



CROPICO RS3

Laboratory d.c. Resistance Standards (16 Standard Values)



The most desirable feature in which any resistance standard should excel is permanence of calibration. This has been achieved by the experience gained over many decades in the manufacture of precision resistors; the careful selection of resistance material, a rugged strain-free construction and a carefully controlled heat treatment and ageing process.

To obtain the optimum performance from these standards, we recommend regular annual certification. A resistance standard which has been carefully used within the limits of the manufacturer's specification increases in usefulness with time, as its complete history is recorded, enabling the user to determine its value at any time.

The RS3 range of resistance standards are constructed using carefully selected low temperature coefficient Manganin or Zeranin wire, depending on value, mounted on formers which have a high mechanical stability. The wires are wound in a strain-free manner and heat treated to remove any stresses. They also are artificially aged under the strictest control. The result is a standard of high-quality with long-term stability and permanence of calibration combined with a low temperature coefficient.

We offer the widest range of standard values available today. In addition we are able to manufacture for specialist applications (e.g. Pt100 simulation) special values to customer requirements. The RS3 range also offers a high-current carrying capability which makes them ideal for applications where precise current needs to be measured.

Model	Value Ω	Accuracy	Max I Air (Amps)	Max I Oil (Amps)
RS3/0001	0.0001	0.02%	100	200
RS3/001	0.001	0.02%	32	60
RS3/01	0.01	0.01%	10	20
RS3/02	0.02	0.02%	7	14
RS3/05	0.05	0.01%	4.5	9
RS3/0.1	0.1	0.005%	3	6
RS3/1	1	0.005%	1.4	3
RS3/10	10	0.005%	0.44	1
RS3/25	25	0.005%	0.2	1
RS3/50	50	0.005%	0.1	0.3
RS3/100	100	0.005%	0.1	0.3
RS3/250	250	0.005%	0.1	0.3
RS3/1k	1k	0.005%	0.03	0.1
RS3/10k	10k	0.005%	0.01	0.03
RS3/100k	100k	0.005%	0.003	0.003
RS3/1M	1M	0.01%	0.0002	0.0002

Case

Light alloy with holes in the side and base to allow free entry and exit of the oil flow. Black anodised finish to give maximum heat radiation.

Top Panel

Bakelite marked with the value class designation and serial number.

Terminals

Potential: - Copper 4 mm.
Current - Brass

Resistance Element

Manganin or Zeranin depending on value. 100 Ω , 1, 10 and 100 k Ω low inductance winding on brass formers with P.T.F.E. insulation. 0.1, 1 and 10 Ω bifilar winding on cylindrical brass formers with P.T.F.E. insulation. 0.01, 0.001 and 0.0001 Ω resistance material in the form of straight rods or loops supported on 12 mm diameter brass conductors.

Thermometer Tube

Slotted extending the length of the resistance element.

Label

Each standard is fitted with a label that describes its characteristics and operating parameters.

Size

160 mm high x 90 mm diameter

Weight

0.9 kg approx.

Wide Range
0.0001 Ω to
1 M Ω

Excellent
Load
Coefficient

Special
Values
Made to
Order

4
Terminal
Construction

Can be
used in Air
or Oil Bath

Each Standard
Supplied Complete
with
Calibration
Certificate

Resistance Standards Type RS3

Nominal Value Ohms	Uncertainty of Initial Adjustment @20°C	Uncertainty of Certification	Temperature Coefficient Typical 15...25°C	*Stability Typical over 1 year	Dissipation Max in Air Watts	Dissipation Max in Oil Watts	Current Max in Air	Current Max in Oil
0.0001	±0.02%	±200ppm	20ppm/°C	0.0025%	1	4	100	200
0.001	±0.01%	±50ppm	25ppm/°C	0.0025%	1	4	32	60
0.01	±0.01%	±25ppm	5ppm/°C	0.001%	1	4	10	20
0.02	±0.01%	±50ppm	5ppm/°C	0.001%	1	4	7	14
0.05	±0.01%	±50ppm	5ppm/°C	0.001%	1	4	4.5	9
0.1	±0.003%	±25ppm	5ppm/°C	0.001%	1	4	3	6
1	±0.003%	±25ppm	5ppm/°C	0.001%	2	10	1.4	3
10	±0.003%	±25ppm	5ppm/°C	0.001%	2	10	0.44	1
25	±0.005%	±25ppm	5ppm/°C	0.001%	1	10	0.2	1
50	±0.005%	±25ppm	5ppm/°C	0.001%	1	10	0.1	0.3
100	±0.003%	±25ppm	5ppm/°C	0.001%	1	10	0.1	0.3
250	±0.005%	±25ppm	5ppm/°C	0.001%	1	10	0.1	0.3
1000	±0.003%	±25ppm	5ppm/°C	0.001%	1	10	0.03	0.1
10000	±0.003%	±25ppm	5ppm/°C	0.001%	1	10	0.01	0.03
100000	±0.003%	±25ppm	5ppm/°C	0.001%	1	1	0.003	0.003
1M	±0.01%	±25ppm	5ppm/°C	0.002%	1	1	0.0002	0.0002

*Note: The stability figures quoted are typical, individual standards will vary depending upon use, storage and small variations in the materials and manufacturing process.

		Temperature Rise°C per Watt		Maximum current carrying capacity for reference conditions			
Model	Resistance Ohms	Temp. Rise in Air	Temp. Rise in Oil	Watts in Air	Current Amps	Watts in Oil	Current Amps
RS3/0001	0.0001	8°C/Watt	1.6°C up to	0.05	22	0.5	70
RS3/001	0.001		5 Watts then	0.05	7	0.5	22
RS3/01	0.01		Reducing to	0.05	2.2	0.5	7
RS3/02	0.02		1.2°C/watt	0.05	1.6	0.5	5
RS3/05	0.05		At 25 Watts	0.05	1	0.5	3
RS3/0.1	0.1	4°C/Watt	0.8°C up to	0.05	0.7	0.5	2.2
RS3/1	1		5 Watts then	0.1	0.3	1	1
RS3/10	10		Reducing to	0.1	0.1	1	0.3
RS3/25	25		0.6°C/watt	0.05	0.045	0.5	0.14
RS3/50	50		At 25 Watts	0.05	0.032	0.5	0.1
RS3/100	100	7.5°C/Watt	7.5°C up to	0.05	0.022	0.5	0.07
RS3/250	250		5 Watts then	0.05	0.014	0.5	0.045
RS3/1k	1000		Reducing to	0.05	0.007	0.5	0.022
RS3/10k	10,000		1.1°C/watt	0.05	0.0022	0.5	0.007
			At 25 Watts				
RS3/100k	100,000	10°C/Watt	3°C/Watt	0.05	0.0007	0.5	0.0022
RS3/1M	1,000,000				0.05	0.0002	0.5

The Resistance Standards Type RS3 were primarily designed as dc standards, however values above 0.1 Ω are non inductively wound and the following ac characteristics are typical.

Value in Ohms	Typical Time Constant
1Ω	+ 0.34μH/Ω
10Ω	+ 0.18μH/Ω
100Ω	+ 0.03μH/Ω
1kΩ	+0.04μH/Ω
10kΩ	+ 0.06μH/Ω