

CRF **us**

APPLICATION NOTE

Precision Fusible Safety Wirewound Resistor

> Features

The CRF us uses specially selected resistive winding wire, wounded on a ceramic rod and welded onto a metal caps, with special non-flammable varnish, to absorb the metal-vapour when the resistor wire fuses, to avoid arcing or short-circuit, on the top silicon cement coating material to ensure safe, without flames or explosion, and silent fusing operation when the main voltage is applied.

The CRF us was specially designed to act as a fuse when the main voltage (230[V]RMS or 120[V]RMS) is applied, to prevent the destruction or failing in the electric circuit. This series also acts as a fusible resistor, limiting the inrush current to prevent overload to the circuit.

CRF us allows designers to easily meet the requirements of safety approval, while eliminating the need to put additional fuses in series with the input resistor, using just one resistor. This will be typically less expensive.

> Fusing Performance

This resistor could also work as a fusing resistor, in case of overload. But unlike fuses, the fusing characteristic is given in power instead of current.

The maximum power vs time could be found in the graph shown beside. The current for a certain ohmic value could be calculated by $I = \sqrt{\frac{P}{R}}$

> UL1412 Approval

The CRF – 8 series is UL approved, for USA and Canada, with UL file E330640.

In the table shown beside, you can find the ohmic values according to each main voltage for each series.

The features for these series are as follows:

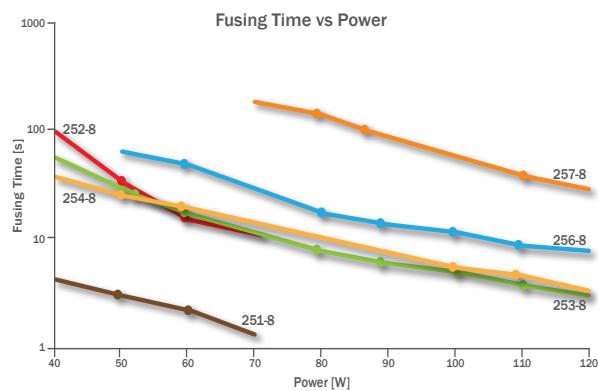
- Immediate interruption at main voltage 230[V], without flame or explosion;
- Regular manufacturing inspections by UL inspector;
- Regular tests monitored by UL laboratory.

> CRF us

Nowadays, the safety requirements in electronic circuits are becoming increasingly important. For VITROHM it is a primary issue for years.

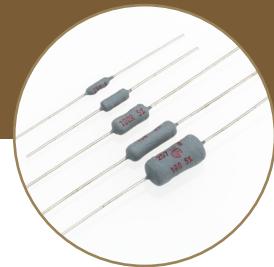
Typical fusible wirewound resistors are used when it's required to pass some type of short transient event without failing.

The CRF us series are designed to be used as a precision safety resistor. This series are used where the electronic circuit need a more robust resistor, a resistor that can withstand high power, either high short-term pulse, where the standard fusible resistor fail.



Resistance Range	UL - Voltage Approved			
	230[V]	375[V]	120[V]	170[V]
CRF251-8		1R... 100R		1R... 100R
CRF252-8		1R... 240R		1R... 240R
CRF253-8	10R... 330R		10R... 90R	
CRF254-8	10R... 330R		10R... 90R	
CRF256-8	10R... 330R		10R... 90R	
CRF257-8		1R... 330R		1R... 330R

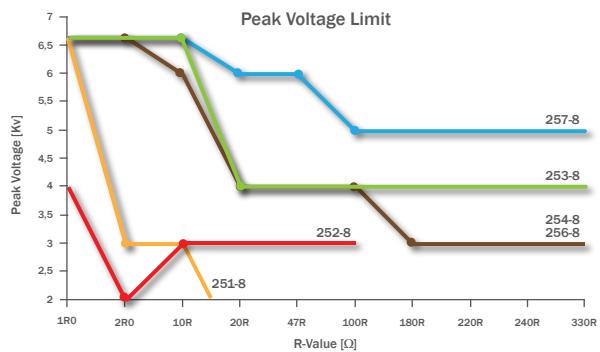
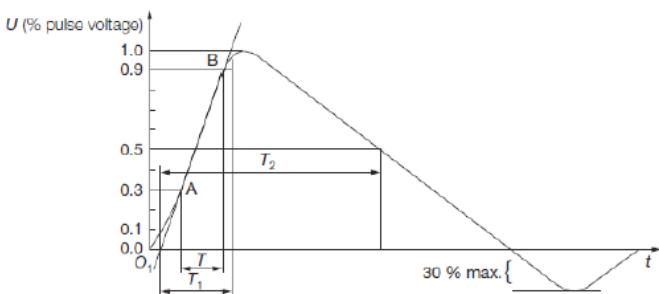
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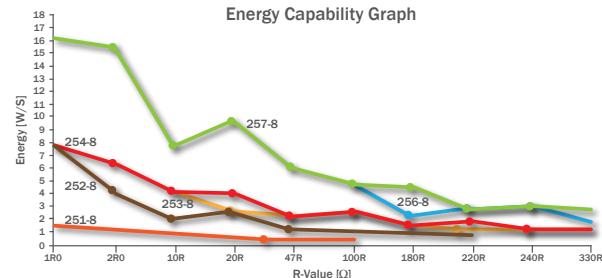
> Pulse Performance

The CRF_cΩ_{us} series is designed exclusively for safety fusing applications. It is known that an excellent safety fusing performance is somehow opposite with inrush-current performance. Nevertheless, they also could withstand a certain energy that results from the inrush current, working also as an energy absorber.

The voltage shown in the "Peak Voltage Limit" graph is the net voltage across the resistor. The generator open voltage will be higher due to the generator's internal impedance 12[Ω]. The pulse shape is according to IEC61000-4-5, 1,2/50[μs], described in the graph. The pulse shape is 10 pulses with a cool down period between 10 to 20[s].



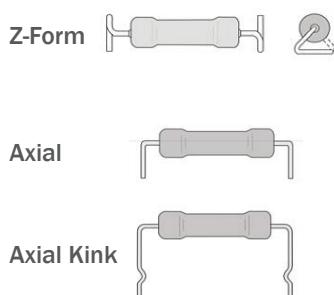
The maximum energy is given by the following graph:



The energy described on the graph above is related with the resistor construction.

> Lead Configurations

The CRF_cΩ_{us} is also available in a different pre-forming, as shown below. Other configurations are available upon request.



> Applications

The most common applications for CRF_cΩ_{us} are:

- ⚡ Electronic energy meter
- ⚡ Power supplies

For these applications the resistor can be used in the power supply that supplies the current to the control circuit, working as a safety fusible resistor.

This not only saves the electronic circuit when the main voltage (230 or 120[V]) is applied to the resistor, but also as an inrush limiter to the circuit.

- Battery chargers
- Fans
- Energy saving lamps
- Presence detectors
- Dimmer switches
- Surge protection