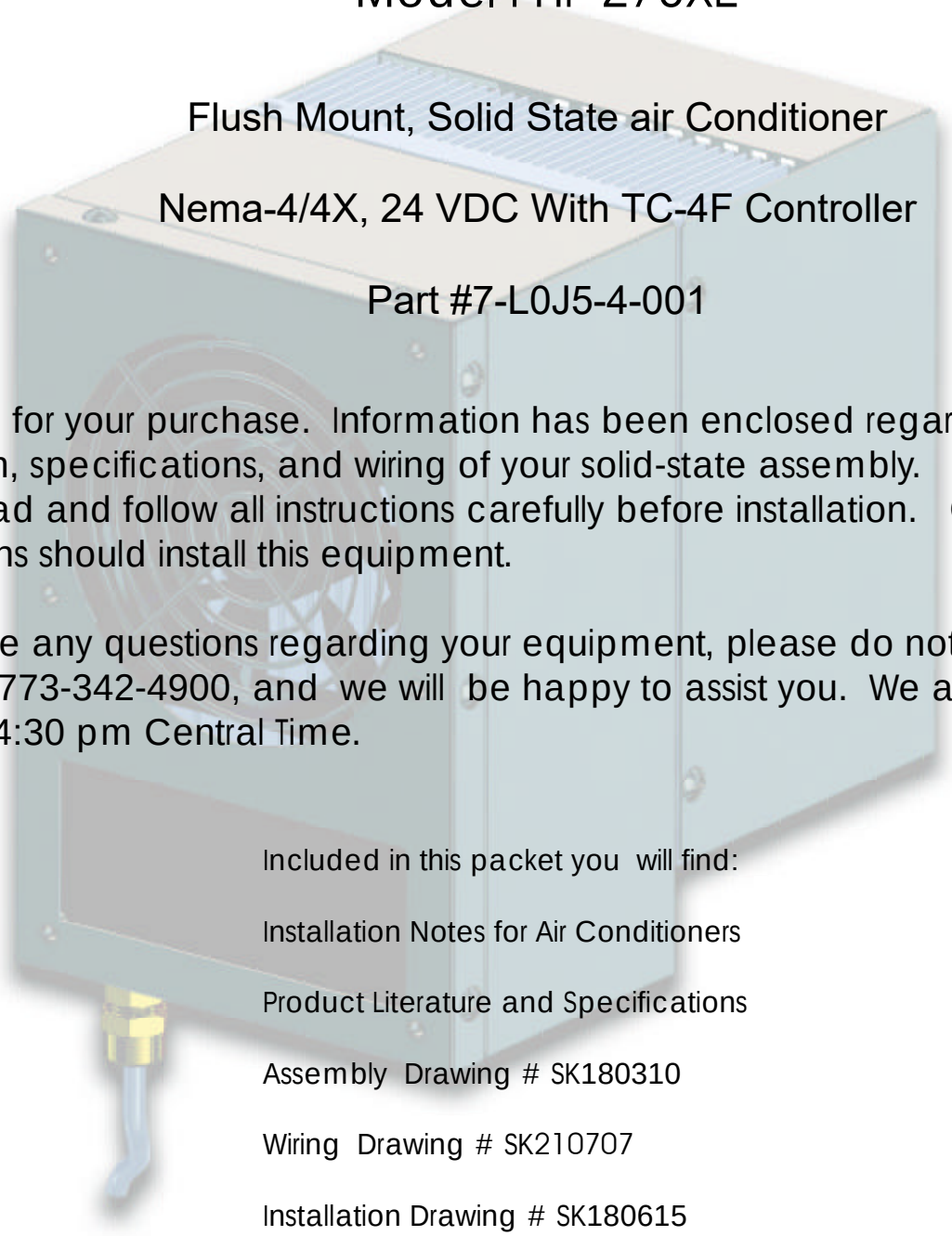
# Product Information Packet

## Model FHP-270XE

Flush Mount, Solid State air Conditioner

Nema-4/4X, 24 VDC With TC-4F Controller

Part #7-L0J5-4-001



Thank you for your purchase. Information has been enclosed regarding the installation, specifications, and wiring of your solid-state assembly.
Please read and follow all instructions carefully before installation. Only qualified technicians should install this equipment.

