

IMPORTANT INSTRUCTIONS - SAVE THESE INSTRUCTIONS

Read all instructions before installing or using the heater. Please adhere to instructions published in this manual. Failure to do so may be dangerous and may void certain provisions of your warranty.

Energy Management System (EMS)

Installation & Operation Manual

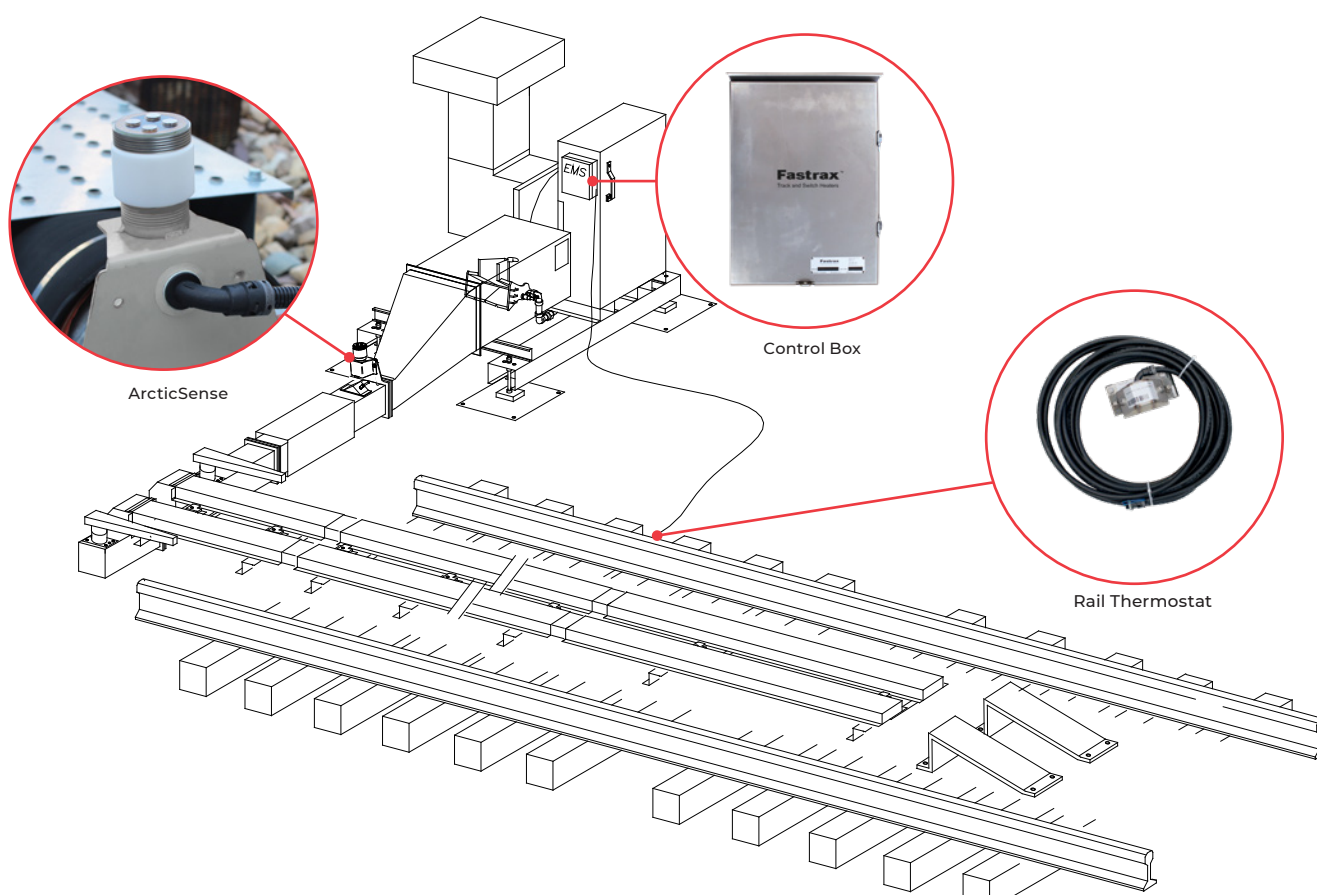


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A. ENERGY MANAGEMENT SYSTEM OVERVIEW

