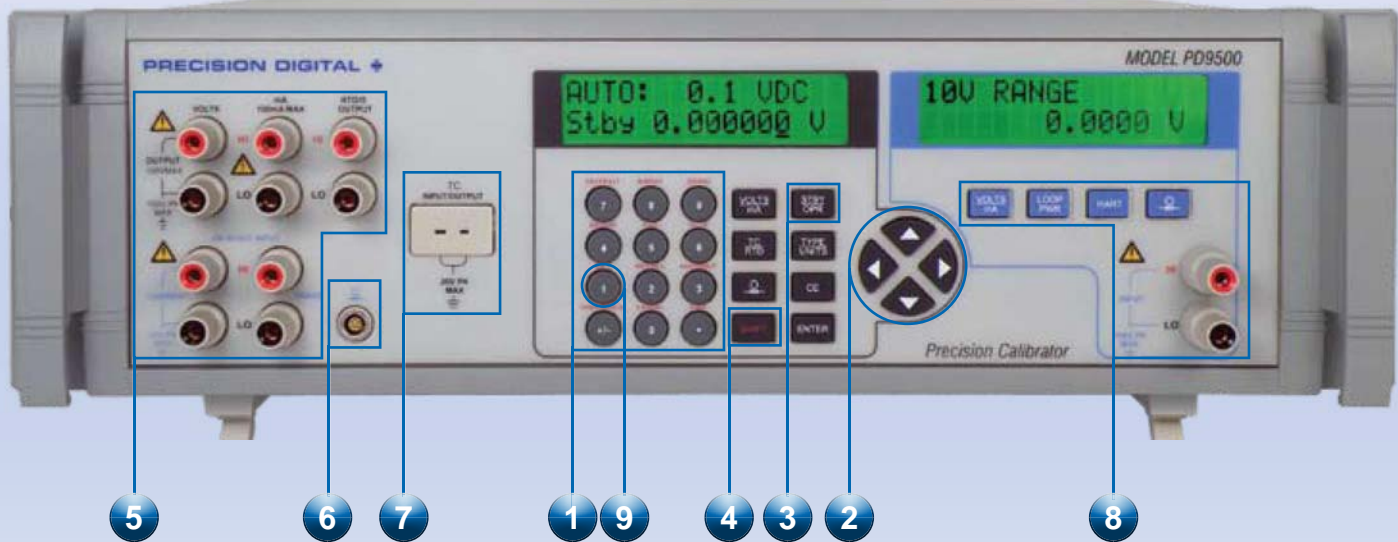# PRECISION CALIBRATOR

Model PD9500

FEATURES

- Initial Calibration Accuracy (6 months) to 0.0025% of Rdg. (voltage)
- 1-Year Accuracy to 0.005% of Rdg. (voltage)
- Source/Read Thermocouple (13), RTD (9), Voltage, Current and Pressure (read only)
- Custom RTD and SPRT Profiles
- Nine Setpoints for Each Output Range and Type
- 24 VDC Loop Power
- Direct Keyboard Entry
- Beryllium-Copper Binding Posts Reduce Thermal EMFs
- RS-232 and IEEE-488 Remote Control
- Compatible with Fluke Met/Cal® Software
- Isolated Measurement Channel
- Selectable 250 Ohm HART™ Resistor
- Includes NIST Traceable Certificate with Calibration Data

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INTRODUCTION

The PD9500 calibrator precision calibrator sources voltage, current, TC, RTD, Ohms, and pressure with a second completely isolated measurement channel for a single laboratory calibration instrument unmatched in versatility, performance, and value. The PD9500 calibrator's world-class performance and features are accessed through a very simple-to-use, intuitive user interface. Precision Digital's PD9500 calibrator is truly a "process calibration laboratory in a box."

1. Direct Keyboard Entry
2. Cursor Entry
3. Automatic Stand-by Mode
4. Shift Pushbutton
5. Five-Way Copper Alloy Binding Posts
6. Pressure Module Connector
7. CJC TC Mini-Jack
8. Isolated Measurement Channel
9. Setpoint Pushbutton

SIMPLE, INTUITIVE INTERFACE

The PD9500 calibrator provides simple, front-panel entry of mode, range, and value, using either direct keyboard entry **(1)** or cursor entry **(2)**. Using cursor entry, the LEFT/RIGHT arrow keys are used to move the cursor under the digit in the display to be changed. The UP/DOWN arrow keys increment/decrement the value at the cursor position. Using direct keyboard entry **(1)**, the exact value desired is entered using the numeric keys, and the ENTER key is pressed to set the output to that value. Whichever way you choose, setup is simple and fast. In the voltage output mode, the PD9500 calibrator auto-ranges on the entered value for maximum accuracy at all times.

