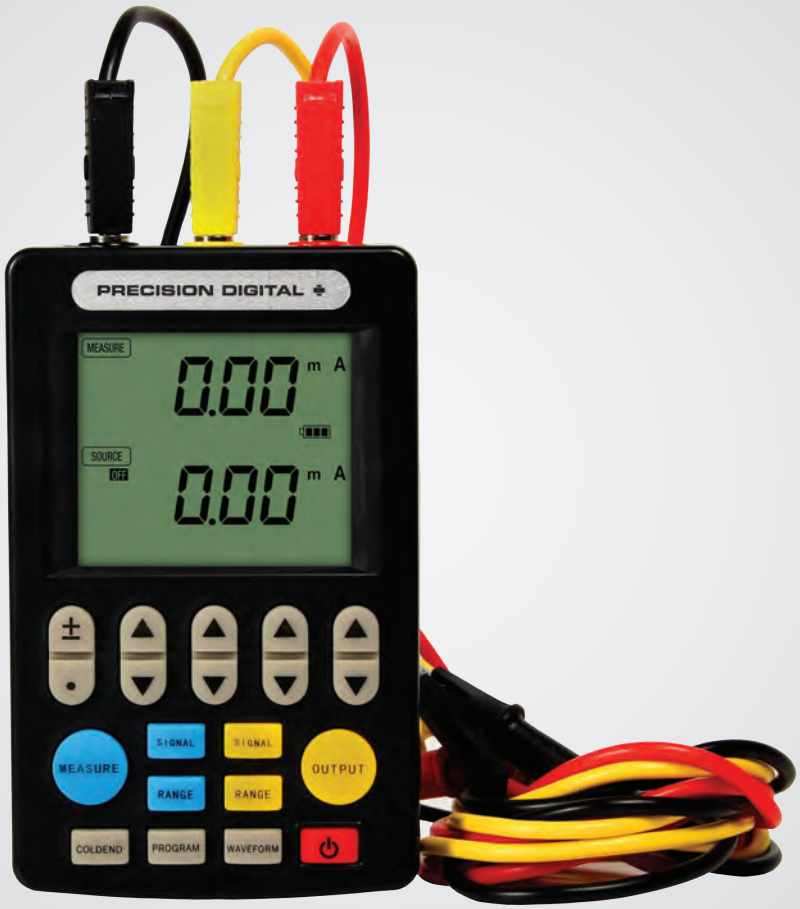
PD9501
Multi-Function Calibrator



FEATURES

- Measure and Source T/Cs, RTDs, Ohms, Current, Voltage
- Compact & Lightweight
- Battery or USB Powered
- Descriptive LCD Display
- 24 V Power to Drive the Transmitter
- Auto Stepping & Auto Ramping
- Selective Auto Off Mode
- LCD includes an LED backlight

PRECISION DIGITAL CORPORATION

PD9501 Multi-Function Calibrator

OVERVIEW

This PD9501 Multi-Function Calibrator has a variety of signal measurement and output functions, including voltage, current, thermocouple, and RTD.

Main Function

Voltage Signal: 0-30 V, 0-25 mV, 0-100 mV output and measurement.

Current Signal: Active and passive 0-25 mA, 4-20 mA output and measurement.

Thermocouple: K, E, J, T, R, B, S, N output and measurement. *Note: Output Range Starts from 0°C*

RTD: PT100 output and measurement.

Ohms: Output and measurement

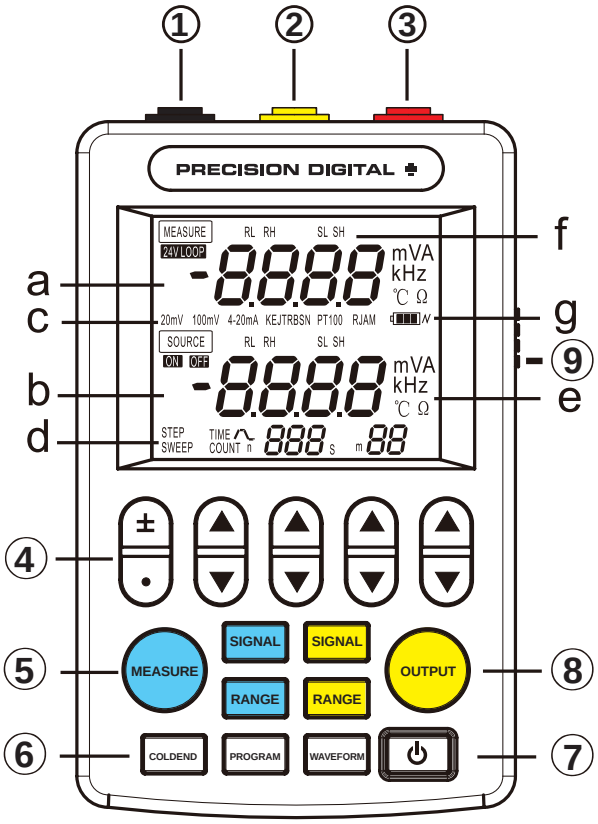
The PD9501 includes a convenient storage case.

