

ecom ***instruments***



PTC 400

Bedienungsanleitung

Instruction Manual

Manuel d'Instructions

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1. Introduction

The PTC 400 is designed to be a versatile, easy to use temperature calibrator with a simple user interface. The following instructions will allow the user to begin simple calibration tasks by learning the basic operation of the keys and their functions.

2. Quick Start Instructions

A. Key Functions

Key	Function
Input/Output	Toggles the function selected from measurement mode to source mode.
TC	Pressing the "TC" or "Thermocouple" key toggles through all available TC types as well as direct mV output.
RTD	Pressing the RTD key toggles through all available RTD types as well as direct ohms output.
°F/°C	Toggles between °F and °C
0-9 keys	These keys allow a user to enter an output value. Example: to output 20 mV select mV output and Press the "2" key then the "0" key followed by the "ENTER" key.
Arrow ↑ ↓	These keys allow small changes to be made to an output value. Press either the up or the down key to set the value as desired.
CE	The clear entry key allows the user to clear a value before the enter key is pressed.
Shift	This key has a blue text color and acts as a second function key to all keys that have an associated second function.

B. Setpoints

1. Storing Setpoints

The setpoint mode allows up to 9 setpoints to be set in non-volatile memory for each range.

The procedure is as follows:

- Set the output to the desired value.
- Press shift followed by the "SET" key
- Choose the desired setpoint storage location by pressing a key (1-9).
- Enter a new value and repeat steps 1 through 3 as needed, up to 9 setpoints for each range can be stored.

2. Recalling Setpoints

- To recall a setpoint press shift followed by the "SPT" key.
- You will be prompted to enter the number of the desired setpoint location set previously.
- Press the desired location number and the unit will go to that output.

3. Automated Stepping

The PTC 400 can auto-step through some or all of the stored setpoints for a given range.

The procedure is as follows:

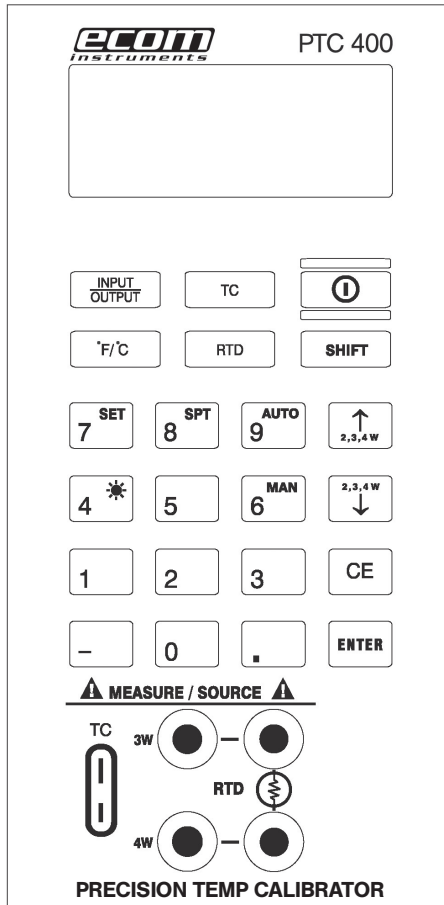
- a. Press “Shift” followed by “Auto”.
- b. “Auto SPT ?” will appear. Enter the ending setpoint location. Example: if you have all 9 setpoints stored but only want to step through the first 3 then enter ”3” for this question.
- c. The next screen prompts you to enter the dwell time from 5 to 500 seconds.
Simply enter a number in that range.
- d. Auto-step will begin.
- e. To exit auto-step press the “CE” key or enter a value.

4. Manual Stepping

The PTC 400 can be manually stepped through all or some of the stored setpoints.

The procedure is as follows:

- a. Press “Shift” followed by “Man”
- b. Using the arrow keys, toggle up and down through the stored setpoints.
- c. To exit press “CE” or simply enter a new output value.



3. Connection Diagrams & Instructions

A. Sourcing Resistance

1. Select the RTD mode.
2. Connect device under test as shown.
3. In the RTD mode, use the RTD key to choose the desired range.
4. The PTC 400 is able to handle up to a 3 mA excitation on the Resistance Simulation Range. Exceeding these limits will result in a warning on the display.

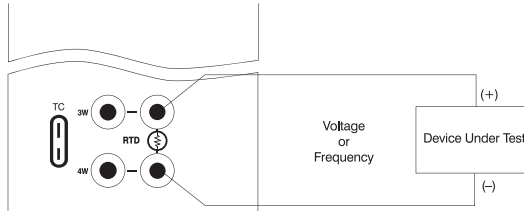


Figure 1.

B. Sourcing a Thermocouple Signal

TC wire must be used to achieve an accurate calibration.

