

RMS

Description

Stainless steel terminals for screws M6, Very robust design for high energy pulses and heavy overload, Suitable for group assemblies

Mechanical characteristics

IP00, Wire wound on ceramic support mounted on a metallic bar

Applications

Dynamic braking, Neutral Grounding, Starting Motor, Charge/discharge capacitors, Load Bank

Market

Railways, Industrial automation, Energy

Special version

Fixing slots different, Adjustable, Not inductive, Mica bar



0.5 ÷ 3.5 KW



ELECTRICAL CHARACTERISTICS

refers to room temperature 25°C

ID	Rated Power	Min Resistance	Max Resistance	Min not inductive Resistance	Max not inductive Resistance
Unit	kW	Ω	Ω	Ω	Ω
RMS 5	500 ÷ 1500	1	47	4	12
RMS 6	650 ÷ 2000	1.2	56	4.8	14
RMS 7	800 ÷ 2300	1.5	68	6	17
RMS 8	950 ÷ 2800	1.8	82	7.2	21
RMS 9	1000 ÷ 3100	2	100	8	25
RMS 10	1200 ÷ 3500	2.2	110	8.8	27

Insulation resistance 1000 VDC ≥ 1000 MΩ

Limit Voltage 2000 V (3000 V for mica bar version)

Temp. Coefficient Resistance: low ohmic value are made with active material CuNi44 that has a TCR of 40 ppm/°C, whereas high ohmic value refers to wire material FeCrAl that has a TCR of 70 ppm/°C. Resistors can be made also with NiCr alloys with TCR between 70 and 240 ppm/°C.

Rated power depends on total surface area according to Newton's law

$$\frac{dQ}{dt} = h \cdot A \cdot (T_{env} - T)$$

Where

Q is the thermal energy in joules
 h is the heat transfer coefficient (W/m² K)
 A is the surface area of the wire (m²)
 T_{env} is the temperature of the environment
 T is the temperature of the wire

In the case of model RMS, the total surface area depends on the ohmic value according to Ohm's law

$$R = \rho \cdot \frac{l}{S}$$

Where

R is the resistance
 ρ is the resistivity of the used alloy
 l is the length of the conductor (wire)
 S is the cross section of the conductor (wire)

The number of the turns in the RMS model is fixed and depends on the diameter of the wire.

As a result, the lower is the ohmic value, the higher is the surface area then the power. At the contrary the higher is the ohmic value, the lower is the surface area and then the power.

In the above table min and max rated power refer to wire temperature 600 °C and resistor placed in free air, in the graph of rated power is shown the power that corresponds to a temperature of wire of 600 °C for ohmic values from the minimum to the maximum.

The same reason is for the energy absorption. Lower ohmic values have higher mass of active material because

$$m = S \cdot l \cdot \rho$$

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Where
 m is the mass of active material
 S is the cross section of the conductor (wire)
 l is the length of the conductor (wire)
 ρ is the density of active material

In the graph of pulse load is shown the energy in kJ that corresponds to a ΔT of the wire of 900 °C according to the law

$$\Delta E = m \cdot cp \cdot \Delta T$$

Where
 ΔE is the amount of energy that enter in the resistor
 m is the mass of the wire
 cp is the specific heat of the wire
 ΔT is the over-temperature of the wire

This equation is valid only when the pulse is very short (< 0.5 s) and it is called adiabatic, it means that all the energy is dissipated by the wire itself. When the pulse duration is longer, the wire can exchange the energy with the surrounding ambient, then the energy that can be dissipated is higher.

For pulse duration less than 60 s, the mass of the wire is determinant to calculate the overload conditions.

Please contact Fairfield technical office for more details.

