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1. INTRODUCTION

The Novus Calibrators series **DC80** are portable instruments designed to meet the user needs for measuring and simulating signals such as voltage, current, resistance, thermocouples and RTDs. The available options depend on the particular model. They are:

- DC80T, for Thermocouples and mV
- DC80R, for RTDs and resistance
- DC80L, for linear mV, V and mA (provides internal power supply for powering 2-wire transmitters)



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2. SAFETY INFORMATION

To avoid possible electric shock or personal injury:

- Use the Calibrator only as specified in this manual, or the protection provided by the Calibrator might be impaired.
- Do not apply more than the rated voltage between the terminals, as marked on the Calibrator, or between any terminal to earth.
- Make sure the battery door is closed and latched before operating the calibrator.
- Remove test leads from the calibrator before opening the battery door.
- Inspect the Calibrator before using it. Do not use the Calibrator if it appears damaged.
- Do not operate the calibrator around explosive gas, vapor, or dust.

To avoid possible damage the calibrator or system, make sure to use the right connector and select the appropriate range before using the instrument for measurement or simulation.

3. MODEL DC80T

The MODEL DC80T is capable of measuring and generating mV and thermocouple signals. The specifications shown on the tables below are valid for the period of one year, at ambient temperatures between 18~28 °C.

INPUT/OUTPUT RANGE	RESOLUTION	ACCURACY
-10 mV to 75 mV	0.01 mV	± (0.025 % + 2 counts)

Measurement and Simulation specifications for Thermocouples:

Type	Range	Resolution	Accuracy	Tamb Error (*)
J	-200 to 1200 °C / -328 to 2192 °F	0.1 °C / °F	± (0.3 °C + 10 µV)	± 0.3 °C
K	-200 to 1370 °C / -328 to 2498 °F	0.1 °C / °F	± (0.3 °C + 10 µV)	± 0.3 °C
T	-200 to 400 °C / -328 to 752 °F	0.1 °C / °F	± (0.3 °C + 10 µV)	± 0.3 °C
E	-200 to 950 °C / -328 to 1742 °F	0.1 °C / °F	± (0.3 °C + 10 µV)	± 0.3 °C
R	-20 to 1750 °C / -4 to 3182 °F	1 °C / °F	± (1 °C + 10 µV)	± 0.3 °C
S	-20 to 1750 °C / -4 to 3182 °F	1 °C / °F	± (1 °C + 10 µV)	± 0.3 °C
B	600 to 1800 °C / 1112 to 3272 °F	1 °C / °F	± (1 °C + 10 µV)	± 0.3 °C
N	-250 to 1300 °C / -418 to 2372 °F	0.1 °C / °F	± (0.3 °C + 10 µV)	± 0.3 °C

- (*) Tamb Error is the accuracy of internal ambient temperature sensor

- Maximal input voltage: 30 Vpp.

3.1. MODEL DC80T GENERAL SPECIFICATIONS

Maximum voltage allowed between any terminal and earth ground or between the two input terminals: 30 V

