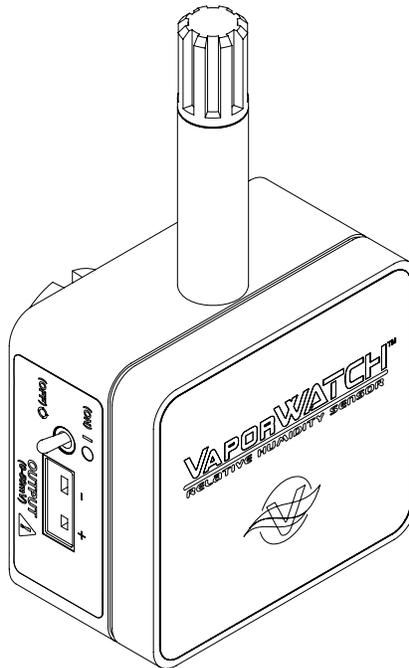




Hardware User's Guide



VaporWATCH®
Relative Humidity Sensor
A44-7423-00 Rev: 1.01



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Introduction

• How to Use This Manual

This User's Guide explains how to use ECD's VaporWATCH® relative humidity sensor.

This manual contains the following sections:

- **Introduction:** Includes a brief Overview and Setup instructions.
- **Operation:** Provides Operation instructions and Maintenance/Troubleshooting information.
- **Appendixes:** Contains the Specifications and Accessories.

This manual is written for users of varied experience. If a section covers information you already know, feel free to skip to the next section.

You **do not need** to be a computer expert to use this manual or the Software.

The manual assumes you are familiar with Microsoft Windows.

• Terms Used in this Manual

The following statements describe special terms that will be used in this manual.

Hardware Terms:

-  Informs the user that the note identifies conditions or practices that could result in damage to the equipment.
-  Informs the user that the note identifies conditions or practices that could result in personal injury or damage to property other than the equipment.
-  Informs the user that the note includes important information.
-  Informs the user that the note includes a handy tip.
- **Relative Humidity**, may be referred as **RH**.
- **SuperM.O.L.E. Gold** data recording device may be referred as the **M.O.L.E.**
- **Thermocouple**, may be referred to as **T/C**.

Software Terms:

- **BakeWATCH SuperM.O.L.E. Gold SPC Software**, may be referred as **SMG SPC**.
- **Workbook**, contains all of the worksheets and the uploaded data set saved with file extension (.MAX).
- **Worksheet**, the individual pages or sheets in the workbook file.
- **Data Set**, multiple data runs uploaded into the workbook file.
- **Data Run / Experiment**, the data uploaded from the M.O.L.E..

• Fonts Used in this Manual

This manual may use a special font to indicate terms or words that can be found directly on the PC display when using Software.

For Example: Select the *Open Workbook* command from the *File* menu to open a new workbook file. This font indicates the words *Open Workbook* and *File* are actually found in the PC display.

• Product Symbols

The following symbols may be present on the Product:

-  Battery charge light indicator
-  Input power connector
-  Power ON
-  Power OFF
-  Direct Current (DC) Power
-  Alternating Current (AC) Power
-  CAUTION: Whenever this internationally recognized symbol is used on the product, additional information concerning that particular feature or function appears in the manual.
-  Power Pack battery charger is protected throughout by double or reinforced insulation.
-  Indoor use only. For electric-shock protection, always operate the battery charger in a protected, indoor location.

• Cleaning Instructions

The product must never be immersed in water or any other cleaning agent. Wipe the exterior of the enclosure with a cloth dampened with water.

To prevent product damage, do not clean the product using organic solvents.

• Operators Safety Information

The safety information in this section is for the benefit of operating personnel. Warnings and Cautions will also be found throughout the manual where they apply.

Hardware changes or modifications to the components are not expressly approved by ECD, Inc. and could void the warranty of the product.



The warranty will not cover damage caused by neglect or abuse of this product. To maintain the safety features incorporated in this product, operation must be in strict compliance with the requirements specified herein.

For protection of the components, observe the following:



- **NEVER** permit the VaporWATCH to exceed the specified operating temperature range 0- 50°C [32° to 122°F] as permanent damage may result. (Refer to *Appendix A: Specifications*).
- **NEVER** operate the VaporWATCH in flammable or explosive atmospheres. Such usage constitutes a fire or explosion risk.
- **NEVER** immerse the VaporWATCH in liquids.
- **NEVER** subject the VaporWATCH to sharp impacts.
- **NEVER** excessively stress the interface or extension cable.
- **NEVER** expose the VaporWATCH and components to corrosive environments.
- **ALWAYS** charge the “Re-chargeable” battery using only the ECD approved charger.

1.0 Unpacking

Inspect the components and accessories to ensure that the Kit is complete, and if there has been any damage caused by shipping.

VaporWATCH Kit:

