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GE Infrastructure
Sensing



Model PM880
Portable Hygrometer

User's Manual



GE Infrastructure Sensing

Model PM880 *Portable Hygrometer*



User's Manual

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PM880 is a GE Panametrics product. GE Panametrics has joined other GE high-technology sensing businesses under a new name—GE Infrastructure Sensing.



Warranty

Each instrument manufactured by GE Infrastructure Sensing, Inc. is warranted to be free from defects in material and workmanship. Liability under this warranty is limited to restoring the instrument to normal operation or replacing the instrument, at the sole discretion of GE Infrastructure Sensing, Inc. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If GE Infrastructure Sensing, Inc. determines that the equipment was defective, the warranty period is:

- one year from delivery for electronic or mechanical failures
- one year from delivery for sensor shelf life
- six months from delivery for probe calibration

If GE Infrastructure Sensing, Inc. determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by GE Infrastructure Sensing, Inc., the repairs are not covered under this warranty.

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If a GE Infrastructure Sensing, Inc. instrument malfunctions within the warranty period, the following procedure must be completed:

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2. If GE Infrastructure Sensing, Inc. instructs you to send your instrument to a service center, it must be shipped prepaid to the authorized repair station indicated in the shipping instructions.
3. Upon receipt, GE Infrastructure Sensing, Inc. will evaluate the instrument to determine the cause of the malfunction.

Then, one of the following courses of action will then be taken:

- If the damage is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
- If GE Infrastructure Sensing, Inc. determines that the damage is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs at standard rates will be provided. Upon receipt of the owner's approval to proceed, the instrument will be repaired and returned.

Table of Contents

Chapter 1: Getting Started

Charging the Battery Pack	1-2
Removing the Battery Pack	1-2
Configuring the Battery Charger	1-3
Charging the Battery Pack	1-4
Powering On and Off	1-5
Powering On.	1-5
Powering Off	1-6
Entering Data Using the Keypad	1-6
Entering Setup Data	1-7
Selecting Probe Type	1-7
Entering Calibration Data	1-9
Displaying Measurements	1-15
Saving Data in a Site File	1-17

Chapter 2: Taking Measurements

Installing the Probe into a Sample System	2-2
Connecting the Sample System to the Process	2-3
Making Probe Connections.	2-4
Recalling a Site File	2-5
Operating the Sample System.	2-6
Conducting a Leak Test	2-7
Shutting Down the Sample System	2-7

Table of Contents (cont.)

Chapter 3: Using the PM880 Screen

Screen Components	3-2
Setting Up the Screen to Display Measurements	3-4
Selecting the Number of Views (Measurements)	3-4
Selecting the Types of Measurements	3-4
Selecting Numeric, Line or Bar Graph Format	3-5
Setting Up the Numeric Format	3-6
Adjusting the Line/Bar Graph Scale	3-7
Creating Function Key Shortcuts	3-9
Assigning/Re-assigning a Function Key	3-9
Clearing a Function Key	3-10
Using the Backlight	3-10
Manually Turning Backlight On and Off	3-10
Setting the Backlight Timer	3-10
Adjusting the Contrast	3-11
Taking a Bitmap Screen Capture (Snapshot)	3-12

Chapter 4: Using Special Features

Selecting English or Metric Units	4-2
Entering Date and Time	4-2
Changing Date and Time Appearance	4-3
Adding a Message to a Site File	4-5
Setting a Probe Calibration Reminder	4-6
Using Automatic Calibration (Auto-Cal)	4-8
Entering Constants and User Functions	4-10
Entering a User Constant	4-10
Entering a Saturation Constant	4-12
Entering User Functions	4-14
Setting Up User Tables	4-19
Using Computer Enhanced Response	4-22
Entering Reference Data	4-24
Using Sleep Mode	4-26
Placing the PM880 in Sleep Mode	4-26
Resuming Operation	4-26
Displaying Meter Information	4-27
Changing the Display Language	4-28
Using On-Line Help	4-29

Table of Contents (cont.)

Chapter 5: Logging Data

Setting up a New Log	5-2
Pausing a Log	5-6
Starting or Restarting a Log	5-7
Ending a Log.	5-8
Viewing All Logs	5-9
Viewing Log Setup Details.....	5-10
Displaying Logged Data.....	5-12
Using the Graph Format.....	5-12
Using the Spreadsheet Format	5-16

Chapter 6: Managing Files

Saving a New Site File	6-2
Recalling a Site File	6-4
Saving a Site File	6-5
Renaming a Site or Log File.....	6-6
Renaming a Site File	6-6
Renaming a Log File	6-8
Copying a Log	6-9
Deleting All Types of Files.....	6-13
Sorting Files in the Site/Drive/Log Manager	6-15

Chapter 7: Using the PM880 with a PC and Printer

Setting Up PM880 IR Communications.....	7-2
Transferring and Printing Files Key	7-3
Printing a Site or Log File	7-4
Printing a Site File	7-4
Printing a Site File (cont.)	7-5
Printing a Log File	7-5
Printing Reports	7-7
Transferring a File To a PC.....	7-8
Transferring a File from a PC.....	7-11
Using Windows Explorer in Windows 95/98/2000..	7-11
Using Windows NT 4.0	7-12
Using Windows 2000.....	7-13

Table of Contents (cont.)

Chapter 8: Maintaining and Troubleshooting the PM880

Checking the PM880 Memory Status	8-3
Checking the Battery Status	8-4
While Taking Measurements	8-4
Using the Battery Command	8-4
Testing the Screen	8-6
Testing the Keypad	8-7
Testing the Watchdog Timer Circuit	8-8
Resetting to Factory Default Settings	8-9
Viewing or Changing Security Settings	8-11
Setting the Security Passcodes	8-12
Setting Remote Access Security	8-13
Updating PM880 Software	8-15
Upgrading Requirements	8-15
Updating Software via IrOBEX	8-17
Updating Software Via IrCOMM	8-19
Removing/Replacing the Batteries	8-22
Recharging the Batteries	8-23
Removing the Battery Pack	8-23
Configuring the Battery Charger	8-24
Charging the Battery Pack	8-25
Error and Screen Messages	8-26
Common Problems	8-30
Replacing and Recalibrating the Moisture Probes	8-33
Recalibrating the Pressure Sensors	8-34

Table of Contents (cont.)

Chapter 9: Features and Specifications

The PM880 Hygrometer	9-1
Probes	9-2
M Series and TF Series Moisture Probes	9-3
Moisture Image Series Probe	9-4
Cabling	9-5
Overall	9-6
Operational	9-6
Electronics	9-7
Moisture Measurement	9-9
Dew/frost Point Temperature	9-9
Temperature Measurement	9-10
Pressure Measurement	9-10
Sample System	9-11
Optional Accessories	9-11

Appendix A: Measurement Considerations

Choosing a Measurement Site	A-1
Moisture/Temperature Probe Considerations	A-2
Sample System Guidelines	A-5

Appendix B: Menu Maps

Chapter 1

Getting Started

The GE Infrastructure Sensing PM880 is a versatile, battery-powered portable hygrometer that is designed for spot sampling moisture measurements. Although the PM880 offers many options, it only requires battery charging and minimal setup to begin taking measurements.

This chapter is designed to provide a step-by-step guide to getting the meter up and running as quickly as possible. Additional programming options are discussed in later chapters.

Follow the sections in this chapter to setup your meter. This chapter includes the following information:

- Charging the batteries
- Powering On and Off
- Entering Data Using the Keypad
- Entering Setup Data
- Displaying Measurements
- Saving Data in Site Files

Charging the Battery Pack

The PM880 is powered by a rechargeable NiMH battery pack. When you receive the PM880, you will need to fully charge the pack. The pack must be charged 4-5 hours until the amber LED on the charger goes out to receive the maximum charge. When fully charged, the pack provides 16 to 24 hours of continuous operation, depending on the probe type and PM880 usage. An internal battery gauge indicates the remaining power in the pack.

Before you charge the battery pack you must make sure the charger is properly configured. Use the instructions below to properly charge the battery pack.

Removing the Battery Pack

1. Make sure you are in a general-purpose location where you can safely charge the pack.

!WARNING!

**THE BATTERY PACK CAN BE INSTALLED
AND REMOVED IN HAZARDOUS AREAS,
HOWEVER, IT MUST BE CHARGED
IN GENERAL-PURPOSE AREAS ONLY.**

2. Remove the four thumb screws on the back panel of the PM880 that secure the pack.
3. Lift the pack out of the unit.

Configuring the Battery Charger

The PM880 battery charger has a switchable voltage input of 115 to 230 VAC. Before you plug the pack into the charger you must make sure the voltage selector is in the correct position before plugging it in.

Caution!

The battery charger is intended for indoor use only. See *Specifications* for power cord type. Risk of electrical shock: dry locations use only. Charge on NiMH type rechargeable batteries. Other types of batteries may burst causing injury and/or damage.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

!DANGER!

TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK,
CAREFULLY FOLLOW GUIDELINES BELOW.

- a. BE SURE VOLTAGE SELECTOR IS IN CORRECT VOLTAGE POSITION BEFORE PLUGGING IN. SEE BOTTOM OF CHARGER.
- b. FOR USE IN THE U.S., THE VOLTAGE SELECTOR SWITCH MUST BE PLACED IN THE 115 VOLT POSITION.
- c. FOR USE IN COUNTRIES OUTSIDE THE U.S., PLACE THE VOLTAGE SELECTOR IN THE CORRECT POSITION. CONFIRM THE VOLTAGE AVAILABLE AT YOUR LOCATION BEFORE USING THE PRODUCT.
- d. FOR CONNECTION TO A SUPPLY NOT IN THE U.S., USE AN ATTACHMENT PLUG OR ADAPTOR OF THE PROPER CONFIGURATION FOR THE POWER OUTLET.

Charging the Battery Pack

1. Plug the pack into the battery charger.
2. Connect the charger to AC power. When power is applied, the amber LED glows and the charger automatically begins charging the pack.
3. The pack is fully charged when the amber LED goes out (approximately 4-5 hours).

IMPORTANT: *When you receive your unit, you should completely charge the battery pack before you use it for the first time.*

4. Remove the pack from the charger and reinstall it in the PM880. Refer to *Checking the Battery Status* on page 8-4 for details on monitoring the battery.

Powering On and Off

IMPORTANT: *For CE compliance, the PM880 is classified as a battery-powered device.*

Powering On

To turn the PM880 on, press the red button in the upper-right-hand corner of the keypad. Immediately upon power up the PM880 displays a series of messages and performs various checks. The screen then appears similar to the one shown in Figure 1-1 below.

Note: *If the meter displays a Probe Reminder message, press [ENTER].*

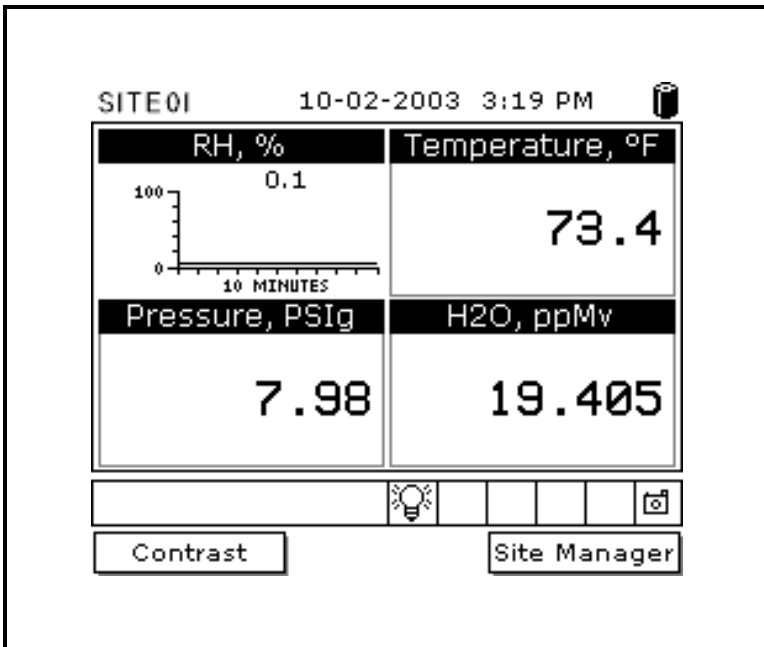


Figure 1-1: Screen After Powering On

Note: *If the meter fails any of these tests, contact GE Infrastructure Sensing.*

Powering Off

1. To turn the PM880 off, press the red key for 3 seconds. The screen now appears similar to Figure 1-2 below.
2. Press [F1] to shut down the PM880.

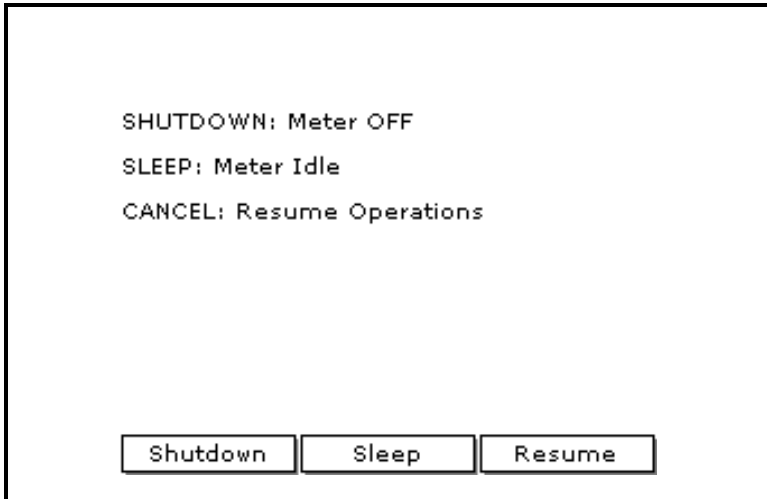


Figure 1-2: The Shutdown Menu

Entering Data Using the Keypad

Use the information below to familiarize yourself with how to enter data using the PM880 keypad.

Use the arrow keys to scroll to a menu topic and then press [ENTER] to open the menu item.

When entering data into a menu window, press:

- The [▼] key to scroll forward through the menu options.
- The [▲] key to scroll back through menu options.
- The [F2] key (Cancel) or the [ESC] key to exit a menu at any time and return to Operate Mode without changing data.

Note: *If you enter an incorrect numeric value, press the [◀] key to erase the last digit entered.*

Entering Setup Data

For immediate operation, the PM880 requires only a moisture probe and its corresponding calibration data. You should enter data for each site where you plan to make a measurement. Once entered, you can save it into a file that can be recalled at the measurement site. Use the sections that follow to program your meter.

Note: *The PM880 has additional menus that enable you to tailor measurements as specifically as possible to your particular application. For more information on menu options refer to Chapter 4, Using Special Features.*

Selecting Probe Type

Use the steps below to select the probe type for the measurement site. Refer to Figure 1-9 on page 1-19 for a menu map.

Note: *You may also enter a constant value for moisture, temperature or pressure measurement (rather than a live input). For more information refer to Entering Constants and User Functions on page 4-10.*

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to Program and press [ENTER].
3. Use the arrow key to scroll to Probe and press [ENTER]. The screen appears similar to Figure 1-3 below.

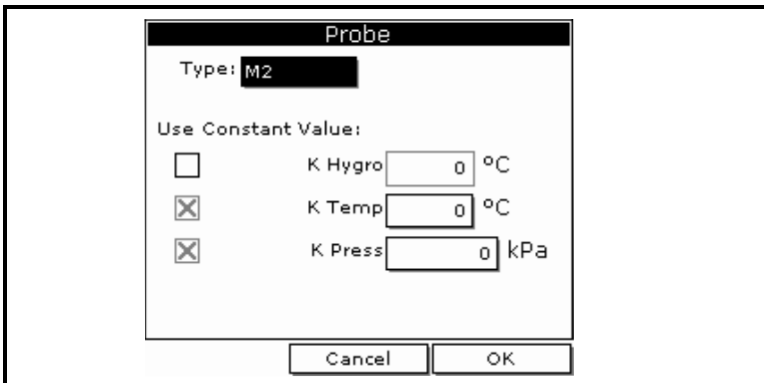


Figure 1-3: The Probe Window

Selecting Probe Type (cont.)

4. At **Type**, press [ENTER] to open the drop-down list of probe types.

Note: *If you do not know the probe type, refer to the Calibration Data Sheet.*

5. Use the arrow keys to scroll to the desired selection and press [ENTER].
6. Press [F3] (OK) to exit.

What's Next?

Do one of the following:

- If you are using an M and TF Series probes, proceed to *Entering Calibration Data* on the next page.
- If you are using an MIS Probe (MISP), proceed to *Displaying Measurements* on page 1-15.

Note: *If you have an MISP probe that was sent back to the factory for calibration **without** the electronics module you need to enter calibration data as described in *Entering Calibration Data* on the next page.*

Entering Calibration Data

The PM880 needs moisture and/or pressure calibration data for probes. You need to enter this data

- when setting up a new unit
- sent a probe(s) back to the factory for calibration

Be sure you have the **Calibration Data Sheets** that are supplied with each GE Infrastructure Sensing probe. Each Calibration Data Sheet consists of a list of data points that you will need to enter or verify, and lists its corresponding probe serial number. Calibration Data Sheets are usually packed inside the probe cases.

Since the PM880 enables you to use more than one probe, the meter provides a place to enter the probe serial number to help you match the probes to the corresponding site files. The probe serial number is stored as part of the site file.

Use the sections on the following pages to enter the serial number, moisture and pressure calibration data for the probes.

Entering Probe ID

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to Program and press [ENTER].
3. Use the arrow key to scroll to Calibrate and press [ENTER].
4. Use the arrow keys to scroll to the Probe ID tab and press [ENTER]. A screen similar to Figure 1-4 below appears.

The screenshot shows a window titled "Calibration - [0123456]". At the top, there are four tabs: "Hygro", "Pressure", "Saturation", and "Probe ID", with "Probe ID" being the active tab. Below the tabs, there are four input fields: "S/N:" with the value "123456", "PR" with a small box, "Calibrated On:" with the value "01-01-2003", and "Cal Reminder:" with the value "12 Months". At the bottom of the window, there are two buttons: "Cancel" and "OK".

Figure 1-4: The Probe ID Window

Entering Probe ID (cont.)

5. Use the arrow keys to scroll to S/N and press [ENTER].
6. Use the numeric keys to enter the serial number from the Calibration Data Sheet and press [ENTER]. The serial number is also scribed on the hex nut of the moisture probe.
7. Use the arrow keys to scroll to the suffix box and press [ENTER] to open the drop-down list.
8. Use the arrow keys to scroll to the desired suffix and press [ENTER].
9. Press [F3] (OK) to exit.

Entering Moisture Calibration Data

You only need to enter calibration data for M and TF Series probes. The Moisture Image[®] Series (MISP) probe stores all calibration data in its electronics module, and uploads it into the PM880 memory when needed.

Note: *It is not necessary to enter calibration data for the Moisture Image Series (MISP) unless you send the probe back to the factory for calibration **without** its electronics module. If this is the case, you must manually enter the calibration data as described below.*

Enter moisture calibration data (MH or FH) and dew point readings (up to 20 data points) for the moisture probe as described below. Refer to Figure 1-9 on page 1-19 for a menu map.

Note: *If you are using a MISP probe and do not need to enter data, proceed to Displaying Measurements on page 1-15.*

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to Program and press [ENTER].
3. Use the arrow key to scroll to Calibrate and press [ENTER].
4. If necessary, use the arrow key to scroll to Hygro and press [ENTER]. The screen appears similar to Figure 1-5 on the next page.

Entering Moisture Calibration Data (cont.)

5. Press [▼] to move the pointer to the 00/MH box in the calibration table.
6. Press [ENTER] to change the value. Use the numeric keys to enter the desired MH or FH value, and press [ENTER].

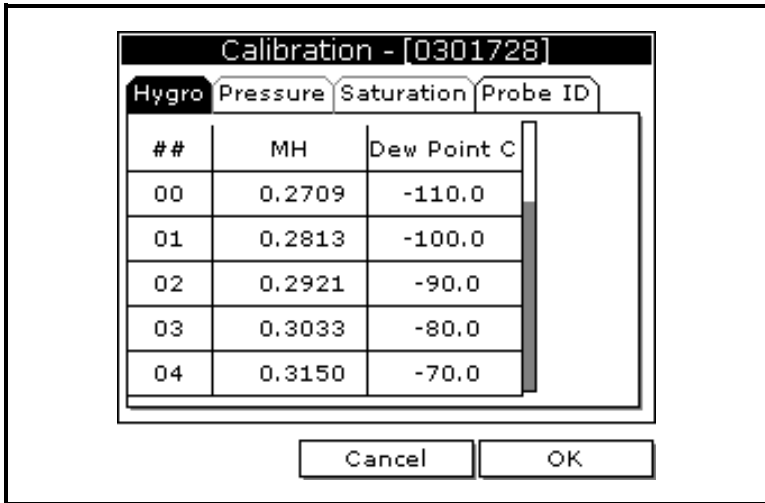


Figure 1-5: The Hygro Window in Calibration

7. Press [▶] to move to the next text box, and press [ENTER]. Use the numeric keys to enter the corresponding dew point reading and press [ENTER].
8. Use the arrow keys to scroll to additional data points and repeat steps 5, 6 and 7 until you have entered the values for each data point.

Note: To insert an additional data point, press [F1] (*Insert*).
To delete a data point, press [F2] (*Delete*).

9. When you have completed entering values, press [F3] (*EXIT*).

What's Next?

Do one of the following:

- If the probe has a pressure transducer, proceed to step 3 in *Entering Pressure Calibration Data* on the next page.
- If the probe does not have a pressure transducer, press [F3] (OK) and proceed to *Displaying Measurements* on page 1-15.

Entering Pressure Calibration Data

To enter calibration data for the pressure transducer, you must list the zero and span range in mV (or FP) and psig. Refer to Figure 1-9 on page 1-19 for a menu map.

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Program** and press [ENTER].
3. Use the arrow key to scroll to **Calibrate** and press [ENTER].
4. Use the arrow key to scroll to **Pressure** and press [ENTER].
The screen appears similar to Figure 1-6 below.

Note: *The corresponding mV value can be in psig (English) or kPa (metric). The supplied Calibration Data Sheets list these values in psig. If you want to change the system units to English, refer to Selecting English and Metric Units on page 4-2.*

The screenshot shows a calibration window titled "Calibration - [0123456]". At the top, there are four tabs: "Hygro", "Pressure", "Saturation", and "Probe ID". The "Pressure" tab is selected. Below the tabs is a table with three columns: "Zero", "mV", and "psig". The "Zero" row shows values 24.40 and 0.00. The "Span" row shows values 184.83 and 6895.00. Below the table are two buttons: "Cancel" and "OK".

	mV	psig
Zero	24.40	0.00
Span	184.83	6895.00

Figure 1-6: The Pressure Window in Calibration

5. Press [▼] to move the pointer to the Zero/mV (Zero/FP) box in the table.
6. Press [ENTER] to change the value. Use the numeric keys to enter the desired value and press [ENTER].
7. The corresponding pressure value box is highlighted. Use the numeric keys to enter the corresponding pressure value and press [ENTER].

Entering Pressure Calibration Data (cont.)

- 8.** The span mV box is highlighted. Repeat steps 5, 6 and 7 to enter the Span values.
- 9.** When you have completed entering values, press [F3] (Exit).
- 10.** Press [F3] (OK) and proceed to *Displaying Measurements* on the next page.

Displaying Measurements

The PM880 can display one to four measurement parameters simultaneously. There are two parts for displaying measurements: selecting the number of measurements and then selecting the type of measurements. Refer to Figure 1-9 on page 1-19 for a menu map.

Selecting the Number of Measurements

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Site** and press [ENTER].
3. Use the arrow keys to move to the desired number of views or measurement windows (1 View, 2 Views, etc.).
4. Press [ENTER] at your selection. The screen displays the designated number of views (measurement windows).

Selecting the Types of Measurements

1. Press [SEL] or arrow keys to move the pointer to the window you want to change and press [ENTER].
2. Use the arrow keys to scroll to **Measurement** and press [ENTER]. The screen appears similar to Figure 1-7 below. The left column displays the five measurement types and the right column displays the measurement units.

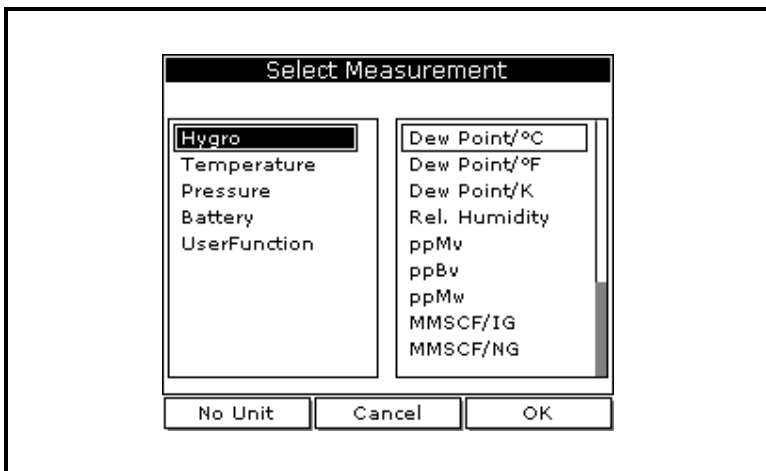


Figure 1-7: The Select Measurement Window

Displaying Measurements (cont.)

Selecting the Types of Measurements (cont.)

3. Use the arrow keys to scroll to the desired measurement type and press [SEL].
4. Use the arrow keys to select the desired measurement unit (or diagnostic parameter).

Note: *Press [F3] (No Unit) to display a measurement with no units.*

5. Press [F3] (OK).
6. Repeat this section for displaying other measurements.

Saving Data in a Site File

A site file contains probe ID, calibration data and display setup information into a file so it can be recalled at the measurement site. Use the following steps to store the data you have entered into a file (refer to Figure 1-9 on page 1-19 for a menu map):

Accessing the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **Site Manager** and press [ENTER].
4. Press [MENU].
5. Use the arrow key to scroll to **File** and press [ENTER].

Entering a Site Name

1. Use the arrow keys to scroll to **New** and press [ENTER]. The screen appears similar to Figure 1-8 below.

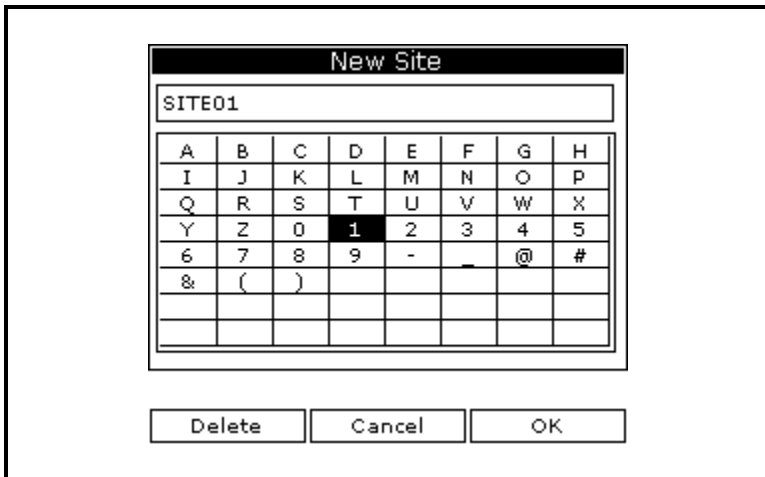


Figure 1-8: Name Entry Window for a New Site

Saving Data in a Site File (cont.)

2. The PM880 displays a default name for the file. If you want to keep the default name, skip to step 4. Otherwise, use [F1] to erase the name and use the arrow keys to scroll to the desired letter or number and press [ENTER].
3. Repeat this procedure until you have created the desired site name of up to eight characters.
4. When you have finished, press [F3] (OK).
5. The PM880 prompts you to save the site file as a template. This is useful if you need to create multiple sites with similar data. At the prompt, do one of the following:
 - Press [F2] (No) if you do not need to use a template, or
 - Press [F3] (Yes) if you do want to use it as a template.

Note: *If you are saving a new file as a template, the PM880 will ask if you want to Save Current Site, press [F2] (No) or [F3] (Yes).*

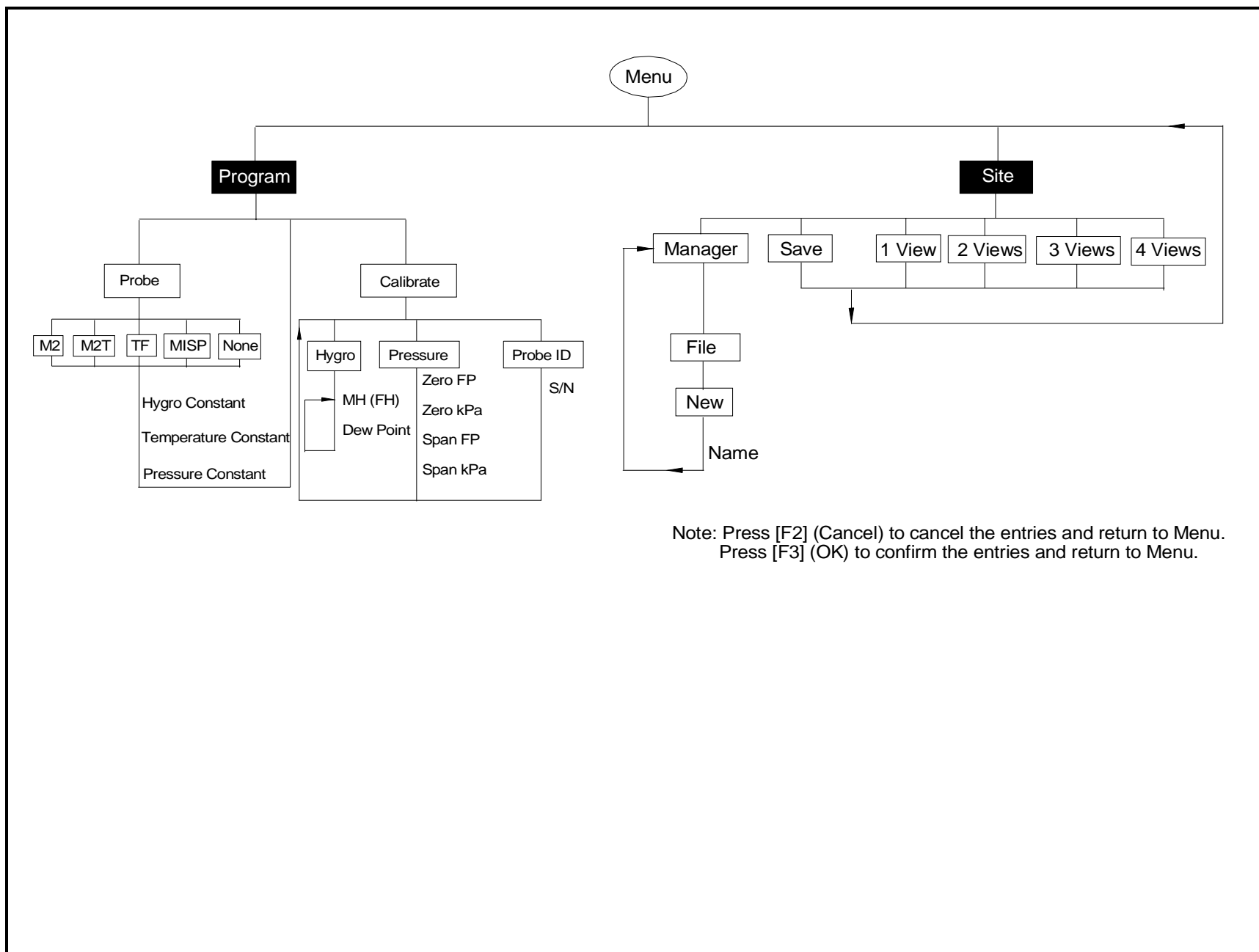
6. Press [F3] (Exit).
7. Press [MENU]. The new site name is displayed in the upper left corner of the screen. You have completed entering site data.

