#### PECO AUTOMATION AND CONTROLS



#### NEMA 4X INDUSTRIAL CONTROLS

T109 AND T115 SERIES RAINTIGHT, WEATHER RESISTANT THERMOSTATS















#### HIGHLIGHTS

- One Control for Heating and/or Cooling
- NEMA 4X Enclosure Complies with N.E.C. Article 547
- Rugged, Weather Resistant Enclosure
- Corrosion Resistant Materials for Long Life
- Low Mass, High Surface Area of Sensors Provide Rapid Response to Temperature Change
- Local and Remote Sensing Models Available
- Large, Readily Visible Dial
- Multi-Positional Mounting Offers Flexibility in New or Existing Installations
- High Level of Accuracy and Sensitivity
- Meets UL and CSA Requirements
- TH109 Features Two SPDT Staged Switches

The PECO T109 and T115 NEMA 4X thermostats are intended for applications that require a rugged, weatherproof control. Typical applications include refrigeration, walk-in coolers, freezers, ventilation fans, dampers, and heating and cooling in factory buildings, greenhouses, garages, warehouses or animal confinement buildings for poultry, hogs or livestock. The unit will tolerate spraying with water, high humidity, airborne contaminates and moderately corrosive conditions.

#### Put Our Experience to Work for You

Since 1938, PECO has been known for highly engineered products that set the standard for quality, performance, and reliability. Now you can buy from the best for less.



#### TECHNICAL SPECIFICATIONS



#### **TECHNICAL SPECIFICATIONS**

	TH109-009	TF115-001	TRF115-005	TRF115-007
Temperature Range	40 to 100°F / 4 to 37°C	40 to 110°F / 4 to 43°C	0 to 120°F / -18 to 49°C	-30 to 100°F / -34 to 38°C
Sensor	Stainless Steel Coiled Bulb	Stainless Steel Coiled Bulb	60" Stainless Steel Bulb/ Capillary	8' (2.44m) Copper Bulb/ Capillary
Switch	SPDT (2)	SPDT	SPDT	SPDT
Remote Temperature Sensing	No	No	Yes	Yes
Enclosure	NEMA 4X Thermoplastic	NEMA 4X Thermoplastic	NEMA 4X Thermoplastic	NEMA 4X Thermoplastic
Control	Dial Knob	Dial Knob	Dial Knob	Dial Knob
Agency Approvals	UL, CSA	UL, CSA	UL, CSA	UL, CSA

Note: For NEMA 4X installation, NEMA 4X connectors must be used.

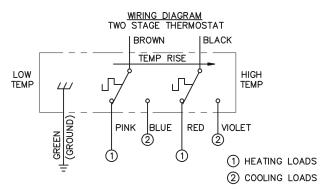
#### **RATINGS**

VOLTAGE RATING	FULL LOAD	LOCKED ROTOR	NON-INDUCTIVE	PILOT DUTY
120 VAC	16.0A	80.0A	25.0A	125VA
208 VAC	13.2A	66.0A	25.0A	125VA
240 VAC	12.0A	60.0A	25.0A	125VA
277 VAC	10.0A	50.0A	22.0A	125VA

SUITABLE FOR 24 VAC OPERATION

#### **WIRING DIAGRAMS**

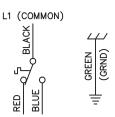
#### TH109-009



THERMOSTAT OPERATION: DOUBLE POLE, DOUBLE THROW CONTACTS OPERATE SEQUENTIALLY WITH 3'F (1.7'C) NOMINAL SEPARATION ON TEMPERATURE RISE OR FALL. AT TEMPERATURE ABOVE THE SET POINT, LEADS BLACK/MIOLET AND BROWN/BLUE ARE CLOSED. ON TEMPERATURE FALL TO 3'F (1.7'C) (NOMINAL) ABOVE THE SET POINT, LEADS BLACK/RED CLOSE AND BLACK/MIOLET OPEN. ON FURTHER TEMPERATURE FALL TO THE SET POINT, LEADS BROWN/PINK CLOSE AND BROWN/BLUE OPEN.

#### TF115-001, TRF115-005, TRF115-007

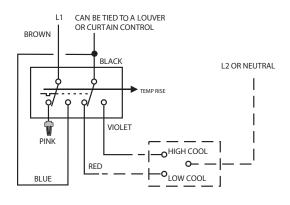
- For local sensing applications the coiled capillary bulb can be tie-wrapped to the bottom tang.