If you have any questions regarding your equipment, please do not hesitate to call us at 773-342-4900, and we will be happy to assist you. We are open from 8:00 am-4:30 pm Central Time.

Included in this packet you will find:

Installation Notes for Air Conditioners

Product Literature and Specifications

Assembly Drawing # SK180310

Wiring Drawing # SK210707

Installation Drawing # SK180615

Warranty Information

teca

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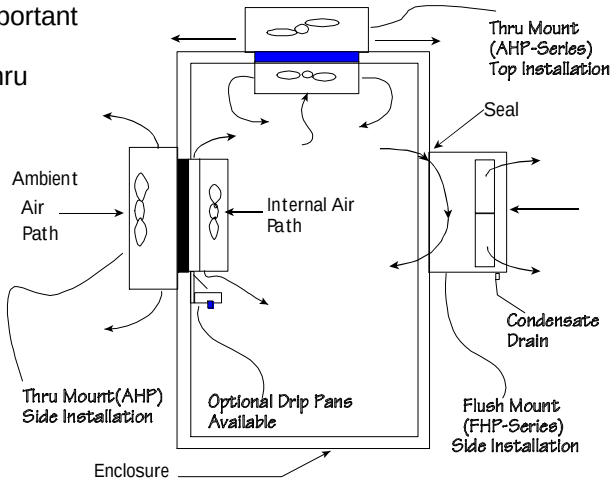
sales@thermoelectric.com www.thermoelectric.com

# Important Installation Notes for Air

Mounting Styles: Both 'thru mount' and 'flush mount' units can be positioned in any orientation and on any enclosure surface. It is important to consider interior air flow patterns when determining the mounting location. Also of importance is an unrestricted flow of ambient air thru the hot side heat exchanger. Ease of access and inspection must be considered for those applications in particularly severe environments which may require occasional maintenance.




## Vertical (Side/Front/Back) Mounting:

Vertical mounting refers to the vertical direction of the cold side or interior fins and is recommended for applications with high humidity, poor and incomplete cabinet seals or any condition which may cause the cold side fins to be maintained at temperatures below the dew point for long periods of time allowing for the formation of condensation. The vertical fin direction provides a drip path whereupon condensation can be collected via a moisture removal system (standard on FHP-units) or a drip pan positioned below the cold side fins. Drip pans are optional for thru mount units.

## Condensate Removal System:

All FHP-Series and AHP-1400 air conditioners contain a built-in condensate removal system. The condensate kit consists of a antifungal sponge with a condensate wick. PVC tubing is also provided for drainage. Drip pans are optional for thru mount units which must be evaluated on an individual basis. Equations defining a relationship between the cold side fin and enclosure temperatures are provided to assist in the evaluation.

## Top Mounting:

Though often the easiest location to mount it is often the most difficult to protect from condensation in this orientation due to the fin orientation, gravity and any susceptible components below. If a drip pan is employed by the end user use caution to place the pan far enough away from the internal fan to minimize the restriction of air flow. The pan should cover the fin ends as well as the fan area. When there is a choice, the vertical orientation is preferred by most users.

## Maintenance:

Since the technology is solid-state, there are no filters, compressors, or fluorocarbons to maintain. The only moving parts are the fans. It is recommended for harsh or dirty environments that the heat sinks be cleaned from time to time. This can be accomplished by directing compressed air over the external fins or on NEMA 4 versions by hosing the unit down. This will increase the overall life and performance of the system.

## Cautions:

Take care when mounting not to damage the seal between the hot and cold side sinks. Do not attempt to mount a unit to a warped surface or try to make the units mounting surface conform to an unflat surface. Do not pinch or damage any leads when mounting. Do not over tighten any installation screw, use reasonable force. Always mount with any condensate drain down. Do not compress the cold side between the hot side and any other surface. Do not obstruct the airflow on either side. When mounting consider the natural air flows of the enclosure. Connect power only after the installation is complete.

## Notes on condensation:

Condensation occurs at the cold side fins when the surface temperature goes below the dew point. To reduce or remove condensate, consider the following:

- Regulate the Fin Temperature above the Dewpoint.
- Keep Enclosure Closed and Sealed from Outside Humidity.
- Use Desiccant (Moisture absorbing Granules.)
- Employ Condensate Removal System/Drip Pans.

