

## SZ2144 Refrigeration Monitor



## Description

The SZ2144 is a microprocessor-based refrigeration monitor and alarm interface designed to monitor up to six coolers or freezers.

## Features

- Stand-alone or network operation
- Independently programmable high and low limits for each input
- Independently programmable manual or automatic alarm reset
- Change of state factor with programmable hysteresis
- Status LEDs
- Relay output to activate additional auxiliary communication devices or external alarm circuit
- Six RTD temperature inputs, three with thermistor option
- Five analog inputs suitable for a broad variety of transducers
- Temperature or pressure monitoring inputs
- Monitor compressor and door status

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## Mounting

The SZ2144 is designed for mounting on a wall or in a panel using four #10 sheet metal screws. Prior to mounting, the jumpers should be placed. (See setup instructions.) If the unit will be stand-alone, all programming should be completed before installation. If the unit will be wired for communications, a unique address should be programmed into the unit. (See programming instructions.)

# Wiring

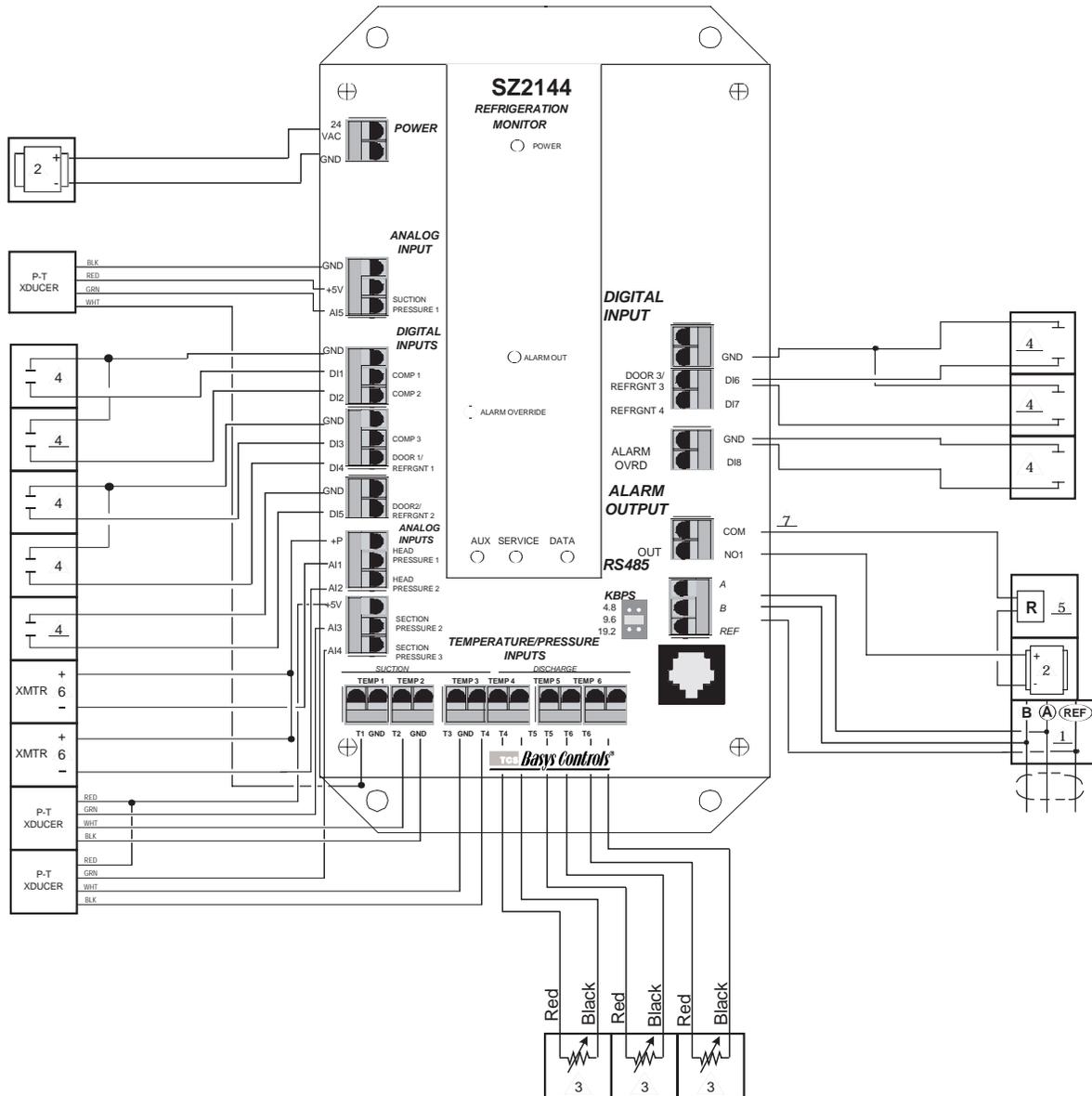
The SZ2144 terminal designations are shown below.

