Product Information Packet

Model FHP-2250

Solid State, NEMA 12, Air Conditioner

24 VDC, with TC-4F Temperature Control

Part #7-H4J 5-0-000

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
Wiring Drawing # SK150425
Installation Drawing # SK130710
Temperature Control Information
Warranty Information
Important Installation Notes for Air Conditioners

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 an 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-2250 Air Conditioner/Heat Exchanger

**FEATURES**
- High capacity thermoelectric design
- Power saving air to air heat exchanger mode (ECO-Mode)
- Heavy duty full perimeter mounting
- No intrusion into enclosure
- Central input cord for easy mounting
- Closed loop design
- Condensate control and evaporation system
- Compact (20.5" L x 13" W x 8.5" D)
- Increased efficiency at higher ambients by as much as 10%
- Virtually maintenance free
- No compressor
- Environmentally friendly and safe
- Stainless Steel exterior housing
- Mounts and operates in any orientation
- Integral temperature controller
- Weight 66 LBS.

**CONTROL TEMPERATURES**
- Active Cooling: 35 °C
- Heat Exchanger (ECO-Mode): 25 °C
- Active Heating: 10 °C
- Typical Hysteresis: 5 °C
- Operating Ambient: -40/+65 °C
- Operating Enclosure: -10/+60 °C

**POWER INPUTS**
- Voltage: 24 VDC
- Current, Active: 15 AMPs
- Current, ECO-Mode: 1.9 AMP

**PERFORMANCE RATINGS**
- Cooling (Traditional): 1250 BTU/HR
- Cooling (Din 3168): 367 WATTS
- Cooling COP (at L35 L35): 1.02
- Heating (Traditional): > 1220 BTU/HR
- Heating (Din 3168): > 367 WATTS
- Heating COP: > 1.02
- Heat Exchanger (ECO-Mode): 12.5 W/°C

**CONFIGURATIONS**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PART NUMBER</th>
<th>NOTES</th>
<th>TEMPERATURE CONTROL</th>
<th>ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>FHP-2250</td>
<td>7-H4J5-0-000</td>
<td>Cool only, industrial fans &amp; power supply</td>
<td>TC-4F</td>
<td>NEMA-12, IP 52</td>
</tr>
<tr>
<td>FHP-2250</td>
<td>7-H4J5-0-000</td>
<td>Cool only, industrial fans &amp; power supply</td>
<td>EXT*</td>
<td>NEMA-12, IP 52</td>
</tr>
<tr>
<td>FHP-2250HC</td>
<td>7-H4J5-1-000</td>
<td>Heat/Cool, industrial fans &amp; power supply</td>
<td>TC-7F</td>
<td>NEMA-12, IP 52</td>
</tr>
<tr>
<td>FHP-2250HC</td>
<td>7-H4J5-1-000</td>
<td>Heat/Cool, industrial fans &amp; power supply</td>
<td>EXT*</td>
<td>NEMA-12, IP 52</td>
</tr>
<tr>
<td>FHP-2250XE</td>
<td>7-H4J5-4-000</td>
<td>Cool only, sealed hot side fans &amp; power supply</td>
<td>TC-4F</td>
<td>NEMA-4, IP 56</td>
</tr>
<tr>
<td>FHP-2250XE</td>
<td>7-H4J5-4-000</td>
<td>Cool only, sealed hot side fans &amp; power supply</td>
<td>EXT*</td>
<td>NEMA-4, IP 56</td>
</tr>
<tr>
<td>FHP-2250XEH</td>
<td>7-H4J5-5-000</td>
<td>Heat/Cool, sealed hot side fans &amp; power supply</td>
<td>TC-7F</td>
<td>NEMA-4, IP 56</td>
</tr>
<tr>
<td>FHP-2250XEH</td>
<td>7-H4J5-5-000</td>
<td>Heat/Cool, sealed hot side fans &amp; power supply</td>
<td>EXT*</td>
<td>NEMA-4, IP 56</td>
</tr>
<tr>
<td>FHP-2250X</td>
<td>7-H4J5-2-000</td>
<td>Cool only, Mil. grade hot side fans &amp; power supply</td>
<td>TC-4F</td>
<td>NEMA-4X, IP 56</td>
</tr>
<tr>
<td>FHP-2250X</td>
<td>7-H4J5-2-000</td>
<td>Cool only, Mil. grade hot side fans &amp; power supply</td>
<td>EXT*</td>
<td>NEMA-4X, IP 56</td>
</tr>
<tr>
<td>FHP-2250XHC</td>
<td>7-H4J5-3-000</td>
<td>Heat/Cool, Mil. grade hot side fans &amp; power supply</td>
<td>TC-7F</td>
<td>NEMA-4X, IP 56</td>
</tr>
<tr>
<td>FHP-2250XHC</td>
<td>7-H4J5-3-000</td>
<td>Heat/Cool, Mil. grade hot side fans &amp; power supply</td>
<td>EXT*</td>
<td>NEMA-4X, IP 56</td>
</tr>
</tbody>
</table>