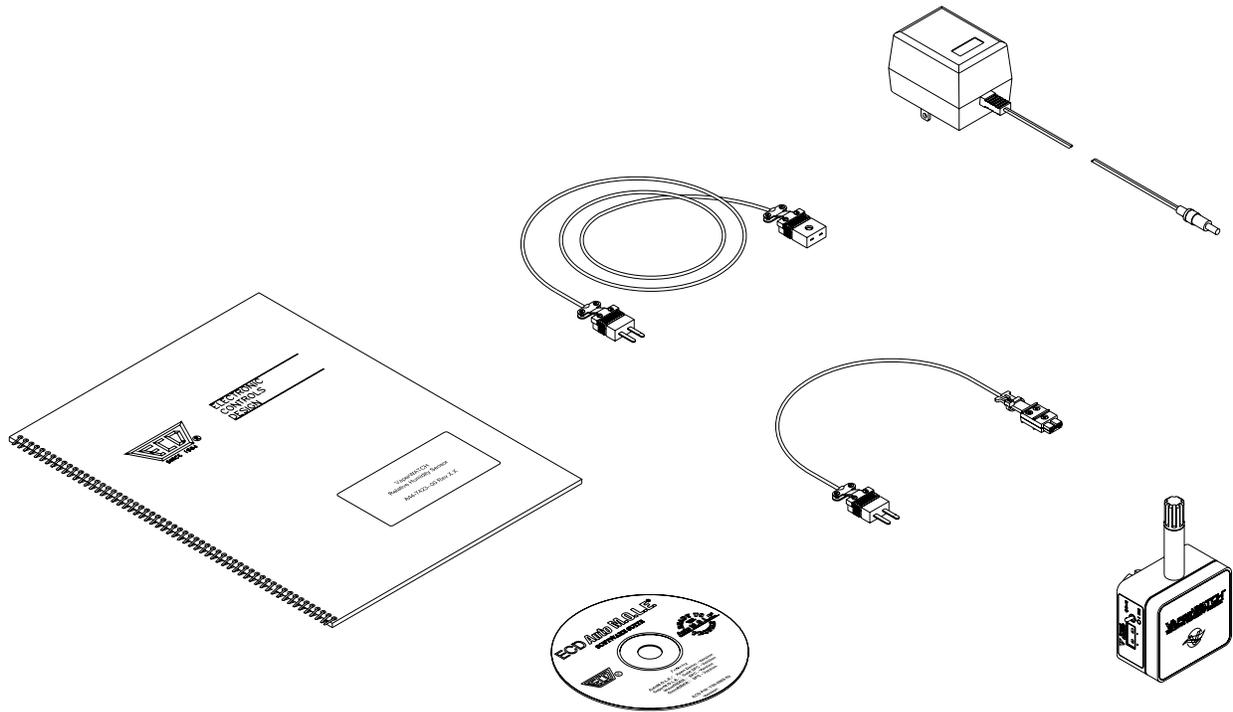


Figure 1-1: VaporWATCH Kit

2.0 System Description

This section offers brief descriptions for the VaporWATCH Kit components.

2.1 VaporWATCH RH Sensor

The VaporWATCH is a reliable, accurate, and easy to use instrument. The RH sensor extends from the top and has a powerful Magnet for mounting to any steel surface. It also includes a Signal Output for connection to the SuperM.O.L.E. Gold, ON/OFF switch, ON/OFF LED, Charging connection, and Charging LED.

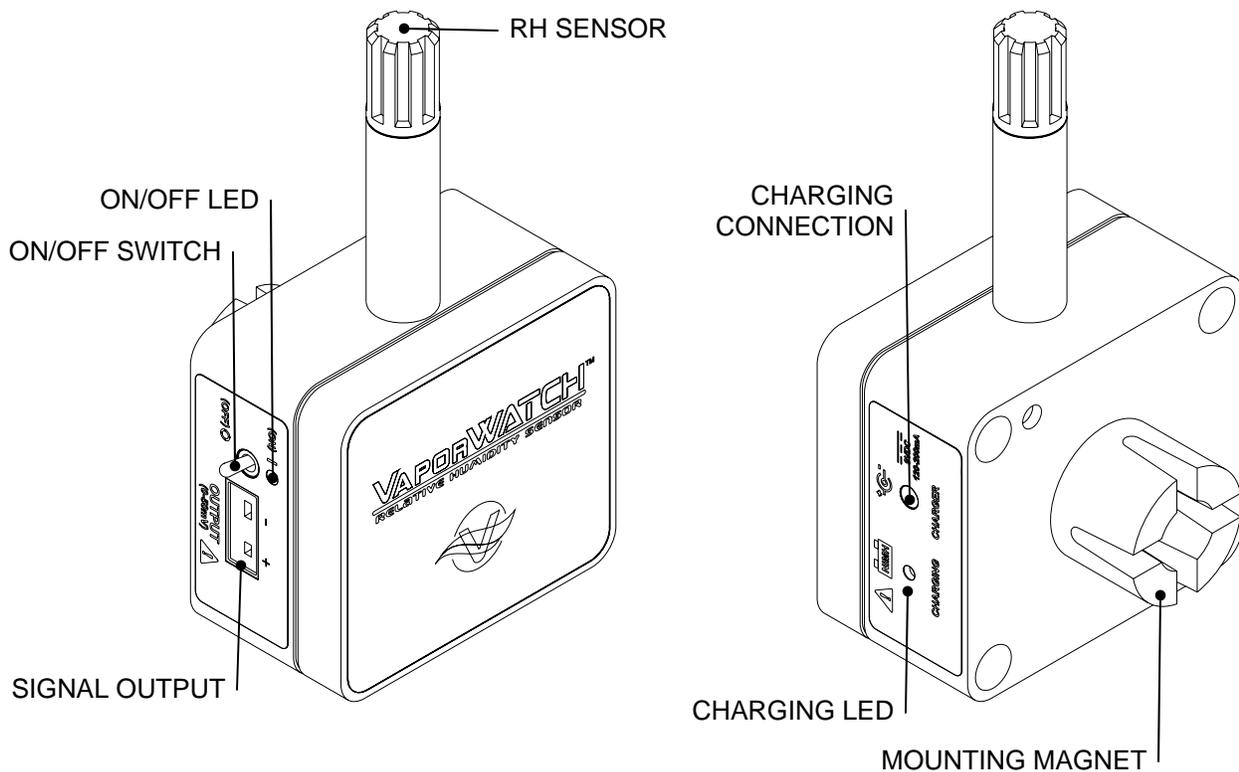


Figure 2-1: VaporWATCH Features

VaporWATCH functions:

- **RH Sensor:** A laser trimmed INTERCAP® capacitive sensing element.
- **ON/OFF switch & LED:** Allows the user to turn the unit ON and OFF. When the unit is “ON” the green LED will illuminate.
- **Signal Output:** Transfers data through the Interface cable to the M.O.L.E..
- **Charging Connection & LED:** This is where the battery charger is connected to charge the internal battery. When the battery is charging the red charging LED will illuminate.
- **Mounting Magnet:** This is used to secure the VaporWATCH to any steel surface during data collection.

2.2 Interface Cable

This Cable connects the M.O.L.E. to the VaporWATCH Signal Output. It is to be used with the extension cable for quick disconnection when removing the unit from the process.

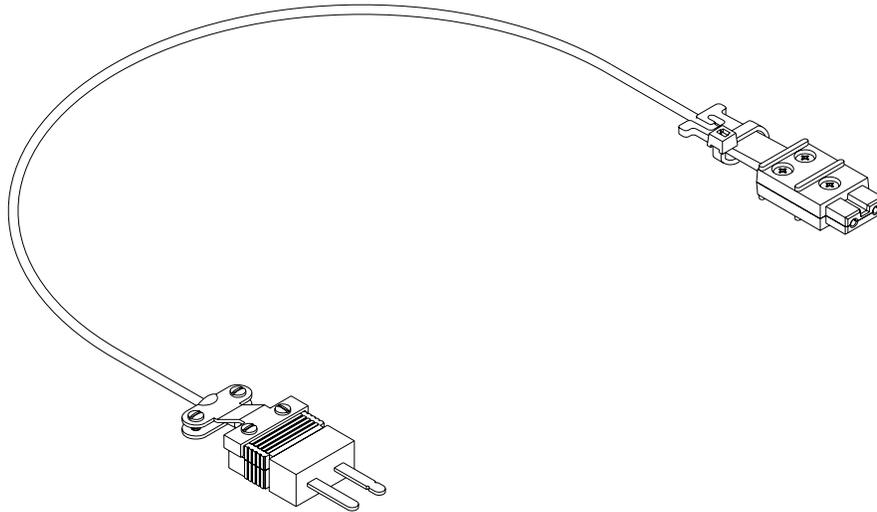


Figure 2-2: Interface Cable

2.3 Extension Cable

A 3' extension cable is included in the hardware package that extends the connection of the M.O.L.E. from the VaporWATCH Signal Output. If your process requires longer extension cables, refer to *Appendix B: Accessories* for alternate lengths.

