



# APPLICATION NOTE: 307

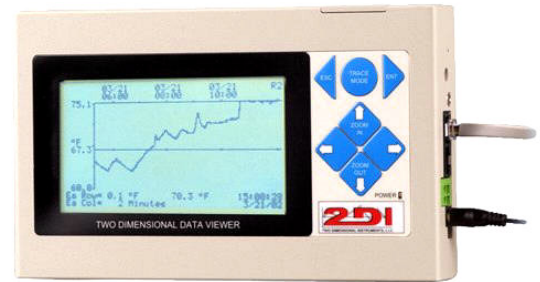
## Monitoring blood products stored in refrigerators & freezers.

Red blood cells must be stored under refrigeration and can be kept for a maximum of 42 days or frozen for up to 10 years. Platelets can be stored at room temperature for a maximum of 5 days. Fresh frozen plasma can be kept frozen for up to 1 year. Cryoprecipitate AHF made from fresh frozen plasma can be stored frozen for up to 1 year.

The ideal temperature for storage of blood is 4°C. In a domestic refrigerator the temperature is not uniform. Blood products should therefore be stored in special blood bank refrigerators to give a uniform temperature of 4°C. This temperature is measured by placing a probe in a vial filled with a liquid that has the same thermal characteristics of the stored blood. This, theoretically at least, gives an accurate reading of the stored blood temperature rather than just the air temperature in the refrigerator. This temperature should be monitored and documented. Many blood banks will also want an alarm installed so that someone is notified if this temperature moves into an unsafe range.

The ThermaViewer is an ideal instrument for monitoring the temperature of a blood bank refrigerator and freezer. It is accurate and automatic. It reads and displays the temperature to the nearest 0.1°C. It can be equipped with one or two thermocouple probes, which can be placed in the vial of liquid. It provides continuous monitoring and indicates trends so that corrective action can be taken. It's relay will trigger an auto dialer to call four numbers if temperature begins to rise or fall.

Using a ThermaViewer is simple, with minimum set-up time required. It needs no programming or maintenance, no paper or pens. Simply plug the ThermaViewer into a wall socket and begin collecting and documenting temperature immediately.



### ThermaViewer

Installation of the ThermaViewer is a simple 5 step process:

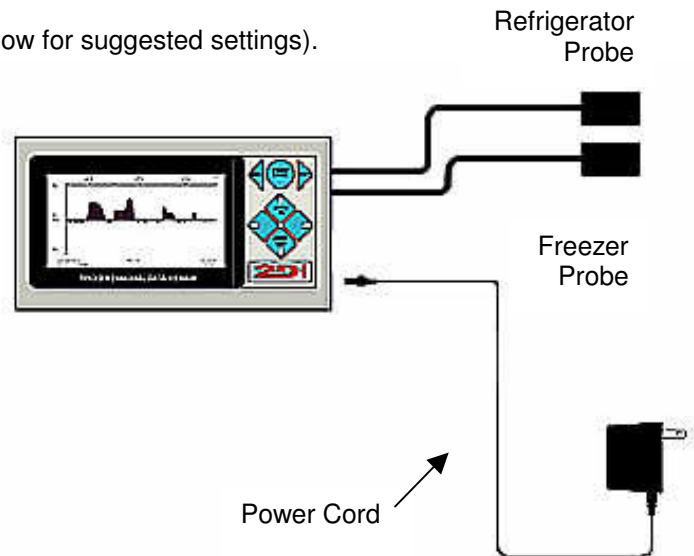
1. Position the two sensor modules in the blood bank refrigerator/freezer to be monitored.
2. Route and Plug in the two 20 foot cables (100 foot cables are available as an option).
3. Plug the power adaptor into a wall socket and into the ThermaViewer.
4. Attach the auto dialer (if purchased).
5. Set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

#### What to Order:

- TDVD-05 2 thermocouples \$ 649.00
- TDVD-05-1 (1 thermocouple) \$ 579.00

#### Optional Items:

- Auto-dialer with cable \$ 165.00
- Local Alarm (siren & strobe) \$ 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 near the blood bank refrigerator and freezer. Position one probe in the refrigerator and one in the freezer to monitor the temperature of each. The probes are normally placed in a vial of liquid so that the displayed temperature is the same as the stored blood. You should avoid mounting the probe near the ceiling of a freezer because during the defrost cycle; the air temperature in this area could be as high as 55°. This will trigger a false alarm and cause a very high temperature reading to appear on the display unit.

