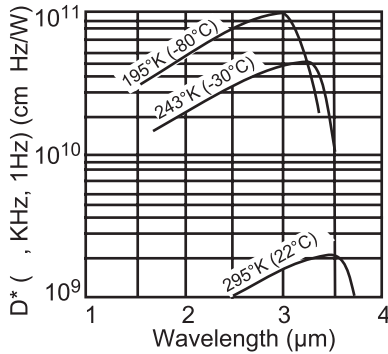




Typical Spectral Response



Maximum Ratings

- TE Cooler Current: 1.0 A
- TE Cooler Voltage: 6.7 V
- Thermistor Power: 0.5 mW
- Storage Temp: -30 to $+70^\circ\text{C}$
- Case Operating Temp: -40 to $+50^\circ\text{C}$

Cautions

- **Do not drop or shock the detector.** The thermoelectric cooler is fragile and will break.
- **Avoid damage to the pinch-off tube** on the side of the package, to protect the vacuum integrity.
- **Observe proper polarity when applying power to the cooler.** Reversing the polarity will cause the cooler to become a heater, and will permanently damage the unit. The polarity is marked on the package.
- **Observe maximum cooler voltage and current.** Cooler power must be DC and should have a maximum ripple of 10%.
- **Avoid bending the package leads** when wiring the unit. A 50W maximum soldering iron is recommended.
- **Provide an adequate heat sink.** Do not apply cooler power until the unit is properly mounted on a heat sink.
- **Operation at 0 V detector bias** is strongly recommended. Maximum bias is 1V.

Description

J12TE4 Series detectors are Indium Arsenide photodiodes mounted on four-stage thermoelectric coolers and sealed in high-reliability vacuum packages.

Cooler Operation

The TE cooler reduces the detector temperature in response to an applied current. Under normal conditions, a detector temperature of $200^\circ\text{K} (-70^\circ\text{C})$ is achieved with a cooler current of approximately 0.7A when the cooler hot side is 22°C (Figure 1).

For every two-degree increase in the cooler hot side temperature, the cooler cold side temperature will increase approximately one degree (Figure 2). The cooler hot side and cold side are illustrated in Figure 3.

In general, the detector temperature is equal to the cooler cold side temperature. The cooler hot side temperature will exceed the heat sink temperature by several degrees, depending on the amount of cooler current.

Heat Sinks

A heat sink **must** be used to prevent overheating and provide optimum cooler performance. The heat sink must be capable of dissipating at least 10W with less than 2°C temperature rise. A thermally conductive compound, such as DOW 340, should be used between the heat sink and the copper package base.

Figure 1: Typical Cooler Performance

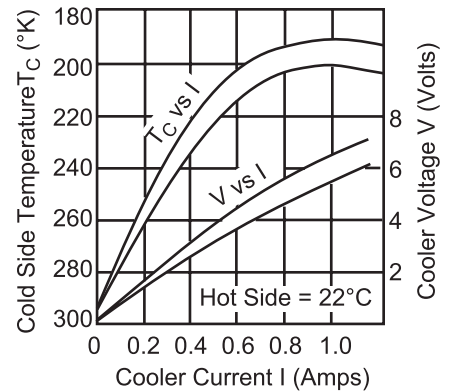


Figure 2: Typical Cooler Performance vs. Hot Side Temperature

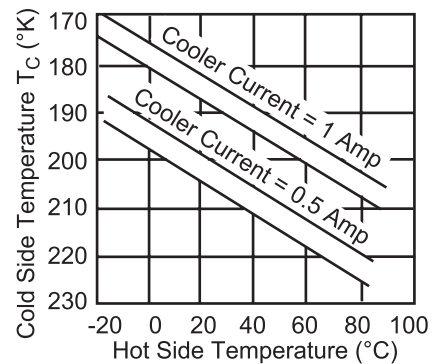
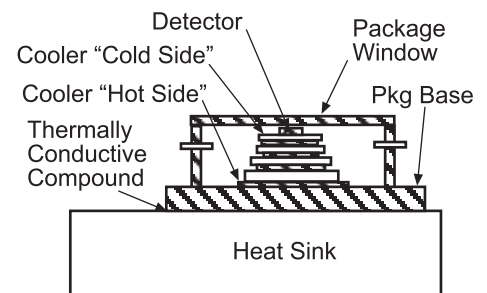


Figure 3: TE Cooler Illustration



System Setup

Read precautionary information and mount the package on a suitable heat sink before attempting to operate the detector. Make all circuit connections before applying power; turn off power before disconnecting or changing connections.

Observing max ratings and polarity, apply power to the cooler leads. Beginning with a fixed voltage and low current, gradually increase the current as the detector cools.

Temperature Control

The detector temperature may be monitored using the built-in thermistor (Figure 4). A calibration chart showing thermistor resistance vs. temperature is provided with each detector.

The thermistor can be used to control and stabilize the detector temperature (Figure 5). The Teledyne Judson Model TC5 power supply and temperature controller is recommended for convenient cooler operation at a range of fixed temperatures. The TC5's built-in power supply and current overload fuse prevents inadvertent cooler damage due to overheating.

Figure 4: Typical Thermistor Values

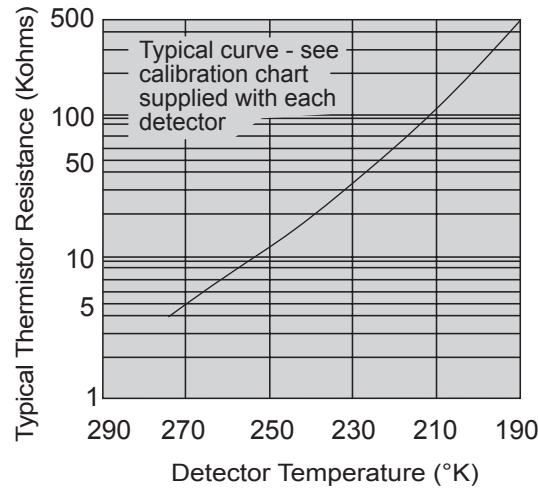
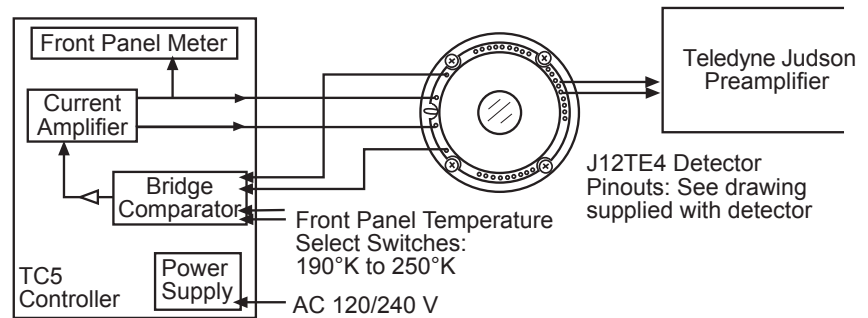


Figure 5: Typical Setup with Automatic Temperature Control



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