Storage temperature: -40 °C ~ 60 °C

Operating temperature: 0 °C ~ 50 °C

Operating altitude: 3000 meters maximum

Temperature coefficient: $\pm 0.02\%$ / °C on 0 °C ~ 18 °C and 28 °C ~ 50 °C

Relative humidity: 95 % up to 30 °C

..... 75 % up to 40 °C

..... 45 % up to 50 °C

Shock: Random 2 g, 5 Hz to 500 Hz

Safety: 1 meter drop test

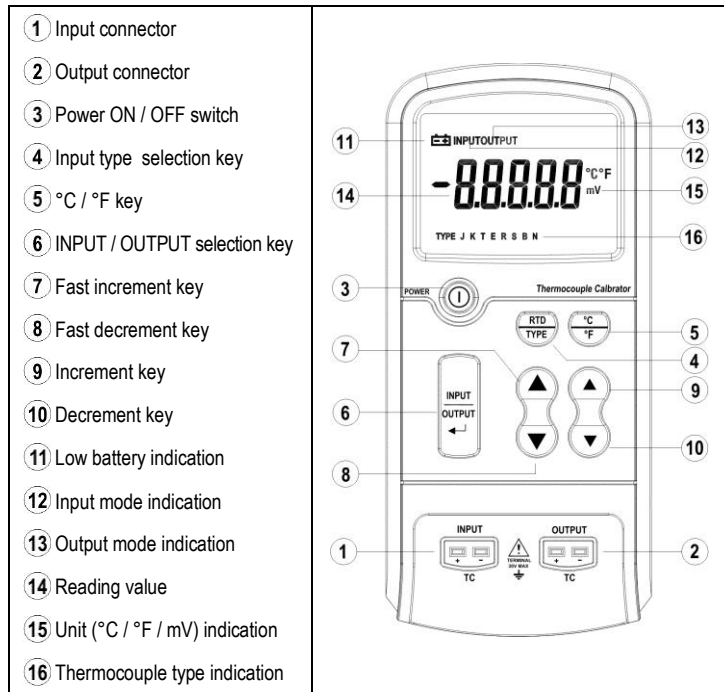
Power requirements: 6 x AAA 1.5 V Battery

Size: 205 mm x 98 mm x 46 mm

Weight: 472 g (with batteries)

3.2. MODEL DC80T FRONT PANEL

The keypad and display functions are shown below:



3.3. MODEL DC80T OPERATING INSTRUCTIONS

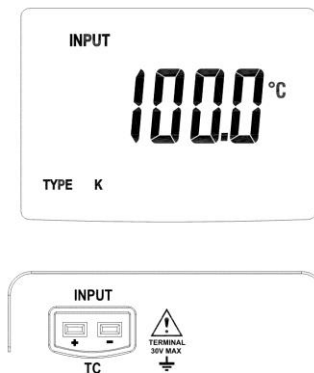
In thermocouple temperature simulation the calibrator generates the voltage as an actual thermocouple, considering both the simulated temperature (hot joint) and connection temperature (cold joint). To ensure stated accuracy the user must use a connection cable between calibrator and calibrated device with the same thermoelectric properties of the selected thermocouple (extension or compensation cable).

A K type extension cable (yellow connector) is supplied with the calibrator and should only be used for K type calibration for maximum accuracy.

Make sure that the appropriate cable with the correct polarity is being used to avoid large calibration errors.

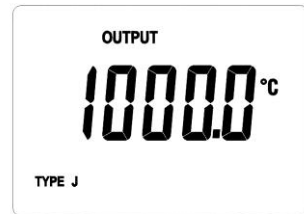
Thermocouple or mV measurement

1. Press the power switch **3** to turn on the calibrator.
2. Press the INPUT / OUTPUT key **6** to select INPUT mode.
3. Press the TC TYPE selection key **4** to configure the instrument to the desired input type
4. Connect the T/C or mV signal to the input connector **1**.
5. The measured value is presented in **14**.



Thermocouple or mV Simulation

1. Press the power switch **3** to turn on the calibrator.
2. Press the INPUT / OUTPUT key **6** to select OUTPUT mode.
3. Press the TC TYPE selection key **4** to configure the desired output signal type.
4. Press the increment / decrement keys **7 8 9 10** to adjust the value to be simulated.
5. The simulated signal is delivered at the output connector **2**.
6. To change output values, press the increment / decrement keys until the desired value is presented in the display. Changing to other input types is accomplished by the TC TYPE selection key **4**.



4. MODEL DC80R

The MODEL DC80R RTD Process Calibrator measures and simulates resistance values of 7 distinct types of RTDs, either in °C or °F. Simultaneous measurement and signal simulation is not provided.

The specifications are valid for the period of one year, at temperatures between 18-28 °C.

