



*ThermaViewer*TM

The BEST way to look at temperature

Installation and Use and Care Guide

Congratulations!

Your concerns about temperature are over! ThermaViewer is a high-quality temperature tracking system that is designed to give you years of reliable service. It can be used to track room temperature as well as temperatures in appliances such as refrigerators, freezers, salad bars, etc.

Please retain this booklet. It contains valuable installation and operational information.

Should you have any need for parts or service, you may phone or FAX us at one of the following phone numbers:

For Parts and Accessories:

- Probes
- PC Interface Cables
- Batteries

J & S Instruments, Inc.
3071 State Route 72 South
Springfield, OH 45505-5023

Phone 937-325-7499
Fax 937-323-9588
sales@jsinstruments.com

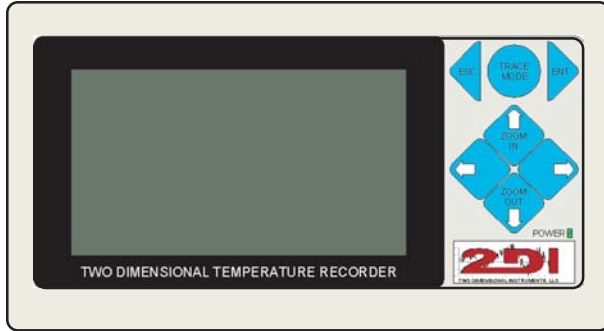
Factory Service and Returns:

Please call J & S Instruments, Inc. for a return authorization (RA) prior to sending any instrument for repair.

Table of Contents

Components and Packing List	4
Quick Start	5
Installation	8
Power, Thermal, and Data Connections	9
Battery Installation	11
User Controls	13
Features and Operation	
Active Mode	19
Sleep Mode	23
Trace Mode	23
Menu Mode	
System Parameters	25
Probe One and Two Parameters/Setup	27
Downloading Temperature Data	33
Warranty	35

Components and Packing List



ThermaViewer

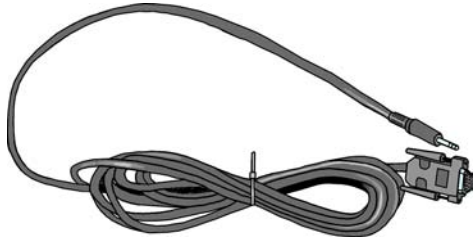


Power Cord
Plugs into any
120 VAC power
source.



Probe Cable

Ten-foot cable for
connection of thermal
probe to ThermaViewer.
Longer cables are
available -- contact Two-
Dimensional Instruments
at (502)-243-0039



PC Cable

Ten-foot cable for connection of PC to
ThermaViewer



Thermal Probe
A small PCB with a
digital temperature
probe permanently
affixed to it.

Quick Start

Your ThermaViewer can be installed and operating in minutes. Factory defaults are set to be used with a refrigerator (21° F. min., 41° F. ref., 70° F. max.). If you are installing a ThermaViewer on an appliance other than a refrigerator, additional set up will be required (see page 27).

Important: *If your ThermaViewer came equipped with the nine-volt battery pre-installed, you may skip step one.*

Once you have unpacked all ThermaViewer components, follow the simple steps below:

1. Install the nine volt battery.

Slide the battery cover on the top of the ThermaViewer forward.

Retrieve the battery wiring harness and attach the connector to the battery.

Insert the battery into the unit and reinstall the battery cover.

2. Attach the probe.

Insert the probe cable into port one on the right side of the unit (see illustration on page nine).

Attach the thermal probe to the other end of the cable.

3. Position the probe.

Attach probe to appliance wall. For best results, the probe should be positioned away from the door toward the back of the unit approximately one-third of the way down from the ceiling.

Tape or permanently affix probe cable to the inside wall of the appliance. In larger units, it may be desirable to install a second probe near the door to monitor temperature spikes due to door usage.

4. Connect power supply

Attach the power cord and insert the plug into a 120 volt power source.

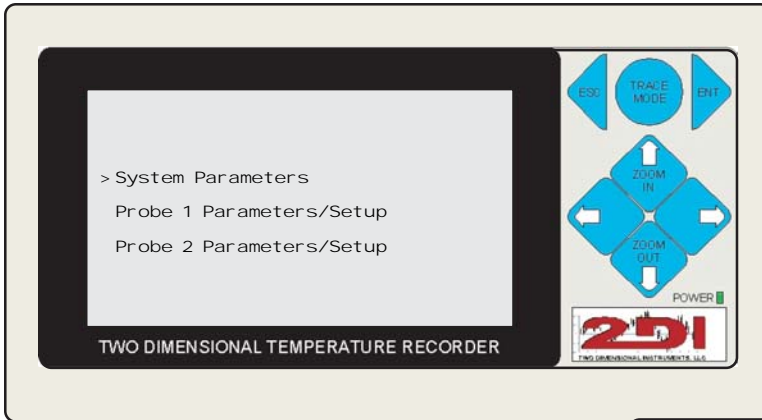
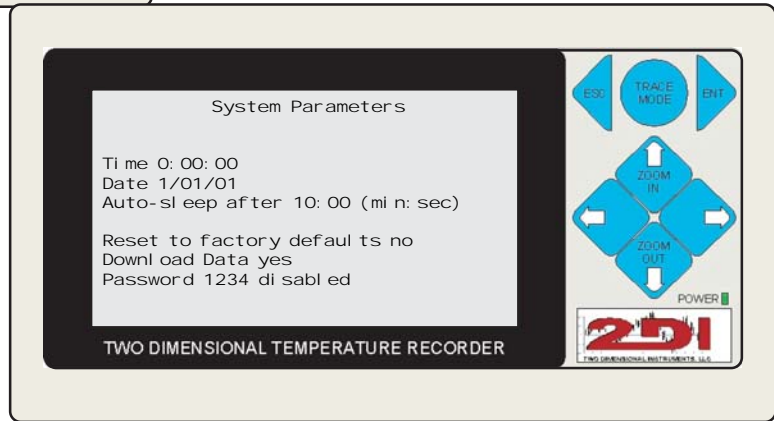


Illustration One

Illustration Two






Quick Start (continued)

5. Reset the display

Insert a straighten paper clip into the reset hole to reset the display (see illustration on page nine).