The PD9500 can be conveniently rack-mounted, or used on a bench-top with pull-down front legs to adjust the viewing angle. Two displays are backlit making it easy-to-read.

THE PERFORMANCE YOU DEMAND IN ANY MODE

Current Mode

The PD9500 calibrator features a precision current output range (100mA) that offers 0.01% (100ppm) accuracy, which is ideal for calibrating process instrumentation especially 4 to 20mA equipment. With a full 12 volts of compliance at 100mA virtually any precision DC current measuring device can be calibrated using the PD9500 calibrator. Like the voltage ranges the current range offers quick settling time and an operate/stand-by mode.

Voltage Mode

The PD9500 calibrator offers four precision voltage output ranges (100mV, 1V, 10V, and 100V) all with 0.003% (30ppm) accuracy. These ranges are ideal for calibrating a broad range of DC voltage instrumentation. Additionally all voltage outputs settle to full specification in less than 200ms making the PD9500 calibrator ideal for automated calibration systems.

An automatic stand-by mode **(3)** assures that output voltages above 30VDC must be acknowledged by the operator before the voltage appears at the output jacks. The stand-by mode is also triggered if the output current compliance is exceeded, thereby protecting the device under calibration.

RTD Mode

The PD9500 calibrator can read and source 9 RTD types as well as YSI 400 thermistor and Ohms for non-standard curves. Probe coefficients (A, B, C, and R0) can be entered directly, with storage for up to five custom curves and one SPRT (Standard Platinum Resistance Thermometer) curve. The performance of the PD9500 calibrator in the RTD mode compares to dedicated RTD measurement instruments. Unlike low-cost, less accurate RTD instruments, the display in the PD9500 calibrator is always active, reading to three decimal places, using polynomial averaging to extract a high accuracy signal. The result is a very quiet, high accuracy reading.

The PD9500 Calibrator in Action

The PD9500 calibrator is used in Precision Digital's manufacturing operation. The calibration process is automated, and commands are sent to the PD9500 calibrator via the RS-232 serial port. RTD, thermocouple, mA, and voltage inputs are calibrated in one program.

Thermocouple Mode

The Precision Digital PD9500 calibrator can read and source any of 11 types of thermocouples. Its TC input and output is Cold Junction Compensated, using an ultra-stable PT-100 sensor.

Pressure Mode

For the ultimate in pressure measurement, performance, and flexibility, the PD9500 calibrator has been designed to accept pressure modules from three different manufacturers, including: BETA, Fluke, and Mensor. Modules are available in up 29 ranges and types including gauge, vacuum, absolute, differential and compound. Modules are available from 10" water column (WC) to 10,000 PSI full scale.

Beta Port Module

Total Setpoint Control

A SHIFT key **(4)** provides easy access to the setpoint controls of the PD9500 calibrator. Up to nine setpoints can be defined for each output mode and each thermocouple and RTD type. Setpoints are recalled individually at the touch of three buttons, SHIFT **(4)**, SETPOINT **(9)** button and then the corresponding numeric keys 1-9. Any number of sequential setpoints can be stepped through automatically, with complete control of dwell time. Either way, for rapid setup of repeatable tests, no other instrument comes close to the Precision Digital PD9500 calibrator.

REMOTE CONTROL

All of the PD9500 calibrator operating functions can be accessed via RS-232, IEEE-488 or USB using a standard PC running Fluke MeTCal® software, Windows® HyperTerminal or other software using an ASCII protocol. Custom control programs may be written using programming software such as C++. Switching between LOCAL and REMOTE is as simple as touching the SHIFT **(4)** and LOCAL buttons.

ROCK-SOLID STABILITY

The PD9500 calibrator stability and accuracy is traceable to NIST standards. The accuracy of the PD9500 calibrator is specified for both 90-day and one-year intervals. Manual zero calibrations can be made on all TC and pressure functions to eliminate any offsets.

FLEXIBLE OUTPUT

Five-way copper alloy binding posts **(5)** provide a wide range of connection options. A standard pressure module connector is provided **(6)**, as is the CJC TC mini-jack **(7)**.

