T°Sentry Model 125 Digital Alarm Operating Instructions

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I Preliminary Checks

A. Unit Check

Check the serial number plate on the rear of the unit to be certain you have received the proper unit for your application.

The temperature range will be indicated by the numbers after the model (125-xxx), and any installed options will be listed by letter after the range designation (125-xxx-yyyy):

If xx is 25 the operating range is -100 to +25 deg.C.
If xx is 50 the operating range is -50 to +50 deg.C.
If xxx is 125 the operating range is 0 to +125 deg.C.
If xxx is 400 the operating range is 0 to +400 deg.C.
(Type K thermocouple only)

The definitions for installed options, yyyy, are as follows:
H -- High resolution display (0.1 deg. Celsius)
L -- Low alarm setpoint
R -- Relay output
V -- Voltage output for recorder
B -- Battery (NiCad) Back-up built-in
CMS - Special computer monitoring system option
F -- Fahrenheit calibration option (see Sec.G of IV)
K -- K Type thermocouple input

B. Operational Check

Plug the attached power module into a 110-120 volt power outlet.

The green power indicator (LED) should be lit, and the display should indicate the current probe temperature. Hold the black (sensing) part of the probe tightly in your hand. The displayed temperature should begin to increase. The unit has a time constant of about 20 seconds so it will take several seconds to level off.

If the unit is responding as described go on to Sec. II, else call factory.

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II. Basic Model 125 Operation

A. Reading and Adjusting Alarm Points

1. To read or set alarm point(s), on the front panel press the button under HIGH or LOW ALARM DISPLAY and while keeping it depressed, turn the adjustment screw located under ADJUST slowly to set the desired alarm setpoint. (On dual alarm point units, only ONE setting can be adjusted at a time.) The alarm light willblink rapidly and the audio will sound in short pulses during the adjustment.

B. Alarm Conditions

1. If the probe temperature exceeds the HIGH setpoint, (or falls below the LOW setpoint on dual setpoint models) the audio alarm will sound and the red LED on the upper right of the panel will flash. The audio alarm can be temporarily silenced (muted) by depressing the DELAY button located just below the alarm light. The unit is shipped with the delay time set at 30 minutes (variable from 15 minutes to two hours, see page 9, Sec. C.)

   During the delay period, the alarm will chirp about every 30 seconds as a reminder that the alarm condition still exists. The alarm light continues to pulse during the delay period.

   If the alarm condition is still present at the end of the preset delay period, the audio alarm will turn on with full intensity.

2. If your Model 125 is equipped with the (R)elay option, the relay will "pull-in" when line power is present. If an alarm condition is detected the relay will "drop out", causing the relay contacts to switch.

   The relay will also "drop out" if power to the alarm is lost, so that it can be used as a power loss detector.

   When line (mains) power to the alarm is lost the green power LED on the upper left of the panel will go off.

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III. General Model 125 Information

A. The Sensor Probe

The sensor supplied with the Model 125 is a highly accurate integrated circuit temperature sensor, encapsulated in epoxy resin with PVC or Teflon insulated wire. The PVC may be used in air, water, or other mild aqueous solutions, from the ice point to +125 °C. At very low temperatures the probe lead wire should be Teflon, because the PVC may will become brittle and crack, allowing the entry of moisture or ice.

NOTE: Immersion in solvents and harsh chemicals must be avoided. Use of protective thermowells when monitoring such materials is required.

*** Damage to probes or electronics caused by exceeding temperature limitations or damage to probes by use in solvents or other unsuitable environments is NOT covered by warranty. ***

If the unit is senses an input that is out of the specified range, it will give a large negative reading (ex. -450), and the alarm will go on. Pressing the delay button will force the display to show the actual temperature reading. For instance, a unit with upper range of 25°C will go out of range if the probe reads 50°C.

If the display shows a continuous reading of a very low number (ex. -450) that is an indication of a failed probe, or a broken probe lead.

If the display shows a continuous reading of a very high number, or is offscale high, that is an indication of a shorted probe, or a shorted probe lead.

Replace probe and recalibrate unit.

B. Installation

The probe may be used in air or simulated product, provided that the product does not contain solvents or reagents that attack polyvinyl or epoxy. (See Sec.A)

If the sensor is to be installed in a refrigerator, it is recommended that the probe be place in a water and glycol chlorine solution to keep bacteria from forming.