## REMOTE SENSOR WIRING

The SZ2144 accepts six 1000 Ω two-wire platinum sensors. Use TS1002, TS1007 or TS3001 for freezer and cooler temperature sensing. When using TCS/Basys Controls three-wire sensors, use the black and red leads, and either clip or twist off the white lead.

The SZ2144 also accepts the PG1000 Temperature Pressure Combination Sensor. The PG1000 contains a

pressure transducer and thermistor temperature sensor in the same housing. The thermistor wires can be connected to the T1, T2 or T3 temperature input terminals. Connect the white wire from the PG1000's thermistor to the T1, T2 or T3 terminal. Connect the black wire from the PG1000 to the corresponding GND terminal. Connect the red pressure wire from the PG1000 to the +P terminal and connect the green wire to the corresponding analog input (AI). The wiring length should not exceed 250 ft. The SZ2144 also accepts two 4-20mA transducer inputs for additional monitoring.



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|--|---|
| <p><b>1</b> For communication wiring, use twisted, shielded 18 or 20 AWG. Must be run separately.</p> <p><b>2</b> 24 VAC transformer. See powering instructions.</p> <p><b>3</b> Sensor input wiring 18 AWG, twisted, shielded pair.</p> <p><b>4</b> Dry contact. Must not be powered.</p> | <p><b>5</b> External relay. 24 VAC Coil</p> <p><b>6</b> 2-wire, 4 to 20 mA transmitter. Sensor input wiring 18 AWG, twisted, shielded pair.</p> <p><b>7</b> These may be connected together for a common transformer or they may be ran from separate transformers.</p> |
|--|---|

**TCS Basys Controls**

## POWERING THE SZ2144

The SZ2144 is powered from 24 VAC +/- 20 %. If wiring for communications, dedicated power must be used to power the SZ2144. Several S-series controllers may be powered from the same transformer, provided that the transformer has enough power.

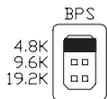
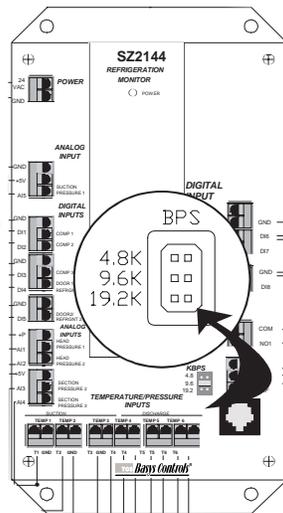
**Caution:** Do not connect to 120VAC. When multiple TCS/Basys Controls devices are using a single transformer, the polarity of the power wiring must be maintained because all TCS devices are half-wave rectified and have common return paths.



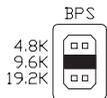
## Setup

### BAUD RATE SELECTION

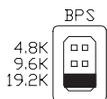
The SZ2144 must be programmed using a PC and TCS/Basys Controls software. A communication baud rate must be set by placing one jumper in the area shown above. This baud rate must be the same for all devices.



For a 4.8K baud rate.



For a 9.6K baud rate.



For a 19.2K baud rate

*Note: for 28.8K baud, install shunts at 19.2K + 9.6K baud.*

## Programming

The SZ2144 must be programmed with a PC if other than factory default settings are desired. A port on the face allows local access for programming. If you plan to program the controller while it is on a network, prior to putting the controller on the network, a unique address must be set in the controller by accessing it through the port on the front.

For more information on programming through the PC, consult your TCS software manuals.