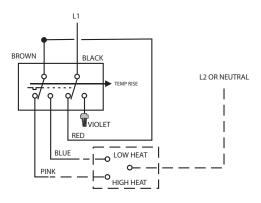
HEATING OR COOLING EQUIPMENT, SPDT, OPENS ONE CIRCUIT (RED/BLACK, REF. HEATING), CLOSES ONE CIRCUIT (BLUE/BLACK, REF. COOLING) ON TEMPERATURE RISE.

#### TH109-009 CONNECTION OPTIONS

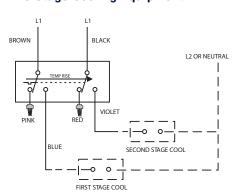
#### Two Speed Cooling Equipment



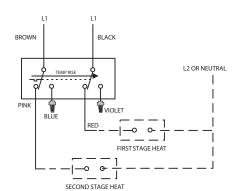
#### Two Speed Heating Equipment



#### **Two Stage Cooling Equipment**



#### Two Stage Heating Equipment



#### **Auto Changeover Control**

1 Heat/1 Cool with 3°F dead band

BROWN

BLACK

L2 OR NEUTRAL

PINK

BLUE

RED

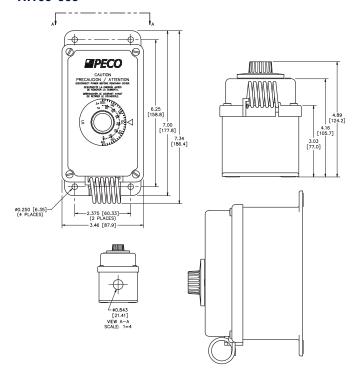
VIOLET

COOLING LOAD

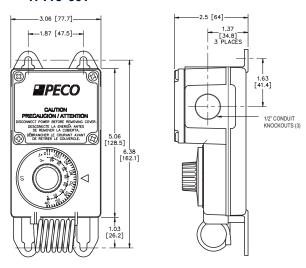
HEATING LOAD

#### **MOUNTING INSTRUCTIONS**

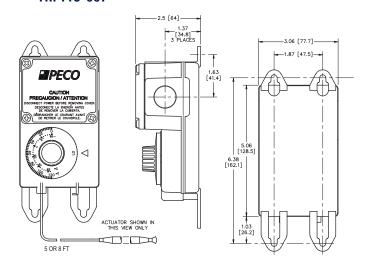
#### TH109-009



#### TF115-001



#### TRF115-005 TRF115-007



#### **MODEL SELECTION GUIDE**

MODEL	PART NUMBER	DESCRIPTION
TH109-009	68427	NEMA 4X thermostat, stainless steel coiled bulb, 40 to 100°F / 4 to 37°C
TF115-001	68471	NEMA 4X thermostat, stainless steel coiled bulb, 40 to 110°F / 4 to 43°C
TRF115-005	68426	NEMA 4X thermostat, 60" stainless steel bulb/capillary, 0 to 120°F / -18 to 49°C
TRF115-007	69320	NEMA 4X low temperature thermostat, 8' copper bulb/capillary, -30 to 100°F / -34 to 38°C









**Automation and Controls** Division of PECO, Inc. PO Box 82189, Portland, OR 97282 Phone: 800-874-8547 / 503-233-6401 Email: sales@pecomanufacturing.com www.pecomanufacturing.com



## NEMA 4X RAINTIGHT THERMOSTAT INSTALLATION AND OPERATING INSTRUCTIONS INSTRUCCIONES DE INSTALACION Y OPERACION DEL THERMOSTATO A PRUEBA DE LLUVIA NEMA 4X THERMOSTAT NEMA 4X ÉTANCHE AUX INTEMPÉRIES INSTRUCTION D'INSTALLATION ET D'UTILISATION

#### **WARNING**

To prevent overheating or fire, use this control as an operating or regulating thermostat. ALWAYS USE A BACKUP CONTROL OR ALARM if a control failure could cause the controlled appliance to overheat or could cause a fire

Where thermostat is capable of cycling directly between heating and cooling loads, failure to provide a load transfer switch will result in thermostat failure.

Do not install, use or operate if product appears damaged, the enclosure is cracked or broken or if the sensor has been bent, crimped or is dirty.

#### APPROPRIATE APPLICATION

This thermostat has been tested by CSA and Underwriters Laboratories Inc. (UL), meets the requirements for NEMA 4X equipment and is suitable for use under the National Electrical Code (NEC), Article 547-7, when used with appropriate watertight connectors (not included).