A.1 Overview

1. The Energy Management System (EMS) allows automatic control of a railway switch heater. It detects moisture and senses ambient, and rail temperature, turning the heater on when it snows and the rail is cold.
2. The EMS provides an aggressive retry for heaters equipped with the appropriate remote Flame Safety Relay reset.
3. The EMS provides a low temperature cut out feature for use with propane fired heaters that do not have tank heaters and are located in cold environments where the temperature drops below -30°C (-22°F) to avoid nuisance shutdowns due to insufficient vapour pressure.
4. There are two EMS versions, 17255-01 comes with a precipitation sensor, ambient temperature sensor, rail thermostat, and control box, as shown. Whereas version 17255-02, does not include the rail thermostat.



Control Box



Rail Thermostat



ArcticSense
Precipitation Sensor

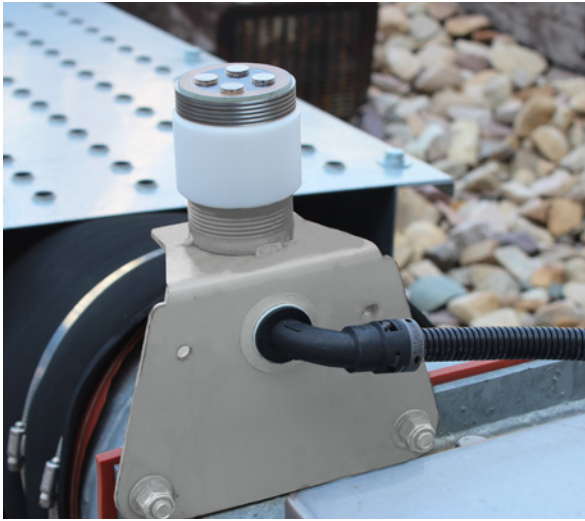
B. EMS INSTALLATION

B.1 Mounting EMS Control Box

1. Mount the EMS control box in a convenient location on, or next to, the heater.

B.2 Mounting Precipitation Sensor

1. Mount the ArcticSense precipitation sensor on the sensor duct flange, where it will be exposed to snow and be in the heated zone. Slotted mounting holes facilitate attachment to the flange bolts in any of 2 position. Select the position that is most likely to be exposed to drifting snow.



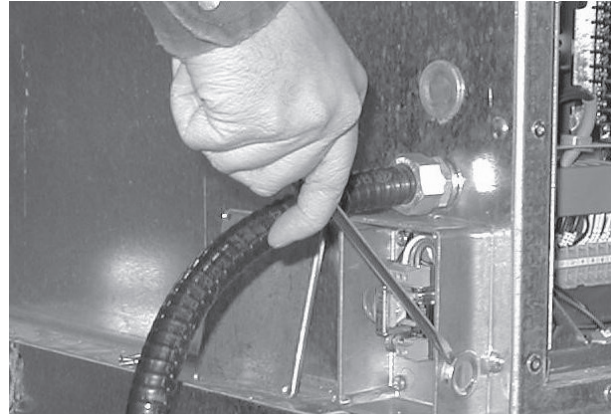
B.3 Mounting Rail Thermostat

1. Mount the rail thermostat on the field or gage side of the stock rail ahead of the points and tie duct, as shown. Select a location shaded from the sun. Provide strain relief in the cable, by leaving adequate slack, as shown, to allow for rail pumping.

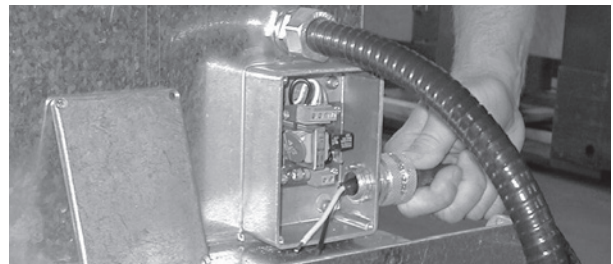
Remove the yellow shim washers when installed on 115 lb rail or lighter. Loosen the two mounting bolts and attach the rail thermostat to the rail flange by tapping it on with a hammer. Once in place tighten mounting bolts to maximize grip.