The following are suggested settings. You should use the settings required by your standards based on your quality assurance plan.

### Suggested settings:

<b>Blood Bank Refrigerator Probe</b>	
Sample Data every	15 seconds
Store Data every	10 minutes
Recorded Temperature	Average
Temperature Scale	C°
Maximum Display Temperature	10°
Minimum Display Temperature	0°
Reference Line	4°
Relay Enabled <sup>1</sup>	
Activate Relay for	0:10 (min:sec)
When Temp >	6° for 3 stored temperatures
When Temp <	2° for 2 stored temperatures

<b>Blood Bank Freezer Probe</b>	
Sample Data every	15 seconds
Store Data every	10 minutes
Recorded Temperature	Average
Temperature Scale	F°
Maximum Display Temperature	55°
Minimum Display Temperature	-30°
Reference Line	-5°
Relay Enabled <sup>1</sup>	
Activate Relay for	0:10 (min:sec)
When Temp >	-10° for 6 stored temperatures
When Temp <	-30° for 6 stored temperatures

Setting the probes to sample data every 15 seconds and store data every 10 minutes causes the ThermaViewer to take forty samples and plot the average. This buffers the readings so that a more accurate temperature is displayed on the graph and captured in memory. Momentary dips and rises of the air temperature, which occur when the door is opened or the defrost cycle kicks in are not enough to affect the actual temperature of the blood products and can safely be averaged over the 10 minute period.

### Downloading data:

The ThermaViewer will hold ten months of temperature data for each probe with the settings above. 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). This program can be downloaded from our Internet web site. There is no license, so the software can be installed on multiple computers if needed. Downloading the temperature data is as simple as plugging the PC cable into the ThermaViewer and a serial port on your computer and clicking the 'Upload' button.

<sup>1</sup> Enable the relay only if you have an alarm or the optional auto-dialer wired to the relay. See note 102

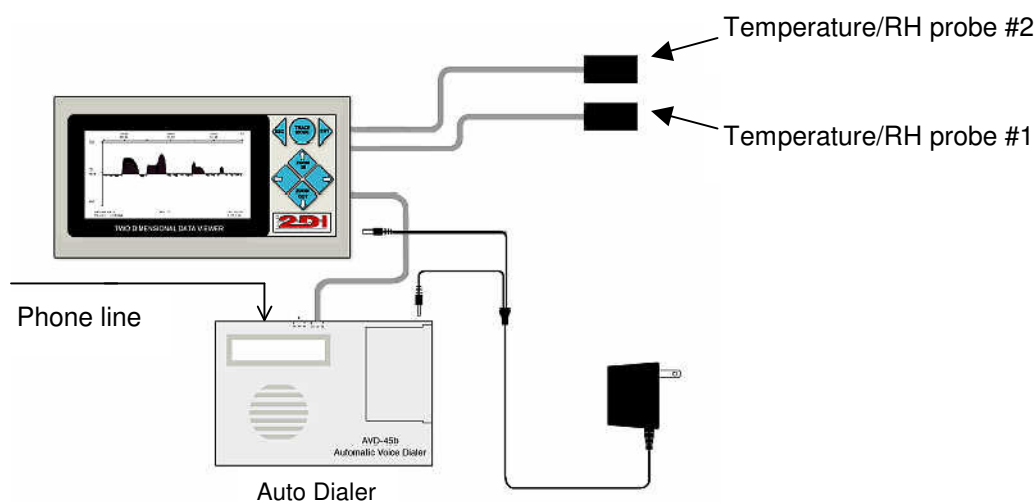
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### Optional Auto-Dialer

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.