Protege ZM System Guide

PROTEGE ZM PORTABLE GAS SYSTEM

087-0048

Rev B

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ABOUT THIS GUIDE

Guide Overview

This guide describes the steps required to use the Protege ZM Portable Gas Monitor and optional system products. This document is for gas detection personnel to manage their gas monitoring device. This document contains information on installation, configuration, operation, maintenance and troubleshooting.

This user guide assumes a basic knowledge of gas detection procedures.

The user guide is divided into the following topics:

- Quick Reference
- Introduction
- Installation
- Configuration and Setup
- Operation
- Maintenance
- Specifications
- Sensor Information
- Support

Warning: *Read, understand and follow the entire content of this guide prior to use. Failure to do so may result in serious injury or death.*

Guide Conventions

The following visual elements are used throughout this guide, where applicable:

Warning: *This icon and text indicate a potentially hazardous situation, which, if not avoided, could result in death or injury.*

Caution: *This icon and text indicates a potentially dangerous procedure. Instructions contained in the warning must be followed. Failure to do so may result in damage to the device.*

This icon and text indicate the possibility of electrostatic discharge (ESD) in a procedure that requires the reader to take the proper ESD precautions.

This icon and text designates information of special note.

Related Product Documentation

Table 1 lists the Scott Safety Family documentation set.

Table 1 Scott Safety Documentation Set

DOCUMENT NAME	PURPOSE	DOCUMENT ID
Protege ZM User Guide	Provides information on operation and maintenance on the Protege ZM monitor.	087-0047
Protege ZM System Guide	Provides information on installation, configuration, operation, maintenance and troubleshooting on the Protege ZM monitor, test station, applicable software and firmware.	087-0048

Revision History

Table 2 shows the revision history for this guide, providing a description of the changes.

Table 2 Protege ZM System Guide Revision History

REVISION	CHANGE
A	• Initial release.
B	• Maintenance chapter — Removed Test Station hardware symptom related to bump test failure. Added Test Station Software symptom “no memory stick” message. Removed PSI values related to Test Station Software Bump Test failure. • Specification appendix — Corrected USB memory size to 2GB. Added operating temperature range. Clarified IS approved temperature range. • Support appendix — Added USB Memory Drive to parts list.

Certifications and Approvals

Table 3 and Table 4 indicates the Test Station and IR Connect has been tested and complies with the following.

Table 3 Certifications and Approvals for Test Station

MARK
 EMC Directive Low Voltage Directive

Table 4 Certifications and Approvals for IR Connect

MARK
 EMC Directive

The approvals for the Protege ZM Monitors are listed in the Protege ZM User Guide.

General Safety Information

Ensure you adhere to the following for your safety.

Warning: *Read and follow the entire content of this guide prior to use. Failure to do so may result in serious injury or death.*

Warning: *All individuals who have or will have responsibility for using or testing this product must read and understand the contents of this manual. The product will perform as designed only if used and tested in accordance with the manufacturer's instructions. Failure to follow manufacturer's instructions will render the warranty and approvals null and void. Failure to follow these instructions may also result in serious injury or death.*

Scott Safety can take no responsibility for use of its equipment if it is not used in accordance with the instructions. If further operational or maintenance details are required but not provided in this guide, contact Scott Safety or their agent. Scott Safety shall not be liable for any incidental or consequential damages in connection with any modifications, errors or omissions in this guide.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to assure compliance with documented system data, repairs to components should be performed only by the manufacturer.

Additionally, industry standards, codes, and legislation are subject to change. Updated copies should be obtained by users to ensure the most recently issued regulations, standards and guidelines are available.

All pertinent state, regional, and local safety regulations must be observed when handling and disposing of hazardous material, Toxic (E-Chem) Sensors, batteries and other similar items that may fall under the classification of hazardous material.

The Electrical, Electronic and Battery elements of this product must not be disposed of via municipal waste streams; they should be delivered to collection facilities. Information on collection facilities is given by the local authorities or importer's representative. Correct disposal will contribute to recycling of materials and prevent negative consequences for the environment.

For products sold in Europe, the end of life procedures for Battery operated Electronic products must comply with the RoHS Directive 2002/95/EC, the WEEE Directive 2002/96/EC and the Battery Directive 2006/66/EC. These directives dictate how to dispose of the electronic and battery elements of the product after use. For Protégé products sold in the UK only, Scott Safety Ltd has provided a collection service. This service can be accessed by Telephoning Customer Services on 01695 711711 who will be happy to assist. Please do not send products back to Scott. In other parts of Europe, other systems are in place. Please contact your local provider of Scott products for more details.

Only use Scott Safety approved replacement parts.

Warnings and Cautions – Monitor and Test Station Use and Care

Ensure you follow the applicable warnings and cautions indicated here.

Warning: *This equipment must be operated and serviced by qualified personnel only. Read and understand the guide completely before operating or servicing. Qualified personnel as defined according to local, county, state, federal and individual company standards.*

Warning: *When in doubt vacate the area immediately. You should vacate the area immediately should the monitor indicate a warning or alarm condition. You should know, understand and follow your company's safety protocols.*

Warning: *Ensure the atmosphere is free from toxic gases prior to starting any of the procedures.*

Warning: *When the primary monitor is off line, ensure you have another online monitor to actively detect gases. The monitor may be off line due to such activities, like but not limited to, calibration, installation, maintenance, troubleshooting, configuration, wiring and other activities.*

Warning: *If the monitor does not function as described herein, remove from service and mark for maintenance. Only use Scott Safety replacement parts where applicable.*

Warning: *Only use the monitor to monitor the atmosphere for the gases and concentrations for which it is set-up to detect.*

Warning: *To prevent ignition of an explosive atmosphere, read and adhere to the manufacturer's live maintenance procedures.*

Warning: *Read this manual for intrinsic safety precautions. Substitution of components may impair intrinsic safety, resulting in serious injury or death.*

Warning: *Perform a bump test every day. Failure to perform a daily functional test could lead to serious injury or death.*

Caution: *Monitor will not operate without power applied. Thus, it only detects gases while powered.*

Caution: *Periodically test for correct operation of the system's alarm events by exposing the monitor to a targeted gas concentration above the high alarm set point.*

Caution: *Verify the gas inlet ports are free of dirt and debris prior to use.*

Caution: *Do not expose the monitor to severe mechanical or electrical shock. Always conduct device startup and bump test procedures after such exposure to verify the monitor's operation and accuracy.*

Caution: *Improper use of the Test Station may result in personal injury or death. Improper use includes, but not limited to, use without adequate training, or proper ventilation, disregard of the warnings and instructions provided with the product, and failure to inspect the product to be sure it is functioning prior to use.*

Warnings and Cautions – Sensor Use and Care

Ensure you follow the applicable warnings and cautions indicated here.

Warning: *Extended exposure of the detector to high concentrations of toxic gases may result in degraded sensor performance. If an alarm occurs due to high concentration of toxic gases, exit to a safe area, bump test, recalibrate if necessary or, if needed, call us.*

Warnings and Cautions – Battery Use and Care

Ensure you follow the applicable warnings and cautions indicated here.

Caution: *No attempt should be made to alter or repair the monitor.*

Caution: *Do not attempt to replace the monitor's battery. It is not replaceable.*

Caution: *Discard monitor as soon as the battery indicator shows fully discharged battery.*

Chapter 1

SCOTT QUICK REFERENCE

Chapter Overview

This chapter covers the following topic:

- Typical Quick Reference

Typical Quick Reference

This section provides a brief amount of information for a typical quick reference.

Warning: *This is not a substitute for the User Guide. All individuals who have or will have responsibility of using or servicing the device must read and understand the contents of the User Guide prior to operation. Failure to do so may result in serious injury or death.*

Powering the Monitor

This section describes the power up sequence. See Table 5.

Table 5 Monitor Power-Up Sequence

ACTION	LCD	RESULTS
Activating monitor: Press and hold down the button for five (5) seconds.		The monitor starts and runs through a self-test. • The monitor emits one audible beep • All LEDs light and monitor vibrates • All LCD display elements appear
	 	After the full element LCD displays, the low alarm and high alarm set points display.
		When a self-test is successful the monitor turns to the original screen showing Months with Clock icon and displays a Check Mark and one short audible beep sounds.

Monitor Alerts & Messages

This section describes various alerts and displays.Table 6 lists the details.

Table 6 Monitor Alarms and Descriptions

LCD	REASON	LED	BEEPS	VIBRATION
	Low Alarm	1 slow flash every second	1 slow beep every second	1 slow vibration every second
	High Alarm and Over Limit (OL) Alarm	2 fast flashes every second	2 fast beeps every second	2 fast vibrations every second

Table 6 Monitor Alarms and Descriptions (continued)

LCD	REASON	LED	BEEPS	VIBRATION
	Detector Life Countdown Alarm*	8 slow flashes per minute	8 slow beeps per minute	8 slow vibrations per minute
	Bump Test Due** Note: LCD toggles between BUP & reading.	Emits alternating flashes (left and right) every 5 seconds		
* When the battery life remaining clock displays 0 hours the detector operates for 8 hours before deactivating. ** This applies only when a bump test interval is set.				

Chapter 2

SCOTT SAFETY INTRODUCTION

Chapter Overview

This chapter covers the following topic:

- Monitor Overview and Optional System Products

Monitor Overview and Optional System Products

The Protege ZM is a portable clip-on one (1) gas disposable monitor that is operated with a single button and has a two (2) year life span (typical). Comes with a non-field replaceable lithium-ion battery, filter and sensor already installed and ready for use.

Gas indication displays via a direct reading backlit LCD, multiple bright LEDs, a loud audible alarm and a vibratory alarm. The monitor includes a downloadable data log for twenty-five (25) events and records denoting exposures, calibrations, and gas values.

The personal gas detection monitor is designed for monitoring the atmosphere for potentially hazardous levels of gases. Select from three (3) types: Hydrogen Sulfide (H_2S), Carbon Monoxide (CO) and Oxygen (O_2) enrichment or depletion. Table 7 lists their available options.

Table 7 Available Monitor Options

ITEM	HIBERNATE MODE OPTION	FACTORY DEFAULT ALARM SET POINTS*
Oxygen (O_2)	No	Low=19.5% High=23.5%
Hydrogen Sulfide (H_2S)	Yes	Low=10PPM High=15PPM
Carbon Monoxide (CO)	Yes	Low=35PPM High=200PPM
* Customer may change these set points using the IR Connect after delivery. To display the monitor alarm set points, press the button on the front of the monitor. Also, set points may be ordered with custom values from the factory.		

Caution: *Use caution when changing alarm set points. Confirm these levels with your company safety officer.*

Warning: *Do not use IR communications when an explosive atmosphere may be present.*

Optional products for the monitor include: a Test Station, as well as, an IR Connect, more specifically:

- The Protege ZM Test Station (portable and stationary models) are available for performing automatic Bump Testing and Calibration. It features a USB Pen Drive, IR Communication Ports, Pressure Gage, Power LED, Pass/Fail Test LEDs, four (4) monitor Bump/Calibration Ports, AC/DC Charging Port, Exhaust Port and Gas Bottle Port, and Protege ZM Test Station Software. The USB Pen Drive allows the monitor's data log to be downloaded.The Test Station Software allows accessing event and record logs, and managing Gas Expiration Dates, Gas Bottle Concentrations, Hibernation and other aspects critical to personal monitoring. The Test Stations are intended for indoor use and are supplied fully assembled.

- The Protege IR Connect is available for configuring a single monitor, or multiple monitors in conjunction with the Test Station. It features, a USB Cable, Power and Communication LEDs. It allows you to quickly configure operating and alarm parameters for up to four (4) monitor's housed in the Test Station using the Protege ZM IR Connect Software.

The monitor ships preconfigured and ready for operation using the factory default settings. However, you my want to reconfigure some of the parameters based upon your application. See "Configuring the IR Connect Software Parameters" on page 28.

If you have any questions about the monitor or its operation contact Scott Safety. See "Technical Service" on page 86.

Figure 1 shows the major parts of the monitor.

Figure 1 Major Parts of the Monitor

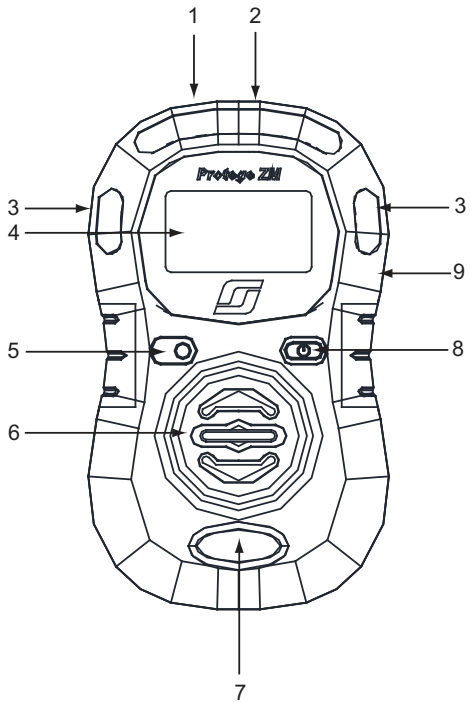


Table 8 lists the major parts of the monitor.

Table 8 Major Parts of the Monitor

REFERENCE NUMBER	ITEM
1	LED alarm (top)
2	IR Interface Port (back)
3	LED alarms (2, side)
4	LCD
5	Audible Alarm Port
6	Gas Inlet Port
7	Gas Label

Table 8 Major Parts of the Monitor (continued)

REFERENCE NUMBER	ITEM
8	Operation Button
9	Alligator Clip (back)

Figure 2 shows the major parts of the Test Station.

Figure 2 Major Parts of the Test Station

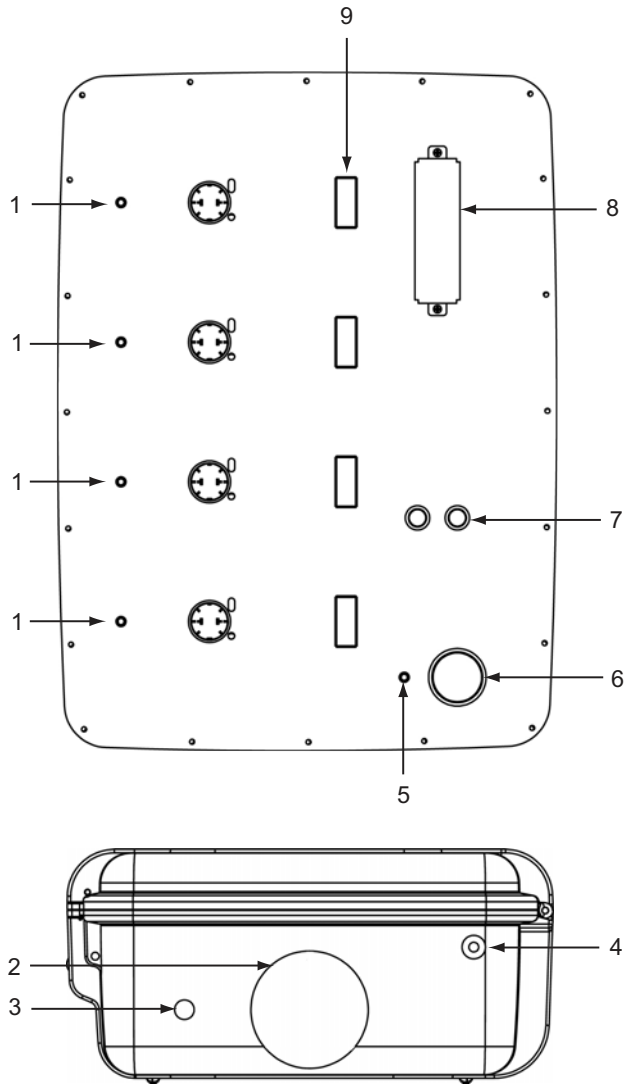


Table 9 lists the major parts of the Test Station.

Table 9 Major Parts of the Test Station

REFERENCE NUMBER	PORTABLE TEST STATION	STATIONARY TEST STATION
1	Test LEDs (Unit 1 - Unit 4)	Same location
2	Calibration Gas Bottle (Intake)	Intake Port located on back panel
3	Exhaust Vent	Located on the back panel
4	AC/DC Charger Port	Located on the back panel
5	Power LED	Same location
6	Pressure Gage	Not Applicable
7	Bump Test and Calibration Buttons	Same location
8	USB Pen Drive and its Metal Cover	Same location
9	IR Communication Ports (1 - 4)	Same location

Figure 3 shows the major parts of the IR Connect.

Figure 3 Major Parts of the IR Connect

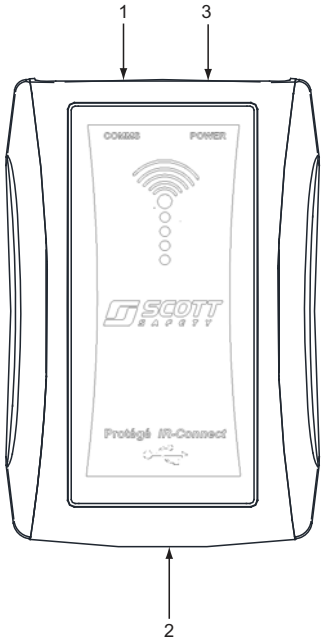


Table 10 lists the major parts of the IR Connect.

Table 10 Major Parts of the IR Connect

REFERENCE NUMBER	ITEM
1	IR Communications LED (front)
2	USB Cable Port
3	Power LED (front)

Chapter 3

SCOTT SAFETY INSTALLATION

Chapter Overview

This chapter covers the following topics:

Planning for Installation

This section provides the pre-installation items.

Verifying Items Shipped

This section provides a list of the items that typically ship with the monitor. Ensure you have all items, if not See “Technical Service” on page 86.

- With monitor:
  - The Monitor
  - Calibration Adapter
  - Protege ZM Gas Detector CD
  - Alligator Belt Clip
- With IR Connect:
  - IR Connect
  - USB cable
  - Protege ZM Gas Detector CD
- With Test Station:
  - Installed USB Pen Drive (under metal cover)
  - AC Power Adapter
  - International Plug Kit for AC Power Adapter
  - Protege ZM Gas Detector CD

Supported Operating Systems

This section describes the Operating Systems that support both the IR Connect and Test Station Software.

- Microsoft Windows® XP
- Microsoft Windows® Vista
- Microsoft Windows® 7

Downloading Software

This section describes how to obtain software.

- IR Connect Software is a Graphical User Interface (GUI) that enables you to modify the monitor’s parameters, upgrade Firmware, and activate Hibernate Mode (if applicable).
- Test Station Software is a GUI that enable you to modify the Test Station’s parameters (to configure multiple monitors), retrieve test logs and upgrade Firmware.

The Test Station requires the installation of .NET Framework, Version=v4.0 (or higher) software.

Both the IR Connect and Test Station Software can be downloaded from our Web site:

- https://www.scottsafety.com/en/us/Pages/Softwaredownloads.aspx

Download the IR Connect Software and Test Station Software from our web site. Click SAVE on the File Download Dialog Box. Next, click SAVE on the Save As Dialog Box, once location is determined. Next, click OPEN FOLDER on Download Complete Dialog Box once download complete. Next, Open the .zip file. Next, Extract both the setup.exe and setup.msi files to the desired location.

