

AASC
ANTI-SWEAT HEATER
CONTROLLER



4910 Wright Road; Suite 120
Stafford, Texas 77477
(281) 207-2775

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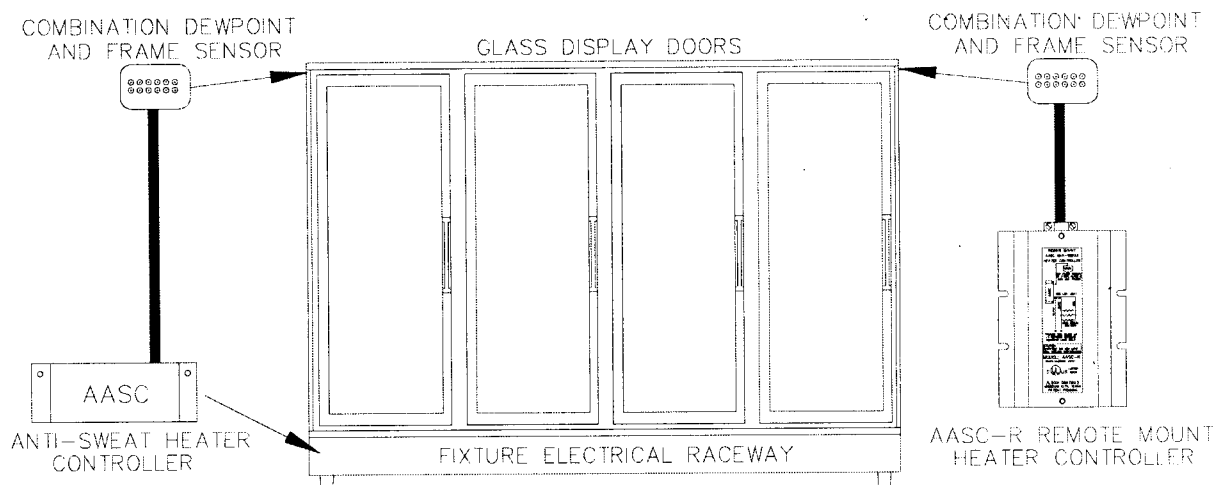
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SECTION A: GENERAL INFORMATION



AASC CONTROLLER OVERVIEW:

The AASC controller is a stand alone anti-sweat heater controller that determines the store's dewpoint and monitors the actual frame temperature to control the frame heat to maintain the frame temperature just above the dewpoint. To compensate for frame conditions where the frame sensor is not located at the coldest spot on the frame, the controller's sensor includes a means for selecting the amount of "offset" from the dewpoint.

Feature / Benefits:

- Patent pending frame temperature feedback optimizes the energy usage of the frame heaters over a wide range of store dewpoints and refrigeration modes and applications.
- Stand-alone control simplifies the installation and service.
- Status LED's provide operational information.
- Pulsed control of the heaters reduces temperature fluctuations and extends heater life.
- Integral frame temperature sensor simplifies installation and service.
- Sensors with different amounts of temperature offset provide a means to compensate for application issues.
- Remote frame sensors provide ability to adapt controller to any application.
- Controlling multiple frames with the AASC-R Remote Mount Controller reduces installation costs.

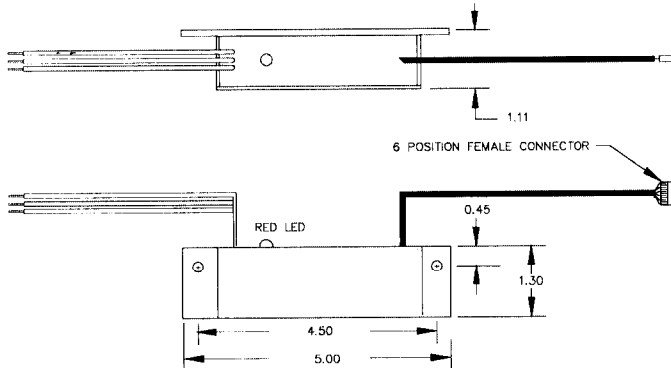
Part Numbers:

- **57000:** AASC Controller with 5' sensor lead
- **57000-EL:** AASC Controller with 10' sensor lead
- **57011:** AASC-R Remote Mounted Controller (5')
- **57001:** AASC Combination Sensor (0°F Offset)
- **57002:** AASC Combination Sensor (5°F Offset)
- **57003:** AASC Combination Sensor (10°F Offset)
- **57015:** AASC Combination Sensor (Adj. Offset)
- **57012:** TM4 Remote Frame Temp. Sensor
- **57013:** Magnetic Remote Frame Temp. Sensor
- **57010:** Cable, Sensor Extension (10')
- **57038:** Thermal Grease Packet, Individual
- **57009:** Thermal Grease Tube
- **57030:** Elapse Hour Meter (115 VAC)
- **40193:** Connector Punch-Down Tool (Jaguar)
- **57040:** Loose Six Position Sensor Connector
- **41111:** Bag of 25 UR Crimp Connectors
- **57036:** AASC Installation and Service Manual
- **57037:** Reach-In Fixture Retrofit Kit:
 - 57000-EL AASC Controller with 10' lead
 - 57015 Combination Sensor with Adj. Offset
 - 57013 Magnetic Remote Frame Sensor
 - 57038 Thermal Grease Packet
- **57039:** Remote Mount Retrofit Kit:
 - 57011 AASC-R Remote Mount Controller
 - 57015 Combination Sensor with Adj. Offset
 - 57038 Thermal Grease Packet

SECTION B: SPECIFICATIONS

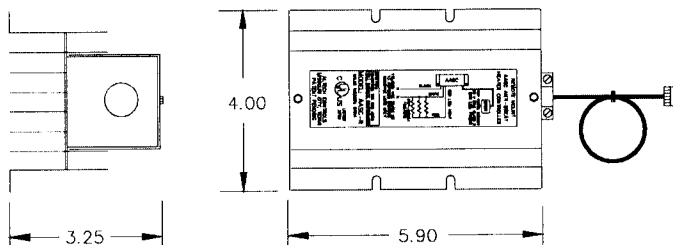
AASC Controller Specifications:

Ambient Temperature:	0 to 100°F
Ambient Humidity:	0-100%
Controller Voltage	100-240 VAC
Maximum Current:	13 Amps
Power Leads:	13" Long
Sensor Cable:	60" (120" for 57000-EL)
Weight:	0.6 lbs.
UL	Recognized



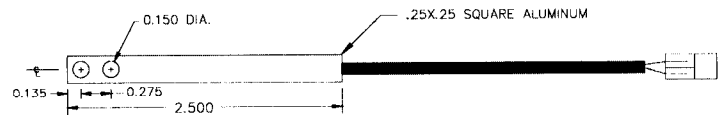
AASC-R Remote Mount Controller Specifications:

Ambient Temperature:	0 to 100°F
Ambient Humidity:	0-100%
Controller Voltage	100-240 VAC
Maximum Current:	13 Amps
Power Leads:	13" Long
Sensor Cable:	57"
Weight:	2.1 lbs.
UL :	Listed



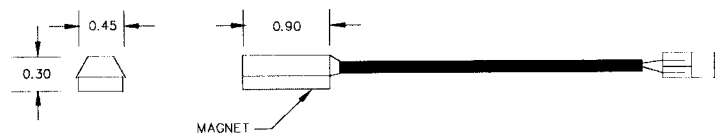
TM-4 Remote Frame Sensor Specifications:

Part Number:	57012
Temperature:	0 to 120°F
Sensor Cable:	120"
Weight:	0.2 lbs.



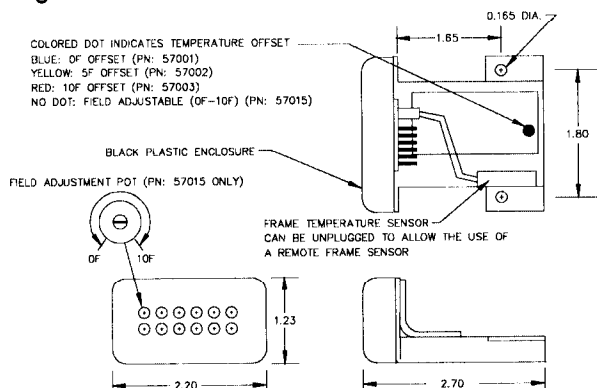
Magnetic Remote Frame Sensor Specifications:

Part Number: 57013
Temperature: 0 to 120°F
Sensor Cable: 120"
Weight: 0.2 lbs.



Combination Sensor Specifications:

Ambient Temperature: 40 to 100°F
Ambient Humidity: 0-95% (Non-condensing)
Weight: 0.1 lbs.