What's Next?

Do one of the following:

- If you are done entering site data, proceed to the next chapter, *Taking Measurements*.
- If you need to enter information for another site, go back to *Entering Setup Data* on page 1-7.

Note: *If you need to create multiple site files with similar data, you can save time by creating one site file and then using **Save As** in the Site Manager to create a copy of that site file with a different name. Refer to *Renaming a Site File* on page 6-6.*



Note: Press [F2] (Cancel) to cancel the entries and return to Menu.
 Press [F3] (OK) to confirm the entries and return to Menu.

Figure 1-9: Getting Started Menus

Chapter 2

Taking Measurements

The PM880 hygrometer is part of measurement system that consists of the electronics, cable, probe and optional sample system. Once the electronics are properly programmed, you must connect the sample system and probes to begin taking measurements. This chapter discusses the steps needed to begin taking basic measurements.

Note: *Refer to Appendix A, Measurement Considerations, for more information on selecting measurement sites and sample system construction.*

- Installing the Probe into a Sample System
- Connecting the Sample System to the Process
- Connecting the Probe to the Electronics
- Recalling a Site File
- Operating the Sample System
- Conducting a Leak Test
- Shutting Down the Sample System

Installing the Probe into a Sample System

Moisture probes are installed into a portable sample system. The sample system protects the probes from coming into contact with damaging elements in the process.

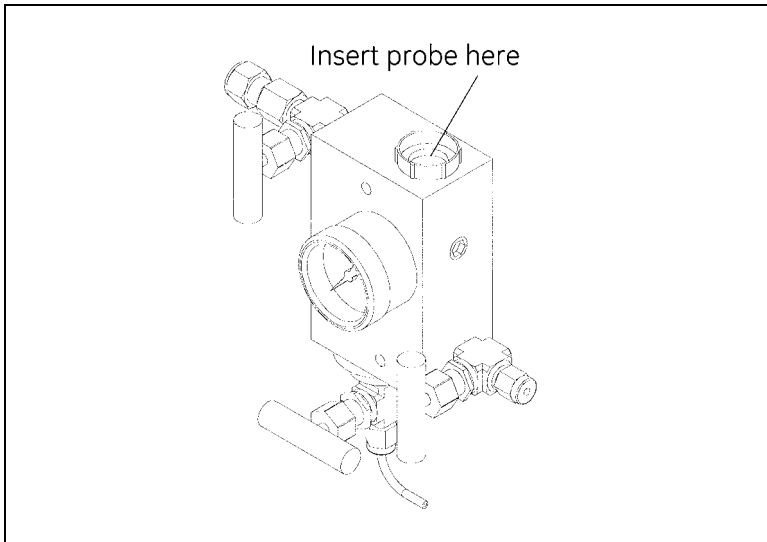
Caution!

If you are mounting the moisture probes directly into the process line, you must consult GE Infrastructure Sensing for proper installation instructions and precautions.

To install a moisture probe:

1. Screw the probe into the receptacle fitting, making sure not to cross thread it. Install moisture probes with different fittings in the appropriate manner.

Note: *Standard moisture probes have a sintered stainless-steel shield that protects the aluminum oxide sensor. Leave the shield in place for maximum protection.*



2. Hand-tighten the probe in a clockwise direction, then tighten it an additional 1/8 turn with a wrench.

Connecting the Sample System to the Process

To connect the sample system to the process at the measurement site, refer to Figure 2-1 below and complete the following steps:

1. Crack open the existing pipeline sample tap valve to clean the sample tap.
2. Close the pipeline sample tap valve.
3. Remove the sample system from its case.
4. Be sure the sample system inlet needle valve is closed and the filter/coalescer outlet needle valve and sample outlet needle valve are open.
5. Connect the sample system to the sample tap. We recommend using 1/4" stainless steel tubing. The distance from the sample tap to the sample system should be as short as possible, typically 5 to 15 feet (1.5 to 4.5 m) male NPT process connection provided.



Figure 2-1: The Sample System and the PM880

Making Probe Connections

Use the following steps to make probe connections:

1. Make sure the PM880 is turned off.
2. Connect the cable to the probe by inserting the bayonet-type connector onto the probe and twisting the shell clockwise until it snaps into a locked position.

Note: *The connector on the probe cable must be rotated until it aligns with the pins in the probe connector, before the cable may be properly inserted into the probe and secured.*

3. Connect the other end of the probe cable to the top of the unit by aligning the red dot on the cable connector at the 12 o'clock position. See Figure 2-2 below for the connector location.

Note: *Remove the probe cable by pulling back the spring-loaded sleeve and pulling the cable out of the connector.*

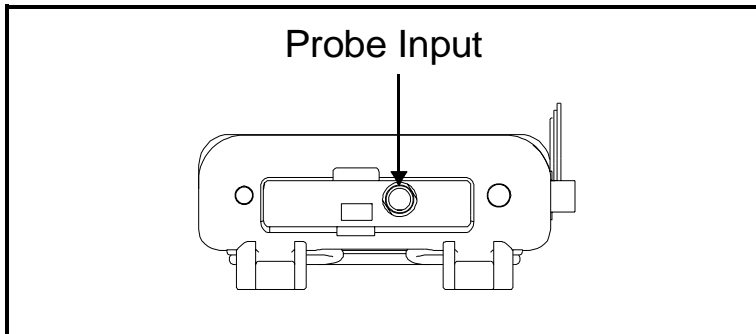


Figure 2-2: Connection Locations

!WARNING!
TO ENSURE THE SAFE OPERATION OF THE PM880,
YOU MUST INSTALL AND OPERATE IT
AS DESCRIBED IN THIS MANUAL. IN ADDITION,
BE SURE TO FOLLOW ALL APPLICABLE
SAFETY CODES AND REGULATIONS FOR INSTALLING
ELECTRICAL EQUIPMENT IN YOUR AREA.

Recalling a Site File

To begin taking measurements you must recall the site file that contains data for the measurement site where you want to take measurements.

Accessing the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **Site Manager** and press [ENTER].

Retrieving the Site File

1. Use the arrow key to scroll to the desired site and press [MENU].
2. Use the arrow key to scroll to **File** and press [ENTER].
3. Use the arrow key to scroll to **Open** and press [ENTER].
4. The PM880 asks you to confirm, press [F3] (**Yes**).
5. Press [F3] (**Exit**).
6. Press [MENU]. The PM880 displays the selected site file in the upper-left of the screen.

Operating the Sample System

Refer to Figure 2-3 while performing this procedure.

1. Crack open the sample inlet valve allowing a low volume purge of the sample system.
2. **Very slowly** open the inlet valve allowing it to reach process pressure.
3. Begin closing the filter/coalescer outlet needle valve and the sample outlet valve until both valves are **nearly** closed.
4. Adjust the sample outlet needle valve and the filter/coalescer outlet valve until you feel a slight pressure against your finger at the venting tubes.
5. Open the inlet valve fully. Be sure the flow out of the venting tubes remains the same as in step 4. To prevent physical damage, do not subject the probe to excessive flow.
6. Turn on the PM880.

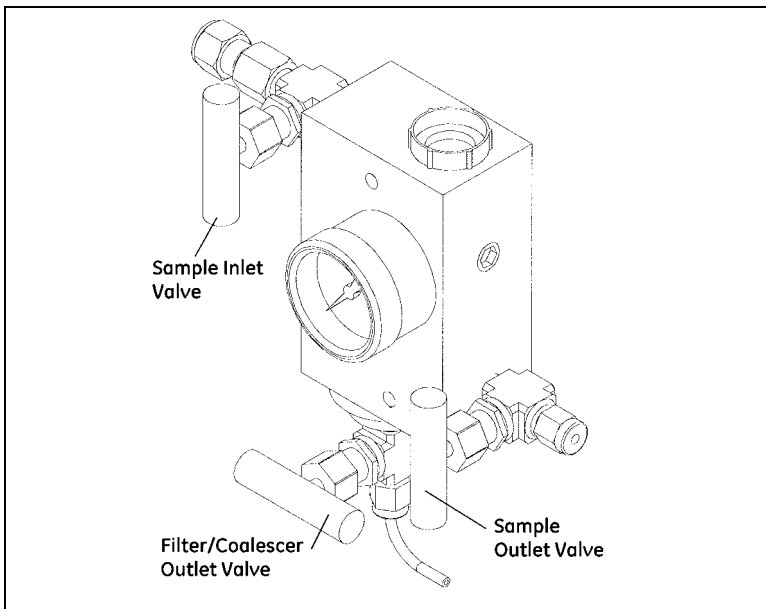


Figure 2-3: Valve Locations on the Sample System

Conducting a Leak Test

It is important to eliminate all leaks for safety reasons and to be sure that measurements are not affected by ambient contamination. Use Snoop Leak Detector or a soapy solution to verify that all connections, valves and fittings are leak tight. Tighten any fittings where a leak is detected.

Shutting Down the Sample System

1. Close the sample outlet needle valve.
2. Slowly open the filter/coalescer outlet needle valve several turns to blow out any contaminants that may have accumulated in the coalescer, valve, or venting tube.
3. Slowly close the sample inlet valve and allow the sample system to depressurize at a rate of approximately 10 psig per second.
4. Close the sample tap valve (permanently mounted on the pipeline).
5. Crack the inlet needle valve to relieve the pressure between the sample tap valve and the inlet needle valve.
6. Completely close all three sample system valves.
7. Remove the sample system from the process, while keeping all valves fully closed to avoid moisture contamination from the ambient air.

Chapter 3

Using the PM880 Screen

Use the sections that follow to setup and make adjustments to the PM880 screen. This chapter discusses the following:

- Screen Components - page 3-2
- Setting Up the Screen to Display Measurements - page 3-4
- Creating Function Key Shortcuts - page 3-9
- Using the Backlight - page 3-10
- Adjusting the Contrast - page 3-11
- Taking a Bitmap Screen Capture (Snapshot) - page 3-12

Screen Components

The PM880 screen displays various information (see Figure 3-1 below). The top line of the screen is the **status bar** that displays the current site being used, time, date and battery status during normal operation. However, the status bar changes to a **menu bar** when programming.

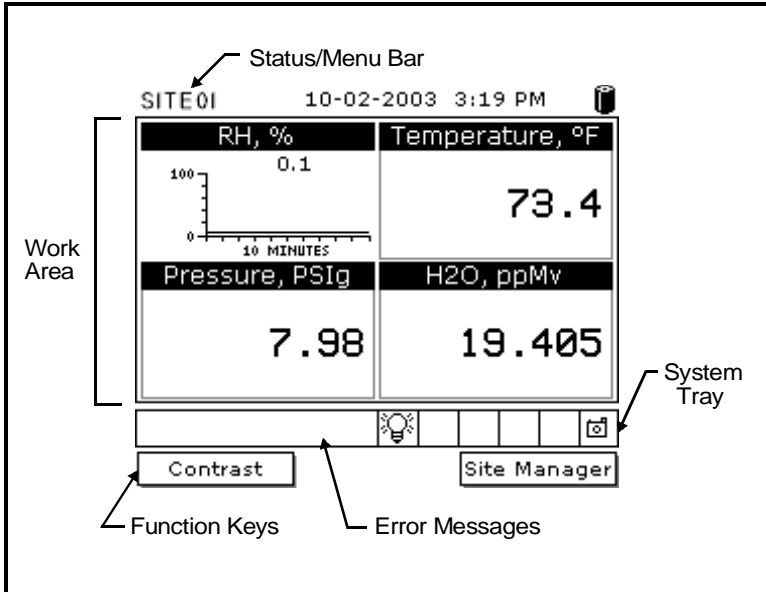









Figure 3-1: The PM880 Screen in Operate Mode

The middle of the screen is the **work area** that displays measurements numerically or as bar or line graphs. During programming, the work area displays menu prompts. The bottom of the screen displays **error messages** (see *Error and Screen Messages* on page 8-26 for more details), the **system tray**, and the **function keys**.

The system tray displays icons that indicate meter operations not otherwise shown (see Table 3-1 on the next page for a list of icons). The three function keys (F1, F2 and F3) have different functions, depending on the task you are performing.

Screen Components (cont.)

Table 3-1: Icons in the System Tray

Icon	Function	Meaning
	IR Transfer	IR data transfer in progress.
	Alert	Indicates the meter encountered an error in operation.
	Log	Indicates a log is pending (no marks) or running (marks).
	Backlight	Indicates that backlight has been activated.
	Low Battery Alert	Indicates 10 minutes or less of battery run time.
	Snapshot (To file)	Indicates that the Snapshot function has been activated, so users can take screen captures.
	(To Printer)	

Setting Up the Screen to Display Measurements

The PM880 can display one to four measurements simultaneously. After you select how many measurements to display, you can select the type of measurements (dew point, temperature, etc.) and the format (numeric, line or bar graph). In addition, the PM880 offers various options for displaying data numerically and graphically.

This section consists of the following:

- Selecting the Number of Views (Measurements) - page 3-4
- Selecting the Types of Measurements - page 3-4
- Selecting Numeric, Line or Bar Graph Format - page 3-5
- Setting Up the Numeric Format - page 3-6
- Adjusting the Line/Bar Graph Scale - page 3-7

Use the section(s) that follow to set up the PM880 screen.

Selecting the Number of Views (Measurements)

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Site** and press [ENTER].
3. Use the arrow keys to move to the desired number of views or measurement windows (1 View, 2 Views, etc.).
4. Press [ENTER] at your selection. The screen displays the designated number of views (measurement windows).

Selecting the Types of Measurements

1. Press [SEL] to move the pointer to the window you want to change and press [ENTER].
2. Use the arrow keys to scroll to **Measurement** and press [ENTER]. The screen appears similar to Figure 3-2 on the next page. The left column displays the five measurement types and the right column displays the measurement units.

Selecting the Types of Measurements (cont.)

- Use the arrow keys to scroll to the desired measurement type and press [SEL].
- Use the arrow keys to select the desired measurement unit (or diagnostic parameter).

Note: Press [F3] (No Unit) to display a measurement with no units.

- Press [F3] (OK).
- Repeat this section for displaying other measurements.

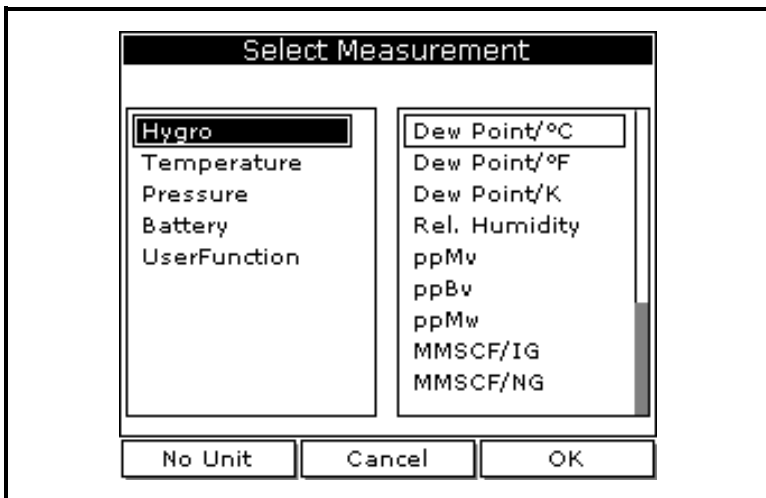


Figure 3-2: The Select Measurement Window

Selecting Numeric, Line or Bar Graph Format

- Press [SEL] to move the pointer to the window you want to change and press [ENTER].
- Use the arrow keys to scroll to View and press [ENTER].
- Use the arrow keys to select the desired format and press [ENTER].

The PM880 displays the desired format and returns to taking measurements.

Setting Up the Numeric Format

1. Press [SEL] to move the pointer to the window you want to change and press [ENTER].
2. Use the arrow keys to scroll to Format and press [ENTER].
The screen appears similar to Figure 3-3 below.

Note: *If **FORMAT** does not appear in the menu, move to a window that is **not** displaying a line or bar graph, or change the window format to numeric as described in the previous section.*

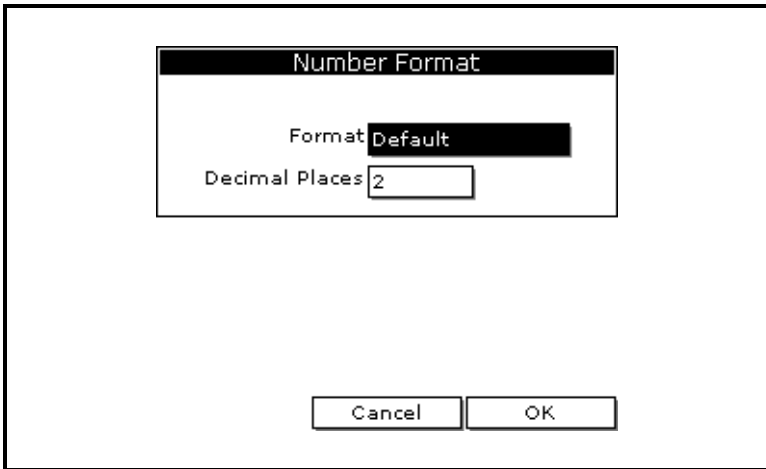


Figure 3-3: The Number Format Window

3. Use the arrow keys to scroll to Format and press [ENTER].
4. Use the arrow keys to select the desired selection and press [ENTER]. You can select from the following:
 - Default - displays the factory default number of decimal digits for the selected measurement.
 - Fixed Decimal - specify how many digits to the right of the decimal
 - Scientific format - displays the value in mantissa exponent format (expressed to the power of 10).

Setting Up the Numeric Format (cont.)

- Repeat steps 3 and 4 for **Decimal Places** or proceed to the next step to exit. You can select from 0 to 4 places.
- Press [F3] (OK).

The PM880 displays the new format and returns to taking measurements.

Adjusting the Line/Bar Graph Scale

The scale of the line and bar graph can be adjusted at any time. You can also alter the graph to display details such as...

- Press [SEL] to move the pointer to the window you want to change and press [ENTER].
- Use the arrow keys to scroll to **Limits** and press [ENTER]. A screen similar to Figure 3-4 below appears

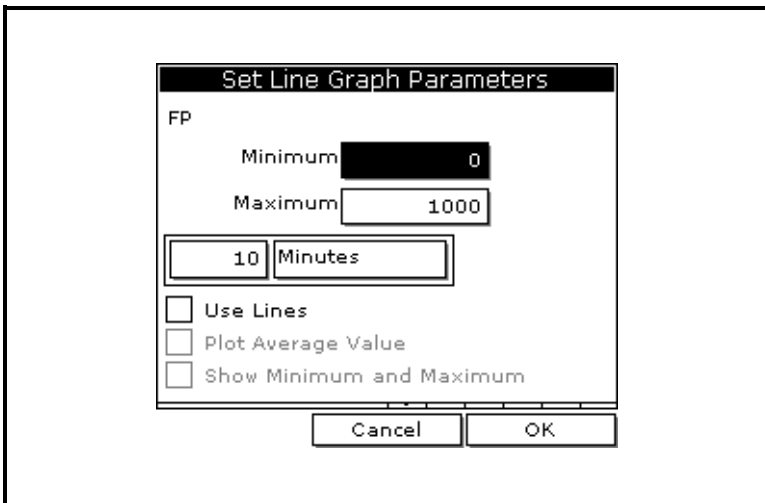


Figure 3-4: The Line Graph Parameters Window

- Use the arrow keys to scroll to **Minimum** and press [ENTER].
- Use the numeric keys to enter the minimum value for the graph and press [ENTER].

Adjusting the Line/Bar Graph Scale (cont.)

5. Repeat steps 3 and 4 for the maximum value.
6. Do one of the following:
 - If you are using a line graph, proceed to step 7.
 - If you are using a bar graph, proceed to step 10.
7. Use the arrow keys to scroll to the time interval and press [ENTER].
8. There are two boxes for entering the time interval. The first box is for a number (1, 2, etc.). The second box asks for the interval (seconds, minutes, hours or days). Use the numeric keys or arrow keys to select the desired interval and press [ENTER].
9. The last three selections enable you to enhance the line graph details. Use the arrow keys to scroll to the desired entry and press [ENTER]. An X in the box activates the option. Choose from the following:
 - Use lines (connect points on graph with lines)
 - Plot average value (not currently available)
 - show minimum and maximum (not currently available)
10. Press [F3] (OK).

The PM880 displays the new format and returns to taking measurements.

Creating Function Key Shortcuts

The three function keys at the bottom of the PM880 screen can be customized to provide shortcuts to the most commonly used functions. For example, the F1 key can be assigned to go directly to the Log Manager. Once assigned, a function key can also be cleared. Use the sections below to performed the desired function.

Assigning/Re-assigning a Function Key

The function keys can be assigned using two methods as described below.

Note: *You can re-assign the function key at any time by assigning a different function.*

Method 1: Using the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **FKeys** and press [ENTER].
4. Use the arrow keys to scroll to the desired key and press [ENTER].
5. Use the arrow keys to scroll to the desired function from the displayed list.
6. Press [F3] (YES).

The PM880 returns to taking measurements. The newly assigned function appears above the assigned function key.

Method 2: Using the Program Menus

1. Use the keypad to go to the desired function that you want to assign to the function key.
2. Press the desired function key. A window appears with the question, "Assign current menu command (XX) to FKeyX?"
3. Press [F3] (OK).

The PM880 returns to taking measurements. The newly assigned function appears above the assigned function key.

Clearing a Function Key

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **FKeys** and press [ENTER].
4. Use the arrow keys to scroll to **Clear F1 (F2 or F3)** and press [ENTER].

The PM880 returns to taking measurements. The previously assigned function is erased.

Using the Backlight

The PM880 has a backlight that helps in viewing data. Since the backlight uses more energy, the PM880 has a backlight timer that you can set to automatically turn the backlight off after a specified time in order to conserve battery life. The PM880 also enables you to turn the backlight on and off manually. Use the sections that follow to operate the backlight.

Manually Turning Backlight On and Off

To manually turn the backlight:

- **On** - press any key on the keypad and the backlight will stay on for the programmed interval. You can also press the power key briefly (about one-half second) and the backlight will stay on for 30 minutes.
- **Off** - press the red power key briefly (about one-half second).

Setting the Backlight Timer

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Backlight** and press [ENTER].

Setting the Backlight Timer (cont.)

4. Use the arrow key to scroll to **Backlight Off** and press [ENTER].
5. Use the numeric keys to enter the number of minutes that the backlight remains on (from 0 to 60).
6. Press [ENTER] to confirm the entry.
7. When you are done, press [F3] (OK). The PM880 returns to taking measurements.

Adjusting the Contrast

To adjust the screen contrast:

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Contrast** and press [ENTER]. A screen similar to Figure 3-5 below appears.

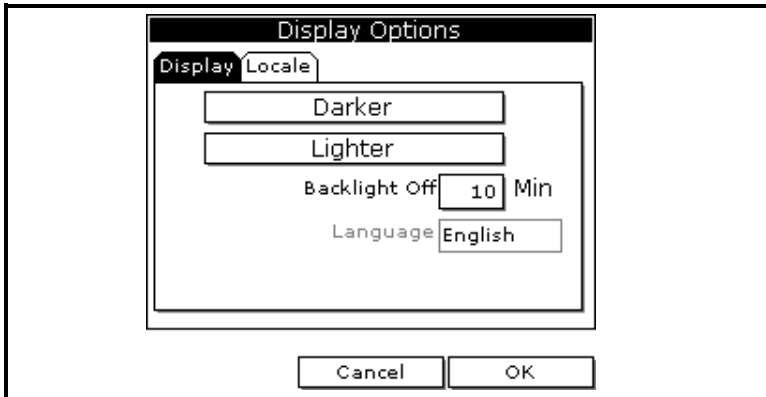


Figure 3-5: Display Tab in the Display Options Window

4. Use the arrow keys to scroll to **Darker** or **Lighter**.
5. Press the [ENTER] button repeatedly until the screen has the desired contrast.
6. When you are done, press [F3] (OK).

The PM880 returns to taking measurements.

Taking a Bitmap Screen Capture (Snapshot)

The Snapshot option enables you to take a screen capture of the current screen in bitmap format (.bmp). Bitmaps can be stored in a file or sent directly to a printer. To take a “snapshot” of the screen:

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Snapshot** and press [ENTER].
4. Use the arrow key to scroll to the desired selection and press [ENTER]. You can choose from the following:
 - **Off** - to turn the snapshot feature off.
 - **To Printer** - to send the snapshot to the printer.
 - **To File** - to send the snapshot to a file.

Note: *In order to send a screen capture to a printer, the PM880 must be properly configured to IR transfer. Refer to Setting Up the PM880 IR Communications on page 7-2.*

An icon of a printer or camera appears on the system tray (see page 3-3) indicating that you have activated the Snapshot option.

5. To capture a screen, press the “.” (decimal) button twice. The meter displays a clock and the message “Screen Dump,” indicating that it is performing a screen capture.

Note: *The snapshot function is deactivated once the power is turned off.*

Taking a Bitmap Screen Capture (Snapshot)

6. If you selected:

- To Printer - the PM880 indicates it is looking for a receiving printer and then transmits the file.

Note: *If the sensor cannot locate a printer, a window appears indicating that it cannot find a device. If it locates more than one compatible infrared device within its range, it asks you to select the desired device.*

- To File - the captured file appears as *ScreenXX.bmp* in the Drive Manager. To transfer the file to a PC, follow the instructions in *Transferring a File to a PC* on page 7-8.

Chapter 4

Using Special Features

The PM880 has a variety of other features to make operation even more convenient. Below is a list of some of the features available. For other features related to testing and service functions, refer to Chapter 8, *Maintaining and Troubleshooting the PM880*.

- Selecting English or Metric Units - page 4-2
- Entering Date and Time - page 4-2
- Changing the Date and Time Appearance - page 4-3
- Adding a Message to a Site File - page 4-5
- Setting a Probe Calibration Reminder - page 4-6
- Using Automatic Calibration - page 4-8
- Entering Constants and User Functions - page 4-10
- Using Computer Enhanced Response - page 4-22
- Entering Reference Data - page 4-24
- Using the Sleep Mode - page 4-26
- Displaying Meter Information - page 4-27
- Changing the Display Language - page 4-28
- Using On-Line Help - page 4-29

Selecting English or Metric Units

The PM880 enables you to select either English or Metric units as global measurement units. The selected units become the default settings for every measurement that has the option for metric/English units. To select the measurement units:

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Units** and press [ENTER].
4. Use the arrow keys to scroll to the desired units and press [ENTER].
5. Press [F3] (OK) and then [MENU].

The PM880 returns to taking measurements.

Entering Date and Time

The PM880 displays the current date and time above the measurements in the upper right corner of the screen. The **Date/Time** command allows you to set the date or time. The current date and time are required for correct data logging operation.

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Date/Time** and press [ENTER].
4. Use the arrow keys to scroll to **Date** and press [ENTER].
5. Use the numeric and arrow keys to enter the current month, day and year, and press [ENTER].
6. Use the arrow keys to scroll to **Time** and press [ENTER].
7. Use the numeric and arrow keys to enter the current time and press [ENTER].
8. Press [F3] (OK) and then [MENU].

The PM880 returns to taking measurements. The new date and time are displayed.

Changing Date and Time Appearance

In addition to setting the correct date and time, you can also change its presentation to suit local preferences. You can select various date format and a time display of AM/PM or 24-hour time. To alter the time and date display:

Accessing the Locale Tab

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Locale** and press [ENTER]. A screen similar to Figure 4-1 appears below.

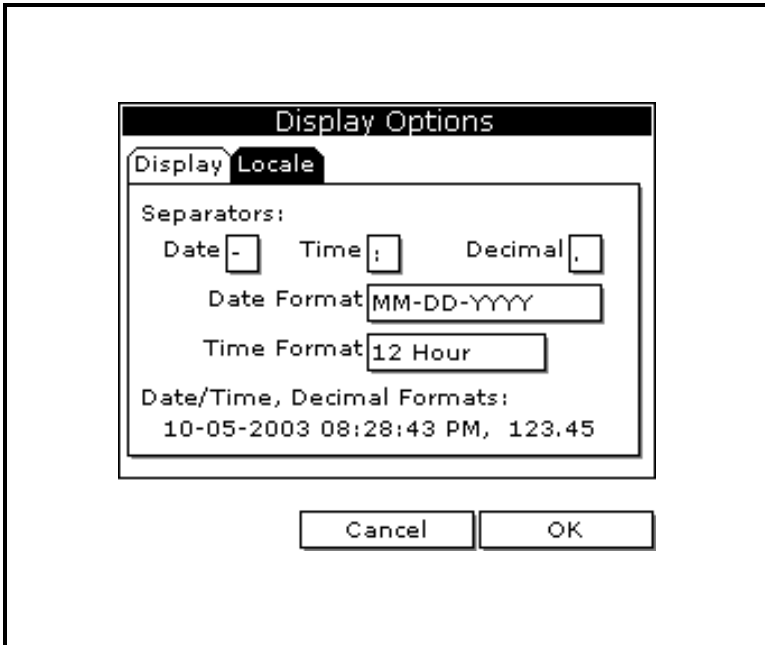


Figure 4-1: Locale Tab

Changing Date and Time Appearance (cont.)

Selecting the Separator

1. Use the arrow keys to scroll to the date separator and press [ENTER].
2. Use the arrow keys to scroll to the desired separator and press [ENTER].
3. Repeat steps 1 and 2 for the other separators.