SZ2144 screen "A"

### PC Clock

When you read a controller, this screen displays the time (military time), the day of the week, the date and year the controller is using. When you click on Enable Clock, these same parameters are read from the computer. When Writing a screen of parameters to a controller, click on Enable Clock immediately before Write Page. This will ensure that the controller will have the proper time, day and date.

### Delay On Power

On a loss of power, when the power comes back, the controller will wait this amount of time before starting to control. Different controllers in one building can have different delays so that all units don't come on at the same time. Enter a delay time (in seconds) that you want the Controller to use on power up.

### DI Delay

This is used to indicate whether to apply a 15 second delay to the digital inputs, before recognizing an alarm condition.

### AI Range and RTD Sensor Type

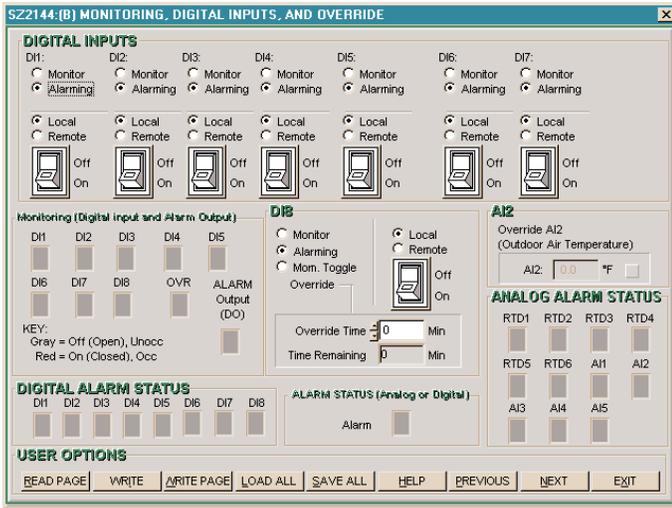
Analog inputs AI3, AI4 and AI5 can use one of three ranges depending on the input signal used. Select the appropriate signal.

RTD Inputs RTD1, RTD2 and RTD3 can either use a 1000 ohm PtRTD as inputs or they can use a 10k thermistor as inputs. Select the input range.

### RTD Monitoring

This displays the actual temperatures for the RTD1 through RTD6 inputs connected to the controller when the controller is read.

SZ2144 screen "B".



**Digital Inputs**

Select whether you want DI1 through DI8 to be Local or Remote. Local means that the controller uses its own control program when looking at these inputs. Remote means that it will take a PC to make any changes to these inputs.

DI1 through DI7 can be used for Monitoring or as an Alarm Input. Select whether to generate an alarm condition with these inputs or whether they will be used for monitoring.

**DI8**

DI8 can be used for Monitoring, Alarming or can be selected to be Momentary Toggle Override.

**Monitoring**

This displays the digital inputs and digital (alarm) output of the controller when the controller is read. The boxes will be Red if the input or output is On or active, and Gray if the input or output is Off or not active.

**Digital Alarm Status**

This displays the digital inputs of the controller when the controller is read. The boxes will be Red if the input or output is On or active, and Gray if the input is Off or not active.

**Alarm Status**

This displays the digital (alarm) output of the controller when the controller is read. The box will be Red if the input or output is On or active, and Gray if the output is Off or not active.

