already collected will be saved. If this shutdown action occurs, connect the battery charger prior to retrieving collected data. If you attempt to turn the system **ON** and the instrument battery voltage is below ~10 volts, the system will not fully power **ON**. Connect the battery charger immediately.

When the battery is not fully charged a message may appear on the instrument LCD display indicating the instrument is operating in the "Safe Mode". If the instrument is operating in the safe mode, fully charge the battery to ensure all functions are operating.

Note: It is recommended to run the instrument without the battery and to use the battery for transportation.

HAZ-SCANNER User Guide – Version V.7.7

An optional external battery pack may be purchased (P/N BUBP-6000) which extends data collection time. Recharge this battery when not in use. The BUBP-6000 option when used in conjunction with the Solar Panel option will enable continuous use. Battery power alone will power the system for approximately 3 to 5 days depending on system configuration.

MEMORY

Storage	100,000,000		
# Total Records	454,545		
Sampling Interval (minutes)	Samples per Hour	Hours	Days
60	1	454,545	18,939.4
30	2	227,273	9,469.7
15	4	113,636	4,734.8
10	6	75,758	3,156.6
1	60	7,576	315.7

Operation

Always select the system sampling location carefully. Install the system and ensure it is physically secure. Before you begin logging data the system will sample data every ten seconds. This can be useful to assist you in finding an optimum location for data collection.

Front Panel Status Lights

Disk LED: Blinks as data is being written to instrument memory.

Logging LED: **ON** when you are logging data. Always upload data before you start a new logging session.

Power LED: Illuminated when the system is powered.

The **scroll** buttons: Use the **Scroll Up** or **Scroll Down** buttons to view current sensor data. Pressing the **Function** button (**1**) displays commands that HAZ-SCANNER can execute, i.e., Log ON, Log OFF, Alarm Reset, Alarm Status, Clear Data, Remove USB and Data-to-USB. Press the scroll buttons to view each option.

Enter button: Press this button to execute the selected command.

Note: The instrument's front panel **Sampling** indicator blinks as HAZ-SCANNER captures samples - if the Sampling indicator is not blinking the logger is not functioning. The sampling LED blinks every 6-10 seconds when not logging data and less frequently when logging data.

HAZ-SCANNER User Guide – Version V.7.7

If you wish to collect data in more than one location it is a good practice to note location changes in the Header Information page.



HAZ-SCANNER Instrument Front Panel Controls

HAZCOMM-PRO Software Functions

User Name and Password

The username is **admin** and the password is **admin**.

Main Page

There are four primary functions on the HAZCOMM-PRO “Main” Screen:

1. **Connect/Disconnect.**
2. Open a previously stored data file. This function cannot be performed while connected to a HAZ-SCANNER instrument.
3. **Start/Stop Logging Data.**

Note: During the first 15 minutes of operation the HAZ-SCANNER system enters a warm up period. During the warm-up period the logging function is disabled.

4. **Retrieve Data** from a HAZ-SCANNER instrument.

Preference Page: Selecting a computer COM Port

Port Name - Before connecting, select the correct COM Port number from the drop down menu. All the active serial ports detected on your computer will be listed. If using a Serial-to-USB adapter the USB adapter must be connected BEFORE you launch the HAZCOMM-PRO software for the program to recognize the adapter. If you do not see the correct COM port listed, exit the application and restart the computer. If you continue to encounter difficulties in selecting the correct computer COM port, access the Windows **Device Manger** to verify the Serial-to-USB adapter is correctly configured. The Preference page also includes Email alerts, date and time format settings.

Popular Functions/Settings

Header – The Header contains detailed information regarding the data set. The user may enter information associated with the data set in the Header Screen. Information about data sets may contain Latitude and Longitude location information, date, time, elevation, descriptive site comments, name of a person collecting data, address of site, sensor lists, Logger ID, alarm levels set and more. The Header information will be printed on generated reports. Each sampling data set may include a unique Header if desired.

Set Alarms – This section will take you to the alarm layout where you may set value limits for all the sensors. These limits are used in reports and for triggering the **alarm module** if your instrument configuration includes an alarm module. When you view current data the background of sensors that exceed their limit will turn red (see the **Alarm** section).

Preferences Menu

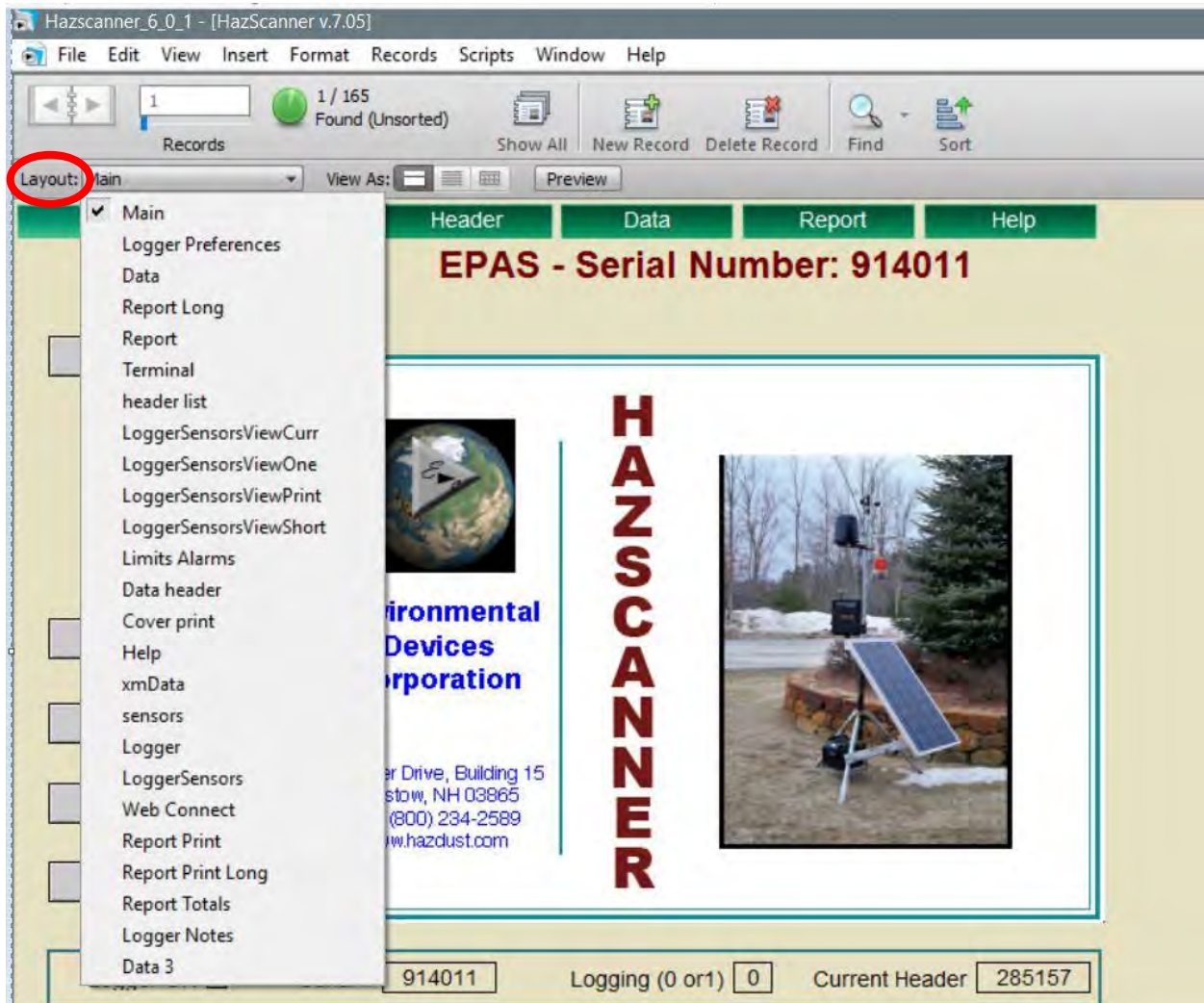
Several functions may be selected in the **Preferences** menu such as selecting COM Ports, setting the date format, setting Email alerts, configuring alarms and location details.



HAZCOMM-PRO Main Menu – Preferences Tab

HAZCOMM-PRO Layout Menu

The HAZCOMM-PRO main page **Layout** menu is primarily intended for advanced troubleshooting and calibration functions. The main page software navigation controls should be used for most other functions.



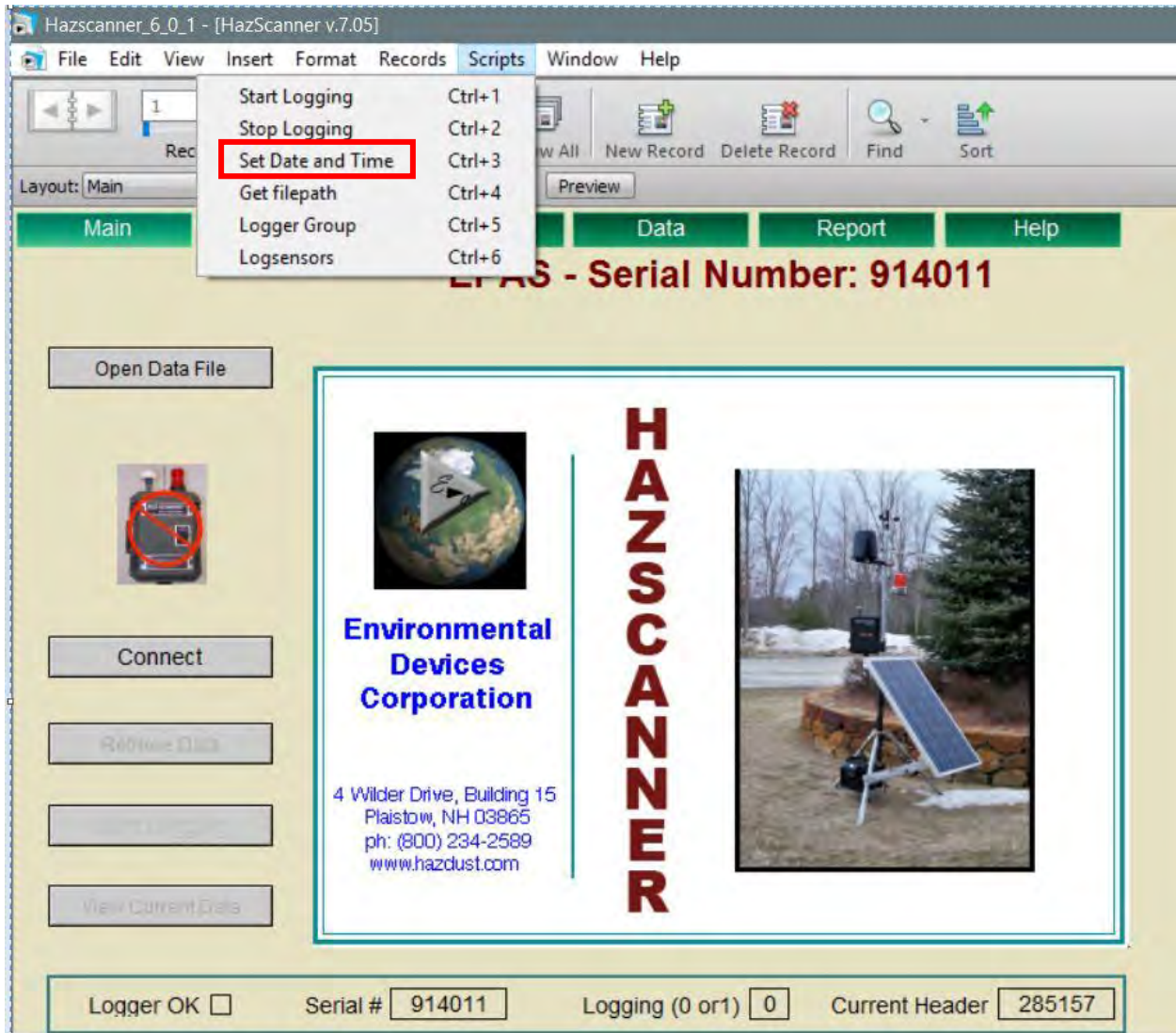
Set Date and Time

The **Date and Time** on the HAZ-SCANNER instrument and HAZCOMM-PRO software may be synchronized to the computer date and time. The HAZ-SCANNER instrument must be connected to the HAZCOMM-PRO software to perform this function.

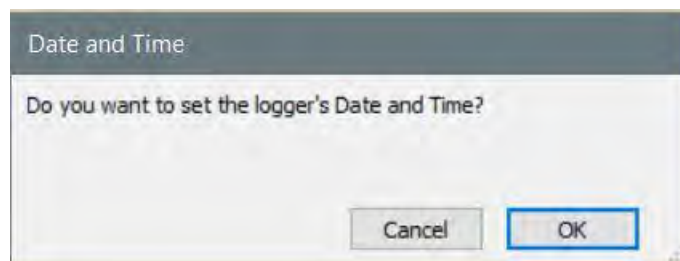
Once the HAZ-SCANNER instrument is connected to the HAZCOMM-PRO software, click on the Windows bar **Scripts** pull down menu and select **Set Date and Time** as shown on the following page. A message will appear confirming this function. Click **OK** to set the date and time. A second message will appear confirming the function has successfully completed.

HAZ-SCANNER User Guide – Version V.7.7

Turning the instrument **OFF** will not change the date and time settings unless the instrument date and time values are reprogrammed or when the instrument internal battery is replaced. Normally you should only have to set the date and time once.



HAZCOMM-PRO Scripts Menu – Set Date and Time



Accept Date and Time Query

Date Format

In addition to setting the date and time, the date format may also be changed. This function is performed in the **Preferences** screen by clicking on the main menu **Preferences** button.

Once the desired date format is chosen in the **Preferences** menu, the HAZCOMM-PRO software will prompt the user to reprogram the connected instrument. **If the instrument is not reprogrammed, changes to the date, time and date format will default to factory settings when the instrument is powered OFF.**

Select the “**Program**” function as shown on the following page. If a date other than the computers date needs to be entered, the user must contact EDC. When scrolling through the LCD on the HAZ-SCANNER instrument the date format should now be changed.

The screenshot displays the HAZ-SCANNER interface with a top navigation bar containing buttons for Main, Preferences, Header, Data, Report, and Help. The Preferences screen is active, showing three sub-sections: Set Serial Port Preferences, Logger Preferences, and Advanced: Set Location.

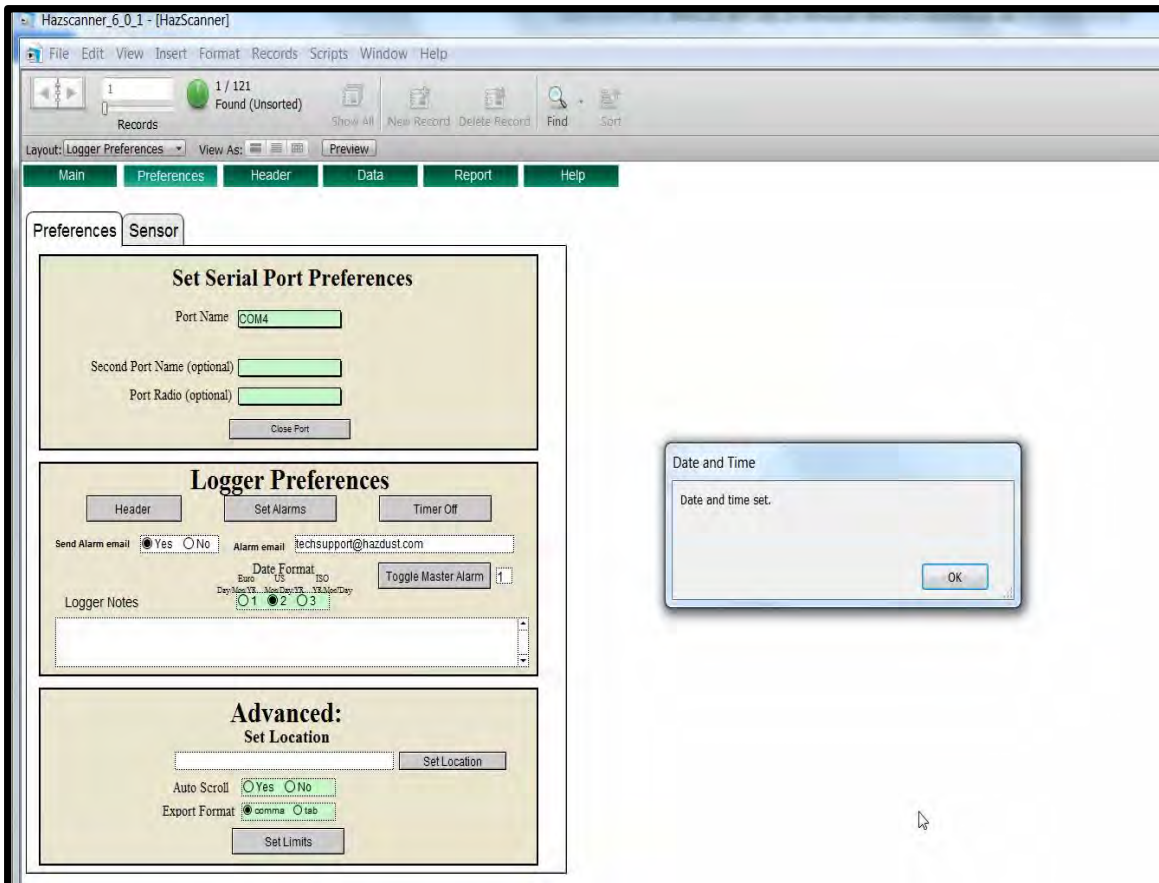
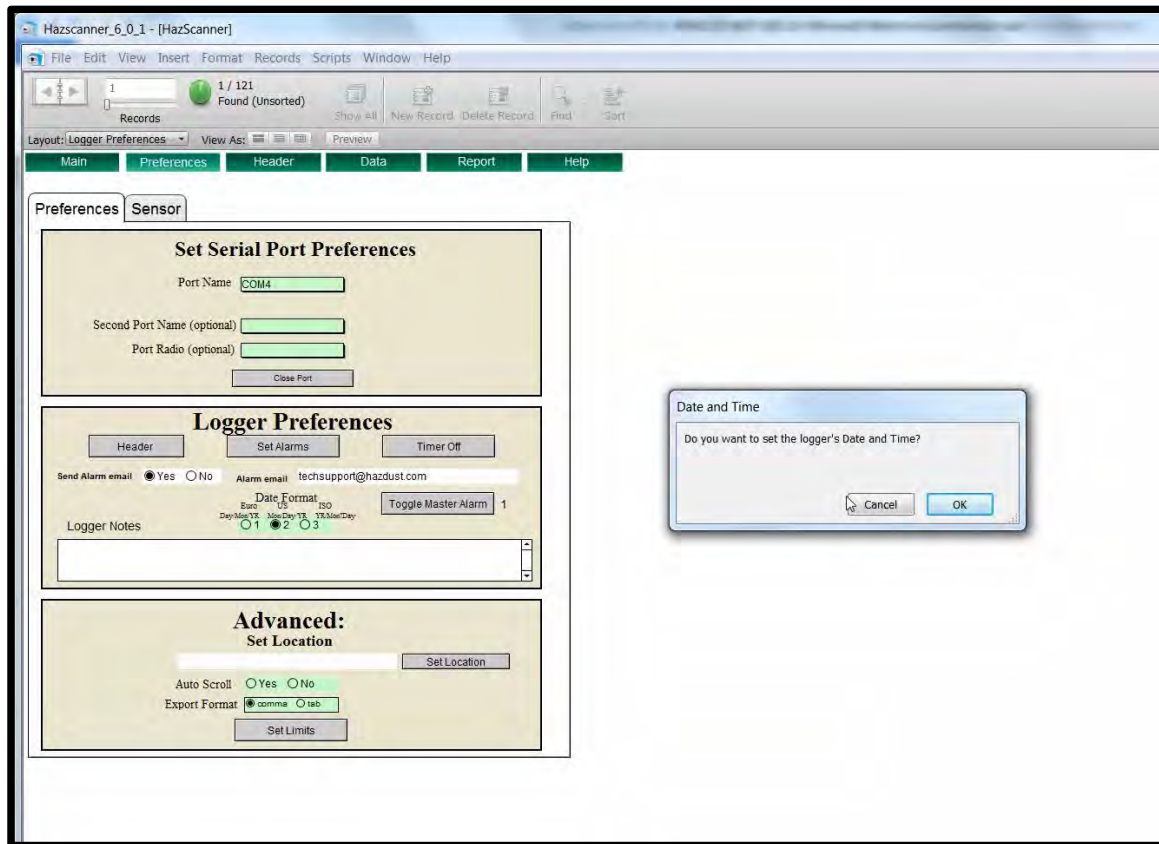
Set Serial Port Preferences: Includes fields for Port Name (COM1), Second Port Name (optional), Port Radio (optional), and a Close Port button.

Logger Preferences: Includes buttons for Header, Set Alarms, and Timer Off. It features a Send Alarm email section with Yes (selected) and No radio buttons, and an Alarm email field containing techsupport@hazdust.com. A Date Format section is highlighted with a red box, showing three options: 1 (Day/Mon/YR), 2 (Mon/DaY/YR, selected), and 3 (YR/Mon/Day). Below this is a Logger Notes text area and a Toggle Master Alarm button set to 1.

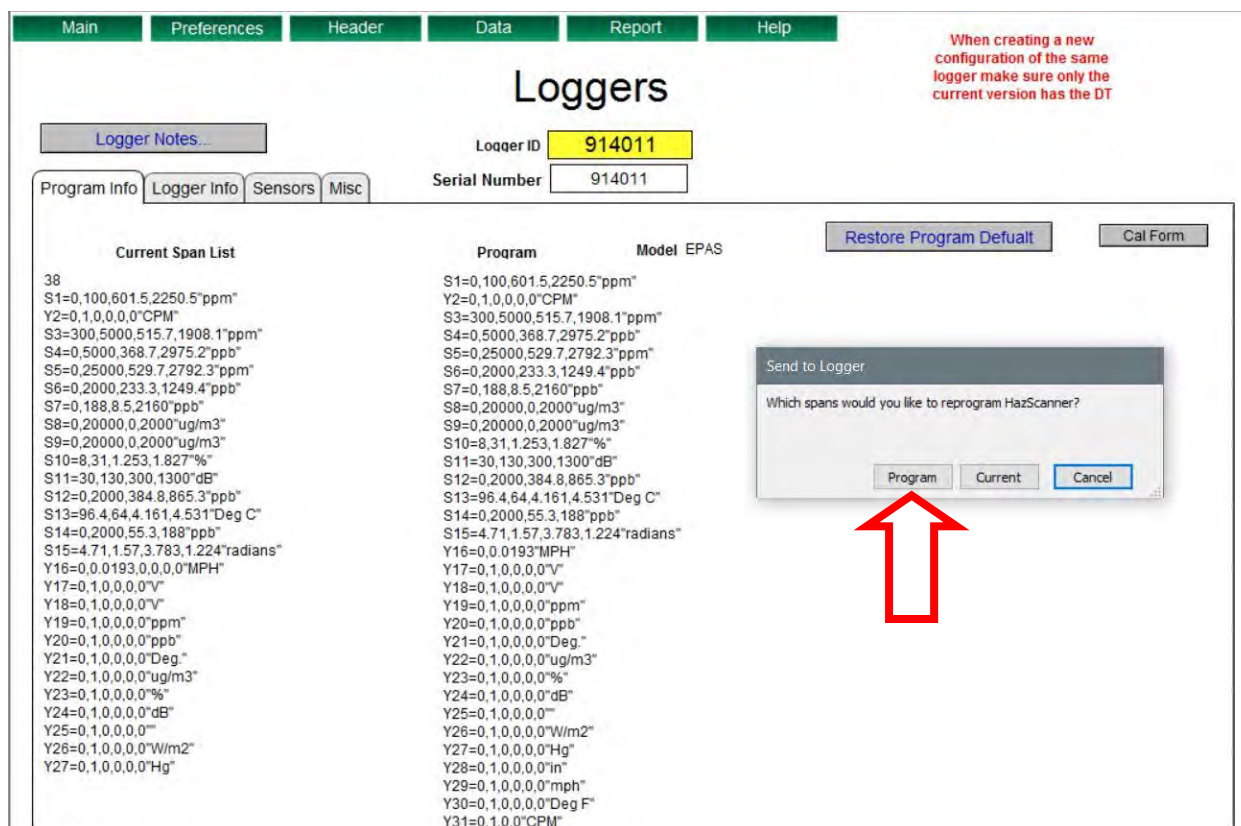
Advanced: Set Location: Includes a location input field with a Set Location button, an Auto Scroll section with Yes and No radio buttons, an Export Format section with comma (selected) and tab radio buttons, and a Set Limits button.

Change Date Format Function

HAZ-SCANNER User Guide – Version V.7.7



HAZ-SCANNER User Guide – Version V.7.7



HAZ-SCANNER Programming Function in the HAZCOMM-PRO Logger Menu

Note: The HAZCOMM-PRO software application **must** be connected to the HAZ-SCANNER instrument when reprogramming a **date/time** and/or a **date format** change.

Help/Registration

The 'Help' menu contains basic information included in this manual for convenient reference. The Help/Registration menu displays a simple registration/help form which, when completed, may be Emailed by clicking on the '**email Form**' button. Customer details and basic system information will be sent to Environmental Devices Corporation. We do not share customer's Email or other information with any 3rd parties. You must be connected to the HAZ-SCANNER instrument and the Internet for this form to be transmitted. You will be given the choice to send anyway if you are not connected to a HAZ-SCANNER instrument. Please transmit this data before contacting EDC technical support.

The screenshot shows the 'Registration/Contact Form' interface within the HAZ-SCANNER software. The top navigation bar includes 'Main', 'Preferences', 'Header', 'Data', 'Report', and 'Help'. Below this, a sub-menu bar shows 'Registration' as the active tab, with other options like 'Basic', 'Preferences', 'Sensor Prefs', 'Logger', 'Header', 'Data', 'Find', 'Report', 'Graphs', and 'Advanced'. The form itself is titled 'Registration/Contact Form' and contains a disclaimer: 'All information will only be used to contact you about updates and support your system.' The form fields are as follows:

- Serial Number: 914011
- Logger ID: 101409
- System Owner: [Text Field]
- Contact Name: [Text Field]
- email: techsupport@hazdust.com
- Owner address: [Text Field]
- Owner phone: [Text Field]
- Notes: [Text Field]

At the bottom right of the form, there are two buttons: 'email Form' (highlighted with a red box) and 'Save Form'.

Environmental Devices Corporation Registration Form

HAZ-SCANNER Instrument Front Panel Data Logging

It is preferable to always use HAZCOMM-PRO software to manage HAZ-SCANNER instruments. HAZ-SCANNER instrument front panel controls should only be used in stand-alone applications. If any instrument front panel controls are used when connected to the HAZCOMM-PRO application, disconnect and re-connect the instrument connection to ensure the software application is updated.

Data logging ON

- The **Clear data** function will erase all old data.
- Ensure all peripheral meters are powered and connected.
- Press the '**Function**' button to scroll.
- Turn system **ON** 20 – 30 minutes before beginning a logging session.

Note: The NO (Nitric Oxide) sensor requires the HAZ-SCANNER instrument to be powered for 24 hours.

- Scroll through the front panel display and verify sensor values look reasonable.
- Push the '**Function**' button.
- If necessary, use the scroll buttons to select '**Log On**'.
- Press the '**Enter**' button.
- Scroll down to the screen that displays the record count. The record count will update after 1 minute.
- **DO NOT DISCONNECT** or **CONNECT** any external sensors or meters after data logging has started.

Data logging OFF

- Stop logging data prior to moving the device or disconnecting any meters.
- Press the front panel '**Function**' button.
- If needed, use the scroll buttons to select function '**Log Off**'.
- Press the '**Enter**' button.

Retrieve/Upload Data

Description: The **Retrieve Data** (also referred to as **Upload Data**) feature allows users to upload data from a HAZ-SCANNER instrument to the HAZCOMM-PRO computer to enable graphing, generating reports and file exporting functions.

1. From the HAZCOMM-PRO main menu, click the **Retrieve Data** button (see below).
2. Review and complete the **Header** data form. It is important to supply meaningful header information to enable you to easily recognize and locate data.
3. Click the blue **Continue** button after completing the new Header form.
4. The computer screen will flash and display a message indicating the records number upload status.
5. A pop-up menu will appear allowing users to choose a saved data file location. When saved to a desired file location, a pop up will appear to indicate the upload was saved successfully. You should always select the **Uploads** folder to store retrieved data.
6. The user will be prompted to erase or keep data in the HAZ-SCANNER instrument. If the instrument data is saved, the next time data is uploaded the data will be uploaded a second time. (See the following pages).



Retrieve Data Control

HAZ-SCANNER User Guide – Version V.7.7

Note: Depending on the amount of data stored in the HAZ-SCANNER instrument, retrieving data may require several minutes to upload instrument data. **Wait** until data retrieval action has completed. Erasing data stored in the instrument will reduce upload data times in the future.



HAZCOMM-PRO Data Retrieving Action

HAZ-SCANNER User Guide – Version V.7.7

Layout: Data header UploadView As:PreviewScript pausedContinueCancel

Header ID
28534

Header Information

Rebuild Sensor Table

ENVIRONMENTAL REPORT

Session location:
Session site:
Organizational affiliation: EDC
Session environment: Outdoors
Session type: Ambient
Session environment:
Session Description:
Logger Serial Number: 914011
Logging began on:
Logging stopped on:
Data uploaded on:
Samples were averaged and saved every: 1 Minute
Report was averaged: 1 Minute
Total samples in this upload:
Memory remaining:

SENSOR	UNITS	LO LIM	HI LIM
Ammonia	ppm	*	*
Atomic Radiation	CPM	*	*
Carbon Dioxide	ppm	*	*
Carbon Monoxide	ppb	*	*
Methane	ppm	*	*
Nitrogen Dioxide	ppb	*	*
Ozone	ppb	*	*
PM Sensor A	ug/m3	*	*
PM Sensor B	ug/m3	*	*
Relative Humidity	%	*	*
Sound	dBA	*	*
Sulfur Dioxide	ppb	*	*
Temperature	Deg F	*	*
VOCS	ppb	*	*
Wind Direction	Deg	*	*

Location

EPAS

Information

Name

City

Platisthor

State

PH

Country

USA

Longitude

Deg

Min

W

Latitude

Deg

Min

N

Elevation

Photo Long and Lat

Collected by

Organization

EDC

Indoors

Outdoors

Ambient

Experiment

Setting

Setting detail

Description

Notes

Session

loggerID

914011

Average period

1 Minute

Start Time

End Time

Upload Time

SensorNameList

PH13,ARad,CO2,CO,CH4,NO2,O3,PM10,PM2.5

Report Count

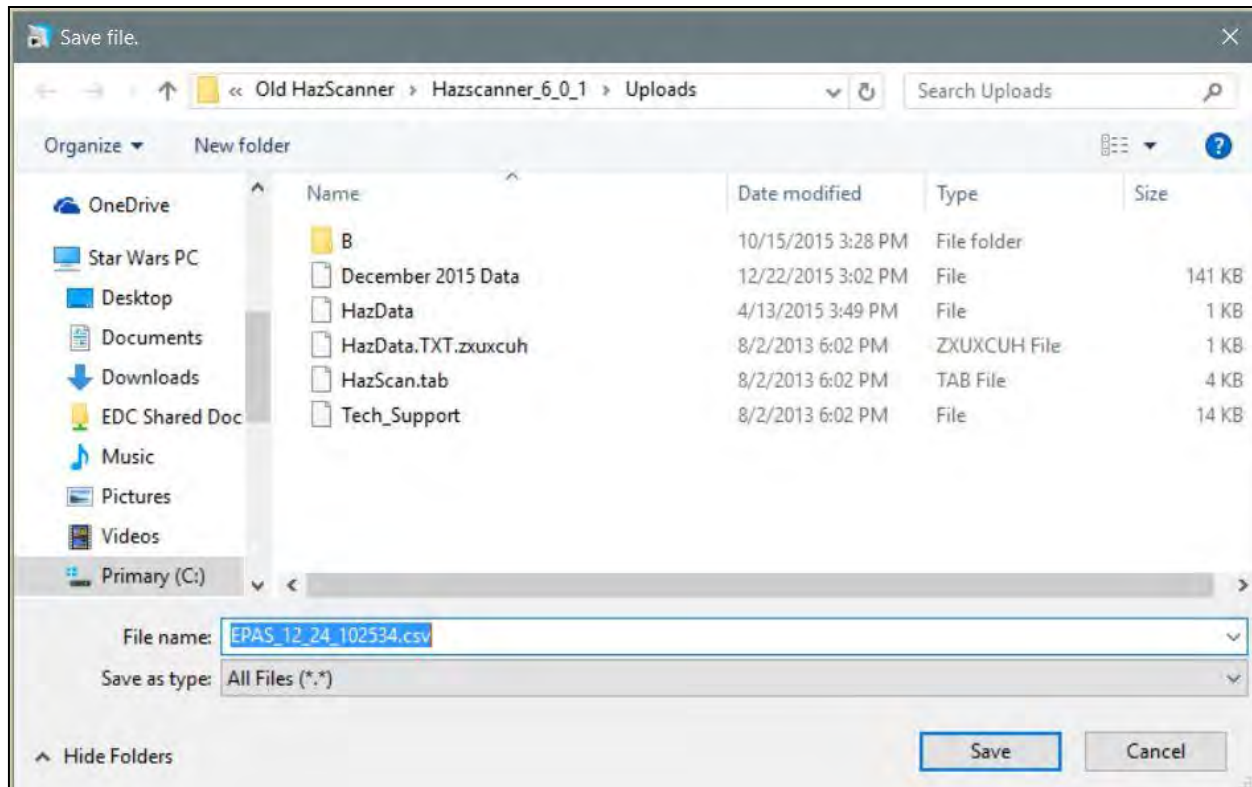
Hi Limit List

Lo Limit List

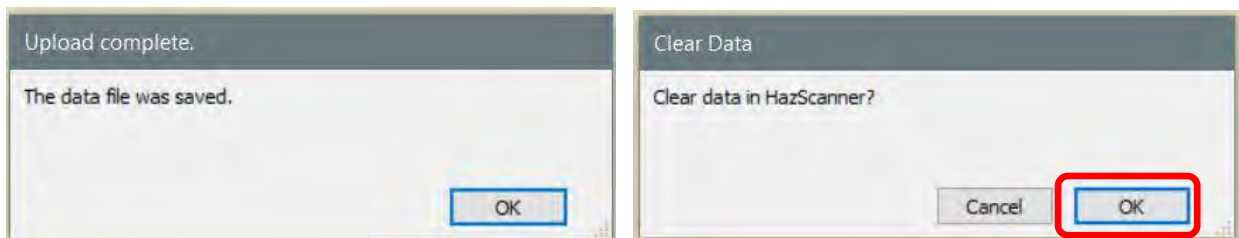
Continue

HAZCOMM-PRO New Header Form

HAZ-SCANNER User Guide – Version V.7.7



Save Uploaded Data to Computer Uploads Folder



Retrieve Data Confirm and Clear Data Option Messages

Note: In most cases it is recommended that once instrument data has been retrieved and stored, HAZ-SCANNER instrument data should be erased – Click **OK** to clear/erase instrument data as shown above.

Viewing Uploaded Data

Description: The “**View Uploaded Data**” feature allows users to view previously uploaded instrument data saved to the HAZCOMM-PRO computer.

Disconnect if you are connected to a HAZ-SCANNER instrument.