If you have any questions regarding your installation, Please feel free to contact our technical department for assistance at 773-342-4900.

# FHP-250 | Air Conditioner

Air Cooled
Flush Mounted
Nema-12, 4, 4X

12 VDC, 24 VDC
109 BTU/HR

## FEATURES

- Compact (only 7" X 4.90" X 7.2")
- Lower vibration and noise
- No moving parts except fans
- Environmentally safe
- No compressor, fluorocarbons or filters
- Condensate control system
- Virtually maintenance-free operation
- Stainless steel exterior housing
- Efficient heat exchanger mode (ECO-Mode)
- Weight 7 LBS.

## POWER INPUTS

| | |
|---|---|
| Voltage | 12 VDC, 24 VDC |
| Current, Active | 6 AMPS, 3 AMPS |
| Current, ECO-Mode | 0.3 AMPS |

## PERFORMANCE RATINGS

| | |
|---|---|
| Cooling (Traditional) | 109 BTU/HR |
| Cooling (Din 3168) | 32 WATTS |
| Cooling COP (at L35 L35) | 0.44 |
| Heating (Traditional) | > 245 BTU/HR |
| Heating (Din 3168) | > 72 WATTS |
| Heating COP | > 1.0 |

## CONTROL TEMPERATURES

| | |
|---|---|
| Active Cooling | 35 °C |
| Heat Exchanger (ECO-Mode) | 25 °C |
| Active Heating | 10 °C |
| Typical Hysteresis | 5 °C |
| Operating Ambient | -40/+70 °C |
| Operating Enclosure | -10/+60 °C |

## CONFIGURATIONS

| MODEL | PART NUMBER | NOTES | INTEGRAL TEMPERATURE CONTROL | VOLTAGE VDC | CURRENT AMPS | ENVIRONMENT |
|---|---|---|---|---|---|---|
| FHP-250FFHC | 7-L094-1-000* | Industrial fans | None | 12 | 6 | NEMA-12, IP 52 |
| FHP-250FFHC | 7-L095-1-000* | Industrial fans | None | 24 | 3 | NEMA-12, IP 52 |
| FHP-250FF | 7-L0J4-0-000 | Industrial fans | TC-4F | 12 | 6 | NEMA-12, IP 52 |
| FHP-250FF | 7-L0J5-0-000 | Industrial fans | TC-4F | 24 | 3 | NEMA-12, IP 52 |
| FHP-250FFHC | 7-L0I4-1-000 | Industrial fans | TC-7F | 12 | 6 | NEMA-12, IP 52 |
| FHP-250FFHC | 7-L0I5-1-000 | Industrial fans | TC-7F | 24 | 3 | NEMA-12, IP 52 |
| FHP-250XEHC | 7-L094-5-000* | Industrial sealed HS fan | None | 12 | 6 | NEMA-4, IP 56 |
| FHP-250XEHC | 7-L095-5-000* | Industrial sealed HS fan | None | 24 | 3 | NEMA-4, IP 56 |
| FHP-250XE | 7-L0J4-4-000 | Industrial sealed HS fan | TC-4F | 12 | 6 | NEMA-4, IP 56 |
| FHP-250XE | 7-L0J5-4-000 | Industrial sealed HS fan | TC-4F | 24 | 3 | NEMA-4, IP 56 |
| FHP-250XEHC | 7-L0I4-5-000 | Industrial sealed HS fan | TC-7F | 12 | 6 | NEMA-4, IP 56 |
| FHP-250XEHC | 7-L0I5-5-000 | Industrial sealed HS fan | TC-7F | 24 | 3 | NEMA-4, IP 56 |
| FHP-250XHC | 7-L094-3-000* | Military grade HS fan | None | 12 | 6 | NEMA-4X, IP 56 |
| FHP-250XHC | 7-L095-3-000* | Military grade HS fan | None | 24 | 3 | NEMA-4X, IP 56 |
| FHP-250X | 7-L0J4-2-000 | Military grade HS fan | TC-4F | 12 | 6 | NEMA-4X, IP 56 |
| FHP-250X | 7-L0J5-2-000 | Military grade HS fan | TC-4F | 24 | 3 | NEMA-4X, IP 56 |
| FHP-250XHC | 7-L0I4-3-000 | Military grade HS fan | TC-7F | 12 | 6 | NEMA-4X, IP 56 |
| FHP-250XHC | 7-L0I5-3-000 | Military grade HS fan | TC-7F | 24 | 3 | NEMA-4X, IP 56 |