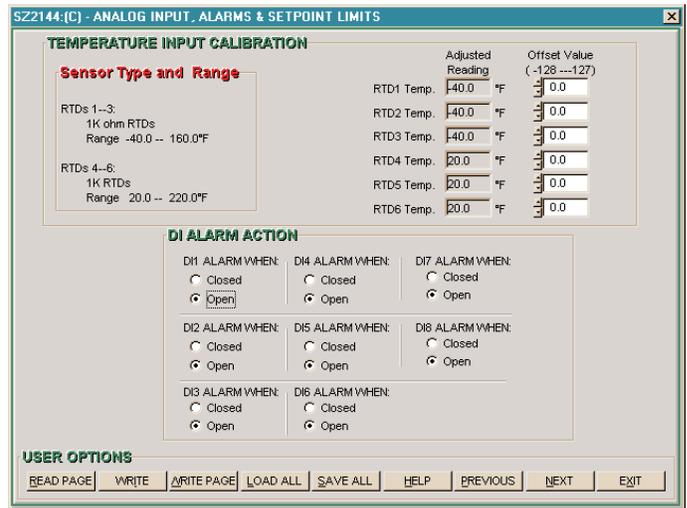
**AI2**

The outdoor air temperature may be overridden from a PC. This would allow only one controller in a building to have an outdoor air sensor. Revelation could use this value and rebroadcast it to the remaining controllers in a building. Choose whether to use this function. You can type in a temperature which the controller will use for 10 minutes. After 10 minutes, the controller reverts back to reading its analog input. i.e. if this function is used, in practice the reading must be updated at least every 10 minutes.

**Analog Alarm Status**

This displays the alarm status' of the analog and RTD inputs of the controller when the controller is read. The boxes will be Red if the input is On or active, and Gray if the input is Off or not active.

SZ2144 screen "C".



**Temperature Input Calibration**

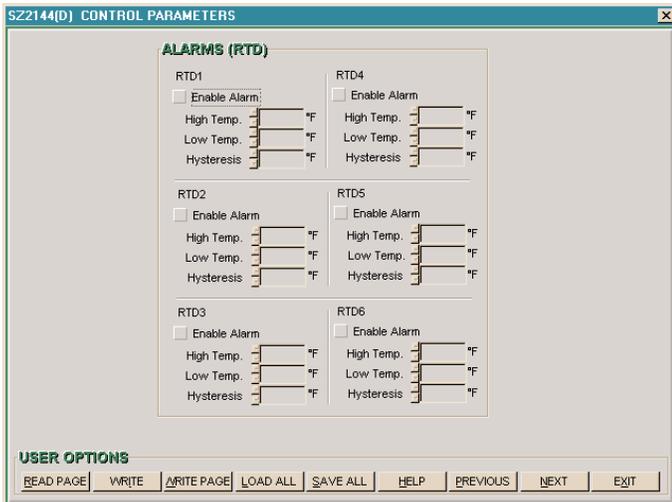
The six temperature inputs are factory calibrated. However, depending on the application (long wire runs, etc.), there may need to be a field adjustment done to these readings. The "Adjusted Reading" is the reading that the SZ2144 actually uses for control. The "Offset Value" is the number of degrees that the actual input temperature has been adjusted. For example: You measure a temperature and it reads 71°. The SZ2144 reading is 72° and the Temperature Input already has an offset of -2.0°. All you need to do is change the offset value to -3.0° and you're done. The SZ2144 will now read 71°.

The RTD temperature inputs are scaled -40 to 160°F (-40 to 71.1°C). These ranges are fixed and cannot be changed. If using a pressure sensor / thermistor combination unit, RTD1, RTD2, RTD3 can accept the thermistor as an input in which case the input is scaled -20° to 120°F (-28.9 to 48.9°C).

**DI Alarm Action**

When using the digital inputs as alarm inputs, select whether the alarm condition will occur when the digital input is open or closed.

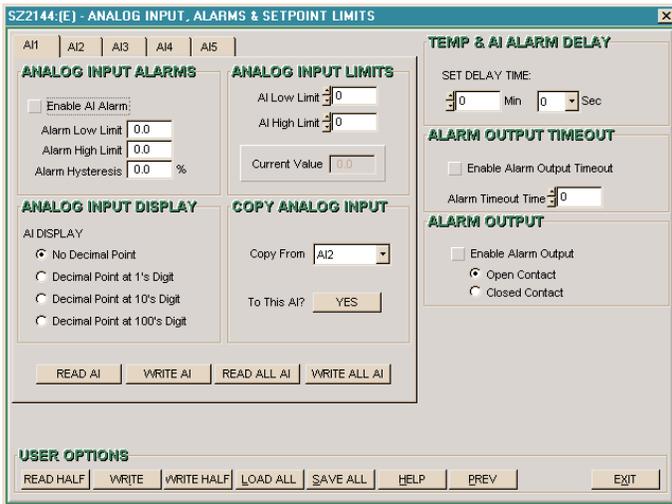
SZ2144 screen "D".