Resistance measurement and simulation specifications:

Range	Measurement accuracy (4 W ± Ω)	Simulate Accuracy (± Ω)	Excitation current (mA)
0.00 Ω ~ 400.00 Ω	0.1	0.15	0.1 ~ 0.5
		0.1	0.5 ~ 3.0
400.0 Ω ~ 1500.0 Ω	0.5	0.5	0.05 ~ 0.8
1500.0 Ω ~ 3200.0 Ω	1	1	0.05 ~ 0.4
	2		

The excitation current applies only to the simulation mode. The excitation current is provided by the target instrument (OHM meter of RTD meter) connected to the calibrator.

RTD measurement and simulation specifications:

Mode	Range	Accuracy (°C)			Excitation current (mA)
		Input 4 W	Input 2 W / 3 W	Output	
Pt10 385	-200 ~ 800 °C / -328 ~ 1472 °F	NOT SPECIFIED			0.1 ~ 3.0
Pt50 385	-200 ~ 800 °C / -328 ~ 1472 °F	0.7	1.0	0.7	0.1 ~ 3.0
Pt100 385	-200 ~ 800 °C / -328 ~ 1472 °F	0.33	0.5	0.33	0.1 ~ 3.0
Pt200 385	-200 ~ 250 °C / -328 ~ 482 °F	0.2	0.3	0.2	0.1 ~ 3.0
	250 ~ 630 °C / 482 ~ 1166 °F	0.8	1.6	0.8	
Pt500 385	-200 ~ 500 °C / -328 ~ 932 °F	0.3	0.6	0.3	0.05 ~ 0.8
	500 ~ 630 °C / 932 ~ 1166 °F	0.4	0.9	0.4	
Pt1000 385	-200 ~ 100 °C / -328 ~ 212 °F	0.2	0.4	0.2	0.05 ~ 0.8
	100 ~ 630 °C / 212 ~ 1166 °F	0.2	0.5	0.2	
Pt100 JIS	-200 ~ 630 °C / -328 ~ 1166 °F	0.3	0.5	0.3	0.1 ~ 3.0

The excitation current applies only to the simulate mode. The excitation current is provided by the target instrument (OHM meter of RTD meter) connected to the calibrator.

4.1. MODEL DC80R GENERAL SPECIFICATIONS

Maximum voltage allowed between any terminal and earth ground or between the two input terminals: 30 V

Resolution: RTD 0.1 °C / °F; Resistance 0.01 / 0.1 Ω

Storage temperature: -40 °C ~ 60 °C

Operating temperature: -10 °C ~ 55 °C

Operating altitude: 3000 meters maximum

Temperature coefficient: ±0.01 % / °C (0 °C ~ 18 °C and 28 °C ~ 50 °C)