Selecting the Date/Time Format

1. Use the arrow keys to scroll to Date Format and press [ENTER].
2. Use the arrow keys to scroll to the desired format and press [ENTER].
3. Repeat steps 1 and 2 for the time format.
4. Press [F3] (OK) and then press [MENU].

The PM880 returns to taking measurements. The new date and time formats are displayed.

Adding a Message to a Site File

The Site Manager has a command that enables you to enter a message or description for each site file (up to 30 characters). The Site Manager displays the site message with the other file information. To add a site message:

Accessing the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **Site Manager** and press [ENTER].

Selecting a Site File

1. Use the arrow key to scroll to the desired site.

Note: *The list of site files in the Site Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **Site** and press [ENTER].
4. Use the arrow key to scroll to **Message** and press [ENTER].

Entering a Site Message

1. Press [F1] (**Delete**) to delete any unwanted letters or numbers. Use the arrow keys to scroll to the desired letter or number and press [ENTER]. To change case or use special characters, press [SEL] to change the character pages.
2. Repeat this procedure until you have created the desired site message.
3. When you have finished, press [F3] (**OK**).

The new site information will be displayed when the site is selected in the Site Manager.

4. Press [F3] (**Exit**).

Setting a Probe Calibration Reminder

The **Probe ID** command enables you to enter the probe serial number, calibration dates and a calibration reminder. Use the following steps to enter probe data:

Accessing the Probe ID Tab

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Program** and press [ENTER].
3. Use the arrow key to scroll to **Calibrate** and press [ENTER].
4. Use the arrow keys to scroll to the **Probe ID** tab and press [ENTER]. A screen similar to Figure 4-2 appears.

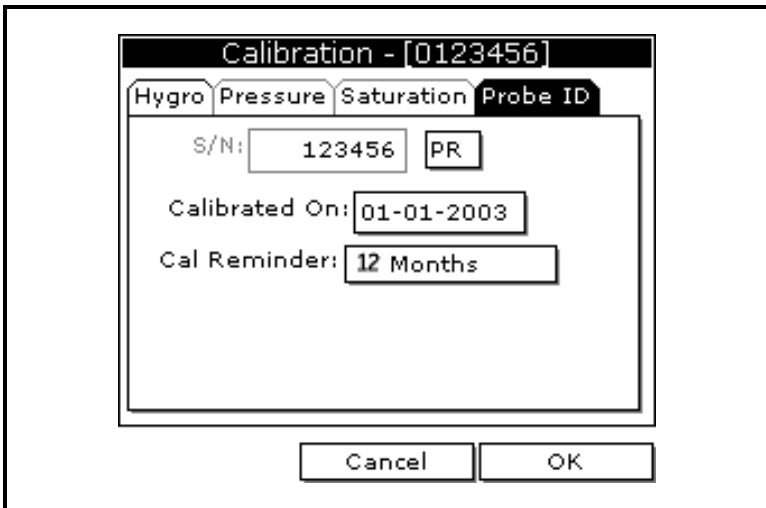


Figure 4-2: The Probe ID Window

Entering Probe Information

1. Use the arrow keys to scroll to **S/N** and press [ENTER].
2. Use the numeric keys to enter the serial number from the Calibration Data Sheet and press [ENTER]. The serial number is also scribed on the hex nut of the moisture probe.

Setting a Probe Calibration Reminder (cont.)

Entering Probe Information (cont.)

3. Use the arrow keys to scroll to the suffix box and press [ENTER] to open the drop-down list.
4. Use the arrow keys to scroll to the desired suffix and press [ENTER].
5. Use the arrow keys to scroll to Calibrated On and press [ENTER].
6. Use the numeric and arrow keys to enter the most recent calibration date. When you have entered the desired month, day and year, and press [ENTER].

Note: *Refer to the calibration data sheet for the most recent calibration date.*

7. Use the arrow keys to move to Cal Reminder and press [ENTER]. This prompt asks you to select a time period for the next probe calibration. The PM880 will display a calibration reminder for the probe determined from the last calibration date. GE Infrastructure Sensing recommends recalibrating a probe a minimum of once a year.
8. Use the arrow keys to move to the desired selection and press [ENTER].
9. Press [F3] (OK) and then [MENU].

The PM880 returns to taking measurements.

What's Next?

The calibration reminder is part of the site file; therefore, if you are not planning on making any more changes to the site file you should save the new changes. Refer to *Saving a New Site File* on page 6-2.

Using Automatic Calibration (Auto-Cal)

The PM880 automatically calibrates the moisture and pressure measurement circuitry (Auto-cal) at a user-selected interval. Auto-cal compensates for any drift in the electronics. GE Infrastructure Sensing recommends setting the AutoCal interval to 8 hours. Set a smaller interval to Auto-cal more frequently if the meter is exposed to extreme temperatures or weather conditions.

Note: *If you are only using Moisture Image Series (MIS) probes to measure moisture, the System Menu is not available.*

Use the steps below to enter an Auto-cal interval:

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to Program and press [ENTER].
3. Use the arrow key to scroll to System and press [ENTER]. A screen similar to Figure 4-3 below appears.

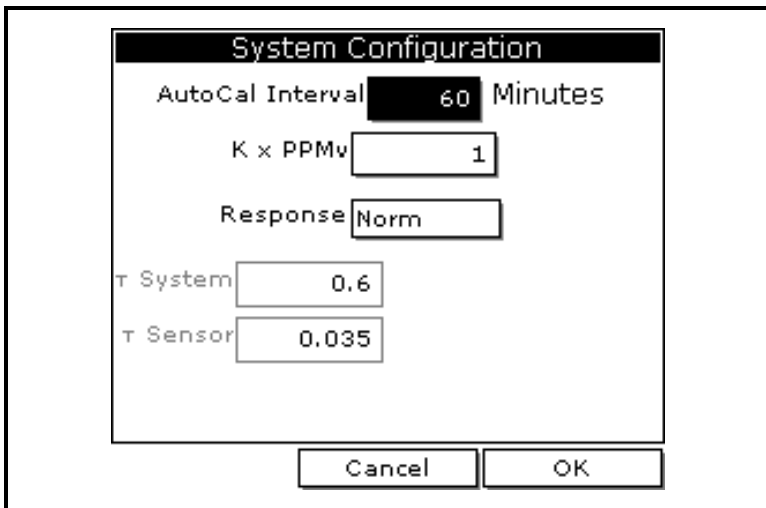


Figure 4-3: The System Configuration Window

Using Automatic Calibration (Auto-Cal)

4. If necessary, use the arrow keys to move to the AutoCal Interval text box.
5. Press [ENTER] to open the text box. Use the numeric keys to enter the desired value (in minutes) and press [ENTER].

Note: *GE Infrastructure Sensing recommends setting the AutoCal interval to 8 hours (480 minutes).*

The next time Auto-cal occurs will depend on the length of the time interval that was selected. See the example below.

EXAMPLE:

The PM880 establishes a fixed schedule, beginning at midnight, using the interval specified to determine the times of subsequent Auto-cals. If you enter an 8 hour time interval, Auto-cal will occur 3 times per day (1 day = 1440 minutes/480 minutes = 3). The fixed schedule will be as follows:

1.8:00 a.m.

2.4:00 p.m.

3.12:00 a.m. (midnight)

If you set the 8 hour Auto-cal interval at 8:10 a.m., the next Auto-cal will occur at 4:00 p.m. (excluding the Auto-cal performed when first leaving System Configuration window).

What's Next?

Do one of the following:

- Use the arrow keys to move to another text box and enter additional data.
- To exit and return to taking measurements, press [F3] (OK) and then [MENU].

Entering Constants and User Functions

The PM880 enables you to enter two types of constants, a user constant and a saturation constant, as well as user-defined functions and tables to manipulate data.

A user constant is a fixed value that is used to multiply the moisture ppm value ($K \times \text{PPM}_v$). A saturation constant is used to calculate PPM_w in non-aqueous liquids. If you do not know the saturation constant of the liquid, contact GE Infrastructure Sensing.

To extend programming capability, user functions enable you to program up to 8 mathematical equations. Additionally, the PM880 also enables you to enter up to 6 tables of non-linear or empirical data to support user function equations.

This section consists of the following information:

- Entering a User Constant - see below.
- Entering a Saturation Constant - page 4-12
- Entering User Functions - page 4-14
- Setting Up User Tables - page 4-19

Entering a User Constant

Use the following steps to enter a user constant. The default multiplier is 1.

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Program** and press [ENTER].
3. Use the arrow key to scroll to **System** and press [ENTER]. A screen similar to Figure 4-4 on the next page appears.
4. Use the arrow keys to move to the $K \times \text{PPM}_v$ text box and press [ENTER].
5. Use the numeric keys to enter the desired value and press [ENTER].

Entering a Constant Multiplier (cont.)

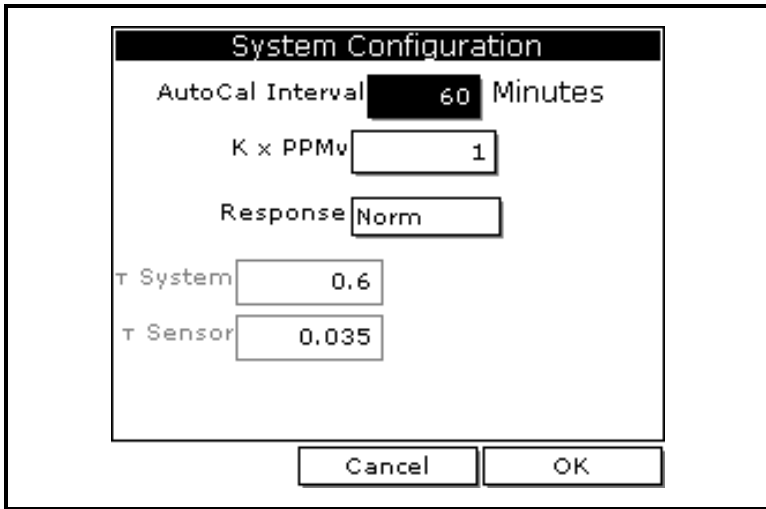


Figure 4-4: The System Configuration Window

What's Next?

Do one of the following:

- Use the arrow keys to move to another text box and enter additional data.
- To exit and return to taking measurements, press [F3] (OK) and then [MENU].

Entering a Saturation Constant

The PM880 requires a saturation constant in order to calculate ppm_w in non aqueous liquids. If you do not know the saturation constants of the process liquid sample, contact GE Infrastructure Sensing. To enter a saturation constant (Cs), you must enter 1 to 8 data points to represent a curve of Cs (values) versus temperature.

To enter data for a saturation constant:

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Program** and press [ENTER].
3. Use the arrow key to scroll to **Calibrate** and press [ENTER].
4. Use the arrow key to scroll to **Saturation** tab and press [ENTER]. A screen similar to Figure 4-5 below appears.

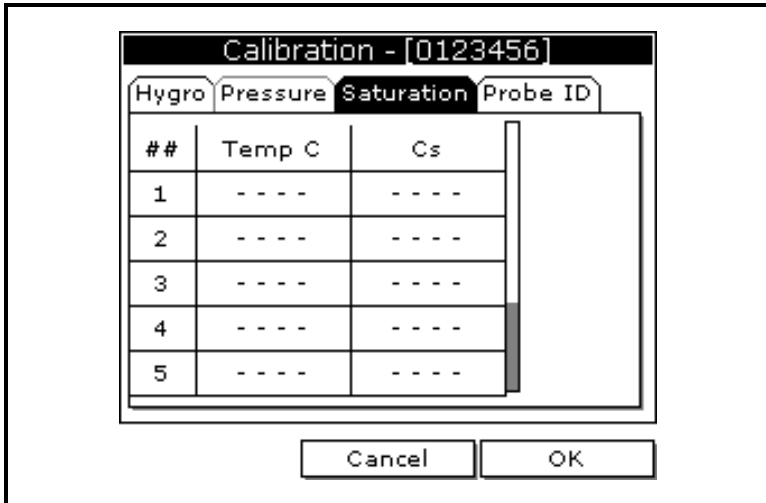


Figure 4-5: The Saturation Window

5. Press [▼] to move the pointer to the Temp C box in the saturation table and press [ENTER].
6. Use the numeric keys to enter the desired temperature value and press [ENTER].

Entering a Saturation Constant (cont.)

7. The Cs text box is highlighted, press [ENTER]. Use the numeric keys to enter the corresponding Cs value and press [ENTER].
8. Repeat steps 6 and 7 until you have entered the values for each data point.

Note: *To insert an additional data point, press [F1] (Insert).
To delete a data point, press [F2] (Delete).*

9. When you have completed entering values, press [F3] (Exit).

What's Next?

Do one of the following:

- Use the arrow keys to scroll to another tab and program additional data (if available, depending on probe type).
- To exit and return to taking measurements, press [F3] (OK) and then [MENU].

Entering User Functions

User functions enable you to program mathematical equations. You can use any parameter in the meter to calculate a different parameter. To enter a user-defined equation:

Accessing the User Function Command

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Program** and press [ENTER].
3. Use the arrow key to scroll to **User Functions** and press [ENTER]. A screen similar to Figure 4-6 below appears.

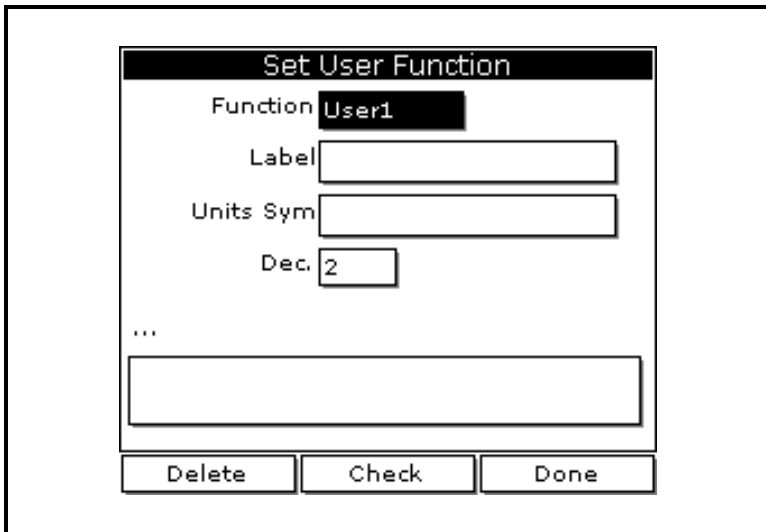


Figure 4-6: The User Functions Window

Entering a Label for the Function

1. The Function box should be highlighted. Press [ENTER] to open the drop-down menu.
2. Use the arrow keys to scroll to the desired function number (User1, User2, etc.) and press [ENTER].

Entering User Functions (cont.)

Entering a Label for the Function (cont.)

- Use the arrow keys to move to the Label box and press [ENTER]. A screen similar to Figure 4-7 below appears.

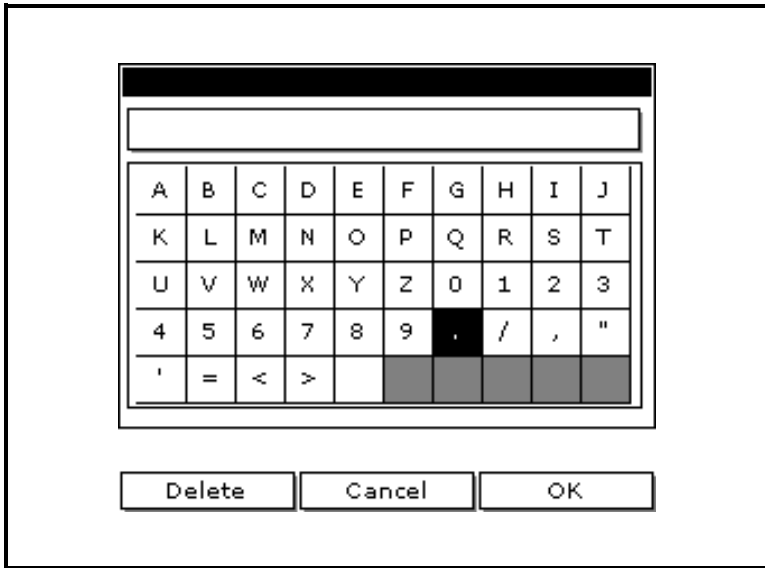


Figure 4-7: The Text Creation Window

- Press [F1] (Delete) to delete any unwanted letters or numbers. Use the arrow keys to scroll to the desired character and press [ENTER]. Press [SEL] to view additional character selections and symbols for creating a label for the function.
- Repeat this procedure until you have created the desired units symbol for the function of up to thirty-two characters.
- When you have finished, press [F3] (OK).

Entering User Functions (cont.)

Entering the Units

The steps below describe how to create a units symbol (e.g. degrees C). This label will appear on the screen when you display the user function measurement.

1. Use the arrow keys to move to the Units Sym box and press [ENTER]. The text creation screen appears again.
2. Press [SEL] to view the three screens with the available characters and symbols for creating the symbol for the units.
3. Use the arrow keys to scroll to the desired character and press [ENTER]. Press [F1] (Delete) to delete any unwanted letters or numbers. Press [SEL] to view additional character selections and symbols for creating a label for the function.
4. Repeat this procedure until you have created the desired label for the function of up to thirty-two characters.
5. When you have finished, press [F3] (OK).

Selecting Decimal Digits

1. Use the arrow keys to move to the Dec box and press [ENTER] to open the drop-down menu.
2. Use the arrow keys to scroll to the desired value (0-4) and press [ENTER]. This value refers to the number of digits to the right of the decimal point.

Entering an Equation

1. Use the arrow keys to move to the blank box at the bottom of the screen and press [ENTER]. A screen similar to Figure 4-8 on the next page appears.
2. Press [SEL] to view additional characters, symbols and functions for creating an equation.

Entering User Functions (cont.)

Entering an Equation (cont.)

- Use the arrow keys to scroll to the desired character and press [ENTER]. Press [F1] (Delete) to delete any unwanted letters or numbers.

IMPORTANT: *To enter a measurement (dew point, temperature, etc.) into the equation, click on MODE in the middle of the third row. The Select Measurement window appears. Select the desired measurements, press [SEL], select the desired units and press [F3] (OK).*

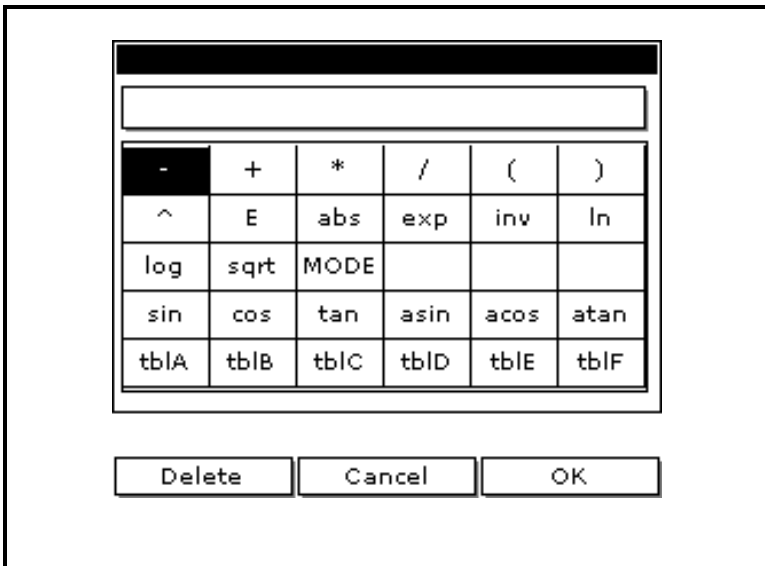


Figure 4-8: The Function Creation Window

- When you have finished entering the equation, press [F3] (OK).
- Press [F2] (Check) to test the validity of the function. The PM880 displays either "OK" or a message such as "Syntax Error."

Entering User Functions (cont.)

Entering an Equation (cont.)

6. Do one of the following:

- To edit the equation, press [ENTER].
- To delete the equation, press [F1] (Delete).
- To confirm the equation and return taking measurements, press [F3] (Done) and then press [MENU].

Note: *To display the user function on the screen, refer to Displaying Measurements on page 1-15. In the Select Measurement window, choose Userfunction and then the units you entered above.*

Setting Up User Tables

To support user-defined functions, the PM880 can hold up to 6 tables of non-linear or empirical data. Users can enter up to 21 X-Y pairs in each table. The user functions can supply an X value with Table (X). The meter then interpolates the Y value for a given X, and substitutes it for Table (X) in the function. (The results are extrapolated if the X value exceeds the bounds of the table.) To set up a user table:

Accessing the User Tables Command

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **User Tables** and press [ENTER]. A screen similar to Figure 4-9 below appears.

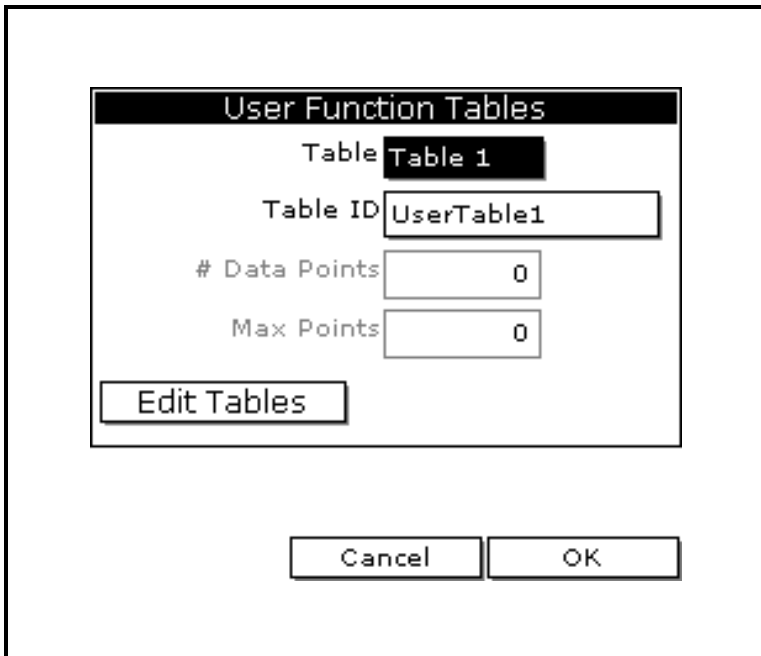


Figure 4-9: The User Tables Window

Setting Up User Tables (cont.)

Entering a Label for the Table

1. The Table box should be highlighted. Press [ENTER] to open the drop-down menu.
2. Use the arrow keys to scroll to the desired table number and press [ENTER].
3. Use the arrow keys to move to the Table ID box and press [ENTER]. A screen similar to Figure 4-10 below appears.

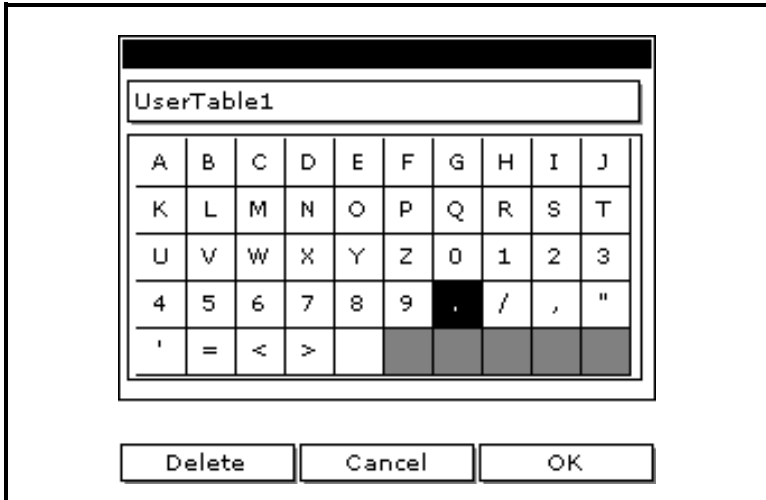


Figure 4-10: The Text Creation Window

4. Use the arrow keys to scroll to the desired character and press [ENTER]. Press [F1] (Delete) to delete any unwanted letters or numbers. Press [SEL] to view the three screens with the available characters and symbols for creating a label for the table.
5. Repeat this procedure until you have created the desired label for the table of up to thirty-two characters.
6. When you have finished, press [F3] (OK).

Note: *It is not necessary to enter the “#Data Points” or “Max Points” text boxes. The meter automatically enters this data.*

Setting Up User Tables (cont.)

Editing the User Table

1. Use the arrow keys to move to Edit Tables box and press [ENTER].
2. Press [▼] to move the pointer to the 1/Table ID column.
3. Press [ENTER] to open the text box. Use the numeric keys to enter the desired value and press [ENTER].
4. Press [▶] to move to the next text box, and press [ENTER]. Use the numeric keys to enter the corresponding value and press [ENTER].
5. Use the arrow keys to scroll to additional data points and repeat steps 2, 3 and 4 until you have entered the values for each data point.
6. When you have completed entering values, press [F3] (OK).
7. To confirm the table and return taking measurements, press [F3] (OK) and then press [MENU].

Using Computer Enhanced Response

Computer Enhanced Response (CER) uses a dynamic moisture calibration technique to extrapolate the moisture level to the end point when making measurements in abrupt “dry down” conditions. The system response time depends on the relative change in dew point. For a change from ambient moisture levels to trace levels, the unit can respond in 3 to 5 minutes.

The accuracy of enhanced response is $\pm 2^{\circ}\text{C}$ of the reading the sensor would have read if it were allowed to reach equilibrium with the gas. To ensure that CER is as accurate as possible, your application should:

- have a reasonably constant final dew point and flow rate.
- have a minimum flow rate of one standard cubic foot per hour (SCFH).
- operate at atmospheric pressure (0 psig).
- have an actual moisture content equal to or wetter than a dew/frost point of
 - MIS Probe: -85°C
 - M Series and TF Series Probe: -110°C

Use the steps below to activate computer enhanced response:

Accessing the Response Command

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Program** and press [ENTER].
3. Use the arrow key to scroll to **System** and press [ENTER]. A screen similar to Figure 4-11 on the next page appears.

Using Computer Enhanced Response (cont.)

Accessing the Response Command (cont.)

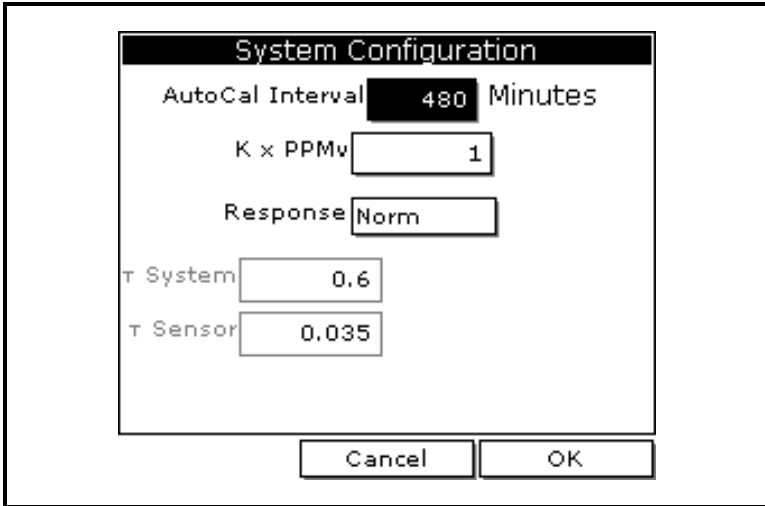


Figure 4-11: The System Configuration Window

Selecting the Response Type

1. Use the arrow keys to move to the Response box and press [ENTER] to open the drop-down menu.
2. Use the arrow key to select the desired response type and press [ENTER]. You can choose from the following:
 - NORM - no computer enhanced response
 - CER - enable computer enhanced response

Note: *The PM880 has an additional option called Derivative Fast Response (DEF). The T System and T Sensor options are only active when DEF is selected. This option is available in Service Mode only. Consult GE Infrastructure Sensing*

3. To return to taking measurements, press [F3] (OK) and then press [MENU].

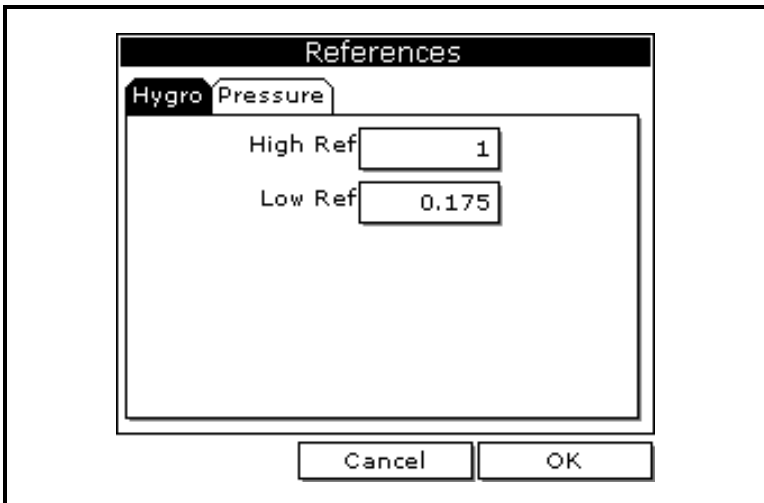
Entering Reference Data

!WARNING!
DO NOT CHANGE THESE VALUES UNLESS
INSTRUCTED BY GE Infrastructure Sensing TO DO SO.

The PM880 requires reference values for its measurement circuitry for moisture and pressure inputs. The references are factory calibration values. These values can be found on the label located inside the battery compartment.

If instructed by GE Infrastructure Sensing to change these values, refer to the steps follows.

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **References** and press [ENTER]. The screen appears similar to Figure 4-12 below.



**Figure 4-12: The Hygrometry Tab
in the References Window**

Entering Reference Data (cont.)

4. Use the arrow keys to move to the desired tab and press [ENTER].
5. Use the arrow keys to move to High Ref and press [ENTER] to open the text box.
6. Use the numeric keys to enter the value recorded on the back of the PM880 and press [ENTER].
7. Repeat steps 5 and 6 for the low reference value.

What's Next?

Do one of the following:

- To exit and return to taking measurements, press [F3] and then [MENU].
- If you need to change values, use the arrow keys to move to the other tab and return to step 5 above.

Using Sleep Mode

The Sleep Mode keeps the PM880 in a state in which the unit appears to be off. During Sleep Mode the unit is idle and consumes less power. When you want to use the unit again, it comes out of Sleep Mode quickly, performs an auto-cal and is restored exactly as you left it.

Placing the PM880 in Sleep Mode

1. Press the red power key for 3 seconds. The screen now appears similar to Figure 4-13 below.
2. Press [F2] to place the PM880 in Sleep Mode.