SECTION C: OPERATION

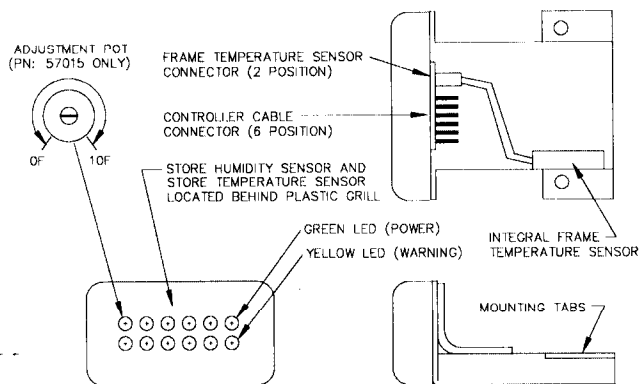


Figure C-1: AASC Combination Sensor

The AASC Combination Sensor contains all the sensing elements for operation of the AASC Controller. It contains the store temperature and humidity sensors used to determine the store dewpoint. It also includes an integral frame temperature sensor that can be used as the feedback element for the AASC controller. It also includes two LED's that provide insight into the AASC operation.

Green LED (Power):

- Indicates that power is being supplied to the Combination Sensor by the AASC controller.
- The LED will stay on even if the heaters are turned off by the AASC controller.

Yellow LED (Warning):

- Indicates that the frame sensor is either much higher or lower than the setpoint.
- This LED will be on if any of the three sensors has failed or is not connected.
- When a controller is first put into service this LED may be on until the frame has a chance to stabilize at the correct temperature.

Adjustment Pot:

- Available on only PN: 57015. It allows the offset to be adjusted from 0°F to 10°F. The other sensors have fixed offset settings.
 - 57001: 0°F Fixed Offset (Blue Dot)
 - 57002: 5°F Fixed Offset (Yellow Dot)
 - 57003: 10°F Fixed Offset (Red Dot)

Integral Frame Temperature Sensor:

- Temperature sensor is bonded to the corner of the bracket and depends on the mounting tabs to be thermally secured to the frame to get an accurate measurement.
- If the location of the combination does not well represent the coldest part of the frame, then a remote frame temperature sensor can be used by disconnecting it from the two position frame sensor connector.

Frame Temperature Sensor Connector:

- Two position connector for the frame temperature sensor.

AASC Controller Connector:

- Six position connector from AASC controller.

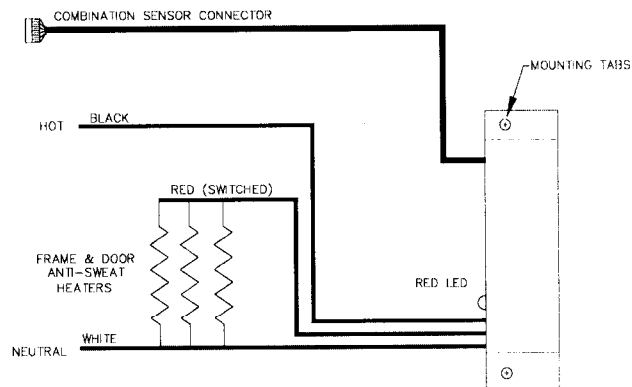


Figure C-2: AASC Controller

The AASC Controller receives the sensor information from the Combination Sensor and determines if the anti-sweat heaters are to be energized via the internal solid-state switch. The heaters are controlled in a 10 second duty cycle. The "Percent ON" will be varied from 0 to 100% based on the perceived need for heat. The duty cycle control helps reduce temperature swing of the frame and prolongs the life of the heaters.

The AASC Controller needs to be mounted in an electrical enclosure suitable for line voltage wiring and also needs to be mounted in thermal contact with a heat sink capable of removing the heat generated by the current passing through the controller to the anti-sweat heaters. The AASC-R Remote Mounted Controller has the AASC Controller mounted in a NEMA1 rated enclosure and that has an integral heat sink.

Red LED (Heaters Energized):

- Indicates that power is being supplied to the anti-sweat heaters.

Combination Sensor Cable:

- Cable is routed to the Combination Sensor.
- If disconnected, the anti-sweat heaters will be energized 100%.