Accuracy Specifications

INPUT	SIGNAL	RANGE	ACCURACY	RESOLUTION	NOTE
DC Voltage	20 mV	0.00-24.00 mV	±0.2%	0.01 mV	
	100 mV	0.0-100.0 mV	±0.2%	0.1 mV	
	V	**Output:** 0.00-15.00 V	±0.2%	0.01 V	**Output:** Maximum current 30 mA **Measurement:** Input Impedance 1.2 M Ω
		Measure: 0.00-30.00 V	±0.2%	0.01 V	
DC Current	mA	0.00-24.00 mA	±0.2%	0.01 V	**Output:** Maximum load 750 Ω **Measurement:** Input Impedance 100 Ω
	4-20 mA	4/8/12/16/20 mA	±0.2%	0.01 mA	
Passive Current	mA	0.00-24.00 mA	±0.2%	0.1 V	**Output:** External power 16-30 V
Power Output	24 V LOOP	24V/16 V	±10%		**Drive Current:** 24 mA
Thermocouple	K	-270 to 1372°C	±1%	1°C	The output or measurement can not be less than the Cold Junction Temperature. **Output:** Range Starts from 0°C
	E	-270 to 1000°C	±1%	1°C	
	J	-210 to 1200°C	±1%	1°C	
	T	-270 to 400°C	±1%	1°C	
	R	-50 to 1768°C	±1%	1°C	
	B	0 to 1820°C	±1%	1°C	
	S	-50 to 1768°C	±1%	1°C	
	N	-270 to1300°C	±1%	1°C	
Ohms	Ω	**Output:** 15.0-400.0 **Measure:** 0.0-400.0	±0.2%	0.1 Ω	**Excitation Current:** Min of 0.5 mA, Max of 3 mA
RTD	PT100	-199.0 to 650.0°C	±0.2%	0.1°C	

PD9501 Multi-Function Calibrator

FUNCTIONS



Terminal Blocks

① Common (**Black**)

② Output Terminal (**Yellow**)

③ Measurement Terminals (**Red**)

Buttons

④ Numeric Modifier Keys

- Increase or decrease values
- Toggle numeric decimal points
- Toggle value plus or minus

⑤ Measurement Function Keys (**Blue**)

[Signal]: toggle signal type
[Range]: toggle measurement range
[Measure]: open/exit measurement function

⑥ Cold Junction and Programming Function Keys

[Cold End]: display/modify cold end
[Program]: turn on the programming function
[Waveform]: change programmable output waveform

⑦ **[Power]:** turn power on/off

⑧ Output Function Keys (**Yellow**)

[Signal]: toggle output signal type
[Range]: toggle output range
[Output]: open/turn off signal output

⑨ Dip Switch (Factory defaults to OFF-Down)

1. **Auto Power Off:** 10 minutes without key operation, automatic shutdown.
2. **Manual Cold End:** Manually set the cold end value when measuring thermocouples.
3. **Passive Output:** outputs a passive current signal for analog transmitters.
4. **Low Load Mode:** When the passive current is input, calibrator supplies 16 V to the transmitter to reduce power consumption and prolong the use time.

LCD Display

a: Measurement: 4 digits with unit
b: Output signal value: 4 digits with unit
c: Signal and cold end mode: 20 mV/100 mV/ 4-20 mA/K/E/J/T/R/B/S/N
RJA: automatic cold junction compensation
M: manual set cold junction compensation
d: Programming function: n/m to split the output, Output value = (Main Set Value)*(n/m)
Sweep: Linear output, Linear output signal
Step: Stepping output
Time: Output time for each step, 0-999s can be set.
Count: Output cycles, 0-999 times can be set, 0 is infinite
e: Unit: mA/mV/°C
f: Range and change function:
RL: Show the lower range limit
RH: Show the high range limit
SL: Show the minimum signal
SH: Show the maximum signal
g: Battery: Icon flashes when charging. Icon will stop flashing when fully charged.

SIGNAL OUTPUT

The calibrator can output voltage, active current, passive current, thermocouple, and RTD signals.