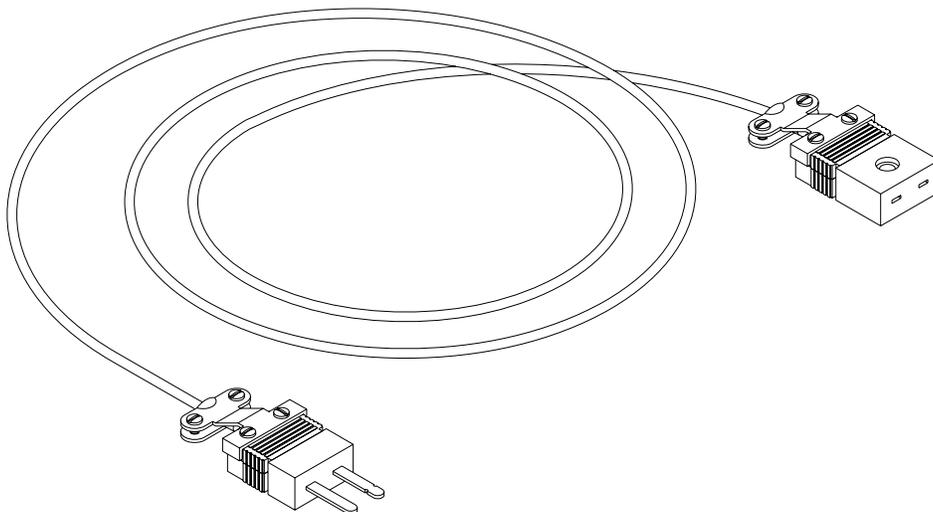


Figure 2-3: Extension Cable

3.0 Setup

This section provides the necessary information to set the VaporWATCH up for operation.

3.1 Charging the Battery

Because the VaporWATCH is powered by a rechargeable battery, it is important that it is charged and operating properly.

When charging the battery the unit must be turned “OFF”. If it is not “OFF” the unit will not charge properly and the “charging “ LED will not illuminate.

Charging:

1. Plug the transformer into a wall outlet and the connector end into the Charging connection. When the unit is charging the Charging LED will illuminate.

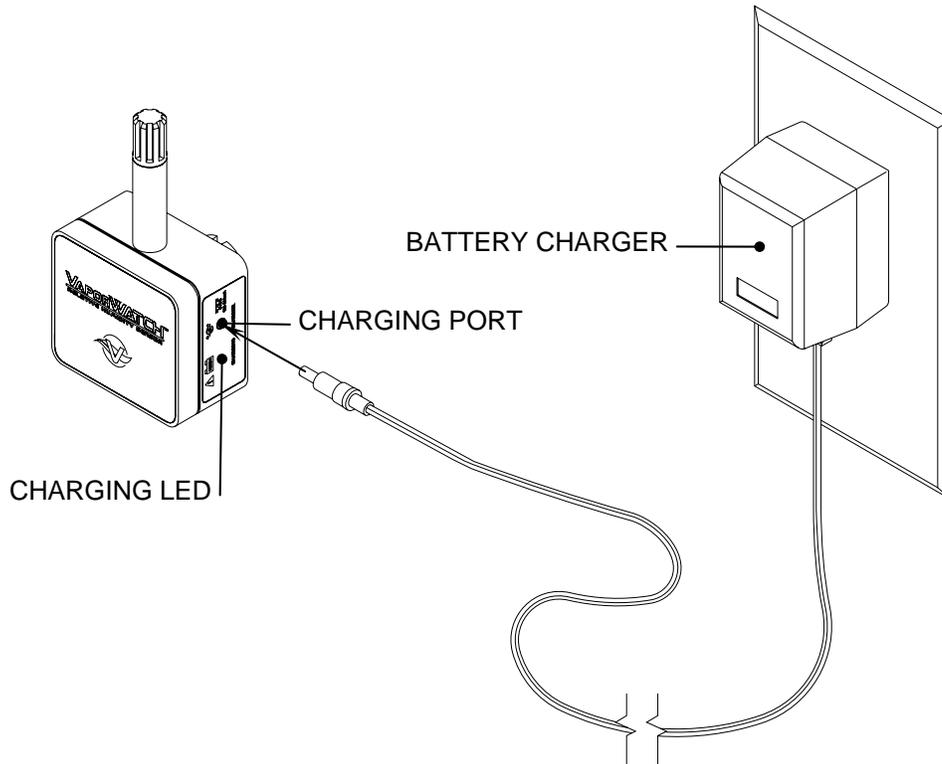


Figure 3-1: Power Pack Charger

A completely discharged battery takes about 14 hours to be fully charged.

2. After the charging cycle is complete the VaporWATCH is ready to use. The battery can continue to be charged however, if it is going to sit idle for five days or more, you may want to disconnect the charger.

3.2 M.O.L.E. Configuration

The M.O.L.E. is dependent on the software to control how it collects and interprets data. An experiment will need to be setup at least once. (Refer to the BakeWATCH SMG SPC software manual for complete software instructions).

Configuration:

1. Start the Software by double clicking on the program icon.
2. Connect the M.O.L.E. to the PC.
3. Select the *Configuration Wizard* command from the *M.O.L.E.* menu and the Configuration dialog box appears.
4. Click the option button next to a COM port which the PC is set up for RS-232 communications or the *Auto* command button to have the software automatically find the COM port the M.O.L.E. type.