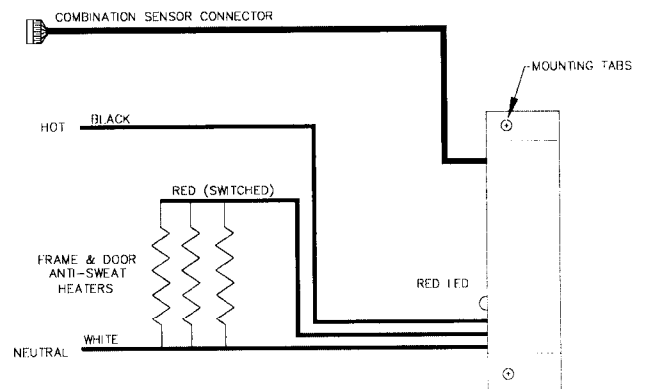
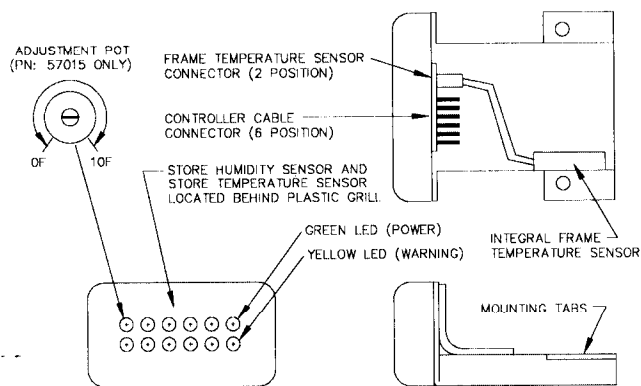
Mounting Tabs:

- Controller must be secured to a heat sink (minimum of 32 sq-in).
- Heat sink compound is required between controller and heat sink.

Line Voltage Leads:

- Black: 115/208/240 VAC hot wire
- White: 115/208/240 VAC Neutral wire
- Red: Switched lead for anti-sweat heaters. Note: Do not short red lead to ground. Permanent damage to the AASC Controller can result!

SECTION D: SERVICE



AASC Problem Diagnostics:

Determine which of the following conditions applies.

1A. Only Green LED is ON and frame is not sweating:

Indicates normal operation

1B. Only Green LED is ON and frame is sweating at the AASC sensor:

Indicates one of the following conditions:

- A: The AASC Combination sensor is not properly secured to the frame
- B: The amount frame heat is insufficient to prevent sweating
- C: The AASC Combination sensor is defective and should be replaced

Hint: Suggest swapping the sensor with one from a properly functioning controller to verify if the sensor is defective.

1C. Only Green LED is ON and frame is sweating in locations away from the AASC sensor but not at the AASC sensor:

Indicates one of the following conditions:

- A: The version of the AASC Combination sensor being used has the wrong offset for the application.
- B: The application needs a remote frame sensor located in a location that is colder than the
- C: A remote frame sensor is not installed correctly or in the right location.
- D: The amount frame heat is insufficient to prevent sweating
- E: A frame or door heater has failed.
- F: A door gasket is not sealing correctly.
- G: The AASC Combination sensor assembly is defective and should be replaced.

Hint: Suggest swapping the sensor with one from a properly functioning controller to verify if the sensor is defective.

2A: Neither the Green nor the Yellow LED's are ON and frame is sweating at the AASC sensor:

Indicates one of the following conditions:

- A: No power to the controller (Klixon, defrost or circuit breaker has power off to the frame heaters.
- B: The connection between the AASC controller and the Combination sensor is defective.
- C: AASC Controller has failed (replace controller). Verify that controller has a properly sized heat sink.

2B: No Green or Yellow LED indication and frame is warm and not sweating:

Indicates one of the following conditions:

- A: The connection between the AASC controller and the Combination sensor is defective.
- B: The AASC controller has been bypassed.

3A: Both the Green and Yellow LED's are both ON and the frame is sweating at the AASC sensor

Indicates one of the following conditions:

A: The amount frame heat is insufficient to prevent sweating

B: A frame heater has failed.

C: The AASC sensor assembly is defective and should be replaced.

Hint: Suggest swapping the sensor with one from a properly functioning controller to determine if the sensor is defective.

D: The controller is defective. Check the red LED on the AASC controller. The heaters should be energized when the controller's Red LED is ON.

Notes: Shorting the controller's red lead to ground can damage the controller's internal solid state switch and cause the heaters not to be energized.