### Alarms (RTD)

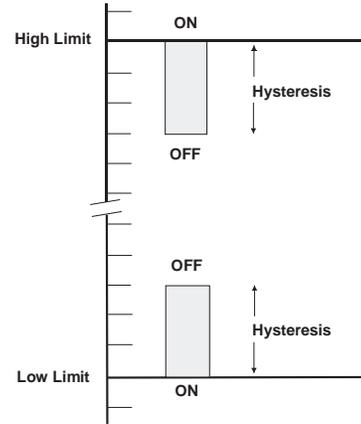
When using RTD (or thermistor) inputs to generate a(n) alarm(s), place a check in the appropriate box and then select the high and low limits for the alarm. Choose a hysteresis value which when the temperature falls from a high alarm or rises from a low alarm the alarm will clear itself.

SZ2144 screen "E".



### Analog Input Alarms

When using Analog Inputs one through five to generate a(n) alarm(s), place a check in the appropriate box and then select the high and low limits for the alarm. Choose a hysteresis value which when the temperature falls from a high alarm or rises from a low alarm the alarm will clear itself. Select the appropriate tab for the appropriate analog input.



### Analog Input Display

For display and monitoring purposes, the SZ2144 allows a decimal point to be turned on for each of the analog inputs. No scaling is done. Choose the position of the decimal point for AI1 and AI2.

### Analog Input Limits

You will need to enter High and Low Limits for AI1 through AI5. These numbers should match your input transmitter range(s). i.e., If 4 to 20mA equals -30 to 130°F, you would enter -30 for the Low Limit and 130 for the High Limit. When the page is read, the current value of the analog input will be displayed.

### Copy Analog Input

The programming of the analog inputs can be copied (cloned) from one analog input to another.

### Temp & AI Alarm Delay

A delay can be set for the analog and temperature inputs. The delay can be from 0 min and 0 sec to 63 min and 45 sec. This is the amount of time that an analog or temperature input must remain in an alarm condition before an actual alarm is generated.

### Alarm Output Timeout

The relay output can be automatically reset after a time delay. This is useful if the relay output is hooked up to an audible alarm which can be shut off after a brief duration. To use this function, you must first enable it and then choose the time in seconds after which the relay output should cease. Note - the SZ2144 will still remain in an alarm condition while an alarm is present.

### Alarm Output

Choose whether to enable the alarm output relay. If enabled, choose whether you want the relay output to be Open or Closed when an alarm condition occurs.

## Checkout & Troubleshooting

### CHECKOUT

1. Be sure to check and verify all wiring before powering the SZ2144.
2. Turn power on. The SZ2144 "Power" LED should light up. Then the Service LED will blink for 15 seconds while the electronics stabilize.
3. If the SZ2144 has not been pre-programmed, it should be programmed at this time.
4. Increase and decrease the setpoints. This must be done from a PC. Observe the operation of the relay and/or analog output(s).
5. Note that the operation of the SZ2144 will depend on how it is programmed.

The SZ2144 is now ready for operation.

### TROUBLESHOOTING

#### Power LED will not come on

Check for 24 VAC on terminals "24 VAC" and "GND". The rest of the trouble shooting must be done with a PC and the Revelation Professional software.

#### No communications

Make sure baud rate selection jumper for the QD1010 and the SZ2144 are the same, and that Revelation is configured for that same baud rate. Address 248 will always work provided that the SZ2144 is NOT connected to a network.

#### Inputs do not read correctly

The SZ2144 is calibrated at the factory. For the supply temperature and other temperature readings make slight adjustments (+/- 12% of the input span) on "Screen C" of the SZ2144 programming screens. (See Temperature Input Calibration on page 4.)

#### Output operation is not correct

Check programmed parameters. Check wiring.

## LED Description

Five LEDs on the unit allow the occupant to view the current operating status of the SZ2144.

**POWER:** This LED will be lit whenever the unit has power.

**OUTPUT:** This LED will be lit when the alarm relay output is on.

**ALARM:** This LED will be on whenever the unit is in an alarm state or when a freezer or cooler door is open.

**SERVICE:** This LED will be on whenever the unit has a service condition. This LED also blinks on powerup until the electronics stabilize.

**DATA:** This LED will blink when the unit is being accessed by a PC.