Download the applicable software: for the IR Connect (IRConnect_vXXXX.exe format), for the Test Station (SetupScottSafetyTest Station_vX.X.XX.msi format).

Only one setup file will be installed, based upon your needs. Consult with your IT Administrator.

Updates to the IR Connect and Test Station Software are typically posted to our Web site.

The .NET Framework, Version=v4.0 (or higher) software can be downloaded from this Web site:

- http://msdn.microsoft.com/en-us/netframework/default

Navigate to applicable Web site. Click on DOWNLOAD. The File Download DIalog Box appears. Click Save. The Save As Dialog Box appears. Click SAVE. Next, click OPEN FOLDER on Download Complete Dialog Box once download is complete.

Versions of the IR Connect and Test Station Software are included on the CD. You can check our web site to compare your software version to those posted.

Downloading Firmware

This section describes how to obtain updates to the monitor and test station firmware, when required.

IR Connect and Test Station Firmware upgrades occur during the lifetime of the products. These may be product improvements to add features or to enhance their performance. You can check our web site to compare your firmware version to those posted to see if your product has the most current version.

The same firmware is used on all monitors (with or without Hibernate Mode).

Updates to the IR Connect and Test Station Firmware can be downloaded from our Web site:

- https://www.scottsafety.com/en/us/Pages/Softwaredownloads.aspx

Updates to the IR Connect's and Test Station's Firmware are typically posted to our Web site.

Download the applicable firmware: for the IR Connect (Pro_ZM_vX.X.img format), for the Test Station (TS-ProZM_vX.X.X.img format).

Installation Checklist

This section provides the installation requirements. Table 11 lists the individual items.

Table 11 Installation Checklist

ITEM	DETAILS
.NET Framework for Test Station (If prompted)	See “Installing .NET Framework Software” on page 14.
IR Connect Software and IR Connect	See “Installing the IR Connect Software” on page 16.
Test Station Software and Test Station	See “Installing the Test Station Software” on page 20.

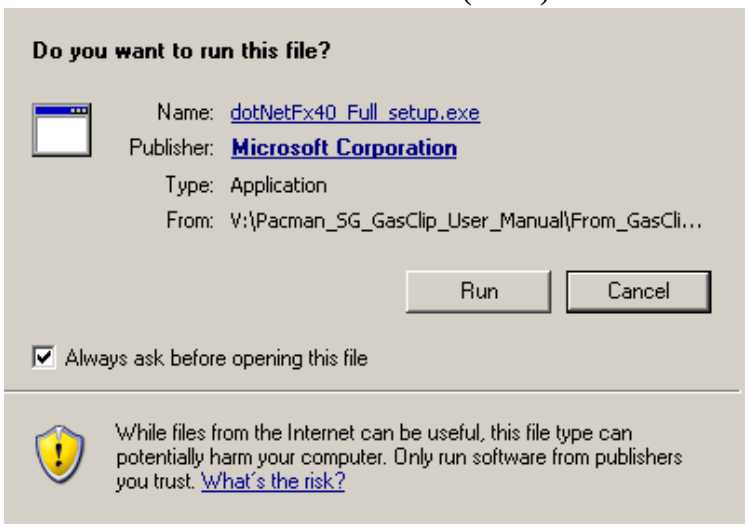
Installing .NET Framework Software

This section describes the installation of the .NET Framework Software, if prompted.

.NET Framework, Version=v4.0 must be installed to use the Test Station Software, and it should be installed first. If not, a prompt appears. However, it may already be installed and this procedure may not be necessary.

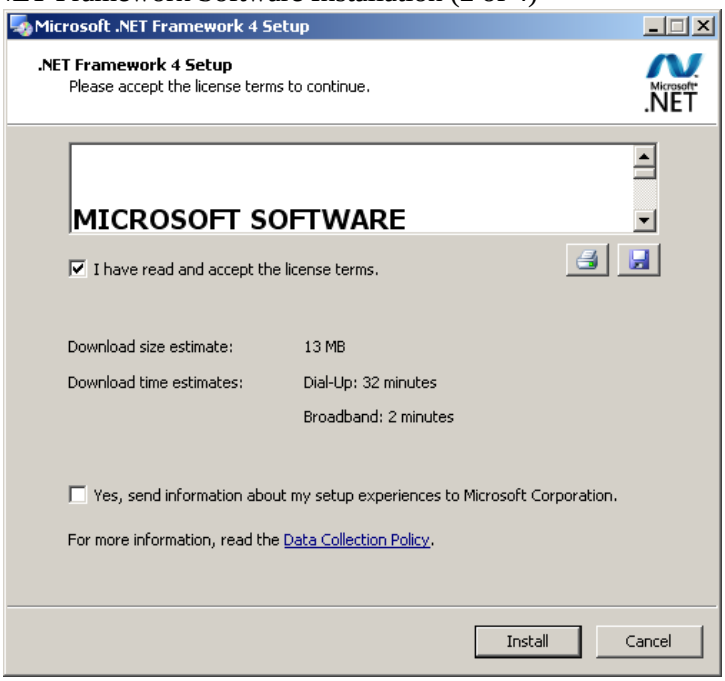
1 Navigate to and double click on the applicable dotNetFx40stup.exe file. The Open File Dialog Box appears. Click Run. See Figure 4.

Figure 4 .NET Framework Software Installation (1 of 4)



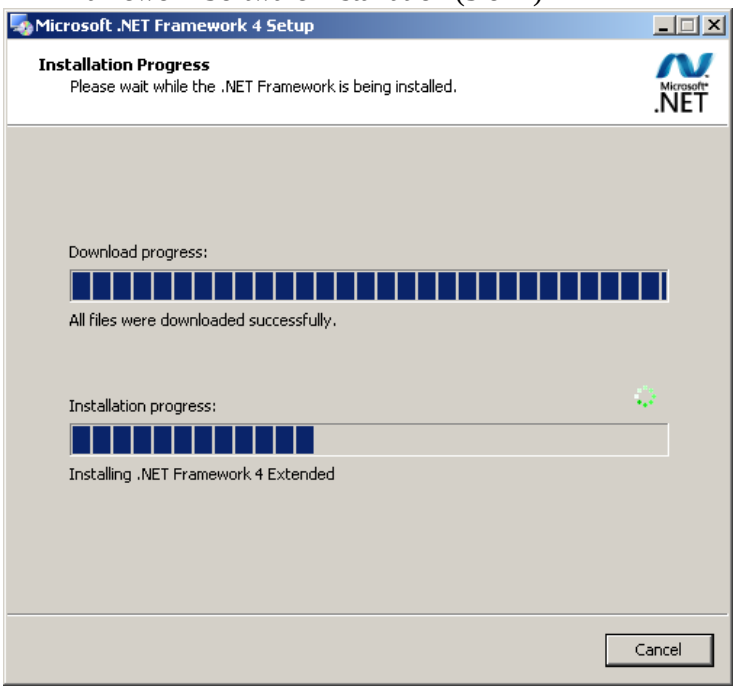
2 The .NET Framework 4 Setup Dialog Box appears. Read and accept the license terms. Click INSTALL. See Figure 5.

Figure 5 .NET Framework Software Installation (2 of 4)



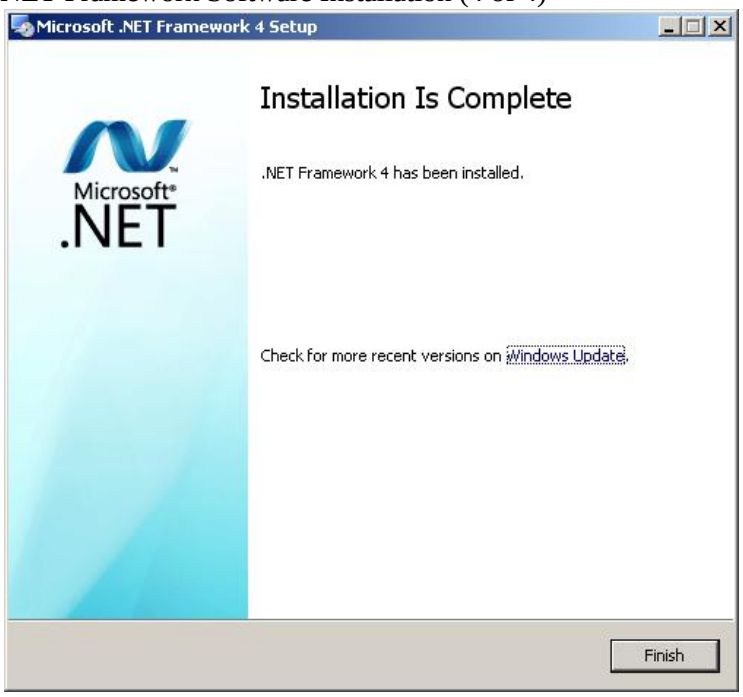
3 The Installation Progress Dialog Box appears. See Figure 6.

Figure 6 .NET Framework Software Installation (3 of 4)



4 The Installation is Complete Dialog Box appears. Click FINISH. See Figure 7.

Figure 7 .NET Framework Software Installation (4 of 4)



5 Double click on the Test Station desktop Shortcut to launch the application.

Installing the IR Connect Software

This section describes the installation of the IR Connect Software.

The IR Connect Software enables you to:

- Set monitor parameters
- Upgrade the Firmware on the monitor
- Place monitor in Hibernate mode (for applicable devices)

PC System Requirements:

- USB port with up-to-date drivers installed
- Operating System (OS) as noted. See “Supported Operating Systems” on page 12.

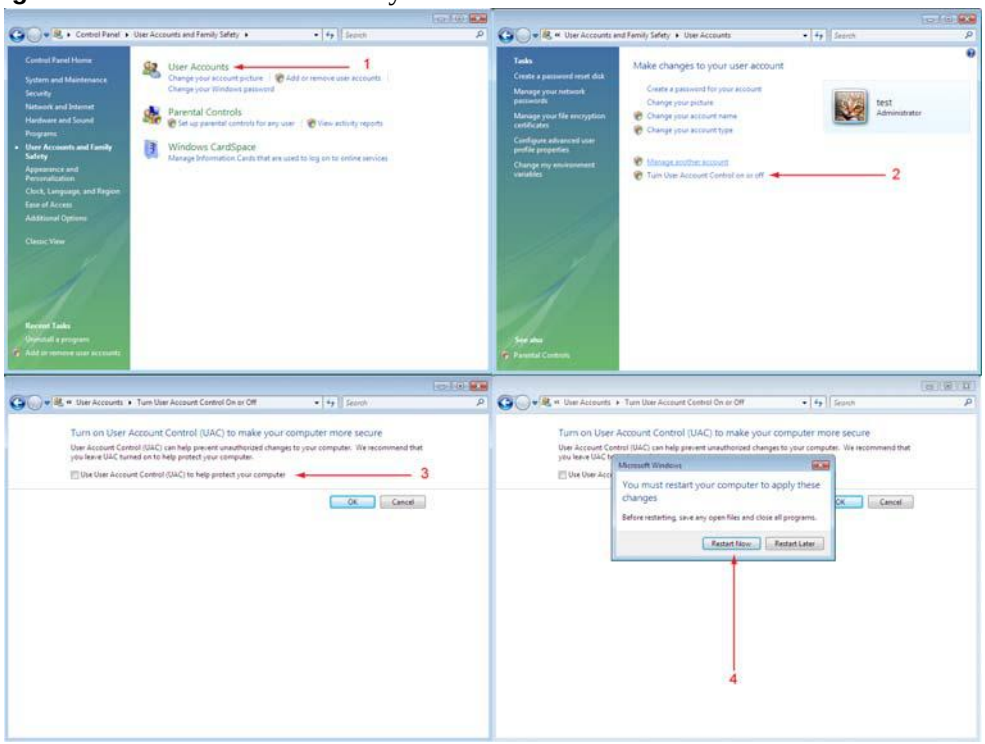
For Windows Vista, perform step 2 *prior to beginning installation. For Windows 7 proceed to* step 3*. For Windows XP proceed to* step 4*.*

1 Prior to installing a higher version of the software, ensure the lower version is removed. To remove lower version, select Start > Control Panel > Add or Remove Programs > Scott Safety IR Connect Un-install > Remove.

2 For Windows Vista OS, navigate to USER ACCOUNTS AND FAMILY SAFETY using the control panel and proceed to remove USER ACCOUNT CONTROL (UAC). The check box must be unchecked for UAC. Restart the PC as necessary. See Figure 8.

3 For Windows 7 OS, navigate to SYSTEM AND SECURITY using the control panel and select CHANGE USER ACCOUNT CONTROL SETTINGS. Move the Selector to the NEVER NOTIFY (lowest level position). Then hit the OK button and next reboot your PC.

Figure 8 Windows Vista OS Only



4 Download the IR Connect Software from our web site. Click SAVE on the File Download Dialog Box. Next, click SAVE on the Save As Dialog Box, once location is determined. Next, click OPEN FOLDER on Download Complete Dialog Box once download complete. Next, Open the .zip file. Next, Extract the .exe file to the desired location.

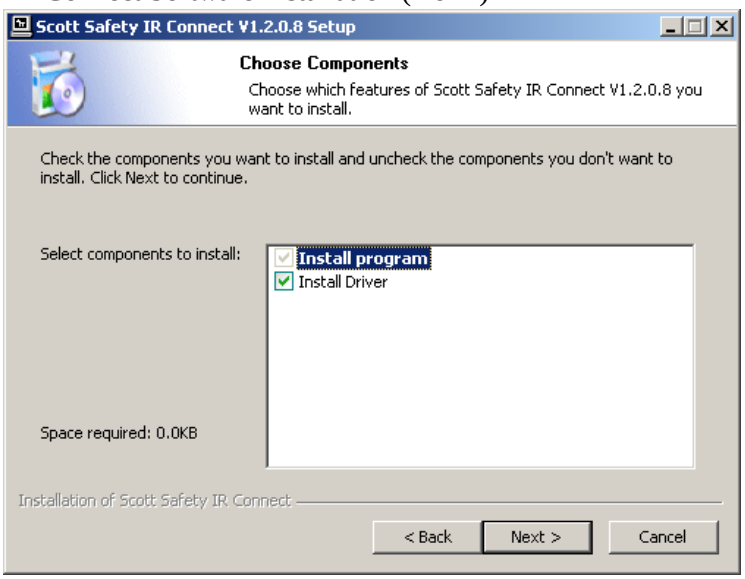
5 After downloading the IR Connect Software, navigate to the “IRConnect_vXXXX.exe” file on the PC and double click it to start the installation procedure.

6 When prompted, click NEXT to proceed with installation. See Figure 9.

Figure 9 IR Connect Software Installation (1 of 4)

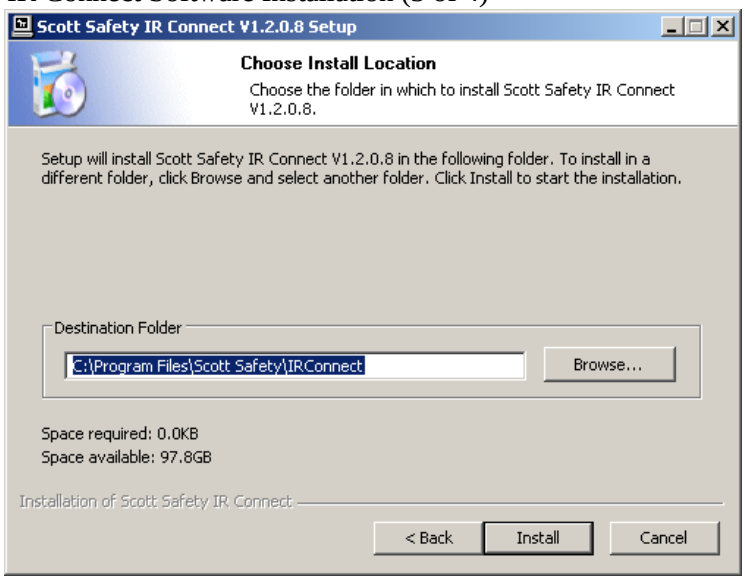
7 When prompted, select components to install. See Figure 10.

Figure 10 IR Connect Software Installation (2 of 4)



8 If desired, select a custom location to install the IR Connect Software or use the default location. Click INSTALL to proceed. See Figure 11.

Figure 11 IR Connect Software Installation (3 of 4)

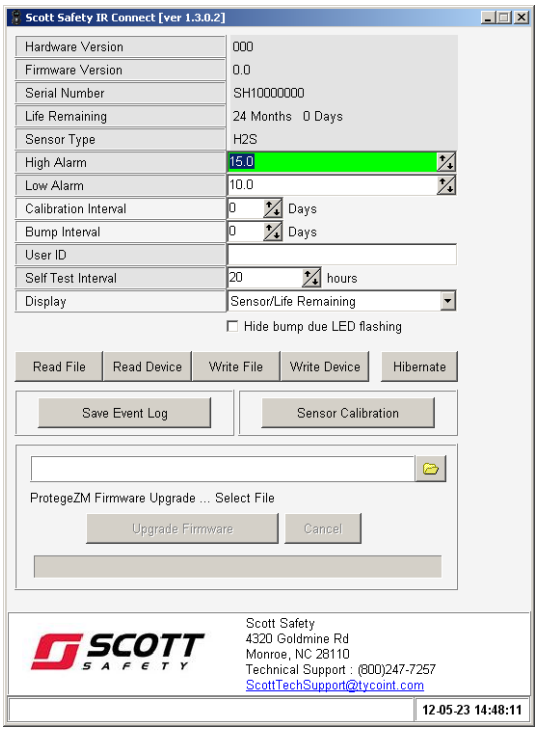


9 When prompted, click FINISH to complete the installation. See Figure 12.

Figure 12 IR Connect Software Installation (4 of 4)

10 Figure 13 shows the screen once you have successfully installed the software and clicked on the IR Connect Software icon.

Figure 13 IR Connect Software Successful Installation



Installing the Test Station Software

This section describes the installation of the Test Station Software.

The Test Station Software enables you to:

- Set Test Station parameters (used to configure multiple monitors placed in the Test Station)
- Upgrade the Firmware on the monitors (placed in the Test Station)
- Retrieve Monitor Event Logs
- Retrieve Test Logs

PC System Requirements:

- USB port with up-to-date drivers installed
- Operating System (OS) as noted. See “Supported Operating Systems” on page 12.

.NET Framework Software must be installed to install the Test Station Software. Please use Windows Update to check for any critical updates to the .NET Framework.

The Test Station Software may be used with either the Test Station or the USB Pen Drive.

Depending on your needs, select either the setup.exe or setup.msi file. Consult with your IT Administrator.