* Heat/Cool function via reverse polarity capable external controller

# FHP-250

**MOUNTING STYLE**

Flush Mounted

**ENVIRONMENTS SERVED**

NEMA-12 IP 52

NEMA-4,4X IP 56

**RATING (TRADITIONAL)**

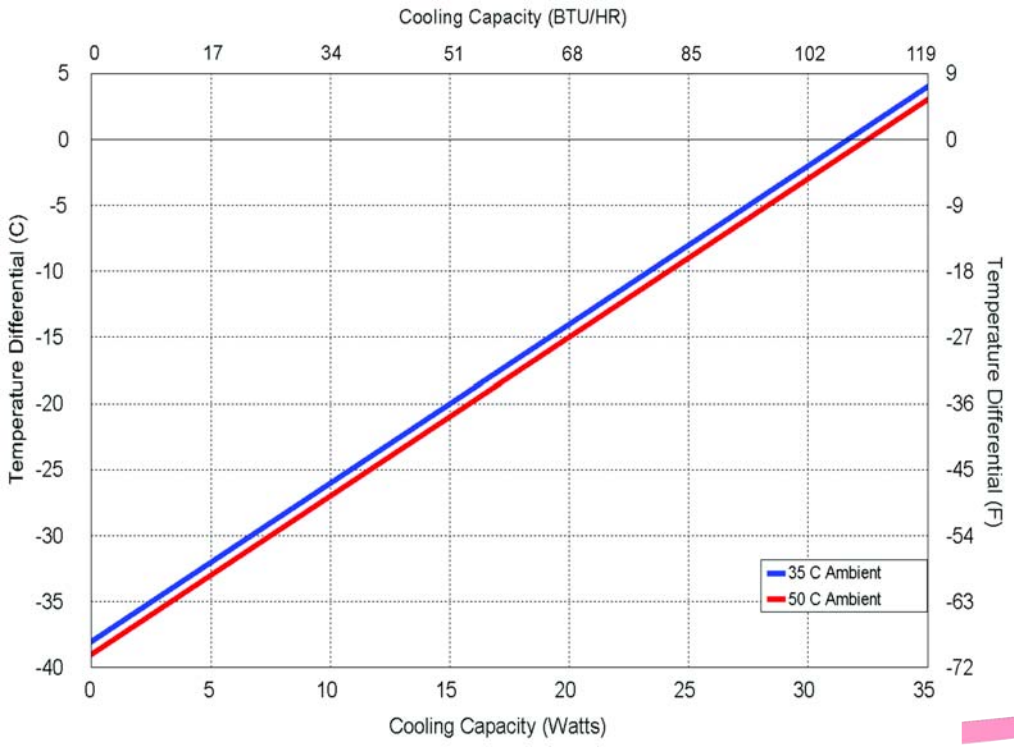
109 BTU/hr @ 0 °F ΔT

**RATING (DIN 3168)**

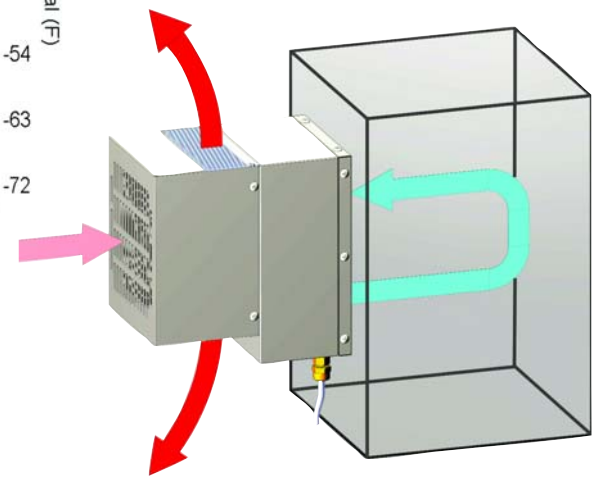
