

# RS9020A-X

## Ultra stable, high load capable Resistance Standards

wekomm

### Technical Data

#### Applications

- Transfer Standards
- Working Standards
- Reference Resistors
- Calibration

#### Features

- Mechanical robust and stable
- No special requirements for operation temperatures
- No oil bath required
- Long term stability better 1ppm / year
- Low impacted from temperature hysteresis
- Temperature stability better than  $1 \mu\Omega / \Omega / ^\circ\text{C}$
- Wide operational range from  $20^\circ\text{C}$  to  $30^\circ\text{C}$
- Custom resistance values on special order
- Made in Germany



With our new resistance standards series 9020A-X we have made a new dimension of precision possible. In experiments our  $1\Omega$  standard exposed a maximum of  $0.8 \mu\Omega/\Omega$  change when being loaded with 1A or 1W. This is an unrivaled performance in the industry and opens a whole new field for precision measurements.

Several National Metrology Institutes use the RS9020A-X resistors for improving their current and power measurement capabilities. The resistors extreme stability under load allows a metrology lab to reduce the relevant uncertainties by at least the factor of 10 in comparison to the standard measurements.

The excellent load stability is just one factor to provide such outstanding performance. The 9020A-X resistor series offer two integrated temperature sensors, mounted very close to the resistive elements. One of those sensors is a selected PT-100 type to measure the absolute temperature of the whole system. A very sensitive thermistor recognizes even the tiniest temperature change. Both sensors can be connected conveniently through the front panel mounted connector. When taking the temperature measurements into ac-

count, the calculated precision of the resistor can be furthermore improved.

A highly engineered fixation and carefully selected insulation materials make sure, that our resistors withstand mechanical stress and keep their electrical values throughout the years. The massive aluminum case warrants the ruggedness of the components and provides excellent shielding when guarding comes into play. Specific manufacturing processes help thermal buffering capabilities so that short term temperature changes have no effect on the actual measurement. In addition, our resistance elements are extremely stable over a temperature range from  $20^\circ\text{C}$  to  $30^\circ\text{C}$ . This warrants a trouble free operation even outside standard cal lab environments. Internally our resistance standards are build completely neutral regarding thermal voltage. The chosen combination of materials does not allow any thermal voltages to build up. For connecting wires, high quality „Low Thermal“ binding posts, built from directly gold plated copper-tellurium will give you the best possible electrical contact. All these features make the RS9020A-X series resistors to one of the best products in it's class.

Each resistance standard is calibrated by an accredited calibration laboratory. The measured resistance value is printed on the back side of the resistance standard. The issued certificate of calibration is part of delivery. On special request, a calibration by a national metrology institute (PTB) can be arranged at additional costs. The following table lists the available standard values of resistance. Customer specific values are available on request without additional charge.

| Model       | Nominal value<br>$\Omega$ | Adjustment to nominal<br>$\mu\Omega/\Omega$ | Calibration uncertainty *1 | Temperature-coefficient *2<br>$\mu\Omega/\Omega / ^\circ\text{C}$ | Drift *3<br>$\mu\Omega/\Omega / \text{year}$ | maximum voltage<br>(Volt) | maximum current<br>(mA) |
|-------------|---------------------------|---|----------------------------|---|--|---------------------------|-------------------------|
| RS9020A-1   | 1,0                       | 20  | *1                         | 1   | 1  | 1                         | 1000                    |
| RS9020A-10  | 10,0                      | 20  | *1                         | 1   | 1  | 3                         | 300                     |
| RS9020A-100 | 100,0                     | 20  | *1                         | 1   | 1  | 10                        | 100                     |

\*1 Uncertainty depending on CalLab - for specifications or requirements contact us prior to ordering

\*2 Does not contain power coefficient, which can be corrected numerically

\*3 After sufficient stabilization time, typical one year

Temperature sensors:

PT100 selected, Class B/10, four wire measurement  
Thermistor 5k $\Omega$ , precision 0,03 $^\circ\text{C}$ , two wire measurement

**Operation temperature:**

20 $^\circ\text{C}$  to 30 $^\circ\text{C}$

**Storage temperature:**

0 $^\circ\text{C}$  to 40 $^\circ\text{C}$

**repetitive Error (Hysteresis):**

30 $^\circ\text{C}$  to 20 $^\circ\text{C}$  to 30 $^\circ\text{C}$ :

neglectable Error

**Size:**

10cm (H) x 20cm(W) x 11,5cm(D)

**Weight:**

5 kg - 7 kg

depending on model

## Ordering Information

**Model:**

RS9020A-1 1 $\Omega$  resistance standard

RS9020A-10 10 $\Omega$  resistance standard

RS9020A-100 100 $\Omega$  resistance standard

RS9020A-CASE transport case



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