6. Set date and time.




Press Enter key 

The menu pictured in Illustration One (at left) will appear. Using the Up  Down  arrow keys, select System Parameters and press the Enter key 




The menu pictured in Illustration Two (at left) will appear.




The cursor will be resting on the time of day.


Using the Up  Down  arrow keys, set the hour (24:00 time) and press the Enter key 

Using the Up  Down  arrow keys, set the minute and press the Enter key 

The cursor is now on the date. Use the Up  Down  arrow keys to set the month and press the Enter key 

Use the Up  Down  arrow keys to set the day and press the Enter key 

Use the Up  Down  arrow keys to set the year and press the Enter key 

Continually press the Escape  key until the temperature graph appears.

Installation

Some advanced preparation, prior to installation, can assure you of many years of reliable and accurate service. Here are a few installation tips:

1. Planning

To ensure adequate cable length, measure the distance from the desired ThermaViewer location to the ideal temperature probe location. Be sure to consider the routing of cable around door jams and dressing the cable around obstacles. A 120 VAC power source is required at the desired ThermaViewer location.

2. Temperature Probes and Cables

Probes and cables may be temporarily affixed to the appliance wall with tape or permanently affixed. For best results, the probe should be positioned away from the door to minimize temperature spikes. Ideal probe location is in the back of the unit approximately one-third of the way down from the ceiling. Tape or permanently affix probe cable to the inside wall of the appliance. In larger units, it may be desirable to install a second probe near the door to monitor temperature spikes due to door usage.

3. PC interface Cable

The ten-foot cable with nine-pin (D9) connector on one end and a stereo plug on the other facilitates easy downloading of data to a computer. The nine-pin D9 connector is compatible with a computer serial port. The stereo plug connector is plugged into the ThermaViewer. If the cable is too short to reach a computer, the ThermaViewer may be temporarily removed from the wall and carried to the PC location. Prior to removing the unit from the wall, be sure the nine-volt battery is in place to back up the power source. To prolong battery life and to ensure an uninterrupted download, take the ThermaViewer power cord to the PC location with you and plug it into a nearby 120 VAC power source.

Power, Thermal, and Data Connections

1. PC Interface

PC cable output for downloading data.

2. Thermal Probe One

Jack for thermal probe cable number one.

3. Thermal Probe Two

Jack for thermal probe cable number two.

4. Power Receptacle

The power cord (wall transformer) plugs into this 12 VAC/500mA receptacle.

5. Reset Switch

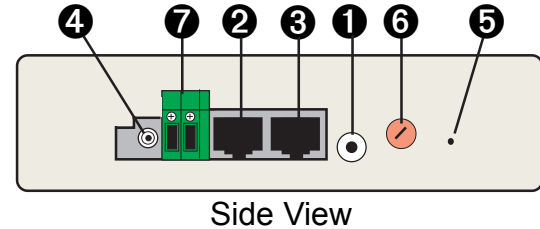
The reset switch may be actuated by using a straightened-out paper clip.

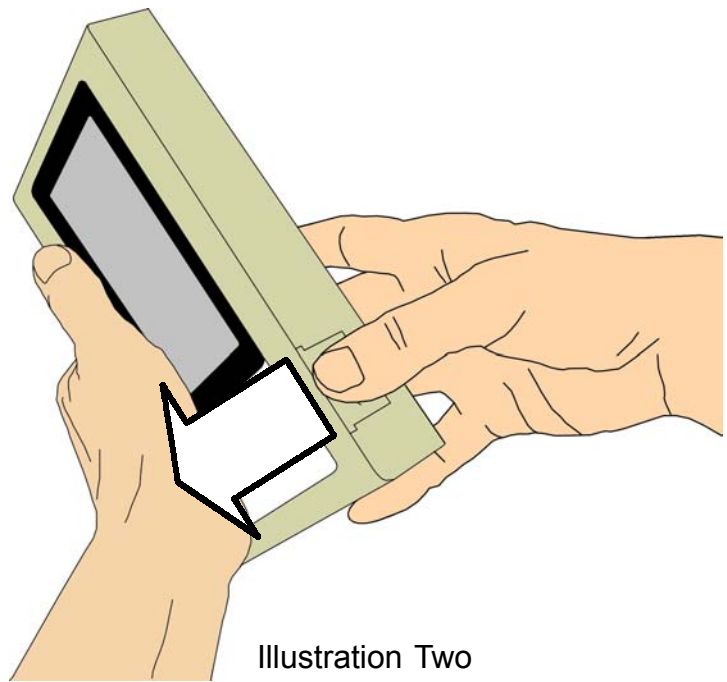
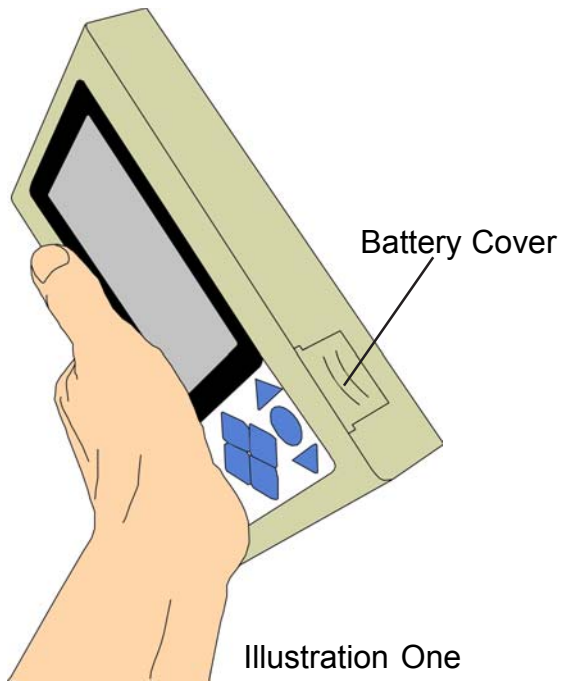
6. Contrast Control

The contrast control for the LCD may be adjusted using a small flat bladed screwdriver.