* Unit is set for 5-32 VDC external signal, relay(s) included

TECA 1-888-TECA-USA (832-2872) www.thermoelectric.com
Equation of line: \( y = \Delta T \) (°C) = Capacity (Watts)

<table>
<thead>
<tr>
<th>Ambient Temp</th>
<th>35°C</th>
<th>50°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure Air</td>
<td>( y = 0.072x - 26.4 )</td>
<td>( y = 0.072x - 27.1 )</td>
</tr>
<tr>
<td>Cold Sink</td>
<td>( y = 0.056x - 26.4 )</td>
<td>( y = 0.056x - 27.1 )</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

**PERFORMANCE CURVE**

- **Cooling Capacity (BTU/HR)**
  - Ambient Temp 35°C
  - Ambient Temp 50°C

**MOUNTING STYLE**
- Flush Mounted

**ENVIRONMENTS SERVED**
- NEMA-12, IP 52
- NEMA-4,4X, IP 56

**RATING (TRADITIONAL)**
- 1250 BTU/hr @ 0 °F ΔT
- 1776 BTU/hr @ +20 °F ΔT

**RATING (DIN 3168)**
- 367 Watts L35 L35
- 168 Watts L35 L50

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**FHP-2250**

- **Air Conditioner - Air Cooled**

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**MOUNTING CUTOUT DIMENSIONS**

- Dimensions do not include hardware
- Mounting hardware and gasket included but not shown
- Dimensions: Inches [Millimeters]

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**TECA**

www.thermoelectric.com 1-888-TECA-USA (832-2872)
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.

### TC-1F Power Temperature Switches

<table>
<thead>
<tr>
<th>Model</th>
<th>Part Number</th>
<th>Note</th>
<th>Voltage</th>
<th>Current</th>
<th>Set Point Tolerance °C</th>
<th>Reset Differential °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cool</td>
<td>TC-1C-XX</td>
<td>Switch closes on temp rise</td>
<td>125 VAC</td>
<td>2</td>
<td>+/− 3</td>
<td>3 - 6</td>
</tr>
<tr>
<td>Heat</td>
<td>TC-1H-XX</td>
<td>Switch closes on temp drop</td>
<td>250 VAC</td>
<td>1.3</td>
<td>+/− 3</td>
<td>3 - 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12 VDC</td>
<td>2</td>
<td>+/− 3</td>
<td>3 - 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24 VDC</td>
<td>1.3</td>
<td>+/− 3</td>
<td>3 - 6</td>
</tr>
</tbody>
</table>


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

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Model TC-4F is similar 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.

### TC-4F Cool Only with ECO-Mode

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Part Number</th>
<th>Notes</th>
<th>Cool Temp °C</th>
<th>Heat Temp °C</th>
<th>T1-T2 (Max) °C</th>
<th>Reset (Typ) °C</th>
<th>Reset °C</th>
<th>Temp @ T3 °C</th>
<th>Operating Voltage</th>
<th>Switching Voltage</th>
<th>Active Mode</th>
<th>Switching Current Max.</th>
<th>ECO-Mode</th>
<th>Switching Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-4F-DC</td>
<td>4F-24C-00-000</td>
<td>12/24/48 VDC</td>
<td>25 +/- 3</td>
<td>35 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>12/24/24 VDC</td>
<td>0-100 VDC</td>
<td>12 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-4F-DC</td>
<td>4F-24D-00-000</td>
<td>12/24/48 VDC</td>
<td>25 +/- 3</td>
<td>35 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>12/24/48 VDC</td>
<td>0-100 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-4F-DC</td>
<td>4F-24E-00-000</td>
<td>12/24/48 VDC</td>
<td>25 +/- 3</td>
<td>35 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>12/24/48 VDC</td>
<td>0-100 VDC</td>
<td>40 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