3B: Both the Green and Yellow LED's are both ON and the frame is warm at the AASC sensor

Indicates one of the following:

A: The AASC sensor's frame sensor is not connected to the AASC sensor board. (Verify the two position frame sensor connection to the AASC sensor board.)

B: The AASC sensor assembly is defective and should be replaced.

Hint: Suggest swapping the sensor with one from a properly functioning controller to determine if the sensor is defective.

C: The controller is defective. Check the red LED on the AASC controller. The heaters should be energized only when the controller's red LED is ON.

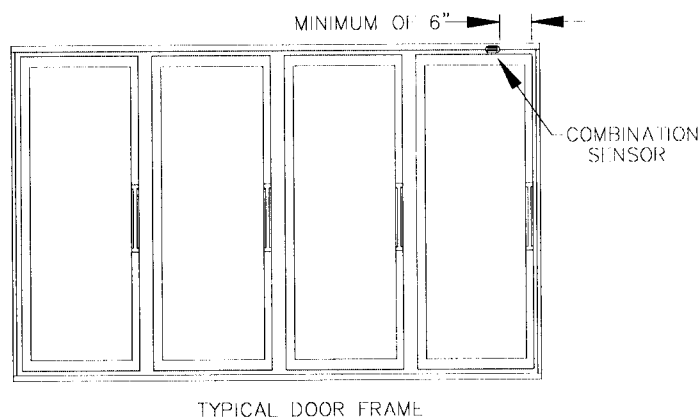
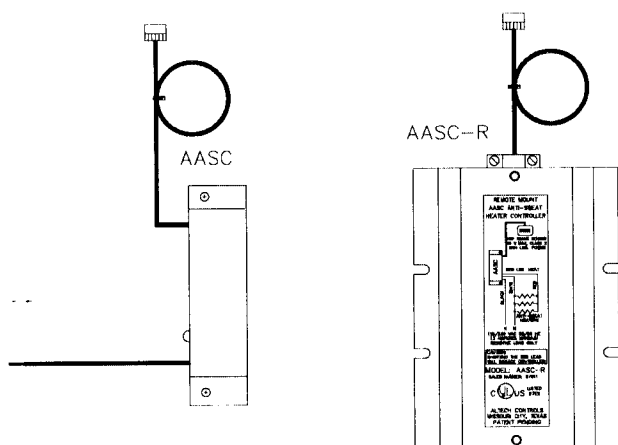
Notes: Shorting the controller's red lead to ground can damage the controller's internal solid state switch and cause the heaters to stay energized.

4: Only the Yellow LED is ON:

Indicates that the AASC sensor assembly is defective and should be replaced.

Hint: Suggest swapping the sensor with one from a properly functioning controller to determine if the sensor is defective.

SECTION E: INSTALLATION



AASC INSTALLATION:

Recommended Tools and Instruments:

- Digital voltmeter
- Non-contact voltage detector
- Amp probe meter
- Portable drill with a 5/16" drill bit
- Tin snips
- Jaguar termination tool (Altech PN: 40193)
- Conduit / electrical installation tools

Recommended Extra Parts:

- Extra six position connectors (Altech PN: 57040)
- Wire nuts for #12 wire
- #8 screws for mounting AASC-R
- #8 screws for mounting Combination Sensor
- Conduit / connection parts
- Silicone sealer

Step 1: Select Controller Package and Location

There is only one version of AASC controller, but it comes configured three different ways:

- AASC (w/o enclosure & 60" cable)(57000)
- AASC (w/o enclosure & 120" cable)(57000-EL)
- AASC-R (w/ enclosure & 57" cable)(57011)

The AASC controller without an enclosure is normally used on Reach-In display fixtures where the controller can be mounted in the electrical raceway. The AASC-R includes a NEMA-1 enclosure and an integral heat sink. It is usually used on door frames mounted in the walls of walk-in coolers or freezers where a large electrical raceway is not provided.

Select a location where the power leads for the anti-sweat heaters are readily available. The controller can be used to control the heat in more than one frame if the total current is limited to 13 amps and the frames are fed from one circuit breaker and are serving the same refrigeration circuit.

The other selection criteria is the length of the sensor cable. Normally the Combination Sensor is located along the top of the door frame. The sensor cable should reach from the controller without splicing.