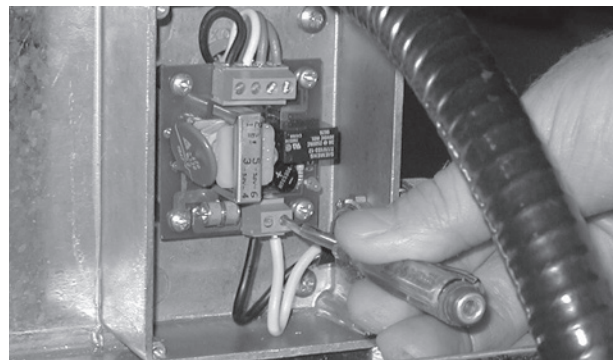
2. Remove the four (4) Phillips screws, the cover, and the plug from the hole in the rail temperature surge



protection box.



3. Pass the two (2) wires from the rail temperature sensor through the hole, install the locknut and tighten.
4. Insert, one each of the bared wires into the two

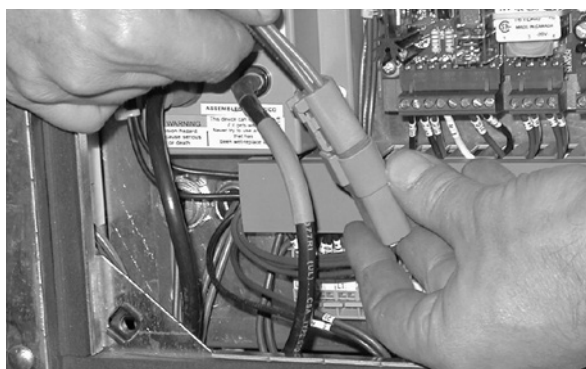


terminals on the surge suppression circuit board, and tighten. There is no polarity.

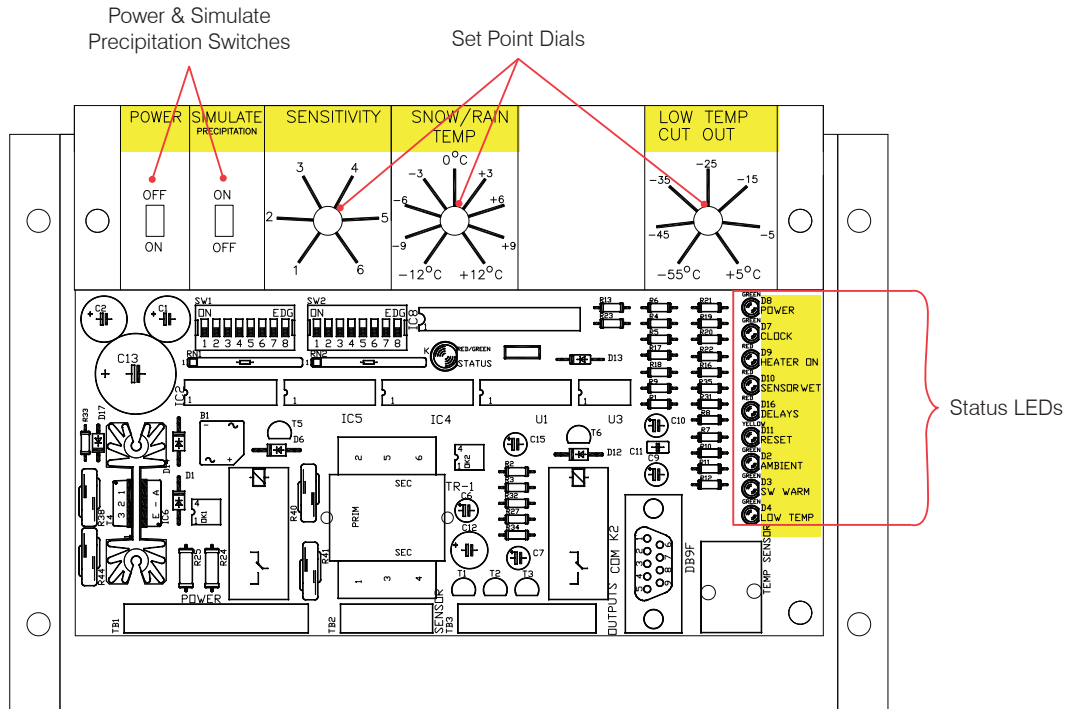
5. Replace the cover, tighten the four (4) Phillips screws.



