

# Standard reference resistor Model CER6000

WIKA data sheet CT 70.30

## Applications

- Primary standards for voltage and resistance in calibration laboratories worldwide
- Calibration reference for resistance and temperature bridges, such as ohmmeters and AC or DC temperature bridges

## Special features

- High accuracy
- Excellent long-term stability
- Low temperature coefficient
- Rugged stainless steel construction



Standard reference resistor, model CER6000, 10 Ω

## Description

This model is available in two series: CER6000-RR (reference resistor) and CER6000-RW (standard reference resistor). The RR series of 4-wire reference resistors offer high accuracy and stability at an economic cost. Designed specifically for use as a comparison standard for AC thermometry resistance bridges of the ASL range, the RR series may also be used in electrical standards laboratories.

In addition to standard fixed values, resistors can be supplied in any value between 1 and 1,000 Ω. Typical applications for the RR series are as transfer standards or reference source in temperature calibration or electrical standards laboratories.

The RW series is made from a specially selected alloy having a low temperature coefficient mounted in a strain-free manner on formers made from a material of low dielectric loss but of high mechanical stability.

Prolonged heat treatment of the elements ensures long-term stability and low temperature coefficient of resistance. The elements are hermetically sealed in stainless steel containers and filled with dry oil Castrol WOM 14.

## Specifications

Reference resistor, model CER6000-RR	
Resistance value	1, 10, 25, 100, 300, 400, 500, 1,000 and 10,000 $\Omega$ others on request
Tolerance	$\pm 10$ ppm
Long-term stability	$< \pm 5$ ppm per year
Temperature coefficient	typically $< 1$ ppm per $^{\circ}\text{C}$
Frequency dependence	$< 1$ ppm up to 400 Hz
<b>Permissible ambient conditions</b>	
Working temperature	20 $^{\circ}\text{C}$ [68 $^{\circ}\text{F}$ ]
Operating temperature	15 ... 40 $^{\circ}\text{C}$ [59 ... 104 $^{\circ}\text{F}$ ]
<b>Case</b>	
Dimensions	$\varnothing = 76$ mm, height 114 mm [ $\varnothing = 2.99$ in, height 4.49 in]
Weight	0.5 kg [1.1 lbs]

Standard reference resistor, model CER6000-RW	
Resistance value	10, 25, 100, 400, 1,000 and 10,000 $\Omega$ others on request
Tolerance	$\pm 10$ ppm
Long-term stability	2 ppm per year (HS version 0.5 ppm per year) <sup>1)</sup>
Temperature coefficient	typically 2 ppm per $^{\circ}\text{C}$ (HS version 0.5 ppm per $^{\circ}\text{C}$ )
Frequency dependence	1 ppm up to 1,592 Hz
<b>Permissible ambient conditions</b>	
Working temperature	20 $^{\circ}\text{C}$ [68 $^{\circ}\text{F}$ ]
Operating temperature	15 ... 40 $^{\circ}\text{C}$ [59 ... 104 $^{\circ}\text{F}$ ]
<b>Case</b>	
Dimensions	$\varnothing = 76$ mm, height 114 mm [ $\varnothing = 2.99$ in, height 4.49 in]
Weight	0.7 kg [1.5 lbs]

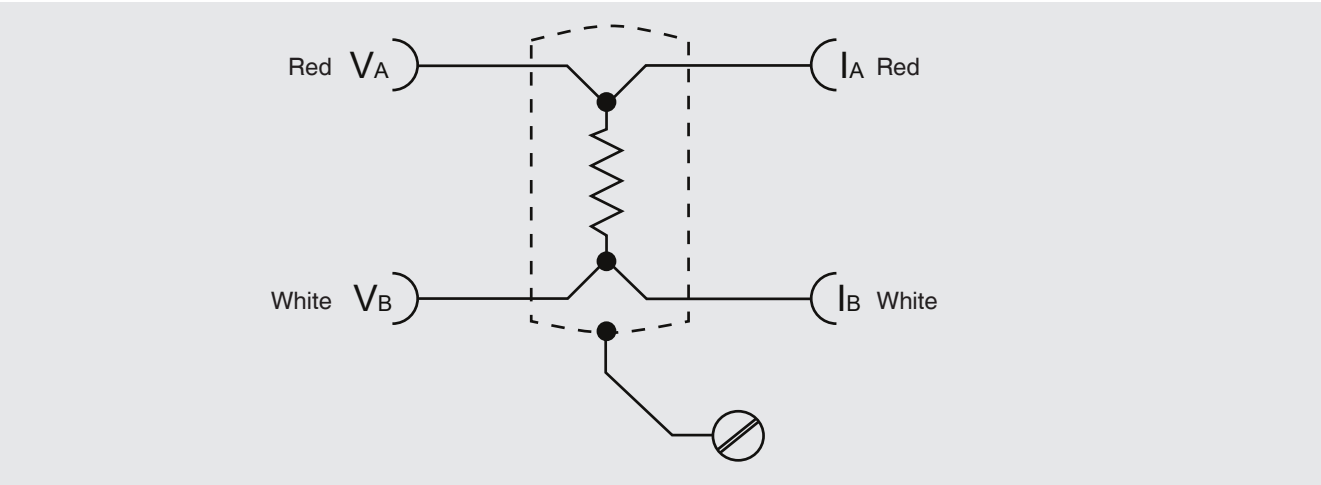
1) No HS version is available for the resistance values 1 k $\Omega$  and 10 k $\Omega$ . Furthermore, it must be noted that with the 10 k $\Omega$  version the value changes from 2 ppm to 5 ppm.