#### INSTALLATION

#### **A WARNING**

To avoid electrical shock or damage to equipment, disconnect all power before installing or servicing.

To avoid potential fire and/or explosion, do not use in potentially flammable or explosive atmospheres.

Installation must be made by a trained, qualified service person in accordance with the National Electrical Code (NEC) and all applicable local codes and ordinances. Installation should meet all applicable national, state and local codes. Refer to the appropriate wiring diagram included. Locate the thermostat (local sensing models) or sensing bulb (remote sensing models) for optimum temperature sensing of the controlled space. Thermostat operation will be affected by unusual heat or cold, such as direct sunlight, near windows or doors or on outside walls.

All fittings and materials used for the installation should be approved, suitable and installed properly for the intended application. For water tightness, the cord seal or conduit hub should be UL listed and marked 4X. The conduit hub is to be tightened onto the conduit before installing in the enclosure.

Where applicable, remove knockout(s) by impacting near the inside edge of the knockout to be removed. **IMPORTANT:** Do not impact, dent or use the sensor for support. This will cause calibration and/or thermostat failure.

#### **A WARNING**

READ INSTRUCTION CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THIS THERMOSTAT. Failure to observe safety information and comply with instructions could result in PERSONAL INJURY, DEATH AND/OR PROPERTY DAMAGE. Retain these instructions for future reference. This product, when installed, will be part of an engineered system whose specifications and performance

will be part of an engineered system whose specifications and performance characteristics are not designed or controlled by PECO. You must review your application and national and local codes to assure that your installation will be functional and safe.

Even though this thermostat is sealed, water or dust could enter through improperly sealed wiring. A drip loop should be provided to prevent water and other liquids from entering the thermostat housing. The cord or conduit connections to the enclosure must be water and dust tight. The cover must be tightened securely to compress the gasket and provide a watertight seal. Use only screws provided. Do not over-tighten.

Maximum sensing element with stand temperature is 35°F (20°C) above the highest temperature setting. Maximum temperature for the plastic enclosure is 140°F 60°C.

#### **A** CAUTION

For use in wet or humid environments or where water tightness is required, failure to use suitable watertight connections and suitable drip loop could allow water to enter the enclosure resulting in thermostat failure.

Use copper wire only. Insulate or wire-nut all unused leads.

Use the grounding provisions provided for connection to the line ground and equipment ground wire.

#### **OPERATION AND CHECK-OUT**

Allow one hour or necessary amount of time for the thermostat and system to stabilize for normal operation. This thermostat is factory calibrated and requires no correction on site.

#### TO CHECK OPERATION OF HEATING SYSTEMS:

- Disconnect power.
- 2. Place the heat/cool selector switch, if applicable, in the heat position.
- 3. Adjust the thermostat set point to at least 10°F (5°C) below the temperature of the controlled space.
- 4. Restore power.
- 5. Slowly adjust the thermostat knob to raise the set point. When the set point reaches the approximate temperature of the controlled space, the heating equipment should start.

#### TO CHECK OPERATION OF COOLING SYSTEMS:

- Disconnect power.
- 2. Place the heat/cool selector switch, if applicable, in the cool position.
- 3. Adjust the thermostat set point to at least 10°F (5°C) above the temperature of the controlled space.
- 4. Restore power.
- 5. Slowly adjust the thermostat knob to lower the set point. When the set point reaches the approximate temperature of the controlled space, the cooling equipment should start.

#### LIMITED WARRANTY

- 1. WARRANTY COVERAGE. PECO warrants to the original user of its products that the products will, at the date of initial purchase, meet the applicable specification for such products and will be free from any defects in materials or manufacture under normal use for 18 months after date of manufacture.
- 2. DISCLAIMER OF WARRANTY OF PRODUCT SUITABILITY. PECO makes no warranty to the purchaser or any third party that its products are suitable for a particular application or design. Many states and localities have differing codes or regulations governing the installation and/or use of PECO' products. PECO cannot guarantee compliance with such regulations; purchaser is solely responsible for safe and correct installation and use of the product and for compliance with applicable codes and regulations.
- 3. EXCLUSION OF IMPLIED WARRANTIES. This warranty is the only warranty applicable to this product and excludes all other warranties, including any WARRANTY OF MERCHANTABILITY, any warranty of fitness for a particular purpose, and any implied warranties otherwise arising from course of dealing or usage of trade, except where the product purchased is subject to consumer product warranty laws, in which case ANY APPLICABLE IMPLIED WARRANTIES ARE LIMITED TO 18 MONTHS, or such shorter period as permitted or required under applicable law.