Step 2: Select Sensors & Locations

The AASC controller needs a frame temperature sensor to provide feedback for controlling the heaters. It is best if the sensor monitors the coldest exposed surface on the frame. Generally the coldest spot for frames installed in walk-in coolers or freezers is along the top rail of the frame. In contrast, reach-in display fixtures generally have the cold surface along the bottom rail. The differences in surface temperature often vary 10°F or more. Consequently, usually the Combination Sensor's integral frame sensor is satisfactory for most frames installed in cooler applications whereas a Remote Frame Temperature Sensor is usually recommended for reach-in display fixtures. The Combination Sensor's offset settings are intended to compensate for minor variations that occur in frame temperatures and should not be used to cover for known top to bottom gradients. If in doubt, it is suggested that surface temperature readings be taken over a typical frame, to determine the coldest spots.

The Combination Sensor usually recommended is the version with the potentiometer for adjusting the offset (PN: 57015). If the desired offset is known, then the versions with fixed offsets can be used.

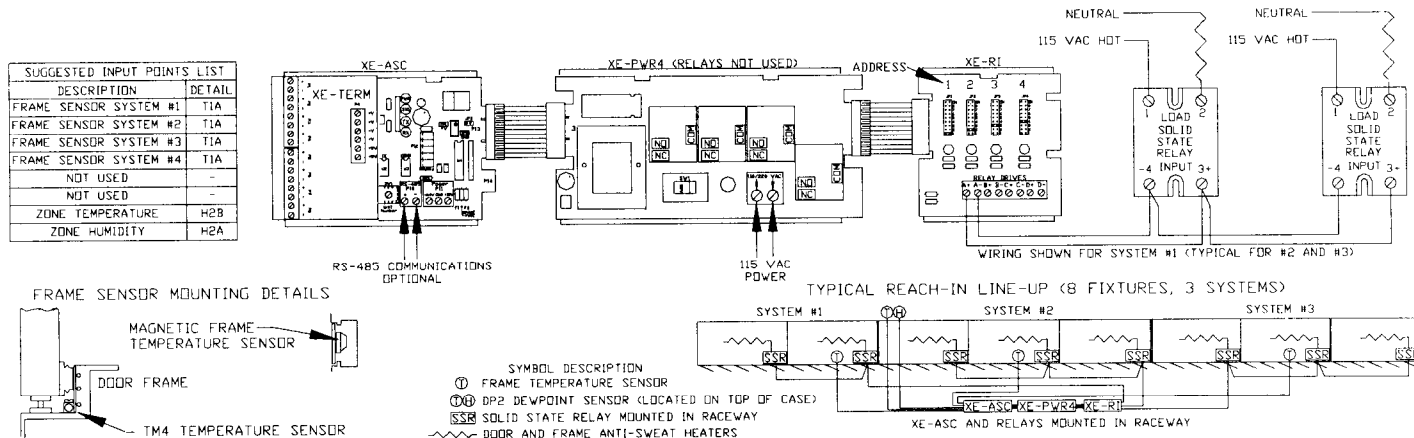
Generally the Combination Sensor is located along the top of the frame a minimum of 6" away from a door mullion. That location is desired because:

- The sensor will be less subject to damage
- The Sensor's LED's are readily visible.
- It is a good location for the integral frame sensor.

However, if a Remote Frame Temperature Sensor is going to be used instead of the integral frame sensor, other locations can also serve as well as long as they allow the sensor to measure store temperature and humidity.

SECTION F: ALTERNATE ANTI-SWEAT HEATER CONTROL APPLICATIONS

XE-ASC ANTI-SWEAT HEATER CONTROL; RACEWAY INSTALLATION:



GENERAL INFORMATION:

The XE-ASC controller is part of Altech Controls XPRT Eagle controllers. The XE-ASC can control the anti-sweat heaters for a line-up of reach-in display cases as shown in the diagram above. It determines the dewpoint of the store and then pulse-width modulates the heaters to maintain the measured frame temperature above the dewpoint. The controller controls the heaters for up to four refrigeration systems, each with multiple cases. It also has the added benefit of automatically collecting heater ON times and has the ability to communicate the status and savings as required.

XE-ASC Features/Benefits:

- Frame temperature sensor feedback automatically compensates energy usage for the fixture temperature and the store dewpoint.
- Pulse-width modulated output reduces heater stress and maintains more uniform frame temperature.
- Slim self-contained design allows the installation to be primarily limited to the raceway, greatly reducing installation costs.
- Factory default settings reduce field setup time.
- Built-in runtime accumulators monitor heater ON time which helps verify ROI.
- Standard RS-485 communication port allows for remote monitoring if desired.

