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# **RH9A Series High Resistance Decade Boxes**

## Operating Instructions

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### **Limited Warranty & Limitation of Liability**

CROPICO guarantees this product for a period of 1 year. The period of warranty will be effective at the day of delivery.

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Due to a policy of continuous development CROPICO reserves the right to alter the equipment specification and description outlined in this publication without prior notice and no part of this publication shall be deemed to be part of any contract for the equipment unless specifically referred to as an inclusion within such contract.

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## Disposal of Old Product



This product has been designed and manufactured with high quality materials and components that can be recycled and reused.

When the crossed out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2012/19/EU.

Please familiarise yourself with the appropriate local separate collection system for electrical and electronic products.

Please dispose of this product according to local regulations. Do not dispose of this product along with normal waste material. The correct disposal of this product will help prevent potential negative consequences for the environment and human health.

### **User Note:**

These Operating Instructions are intended for the use of Competent Personnel.

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## Introduction

The Cropico RH9A series is a range of high resistance precision decade boxes. Featuring 1, 3, 6, and 9 dials, they offer resistances up to 1 Terraohm. Each instrument is built using specially aged precision thick film or metal film resistors that are mounted directly onto the purpose designed decade switches.

The RH9A is useful as a laboratory tool or reference standard wherever low current and high resistances are encountered. A typical application would be in the calibration of insulation testers.



## Unpacking Instructions

Your RH9A has been thoroughly tested and inspected before shipping. Unless a special calibration has been requested a Cropico “In-house” calibration certificate will also be included. Therefore the instrument is ready for use after unpacking. However, it is recommended that the instrument is checked for any damage that may have occurred in transit. In the unlikely event that damage has occurred, all packing materials should be retained and Cropico Ltd. or the local agent should be contacted for further instructions.

The RH9A comes complete and ready for use. The package should contain:-

- a) The instrument
- b) 2 Input Connectors with connection cable
- c) Test Certificate
- d) Certificate of Conformity
- e) Instructions for use



**Use only the high voltage leads provided.**



**Connect the earth terminal to the protective earth before use.**



**Make sure all leads are connected before activating the high voltage source. Make sure the high voltage source is deactivated before disconnecting the leads.**



**RH9A series is designed to accept the maximum voltage of 5000V dc.**

## Specification RH9A

Switch Settings	Accuracy	Max Vdc/Step	Power Rating	Temp. Coeff.
1 k	±0.1%	30 V	1 Watt	±50 ppm/°C
10 kohm	±0.1%	100 V	1 Watt	±50 ppm/°C
100 kohm	±0.1%	300 V	1 Watt	±50 ppm/°C
1 Megohm	±0.1%	350 V	1 Watt	±50 ppm/°C
10 Megohm	±1%	3,500 V	1.5 Watts	±100 ppm/°C
100 Megohm	±1%	4,000 V	1.5 Watts	±100 ppm/°C
1 Gigohm	±1%	4,000 V	3.5 Watts	±100 ppm/°C
10 Gigohm	±1%	5,000 V	3.5 Watts	±250 ppm/°C
100 Gigohm	±3%	5,000 V	1.3 Watts	±2,000 ppm/°C

## Specification RH9A-5

Switch Settings	Accuracy	Max Vdc	Power Rating	Temp. Coeff.
1 k	±0.1%	30 V	1 Watt	±50 ppm/°C
10 kohm	±0.1%	100 V	1 Watt	±50 ppm/°C
100 kohm	±0.1%	300 V	1 Watt	±50 ppm/°C
1 Megohm	±0.1%	350 V	1 Watt	±50 ppm/°C
10 Megohm	±1%	3,500 V	1.5 Watts	±100 ppm/°C
100 Megohm	±1%	4,000 V	1.5 Watts	±100 ppm/°C
1 Gigohm	±1%	5,000 V	3.5 Watts	±100 ppm/°C
10 Gigohm	±1%	5,000 V	3.5 Watts	±250 ppm/°C
100 Gigohm	±3%	5,000 V	1.3 Watts	±2,000 ppm/°C
1 Teraohm	±3%	5,000 V	1.3 Watts	±2,000 ppm/°C

To ensure permanence of calibration the figures for the maximum Voltage on each decade should not be exceeded.

Connection is made to the RH9A by means of special high voltage plugs and sockets which should always be used. Each plug is fitted with a high voltage cable.



When using the instrument set the required dial setting on the RH9A before applying the voltage from the device being tested.

Before altering the resistance setting of the RH9A always switch off the applied voltage from the device being tested to avoid the possibility of actually switching 5kV d.c. which could be harmful to the RH9A.

When using the higher values on the RH9A i.e. above a setting of 1G $\Omega$  the following comments should be noted.

1. Connection leads should be kept as short as possible
2. Having set the dials on the RH9A and the test object switched on, the operator should stand away from the instrument and avoid moving as this could influence the measurement and give an unstable reading.
3. It should be noted that an operator moving near the test and wearing synthetic clothing will cause unstable readings.
4. Using high resistance settings on the RH9A and having a low test voltage on the device being tested requires a lot of patience as the test currents involved are very low and it may take some time to resolve a final reading.
5. Measurement of high resistance values is dependent upon:
  - a) Relative humidity
  - b) Ambient temperature
  - c) Measuring time
  - d) Polarity of test voltage
  - e) Previous test voltages applied
6. If the value to be selected is equivalent to the first position of the dial, always use position 10 on the previous dial, this will have a better uncertainty of measurement. This is of course, subject to the max volts for the dial used not being exceeded.

7. The earth terminal mounted on the top panel should be connected to earth to ensure operation safety and minimise measurement errors.

### Terminals

2 x	Special Shrouded Plug Sockets	Hi and Lo Connections
1 x 4mm	Binding Post	Ground Connection

### Dimensions and Weight

	<b>RH9A-#</b>	<b>RH9A-5</b>
<b>Dimensions</b>	47cm x 37cm x 19cm	22cm x 11cm x 9cm
<b>Weight</b>	8.8 Kg.	0.8 Kg.

## **Routine Maintenance**

With normal usage the RH9A requires little or no maintenance. The special insulators around the High and Low input sockets should be kept clean to avoid the shunting effect of accumulated dirt and grease. Wiping with an alcohol moistened cloth should be sufficient to maintain accuracy.

If the instrument is removed from its case for any reason, the resistors must never be touched with the fingers. Touching the resistors will seriously effect the calibration of the instrument and may cause progressive deterioration of accuracy.

Calibration of the RH9A requires a Precision Terraohmmeter and a Resistance Bridge such as a Wheatstone or a Comparator Bridge with another RH9A with known calibration for comparison.

Replacement of individual resistors is not recommended as resistors are selected and matched by Cropico as part of each decade to maintain the specified accuracy throughout the entire resistance range.

Should switch lubrication ever be required, only a pure silicone lubricant should be applied very sparingly. Ordinary switch lubricants may have a low leakage resistance, which will change the calibration of the higher resistance decades.

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