

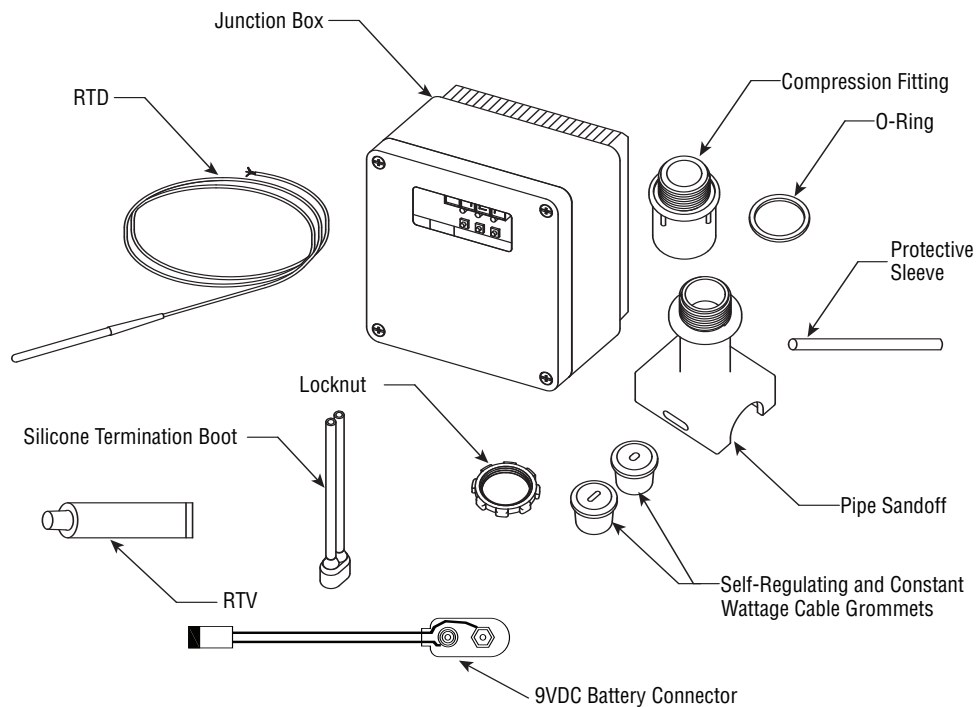
# Chromalox®

## Installation Instructions

### SERVICE REFERENCE

DIVISION 4	SECTION DTS
SALES REFERENCE (Supersedes PJ944-5)	PJ944-6
161-562581-049	
DATE	MARCH, 2012

## DTS-HAZ For Use With Self-Regulating & Constant Wattage Heating Cables



Description	Quantity
Junction box	1
Line/Ambient Sensing RTD	1
Compression Fitting	1
Locknut	1
Silicone Termination Boot	1
Pipe Standoff	1
RTV	1
O-Ring	1
Self-regulating Cable Grommet	1
Constant Wattage Cable Grommet	1
9 VDC Battery Connector	1
Protective Sleeve	1



### GENERAL

The DTS-HAZ is used for electrical termination of self-regulating and constant wattage cables. Each kit contains the terminations needed to make all electrical connections.

The DTS-HAZ digital thermostat kit is a microprocessor based temperature control and power connection kit used for freeze protection or

process temperature maintenance of pipes or tanks protected by heat tracing products. This thermostat can be used with Constant Wattage, Mineral Insulated or Self regulating heating cables in ordinary area or Div 2 hazardous area locations.

## INSTALLATION

Explanation of Symbols Used:

**⚠** Means **WARNING**.

**⏚** Means Earth (ground) terminal.

### ⚠ WARNING

**HAZARD OF ELECTRIC SHOCK. Disconnect all power before starting. All installations must be effectively grounded in accordance with the National Electrical Code to eliminate shock hazard.**

### ⚠ WARNING

**Turn off power before removing junction box cover at all times.**

### ⚠ WARNING

**Users should install adequate controls and safety devices with their electric heating equipment. Where the consequences of failure may be severe, back-up controls are essential. Although the safety of the installation is responsibility of the user, Chromalox will be glad to assist in making equipment recommendations.**

### ⚠ WARNING

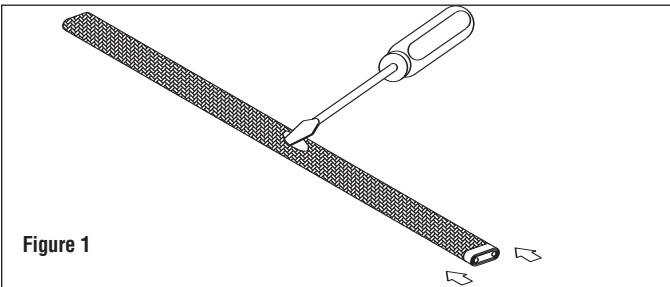
**A disconnect device and circuit breaker should be provided in the end installation. The installation and proximity for the disconnect device must satisfy the electrical Authority having jurisdiction for the installation. Branch circuit protection should be set for 40 amps or lower.**