6. Connect the surge isolator two pin connector with the mating plug located inside the electrical component area, hanging immediately under the DSI.



C. ELECTRICAL CONNECTIONS OVERVIEW



CAUTION. Disconnect heater from power supply at integral disconnect or fuse box before opening closures or servicing heater.

Lock the switch in the “OFF” (open) position and tag the switch to prevent unexpected power application.

This heater should only be serviced by qualified personnel with electrical heating equipment experience.

Install and use the heater in accordance with local codes and this Owner’s Manual.

NOTE: Refer to schematic inside door for electrical connections.

C.1 Power

Connect 120V power to terminals 1 and 3, and ground wire to ground stud.

C.2 Control

Connect heater control to terminals 9 and 8, (Normally Open, NO) or 9 and 7 (Normally Closed, NC).

C.3 Alarm Indication

1. A 120Vac Alarm signal from the heater can be used to trigger the aggressive retry feature of the EMS.
 - 1.1 Connect the Alarm Neutral terminal 6 to the neutral in the heater. Connect the Alarm signal (120Vac) from the heater to terminal 5 on EMS.
 - 1.2 On a MARK VI heater the alarm signal is available directly on the “ALARM” relay coil, contact A1.
 - 1.3 On a MARK VII heater connect the alarm signal to either Terminal Block 1 terminal 1 or to the “ALARM” relay terminal 2.

- 1.4 On a Micro heater the signal is available at the “ALARM” relay terminal 9.

NOTE: YARDMASTER heaters do not require this connection. The aggressive retry feature is integrated into the YARDMASTER controller.

C.4 Aggressive Retry

1. If the heater you are controlling is equipped with a flame safety relay reset module, connect the reset to the appropriate terminals 14 and 13 (NO). If the heater is equipped with Direct Spark Igniter connect the reset normally closed contact, terminals 12 and 14, into the wire to the request relay.

NOTE: YARDMASTER heaters do not require this connection. The aggressive retry feature is integrated into the YARDMASTER controller.

- 1.1 Turn on power at electrical service. Ensure 5 amp panel breaker is closed.

C.5 Operation and Adjustments

1. **Set Point Dials:** The EMS board (15919) monitors environmental conditions based on various set points. All set points are easily adjustable by dials located at the top of the EMS board. These set points, when triggered by environmental conditions, send out a signal to the controller to turn the heaters on.
 2. **Power Switch and Moisture Simulation Switch:** The power switch and a moisture simulation switch enable resetting or disabling the EMS and aid in troubleshooting.
- LED Lights:** On the right side of the EMS board there are a number of LED lights which indicate the status of the EMS board.

C.6 Switches & Dials

1. 'POWER ON/OFF'
This allows you to turn OFF/ON the EMS. This switch is also used to reset the EMS in case of a lockout. Four alarms from the heater within less than 5 minutes.
 2. 'SIMULATE PRECIPITATION ON/OFF'
This is normally OFF. To simulate moisture (snow or rain) you can switch it ON and the EMS receives a signal the sensor is wet. Used to test and troubleshoot the EMS.
 3. 'SENSITIVITY'
This knob is used to adjust the sensitivity of the precipitation sensor. 6 is maximum sensitivity and 1 is least sensitive. Factory set at 3.5.
 4. 'SNOW-RAIN TEMP'
Adjustable set point, from -12°C to 12°C (10°F to 54°F). If the ambient temperature is below this set point, the EMS sees any moisture as snow and will turn the heater ON. Above this set point it detects rain and will not turn on the heater.
 5. 'SWITCH WARM TEMP'
This set point is not used with this EMS. This feature is used only with the intermediate EMS.
 6. 'LOW TEMP CUT OUT' 5°C to -55°C (41°F to -67°F)
This set point determines the temperature at which the heater will be turned OFF. Usually set to -35°C (-31°F).
- NOTE:** Propane gas does not provide adequate vapour pressure below -40°C/F. By disabling the heater at temperatures below the set point, alarm shutdown and manual resets are avoided.
- NOTE:** Natural gas fired heaters or propane tanks with tank heaters DO NOT require this feature and the set point can be lowered to the minimum of -55°C (-67°F).
7. 'DELAY ON', 'DELAY OFF' DIP SWITCHES ON THE BOARD