If the sensor is to be used in a cabinet or enclosure, particularly freezers, it is important that good techniques be employed to prevent migration of room moisture into the cabinet. Whenever possible, the probe should be installed through an existing access port provided by the manufacturer and then the port should be resealed

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Alternatively the probe can be run under, over, or through the door sealing gasket. Often a door gasket will have a joint at one or more corners. One technique is to open that joint slightly by carefully making a slit with a razor blade and inserting the flat probe wire and then resealing the joint with flexible silicone sealing compound. Inside the cabinet, the probe wire should be run so that it will not become snagged during loading, unloading or cleaning procedures and suffer possible physical damage.

C. Sensor Location

The sensor should be installed to respond to the average temperature of the space being monitored and not to local conditions caused by door openings etc.

The object is to provide a certain amount of safety for the area being monitored without generating "false" or nuisance alarms. For example, locating the sensor probe on the bottom of a chest freezer will result in the alarm being sounded later than if it was located near the top.

However, locating the sensor too close to the top of the chest freezer could result in the alarm being sounded due to routine lid opening. It is wise to choose a location that offers the degree of safety that is desired for the enclosure contents.

D. Display Interpretation

Digital devices generally do not "round off". In the case of temperature monitors, a display that reports a value of 10 deg. can represent any temperature from 10.0 to 10.9 degrees. Therefore, a very small system change (0.1 deg. or less) or minor electronic disturbance may cause the displayed temperature to change one digit.

Only when the displayed temperature is changing with a period of greater than 20 seconds, can the change be related to real thermal changes in the space being monitored.

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IV. Description Of Optional Features

This section describes specifications for each of the currently available options.

A. NiCad Battery Back-Up (B)

On units equipped with the NiCad trickle charged battery back-up option, the Model 125 is shipped with the battery in place and connected.

When first placed in service the battery must be activated. This is done by removing the screw located outside on the left side of the module.

1. Operation With NiCad Back-Up

   When line power is present, all of the normal features described above are operational. When normal line (mains) power is lost the NiCad provides power to maintain two important functions:

   a. Power to operate the audio and visual alarms at a reduced duty cycle to conserve battery power.
   b. Power to allow continued reading of the temperatureof the monitored space.

2. Testing Of NiCad Operation

   If the unit has the NiCad option, and the screw on the outside has been removed, disconnect the power supply from the line (mains).

   Upon doing this:

   a. The green LED will go off.
   b. The red alarm LED will begin to flash.
   c. The audio alarm will begin to "chirp".
   d. The LCD temperature display will go blank.
   e. On units with the (R) relay option, the relay will switch.

   The delay button has a **new** function under NiCad operation. If it is depressed and released, the monitored (probe) temperature will be displayed for about five seconds and then will disappear to conserve power.

   If the switch is held down the temperature display will remain.
   This feature allows the monitored temperature to be accurately determined without entering or opening the space. This is particularly important when monitoring refrigerated cabinets or areas.

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B. Low Temperature Alarm (L)

The low temperature alarm option duplicates the standard high temperature alarm features except that it is triggered into alarm by the temperature falling below the desired setpoint.

Note that both alarm points can be set anywhere within the operating range of the Model 125. It is important that the LOW alarm point be set at a lower temperature than the HIGH alarm. This ensures establishing a "window" of permissible temperatures within which no alarm will be issued.

If the temperature goes above the high setting or below the low setting, the alarm conditions will be initiated.

C. High Resolution Display (H)

The high resolution option allows temperature monitoring and alarm setting to 0.1 deg.C. All of the Model 125 standard features remain the same.

D. Relay Option (R)

The relay option consists of a single pole double throw (SPDT) relay that changes state (switches) with the loss of line power or the presence of an alarm condition.

The relay is rated for pilot duty operation only and is not to be used for control switching. The relay contacts and connections are rated at 30 volts and 1 ampere.

In normal applications, the relay is used to signal remote or central monitoring systems of the existence of an alarm condition at the apparatus being monitored.

E. Voltage Output (V)

The V option provides a millivolt signal proportional to the monitored temperature. The standard output is 10 mv per degree C. with 0 mv at 0 deg.C. For example, if the monitored temperature is +37 deg.C., the voltage output is +370 millivolts (.370 v); if the monitored temperature is -20 deg.C., the voltage present at the V option
connector is -200 mv (.200 v).

The signal is intended for recorders and data loggers only and no attempt should be made to use this voltage to operate other devices directly. The input

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impedance of apparatus using the voltage signal should not be less than 100K ohms.

The V option is supplied with a mating cable and connector.

