

APPLICATION NOTE: 306

Monitoring Freezers with the ThermaViewer

Many products used in manufacturing are stored in freezers with temperatures from -20°C down to -100°C . Some of these products are very expensive and deteriorate rapidly if not kept at the proper temperatures. Because of the value of the stored inventory they should be constantly monitored and alarmed for protection.



Although these freezers are normally very reliable, it is possible for them to have problems. It is crucial that these freezers be monitored twenty-four hours a day, seven days a week and is equipped with an alert device that will give a warning if the temperature rises. There have been cases where a freezer got stuck in the defrost cycle for several hours and then unexplainable came out of the cycle to cool back down. No one ever knew that the products were compromised because the problem occurred over the weekend or at a time when personnel were absent. Chart recorders and data loggers have done this job in the past but they each have drawbacks that make them a less than ideal solution. Chart recorders require frequent maintenance of changing charts and pens and data loggers don't have a visual display so the data is not easily accessible.



The ThermaViewer is an ideal instrument for monitoring and documenting -20°C and -100°C freezers. It is accurate and automatic. It not only shows the current temperature and a temperature chart of conditions over a ten month period for two different freezers, it also has a dry-contact relay that will trigger an alarm or auto dialer in the event of an emergency.

No special training is required to read or interpret the chart, which means that anyone that comes near the ThermaViewer will automatically get a quick update on the condition of the samples. Using a ThermaViewer is simple, with minimum set-up time required. It needs no programming, maintenance, paper or pens. Simply plug the ThermaViewer into a wall socket, position the probes and begin collecting temperature information immediately.

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

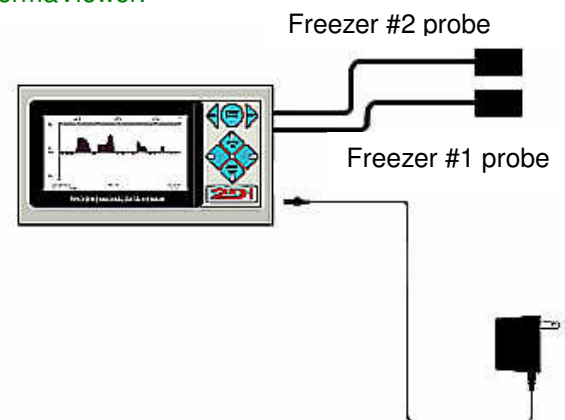
1. Position the two thermocouples in each freezer to be monitored.
2. Route and Plug in the two 20 foot cables (100 foot cables are available as an option).
3. Plug the power adaptor into a wall socket and into the ThermaViewer.
4. Attach the auto dialer (if purchased).
5. Set the time and monitoring frequency (see below for suggested settings).

What to Order:

- TDVD-01 (2-digital probes) \$ 579.00 (-20 to 75°C)
- TDVD-02 (2-themistor probes) \$ 679.00 (-20 to 75°C)
- TDVD-05 (2 Thermocouples) \$ 679.00 (-250 1200°C)

Optional Items:

- Auto-dialer with cable \$ 189.00
- Local alarm (strobe & siren) \$ 50.00
- 100 foot cable \$ 50.00
- International power supply \$ 30.00
(100-240vac, 50-60hz)





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Installation and Setup

Mount the ThermaViewer display unit near the two freezers to be monitored. Position one probe in each freezer. The probes are normally placed about ½ way up from the floor and about ½ way back inside the unit to monitor the average temperature maintained within that appliance. Do not place the probe near the roof of the freezer. This is where the hot air accumulates during the defrost cycle. If the probe is in this area you will get false measurements and could even get a phone call in the middle of the night when the relay trips. (If your standards call for positioning the probes in other locations you should follow those guidelines.)

The following are suggested settings.