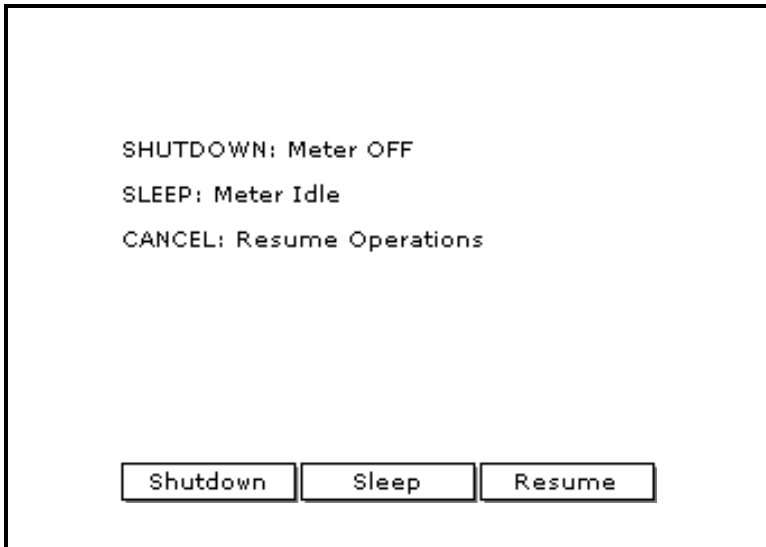


Figure 4-13: The Shutdown Menu

Resuming Operation

Tap the red power key. The PM880 powers on, performs an auto-cal and returns to exactly where you left it.

Displaying Meter Information

The About command displays software information and other useful data specific to your meter. To display meter information:

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **About** and press [ENTER]. A screen similar to Figure 4-14 below appears.

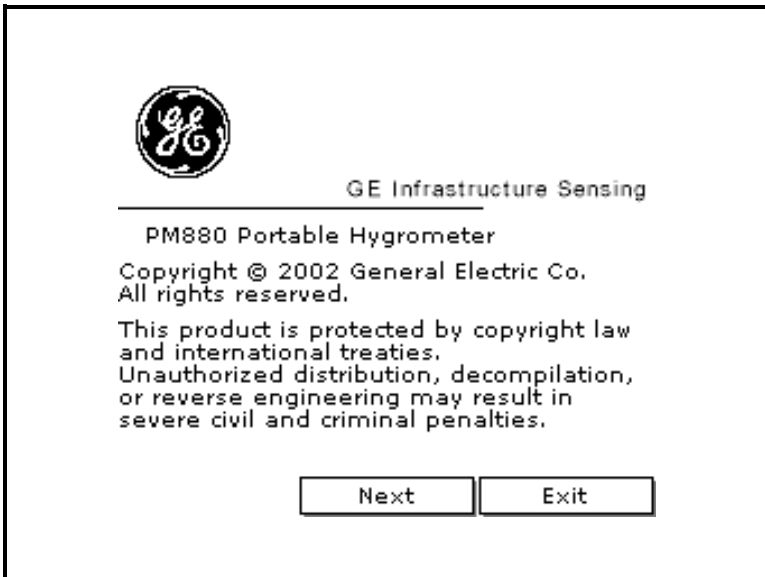


Figure 4-14: The About Window

4. Press [F2] (Next) to list additional data such as the boot program, instrument program, FPGA (timing) program, language, help version, serial number and PCI number.
5. Press [F3] (Exit) and then press [MENU].

The PM880 returns to taking measurements.

Changing the Display Language

The PM880 user program is available in several languages. To change the language:

Note: *The PM880 defaults to US English. However, one or more alternate languages can be installed at any time. Consult your GE Infrastructure Sensing representative or www.gesensing.com for available languages.*

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].

Use the arrow key to scroll to **Language** and press [ENTER]. A screen similar to Figure 4-15 below appears.

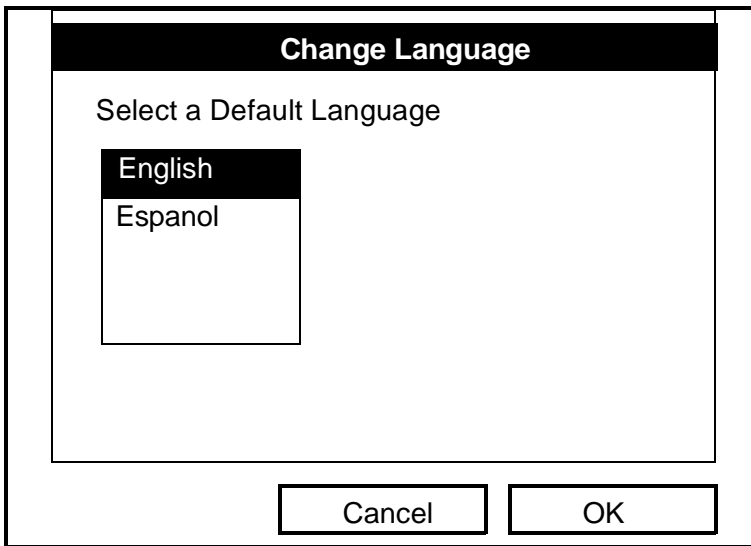


Figure 4-15: Language Change Window

3. Use the arrow keys to scroll to the desired language and press [ENTER].
4. Press [F3] (OK) and then press [MENU].

The meter restarts in the desired language.

Using On-Line Help

The PM880 offers on-line help screens that contain descriptions and instructions for various topics. You can access on-line help at anytime by press the [?] key. The on-line help screen that appears depends on what the meter is doing at the time the [?] key is pushed. While:

- taking measurements - the on-line help screen displays a table of contents.
- in the user program - the on-line help screen displays the help screen relevant to the program menu.

Use the function keys at the bottom of the screen to navigate through on-line help.

Chapter 5

Logging Data

Data logging is one of the PM880's most powerful and flexible features. The meter enables you to choose up to 12 measurements to log. Logs can run one at a time or simultaneously. Error and circular logs are also available. The logged data is internally stored in battery-backed-up memory.

A fixed amount of memory is assigned to store logs. The frequency of the time interval, the length of the log run, and the number of logs affect the amount of memory required for a particular log. For example, a 2 hour log that records every 5 seconds will use up more memory than a 2 hour log that records every 5 minutes.

The PM880 also has various tools to enable you to do the following:

- setting up a new log - page 5-2
- pausing a log - page 5-6
- starting and restarting a log - page 5-7
- ending a log - page 5-8
- viewing all logs - page 5-9
- viewing log setup details - page 5-10
- viewing logged data in graph or spreadsheet format - page 5-12

The PM880 has additional logging capabilities. For more details on these functions refer to Chapter 6, *Managing Files* and Chapter 7, *Using the PM880 with a PC and Printer*.

Setting up a New Log

Use the following steps to create a new log.

Note: *If you need to create another log file that is similar to a log you have already created, you can save time by copying the existing log and editing it. Refer to Copying a Log on page 6-9.*

Creating a New Log

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to Logging and press [ENTER].
3. Use the arrow key to scroll to New Log and press [ENTER]. A screen similar to Figure 5-1 below appears.

Note: *You can also create a new log by scrolling to Log Manager, press [ENTER], press [MENU], scroll to File, press [ENTER], scroll to New and press [ENTER].*

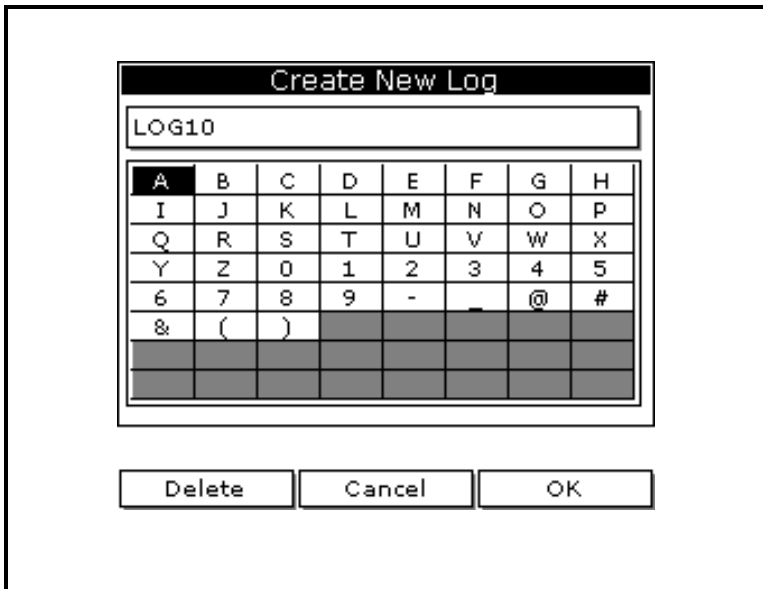
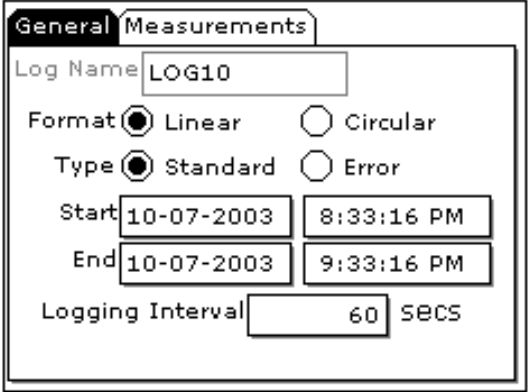


Figure 5-1: The New Log Window

Setting up a New Log (cont.)

Entering a Log Name

1. Use the arrow keys to scroll to the desired letter or number and press [ENTER]. Press [F1] (Delete) to delete any unwanted letters or numbers.
2. Repeat this procedure until you have created the desired log name of up to eight characters.
3. When you have finished, press [F3] (OK). A screen similar to Figure 5-2 below appears.



The screenshot shows a dialog box titled "General" with a sub-tab "Measurements". The "Log Name" field contains "LOG10". The "Format" section has "Linear" selected with a radio button, and "Circular" is unselected. The "Type" section has "Standard" selected with a radio button, and "Error" is unselected. The "Start" field is split into two boxes: "10-07-2003" and "8:33:16 PM". The "End" field is split into two boxes: "10-07-2003" and "9:33:16 PM". The "Logging Interval" field contains "60" followed by "SECS". At the bottom of the dialog are two buttons: "Cancel" and "Activate".

Figure 5-2: The General Log Format Window

Setting up a New Log (cont.)

Selecting General Log Settings

1. The **General** tab displays various parameters for log setup. Use the [▼] key to scroll to **Format** and do the following:
 - Use the arrow keys to make a selection and press [ENTER]. Use the same procedure for **Type**.
 - To edit text boxes, scroll to the box and press [ENTER]. Use the [◀] and [▶] keys to scroll to the number to change and use the numeric keys to change the number and press [ENTER].

Note: *If you choose to run a circular log, you will need to enter the number of records you want to log instead of an end date and time.*
2. Use the arrow keys to move to the **Measurements** tab and press [ENTER]. A screen similar to Figure 5-3 below appears.

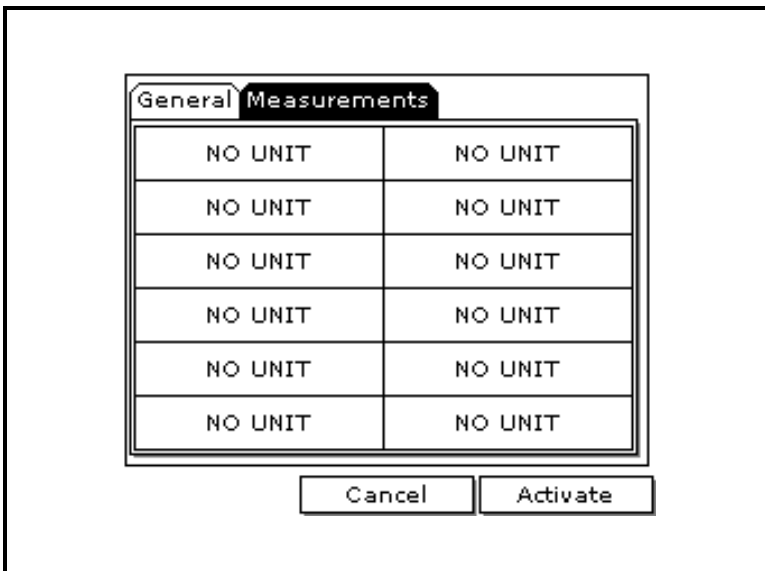


Figure 5-3: The Log Measurements Window

Setting up a New Log (cont.)

Selecting Measurement to Log

1. Use the [▼] key to step to a box and press [ENTER]. A screen similar to Figure 5-4 below appears.

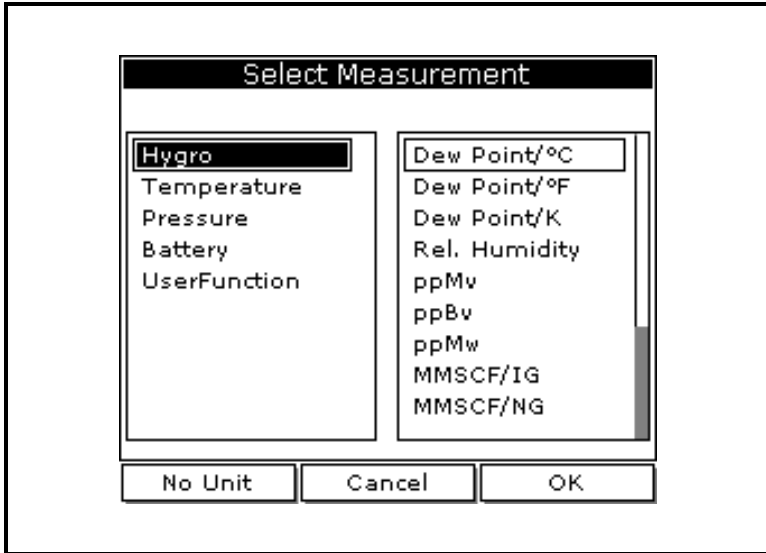


Figure 5-4: The Select Measurement Window

2. Use the arrow keys to scroll to the desired measurement type and press [SEL].
3. Use the arrow keys to scroll to the desired units and press [F3] (OK).
4. Repeat steps 1 through 3 for up to 12 different parameters.
5. When you have finished, press [F3] (Activate) to start the log. The log will begin at the specified date and time.

Note: *If you created the log from within the Log Manager, the meter returns to the Log Manager, press [F3] (Exit) and then press [MENU].*

The PM880 returns to taking measurements. A Pencil icon appears in the bottom right-hand side of the screen.

Pausing a Log

The PM880 has two commands to pause logs: **Pause** and **Pause All Logs**. The PM880 can only pause logs that are currently running.

Note: *The PM880 also has an **End** command that enables you to stop the log permanently. See [Ending a Log on page 5-8](#).*

Use the steps below to pause one or more logs:

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].

Selecting a Log File

1. Use the arrow key to scroll to the desired log.

Note: *The list of log files in the Log Manager can be listed chronologically or alphabetically. Refer to [Sorting Files in the Site/Drive/Log Manager on page 6-15](#).*

2. Press [MENU].
3. Use the arrow key to scroll to **Log** and press [ENTER].
4. Use the arrow key to scroll to **Pause** or **Pause All Logs** and press [ENTER].

The PM880 returns to the Log Manager, which displays the selected log as *Paused*.

What's Next?

Do one of the following:

- To pause another log, repeat the above steps.
- To return to taking measurements, press [F3] (**Exit**) and then press [MENU].

Starting or Restarting a Log

The **Start** and **Start All Logs** commands enable you to restart a paused log or start a pending log. You cannot restart a log that is completed or ended using the **End** command.

Use the following steps to start or restart one or more logs:

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].

Selecting a Log File

1. Use the arrow key to scroll to the desired log.

Note: *The list of log files in the Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **Log** and press [ENTER].
4. Use the arrow key to scroll to **Start** or **Start All Logs** and press [ENTER].

The PM880 returns to the Log Manager, which displays the selected log as *Running* or *Pending*.

What's Next?

Do one of the following:

- To start or restart another log, repeat the above steps.
- To return to taking measurements, press [F3] (Exit) and then press [MENU].

Ending a Log

The **End** and **End All Logs** commands enables you to stop a log that is currently running or pending. Once you end a log it cannot be restarted.

Note: *The PM880 also has an **Pause** command that enables you to stop the log temporarily. See **Pausing a Log** on page 5-6.*

Use the following steps to start or restart one or more logs:

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].

Selecting a Log File

1. Use the arrow key to scroll to the desired log.

Note: *The list of log files in the Log Manager can be listed chronologically or alphabetically. Refer to **Sorting Files** in the **Site/Drive/Log Manager** on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **Log** and press [ENTER].
4. Use the arrow key to scroll to **End** or **End All Logs** and press [ENTER].

The PM880 returns to the Log Manager, which displays the selected log as *Finished*.

What's Next?

Do one of the following:

- To end another log, repeat the above steps.
- To return to taking measurements, press [F3] (**Exit**) and then press [MENU].

Viewing All Logs

Logs are associated with the site in use at the time the log is created (or run). By default, the Log Manager only displays the logs created with the site file that is currently running. The Log Manager has a command that enables you to view all existing logs regardless of the current site file.

To view all existing logs (finished or pending):

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].
4. Press [MENU].
5. Use the arrow keys to scroll to **Log** and press [ENTER].
6. Use the arrow keys to scroll to **View All Sites** and press [ENTER].
7. To return to taking measurements, press [F3] (**Exit**) and then press [MENU].

Viewing Log Setup Details

The PM880 enables you to view more than the log details shown in Log Manager. The Details command enables you to see the log status, date and time, length, interval, records types of measurements logged and service information.

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].

Selecting a Log

1. Use the arrow key to scroll to the desired log. Logs are associated with the site file in use at the time the log is created or run. If you do not see the desired log in the list, refer to *Viewing All Logs* on page 5-9 to display all the existing logs.

Note: *The list of log files in the Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **View** and press [ENTER].
4. Use the arrow key to scroll to **Details** and press [ENTER]. A screen similar to Figure 5-5 on the following page appears.
5. When you are done viewing the log details, press [F3] (Exit).

What's Next?

Do one of the following:

- To view the details of another log, press [ESC] and return to *Selecting a Log* above.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].

Viewing Log Setup Details (cont.)



Figure 5-5: The Log Details

Displaying Logged Data

The PM880 enables you to view logged data in a graph or spreadsheet format. Graphs and spreadsheets are setup in the Log Manager. Use the steps below to access the Log Manager and view logged data.

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].
4. To view logged data in:
 - graph format, refer to *Using the Graph Format* below.
 - spreadsheet format, refer to *Using the Spreadsheet Format* on page 5-16.

Using the Graph Format

Selecting a Log

1. Use the arrow key to scroll to the desired log. Logs are associated with the site file in use at the time the log is created or run. If you do not see the desired log in the list, refer to *Viewing All Logs* on page 5-9 in the Log Manager to display all the existing logs.

Note: *The list of log files in the Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **View** and press [ENTER].
4. Use the arrow key to scroll to **Graph** and press [ENTER].

Using the Graph Format (cont.)

Selecting a Measurement Parameter

1. The Select Measurement window appears and lists the log measurement parameters. Use the arrow keys to select the measurement parameter to graph.

Note: *The above step will not appear if the log consists of one measurement type. Skip to step 3.*

2. Press [F3], View. A screen similar to Figure 5-6 below appears.
3. Do one of the following:
 - To adjust the graph scale, press [F1] (Scale) and go to page 5-14.
 - To adjust the time scale, press [F2] (Time) and go to page 5-15.
 - To view the next measurement in the log, press [SEL].
 - To zoom in and out by 200%, press [▼] to zoom in and [▲] to zoom out. when zoomed, use the [◀] and [▶] keys to scroll through the graph. The screen displays the range when zoomed. See Figure 5-6 below.
 - To exit and return to taking measurements, press [F3] (Exit) twice and then press [MENU].

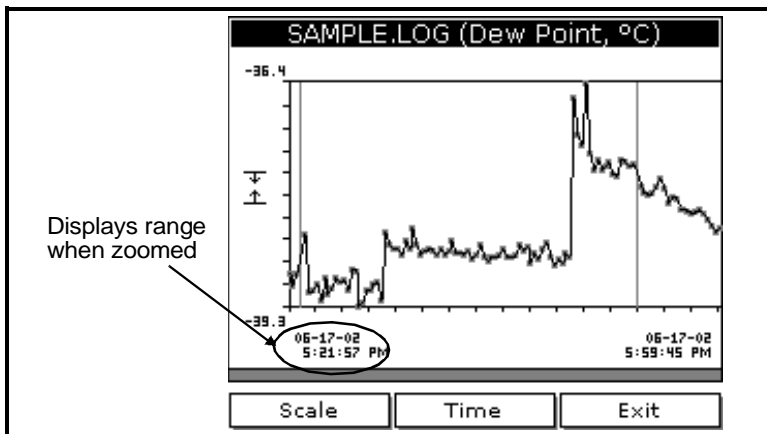


Figure 5-6: The Log Graph Display Window

Using the Graph Format (cont.)

Adjusting the Graph Scale

1. The Y-Axis window appears. Use the arrow keys to scroll to one of the following and press [ENTER]:
 - **Max** - the graph extends to highest logged value.
 - **Range** - the graph extends from the lowest to the highest logged value.
 - **Set** - the graph extends between a specified minimum and maximum value.
2. Do one of the following:
 - If you selected **Max** or **Range**, proceed to step 6.
 - If you selected **Set**, proceed to the next step.
3. Use the arrow keys to scroll to the Minimum text box and press [ENTER].
4. Use the numeric keys to enter the desired value and press [ENTER].
5. Repeat steps 3 and 4 to enter the Maximum value.
6. When you have finished, press [F3] (OK) to exit and view the graph.

What's Next?

Do one of the following:

- To return to the Log Manager and view another log, press [F3] (Exit) and then press [MENU]. Return to *Using the Graph Format* on page 5-12.
- To view logs using the spreadsheet format, press [F3] (Exit), then press [MENU] and proceed to *Using the Spreadsheet Format* on page 5-16.
- To exit and return to taking measurements, press [F3] (Exit) twice and then press [MENU].

Using the Graph Format (cont.)

Adjusting the Time Scale

1. The Enter Time window appears. Use the arrow keys to scroll to the desired text box. Press [ENTER] to open the box.
2. Use the numeric keys to enter the desired number and press [ENTER].
3. Repeat steps 1 and 2 for other entries.
4. When you have finished, press [F3] (OK) to exit and view the graph.

What's Next?

Do one of the following:

- To return to the Log Manager and view another log, press [F3] (Exit) and then press [MENU]. Return to *Using the Graph Format* on page 5-12.
- To view logs using the spreadsheet format, press [F3] (Exit), then press [MENU] and proceed to *Using the Spreadsheet Format* on the next page.
- To exit and return to taking measurements, press [F3] (Exit) twice and then press [MENU].

Using the Spreadsheet Format

1. Use the arrow key to scroll to the desired log. Logs are associated with the site file in use at the time the log is created or run. If you do not see the desired log in the list, refer to *Viewing All Logs* on page 5-9 to display all the existing logs.

Note: *The list of log files in the Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **View** and press [ENTER].
4. Use the arrow key to scroll to **Spreadsheet** and press [ENTER]. A screen similar to Figure 5-7 below appears.

SAMPLE.LOG		
Time	Hygro Dew Point/°C	Temperature °F
06-17-02		
17:21:57	-38.9	Error:8
17:22:17	-39.0	Error:8
17:22:38	-38.9	Error:8
17:22:59	Error:1	Error:8
17:23:20	-38.4	Error:8
17:23:40	-39.1	Error:8
17:24:01	-39.1	Error:8

Time Refresh Exit

Figure 5-7: The Log Spreadsheet Window

Using the Spreadsheet Format (cont.)

5. Use the [◀] and [▶] keys to scroll to other columns, or the [▼] or [▲] keys to scroll backward or forward in time.
6. Do one of the following:
 - To adjust the time scale, press [F1] (Time) and refer to Adjusting the Time Scale below.
 - To exit and return to taking measurements, press [F3] (Exit) twice and then press [MENU].

Viewing Data at a Specific Time

1. The Enter Time window appears. Use the arrow keys to scroll to the desired text box. Press [ENTER] to open the box.
2. Use the numeric keys to enter the desired number and press [ENTER].
3. Repeat steps 1 and 2 for other entries.
4. When you have finished, press [F3] (OK) to exit and view the spreadsheet. The PM880 displays the data nearest the time entered.

What's Next?

Do one of the following:

- To return to the Log Manager and view another log, press [F3] (Exit) and then press [MENU]. Return to *Using the Graph Format* on page 5-12.
- To view logs using the spreadsheet format, press [F3] (Exit), then press [MENU] and proceed to *Using the Spreadsheet Format* on the previous page.
- To exit and return to taking measurements, press [F3] (Exit) twice and then press [MENU].

Chapter 6

Managing Files

The PM880 program provides three useful tools for managing multiple files: the Site Manager, Drive Manager and Log Manager. The Site Manager enables you to create, recall, edit, rename and delete site files, the Drive Manager enables you to transfer and delete all types of files the PM880 can generate, while the Log Manager lets you rename, copy and delete log files. Use the following sections to perform the desired task:

- save a new site file - page 6-2
- recall an existing site file - page 6-4
- save changes to an existing site file - page 6-5
- rename a site or log file - page 6-6
- copy (clone) a log - page 6-9
- delete all types of files - page 6-13
- sort files in the Site/Drive/Log Manager (chronologically or alphabetically) - page 6-15

The Site and Log Managers have additional commands for printing and all the Managers have the ability to transfer files to and from a PC. For more details on these functions refer to Chapter 7, *Using the PM880 with a PC and Printer*.

Saving a New Site File

Use the steps below to save a new site.

Accessing the Site Manager

1. Enter the necessary data and properly setup the screen. See Chapter 1, *Getting Started*, for entering data.
2. If the menu is not active, press [MENU].
3. Use the arrow key to scroll to **Site** and press [ENTER].
4. Use the arrow key to scroll to **Site Manager** and press [ENTER].
5. Press [MENU].
6. Use the arrow key to scroll to **File** and press [ENTER].

Entering a Site Name

1. Use the arrow key to scroll to **New** and press [ENTER]. The screen appears similar to Figure 6-1 below.

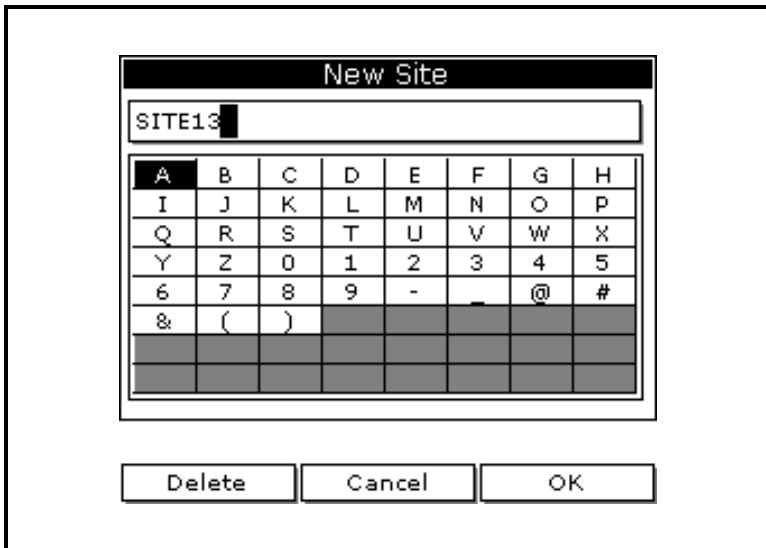


Figure 6-1: Name Entry Window for a New Site

Saving a New Site File (cont.)

Entering a Site Name (cont.)

2. Use the arrow keys to scroll to the desired letter or number and press [ENTER]. Press [F1] (Delete) to delete any unwanted letters or numbers.
3. Repeat this procedure until you have created the desired site name of up to eight characters.
4. When you have finished, press [F3] (OK).
5. The PM880 prompts asks you if you want to save the site as a template. Saving the site file as a template is useful when you need to create multiple sites with similar data. At the prompt, do one of the following:
 - Press [F2] (No) if you do not want to use it as a template, or
 - Press [F3] (Yes) if you do want to use it as a template.
6. Press [F3] (Exit).
7. Press [MENU]. The new site file is displayed in the upper left corner of the screen.

Recalling a Site File

Use the following steps to recall a previously programmed site file:

Accessing the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **Site Manager** and press [ENTER].

Retrieving the Site File

1. Use the arrow key to scroll to the desired site.

Note: *The list of site files in the Site Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **File** and press [ENTER].
4. Use the arrow key to scroll to **Open** and press [ENTER].
5. The PM880 asks you to confirm, press [F3] (Yes).
6. Press [F3] (Exit).
7. Press [MENU]. The PM880 displays the new site file in the upper-left corner of the screen.

Saving a Site File

Saving changes to an existing site can be done from the Site Menu or the Site Manager.

Using the Site Menu

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Site** and press [ENTER].
3. Use the arrow keys to scroll to **Save Now** and press [ENTER].
4. The PM880 prompts you to save the current site, press [F3], (Yes).
5. Press [MENU]. The PM880 displays the current site file in the upper-left corner of the screen.

Using the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **Site Manager** and press [ENTER].
4. Press [MENU].
5. Use the arrow key to scroll to **File** and press [ENTER].
6. Use the arrow key to scroll to **Save** and press [ENTER].
7. The PM880 asks you to confirm, press [F3] (Yes).
8. Press [F3] (Exit).
9. Press [MENU]. The PM880 displays the new site file in the upper-left corner of the screen.

Renaming a Site or Log File

Use the appropriate section that follows to rename:

- a site file, refer to the section below.
- a log file, refer to page 6-8.

Renaming a Site File

The PM880 offers two ways to rename files. In the Site Manager you can use the following commands:

- **Save As** to create a copy of the file with a different name
- **Rename** to change the name of the site file.

Use the steps below to perform the desired task.

Accessing the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **Site Manager** and press [ENTER].

Renaming a Site File

1. Use the arrow key to scroll to the desired site.

Note: *The list of site files in the Site Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **File** and press [ENTER].
4. Use the arrow key to scroll to:
 - **Save As** and press [ENTER] - to create a copy of the file with a different name.
 - **Rename** and press [ENTER] - to change the name of the site file.

Renaming a Site or Log File (cont.)

Renaming a Site File (cont.)

