ATE1-TC-71 TEC Modules

This TEC module can be controlled by our TEC controllers to build highly stable and efficient temperature regulating systems. The ATE1-TC-71 series TECs can be used with our thermistors as well to achieve precise and stable temperature sensing.

The ATE1-TC-71 series TECs come in with highly flat bare ceramic surfaces on the both sides, they can be mounted onto flat metal surfaces by inserting thin layers of thermally conductive filler materials, the so-called thermal pads, or placing a thin layer of thermal paste. When mounting, make sure that proper pressure is applied constantly to keep good thermal contacting between the metal and the TEC plates, minimizing thermal resistance between them.

The TECs can withstand strong orthogonal forces applied to the surface, but very vulnerable to tangent forces, especially shocking tangent forces. A small shocking tangent force can cause the Peltier elements crack inside. The crack may not cause operation problem initially, but it will grow with time, causing the TEC resistance to increase slowly, by the end, the TEC will stop operating.

The ATE1-TC-71 TECs come with 2 insulated lead wires. The positive wire is in red color, and the negative wire is of black. The mechanical dimensions are shown in Figure 2.

The TECs, which have the edge area be sealed, are to prevent moisture from getting into the Peltier elements and to extend the life time of the TECs. The advantage of the non-sealed TECs is that the efficiency is higher and can achieve higher maximum temperature difference between the two TEC plates.

For applications in moisture environments, sealed version is recommended, in order to achieve long life time and high reliability for the system.

For high end applications where good and reliable thermal contacts are needed between the TEC and the target object surfaces, the TEC ceramic surface can be metalized so that the TEC and the target object surfaces can be soldered together.

FEATURES

- Long Life Time than Standard TECs
- Maximum Input Voltage: 9.0V
- 100 % lead (Pb)-free and RoHS Compliant

APPLICATIONS

Regulate the temperature of the target object with high changing speed and stabilize the temperature to a wide range with high precision. Long life TEC modules are widely used for temperature cycling applications, including instrumentation, PCR devices, thermal cyclers, chillers and analyzers, etc.

DESCRIPTIONS

This series of TEC (Thermoelectric Cooler) modules, ATE1-TC-71, has 71 pairs of Peltier elements inside with a maximum voltage of 9.0 Volt. They are designed for temperature cycling applications, in which a TEC module is exposed to demanding physical stresses as the module shifts from heating to cooling, and this can significantly reduce the operational life of a standard TEC. This long life time TECs have significantly longer life time than standard TECs.
To achieve high COP, Coefficient of Performance, which is defined as:

\[ \text{COP} = \frac{\text{thermal power}}{\text{electric power}} \]

the ratio between the TEC’s output thermal power and the input electric power. Apparently, a high COP leads to low power system consumption, thus, high efficiency. The key to achieve high COP is to design the system with a low maximum temperature difference between the 2 TEC plates (the hot side and the cold side), DT. When the operating DT can be kept to be \( \leq 30^\circ \text{C} \), the COP can be as high as 2, a very good result.

When the required maximum temperature difference is low, such as \( < 30^\circ \text{C} \), a large TEC module can be used to drive small thermal load, resulting in a low DT, thus high COP and efficiency.

It is not hard to design in a TEC system, but does require some understanding of heat transfer and a good grasp of your applications.
MECHANICAL DIMENSIONS

The mechanical dimensions of the ATE1-TC-71 are shown below. The ATE1-TC-71 series TECs come in square shape, small size, and light weight.

![Diagram of ATE1-TC-71 mechanical dimensions]

Figure 2. Mechanical Dimensions of Sealed ATE1-TC-71

Note: As Figure 2 shows, when the red lead wire is on the right, then the top surface is the cold side of the TEC.

CAUTIONS

1. Never apply electricity to TEC modules without having heat sinks attached properly.
2. Always keep the current less than $I_{\text{MAX}}$, to avoid thermal run-away disaster.

NOTICE

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