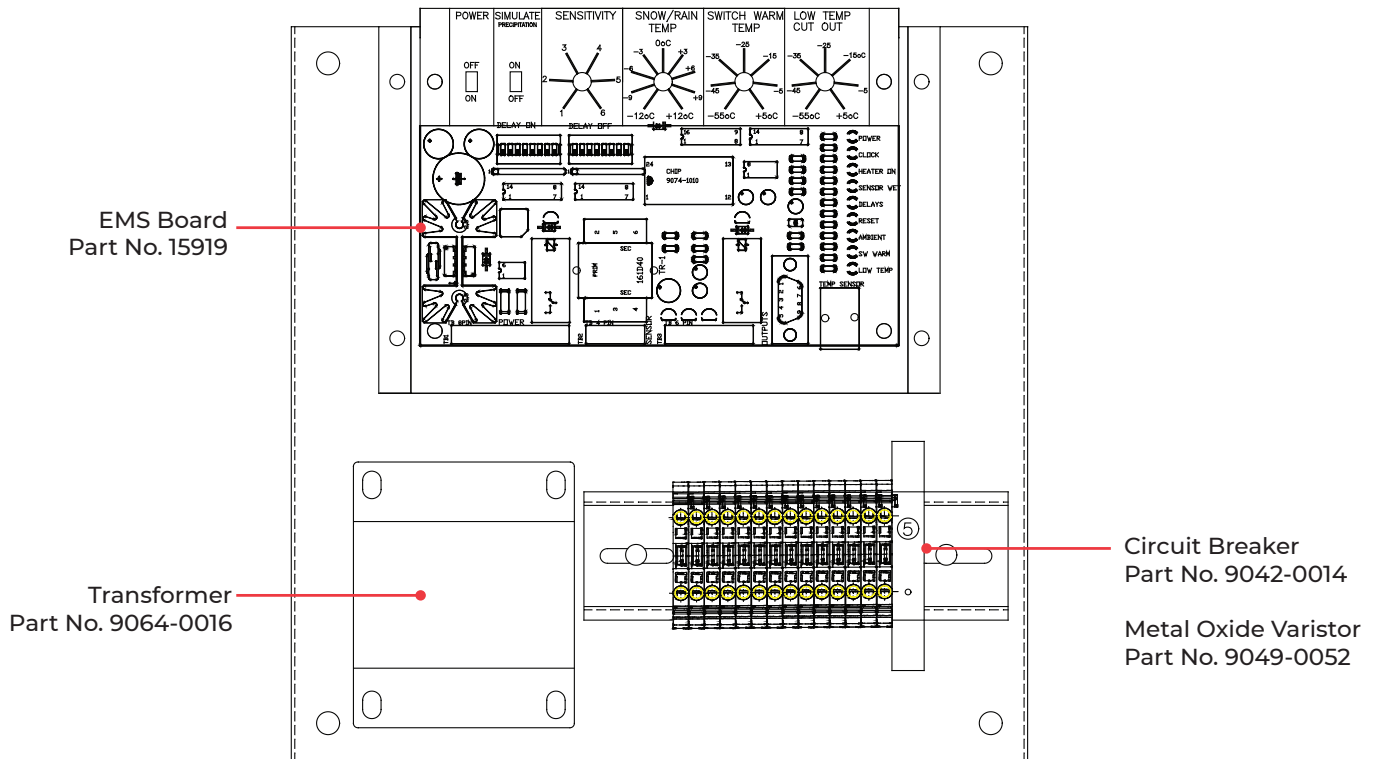
These switches are used to set the DELAY ON and DELAY OFF times for EMS operation. The value of the time is calculated by adding the binary code value of the actual switch. Minimum step is one minute. The values are 1, 2, 4, 8, 16, 32, 64, and 128 and any combination between, and up to 255 minutes. Example shown has 5 minutes delay on and 15 minutes delay off.

8. Heaters equipped with the 'AGGRESSIVE RETRY OPTION'
If the heater is equipped with the AGGRESSIVE RETRY OPTION, the EMS will reset the heater up to three times within 5 minutes and then lock out.