1. Click the **Open Data File** button located on the HAZCOMM-PRO Main page.

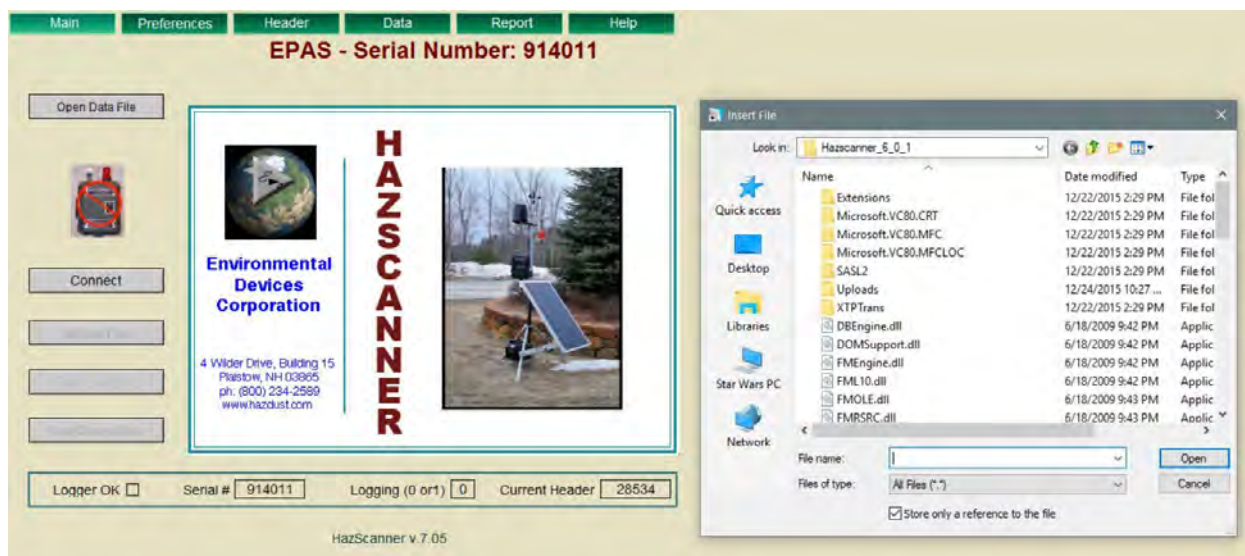
Note: Unless configured otherwise, HAZCOMM-PRO software saves retrieved/uploaded data files to the **Uploads** folder. Data should always be saved to the HAZCOMM-PRO **Uploads** folder to enable convenient access to stored data files.

2. The **Uploads** directory will appear. Select the desired data file.
3. Data will open in the **Environmental Reports Page**. From this page users may review minimum, maximum and average values of uploaded data. Data graphs may also be created. Please see the following pages for more information on creating reports and data graphs.



HAZCOMM-PRO Open Data File Control

HAZ-SCANNER User Guide – Version V.7.7



HAZCOMM-PRO Open Data File Dialog

Main

Preferences

Header

Data

Report

Close Data Files

Environmental Report

Record Cnt 15

Start Date 12/16/2015

1:59:00 PM

End Date 12/22/2015

2:01:00 PM

More Detail

Header

Sort

Graphs

Print/Export

☒ 284558

☐ 285157

HAZ-SCANNER User Guide – Version V.7.7

The screenshot shows the 'Environmental Report' window in the HAZ-SCANNER software. The window has a menu bar (File, Edit, View, Insert, Format, Records, Scripts, Window, Help) and a toolbar with buttons for 'Records', 'Show All', 'New Record', 'Delete Record', 'Find', and 'Sort'. Below the toolbar is a 'Layout: Report' dropdown and a 'View As:' section with icons for 'Table', 'Graphs', and 'Print/Export'. The main area is titled 'Environmental Report' and contains a 'Record Cn' field (2438), 'Start Date' (7/22/2014 5:32:01 PM), and 'End Date' (7/24/2014 10:09:01 AM). A 'Close Data Files' button is at the top right. A 'More Detail' button is in the center. A 'Comments' tab is on the right. The data table has columns for various sensors: CO, NO2, NO, PMA, PMB, RH, SO2, TmpC, WDir, WSpM, Pwr, V. The table is color-coded by sensor type: CO (black), NO2 (red), NO (blue), PMA (green), PMB (yellow), RH (purple), SO2 (brown), TmpC (pink), WDir (light blue), WSpM (light green), Pwr (light purple), V (light yellow). The table shows data for 'EPAS Header', 'Daily', and 'Ave Period' rows. Callouts 1 through 7 point to specific features: 1. Record Cn, 2. Start Date, 3. Sensor and Unit of Measurement, 4. End Date, 5. Average (Black), Max (Red), Minimum (Blue), 6. More Detail button, 7. Comments tab.

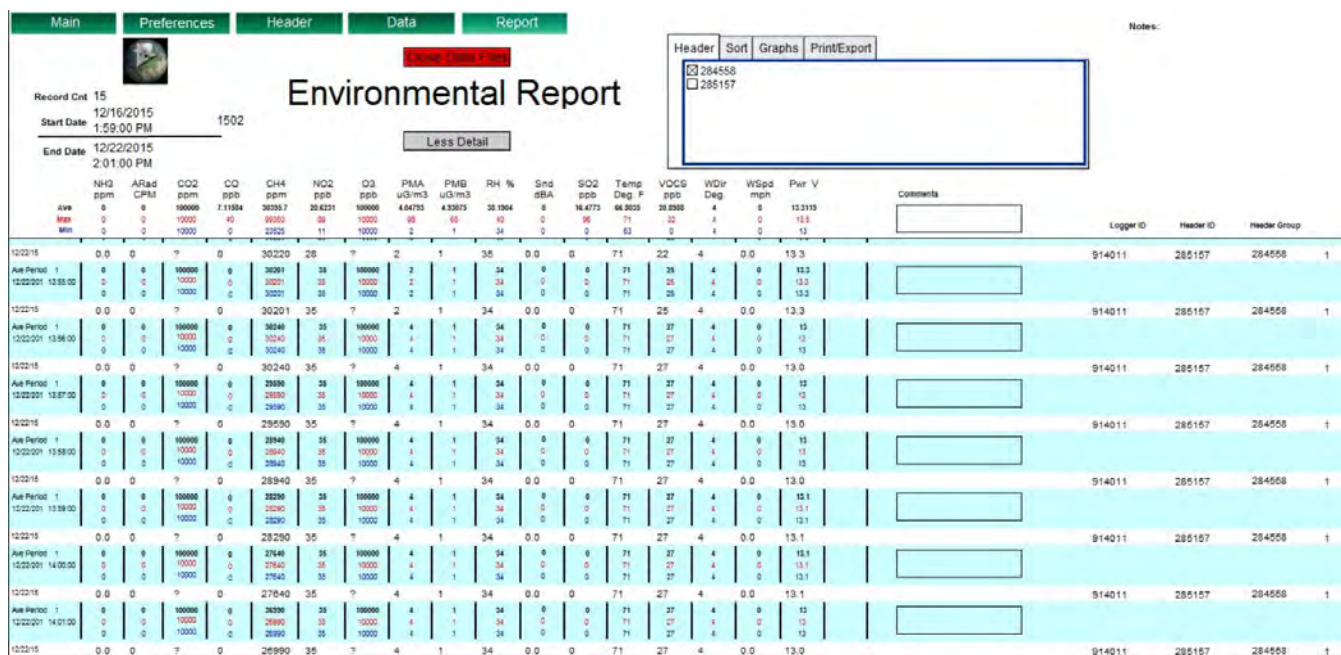
HAZCOMM-PRO Environmental Report Screen

Description of Key Features on the Environmental Report Page

1. Number of records
2. Start Date and Time of recorded data
3. Sensor and Unit of Measurement
4. End Recording Date and Time
5. Average (**Black**), Max (**Red**), Minimum (**Blue**)
6. Click "**More Detail**" to view minimum, maximum or average value of each data point.
7. The **Add Comments** tab may be used to explain data points of interest.

Note: The **More Detail** displays all data points with the colored lines representing the average period totals. **Less Detail** hides the numbers and only displays average data.

HAZ-SCANNER User Guide – Version V.7.7

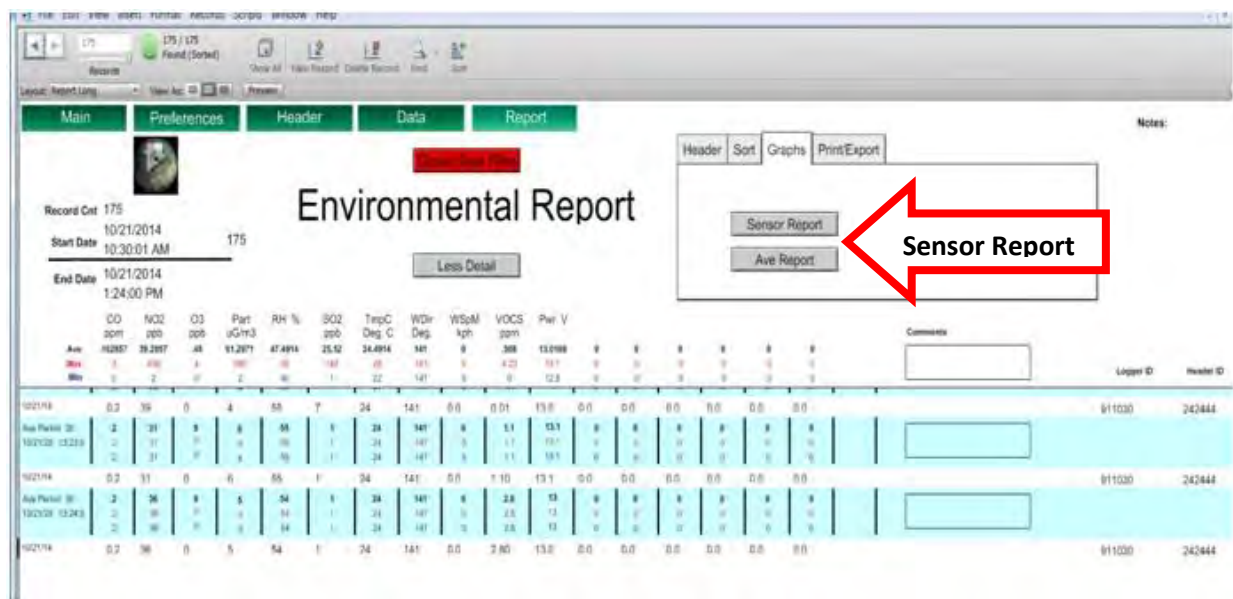


HAZCOMM-PRO Environmental Report – More Detail

Graphing Data

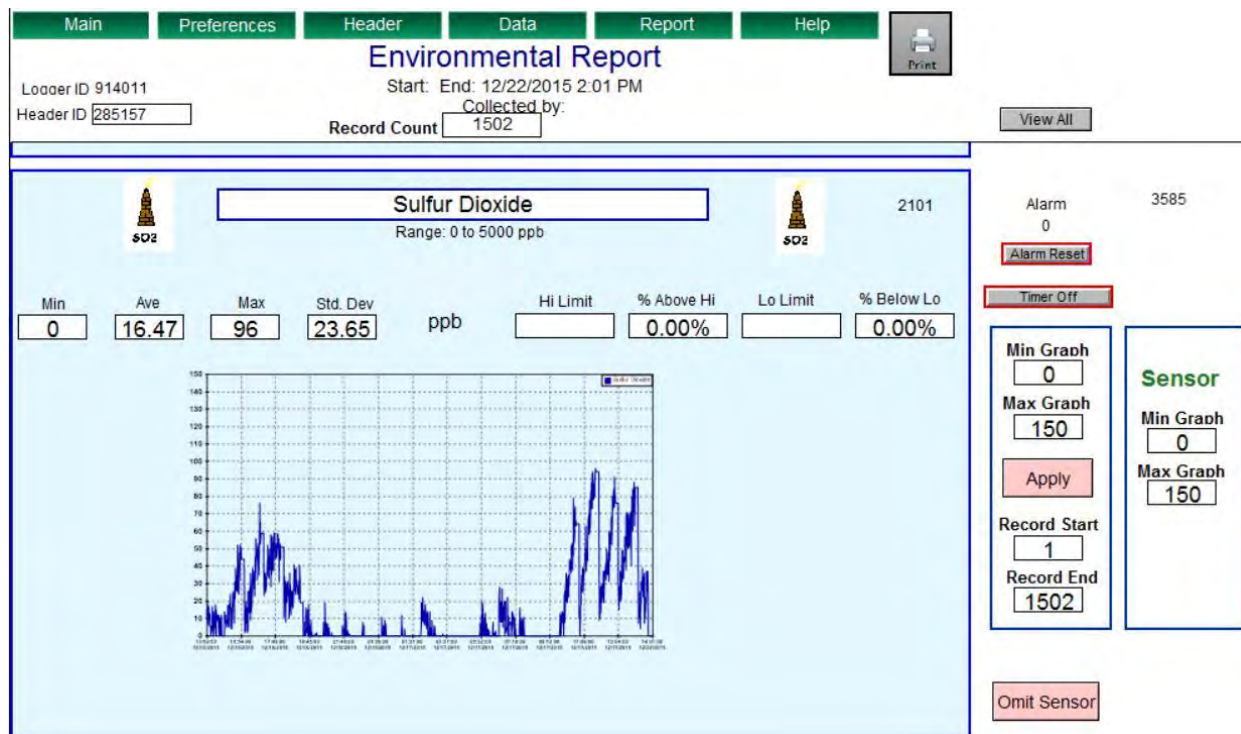
Description: Users may plot stored data on a line graph using the HAZCOMM-PRO graphing capabilities. Once instrument data is plotted, users may hone in on certain data points for emphasis. **Sensor Report** graphs all data whereas **Ave Report** only graphs average data.

The HAZ-SCANNER instrument must be **disconnected** from the HAZCOMM-PRO application and the data must be retrieved by following the instructions in the “**Viewing Uploaded Data**” section below.



HAZ-SCANNER Graphing Data Screen

HAZ-SCANNER User Guide – Version V.7.7



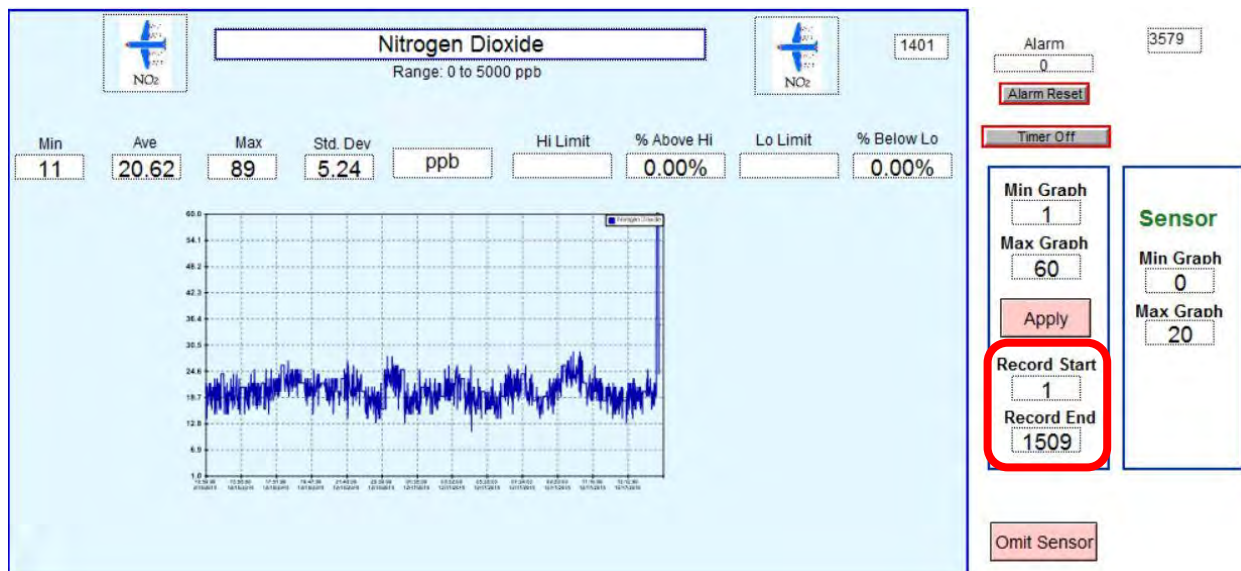
HAZCOMM-PRO Sensor Graph Example

Note: It is normal for the HAZCOMM-PRO computer screen to flash several times while the software is generating a report or graphing data points.

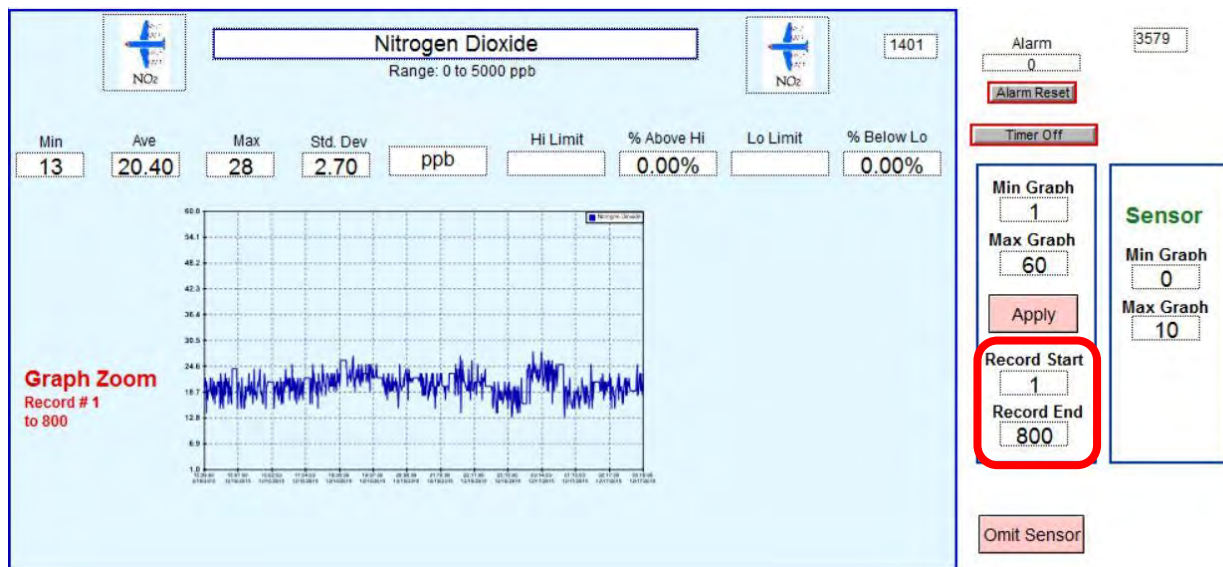
HAZ-SCANNER User Guide – Version V.7.7

HAZCOMM-PRO Graph Display Tools

Using special HAZCOMM-PRO graph display tools, you may zoom in on either or both the X and Y graph axis's to display only areas of interest in captured data. See the examples below for how to use the graph zoom feature.



HAZCOMM-PRO Raw Nitrogen Dioxide Graph

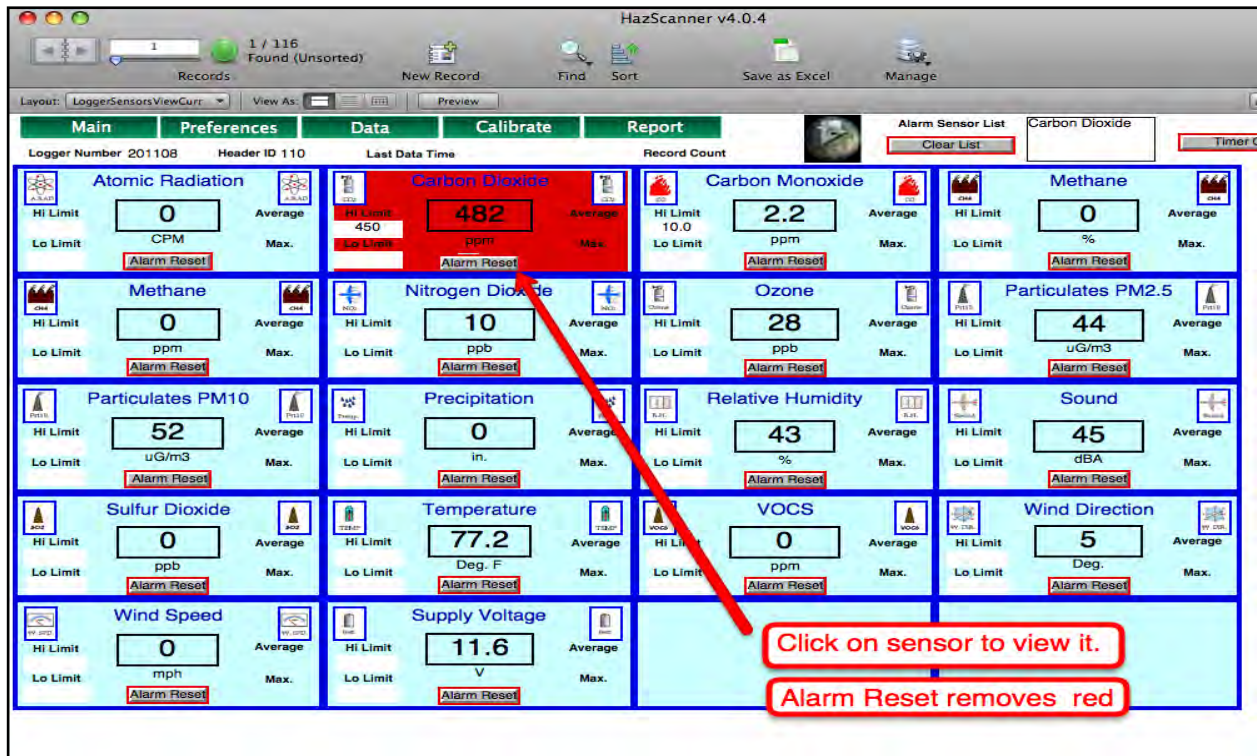


HAZCOMM-PRO Graph Zooming Feature Applied

Change the **Min-Max** (vertical axis) and/or the **Record Start-Record End** (horizontal axis) values to hone in on graph areas of interest. These controls effectively change graph axis ranges for improved point resolution. Min-Max may be used to create a nice looking report especially when there are minor variations in data point values.

View Current Data

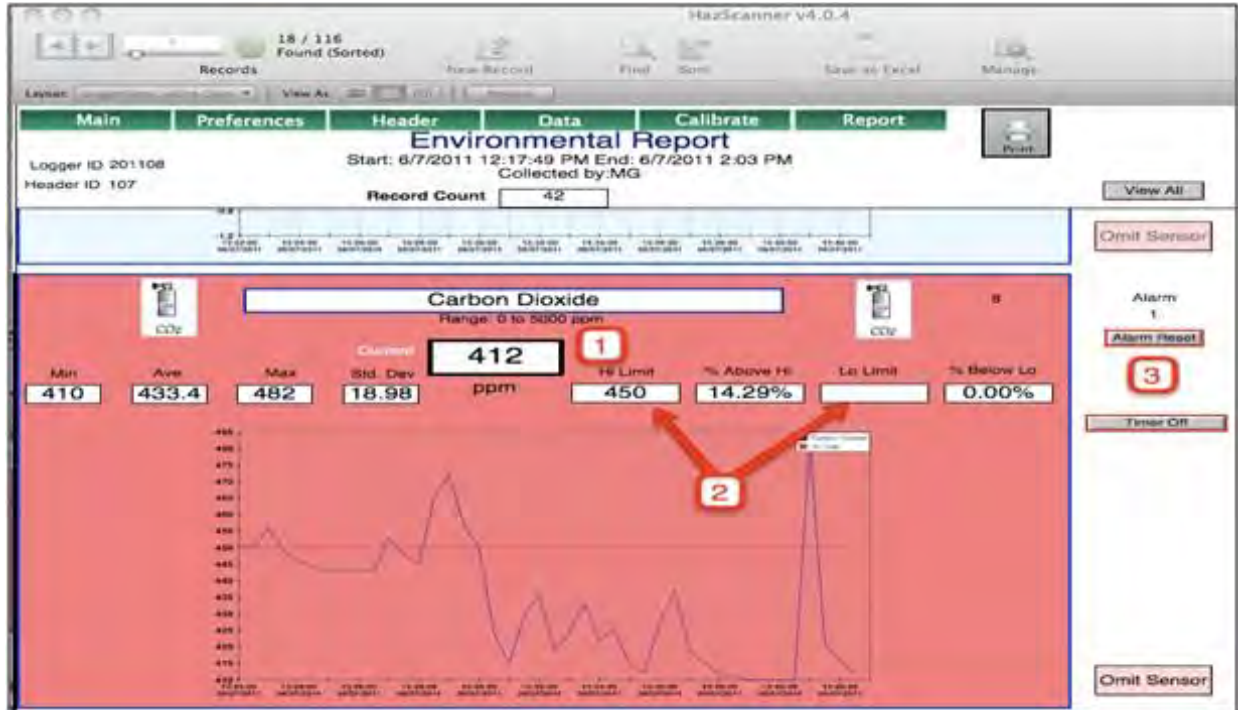
Click on the HAZCOMM-PRO main page **View Current Data** button to view current instrument data.



If data logging has been activated, HAZCOMM-PRO will retrieve current sensor data from a connected instrument or instruments. If a HAZ-SCANNER instrument contains a large amount of stored data it is recommended that users should **Retrieve/Upload** data prior to activating the **View Current Data** feature.

This screen will display the current average and maximum sensor values. You may set and view value limits on this page by entering values into the **Hi Limit** or **Lo Limit** fields. The background of a sensor pane will turn **red** if it has exceeded a **High Limit** value. The sensor pane will remain **red** even if the value drops below the Hi Limit value until the user clicks the **Alarm Reset** button. Clicking on an individual sensor it will display a screen that provides a more detailed data summary and graph of the selected sensor. The information displayed on this page is all data for the current header only.

HAZ-SCANNER User Guide – Version V.7.7



HAZCOMM-PRO Alarm Sensor Screen

(1) Shows the current value. (2) Shows the current limits. You may change the limits and the graph will refresh to reflect this change. (3) The **Alarm Reset** control will turn the red warning background back to blue.

The **Print** button on this page is designed for the report function but may be used to print the current group (the print button prints **ALL** sensors).

Click the **Omit Sensor** button to exclude a sensor from this found set and printing. To print an individual sensor from the layout menu, go to the **Logger Sensors View Print** in the **Layout** menu first and choose 'Current record' to print a single graph.

Note: When the **Print** dialog appears you may select and print a single page. Noting the current record number will provide information as to the pagination of the graphs.

Reports

Select **Report** from the HAZCOMM-PRO menu bar.

You may select an average period for your report from the drop down list in the **Report Ave** field (only in the '**More Detail**' report screen).

- Then from the **Sort** menu, press one of the buttons **Sort**, **Daily Report**, **Average Report**.
- The **Less Detail** control will now show the summary detail.
- **Export Data** performs the same function as in the Data window.

Export Ave will export the summary based on the **Report Ave** period. If you prefer to export a daily average, select 24 hours for your average report period.

The **Sensor Report** button will present a graphic report with a graph of each sensor with minimum, maximum and other information all based on the original sensor data. This will not change by changing the average period. You may add limits to generate a report that gives the percentage (%) above high limits and below low limits. Loading a report from a large data set may take up to two minutes.



HAZCOMM-PRO Reports Sort Menu

Note: It is normal for the HAZCOMM-PRO software screen to flash several times while the software is generating a report or graphing data points.

Setting Alarms

There are 2 types of alarms. They are both based on the **Hi limit** or **Lo limit** fields on the **View Sensor** screens. If a software alarm limit is set and exceeded, the background color of the sensor will change from blue to red. The color change remains red until you click on the **'Reset Alarm'** button on that particular sensor. This action results in creating a line in the **Sensor Alarm** list at the top of the screen. Adding or changing a limit does not send it to the logger. You must access to the **'Set Alarm'** screen and send the new limit(s) to the logger.









Logger Alarm: If you want to set the alarms in the logger (see following page for more details):

- In the **Preferences** menu, click the **'Set Alarm'** button. This opens the HAZCOMM-PRO Alarms screen. If you just want to view a limit in the software, entering a value will create a limit.
- Press Button 4: **'Clear all limits'** and enter what you want the new limits to be.
- Review the limits and change any that require changing.
- Button 3: **'Set All Logger Alarms'** will reset all limits in the logger.
- Button 5: **'Set Logger Alarm'** will just set the limit for a selected sensor.
- Button 1: Turns the master switch either ON or OFF. OFF will disable all logger alarms.
- Button 2: **'Clear Logger Alarm'** will turn OFF the current alarm in the logger. If another alarm occurs, an alarm will be activated.

The screenshot shows the 'Logger Preferences' window with the 'Set Alarms' button highlighted. The interface includes several configuration options: a 'Header' button, a 'Timer Off' button, a 'Send Alarm email' section with 'Yes' selected, an 'Alarm email' field containing 'techsupport@hazdust.com', a 'Date Format' section with 'US' selected, a 'Toggle Master Alarm' button set to '1', and a 'Logger Notes' text area. The 'Set Alarms' button is prominently outlined in red.

HAZCOMM-PRO Logger Preferences Menu – Set Alarms

Clicking on the **Set Alarms** button displays the **Alarms** menu as shown on the following page.

Main	Preferences	Header	Data	Report	Help
 <h1>Alarms</h1>		<div> <div>Turn Logger Alarms Off</div> <div>Turn Logger Alarms On</div> <div>Clear All Limits</div> <div>Clear Logger Alarm</div> <div>Set All Logger Alarms</div> </div> <div> <div>2</div> <div>3</div> </div>			
Logger Number 914011		Header ID 285157			
<div>  Ammonia ppm </div> <div> <div>1</div> <div>High Limit</div> <div>Low Limit</div> </div>		<div> <div>Set Logger Alarm</div> <div>Reset Alarm</div> <div>0</div> </div>			
<div>  Atomic Radiation CPM </div> <div> <div>High Limit</div> <div>Low Limit</div> </div>		<div> <div>Set Logger Alarm</div> <div>Reset Alarm</div> <div>0</div> </div>			
<div>  Carbon Dioxide ppm </div> <div> <div>High Limit</div> <div>Low Limit</div> </div>		<div> <div>Set Logger Alarm</div> <div>Reset Alarm</div> <div>0</div> </div>			
<div>  Carbon Monoxide ppb </div> <div> <div>High Limit</div> <div>Low Limit</div> </div>		<div> <div>Set Logger Alarm</div> <div>Reset Alarm</div> <div>0</div> </div>			
<div>  Methane ppm </div> <div> <div>High Limit</div> <div>Low Limit</div> </div>		<div> <div>Set Logger Alarm</div> <div>Reset Alarm</div> <div>0</div> </div>			
<div>  Nitrogen Dioxide ppb </div> <div> <div>High Limit</div> <div>Low Limit</div> </div>		<div> <div>Set Logger Alarm</div> <div>Reset Alarm</div> <div>0</div> </div>			
<div>  Ozone ppb </div> <div> <div>High Limit</div> <div>Low Limit</div> </div>		<div> <div>Set Logger Alarm</div> <div>Reset Alarm</div> <div>0</div> </div>			

HAZCOMM-PRO Alarm Screen

Alarms

To **SET** sensor alarms:

- Connect to a HAZ-SCANNER instrument using the HAZCOMM-PRO software.
- In the **View Current Data** screen, click the **'Set Alarms'** button.
- Enter High limits for any sensor you wish to generate an alarm. **(1)**
- Click **'Turn Logger Alarms On'**. **(2)**
- Click **'Set All Logger Alarms'**. **(3)**
- Review the **Alarm** section of this document for additional details.
- **DO NOT** TURN THE SYSTEM **OFF** after setting the limits/alarms.

Alarms - HAZ-SCANNER Instrument User Interface

From the HAZ-SCANNER instrument front panel user interface's logger function, you may scroll and activate the **'Alarm Reset'** function which will turn **OFF** activated alarms. If the alarm condition remains valid, the alarm will sound a second time. You may also set the **'Alarm Status'** from **1 - ON** to **0 - OFF**. This action will change all logger alarm functions in the instrument's logger to **ON** or **OFF**. See the following page for additional details.

HAZ-SCANNER User Guide – Version V.7.7

Note: The logger alarm will shut **OFF** after 30 minutes to conserve power. Use the 'Alarm Status' function to reset an active alarm.



HAZ-SCANNER Instrument Alarm Functions

Email Alarm Alerts Function

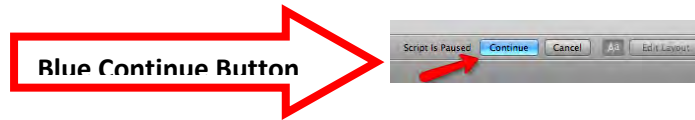
In the HAZCOMM-PRO **Preferences** menu you may enter a valid Email address to transmit new alarms to a user's Email address as shown below.

In addition to entering a valid Email address, click the **Yes** choice in the **Send Alarm Email** box and ensure the **Toggle Master Alarm** function is set to 1.

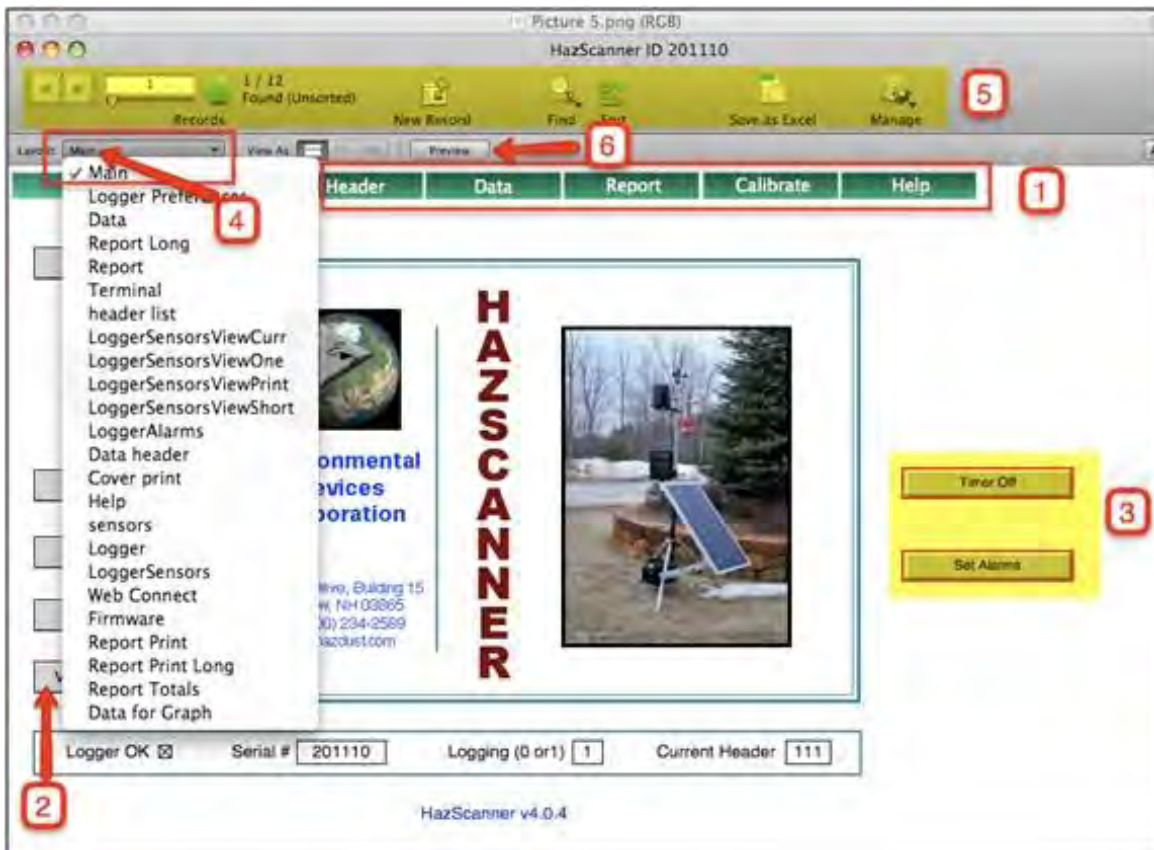
HAZCOMM-PRO Alarm Email Alert Entries

Note: To enable the HAZCOMM-PRO **Alarm Email** function, the HAZCOMM-PRO computer must be connected to the **Internet**.

