



# Time Electronics

## 5011 Resistance and Temperature Calibrator



- 1Ω to 120MΩ
- 100ppm basic accuracy
- RTD simulation
- Optional Thermocouple Simulation
- DCV and DCI options
- 10MHz frequency option
- RS232/GPIB/USB interfaces
- Front panel operation
- PC/laptop control via EasyCal software

### 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 / RTD source, the 5011 provides precision resistance with a best accuracy of 0.01% and 1mΩ resolution (50Ω to 1kΩ).

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 (+/- 20V) and simulates thermocouple types K, J, T, R, S, N, E and B.

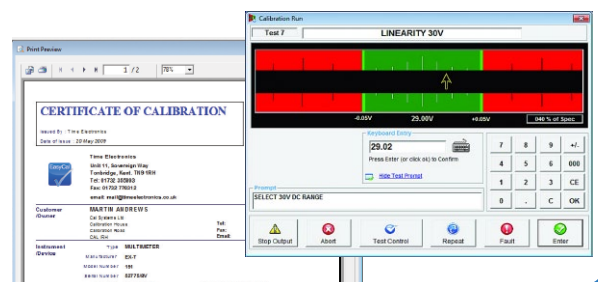
With the DC current option fitted the 5011 can source up to 220mA. This makes the instrument ideal for accurate process control calibration.

Also available is a 0.1Hz to 10MHz frequency option (Period 100ns to 10s). The output is variable with a best resolution setting of 0.1Hz.

### CALIBRATION MADE EASY

To automate the calibration process the 5011 can be controlled using Time Electronics' EasyCal software. This provides increased speed of calibration and consistency of results.

Easily produce calibration certificates and reports to ISO 9001, ISO 17025, and other international quality standards.



## TECHNICAL SPECIFICATION

### Standard Features

#### Resistance

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

Temperature Coefficient ..... less than 50 ppm per °C  
 Power Rating ..... 0.1 Watt per resistor  
 Maximum Voltage ..... 250V  
 Resistance Switch Time ..... < 250μs  
 Operation Time ..... < 300ms  
 End Resistance Variation ..... < 2.5mΩ

\* Output Setting Resolution below 50Ω is 5mΩ

#### 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 (9711)

Type	Range °C	Accuracy °C
J	-210 to 150 / 150 to 1200	0.15 / 0.3
K	-270 to 190 / 190 to 1250	0.5 / 0.6
T	-200 to 150 / 150 to 400	0.4 / 0.5
R	-50 to 800 / 800 to 1750	0.8 / 2.0
S	-50 to 850 / 850 to 1750	0.9 / 2.0
B	100 to 1200 / 1200 to 1800	1.0 / 2.0
N	-270 to 260 / 260 to 1300	0.5 / 0.4
E	-50 to 1000	0.3

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
20mV	100ppm + 4μV	100nV
200mV	30ppm + 6μV	1μV
2V	25ppm + 20μV	1μV
20V	25ppm + 150μV	10μV

#### DC Current\* (9718, requires 9711 option) Compliance Voltage: 11V

Range	Accuracy	Resolution
200μA	150ppm + 15nA	1nA
2mA	100ppm + 40nA	10nA
20mA	80ppm + 200nA	10nA
200mA	80ppm + 3μA	100nA

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

**Digital Frequency / Period (9729):** 2V pk/pk approx 0.1Hz to 10MHz / 100ns to 10s. Accuracy 20ppm

## GENERAL SPECIFICATION

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 +/- 5°C, Storage: -10°C to 50°C  
 Operating Humidity/Altitude ..... Humidity - Operating: < 80% non-condensing / Altitude: 0 to 3km. Non operating: 3km to 12km  
 Line Power ..... 100 to 230V AC 50/60Hz. Power Consumption 60W typical, 80W Max.  
 Dimensions / Weight ..... W450 x D272 x H152mm (18 x 11 x 7") / 7kg (15.4 lbs)  
 Supplied With ..... User manual, RS-232 cable, USB adaptor/cable

## ORDERING INFORMATION

5011	Resistance and Temperature Calibrator	9541	Basic Test Lead Set
9711	Internal DC Voltage and Thermocouple Simulation	9796	Premium Test Lead Set
9718	Internal Current Option (220mA max)	C171	Factory Calibration Certificate (NPL traceable)
9729	Internal Frequency Option (10MHz digital)	C115	UKAS Calibration Certificate (ISO 17025)
9733	Rear panel terminals	9795	Printer & Connectivity Kit
9728	19" Universal Rack Mount Kit	ECFLA	EasyCal Software (see separate datasheet for options)

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

Time Electronics Ltd, Unit 11 Sovereign Way, Botany Industrial Estate, Tonbridge, Kent, TN9 1RH. United Kingdom.

T: +44 (0) 1732 355993 F: +44 (0) 1732 770312 E: mail@timeelectronics.co.uk