

Air-to-Air Thermoelectric Assembly



The Tunnel Series Air-to-Air thermoelectric assembly is a thermoelectric based air conditioner designed to temperature control small chambers used in analytical and medical diagnostic instruments. The unique design offers premium fans pushing air across-high density heat sinks to minimize the number of air flow paths required to operate. The design utilizes custom thermoelectric modules to maximize cooling capacity with a high coefficient of performance. Moisture resistant insulation is used to keep condensation from penetrating the TEM cavity. The units operate on DC and are designed for an indoor lab use environment.

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FEATURES

- Compact form factor
- Improved sealing for moisture protection
- Reliable solid-state operation
- RoHS compliant

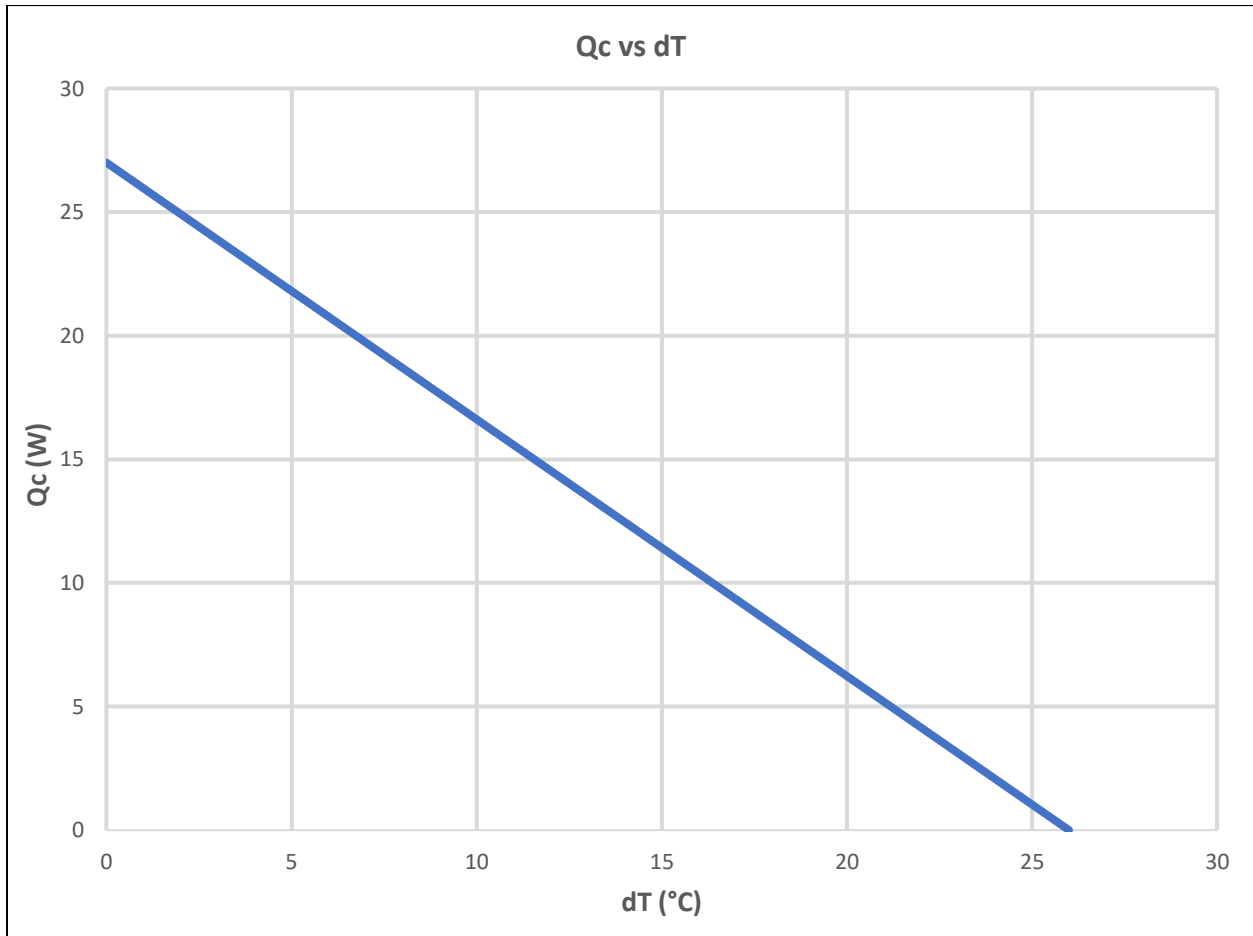
APPLICATIONS

- Analytical storage compartment temperature control
- Medical diagnostic chamber refrigeration