Voltage, Active Current Output

① Connect the black wire to the common terminal, connect the yellow wire to the output terminal

② Press **[Signal]** to toggle the signal type

③ Press ▲▼ to adjust the output value

④ Press **[Output]**, the "source" will change from OFF to ON and start the output function.

4-20 mA Output

① Choose 4-20 mA for signal type

② Press the opposite **[Signal]**. You can choose 4→8→12→16→20 or press ▲▼ to adjust

③ Press **[Output]** to open the output function

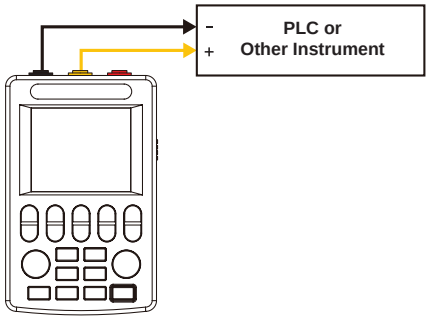


Figure 1: Output Active Current/Voltage to the meter or PLC

RTD and Thermocouple Output

Note: On thermocouple, the output temperature is minus the voltage value corresponding to the cold junction temperature.

① Press **[Signal]** to select signal type. Choose from K/E/J/T/R/B/S/N/RTD/Ω

② Press ▲▼ to set output value of temperature

③ Press **[Output]** to open the function

Passive Current Output

Active with DIP Switch setting

Passive current output can be used as a 2-wire transmitter simulator for loop testing.

① Choose 4-20 mA for signal type

② Press the opposite **[Signal]**. You can choose 4→8→12→16→20 or press the ▲▼ to adjust

③ Press **[Output]** to open the output function

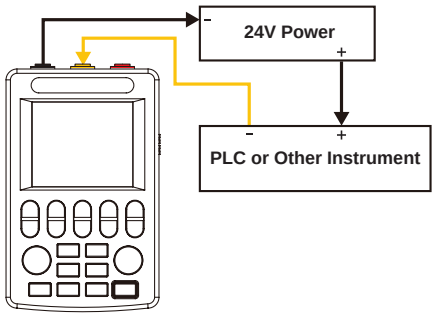


Figure 2: 2-wire Transmitter Simulator

Voltage, Current Signal Output or Measurement by Display Range (Eliminates range conversions)

① Signal type must be voltage or current

② Press **[Range]** to select display range limit: RL, RH, SL, SH

③ When "RL" is selected press ▲▼ to set value

④ Setup the RL, RH, SL, SH in turn

OUTPUT

⑤ Press **[Range]** to exit the rage setup. Press ● to toggle between signal output or range output (no units are displayed on output)

⑥ Press the ▲▼ to change the output value

⑦ Press **[Range]** to open the function

MEASURE

⑤ Press **[Range]** to exit the rage setup. Press ● to toggle between signal value or range output (no units are displayed on output)

⑥ It shows the measurement or conversion value according to range

PD9501 Multi-Function Calibrator

SIGNAL MEASUREMENT

The calibrator can measure voltage, active current, passive current, thermocouple signal, and RTD.

When measure function is not in use press **[Measure]** to turn off the measure mode to conserve battery power.

Voltage, Active Current Measurement

① Connect the black wire to the common terminal, connect the red wire to the measure terminal

② Press **[Measure]** to open measure function

③ Press **[Signal]** to toggle signal type

④ Shows value in the LCD screen

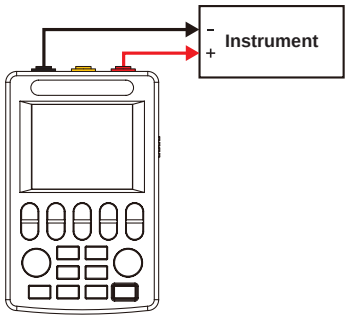


Figure 3: Measurement voltage, active current

Passive Current Measurement

① Wiring as the 2-wire or 3-wire system

② Press Blue **[Signal]** to set signal type to 24 V loop

③ Generator outputs 24 V (or 16 V when via DIP switch to low power mode

④ Shows value in the LCD screen

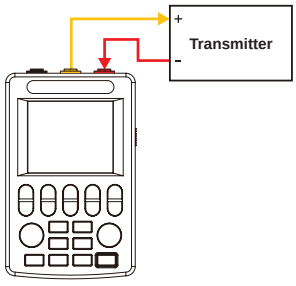


Figure 4:
Measure 2-wire transmitter

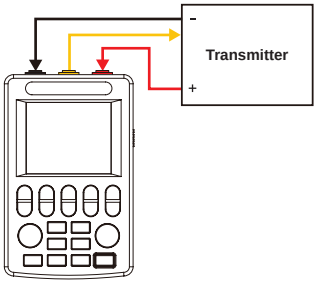


Figure 5:
Measure 3-wire transmitter

RTD and Thermocouple Measurement

① Connect the black wire to the common terminal, connect the red wire to the measuring terminal