Navigation



The **Blue** “Continue” button provides time to input data before the software continues. Select this function when you need additional time. Wait a few seconds to see if it is just a pause.



HAZCOMM-PRO Primary Navigation Functions

- (1) Menu buttons. Use these whenever possible.
- (2) Main menu action and navigation buttons.
- (3) Set Alarm presents a screen to set limits and alarms. **Timer Off** turns all alarms off.
- (4) The **Layout** menu. A quick way to access different views and functions.
- (5) The status bar displays different options. The **Number of Records** helps identify where you are (Logger, Logger Sensors, or Data).
- (6) The **Preview** button shows how the display will look if printed from the upper menu. In most cases the **Print** button will allow a printer friendly view.

HAZ-SCANNER User Guide – Version V.7.7

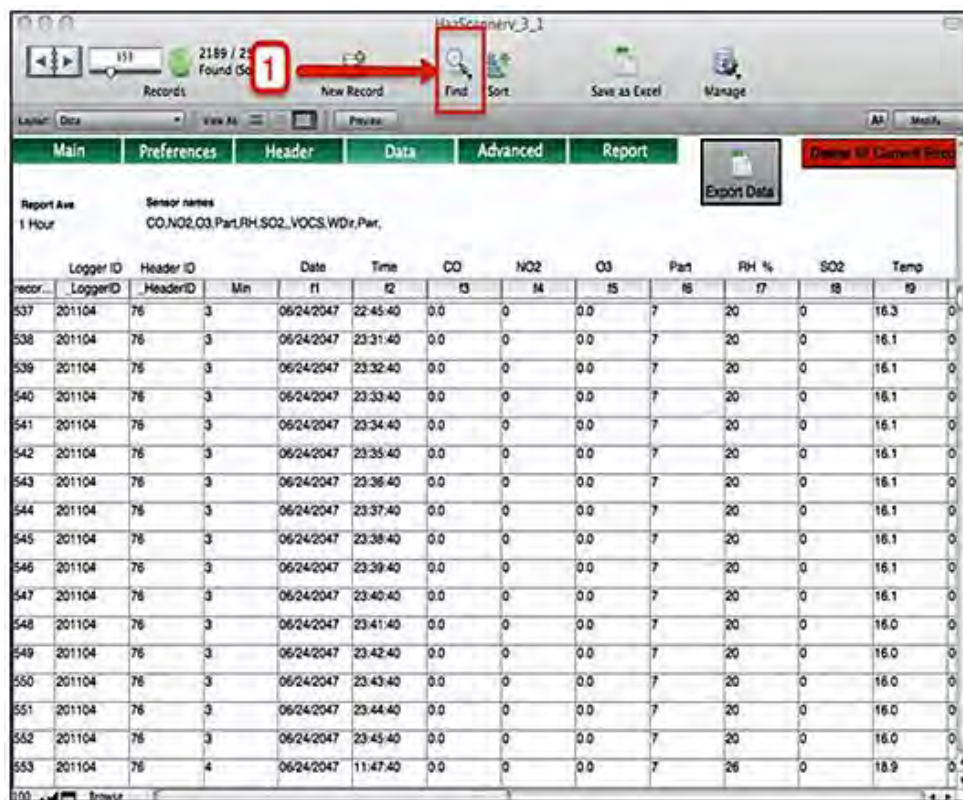
The **Zoom** in and **Zoom out** buttons are at the bottom left of the screen as shown below.



Zoom In- Zoom Out Feature

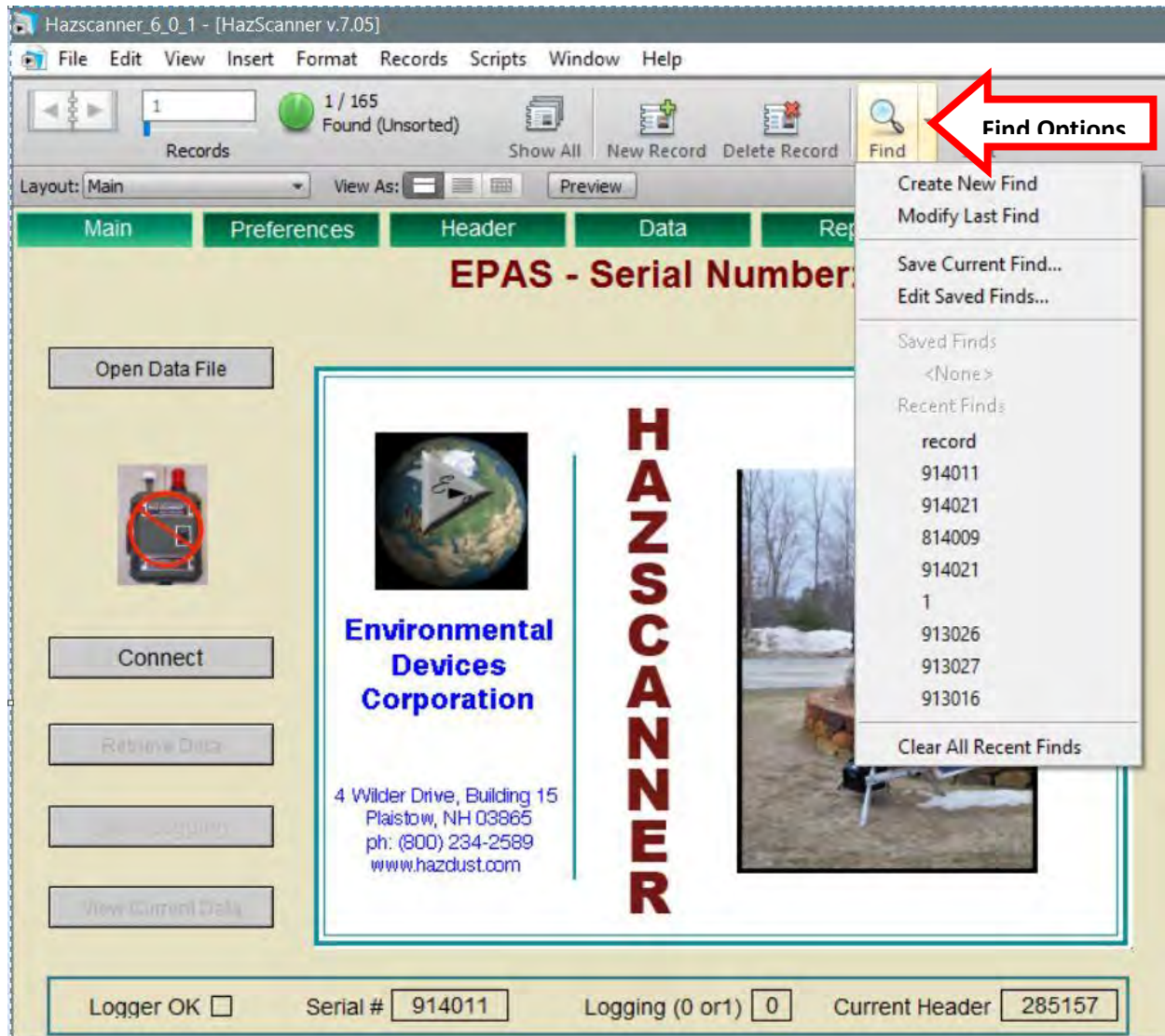
Find

The Find feature is one of the most powerful features of a database. It is worth spending time to learn how to find the data records you wish to access. Multiple finds, constrained finds, extended finds and special characters (Operators) are all features you should become comfortable with.



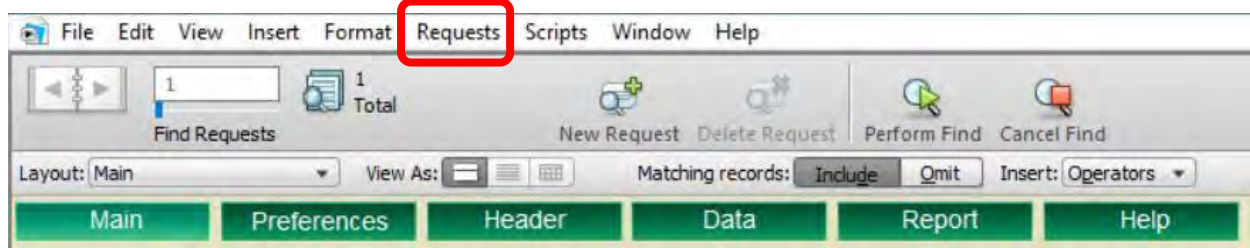
HAZCOMM-PRO Find Feature

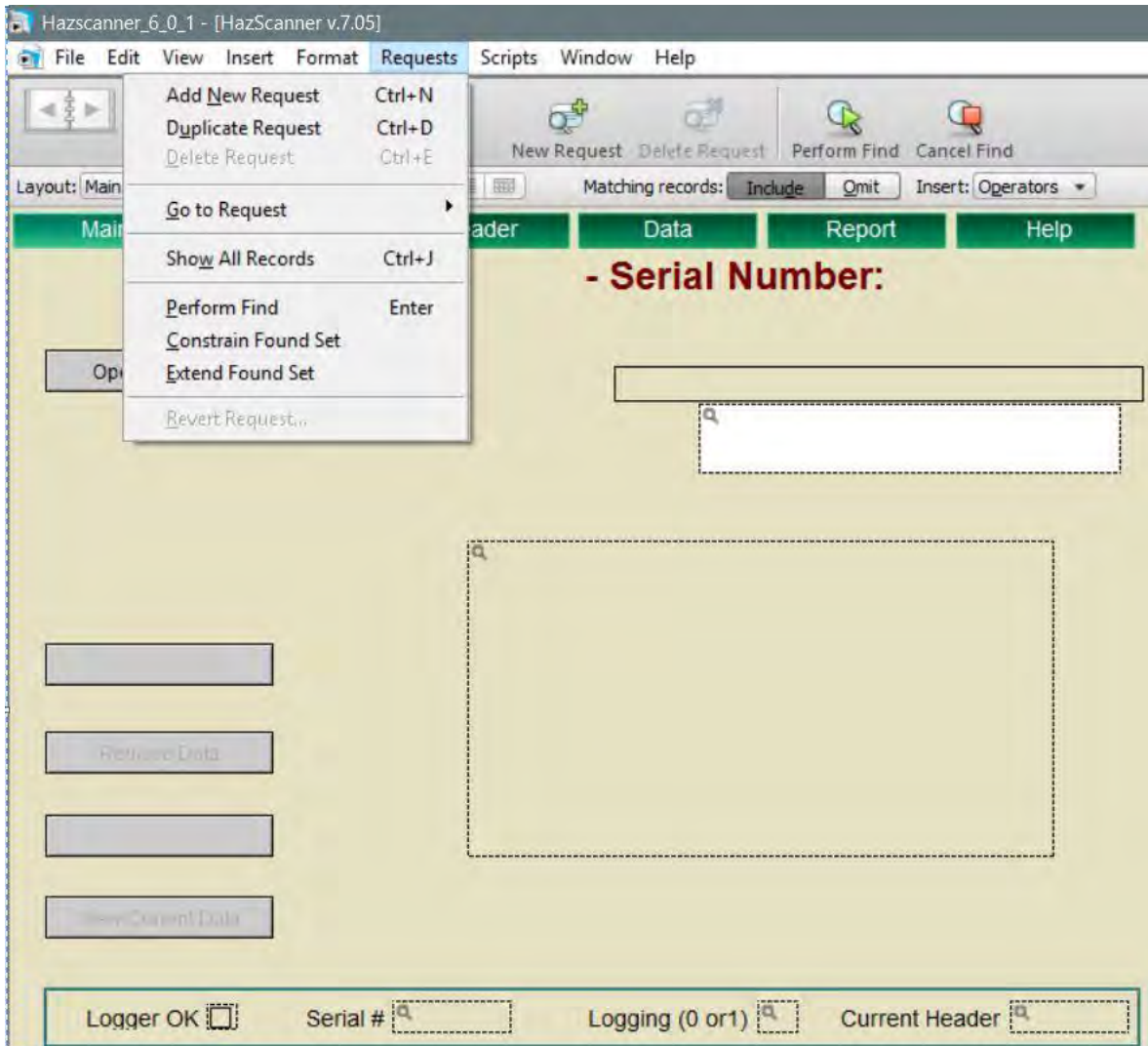
HAZ-SCANNER User Guide – Version V.7.7



HAZCOMM-PRO Find Options

In addition to the basic **Find** features identified by clicking in the Find side button, a **Requests** sub-menu will open on the windows frame displaying additional Find functions as described below.





Request Find Options

Saved Finds: Your saved and recent finds are found by clicking and holding the cursor on the **Find** icon side bar.

Constrain Found Set: Performs the current Find in the current found set only. Removes these items from the **Found Set**.

Extend Found Set: Performs the current Find in the omitted records only. Adds these items to the **Found Set**.

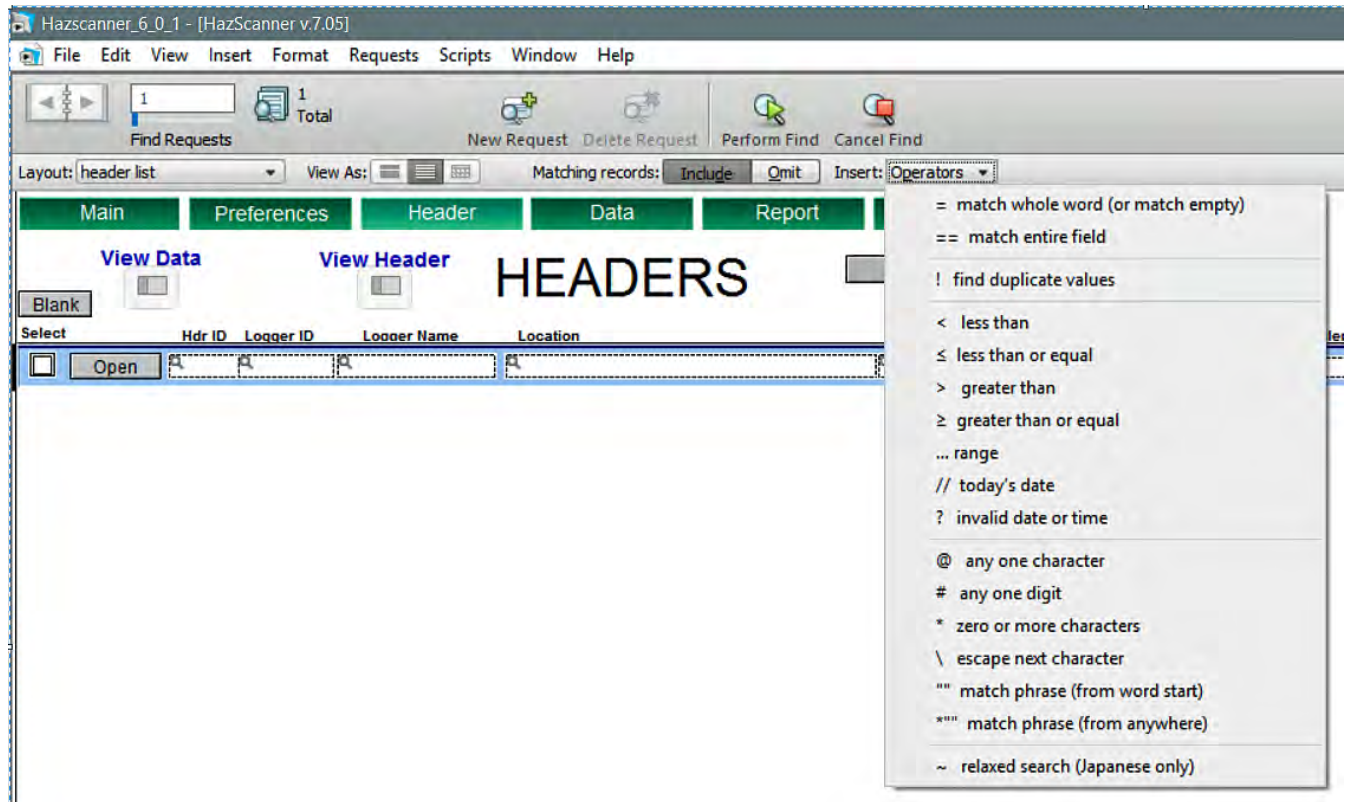
Add New Request: Creates an **OR** find, finding both Headers '105' and '106'.

After performing a **Find**, you may use the **Omit Record** to remove a single record from your Found Set or '**Show Omitted Only**' will switch you to the omitted records found set.

CAUTION: Use caution when using the **Delete** and **Omit** functions. Delete action is permanent and if used improperly may result in loss of critical software functions.

HAZ-SCANNER User Guide – Version V.7.7

Additional Find Options – Logical Operators



HAZCOMM-PRO Logical Find Operator Options

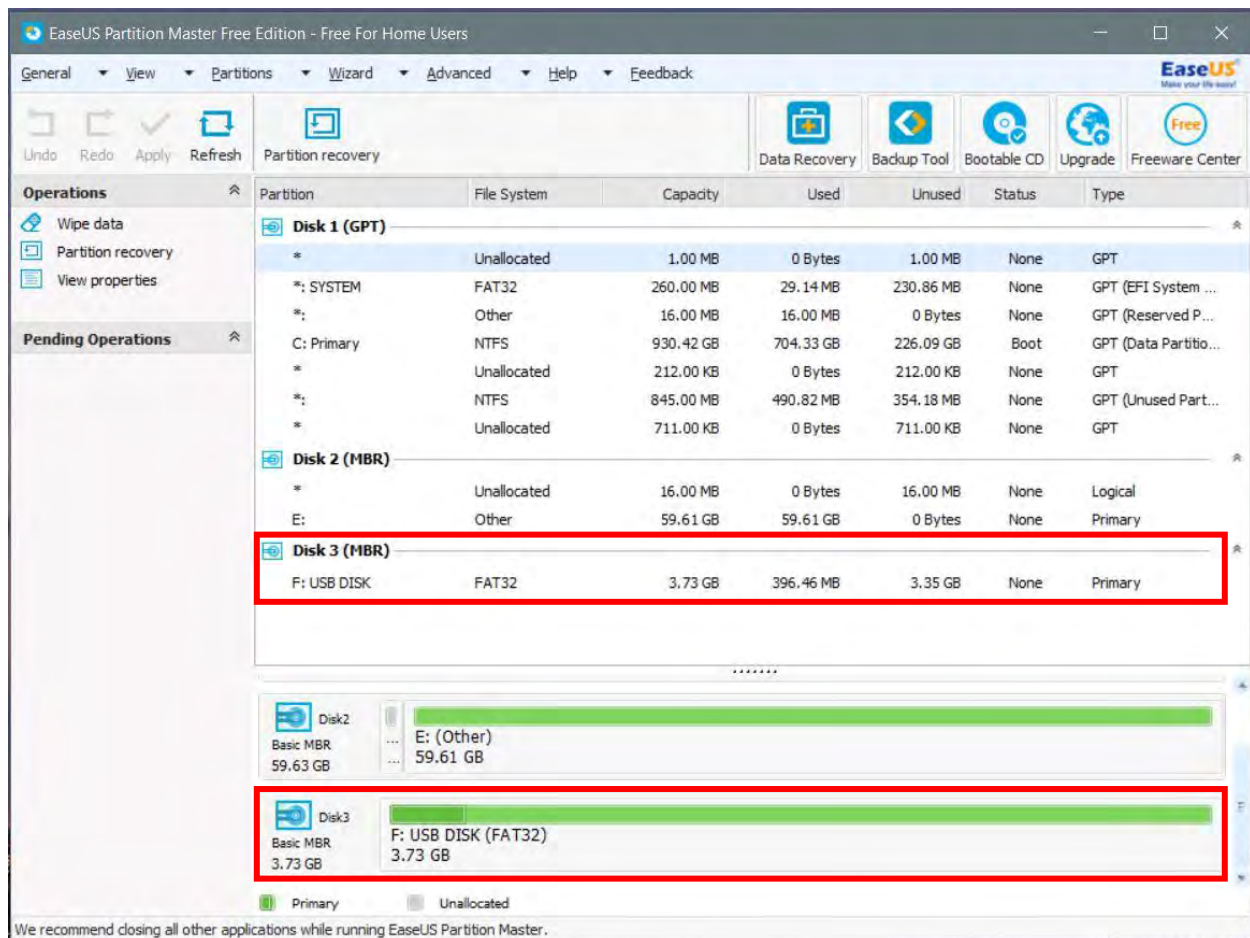
USB Flash Drive Management – Resize Partition

Required Equipment/Software

- HAZ-SCANNER instrument
- USB thumb drive (sometimes called a flash drive, memory stick or disk drive)
- Computer running Microsoft Windows with an available USB port
- EASEUS (free) **Partition Master** software (<http://www.partition-tool.com/download.htm>)

Process: Delete all partitions on the USB thumb drive. Before you run Partition Master you will need to connect your USB thumb drive to an available USB port on a computer. Upon running Partition Master you will be presented with a summary screen that identifies all available drives on the local computer, including the Windows system drive and any removable drives (including the connected USB thumb drive).

NOTE: It is important to identify the correct disk drive that corresponds to your connected USB thumb drive.



Partition Master User Interface

HAZ-SCANNER User Guide – Version V.7.7

In the Partition Master main menu, right-click the disk that corresponds to your USB thumb drive and click the **Delete all Partitions** option.

- A warning window will appear that will ask you to confirm this action, click **OK**.
- The “**delete all partitions**” task will be added to the **Pending Operations** list on the Left hand side of the screen, these tasks are queued and executed after all tasks are defined.

Create a smaller partition on the USB disk

Now that you have a blank file system on your USB thumb drive it will be necessary to create a single, smaller file-system which will be used to store your HAZ-SCANNER log files.

In the main Partition Master window, right-click the “unallocated” item underneath your USB thumb drive and click **Create Partition**. A dialog box will appear that asks for the specifications for the new partition, these specifications will be:

Create as = **Primary**
File System = **FAT**

Drag the slider from the right hand side to create the desired storage space on the USB thumb drive (smaller space = faster logger response time). It is recommended that this size be 2000 MB (2 GB) or smaller.

Check to ensure that “**unallocated space before**” is 0.0. Click **OK** when done.

A new task will be added to the **Pending Operations** list on the left-hand side of the main screen.

Format the new partition for use with a HAZ-SCANNER instrument

Now that a smaller partition has been created for use with a HAZ-SCANNER device, we need to format the thumb drive so that it will be optimized for speed rather than space. What this means is that we need to have a large cluster size (32KB) rather than the standard 4KB cluster size. This effectively reduces the total number of clusters and therefore the read time is significantly reduced. The downside to this approach is that the smallest file that can exist on the drive is 32KB, so if one were to store many small files on the drive (like an operating system) then the drive would fill up quickly. This is not a problem for HAZ-SCANNER because stored files are few and are typically large files.

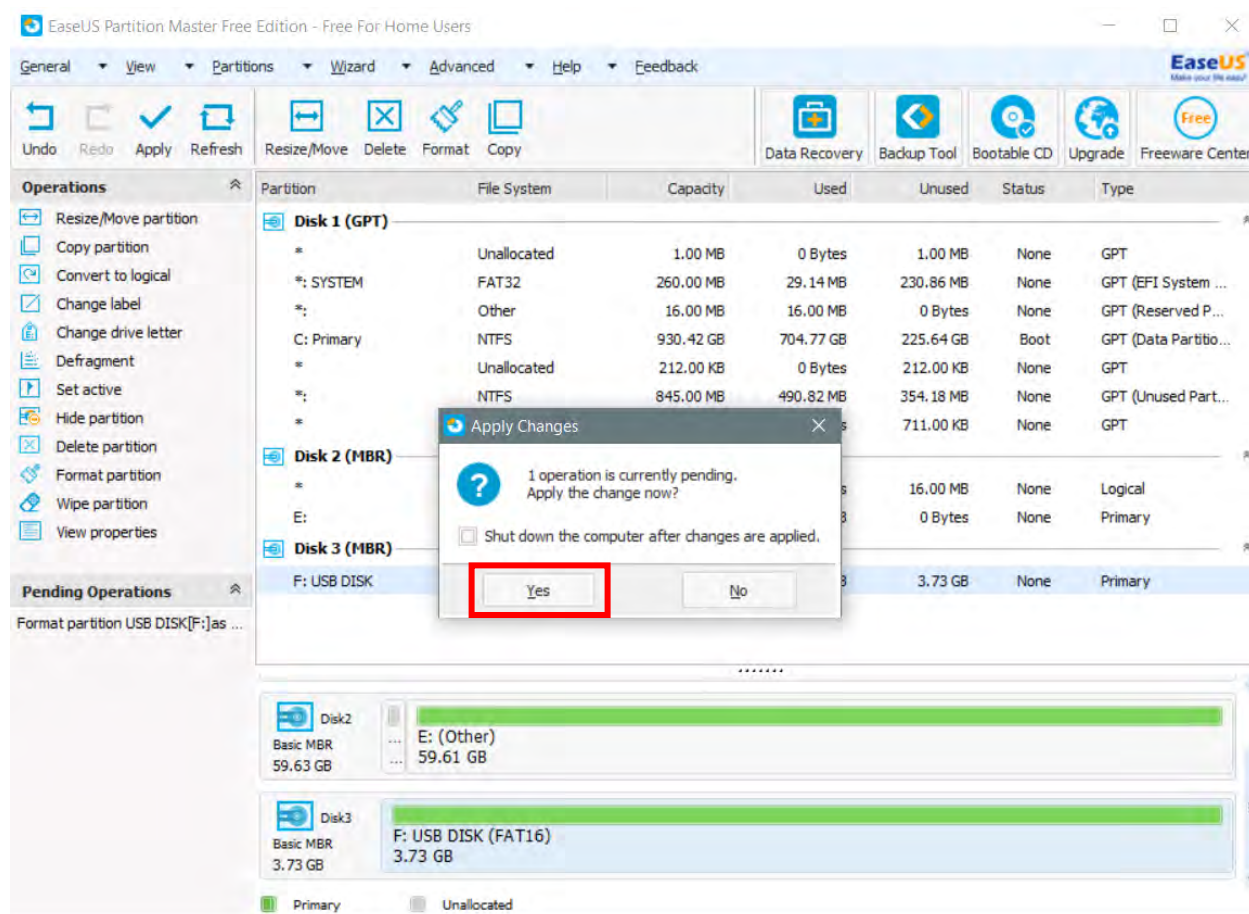
In the main Partition Master window, right-click the new “**FAT16**” entry underneath your USB thumb drive and click **Format Partition**.

A dialog box will appear that asks for the specifications for the new partition, these specifications will be:

File System = **FAT**
Cluster size = **32KB**

Click **OK** when done.

HAZ-SCANNER User Guide – Version V.7.7



Partition Master – Apply Changes

Apply the changes

Now that the specifications for the USB thumb drive have been identified and queued, we need to apply the changes. To do this you need to click the large tick in the tool bar at the top of the screen. At this stage you will be prompted to confirm these changes. Click **YES** to confirm. If prompted to restart the computer, select **NO** as it is unnecessary.

Typical read times for USB drives

The table below identifies the time required for HAZ-SCANNER to analyze and read a USB thumb drive before it can be used for data storage. A USB drive of 2 GB or less will reduce the upload time. The green disk light on the HAZ-SCANNER instrument will blink rapidly when transmitting data. A fully loaded system sampling once a minute for 24 hours will take approximately 10 minutes to complete the data transfer process.

HAZ-SCANNER User Guide – Version V.7.7

Drive capacity (MB)	Cluster size (KB)	HazScan read (secs)
500	8	14
500	16	8
500	32	5
1000	16	14
1000	32	8
2000	32	14
4000	8	182
4000	16	93
4000	32	47

Uploading HAZ-SCANNER Data to a USB Thumb Drive

Note: Thumb drives supplied by EDC containing HAZCOMM-PRO software have been preformatted. If using another thumb drive, format the drive first using the instructions above.

1. Insert the USB Thumb Drive into the HAZ-SCANNER USB port. HAZ-SCANNER will then display **'Reading USB Device'**.
2. When the device has recognized the thumb drive, the display will read **'USB Device Ready'**.
3. Press the front panel **Function** button and scroll until **'Data to USB'** is displayed. Press **Enter**.
4. HAZ-SCANNER will then display arrows and **'DATA to USB'**.

'DATA to USB' is displayed only for a second. The display will then display the date and time. This does **NOT** indicate that the data transfer is complete. The **disk icon will flash** until the data has been fully uploaded. Once data transfer is complete, the front panel disk icon will flash once every 6 seconds. Once the data transfer is complete, press the function button until **"Remove USB"** is displayed. Press **Enter**. Remove USB thumb drive. HAZ-SCANNER will then display **'USB removed'**.

See the following pages for HAZ-SCANNER front panel display functions and confirmations.



HAZ-SCANNER Front Panel Data Upload Displays

HAZ-SCANNER User Guide – Version V.7.7



Data to USB



Reading USB Device



USB Device Ready



NOTE: "DATA to USB" is displayed only for a second. The display will then defer back to date and time. This does **NOT** indicate that the data transfer is complete. The disk icon will flash until the data has been fully uploaded. Once data transfer is complete, disk icon will flash once every 6 seconds.

START
PRESS AND HOLD
5 SECONDS

PARTICULATE SENSOR
AIR FLOW
2.0 LPM

HAZ-SCANNER™
Air Quality Monitoring System

Function 5/8
Remove USB

Environmental Devices Corporation - USA

Sampling Disk Logging Power

Function Enter

A

B

POWER

START
PRESS AND HOLD
5 SECONDS

HAZ-SCANNER™
Air Quality Monitoring System

Date: 10-04-2014
Time: Rembus USB

Environmental Devices Corporation - USA

Sampling Data Logging Power Function

Particulate Sensor
Air Flow 2.0 LPM

A
B

49

Troubleshooting

You may use the HAZCOMM-PRO software screens to troubleshoot the system with EDC Technical Support assistance. HAZCOMM-PRO software may be used to directly send commands to a HAZ-SCANNER instrument which may be used to isolate a problem or problems. HAZCOMM-PRO special functions may be accessed from the **Layout** menu (**Terminal**) or from a drop down list found on the bottom of the **Preferences** screen. If you have zeroed or set new spans on HAZ-SCANNER sensors it will be necessary to reprogram a HAZ-SCANNER instrument as shown below.

Reprogramming a HAZ-SCANNER instrument will overwrite factory settings and make it possible to add new spans. If the spans shown in the **Span List** are the same as those in the HAZ-SCANNER **Program List**, then the system is up to date. It is best to **not** use this capability and reset the zeros and spans before beginning a new session and leave the factory settings as the default settings.

Loggers

Logger Notes...

Logger ID 914011

Program Info

Logger Info

Sensors

Misc

Serial Number 914011

Current Span List

38

S1=0,100,601.5,2250.5"ppm"

Y2=0,1,0,0,0,0"CPM"

S3=300,5000,515.7,1908.1"ppm"

S4=0,10,389.5,114.7"

S5=0,25000,529.7,2792.3"ppm"

S6=0,2000,233.3,1249.4"ppb"

S7=0,188,8.5,2160"ppb"

S8=0,2,0,91.9"uG/m3"

S9=0,20000,0,2000"ug/m3"

S10=8,31,1.253,1.827"%"

S11=30,130,300,1300"dB"

S12=0,4,384.8,796.2"ppb"

S13=96,4,64,4,161,4,531"Deg C"

S14=0,2000,55.3,188"ppb"

S15=4.71,1.57,3.783,1.224"radians"

Y16=0,0,0,0,193,0,0,0,0"MPH"

Y17=0,1,0,0,0,0"V"

Y18=0,1,0,0,0,0"V"

Y19=0,1,0,0,0,0"ppm"

Y20=0,1,0,0,0,0"ppb"

Y21=0,1,0,0,0,0"Deg."

Y22=0,1,0,0,0,0"ug/m3"

Y23=0,1,0,0,0,0"%"

Y24=0,1,0,0,0,0"dB"

Y25=0,1,0,0,0,0"

Y26=0,1,0,0,0,0"W/m2"

Y27=0,1,0,0,0,0"Hg"

Program **Model**

S1=0,100,601.5,2250.5"ppm"

Y2=0,1,0,0,0,0"CPM"

S3=300,5000,515.7,1908.1"ppm"

S4=0,5000,368.7,2975.2"ppb"

S5=0,25000,529.7,2792.3"ppm"

S6=0,2000,233.3,1249.4"ppb"

S7=0,188,8.5,2160"ppb"

S8=0,20000,0,2000"ug/m3"

S9=0,20000,0,2000"ug/m3"

S10=8,31,1.253,1.827"%"

S11=30,130,300,1300"dB"

S12=0,2000,384.8,865.3"ppb"

S13=96,4,64,4,161,4,531"Deg C"

S14=0,2000,55.3,188"ppb"

S15=4.71,1.57,3.783,1.224"radians"

Y16=0,0,0,0,193"MPH"

Y17=0,1,0,0,0,0"V"

Y18=0,1,0,0,0,0"V"

Y19=0,1,0,0,0,0"ppm"

Y20=0,1,0,0,0,0"ppb"

Y21=0,1,0,0,0,0"Deg."