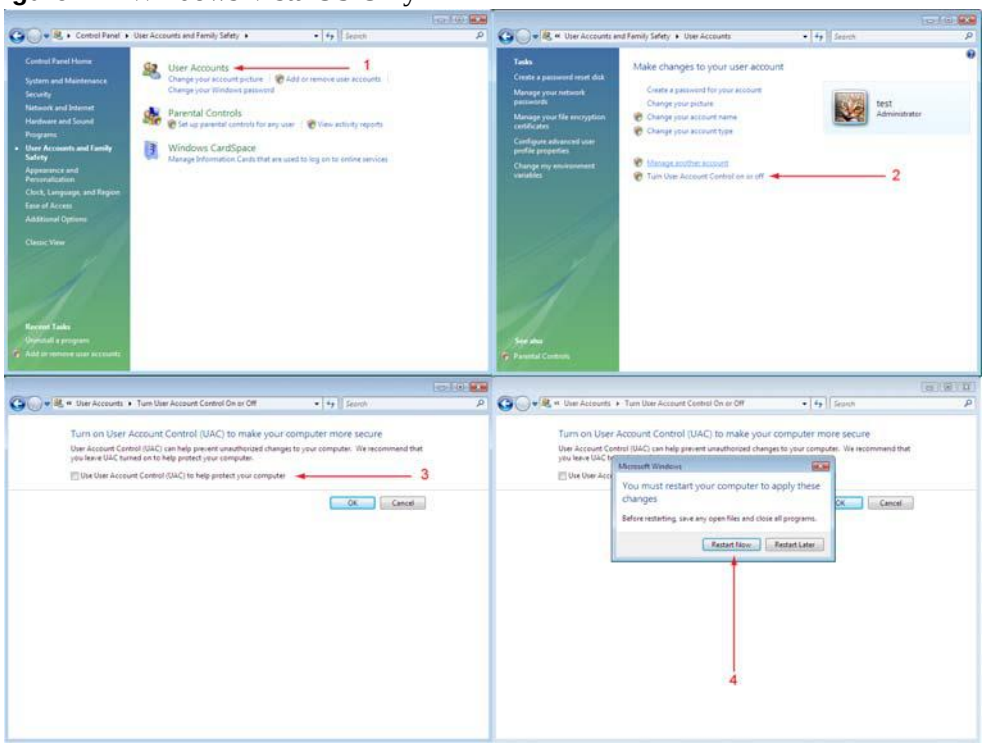
For Windows Vista, perform step 2 prior to beginning installation. For Windows 7 proceed to step 3. For Windows XP proceed to step 4.

1 Prior to installing a higher version of the software, ensure the lower version is removed. To remove lower version, select Start > Control Panel > Add or Remove Programs > Scott Safety Test Station Un-install > Remove.

2 For Windows Vista OS, navigate to USER ACCOUNTS AND FAMILY SAFETY using the control panel and proceed to remove USER ACCOUNT CONTROL (UAC). The check box must be unchecked for UAC. Restart the PC as necessary. See Figure 14.

3 For Windows 7 OS, navigate to USER ACCOUNTS using the control panel and select CHANGE USER ACCOUNT CONTROL SETTINGS. Move the Selector to the NEVER NOTIFY (lowest level position). Then hit the OK button and next reboot your PC.

Figure 14 Windows Vista OS Only

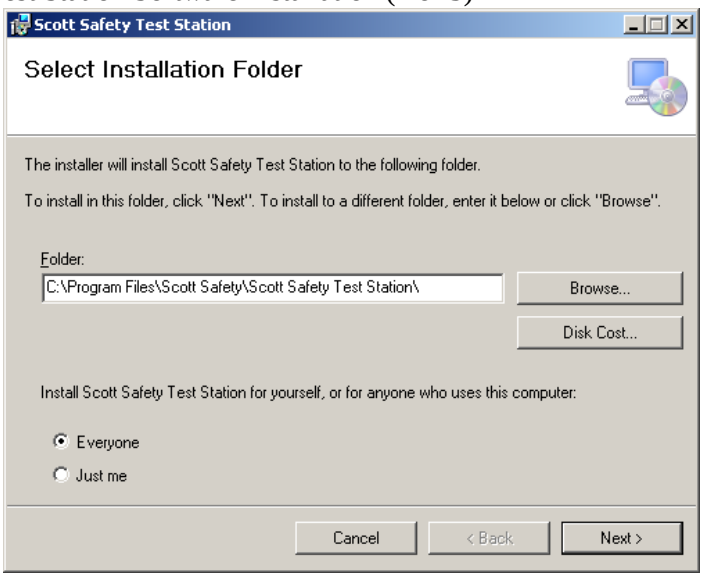


4 Download the Test Station Software from our web site. Click SAVE on the File Download Dialog Box. Next, click SAVE on the Save As Dialog Box, once location is determined. Next, click OPEN FOLDER on Download Complete Dialog Box once download complete. Next, Open the .zip file. Next, Extract the .exe file to the desired location.

5 Navigate to and double click on the setup.msi file. The Select Installation Folder Dialog Box appears. Either accept default location or browse to custom location. Then, click NEXT. See Figure 15.

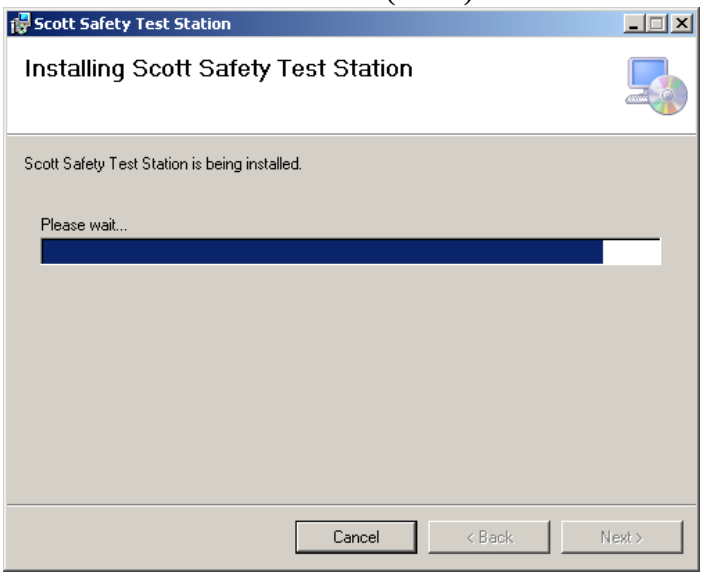
The "Just me" option prevents running the application in a Shared PC situation by another user.

Figure 15 Test Station Software Installation (1 of 3)



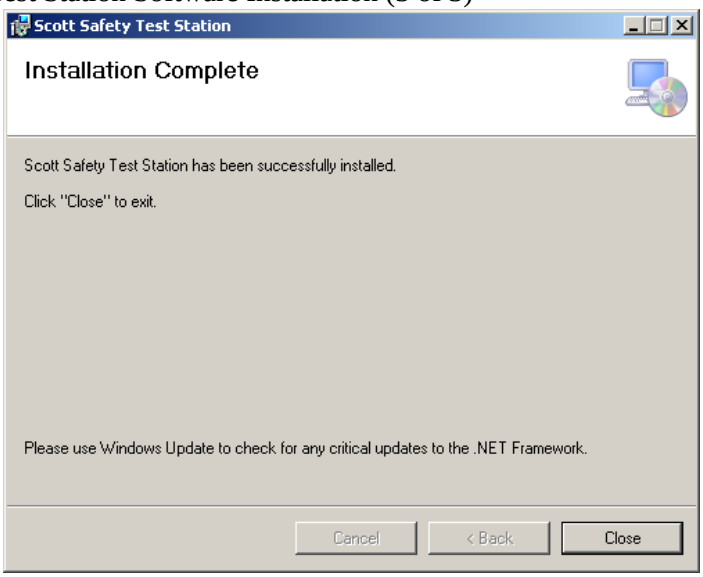
6 The Installing Test Station Dialog Box appears showing progress. See Figure 16.

Figure 16 Test Station Software Installation (2 of 3)



7 The Installation Complete Dialog Box appears. Click CLOSE. See Figure 17.

Figure 17 Test Station Software Installation (3 of 3)



8 Double click on the Test Station desktop Shortcut to launch the application.

Chapter 4

CONFIGURATION AND SETUP

Chapter Overview

This chapter covers the following topic:

Connecting the Monitor to a PC

This section describes connecting the monitor to a PC.

The purpose of this hardware configuration is to configure one monitor at a time.

Required items:

This assumes you have already installed the IR Connect Software.

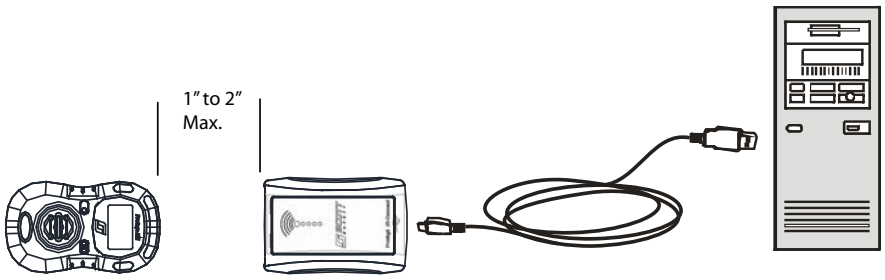
- The monitor
- The IR Connect and its USB Cable
- A PC
- IR Connect Software installed

1 Plug the USB Cable into the PC USB port and the other end into the IR Connect.

2 With the monitor powered on, place it face up or face down, within 1” to 2” in front of the IR Connect. Ensure the two IR ports have a direct line of sight. See Figure 18.

When face down, ensure monitor is level, or it will not be able to communicate with the IR Connect. When face up, check for the Infrared Data Transfer Icon to appear. This confirms communication between the monitor and the IR Connect.

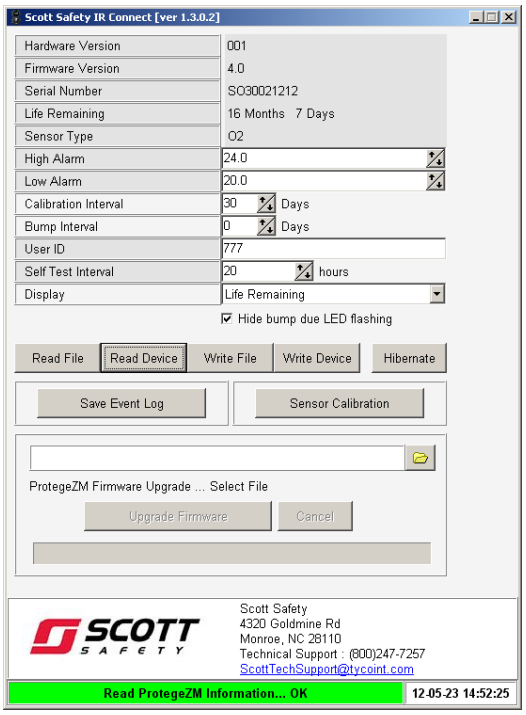
Figure 18 Connecting the IR Connect to a PC



3 Click on the IR Connect Software icon on the desktop. The monitor is ready for a READ DEVICE command.

4 Then click READ DEVICE. If the read was successful, a Green Bar at the bottom of the screen appears. See Figure 19.

Figure 19 IR Connect Software Successful Read Device



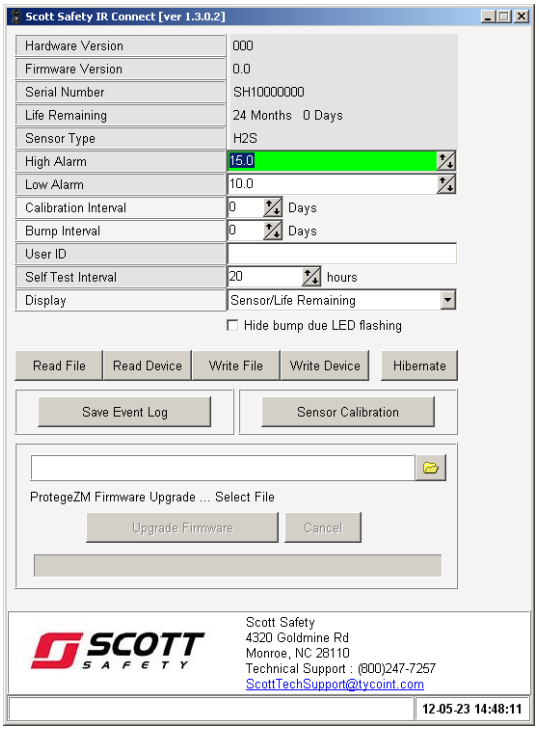
After communications are established between the IR Connect and the Monitor, the parameters my be configured and a WRITE DEVICE performed. See “Configuring the IR Connect Software Parameters” on page 28.

Configuring the IR Connect Software Parameters

This section describes configuring the IR Connect Software parameters.

The various parameters are shown in Figure 20 (after installed and confirmed communications between the IR Connect and the Monitor per a READ DEVICE performed during installation) and detailed in Table 12. These parameters allow you to program the individual Monitor to met your needs.

Figure 20 IR Connect Software After Installed



Warning: *After making changes to High/Low Alarm parameters and performing a WRITE DEVICE command, perform a READ DEVICE command to verify changes. This ensures desired changes have been stored in memory. Over range WRITES are not stored in memory. Failure to follow these instructions may result in serious injury or death.*

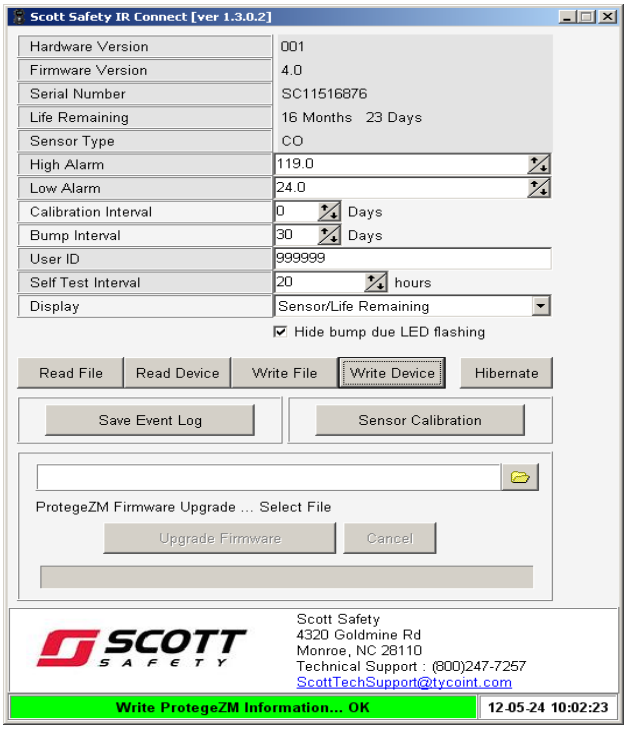
Table 12 IR Connect Software Parameters

ITEM	DETAILS
High Alarm/Low Alarm Set Points	Allows adjusting the low/high alarm set point from the factory defaults. • For H_2S: Default low/high =10/15PPM Range =1 to 100 PPM • For CO: Default low/high =35/200PPM Range =1 to 300PPM • For O_2: Default low/high=19.5/23.5% Volume Range=1 to 30% Volume Note: Ensure the set alarm limits do not exceed the local or site guidelines. Some sites may have different set points than others.
Calibration Interval	Displays the following values based on the monitor's type: • For H_2S: Default =0days • For CO: Default =0days • For O_2: Default =30days Note: The O_2 monitor factory default Calibration Interval is set to 30days. Thus, every 30 days, the monitor displays a flashing CAL screen, indicating the monitor needs Calibrating.
Bump Interval	Setting a value automatically displays "BUP" on the monitor's LCD when the monitor has not been Bump Tested within the time frame and remains until cleared. This option aids in bump test accountability. Default=0 days Range=0 to 365 days For details on clearing this parameter, See "Clearing a Bump Test Interval Alarm Alert" on page 61.
User ID	Allows entering up to six (6) characters to identify each individual device. Displays in two screens when all 6 characters are used. Note: Tab down to this field to select prior to entering ID.Otherwise field will not accept entry. Also, some alphabetic characters do not display well on the segmented display.
Self-Test Interval	Allows adjustments to this item. Default=20hours Range=6 to 24hours
Display	Sets detector display; Sensor/Life Remaining, Sensor Reading, or Life Remaining. Sensor/Life Remaining mode shows life remaining instead of zero. When it's not reading zero, then it shows the gas reading. Default= Sensor/Life Remaining
Hide Bump Due LED Flashing	When checked, disables the monitor's LEDs from flashing when due for a Bump Test. When unchecked, the monitor's LEDs flash when due for a Bump Test. Default= Unchecked

Changed parameters appear in Green prior to WRITE DEVICE execution.

After making changes, click on WRITE DEVICE. If a successful write, a Green Bar appears at the bottom. See Figure 21.

Figure 21 IR Connect Software Successful Write Device



Warning: *After making changes to High/Low Alarm parameters and performing a WRITE DEVICE command, perform a READ DEVICE command to verify changes. This ensures desired changes have been stored in memory. Over range WRITES are not stored in memory. Failure to follow these instructions may result in serious injury or death.*

Writing and Reading Files

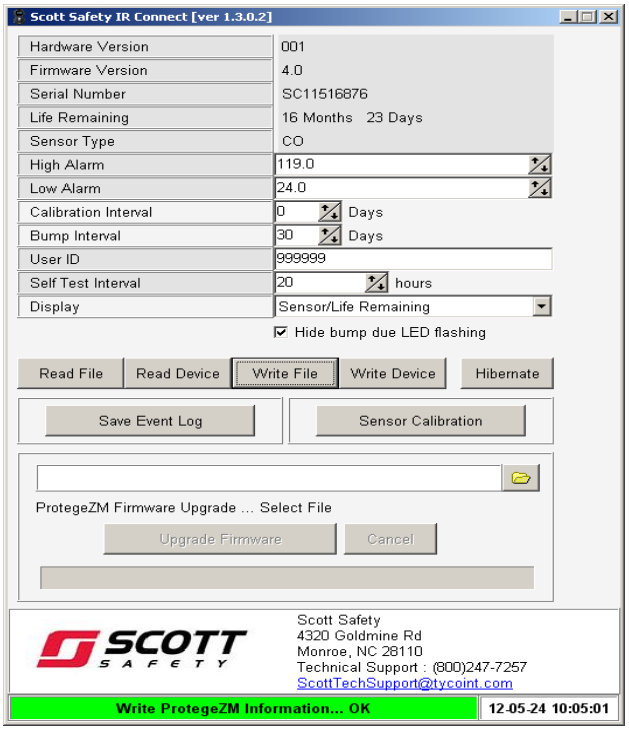
This section describes writing and reading file functions using the IR Connect Software.

These functions are used when you want to save a particular configuration (WRITE FILE) or load a particular saved configuration (READ FILE).

These commands (WRITE and READ FILE) are made to a PC, not to a Monitor.

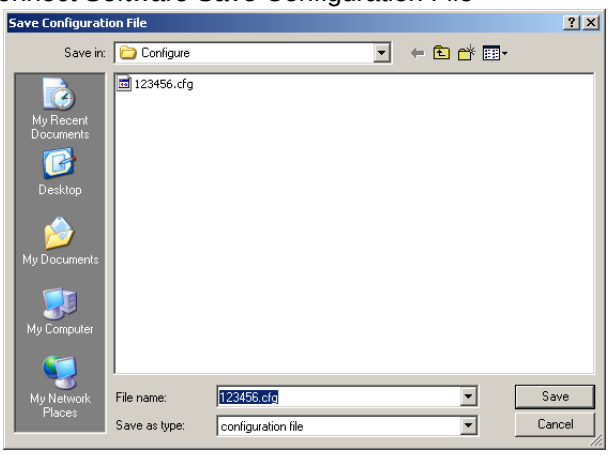
1 Click WRITE FILE to save a particular configuration. See Figure 22.