Relative humidity: 95 % up to 30 °C

..... 75 % up to 40 °C

..... 45 % up to 50 °C

..... 35 % up to 55 °C

Shock: Random 2 g, 5 Hz to 500 Hz

Safety: 1 meter drop test

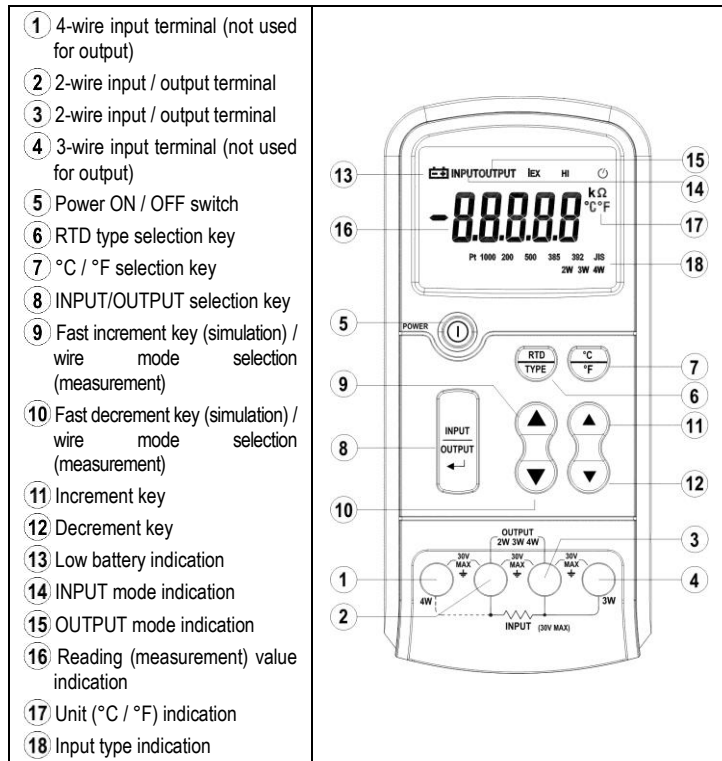
Power requirements: 6 x AAA 1.5 V Battery

Size: 205 mm x 98 mm x 46 mm

Weight: 472 g (including batteries)

4.2. MODEL DC80R FRONT PANEL

The keypad and display functions are shown below:

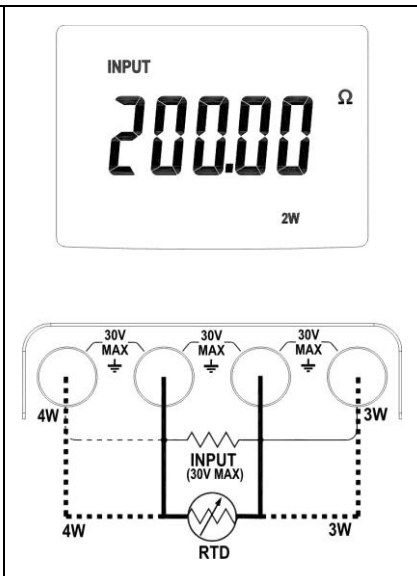


Accessories included: 2 pairs of test leads and alligator clips

4.3. MODEL DC80R OPERATING INSTRUCTIONS

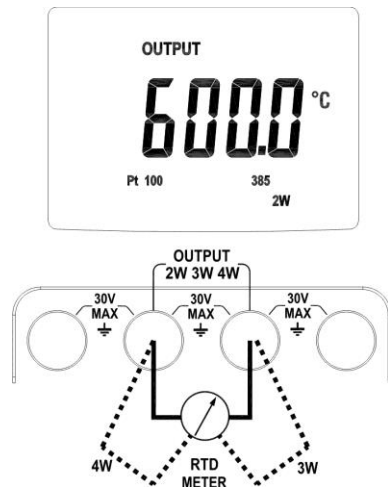
RTD measurement

1. Press the power switch **5** to turn ON the calibrator.
2. Press the INPUT / OUTPUT key **8** to select INPUT mode.
3. Press RTD mode key **6** for selecting the RTD type.
4. Connect the RTD or Resistance to the input connector.
5. For 3 W / 4 W mode measurements, press the wire mode select key **9** and **10** to select the desired mode. Then wire the signal to the corresponding input terminal.
6. Get the reading value **16**.



RTD Simulation

1. Press the power switch **5** to turn ON the calibrator.
2. Press the INPUT / OUTPUT key **8** to select OUTPUT mode.
3. Press RTD mode key **6** to select the desired RTD type.
4. Press the Increment / decrement keys **9** **10** **11** **12** to set the desired output value.
5. Connect the RTD or Resistance meter to the input terminals, as indicated in the drawing at the right.
6. For simulating signal in 3W / 4W modes, add the extra wires as shown in the drawing.
7. To change the output value, press the increment / decrement keys **9** **10** **11** **12** until the desired value is presented on the display. Changing to another RTD type is accomplished by the RTD TYPE selection key **6**.



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