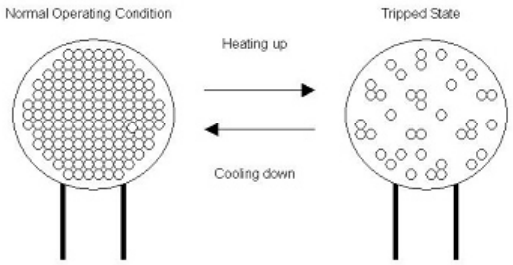
Frequently Asked Questions (FAQ) on PPTC Resettable Device:

Q: How does the Fuzetec PPTC device work? Is it self-resetting?

A: Yes, the Fuzetec Polymeric PTC device is self-resetting. Basically, it is a PTC (positive thermal coefficient) variable resistor with its resistance increasing with the increase in current.

While the device allows current to pass through during normal conditions, at the time of an over current condition its PTC polymeric material undergoes a change of state, whereby the polymer portion expands and causes the carbon black particles within the polymer to separate from each other thereby disconnecting the electrical path between them. The device thus attains a high resistance state and does not allow the current to pass through as long as over current conditions persist.

The device resets itself once the fault is cleared and it has an opportunity to cool down. Cooling causes the special polymer within the device to contract and reconnect the carbon black particles, thus lowering the resistance and once again allowing the current to pass through normally.



The normal way to cool down the device is to power off the equipment that is being protected by the Resettable device, thereby cutting the maintain or trickle current and allowing the device to cool.

Q: How long does it take for the device to reset?

A: The time it takes the Resettable device to reset back to the low resistance state depends on a variety of factors: the rating of the device, the method of mounting, the ambient temperature, the air flow in and around the ambient, and the duration of the trip event. In general, most devices under expected conditions will reset within a couple of minutes although many will reset within seconds.

Q: Will the Resettable device stay latched throughout the fault condition or will it set up a cycle of on- off-on?

A: Resettable device will not cycle between a normal and a tripped state while a fault condition is present. When the device trips and goes from a low resistance to a high resistance state, a small amount of trickle current (or leakage current) is still present. This leakage current is sufficient to maintain the device in high resistance state. The Resettable device generally requires the power to the circuit to be interrupted, allowing it to cool and return to the normal low resistance state.

Q: When will the Resettable device reset?

A: The reset condition is a function of the current and voltage as well as the temperature. The device will usually begin to reset when its temperature decreases below 90C (We can say that a device below 80C has essentially reset). When the following condition is reached:

$V^{**}2/4R_L < Pd$

Where: V = Operating voltage of the circuit

R_L = Load resistance

Pd =Power dissipated by the Resettable Fuse, provide by the fuse mfr.

Q: What is the resistance of a Resettable device in the tripped state?

A: The resistance of the device in the tripped state depends on the following:

a) Rating of the device used,

b) Voltage across the device,

c) Power dissipation of the device.

The value of this resistance can be found using the following equation:

R1=V**2/Pd.

Q: What would be the leakage current in the tripped state?

A: When the PPTC Resettable device is latched in its high resistance state, the amount of current allowed to pass through the device is a fraction of the fault current. The current can be calculated by using the following equation:

I=Pd/Vps

Where: I = Leakage current of the device in the tripped state
Pd = Power dissipated by the device provided by the manufacturer
Vps = Voltage across the Resettable Fuse

Q: Can the device be used for applications requiring automatic reset?

A: In most all applications, power must be removed and the fault condition cleared in order to reset the device and restore the circuit to normal operation. However, under certain conditions the device may reset automatically. Generally, automatic reset can be designed into applications where the voltage could be varied during operation. This is because the Resettable device provides soft switching into a high resistance tripped state and it automatically resets to a lower resistance state when the source voltage reduces.

An example of this is the loudspeaker overdrive-protection solution. High-powered amplifiers used with lower powered speakers may overdrive loudspeaker coils with excessive power during sustained high volumes.

A typical circuit protection method is to place the Resettable device in series with the speaker. Resettable device of an appropriate rating should be selected so that its time-to-trip at any particular current is less than the time required to damage the driver at that current. As the source voltage is increased, current through the Resettable device increases, eventually causing it to trip and limit the power the speaker experiences. As the source voltage

decreases to normal levels, the voltage drop across the Resettable device too decreases. If the voltage drops to a sufficiently low level, the device will return to a low resistance state and will **automatically reset.**

When the following condition is met the Resettable device will automatically reset:

$$V^{**}2/4R_L < Pd$$

Where: V = Operating voltage of the circuit

R_L = Load resistance

Pd =Power dissipated by the device provided by the device manufacturer.

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