Figure 22 IR Connect Software Write File



2 Next, the Save Configuration Dialog Box appears. Enter file name and click SAVE. See Figure 23.

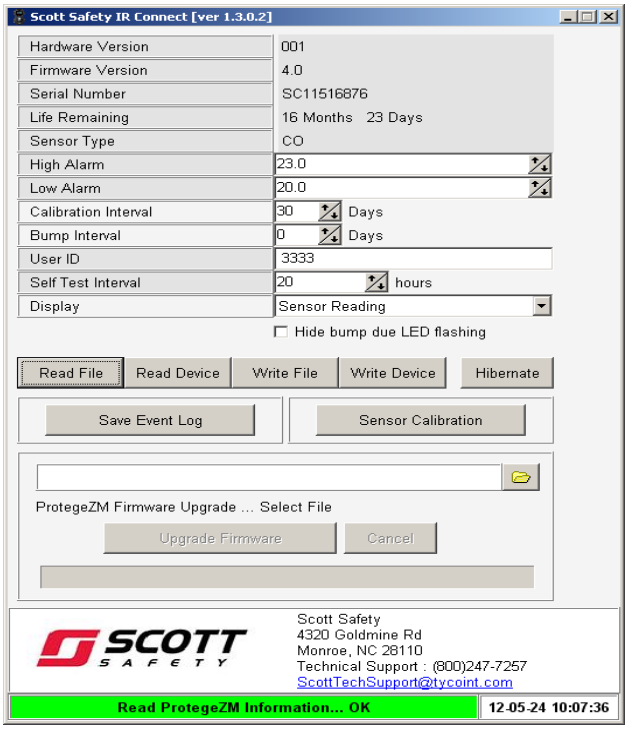
Figure 23 IR Connect Software Save Configuration File



3 This writes (saves) the shown configuration parameters to a PC, not to a Monitor. These configuration parameters may be loaded by performing a READ FILE function.

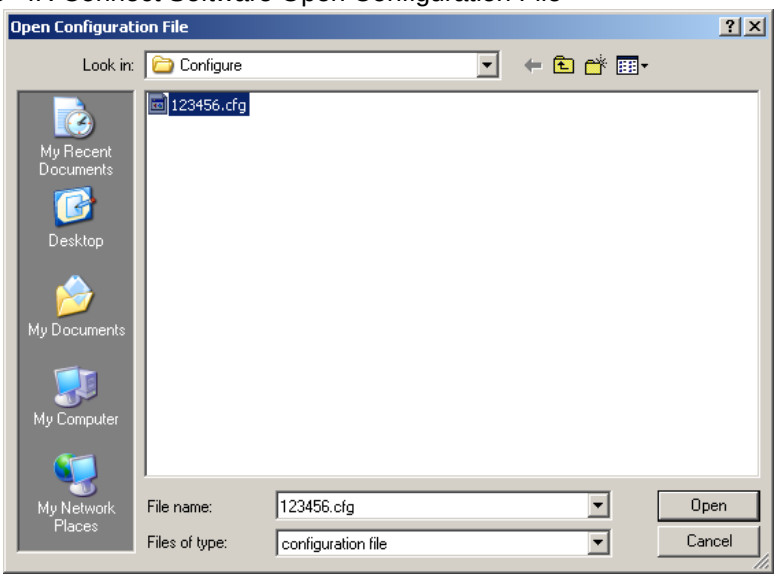
4 Click READ FILE to load a particular configuration. See Figure 24.

Figure 24 IR Connect Software Read File



5 Next, the Open Configuration Dialog Box appears. Click on the previously saved (WRITE FILE) name and click OPEN. See Figure 25.

Figure 25 IR Connect Software Open Configuration File



6 This reads (loads) the particular configuration parameters that were saved to memory for that Monitor.

Connecting the IR Connect to the Test Station

This section describes connecting the IR Connect to the Test Station to use the Test Station Software.

The purpose of this hardware configuration is to configure multiple monitors at a time.

Required items:

This assumes you have already installed the Test Station Software.

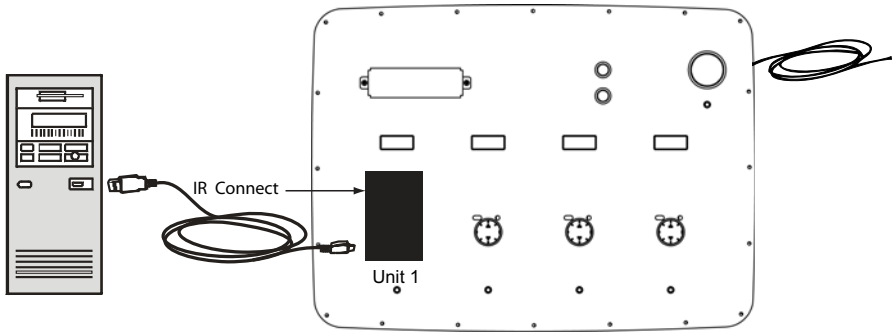
- The IR Connect and its USB Cable
- A PC
- Test Station with AC Power Adapter

1 Plug the USB Cable into the PC's USB port and the other end into the IR Connect.

2 Place the IR Connect in the left most slot labeled "Unit 1" of the Test Station. Ensure the two IR ports are facing each other and square. See Figure 26.

The IR Connect only operates in the "Unit 1" slot.

Figure 26 Connecting the IR Connect to a PC & the Test Station



3 To power on the Test Station, press the Bump Test Button.

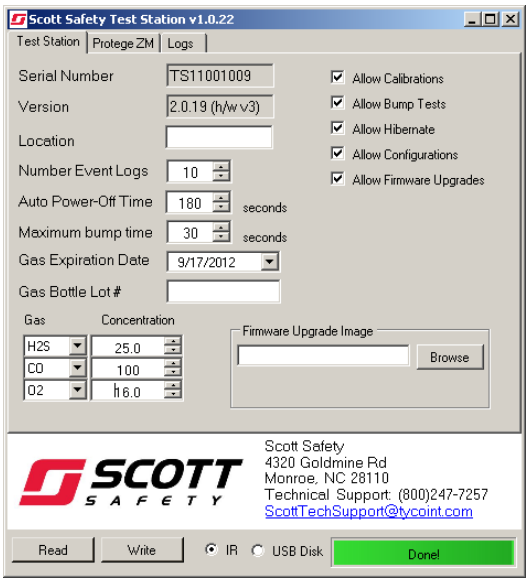
4 Ensure the Test Station powers up properly. The Power LED lites Green - Red and then Green. The Unit1 to Unit4 LEDs lites Orange - Red and then Off. If the AC Adapter is used and battery is charging, then the 4 Unit LEDs lite in sequence from left to right.

The Test Station is equipped with an automatic power shut off after sitting idle for 120 seconds. Power LED lites Green while On. This parameter is configurable.

5 Open the Test Station Software that was already installed.

6 After proper IR Connect placement, ensure IR is selected and click READ. A successful connection results in a green bar in the lower right hand corner and the Unit 1 LED flashes Green. See Figure 27.

Figure 27 Test Station Software Read



Configuring the Test Station Software Parameters

This section describes configurating the Test Station Software parameters.

The Test Station Software consists of the following three (3) Tabs:

- Test Station — Allows changes to Test Station parameters
- Protege ZM — Allows various changes to each sensor type. Once this configuration has been sent to the Test Station, every monitor that is Bump Tested or Calibrated takes on these new configuration parameters.
- Logs — Allows retrieving Test Records, Event Logs and Inventory Files. See "Maintenance" on page 55.

Warning: *Parameter changes written to the Test Station over ride those Monitor parameters when Monitors are Bumped or Calibrated. Failure to follow these instructions may result in serious injury or death.*

When the Test Station reads a configuration file, it uses those settings until it shuts down or until a new configuration file is inserted. If the Test Station is powered and then the USEB Pen Drive is removed, it continues to use those settings. When the Test Station is turned off and on again with no USB Pen Drive installed, then the Test Station starts using the firmware defaults.

Figure 28 shows the Test Station Tab screen and Table 13 details the parameters. These parameters allow you to program the Test Station to met your needs.

Figure 28 Test Station Software Read

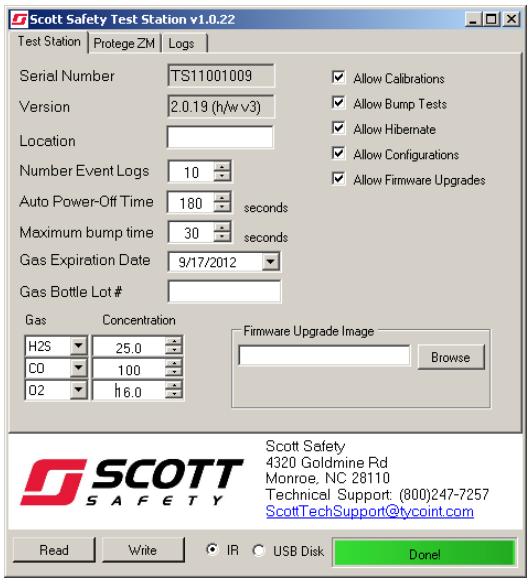


Table 13 Test Station Software Parameters

ITEM	DETAILS
Location	User adjustable text field that is logged with each test. Used to assign a unique name to the Test Station. This appears on the test log file. For example, “Tailer 57 Test Station”.
Number Event Logs	Specifies the number of consecutive monitor event logs to store and to transfer from monitor to Test Station. Default= 10 Range= 0 to 500
Auto Power-Off Time	After performing a test, the Test Station powers off after 120 seconds. To change, select from the other options. Default=120seconds Range=0 to 3600seconds.
Maximum Bump Time	Maximum time to apply gas if a sensor isn’t responding. Default=30seconds Range=20 to 80seconds.
Gas Bottle Fields	Note: Verify the entries and make sure they match the gas bottles in use. If gas bottles and the mixture change, update the gas concentrations in these boxes or the tests will be inaccurate. Allows entering information pertaining to the calibration gas. Expiration Date and Bottle Lot# appear on each test record. If the expiration date is set to today’s date, that field remains blank on the test record. Note: Changing any of the Testing Check Boxes may disable key testing functions. Note: Click on the arrow to access the pull-down calendar and select a specific date. Note: Update expiration date, bottle lot and mixture data each time a new bottle of Calibration Gas is inserted into the Test Station.
Firmware Upgrade	Allows Firmware upgrades during the life of the Test Station. These may be product improvements to add additional features or to enhance monitors performance. Most firmware upgrades are not required unless notified by us. To see if your monitor has the most current version, please contact us.
Allow Calibrations	Can optionally enable/disable calibrations form the Test Station.
Allow Bump Tests	Can optionally enable/disable bump test form the Test Station.
Allow Hibernate	Can optionally enable/disable 2 button press to hibernate CO and H_2S monitors.
Allow Configurations	Can optionally enable/disable re-configuring the monitors.
Allow Firmware Upgrade	Can optionally allow Monitor firmware upgrades to the image stored on the Test Station.

After configuration changes, click WRITE. If a successful write, a Green Bar appears in the bottom right hand corner of the screen.

Figure 29 shows the Protege ZM Tab and Table 14 details the parameters. These parameters allow you to configure each sensor type to met your needs. Once this configuration has been sent to the Test Station, every monitor that is Bump Tested takes on these new configuration parameters.

Warning: *Avoid setting the High Alarm parameter to a value that is lower than the Low Alarm parameter or vise vera. Also, avoid setting either or both High and Low Alarms parameters to zero. Failure to follow these instructions may result in serious injury or death.*

Figure 29 Test Station Software Protege ZM Tab Screen

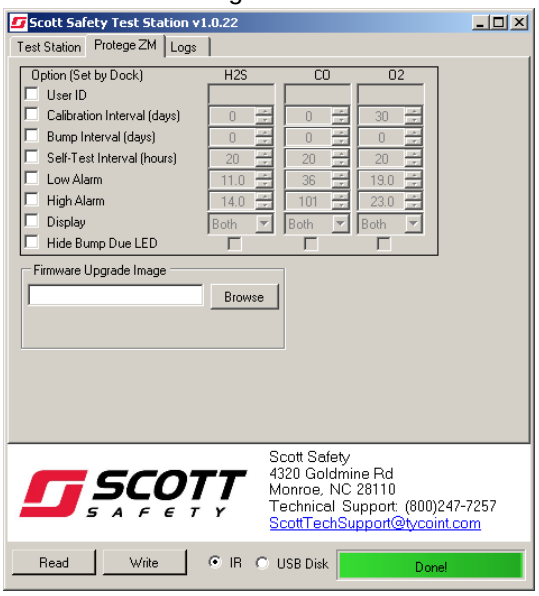


Table 14 Test Station Protege ZM Tab Parameters

ITEM	DETAILS
User ID	Used to assign a unique electronic user ID. Range= Up to 6 characters. Note: Tab down to this field to select prior to entering ID. Otherwise field will not accept entry. Also, some alphabetic characters do not display well on the segmented display.
Calibration Interval	Sets the time between calibrations
Bump Interval	Setting a value automatically displays BUP on the monitor's LCD when the monitor has not been Bump Tested within the time frame and remains until cleared. This option aids in bump test accountability. Default=0 Range=0 to 365 days. For details on clearing this parameter, See "Clearing a Bump Test Interval Alarm Alert" on page 61.
Self Test Interval	Allows adjusting the self test frequency from the default. Default=20 Range=6 to 24 hours

Table 14 Test Station Protege ZM Tab Parameters (continued)

ITEM	DETAILS
High Alarm/Low Alarm Set Points	Allows adjusting the low/high alarm set point from the factory defaults. • For H_2S: Default low/high =10/15PPM Range =1 to 100 PPM • For CO: Default low/high =35/100PPM Range =1 to 300PPM • For O_2: Default low/high=19.5/23.5% Volume Range=1 to 30% Volume Note: Ensure the set alarm limit do not exceed the local or site guidelines. Some sites may have different set points than others.
Display	Sets detector display; Both, Sensor Reading, or Life Remaining. Both mode shows life remaining instead of zero. When it's not reading zero, then it shows the gas reading. Default= Both
Hide Bump Due LED Flashing	When checked, disables the monitor from flashing when due for a Bump Test. When unchecked, the monitor flashes when due for a Bump Test. Default= Unchecked Note: Ensure all applicable Check Boxes are marked to enable this function. The one to the left and under the applicable Sensor Type.
Firmware Upgrade	Allows Firmware upgrades during the life of the Test Station. These may be product improvements to add additional features or to enhance monitors performance. Most firmware upgrades are not required unless notified by us. To see if your Test Station has the most current version, please contact us. Note: Once new firmware is upgraded to the Test Station, monitors are upgraded before testing. During the upgrade, the Test Station's LEDs remain Orange and Flash. Do not move the monitor during a firmware upgrade.

To make changes to a particular field, update the value and ensure the Check Box on the left hand side is checked.

After configuration changes, click WRITE. If a successful write, a Green Bar appears in the bottom right hand corner of the screen.

Using the USB Pen Drive to Read Default Settings with the Test Station Software

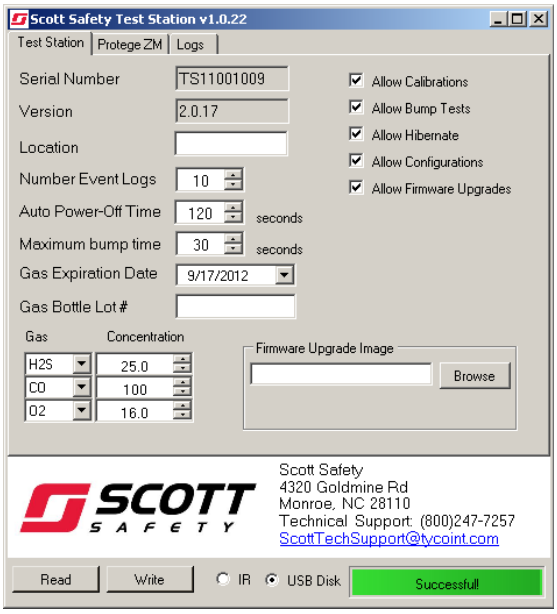
This section describes using the USB Pen Drive with the Test Station Software to READ the defaults.

1 Insert the USB Pen Drive into your PC's USB port. After hardware is found the Drive Dialog Box appears.Close the Drive Dialog Box.

2 Open the Test Station Software.

3 Ensure the USB DISK is selected and click READ. A successful connection results in a Green bar in the lower right hand corner. See Figure 30.

Figure 30 USB Disk Read



4 The defaults are restored for the Test Station, Protege ZM and the Logs.

Using the USB Pen Drive to Write Default Settings with the Test Station Software

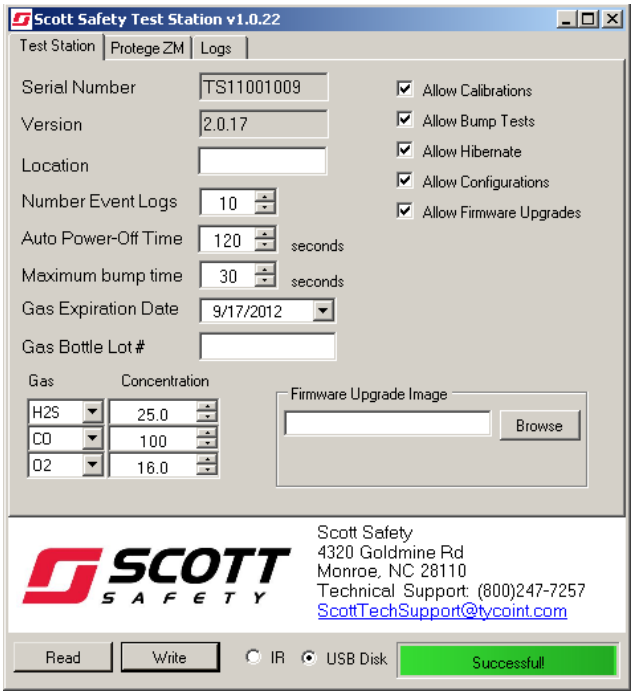
This section describes using the USB Pen Drive with the Test Station Software to WRITE the settings.

1 Insert the USB Pen Drive into your PC's USB port. After hardware is found the Drive Dialog Box appears.Close the Drive Dialog Box.

2 Open the Test Station Software.

3 Ensure the USB DISK is selected and click WRITE. A successful connection results in a Green bar in the lower right hand corner. See Figure 31.

Figure 31 USB Disk Write



4 The settings are written for the Test Station, Protege ZM and the Logs.

Additionally, the USB Pen Drive can be used to access the Event Logs and Test Records directly. This allows remote access and verification of the files. See "Retrieving Event Logs and Test Records Using the USB Pen Drive" on page 61.