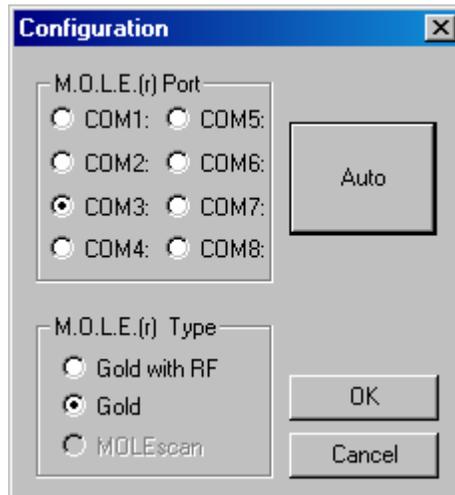


Figure 3-2: Configuration

5. Click the **OK** command button to use the selection and continue to the M.O.L.E. Settings dialog box.



The Configuration Wizard can be exited any time by selecting the *Cancel* button.

6. Type a company, operator, or machine name in the text box.



Select the *Read* command button to view the settings currently stored in the M.O.L.E.. If acceptable proceed to Step 8.



Figure 3-3: M.O.L.E. Settings

7. Click the *OK* command button to store the information in the M.O.L.E. and continue to the Configure M.O.L.E. Hardware dialog box.
8. Click the check box beside a corresponding channel to turn it “ON” or “OFF”. If a channel is “OFF”, it does not collect data for that channel, increasing battery life.

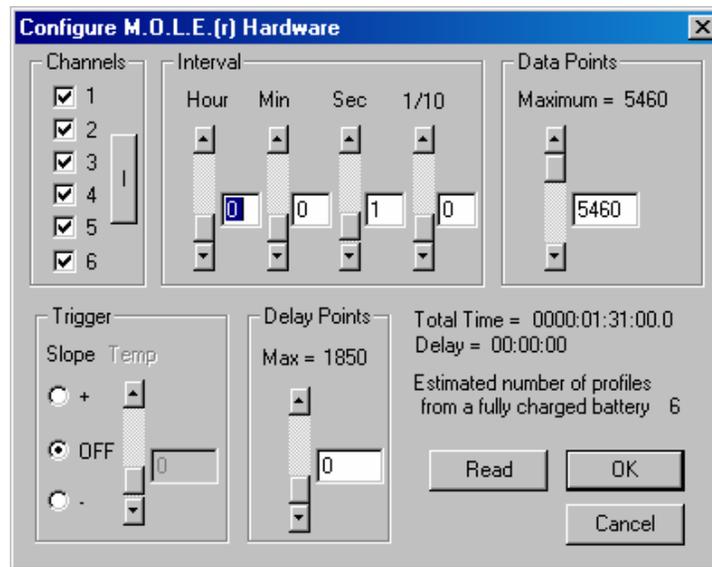


Figure 3 4: Configure M.O.L.E. Hardware



When M.O.L.E. configure options are modified, the data is calculated and then amount of profiles the user can expect from the power pack battery (based on a fully-charged power pack battery) is displayed in the lower right corner next to the *Profiles Per Battery* line.

9. Click the Input Sensors (“I”) button in the Channels Group box.

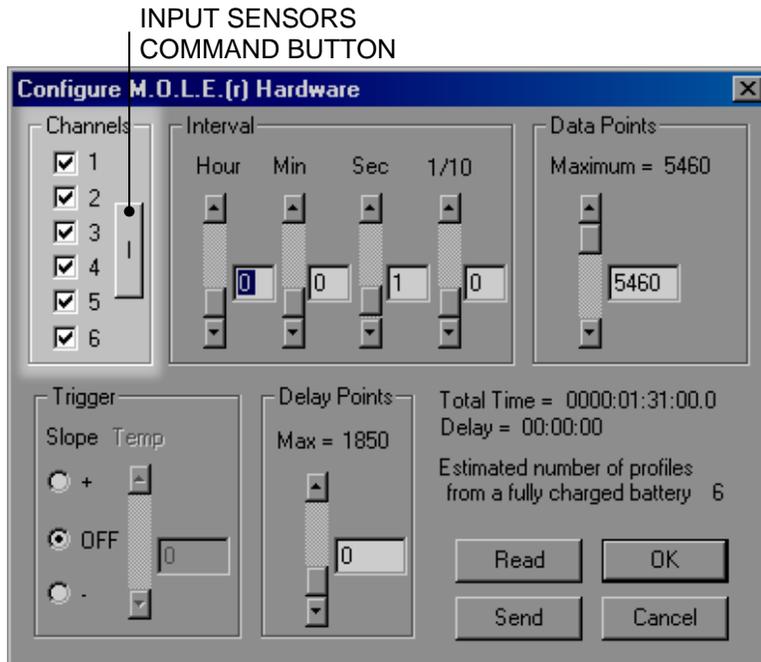


Figure 3-5: Input Sensors Button

10. Select RH as the sensor type for the channel it is connected.

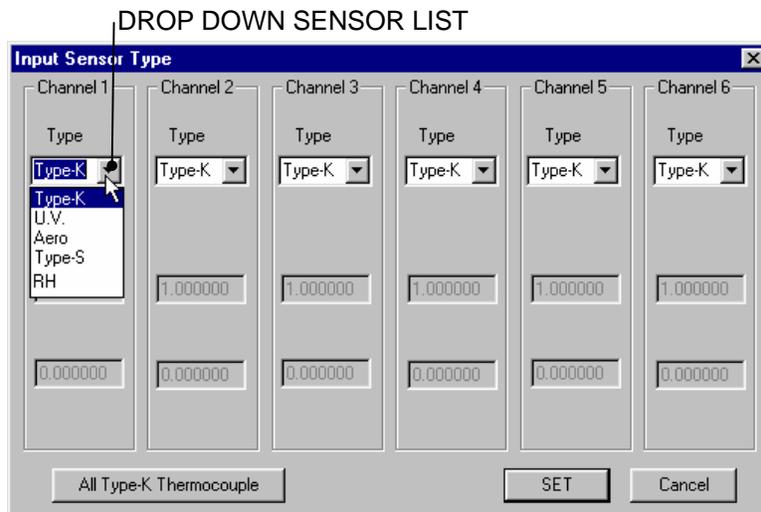


Figure 3-6: Sensor Configuration Dialog Box



More than one RH sensor can be selected. However, there must be one temperature channel (Type K, Type S).



The software allows you to select two different input sensor types at one time. The Data Graph displays two different Y-axis scales, Temperature scale on the left (Type K, Type S) and the input sensor scale on the right (Aero, U.V., and RH).

11. Click the *Set* command button to make the selected sensor default.
12. When the *Set* command button is selected, a Scaling dialog box appears so the scale can be adjusted to the new sensor(s) configuration if required for the sensor type.