7. Relay

The plug connects to a 15A/50V AC/DC passive relay. The relay closes and the speaker emits an alert buzzer whenever the user-defined preset conditions are met. The set criteria can be established for either probe in the probe menus.





Battery Installation

Battery backup

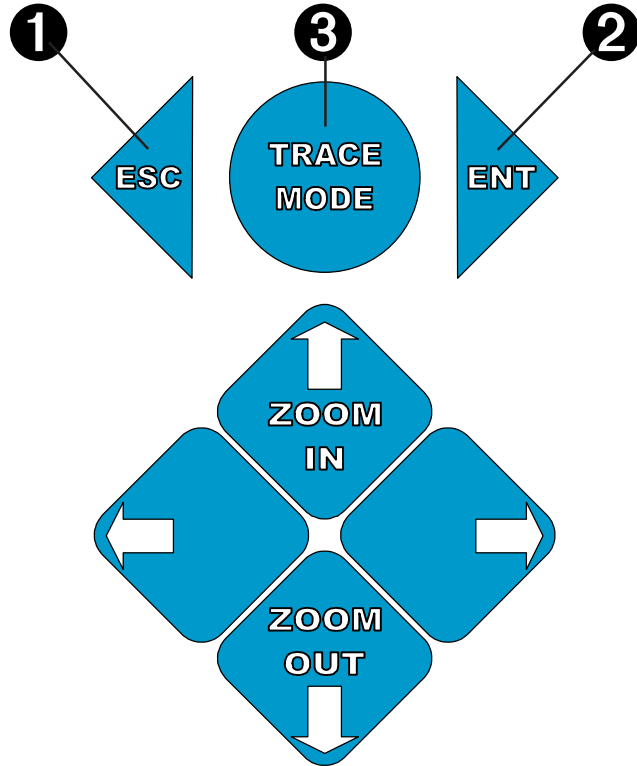
The ThermaViewer has two types of batteries. One is a small “button” type battery that is not user accessible. Its purpose is to ensure an accurate date and time. It has an estimated ten-year life span. The second battery is a nine-volt, user-accessible battery requiring periodic replacement. Its purpose is to supply temporary backup power during a power outage. Frequent power outages will shorten battery life. After the battery has accumulated four hours of run time, it should be replaced.

1. Access may be gained through a small door on the top of the ThermaViewer (see illustration one at left). The door may be opened by pressing gently and pushing it forward (see illustration two at left). The door will separate from the ThermaViewer and the battery can be changed.
2. Gently remove the old battery by pulling out the two wires (red & black) and unsnapping the connector from the battery. Snap the connector onto a new battery and insert it into the compartment.
3. Replace the battery door by sliding it back into position.



Operational Tip:

Battery life may be increased if *Sleep Mode* option is selected (see page 23). Due to the potential for losing data, never replace the battery with the power supply disconnected.

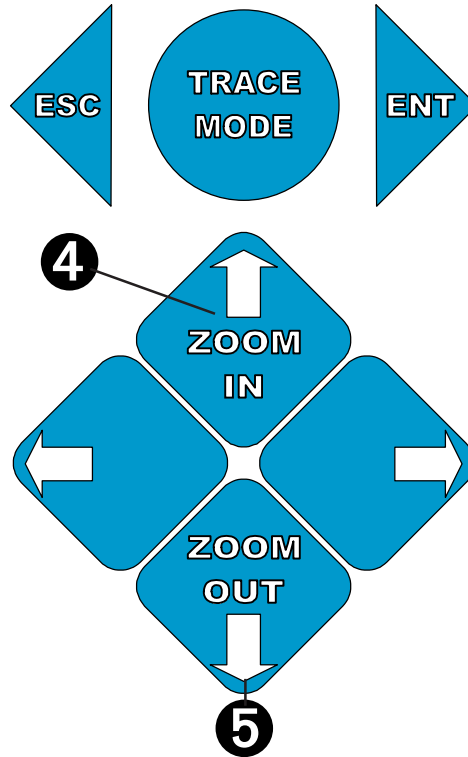


User Controls

ThermaViewer has four modes of operation, *Active*, *Menu*, *Sleep*, and *Trace*. Detailed descriptions begin on page 19.

The Buttons

1. The ESC key is used two different ways, depending upon the mode of the ThermaViewer:
 - In the *Active Mode* the ESC key toggles the choice of probes (one or two).
 - In the *Menu Mode* the ESC key moves the cursor back one field and the original entry for that field is retained.
 - Pressing the ESC key in the *Trace Mode* exits the *Trace Mode*.
2. The ENT key performs several functions depending on the ThermaViewer's mode of operation.
 - In the *Sleep Mode* pressing the ENT key awakens the display.
 - Pressing the ENT key in the *Active Mode* causes the unit to enter the *Menu Mode*.
 - In *Menu Mode*, pressing the ENT key causes the data in the current field to be saved and advances the cursor to the next field.
3. The Trace key is used as follows:
 - In the *Active Mode* pressing the Trace key causes the ThermaViewer to enter the *Trace Mode*.