5. Use the arrow keys to scroll to the desired letter or number and press [ENTER]. Press [F1] (Delete) to delete any unwanted letters or numbers.
6. Repeat this procedure until you have created the desired site name of up to eight characters.
7. When you have finished, press [F3] (OK).
8. Do one of the following:
 - If you selected **Save As**, the PM880 prompts you to save the current site, press [F3] (Yes) and proceed to *What's Next?* below.
 - If you selected **Rename**, the PM880 renames the file and returns to the Site Manager. Proceed to *What's Next?* below.

What's Next?

Do one of the following:

- If desired, repeat steps 1 through 8 above for another file.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU]. The newly renamed site file is displayed in the upper left corner of the screen.

Note: *The PM880 uses the renamed site file to take measurements. To recall a different site file, refer to Recalling a Site File on page 6-4.*

Renaming a Site or Log File (cont.)

Renaming a Log File

Use the steps below to rename a log file.

Accessing the Log Manager

1. If the menu is active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].

Renaming a Log File

1. Use the arrow key to scroll to the desired site.

Note: *The list of site files in the Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **File** and press [ENTER].
4. Use the arrow key to scroll to **Rename** and press [ENTER].
5. Use the arrow keys to scroll to the desired letter or number and press [ENTER]. Press [F1] (Delete) to delete any unwanted letters or numbers.
6. Repeat this procedure until you have created the desired log name of up to eight characters.
7. When you have finished, press [F3] (OK).

The PM880 renames the file and returns to the Log Manager. Proceed to *What's Next?* below.

What's Next?

Do one of the following:

- If desired, repeat steps 1 through 7 above for another file.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].

Copying a Log

If you need to create another log file that is similar to a log you have already created, you can save time by copying the existing log and editing it. Use the followings steps to copy (clone) a log:

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].

Selecting a Log File

1. Use the arrow key to scroll to the desired log and press [ENTER]. If you do not see the desired log in the list, refer to Viewing All Logs on page 5-9 to display all the existing logs.

Note: *The list of log files in the Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **File** and press [ENTER].
4. Use the arrow key to scroll to **Clone Selected Log** and press [ENTER]. The screen appears similar to Figure 6-2 on the next page.

Note: *If you try to copy a log that is associated with a site file that is not currently running the Clone Selected Log command will be grayed out. Use a different log for cloning.*

Copying a Log (cont.)

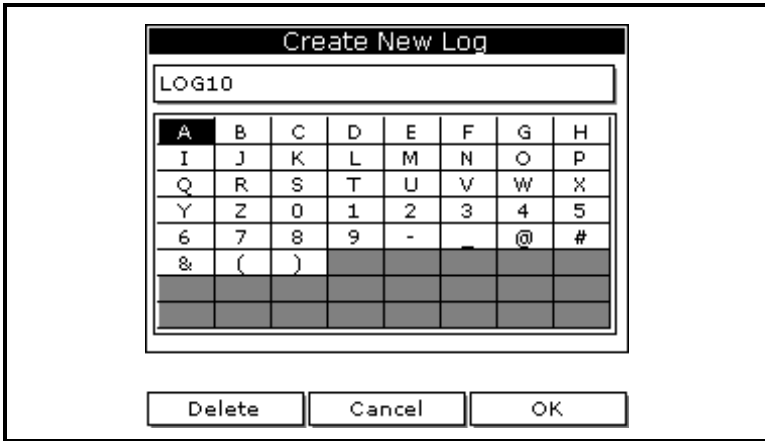


Figure 6-2: Name Entry Window for a New Log

Entering a Log Name

1. Use the arrow keys to scroll to the desired letter or number and press [ENTER]. Press [F1] (Delete) to delete unwanted characters.
2. Repeat this procedure until you have created the desired site name of up to eight characters.
3. When you have finished, press [F3] (OK).

Editing General Log Settings

1. The **General** tab displays various parameters for log setup. Use the [▼] key to scroll to **Format** and do the following:
 - Use the arrow keys to make a selection and press [ENTER]. Use the same procedure for **Type**.
 - To edit text boxes, scroll to the box and press [ENTER]. Use the [◀] and [▶] keys to scroll to the number to change and use the numeric keys to change the number and press [ENTER].

Note: *If you choose to run a circular log, you will need to enter the number of records you want to log instead of an end date and time.*

Copying a Log (cont.)

Editing General Log Settings (cont.)

- Use the arrow keys to move back to the **General** tab and then move to the **Measurements** tab and press [ENTER]. A screen similar to Figure 6-3 below appears.

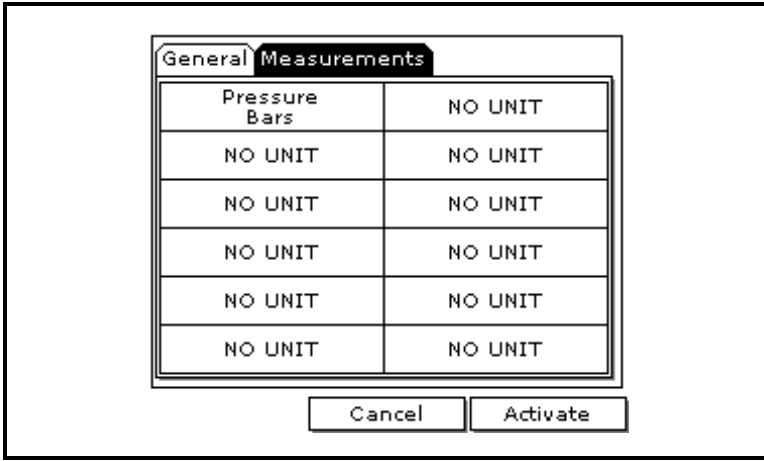


Figure 6-3: The Log Measurements Window

Editing Measurement Settings

- Use the [▼] key to step to a box and press [ENTER]. A screen similar to Figure 6-4 below appears.

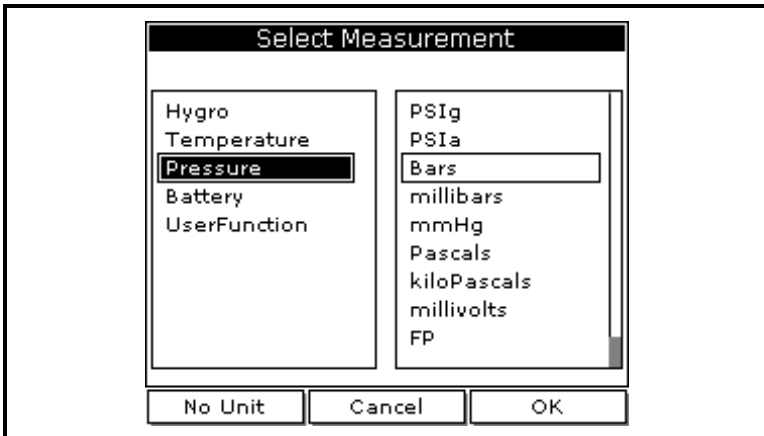


Figure 6-4: The Select Measurement Window

Copying a Log (cont.)

Editing Measurement Settings (cont.)

2. Use the arrow keys to scroll to the desired measurement type and press [SEL].
3. Use the arrow keys to scroll to the desired units and press [F3] (OK).
4. Repeat steps 1 through 3 for up to 12 different parameters.
5. When you have finished, press [F3] (**Activate**) to start the log. The PM880 returns to the Log Manager. The log will begin at the specified date and time.

What's Next?

Do one of the following:

- To copy another log, repeat the steps beginning in *Selecting a Log File* on page 6-9.
- To exit and return to taking measurements, press [F3] (**Exit**) and then press [MENU]. A Pencil icon appears in the bottom right-hand side of the screen.

Deleting All Types of Files

Use the steps below to delete unwanted files from the PM880 memory:

Note: *If the site file you want to delete is currently active, you must recall another site before you can delete it.*

Accessing the Site, Drive or Log Manager

1. If the menu is active, press [MENU].
2. To delete:
 - site, meter, log or snapshot files, press **Site** and press [ENTER].
 - log files only, press **Logging** and press [ENTER].
3. Use the arrow key to scroll to:
 - **Site Manager** and press [ENTER] - to delete site files only.
 - **Drive Manager** and press [ENTER] - to delete all types of files.
 - **Log Manager** and press [ENTER] - to delete log files only.

Deleting a File

1. Use the arrow key to scroll to the desired file.

Note: *The list of site files in the Site/Drive/Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **File** and press [ENTER].
4. Use the arrow key to scroll to **Delete** and press [ENTER]. The Log Manager has an additional command to **Delete All Logs?**
5. The PM880 asks you to confirm, press [F3] (**Yes**). The PM880 returns to the Site/Drive/Log Manager.

Deleting All Types of Files (cont.)

What's Next?

Do one of the following:

- If desired, repeat steps 1 through 5 to delete another file.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].

Sorting Files in the Site/Drive/Log Manager

The Site, Drive or Log Manager can list files in chronological or alphabetical order. Use the following steps to change the order in which the files are listed:

1. From the Site, Drive or Log Manager, press [MENU].
2. Use the arrow key to scroll to **Sort** and press [ENTER].
3. Use the arrow key to scroll to select:
 - **By Name** and press [ENTER] - to list the files alphabetically.
 - **By Date** and press [ENTER] - to list the files chronologically.

What's Next?

Do one of the following:

- To exit, press [F3] (Exit) and then press [MENU] to leave the Manager and return to taking measurements.
- Return to performing the desired task(s) in the Manager.

Chapter 7

Using the PM880 with a PC and Printer

The PM880 has the ability to transfer files to and from a PC. The Site Manager and Drive Manager both have a transfer command that allows you to select a file and beam it to and from the PC and the PM880. The Site Manager has an additional command that enables you to send site files to a printer.

To transfer or print files, you must have a built-in infrared sensor or an infrared sensor connected to the PC and/or printer that is IrDA (Infrared Data Association) compatible. The PM880 is already setup for IrDA infrared communications. The PM880 can also communicate with other IR devices using an IR232 virtual interface; however, this protocol is used for other applications.

Before the PM880 can communicate with your PC or printer, the IR function for that device must be activated and set up properly. Consult the documentation for your device.

Note: *While sending or receiving files, the PM880 continues to take measurements, but at a slower rate.*

This chapter consists of the following:

- Setting Up PM880 IR Communications - page 7-2
- Transferring and Printing Files Key - page 7-3
- Printing Files from the PM880 - page 7-4
- Printing Reports - page 7-7
- Transferring Files to a PC - page 7-8
- Transferring Files from a PC - page 7-11

Setting Up PM880 IR Communications

The PM880 is already setup for IrDA (Infrared Data Association) infrared communications. Most PCs and devices use the IrDA protocol and the PM880 should not need to be reconfigured. If necessary, the PM880 can also be configured for IR232 communications.

The PM880 can communicate with PC's operating with Windows NT 4.0/95/98/2000. If you are using Windows NT 4.0, you must use QuickBeam[®] software. All other operating systems have IR software capable of communicating with the PM880.

GE Infrastructure Sensing also offers PanaView software that enables you to perform many PM880 functions using your computer.

Use the following steps if you need to change the PM880 IR set up:

Accessing the Meter Menu

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Communication** and press [ENTER]. The Communications window appears similar to Figure 7-1 below.

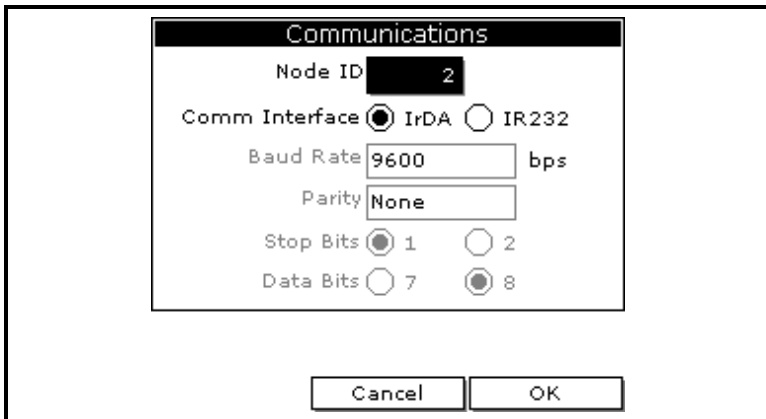


Figure 7-1: The Communications Window

Setting Up PM880 IR Communications (cont.)

Changing Communication Setup

1. The Communications window displays the various parameters for IR setup. Use the arrow keys to scroll to the desired parameters and press [ENTER] to select or open a text box.

!WARNING!

**Do NOT change the Node ID unless
instructed to do so by GE Infrastructure Sensing.**

IMPORTANT: *Baud rate, parity, stop bits and data bits are only active when IR232 is selected for the communication interface. IR232 requires the following parameters: 9600, None, 1 and 8 respectively.*

2. Press [F3] (OK) and then press [MENU]. The PM880 returns to taking measurements.

Transferring and Printing Files Key

Since the PM880 offers many tools and options for file management, Table 7-1 breaks down each Manager and its transferring and printing capabilities.

Table 7-1: Manager Key

File Type	Transfer Direction	Transfer Using	Print Using
Site Files (.sit)	To and From PC	Site or Drive Manager	Site Manager
Meter Files (.met)	To and From PC	Drive Manager	No Printing
Log Files (.log)	To PC	Drive or Log Manager	Log Manager
Snapshot Files (.bmp)	To PC	Drive Manager	No Printing

Printing a Site or Log File

The PM880 can send site files, log files and snapshots (screen captures) to a printer. This section describes the steps for printing site and log files. To print a snapshot, refer to *Taking a Bitmap Screen Capture (Snapshot)* on page 3-12. Use the appropriate section that follows to print a site or log file.

IMPORTANT: *The PM880 IR function is already setup for IrDA infrared communication. To change IR settings, Setting Up PM880 IR Communications on page 7-2.*

Printing a Site File

Accessing the Site Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Site** and press [ENTER].
3. Use the arrow key to scroll to **Site Manager** and press [ENTER].

Selecting a Site File

1. Use the arrow key to scroll to the desired site.

Note: *The list of site files in the Site Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **Site** and press [ENTER].
4. Make sure the IR beam on the PM880 has clear access to the IR sensor on the printer.
5. Use the arrow key to scroll to **Print** and press [ENTER].

The PM880 indicates that it is searching for a receiving printer. If it spots more than one compatible infrared device within its range, it asks you to select the desired device.

Printing a Site File (cont.)

Selecting a Site File (cont.)

6. Once the PM880 finds the printer, it asks you to confirm, press [F3] (Yes) and then press [MENU]. The PM880 returns to the Site Manager.

What's Next?

Do one of the following:

- If desired, repeat steps 1 through 6 in the previous section to print another site file.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].

Printing a Log File

Accessing the Log Manager

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Logging** and press [ENTER].
3. Use the arrow key to scroll to **Log Manager** and press [ENTER].

Selecting a Log File

1. Use the arrow key to scroll to the desired log. Logs are associated with the site file in use at the time the log is created or run. If you do not see the desired log in the list, refer to *Viewing All Logs* on page 5-9 to display all the existing logs.

Note: *The list of site files in the Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to **File** and press [ENTER].
4. Use the arrow key to scroll to **Print** and press [ENTER].

Printing a Site or Log File (cont.)

Entering a Time Window for Printing

1. The PM880 displays the start and end time of the log (see Figure 7-2 below). Use the arrow and [ENTER] keys to change the start date and/or time to indicate what portion of the log you want to print. Do not edit the time to print the entire log.

Enter Time	
Start Date	Start Time
2003/03/01	13:23:41 PM
End Date	End Time
2003/03/01	13:53:41 PM

Figure 7-2: The Enter Time Window

Entering a Time Window for Printing (cont.)

2. Make sure the IR beam on the PM880 has clear access to the IR sensor on the printer and press [F3] (OK).

The PM880 indicates that it is searching for a receiving printer and then sends the file. If it spots more than one compatible infrared device within its range, it asks you to select the desired device.

Note: *If the PM880 cannot detect an infrared device, a window appears indicating this problem. Reposition the PM880 and press [F3], Yes. Consult the factory if the PM880 is unable to make contact with your PC.*

What's Next?

Do one of the following:

- If desired, repeat the steps beginning in *Selecting a Log File* on the previous page to print another log file.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].

Printing Reports

When used with an IR-compatible printer, the PM880 can print out a variety of data (current site, logs, drive contents, and user functions, tables and settings) using the Reports command. Use the steps below to print the desired report:

IMPORTANT: *The PM880 IR function is already setup for IrDA infrared communication. To change IR settings, Setting Up PM880 IR Communications on page 7-2.*

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Reports** and press [ENTER]. A screen similar to Figure 7-3 below appears.

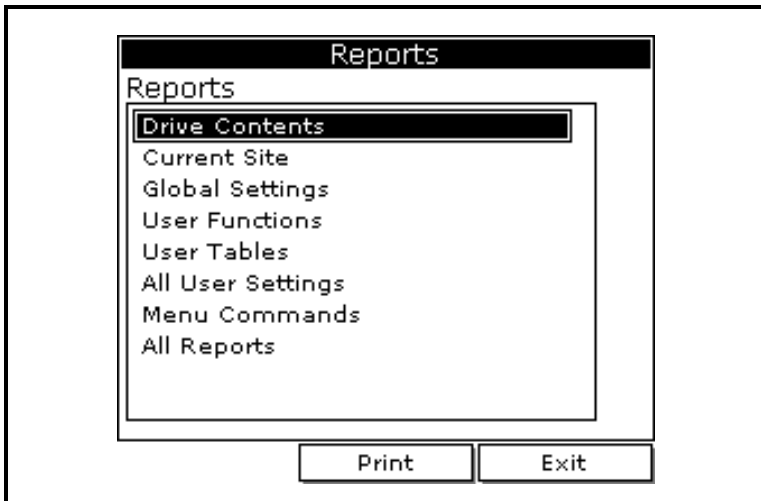


Figure 7-3: The Reports Window

4. Use the arrow keys to select the desired report.
5. Make sure the IR beam on the PM880 has clear access to the IR sensor on the printer.
6. Press [F2] (Print) to print out the desired reports.

What's Next?

Do one of the following:

- If desired, repeat steps 4 through 6 to print another report.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].

Transferring a File To a PC

You can use the Site Manager, Drive Manager or the Log Manager to transfer files to your PC. The Site Manager allows you to transfer site files only; the Drive Manager enables you to transfer any file in the PM880; and, the Log Manager enables you to transfer log files only.

Use the steps below to transfer files to your PC:

Preparing for File Transfer

1. The PM880 IR function is already setup for IrDA infrared communication. To change IR settings, *Setting Up PM880 IR Communications* on page 7-2.

2. If you are using Windows NT 4.0, open the QuickBeam[®] software. Proceed to the next section.

Accessing the Site, Drive or Log Manager

1. If the menu is not active, press [MENU].

2. To transfer:

- site, meter, log or snapshot files, press **Site** and press [ENTER].
- log files only, press **Logging** and press [ENTER].

3. Use the arrow key to scroll to:

- **Site Manager** and press [ENTER] - to transfer site files only.
- **Drive Manager** and press [ENTER] - to transfer all types of files.
- **Log Manager** and press [ENTER] - to transfer log files only.

Transferring a File To a PC (cont.)

Selecting a File

1. Use the arrow key to scroll to the desired file. Logs are associated with the site file in use at the time the log is created or run. If you do not see the desired log in the list, refer to *Viewing All Logs* on page 5-9 to display all the existing logs.

IMPORTANT: *The list of site files in the Site/Drive/Log Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Press [MENU].
3. Use the arrow key to scroll to:
 - *For Site Manager - Site* and press [ENTER].
 - *For Drive or Log Manager - File* and press [ENTER].
4. Make sure the IR beam on the PM880 has clear access to the IR sensor on the PC.
5. Use the arrow key to scroll to **Transfer** and press [ENTER].
6. The PM880 establishes communications with your PC and uploads the selected file. Respond to any screen prompts from the PC.

When the upload is complete, the meter returns to the Site/Drive/Log Manager.

IMPORTANT: *If the PM880 cannot detect an infrared device, a window appears indicating this problem. Reposition the PM880 and press [F3], Yes. Consult the factory if the PM880 is unable to make contact with your PC.*

Transferring a File To a PC (cont.)

Locating and Viewing the Transferred File

Your PC stores the transferred file in a default location. The location depends on the PC's operating system:

- Windows NT 4.0 - the transferred file in the QuickBeam Inbox folder.
- Windows 95/98/2000 - the transferred file appears in the default folder. The default folder is set in the *Windows Control Panel* using the *Wireless Link/Infrared* icon



What's Next?

Do one of the following:

- Use any text editor to open the file on your PC.
- If desired, repeat steps 1 through 6 (*Selecting a File* on the previous page) to transfer another file.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].

Transferring a File from a PC

The PM880 enables you to transfer site (.sit) and meter (.met) files from your PC to the meter. If you rename another type of file with one of these extensions and transfer it, it will be transferred, but will not function if you open it.

Note: *The PM880 IR function is already setup for IrDA infrared communication. To change IR settings, Setting Up PM880 IR Communications on page 7-2.*

The transfer procedure differs depending on your PC's operating system. Use the appropriate section that follows to transfer files:

IMPORTANT: *If you transfer a file and the meter already has a file with the identical name, the meter will overwrite its current file with the transferred file. If the transferred file has a name longer than eight characters, the meter will shorten the name to eight characters, and replace any spaces in the name with underbars.*

- Using Windows Explorer for Windows 95/98/2000 - see below
- Windows NT 4.0 - see the next page
- Windows 95/98 - page 7-13
- Windows 2000 - page 7-13

Using Windows Explorer in Windows 95/98/2000

1. Open Windows Explorer.
2. Right click on the desired file.
3. Click **Send to**.
4. Click **Infrared Recipient**. A window appears indicating the file is downloading.

Using Windows NT 4.0

1. Open the QuickBeam[®] software.
2. Make sure the IR beam on the PM880 has clear access to the IR sensor on the PC.
3. In the Quickbeam window, click on **Send**.
4. Click on **Files** or **Files on Clipboard** and scroll to the desired file.
5. Click on **Send**. QuickBeam opens a window indicating that it is downloading the file.

Note: *A quicker way to send files (replace steps 4 and 5 above) is to click on the desired file, and drag it onto the rocket button in the QuickBeam window, as shown in Figure 7-4 below.*

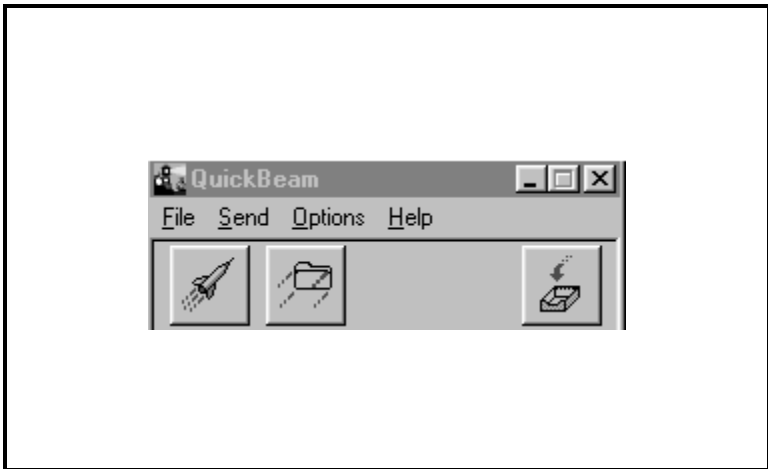




Figure 7-4: The QuickBeam Window

Using Windows 95/98

1. Click on the *Infrared* icon in the System Tray -  . A window similar to Figure 7-5 below appears.
2. Select the desired file and click on **Send**. A window appears indicating the file is downloading.

Using Windows 2000

1. To activate infrared communications on your PC, line up the IR beam on the PM880 with the PC's IR sensor. A window appears indicating IR communications is activated.
2. Click on the *Infrared* icon in the System Tray -  . A window similar to Figure 7-5 below appears.
3. Select the desired file and click on **Send**. A window appears indicating the file is downloading.

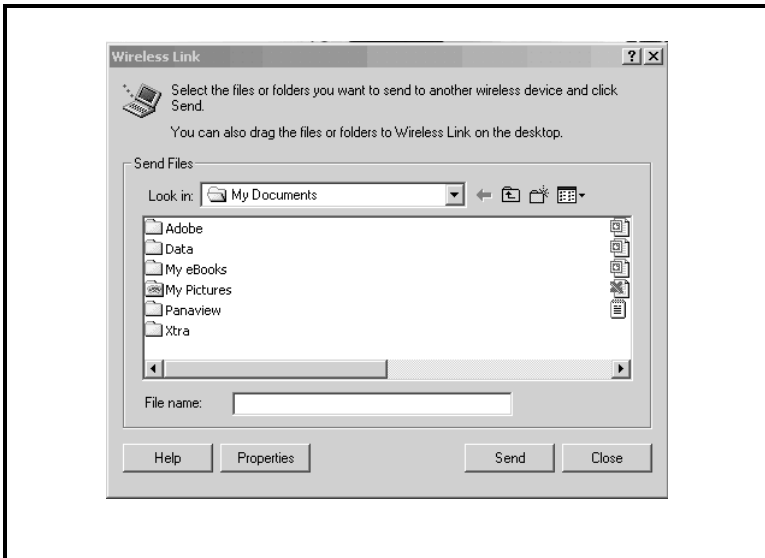


Figure 7-5: *Wireless Link* Window

Chapter 8

Maintaining and Troubleshooting the PM880

The PM880 is designed to be maintenance and trouble-free; however, because of process conditions and other factors, minor problems may occur. The PM880 provides commands to monitor and check its various components. This section also includes information on some of the most common problems you may encounter. If you cannot find the information you need in this chapter, please consult GE Infrastructure Sensing.

Caution!

Do not attempt to troubleshoot the PM880 beyond the instructions in this chapter. If you do, you may damage the unit and void the warranty.

- Checking the Memory Status - page 8-3
- Checking the Battery Status - page 8-4
- Testing the Screen - page 8-6
- Testing the Keypad - page 8-7
- Testing the Watchdog Timer Circuit - page 8-8
- Resetting to Factory Default Settings - page 8-9
- Viewing and Changing Security Settings - page 8-11
- Updating PM880 Software - page 8-15
- Removing/Replacing the Batteries - page 8-22
- Recharging the Batteries - page 8-23

Maintaining and Troubleshooting the PM880 (cont.)

- Error and Screen Messages - page 8-26
- Common Problems - page 8-30
- Replacing and Recalibrating the Moisture Probes - page 8-33
- Recalibrating the Pressure Sensors - page 8-34

Note: *While the MIS Probe and Factory Calibration options appear on the Service Menu, they are only available to operators with a Service level security code. Consult GE Infrastructure Sensing for further information.*

Checking the PM880 Memory Status

The PM880 stores all types of files in its memory. Each type of Manager enables you to monitor the size of a file and the remaining amount memory. To check the memory status:

Accessing the Site, Drive or Log Manager

1. If the menu is not active, press [MENU].
2. To check:
 - site, meter, log or snapshot files, press **Site** and press [ENTER].
 - log files only, press **Logging** and press [ENTER].
3. Use the arrow key to scroll to:
 - **Site Manager** and press [ENTER] - to check site files only.
 - **Drive Manager** and press [ENTER] - to check all types of files.
 - **Log Manager** and press [ENTER] - to check log files only.

Selecting a Log File

1. Use the arrow key to scroll to the desired files. If you do not see the desired log in the list, refer to *Viewing All Logs* on page 5-9 to display all the existing logs.

Note: *The list of files in each Manager can be listed chronologically or alphabetically. Refer to Sorting Files in the Site/Drive/Log Manager on page 6-15.*

2. Check the lower right-hand corner of the window. You should see the current date and time, the size of the selected file and the remaining amount of memory.

What's Next?

Do one of the following:

- To check the size of another file, use the arrow keys to scroll to the desired file.
- To exit and return to taking measurements, press [F3] (Exit) and then press [MENU].




Checking the Battery Status

The PM880 provides two ways to monitor the battery status: displays a battery icon while taking measurements and using the Battery command. Refer to the appropriate section that follows for more details.

While Taking Measurements

While taking measurements, the PM880 displays a battery icon in the upper right corner of the screen. Refer to Table 8-1 below for a list of battery icons.

Table 8-1: Battery Status Icons

Icon	Battery Status
	Full battery
	Partially full battery
	Empty battery

Using the Battery Command

The Battery command enables you to monitor the battery status more closely. Use the following steps to check the battery status:

1. If the menu is not active, press [MENU].
2. Use the arrow key to scroll to **Meter** and press [ENTER].
3. Use the arrow key to scroll to **Battery** and press [ENTER]. A screen similar to Figure 8-1 on the next page appears.
4. Press [F3] (Exit) to return to taking measurements.

Using the Battery Command (cont.)

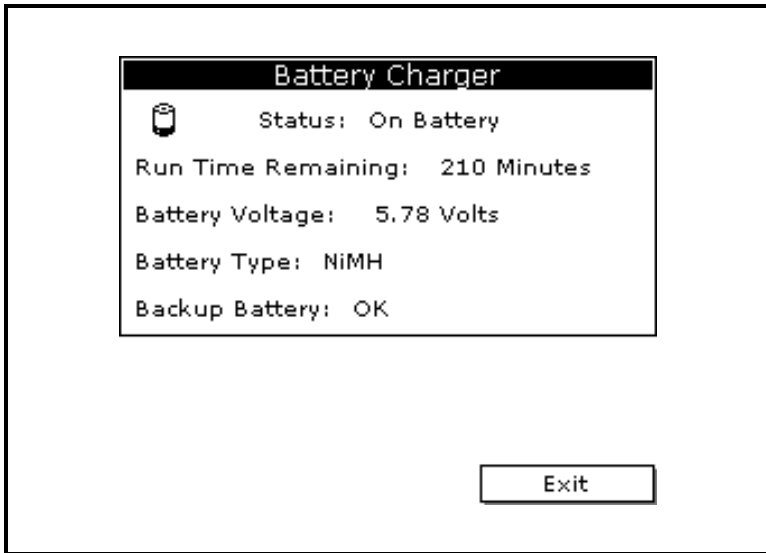


Figure 8-1: The Battery Charger Window

Testing the Screen

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Test** and press [ENTER].
4. Use the arrow keys to scroll to **Test Screen** and press [ENTER]. A screen with a checkerboard pattern appears as shown in Figure 8-2 below.