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MECHANICAL DATA

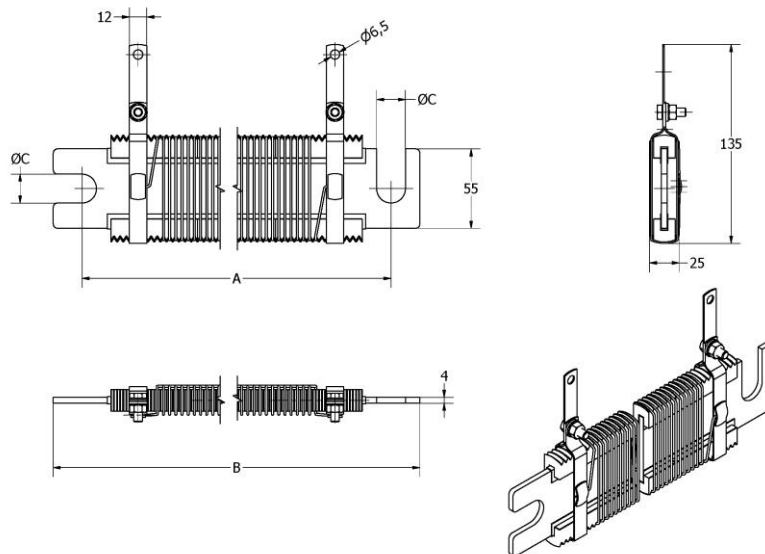
Unit [mm]	A [mm]	B [mm]	C [mm]	Weight [g]
RMS 5	340	380	20	1050
RMS 6	400	440	20	1200
RMS 7	460	500	20	1350
RMS 8	520	560	20	1500
RMS 9	580	620	20	1600
RMS 10	650	700	27	1700

Unless otherwise specified, applicable standard of general tolerances for linear and angular dimensions is ISO 2768-1 class c.

Different slots positions are available: Axial – Axial, or Transversal – Transversal. Picture at page 1 refers to RMS Axial Axial.

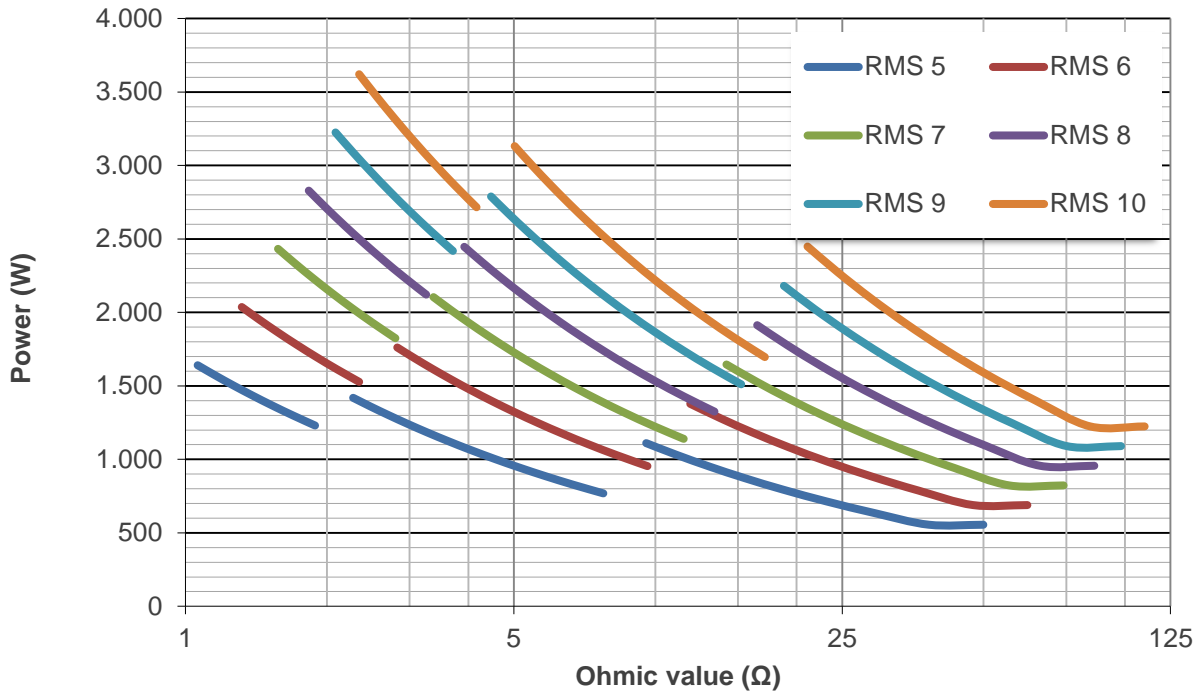
Weight indicated in the table is an approximate data, the exact data depends on wire mass and on the material of bar. Mica bar allows to save weight.