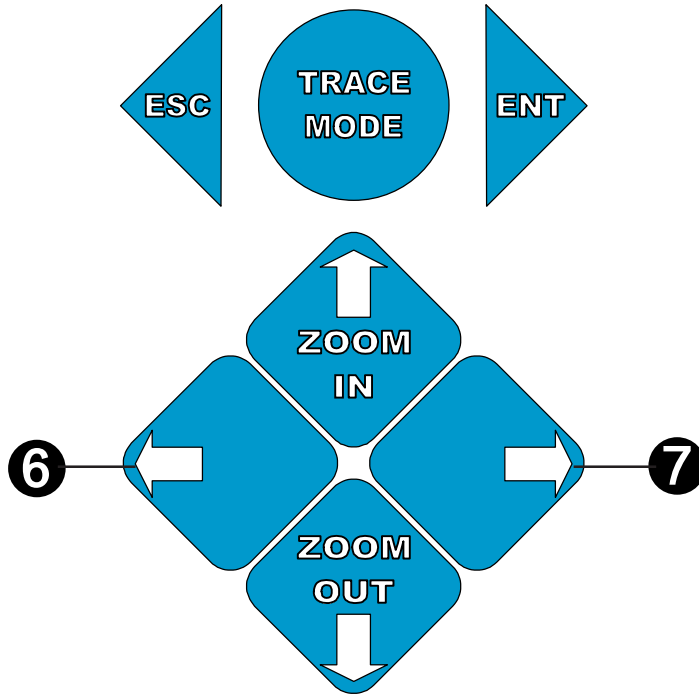
User Controls (continued)

4. Up arrow key

- In the *Active* or *Trace Modes*, pressing this key causes the display to zoom in. The zoom-in effect causes the time frame of the graph to change. For example, if the current graph is set to show four temperatures in each column, pushing the Up arrow key causes the parameters to change so that each column only shows two temperatures, etc.
- In the Menu Selection display, pushing the Up or Down arrow keys allows selection of one of three menus.
- Within the Parameters Menu, pushing the up arrow key scrolls upward through the possible choices in the highlighted field.

5. Down arrow key

- Pushing the Down arrow key, also called the Zoom Out key, has the opposite effect as the Up arrow key. As expected, it also causes the time frame of the graph to change. For example, if the graph is showing four temperatures on each vertical line, pushing the Down arrow causes the scale to change so that each line now shows eight temperatures, etc.



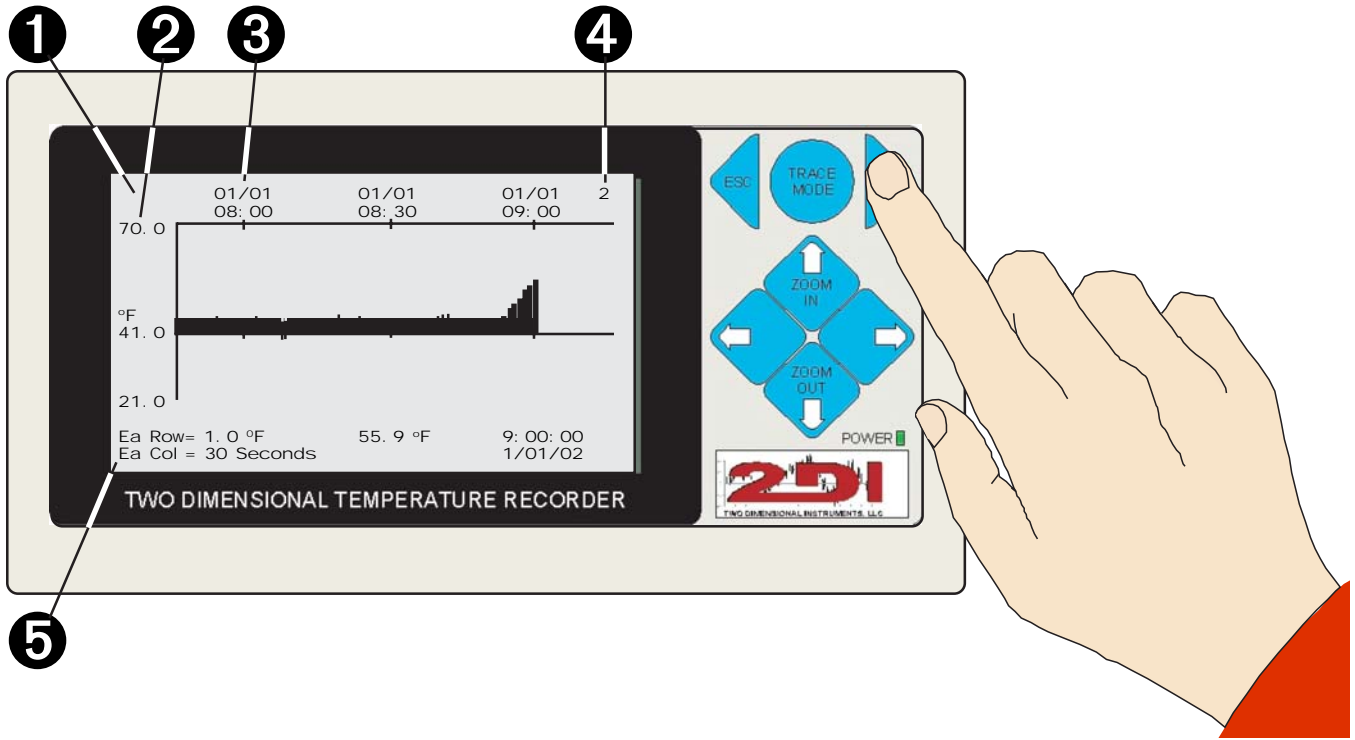
User Controls (continued)

6. Left arrow key.

- In the *Active Mode*, pushing the Left arrow causes the displayed data to scroll left one screen at a time.
- In the *Trace Mode* pushing the Left arrow key causes the double headed arrow on the bottom data display line to move left. If the arrow scrolls past the left edge of the display, the data is shifted one screen to the left
- Left arrow key is disabled in *Menu Mode*.