Some States do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

4. REMEDIES FOR NONCONFORMITY. If the product purchased does not conform to the

- 4. REMEDIES FOR NONCONFORMITY. If the product purchased does not conform to the applicable warranty, PECO will provide, at its option and in accordance with the procedures in the following section, one of the following remedies: (1) repair of the nonconforming product, (2) replacement with a conforming product, (3) refund of the original purchase price. THESE REMEDIES SHALL BE THE EXCLUSIVE AND SOLE REMEDY for any breach of warranty.

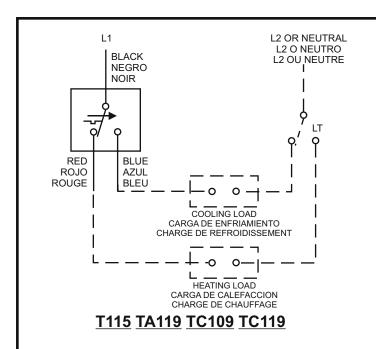
  5. TO OBTAIN WARRANTY SERVICE. For any product believed to be defective within the
- 5. TO OBTAIN WARRANTY SERVICE. For any product believed to be defective within the limited warranty period, first write or call dealer from whom product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to PECO at the address below, giving dealer's name, address, date and number of dealer's invoice, and describe the nature of the defect.
- 6. LIMITATION OF LIABILITY. PECO WILL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES resulting from any defect in the product purchased. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

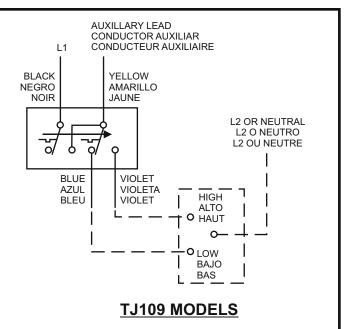
This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

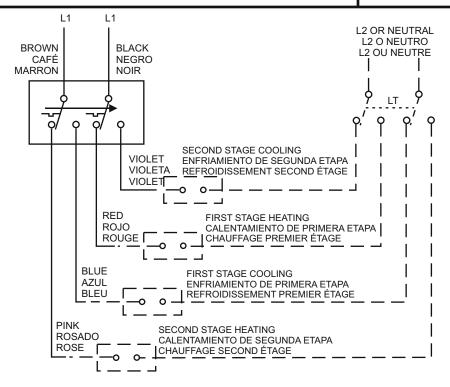
Manufactured by PECO, Inc.

4709 SE 18th Avenue - Portland, OR 97202 - USA

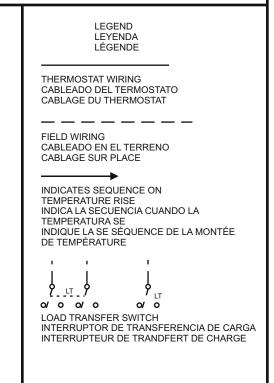
P.O. Box 82189 - Portland, OR 97282 - USA







**TH109** 



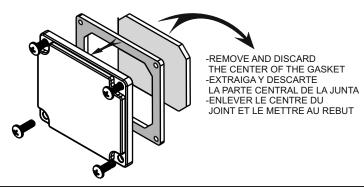
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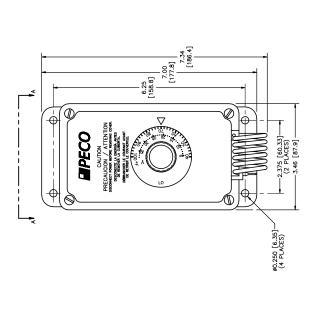
#### WARNING ADVERTENCIA AVERTISSEMENT

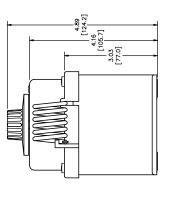
-TO INSURE WATER TIGHTNESS, THE ENCLOSED GASKET MUST BE INSTALLED UNDER THE WIRING CAP.

-PARA ASEGURAR LA ESTANQUIDAD AL AGUA, LA JUNTA SUMINISTRADA DEBERÁ INSTALARSE DEBAJO DEL CASQUETE DEL ALAMBRADO.