F. CMS Option (CMS)

A microcomputer based system for monitoring up to 225 points can be supplied by Hampshire Controls Corp.

Also available is a microprocessor based system capable of monitoring up to 32 points that is supplied by Hampshire Controls Corp.

The CMS option indicates a specially modified Model 125 for use in either system.

If you have an interest in a Monitoring System please contact the factory directly.

G. Fahrenheit Calibration Option (F)

Standard Model 125 calibration is in degrees Celsius. The "F" option indicates that Fahrenheit calibration is desired.

NOTE: If the unit ordered is a Model 125-125 with 0.1 deg. Resolution (Model 125-125-HF), the maximum temperature that can be displayed is 199.

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V. Internal Adjustments

The T°Sentry Model 125 has several internal adjustments that can be changed to alter operating characteristics.

A. Audio Delay Interval

The Model 125 is shipped with a temporary delay timefor the audio output set to 30 minutes. This is the time period that will be set each time the front panel button marked "DELAY" is pushed.

To alter the DELAY time, see Section C of Internal Adjustments.

B. Chirp Period

The Model 125 has a soft "chirp" that sounds whenever the alarm is in the audio delay mode. This sound, along with the red flashing alarm LED, serves as a reminder that the alarm condition still exists.

The Model 125 is shipped with the chirp interval set at 30 seconds. To alter the chirp interval, see Section C below.

C. Adjustments

To change the "DELAY" time and/or the "CHIRP" interval proceed as follows:

1. Disconnect the unit from the power (mains) line.
2. Remove the four front panel corner screws.
3. Pull the panel up (forward), turn it over and lay it down to the right of the case.
4. Locate the pin arrays on the circuit board. They will be found on the lower left side of the board close to the case. A bright blue jumper is installed on the audio DELAY pins and a black jumper on the CHIRP pins. See diagram on next page. The boxes around the letters indicate jumper positions as shipped.

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VI. Calibration Procedures

The integrated circuit sensor used in the Model 125 has exceptional long term stability and should not require recalibration in normal usage. However, if the probe is subjected to temperature extremes outside of the normal operating range for the unit, or if the probe is damaged and must be replaced, it will be necessary to recalibrate.

Under certain circumstances recalibration of the unit at the specific temperature of use may improve accuracy, particularly if the 0.1 degree High resolution option is being used.

To recalibrate the Model 125 proceed as follows:

1. Follow the procedure outlined in steps 1-3 under Section C. of Internal Adjustments to prepare the unit for recalibration.

2. Locate the adjustment potentiometers (pot) on the left edge of the board.

   a. One of the adjustment potentiometers will be marked with an "O". This is the ZERO adjust.
   Another will be marked with an "S". This is the SPAN adjust.

***** There will also be one or more potentiometers that are not labeled. These should NOT be adjusted. *****

   b. Adjusting the ZERO - Immerse the sensor probe in a stirred ice water bath. Allow five minutes for equilibration. Be sure that clean solid ice is present.

      Turn the "O" adjustment pot with a small screwdriver until the unit display reads 0 deg. or 0.0 on "H" option models. Try to "center" 0 by turning a little past until
      a 1 or -1 appears, estimate the distance moved, then return the pot to a point where 0 just appears on the display.

c. Adjusting the SPAN - Immerse the sensor probe in a KNOWN temperature other than 0 °C.

   This second temperature must be known as accurately as possible. In order to guarantee sufficient accuracy, use a thermometer that you can trust, preferably a short range Anschutz type. By using masking tape or a rubber band, join the sensor probe and the thermometer so that they both are at the same location in this environment. Stir in the liquid. Allow time for the probe and the reference thermometer to equilibrate. Turn the

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"S" adjustment pot until the reference thermometer and the display agree, using the same centering technique outlined under the ZERO adjust.

If this higher (or lower) temperature is changing rapidly, accurate adjustment will be difficult. One technique to slow the rate of change is to use a Dewar flask or a Thermos bottle as a container and keep the sensor probe and reference thermometer near the bottom while stirring gently.

d. Recheck the ZERO setting. If it needs to be readjusted do so and then recheck the SPAN adjustment.

NOTE: NO POTENTIOMETERS OTHER THAN THE ZERO AND SPAN SHOULD BE ADJUSTED IN THE FIELD. FACTORY RECALIBRATION OF UNITS THAT HAVE BEEN INCORRECTLY ADJUSTED IS NOT COVERED BY WARRANTY.

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