7. Right arrow key.

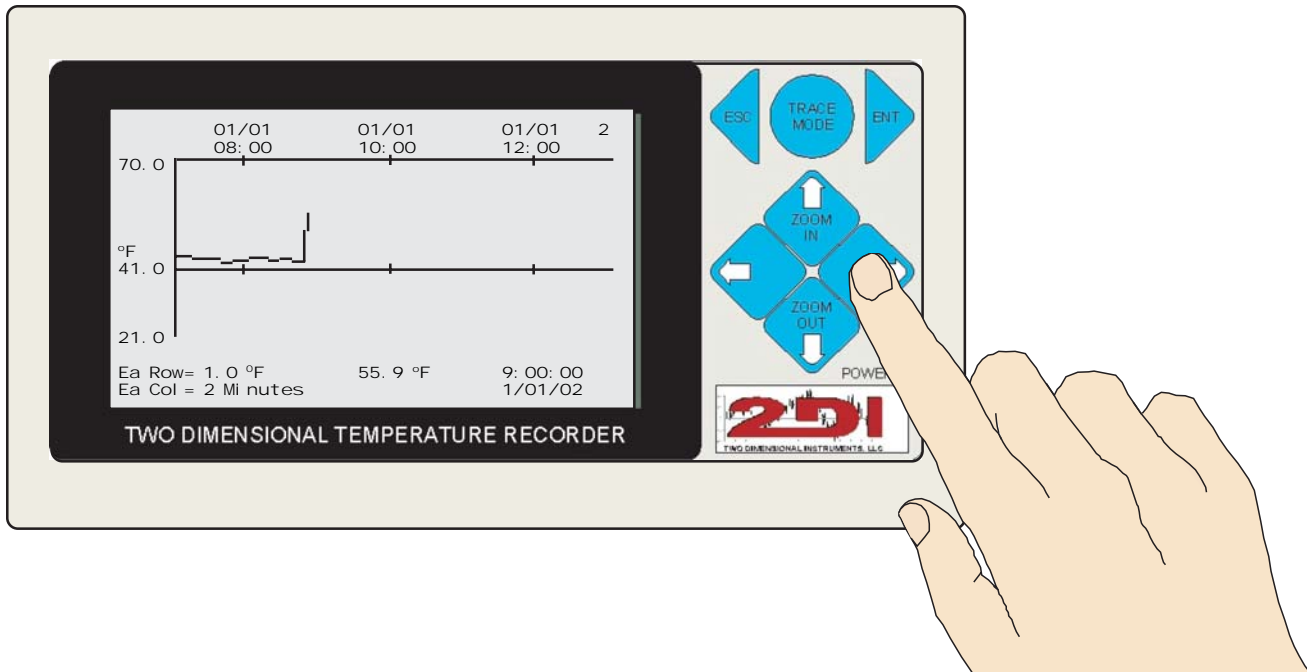
- Pushing the right arrow in the *Active Mode* causes the displayed data to scroll right one screen at a time.
- In the *Trace Mode* pushing the Right arrow key causes the double headed arrow on the bottom data display line to move right. If the arrow scrolls past the right edge of the display, the data is shifted one screen to the right.
- Right arrow key is disabled in *Menu Mode*.



Features and Operation

Active Mode

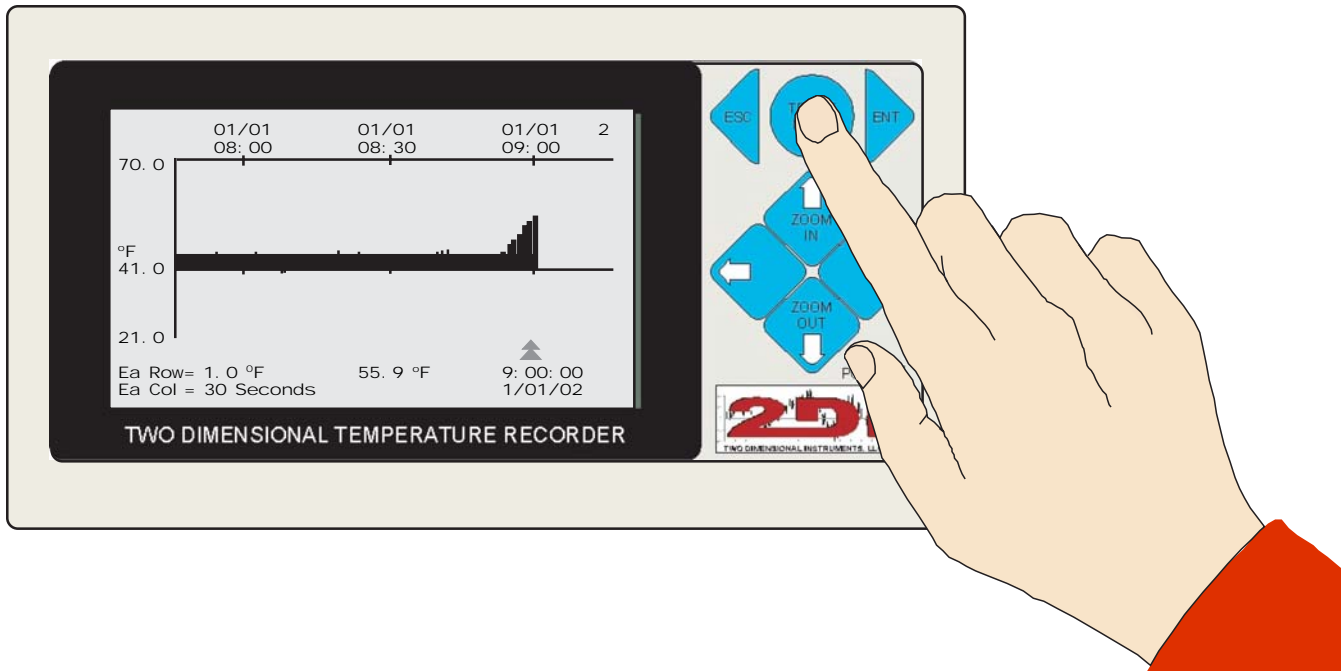
1. The probe is sampling data and a graphic is displayed on the LCD. Past and present data may be viewed. Also called the *Awake Mode*, it is the most-frequently viewed display.
2. The left side of the display shows the user-defined temperature criteria for the probe being monitored.
3. The time period is displayed across the top of the LCD and can range from 45 minutes to three years. Collected data can be displayed in two different ways:
 - The one-to-one display data appear as a filled-in line graph. Each collected temperature appears as a spot on the graph and the space between that point and the “reference” line is filled in. Example: If data is being saved once a minute on the one-to-one graph, each collected temperature data point will appear either above, below, or exactly on the “reference” line and each pixel between the temperature and the “reference” line will be painted black (see illustration at left).
 - Using the Zoom-Out key offers several variations for displaying data (see number six on next page).
4. The probe currently being monitored (one or two) is displayed in the top right corner of the display. If the number three appears, no probe is plugged into the unit.
5. The bottom two rows display the graph legend, the current temperature, and the date and time.