Suggested settings for –20°C Freezer and a –80°C Freezer:

| Freezer Probe | |
|-----------------------------|--------------------------------|
| Sample Data every | 15 seconds |
| Store Data every | 10 minutes |
| Recorded Temperature | Average |
| Temperature Scale | F° |
| Maximum Display Temperature | 50° |
| Minimum Display Temperature | -30° |
| Reference Line | -20° |
| Relay Enabled ¹ | |
| Activate Relay for | 0:10 (min:sec) |
| When Temp > | -5° for 6 stored temperatures |
| When Temp < | -40° for 6 stored temperatures |

| Freezer Probe | |
|-----------------------------|---------------------------------|
| Sample Data every | 15 seconds |
| Store Data every | 10 minutes |
| Recorded Temperature | Average |
| Temperature Scale | F° |
| Maximum Display Temperature | -60° |
| Minimum Display Temperature | -100° |
| Reference Line | -80° |
| Relay Enabled ¹ | |
| Activate Relay for | 0:10 (min:sec) |
| When Temp > | -30° for 6 stored temperatures |
| When Temp < | -100° for 6 stored temperatures |

Setting the probes to sample data every 15 seconds and store data every 10 minutes causes the ThermaViewer to store and chart the average of forty samples. This causes the graph to more accurately reflect the internal temperature of the stored materials rather than the air temperature of the refrigerator or freezer. Momentary dips and rises of the air temperature, which occur when the door is opened are not enough to affect the actual stored materials and can safely be averaged over the 10 minute period between readings.

Downloading data:

The ThermaViewer will hold ten months of temperature data for each probe with these settings. 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 graph with the same program that downloads data to your computer (TView).

¹ Enable the relay only if you have an alarm or the optional auto-dialer wired to the relay. Application note 102.

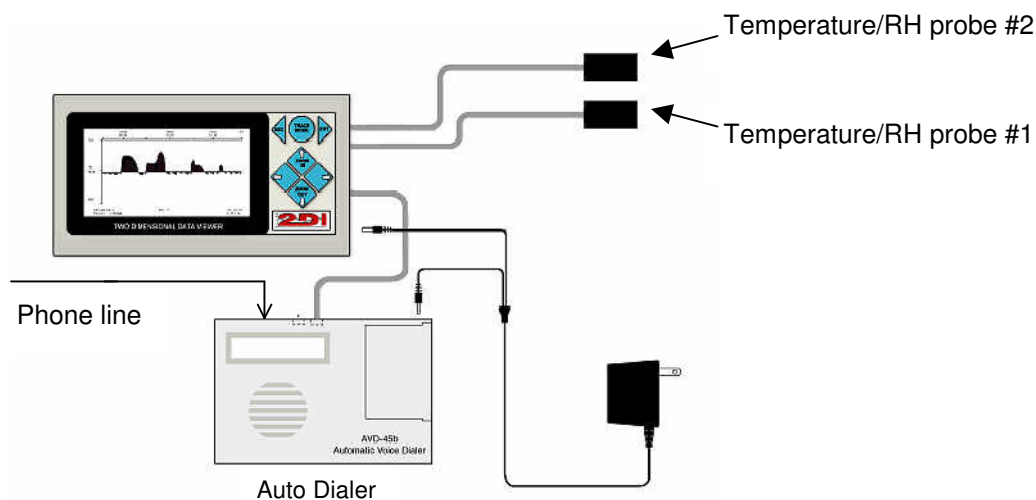
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Optional Auto-Dialer

The ThermaViewer comes equipped with a 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 80°F for more than 60 minutes or falls below 60°F for more than 40 minutes, if the suggested settings above are used. Once the relay has been triggered, the alert clock is reset. Therefore in this example, after the relay is triggered, the temperature will have to rise above 80°F for more than 1 hour or falls below 60°F for more than 40 minutes before the relay will be triggered again.

If you need faster response time you can decrease the number of stored temperatures in the probe menus. Setting this value for 1 instead of 6 will result in triggering the relay if one measurement is above or below the set values.

If an auto dialer is ordered with a ThermaViewer, a power supply with two leads is supplied to provide power for both the ThermaViewer and 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 immediately call the four phone numbers stored in its memory. Allow 90 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