32 Watts L35 L35

20 Watts L35 L50

## PERFORMANCE CURVE

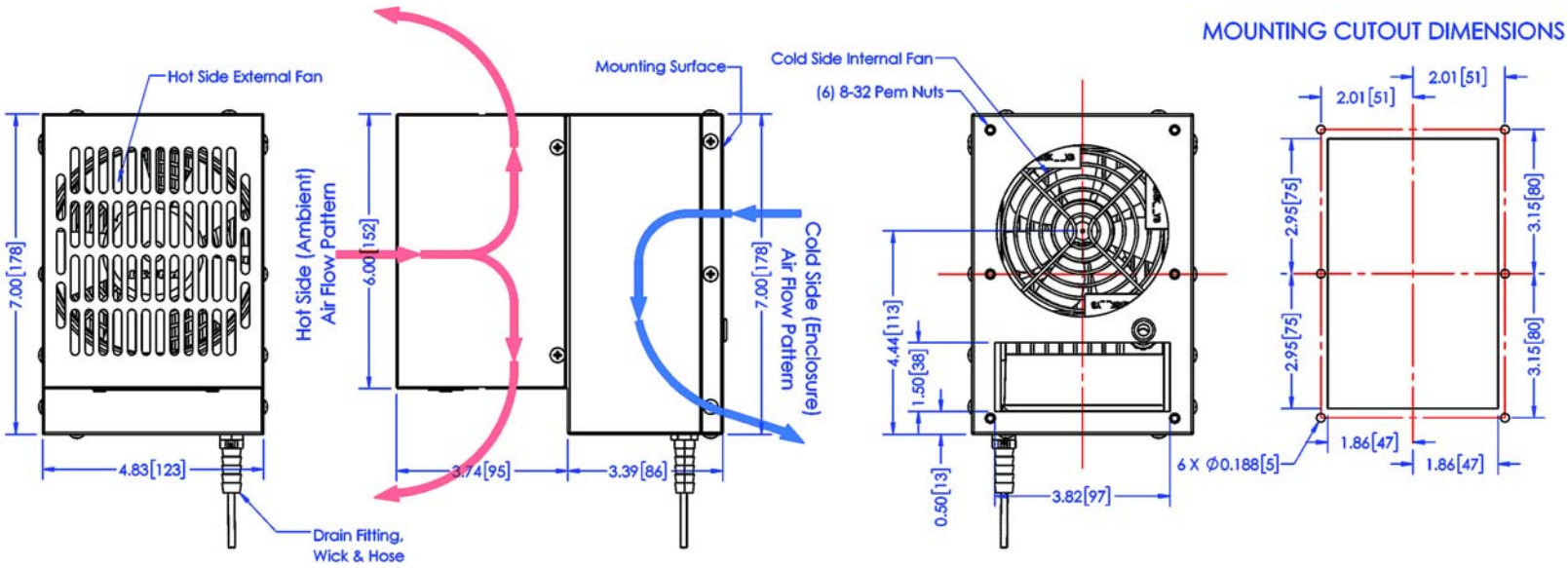



| Equation of Line: | y=ΔT(°C) | x=Capacity (Watts) |
|---|---|---|
| **Ambient Temp** | **35°C** | **50°C** |
| Enclosure Air | y=1.2x-38 | y=1.2x-39 |
| Cold Sink | y=1.02x-38 | y=1.02x-39 |