Features and Operation (continued)

6. In the zoomed-out mode more than one collected temperature appears in each column. So if the ThermaViewer is set to store data every minute and the graph is set to “each column = 2 minutes,” then each column will have a vertical line in it with the high temperature as the top of the line and the low temperature being the bottom of the line (see illustration at left). Further, if the graph is zoomed out so that “each column = 64 minutes,” the represented temperatures (in this case all 64 of them) will appear as a single vertical line with the highest collected temperature being the top of the line and the lowest recorded temperature being the bottom of the line. ThermaViewer is capable of displaying columns in the following temperature data modes:

- 1 stored temperature
- 2 stored temperatures
- 4 stored temperatures
- 8 stored temperatures
- 16 stored temperatures
- 32 stored temperatures
- 64 stored temperatures
- 128 stored temperatures



Features and Operation (continued)

7. If the roll-over option in the Systems Parameters menu is set to “on,” the oldest data will be overwritten. If the roll-over option is set to “off,” no data will be added once the ThermaViewer’s memory is full of collected values.

Sleep Mode

In the *Sleep Mode* the display (LCD) is asleep or blank. The ThermaViewer goes into this mode after a user-defined, preset time has elapsed **and** no button has been pushed. The default for this mode is zero -- in other words, when zero is selected, the ThermaViewer display will never enter a *Sleep Mode*. Pressing the ENT key awakens the display.

Trace Mode

The *Trace Mode* retrieves detailed data about a specific event, essentially providing the viewer with a “snapshot” in time. When the *Trace Mode* key is pressed, a double arrow appears at the bottom of the LCD (see illustration at left). The double arrow may be scrolled left or right by pressing the left or right arrow keys. Just as in the *Active Mode*, the Zoom In/Zoom Out keys may be used to reveal more detailed information. The date, time, and temperature displayed at the bottom of the screen reflect the column of data to which the arrow points.

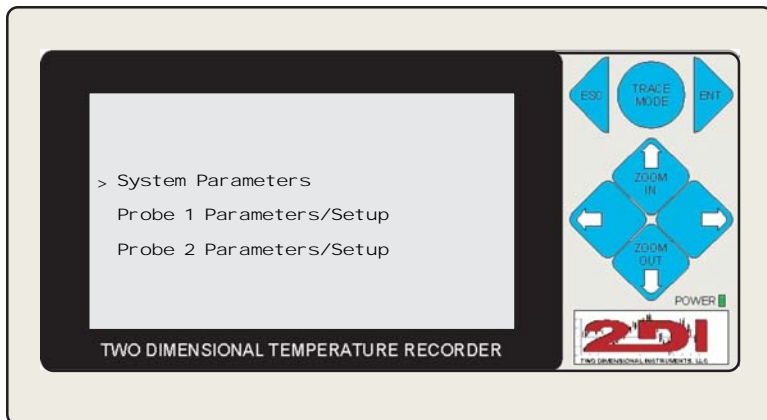
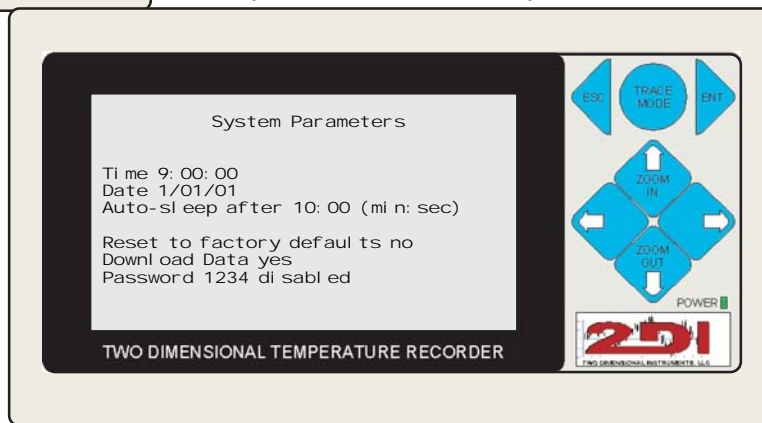


Illustration One

Illustration Two



Features and Operation (continued)

Menu Mode

When the ENT key is pressed during the *Active Mode* the ThermaViewer enters the *Menu Mode* (see illustration one at left). By using the Up or Down arrow keys, one of three menu options may be chosen. Press the ENT key to display the selected menu.

System Parameters

The System Parameters Menu allows customization of the ThermaViewer's display to meet an owner's specific needs (see illustration two at left). The fields listed below may be changed by an owner. The ENT key is used to save data and advance from one field to the next. The Up and Down arrow keys may be used to change the value of a field. Continually pressing the ESC or ENT key will eventually exit the System Parameters Menu.

Important: In order for a change in a field to take affect, the ENT key must be pressed.

The following fields may be changed:

Time 9:00:00

Date 01/01/02

Auto-sleep after 10:00 (min:sec)