Chapter 5

SCOTT SAFETY OPERATION

Chapter Overview

This chapter covers the following topics:

Operating the Monitor

This section describes the operational modes of the monitor.

Warning: *If the monitor fails to respond properly upon start up, or if calibration is out of date, do not use the device until it has been properly calibrated. Failure to do so could result in death or injury. Additionally, when the monitor's LCD is blank and it does not respond it means the two year life has expired.*

The monitor uses a special high viewing angle LCD designed to enhance the screen visibility. In the absence of gas, it displays life remaining in months. In those cases where gas is present, the display automatically shifts to a display that shows the gas concentration value and a battery icon.

To activate the monitor, press and hold down the front button for about five (5) seconds. On activation, the monitor vibrates, flashes and sounds an audible alarm. A successful activation displays the life remaining in months on the LCD as 24 months. See "Powering Up the Monitor" on page 45.

The displayed value (for normal mode) appearing on the monitor's LCD, may be changed using the Display parameter of the IR Connect Software.

Figure 32 shows the LCD items.

Figure 32 Monitor LCD Indicators

Table 15 lists the LCD items and their descriptions.

Warning: *If monitor does not operate in the manner described here, do not use. Tag it out of service. Failure to ensure it is properly operating may result in serious injury or death.*

Warning: *You must familiarize yourself with the icons in both the non-alarm and alarm states.*

Warning: *If the display is missing icons or cannot be clearly read, please contact us.*

Table 15 Monitor LCD Items and Descriptions

REFERENCE NUMBER	DESCRIPTION
1	Alarm Condition Icon
2	Self-Test Status Icon
3	Test Reminder Icon – Display indicates self-test needed
4	Gas Type Icon

Table 15 Monitor LCD Items and Descriptions (continued)

REFERENCE NUMBER	DESCRIPTION
5	Battery Indicator Icon (Used During Real-Time Gas Reading)
6	Instrument Life Remaining or Real Time Gas Reading Data
7	High and Low Alarm Set Point Icons
1/7	Alarm Condition Icons
6/8	Instrument Life Remaining Icons
9	Infrared Data Transfer Icon
10/11	Months/Days/Hours Since Last Maximum Exposure
6/11	Instrument Life Remaining Indicator Data and Icon

Powering Up the Monitor

This section describes the power up sequence.

Warning: *If the monitor does not operate in this fashion, do not use. Tag it out of service. Failure to do so may result in serious injury or death.*

Table 16 details the sequence.

Table 16 Monitor Power-Up Sequence

ACTION	LCD	RESULTS
Press and hold down the button for five (5) seconds.		The monitor starts and runs through a self-test. During the self-test ensure the following: • The monitor emits one audible beep • All LEDs light and monitor vibrates • All LCD display elements appear
	 	After the full element LCD displays, the low alarm and high alarm set points display.
		When a self-test is successful the monitor turns to the original screen showing Months with Clock icon and displays a CHECK MARK and one short audible beep sounds.

Monitor LCD Alerts & Alarms

This section describes various alerts and alarms.Table 17 lists the details.

Table 17 Monitor Alerts and Alarms Descriptions

LCD	REASON	LED	BEEPS	VIBRATION
	Low Alarm	1 slow flash every second	1 slow beep every second	1 slow vibration every second
	High Alarm and Over Limit (OL) Alarm	2 fast flashes every second	2 fast beeps every second	2 fast vibrations every second
	Detector Life Countdown Alarm*	8 slow flashes per minute	8 slow beeps per minute	8 slow vibrations per minute
	Bump Test Due** Note: LCD toggles between BUP & reading.	Emits alternating flashes (left and right) every 5 seconds		
* When the Monitor remaining clock displays 0 hours the detector operates for 8 hours before deactivating. ** This applies only when a bump test interval is set.				

Hibernating the Monitor Using the IR Connect

This section describes hibernating the monitor using the IR Connect and the IR Connect Software. This only applies to specific devices designed for hibernating.

This assumes the IR Connect Software is already installed.

1 Ensure the IR Connect USB Cable is connected.

2 Click READ DEVICE on the IR Connect Software.

When the Device is hibernated, the event log is cleared. It is highly recommended to save the event log by clicking SAVE EVENT LOG before hibernating.

3 Click HIBERNATE, acknowledge the event log message.

4 Ensure the monitor is kept in front of the IR Connect until the “Hibernate OK” message is displayed at the bottom of the IR Connect Software.

5 Confirm the Monitor’s LCD is blank.

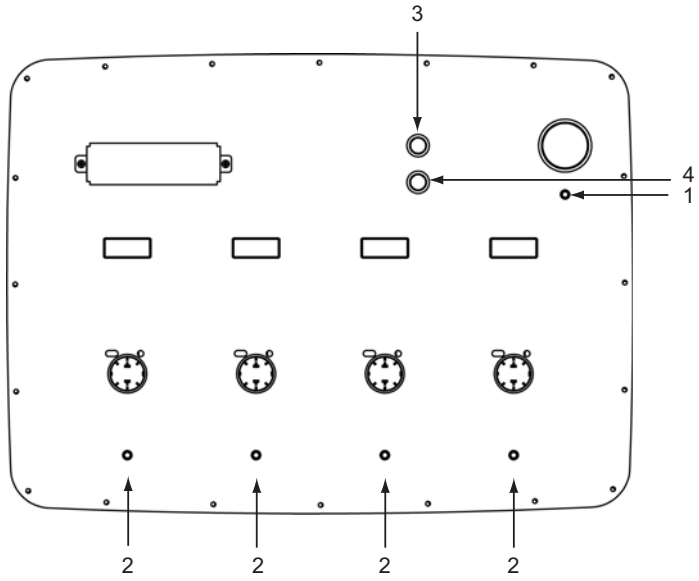
6 If you encounter any problems, please contact us.

Operating the Test Station

This section describes the operational modes of the Test Station.

Figure 33 shows the LEDs.

Figure 33 Test Station LED Indicators



Test Station LEDs and Buttons

This section describes LEDs and Buttons of the Test Station.Table 18 lists the details.

Table 18 Test Station LEDs and Buttons Descriptions

ITEM	LED	BUTTON	STATE	INDICATOR
1	Power		Battery charged	Solid Green
			Battery Low	Blinking Green
			USB installed during Testing	Solid Green
			USB failed or missing during Testing	Blinking Orange
			Tests not being recorded	Blinking Green
2	Unit 1 to Unit 4		Testing	Solid Orange
			Testing Passed	Solid Green Note: the Monitor sounds and its LEDs flash.
			Testing Failed	Solid Red
			Battery Charging	LEDs cycle in a left to right direction
3		Bump Test	Button: Press to Test	
4		Calibration	Button: Press to Test	

Powering Up the Test Station

This section describes the power up sequence.

Table 19 details the sequence.

The power supply adaptor functions as the main power disconnect.

Table 19 Test Station Power-Up Sequence

ACTION	RESULTS
Press the Bump Test button.	The Test Station starts and runs through a self-test. During the self-test ensure the following: • The Power LED & the four (4) Unit LEDs lite Orange • The Power LED lites Green • The four (4) Unit LEDs lite Red • The four (4) Unit LEDs turn off & the Power LED remains Green
Note: The Test Station automatically powers off after 120 seconds, and the Power LED turns off.	

Hibernating the Monitor Using the Test Station

This section describes hibernating the multiple monitors using the Test Station. This only applies to specific monitors designed to hibernate.

1 Ensure the Test Station is powered and a USB Memory is installed.

2 Place the desired number of Monitors into the Test Station. The Test Station may hibernate up to four (4) Monitors at once.

3 Press and Hold both the BUMP TEST and CALIBRATION buttons for about two (2) seconds.

Allow Hibernate must be checked in the Test Station Software and a WRITE command performed prior to pushing the BUMP and CALIBRATION buttons for this method to be used.

4 A successful hibernation results in a GREEN light corresponding to the Monitor's Unit Number.

The Event Log is automatically stored onto the Test Station's USB Memory.

5 Confirm the Monitor's LCD is blank.

6 If you encounter any problems, please contact us.

Chapter 6

SCOTT MAINTENANCE

Chapter Overview

This chapter covers the following topics:

Testing the Monitor

This section covers calibration of the monitor.

Warning: *Operating a device that has exceeded its calibration date can cause false readings of detected gases. Readings obtained while monitor is out of calibration are invalid and could lead to death or injury.*

Scott Safety recognizes the potential of the monitor as a life saving device when operated and maintained correctly. As such, verifying proper operation of the monitor in the form of Calibration and regular Bump Testing is essential to ensure the monitor performs as intended in a potentially hazardous environment.

The frequency at which Calibration and Bump Testing occur is best determined based on local regulatory standards, company policies, and industry best practices. Scott Safety is not responsible for setting policies or practices.

- Calibration — Is performed to ensure the device detects target gases within specified operating parameters. Calibration is the adjustment of the monitor's response to match a known concentration of gas. Sensors can lose sensitivity through normal degradation, exposure to high gas concentrations, or sensor poisoning.

Bump Testing Using Calibration Adapter

This section describes how to perform a manual Bump Test.

Equipment required:

- Calibration gas – Verify concentration level exceeds set points of monitor and expiration date of cylinder has not passed.
- Tygon tubing – 2 feet of 3/16" ID
- Regulator – Set to provide flow at 0.5LPM
- Calibration Adapter – Shipped with monitor

1 Verify the concentration level of the target gas in the cylinder exceeds alarm settings of the monitor as set using the IR Connect Software. See "Configuring the IR Connect Software Parameters" on page 28. If needed.

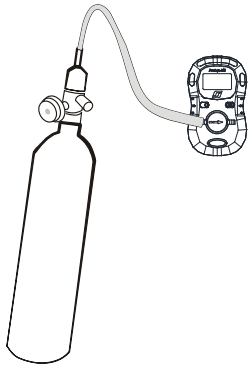
2 Attach the Regulator to the gas cylinder and verify cylinder pressure.

3 Connect Tygon tubing to both the Regulator and Calibration Adapter.

4 Attach Calibration Adapter to monitor and apply gas. See Figure 34.

Ensure the Calibration Adapter is fitted onto the monitor with the Arrow Head pointing to the right for proper flow. Additionally, ensure the tubing from the Regulator is attached to the Calibration Inlet (Non Arrow end).

Figure 34 Bump Test - Calibration Adapter Attached



5 Verify monitor responds to target gas and activates the visual, audible, and vibrating alarms.

6 Turn off gas cylinder and remove Calibration Adapter.

Warning: *If the monitor fails to activate all alarms within one (1) minute, the monitor must be taken out of service and tagged. Failure to do so could lead to death or injury.*

Bump Testing Using Test Station

This section describes how to perform a Bump Test using the Test Station.

Equipment required:

This assumes you have already installed the IR Connect Software, and Test Station Software.

- Calibration gas – Verify concentration level exceeds set points of monitor and expiration date of cylinder has not passed.
- Test Station
- Monitors
- IR Connect with USB Cable
- A PC

1 Ensure an IR WRITE was performed that sent the desired configuration parameters to the Test Station. See “Connecting the IR Connect to the Test Station” on page 34. And See “Configuring the Test Station Software Parameters” on page 36.

2 Ensure the Test Station is powered and the appropriate Gas bottle is installed properly into the Test Station.

3 Ensure the IR Connect is removed from the Unit 1 slot of the Test Station.

4 Turn power on to each monitor being Bump Tested.

5 Place the desired number of monitors in the four (4) Unit slots.

6 Press the Bump Test Button. Monitors alarm sounds, the Power LED lites Orange then Green, applicable Unit LEDs lite Orange, while non applicable Unit LEDs lite Red during the Bump Test. Unit LEDs lite Green when successful or Red if failed.

7 After Bump Test, the Power LED lites Green and all Unit LEDs lite Red, then all Unit LEDs turn off.

8 Remove bumped monitors.

9 Verify monitor responds to target gas and activates the visual, audible, and vibrating alarms.

10 Test Station automatically powers down.

Warning: *If the monitor fails to activate all alarms within one (1) minute, the monitor must be taken out of service and tagged. Failure to do so could lead to death or injury.*

Calibrating the O_2 Monitor Using the Front Button

This section describes how to calibrate a O_2 monitor using only the front button.

Warning: *Only perform O_2 calibration in normal air (20.9% Oxygen) that is free of hazardous gases.*

1 Press and hold the front button for four (4) seconds.

2 CAL displays and the O_2 icon flashes in the lower left hand corner.

3 After a successful calibration, the monitor emits one (1) beep, vibrates and the LEDs flash.

4 After an unsuccessful calibration, the monitor does not beep or flash and continues to display CAL. If after a few failed calibrations, please contact us.

Calibrating the CO, H_2S or O_2 Monitor Using the IR Connect Software

This section describes how to calibrate a CO, H_2S or O_2 monitor using the IR Connect Software.

Equipment required:

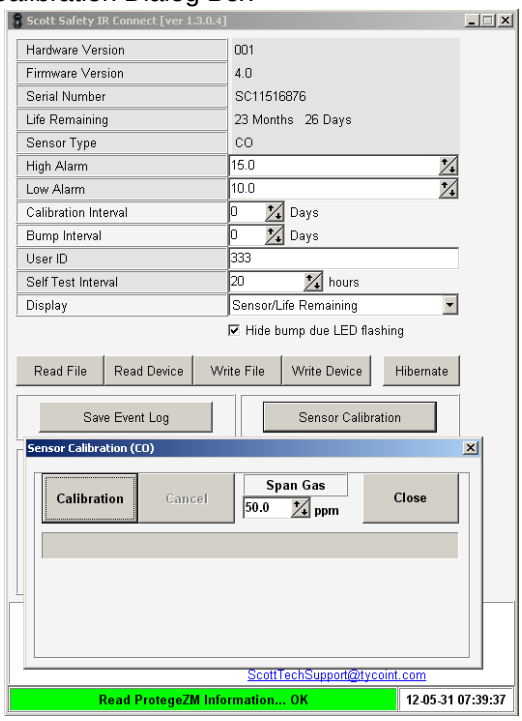
This assumes you have already installed the IR Connect Software.

- Calibration gas – Verify concentration level exceeds set points of monitor and expiration date of cylinder has not passed.
- Monitor
- IR Connect with USB Cable
- A PC

1 Place the monitor either face up or face down, within 1” to 2” in front of the IR Connect, with the top end of the monitor facing the IR Connect.

2 Press SENSOR CALIBRATION, the dialog box appears. See Figure 35.

Figure 35 Sensor Calibration Dialog Box

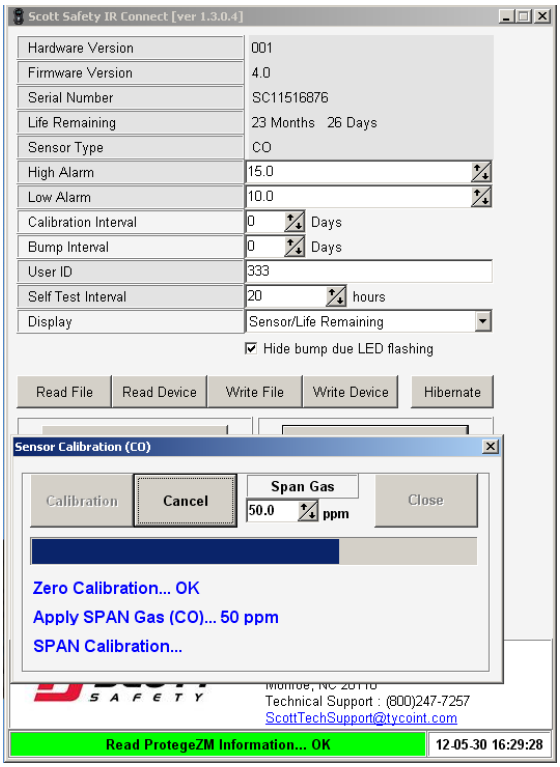


3 Select the concentration value of the Span Gas (PPM or %).

4 Select CALIBRATION. The monitor's LCD displays CAL. Next, the Dialog Box displays Zero Calibration... OK, Apply Span Gas (Gas type)... xx ppm or %, and SPAN Calibration... and a Status Bar starts. See Figure 36.

Do not apply gas prior to the display of the "Zero Calibration... OK" message.

Figure 36 Sensor Calibration In Process



5 Remove the monitor from the IR Connect in order to apply gas to the monitor.

6 Apply Calibration Gas to the monitor using Tygon Tubing, Calibration Adapter, and Regulator prior to the Status Bar timing out.

7 When the monitor's calibration is successful, all LED's flash, it beeps, vibrates and the LCD reflects the reading.

Since the IR Connect is no longer communicating with the monitor, the Status Bar finishes and the Dialog Box displays Calibration... Time-out.

8 Select CLOSE.

Maintenance

This section covers maintenance requirements.

Self-Testing the Monitor

This section covers self-testing the monitor.

Prior to daily use, the device prompts to perform a self-test. This process is a simple and effective way to ensure safe operation of the monitor. During the self-test, the audio, visual and vibration alarms are activated and the sensor is tested. Table 20 details a step by step process for performing the self-test.

Warning: *The Self-test does not take place of a Bump Test or a Calibration to ensure the monitor response to gas.*

Table 20 Self-Test Steps

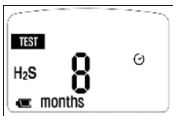
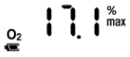
LCD	STEPS
	When the TEST icon appears in the upper left hand corner, a self-test is required. Press the button on the front of the monitor to perform the self-test.
	After pressing the button this screen appears. During the self-test ensure the following occurs: • The monitor emits one audible beep • All LEDs light and monitor vibrates • All LCD display elements appear
	After the full element LCD displays, the low alarm and high alarm set points display. Note: These alarm set points may be changed using either the IR Connect Software or Test Station Software. See “Specifications” on page 80. Note: Once a self-test is performed successfully, the Check Mark appears automatically, and the High and Low set points display.
	Note: Provided the monitor has not been programmed via the IR Connect Software or has not been exposed to gas, this displays. Otherwise, go to the next step. When a self-test is successful the monitor turns to the original screen and displays a CHECK MARK in place where the TEST icon was previously displayed and one short audible beep sounds. The monitor by default prompts another self-test in twenty (20) hours from when the button was pressed. Note: This value may be changed using the IR Connect Software.
	(If applicable) If programmed with a USER ID, after the alarm set points are displayed, a combination of numbers or letters scrolls across the LCD. This includes a maximum of two (2) screens with a maximum character limit on the USER ID of six (6) characters. The USER ID may be changed via the IR Connect Software.

Table 20 Self-Test Steps (continued)

LCD	STEPS
	(If applicable) If the monitor has been exposed to gas exceeding the low alarm set point, a value appears with MAX next to it. This represents the peak value (highest) that the monitor has seen. After this screen, another appears displaying a value with (hours, days, or months), this represents the amount of time past since the peak reading.
	(If applicable) After the peak reading and time since screens, another screen displays with CLP (Clear Last Peak). If you press the button while this is displayed, the peak value on the monitor resets. Note: The value is cleared from the display, but the value is stored in the monitor's event log. This value may be cleared on the next screen.

