Safe and Energy Efficient

Honeycomb PTC Heaters

Technical Overview

Pelonis Technologies' *specialty heating disc is made from a revolutionary ceramic material and has over 1,200 holes that heat 100% of the airflow across the entire surface area of the disc. This creates a superior heat transfer in a small space which produces an instant flow of heat up to 50% hotter than conventional coil or ceramic chip heaters. The honeycomb disc is very safe and operates below the combustion point of paper.*

HONEYCOMB PTC HOLDER ASSEMBLIES

Honeycomb PTC heating elements can be configured into three, four, or five disc configurations that produce up to 2000 watts of heat output. Other OEM configurations are possible depending on customer applications. All PTC holder assemblies consist of high temperature PPS plastic, stainless steel contacts, and silver coating for optimum conductivity.

PART NO.	VOLTAGE (V)	HEAT OUTPUT (W)	MATERIAL	CONFIGURATION
PH1209-Q4 PH2205-Q4	120 230	1100 1100	PPS High Temperature Plastic, Stainless Steel Contacts, and Silver Coating	
PH1212-A8 PH2207-A9	120 230	1500 1500	" "	
PH1212-L4 PH2207-L4	120 230	1500 or 2000 1500 or 2000	" "	

Part No Code: (Example: PH 12 09 – Q 4)

PH: PTC Holder / 12:120V; 22:220V; / 09:9A; 05:5A; 07:7A; 12:12A

Q: Triangle Shape; L: Round Shape; A: Square Shape

4: Series #

PTC Heater assemblies can be configured with various size cooling fans and blowers to provide powerful, safe, and compact air heating systems that can be used in a variety of applications.

What is PTC?

PTC is a semiconductor ceramic that has a very high **Positive Temperature Coefficient (PTC).** When power is applied on the PTC, its resistance initially decreases and its temperature increases. This reduction of resistance accounts for the inrush current which usually occurs within the first 5 seconds.

As the temperature of the PTC increases and reaches the PTCs Curie Temperature (Tc), its resistance drastically increases, resulting in current reduction. Current reduction also means power reduction and temperature reduction. Thus, the PTC material will try to maintain a constant temperature which in practical applications (near the Curie Temperature) is practically independent of the air flow applied.

The PTC heat output can be regulated by the air flow applied in typical applications of heat generation; the higher the air flow, the higher the heat output.

Fig. A shows the typical Resistance vs. Temperature characteristics and Fig. B shows the Current vs. Time characteristics.

Resistance / Temperature Graph

In Fig. A, we plot Resistance / Temperature characteristics of two different PTC pellets. Basically, you have the "A" category, which are the high Curie temperature PTC pellets where Tc is larger than 120 ºC. These are suitable as over-heat protectors and high heat generation heaters. Notice that the R/T slope is not as steep to allow for smaller resistance change per degree of temperature change. This gives a larger "operating window" in the R/T curve.

In the "B" category, those with Curie point below 120ºC, the steep slope gives us higher resistance sensitivity in an ON - OFF situation, making them ideal for switching purposes (e.g. thermal sensors, over-current protectors, relays, and degassers).

Based on the PTC characteristics, there are 3 different types of applications where PTC can be used:

1. **Heat Generation:** The PTC is used as a heating element by applying the rated voltage range and choosing the operating current point by removing the heat generated either by conduction, natural convection, forced air convection, or radiation.
2. **Temperature Sensing**: In this case, we are utilizing the property of the Curie Temperature point at which the PTC resistance increases drastically. Selecting the Curie Temperature to be the same as the critical ambient temperature for our application, we can use the resistance change effect for temperature monitoring and compensation purposes.
3. **Initial Current Applications**: In this case, the inrush current property is utilized (as in the case of the motor starter for activation of the starting coil). The PTC allows maximum current flow for the first few seconds and then it will present a high resistance (it will virtually act as an open circuit).

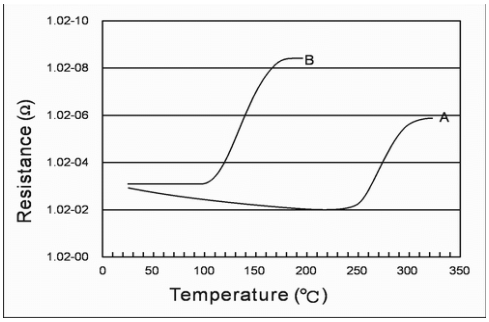

Fig. A

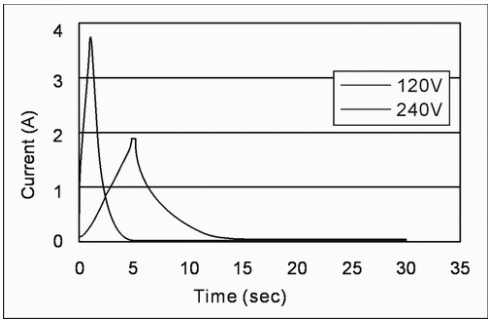

Fig. B

PTC can be used in a variety of applications, some of which include:

air conditioners	custom heaters
water heaters	mat/cushion heaters
hot plates	clothes dryers
thermos containers	rice cookers
shoe dryers	photo copiers
steam irons	steam hair brushes
sauna equipment	injector warmers
phone displays	medical equipment
motor starters	luminance starters
circuit breakers	blood analyzers