Y22=0,1,0,0,0,0"ug/m3"

Y23=0,1,0,0,0,0"%"

Y24=0,1,0,0,0,0"dB"

Y25=0,1,0,0,0,0"

Y26=0,1,0,0,0,0"W/m2"

Y27=0,1,0,0,0,0"Hg"

Y28=0,1,0,0,0,0"m"

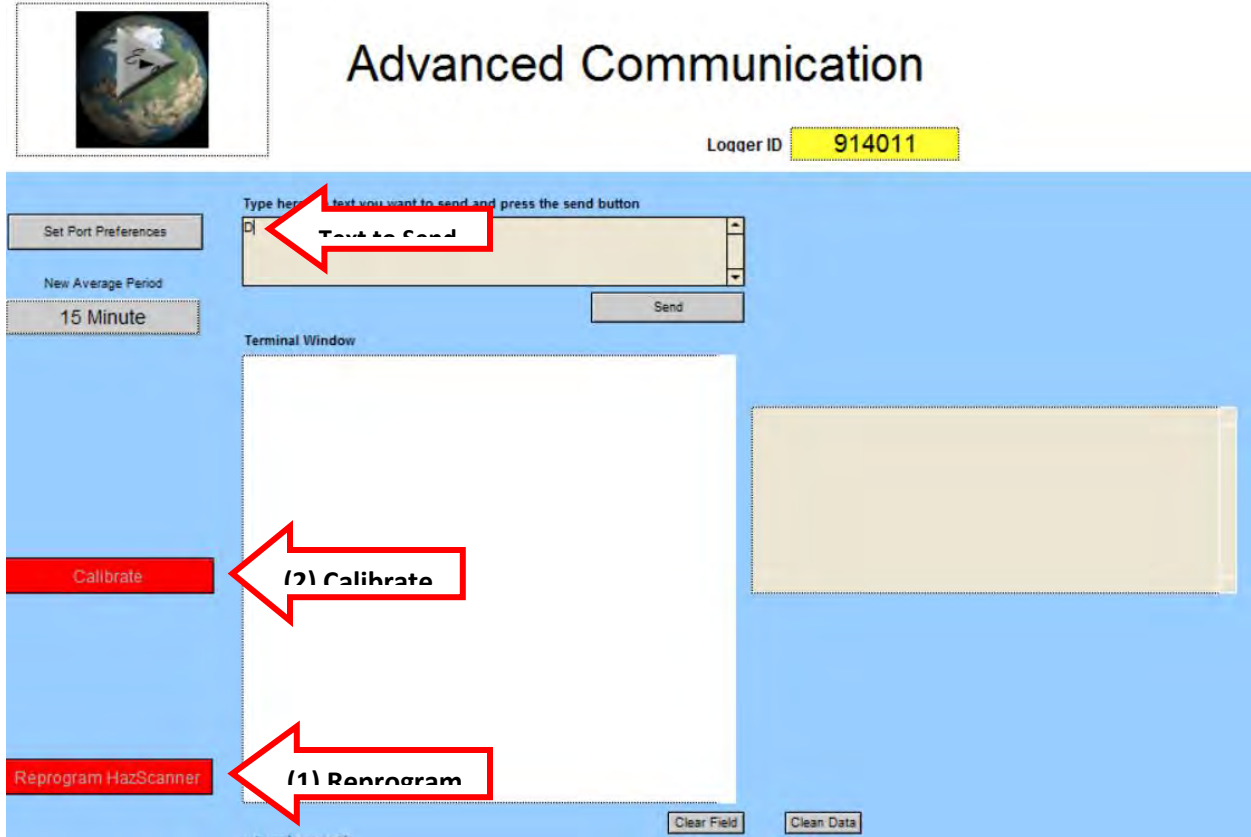
Y29=0,1,0,0,0,0"mph"

Y30=0,1,0,0,0,0"Deg F"

HAZ-SCANNER Span and Program Lists in Logger Menu

HAZ-SCANNER User Guide – Version V.7.7

- (1) **Reprograms** HAZ-SCANNER Instrument.
- (2) Presents the **Calibrate** screen.



HAZCOMM-PRO Terminal Screen

Having Trouble Connecting?

1. Is the HAZ-SCANNER system powered on?
2. Is the serial data cable securely connected to the computer and HAZ-SCANNER instrument?
3. Is the required software driver installed if you are using a Serial-to-USB adapter on either a Macintosh computer or a PC?
4. Did you connect the USB-to-Serial adapter before you started HAZCOMM-PRO software?
5. Have you tried restarting the HAZ-SCANNER instrument and/or rebooted the computer?
6. Access the **Terminal** screen and send a '**D**' character to see if the date is returned.

Trouble Creating a Report

1. Check to ensure you are **not** currently connected to the HAZ-SCANNER instrument.
2. Check the **Header ID** in the Layout **Header List** and ensure there is associated data. Check to ensure the correct data set is seen. You may also perform a **Find** function in the **Data** window to search for the correct data set.
3. Ensure you have correctly sorted the data using the '**Sort**' menu.

Power Off?

If data logging has halted and the instrument indicators are off, the likely cause is a drained battery. Place the instrument power switch in the '**Off**' position and connect the charger to the instrument. Wait 2 or 3 minutes before attempting to reconnect to the instrument. Leave the charger connected.

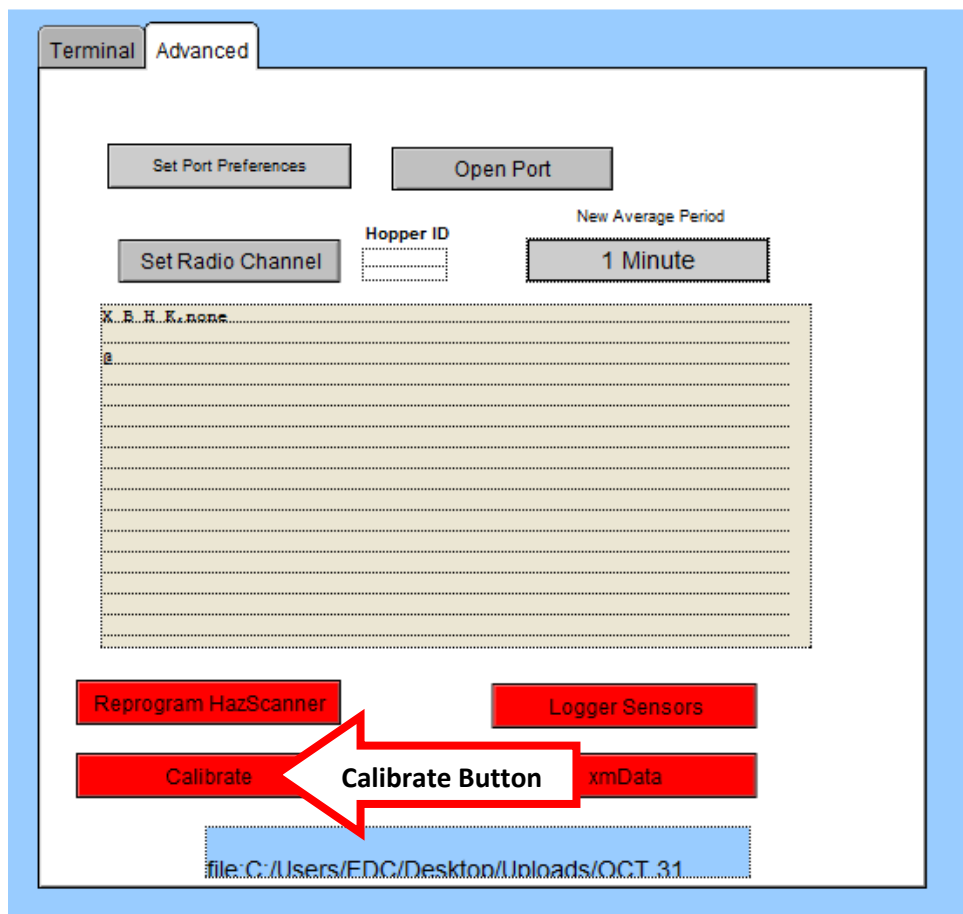
HAZ-SCANNER Particulate Calibration Verification

(Using Calibration Span Reference Part Number CS-105)

Note: Actual particulate calibration requires use of a dust chamber which is usually performed in the EDC factory. The procedures below are designed to **verify** proper calibration.

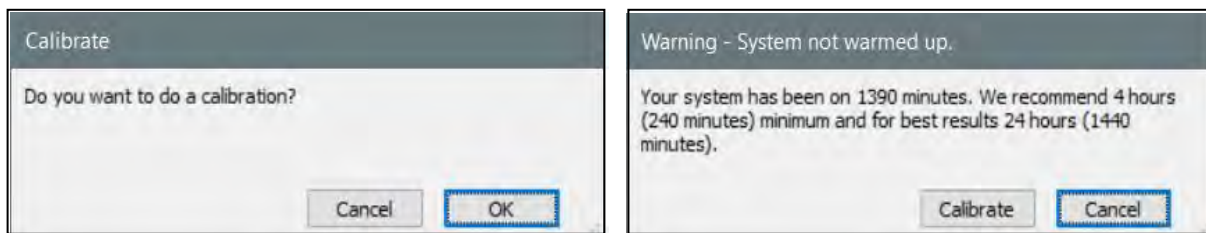
From the HAZCOMM-PRO software Layout menu, select **'Terminal'**. From the Terminal screen click the "Advanced" tab, then click on the **'Calibrate'** button. The password is "HAZSCAN321". From the pop up window select 'calibrate' then select 'OK'. Then on pop-up **"Purge"** message select **'OK'**. Wait **8 minutes** for the purge (Auto Zero) process to complete.

Note: **Stop logging** prior to beginning the calibration procedure. If at any time during the calibration process you wish to re-zero the sensors, press the **'Purge'** button.

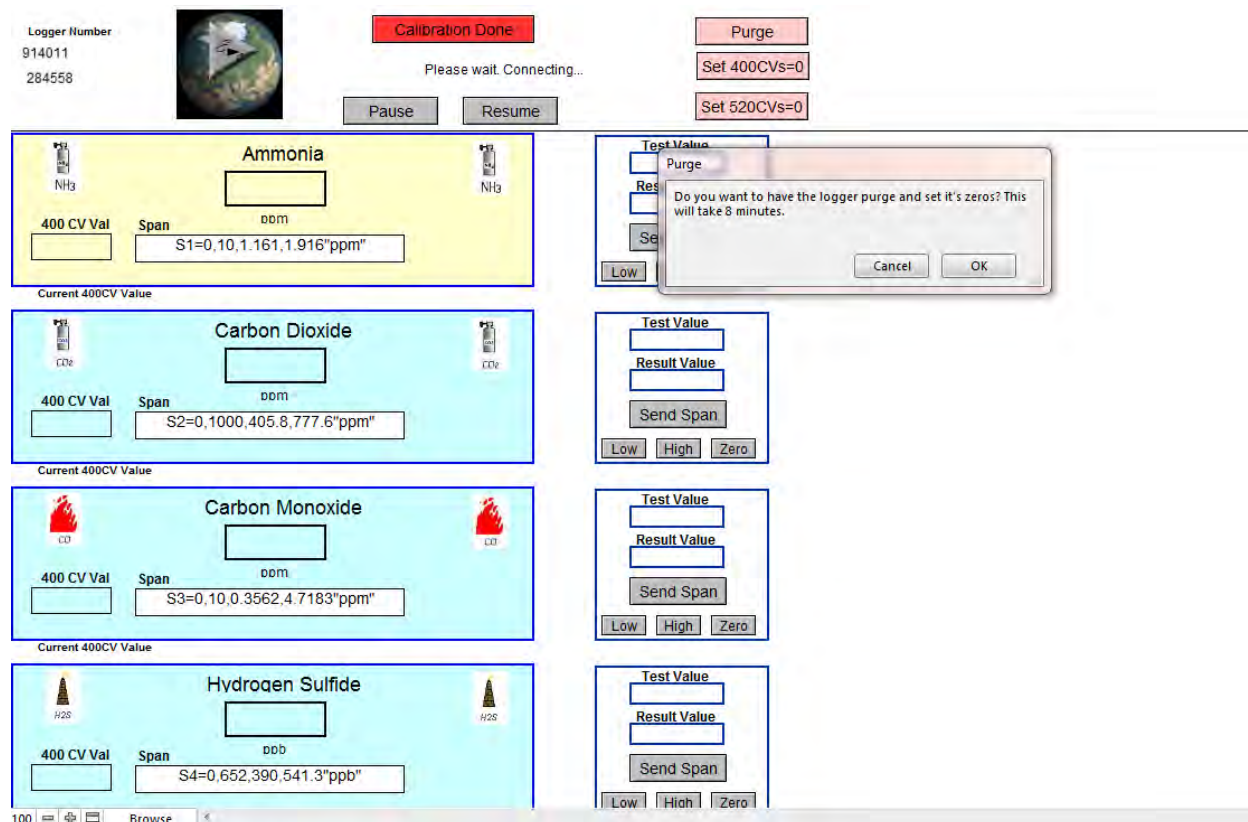


HAZCOMM-PRO Terminal Screen

HAZ-SCANNER User Guide – Version V.7.7



HAZCOMM-PRO Calibrate Confirmation Pop-up Messages



HAZCOMM-PRO Calibration Screen

On the HAZ-SCANNER instrument panel, press the **down** arrow until the front panel displays **Particulate Sensor (A or B)**.

From the HAZCOMM-PRO **Calibration** page, click on the corresponding **Particulate Sensor** box. The box color will change to **yellow** when selected.

1. Remove the **Impactor Sleeve** (see below).
2. Align and insert the **Calibration Span Tool** (Reference P/N CS-105).

HAZ-SCANNER User Guide – Version V.7.7

- Wait 5 minutes for measurements to stabilize. Observe the 'K' value on the HAZ-SCANNER front panel. The 'K' value should match the values displayed in the HAZCOMM-PRO software and on the HAZ-SCANNER front panel display within +/- 10%.

Note: Ensure the **alignment hole** on the CS-105 tool is perfectly aligned with the **locating dot** as shown below. Check to ensure the CS-105 tool is firmly pressing against the locating hole. Repeat the installation of the CS-105 Calibration Span tool a few times to ensure the value of 'K' remains consistent.

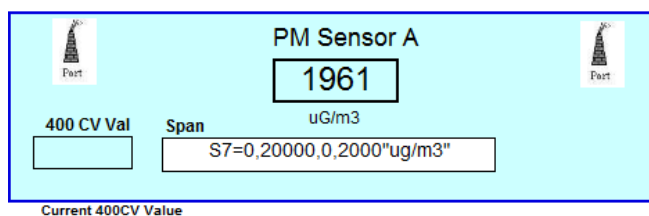
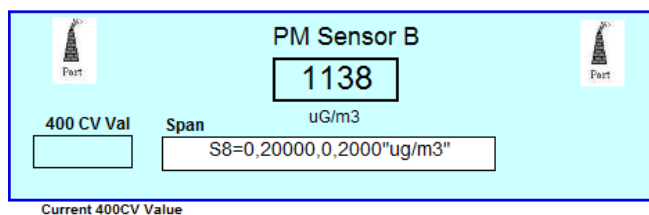
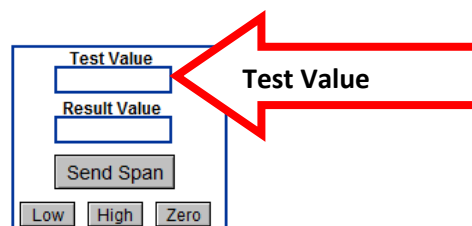
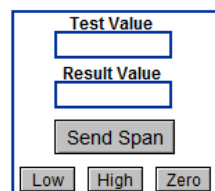


HAZ-SCANNER Impactor Sleeve



HAZ-SCANNER Calibration

- If the 'K' value is not within +/- 10% of the displayed values, enter the number being displayed into the "Test Value" window. Next enter the 'K' value into the 2nd spot in the Span window (replacing 20000). Click on the "High" button under the Test Value window and then click "Send Span"
- Repeat Steps 2 and 3 if the HAZ-SCANNER instrument is equipped with two particulate sensors.

A screenshot of the PM Sensor A display. It shows a 'Part' icon, a '400 CV Val' input field, a 'Span' input field containing 'S7=0,20000,0,2000"ug/m3"', and a large digital display showing '1961 uG/m3'. Below the display is the text 'Current 400CV Value'.A screenshot of the PM Sensor B display. It shows a 'Part' icon, a '400 CV Val' input field, a 'Span' input field containing 'S8=0,20000,0,2000"ug/m3"', and a large digital display showing '1138 uG/m3'. Below the display is the text 'Current 400CV Value'.A screenshot of the 'Test Value' window. It has a 'Test Value' input field, a 'Result Value' input field, a 'Send Span' button, and three buttons: 'Low', 'High', and 'Zero'. A large red arrow points to the 'Test Value' input field with the label 'Test Value'.A screenshot of the 'Test Value' window, identical to the one above, showing the 'Test Value' input field, 'Result Value' input field, 'Send Span' button, and 'Low', 'High', and 'Zero' buttons.

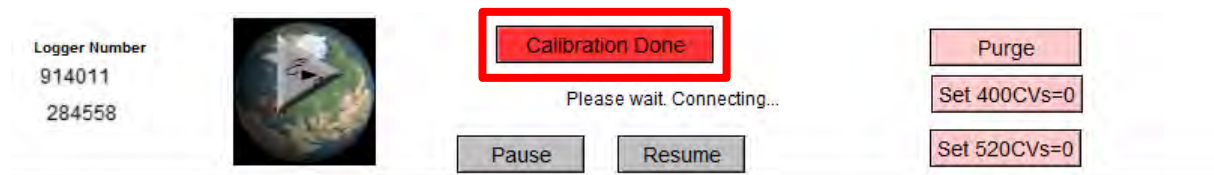
HAZ-SCANNER User Guide – Version V.7.7

HAZCOMM-PRO Particulate High Point Set Confirmation Menus

Using the HAZCOMM-PRO software, proceed and verify the calibration any additional particulate sensors (if equipped). When all particulate sensors have verified calibration, remove the **Calibration Span Reference** tool, reinstall the HAZ-SCANNER Impactor sleeve and proceed as follows.

From the HAZCOMM-PRO calibration page:

1. Press '**Calibration Done**' button as shown below.
2. Select '**Reprogram**' and enter your login password when requested.
3. Select "Current" to program the unit with the new spans. Select "yes" to confirm
4. After programming has completed, scroll through the HAZ-SCANNER front panel to ensure the instrument has been successfully programmed.
5. From the HAZCOMM-PRO main page, disconnect and reconnect to the HAZ-SCANNER instrument to ensure the system functions properly.



HAZCOMM-PRO Calibration Done Button

Next, select the **Logger** menu from the main page **Layout** drop down menu. Follow the instructions on the following page as part of reprogramming a freshly calibrated HAZ-SCANNER instrument to reflect these changes.

HAZ-SCANNER User Guide – Version V.7.7

Note: On the current span list, ensure the first line shows the number 38 (correct). If 38 is not the first value on the first line as shown below, delete the line above the 38 and access the **Terminal** menu from the main page Layout drop down menu. From the HAZCOMM-PRO Terminal page, reprogram the HAZ-SCANNER instrument by clicking on the **Reprogram** button as shown on the following page.

Loggers

Logger Notes...

Logger ID 914011
 Serial Number 914011

Program Info

Logger Info

Sensors

Misc

Current Span List

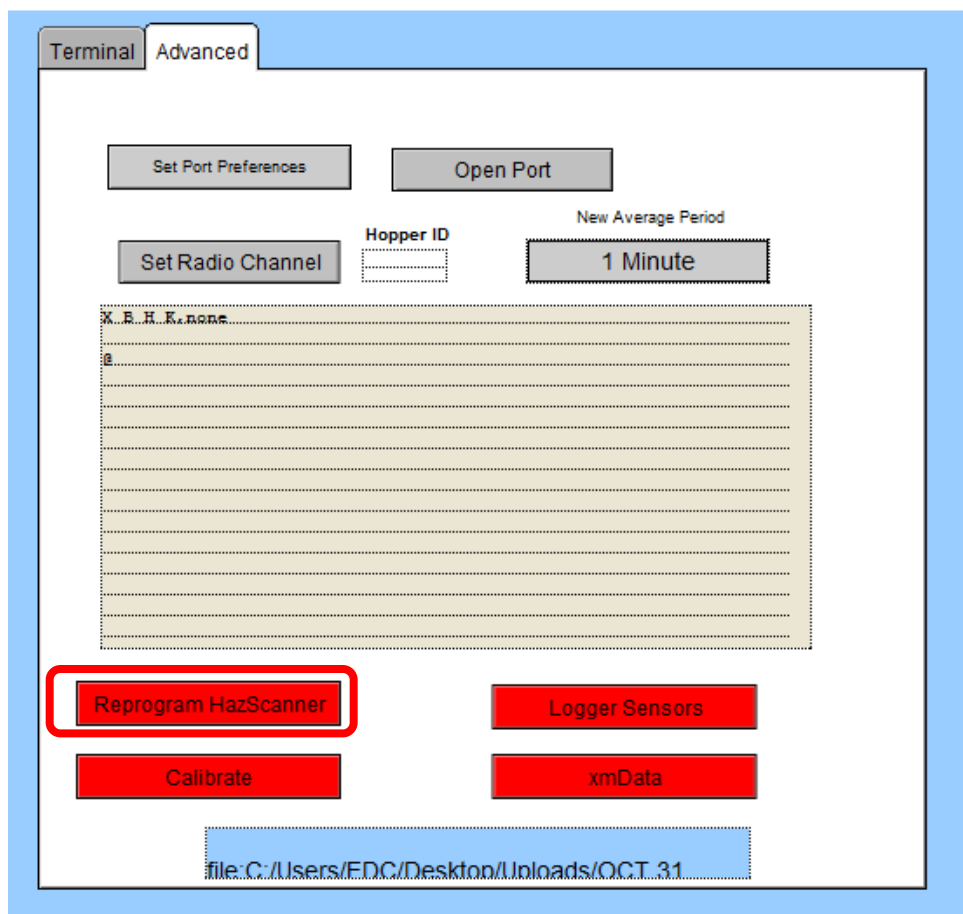
38
S1=0,100,601.5,2250.5"ppm"
Y2=0,1,0,0,0,0"CPM"
S3=300,5000,515.7,1908.1"ppm"
S4=0,10,389.5,114.7"
S5=0,25000,529.7,2792.3"ppm"
S6=0,2000,233.3,1249.4"ppb"
S7=0,188,8.5,2160"ppb"
S8=0,2,0,91.9"uG/m3"
S9=0,20000,0,2000"ug/m3"
S10=8,31,1,253,1,827"%"
S11=30,130,300,1300"dB"
S12=0,2000,384.8,865.3"ppb"
S13=96.4,64,4,161,4,531"Deg C"
S14=0,2000,55.3,188"ppb"
S15=4.71,1,57,3,783,1,224"radians"
Y16=0,0,0,193,0,0,0,0"MPH"
Y17=0,1,0,0,0,0"V"
Y18=0,1,0,0,0,0"V"
Y19=0,1,0,0,0,0"ppm"
Y20=0,1,0,0,0,0"ppb"
Y21=0,1,0,0,0,0"Deg."
Y22=0,1,0,0,0,0"ug/m3"
Y23=0,1,0,0,0,0"%"
Y24=0,1,0,0,0,0"dB"
Y25=0,1,0,0,0,0"
Y26=0,1,0,0,0,0"W/m2"
Y27=0,1,0,0,0,0"Hg"

Program

Model

S1=0,100,601.5,2250.5"ppm"
Y2=0,1,0,0,0,0"CPM"
S3=300,5000,515.7,1908.1"ppm"
S4=0,5000,368.7,2975.2"ppb"
S5=0,25000,529.7,2792.3"ppm"
S6=0,2000,233.3,1249.4"ppb"
S7=0,188,8.5,2160"ppb"
S8=0,20000,0,2000"ug/m3"
S9=0,20000,0,2000"ug/m3"
S10=8,31,1,253,1,827"%"
S11=30,130,300,1300"dB"
S12=0,2000,384.8,865.3"ppb"
S13=96.4,64,4,161,4,531"Deg C"
S14=0,2000,55.3,188"ppb"
S15=4.71,1,57,3,783,1,224"radians"
Y16=0,0,0,193"MPH"
Y17=0,1,0,0,0,0"V"
Y18=0,1,0,0,0,0"V"
Y19=0,1,0,0,0,0"ppm"
Y20=0,1,0,0,0,0"ppb"
Y21=0,1,0,0,0,0"Deg."
Y22=0,1,0,0,0,0"ug/m3"
Y23=0,1,0,0,0,0"%"
Y24=0,1,0,0,0,0"dB"
Y25=0,1,0,0,0,0"
Y26=0,1,0,0,0,0"W/m2"
Y27=0,1,0,0,0,0"Hg"
Y28=0,1,0,0,0,0"in"
Y29=0,1,0,0,0,0"mph"
Y30=0,1,0,0,0,0"Deg F"

HAZCOMM-PRO Logger Menu Span List Display



HAZCOMM-PRO Terminal – Reprogram HAZ-SCANNER Button

Select '**Current Spans**' to complete reprogramming the HAZ-SCANNER instrument.

If the Logger span list was correct, proceed with the HAZ-SCANNER gas calibration procedures described on the following pages.

End of Particulate Calibration Span Verification Procedure

HAZ-SCANNER Gas Calibration Procedures

1. Restart the HAZ-SCANNER instrument at least 24 hours prior to starting the gas calibration process.
2. Remove the HAZ-SCANNER cover and turn **OFF** the **Air Sampling Pump** switch as shown below.
3. Remove the screw in the gas calibration inlet port as shown below.

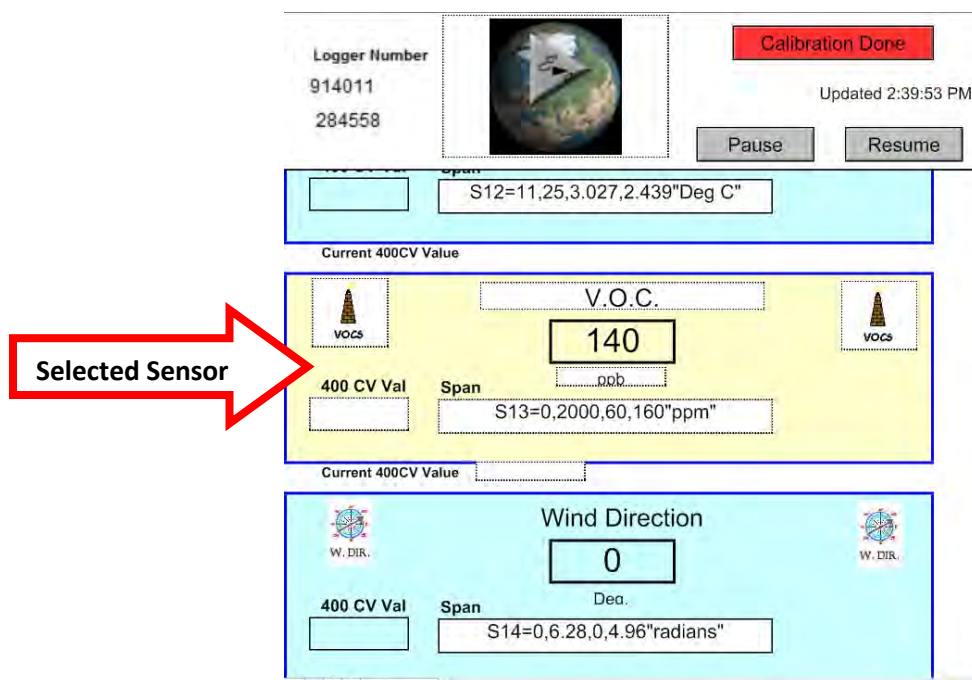


HAZ-SCANNER Air Sampling Pump Switch and Gas Inlet Port

Proceed as follows:

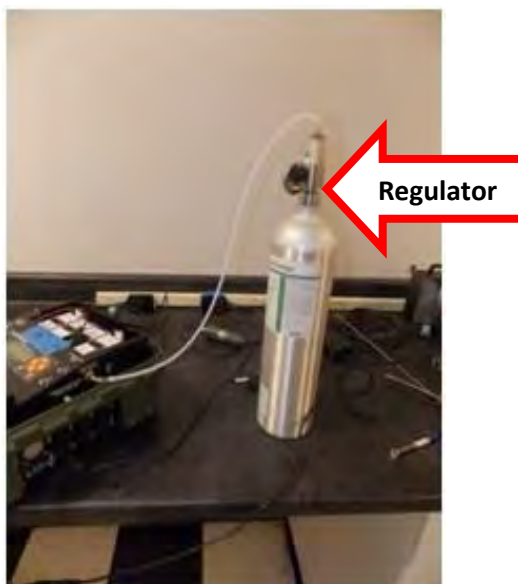
1. Establish a serial data connection between the HAZ-SCANNER instrument and the computer running HAZCOMM-PRO software.
2. From the HAZCOMM-PRO main page **Layout** menu, select '**Terminal**'.
3. Press the '**Calibrate**' button in the Terminal windows and confirm to proceed with the instrument calibration procedure.
4. The calibrate password is **HAZSCAN321**. Enter this password when requested.
5. Answer '**No**' when it asks you if you want to purge.
6. Scroll and click on the gas sensor to be calibrated. The selected sensor will be highlighted in yellow as shown on the following page.

HAZ-SCANNER User Guide – Version V.7.7



HAZCOMM-PRO Gas Calibration Pause and Resume Buttons

7. Attach tubing from **Zero Air** gas bottle with .5L regulator to the HAZ-SCANNER instrument gas inlet port and open the valve.
8. Wait 5 minutes for **Zero Air** to equalize in the sensor manifold.
9. In the HAZCOMM-PRO software application, press the '**Zero Sensor**' button then click '**Send Span**'.



HAZ-SCANNER Tubing Connection to Zero Air Gas Bottle

HAZ-SCANNER User Guide – Version V.7.7

HAZCOMM-PRO Set New High Span Concentration

10. Repeat 9 for each gas sensor to be calibrated.
11. Remove the zero air bottle from the HAZ-SCANNER instrument gas inlet port and connect the calibration gas for the desired sensor and open the valve.
12. Wait until the concentration displayed value does not change a lot.
13. Enter the displayed concentration in the '**Test Value**' field, click the '**High**' button then click '**Send Span**'. If the concentration in the bottle is different from the concentration in the span, replace the spanned concentration with the actual concentration on the bottle.

The screenshot displays the HAZCOMM-PRO software interface. At the top, a 'Calibration Done' button is highlighted with a red arrow. Below it, the 'V.O.C.' section shows a 'Test Value' of 50906 and a 'Result Value' of 2343.76608. A red box highlights the 'Test Value' and 'Result Value' fields, with a red arrow pointing to the 'Test Value' field and the text 'Enter concentration'. The 'Send Span' button is also visible. The 'Wind Direction' section shows a value of 0. The '400 CV Val' and 'Span' fields are also visible.

Logger Number
914011
284558

Calibration Done

Updated 2:49:20 PM

Pause Resume

S12=11,25,3.027,2.439"Deg C"

Current 400CV Value

V.O.C.

50906

Test Value

50906

Result Value

2343.76608

Send Span

Low High Zero

Enter concentration

Span

S13=0,50000,56.7,2303.062"ppm"

The 'High' concentration is the 2nd number and the 'Low' concentration is the first number

Current 400CV Value

Wind Direction

0

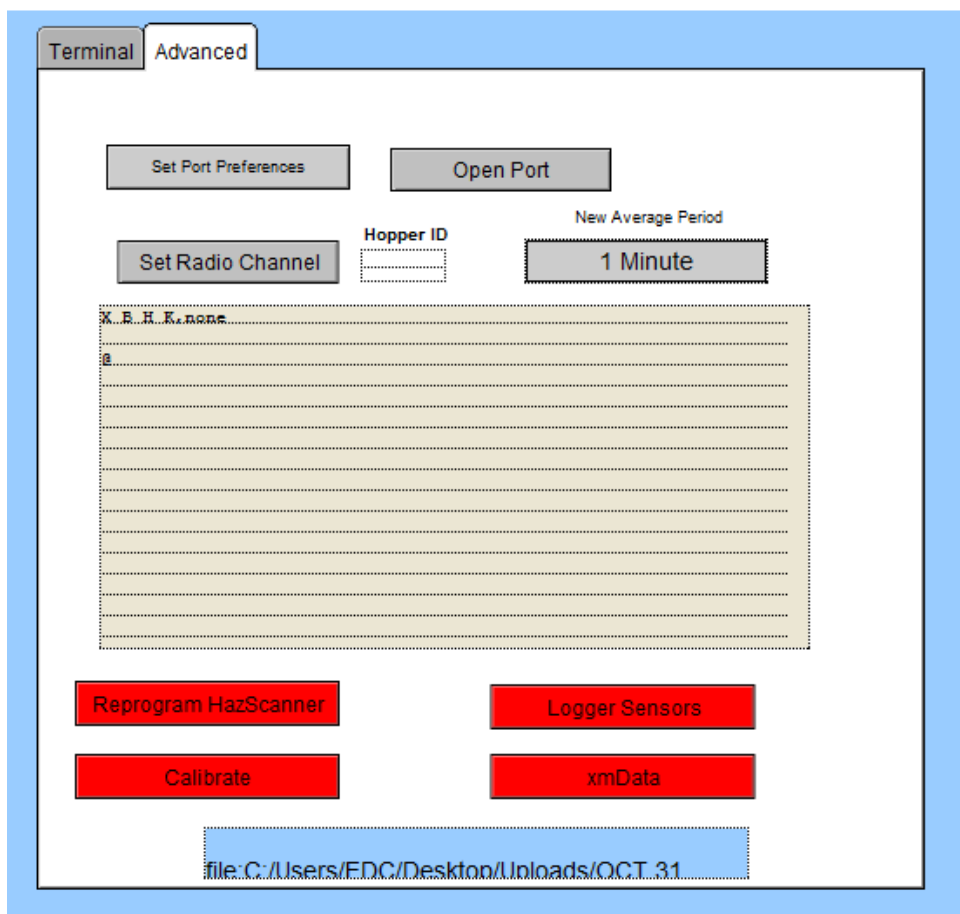
400 CV Val

Span

S14=0,6.28,0,4.96"radians"

Dec.

14. Repeat for each sensor being calibrated.
15. When done, remove the calibration gas bottle tubing from the instrument and replace the screw in the gas calibration inlet port.
16. Turn ON the sampling port pump.
17. In the HAZCOMM-PRO software, click the '**Calibration Done**' button as shown above.
18. You will be reminded to reprogram the instrument. Press '**Cancel**' when the HAZCOMM-PRO popup dialog appears.
19. Go to the Terminal and then click on the '**Advanced**' tab, shown on the next page.



20. Press the **Reprogram HAZ-SCANNER** button on the Terminal page.
21. Enter the password '**HAZSCAN321**' and then select '**Current**' span.

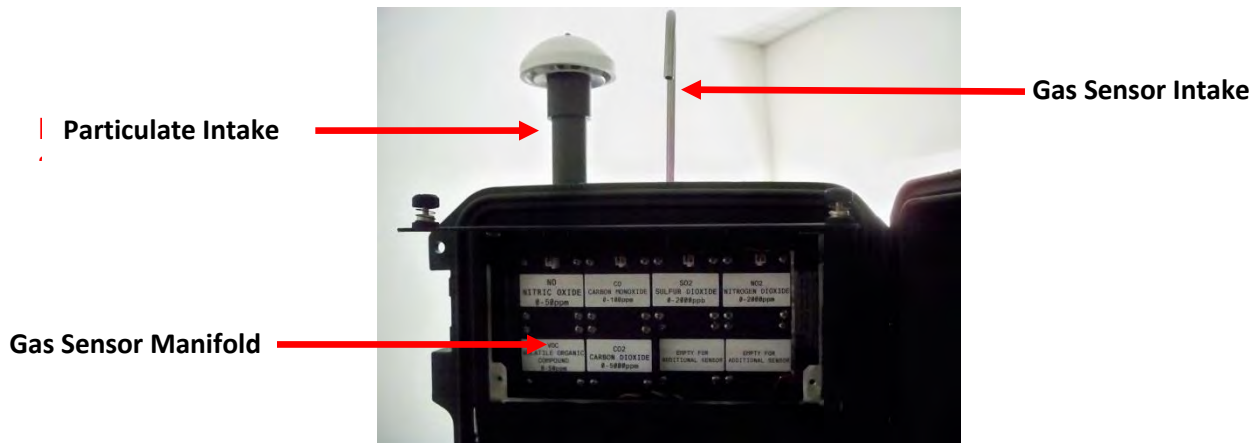
NOTE: You may choose not to reprogram, but you will LOSE your new spans if the instrument is shut off UNLESS you reprogram!

End of HAZ-SCANNER Gas Sensor Calibration Process

Particulate Sensor Accessories

Particulate Accessories - Particulate Sensor (PM)

The PM sensor used with the HAZ-SCANNER system has the ability to measure 1.0 micron, 2.5 micron, 4.0 micron or 10 micron particle sizes. You will find a small cylindrical object in the HAZ-SCANNER case called an **Impactor Sleeve**. You may change the particle detection size by physically replacing the PM Impactor inside the sleeve. The PM10 Impactor will detect a wider range of particle sizes than the PM2.5 or PM-4.0 Impactor. Impactor sizes are labeled on the Impactor Sleeve.



After placing the Impactor into the Impactor Sleeve caution must be exercised while inserting the proper Impactor Sleeve into the correctly designated sensor intake.



