

# Temperature Controlled AC/DC Resistors

## Model 456

- Nominal Temperature Coefficient of Resistance: +0.02ppm/°C (with temperature control on) 18 to 25°C
- Power Rating: 0.5 Watt at +25°C
- Resistance Tolerance (Initial Resistance Accuracy): ±0.005%
- Standard models: 10, 25, 100, 1000 and 10,000Ω
- Current Noise: <0.010μV (RMS) / Volt of Applied Voltage.
- Thermal EMF: 0.1μV/°C Max; 0.05μV/°C Typical
- The most precise and stable resistors available.
- Impervious to harmful environments - oil filled.

By temperature controlling an otherwise very stable resistor a performance close to the very best available World-wide can be achieved at a surprisingly low price. The resistor itself is oil filled and hermetically sealed.

The function of hermetic sealing is to eliminate the ingress of moisture and oxygen both of which play a role in the long term degradation of unsealed resistors. A further enhancement in both short and long term stability is achieved by oil filling. The oil also acts as a thermal conductor allowing the device to accept short periods of overload without degradation.

With accuracies of ±0.005%, a wide resistance range and long term drift of less than 5ppm, these devices are virtually secondary standards that can be kept in a laboratory as references to calibrate other devices.

The Resistor is held in a temperature controlled environment heated to 30°C ±0.1°C other temperatures are available to special order. The heater requires 2 watts at 5V which can be supplied by a battery or an unregulated DC supply. In an ambient of 20°C the Resistor's heater will warm up in typically 30 minutes, and a LED shows when the temperature has been reached. A test pocket is provided so that the resistors' temperature can be monitored if required.

Stability of 0.1 ppm/month or better can be expected.

Standard models are: 10, 25, 100, 1000, 10,000Ω. For other values please contact Isotech.

For the highest quality traceability we recommend that the 456 be UKAS Certified. We can offer the 2 Sigma Uncertainties shown in the table.



Model	456
Rating	0.5 Watt
Stability	Typically 1ppm per year at 1mA
Traceability	A Traceable Certificate accompanies your 456 to the 2 sigma uncertainties shown.
Induction	0.08μH typical
Capacitance	0.5pF
Dimensions	144 x 110 x 96mm (in box)
Weight	1kg (including box) 550g (excluding box)

### How to Order

456 Temperature Controlled Fixed AC/DC Resistor  
Please specify ohmic value  
State with UKAS Calibration or without UKAS Calibration.

### Isotech UKAS Calibration Uncertainties (k=2)

Measured Quantity Instrument or Gauge	Range/ Frequency	Best measurement Capability expressed as an Expanded Uncertainty
<b>DC Resistance</b>		
0.1Ω to 1000Ω		±5ppm
1kΩ to 100kΩ		±12ppm
<b>AC Resistance</b>		
2.5Ω to 400Ω	75Hz	±15ppm
400Ω to 1000Ω	75Hz	±100ppm

The latest schedule can be found on the Isotech website or at [www.ukas.org](http://www.ukas.org).