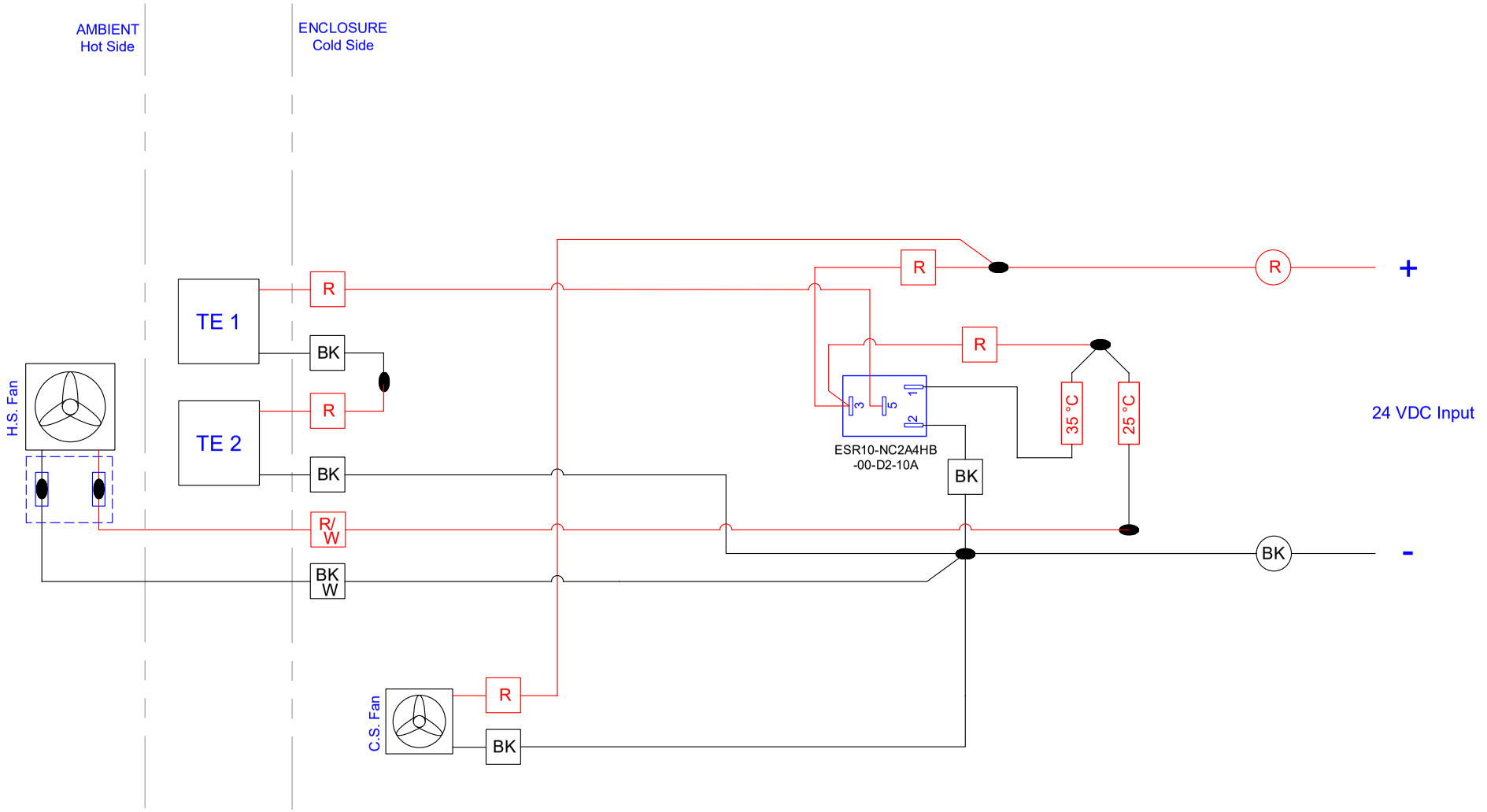


Air Flow Pattern

## DIMENSIONS




Dimensions: Inches [Millimeters]
Dimensions do not include hardware




| REV | DESCRIPTION | Date | APPROVED |
|---|---|---|---|
| | | | |

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:

| DECIMALS | ANGLE |
|---|---|
| .XX +/- | +/- |
| .XXX+/- | FRACTION +/- |

FINISH:

MATERIAL:

THERMOELECTRIC COOLING AMERICA CORP.

# AHP-270XE 24 VDC WITH TC-4F WIRING DIAGRAM

| DRAWN BY: | DRAWING # | REV LEVEL |
|---|---|---|
| AA | SK210707 | |
| DATE: 07/13/2021 | | |
| S2007 | SCALE | MASTER: MASTER / SHEET |

## TC-1F POWER TEMPERATURE SWITCHES

Models TC-1F power temperature controller, with small tolerance and reset differential, are the simplest and most cost effective way to control a cooling or heating device (VAC or VDC) without a need for a relay. For circuits that have higher current draw simply use them in conjunction with a solid state relay.