### ⚠ WARNING

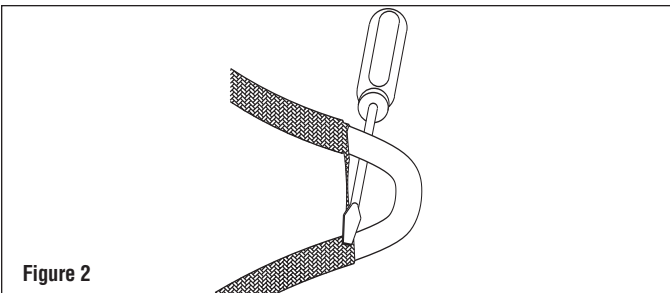
**In all cases where the ⚠ symbol is used on the product, consult the documentation to find out the nature of the potential hazard and any actions to be taken.**

Braid only cable instructions for SRL-C, SRF-C, SRM/E-C.  
CWM-C cable special instructions denoted by \*

1. For each cable, push braiding back from the end of the cable. 11 inches from cable end create a bulge. At the bulge, separate the braid to make an opening.

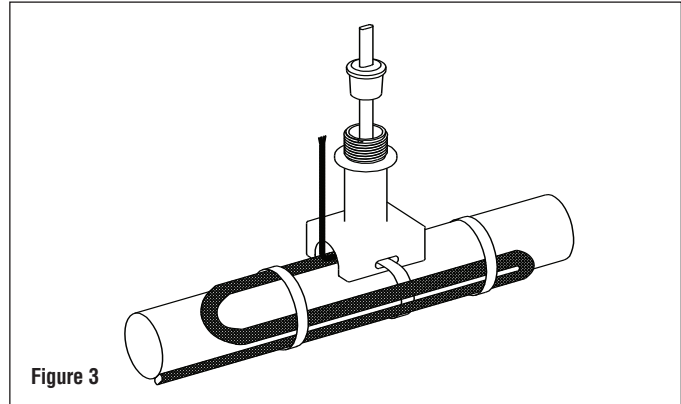


2. While bending the heating cable, work the cable through the braid opening. Pull the braid tight.

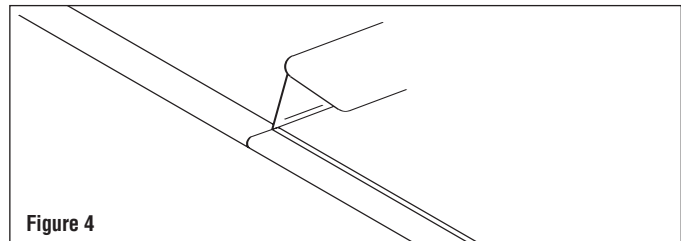


3. Insert cables and capillary tube through pipe standoff and grommet as shown. There should be 8 inches of cable past the grommets edge. Attach the pipe standoff to the pipe with a pipe strap

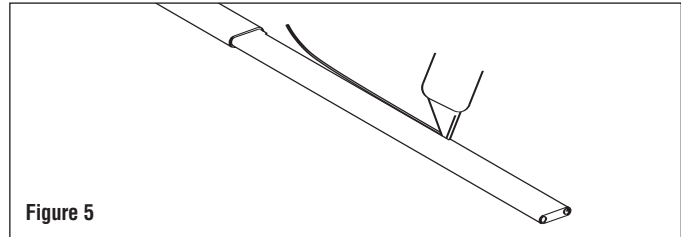
(Chromalox type PS not included) as shown. Leave braid of the cable outside of pipe standoff and connect to ground (grounding clamp not included). Tape cable to pipe as shown. Small slice will need to be cut in grommet to allow the RTD wire to exit the pipe standoff out the bottom. For pipes smaller than 1-1/2" dia. a small pipe adapter (Chromalox model SPA not included) is required.



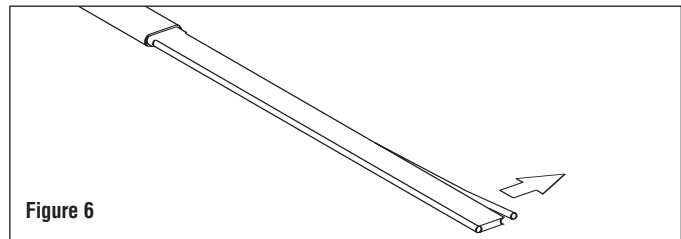
4. Score the inner insulation 7 inches from the end. Lightly cut the inner jacket up the center to end of heating cable and remove the inner jacket from the cable.



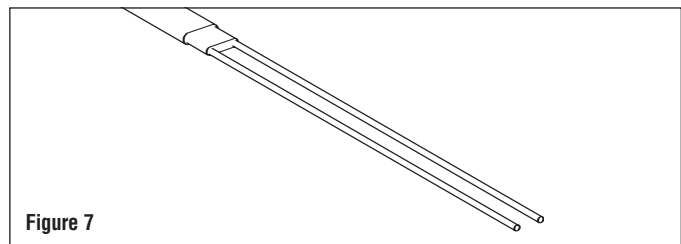
5. Shave the core material from the outside of each bus wire. \*Skip this step if using CWM-C constant wattage cable.



6. Starting at the end of the heating cable, using needle nose pliers or a knife pull each bus wire away from the core material. \*Separate CWM-C leads and strip 1/4" from each leadwire.



