

RS2

Precision Resistance Standard

Includes 8 Resistances

1Ω to 10MΩ in decade steps; others on request

Calibration Data

Comes with calibration data;

4-Wire Binding Posts

Uses gold plated copper (low EMF) binding posts with 4-wire connection

Low Temperature Drift

Very low temperature coefficient

Low Aging Rates

Designed for highest Stability/lowest aging drifts

Temperature Sensor

PT100 temperature sensor included

Sealed Case

Avoids ingress of moisture by sealed case and special dissicant

ROHS

ROHS-compliant

Optional Versions

Optionally possible are versions with other resistances values; Please contact us



The RS2 is a very cost efficient yet highly precise Resistance Standard, intended e.g. for the verification and calibration of precision multimeters. It is designed for use in laboratory, research, metrology and educational applications where very stable yet economical Resistance Standards are needed.

The RS2 is based on hermetic, oil filled metal foil and ceramic film resistors with extremely low aging and temperature drift, for use in conjunction with the most precise 8.5 digit DMMs. It comes with gold plated Tellurium-Copper binding posts for the Standard Resistor to ensure low EMF voltages.

The case of the RS2 is sealed and uses a special dissicant to achieve a low internal humidity level, resulting in further reduced humidity-induced drifts. Calibration is based on highly precise measurements against Standards such as the SR104 Primary Resistance Standard, calibrated to sub-ppm uncertainty levels and traceable to National Standards. A factory calibration certificate is shipped together with every item.

Besides the standard versions listed, custom versions with other resistance values and uncertainties can be made available, please contact us, e.g. through our webpage www.ab-precision.com.

Parameter	Details
Resistance	Available in 8 Decade Values, 1Ω to 10MΩ Other values on request
Operating Voltage	40V DC peak maximum (SELV voltages <u>only!</u>), unless specified lower
Operating Temp.	18 – 28 °C
Connectors (4-wire-measurement)	Resistor: 4 gold plated CuTe 4mm binding posts PT100: 4 tin plated brass 4mm binding posts
Order Code	RS2-10k: 10kΩ version, ROHS Others on request

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Typical Specifications at 23°C, K=2, unless otherwise specified:

Parameter	Condition	Specification
Ambient Conditions	Operation, per specification Operation, no damage Storage	18 – 28 °C 5 – 40 °C 5 – 40 °C
PT100 Sensor Accuracy *2) *3)	18 - 28°C	< +/- 0.25K max.
Maximum Power rating *4)	All values	10mW
Resistor Material	RS2-1 to RS2-100k RS2-1M, RS2-10M	Hermetic metal foil Metal film
Working Voltage/Power	Between any contacts	40V peak max. or 10mW max. Whichever is less
I/O Binding Posts(9 x)	Resistance Standard (4 x) PT100 (4 x), Guard	Gold plated tellurium-copper Tin plated brass
Weight	All values	Appr. 0.5kg

	1Ω	10Ω	100Ω	1kΩ	10kΩ	100kΩ	1MΩ	10MΩ
Maximum Calibration Uncertainty in ppm *1) *2)	20	9	6	3	1.5	3	7	20
Maximum Temperature Coefficient in ppm/K *3)	3	2.5	0.5	0.5	0.5	0.5	2.5	2.5
Max. Deviation from nominal in % *1) *2) *5)	0.05	0.02	0.01	0.005	0.005	0.005	0.01	0.01
Max. Aging Drift in ppm/a *1) *2*)4) *6)	1	1	1	1	1	1	15	15
Maximum Working Voltage in V	0.1	0.31	1	3.1	10	31	40	40

Notes:

*1): relative to National Standards (PTB).

*2): relative to time and temperature of calibration and at $P_R < 10mW$ at all times; for temperature value see calibration data

*3): within specified operating temperature range

*4): although a higher load of up to 0,25W will not destroy the resistors, it will permanently degrade stability/drift.

*5): smaller deviations from nominal are available, please contact us.

*6): <40 ppm/a in the first year for 1M and 10M

Please note that all specifications are typical values related to 23°C, unless otherwise specified.

For specified values, ambient temperature gradient shall be < 1K/h. Allow for sufficient stabilization time after high temperature changes.

To calculate total uncertainties, add calibration uncertainty, aging drift and temperature drift

RS2 V4 Datasheet (c) 3/2021; ab-precision

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Description:

The RS2 resistance standard consists of a precision, low temperature-drift resistor with nominal values available from 10Ω to $10M\Omega$, mounted in a sealed metal enclosure. Four-wire low-EMF measurement terminals are used, eliminating the resistance of the measurement cable and binding posts. The sealed metal enclosure with guard connection reduces environmental electrical noise effects. The impact of humidity on the aging of the resistors is reduced by using hermetically sealed and oil filled resistors (1M and 10M are hermetic ceramic) and a special desiccant that keeps the internal humidity at a very low level. Also, internal humidity-driven leakage currents are reduced. Enough desiccant is included to support long term operation over many years, even assuming ingress of certain amounts of air (which can never be totally eliminated with a sealing gasket) caused by air pressure changes.

A high accuracy PT100 is included for measuring directly the temperature of the resistors body during the calibration process.

Although the unit uses higher voltage components, because of its intended use and construction, it is specified for use with SELV (Safety Extra Low Voltage) voltages up to 40V DC maximum only and a 10mW maximum power rating per resistance to ensure low drift rates.

Operation Precautions:

This product is a precision device and special care should be taken when operating it to achieve optimum performance. Always use 4-wire measurement techniques, also for the PT100 temperature sensor, to avoid any impact of the measurement cable resistance. Do not drop, handle carefully and ensure a temperature stabilized environment. Avoid any direct air drafts across the item and high or fast thermal gradients. Allow for sufficient stabilization time after any exposure to high temperature gradients or environments outside of the specified operating range. Direct infrared radiation or other heat sources in close proximity to the unit should be avoided and will impact accuracy. Use short, shielded/twisted cables and avoid EMI-generating devices in close proximity to limit electrical interference and achieve maximum accuracy. Avoid temperature extremes whenever possible. Do not exceed the specified operating and storage conditions, otherwise damage may occur. Never apply a power greater than 10mW per resistor, this will adversely affect aging drift. Do not open item in order to avoid ingress of humidity. Use low EMF cables (with copper-based spades or banana plugs) for the Standard resistor element. Switch on thermal (EMF) voltage compensation on Ohm-meters supporting this.

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