Caution: *If the self-test fails, the monitor emits five (5) short beeps and flashes before displaying TEST.*

Caution: *If the self-test fails three (3) consecutive times the monitor enters Fail Safe mode. Please contact us for a replacement.*

Caution: *During normal operations, the battery is continuously monitored. If the battery is low for more than three (3) hours the monitor enters Fail Safe mode.*

Caution: *If the battery self-test fails five (5) consecutive times the LCD goes blank. In case of a blank LCD, discontinue use and contact us for a replacement.*

Upgrading Monitor Firmware using the IR Connect Software

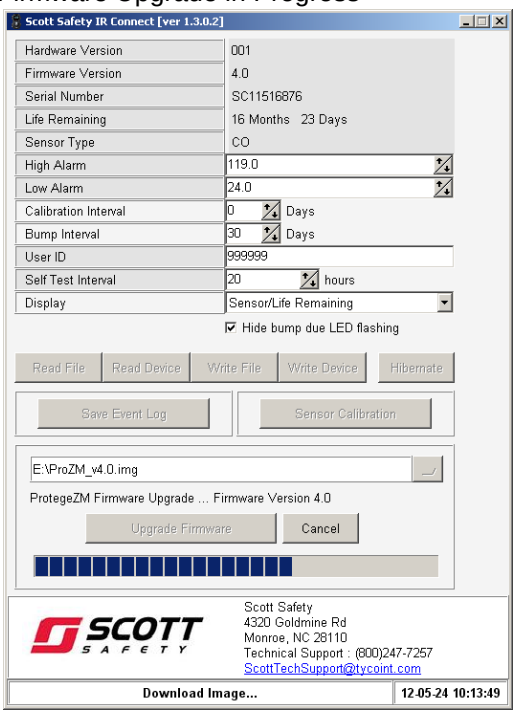
This section describes upgrading the Monitor's firmware using the IR Connect Software.

Upgrade may be product improvements to add additional features or to enhance monitor performance. Most firmware upgrades are not required unless notified by us. To determine if your monitor has the most current revision, please contact us.

1. Position the monitor in front of the IR Connect. Perform a READ DEVICE prior to performing any upgrades to ensure a connection has been established.
2. After a successful READ DEVICE has been acknowledged, click on the Folder icon located in the bottom right of the screen. Then select the firmware file (Pro_ZM_vX.X.img format) to upgrade to and then click UPGRADE FIRMWARE. This takes about 30 seconds to perform. See Figure 37.

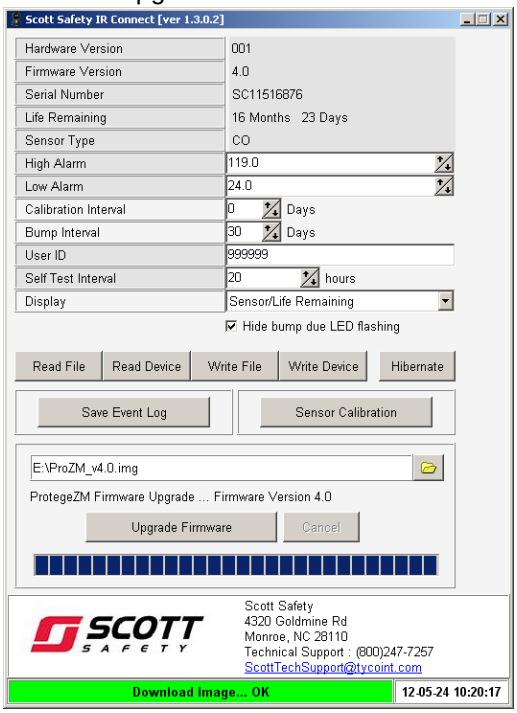
Do not move the monitor during the firmware upgrade. Also, note the location of the file.

Figure 37 Monitor Firmware Upgrade in Progress



3 Once a successful upgrade is complete, a Green Bar appears with “Download image... OK” at the bottom of the screen. See Figure 38.

Figure 38 Monitor Firmware Upgrade Successful



Saving the Event Log

This section describes saving the Monitor's event log using the IR Connect Software.

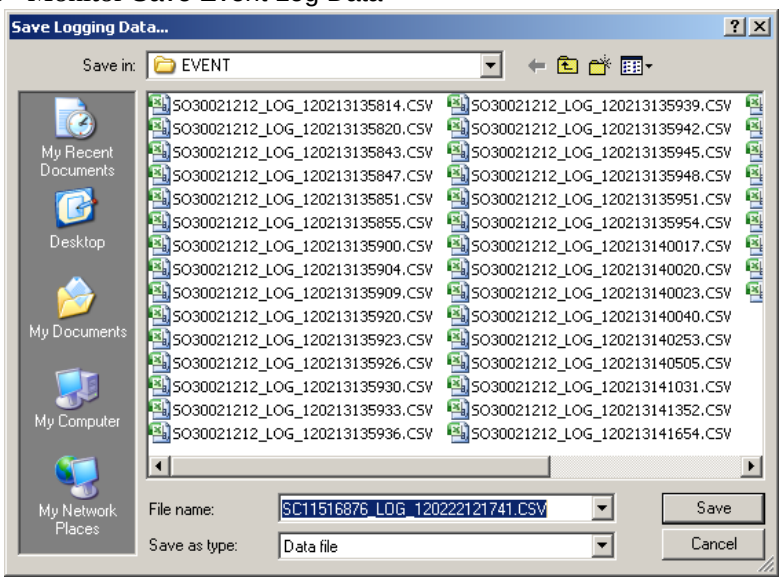
By default the monitor stores the last twenty-five (25) alarm events. It stores events using a First In First Out (FIFO) method. That is, the twenty-six event replaces the first event and so on. This information may be downloaded to a PC using the IR Connect Software. For each alarm event the monitor records the following:

- Product Name
- Log Type
- Serial Number
- Firmware Version
- ID
- Life Remaining
- Total Number of Events
- Duration of Events
- Number of Self-Tests
- Event Date
- Event Time
- Bump Test (Yes or No)
- Duration (Seconds)
- Sensor Reading (PPM or %)
- Alarm Condition (Low, High or OL)

We recommend saving its event log prior to placing the monitor in hibernation. To save the log, click on SAVE EVENT LOG. This allows the selection of a specific folder to save the event log to. Once hibernation occurs, all prior event logs are erased.

1. Position the monitor in front of the IR Connect. Perform a READ DEVICE prior to performing any upgrades to ensure communication has been established.
2. Click on SAVE EVENT LOG to save the log. This allows the selection of a specific folder to save the event log. See Figure 39.

Figure 39 Monitor Save Event Log Data



3 Click SAVE on the Save Logging Data... Dialog Box, to save the .CSV file.

The default directory is C:\Program Files\ScottSafety\IRConnect|EVENT.

Hibernating the Monitor using the IR Connect Software

This section describes hibernating the Monitor using the IR Connect Software.

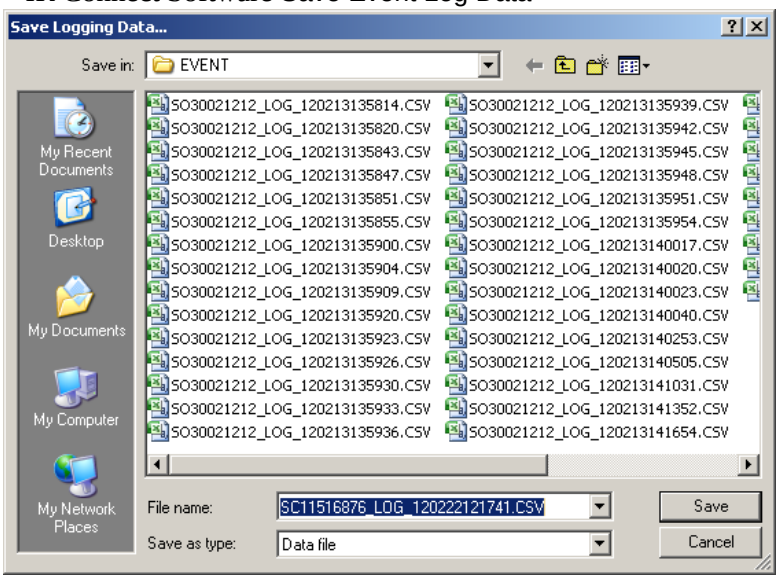
This operation preserves the battery when the monitor is not in service.

This operation is only allowed on the CO and H_2S monitors.

1 Position the monitor in front of the IR Connect. Perform a READ DEVICE prior to performing any upgrades to ensure a connection has been established.

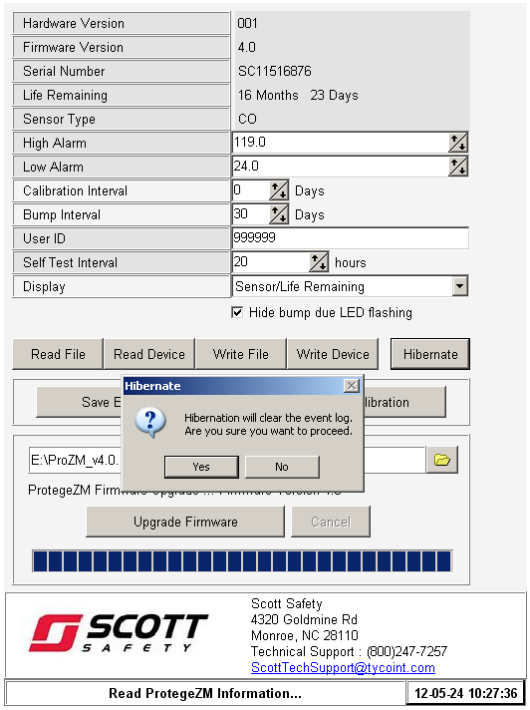
Prior to placing a monitor in hibernation, we recommend saving its event log. To save the log, click on SAVE EVENT LOG. This allows the selection of a specific folder to save the event log to. Once hibernation occurs, all prior event logs are erased. See Figure 40.

Figure 40 IR Connect Software Save Event Log Data



2 After the event log is saved, proceed to hibernate the monitor. Press HIBERNATE. A screen appears asking you if you want to proceed. If you have already saved the event log, click YES. See Figure 41.

Figure 41 IR Connect Software Hibernation



3 A successful hibernation displays a Hibernate... OK Green Bar. See Figure 42.

Figure 42 IR Connect Software Hibernate... OK

Clearing a Bump Test Interval Alarm Alert

This section describes clearing a Bump Test Interval Alarm Alert.

When a monitor is due for a bump test, the monitor toggles between BUP and the reading. A bump test may be performed at anytime using the Test Station with a target gas.

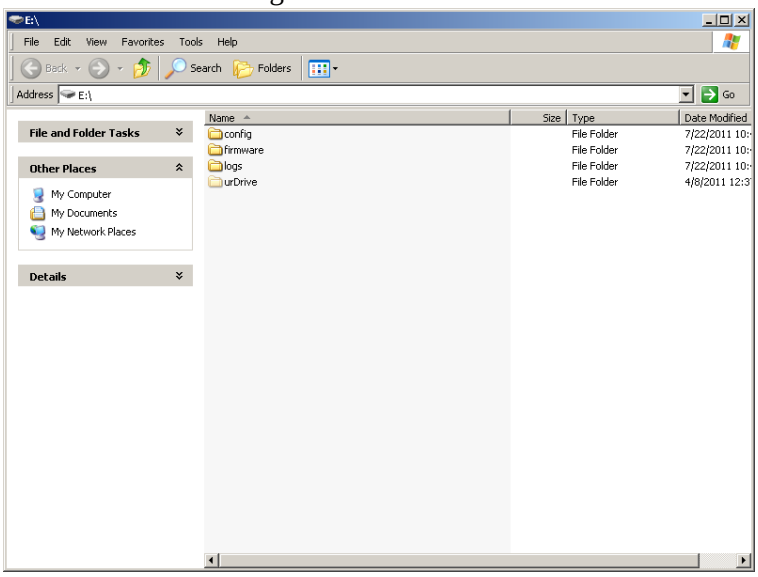
Or using the monitor and a target gas, press the front button down once. It displays numerous screens, then displays the word GAS while the TEST icon flashes. The monitor waits 45 seconds for the target gas to be applied, or a button press to skip the bump test. Once gas is applied the check mark appears.

Retrieving Event Logs and Test Records Using the USB Pen Drive

This section describes retrieving the Monitor's event logs and Test Station test records using the USB Pen Drive. This allows remote access and verification of the event logs and test records.

1. Locate the USB Pen Drive metal cover in the upper left hand corner of the Test Station.
2. Remove the USB Pen Drive metal cover.
3. Remove the USB Pen Drive from the Test Station.
4. Insert the USB Pen Drive into your PC's USB port. After hardware is found the Drive Dialog Box appears. See Figure 43.

Figure 43 USB Pen Drive Dialog Box



5. Three (3) folders: Logs, Firmware, and Config are shown, after accessing the USB via your PC. Only the Log folder applies when accessing the event logs and test records. Event logs are stored in the ProZM and TS-ProZM folders.

Use caution when accessing other folders as they contain files that can only be changed through the Test Station Software.

Caution: *Do not delete any files from the USB Pen Drive as the Test Station does not store this information internally outside of the USB.*

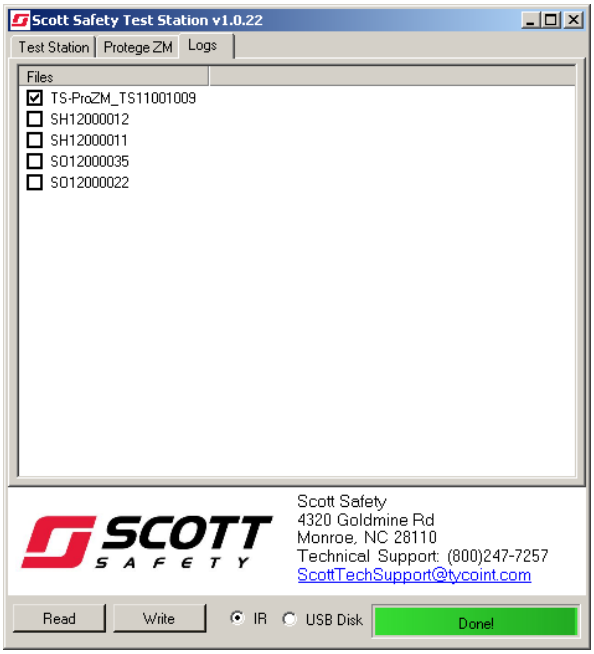
Retrieving Test Records Using the Test Station Software

This section describes retrieving the Test Station's test records using the Test Station Software.

Test records contain detailed dates and times for individual bump test and calibrations. The test record is listed at the top of the page and starts with TS-ProZM_Serial Number.

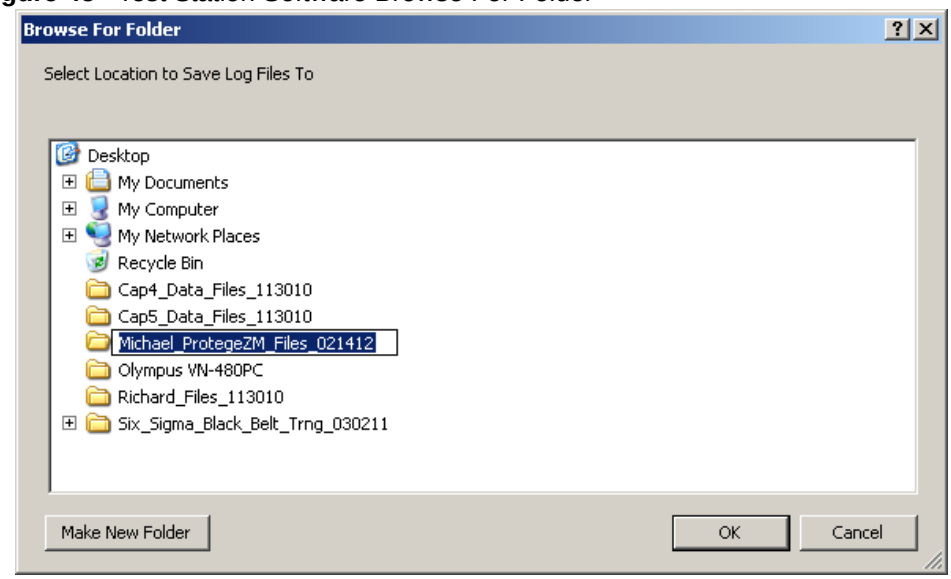
1. Select either IR or USB Disk and then click READ, depending on the location of the USB Pen Drive.
2. The Test file automatically populates. Click the check box next to the test file and click READ again. See Figure 44.

Figure 44 Test Station Software Test Records



3. The Browse For Folder Dialog Box appears. Select the location to store the file. By default these file are .CSV and should be opened using MS Excel. This is the default location for both test files and event logs. See Figure 45.

Figure 45 Test Station Software Browse For Folder



This file (ts-prozm.csv) follows a specific format so that it can later be parsed into a database or Excel format for further manipulation and storage. You can access the .CSV file containing the test results. There are multiple lines in every test report. See Table 21 for line by line details.

Table 21 Test Record Line by Line Details

LINE	FIELD	DESCRIPTION
First line For test station and overall results for each test	Date	Date and Time of Test
	Test	Type of Test (Calibration, Bump Test, Turn Off (for monitor with hibernation mode)
	Test Station	Model Number
	Serial Number	Individual serial number for test station
	Overall Result	Pass/Fail
	Test F/W Version	Test Station firmware version
	Test H/W Version	Test Station hardware version
	Location	This field may be configured via the Test Station Software. For example, unique location, etc.

Table 21 Test Record Line by Line Details (continued)

LINE	FIELD	DESCRIPTION
Second line These are unique to each monitor and appear for each test	Bay Num	1,2,3,4 these correspond with the matching Unit numbers on the test station
	Detector	Monitor or Monitor with Hibernation mode.
	Serial	Serial Number for each monitor
	Result	Pass/Fail
	Monitor F/W Version	Monitor firmware version
	Monitor H/W Version	Monitor hardware version
	Audio	Pass/Fail
	Num Sensors	Number of sensors in the monitor, this should always display 1.
	Options (Show Sensor Reading, Bump Flash Disabled and Hide Clock)	T (True) if enabled; F (False) if disabled.
	Options (User ID)	Unique 6 digit number assigned by user.
	Options (Self Test Interval)	Default is 20hours; this option may be changed via the IR Connect or via the Test Station Software.
Third line For each sensor on the monitor	Sensor	Senor Type (H_2S, CO or O_2)
	Result	Pass/Fail
	Reading	Peak unit reading during test in PPM or %
	Bottle Lot#	Field configured via Test Station Software.
	Bottle Expiry	Field configured via Test Station Software.
	Bottle Concentration	Default settings may be found and configured via the Test Station Software.
	Options (High Alarm, Low Alarm)	Alarm settings of the individual monitor.
	Options (Calibration Interval and Bump Test Interval)	Intervals of the individual monitor.
	Options (Bump Test Due and Calibration Test Due)	Number of days monitor scheduled test is due.