Reset to factory defaults no/yes

Download data no/yes

Password 1234 Disabled/Enabled

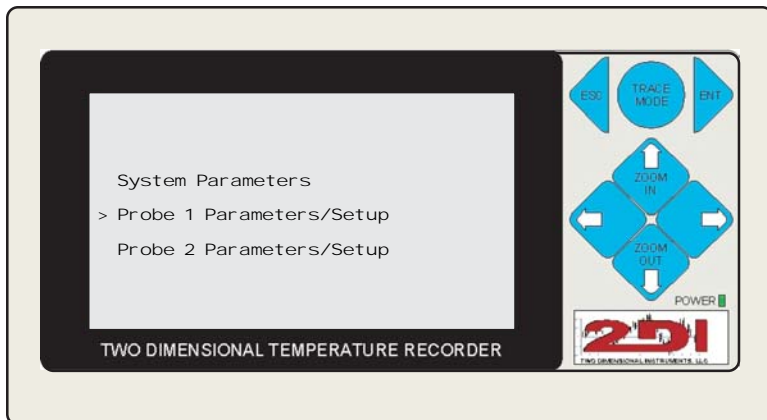
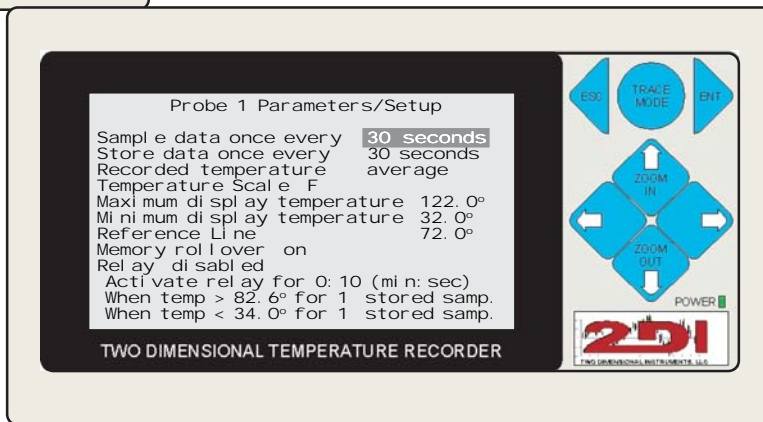


Illustration One

Illustration Two



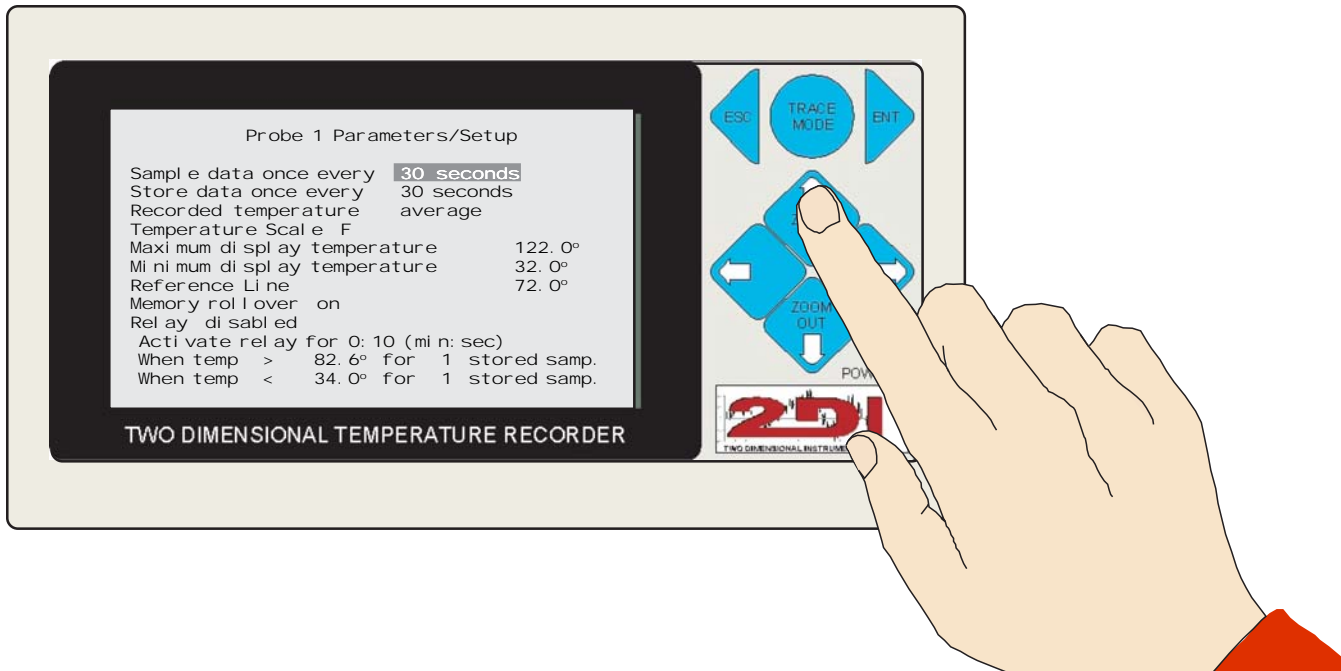
Features and Operation (continued)

Probe One (or Probe Two) Parameters/Setup

The Probe One and Probe Two Parameters/Setup are identical. The Probe One (or Probe Two) Parameters/Setup Menu is accessed via the *Menu Mode* (see illustration one at left). Use the Down arrow key to position the cursor next to the Probe One (or Probe Two) Parameters/Setup option and press the ENT key to display.

The Probe One (or Probe Two) Parameters/Setup Menu allows customization of the ThermaViewer's display (such as sample rate, data storage rate, and data storage value) to meet the owner's specific needs (see illustration two at left). The fields described in the following pages may be changed by an owner. The ENT key is used to advance from one field to the next. The Up and Down arrow keys may be used to change the value in a field. Continually pressing the ESC or ENT key will eventually exit the Probe One (or Probe Two) Parameters/Setup Menu.

