APPLICATON NOTE: 18

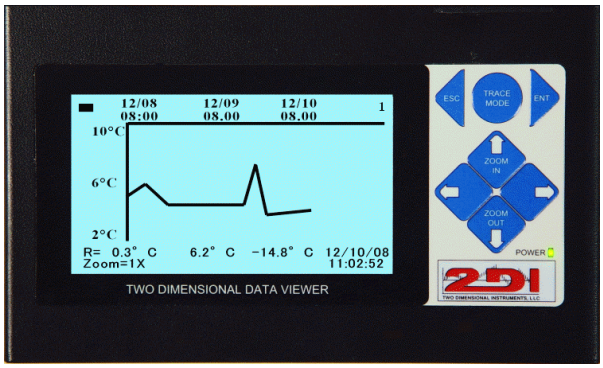
TWO DIMENSIONAL INSTRUMENTS, LLC

Monitoring Very Cold Temperatures with Wireless Thermocouples

Some freezers are designed to maintain temperature at –80°C. It is important to monitor and document the temperature of these freezers over time for quality assurance. The ThermaViewer with its flexibility in sample rates, data logging and displaying data makes is ideally suited for this purpose.

It can be set to sample and store temperatures every 1 minute up to every 24 hours.

In most cases a thermocouple probe is used because of its ability to handle a wide range of temperatures and environments. K-type thermocouples can monitor temperatures between –250°C and 1250°C. If you need a different type of thermocouple (E,J,T,S) they are also available.



Using a ThermaViewer is simple, with minimum set-up time required. It stores and display weeks, months, and even years of temperature history for each of its sensors. Because it doesn't need paper charts or pens to draw the chart, there is no ongoing labor or expense of replacing charts or pens. The chart, unlike the old paper charts, is very easy to understand, which means that every employee will become part of your quality assurance. Each time they glance at the ThermaViewer they see an exact history of the temperatures.

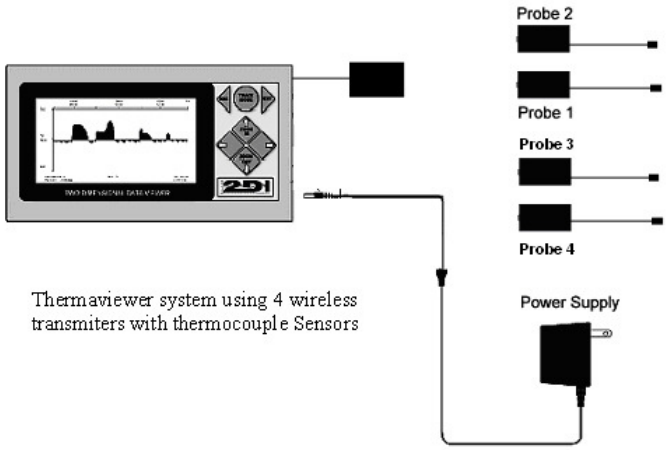
It needs no complicated programming or maintenance. Simply plug the ThermaViewer display unit into a wall socket and begin collecting and documenting temperature immediately.

Installation of the ThermaViewer is a simple six-step process:

1. Plug the power adaptor into a wall socket and into the ThermaViewer.
2. Link the sensors to the base station if not already linked
3. Position the sensors
4. Attach the auto dialer (if purchased).
5. Set the time and monitoring frequency (see below for suggested settings).
6. Set the alarm parameters.

What to Order:

- WTDVD (Display with base station) $ 499.00
  1,2,3 or 4 sensors
- WS4HETCK External thermocouples $ 149.00



Thermaviewer system using 4 wireless transmiters with thermocouple Sensors

Optional Items:

- Auto-dialer with cable[2] $ 199.00
- Serial to IP converter (1 port) $ 139.00

P O Box 159 • Crestwood, KY 40014 • (877) 241-0042 • info@e2di.com • www.e2di.com

APPLICATON NOTE: 18

TWO DIMENSIONAL INSTRUMENTS, LLC

Installation and Setup: Monitor, document and alarm

Mount the ThermaViewer display in an area that can easily be seen by everyone. The thermocouple itself plugs into the transmitter module and comes with a four foot TC wire. Position each thermocouple in the area to be monitored.

The following are suggested settings for a hypothetical example. We will assume that we want to monitor a –80° freezer and a –190° Liquid Nitrogen freezer: The –80°C freezer needs to stay very close to –80°C and the liquid at -190°C. We want to be alerted if the freezer temperature moves above –55 °C for more than 20 minutes and of course, we really do not care how cold it gets so we will set the low temperature alarm point at –95°C. We want the liquid nitrogen freezer to maintain -190°C and want to be alerted if the temperature rises above -175°C for more than 30 minutes. Again we do not care how cold it gets so we will set the low point at –250°.

You should use the settings required by your standards based on your quality assurance plan.