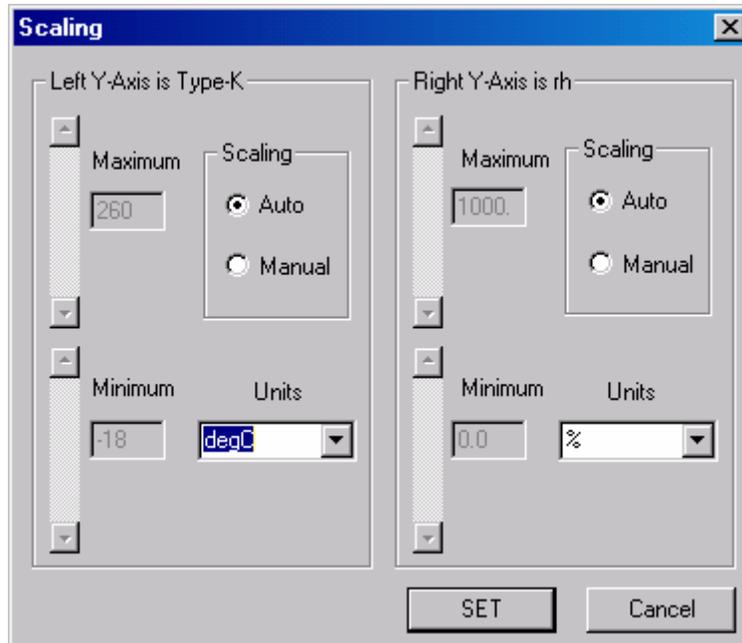


Figure 3-7: RH Scaling

13. Click the *Set* command button to save the configuration and continue to the Set Instruments Clock dialog box.

14. Enter the correct month, day, year, hour, minute, and second by adjusting the slider(s) or manually typing in the corresponding text box.



Select the *Read* command button to view the clock settings currently stored in the M.O.L.E.. If acceptable proceed to Step 14.

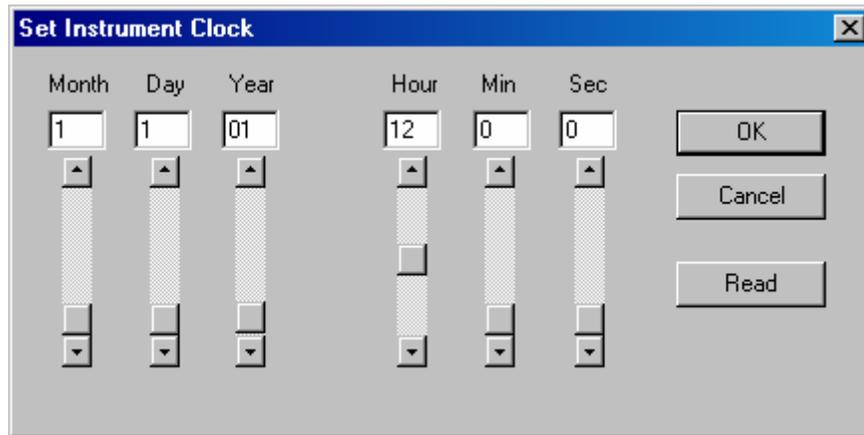


Figure 3-8: Set Instrument Clock



When the Set Instrument Clock dialog box appears the current computer clock setting is automatically entered in the text boxes.

15. Click the *OK* button to reset the clock.

16. Disconnect the M.O.L.E. from the PC and data can now be collected.

4.0 Operation

The following section will guide the user through a typical operation process. Portions of this section may require the SuperM.O.L.E. Gold Hardware and Software manuals for additional information.

• Step 1 - Data Collection



Never permit the M.O.L.E. and VaporWATCH to exceed the absolute maximum warranted internal temperature, as permanent damage may result. The warranty will not cover damage caused by exceeding the maximum specified internal temperature. Refer to the Armor Chart and heat limit warnings in the SuperM.O.L.E. Gold hardware manual.

- 1 Attach the sensors to the M.O.L.E.

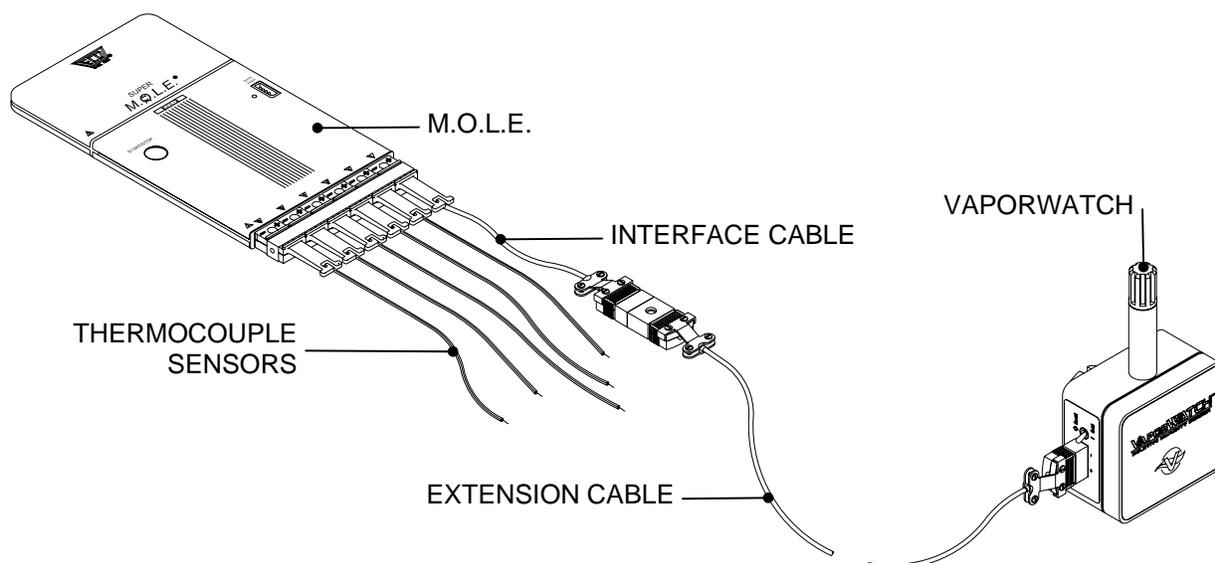


Figure 3-9: Sensor Attachment

2. Attach the VaporWATCH to a steel surface on the test product.
3. Press the M.O.L.E. Start/Stop button once and VaporWATCH switch to the “ON” position to initiate data collection. When the M.O.L.E. is “ON”, the Activity light will flash quickly and then flash at the log interval for the duration of the experiment.