DRAWING

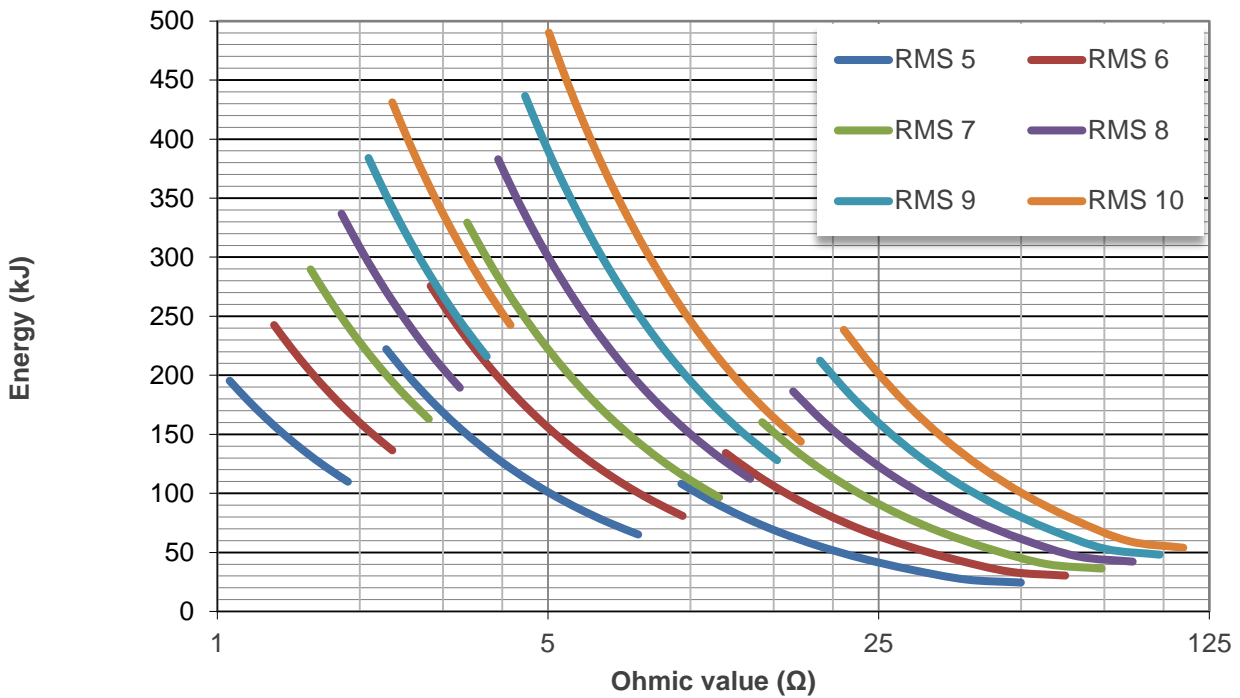


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POWER VS. OHMIC VALUE (WIRE TEMP. 600°C)



PULSE LOAD GRAPH (ΔT WIRE 900 °C)



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Marking

The resistor is marked on the collar with indelible ink high temperature
FAIRFIELD – RMS 5 15R 5% WW/YY (week / year)

Installation

In case of group mounting keep a distance of at least 30 mm between consecutive resistors.

Packing

The resistor is packed in a way to preserve incidental damages due to transport. The resistor is made by ceramic parts, accidental fall can damage it, handle with care.

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Ordering Information

RMS/Y M RRRR 5% (mica)

Y R : adjustable version

N : not-inductive version

MICA (at the end of description) :

M Model 5, 6, 7, 8, 9, 10

RRRR Resistance value (nominal at 20°C)

Example

RMSN 5 15R 5%

RMS is the name of the product

N means the resistor is made in not inductive version

15R means 15 Ω that is the nominal ohmic value at 20°C

5% is the tolerance on the ohmic value, in this case the value of the resistor is accepted when is within 14.25 Ω + 15.75 Ω

Note: tolerance on ohmic value for adjustable resistors is normally - 0+15%; tolerance on ohmic value for standard resistor is normally ±5%

Picture at page 1 refers to RMS 6 Axial Axial stainless steel bar.