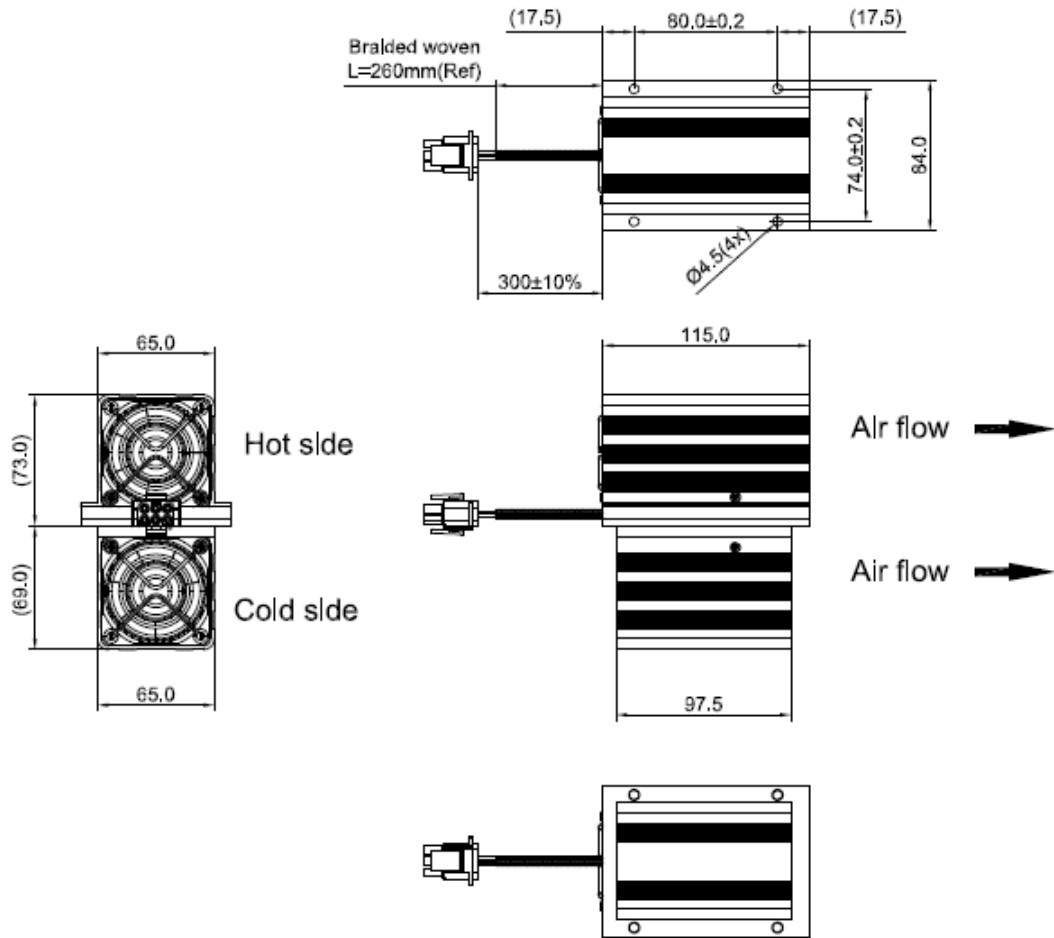
| SPECIFICATIONS | |
|--------------------------------|---|
| TEA Model | AAT,027,12,22,00,00 |
| Heat Transfer, Cold Side | Air |
| Heat Transfer, Hot Side | Air |
| Cooling Power | 27 W @ $\Delta T=0^{\circ}\text{C}$ and $T_a=35^{\circ}\text{C}$, Tolerance $\pm 10\%$ |
| TEM Input Power | |
| Voltage, Nominal | 12 VDC |
| Current, Nominal | 2.3 Amps @ $\Delta T=0^{\circ}\text{C}$ |
| Fan Input Power | |
| Hot side Fan Voltage, Nominal | 12 VDC |
| Hot side Fan Current, Nominal | 0.25 Amps |
| Cold side Fan Voltage, Nominal | 12VDC |
| Cold side Fan Current, Nominal | 0.25Amps |
| Dimension (L x W x H) | 115 x 84 x 142 mm |
| Weight | 1.0kg |
| Operating Temperature | -10°C to 50°C |
| Packaging | Individual cardboard box |