HAZ-SCANNER Impactor Insertion into Impactor Sleeve

Occasionally you should remove, clean and re-grease the Impactor. The Impactor is located inside the Impactor sleeve. See specific instruction on how to remove and insert Impactors into the Impactor Sleeve on the following page.

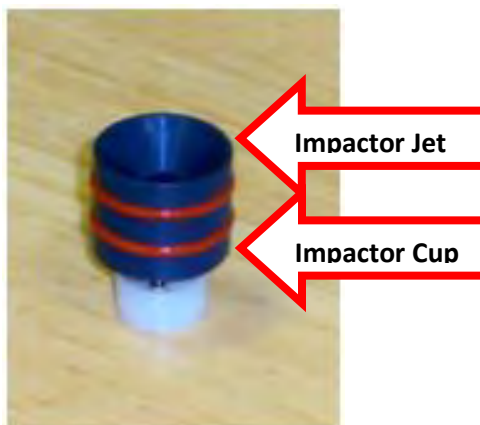
HAZ-SCANNER systems have the ability to monitor two particulates simultaneously. If configured for two particulate sensors, sensors are labeled **Sensor A** and **Sensor B**. Sensor A is used for PM-10 or TSP. Sensor B is used for PM-2.5. **Be certain these sensors are installed in their proper slots or improper readings will result.**

After placing the desired Impactor into the Impactor sleeve, use caution while inserting the proper Impactor Sleeve into the correct sensor intake.

HAZ-SCANNER Impactor Instructions

(Impactor Part Number: HS-PM1.0um, HS-PM2.5um, HS-PM4.0um, and HS-PM10um)
(Impactor Sleeve Part Number: IMS-105)

The Impactor assembly consists of an Impactor cup and an Impactor jet. The Impactor jet and cup are conjoined by three male pins on the Impactor Jet aligned with corresponding female connector holes on the Impactor Cup.



HAZ-SCANNER Impactor Assembly

The Impactor assembly fits into the Impactor sleeve. Insert the cup end of the Impactor into the Impactor sleeve approximately **one inch**, or 25mm, into the Impactor sleeve as shown below.



Inserting the Impactor Assembly into the Impactor Sleeve

Insert the Impactor sleeve containing the Impactor assembly into the HAZ-SCANNER particulate monitor port.

In order to change the Impactor cut point selective size, clean, or grease the Impactor cup, the Impactor assembly must be removed. To remove the Impactor assembly from the Impactor sleeve, push upward from the bottom of the sleeve with the trim stick provided with the HAZ-SCANNER product. A pencil or similar tool may also be used for this purpose.



Removing Impactor Assembly from Impactor Sleeve

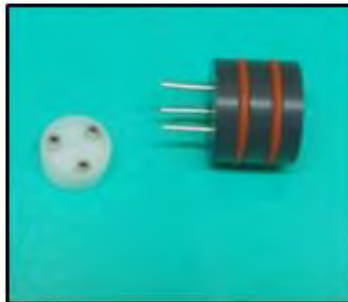
Only use a small amount of Impactor grease (P/N IG-105). Remove any excess grease before placing the Impactor into the sensor. Please see the following instructions for adding grease to Impactor assemblies.

Instructions for Impactor Grease (P/N IG-105) for HazDust and HAZ-SCANNER Single Jet Inertial Impactors

The impactation inlet should be dismantled, inspected, and cleaned at regular intervals, i.e., every 10th samples, or after 250 hours of normal ambient use. Clean as often as appropriate.

Application Steps:

1. Remove the Impactor assembly through top of sleeve as described above.
2. Disassemble the Impactor body from the Impactation Plate as shown below.



Disassemble Impactor Plate from Impactor Assembly

Apply a small amount of Impactor grease (P/N IG-105) by squeezing a small amount of grease onto a finger and wipe evenly onto Impactor Plate as shown on the following page.



Applying Grease to Impactor Plate

3. Reassemble the Impactor Plate to the Impactor Body and insert into the Impactor Sleeve. Ensure the Impactor is inserted at least 2 cm below the Impactor Sleeve opening.
4. Once the Impactor body and Impactor Plate have been reassembled, push at least 2 cm into the Impactor Sleeve as shown below.



Reinsert Impactor into Impactor Sleeve

Note: Alternatively, a slurry mixture of hexane or a suitable solvent may be used by following the steps below.

1. Prepare a mixture of hexane and IG-105 grease in a dropper bottle until thoroughly mixed. Use a 1-inch length of IG-105 to 100 ml of hexane. Vigorously shake the mixture until an opaque, uniform suspension, free of globs is obtained.
2. Put two or three drops of the cloudy solution on the Impaction Plate. The drops should saturate the Plate, flowing freely from edge to edge.
3. Let the Plate “dry” by allowing hexane to volatilize, leaving thin film of grease on the Plate.

Cleaning the Impactor

1. Remove the Impactor assembly from the Impactor Sleeve. Disassemble Impactor Body from the Impaction Plate as described above.

HAZ-SCANNER User Guide – Version V.7.7

2. Inspect the O-rings on the Impactor for fitness and replace if necessary. Remove any loose particulate material from the Impactor Sleeve while preventing material from falling onto the 47mm gravimetric filter below and causing erroneous gravimetric results.
3. Rinse the Impactor from top to bottom with hexane or a suitable solvent using a squeeze bottle. Pay particular attention to the Impaction Plate having concentric grooved rings. The Impactor may also be cleaned with a foam tip swab and warm soapy water.
4. Carefully re-insert the Impactor assembly into the top of the Impactor Sleeve. The Impactor must be pushed down at least 2 cm into the Impactor Sleeve.

HAZ-SCANNER Tripod Assembly P/N TP-600

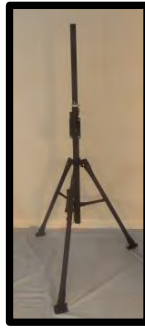


Insert pin in lower mast and tighten screws

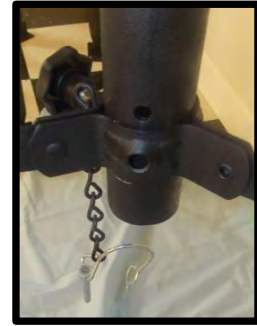
HAZ-SCANNER User Guide – Version V.7.7



Expand legs and flatten feet



Raise mast



Raise mast until mast hole is above leg bracket

Step 1 - Expand tripod legs and flatten tripod feet.

Step 2 - Raise the tripod by pulling up on the mast. The hole on the mast should be raised above the tripod leg bracket. Tighten thumb screws.

Step 3 - Insert the securing pin through the mast hole. Push the securing clasp around the securing pin to hold in place (see below).



Insert pin and attach clamp



Tighten leg bracket mast thumb screws



Place instrument on mounting arm. Tighten thumb screw

Step 4 - Tighten thumb screws where tripod legs attach to mast.

Step 5 - Place instrument on mounting arm and tighten thumb screw.

Step 6 - Insert height adjustment pin and and tighten compression nut.

Step 7 - Place height adjustment pin in mast hole.



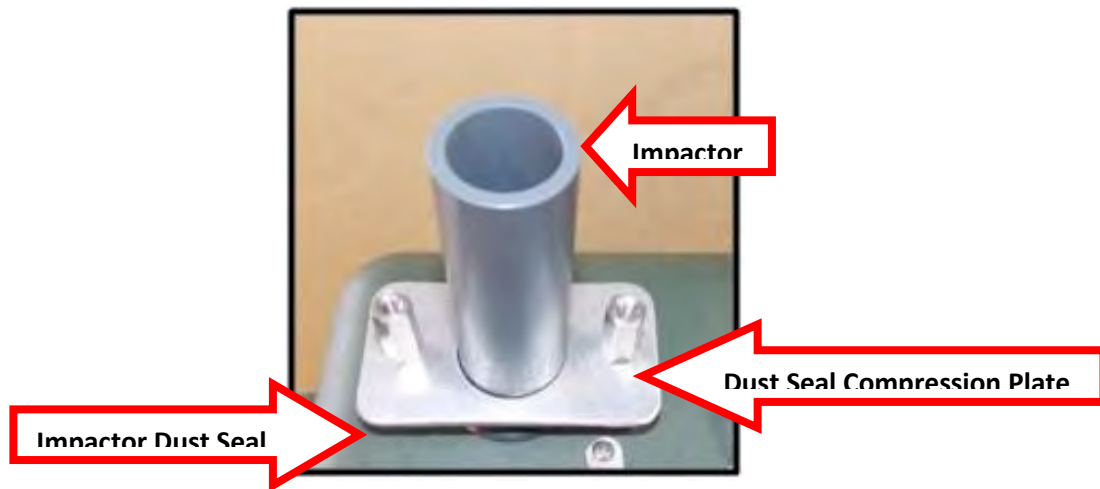
Height adjustment pin

Insert height adjustment pin

Note: Verify the TP-600 tripod mounting surface area is level. Secure the tripod with ¼ inch diameter stakes for temporary use. Insert spikes in ground at an angle. For continuous use bolt the tripod to cement pads with ¼ inch diameter anchors. Install stakes or bolts on each of the three tripod feet. Ensure tripod is securely fastened and anchored when operated in strong wind areas.

Accessories Installation and Use

HAZ-SCANNER Dust Seal Compression Plate Installation



HAZ-SCANNER Dust Seal Compression Plate

1. Find the predrilled holes on the top of the HAZ-SCANNER case and remove mounting screws.



Place Dust Seal Compression Plate into Impactor Sensing Inlet as shown.

2. Insert the **Dust Seal Compression Plate** into the Impactor Sensing Inlet. Align the screws with the predrilled holes. Tighten by hand or with a screwdriver until pressure is applied to the Impactor dust seal.

Instructions for Using Flow Meter (P/N FM-105) with HAZ-SCANNER

Adjusting the Flow Rate



Flow Adjustment Meter Attached to HAZ-SCANNER Instrument

Note: Flow meter must remain vertical when measuring HAZ-SCANNER flow.



Note: Newer HAZ-SCANNER models' flow adjustment controls are located below the display panel.

PC-106 Precipitation Cap Rain/Solar Applications with HAZ-SCANNER



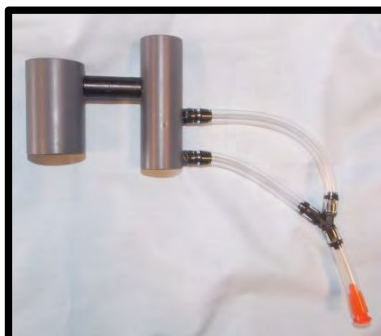
HAZ-SCANNER Precipitation Cap

Place the **Precipitation Cap** onto the HAZ-SCANNER Sampling Impactor Sleeve as shown above.

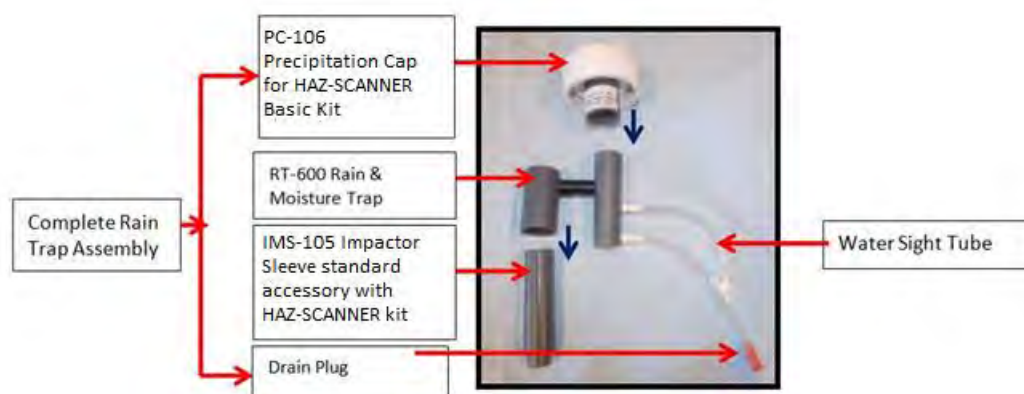
Description: Precipitation Caps can be thought of as Precipitation/Solar Shields. The inferred sun rays can be read by the light scattering technique as a particulate. Same is true for precipitation. Precipitation does not refer to just rain. It refers to light moisture, debris, sand, leaves, bird droppings, etc. The PC-106 is a shield that protects against such things falling from overhead.

Rain and Moisture Trap for HAZ-SCANNER

(Model HAZ-SCANNER P/N RT-600)



Description: The RT-600 assembly provides added protection against water and moisture entry into the air intake inlet during continued outdoor HAZ-SCANNER monitoring. The RT-600 is a mandatory accessory for the HAZ-SCANNER system when the application dictates unattended 24 hour monitoring in potential rain or high moisture environments. It is to be used with the PC-106 which is standard with the purchase of a Particulate Sensor.



HAZ-SCANNER Rain and Moisture Trap Assembly

Assembly Steps

1. Locate the longer grey cylinder above the Sight Tube of RT-600.
2. Push the PC-106 onto the grey cylinder above the Site Tube.
3. Push the IMS-105 to the underside of the shorter grey cylinder.
4. Place the RT-600 complete assembly into the air intake of the HAZ-SCANNER instrument.
5. When water is trapped in the Site Tube, remove the orange plug and allow water to drain.
6. Replace the orange drainage plug – ensures proper inlet flow and prevents access to the sensor.

Rain Trap Installation when using Particulate Inlet Heater (P/N HA-600)

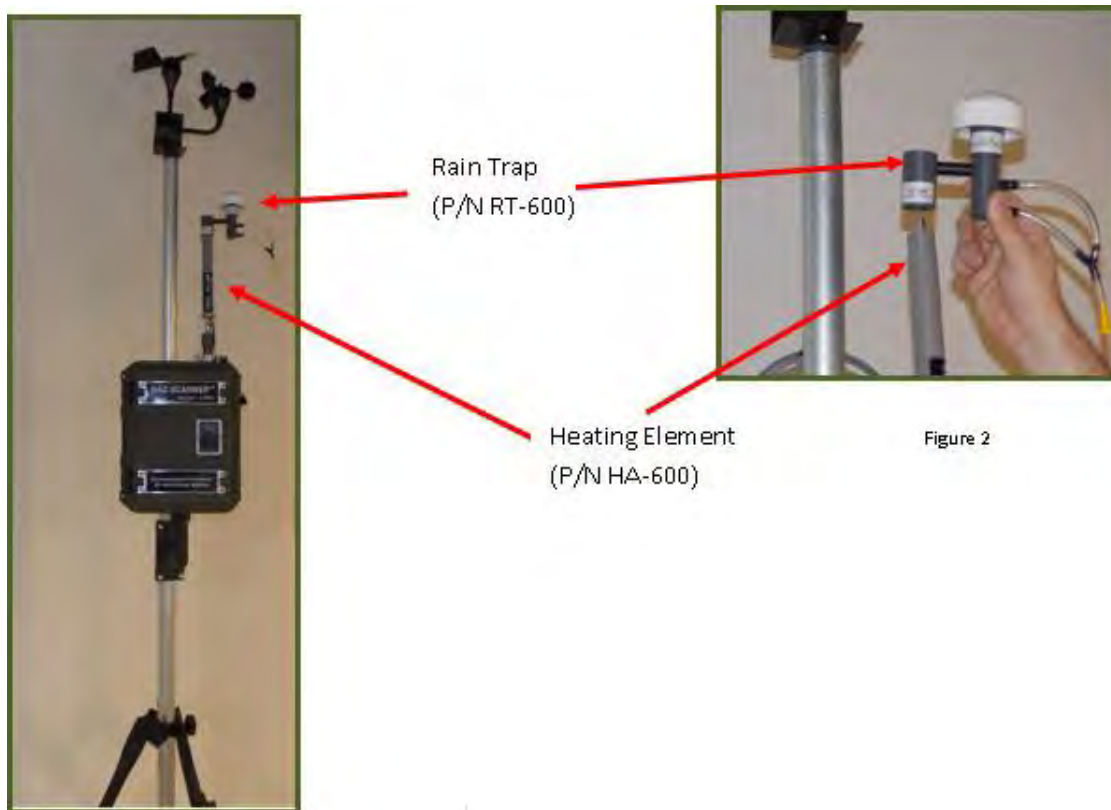


Figure 1

Figure 2

HAZ-SCANNER Rain Trap and Particulate Inlet Heater

Description

The Particulate Inlet Heater (P/N HA-600) should be used in applications where non-condensing moisture levels above 50% exists. The Rain Trap (RT-600) should be used in areas where the likelihood of condensing moisture events is high, i.e., rain, sleet, snow, etc.

Installation

Place the Rain Trap on top of the Particulate Inlet Heater as shown above in Figure 1 and Figure 2.

HA-600 Inlet Heater Assembly

Air Temperature Conditioning when used with HAZ-SCANNER Instruments



HAZ-SCANNER HA-600 Inlet Heater Components

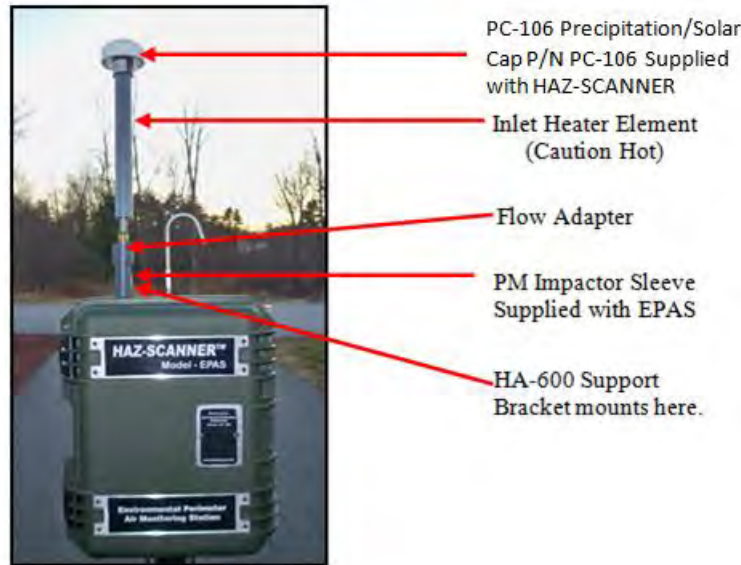
Description

The HA-600 is necessary for ambient air monitoring of particulates in high humidity environments where the relative humidity is greater than 60%. The HA-600 will evaporate water from hydrophilic solid particulates leaving behind dry particulate matter to be measured. This accessory is especially useful for air monitoring in fog and/or mist conditions. The HA-600 heater is not effective at RH levels above 95% or during precipitation. For monitoring in rain environments, customers are advised to purchase the RT-600 Rain Trap accessory.

Caution: The Inlet heater is “HOT” when powered - use caution when handling.

Please see the **Appendix** for HA-600 Inlet Heater connection details.

HAZ-SCANNER User Guide – Version V.7.7



HAZ-SCANNER Rain Trap and Inlet Heater Assembly

Setup and Operation

1. Mate the connector on the inlet heater cable to the external battery power pack cable.
2. Insert the inlet heater assembly with flow adapter onto the Impactor sleeve as shown above.
3. If using the HAZ-SCANNER internal battery to power the HAZ-SCANNER instrument, check to ensure the internal battery is fully charged and power is switched **ON** (battery will provide instrument power for approximately 10 hours when fully charged).
4. The Inlet Heater temperature is set for sampling at a flow rate of 2 LPM. Turn on the HA-600 heater by depressing the power switch and allow the heater to warm up for 10 minutes before sampling particulates with HAZ-SCANNER.
5. Only charge the external power pack batteries with the supplied charger with the battery power pack OFF. The charger LED indicator will turn green when batteries are fully charged.

Note: If using the HA-600 continuously (or longer than 10 hours), you may connect the HA-600 power pack **Battery Charger** directly to the HA-600 heater power cable connector. If using the back-up battery and/or solar panel power options, connect the HA-600 Inlet heater power connector to the **EPC-BUBP-600** cable connected to the back-up battery.

Power Option Accessories

External Power Connector (P/N EPC-600) Instructions for HAZ-SCANNER Systems

Description:

The External Power Connector (**EPC-600**) is used to connect the HAZ-SCANNER system to the internal battery charger when the instrument front cover is closed. The External Power Connector assembly will connect to the side of the HAZ-SCANNER connector panel marked as '**Solar Panel/External Power**'. The other end of the External Power Connector cable assembly will connect to the **BC-6000 Universal Battery Charger** as shown below.



HAZ-SCANNER EPC-600 External Power Connector Connections



BC-6000 Universal Battery Charger

Power Connection for Back-Up Battery

(P/N EPC-BUBP-600)

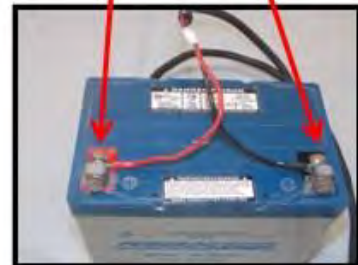
Description

The EPC-BUBP-600 External Power Connection accessory is used with a 12 Volt DC/75 Ampere AGM back up battery (BUBP-6000) and is used for powering HAZ-SCANNER systems with or without a solar panel. The BUBP-6000 battery requires approximately 20 hours of direct sunlight for the standard solar panel to fully charge the battery. The BUBP-6000 battery may also be charged with AC power using the AC charger (P/N BC-BUBP-6000). The BC-BUBP-6000 AC charger is connected to the HAZ-SCANNER system via the EPC-BUBP-600 External Power Connector cable assembly as shown below.

Step 1 Connect the EPC-BUBP-600 male bayonet cable connector to the HAZ-SCANNER EPC-600 female bayonet connector as shown.



Step 2 Connect the EPC-BUBP-600 battery cable connectors to the BUBP-6000 battery as shown. Red = Positive; Black = Negative.



HAZ-SCANNER EPC-BUBP-600 Power Connection Details

External Battery Charger (BC-BUBP-6000) and Back Up Battery (BUBP-6000) for HAZ-SCANNER Systems



Description

The BUBP-6000 battery is a 12 Volt DC/75 Ampere AGM back up battery for powering HAZ-SCANNER systems with or without solar panels. The BUBP-6000 battery installation requires approximately 20 hours of direct sunlight for the standard **80 watt** solar panel to fully charge the battery. The BUBP-6000 battery may be charged with AC power using the external AC charger (P/N BC-BUBP-6000). The BC-BUBP-6000 AC charger is connected to the BUBP-6000 using battery connector clamps as described on the following page.

HAZ-SCANNER User Guide – Version V.7.7

BC-BUBP-6000 External Battery Charger Connections

1. Connect the **RED** cable clamp to the **Positive** terminal of the back-up battery.
2. Connect the **BLUE** cable clamp to the **Negative** terminal of the back-up battery.
3. Connect the BC-BUBP-6000 charger to an AC power source to charge the battery **without the use of a solar panel**. Charge time is approximately 10 hours or when the charger LED turns green.

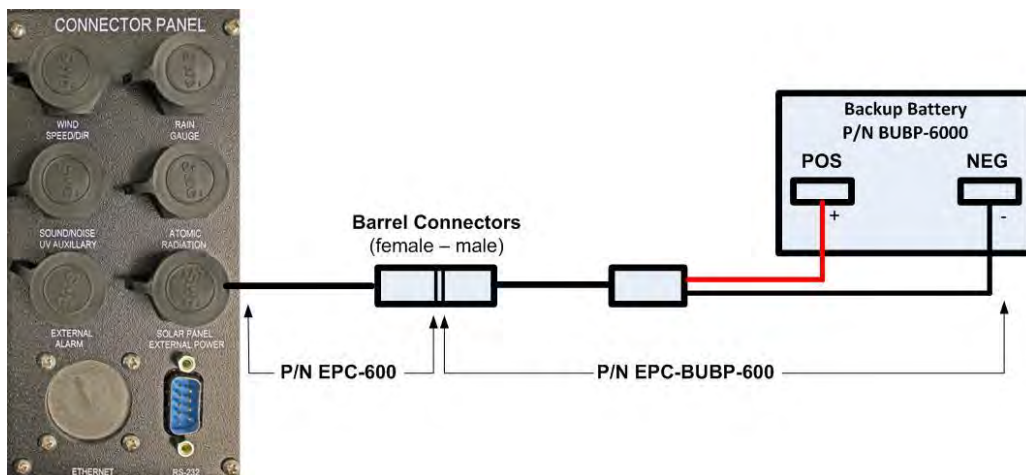
Note: The red power switch on one end the external AC charger indicates the option for **115 VAC** or **230 VAC** AC power. Always check to ensure the battery charger is configured for the correct AC power source voltage.



HAZ-SCANNER External BC-BUBP-6000 Battery Charger

BUBP-6000 Backup Battery Connection to HAZ-SCANNER Instrument

1. Connect the **RED** cable from the EPC-BUBP-600 cable assembly to the **Positive** terminal on the backup battery. Secure with bolts (not included).
2. Connect the **BLACK** cable from the EPC-BUBP-600 cable assembly to the **Negative** terminal on the backup battery. Secure with bolts (not included).
3. Connect the EPC-600 Connector cable to the side of the HAZ-SCANNER connector panel labeled **'Solar Panel External Power'** as shown below.

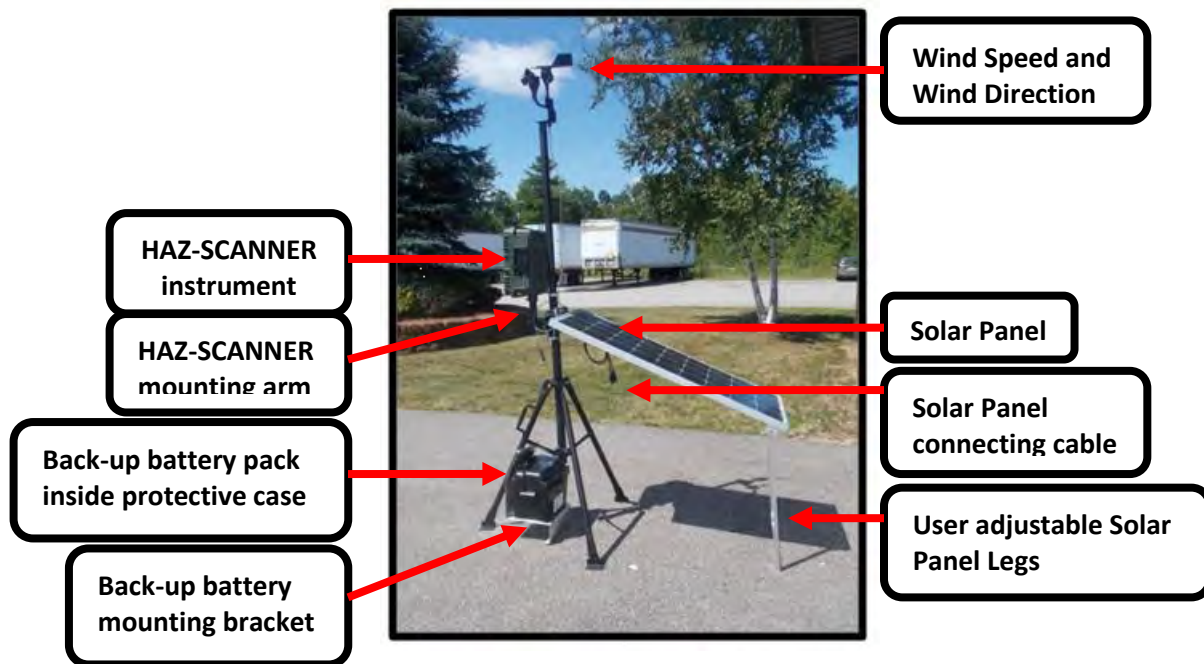


Instructions for Mounting Back Up Battery

(P/N BUBP-6000)

to Tripod

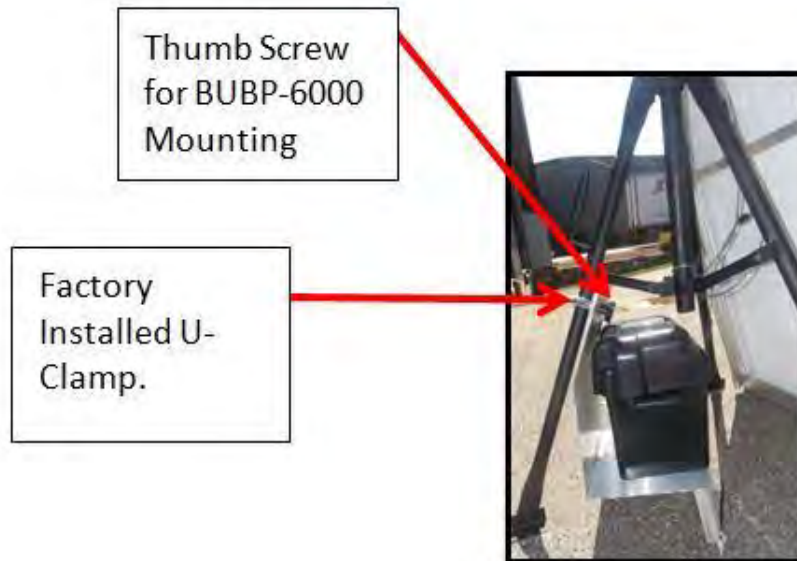
(P/N TP-600)



HAZ-SCANNER System – Tripod Mounting

Tripod and Back-Up Battery Installation Details

1. Remove the back-up battery bracket thumb screws from the factory installed U-Clamp found on a lower tripod leg.
2. Locate the pre-drilled holes on the back-up battery mounting plate as shown below
3. Replace the thumb screws after positioning the mounting plate and tighten.



Back-up Battery Bracket Mounted on Tripod

Transport Cart for Back-Up Battery Pack



Instructions

1. Place the Transport Cart on the ground.
2. Place a hand under the cart handle and lift up to extend the handle.
3. Carefully place the back-up battery on the cart platform. Wrap the supplied bungee cords over the battery and cart to secure the battery during transport (see below).



Transport Cart Handle



Bungee Cords

Transport Platform

Transport Cart for Back-up Battery



Place Bungee Cord
over Back Up Battery
Cables.



Secure Bungee to the back
of the Transport Cart

Back-up Battery Transport Cart Securing Details

Instructions for Mounting Solar Panel (P/N SP-6000) to Tripod (P/N TP-600)

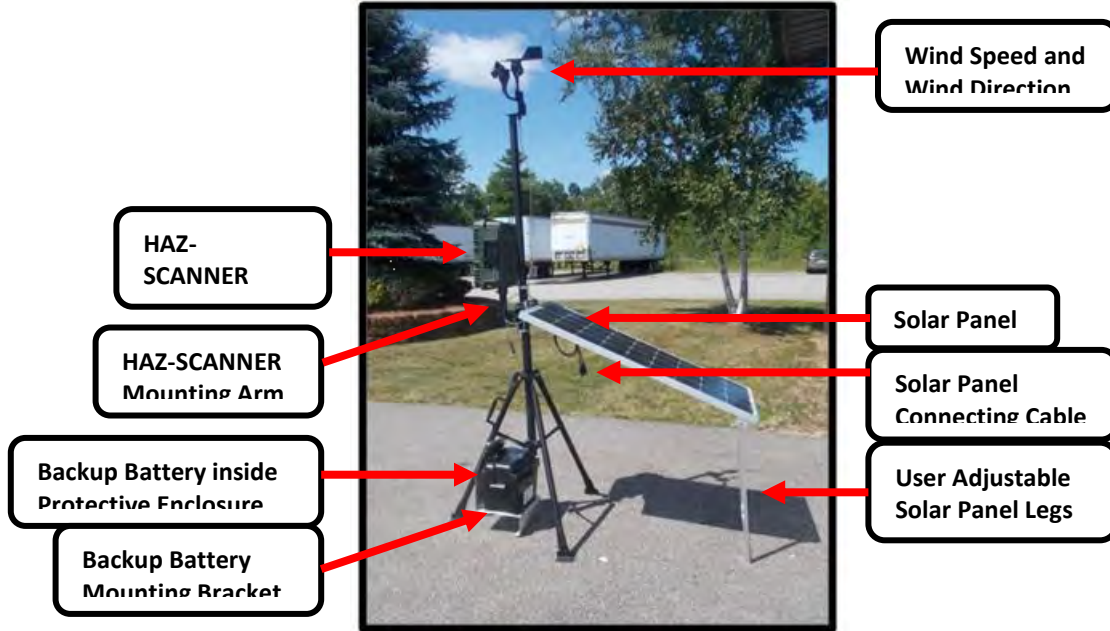


Description

The SP-6000 100 watt solar panel will charge the HAZ-SCANNER battery when the solar panel is exposed to direct sun light. For long term monitoring use the solar panel option with a back-up battery (P/N BUBP-6000).

The 12 Volt DC back-up battery capacity is rated at 75 Amperes and will typically power a HAZ-SCANNER system for 3 to 5 days depending on system configuration.

To achieve maximum output using solar panels, move and position the panel(s) facing in the same direction as the Sun's rays. For permanent installations, orient solar panel(s) depending on your location. As an example, if you live in or near **Seattle, Washington**, you would point the solar panel in a **south** direction at an approximate 45-50° angle during the summer. During the winter, the solar panel angle should be set to approximately 63°.



HAZ-SCANNER System Tripod and Solar Panel Mounting Details

Installation

1. A factory installed U-Clamp is positioned on the Tripod (P/N TP-600) for the Solar Panel directly behind the mounting arm for the HAZ-SCANNER instrument. Remove the U-Clamp thumb screws.
2. Locate the predrilled holes on the Solar Panel Mounting Plate. Position the Mono-Crystalline Solar Panel (P/N SP-600) on the U-Clamp.
3. Re-attach the thumb screws and tighten.
4. Unfold the Solar Panel. Unfold and position the stabilizing leg and Solar Panel legs so they touch the ground. Position the Solar Panel for optimum sunlight.



Solar Panel Bracket Thumb Screws

Use ground anchors, stakes or bolt tripod feet to cement pads to secure installation against strong winds

Verify that the TP-600 tripod mounting surface area is level. Secure the tripod feet with ¼ inch diameter ground stakes for temporary use. Insert stakes at an angle to improve stability. For continuous use bolt the tripod feet to cement pads with ¼ inch diameter anchors. Install stakes or bolts on each of the three tripod feet. Ensure the tripod is securely fastened and anchored for use in areas with strong winds.

Adjusting Solar Panel Tilt Twice a Year

You are encouraged to adjust the tilt of the solar panels twice a year. The following table provides the optimum dates to perform these adjustments:

	Northern Hemisphere	Southern Hemisphere
Adjust to Summer angle on	March 30	September 29
Adjust to Winter angle on	September 12	March 14

If your latitude is between 25° and 50° the best tilt angle for summer is the latitude, times 0.93, minus 21 degrees. The best tilt angle for winter is the latitude, times 0.875, plus 19.2 degrees. See the chart below from <http://www.solarpaneltilt.com/>. Additional information on solar panel optimization is available from this website.

HAZ-SCANNER User Guide – Version V.7.7

Latitude	Summer angle	Winter angle	Average Insolation on panel	% of optimum
25°	2.3	41.1	6.6	76%
30°	6.9	45.5	6.4	76%
35°	11.6	49.8	6.2	76%
40°	16.2	54.2	6.0	75%
45°	20.9	58.6	5.7	75%
50°	25.5	63.0	5.3	74%

Solar Charge Controller for HAZ-SCANNER Systems

Description

The **Solar Charge Controller** attaches to the External Back Up Battery (P/N BUBP-6000) and protects the battery from overcharge and discharge conditions.



Installation

1. Attach the **Solar Charge Controller** to the BUBP-6000 back-up battery by locating the factory placed Velcro on top of the battery. Align the Velcro on the back of the Solar Charge Controller with the Velcro on top of the battery and fasten them together.
2. Locate the loose end of the blue sheathed Solar Charge Controller cable assembly (the other end is connected to the Solar Charge Controller) as shown below.