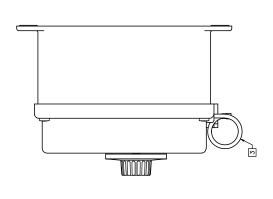
-POUR ASSURER L'ÉTANCHÉITÉ À L'EAU, LE JOINT STATIQUE (FOURNI) DOIT ÊTRE INSTALLÉ SOUS LE CULOT POUR CÂBLAGE.

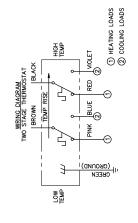






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1. THERMOSTAT OPERATION: DOUBLE POLE, DOUBLE THROW CONTACTS OPERATE SEQUENTIALLY WITH 57 TO," NO MONTACT OF PARATION ON TEMPERATURE RISE OF FALL. AT TEMPERATURA BROWN THE SET OF FALL. AT TEMPERATURA BROWN FILE ABOUT THE SET POLY, LACKS FALL TO 37 (1,7°C) (NOMINAL) ABOVE THE SET POINT, LEADS BROWN, PELL BLACK, ANDEL TO SEE AND BROWN/PINK CALL TO THE SET POINT, LEADS BROWN/PINK CALCE AND BROWN/BLUE OPEN.

2. ENCLOSURE AND COVER ARE GRAY THERMOPLASTIC. KNOB IS BLACK THERMOPLASTIC WITH WHITE MARKINGS. BLACK LOGO IS PRINTED ON COVER SURFACE.

STAINLESS STEEL.

4. ADJUSTABLE TEMPERATURE RANGE IS 40°F TO 100°F (4°C TO 38°C).

6. MAXIMUM AMBIENT TEMPERATURE FOR ASSEMBLY IS 140F (60°C). 5. BOX MAY BE MOUNTED WITH WIRING ENTRY AT TOP OR BOTTOM AS NEEDED FOR INSTALLATION REQUIREMENTS.

7. U.L. LISTED FILE E50023. C.S.A. CERTIFIED FILE NO. LR30247.

© OPENING ON ONE END, 1/2" CONDUIT SIZE, PROVIDES FOR ULL LISTED RANITIONT CORD SEAL OR CONDUIT HUB. WITH COVER ASSEMBLED IN PLACE THE ENCLOSURE WILL MEET NEMA 4X "PANTIGH" RATING.

9. LOAD LEADS AND GROUND LEAD ARE #14 AWG 600V, 105°C (221°F) STRANDED COPPER WRE. FREE LEAD LENGTH IS 6" [152] MINIMUM WITH WIRE ENDS STRIPPED TO 0.62" [15.7].

# 10. ELECTRICAL RATING: VAC | INDUCTIVE | RESISTIVE | PILOT | VAC | I.DA | I.DA | AMPS | DILOT | I.DA | I

DUTY	125 VA	125 VA	125 VA	125 VA	
AMPS	25	25	25	22	
LRA	80.0	0.99	60.0	20.0	
FLA	16.0	13.2	12.0	10.0	
2	120	208	240	277	

SUITABLE FOR 24 VAC OPERATION
11. ELECTRICAL RATING AND GROUNDING INSTRUCTION LABEL
AFFIXED TO INSIDE OF ENCLOSURE.

12. MARKING TO INCLUDE: 4MY92

(DC REPRESENTS A DATE CODE.)

13. UNIT IS INDIVIDUALLY BOXED WITH LOOSE INSTRUCTION SHEET, INDIVIDUAL AND MASTER CARTONS MARKED WITH REQUIRED IDENTIFICATION, PACKED 20 UNITS PER MASTER CARTON.