7. Remove the exposed core material and cut 1/4" off the end of each bus wire. \*Skip this step if using CWM-C constant wattage cable.



## INSTALLATION (cont'd.)

8. Liberally apply RTV over the exposed matrix and leads. Push the rubber boot over the heating cable. Trim lead ends as needed.  
\*Boot is not needed when using CWM-C constant wattage cable.

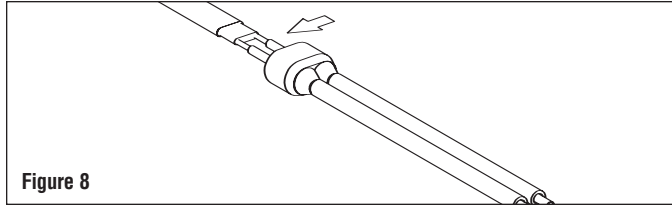


Figure 8

9. Slide compression fitting over cable. Grommet should be placed inside pipe standoff. Termination boot should be spaced 1/2" from sealing grommet. Tighten compression fitting until it bottoms out against pipe standoff.

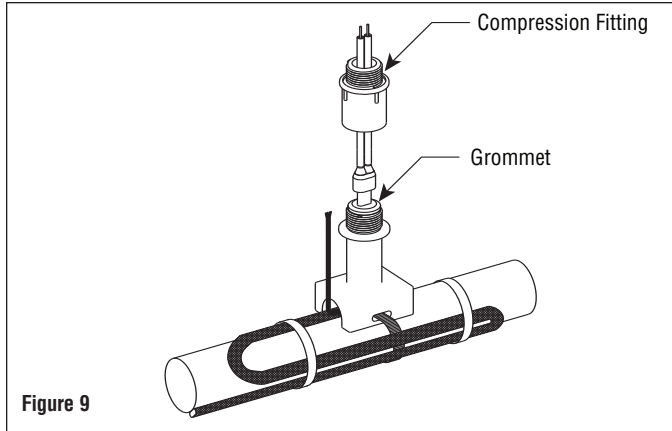


Figure 9

10. Assemble junction box to compression fitting as shown. Tighten locknut until the junction box bottoms out against the lip of the compression fitting.

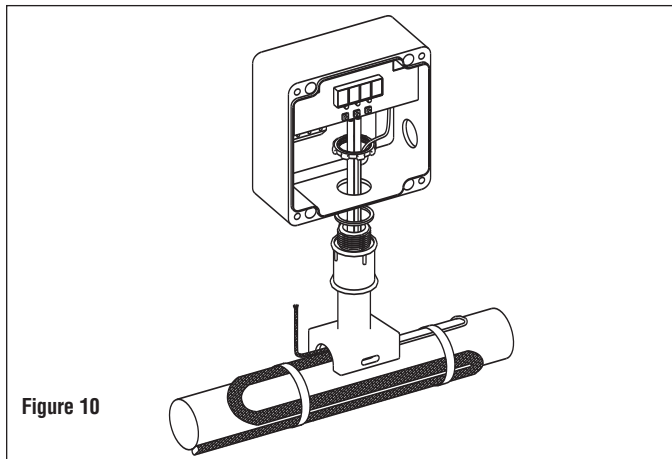


Figure 10

11. Attach 3/4" conduit hub. Please see the electric diagrams below for proper wiring for your application. Attach junction box cover to seal enclosure. **Note:** The conduit hub shall be listed for Class 1, Div. 2; Class II Div. 1 & 2, Class III, Div. 1 & 2, and 4X rated by a nationally recognized testing laboratory.