ISOLATED MEASUREMENT CHANNEL

The PD9500 calibrator features a fully isolated measurement channel **(8)** which allows the user to calibrate process transmitters and signal isolators. In reality it's like having two instruments in one! This channel also incorporates a 24 volt loop power supply to power 2-wire transmitters and a HART interface resistor enabling direct connection to HART communicators. Key features are:

- Two voltage ranges 10V and 100V DC
- mA range 0 to 52mA
- mA range with simultaneous 24 volt power (0 to 24ma)
- Selectable 250 ohm HART resistor
- Accuracy of 0.005% of reading on all ranges

SPECIFICATIONS

(1 year at 23 °C ±5 °C, % of reading/setting, unless otherwise noted)

Output Voltage

Range
- 0 to 100.000 mV
- 0 to 1.00000 V
- 0 to 10.0000 V
- 0 to 100.000 V

Resolution

0 to 100 mV Range	1 µV
0 to 1 V Range	10 µV
0 to 10 V Range	100 µV
0 to 100 V Range	1 mV

Accuracy

0 to 100 V Range	±0.003% (30ppm) ± 3 µV
0 to 1 V Range	±0.003% (30ppm) ± 10 µV
0 to 10 V Range	±0.003% (30ppm) ± 100 µV
0 to 100 V Range	±0.003% (30ppm) ± 1 mV

Maximum Burden (~ 1 Ohm output impedance)

0 to 100 mV Range	10 mA
0 to 1 V Range	10 mA
0 to 10 V Range	10 mA
0 to 100 V Range	1 mA

Output Current

Range	0 to 100.000 mA
Resolution	1 µA
Accuracy (% of rdg.)	± 0.005% ± 1 Count
Maximum Burden	10 V

Thermocouples

Output

Types	J, K, T, E, R, S, N, B, L, U, C, BP, XK
Range	mV
Resolution	0.1 °C/°F
Accuracy	0.14 °C; Type J, typical

Input

Types	J, K, T, E, R, S, N, B, L, U, C, BP, XK
Range	mV
Resolution	0.01 °C/°F
Accuracy	0.14 °C; Type J, typical

RTD

Output

Range	Pt385 (100, 200, 500, 1000), Pt392, Pt3916 (JIS), Ni120, Cu 10, YSI 400
Resolution	0.01 °C/°F; Pt385-1 00, typical
Accuracy	±0.05 °C; Pt385-100, typical

Input (All RTD inputs are 4 wire)

Range	Pt385 (100, 200, 500, 1000), Pt392, Pt3916 (JIS), Ni120, Cu10, YSI 400, 25 Ohm SPRT
Resolution	0.001 °C/°F; Pt385-100, typical
Accuracy	±0.02 °C; Pt385-100, typical

Ohms

Output

Range	5 to 4000.0 Ω
Resolution	5 to 400.00 Ω 0.001 Ω, 5 to 4000.0 Ω 0.01 Ω
Accuracy	5 to 400.00 Ω ±0.05 Ω, 5 to 4000.0 Ω ±0.3 Ω

Input (4 wire connection)

Range	0 to 4000.00 Ω
Resolution	0 to 400.00 Ω 0.001 Ω, 0 to 4000.0 Ω 0.01 Ω
Accuracy	0 to 400.00 Ω 40 PPM ±0.002 Ω, 0 to 4000.00 Ω 40 PPM ±0.02 Ω

Pressure

Range	0 to 1 inch H_2O; to 10,000 psi
Compatibility	All BetaPort modules using the BPPA adapter, and all Fluke 700 and Mensor 6100 Series Pressure Modules

Isolated Measurement Channel

Range	Accuracy
0 to 10.0000V	±0.005% ± 0.2mV
0 to 100.000V	±0.005% ± 2.0mV
0 to 52.0000mA	±0.01% ± 1µA
Loop power	24 V ± 10%
HART™ resistor	250 Ω ± 3%
Maximum current	24 mA

Stability

Warm-up Time	30 minutes to rated accuracy
Temp Coefficient	10% of accuracy spec/°C (-18° to 28°C)

Environmental

Operating Temp.	0° to 50°C
Storage Temp.	-20° to 70°C

Humidity

Operating	<80% to 30°C, <70% to 40°C, <40% to 50°C
Storage	<95%, non-condensing

Power Requirements

Voltage Range	Selectable 90 to 140 VAC, and 210 to 240 VAC, <15 VA

Mechanical

Dimensions	5" x 19" x 11" (H x W x D) (17.7 cm x 48.26 cm x 27.96 cm)
Weight	10.5 lbs. (4.8 kg)
Display	(2) large character 16 by 2 line alphanumeric backlit LCDs

ORDERING INFORMATION

Model PD9500 calibrator • Precision Calibrators	
Model	**Description**
PD9500-115	Precision Calibrator, 115 VAC 50/60 Hz
PD9500-230	Precision Calibrator, 230 VAC 50/60 Hz

Your Local Distributor is:

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