Blue sheathed connector cable factory install into Solar Charge Connector.

3. Find the notch on the Solar Charge Controller cable assembly as shown below.



Notch on end of blue sheathed connector cable.

HAZ-SCANNER User Guide – Version V.7.7

4. Position the notch at the 12 o'clock position. Connect to the HAZ-SCANNER Connector Panel jack labeled '**Solar Panel External Power**'. Twist to lock in place.



Rotate notch to the 12 O'Clock position. Connect to HAZ-SCANNER connector panel jack labeled '**Solar Panel**'

Connecting the Solar Panel Charge Controller to HAZ-SCANNER Connector Panel

5. Locate the factory installed black sheathed cable assembly on the back of the Solar Panel (P/N SP-600).



Factory installed black sheathed cable on back of Solar Panel

6. Locate the black and red wire sheathed cable assembly on the back of the Solar Panel. Connect the other end of this black sheathed cable assembly to the mating connector on the Solar Panel Charge Controller attached to the top of the BUBP-6000 back-up battery as shown on the following page.



Connecting the Solar Panel to the Solar Panel Charge Controller

Note: Included with the purchase of the Solar Panel accessory in conjunction with the back-up battery option is the Solar Charger Owner’s Manual from the manufacturer. Below is an excerpt from the manual describing the charger LED indications.




Icon:	Description
	Green ON: Solar power is charging the battery Green BLINKING: The system is over voltage
	Green ON: Battery level is in the right range Green SLOWLY FLASHING: Battery level is full Orange ON: Battery level is low Red ON: Battery Over-discharged
	Orange ON: The load output is on Red SLOWLY FLASHING: Overload* Red BLINKING: Load is short-circuit*

Table 2. LED Indicators

Note: Please see the **Appendix** section for additional Solar power connection details

Optional External Meters and Accessories

ELF/EMF Meter for HAZ-SCANNER Systems (P/N HS-ELF-6000)



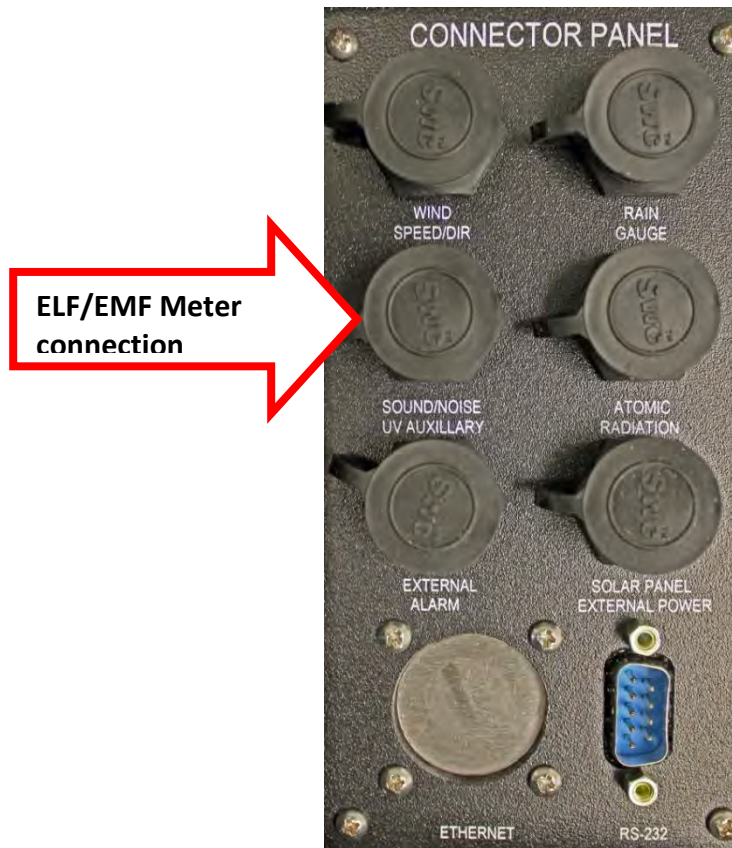
ELF/EMF Meter

Installation

1. Ensure the ELF/EMF Meter batteries are fully charged.
2. Connect the black ELF/EMF Meter Signal Cable into the side of the ELF/EMF Meter.
3. Connect the 4-Pin end of the Black ELF/EMF Signal Cable into the side of the HAZ-SCANNER connector panel marked **'Sound/Noise UV Auxiliary'** as shown below.



ELF/EMF Meter Connections to HAZ-SCANNER System



ELF/EMF Meter Connection to HAZ-SCANNER Connector Panel

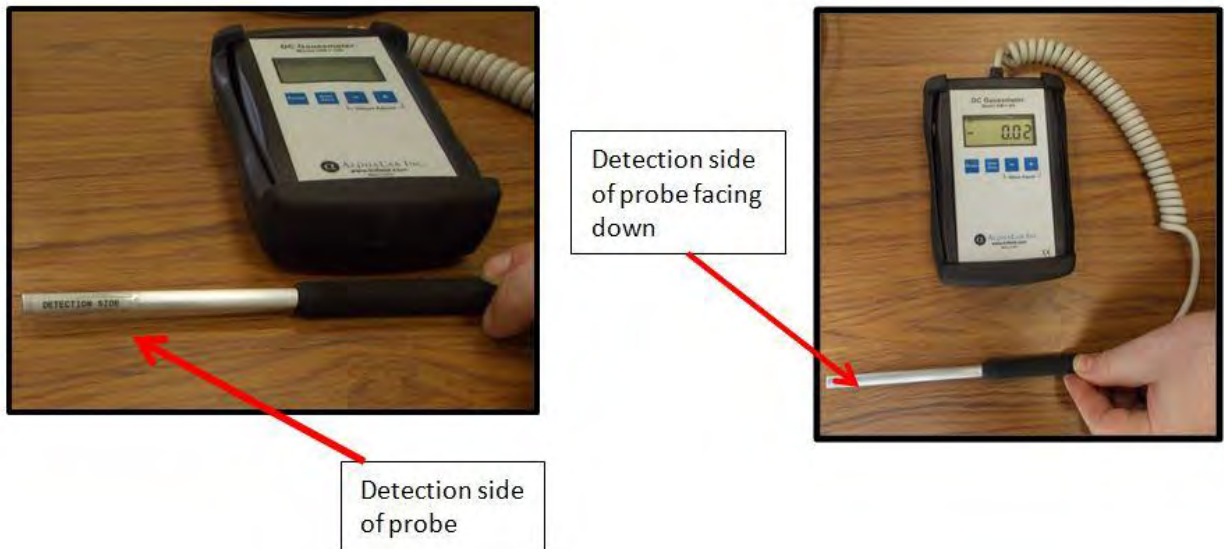
ELF/EMF Meter Operation

1. Press and hold the power button to turn ON the ELF/EMF Meter.



HAZ-SCANNER User Guide – Version V.7.7

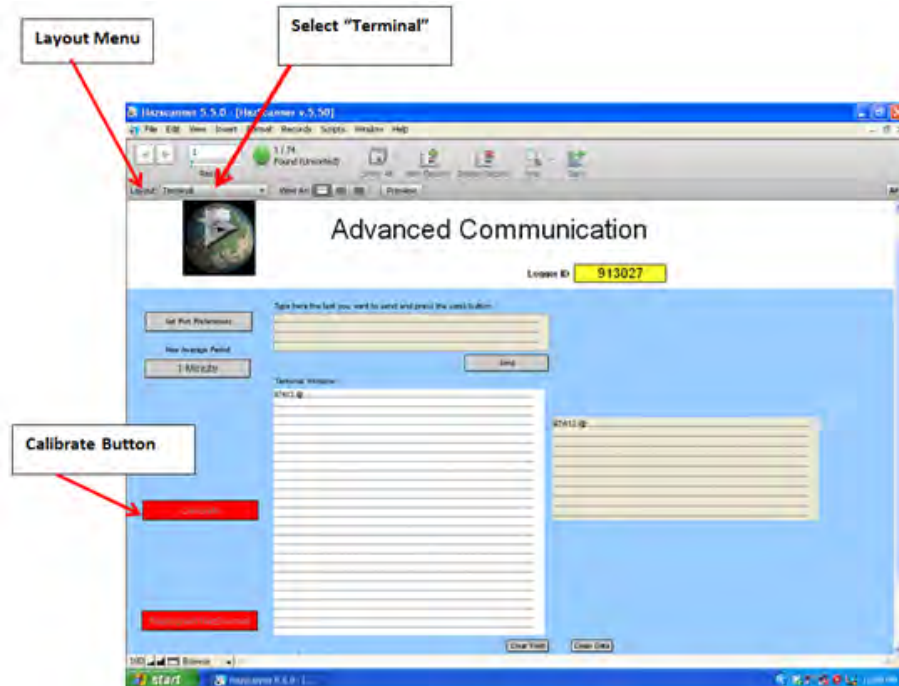
2. Magnetometer measurements are based on the Earth's magnetic field. The ELF/EMF meter may be zeroed one of two ways. The first method is to use a Zero Gauss Chamber (not supplied). The second method involves precise placement of the meter probe. Place the probe on a nonmagnetic surface with the detection side of the probe facing down and positioned in an East to West direction. Pivot the probe slightly until the display reads zero (see below).



Correct Use of ELF/EMF Detection Probe

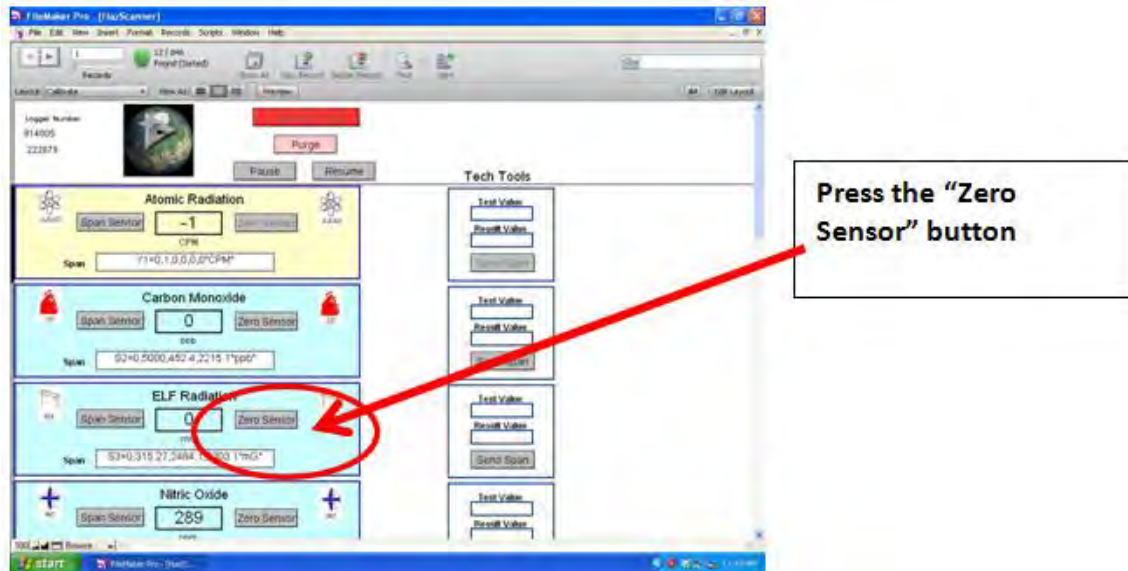
3. Zero the ELF/EMF Meter by pressing and holding the “Auto Zero” button on the ELF/EMF Meter
4. Connect the HAZ-SCANNER instrument to the computer running HAZCOMM-PRO software and establish a serial data connection.
5. In the Layout drop down menu select ‘Terminal’ then click the ‘Calibrate’ button.

HAZ-SCANNER User Guide – Version V.7.7



HAZCOMM-PRO Calibrate Function

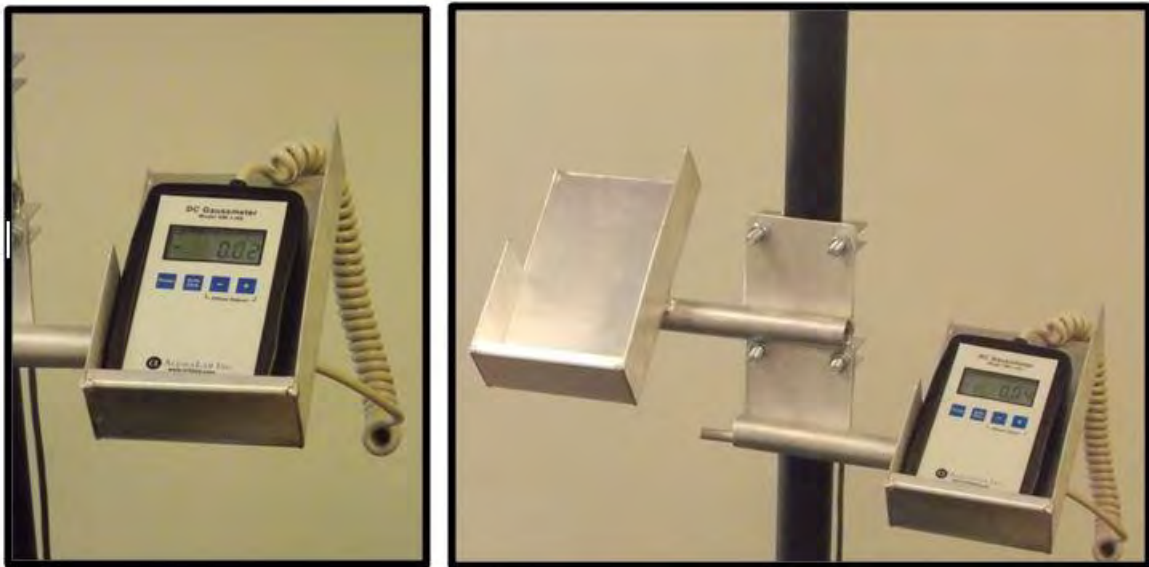
6. Click the 'Zero Sensor' button.



Zero Sensor Control

HAZ-SCANNER User Guide – Version V.7.7

7. Place the ELF/EMF Meter on the HAZ-SCANNER mounting bracket on the tripod as shown below. The ELF/EMF Meter may also be removed for localized monitoring.



ELF/EMF Meter Mounting Details

8. Using the ELF/EMF Probe by placing the probe on the object to be measured with the detection side of the probe facing down.



ELF/EMF Detection Probe Use

ELF/EMF Meter Specifications

- Display Resolution: .01 Gauss
- Sensor Minimum Resolution: .1G
- Sensor Accuracy: +/- % or 2% Full Scale
- Measurement Range: .01G to 200G

Rainfall Sensor

Standard Tipping Bucket Rain Gauge

(P/N: RS-6000)



Description

The RS-6000 Rain Gauge is a tipping bucket rain gauge designed to meet the guidelines provided by the World Meteorological Organization. Rain enters the collector cone, passes through a debris-filtering screen, and collects in one chamber of the tipping bucket. The bucket tips when it has collected an amount of water equal to 0.01" (0.254mm) of rainfall. As the bucket tips, it causes a switch closure and brings the second tipping bucket chamber into position. The rain water drains out through the screened drains in the base of the collector.

The body and base of the collector are constructed of tough, UV resistant plastic. The tipping bucket pivots on bearings that minimize friction and wear. Stainless steel adjustment screws under each chamber of the tipping bucket allow you to fine-tune the calibration. Mounting holes are pre-drilled in the base and a built-in leveling trough aids in installation.

Rain Gauge Specifications

Resolution: 0.01"/tip

Accuracy: +/- 4% up to 3"/hour

Max Rate: Unlimited



Rain Gauge Mounted on Tripod

9. Attach the Rain Gauge to the Tripod using the U-Clamp as shown above.

Atomic/Nuclear Radiation Meter

(P/N HS-AR-6000)



1. Ensure the Atomic/Nuclear Radiation Meter's batteries are fully charged.
2. Connect the Signal Cable Stereo Jack to the Atomic/Nuclear Radiation Meter as shown below.



Plug Signal Cable Stereo
Jack into
Atomic/Nuclear
Radiation Meter.

3. Connect the 4-Pin end of the Signal Cable into the HAZ-SCANNER Connector Panel jack labeled 'Atomic Radiation' as shown below.

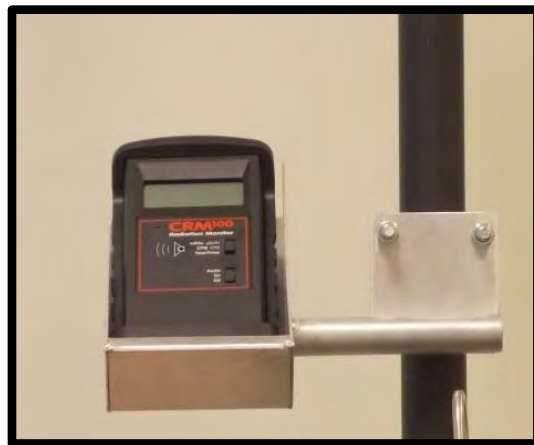


Plug 4-Pin end of
Signal Cable into
HAZ-SCANNER
Connector Panel
jack labeled
"Atomic Radiation"



Atomic/Nuclear Radiation Meter Connection to HAZ-SCANNER System

4. Power on the meter.
5. After 1 minute the meter will beep indicating the device is ready for use.
6. The HAZ-SCANNER system will take approximately 2 minutes to correctly display equal counts per minute displayed on Atomic/Nuclear Radiation Meter.
7. Place the Atomic/Nuclear Radiation Meter in the Meter Cradle mounted to the HAZ-SCANNER Tripod as shown below.



Atomic/Nuclear Radiation Meter Mounted on HAZ-SCANNER Tripod

Alarm Unit for HAZ-SCANNER Systems

(P/N AL-6000)



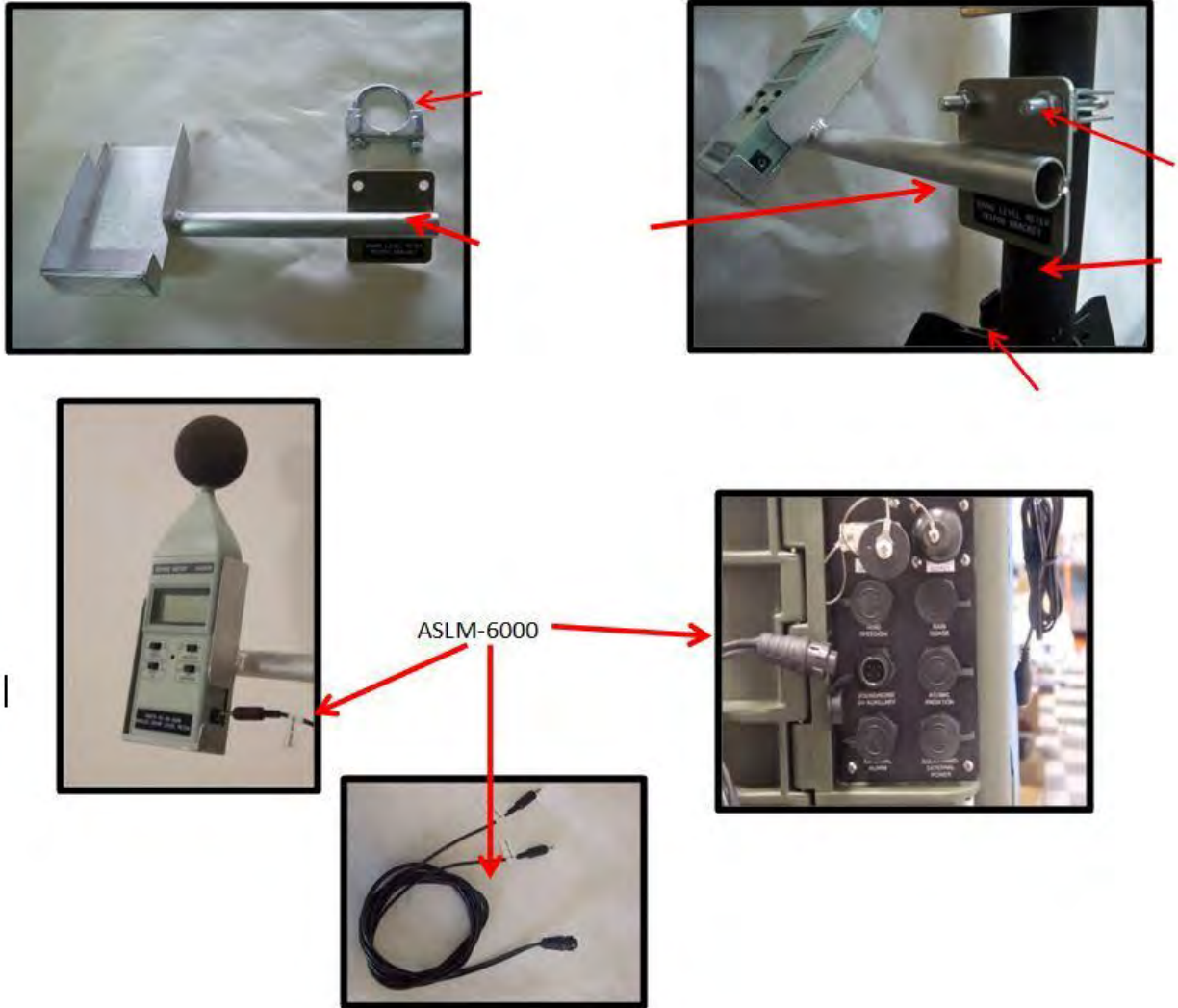
Upper Mast

Attach AL-6000 Alarm Unit to upper mast using the U-clamp provided. Position as desired.

Audible Alarm Switch

Tripod Mounting Bracket for Sound Meter

(P/N HS-SM-6000)



Sound Meter Mounting Details

Installation

1. Secure the Sound Meter bracket to the lower mast of HAZ-SCANNER Tripod using U-Clamp.
2. Connect the Signal Cable (P/N ASLM-6000) to the Sound Meter and HAZ-SCANNER instrument.
3. Consult Sound Meter Instruction Manual for operation.

WS-WB-600 Wet Bulb Mounting Instructions for HAZ-SCANNER Systems



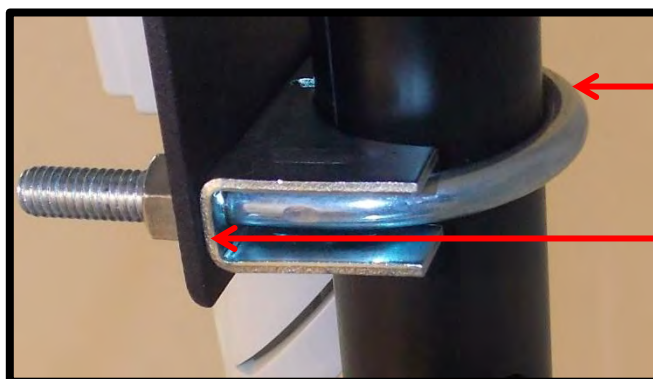
Signal Output: 0-5Vdc

Range: 0-100°F

Display Resolution: 1°F

Calibration: Tested and calibrated against the National Institute of Standards and Technology (NIST).

Manufacturer: TeleAire is a GE product - Model HumiTrac XR



Step 1: Place the U-Clamp around the back of the Tripod.

Step 2: Position the flat surface of the U-Clamp Bracket against the WB- 600 mounting plate.

Step 3: Place nuts on threaded end of U-Clamp. Fasten with wrench.

WB-600 Tripod Mounting Details

1. Place the U-Clamp around the rear of the Tripod.
2. Position the flat surface of the U-Clamp bracket against the WB- 600 mounting plate.
3. Place nuts on the threaded end of the U-Clamp. Tighten with a wrench.
4. Connect the 4- Pin Power Signal Cable from the WB-600 into the HAZ-SCANNER Connector Panel jack labeled '**Sound/Noise UV Auxiliary**'.



Step 4: Connect 4- Pin Power Signal Cable from the WB-600 into the Connector Panel of the HAZ-SCANNER instrument jack labeled "Sound/Noise UV Auxiliary."

Gas Treatment Module for HAZ-SCANNER (P/N GTM-6000)

The **Gas Treatment Module** contains activated carbon, Hopacalite, and Purafill media for scrubbing ambient toxic gas levels. When the HAZ-SCANNER monitor's internal solenoid system is activated, the ambient air is passed through the GTM-6000 scrubber to provide zero air to re-establish the baseline.

The GTM-6000 should be replaced approximately after 2000 hours of air sample use. To replace the GTM-6000 scrubber, first you need to remove the front panel by removing the (4) screws. There are (2) screws located on each side (Figure 1.1). Next, remove tubing on each side of the GTM-6000 and unclip old GTM-6000 and replace with new GTM-6000 cartridge (Figure 1.2).



Figure 1.1

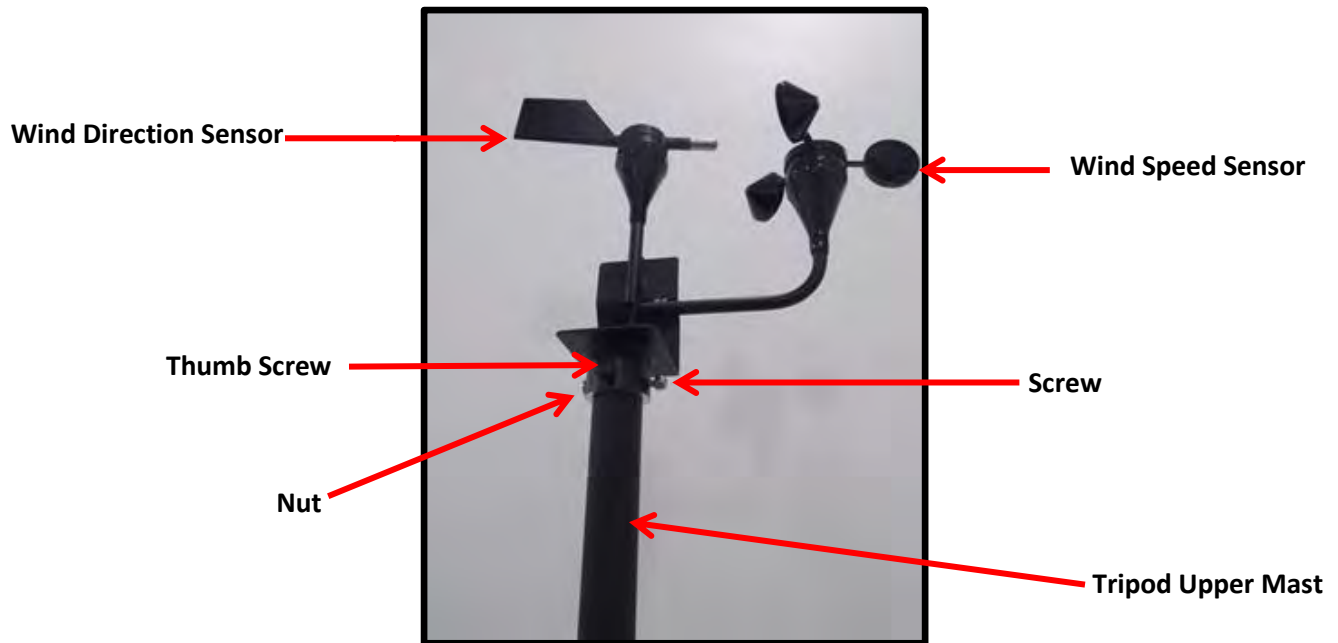
GTM-6000 Gas Scrubber

Remove (2) screws on each side of panel and lift top panel.



Figure 1.2

HAZ-SCANNER Wind Speed and Direction Mounting Instructions



Place the Wind Speed and Direction Sensor on top of the tripod upper mast and secure with screw, nut, and thumb screw.



Line up the two ridges on the Wind Direction Sensor. Ensure these marks are facing North.

Wireless System Connections

RM-105EXT Extended Range Wireless Radio Digital Modem Product Instructions for use with HAZ-SCANNER systems.

The RM-105EXT Extended Range Wireless Radio modem products are an optional accessory for use with HAZ-SCANNER systems. The RM-105EXT Extended Range Wireless modems are capable of transmitting 1 Watt digital modulated RF signals in the 900 MHz ISM band. Either Omni-directional or high gain Yagi antennas may be used to extend the distance between a computer and one or more HAZ-SCANNER instruments. Reliable wireless data transmission of up to 5 miles (line-of-sight) is possible using these digital radio systems. Each RM-105EXT radio modem module includes an integrated RS232 serial data modem which provides end-to-end serial data connectivity.

Note: To minimize confusion, the RM-105EXT modems are labeled “transmitter” or “receiver” always referencing a remote HAZ-SCANNER instrument location as a “transmitter”, i.e., sending data to a HAZCOMM-PRO computer base modem labeled as a “receiver”.

Supplied Components:

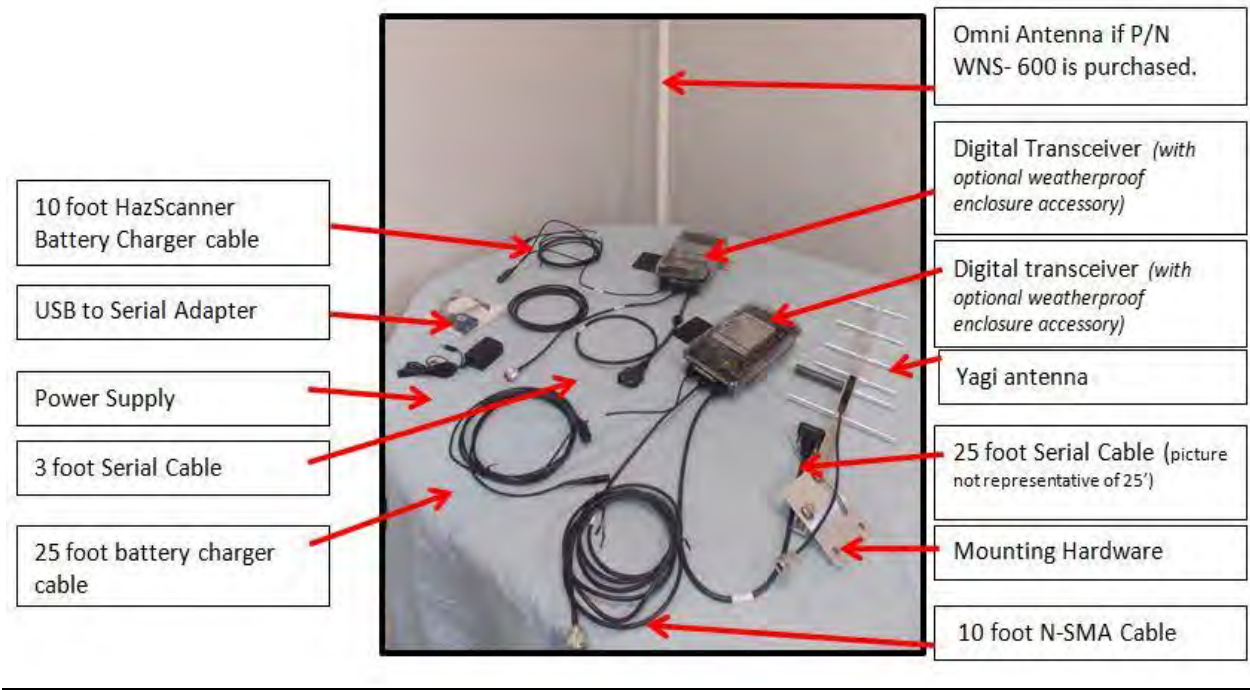
(2) RM-105EXT Extended Range Wireless Radio Kits. Each kit includes (1) RM-105EXT Extended Range Wireless Radio modem for connection to a computer and (1) RM-105EXT Extended Range Wireless Radio modem connected to a remote HAZ-SCANNER instrument.

- (1) 25 foot serial data cable assembly for **base** station - wired to enclosure
- (1) 3 foot serial cable assembly for **remote** location – wired to enclosure
- (1) Serial-to-USB adapter assembly
- (2) 10 foot N-SMA cable assemblies (base and remote) – wired to enclosure
- (2) Extended range Omni-directional or Yagi antennas with mounting hardware

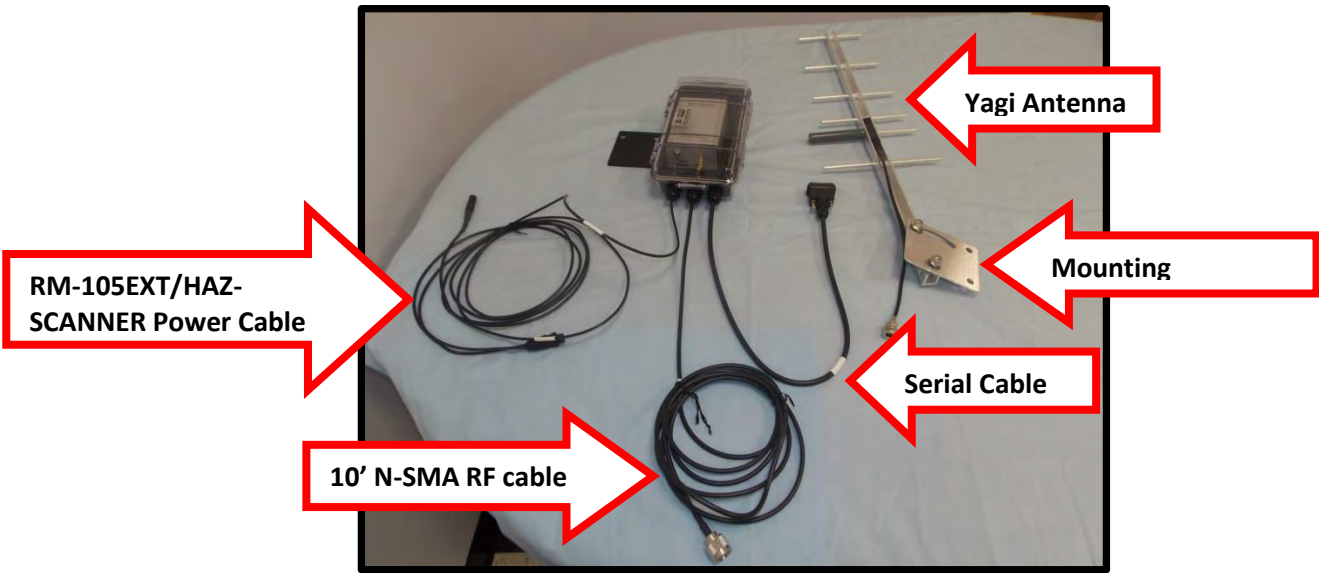
Note: If Wireless Network Software Option (P/N WNS-600) is purchased, one Yagi antenna may be replaced with an Omni-directional antenna for point-to-multipoint operation depending on RF path design recommendations.

- (1) Power supply for each radio modem kit
- (2) P/N RM-105EXT/HAZ-SCANNER Battery Charger Cable assembly - wired to enclosure

Note: The use of RM-105EXT Extended Range wireless radios are fully supported in **HAZCOMM-PRO** software. All radio components are frequency matched and programmed for use with HAZCOMM-PRO software.



Base and Remote Wireless Radio System Components



Standard Remote Wireless Radio Cable Assemblies

HAZ-SCANNER User Guide – Version V.7.7

RM-105EXT Extended Range Wireless Radio modem setup for BASE STATION (Receiver)

1. Insert the CD containing the Serial-to-USB adapter software and install drivers for the Serial-to-USB adapter.
2. Attach the Serial-to-USB adapter to a computer USB port if required.

Note: In most cases you should always use the same computer **USB port** to connect the Serial-to-USB adapter to the HAZCOMM-PRO computer.