4. Place the M.O.L.E. in the appropriate Thermal barrier making sure the sensor wire does not get pinched.

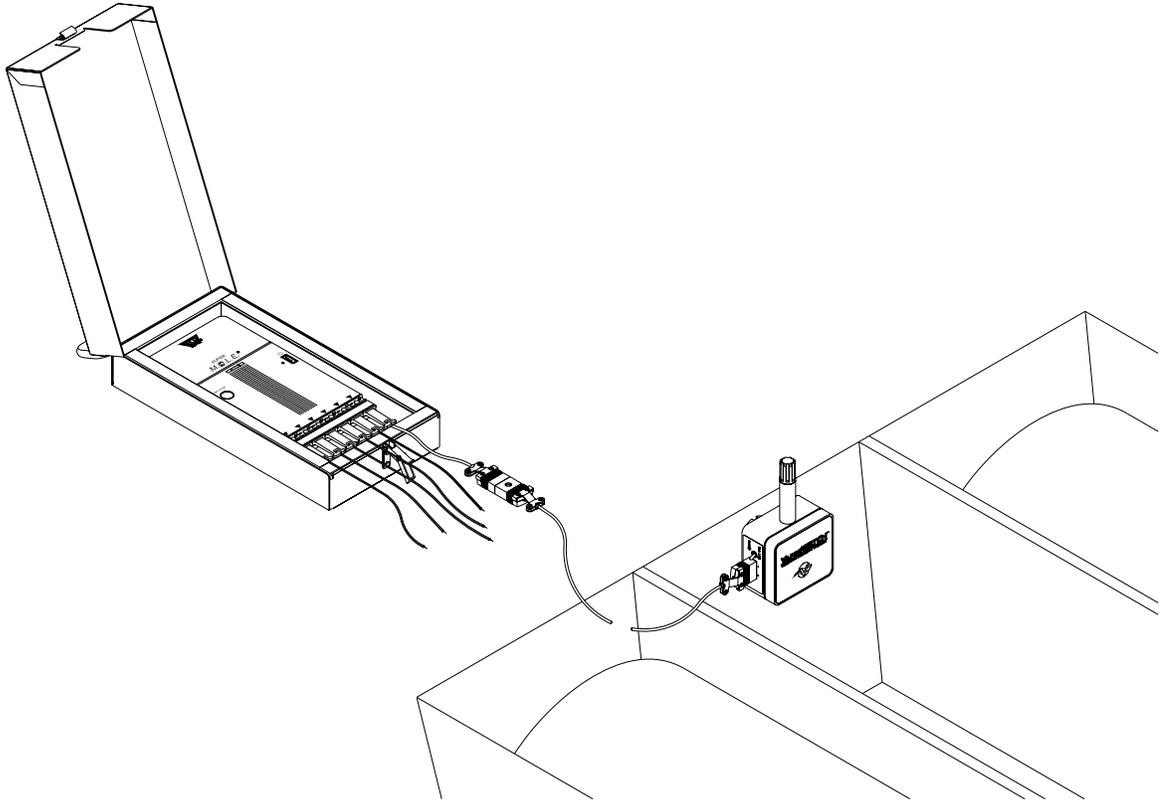


Figure 4-1: Thermal Barrier

5. Pass the thermally protected M.O.L.E. and VaporWATCH through the process.



When retrieving the M.O.L.E. and sensor use caution as it may be warm.

6. As the M.O.L.E. and VaporWATCH emerge from the process, remove the sensor(s) from the test product and lay the thermal barrier to a table or flat surface.
7. Open the Thermal barrier and if the Activity LED is still flashing this means the M.O.L.E. is still logging and it must be turned “OFF”. To turn the M.O.L.E. “OFF” press and **Hold** the Start/Stop button until the Activity LED turns off, and then release the button.



When turning the M.O.L.E. “OFF”, do not release the button until the light goes off. Pressing the Start/Stop button briefly will restart the data collection process and erase all the data in memory.

8. Remove the M.O.L.E. from the Thermal barrier and wait a few minutes for the M.O.L.E. to cool. Handle it carefully, as the case may still be warm.
9. Disconnect all sensors from the M.O.L.E. and place it near the PC that has the software installed on it.



If you remove sensors before the M.O.L.E. has stopped collecting data, the data for that channel might become distorted.

• Step 2 - Transferring Data

When data is transferred from the M.O.L.E. to the PC, it is uploaded and saved in a software Workbook file for analysis and report style printing.

To Read M.O.L.E. Data:

1. Restore the Software.
2. Select a desired Workbook file to upload the collected data.
3. Connect the M.O.L.E. to the PC using the PC interface cable (for more information refer to the appropriate section in the SuperM.O.L.E. Gold Hardware manual).
4. Select the *Read M.O.L.E. Data* command from the *M.O.L.E.* menu. A dialog box appears asking the user if they want to copy the existing experiment information from the currently displayed profile on the Profile worksheet.



If the VaporWATCH is not configured for any channel proceed to step 6.

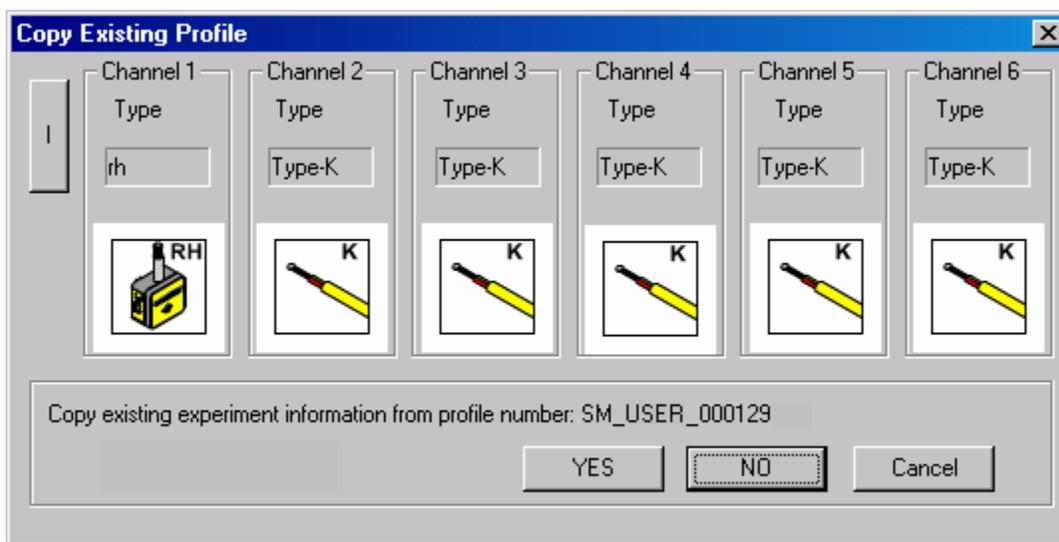


Figure 4-2: Copy Existing Profile information

- Click the *Yes* command button to start the new data run using the settings from the selected profile.
 - Click the *No* command button to start the new data run using the default settings.
 - Click the *Cancel* command button to return to the worksheet without uploading the data run.
5. Proceed to Step 12.

