Time Electronics
5011 Resistance and Temperature Calibrator

Description

A versatile, high accuracy calibrator that can be used in a wide range of applications across various industries. Primarily used as a programmable resistance and RTD source, the 5011 provides precision resistance with a best accuracy of 0.01 % and 1 mΩ resolution (50 Ω to 1 kΩ).

Internal options for increased capabilities can be fitted as per customer requirement. These include DC voltage and thermocouple simulation, DC current, and frequency. The 5011 can be used to cover a wide workload as a laboratory calibrator or be incorporated into an automated test system. A rack mount kit option is also available.

Simple operation and clear visual display

Front panel operation allows the user to quickly set the function and output required. Using the jog / shuttle dial deviation the user can finely adjust the output value as a percentage (± 9.99 %). All this information is shown on a clear, easy to read LED display. As standard the 5011 uses a SCPI command structure for programming. It also supports the Time Electronics 9811/19/20 command set making it an ideal replacement for these legacy models.

Flexible options

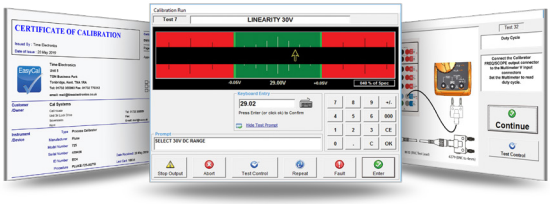
A range of internally fitted options are available for the 5011, providing added functionality and features. The DCV / Thermocouple option provides a DC voltage source (± 20 V) and simulates thermocouple types K, J, T, R, S, N, E and B. With the DC current option fitted the 5011 can source up to 220 mA. This makes the instrument ideal for accurate process control calibration. Also available is a 0.1Hz to 10MHz frequency option (Period 100 ns to 10 s). The output is variable with a best resolution setting of 0.1 Hz.

Features

- 1 Ω to 120 MΩ
- 100 ppm basic accuracy
- RTD simulation
- Optional Thermocouple Simulation
- DCV and DCI options
- 10 MHz frequency option
- RS-232, GPIB, USB interfaces
- Front panel operation
- PC/laptop control via EasyCal software

EasyCal Calibration Software

The 5011 can be controlled via Time Electronics EasyCal software to automate the calibration process. This provides increased speed of calibration and consistency of results.Produce traceable calibration certificates and test reports for quality standards with additional uncertainty information for ISO 17025 conformance.



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Technical Specifications

(Accuracies quoted are for 1 year at 22 °C ± 3 °C)

Standard features

Resistance

Range	Accuracy	Resolution
1 Ω to 20 Ω	0.01 % ± 10 mΩ	1 Ω
20 Ω to 99.999 Ω	0.01 % ± 10 mΩ	1 mΩ / 5 mΩ*
100 Ω to 999.999 Ω	0.01 % ± 8 mΩ	1 mΩ
1 kΩ to 9.999 kΩ	0.02 % ± 23 mΩ	1 Ω
10 kΩ to 99.999 kΩ	0.01 % ± 1 Ω	1 Ω
100 kΩ to 999.99 kΩ	0.01 % ± 10 Ω	10 Ω
1 MΩ to 9.9999 MΩ	0.02 % ± 100 Ω	100 Ω
10 MΩ to 120 MΩ	0.1 % ± 1 kΩ	1 kΩ

Temperature coefficient ..... less than 50 ppm/°C

Power rating ..... 0.1 W per resistor

Maximum voltage ..... 250 V

Resistance switch Time ..... 250 µs

Operation time ..... 300 ms

* Output setting resolution below 50 Ω is 5 mΩ

PRT Simulation

RTD Type	Alpha coeff	Range	Accuracy
Pt100	0.003850	-180 to -100 °C	0.1 °C
Pt100	0.003850	-100 to 850 °C	0.05 °C

It should be noted that the accuracy of the PRT simulation is determined by the accuracy of the PRT tables (BS EN 60751) published by the British Standards Institute. The 5011 uses precise digital interpretation of the tables to output resistance values that are within the accuracies specified in the table.

Options

Thermocouple simulation

Type	Range °C	Accuracy °C
J	-210 to -50 / -50 to 1200	0.15 / 0.2
K	-200 to -100 / -100 to 1372	0.25 / 0.18
T	-200 to 100 / 100 to 400	0.2 / 0.15
R	-50 to 50 / 50 to 250 / 250 to 1768	1 / 0.7 / 0.6
S	-50 to 500 / 500 to 1768	0.9 / 0.6
B	300 to 800 / 800 to 1820	1.5 / 0.8
N	-200 to 0 / 0 to 600 / 600 to 1300	0.4 / 0.15 / 0.2
E	-200 to 0 / 0 to 1000	0.2 / 0.12

Cold Junction Compensation ± 0.5 °C (applies to ambient changes of less than ± 1 °C at 23 °C). The accuracy of the thermocouple simulation is determined by the accuracy of the 5011's DC voltage function and the accuracy of the standard thermocouple tables (BS EN 60584-1) published by the British Standards Institute. The 5011 uses precise digital interpretation of the tables to output voltage levels that are within the accuracies specified in the table.

DC Voltage* (9711)

Range	Accuracy	Resolution
0 to 20 mV	40 ppm + 4 µV	0.1 µV
20 to 200 mV	40 ppm + 4 µV	1 µV
0.2 to 2 V	40 ppm + 15 µV	1 µV
2 to 20 V	40 ppm + 75 µV	10 µV

DC Current* (9718, requires 9711 option). Compliance Voltage: 10 V

Range	Accuracy	Resolution
0 to 200 µA	150 ppm + 25 nA	0.1 nA
0.2 to 2 mA	120 ppm + 55 nA	1 nA
2 to 20 mA	120 ppm + 200 nA	10 nA
20 to 200 mA	120 ppm + 2 µA	100 nA

* Specifications apply from 10 to 100 % of range. 10 % over range.

Digital frequency / period (9729)

2 V pk/pk approx 0.1 Hz to 10 MHz / 100 ns to 10 s. Accuracy 20 ppm.

General Specifications

Warm up ..... 30 minutes to full accuracy.

Settling time ..... Less than 5 seconds.

Standard interfaces ..... GPIB (IEEE-488), RS-232, USB.

Temperature performance ..... Operating: 0 to 40 °C.
Full Spec: 23 °C ± °C.
Storage: –10 °C to 50 °C.

Operating humidity/Altitude ..... < 80 % non-condensing.
Operating altitude: 0 to 3 km.
Non operating altitude: 3 to 12 km.

Line power ..... 100 to 230 V AC 50/60 Hz.
Power Consumption 60 W typical, 80 W maximum.

Dimensions ..... W 450 x D 272 x H 152 mm (18 x 11 x 7 ").

Weight ..... 7 kg (15.4 lbs).

Supplied with ..... User manual, RS-232 cable, USB adaptor/cable.

Due to continuous development Time Electronics reserves the right to change specifications without prior notice.

Ordering information

5011 ..... Resistance and Temperature Calibrator

9711 ..... Internal DC voltage and thermocouple simulation

9718 ..... Internal current option (220 mA max)

9729 ..... Internal frequency option (10 MHz digital)

9728 ..... 19 " Universal rack mount kit

9541 ..... Basic test lead set

9796 ..... Premium test lead set

C171 ..... Traceable calibration certificate (Factory)

C115 ..... Accredited calibration certificate (ISO 17025)

9795 ..... Printer and connectivity kit

ECFLA ..... EasyCal Software (see separate datasheet for options)

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