C.7 Status LEDs

Status LED	Description
POWER	Indicates 12V DC present on the board
CLOCK	Blinking once a second means clock is working
HEATER ON	Heater relay is energized. Heaters requested to run
SENSOR WET	Indicates when the sensor is wet or simulated wet
DELAYS	Shows Delay Status: <ul style="list-style-type: none"> Dark: No delay time active Lit: Delay time active. Either delay off or delay on time <ul style="list-style-type: none"> If 'HEATER ON' LED is dark - delay on time If 'HEATER ON' LED is lit - delay off time Blinking: Delay time reset to zero
RESET	Relay to reset flame safety relay. (Aggressive retry)
AMBIENT	Ambient temperature is below SNOW/RAIN TEMP and sensor is wet
SW WARM	Ambient temperature is below SWITCH WARM set point (not available with this EMS)
LOW TEMP	Ambient temperature is below low temp cut out set point. EMS will turn the heater off. LED heater on is dark (heater on relay de-energized)

D. SPARE PARTS & DRAWINGS



ArcticSense, c/w 10' cable
13849-02



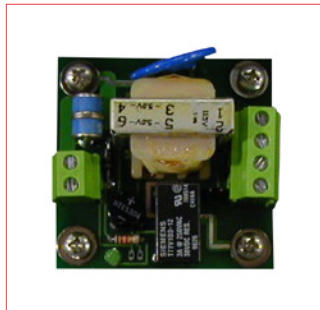
ArcticSense head only
13849-03



Rail thermostat c/w 40' cable
16442-03



Rail thermostat only, 13340-03
Enclosure only, 17895



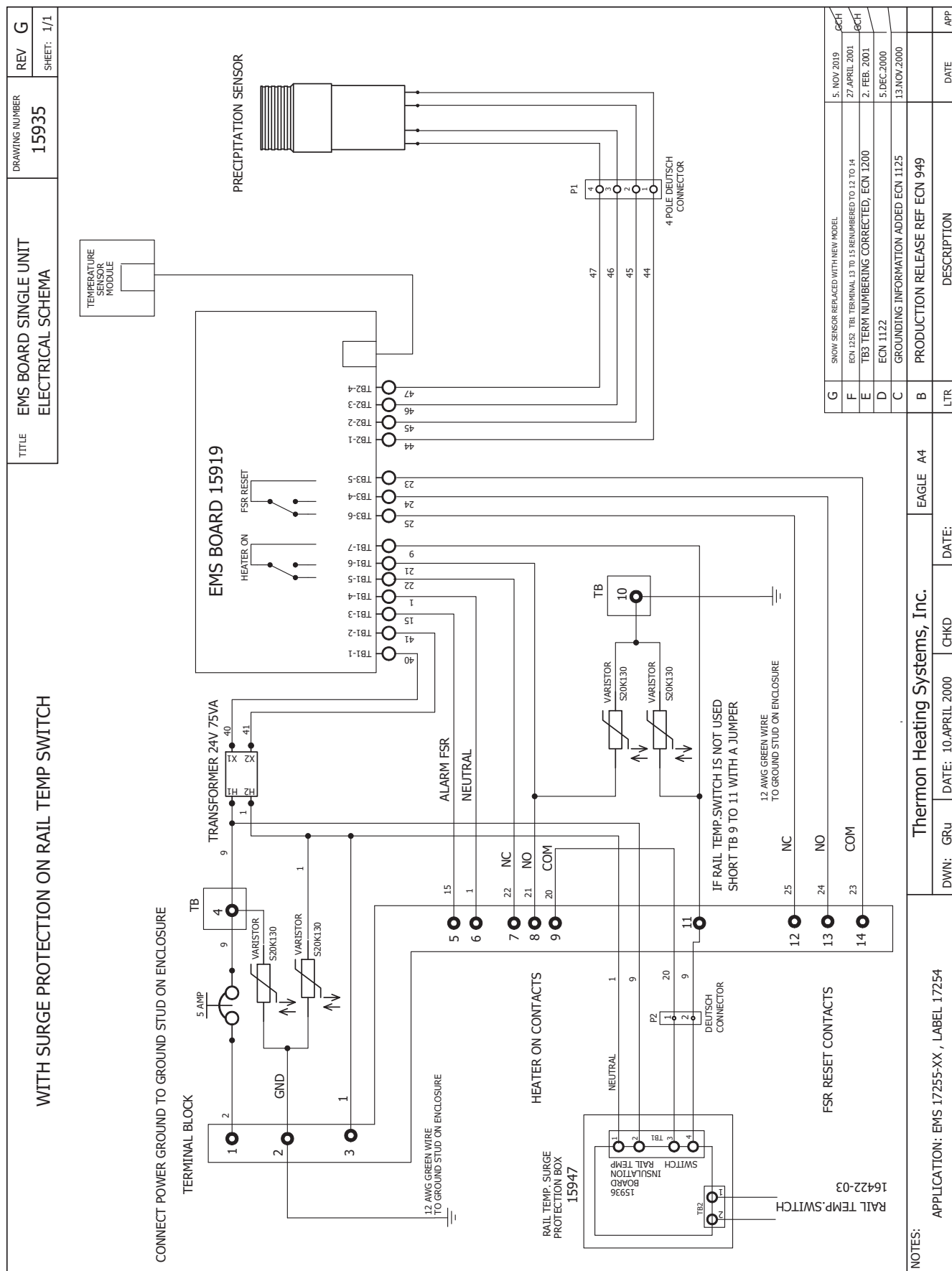
Rail thermostat surge isolator.
Replacement board only, 15948