Retrieving Event Logs Using the Test Station Software

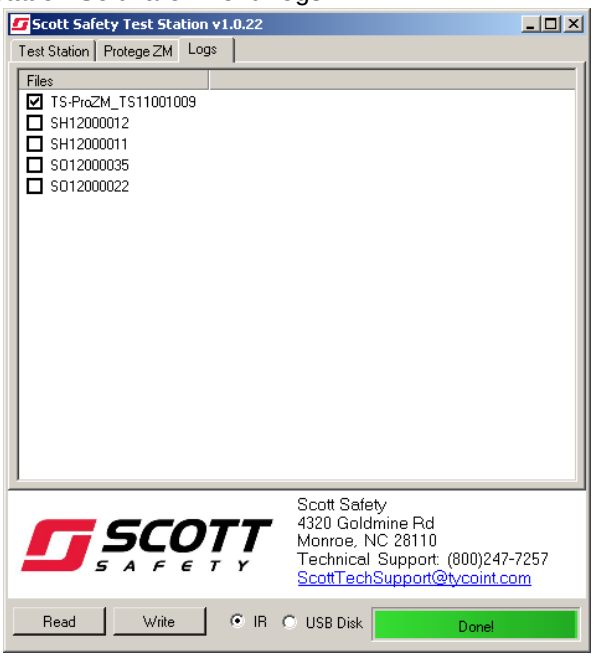
This section describes retrieving the Monitor's event log using the Test Station Software.

Event logs are listed by serial number. The event log retrieved are up to the last twenty five (25) most recent events. Past events can be located by accessing the USB pen drive.

1 Select either IR or USB Disk and then click READ, depending on the location of the USB Pen Drive.

2 All available monitors are listed by serial numbers. To select the file(s) you want, check the box next to the desired monitor(s). You may download multiple event logs at the same time. By default these files are .CSV and should be opened using MS Excel. See Figure 46.

Figure 46 Test Station Software Event Logs



Individual event logs (eventxxx.csv) are organized inside the ProZM folder by the serial number. The serial number format is MGYYWWxxxx (where M=Monroe code, G=Gas type (H,O,C), YY=Year, WW=Week and xxxx is the 4-digit serial number).

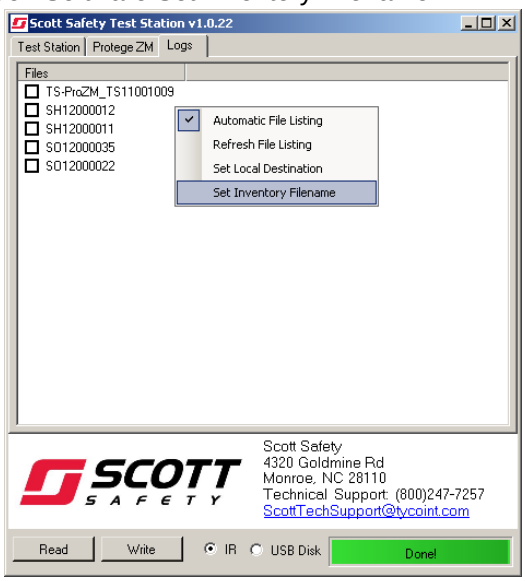
Retrieving Inventory File Using the Test Station Software

This section describes retrieving the Monitor's inventory file using the Test Station Software.

The inventory file allows you to keep better track of your monitors. The Test Station Software can generate an inventory file that is listed by serial number, unit ID and gas type.

1 While in the Logs Tab, right click and then select SET INVENTORY FILENAME. See Figure 47.

Figure 47 Test Station Software Set Inventory Filename



2 Next, the Select Inventory File to Save Dialog Box appears. Select the location to save the file and select the name of the file. Return back to the Test Station Software and check on the box next to TS-ProZM_Serial Number, then click READ again. Then, go to the specified location to find the inventory file.

Upgrading Test Station Firmware using the Test Station Software

This section describes upgrading the Test Station's firmware using the Test Station Software.

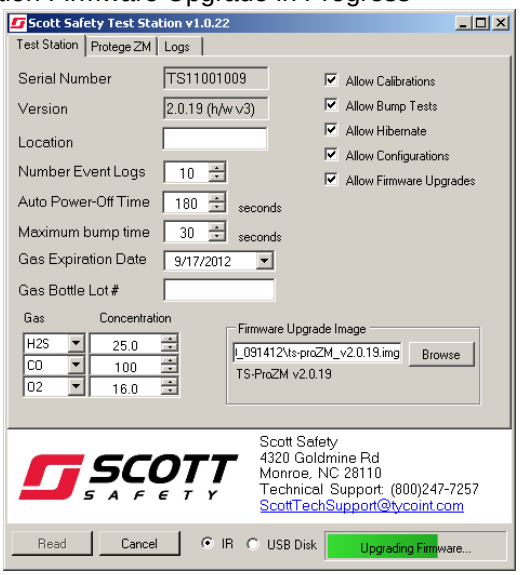
Upgrade may be product improvements to add additional features or to enhance monitor performance. Most firmware upgrades or not required unless notified by us. To determine if your monitor has the most current revision, please contact us.

1 Position the IR Connect in Unit 1 position. Perform a READ prior to performing any upgrades to ensure a connection has been established.

2 After a successful READ has been acknowledged, select IR, click on Browse located in the bottom right corner of the screen, the Open Dialog Box appears. Then select the firmware file (TS-ProZM vX.X.XX.img format), then click Open. Then select WRITE. This takes about 30 seconds to perform. During the operation, a Green Bar appears with "Upgrading Firmware ...". See Figure 48.

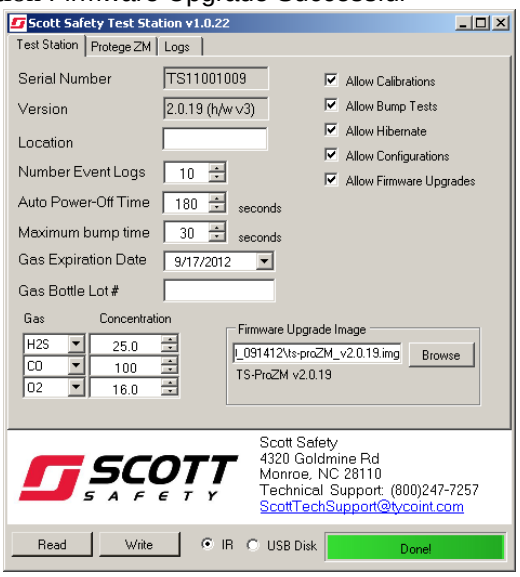
Do not move the monitor during the firmware upgrade. Also, note the location.

Figure 48 Test Station Firmware Upgrade in Progress



3 Once a successful upgrade is complete, a Green Bar appears with “Done!” at the bottom of the screen. See Figure 49.

Figure 49 Test Station Firmware Upgrade Successful



Maintaining the Test Station

Refer to Table 22 for maintenance of the Test Station.

Table 22 Test Station Maintenance

ITEMS
Inspect the Test Station before and after each use to ensure all components are in operating order and undamaged.
Ensure the Gas Cylinder has adequate gas for testing purposes.
Inspect each Sensor Cavity to ensure that each opening is free and clear of debris.
Inspect the AC Power module and ensure it is undamaged.
Clean the Test Station, remove devices and disconnect from power source. Use only a soft cloth to wipe surfaces. If necessary, a mild detergent may be used. Dry thoroughly before applying power or replacing devices.

Error Codes

Table 23 provides a list of error codes for the Protege ZM.

Table 23 Protege ZM Error Codes

ERROR CODES	CAUSE	SOLUTION
E01	Configuration memory corrupt	Press the button to acknowledge the error. Then reconfigure the device using the IR Connect.
E02	Gas memory corrupt	Press the button to acknowledge the error. Then reconfigure the device using the IR Connect. Calibrate the device.
E03	Program memory corrupt	Press the button to acknowledge the error. Then attempt to load a new firmware image into the device via the IR Connect. If that is unsuccessful, then contact us.
E05	Bad battery	Contact us.
E06	Bad sensor	Contact us.

Troubleshooting

Refer to Table 24 for troubleshooting assistance.

Prior to replacing any items of the Test Station, ensure that an adequate supply of power is provided either via the battery or the AC line.

This is a basic troubleshooting matrix which identifies the most likely items and as such is not an exhaustive matrix.

Table 24 Troubleshooting Matrix

ITEM	SYMPTOM/CAUSE	SOLUTION
IR Connect Software	Monitor Connect Error dialog box appears while trying to Read or Write to the Monitor and a Red Bar appears at the bottom.	• Ensure the monitor is placed either face down or face up in front of the IR Connect from 1” to 2” a part. • Ensure the IR Port on the IR Connect is not clogged with dirt or debris. • Ensure the IR Connect and the Monitor are not in high light area (i.e. bright light bulb or bright sunlight) as this may interfere with IR connectivity.
	IR Connect is not Found Error dialog box appears while trying to Read or Write to the Monitor and a Red Bar appears at the bottom.	• Ensure the USB Cable is properly connected at both the PC and the IR Connect. • Provided the USB Cable connections are secure, un install and reinstall the IR Connect Software.
	During a Write Device, a Write Protege ZM Information Dialog Box appears stating “Check sensor type and Alarm setting.”	• Ensure the sensor type and its applicable settings shown in the IR Connect software matches the actual Monitor you are trying to Write.
	Dialog Box error appears during a READ. IR Connect is not found. IR Connect Re-Install driver (A)	• Ensure a Scott IR Connect USB Cable is used.

Table 24 Troubleshooting Matrix (continued)

ITEM	SYMPTOM/CAUSE	SOLUTION
Test Station Software	Bump Test failed	• Ensure the IR Connect is communicating with the Test Station. • Ensure the Sensor Cavities and Audible Alarm Cavities are clear of dirt or debris. • Ensure the Calibration Gas level is correct. • Ensure the Test Station is not placed directly in bright sunlight. • Re-try the Monitor. If the Monitor fails three (3) times, please contact us.
	Red Bar appears after an IR READ attempted	• Ensure the IR Connect is squarely facing the IR Receiver of the Unit 1 slot. • Ensure the Test Station is powered up. • Ensure USB Pen Drive is installed. • Verify USB Driver properties via control panel for an error. If confirmed, update USB Driver.
	Red Bar appears during an IR WRITE	• Ensure the IR Connect is squarely facing the IR Receiver of the Unit 1 slot. • Ensure the Test Station is powered up.
	Red Bar appears during an IR WRITE with “No Memory Stick” message. This is caused when a none Scott branded USB drive is used in the Test Station.	• Access and remove the Lithium Battery connector from the Main PCB for about 10 seconds and then reconnect. • Ensure only a Scott branded USB Pen Drive is used in Test Station to prevent future reoccurrences.
Test Station Hardware	Unit LED does not lite or Power LED does not lite	• Verify connection. • Swap the applicable LED plug with other connections to determine if applicable LED is bad on Main PCB. • Replace applicable LED, item #8 in Figure 50.
	Power LED blinks	• Ensure USB Pen Drive is installed. • Replace Main PCB, item #5 in Figure 50.
	No audible from Monitor	• Try another bay. • Replace applicable IR PCB, item #4 in Figure 50. • Replace applicable Microphone Subassembly, item #9 in Figure 50.
	Solenoid does not activate (clicking sound)	• Replace Regulator and Solenoid, item #30 (Portable) in Figure 51. • Replace Solenoid Value, item #55 (Stationary) in Figure 52.
	Broken case handle or latch or case damaged	• Replace case, item #31 (Portable) in Figure 51, or item #56 (Stationary) in Figure 52.
	Power Jack shows physical damage or intermittent power loss	• Verify connection. • Replace Power Jack, item #34 in Figure 51, and Figure 52.

Table 24 Troubleshooting Matrix (continued)

ITEM	SYMPTOM/CAUSE	SOLUTION
Test Station Hardware (Continued)	Run time below requirements or battery damaged	• Verify connection. • Replace Lithium Rechargeable Battery, item #6 in Figure 50.
	Bump or Calibration Push Button loss of function or shows physical damage	• Verify connection and function. • Replace applicable Push Button Switch, item #35 in Figure 51, and in Figure 52.
	USB Cover Bracket shows physical damage or misplaced	• Replace USB Cover Bracket, item #26 in Figure 51, and Figure 52.
	USB Shroud Block shows physical damage	• Replace USB Shroud Block, item #27 in Figure 51 and Figure 52.
	Lithium Battery Holder shows physical damage	• Replace Lithium Battery Holder, item #7 in Figure 50.
	IR PCB Shroud Block shows physical damage	• Replace IR PCB Shroud Block, item #28 in Figure 51 and Figure 52.
	Gas leak	• Replace Teflon tape. • Replace 1/8” High Pressure Tube Fitting, item #33 in Figure 51.
	Tygon tubing does not stay in place or excess leaking	• Replace Bulkhead Fitting 5/16” Tube, item #32 in Figure 51, and Figure 52.
	Improper readings or gauge leaks	• Replace Gauge, item #36 in Figure 51.
	Calibration Cap damaged	• Replace Calibration Cap Modification, item #2 in Figure 50.
	Calibration Cup Holder Bracket damaged	• Replace Calibration Cup Holder Bracket, item #3 in Figure 50.
	Calibration Bottle Mount damaged	• Replace Calibration Bottle Mount Kit, item #29 in Figure 51.

Table 24 Troubleshooting Matrix (continued)

ITEM	SYMPTOM/CAUSE	SOLUTION
Test Station Hardware (Continued)	Gas leak or damaged Tygon tubing or Tygon tubing not staying on barbs	• Tighten Tygon tubing on Barb. • Replace Tubing/Barb Kit, item #1 in Figure 50.
	Top panel Screws misplaced or stripped	• Replace applicable screws, item #25 in both Figure 51 and Figure 52.
	If damaged or lost	• Replace Pry Out Plug, item#57 (Stationary) in Figure 52.
	After replacing various wires and having to remove Cable Ties	• Replace Cable Ties. See Table 25.
	AC Power Adapter power appears intermitted	• Verify Power Jack connection and function. • Replace AC Power Adapter. See Table 25.