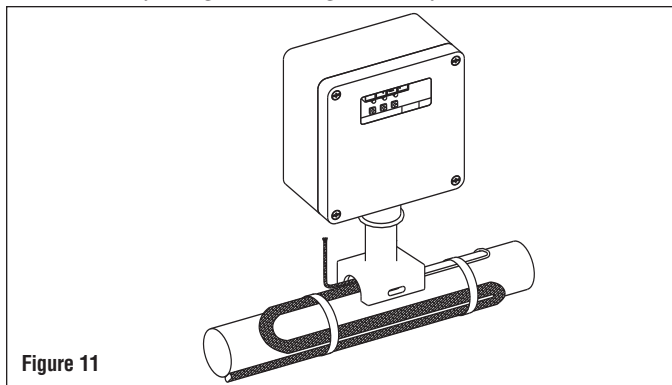


Figure 11

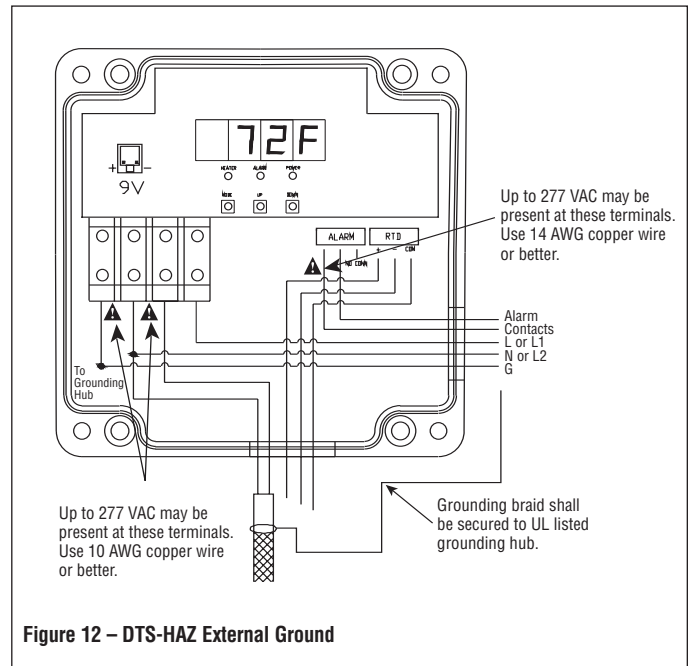


Figure 12 – DTS-HAZ External Ground

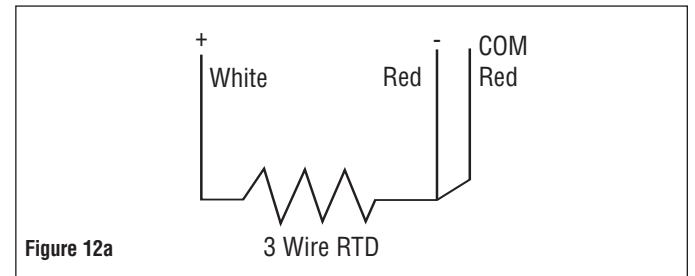


Figure 12a

### ⚠ CAUTION

**Be sure to install this device vertically as pictured in Fig. 10. This controller utilizes a heat sink which is designed to cool the unit during operation. Under no circumstance should air flow around the controller be compromised in any way. Failure to do so may result in the overheating of the controller, product failure, product temperatures which exceed the Hazardous Area maximum temperature limit and even fire.**

### ⚠ CAUTION

**Enclosure lid must be properly sealed prior to operating. Each of the four (4) screws are to be evenly tightened by hand with appropriate screw driver ONLY until snug. It is recommended that the lid be secured with a torque of 12-15 inch-lbs per screw. Overtightening or uneven tightening may cause the lid to break which would void all environmental and hazardous location approvals. Due to an electrical shock hazard, do not operate thermostat if lid is cracked, broken or uneven with enclosure.**

## INSTALLATION (cont'd.)

**Overjacketed cable instructions for SRL-CR, SRL-CT, SRF-CR, SRM/E-CT. CWM-CT cable instructions denoted by \***

1. Insert heating cable and capillary tube through pipe standoff and grommet as shown. 8 inches of cable should extend past the grommet. Attach the pipe standoff to the pipe with a pipe strap (Chromalox type PS not included) as shown. Attach extra cable to pipe as appropriate. Small slice will need to be cut in grommet to allow the RTD wire to exit the pipe standoff out the bottom. For pipes smaller than 1 1/2" diameter optional small pipe adapter (Chromalox model SPA not included) is required.

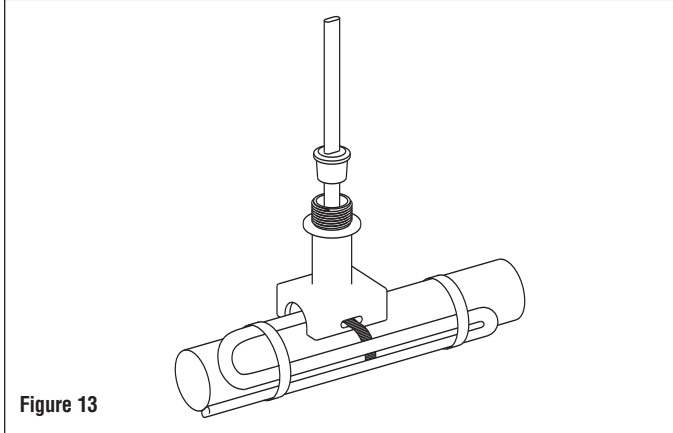


Figure 13

2. Score the outer insulation 7 inches from the end of the cable. Lightly cut the outer jacket up the center to the end of heating cable and remove the outer jacket from the cable. **WARNING: DO NOT CUT METAL BRAID.**