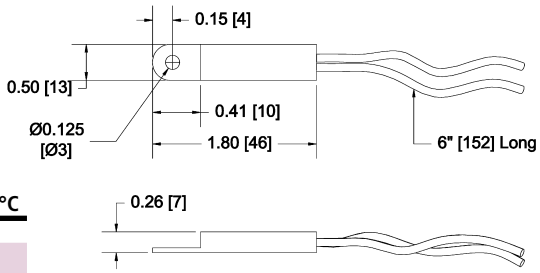
**Part Numbers:**

| Mode | Part Number | Note |
|---|---|---|
| Cool | TC-1C-**XX** | switch closes on temperature rise |
| Heat | TC-1H-**XX** | switch closes on temperature drop |

**XX:** Specify temperatures 20 °C, 25 °C, 30 °C, 35 °C for cool mode and 10°C, 15 °C for heat mode

*Example: TC-1C-20 and TC-1H-10*

| VOLTAGE | CURRENT AMPS | SET POINT T OLERANCE °C | RESET DIFFERENTIAL °C |
|---|---|---|---|
| 125 VAC | 2 | +/- 3 | 3 - 6 |
| 250 VAC | 1.3 | +/- 3 | 3 - 6 |
| 12 VDC | 2 | +/- 3 | 3 - 6 |
| 24 VDC | 1.3 | +/- 3 | 3 - 6 |




**Dimensions: Inches [Millimeters]**

## TC-4F COOL ONLY WITH ECO-MODE

Model TC-4F is simillar to TC-1F plus it has a 2nd power switch for heat exchanger mode (ECO-Mode). The active cool set point for TC-4F is 35 °C and for heat exchanger mode (ECO-Mode) is 25 °C.

| MODEL NUMBER | PART NUMBER | NOTES | HX TEMP. °C | COOL TEMP. °C | RESET (MAX) °C | RESET (TYP) °C | OPERATING VOLTAGE | SWITCHING VOLTAGE | ACTIVE MODE SWITCHING CURRENT MAX. | ECO-MODE SWITCHING CURRENT |
|---|---|---|---|---|---|---|---|---|---|---|
| TC-4F-DC | 4F-24C-00-000 | 12/24/48 VDC | 25 +/- 3 | 35 +/- 3 | 6.5 | 3 | 12/24/24 VDC | 0-100 VDC | 12 ADC | 1.3 ADC |
| TC-4F-DC | 4F-24D-00-000 | 12/24/48 VDC | 25 +/- 3 | 35 +/- 3 | 6.5 | 3 | 12/24/48 VDC | 0-100 VDC | 20 ADC | 1.3 ADC |
| TC-4F-DC | 4F-24E-00-000 | 12/24/48 VDC | 25 +/- 3 | 35 +/- 3 | 6.5 | 3 | 12/24/48 VDC | 0-100 VDC | 40 ADC | 1.3 ADC |

## TC-6F COOL ONLY

Model TC-6F (Cool Only) thermostat is designed using two temperature power switches in conjunction with a solid state relay. A three position switch is provided to adjust temperature settings.

| MODEL NUMBER | PART NUMBER | NOTES | TEMP @ T1 °C | TEMP @ T2 °C | T1-T2 (MAX) °C | RESET (TYP) °C | RESET °C | TEMP @ T3 | OPERATING VOLTAGE | SWITCHING VOLTAGE | SWITCHING CURRENT MAX. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TC-6F | 6F-00A-00-000 | No Relay | 35 +/- 5 | 25 +/- 5 | 10 +/- 3 | 6.5 | 3 | Continuous On | NA | NA | NA |
| TC-6F-AC | 6F-03T-00-000 | VAC Version | 35 +/- 5 | 25 +/- 5 | 10 +/- 3 | 6.5 | 3 | Continuous On | 85-250 VAC | 24-280 VAC | 10 |
| TC-6F-DC | 6F-43D-00-000 | 12/24 VDC | 35 +/- 5 | 25 +/- 5 | 10 +/- 3 | 6.5 | 3 | Continuous On | 12/24 VDC | 0-100 VDC | 20 ADC |
| TC-6F-DC | 6F-33D-00-000 | 48 VDC | 35 +/- 5 | 25 +/- 5 | 10 +/- 3 | 6.5 | 3 | Continuous On | 48 VDC | 0-100 VDC | 20 ADC |