6. Click the input sensors configuration (“I”) button.

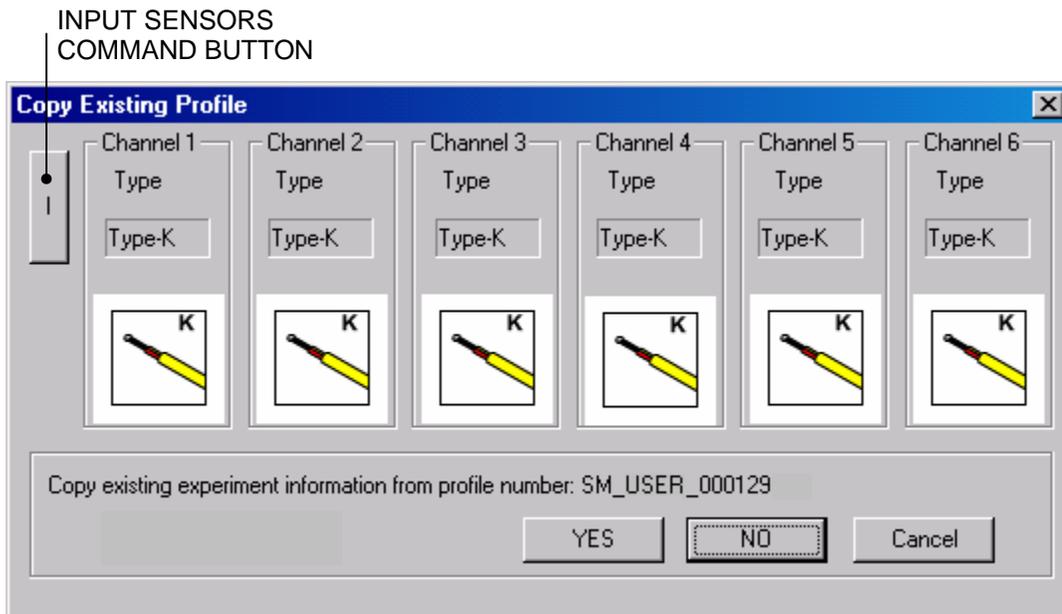


Figure 4-3: Sensor Configuration

7. Select RH from the channel drop down menu as the sensor type for the channel the VaporWATCH is connected to.

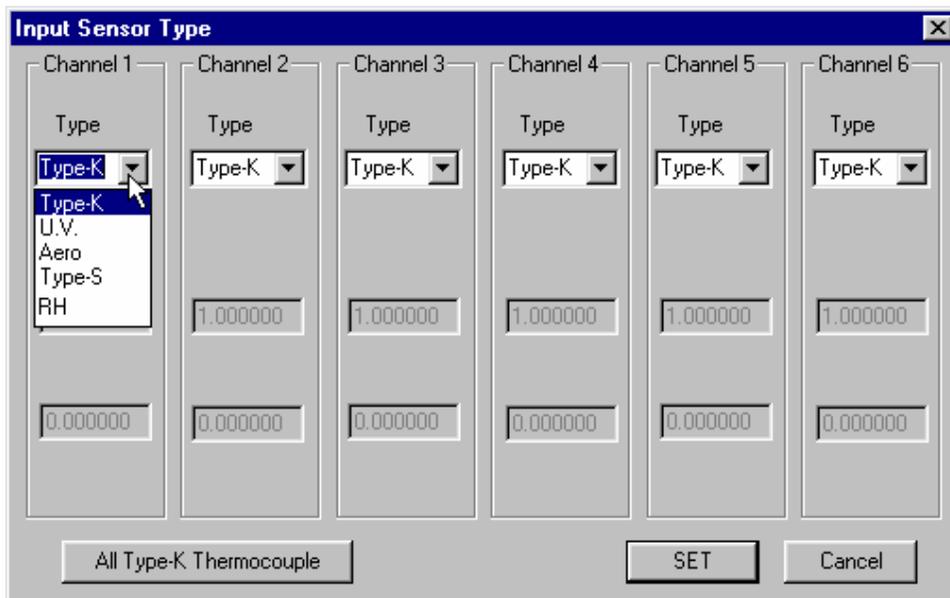


Figure 4-4: Sensor Configuration Dialog Box

8. Click the *Set* command button to make the selected sensor default.

9. When the *Set* command button is selected, a Scaling dialog box appears so the scale can be adjusted to the new sensor(s) configuration.