3. Attach one end of the supplied RM105EXT serial data cable (25 feet) to a Serial-to-USB adapter (or directly to a computer serial data port).
4. Ensure the other end of the RM105EXT serial data cable is connected to the RM-105EXT Wireless Radio modem serial data connector inside the waterproof enclosure.
5. Connect the 25 foot RM-105EXT Extended Range Wireless modem power cable that is wired to the inside the waterproof enclosure to the supplied RM105EXT power supply.
6. Ensure the 10 foot N-SMA antenna cable assembly is connected to the RM-105EXT Extended Range Wireless Radio modem SMA connector that is mounted inside the enclosure. Do not over-tighten this connector. For maximum radio system performance mount the antenna as high as possible above the ground and clear of surrounding nearby objects. It may be necessary to add additional RF coaxial cable to accommodate higher antenna installations. Please contact Environmental Devices Corporation for wireless systems installation advice for your particular installation. Exposed RF connections should be insulated as described below.

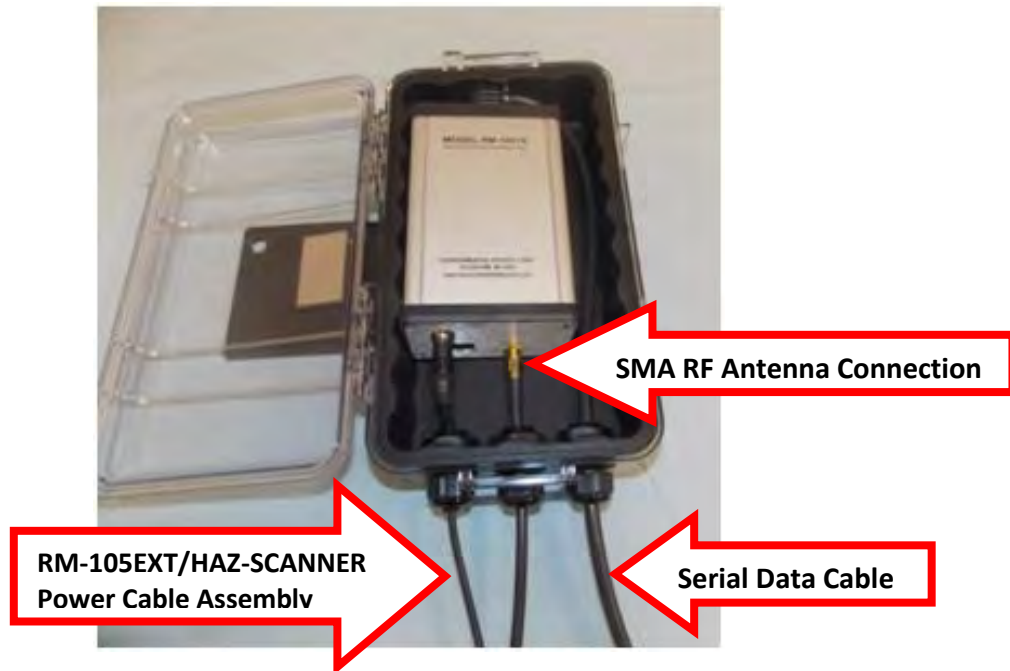
RM-105X Wireless Radio Setup for HAZ-SCANNER Systems (transmitter)

1. Fully charge the HAZ-SCANNER battery. The battery indicator LED will turn from red to green when fully charged. The HAZ-SCANNER **battery run time is reduced to approximately 5 hours** when powering wireless radio equipment.
2. Attach the supplied 10 foot N-SMA cable assembly from the bottom of the waterproof enclosure to the antenna as shown on the following page.

Note: For exposed RF connectors, wrap the entire connection once (or twice) with 3M Scotch Super 88 or 88T PVC electrical tape. Super 88 is recommended over Super 33 or the other tape because of its ideal temperature characteristics and the fact it is 20% thicker. Be sure to allow a significant overlap of each turn. On the last turn, don't pull the tape hard, just leave it loose and press it down. This will help prevent it from unwrapping. Ensure there are no air cavities or openings in the tape. Where there is air, there will be water. Next, wrap the entire connection once (or twice) with 3M Scotch 2242 rubber electrical tape. Pull the tape so hard that it turns from black to gray and wrap it tightly around the entire area previously covered with Super 88 electrical tape. Wrap the entire connection once (or twice) again with a layer of Super 88 electrical tape. Leave a 1 foot drip loop of cable at the antenna end of the transmission line.

HAZ-SCANNER User Guide – Version V.7.7

Depending primarily on 900 MHz RF path dynamics, the use of Omni-directional antennas may be preferred over the use of Yagi high-gain directional antennas. Please consult with Environmental Devices Corporation for the recommended antenna types for each radio link.

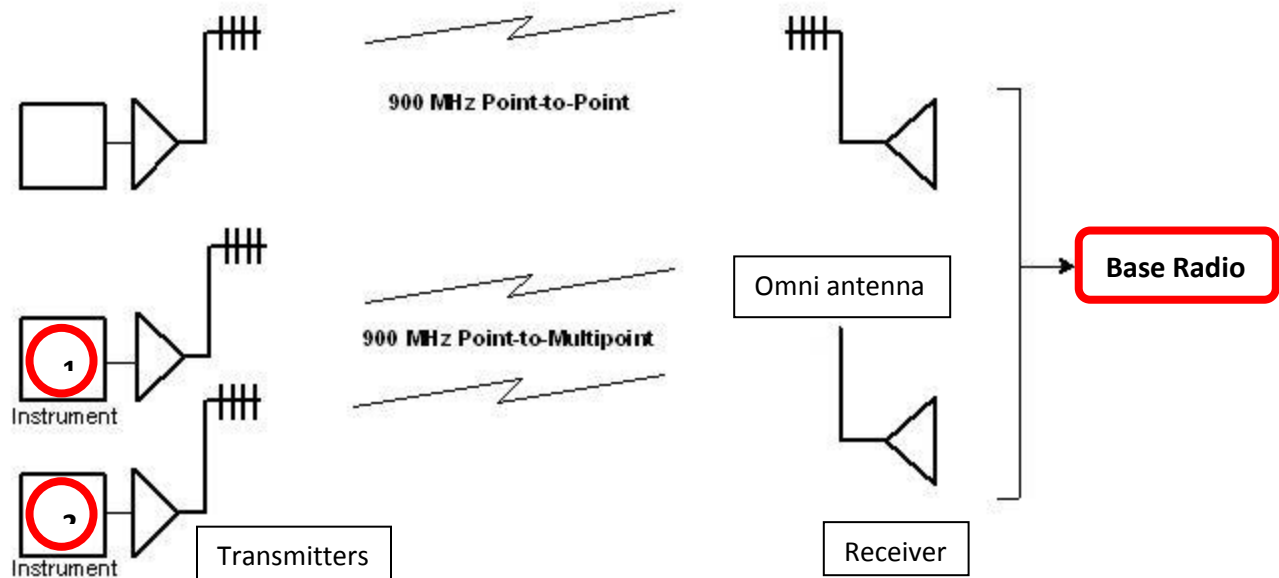


Cable Connections to Wireless Radio Modem

3. Attach the 3 foot serial data cable from the radio enclosure to the HAZ-SCANNER DB9 serial data panel connector.
4. Connect the 10 foot power cable to the HAZ-SCANNER power supply. The HAZ-SCANNER power supply will power both the HAZ-SCANNER instrument and RM-105EXT wireless equipment.
5. Start HAZ-SCANNER logging either from the computer or from the HAZ-SCANNER front panel. Review the Quick Start instructions for further guidance.

Please see the Appendix for additional interconnection details.

When using HAZCOMM-PRO software, the **View Current Data** option will display the instrument's sensor dashboard which will update once per minute and simultaneously store sensor data. The software will connect and collect data from all networked HAZ-SCANNER instruments where Point-to-Multipoint HAZ-SCANNER systems are involved. In Point-to-Multipoint systems, each HAZ-SCANNER instrument will be connected to a single base station radio unit as shown on the following page. When the HAZCOMM-PRO software main page **Disconnect** button is clicked, all systems will be disconnected.



HAZ-SCANNER Point-to-Point and Point-to-Multipoint System Architecture

Note: To minimize confusion, the RM-105EXT modems are labeled “transmitter” or “receiver” always referencing a remote HAZ-SCANNER instrument location as a “transmitter”, i.e., sending data to a HAZCOMM-PRO computer end radio modem labeled as a “receiver”.

Technical Description of Point-to-Multipoint Wireless Architecture

Unlike Point-to-Point wireless systems, in a Point-to-Multipoint system one wireless modem serves as the **base** unit (receiver) for two or more remote wireless modems (transmitters) each connected to a HAZ-SCANNER instrument’s serial data interface. In actual operation, all wireless modems communicate in both directions. Please see the Appendix for additional details.

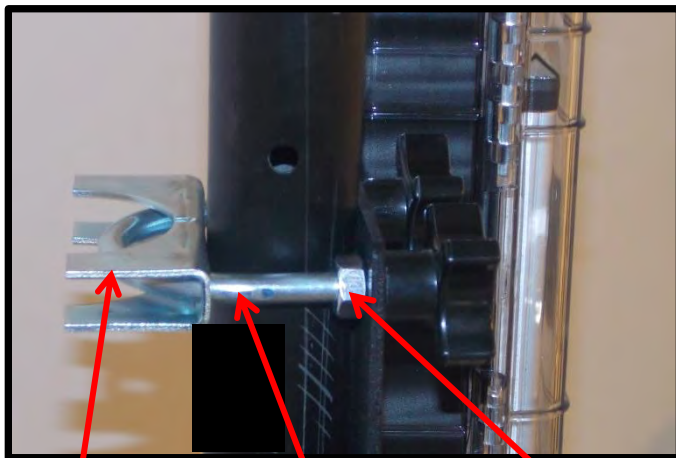
In a Point-to-Multipoint system, the HAZCOMM-PRO software is configured to address individual HAZ-SCANNER instruments by changing the base modem radio channel and the far end modem address. For example, in the diagram above, HAZSCOM-Pro software will configure the base radio modem to communicate with first with HAZ-SCANNER instruments 1 and then switch the base modem radio channel and the far end modem address to communicate with HAZ-SCANNER instrument 2. In this manner a single RM-105EXT base modem (labeled as a “receiver”) may be configured to communicate with two or more remote HAZ-SCANNER instruments.

Because the remote 900 MHz RM-105EXT radios are configured to operate on different radio channels, communications to and from the base radio receiver unit act as single channel radio communications between the HAZCOMM-PRO software and each remote HAZ-SCANNER instrument.

Note: In those cases where direct (line-of-sight) RF communication links between the HAZCOMM-PRO computer location and the remote HAZ-SCANNER site are blocked, the use of a specially configured 900 MHz **repeater radio** product may be required.

Radio Weather Proof Enclosure (P/N RM-105-WE)

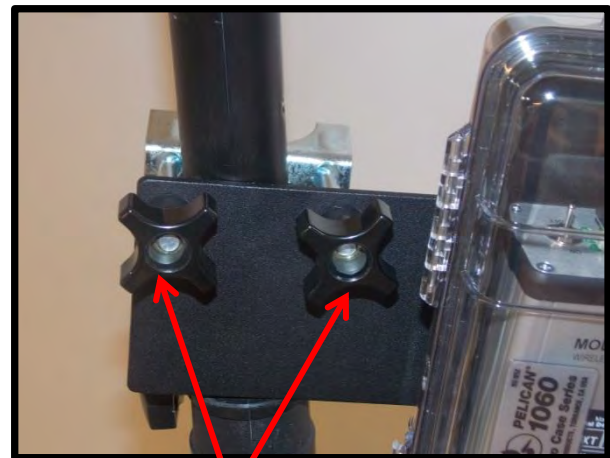
Mounting Instructions for Tripod (P/N TP-600)



U-Clamp Bracket

U-Clamp

Nut



Knobs

Installation Instructions

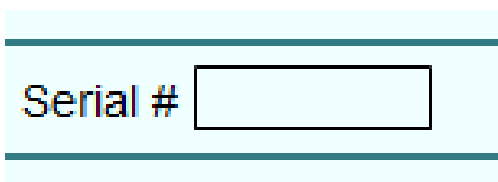
1. Place the U-Clamp into the pre-drilled holes of the U-Clamp bracket.
2. Place the flat side of the U-Clamp bracket against the rear of the tripod.
3. Tighten nuts against tripod as shown above.
4. Align pre-drilled holes of the RM-105-WE Mounting Bracket with the U-Clamp.
5. Tighten knobs to U-Clamp.

Instructions for configuring HAZCOMM-PRO software when used with RM-105EXT radio links

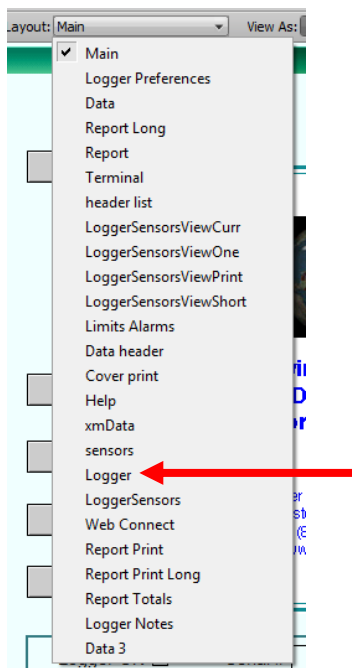
1. Start the HAZCOMM-PRO software and press the **Find** button on the menu bar.



2. In the **Serial Number** field at the bottom of the screen, insert the serial number of the remote HAZ-SCANNER instrument you wish to access over a wireless radio link.



3. In the **Layout** drop down menu, select **logger**.



Logger Selection in Layout Menu

HAZ-SCANNER User Guide – Version V.7.7

- In the **Logger** screen, select the **Logger Info** tab and type in the **RF channel** of the first remote RM-0105EXT radio modem in the '**_HopperID**' field as shown below.

The screenshot shows the 'Logger Info' tab in the HAZ-SCANNER software. A red arrow points to the '_HopperID' field, which is currently empty. The 'SensorList' field contains a long alphanumeric string. The 'Unit List' field shows a list of units. The 'Firmware Version' is 6010. The 'Wind' field has radio buttons for 'Yes' and 'No'. The 'Temp Comp Channel' is 'REF'. The 'Temp Comp Duplex' is '0'. The 'logger calTemp' is '84'. The 'date manufactured' is '5/27/2014'. The 'date serviced' is empty. The 'Unit Format' has radio buttons for 'Metric' and 'US'. The 'Serial Number' is '914011'. The 'SensorChanList' is '1+V,3HSC,1+V,1-V,1*V,1*V,1+V,2-V,2+V,1+HV,1-V,1*V,1-HV,1-V,2*HV,2HSC,VEXT'. The 'Sensor names' are 'NH3,ARad,CO2,CO,CH4,NO2,O3,PMA,PMB,RH,Snd,SO2,Temp,VOCS,WDir,WSpd'. The 'Duplex' is '4,0,1,1,3,2,3,0,0,2,4,1,2,3,0,0,0'. The 'Logger name' is empty. The 'CurrHdr' is '284558'. The 'datataker Serial Num' is '101409'.

- Press the HAZCOMM-PRO **Main** tab.
- Connect the base radio unit serial data cable to the HAZCOMM-PRO computer serial port or Serial-to-USB adapter.
- Connect the remote wireless radio modem serial data cable to the HAZ-SCANNER instrument serial data interface.
- Click the **Connect** button on the HAZCOMM-PRO computer.

Note: The serial data cable length between the HAZCOMM-PRO computer and the base wireless radio unit cannot exceed **30 feet**. It may be necessary to extend the RF cable length between the base radio unit and the antenna to allow placement of the wireless radio waterproof enclosure closer to the HAZCOMM-PRO computer. Please contact Environmental Devices Corporation for recommendations associated with extending RF transmission line distances, i.e., the type of RF transmission line, waterproofing RF connections and other considerations.

Note: Follow the HAZCOMM-PRO configuration steps above for each remote Point-to-Multipoint HAZ-SCANNER system. Each remote HAZ-SCANNER wireless radio unit will be configured to operate on a different RF radio channel referred to as a "**Hopper**" channel in HAZCOMM-PRO software. The base unit radio RF channel will then be associated with each remote HAZ-SCANNER radio unit and allow the HAZCOMM-PRO software to automatically select to which remote HAZ-SCANNER instrument it will establish a serial data connection.

Powering the RM-105 EXT Radios with HAZ-SCANNER Solar Panel (P/N SP-6000)

To use with Solar Panel Option (P/N SP-6000)

1. Connect the **EPC-BUBP-600** male power jack into the mating female end in the back of the RM-105 radio modem.
2. Connect the **EPC-BUBP-600** Plus and Minus leads to the **BUBP-600** Back Up battery.



When Back Up Battery is Charged with Solar Panel Option

Note: When powering the RM-105 EXT radios from DC power sources, including the repeater radio option, radio DC power is normally obtained from a direct connection to the Back Up battery as shown above.

Please see the Appendix for RM-105 EXT AC and DC powering options which may include:

1. Powering RM-105EXT radio from BC-6000 Battery Charger.
2. Powering RM-105EXT radio from supplied RM-105EXT AC power supply.
3. Powering RM-105EXT radio from Back Up battery with or without Solar Panel option.
4. Powering RM-105EXT repeater using AC or DC power options.

Connect the male power jack into the mating female jack on the back of the RM-105EXT radio modem.



Plug end into the HAZ-SCANNER Battery Charger P/N BC-6000

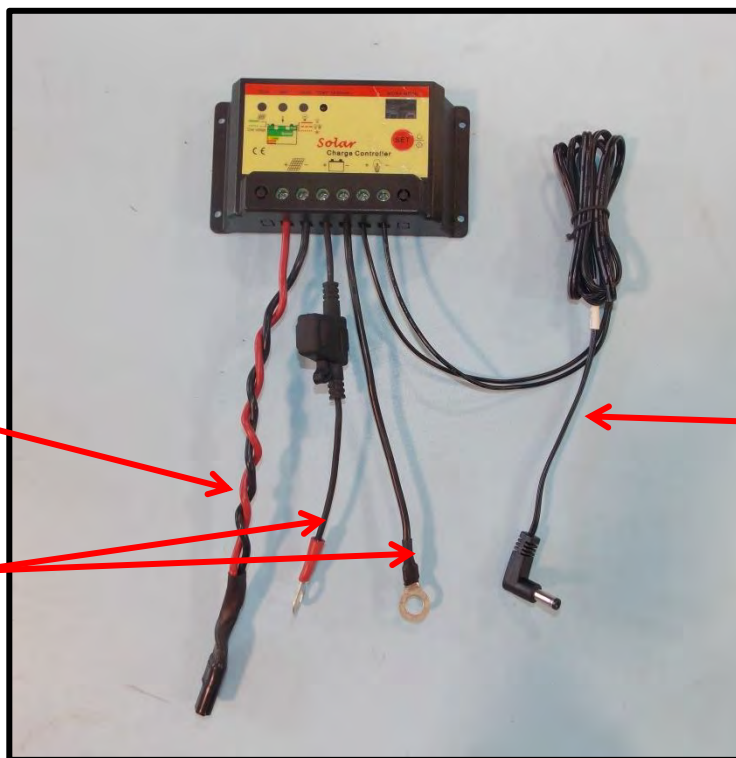
Plug into HAZ-SCANNER External Power Connector EPC-600

RM-105 EXT AC Powering Connections

Solar Charge Controller for Repeater Radio Configurations

Plug into Solar Panel (P/N SP-6000)

Attached to Back Up Battery (P/N BUBP-600). The red wire attaches to the positive terminal, the black wire to the negative battery terminal.



Connect to Repeater Radio Modem

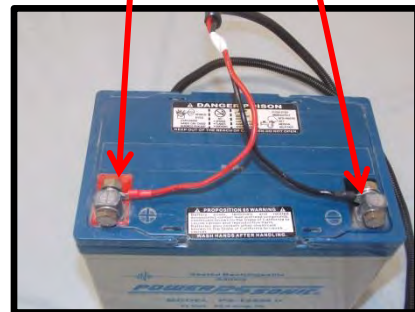
Solar Power Connections for Radio Repeater Configurations

Connecting the External Power Cable to the Back Up Battery (P/N BUBP-600) and RM-105 EXT Modem

Step 1 Connect to the RM-105EXT modem power jack



Step 2 Attach to the Back Up Battery P/N BUBP-600. The red wire will attach to the positive battery terminal and the black wire to the negative battery terminal.



Yagi Antenna Mounting Installation



Yagi antenna

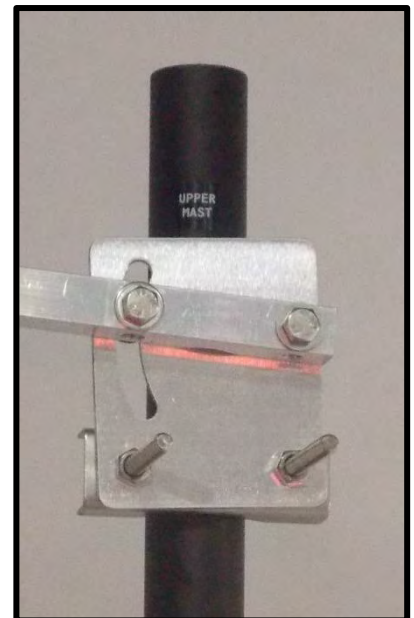
Wind Speed and
Direction Sensor

RM-105EXT waterproof
radio enclosure

Tripod- (Actual Tripod in
use will be secured to
cement pad or ground
spikes).

Mount Yagi antenna to tripod using the supplied mounting hardware.

1. The Pivoting Mounting Plate of the Yagi Antenna is factory mounted to the Yagi Antenna. Remove mounting nuts.
2. Align pre-drilled holes on Pivoting Mounting Arm Plate of the Yagi antenna with U-Clamp Bracket.
3. Tighten nuts with a wrench.
4. Pivot Yagi antenna to desired vertical and horizontal position.



Sensor Specifications

HAZ-SCANNER User Guide – Version V.7.7

CARBON MONOXIDE (CO)

PERFORMANCE	Sensitivity	nA/ppm in 400ppm CO	30 to 48
	Response time	T ₉₀ (s) from zero to 400ppm CO % 22° C	<25
	Zero current	Ppm equivalent in zero air	<± 3
	Resolution	RMS noise (ppm equivalent)	<1.5
	Range	Ppm limit of performance warranty	1,000
	Linearity	Ppm CO error at full scale, linear at zero and 400ppm co	± 40
	Overgas limit	Maximum ppm for stable response to gas pulse	2,000
LIFETIME	Zero drift	Ppm equivalent change/year in lab air	<0.5
	Sensitivity drift	% change/year in lab air, monthly test	< 6
ENVIRONMENTAL	Sensitivity @ -20° C	% (output @-20° C/output @20° C) @ 400ppm CO	55 to 80
	Sensitivity @ 50° C	% (output @ 50° C/output @ 20° C) @400ppm CO	105 to 115
	Zero @ -20° C	ppm equivalent change from 20° C	< ± 3
	Zero @ 50° C	Ppm equivalent change from 20° C	< ± 4
CROSS SENSITIVITY	Filter Capacity	Ppm hrs H ₂ S	20,000
	H ₂ S sensitivity	% measured gas @ 20ppm H ₂ S	< 0.1
	NO ₂ sensitivity	% measured gas @ 10ppm NO ₂	< 0.1
	Cl ₂ sensitivity	% measured gas @ 10ppm Cl ₂	< 0.1
	NO sensitivity	% measured gas @ 50ppm NO	< 50
	SO ₂ sensitivity	% measured gas @ 20ppm SO ₂	< 0.1
	H ₂ sensitivity	% measured gas @ 400ppm H ₂	< 70
	C ₂ H ₄ sensitivity	% measured gas @ 400ppm C ₂ H ₄	< 100
	NH ₃ sensitivity	% measured gas @ 20ppm NH ₃	<0.1
KEY SPECIFICATIONS	TEMPERATURE RANGE	°c	-20 TO 50
	Pressure range	kPa	80 to 120
	Humidity range	%rh (see note below)	15 to 90
	Storage period	Months @ 3 to 20°C (stored in sealed pot)	6
	Load resister	Ω (recommended)	10 to 47
	Weight	g	< 2

HAZ-SCANNER User Guide – Version V.7.7

CARBON DIOXIDE (CO₂)

SPECIFICATION

OPERATING VOLTAGE RANGE:	3.0 – 5.0 V DC
OPERATING CURRENT:	Constant Current operation, current range 75 – 85mA
PROGRAMMABLE OUTPUT VOLTAGE RANGES:	Voltage output Types – 0V to 2.8 volts DC. Bridge Output Types – 0V to Bridge Supply Voltage
MEASURING RANGES / RESOLUTION:	0 – 500 ppm / 10 ppm resolution from 0 to 250 ppm, then 20 ppm up to full scale 0 – 1000 ppm / 20 ppm resolution from 0 to 500 ppm, then 40 ppm up to full scale 0 – 2000 ppm / 50 ppm resolution from 0 to 1000 ppm, then 100 ppm up to full scale 0 – 5000 ppm / 50 ppm resolution from 0 to 2500 ppm, then 100 ppm up to full scale 0 – 10,000 ppm / 100 ppm resolution from 0 to 5000 ppm, then 200 ppm up to full scale
WARM UP TIME:	To final zero ± 0.2 % of range ; 1 minute @ 20°C (68°F) ambient
RESPONSE TIME T₉₀:	<30s @ 20°C (68°F) ambient
ZERO REPEATABILITY:	± 2 % of full scale @ 20°C (68°F) ambient
SPAN REPEATABILITY:	± 2 % of full scale @ 20°C (68°F) ambient
LONG TERM ZERO DRIFT:	± 1 % of full scale / month @ 20°C (68°F) ambient
OPERATING TEMPERATURE RANGE:	-20°C to +50°C (-4°F to 122°F)
TEMPERATURE PERFORMANCE:	± 10 % of reading up to 50% FSD and ± 15 % of reading from 50% to 100% FSD over the range -20°C to +50° C (-4°F to 122° F)
STORAGE TEMPERATURE RANGE:	-20° C to +50°C (-4°F to 122°F)
HUMIDITY RANGE:	0 to 95% RG non-condensing.
DIGITAL SIGNAL FORMAT:	8 data bits, 1 stop bit, no parity, 2.8V logic level
STANDARD BAUD RATES:	34,400, 19,200, 9600
USER CONFIGURABLE PARAMETERS	Zero output voltage FSD output voltage Positive or negative going output Sensors 'zero' function Sensor 'span' function

HAZ-SCANNER User Guide – Version V.7.7

NITRIC OXIDE (NO)

PERFORMANCE	Sensitivity	nA/ppm in 40ppm NO	500 to 750
	Response time	t_{90} (s) from zero to 40ppm NO	< 10
	Zero Current	Ppm equivalent in zero air	0 to 1
	Resolution	RMS equivalent in zero air	< 0.1
	Range	Ppm limit of performance warranty	100
	Linearity	Pm error at full scale, linear at zero and 40ppm no	< ± 1.5
	Overgas limit	Maximum ppm for stable response to gas pulse	200
LIFETIME	Zero drift	Ppm equivalent change/year in lab air	<0.4
	Sensitivity drift	% change/month in lab air, month test	< 5
ENVIRONMENTAL	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C)40ppm NO	65 to 85
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) 40ppm NO	102 to 115
	Zero @ -20°C	Ppm equivalent change from 20°C	< ± 0.5
	Zero @ 50°C	Ppm equivalent change form 20°C	3 to 6
CROSS SENSITIVITY	H ₂ S Sensitivity	% measured gas @ 20ppm H ₂ S	<30
	NO ₂ Sensitivity	% measured gas @ 10ppm NO ₂	< 5
	Cl ₂ Sensitivity	% measured gas @ 10ppm Cl ₂	< 5
	SO ₂ Sensitivity	% measured gas @ 10ppm SO ₂	< 3
	CO Sensitivity	% measured gas @ 400ppm CO	< 0.1
	H ₂ Sensitivity	% measured gas @ 400ppm H ₂	< 0.1
	C ₂ H ₄ Sensitivity	% measured gas @ 1000ppm C ₂ H ₄	< 0.1
	NH ₃ Sensitivity	% measured gas @ 20ppm NH ₃	< 0.1
	CO ₂ Sensitivity	% measured gas @ 5% CO ₂	< 0.1
KEY SPECIFICATIONS	Temperature range	°C	-20 to 50
	Pressure range	kPa	80 to 120
	Humidity range	%rh (see note below)	15 to 90
	Storage period	Months @ 3 to 20°C (stored in sealed pot)	6
	Bias voltage	mV (working electrode above ground)	300mV
	Load resistor	Ω (for optimum performance)	100 to 47
	Weight	g	< 2

HAZ-SCANNER User Guide – Version V.7.7

NITROGEN DIOXIDE (NO₂)

PERFORMANCE	Sensitivity	nA/ppm in 10ppm NO ₂	-200 to -400
	Response time	t ₉₀ (s) from zero to 10ppm NO ₂	<25
	Zero Current	ppm equivalent in zero air	± 0.35
	Resolution	RMS noise (ppm equivalent)	0.1
	Range	ppm NO ₂ limit of performance warranty	20
	Linearity	ppm error at full scale, linear at zero and 10ppm NO ₂	
	Overshoot limit	Maximum ppm for stable response to gas pulse	60
LIFETIME	Zero drift	ppm equivalent change/year in lab air	nd
	Sensitivity drift	% change/month in lab air, twice monthly test	Nd
ENVIRONMENTAL	SENSITIVITY @ -20°C	% (output @ -20°C/output @ 20°C) @ 10ppm	80to 95
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) @ 10ppm	95-105
	Zero @ -20°C	ppm equivalent change from 20°C	<± 0.6
	Zero @ 50°C	ppm equivalent change from 20°C	<± 0.5
CROSS SENSITIVITY	H ₂ S	Sensitivity % measured gas @ 20ppm H ₂ S	<-20
	CL ₂	Sensitivity % measured gas @ 10ppm CL ₂	<80
	NO	Sensitivity % measured gas @ 50ppm NO	<0.5
	SO ₂	Sensitivity % measured gas @ 20ppm SO ₂	< 1
	CO	Sensitivity % measured gas @ 400ppm CO	<0.1
	H ₂	Sensitivity % measured gas @ 400ppm H ₂	<0.1
	C ₂ H ₄	Sensitivity % measured gas @ 400ppm C ₂ H ₄	< 0.1
	NH ₃	Sensitivity % measured gas @ 20ppm NH ₃	< 0.1
	CO ₂	Sensitivity % measured gas @ 10% CO ₂	< 0.1
KEY SPECIFICATIONS	Temperature range	°C	-20 to 50
	Pressure range	kPa	80 to 120
	Humidity range	%rh (see note below)	15 to 90
	Storage period	Months @ 3 to 20°C (stored sealed pot)	6
	Load resistor	Ω (for optimum performance)	33
	Weight	g	<2

HAZ-SCANNER User Guide – Version V.7.7

OZONE (O3)

Specification	
Power	
Input	11 – 24 VDC
Consumption	2.5 – 6 W max
Outputs	
0-5V analog	8 bit
Relay	Onboard 24VDC / 2A, NO , NC, COM
2 x LED indicator	Relay status Red = activated
	Sensor status Green = normal
	Green slow flash (2 seconds) = warming up
	Green fast flash (0.3 seconds) = failure
RS232	2-wire proprietary protocol (not ASCII)
RS485	2-wire proprietary protocol (not networkable)
I2C	Optional
Inputs	
Relay set points	4-way dip switch
Zero calibration	Auto-calibration zero button
Reset	Microprocessor reset button
Span calibration	Factory use only
Analog inputs	2 Voltage (optional)
Digital input	2 x GPIO (optional, can be used for digital temp/RH sensor)
Diagnostics	
If sensor failure then -	
Status LED	Fast green flash
Relay	AA version (energized) LED red
	AB version (de-energized) LED off
	C10 version (de-energized) LED off
0-5V analog output	5V
Mechanical	
Board Size	60 mm x 75 mm
Mounting	Screw or extrusion slot
Fan (if required)	On-board ball-bearing 50,000 hours
Sensor filter	On-board
Options	
Serial Display	Display Connector
High resolution 0-5V analog	12 bit
Temp/RH sensor	GPIO option
I2C output	Display Connector
Environmental	
Operating temperature	0°C to 50°C (-20°C to 50°C if enclosed)
Operating humidity	5% to 95% RH (non-condensation)

HAZ-SCANNER User Guide – Version V.7.7

OZONE (03) (continued)

Sensor	Calibrated Range (ppm)	0-5V output scale	LDL	Accuracy of factory Calibration	Resolution (ppm)	Response Time (T90)	Sampling Method	Operating Temp. (environmental)	Relative Humidity (Non –condensing)
Ozone 0-0.15 ppm	0-0.150	0-0.500	1 ppb	<± 0.005 ppm	0.001	< 70s	F, P1, P2	-5°C to 40°C	5 to 95%
Ozone 0-0.5 ppm	0-0.500	0-0.500	1ppb	<±0.008 ppm 0-0.1 pm	0.001	< 60s	F, P1, P2	-5°C to 40°C	5 to 95%

HAZ-SCANNER User Guide – Version V.7.7

PARTICULATES (PM)

Operation:	Four key splash proof membrane switch – menu driven
Calibration:	Gravimetric reference NIST Traceable – SAE fine test dust-ISO12103-1
Accuracy:	± 10% to filter gravimetric SAE fine test dust
Sensing range:	.001-20.0 mg/m ³ or optional .01-200.0 mg/m ³ or .1-2000.0 mg/m ³
Particle size range:	.1-100µm
Precision:	± .003 mg/m ³ (3µg/m ³)
Sampling flow rate:	2.0 liters/minute
Analog output:	0-2 Vdc
Power:	Rechargeable and interchangeable battery
Operating temperature:	-10°C to 50°C
Storage temperature:	-20°C to 70°C
Humidity:	95% non-condensing

HAZ-SCANNER User Guide – Version V.7.7

RELATIVE HUMIDITY

Humidity Characteristics	Symbol	Min	Typ	Max	Unit
Humidity Measuring Range	RH	0		100	%RH
Relative Humidity Accuracy (10 to 95% RH)	RH		+/-3	+/-5	%RH
Supply Voltage	Vs	4.75	5.00	5.25	Vdc
Nominal Output @ 55%RH (at 5Vdc)	Vout	2.42	2.48	2.54	V
Current Consumption	Ic		2.8	4	mA
Temperature Coefficient (10 to 50°C)	Tcc		-0.05	-0.1	%RG/°C
Average Sensitivity from 33% to 75%RH	$\Delta V_{out}/\Delta RH$		+26		mV/%RH
Sink Current Capability ($R_L = 33k\Omega$)	I			150	μA
Recovery Time after 150 hours of condensation	Tr		10		S
Humidity Hysteresis			+/-1		%RH
Humidity Resolution			0.4		%RH
Long Term Stability	T		+/-0.5		%RH/yr
Time Constant (at 63% of signal, static) 33% to 75%RH (1)	T		5	10	S
Output Impedance	Z		70		Ω
Warm Up Time	tw		200		ms

(1) At 2m/s air flow

HAZ-SCANNER User Guide – Version V.7.7

SULFUR DIOXIDE (SO₂)