② Press blue [Measure] to set signal type to K/E/J/T/R/B/S/N/RTD/Ω

③ Value is displayed on the LCD screen

To view or adjust cold junction temperature for thermocouple:

① Press **[Cold End]** to display cold end temperature

② If the LCD displays **"RJA"** the cold end is collected by the internal sensor and cannot be modified.

③ Select the **"M"** on the LCD to manually set the cold end value.

PROGRAMMABLE OUTPUT

Scaled Output Function (n/m)

The voltage, current, and thermocouple signals can be scaled by n/m.

Output value = (Main Set Value) × (n/m)

① Press ▲▼ to change the main setpoint

② Press **[Program]** to open split output mode to display n/m menu

③ Set (**m**) from 1 to 20

④ Set (**n**) from 0 to 20

⑤ Press yellow **[Output]** to open/exit the output

⑥ Press **[Program]** to exit the split output function

Linear Output Function

The signal value can be output linearly according to the time set by the user.

① Press ▲▼ to set value for the main set point

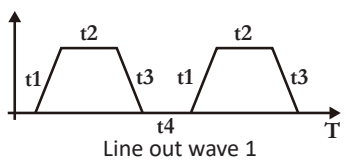
② Press **[Waveform]** to display "sweep". This enables linear output function.

③ Press **[Program]** to set output time for rise time, hold time [top], fall time, hold time [low].
Press ▲▼ to set time between 0-999s.

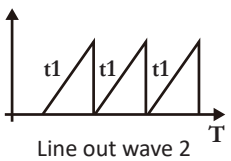
④ Press **[Program]** again to set number of linear outputs from 0-999.

⑤ Press yellow **[Output]** to open/exit the output

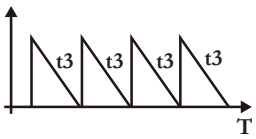
⑥ Press **[Program]** to exit the linear output function



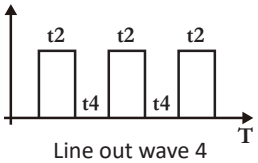
Line out wave 1
Normal timing



Line out wave 2
t2=t3=t4=0s



Line out wave 3
t1=t2=t4=0s



Line out wave 4
t1=t3=0s

PD9501 Multi-Function Calibrator

Automatic Step Output Function

The signal value can be stepped out according to the user-defined value.

① Press ▲▼ to set value for the main setpoint

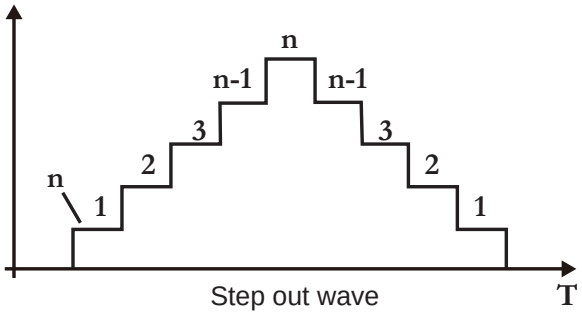
② Press **[Waveform]** to display “step”. This enables step output function.

③ Press **[Program]** to set “time”. Press ▲▼ to set time between 0-999s.

④ Press **[Program]** again to set N/m for step output

⑤ Press yellow **[Output]** to open/exit the output

⑥ Press **[Program]** to exit the step output function



Step out wave

SPECIFICATIONS

Operating Temperature: 15 to 130°F (-10 to 55°C)
Storage Temperature: 5 to 158°F (-20 to 70°C)
Relative Humidity: 20 to 80%
External Dimensions: 4.5" x 2.5" x 10.2" (115 mm x 70 mm x 26 mm)
Weight: 10.6 oz (300 g)
Power: Internal rechargeable Lithium Ion battery (non-replaceable) or external USB power
Power Dissipation: 300 mA, 7-10 hours
Reverse Connection and Overcurrent Protection: 30 V
Cables Provided: Three signal cables and one USB cable

ORDERING INFORMATION

Model	Description
PD9501	Multi-Function Calibrator

Your Local Distributor is:

⚠ WARNING
Cancer and Reproductive Harm - **www.P65Warnings.ca.gov**

LDS9501_A 03/19

PRECISION DIGITAL CORPORATION