Rail thermostat jumper
16422-02



Ambient temperature sensor
16426

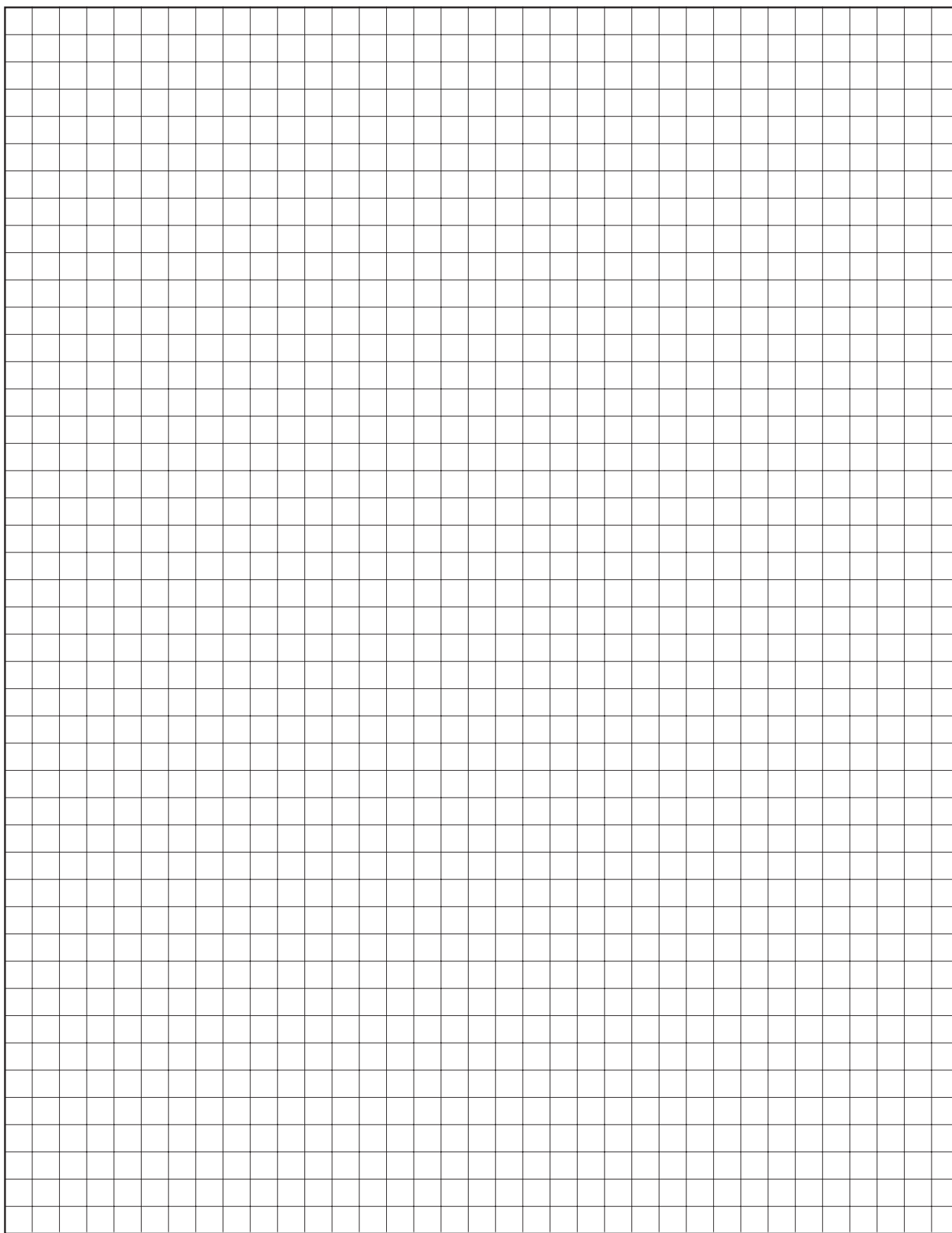


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NOTES





PLEASE ADHERE TO INSTRUCTIONS IN THIS MANUAL

Failure to do so may be dangerous and may void certain provisions of your warranty.

For further assistance, please call 1.855.244.3128

WARRANTY: Under normal use the Company warrants to the purchaser that defects in material or workmanship will be repaired or replaced without charge (from date of shipment) for a period of:

- 84 months - SwitchBlade® Heaters
- 60 months - DC Heaters
- 36 months - DC Control Panels
- 36 months - HELLFIRE Heaters, FEB Heaters
- 12 months - All other Fastrax® Products

Any claim for warranty must be reported to the sales office where the product was purchased for authorized repair or replacement within the contract terms.

Subject to State or Provincial law to the contrary, the Company will not be responsible for any expense for installation, removal from service, transportation, or damages of any type whatsoever, including damages arising from lack of use, business interruptions, or incidental or consequential damages.

The Company cannot anticipate or control the conditions of product usage and therefore accepts no responsibility for the safe application and suitability of its products when used alone or in combination with other products. Tests for the safe application and suitability of the products are the sole responsibility of the user.

This warranty will be void if, in the judgment of the Company, the damage, failure or defect is the result of:

- Vibration, radiation, erosion, corrosion, process contamination, abnormal process conditions, temperature and pressures, unusual surges or pulsation, fouling, ordinary wear and tear, lack of maintenance, incorrectly applied utilities such as voltage, air, gas, water, and others or any combination of the aforementioned causes not specifically allowed for in the design conditions