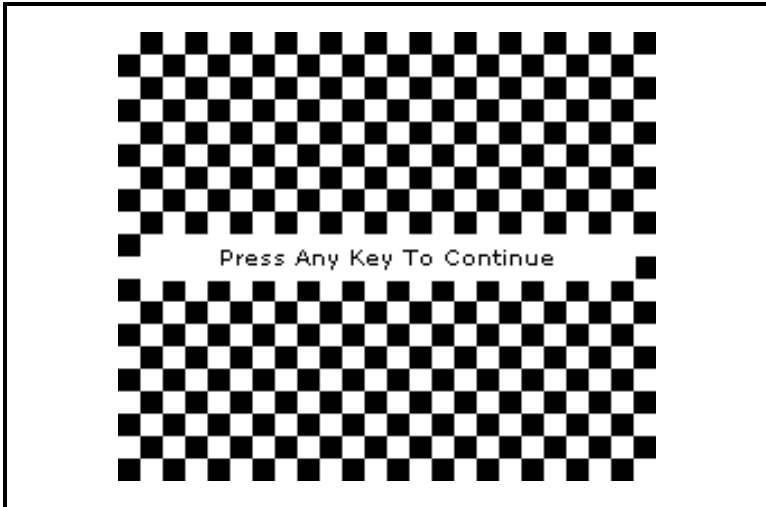


Figure 8-2: A Functioning Test Screen

5. Press any key. The screen should redraw with the same checkerboard pattern. Make sure the screen redraws properly.
6. Keep pressing keys to change the screen. The PM880 will sequence through a number of dark and light screens before returning to taking measurements. Make sure the screen keeps redrawing properly. If it does not, please consult GE Infrastructure Sensing.

Testing the Keypad

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Test** and press [ENTER].
4. Use the arrow keys to scroll to **Test Keys** and press [ENTER].
The screen appears similar to Figure 8-3 below.

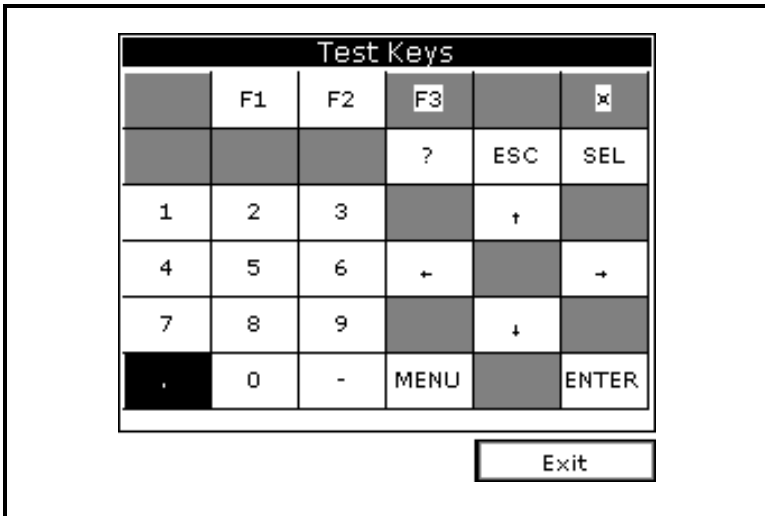


Figure 8-3: The Test Keys Window

5. Press any key on the keypad. The corresponding box on the screen should darken.
- Note:** *If the box does not darken or if the key does not appear on the screen, contact GE Infrastructure Sensing.*
6. Press [F3] and then [MENU] to return to taking measurements. If any key does not appear on the screen, contact GE Infrastructure Sensing.

Testing the Watchdog Timer Circuit

The PM880 includes a watchdog timer circuit. If a software error causes the meter to stop responding, this circuit automatically resets the meter.

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Test** and press [ENTER].
4. Use the arrow keys to scroll to **Watchdog Test** and press [ENTER]. The screen appears similar to Figure 8-4 below.

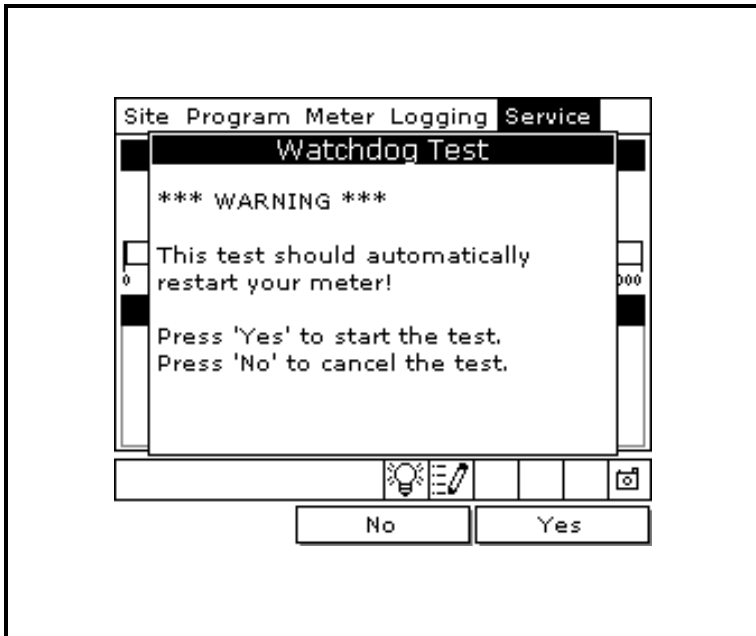


Figure 8-4: The Watchdog Test Screen

5. Press [F3] (Yes) to start the test. The PM880 screen becomes blank for a few seconds and then begins the boot sequence. If it does not follow this sequence, consult GE Infrastructure Sensing.

Resetting to Factory Default Settings

The Factory Defaults command enables you to return the meter to its preprogrammed default settings. The PM880 replaces the default site file and the global meter settings with the factory default settings. To reset the meter:

1. Transfer or print all sites and logs. Refer to Chapter 7, *Using the PM880 with a PC and Printer*.

!WARNING!
ALL SETTINGS IN THE DEFAULT SITE WILL BE RESET.
BE SURE TO TRANSFER OR PRINT ALL SITES
AND LOGS BEFORE RESETTING!

2. If the menu is not active, press [MENU].
3. Use the arrow keys to scroll to **Service** and press [ENTER].
4. Use the arrow keys to scroll to **Factory Defaults** and press [ENTER]. The screen appears similar to Figure 8-5 below.



Figure 8-5: The Factory Defaults Window

Resetting to Factory Default Settings (cont.)

5. Press [F3] (OK) to restore the factory default settings.
6. The program asks for confirmation: “Are you SURE?” Press [F3] (Yes).

The PM880 replaces the default site file and the global meter settings with the factory default settings. When the meter returns to taking measurements, it displays data using the default site.

Viewing or Changing Security Settings

To guard against accidental or intentional tampering, the PM880 includes a password-based security system. The system has three security levels. Individual passcodes protect the three security levels; they consist of one to eight digits. The three levels are as follows:

- **User Level** - allows access to the display and non-critical meter settings (such as resetting the clock).
- **Operator Level** - allows access to most of the meter settings used to set up the meter such as probe selection and calibration data. This level also allows you to delete files such as old logs and unneeded site files.
- **Service Level** - provides access to all meter settings, and is available only to GE Infrastructure Sensing representatives and authorized service agents.

The backup battery maintains the file system, so that if the battery fails or the drive is erased, the passcodes will revert to the default values. For both the User and Operator level, the default code is 2719.

Use the sections that follow to setup security levels and enter new passcodes.

- **Setting the Security Passcodes** - see the next page
- **Setting Remote Access Security** - page 8-13

Setting the Security Passcodes

To enter new security passcodes:

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Security Settings** and press [ENTER].
4. Use the arrow keys to move to the **Passwords** tab and press [ENTER]. The screen appears similar to Figure 8-6 below.



Figure 8-6: The Passcode Entry Window

5. Use the arrow keys to scroll to the desired passcode text box and press [ENTER].
6. Use the numeric keys to enter the new passcode (1 to 8 digits) and press [ENTER].

IMPORTANT: *Be sure to keep a record of the new passcode.*

What's Next?

- To change remote access settings, refer step 4 in *Setting Remote Access Security* on the next page.
- To exit and return to taking measurements, press [F3] (OK) and then [MENU].

Setting Remote Access Security

The PM880 enables you to set remote access security for each security level. Remote access consists of allowing the PM880 to communicate with PanaLink (GE Infrastructure Sensing software), receive files from a PC via IrDA, and transmit files to a PC via IrDA. To set remote access:

Note: *The remote access security settings are only available to users with Operator or Service level passcodes.*

1. Press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Security Settings** and press [ENTER].
4. Use the arrow keys to move to the Level tab and press [ENTER]. The screen appears similar to Figure 8-7 below.



Figure 8-7: Security Level Window

5. Use the arrow keys to move to Security Level and press [ENTER] to open the drop-down menu.
6. Scroll to the desired level and press [ENTER].

Setting Remote Access Security (cont.)

7. The PM880 may ask you to enter a passcode depending on the level you choose. Enter the passcode and press [ENTER].

Note: *You can change the remote access security settings for the Service Level; however, you will need to enter the passcode for that level. Contact GE Infrastructure Sensing.*

8. Use the arrow keys to scroll to the desired options. Press [ENTER]. When an “X” appears in the box, access is granted.

What's Next?

- To change security passcodes, refer to step 4 in *Setting the Security Passcodes* on page 8-12.
- To exit and return to taking measurements, press [F3] (OK) and then [MENU].

Updating PM880 Software

As discussed in Chapter 7, *Using the PM880 with a PC or Printer*, the PM880 uses an IR transceiver to transfer files. The IR function can also be used to upgrade the meter's user program. The software upgrade includes the bootloader and instrument software, and the meter and Help string files.

Before you can upgrade the meter's user program, you should print out or download logs and other settings stored in the PM880's memory.

Caution!

To guard against mishap, you should print out, download or otherwise record all logs, settings and other data you wish to save.

Once you have backed up your data, refer to the section below to begin the upgrading procedure.

Upgrading Requirements

To use your PC to download the new user program, your computer must meet the following requirements.

Infrared Hardware

The PM880 is equipped with a built-in IR sensor. Your PC must have an infrared sensor (built-in or external). If your PC does not have a built-in IR sensor, you can purchase a compatible IR dongle. GE Infrastructure Sensing recommends the ActiSys ACT-IR220L+ infrared to RS232 adapter.

Upgrading Requirements (cont.)

MicroSoft Windows Operating System

The operating system software must be IrDA compatible. There are two IR standards supported by MicroSoft Windows operating systems: IrOBEX and IrCOMM.

- IrOBEX is the newest standard and is used by most Windows operating systems. This standard transfer files faster and tolerates IR interruptions better.
- IrCOMM is an older standard and is used by some Windows operating systems. This standard transfers files at a slower rate, but can still be used to upgrade the meter's user program.

GE Infrastructure Sensing recommends updating software via the IrOBEX standard; however, the IrCOMM standard is available for users who have problems with IrOBEX. Use Table 8-2 below to find out which standard your PC's operating system can use.

Table 8-2: IrDA Compatibility of Windows Operating Systems

Operating System	IrCOMM	OBEX
Windows XP	No	Yes
Windows 2000	No	Yes
Windows NT 4.0	QuickBeam*	QuickBeam*
Windows Me*	Yes	Yes
Windows 98 SE*	Yes	Yes
Windows 98*	Yes	Yes
Windows 95*	Yes	Yes
Windows 3.1	No	No
DOS 6.22	No	No

*May require QuickBeam installation under some circumstances when Windows built-in support fails. QuickBeam is a recommended infrared file software transfer utility from Extended Systems, Inc. Since Windows NT 4.0 does not provide built-in support for IR file transfer, QuickBeam is necessary with this operating system.

What's Next?

To upgrade using:

- IrOBEX - refer to *Updating Software via IrOBEX* below.
- IrCOMM - refer to *Updating Software via IrCOMM* on page 8-19.

Updating Software via IrOBEX

Use the sections below to upgrade the PM880 software using IrOBEX.

Setting Up PM880

1. Press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Flash Update** and press [ENTER]. The screen appears similar to Figure 8-8 below.

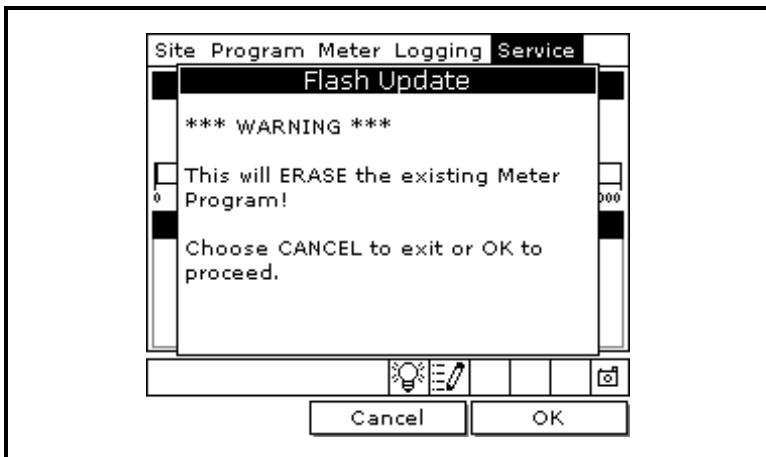


Figure 8-8: The Flash Update Window

Setting Up PM880 (cont.)

4. Press [F3] (OK) to confirm that you wish to erase the program.
5. The meter asks for confirmation. Press [F3] (OK) to continue with the update.
6. After the PM880 reboots, the meter will ask you a series of questions. Use the appropriate function key to respond, then refer to the next section.

Downloading User Program Upgrades

Note: *You can also use Infrared Transfer Application (My Computer\Infrared Recipient) to download files.*

1. Using your PC, open *Windows Explorer*.
2. Go to the folder where the upgrade files are stored.
3. Highlight the desired file(s) by clicking once. The software upgrade includes the bootloader and instrument software, and the meter and Help string files.
4. Right click on the file(s).
5. Be sure the infrared sensor on the meter has a clear path to the infrared adapter on the PC.
6. Select *Send To* → *Infrared Recipient* or *Nearby Computer* (or *QuickBeam* if *QuickBeam* has been installed)
7. The computer will display a window showing the status of the file upload.

Updating Software Via IrCOMM

Use the sections below to upgrade the PM880 software using IrCOMM.

Setting up the PC

Note: *The use of Hyperterminal is shown here as an example. If you are using a different communications software, see its manual for detailed instructions.*

1. From the Start Menu, click *Programs/Accessories/Hyperterminal* to open the Hyperterminal window.
2. If the call is not connected, click on *Connect* from the *Call* menu in Hyperterminal.
3. From the *File* menu, click *Properties*. Be sure the *New Connection Properties* window is set to your virtual infrared port.

Note: *You can determine which virtual port your infrared is using by opening Infrared Monitor in the Control Panel and clicking on the Options tab. It displays the message, "Providing Application Support on:" and then lists the virtual infrared port.*

Setting Up PM880

1. If the menu is not active, press [MENU].
2. Use the arrow keys to scroll to **Service** and press [ENTER].
3. Use the arrow keys to scroll to **Flash Update** and press [ENTER]. The screen appears similar to Figure 8-9 on the next page.
4. Press [F3] (OK) to confirm that you wish to erase the program.
5. The meter asks for confirmation. Press [F3] (OK) to continue with the update.
6. After the PM880 reboots, the meter will ask you a series of questions. Use the appropriate function key to respond, then refer to the next section.

Setting Up PM880 (cont.)

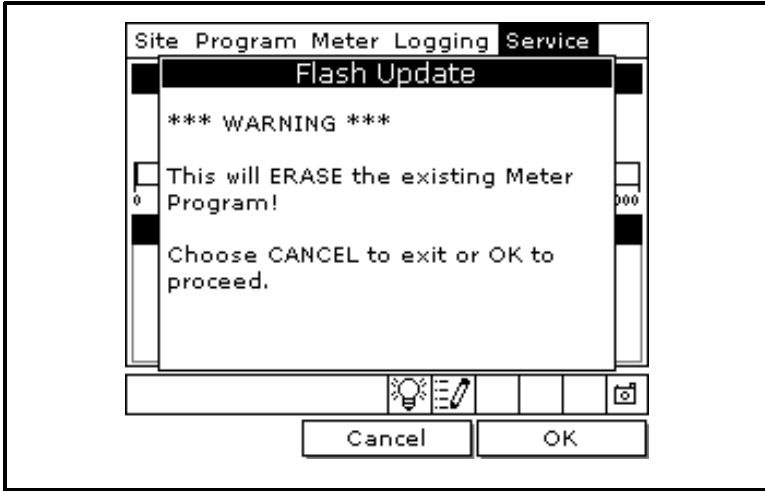


Figure 8-9: The Flash Update Window

Downloading User Program Upgrades

1. Be sure the infrared sensor on the meter has a clear path to the infrared adapter on the PC.
2. Return to the PC Hyperterminal program. In the Hyperterminal window, pull down the *Transfer* menu and click *Send File*. A window opens similar to Figure 8-10 below.

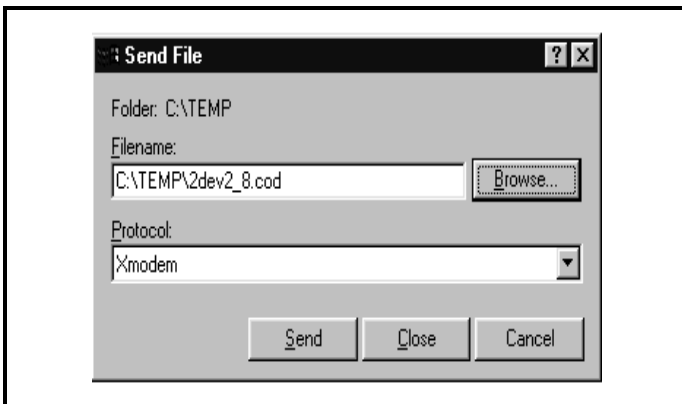


Figure 8-10: The Send File Window in the Transfer Menu

Downloading User Program Upgrades (cont.)

3. Click on the replacement software (designated by a .cod extension) from the folder where it has been stored.
4. From the Protocol drop-down menu, select Xmodem.
5. Click *Send*. For a successful transfer, the PC window appears similar to Figure 8-11 below, while the PM880 screen displays the program ID, size, load address and a count of blocks being loaded.

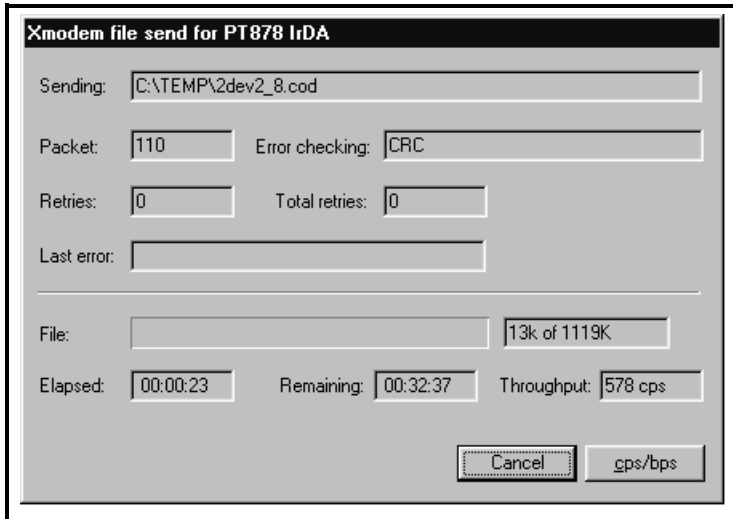


Figure 8-11: The File Transmission Window

Removing/Replacing the Batteries

If you need to replace the rechargeable batteries, use NiMH high energy rechargeable batteries (GE Infrastructure Sensing Part Number 705-1023).

Caution!

Replace batteries only with the specified rechargeable NiMH batteries. Do not attempt to recharge non-rechargeable batteries.

To remove/replace the batteries:

1. Make sure the new battery pack is charged as described in *Recharging the Batteries* on the next page.
2. Remove the four thumb screws on the back panel of the PM880 that secure the NiMH battery pack. Lift the battery pack out of the unit. See Figure 8-12 below.
3. Insert the new battery pack.
4. Replace the four screws on the back panel.

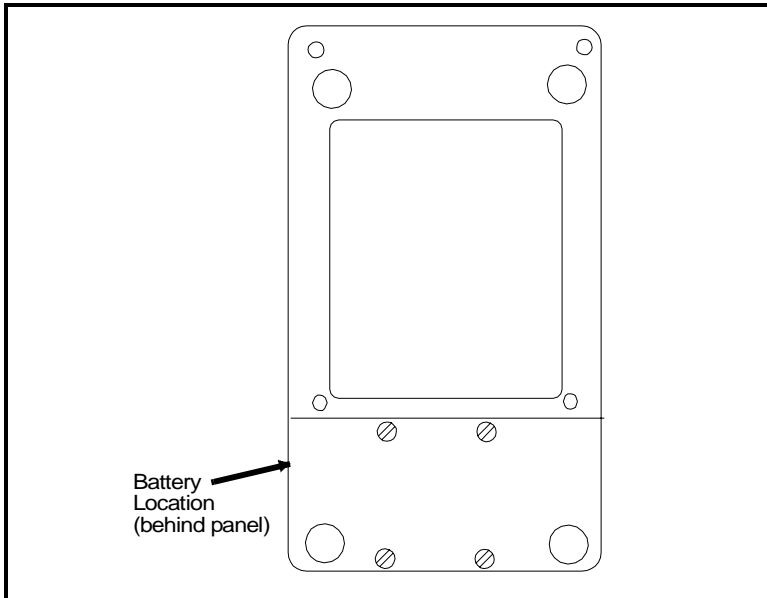


Figure 8-12: NiMH Battery Location

Recharging the Batteries

The PM880 is powered by a rechargeable NiMH battery pack. The batteries must be charged 4-5 hours until the amber LED on the charger goes out to receive the maximum charge. When fully charged, the batteries provide 16 to 24 hours of continuous operation, depending on the probe type and PM880 usage. An internal battery gauge indicates the remaining power in the batteries.

Before you recharge the battery pack you must make sure the charger is properly configured. Use the instructions below to properly charge the battery pack.

Removing the Battery Pack

1. Make sure you are in a general-purpose location where you can safely charge the pack.

!WARNING!
**THE BATTERY PACK CAN BE INSTALLED
AND REMOVED IN HAZARDOUS AREAS,
HOWEVER, IT MUST BE CHARGED
IN GENERAL-PURPOSE AREAS ONLY.**

2. Remove the four thumb screws on the back panel of the PM880 that secure the pack.
3. Lift the pack out of the unit.

Configuring the Battery Charger

The PM880 battery charger has a switchable voltage input of 115 to 230 VAC. Before you plug the pack into the charger you must make sure the voltage selector is in the correct position before plugging it in.

Caution!

The battery charger is intended for indoor use only. See *Specifications* for power cord type. Risk of electrical shock: dry locations use only. Charge on NiMH type rechargeable batteries. Other types of batteries may burst causing injury and/or damage.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

!DANGER!

TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK,
CAREFULLY FOLLOW GUIDELINES BELOW.

- a. BE SURE VOLTAGE SELECTOR IS IN CORRECT VOLTAGE POSITION BEFORE PLUGGING IN. SEE BOTTOM OF CHARGER.
- b. FOR USE IN THE U.S., THE VOLTAGE SELECTOR SWITCH MUST BE PLACED IN THE 115 VOLT POSITION.
- c. FOR USE IN COUNTRIES OUTSIDE THE U.S., PLACE THE VOLTAGE SELECTOR IN THE CORRECT POSITION. CONFIRM THE VOLTAGE AVAILABLE AT YOUR LOCATION BEFORE USING THE PRODUCT.
- d. FOR CONNECTION TO A SUPPLY NOT IN THE U.S., USE AN ATTACHMENT PLUG OR ADAPTOR OF THE PROPER CONFIGURATION FOR THE POWER OUTLET.

Charging the Battery Pack

1. Plug the pack into the battery charger.
2. Connect the charger to AC power. When power is applied, the amber LED glows and the charger automatically begins charging the pack.
3. The pack is fully charged when the amber LED goes out (approximately 4-5 hours).

IMPORTANT: *When you receive your unit, you should completely charge the battery pack before you use it for the first time.*

4. Remove the pack from the charger and reinstall it in the PM880. Refer to *Checking the Battery Status* on page 8-4 for details on monitoring the battery.

Error and Screen Messages

The PM880 has a series of error messages that display on the screen when the error occurs. The error messages are only general descriptions of the possible problems. The PM880 also has several screen messages that appear during operation and setup.

Use Table 8-3 below to isolate and remedy the problem. If you are unable to remedy the problem, contact GE Infrastructure Sensing.

Table 8-3: Error and Screen Messages

Error Message	Problem	Action
Error Codes		
Err 1: No Probe	A probe of type required has not been installed.	Connect the required probe.
Err 2: Out of Range	A calculated result exceeds the unit's capacity.	Contact GE Infrastructure Sensing.
Err 3: Over Range	A calculated result exceeds the unit's calibration range.	Contact GE Infrastructure Sensing. Change the measurement units so that the result is within range.
Err 4: Under Range	A calculated result is below the unit's calibration range.	Contact GE Infrastructure Sensing.
Err 5: Not Avail	The mode or units selected require more data or a different sensor.	Choose a different mode and/or units. Connect the required probe.
Err 6: No Comm	The MIS Probe did not respond to a request for data.	Check the MIS Probe connections. Replace the MIS Probe.
Err 7: No Link	Communication with an MIS Probe has failed. The probe is disconnected or damaged.	Check the MIS Probe connections. Replace the MIS Probe.

Table 8-3: Error and Screen Messages (cont.)

Error Message	Problem	Action
Error Codes (cont.)		
Err 8: Bad CRC	Communication with an MIS Probe is intermittent or distorted.	Check for cable breaks or high electromagnetic interference (EMI).
Err 9: Bad Msg	The MIS Probe sent a response that is not supported by the PM880.	Consult GE Infrastructure Sensing.
Err 11: No Reference	No reference values were entered for a moisture or pressure probe.	Enter reference values.
Err 12: No Calibration	No calibration curve was entered for a moisture or pressure probe.	Enter calibration curve.
Err 15: Cal Error	An internal calibration reference has failed during Auto-Cal, or a probe failure is interfering with AutoCal.	Contact GE Infrastructure Sensing.
Err 25: No Data	The MIS Probe has not responded, or a calculation is not yet complete.	The PM880 will try to send data; wait for next update.
MIS Probe		
Calibration data will be written to the attached MIS probe.	This screen appears when new calibration data is manually entered in the Calibrate menu.	<p>Press [F3] (OK) to overwrite existing data. Pressing OK overwrites the calibration data stored in the MIS probe electronics module.</p> <p>Press [F2] (Cancel) to discontinue.</p>

Table 8-3: Error and Screen Messages (cont.)

Error Message	Problem	Action
MIS Probe (cont.)		
These setup values will be written to the attached MIS probe.	This screen appears when new setup data is manually entered in the Service, MIS Probe menu.	<p>Press [F3] (OK) to overwrite existing data. Pressing OK overwrites the setup data (e.g. reference values) stored in the MIS probe electronics module.</p> <p>Press [F2] (Cancel) to discontinue.</p>
No link to the MIS probe.	This screen appears when trying to write to a disconnected MIS probe.	<p>Press [F3] (OK) to cancel all writes. The PM880 will read from the next connected MIS probe.</p> <p>During the “No Link” condition, the Hygro and Pressure tabs in the Calibrate menu are disabled. These calibration values are erased until a new probe is connected.</p>
A MIS probe change has been detected.	This screen appears after a probe change.	Press [F3] (OK) to cancel all writes. The PM880 will read data from the next connected MIS probe.

Table 8-3: Error and Screen Messages (cont.)

Error Message	Problem	Action
MISC		
Probe due for calibration.	This screen appears at the user-programmed interval in the Probe ID tab in the Calibrate menu.	<p>Send probe back to factory for recalibration. If you are recalibrating a MIS probe, make sure you send the electronics module back with the probe.</p> <p>Press [ENTER] to temporarily clear the reminder.</p> <p>To turn off the reminder, use the Program, Calibrate, Probe ID menus. Turn Cal Reminder to None.</p>
If you see this message, the watchdog test has FAILED. Please consult the factory for instructions.	This screen appears if the watchdog timer circuit fails the watchdog test (Service, Test, Watchdog Test menu).	Press [F3] (OK) to continue. Contact the factory.

Common Problems

If the PM880 measurement readings seem strange, or they do not make sense, there may be a problem with the probe or a component of the process system. Table 8-4 below contains some of the most common measurement problems.

Table 8-4: Troubleshooting Guide for Common Problems

Possible Cause	System Response	Action
Symptom: Accuracy of moisture sensor is questioned.		
Insufficient time for system to equilibrate	Probe reads too wet during dry down conditions, or too dry in wet up conditions.	Change the flow rate. A change in dew point indicates the sample system is not at equilibrium, or there is a leak. Allow sufficient time for sample system to equilibrate and moisture reading to become steady. Check for leaks.
Dew point at sampling point is different than the dew point of the main stream.	Probe reads too wet or too dry.	Readings may be correct if the sampling point and main stream do not run under the same process conditions. The different process conditions cause readings to vary. If sampling point and main stream conditions are the same, check sample system pipes, and any pipe between the sample system and main stream for leaks. Also, check sample system for adsorbing water surfaces, such as rubber or plastic tubing, paper-type filters, or condensed water traps. Remove or replace contaminating parts with stainless steel parts.
Sensor or sensor shield affected by process contaminants (refer to <i>Application of the Hygrometer</i>).	Probe reads too wet or too dry.	Clean the sensor and the sensor shield as described in <i>Aluminum Oxide Probe Maintenance in Application of the Hygrometer</i> . Then reinstall sensor.
Sensor is contaminated with conductive particles (refer to <i>Application of the Hygrometer</i>).	Probe reads high dew point.	Clean the sensor and the sensor shield as described in <i>Aluminum Oxide Probe Maintenance in Application of the Hygrometer</i> . Then reinstall sensor.

Table 8-4: Troubleshooting Guide for Common Problems

Possible Cause	System Response	Action
Symptom: Accuracy of moisture sensor is questioned.		
Sensor is corroded (refer to <i>Application of the Hygrometer</i>).	Probe reads too wet or too dry.	Return probe to factory for evaluation.
Sensor temperature is greater than 70°C (158°F).	Probe reads too dry.	Return probe to factory for evaluation.
Stream particles causing abrasion.	Probe reads too wet or too dry	Return probe to factory for evaluation.
Symptom: Screen always reads the wettest (highest) programmed moisture calibration value while displaying dew/frost point.		
Probe is saturated. Liquid water present on sensor surface and/or across electrical connections.		Clean the sensor and the sensor shield as described in <i>Aluminum Oxide Probe Maintenance</i> in <i>Application of the Hygrometer</i> . Then reinstall sensor.
Shorted circuit on sensor.		Run “dry gas” over sensor surface. If high reading persists, then probe is probably shorted and should be returned to the factory for evaluation.
Sensor is contaminated with conductive particles (refer to <i>Application of the Hygrometer</i>).		Clean the sensor and the sensor shield as described in <i>Aluminum Oxide Probe Maintenance</i> in <i>Application of the Hygrometer</i> . Then reinstall sensor.
Improper cable connection.		Check the cable connections to both the probe and the PM880.