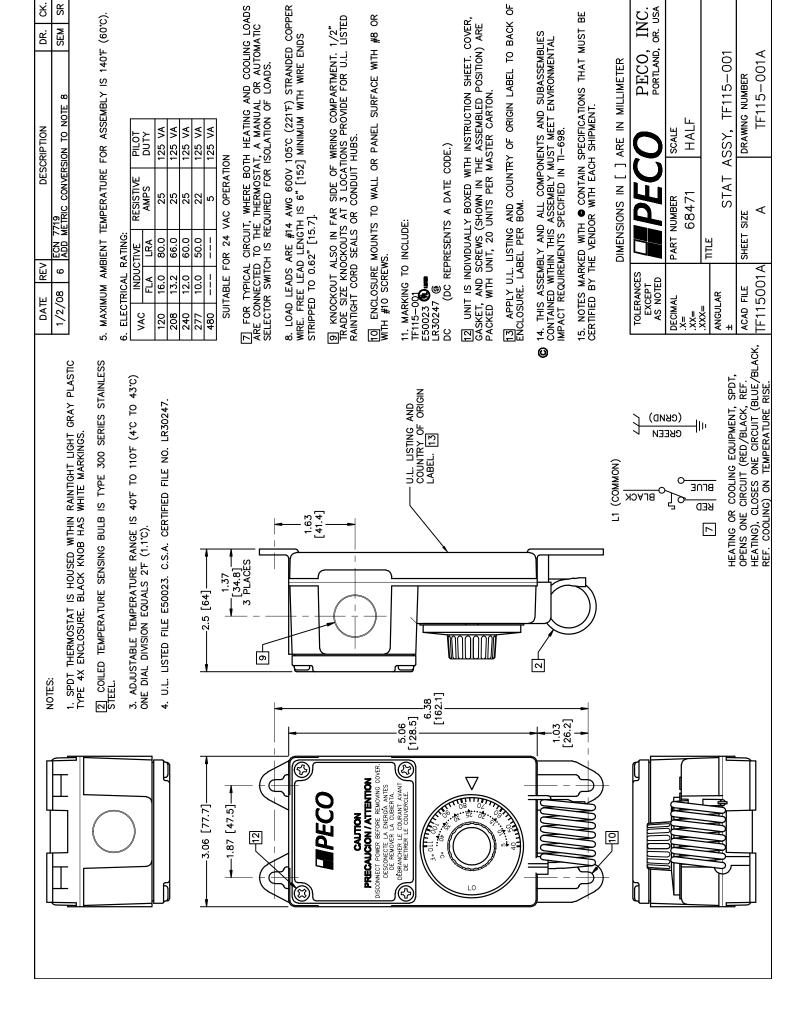
15. THERMOSTAT OPERATION IS NOT AFFECTED BY MOUNTING POSITION. 14. STAINLESS STEEL COVER SCREWS PACKED IN ENVELOPE.

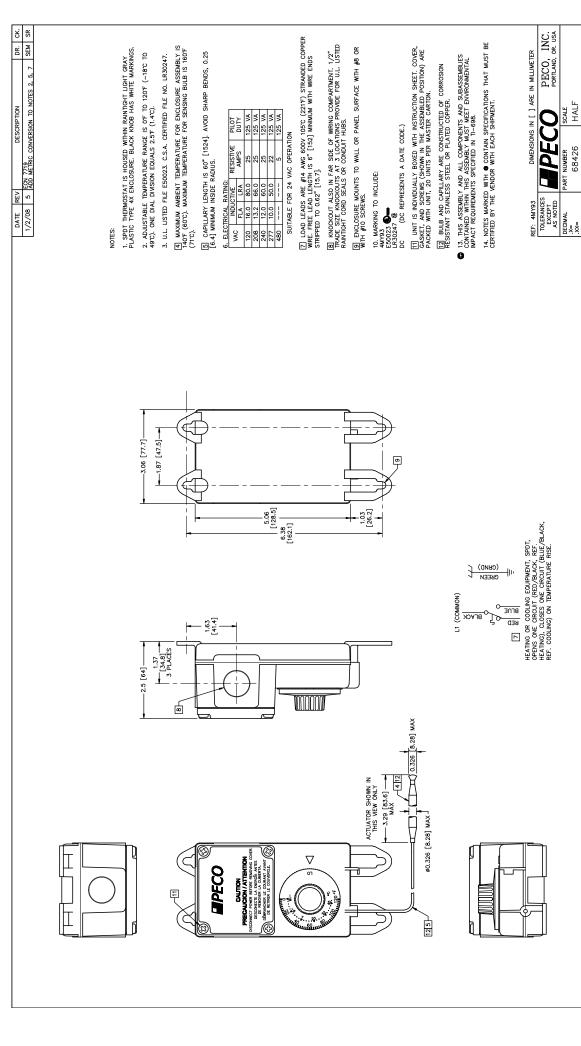
16. THIS ASSEMBLY AND ALL COMPONENTS AND SUBASSEMBLES CONTAINED WITHIN THIS ASSEMBLY MUST MEET ENVIRONMENTAL MIPACT REQUIREMENTS SPECIFIED IN TI-699.

17. NOTES MARKED WITH @ CONTAIN SPECIFICATIONS THAT MUST BE CERTIFIED BY THE VENDOR WITH EACH SHIPMENT.

PECO, INC. PORTLAND, OR. USA				STAT ASSY, TH109-009	DRAWING NUMBER	TH109-009
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