ORDERING INFORMATION:

55020	XE-ASC Anti-Sweat Heater Controller
55020-S	XE-ASC Configured for SweatMiser Retrofit
52174	XE-PWR4: Power Supply; 115/230 VAC In; 4 Relays
52173	XE-RI: Relay Interface Board
54001	Solid State Relay, 20 Amp; 24 VDC Input
52041	XE-TERM: Plug-On Input Terminal Board For XE-IO
54000-18	Mounting Track; 18" Long
54005	TM-4 Temperature Sensor (square 0.25")
57013	Magnetic Frame Temperature Sensor
53002	DP2 Dewpoint Sensor
54002	Cable, Accessory, 3" Long

IC Frame Temp 1 (F):	54.4
FF Left Frame Temp (F):	55.7
IC Frame Temp 2 (F):	55.7
FF Right Frame Temp (F):	56.6
Dewpoint Calc (F):	47.8

XE-ASC Status

The default status screen presents the current frame temperatures and the zone dewpoint. If more detailed information is required, select the Detailed Status Screen.

Anti-Sweat Control Status:			
Dewpoint Calc (F): 57.7			
Relay Combinations:			
PID Status:	FF Left Heater Ctrl (S): 71	FF Right Heater Ctrl (S): 85	FF Right Heater Ctrl (S): 85
IC Heater Ctrl (S): 100	FF Left Frame Temp (F): 61.0	IC Frame Temp 2 (F): 61.2	FF Right Frame Temp (F): 59.9
IC Frame Temp 1 (F): 56.0	Heat Sink Temp 2 (F): 75.9	Zone Temperature (F): 59.0	Zone RH (%): 57
Heat Sink Temp 1 (F): 176.1	Output Status:	ASC 3 Fz Heat Heater: ON	ASC 4 FF Right Heater: ON
ASC 1 IC Heater: ON	ASC 2 FF Left Heater: ON	ASC 3 Fz Heat Heater: ON	ASC 4 FF Right Heater: ON

XE-ASC Detailed Status

Additional information is provided in this screen:

- Zone Dewpoint:** Calculated from the measured Zone Temperature and Zone Relative Humidity.
- PID Status:** Each PID controls one of the Relay Outputs. It's value is fed to the Duty Cycle function which controls the amount of time the Relay Outputs are "ON".
- Input Values:** Current values of the analog inputs.
- Output Values:** Current status of the Relay Outputs.