Figure 50 Test Station Front Panel Bottom View

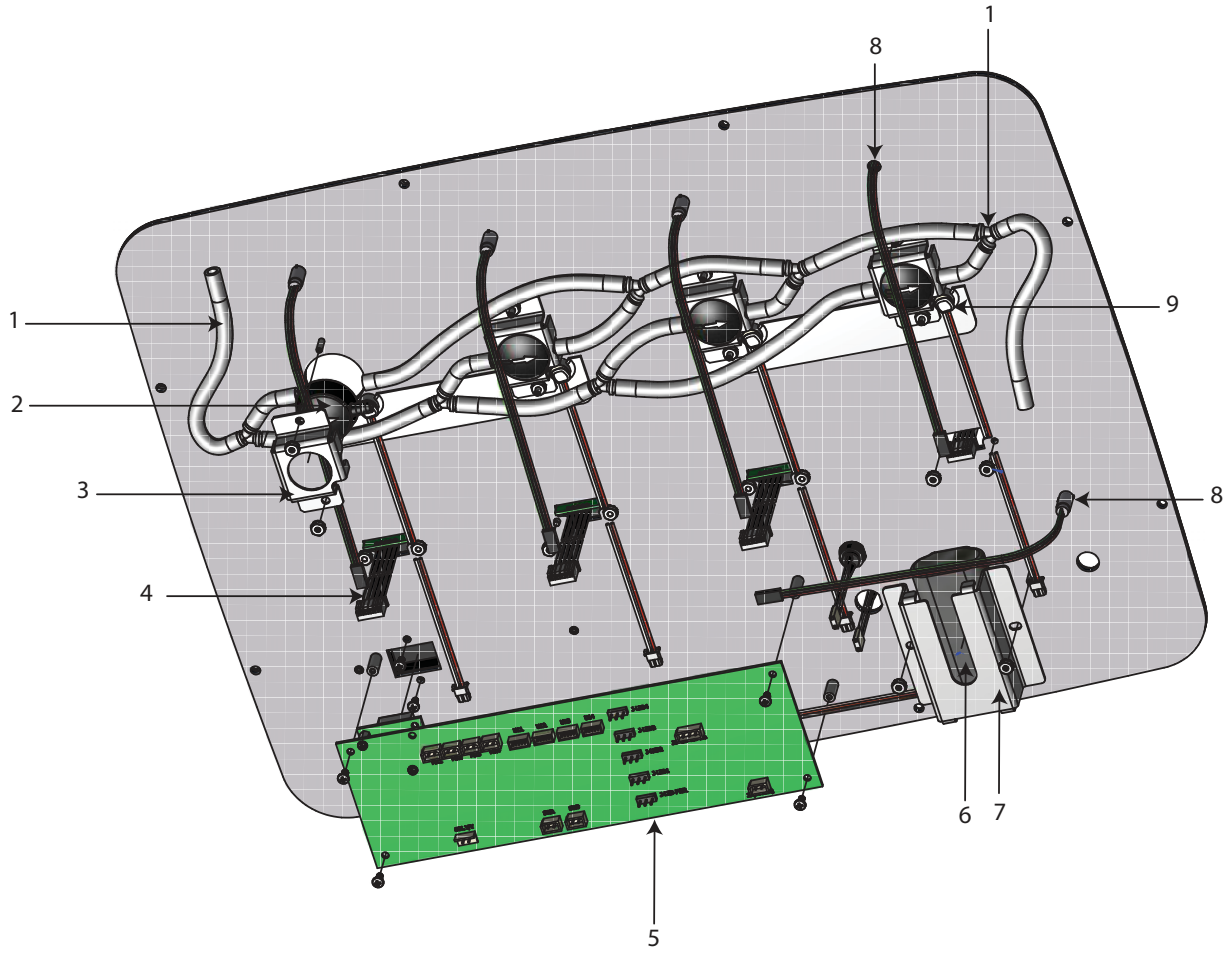


Figure 51 Test Station Exploded View Portable

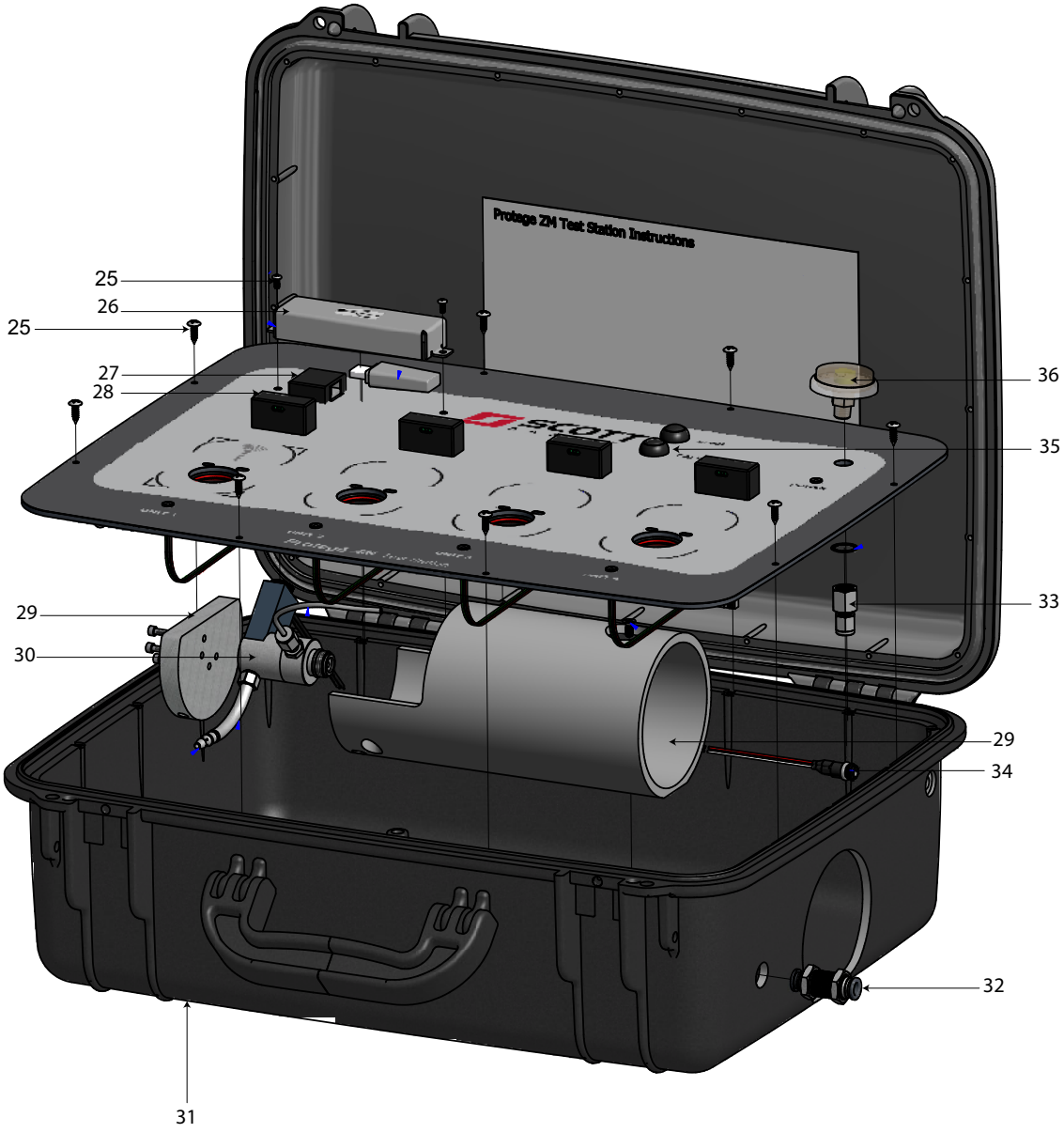


Figure 52 Test Station Exploded View Stationary

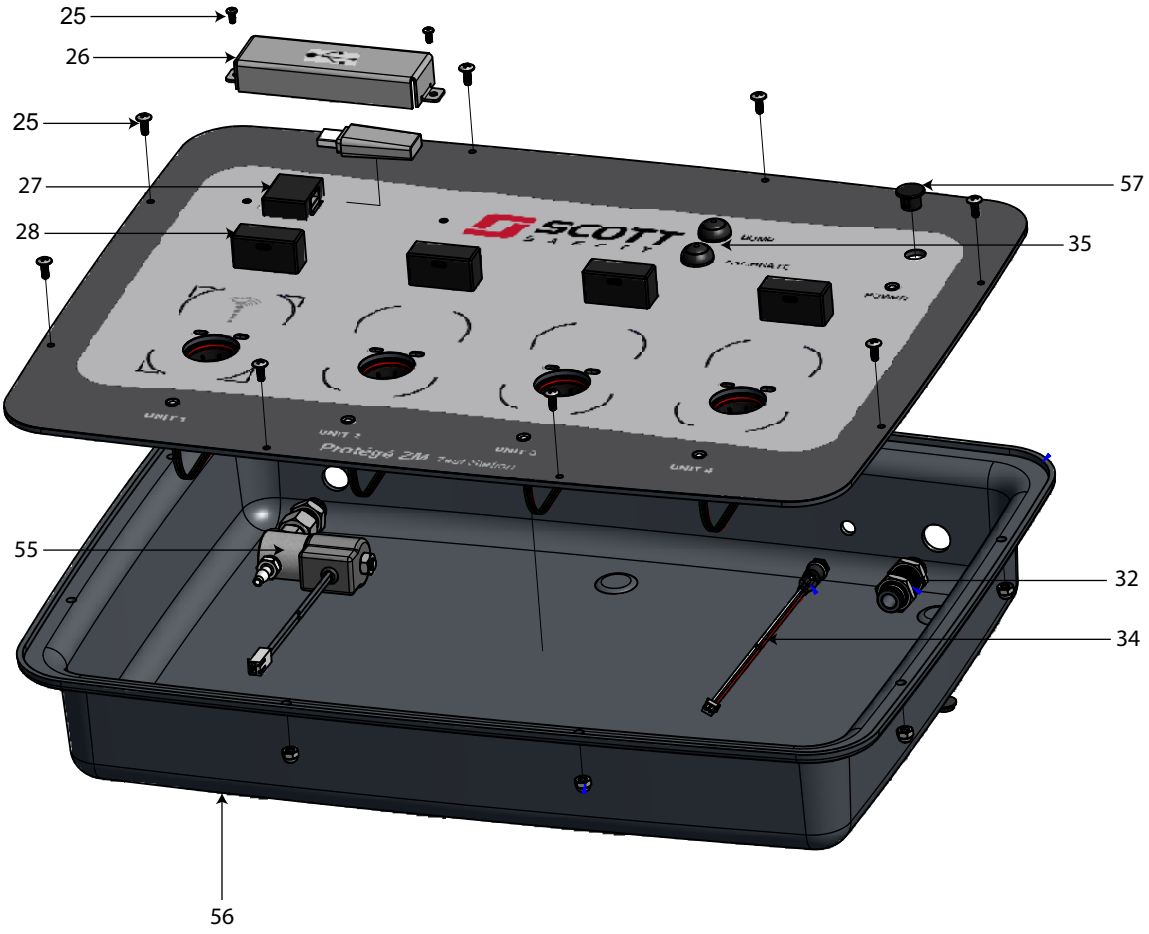


Table 25 provides a list of Field Replaceable Units.

Table 25 Field Replaceable Units (FRUs)

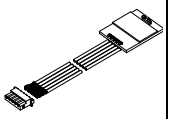
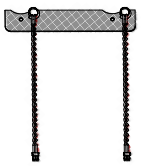
REFERENCE NUMBER	ITEM	DESCRIPTION	PART NUMBER
Item #1 in Figure 50		Tubing/Barb Kit	8000003
Item #2 in Figure 50		Calibration Cap Modification	074-0569
Item #3 in Figure 50		Calibration Cup Holder Bracket	074-0364
Item #4 in Figure 50		IR PCB	093-0590
Item #5 in Figure 50		Main PCB	093-0593
Item #6 in Figure 50		Lithium Rechargeable Battery with Wiring and Plug	093-0592
Item #7 in Figure 50		Lithium Battery Holder	073-0360
Item #8 in Figure 50		LED Kit	8000001
Item #9 in Figure 50		Microphone Subassembly	096-3469

Table 25 Field Replaceable Units (FRUs) (continued)

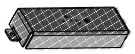
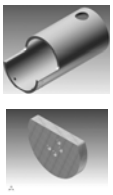
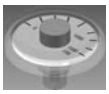
REFERENCE NUMBER	ITEM	DESCRIPTION	PART NUMBER
Item #25 in Figure 51& in Figure 52		Screws/Hardware Kit	8000002
Item #26 in Figure 51& in Figure 52		USB Cover Bracket	073-0362
Item #27 in Figure 51& in Figure 52		USB Shroud Block	073-0361
Item #28 in Figure 51& in Figure 52		IR PCB Shroud Block	073-0359
Item #29 in Figure 51		Calibration Bottle Mount Kit	8000005
Item #30 (Portable) in Figure 51		Regulator/Solenoid (Portable) 0.3LPM	096-3470-1
Item #31 (Portable) in Figure 51		Case Portable	077-1392
Item #32 in Figure 51& in Figure 52		Bulkhead Fitting 5/16” Tube	077-1395
Item #33 in Figure 51		1/8” High Pressure Tub Fitting	048-0084

Table 25 Field Replaceable Units (FRUs) (continued)

REFERENCE NUMBER	ITEM	DESCRIPTION	PART NUMBER
Item #34 in Figure 51& in Figure 52		Power Jack with Connector	093-0591
Item #35 in Figure 51 & in Figure 52		Push Button Switch (Bump and Calibration)	093-0587
Item #36 in Figure 51		Gauge	077-1394
Item #55 (Stationary) in Figure 52		Solenoid (Stationary)	096-3470-2
Item #56 (Stationary) in Figure 52		Case Stationary	074-0568
Item#57 Stationary) in Figure 52		Pry Out Plug 6/6 Nylon (Stationary)	074-0570
N/A		Cable Tie Kit	8000004
N/A		AC Power Adapter (12VDC, 18W)	028-0055
Note: For calibration equipment, contact your Scott sales representative.			

Appendix A

SCOTT SAFETY SPECIFICATIONS

Appendix Overview

This appendix covers the following topic:

- Specifications

Specifications

Table 26 lists the monitor's specifications. Table 27 lists the IR Connect specifications. Table 28 lists the Test Station specifications.

Table 26 Monitor Specifications

MONITOR SPECIFICATIONS		
Battery Life	2 years, 4 minutes of alarm time per day	
Alarms	Visual, vibrating, audible 95dB	
Tests	Full function self-test on activation and every 20hours; continuous automatic battery tests	
Data Log	Last 25 events	
Housing	Impact Adsorbent Overmold	
Hydrogen Sulfide	Range	1 to 100PPM, 1PPM
	Low Alarm Set Point	10PPM*
	High Alarm Set Point	15PPM*
	Calibration Gas Concentration	25PPM
Carbon Monoxide	Range	1 to 300PPM, 1PPM
	Low Alarm Set Point	35PPM*
	High Alarm Set Point	200PPM*
	Calibration Gas Concentration	100PPM
Oxygen	Range	1 to 30% Volume, 0.1%
	Low Alarm Set Point	19.5%*
	High Alarm Set Point	23.5%*
	Calibration Gas Concentration	16%
Dimensions	3.7Hx2.2Wx1.3"D (94Hx56Wx33mmD)	
Weight	2.7oz (76g)	
Intrinsically Safe Approved Temperature Range	H_2S:-40 to +122°F (-40 to +50°C) CO:-22 to +122°F (-30 to +50°C) O_2:-58 to +122°F (-50 to +50°C) IS approved temperature may not reflect the operating temperature.	
Operating Temperature Range	H_2S, CO and O_2:14 to +122°F (-10 to +50°C) For values outside this temperature range, you may experience reduced performance or alarm functionality.	
Operating Humidity	5% to 95% RH, Non-Condensing	
*Note: These values are factory defaults. These values may be changed.		

Table 27 IR Connect Specifications

IR CONNECT SPECIFICATIONS	
Range	2.0 to 16.0” (50 to 406mm)
Power	USB (5V)
Operating System	Compatible with MS Windows XP, Vista and Windows 7
Reporting	Event logs from the monitor and Firmware upgrades to the monitor
Readings & Configurations	Alarm set points to the monitor
Dimensions	3.8Hx2.5Wx1.1”D (95Hx63Wx28mmD)
Weight	2.7oz (76g)
Operating Temperature	50 to 104°F (10 to 40°C)
Operating Humidity	5% to 95% RH, Non-Condensing

Table 28 Test Station Specifications

TEST STATION (PORTABLE & STATIONARY) SPECIFICATIONS	
Test Performed	Bump Test & Calibration
Test Capacity	Up to four (4) monitors simultaneously
DC Battery	12VDC Lithium Ion rechargeable
AC Power Adaptor	• Equipped with adapter • Input Voltage: 100 to 140VAC, 47 to 63Hz • Input Current: 450mA @ 100VAC
Test Station DC	Input Power:12VDC, 1.5A Max.
Bump Time	<30Seconds
Calibration Time	<2Minutes
Regulator Flow Rate (Portable only)	0.3LPM
Bump Cycles/DC Battery Charge	1,000 (~33hrs)
Memory	Ships with a 2GB USB Standard Pen Drive Installed (Larger memory size may be used)
LEDs	Power, Unit1, Unit2, Unit3 and Unit4
Buttons	Bump Test and Calibration
Information Stored	Bump/Calibration Logs, Individual Monitor Event Logs, Firmware, and Unit Configurations
Configuration	Unit settings (configuration and Firmware) may be programmed/upgraded via the Test Station

Table 28 Test Station Specifications (continued)

TEST STATION (PORTABLE & STATIONARY) SPECIFICATIONS		
Gases Available	H_2S, CO and O_2	
Calibration Gas Bottle	Compatible with 34L or 103L bottles	
Unit Compatibility	Works with monitors with and without Hibernate mode.	
Portable/Stationary Case	Industrial grade carrying case (easy open double throw latches, O-ring seal, pressure equalization valve)	
Dimensions	Portable	19.75Lx15.5Wx7.5”D (501Lx394Wx191mmD)
	Stationary	19.5Lx13.5Wx3.0”D (495Lx343Wx76mmD)
Weight	Portable	13.74lbs. (6.23kg) (without Gas Bottle)
	Stationary	7.3lbs. (3.3kg)

Appendix B

SCOTT SAFETY SENSOR INFORMATION

Appendix Overview

This appendix covers the following topic:

- Gas Interferences

Gas Interferences

There are known gas interferences to a limited number of chemical compounds. Scott Safety attempts to identify possible gas interferences to which gas sensors may be exposed; however, not all chemical compounds that presently exist have been tested. Table 29 provides known toxic gas interferences.

Table 29 *does not show, nor should it be implied, that no additional interferences may occur. These selectivity ratios are used as guides only. They are not to be used as calibration factors. The gas species' actual cross-sensitivities may vary from the values shown.*

Keys for Table 29.

- Zero – Indicates tested and confirmed no interferences
- Blank – Indicates not tested
- Neg – Indicates gas produces a negative signal
- Two values in a cell – Indicates initial peak and finish offset (unstable or transition gas) and should not be used for cross calibration

Table 29 Gas Interferences

		SENSOR TYPES (ALL VALUES IN PPM)	
		CO	H_2S
Interference Gas	CO	1	< 0.02
	H_2S	< 0.02	1
	SO_2	0	=0.3
	NO	<0.1	
	H_2	<0.4	<0.1
	C_2H_5OH	0	= -0.005

Key: < Less than; ~ Approximate.

For each sensor type, the table shows how 1ppm of an Interference Gas appears on that specific sensor type. For example, 1ppm CO appears as less than <0.02ppm on a H_2S sensor.

Appendix C

SCOTT SUPPORT

Appendix Overview

This appendix covers the following topics:

- Technical Service
- Parts List
- Warranty Statement

Technical Service

Congratulations on your purchase of a Scott Safety product. It is designed to provide you with reliable trouble-free service.

Contact us, if you have technical questions, need support, or if you need to return a product.

When returning a product, contact Technical Support to obtain a Return Material Authorization (RMA) number prior to shipping for service repairs.

North America
Scott Safety
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4320 Goldmine Road
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Technical Support FAX: 704-291-8330
E-Mail: scotttechsupport@tycoint.com
Web Site: http://www.scottsafety.com/

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Service Dept
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Singapore 554911
Telephone: +65. 6883 9671
Fax:+65. 6234 2691
E-Mail: hokchan@tycoint.com

Parts List

Table 30 provides a parts list.

Table 30 Applicable Parts List

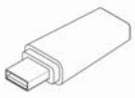
CATEGORY	ITEM	DESCRIPTION	PART NUMBER
Monitor		Monitor	096-3459-xx -01= CO (Red) -02= H_2S (Red) -03= O_2 (Red)
Accessories for Monitor		Calibration Cap/Adapter	074-0564
		Tygon Tubing 3/16”ID, 10’ length, Soft (For Non-Reactive gases)	096-3167
		Alligator Belt Clip	073-0355
Test Station		Test Station	096-3467-xx -01= Portable -02= Stationary
		USB Memory Drive (Scott branded)	093-0582
Accessories for Test Station		AC Power Adapter (12VDC, 18W)	028-0055
		International plug kit for AC Power Adapter	028-0056

Table 30 Applicable Parts List (continued)

CATEGORY	ITEM	DESCRIPTION	PART NUMBER
IR Connect		IR Connect	093-0588
		IR Connect USB Cable Note: For proper fit, use Scott provided USB cable.	093-0589
Manual		Protege ZM Gas Detector CD	096-3474
Gas Cylinders & Regulator		H_2S Single Gas Cylinder 25ppm, 34L bottle, (500PSI)	077-0272
		CO Single Gas Cylinder 100ppm, 103L bottle, (1000PSI)	077-0246
		O_2 Single Gas Cylinder 16%, 103L bottle, (1000PSI)	077-0039
		Regulator, 0.5LPM (For Manual Calibration)	077-0018
Note: For calibration equipment, contact your Scott sales representative.			

Warranty Statement

Scott Safety (SCOTT) warrants the Protege ZM PORTABLE GAS DETECTION MONITOR PRODUCTS (THE PRODUCTS) to be free from defects in workmanship and materials under normal use and service for a period of two (2) years beginning upon the date of activation for all Protégé ZM Oxygen Monitors and All Other Protégé ZM Monitors for three (3) years from date of activation or 24 months of operational life, whichever occurs first. This warranty is valid only if the detector is activated within one year from the original date of manufacture by SCOTT.

Scott Safety (SCOTT) warrants the Protege ZM TEST STATION PRODUCTS (THE PRODUCTS) to be free from defects in workmanship and materials under normal use and service for a period of two (2) years from the original date of manufacture by SCOTT.

Scott Safety (SCOTT) warrants the Protege IR Connect PRODUCTS (THE PRODUCTS) to be free from defects in workmanship and materials under normal use and service for a period of two (2) years from the original date of manufacture by SCOTT.

This warranty applies to all components of THE PRODUCTS supplied at the time of original sale of THE PRODUCTS, EXCEPT consumable items.

SCOTT's obligation under this warranty is limited to replacing or repairing (at SCOTT's option) THE PRODUCTS or components shown to be defective in either workmanship or materials.

Only personnel of SCOTT or, when directed by SCOTT, authorized SCOTT agents are permitted to perform warranty obligations. This warranty does not apply to defects or damage caused by any repairs of or alterations to THE PRODUCTS made by owner or any third party unless expressly permitted by SCOTT product manuals or by written authorization from SCOTT.

To obtain performance under this warranty, and as a condition precedent to any duty of SCOTT, the purchaser must return such products to SCOTT, a SCOTT authorized distributor or a SCOTT authorized service center. See “Technical Service” on page 86.

This warranty does not apply to any malfunction of or damage to THE PRODUCTS resulting from accident, alteration, misuse, or abuse.

THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIEDINCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN ADDITION, SCOTT EXPRESSLY DISCLAIMS ANY LIABILITY FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IN ANY WAY CONNECTED WITH THE SALE OR USE OF SCOTT PRODUCTS, AND NO OTHER FIRM OR PERSON IS AUTHORIZED TO ASSUME ANY SUCH LIABILITY.

SCOTT INDEX SAFETY

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