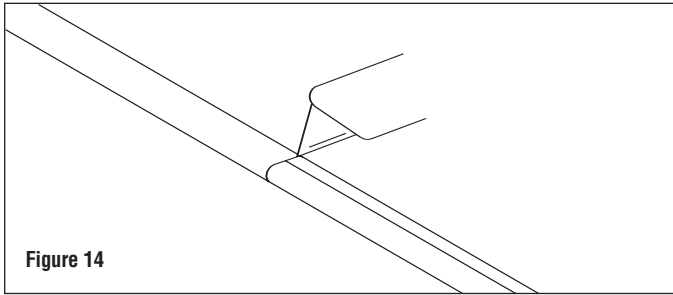


Figure 14

3. Move braid back toward the overjacket, creating a bulge. At the bulge, separate the braid to make an opening.

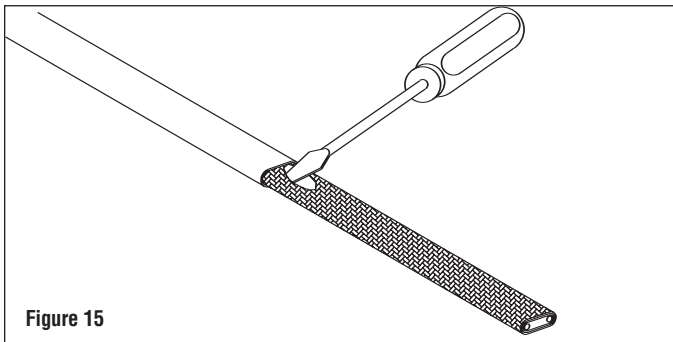


Figure 15

4. While bending the heating cable, work the cable through the braid opening. Pull the braid tight.

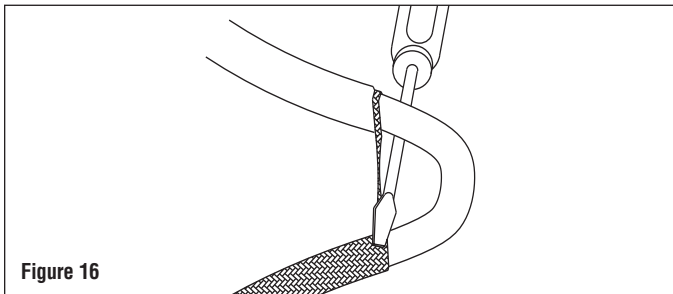


Figure 16

5. Score the inner insulation 6 inches from the end. Lightly cut the inner jacket up the center to end of heating cable and remove the inner jacket from the cable.

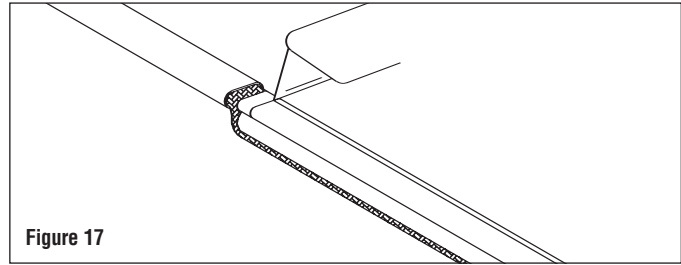


Figure 17

6. Shave the core material from the outside of each bus wire. \*Skip this step if using CWM-C constant wattage cable.

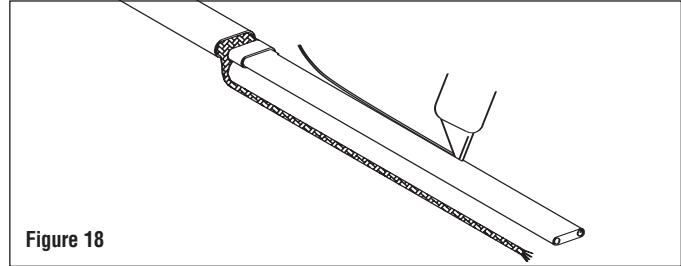


Figure 18

7. Starting at the end of the heating cable, using needle nose pliers or a knife pull each bus wire away from the core material. \*Separate CWM-C leads and strip 1/4" from each leadwire.

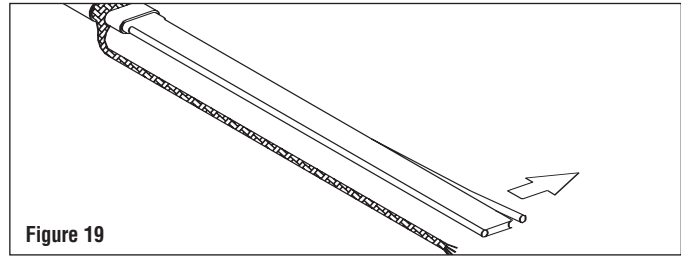


Figure 19

8. Remove the exposed core material and cut 1/4" of the end of each bus wire. \*Skip this step if using CWM-C constant wattage cable.

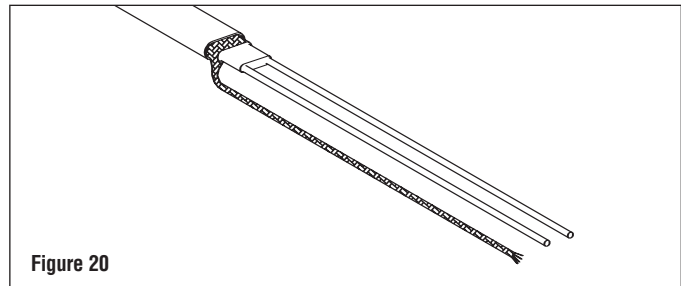


Figure 20

9. Liberally apply RTV over the exposed matrix and leads. Push the rubber boot over the heating cable. Trim lead ends as needed. \*Boot is not needed when using CWM-C constant wattage cable.