### TC-6F Cool Only

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Part Number</th>
<th>Notes</th>
<th>Cool Temp °C</th>
<th>Heat Temp °C</th>
<th>HX Temp °C</th>
<th>Cool Temp °C</th>
<th>Heat Temp °C</th>
<th>T1-T2 (Max) °C</th>
<th>Reset (Typ) °C</th>
<th>Reset °C</th>
<th>Temp @ T3 °C</th>
<th>Operating Voltage</th>
<th>Switching Voltage</th>
<th>Switching Current Max.</th>
<th>H-Bridge Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-6F-DC</td>
<td>6F-24C-00-000</td>
<td>No Relay</td>
<td>35 +/- 5</td>
<td>25 +/- 5</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>12/24/24 VDC</td>
<td>0-100 VDC</td>
<td>12 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-6F-AC</td>
<td>6F-24D-00-000</td>
<td>VAC Version</td>
<td>35 +/- 5</td>
<td>25 +/- 5</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>85-250 VAC</td>
<td>24-280 VAC</td>
<td>10 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-6F-DC</td>
<td>6F-24E-00-000</td>
<td>12 VDC</td>
<td>35 +/- 5</td>
<td>25 +/- 5</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>12/24 VDC</td>
<td>0-100 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-6F-DC</td>
<td>6F-24F-00-000</td>
<td>48 VDC</td>
<td>35 +/- 5</td>
<td>25 +/- 5</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>48 VDC</td>
<td>0-100 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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:

### TC-3F Heat and Cool

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Part Number</th>
<th>Notes</th>
<th>Cool Temp °C</th>
<th>Heat Temp °C</th>
<th>HX Temp °C</th>
<th>Cool Temp °C</th>
<th>Heat Temp °C</th>
<th>T1-T2 (Max) °C</th>
<th>Reset (Typ) °C</th>
<th>Reset °C</th>
<th>Temp @ T3 °C</th>
<th>Operating Voltage</th>
<th>Switching Voltage</th>
<th>Switching Current Max.</th>
<th>H-Bridge Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-3F-AC</td>
<td>3F-24G-00-000</td>
<td>VAC Version</td>
<td>35 +/- 5</td>
<td>15 +/- 5</td>
<td>6.5</td>
<td>3</td>
<td>85-320 VAC</td>
<td>24-280 VAC</td>
<td>10 ADC</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-3F-DC</td>
<td>3F-24H-00-000</td>
<td>12 VDC</td>
<td>35 +/- 5</td>
<td>15 +/- 5</td>
<td>6.5</td>
<td>3</td>
<td>3.5-32 VDC</td>
<td>0-100 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-3F-DC</td>
<td>3F-24I-00-000</td>
<td>12 VDC</td>
<td>35 +/- 5</td>
<td>15 +/- 5</td>
<td>6.5</td>
<td>3</td>
<td>3.5-32 VDC</td>
<td>0-100 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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).

### TC-7F Heat/Cool with ECO-Mode

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Part Number</th>
<th>Notes</th>
<th>Cool Temp °C</th>
<th>Heat Temp °C</th>
<th>HX Temp °C</th>
<th>Cool Temp °C</th>
<th>Heat Temp °C</th>
<th>T1-T2 (Max) °C</th>
<th>Reset (Typ) °C</th>
<th>Reset °C</th>
<th>Temp @ T3 °C</th>
<th>Operating Voltage</th>
<th>Switching Voltage</th>
<th>Switching Current Max.</th>
<th>H-Bridge Relays</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC-7F-DC</td>
<td>7F-24G-00-000</td>
<td>24 VDC</td>
<td>35 +/- 3</td>
<td>25 +/- 3</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-7F-DC</td>
<td>7F-24H-00-000</td>
<td>12 VDC</td>
<td>35 +/- 3</td>
<td>25 +/- 3</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>12 VDC</td>
<td>12 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-7F-DC</td>
<td>7F-24I-00-000</td>
<td>12 VDC</td>
<td>35 +/- 3</td>
<td>25 +/- 3</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>12 VDC</td>
<td>12 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC-7F-DC</td>
<td>7F-24J-00-000</td>
<td>24 VDC</td>
<td>35 +/- 3</td>
<td>25 +/- 3</td>
<td>10 +/- 3</td>
<td>6.5</td>
<td>3</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>20 ADC</td>
<td>1.3 ADC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

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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.