Table 8-4: Troubleshooting Guide for Common Problems

Possible Cause	System Response	Action
Symptom: Screen always reads the driest (lowest) programmed moisture calibration value while displaying dew/frost point.		
<p>Open circuit on sensor.</p> <p>Non-conductive material is trapped under contact arm of sensor.</p>		<p>Return probe to factory for evaluation.</p> <p>Clean the sensor and the sensor shield as described in <i>Aluminum Oxide Probe Maintenance in Application of the Hygrometer</i>. Then reinstall the sensor. If the low reading persists, return the probe to the factory for evaluation.</p>
Improper cable connection.		Check the cable connections to both the probe and the PM880.
Symptom: Slow response.		
<p>Slow outgassing of system.</p> <p>Sensor is contaminated with non-conductive particles (refer to <i>Application of the Hygrometer</i>)</p>		<p>Replace the system components with stainless steel or electro-polished stainless steel.</p> <p>Clean the sensor and the sensor shield as described in <i>Aluminum Oxide Probe Maintenance in Application of the Hygrometer</i>. Then reinstall the sensor.</p>
Symptom: Exception screen.		
Unrecoverable software error.		Contact GE Infrastructure Sensing.

Replacing and Recalibrating the Moisture Probes

Note: *Remove the probe cable by pulling back the spring-loaded sleeve and pulling the cable out of the connector.*

For maximum accuracy you should send moisture probes back to the factory for recalibration every six months to one year, depending on the application. Under severe conditions you should send the probes back for recalibration more frequently; in milder applications you do not need to recalibrate probes as often. Contact a GE Infrastructure Sensing applications engineer for the recommended calibration frequency for your application.

Note: *You can program the PM880 to remind you when it is time to send the probes back for recalibration. Refer to Setting a Probe Calibration Reminder page 4-6*

When you receive new or recalibrated probes, be sure to follow the instructions in Chapter 1, *Getting Started*, to install, connect and enter calibration data for the probe(s). Note that each probe has its own Calibration Data Sheet with the corresponding probe serial number printed on it.

You do not have to enter calibration data for the Moisture Image Series (MIS) Probe if you returned both the sensor and the electronics module to the factory for recalibration. However, you should verify that the calibration data entered at the factory is correct (see *Entering Setup Data* on page 1-7). If you only sent the sensor part of the MIS Probe to the factory without the module, you must enter the calibration data manually.

Recalibrating the Pressure Sensors

Since the pressure sensor on a TF or Moisture Image Series (MIS) Probe is a strain gage type, the pressure calibration is linear and is calibrated at 2 data points. Each point consists of a voltage or FP value and a corresponding pressure value in psig. Check or change the 2 calibration data points using the steps below.

1. Set one of the boxes on the screen to display pressure in mV (or FP) and another box to display psig. Refer to *Displaying Measurements* on page 1-15 to set up the screen.
2. Expose the pressure sensor to air and record the mV (or FP) and psig readings. This reading is for the zero pressure.
3. Expose the pressure sensor to a known full scale pressure source and record the mV (or FP) and psig readings. This reading is for the span pressure.
4. Press [MENU].
5. Use the arrow key to scroll to **Program** and press [ENTER].
6. Use the arrow key to scroll to **Calibration** and press [ENTER].
7. Proceed to *Entering Pressure Calibration Data* on page 1-13 to complete entering data.

Chapter 9

Features and Specifications

The Model PM880 is a microprocessor-based portable hygrometer designed to measure dissolved moisture concentration in gases and non-aqueous liquids. This highly-advanced industrial analyzer is adaptable to many applications, and is certified intrinsically safe for use in hazardous locations.

The complete analyzer, including the hygrometer, cables and measurement probes, forms a “system” designed to monitor a process accurately and reliably. The following section discusses each part of this system and lists specifications.

The PM880 Hygrometer

The center of the measurement system is the PM880 hygrometer. The front of the meter has a Liquid Crystal Display, a membrane keypad and menu keys. See Figure 9-1 below.

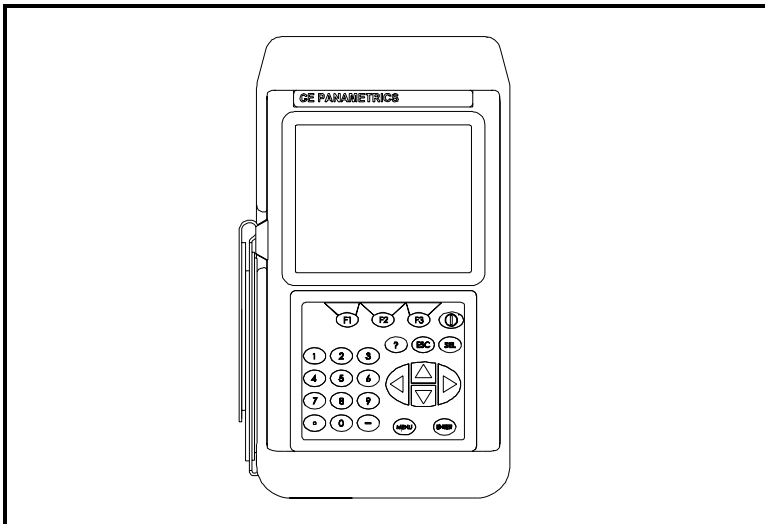


Figure 9-1: The PM880 Hygrometer

The PM880 Hygrometer (cont.)

The top of the PM880 (shown in Figure 9-2 below) includes an input for connecting moisture probes. An internal infrared transceiver enables communication between the meter and other IR devices, particularly the IR ports or dongles (IR to RS232 adapters) of Windows[®]-based PCs or printers. Users can send and receive site and log data; they can also program the meter via the optional PanaView software interface. The PM880 was designed for use with products that comply to the IrDA protocol.

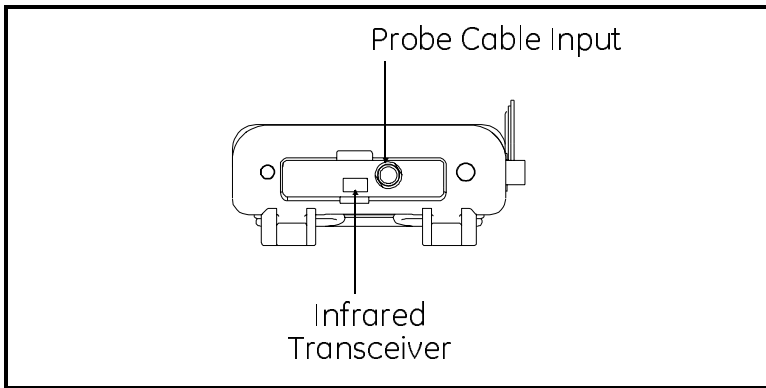


Figure 9-2: Probe Connection and Infrared Transceiver

Probes

Probes are the part of the system that come into contact with the process flow. The PM880 uses various types of probes to make moisture, temperature, and pressure measurements.

Note: *Only GE Infrastructure Sensing standard probes can be used with the PM880.*

- Moisture (M) Series - moisture and temperature.
- Three Function (TF) Series - moisture, temperature, and pressure.
- Moisture Image Series Probes - moisture, temperature, and pressure.

M Series and TF Series Moisture Probes

The M Series and the TF Series probes are very similar. Both probes use the GE Infrastructure Sensing aluminum oxide sensors to measure moisture, and a thermistor bead (optional) to measure temperature. The TF Series, however, also has an optional built-in strain-gage-type pressure transducer. The sensor assemblies are secured to a probe mount and are usually protected with a sintered stainless-steel shield (TF-9 probes do not have a shield). Other types of shields are available. See Figure 9-3 below.

If the optional temperature thermistor or pressure transducer is not used, the user can enter fixed values for temperature and pressure into the PM880 memory.

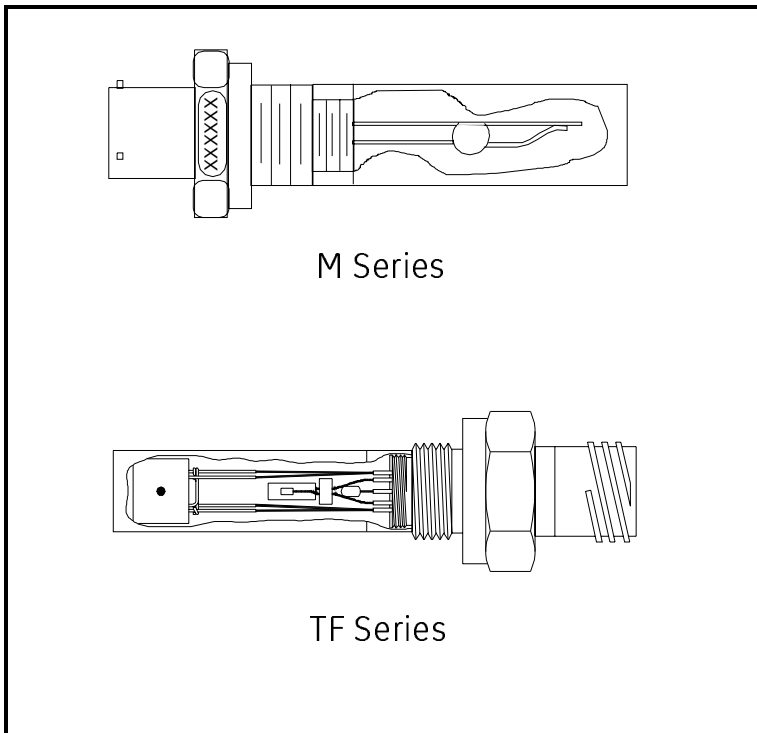


Figure 9-3: The M and TF Series Probe
(ref dwgs 750-042 and 901-152)

M Series and TF Series Moisture Probes (cont.)

Although the M and the TF Series probes may be installed directly in the process line, more often these probes are inserted into a sample system. The sample system protects the probes and enables the user to easily remove the probes for calibrating, servicing and cleaning. Sample systems also control various process and environmental conditions so that the moisture probe or sample system operates within specifications.

The M and the TF Series probes, when operated with a BASEEFA-approved PM880, are intrinsically safe and designed to meet the requirements of IEC/CENELEC zone 0 areas.

The M and TF Series probes measure moisture content in a standard range from -110°C to 20°C (-166°F to 68°F) dew/frost point temperature and optionally from -110°C to 60°C (-166°F to 140°F). Both probes optionally measure temperature in a range of -30°C to 70°C (-22°F to 158°F). The TF probe optionally measures pressure from 30-300/50-500/100-1000/300-3000/500-5000 PSIG.

Moisture Image Series Probe

The Moisture Image Series Probe measures moisture, temperature (optional), and pressure (optional). The Moisture Image Series Probe has its own electronics module that consists of a built-in microcontroller with 16-bit resolution. See Figure 9-4 below.

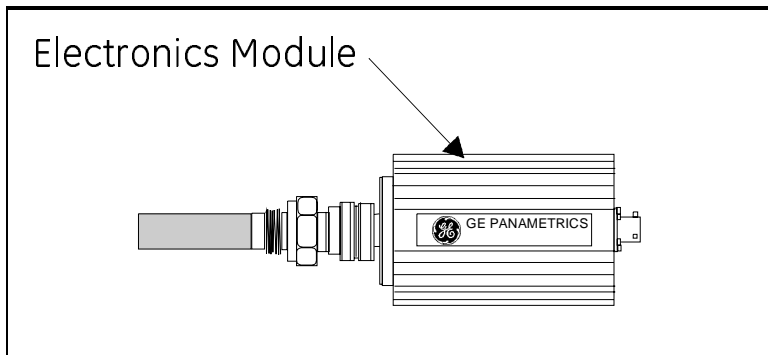


Figure 9-4: The Moisture Image Series Probe

Moisture Image Series Probe (cont.)

The electronics module stores the probe calibration and reference data in non-volatile memory; therefore, the user never needs to enter the data by hand. The Moisture Image Series Probe also features continuous compensation of its own analog circuitry to assure long-term electronic stability.

The Moisture Image Series Probe, when operated with a BASEEFA-approved PM880, is intrinsically safe and designed to meet the requirements of IEC/CENELEC zone 0 areas.

The Moisture Image Series Probe measures moisture content in a standard range from -110°C to 20°C (-166°F to 68°F) dew/frost point temperature and optionally from -110°C to 60°C (-166°F to 140°F). In addition, it can be used to measure temperature in a range of -30°C to 70°C (-22°F to 158°F) and pressure from 30-300/50-500/100-1000/300-3000/500-5000 PSIG.

Cabling

Each probe requires an interconnecting cable. Cables differ depending on the probe. The various cables are discussed below under the appropriate probe type. All of these cable assemblies can be ordered from GE Infrastructure Sensing.

M Series and TF Series Probes

The M and the TF Series probes are connected to the analyzer with a special GE Infrastructure Sensing shielded cable. Probes can be located up to 600 meters (2,000 feet) from the PM880 (consult GE Infrastructure Sensing for distances up to 1,200 meters). To measure pressure with a TF probe, the maximum cable length is approximately 152 meters (500 feet).

Moisture Image Series Probe

The Moisture Image Series Probe can be connected to the PM880 with an unshielded, twisted-pair cable. The probe may be located up to 915 meters (3,000 feet) from the analyzer using 22 AWG twisted pair cable. (Consult GE Infrastructure Sensing for longer cable lengths.)

Overall

Channels

Single Channel

Dimensions

- Size: 9.4 × 5.5 × 1.5 in.
(238 × 138 × 38 mm)
- Weight, electronics: 2.5 lb (1.13 kg)
- Weight, sample system: 4 lb (1.8 kg)

Enclosure

NEMA 4X IP67

Operational

Site Parameter Programming

Menu-driven, graphic, operator interface uses keypad and sift-function keys. Online help functions. Memory storage for saving site parameters.

Data Logging

Memory capacity to log over 100,000 moisture data points. Programmable keypad for log units, update times, and start and stop times.

Display Functions

Displays measurements and logged data in alphanumeric or graphical format. Language options: Dutch, English, French, German, Italian, Portuguese, Russian, Castilian Spanish, Latin-American Spanish and Swedish.

Display Units

- Moisture: DP temperature, ppm_v, ppm_w, %RH, lb/MMSCF and others.
- Temperature: °F, °C and °K
- Pressure: psig, bar, kPa (gauge), kg/cm² (gauge) and others

Electronics

Internal Batteries

Rechargeable. PM880 batteries can be installed or removed in hazardous areas. Batteries must be recharged in general-purpose areas only.

Battery Life

15 to 24 hours depending on probe type (battery life reduced when operating below 0°C).

Battery Charger

- Switchable input: 115 to 230 VAC, 50/60 Hz
- Requires approximately 3 hours to full battery charge
- Power cord: CSA Certified and UL Recognized
Rating: 1250 W, 10 A, 125 V
Wire: 3 Cond., 18 AWG or equivalent
- Power supply attachment plug:
CSA Certified and UL Recognized
Type: 250 V, 10 A
Mounting: Snap fit in the rectangle hole provided.

Memory

FLASH memory

Operating Temperature

14° to 122°F (-10° to 50°C)

Note: *To ensure maximum battery life storage, GE Infrastructure Sensing does not recommend storing at temperatures exceeding 95°F (35°C) for longer than one month.*

Keypad

25-key, rubberized, tactile membrane

Display

240 × 200-pixel, graphic backlit LCD

Electronics (cont.)

Printer/Terminal Output

Infrared communications port

Cables

Cable type dependent on probe type: M Series, TF Series, or Moisture Image Series. LEMO[®]-to-bayonet connector

Cable Length

- Standard: 10 ft (3 m)
- Optional: Consult G6E Infrastructure Sensing for other lengths

Hazardous Area Classification

!WARNING!

Certified when used with battery pack 200-075. Substitution of components may impair intrinsic safety.

Electronics - Intrinsic-safety certification:

Bassefa (2001) Ltd.

 II 1 G EEx ia IIC T3

$(-20^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C})$

Baseefa02ATEX0191; and



CI I, Div 1, Gr A, B, C, D, Type 6

Battery Charger - Intrinsic-safety certification:



CI 2 Battery Charger

Input: 115 VAC, 150 mA or 230 VAC, 74 mA, 50/60 Hz

Output: 7.5 VDC, 690 mA, 5.2 W

European Compliance

Complies with EMC Directive 89/336/EEC

Moisture Measurement

Compatibility

Compatible with all GE Infrastructure Sensing aluminum-oxide moisture probes: M Series, TF Series and Moisture Image Series. Each probe type requires a different type of I/O cable.

Calibration

GE Infrastructure Sensing moisture sensors are computer calibrated to NIST-traceable moisture concentrations.

Dew/frost Point Temperature

Overall Calibration Range

-110° to 60°C

Calibration Range Options

- Standard: 20° to -80°C with data to -110°C
- Ultralow: -50° to -110°C
- Extended High: 60° to -80°C with data to -110°C

Accuracy

- $\pm 2^\circ\text{C}$ from 60° to -65°C
- $\pm 3^\circ\text{C}$ from -65° to -110°C

Repeatability

- $\pm 0.5^\circ\text{C}$ from 60° to -65°C
- $\pm 1^\circ\text{C}$ from -65° to -110°C

Operating Pressure

5 μ of Hg to 5,000 psig (345 bar) limited by pressure sensor — see pressure measurement specifications

Temperature Measurement

Optional thermistor is available for all GE Infrastructure Sensing moisture probes.

Range

-30°C to 70°C (-22° to 158°F)

Accuracy

±0.5°C at -30°C

Pressure Measurement

Optional pressure sensor is available for TF Series and Moisture Image Series moisture probes

Ranges

- 30 to 300 psig (3 to 12 bar)
- 50 to 500 psig (4 to 35 bar)
- 100 to 1,000 psig (7 to 69 bar)
- 300 to 3,000 psig (21 to 207 bar)
- 500 to 5,000 psig (35 to 345 bar)

Accuracy

±1% at full scale

Proof Pressure

3 times span of available range up to maximum 7,500 psig (518 bar)

Sample System

Specifications for SS880A standard sample system, comprising an inlet needle valve, a built-in coalescing filter and sample cell with bypass needle valve and venting tube, a pressure gage (various ranges), and an outlet needle valve with venting tube.

Wetted Parts

316 SS

Operating Pressure

Configurations available for 300, 500, 1,000, 2,000 or 3,000 psig (21, 35, 69, 207, or 345 bar), dependent on pressure gauge

Maximum Pressure Rating

- Standard: 3,000 psig (207 bar)
- Optional: 5,000 psig (345 bar)

Other Options

- Inlet pressure regulator, 0 to 500 psig (1 to 345 bar) outlet
- Armored flowmeter, 1.3 to 13 SCFH
- 10-ft (3-m), flexible, PTFE-lined, braided-stainless steel hose with 1/8-in. tube connections. Not recommended for dew point temperatures below -103°F (-75°C).

Optional Accessories

- Infrared adapter connects to serial port of desktop or laptop PCs to add infrared capability
- Portable, infrared, thermal printer with rechargeable battery and 120 to 240-VAC battery charger. Printer dimensions: 6.3 × 6.5 × 2.3 in. (160 × 164 × 59 mm). Weight: 13 oz (370 g). Print width: 4 in. (104 mm).
- PC Interface Software - PanaView™ Graphical User Interface.

Appendix A

Measurement Considerations

There are a variety of environmental and installation factors that can affect measurements. These factors should be discussed with a GE Infrastructure Sensing applications engineer or field sales person by the time you receive the PM880. However, if you decide to add additional measurement sites, this section contains some basic guidelines for selecting a measurement site and constructing a sample system. This section includes the following:

- Choosing a Measurement Site - see below
- Moisture/Temperature Probe Considerations - page A-2
- Sample System Guidelines - page A-5

Choosing a Measurement Site

You should have discussed environmental and installation factors with a GE Infrastructure Sensing applications engineer or field sales person by the time you receive the PM880. The equipment should be suited to the application and installation site.

- Choose an installation site for the probes and sample systems that is as close to the process line as possible. Avoid long lengths of connecting tubing. If long distances are unavoidable, a fast sampling by-pass loop is recommended. Do not install any other components, such as filters, ahead of the probes or sample system unless instructed to do so by GE Infrastructure Sensing.
- Observe all normal safety precautions. Use the probes within their maximum pressure and temperature ratings.

Choosing a Measurement Site (cont.)

- Locate the electronics unit away from high temperatures, strong electrical transients, mechanical vibrations, corrosive atmospheres, and any other conditions that could damage or interfere with the meter operation.
- Protect the probe cables from excessive physical strain (bending, pulling, twisting, etc.). In addition, do not subject the cables to temperatures above 65°C (149°F) or below -50°C (-58°F).
- Observe the proper cable restrictions for the probes. You can locate the Moisture Image Series probe up to 915 meters (3,000 feet) away from the electronics unit with unshielded twisted pair cable. The M Series and TF Series probes require specially shielded cable. You can locate the M and TF probes up to 600 meters (2,000 feet) from the unit. If you are measuring pressure with a TF probe, the cable length should not exceed 152 meters (500 feet).

Moisture/Temperature Probe Considerations

The M Series, TF Series, and Moisture Image Series probes consist of an aluminum oxide sensor mounted on a connector head. Standard probe mounts include a protective stainless steel shield.

The probe sensor materials and housing maximize durability and insure a minimum of water absorbing surfaces in the vicinity of the aluminum oxide surface. A sintered stainless steel shield is used to protect the sensor from high flow rates and particulate matter. The end cap should not be removed except upon advice from GE Infrastructure Sensing.

The sensor has been designed to withstand normal shock and vibration. You should make sure that the active sensor surface is never touched or allowed to come into direct contact with foreign objects, since this may adversely affect performance.

Moisture/Temperature Probe Considerations (cont.)

Observing these few simple precautions will result in a long and useful probe life. GE Infrastructure Sensing recommends that probe calibration be checked routinely, at 12-month intervals, or as recommended by our applications engineers for your particular application.

The probe will measure the water vapor pressure in its immediate vicinity; therefore, readings will be influenced by its proximity to the system walls, materials of construction, and other environmental factors. The sensor can be operated under vacuum or pressure, flowing or static conditions.

Observe the following environmental precautions.

a. Temperature Range

The standard probe is operable from -110°C to $+70^{\circ}\text{C}$ (-166°F to 158°F).

b. Moisture Condensation

Be sure the temperature is at least 10°C higher than the dew/frost point temperature. If this condition is not maintained, moisture condensation could occur on the sensor or in the sample system, which will cause reading errors. If this happens, dry out the probe following the procedures outlined in *Application of the Hygrometer*.

c. Static or Dynamic Use

The sensor performs equally well in still air or where considerable flow occurs. Its small size makes it ideal for measuring moisture conditions within completely sealed containers or dry boxes. It will also perform well under gas flow conditions as high as $10,000\text{ cm/sec}$ and liquid flow conditions to 10 cm/sec . Refer to *Application of the Hygrometer*, for maximum flow rates in gases and liquids.

Moisture/Temperature Probe Considerations (cont.)

d. Pressure

The moisture probe directly measures water vapor pressure. The moisture sensor measures water vapor under vacuum or high pressure conditions from as little as 5 microns Hg to as high as 5,000 psi total pressure.

e. Long-Term Storage & Operational Stability

Sensors are not affected by continuous abrupt humidity changes or damaged by exposure to saturation conditions even when stored. However, you should store probes in their original shipping containers in a clean, dry location. If the probe is saturated during storage, refer to *b. Moisture Condensation* on the previous page before installing the probe. For best performance, do not store probes longer than one to two years from their calibration date.

f. Freedom from Interference

The sensor is completely unaffected by the presence of a wide variety of gases or organic liquids. Large concentrations of hydrocarbon gases, Freon™, carbon dioxide, carbon monoxide, and hydrogen have no effect on sensor water vapor indications. The sensor will operate properly in a multitude of gaseous or non-conductive liquid environments.

g. Corrosive Materials

Avoid all materials that are corrosive or otherwise damaging to aluminum or aluminum oxide. These include strongly acidic or basic materials and primary amines.

Sample System Guidelines

A sample system is highly recommended for moisture measurement. The purpose of a sample system is to condition or control a sample stream to within the specifications of a probe. The application requirements determine the design of the sample system. GE Infrastructure Sensing applications engineers will make recommendations based on the following general guidelines:

- Typically, sample systems should be kept very simple. They should contain as few components as possible and all or most of those components should be located downstream of the measurement probe. Figure A-1 on the next page shows an example of a simple sample system consisting of an explosion-proof housing with a sample cell, a filter, a flow meter, a vent valve and two shut off valves, one at the inlet and one at the outlet.
- The sample system components should not be made of any material that will affect measurements. A sample system may include a filter to remove particulates from the sample stream or a pressure regulator to reduce or control the pressure of the stream. However, most common filters and pressure regulators are not suitable for sample systems because they have wetted parts that may absorb or release components (such as moisture) into the sample stream. They may also allow ambient contamination to enter the sample stream. In general, you should use stainless steel material for all wetted parts.

Contact the GE Infrastructure Sensing PCI Division at 1-800-833-9438 (within the USA) or 781-899-2719 (outside the USA) for further instructions.

Sample System Guidelines (cont.)

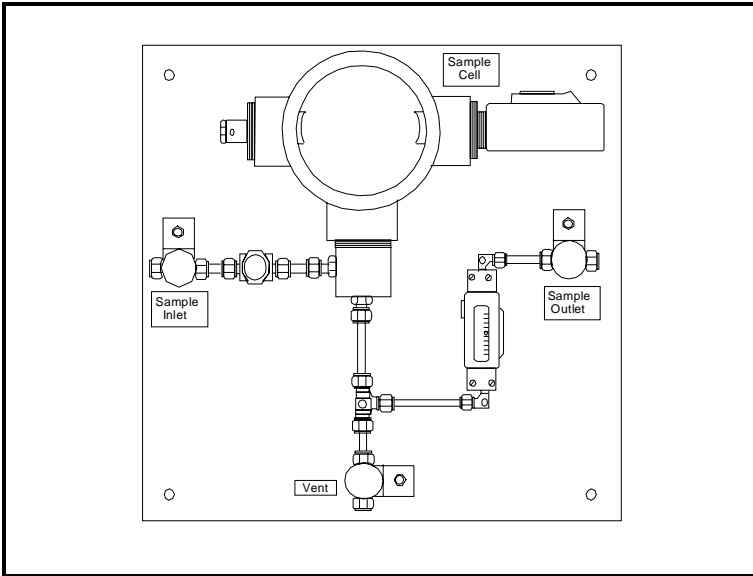


Figure A-1: A Typical Moisture Sample System

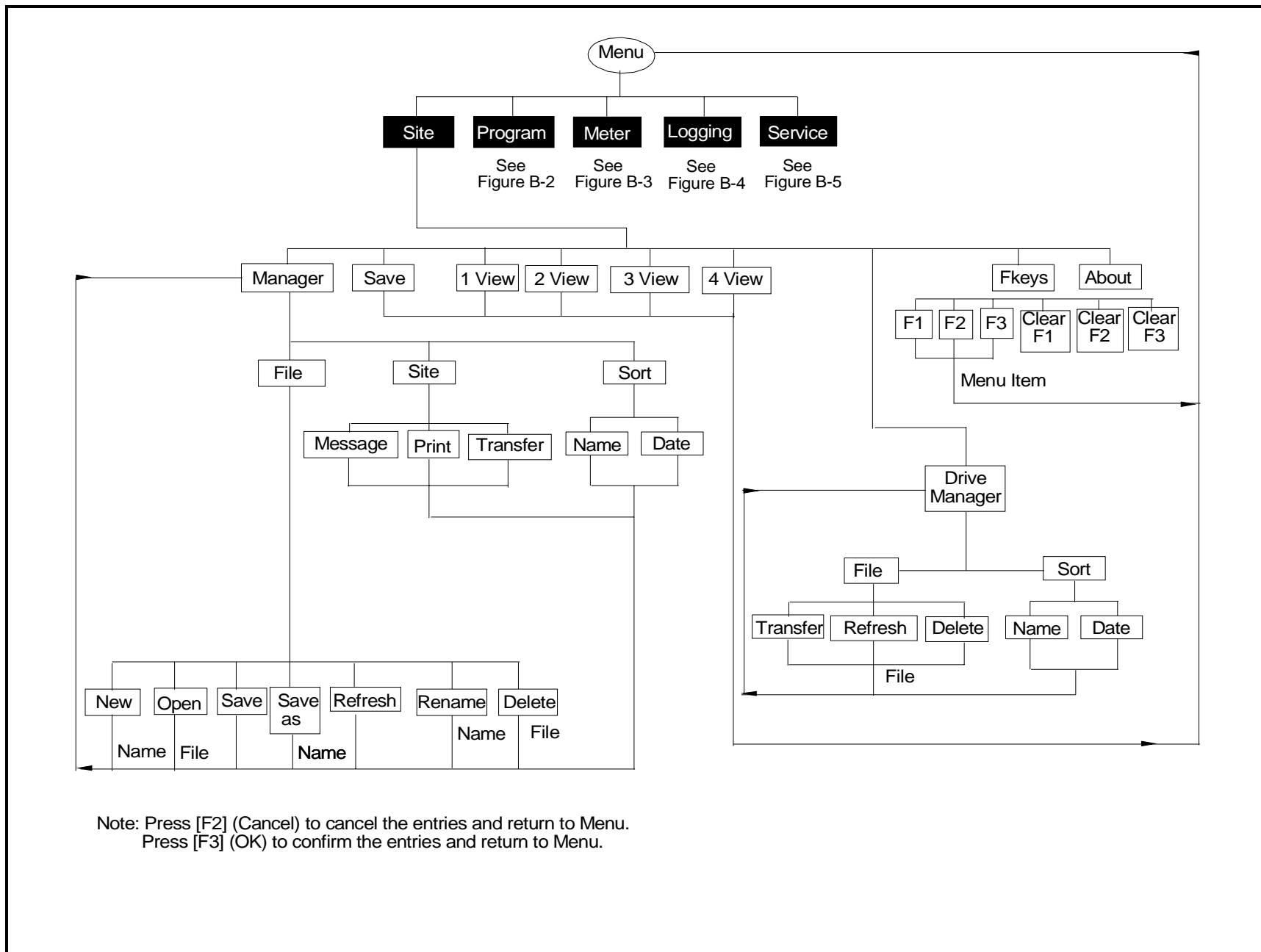
Note: *The actual sample system design is dependent on the application requirements.*

Appendix B

Menu Maps

This chapter includes menu maps of the PM880 program. Refer to the following:

- The Site Menu - page B-2
- The Program Menu - page B-3
- The Meter Menu - page B-4
- The Logging Menu - page B-5
- The Service Menu - page B-6



Note: Press [F2] (Cancel) to cancel the entries and return to Menu.
 Press [F3] (OK) to confirm the entries and return to Menu.