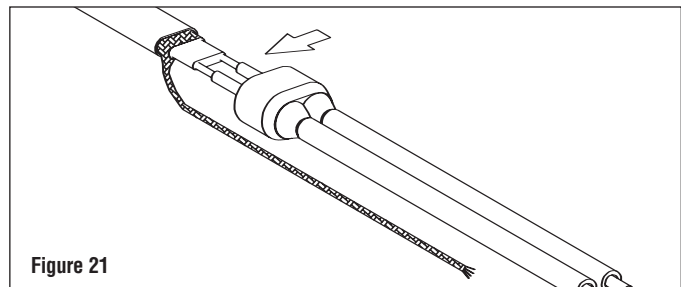
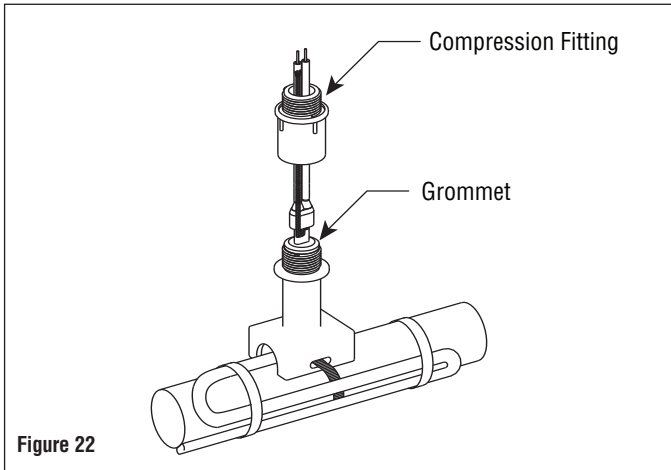


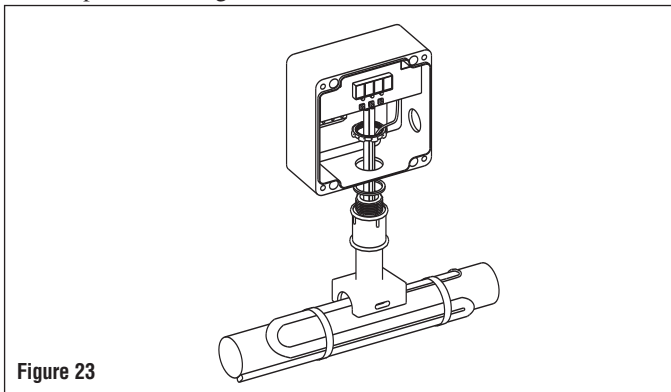
Figure 21

## INSTALLATION (cont'd.)

10. Slide compression fitting over cable. Grommet should be placed inside pipe standoff. Termination boot should be spaced 1/2" from sealing grommet. Tighten compression fitting until it bottoms out against pipe standoff.



11. Assemble junction box to compression fitting as shown. Tighten locknut until the junction box bottoms out against the lip of the compression fitting.



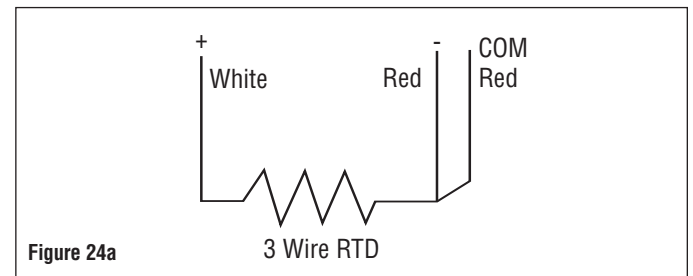
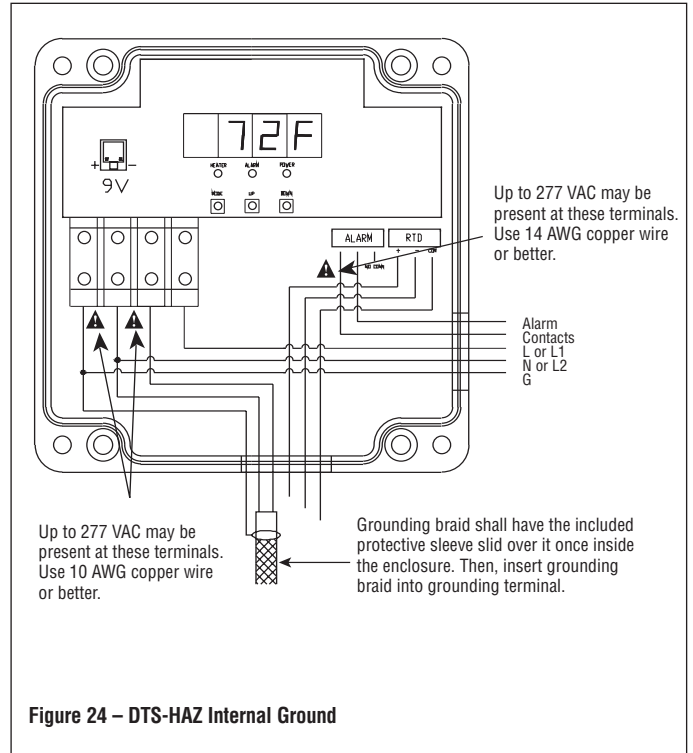
12. Attach 3/4" conduit hub. Please see the electric diagrams below for proper wiring for your application. Attach junction box cover to seal enclosure. For over-jacketed cable with internally grounded braid: Grounding braid shall have the included protective sleeve slid over it once **inside** the enclosure. Then, insert grounding braid into grounding terminal. **Note:** The conduit hub shall be listed for Class 1, Div. 2; Class II Div. 1 & 2, Class III, Div. 1 & 2, and 4X rated by a nationally recognized testing laboratory.