PERFORMANCE CURVES

TEA performance at $T_h = 35^\circ\text{C}$



ISOMETRIC DRAWINGS

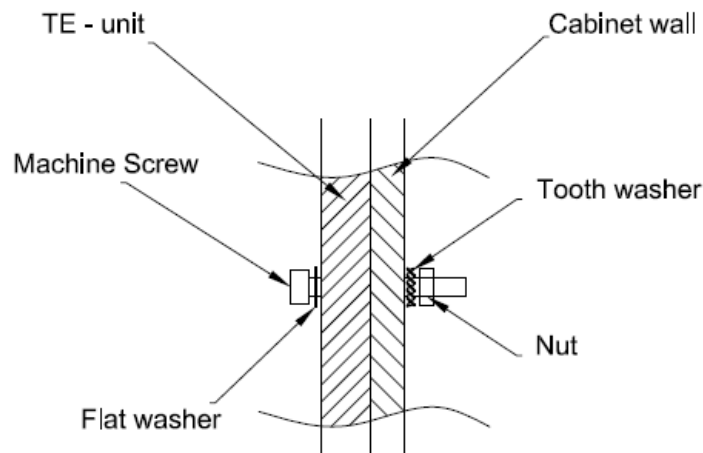


ELECTRICAL CONNECTIONS

| OBJECT | WIRE TYPE | COLOR | TERMINAL | RECEPTACLE HOUSING | POLE | PLUG HOUSING |
|-----------------|-----------|--------|--------------------------|----------------------------|------|----------------------------|
| TEM + | AWG #20 | Red | TE Connectivity 350547-1 | TE Connectivity 1-480704-0 | 1 | TE Connectivity 1-480705-0 |
| TEM - | | Black | | | 2 | |
| FAN COLD SIDE + | | Purple | | | 3 | |
| FAN COLD SIDE - | | Blue | | | 4 | |
| FAN HOT SIDE + | | White | | | 5 | |
| FAN HOT SIDE - | | Green | | | 6 | |

INSTALLATION INSTRUCTIONS

1. Mount with “hot side” external to chamber wall.
2. Cutout should be approximately 100 x 67 mm.
3. Unit should be fastened as shown in diagram with gasket material sealing around cutout.
4. For operation below dew point, recommend to position unit in vertical direction with wires facing down to allow for condensation to run off of unit. Drip tray may be required to collect moisture from surfaces at temperatures below dew point.
5. TE should not be used as part of the structure and is recommended to be protected from external forces.
6. The input power to TEA should be protected with fuse. Fuse rating should withstand 150% of nominal current rating for 60 seconds. This is valid at $T_a=35^{\circ}\text{C}$. Fuse ratings for other ambient temperatures ($x^{\circ}\text{C}$) can be calculated with the formula $I [x^{\circ}\text{C}] = I [35^{\circ}\text{C}] / (1+0.005*(x-35))$. This is valid when regulating with an On/Off regulation. At rapid temperature cycling where this is applicable, there can be a need for even higher fuse ratings.
7. Max ripple current on supply power should be $\leq 5\%$.
8. Switching power to TEMs at frequencies between 0.01Hz to 5KHz may degrade reliability and



shorten life.

SERVICE

- Units are generally maintenance free, however occasionally it is recommended to clean the heat sinks and fans of debris. This is best done with compressed air.

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