## Certificates

Certificate	
Calibration for model CER6000-RR	Standard: without Option: UKAS calibration certificate
Calibration for model CER6000-RW	Standard: without Option: UKAS calibration certificate or NPL calibration certificate DC or DC and AC
Recommended recalibration interval	1 year (dependent on conditions of use)

Approvals and certificates, see website

**Connections of the reference resistor, model CER6000-RR**



**Model CER6000-RR reference resistor with 100 Ω**



**Model CER6000-RR reference resistor with different resistance range**

## Standard reference resistor, model CER6000-RW (model Wilkins 5685)

The 4-pin standard reference resistors comply with the highest specification and are suitable for DC or AC use up to frequencies of several kHz. The range available now extends from 1 ... 10,000  $\Omega$ .

The resistors are made from a specially selected alloy having a low temperature coefficient and are mounted in a strain-free manner on formers made from material of low dielectric loss but of high mechanical stability. All the internal connections are welded for strength and a specially developed aging technique is used to ensure the long-term stability and low temperature coefficient of resistance. The elements are hermetically sealed in oil-filled stainless steel enclosures.

Provision is made for inserting a thermometer to monitor temperature but best performance is achieved when used in an oil bath which is temperature controlled.

Maximum dissipation for the standard reference resistor is 1 W but the highest performance will be obtained with a dissipation of around 10 mW which is the ideal working condition. No harm will occur if the dissipation is increased to 1 W but self-heating will take effect after a few minutes.

### Selected high specification (HS)

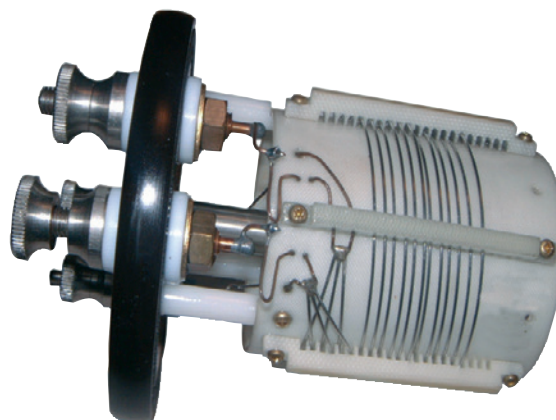
During their manufacture some resistive elements exhibit characteristics that show that with substantially increased processing time, they will produce standards with stability and temperature coefficients superior to those specified for the normal product. The standard reference resistors that can be produced from these elements are offered as versions "high specification".

### Background information

The design of these AC/DC standard reference resistors is based on the collaboration with the UK national physical laboratory.

The design originated with F. J. Wilkins whose name the instruments still bear to this day. Wilkins resistors are ideally suited for producing a most temperature-stable standard reference resistor with minimum long-term drift, which is suited for use with both direct and alternating current.

Since the introduction of these standard reference resistors they have been adopted by many major industrial companies as their primary resistance reference standards. Information obtained from laboratories over the past twenty-five years indicate their exceptional high specification. With monitored examples exhibiting stabilities within 1 ppm over a period of ten years.



Standard reference resistor, model CER6000-RW

## Scope of delivery

- Model CER6000 standard reference resistor according to specifications

## Option

- UKAS calibration of fixed resistor
- NPL calibration of fixed resistor, DC at 20 °C [68 °F]
- NPL calibration of fixed resistor, DC at 23 °C [73 °F]
- NPL calibration of fixed resistor, DC and one frequency AC at 20 °C [68 °F] (please specify the frequency)
- NPL calibration of fixed resistor, DC and one frequency AC at 23 °C [73 °F] (please specify the frequency)

## Accessories

- Model FA-4 2-terminal adapter for connecting RR resistors to BNC (2 per pack)
- Thermal case for CER6000-RW resistors, at a fixed temperature of 36 °C [97 °F]



**Thermal case for CER6000-RW resistors, at a fixed temperature of 36 °C [97 °F]**

## Ordering information

CER6000 / Accuracy / Value / Version / Calibration / Frequency / Accessories / Further approvals / Additional order information

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