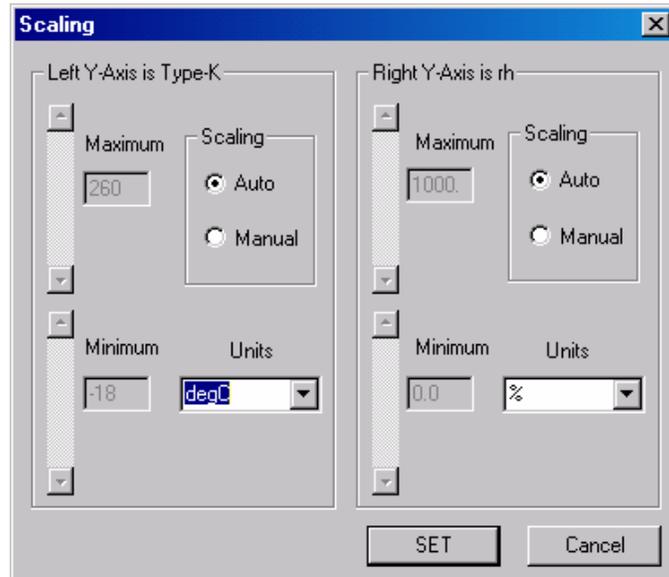


Figure 4-5: RH Scaling

10. Click the *Set* command button to save the configuration and return to the Copy existing profile dialog box.

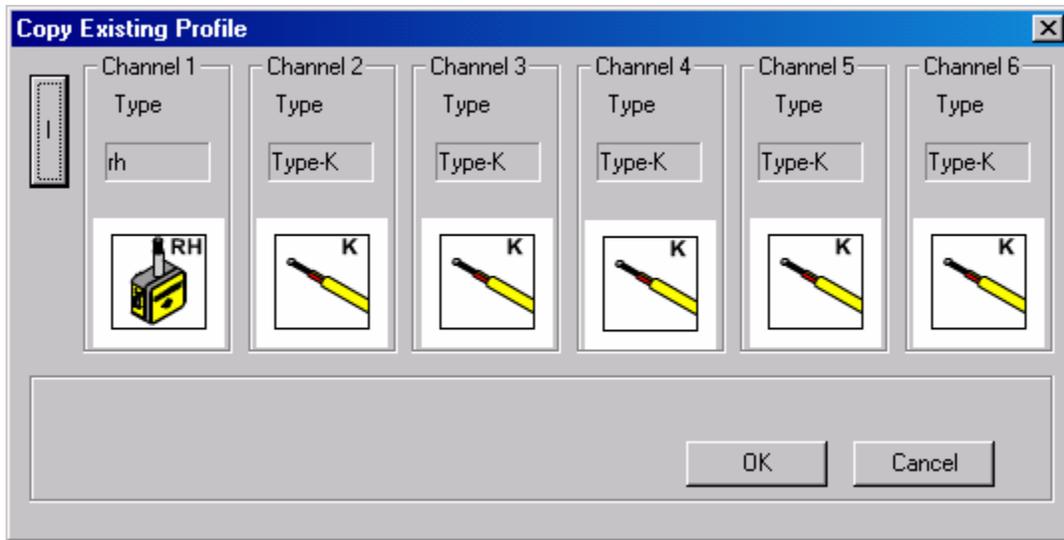


Figure 4-6: Configured Sensors

11. Click the *OK* command button to start the new data run or *Cancel* to return to the worksheet without uploading the data run.

12. Once uploading has started, the *Read Data from M.O.L.E.* status box appears showing the status of the uploading process. To discontinue click the *Cancel* command button at any time.

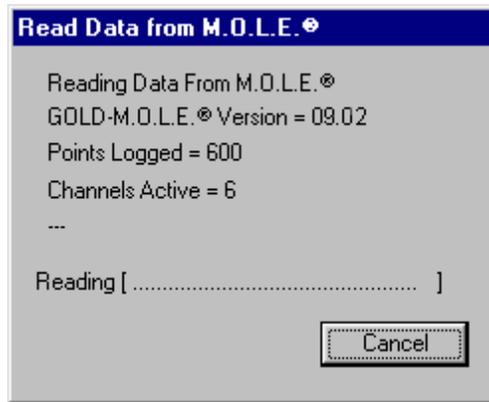


Figure 4-7: Read M.O.L.E. Data Status Box



If a message box appears stating that the M.O.L.E. is not responding, check the COM port configuration, cable connections, and/or the M.O.L.E. itself (i.e. battery).

13. When the data transfer is complete the status box will disappear and the data run will automatically be uploaded into a data run row on Spreadsheet worksheet. The software will then return to the worksheet where the where the command was activated.

The information is automatically saved and the experiment data can now be analyzed with the software.

5.0 How to Get Additional Help

If you still have problems, let us help you. We offer many ways to service your problems. You can call our Service/Test technicians, visit our web site to view our FAQ section (Frequently asked Questions) or send us e-mail explaining your problem in detail.

When calling our Service/Test technicians or sending us e-mail, please include the following information:

- Product Description (i.e. VaporWATCH RH Sensor, SuperM.O.L.E. Gold).
- Product Serial Number.
- Software Version (i.e. 5.12).

Here is how to contact ECD:

Telephone: (503) 659-6100

FAX: (503) 659-4422

Technical Support: (800) 323-4548

Email: support@ecd.com

Internet: <http://www.ecd.com>

Appendix A: Specifications

VaporWATCH:

PHYSICAL DIMENSIONS:	4.7"High x 2.535" Wide x 2.135 Thick
RESOLUTION:	0.1 RH
RH RANGE:	0 to 100% non condensing
OPERATING TEMPERATURE RANGE:	0- 50°C [32° to 122°F]
ACCURACY:	3% of reading

Rechargeable Battery Specifications:

BATTERY TYPE:	NiMH
BATTERY LIFE (PER CHARGE):	4 hours continuous
CHARGE TIME:	14 hours.
EXPECTED CHARGING CYCLES:	300-400

Charger Model Specifications:

NORTH AMERICA:	ECD Part No. E31-0900-25 Input: 120 V, AC, 50/60 Hz, 2.8 VA Output: 9V DC, 120-200mA, 1.08VA
CONTINENTAL EUROPE:	ECD Part No. E31-0900-21 Input: 230 V, AC, 50/60 Hz, 2.8 VA Output: 9V DC, 120-200mA, 1.08VA
UNITED KINGDOM	ECD Part No. E31-0900-23 Input: 240 V, AC, 50/60 Hz, 2.8 VA Output: 9V DC, 120-200mA, 1.08VA

Appendix B: Accessories

Thermal Protective Enclosures:

<u>Model</u>	<u>Dimensions</u>	<u>Part Number</u>
BB-45 Hinged Hot Box	1.75" x 4.6" x 9.9"	E44-4245-80
Super Hot Box	5.25" x 7.9" x 13.0"	E29-2686-90
1.0" Uni-Barrier	1.0" x 4.1" x 10.6"	E42-0901-80
INDATA 60 Barrier	2.5" x 10" x 13"	E31-0908-80

Accessories and Value Added Options:

	<u>Part Number</u>
Extended warranty, 1 year, includes 1 calibration	A10-0900-00
Power Pack Charger, North America	E31-0900-25
Power Pack Charger, Continental Europe	E31-0900-21
Power Pack Charger, United Kingdom	E31-0900-21
VaporWATCH 3" Extension Cable	E44-7423-73
VaporWATCH 7" Extension Cable	E44-7423-77
VaporWATCH Custom Extension Cable	E44-7423-76
SuperM.O.L.E. Gold to VaporWATCH Interface Cable	E44-7423-95
USB to RS232 Serial Converter	Y23-0872-10
Operating Manual, VaporWATCH®	A44-7423-00
Operator's Manual, BakeWATCH® SMG SPC Software	A44-2253-23