- Or, any act or omission by the Purchaser, its agents, servants or independent contractors which for greater certainty, but not so as to limit the generality of the foregoing, includes physical, chemical or mechanical abuse, accident, improper installation of the product, improper storage and handling of the product, improper application or the misalignment of parts.

No warranty applies to paint finishes except for manufacturing defects apparent within 30 days from the date of installation.

The Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the product(s).

The Purchaser agrees that all warranty work required after the initial commissioning of the product will be provided only if the Company has been paid by the Purchaser in full accordance with the terms and conditions of the contract.

The Purchaser agrees that the Company makes no warranty or guarantee, express, implied or statutory, (including any warranty of merchantability or warranty of fitness for a particular purpose) written or oral, of the Article or incidental labour, except as is expressed or contained in the agreement herein.

LIABILITY: Technical data contained in the catalog or on the website is subject to change without notice. The Company reserves the right to make dimensional and other design changes as required. The Purchaser acknowledges the Company shall not be obligated to modify those articles manufactured before the formulation of the changes in design or improvements of the products by the Company.

The Company shall not be liable to compensate or indemnify the Purchaser, end user or any other party against any actions, claims, liabilities, injury, loss, loss of use, loss of business, damages, indirect or consequential damages, demands, penalties, fines, expenses (including legal expenses), costs, obligations and causes of action of any kind arising wholly or partly from negligence or omission of the user or the misuse, incorrect application, unsafe application, incorrect storage and handling, incorrect installation, lack of maintenance, improper maintenance or improper operation of products furnished by the Company.