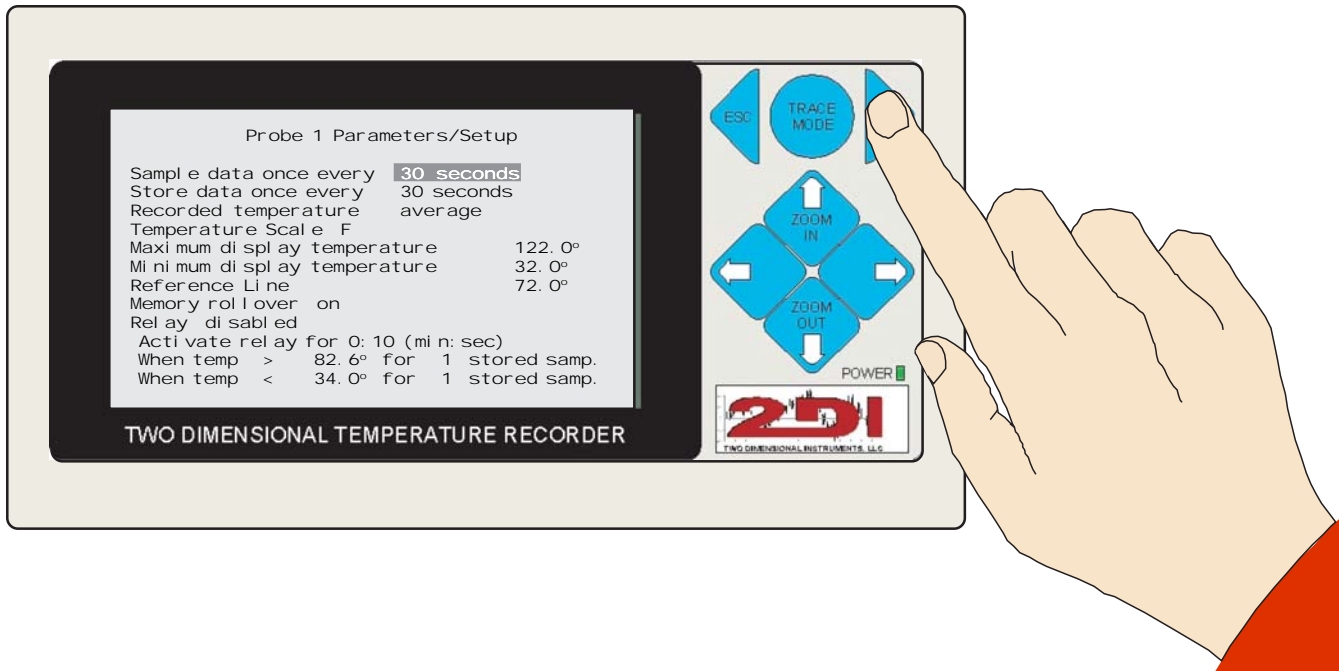
Important: In order for a change in a field to take affect, the ENT key must be pressed.



Features and Operation (continued)

The following Probe One/Probe Two Parameters/Setup fields may be changed by the owner:

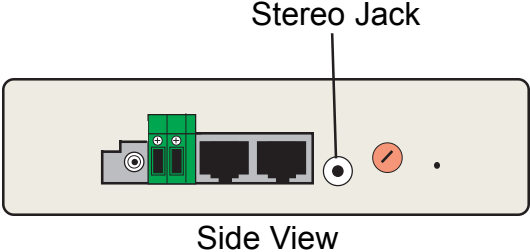
Field:		Options:					
Sample data once every	15 sec	30 sec	1 min	5 min	10 min	30 min	60 min
Store data once every	15 sec, 30 sec, one min, five min, ten min, 30 min, 60 min.	30 sec, one min, five min, ten min, 30 min, 60 min.	one min, five min, ten min, 30 min, 60 min.	five min, ten min, 30 min, 60 min.	ten min, 30 min, 60 min.	30 min, 60 min.	60 min.
Recorded temperature	Average	Minimum	Maximum	Exact Middle	Most Frequent		
Temperature scale	C/F						
Maximum temperature display	User- Defined Temp (-40° F to 212° F.)						
Minimum temperature display	User- Defined Temp (-40° F to 212° F.)						



Features and Operation (continued)

The first three fields determine what temperatures are actually sampled and stored by the ThermaViewer. The ThermaViewer can be set to sample a temperature every 15 seconds but only record a temperature every minute, or every five minutes, etc. This causes the temperature data to be buffered in order to filter out quick temperature fluctuations. For example, if you sample temperatures every 15 seconds but only store a temperature every 60 seconds, the ThermaViewer will sample four temperatures before storing a value. The value actually stored is determined by setting the Recorded Temperature value (Average, Minimum, Maximum, Exact Middle, Most Frequent).

Field:		Options:					
Reference line	User-Defined Temp						
Memory roll-over	On/Off						
Relay	Disable/Enable						
Activate relay for	User-defined time						
When temp is >	User-defined temp (-40° F to 212° F.)	User-defined sample rate					
When temp is <	User-defined temp (-40° F to 212° F.)	User-defined quantity					



Power, Thermal, and Data Connections

Probe Two Parameters/Setup

All entries are identical to those of probe one (see page 27).

Downloading Data

Downloading data to a PC for long term storage, data analysis, or printing can be easily achieved via the stereo jack on the side of the ThermaViewer. By attaching the interface cable to the stereo jack and the nine-pin (D9) connector to the serial port on a PC, data can be downloaded. Here are the steps to download the data:

1. Connect the interface cable between the ThermaViewer and the PC
2. Using terminal emulation software (like Microsoft Windows® HyperTerminal), configure the PC to receive data.
3. Press the ENT key on the ThermaViewer to open up the menu. Press the ENT button to select System Parameters, move to the download data selection, and select Yes. Data will be imported into a CSV (comma separated variable) file.

Warranty

Warranty

Two Dimensional Instruments, LLC warrants the ThermaViewer line of instruments to be free from defects in material and workmanship for a period of twelve months after delivery. In the event of a claim under this warranty the product or part must be returned to the factory for repair or replacement (shipping prepaid) with a Return Authorization Number. It will be repaired or replaced at Two Dimensional Instruments, LLC option without charge.

This warranty does not covers routine calibration or battery replacement. The forgoing warranty and remedy are exclusive and in lieu of all other warranties either expressed or implied.

Two Dimensional Instruments, LLC, shall not be liable for consequential or incidental damages resulting from failure or malfunction of its products. Two Dimensional Instruments, LLC, makes no warranty for products not manufactured by it or for any modified by buyer or subject to misuse or neglect.

FCC Regulations

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technical for help

Caution: Any changes or modifications not expressly approved by the manufacture could void the user's authority to operate this device under the FCC part 15 regulations.

ThermaView patents pending

Printed in USA ® Two Dimensional Instruments, LLC 2002

J & S Instruments, Inc.
3071 State Route 72 South
Springfield, OH 45505-5023

Phone 937-325-7499
Fax 937-323-9588
sales@jsinstruments.com