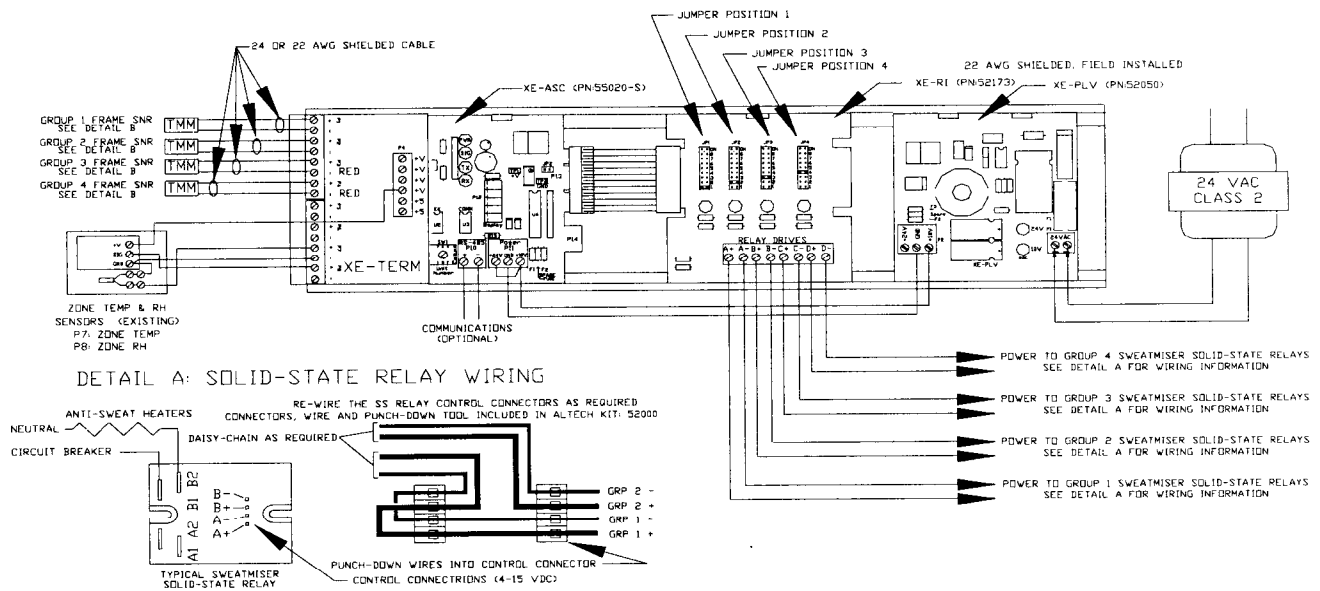
Input Function Select:	Relay 1s ASC 1 IC Heater	Accumulated On Time (H): 5108
Reset:	No Change	Date Reset (MM/DD/YYYY): 4/20/2007
Runtime 2:		
Input Function Select:	Relay 2s ASC 2 FF Left Heater	Accumulated On Time (H): 4063
Reset:	No Change	Date Reset (MM/DD/YYYY): 4/20/2007
Runtime 3:		
Input Function Select:	Relay 3s ASC 3 Fz Heat Heater	Accumulated On Time (H): 3010
Reset:	No Change	Date Reset (MM/DD/YYYY): 4/20/2007
Runtime 4:		
Input Function Select:	Relay 4s ASC 4 FF Right Heater	Accumulated On Time (H): 2976
Reset:	No Change	Date Reset (MM/DD/YYYY): 4/20/2007
Runtime 5:		
Input Function Select:	LV-2s Total Runtime	Accumulated On Time (H): 5277
Reset:	No Change	Date Reset (MM/DD/YYYY): 4/20/2007
Runtime 6:		
Input Function Select:	None	Accumulated On Time (H): 0
Reset:	No Change	Date Reset (MM/DD/YYYY): 1/7/1984

XE-ASC Runtime

To help verify savings, each of the Relay Outputs has it's On Time recorded in total hours since it was last reset. The total time since the last reset is stored in Runtime 5. The date the last reset is also recorded. To reset the runtime change the value next to Reset from "No Change" to "Reset"

Note: If the date stored in the XE-ASC is not correct, the date and time can be changed in the "Read All" screen.

SWEATMISER PANEL RETROFIT



SweatMiser Overview:

The SweatMiser panel controls all its solid-state relays using one fast duty cycle. It utilizes user defined parameters to set a reset schedule whose percentage ON is based on the measured dewpoint of the store. The problems with the SweatMiser approach are:

- It controls all the fixture heaters based on the one that that requires the most. Consequently, it can not take advantage of the savings that can be made due to variations in heat requirements resulting in differences in fixture temperatures or differences in frame construction.
- It does not utilize any frame temperature feedback. It instead requires the serviceman to guess the proper parameters. This guessing process normally results in conservative estimates that prevent sweating and normally greatly reduce the savings.
- The SweatMiser controller only provides an instantaneous indication of savings. It does not provide a means for determining savings of a period of time that would allow verification of operation the 99.9% of the time a serviceman is not on site.

SweatMiser Retrofit Overview:

If a store has a SweatMiser panel, significant additional energy savings can be achieved by replacing the SweatMiser electronic controller with the XE-ASC controller and feedback frame temperature sensors from selected master frames. The cost of the retrofit is minimized by utilizing the SweatMiser's solid-state relays and most of the labor required to feed anti-sweat heaters from dedicated electrical circuits.

SweatMiser Retrofit Procedure:

The retrofit consists of the following steps:

- Determine which of the SweatMiser's electrical circuits have similar frame and fixture temperatures. The XE-ASC can handle up to four different groups.
- Select a frame in each grouping to act as the master frame.
- Route a shielded cable to each master frame and mount a frame sensor. Typically this will be along the frames bottom rail of a reach-in fixture and on the frame's top rail for walk-in coolers and freezer applications. See the sensor mounting locations recommendations.
- For maximum reliability, it is recommended that the SweatMiser's store temperature and store humidity sensors be replaced with the DP2 Dewpoint Sensor.