### ⚠ CAUTION

**Enclosure lid must be properly sealed prior to operating. Each of the four (4) screws are to be evenly tightened by hand with appropriate screw driver ONLY until snug. It is recommended that the lid be secured with a torque of 12-15 inch-lbs per screw. Overtightening or uneven tightening may cause the lid to break which would void all environmental and hazardous location approvals. Due to an electrical shock hazard, do not operate thermostat if lid is cracked, broken or uneven with enclosure.**

### ⚠ CAUTION

**Be sure to install this device vertically as pictured in Figure 23. This controller utilizes a heat sink which is designed to cool the unit during operation. Under no circumstance should air flow around the controller be compromised in any way. Failure to do so may result in the overheating of the controller, product failure, product temperatures which exceed the Hazardous Area maximum temperature limit and even fire.**



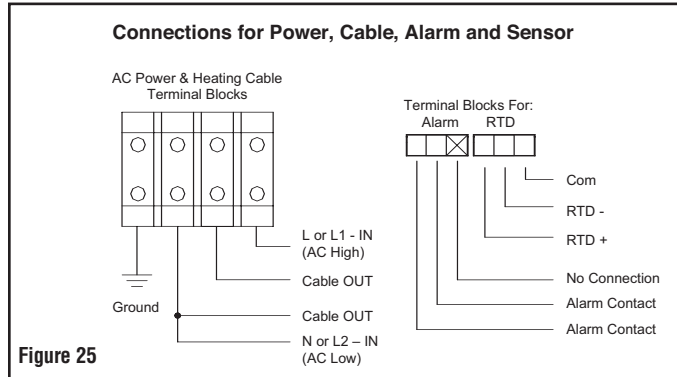
## START-UP

### ⚠ WARNING

**For up to 30 amp loads, use minimum 10 AWG wiring or better for 120/277 VAC power input.**

**Connecting power to the unit.**

- Powering up with 120/277 VAC:** To power up the unit apply 120/277 VAC to the terminal block according to the schematic below:



- Programming with 9VDC battery:** The DTS-HAZ may be programmed with a 9VDC battery should standard service line voltage be unavailable.  
**Note:** Powering unit with 9VDC should only be used for programming purposes and not operation of the unit.

### 3. Programming and alarm overview

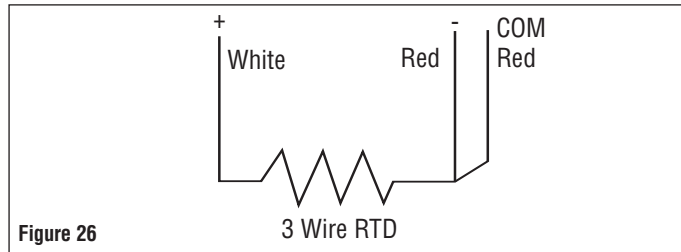
Digital Thermostat must have the following components set to correctly control the temperature:

- Setpoint – targeted temperature value that controller will aim to reach

- Hi Temperature Threshold – max. temperature value. After reaching this threshold controller will set Alarm condition.
- Lo Temperature Threshold – min. temperature value. After reaching this threshold controller will set Alarm condition.
- Deadband – The allowable temperature differential between the Set Point and the Sensed Temperature during normal operation. The Deadband is centered on the Setpoint. The Deadband has a range of 2 to 10 deg. in 2 degree increments. The Load is removed once the temperature is 1/2 way between the Setpoint and the upper limit of the Deadband.
- Units – selection between degrees Fahrenheit or Celsius.
- Soft Start Function – The soft start may be enabled or disabled. When enabled, the Soft start algorithm initiates at power on & whenever low end of dead band is realized. When initiated, 0% - 100% Power is achieved over 167 seconds.
- Alarm – The Alarm is rated for 12-277 VAC and 2 amperes RMS. **NOTE:** The Alarm functions only with AC voltage. The **FACTORY DEFAULT SETTING IS NORMALLY CLOSED.** You may toggle this setting to Normally Open via the control push buttons.