PERFORMANCE	Sensitivity	nA/ppm in 10ppm SO ₂	180 to 350
	Response time	t ₉₀ (s) from zero to 10ppm SO ₂	<12
	Zero current	Ppm equivalent in zero air	<± 0.2
	Range	Ppm limit of performance warranty	20
	Linearity	Ppm error at full scale, linear at zero and 10ppm	<5
	Overgas limit	Maximum ppm for stable response to gas pulse	50
LIFETIME	Zero drift	Ppm equivalent change/year in lab air	<0.2
	Sensitivity drift	% change/year in lab air, monthly test	<6
ENVIRONMENTAL	Sensitivity @ -20°C	% (output @ -20°C/output @ 20°C) 10ppm	72 to 88
	Sensitivity @ 50°C	% (output @ 50°C/output @ 20°C) 10ppm	74 to 90
	Zero @ -20°C	Ppm equivalent change from 20°C	<± 1
	Zero @ 50°C	Ppm equivalent change from 20°C	<-0.5 to 1.5
CROSS SENSITIVITY	H ₂ S sensitivity	% measured gas @ 20 ppm H ₂ S	<-350
	NO ₂ sensitivity	% measured gas @ 10ppm NO ₂	<-100
	Cl ₂ sensitivity	% measured gas @ 10ppm Cl ₂	<-100
	NO sensitivity	% measured gas @ 50ppm NO	<1
	CO sensitivity	% measured gas @ 400ppm CO	<-0.2
	H ₂ sensitivity	% measured gas @ 400ppm H ₂	<1
	C ₂ H ₄ sensitivity	% measured gas @ 400ppm C ₂ H ₄	<3
	NH ₃ sensitivity	% measured gas @ 20ppm NH ₃	<0.1
	CO ₂ sensitivity	% measured gas @ 10% CO ₂	<0.1
KEY SPECIFICATIONS	Temperature range	°C	-20 to 50
	Pressure range	kPa	80 to 120
	Humidity range	%rh (see note below)	15 to 90
	Storage period	Months @ 3 to 20°C = (stored in sealed pot)	6
	Load resistor	Ω (for optimum performance)	22
	Weight	g	<2

HAZ-SCANNER User Guide – Version V.7.7

TEMPERATURE

(Ta=25°C)

Temperature Characteristics	Symbol	Min	Typ	Max	Unit
Nominal Resistance @25°C	R		10		KΩ
Beta value: B25/100	β	3600	3730	3800	
Temperature Measuring Range	Ta	-30		80	°C
Nominal Resistance Tolerance @25°C	Rn		2	3	5
Beta Value Tolerance	β		3		%
Response Time	τ		10		s

HAZ-SCANNER User Guide – Version V.7.7

WIND DIRECTION

Description	
Sensor type	Continuous rotation potentiometric wind direction vane
Applications	<ul style="list-style-type: none"> • Wind resource assessment • Meteorological studies • Environmental monitoring
Sensor range	360 ° mechanical, continuous rotation
Instrument compatibility	All NRG loggers
Output signal	
Signal type	Analog DC voltage from conductive plastic potentiometer, 10K ohms
Transfer function	Output signal is a ratiometric voltage
Accuracy	Potentiometer linearity within 1%
Dead band	8° Maximum, 4° Typical
Output signal range	0V to excitation voltage (excluding deadband)
Response Characteristics	
Threshold	1 m/s (2.2 miles per hour)
Power requirements	
Supply voltage	Regulated potentiometer excitation of 1V to 15 V DC
Installation	
Mounting	Onto a 13 mm (0.5 inch) diameter mast with cotter pin and set screw
Tools required	0.25 inch nut driver, petroleum jelly, electrical tape
Environmental	
Operating temperature range	-55°C to 60°C (-67 °F to 140 °F)
Operating humidity range	0 to 100% RH
Lifespan	50 million revolutions (2 to 6 years normal operation)
Physical	
Connections	4-40 brass hex nut/post terminals
Weight	0.14 kg (0.3 pounds)
Dimensions	<ul style="list-style-type: none"> • 21 cm (8.3 inches) length x 12 cm (4.3 inches) height • 27 cm (10.5 inches) swept diameter
Materials	
Wing	Black UV stabilized injection molded plastic
Body	Black UV stabilized static dissipating plastic
Shaft	Stainless steel
Bearing	Stainless steel
Boot	Protective PVC sensor terminal boot included
Terminals	brass

HAZ-SCANNER User Guide – Version V.7.7

WIND SPEED

Description	
Sensor type	3-cup anemometer
Applications	<ul style="list-style-type: none"> Wind turbine control wind speed measurement for programmable controllers meteorological studies environmental monitoring
Sensor Range	1 m/s to 96 m/s (2.2 mph to 215 mph) (highest recorded)
Instrument compatibility	Controllers or loggers requiring a square wave signal
Output signal	
Signal type	<ul style="list-style-type: none"> square wave signal from open collector transistor external pull-up resistor required frequency proportional to wind speed
Anemometer Transfer Function	<ul style="list-style-type: none"> Consensus Transfer Function:
	Scale Factor (Slope): 0.765 m/s/Hz
	(1.711 mph/Hz
	Offset: 0.35 m/s (0.78 mph)
	<ul style="list-style-type: none"> Refer to the White Paper “The Maximum Type 40 Anemometer Calibration Project” for information on the consensus transfer function
Recommended load resistance	<ul style="list-style-type: none"> Output sinks up to 20 mA 3300 Ohm typical pull-up resistor for 24 V 1500 Ohm typical pull-up resistor for 24 V 330 Ohm typical pull-up resistor for 5V
Calibration	Calibrated version available
Output signal range	0 Hz to 125 Hz
Uncertainty	Accuwind (Riso-R-1556) Classification:
	<ul style="list-style-type: none"> Class 2.4A Class 7.7B
	IEC 61400-12-1 operational standard uncertainty:
	<ul style="list-style-type: none"> ± 0.14 m/s at 10 m/s for Class A ± 0.45 m/s at 10 m/s for Class B Refer to calibration sheet for information on calibration uncertainty
Response characteristics	
Distance constant (63% recovery)	<ul style="list-style-type: none"> 2.55 m (8.37 feet) at 5m/s per ASTM D 5096-02 2.56 m (8.40 feet) at 10m/s per ASTM D 5096-02
Moment of inertia	<ul style="list-style-type: none"> 1.01×10^{-4} kg-m² 74.5×10^{-6} S-ft²
Swept diameter of rotor	190 mm (7.5 inches)
Power requirements	
Supply voltage	5 V to 26 V DC
Supply current	9 mA maximum
Mounting	Onto a 13 mm (0.5) diameter mast with cotter pin and set screw
Tools required	0.25 inch nut driver, petroleum jelly, electrical tape

Contact Information

For further assistance please contact:



Environmental Devices Corporation

603-378-2112

800-234-2589

Fax 603-378-2113

sales@hazdust.com

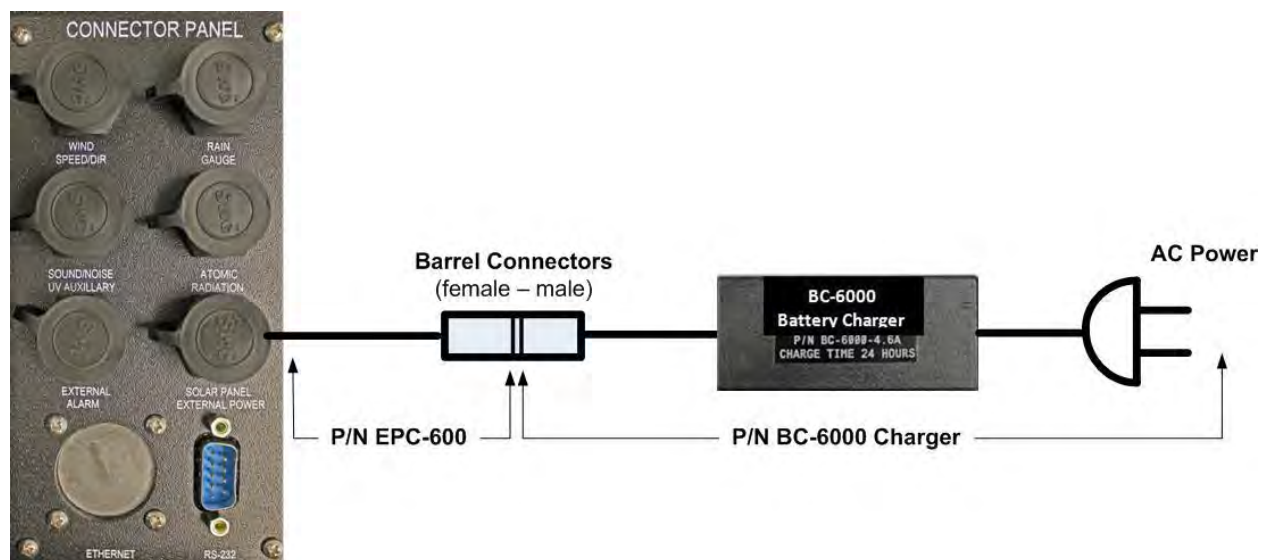
techsupport@hazdust.com

4 Wilder Drive, Building 15

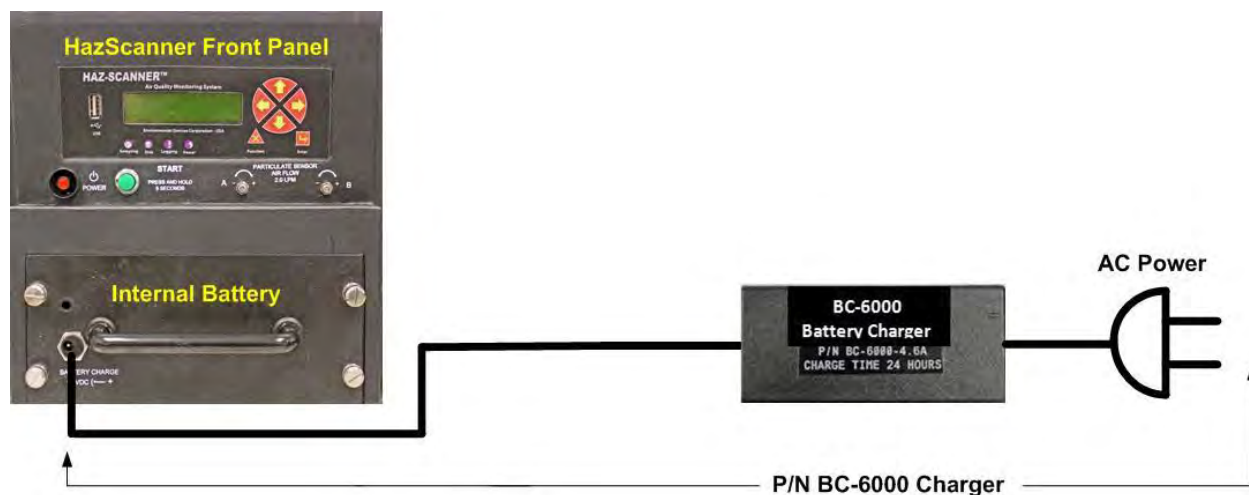
Plaistow, NH 03865

USA

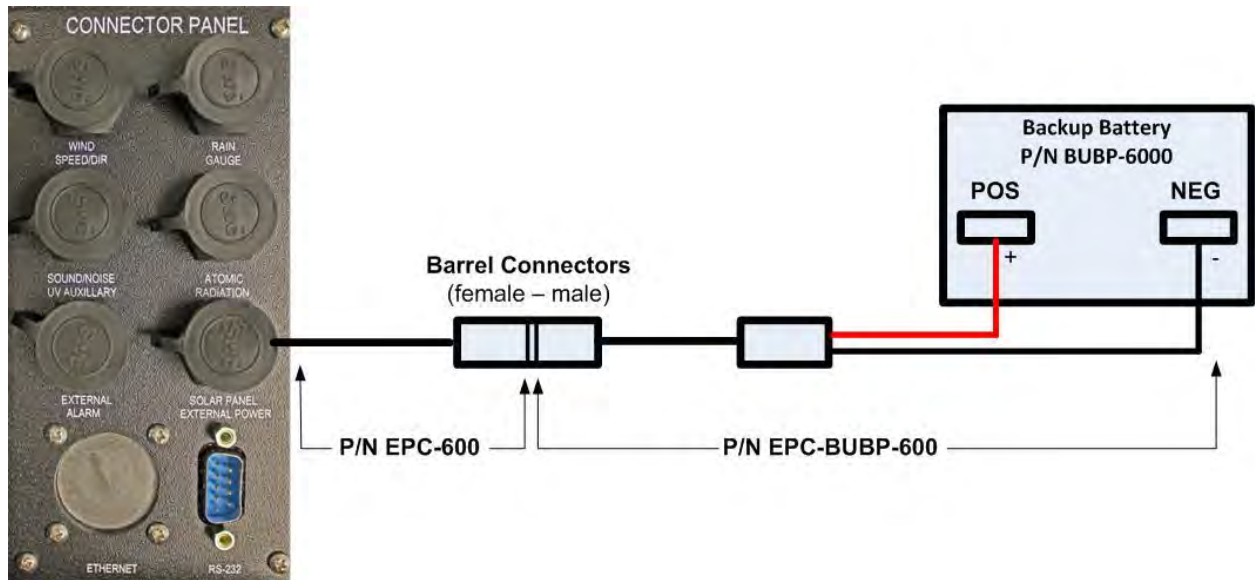
Appendix



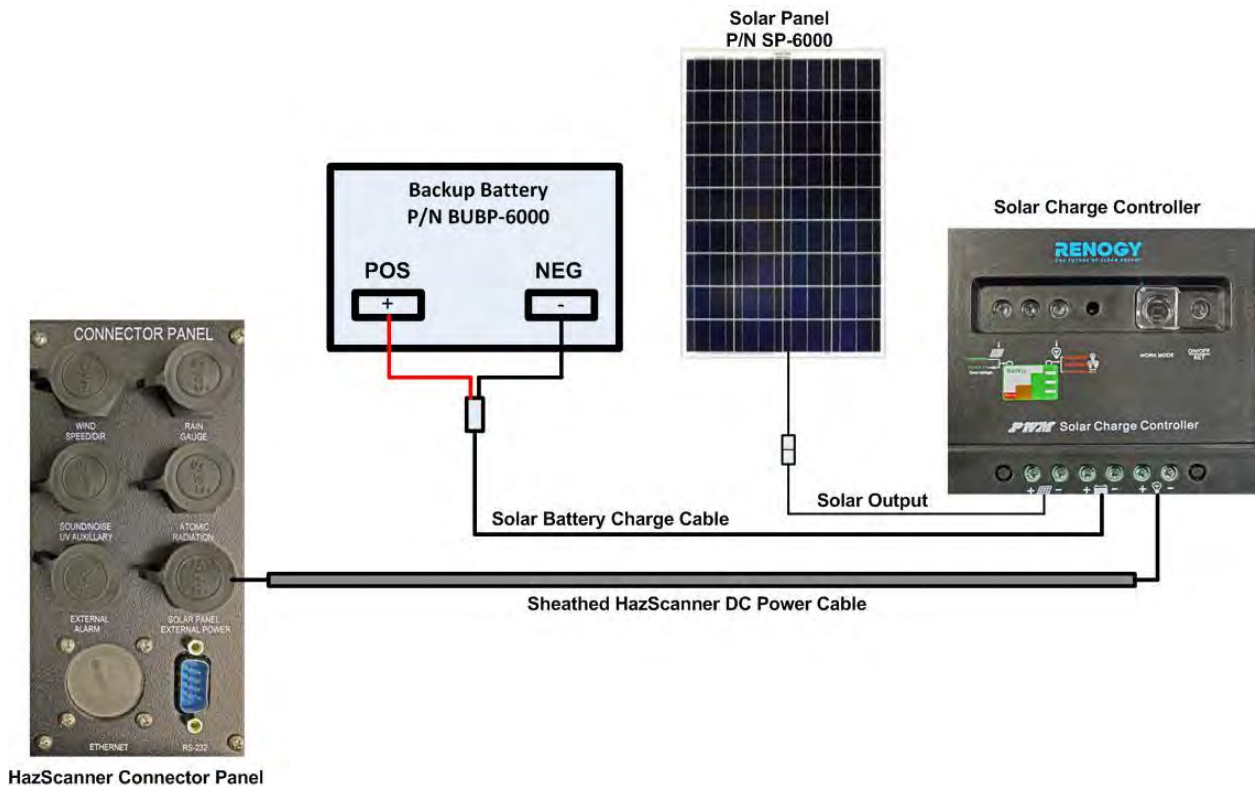
HAZ-SCANNER Basic AC Powering Option



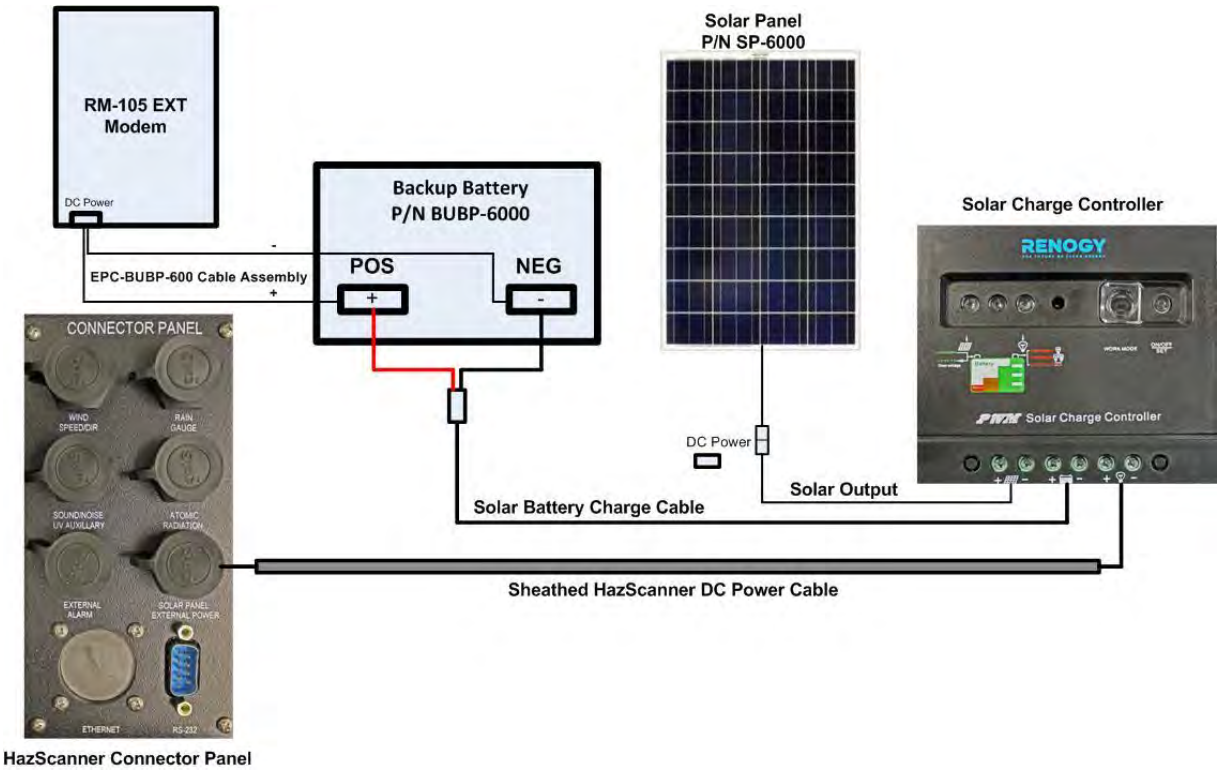
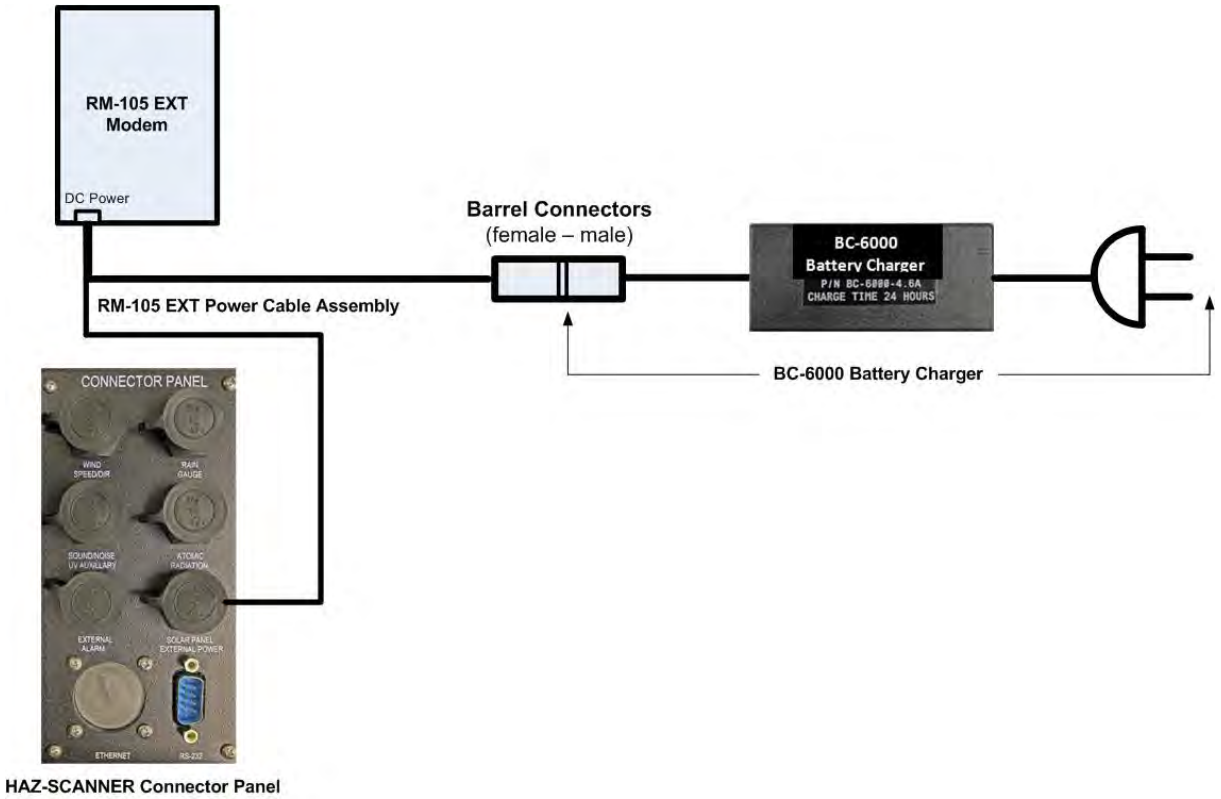
HAZ-SCANNER Front Panel – Charge Internal Instrument Battery Power Option



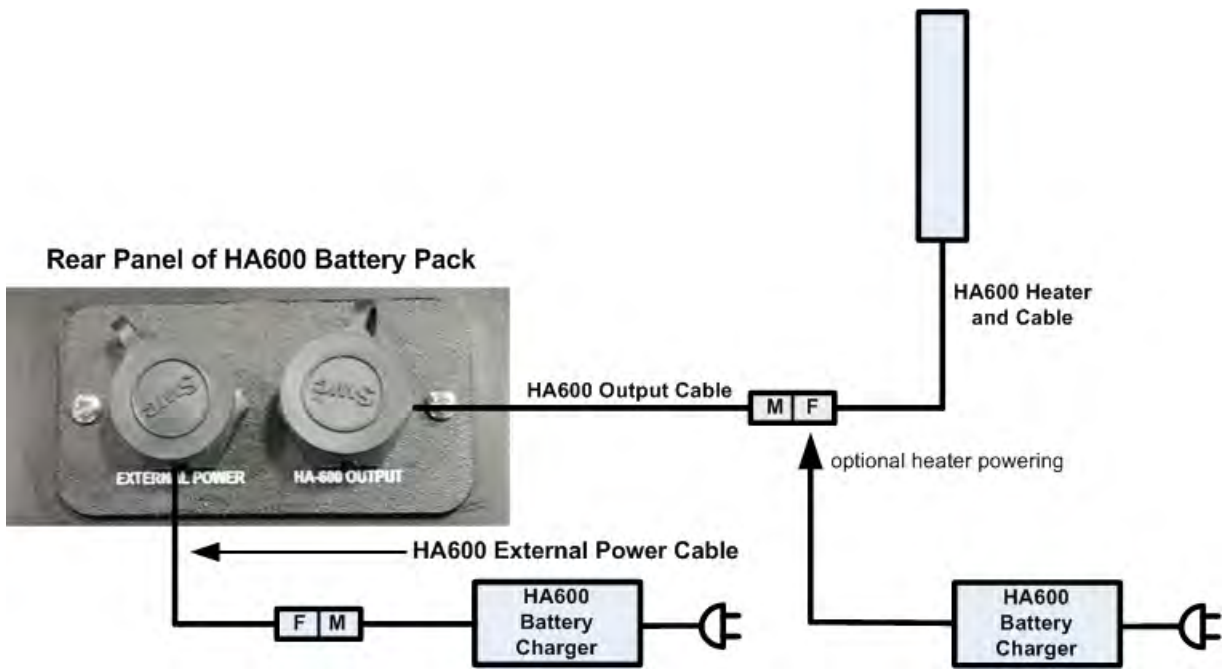
HAZ-SCANNER Backup Battery Powering Option



HAZ-SCANNER Solar Power + Backup Battery Option



RM-105 EXT Modem AC and DC Powering Options



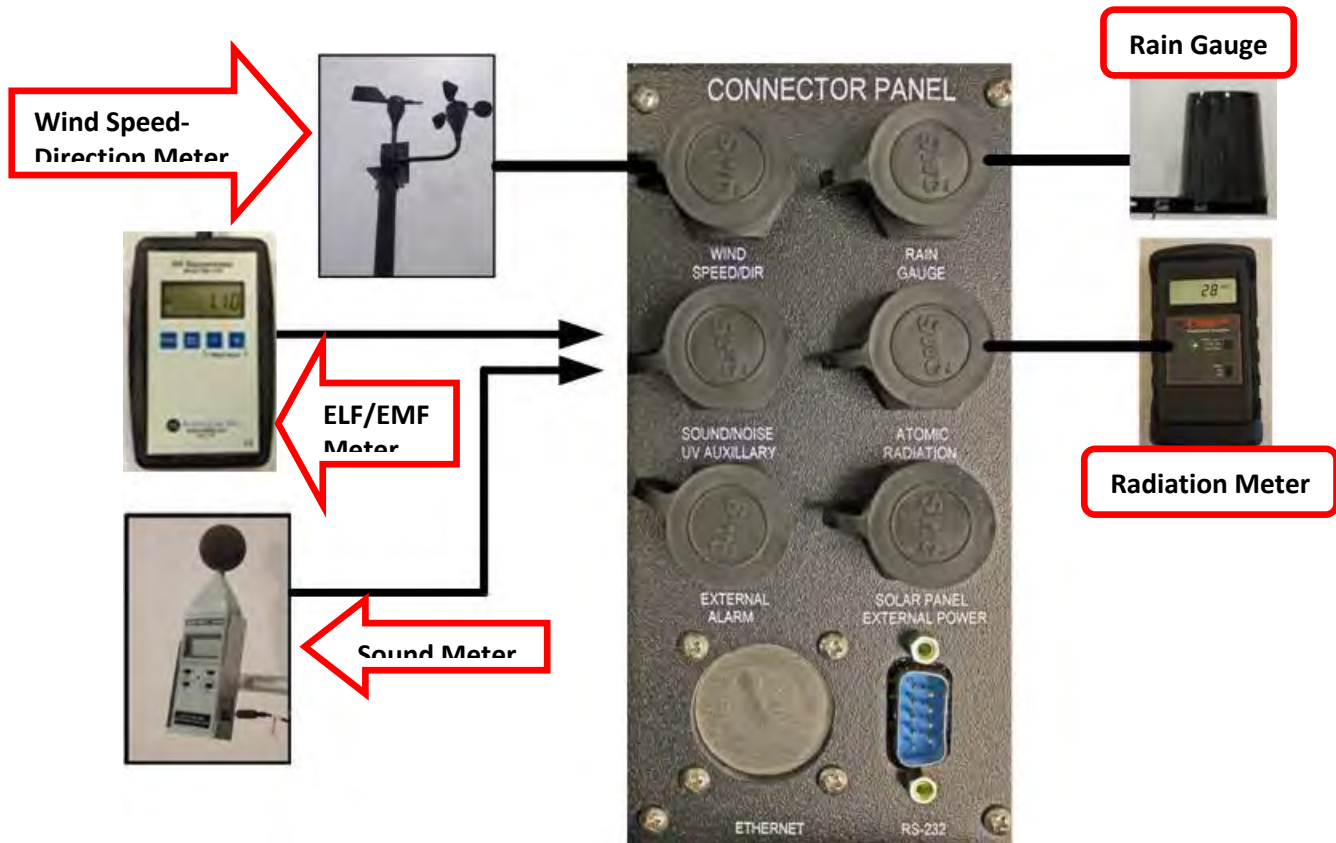
HA-600 Inlet Heater Power Connections

Notes:

1. HA600 Battery Charger may be used to power HA-600 Heater independently as shown above.
2. HA-600 Battery Pack will power the heater for approximately 10 hours on a full charge.
3. HA-600 Battery Charger is supplied with multiple AC power adapters for use in the U.S. and in most foreign countries. The battery charger will accept 110 to 240 VAC power.
4. The difference between the **HA-600 External Power Cable** and the **HA-600 Output Cable** are the type of bayonet connectors on these cable assemblies, i.e., male or female.
5. If using the back-up battery and/or solar panel power options, you may connect the HA-600 Inlet heater power cable to the **EPC-BUBP-600** cable connected to the back-up battery.

Caution: The Inlet heater is “**HOT**” when powered - use caution when handling.

HAZ-SCANNER User Guide – Version V.7.7



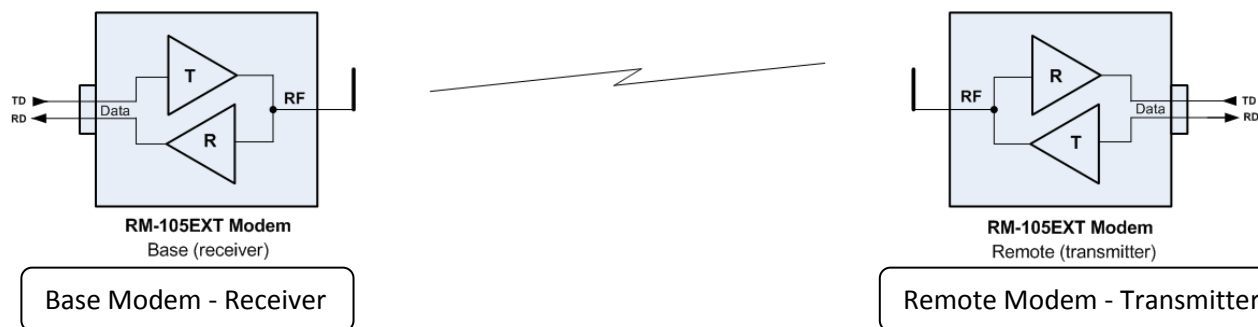
HAZ-SCANNER Peripheral Connections

Peripheral	Part Number
Wind Speed-Direction Meter	HS-WS&D-6000
ELF/EMF Meter	HS-ELF-6000
Sound Meter	HS-SM-6000
Rain Gauge	RS-6000
Radiation Meter	HS-AR-6000

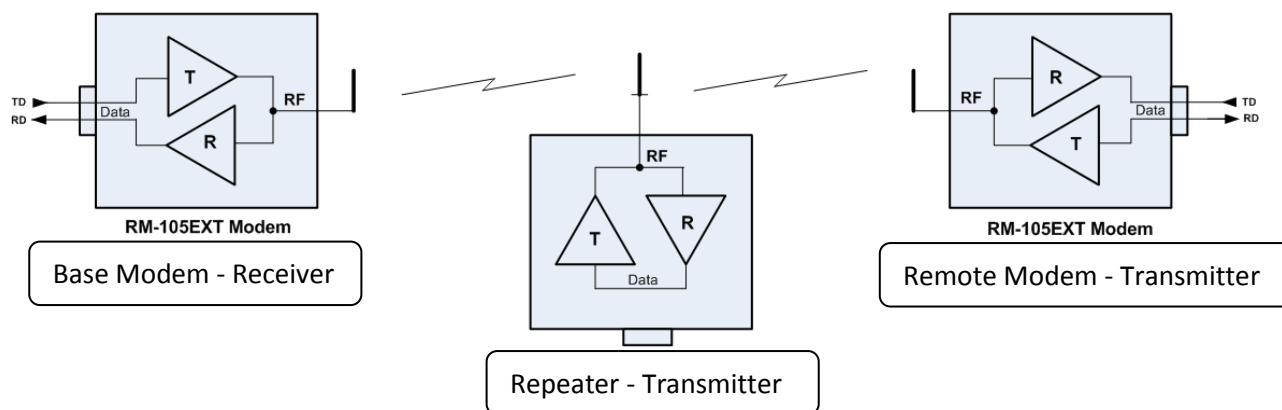
Optional external sensor/meters that may be connected to a HAZ-SCANNER system are listed below.

- Barometric Pressure Sensor – **P/N HS-BP-6000**
- Dew Point Sensor – **P/N HS-DP-6000**
- Solar Radiance Intensity Meter – **P/N HS-SR-6000**
- Quest Compatible Sound Level Meter – **P/N ASLM-6000**

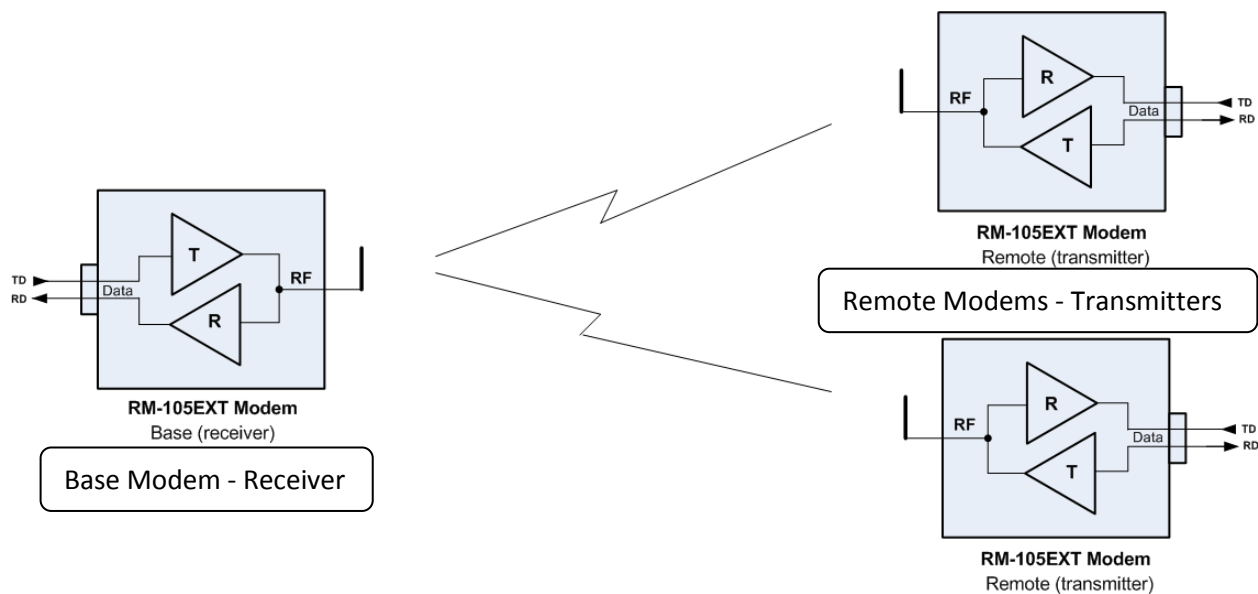
RM-105EXT Wireless Digital Modem Topology



RM-105EXT Point-to-Point Wireless Link



RM-105EXT Radio Link with Repeater Option



RM-105EXT Point-to-Multipoint Wireless Link Configurations