## TC-3F HEAT AND COOL

Model TC-3F (Heat/Cool) thermostat incorporates the same technology as the TC-6F. It contains a single setting each for both heating and cooling as referenced below:

| MODEL NUMBER | PART NUMBER | NOTES | COOL TEMP. °C | HEAT TEMP. °C | RESET (MAX) °C | RESET (TYP) °C | OPERATING VOLTAGE | SWITCHING VOLTAGE | SWITCHING CURRENT MAX. | H-BRIDGE RELAYS |
|---|---|---|---|---|---|---|---|---|---|---|
| TC-3F-AC | 3F-04R-00-000 | VAC Version | 35 +/- 5 | 15 +/- 5 | 6.5 | 3 | 85-280 VAC | 24-280 VAC | 10 AMPS | N/A |
| TC-3F-DC | 3F-44G-00-000 | 12/24 VDC | 35 +/- 5 | 15 +/- 5 | 6.5 | 3 | 3.5-32 VDC | 0-100 VDC | 20 ADC | N/A |
| TC-3F-DC | 3F-44P-00-000 | 12/24 VDC | 35 +/- 5 | 15 +/- 5 | 6.5 | 3 | 3.5-32 VDC | 0-100 VDC | 20 ADC | Solid State |

## TC-7F HEAT/COOL WITH ECO-MODE

Model TC-7F (Heat/Cool) thermostat incorporates the same technology as the TC-3F. It contains a single setting each for both heating and cooling and a heat exchanger mode (ECO-Mode).

| MODEL NUMBER | PART NUMBER | NOTES | COOL TEMP. °C | HX TEMP. °C | HEAT TEMP. °C | RESET (MAX) °C | RESET (TYP) °C | OPERATING VOLTAGE | SWITCHING VOLTAGE | SWITCHING CURRENT MAX. | H-BRIDGE RELAYS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TC-7F-DC | 7F-24G-00-000 | 24 VDC | 35 +/- 3 | 25 +/- 3 | 10 +/- 3 | 6.5 | 3 | 24 VDC | 24 VDC | 20 ADC | N/A |
| TC-7F-DC | 7F-24O-00-001 | 24 VDC | 35 +/-3 | 25 +/-3 | 10 +/-3 | 6.5 | 3 | 24 VDC | 24 VDC | 12 ADC | Solid State |
| TC-7F-DC | 7F-24S-00-000 | 12 VDC | 35 +/-3 | 25 +/-3 | 10 +/-3 | 6.5 | 3 | 12 VDC | 12 VDC | 20 ADC | Solid State/Mechanical |
| TC-7F-DC | 7F-24T-00-000 | 24 VDC | 35 +/-3 | 25 +/-3 | 10 +/-3 | 6.5 | 3 | 24 VDC | 24 VDC | 20 ADC | Solid State/Mechanical |
| TC-7F-DC | 7F-24U-00-000 | 48 VDC | 35 +/-3 | 25 +/-3 | 10 +/-3 | 6.5 | 3 | 48 VDC | 48 VDC | 20 ADC | Solid State/Mechanical |

**For custom variations of any of the controls, contact TECA.**

# LIMITED WARRANTY

In the event a defect in material or workmanship is discovered in any of TECA's products within one year after the date they are delivered to Buyer, and if: (a) TECA is notified of the defect in writing by certified mail within 14 days of the date of discovery; (b) TECA may then either, at its sole discretion, inspect the product at Buyer's location, or require that the product be made available at Buyer's expense at TECA's premises for TECA's inspection within 14 days of the date of notification; and (c ) the products are defective and the defects result from faulty materials and/or workmanship and not in any way from accident, misuse, misapplication, mishandling, modification, or alteration by the Buyer or the shipper, then TECA shall, at its sole option, repair or exchange defective products free of charge to Buyer, or credit to buyer the price of the defective products. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL TECA BE LIABLE FOR ANY CLAIM BASED UPON BREACH OF EXPRESS OR IMPLIED WARRANTY OR ANY OTHER DAMAGES WHETHER SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, LOST PROFITS, BUSINESS INTERRUPTION, OR LOSS OF BUSINESS OR CUSTOMER RELATIONSHIPS.

## RETURNED GOODS, RESTOCKING CHARGES

In order to return merchandise for any reason ( repair, replacement, or credit) a return authorization number must be issued by TECA. New merchandise may not be returned for credit beyond 60 days from shipment. Charges for incidental or other damages may also be made. All returned goods must be sent freight prepaid. A restocking charge of 15% will apply. On special equipment and custom modified equipment orders, additional incremental cancellation charges may be made.