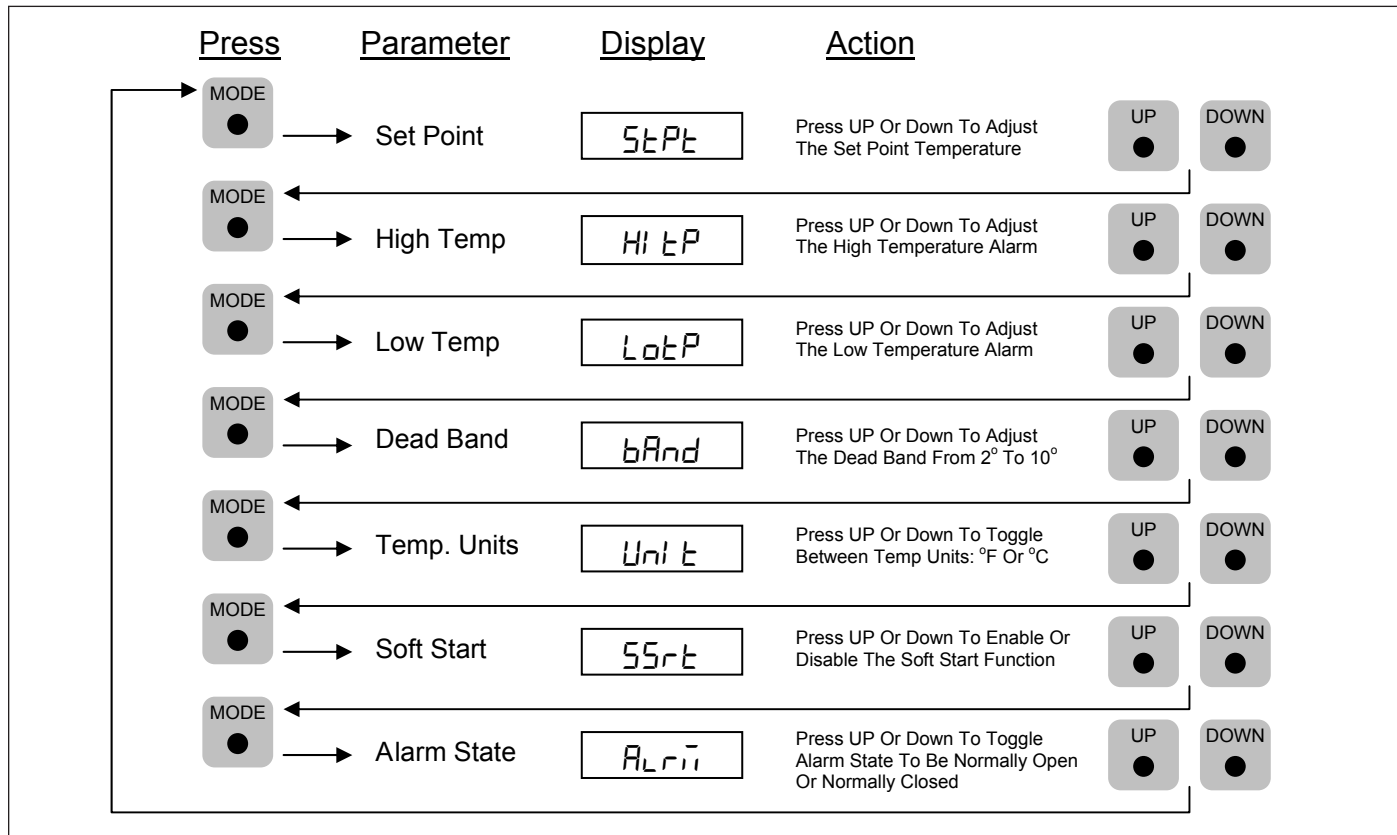
### Connecting RTD Wire

- Connect RTD wire according to the schematic:



## PROGRAMMING

To Program the Digital Thermostat follow the instructions below:



## TROUBLESHOOTING

Alarm Type:	Display	Solution:
Sensor Open	Sens err	Check if your sensor is correctly connected to the unit
Sensor Shorted	Sens err	Check if your sensor is correctly connected to the unit
Lo Temperature	Blinking between sensed temperature and “LoTP”	Sensed temperature is below Lo Temp. Threshold. Alarm will be cleared automatically when sens temp > lo threshold + 5 deg
Hi Temperature	Blinking between sensed temperature and “HiTP”	Sensed temperature is above HI Temp. Threshold. Alarm will be cleared automatically when sens temp < hi threshold - 5 deg
EPR	EEPROM memory error	Press UP & DOWN keys for 2 seconds. Unit will be loaded with default settings
ERR1	Program memory error	Program memory corrupt. Solution: Reprogram the unit. Consult Factory.

### Product Maintenance & Care

The following inspections should occur upon receipt of product and at least once every year.

#### a. Wiring

Inspect wiring for wear, fraying and evidence of overheating. Repair minor defects with a high quality grade of electrical tape or replace if needed.

#### b. Hardware & Connectors

Inspect for loose electrical and mechanical connections. Tighten or replace all loose or missing hardware.

#### c. Cleaning

This product does not require cleaning. However, the heat sink fins on back must routinely be inspected for any debris. Remove any debris with a stiff brush or other careful means. Take care not to break any fins. Should any of the fins break, the unit should be replaced.

### Equipment Ratings:

Voltage Rating: 100-277 VAC, 50/60 Hz

Current Rating: 30 amps

Ambient Temperature Rating: -40°F to +104°F

VA rating on electronics: 4.0 Watts

The electronics are protected by a 0.5 Amp 350 VAC 2AG fuse

Maximum RTD output 1.25 volts, 7 milliamps

### Alarm Function:

Alarm contact rating 12-277 VAC, and 2 amps RMS

Alarm works with AC operation ONLY

Normally Closed - Factory Default

Normally Open - Optional Setting

### Agency Approvals:

UL/cUL - Ordinary area, File number E336917

UL/cUL - Hazardous area (C1D2, Groups A, B, C & D) – File number E347725

## ⚠ WARNING

**EXPLOSION HAZARD. Substitution of any component may impair suitability for Class 1, Div. 2.**

**Limited Warranty:**

Please refer to the Chromalox limited warranty applicable to this product at <http://www.chromalox.com/customer-service/policies/termsofsale.aspx>.

**Chromalox<sup>®</sup>**  
**PRECISION HEAT AND CONTROL**

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