Figure B-1: The Site Menu

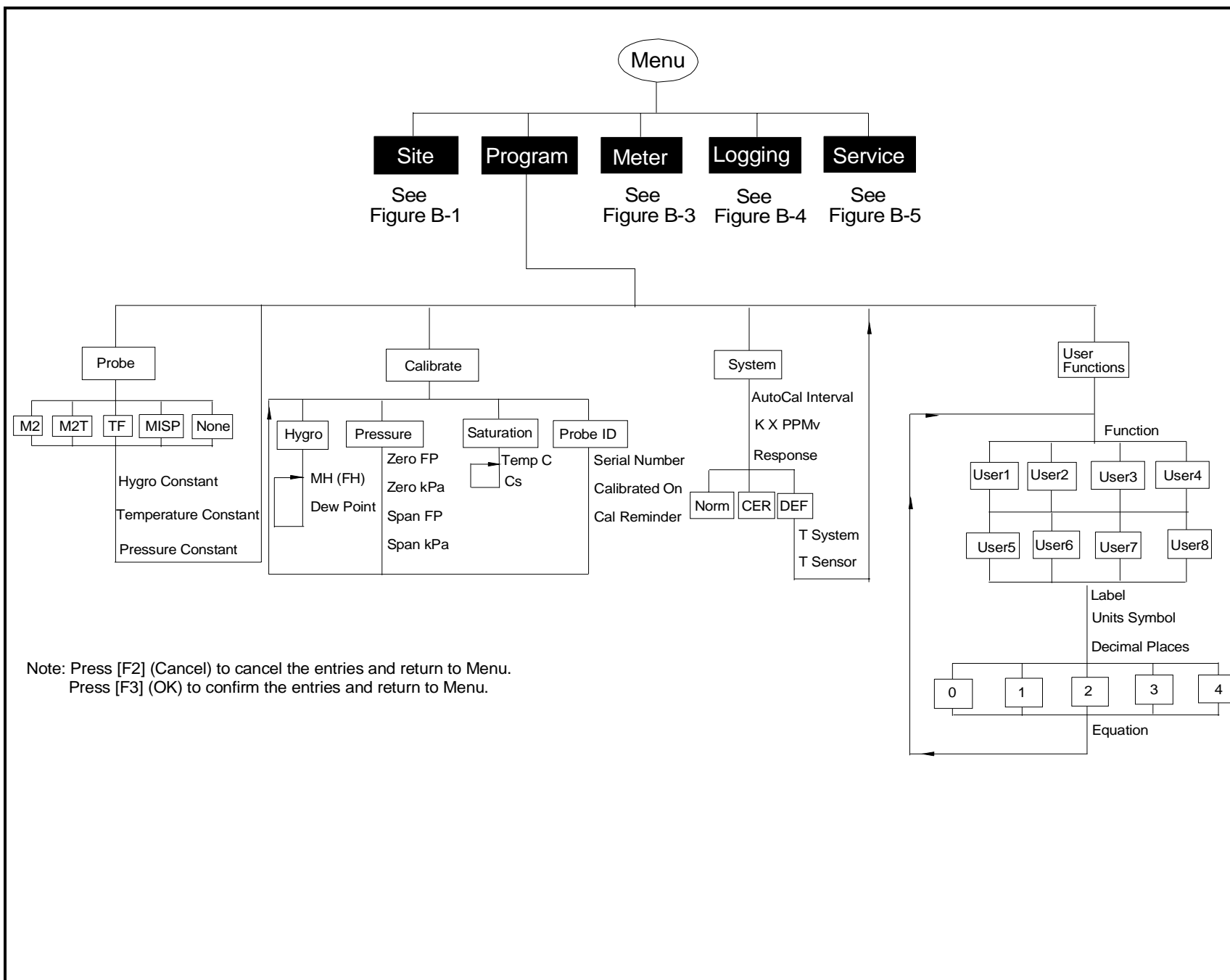
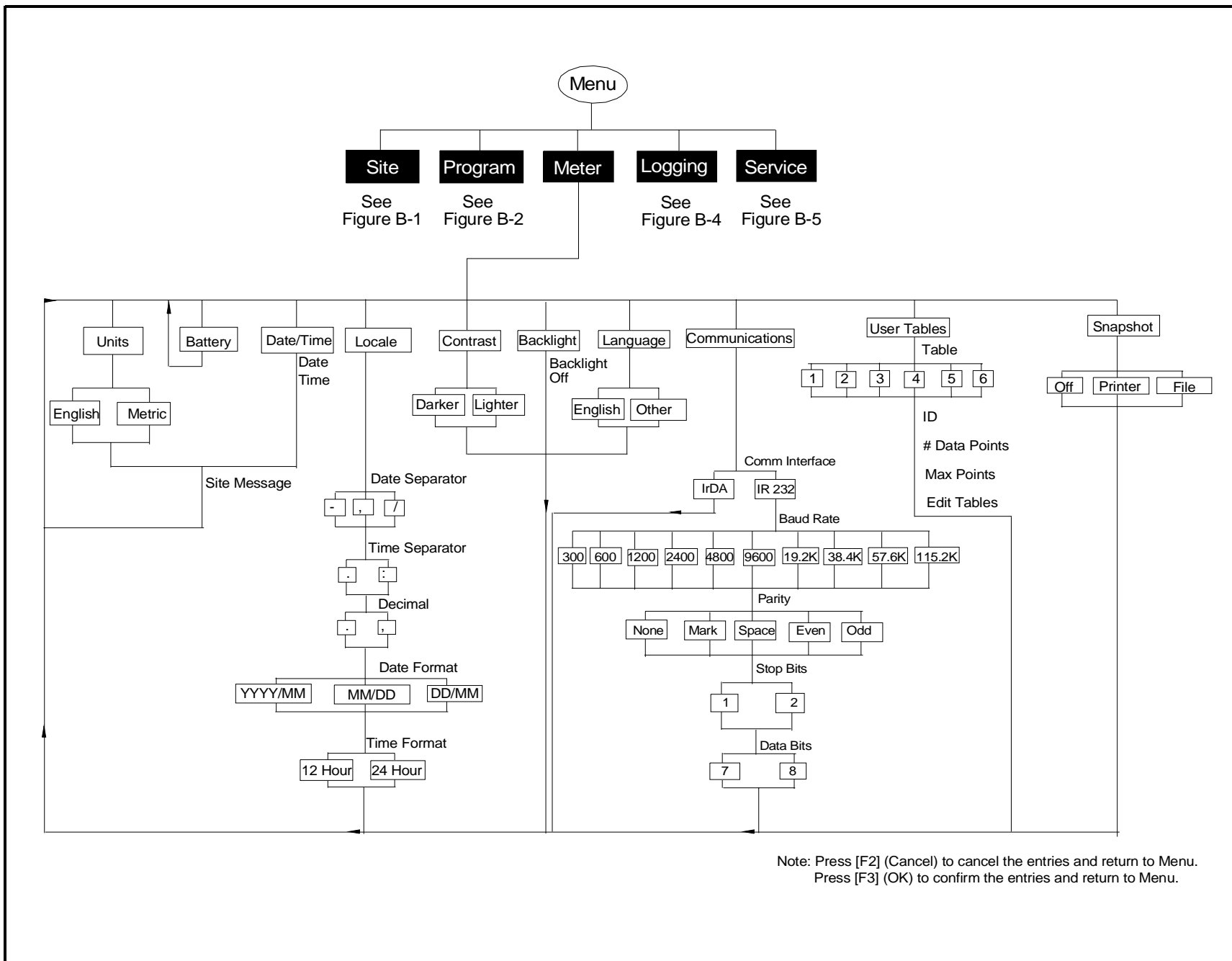


Figure B-2: The Program Menu



Note: Press [F2] (Cancel) to cancel the entries and return to Menu.
 Press [F3] (OK) to confirm the entries and return to Menu.

Figure B-3: The Meter Menu

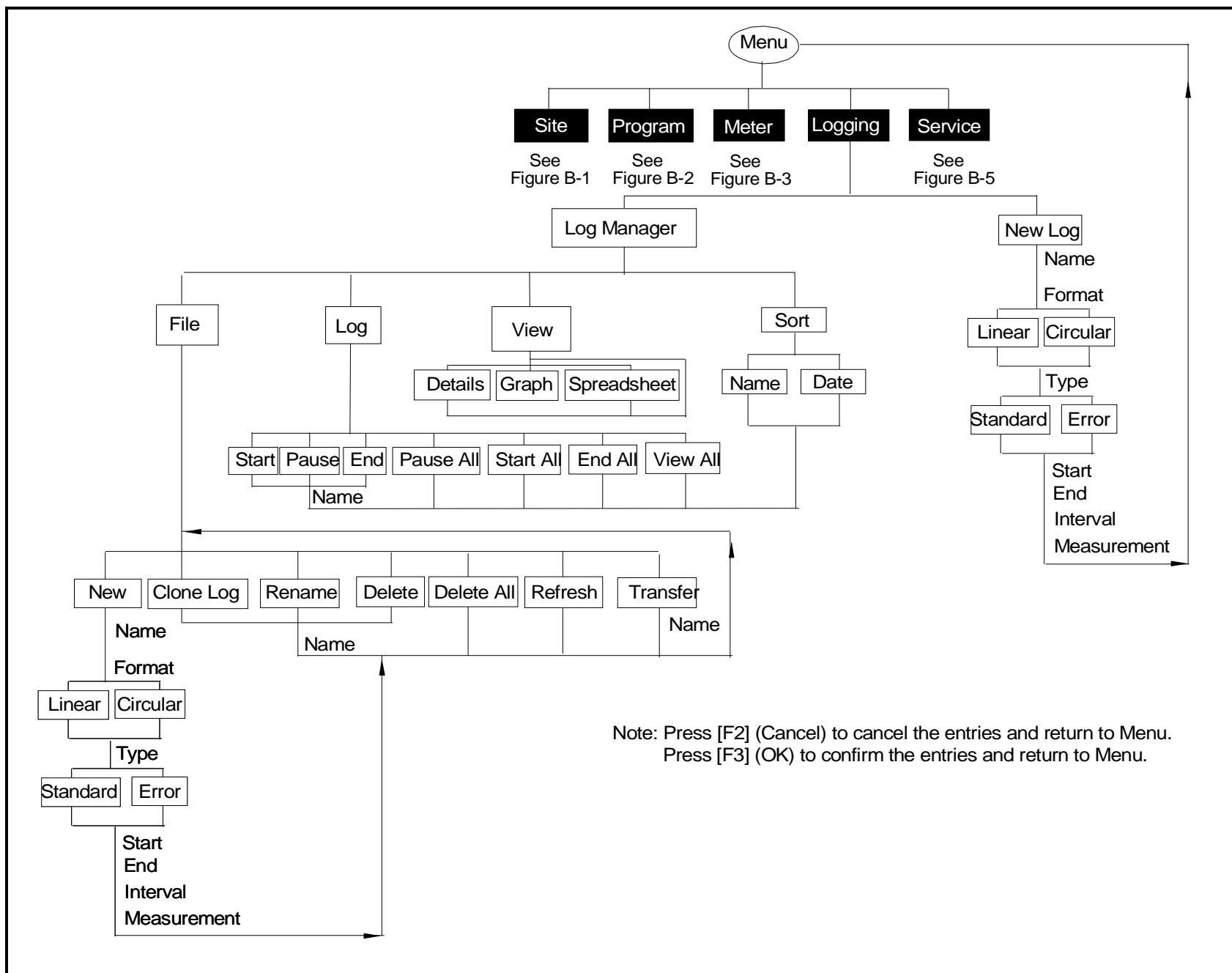


Figure B-4: The Logging Menu

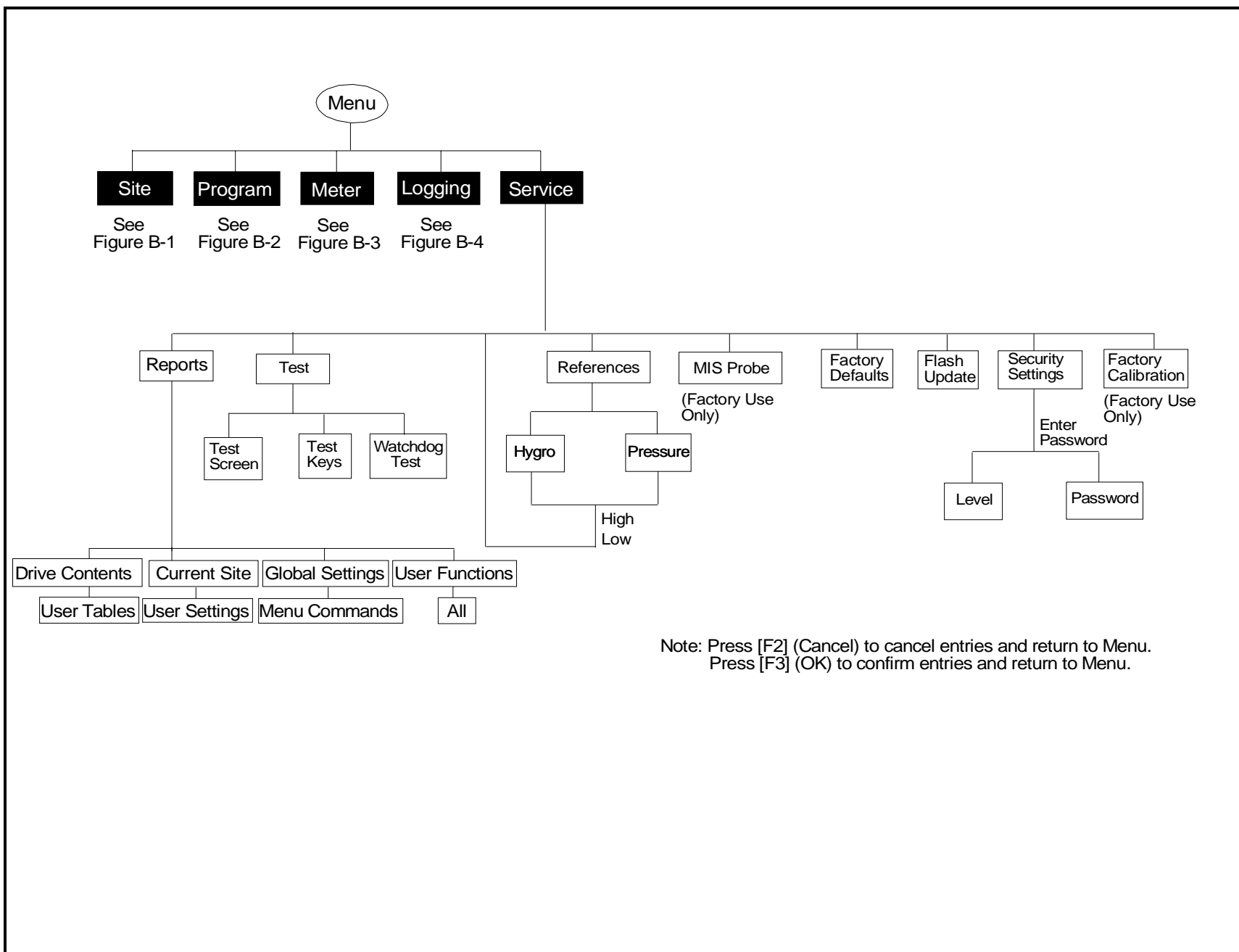


Figure B-5: The Service Menu

Index

A

About Option	4-27
Accessories	9-11
ActiSys ACT-IR220L+ infrared adapter	8-15
Auto-Cal, Using	4-8

B

Backlight Option	3-10
Backlight, Timeout	3-10
Bar Graph, Adjusting Scale.	3-7
Batteries	
Charge	8-23
Charger, Settings	1-3, 8-24
Checking Status.	8-4
Initial Charge.	1-2
Removing Pack	1-2, 8-23
Replacing	8-22
Battery Option.	8-4
Bitmap Screen Capture, Taking.	3-12

C

Cables	
Installation Restrictions	2-2
M Series Probe	9-5
Moisture Image Series	9-5
Pressure Sensors	9-5
TF Series Probe.	9-5
Calibration	
Auto-Cal, Using	4-8
Calibration Reminder for Probes	4-6
Data for Probes	1-9
Entering Data for Pressure	1-13
Entering Moisture Data.	1-10
Recalibrating Pressure Sensors	8-34
Replacing and Recalibrating Moisture Probes	8-33
Calibration Reminder	
Entering.	4-6
CER	
see Computer Enhanced Response	
Checking Battery Status	8-4
Checking Memory Status	8-3

Index (cont.)

C (cont.)

Checks	
Power Up	1-5
Clearing Function Key	3-10
Common Problems	8-30
Communications Option	7-2, 7-4, 7-7, 7-8, 7-11
Computer Enhanced Response, Using	4-22
Conducting a Leak Test	2-7
Constants, Entering	4-10
Contrast Option	3-11
Contrast, Adjusting	3-11
Copying a Log	6-9

D

Date	
Changing Appearance	4-3
Entering	4-2
DEF (Derivative Fast Response)	4-22
Defaults, Resetting to	8-9
Deleting Files	6-13
Description	
Error Messages	8-26
Screen	1-6
Diagnostics	
Error Messages	8-26
Display	
Bitmap Screen Capture	3-12
Configuring	1-15
Contrast, Adjust	3-11
Date and Time Appearance, Changing	4-3
Language, Changing	4-28
Messages	8-26
Screen	1-6
Selecting Format	3-5
Testing	8-6
Displaying Details	5-10, 5-11

Index (cont.)

E

Electrical Connections	2-4
Electronics	
Error Messages	8-26
Features	9-1
Installation Site	2-1
Specifications	9-7
Ending a Log	5-8
English Units	4-2
Error Messages	8-26
Battery	1-2, 6-23

F

Factory Defaults Option	8-9
Features	9-1
Files	
Deleting	6-13
Sorting	6-15
Transferring from a PC	7-11
Transferring to a PC	7-8
Format Option	3-5
Function Key	
Clearing	3-10
Configuring	3-9

G

Graph Scale, Adjusting	3-7
----------------------------------	-----

H

Help	
On-line, Getting	4-29
Hyperterminal	
for Software Update	8-19

Index (cont.)

I

Installation	2-4
Conducting a Leak Test.	2-7
Connecting the Sample System to the Process	2-3
Moisture Probe Considerations.	2-2
Operating the Sample System.	2-6
Probes into Sample System.	2-2
Sample System	2-5
Site Selection	2-1
Shutting Down the Sample System.	2-7
IR Communications	
Changing Parameters	7-2, 7-4, 7-7, 7-8, 7-11

K

Keypad	
Testing	8-7

L

Language, Changing	4-28
Limits Option	3-7
Line Graph	
Adjusting Scale	3-7
Log	5-10, 5-11
Copying.	6-9, 6-10, 6-11, 6-12
Deleting.	6-13
Ending	5-8
Graph Form.	5-12
New.	5-2
Printing	7-4
Renaming	6-6
Spreadsheet Format.	5-16, 5-17
Starting/Restarting	5-7
Stopping	5-6
Transferring from a PC	7-11
Transferring to PC.	7-8
Viewing	5-9
Logging Menu	
Menu Map.	B-5

Index (cont.)

M

M Series Probe	
Cables	9-5
Description	9-3, 9-4
Measurement Units, Selecting	4-2
Measurements, Displaying	1-15
Memory	
Checking	8-3
Menu Maps	
Getting Started	1-19
Logging	B-5
Meter	B-4
Program	B-3
Service	B-6
Site	B-2
Meter Information, Displaying	4-27
Meter Menu	
Menu Map	B-4
Metric Units	4-2
Model Number, Viewing	4-27
Moisture	
Auto-Cal, Using	4-8
Computer Enhanced Response, Using	4-22
Entering Calibration Data	1-10
Measurement Considerations	2-1
Moisture Image Series Probe	9-4, 9-5
Description	9-4, 9-5
Moisture Probes	
Considerations for Installation	2-2
Electrical Connections	2-4
Installing into the Sample System	2-2
M Series	9-3, 9-4
Moisture Image Series	9-4, 9-5
Sample System	2-5
TF Series	9-3, 9-4

N

New Log	5-2
-------------------	-----

O

On-line Help, Getting	4-29
---------------------------------	------

Index (cont.)

P

Passcodes	8-11
Passwords	8-11
PC File Transfer	7-11
Power	
Sleep Mode, Using	4-26
Turn On and Off	1-5
Pressure	
Auto-Cal, Using	4-8
Entering Calibration Data	1-13
Recalibrating Sensors	8-34
Pressure Transducers, Cables	9-5
Pressure Transmitters, Cables	9-5
Printing a Log	7-4
Printing a Site	7-4
Printing Reports	7-7
Probe ID, Entering	1-9, 4-6
Probe Type, Selecting	1-7
Probes	
Auto-Cal, Using	4-8
Cables	9-5
Calibration Reminder, Entering	4-6
Entering ID	1-9
Reference Date, Entering	4-24
Replacing and Recalibrating	8-33
Selecting Type	1-7
Program Menu	
Menu Map	B-3

R

Recalling a Site	2-5, 6-4
Reference Data, Entering	4-24
Renaming a Log	6-6
Renaming a Site	6-6
Replacing and Recalibrating Moisture Probes	8-33
Replacing Batteries	8-22
Reports Option	7-7
Reports, Printing	7-7
Resetting to Factory Defaults	8-9
Response Type	4-22

Index (cont.)

S

Sample System	
Connecting to Process	2-3
Description of	2-5
Installing Probe	2-2
Leak Test	2-7
Operating	2-6
Shutting Down	2-7
Specifications	9-11
Saturation Constants, Entering	4-10, 4-13
Saving a New Site	6-2
Saving a Site	6-5
Screen	
Bitmap Screen Capture	3-12
Contrast, Adjust	3-11
Components	3-2
Date and Time Appearance, Changing	4-3
Description	1-6
Language, Changing	4-28
Messages	8-26
Selecting Format	3-5
Testing	8-6
Security Settings	
Viewing or Changing	8-11
Service Menu	
Menu Map	B-6
Setting up PC for Flash Update	8-19
Shortcuts	
Function Key, Configuring	3-9
Site	
Creating a Message	4-5
Creating a New	6-2
Deleting	6-13
Open	6-4
Printing	7-4
Recalling	2-5, 6-4
Refreshing	6-15
Renaming	6-6
Saving	1-17, 6-5
Saving New	6-2
Selection	2-1
Transferring from a PC	7-11
Transferring to PC	7-8
Site Menu	
Menu Map	B-2
Sleep Mode, Using	4-26

Index (cont.)

S (cont.)

Snapshot	3-12
Soft Key	
see Function Key	
Software version	4-27
Software, Updating	8-15
Sorting Files	6-15
Specifications	9-1
Accessories	9-11
Cables	9-5
Dew/Frost Point Temperature	9-9
Electronics	9-7
Moisture	9-9
Operational	9-6
Overall	9-6
Pressure	9-10
Sample System	9-11
Temperature	9-10
Starting/Restarting a Log	5-7
Stop Log	5-6
Symbols	3-3

T

Testing	
Keypad	8-7
Screen	8-6
Watchdog Timer Circuit	8-8
TF Series Probe	
Cables	9-5
Description	9-3, 9-4
Time	
Changing Appearance	4-3
Entering	4-2
Transducers, Cables	9-5
Transferring Files from a PC	7-11
Transferring Files to a PC	7-8
Transmitters, Cables	9-5
Troubleshooting	
Error Messages	8-26
Screen Messages	8-26
Turning On/Off	1-5

Index (cont.)

U

Units Option	4-2
Updating Software.....	8-15
User Constants, Entering	4-10
User Functions	
Entering	4-10, 4-14
Option	4-14
User Tables	
Creating.....	4-19
Entering.....	4-10
Option	4-19

V

View All Sites Option	5-9
Viewing Logs	5-9
Voltage Selector.....	1-3, 6-24

W

Watchdog Timer Circuit	
Testing	8-8

We, **Panametrics Limited**
Shannon Industrial Estate
Shannon, County Clare
Ireland

declare under our sole responsibility that the

Moisture Monitor Series 35IS Portable Analyzer
PM880 Portable Moisture Monitor

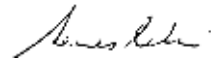
to which this declaration relates, are in conformity with the following standards:

- EN 50014:1997+A1+A2:1999
- EN 50020:1994
- EN50284:1999
- II 1 G EEx ia IIC T4
PM880: BASEEFA02ATEX0191
Baseefa (2001) Ltd/EECS, Buxton SK17 9JN, UK
MMS 35IS: ISSeP01ATEX035 X, ISSeP, B7340 Colfontaine, Belgium
- EN 61326:1998, Class A, Annex C, Continuous Unmonitored Operation
(for EN 61000-4-3, the **MMS 35IS** meets performance Criteria A and, in a limited number of frequencies, performance Criteria B per EN 61326.)

following the provisions of the 89/336/EEC EMC Directive and the 94/9/EC ATEX Directive.

The units listed above and any sensors and ancillary sample handling systems supplied with them do not bear CE marking for the Pressure Equipment Directive, as they are supplied in accordance with Article 3, Section 3 (sound engineering practices and codes of good workmanship) of the Pressure Equipment Directive 97/23/EC for DN<25.

Shannon - July 1, 2003



Mr. James Gibson
GENERAL MANAGER



CERT-DOC-H3



August 2004)

Nous,

Panametrics Limited
Shannon Industrial Estate
Shannon, County Clare
Ireland

déclarons sous notre propre responsabilité que les

Moisture Monitor Series 35IS Portable Analyzer
PM880 Portable Moisture Monitor

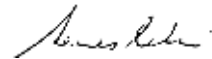
relatif à cette déclaration, sont en conformité avec les documents suivants:

- EN 50014:1997+A1+A2:1999
- EN 50020:1994
- EN50284:1999
- II 1 G EEx ia IIC T4
PM880: BASEEFA02ATEX0191
Baseefa (2001) Ltd/EECS, Buxton SK17 9JN, UK
MMS 35IS: ISSeP01ATEX035 X, ISSeP, B7340 Colfontaine, Belgium
- EN 61326:1998, Class A, Annex C, Continuous Unmonitored Operation
(for EN 61000-4-3, the **MMS 35IS** meets performance Criteria A and, in a limited number of frequencies, performance Criteria B per EN 61326.)

suivant les règles de la Directive de Compatibilité Electromagnétique 89/336/EEC et d'ATEX 94/9/EC.

Les matériels listés ci-dessus, ainsi que les capteurs et les systèmes d'échantillonnages pouvant être livrés avec ne portent pas le marquage CE de la directive des équipements sous pression, car ils sont fournis en accord avec la directive 97/23/EC des équipements sous pression pour les DN<25, Article 3, section 3 qui concerne les pratiques et les codes de bonne fabrication pour l'ingénierie du son.

Shannon - July 1, 2003



Mr. James Gibson
DIRECTEUR GÉNÉRAL



CERT-DOC-H3



August 2004)

Wir,

Panametrics Limited
Shannon Industrial Estate
Shannon, County Clare
Ireland

erklären, in alleiniger Verantwortung, daß die Produkte

Moisture Monitor Series 35IS Portable Analyzer
PM880 Portable Moisture Monitor

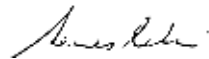
folgende Normen erfüllen:

- EN 50014:1997+A1+A2:1999
- EN 50020:1994
- EN50284:1999
- II 1 G EEx ia IIC T4
PM880: BASEEFA02ATEX0191
Baseefa (2001) Ltd/EECS, Buxton SK17 9JN, UK
MMS 35IS: ISSeP01ATEX035 X, ISSeP, B7340 Colfontaine, Belgium
- EN 61326:1998, Class A, Annex C, Continuous Unmonitored Operation
(for EN 61000-4-3, the MMS 35IS meets performance Criteria A and, in a limited number of frequencies, performance Criteria B per EN 61326.)

gemäß den Europäischen Richtlinien, Niederspannungsrichtlinie EMV-Richtlinie
Nr.: 89/336/EG und ATEX Richtlinie Nr. 94/9/EG

Die oben aufgeführten Geräte und zugehörige, mitgelieferte Sensoren und
Handhabungssysteme tragen keine CE-Kennzeichnung gemäß der Druckgeräte-Richtlinie,
da sie in Übereinstimmung mit Artikel 3, Absatz 3 (gute Ingenieurpraxis) der Druckgeräte-
Richtlinie 97/23/EG für DN<25 geliefert werden.

Shannon - July 1, 2003



Mr. James Gibson
GENERALDIREKTOR



CERT-DOC-H3



August 2004)

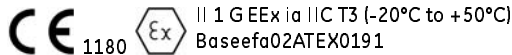
We,

GE Infrastructure Sensing, Inc.
1100 Technology Park Drive
Billerica, MA 01821-4111
U.S.A.

as the manufacturer, declare under our sole responsibility that the product

Model PM880 Portable Hygrometer

to which this document relates, in accordance with the provisions of ATEX Directive 94/9/EC Annex II, meets the following specifications:



Furthermore, these additional requirements and specifications apply to the product:

- Having been designed in accordance with EN 50014, EN 50020, and EN 50284, the product meets the fault tolerance requirements of electrical apparatus for category “ia”.
- The product is an electrical apparatus and must be installed in the hazardous area in accordance with the requirements of the EC Type Examination Certificate. The installation must be carried out in accordance with all appropriate international, national and local standard codes and practices and site regulations for flameproof apparatus and in accordance with the instructions contained in the manual. Access to the circuitry must not be made during operation.
- Only trained, competent personnel may install, operate and maintain the equipment.
- The product has been designed so that the protection afforded will not be reduced due to the effects of corrosion of materials, electrical conductivity, impact strength, aging resistance or the effects of temperature variations.
- The product cannot be repaired by the user; it must be replaced by an equivalent certified product. Repairs should only be carried out by the manufacturer or by an approved repairer.
- The product must not be subjected to mechanical or thermal stresses in excess of those permitted in the certification documentation and the instruction manual.
- The product contains no exposed parts which produce surface temperature infrared, electromagnetic ionizing, or non-electrical dangers.





USA

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Billerica, MA 01821-4111
Web: www.gesensing.com

Ireland

Shannon Industrial Estate
Shannon, County Clare
Ireland