Suggested settings:

Probe #1
Sample data every 00:10:00 HHMMSS
Type of averaging: Med

Maximum Display Temperature 0°
Minimum Display Temperature -85°

Probe #2
Sample data every 00:10:00 HHMMSS
Type of averaging: Med

Maximum Display Temperature -50°
Minimum Display Temperature -220°

Alarm Settings:

Sensor 1 – Temperature
Relay: Enabled
Trigger relay for 10:00 MMSS
If temperature> -55° for more than 00:20:00 HHMMSS
If temperature< -95° for more than 00:20:00 HHMMSS

Sensor 2 – Thermistor/RH
Relay: Enabled
Trigger relay for 10:00 MMSS
If temperature> -175° for more than 00:30:00 HHMMSS
If temperature< -250° for more than 00:20:00 HHMMSS

The alarm: In addition to the temperature alarm the ***power failure alarm*** will also sound (if enabled) and close the relay if the unit switches to battery power.

Calibration: The thermocouple sensors can be calibrated and any corrections entered into a three-point calibration table. The base station carries the calibration corrections.

Downloading data:
The ThermaViewer will hold and chart approximately 9 months of temperature history for each sensor with the above settings (storing a temperature every 10 minutes). A regular schedule for downloading data from the ThermaViewer should be established so that a back up copy of the data is maintained in your computer. You can also print out a copy of the chart with the same program that downloads data to your computer (TView). Access to the unlicensed TView software is provided with the ThermaViewer. It can be installed on multiple computers to download the stored data.

[1] Enable the relay only if you have an alarm or an auto-dialer wired to the relay. See application note 102

APPLICATON NOTE: 102

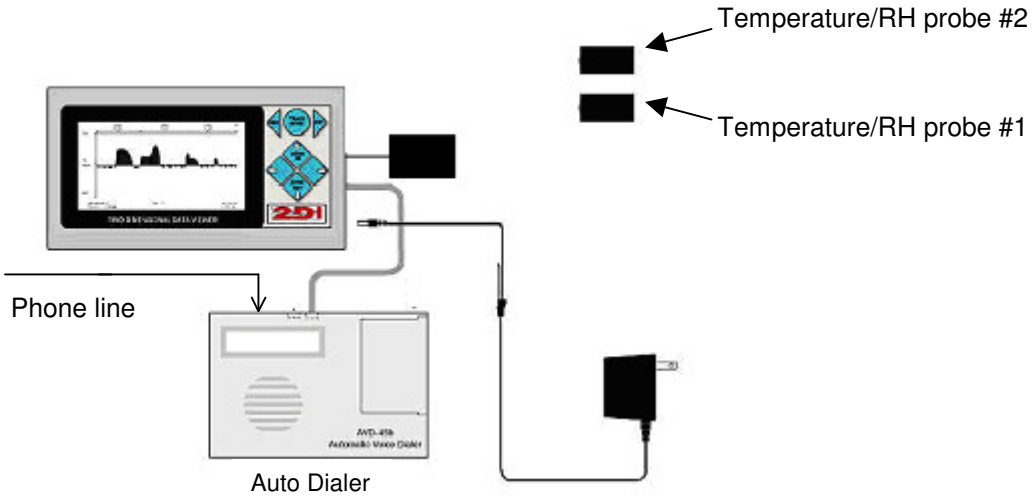
TWO DIMENSIONAL INSTRUMENTS, LLC

Optional Auto-Dialer

The ThermaViewer comes equipped with a N/C dry-contact relay that can be used to trigger an alarm or auto dialer. Each probe has its own high and low trigger point. The relay will be closed when temperature rises above -55°C for more than 20 minutes or falls below -95°F for more than 20 minutes, if the suggested settings above are used for sensor 1. Once the relay has been triggered, the alarm clock is reset. Therefore, in this example, after the relay is triggered, the temperature will have to rise above -55°F for more than 20 minutes or fall below -95°F for more than 20 minutes before the relay will be triggered again.

If you need faster response time you can decrease the delay time a temperature must be above your trigger point. However if you set the time less than the store rate (in this case 10 minutes) you might not be able to see the actual temperature that triggered the alarm since the stored value is an average of all temperature taken within the interval whereas the alarm is measured on a different clock.

A separate power supply is supplied to provide power to the auto-dialer. The auto dialer will call four phone numbers (i.e. phone, pager, answering machine or service) and leave a 16 second message when triggered by the ThermaViewer. It will keep calling the four numbers until someone picks up and the message is delivered.



The auto dialer should be set as follows:

60 second exit delay
20 second entry delay
N.O. (meaning that the relay is normally open).
MOM (meaning that it only takes a momentary activation from the relay to trigger the dialer).

A relay test function on the System Parameter of the ThermaViewer causes the relay to be immediately triggered. Entering 'yes' in this field causes the ThermaViewer causes the auto dialer to call after the 20 second entry delay, the four phone numbers stored in its memory. Allow at least 70 seconds to elapse between the time you exit the programming mode of the auto dialer and you activate the relay.

Technical support for Auto Dialer only (858) 413-0149

P O Box 159 • Crestwood, KY 40014 • (877) 241-0042 • info@e2di.com • www.e2di.com