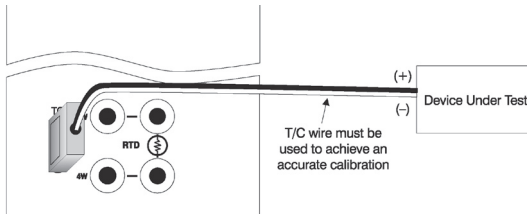


Figure 2.

Note: For best accuracy allow a 10 minute warm-up period after the PTC 400 is turned on.

C. Measuring Temperature Using a Thermocouple

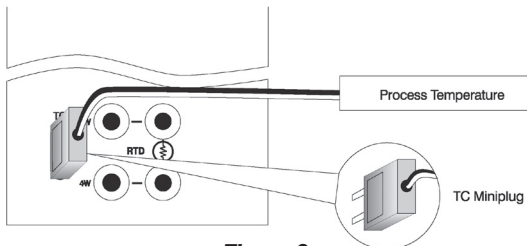


Figure 3.

D. Measuring Resistance (RTDs)

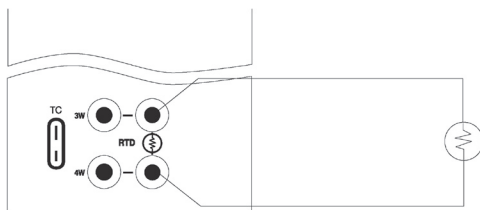
When measuring resistance (ohms) there are 3 choices when using the PTC 400. The choices are 2-wire, 3-wire, and 4-wire measurements. While 4-wire offers the highest accuracy, most industrial RTDs are a balance 3-wire. Figure 4 shows how to hook up the PTC 400 for the 3 types of measurements.

1. Choose the desired RTD/ohms range by first pressing the "RTD" key to get into the RTD mode. Continue to press the "RTD" key to step through all of the RTD choices.

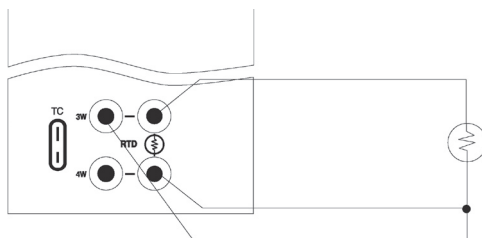
2. Make sure the PTC 400 is in the Input Mode

(Note: that it will indicate 2, 3, or 4W in the upper left corner of the LCD).

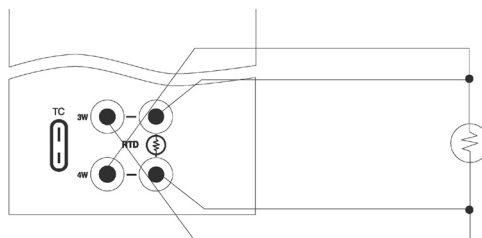
To set the desired wire configuration use the Up/Down arrow keys to toggle through the 2, 3, and 4 wire modes.



Measuring a 2 Wire RTD or Using the Continuity Function



Measuring a 3 Wire RTD



Measuring a 4 Wire RTD

Figure 4.

E. Sourcing Resistance Into a RTD Transmitter

1. As described previously in section A the PTC 400 can source resistance in a RTD Transmitter or measuring device. In many cases the unit under test will require a 3 or 4 wire connection to achieve best accuracy. Refer to Figure 5 for connection information.

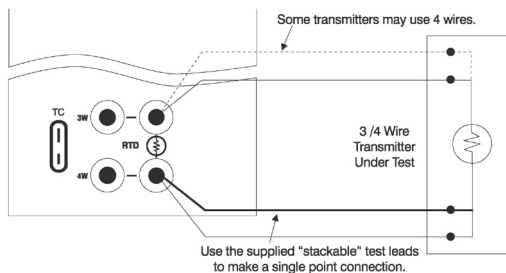


Figure 5.

4. Maintenance

A. Power Requirements

The PTC 400 operates on 4 AA alkaline batteries or optional rechargeable Ni-Cd batteries. To replace the alkaline batteries or to install rechargeable batteries remove the two (2) screws on the rear battery door and lift the battery cover. When using Ni-Cd batteries the AC adapter will simultaneously power the PTC 400 and charge the batteries. A full charge will take 10- 12 hours. The AC adapter can be used to power the unit on the bench with or without Ni-Cd batteries installed. Never connect the AC adapter with alkaline batteries installed, be sure to remove the alkaline batteries before using the AC adapter.

B. Field Replacement Fuse Update

PTC 400s come with a field replaceable minifuse. This fuse protects the PTC 400 from mis-connections beyond the ratings specified for the PTC 400 inputs and outputs. If an overload condition occurs and a blown fuse is suspected perform the following fuse check/replacement procedure:

1. Remove the four screws on the rear of the PTC 400 that hold the enclosure together.
NOTE: Two of the screws are under the battery compartment door.
2. With the case top open, locate the two socketed mini fuses mounted near the input/output connection jacks.
3. Remove one fuse at a time and check continuity using an ohmmeter. A good fuse will read 10 ohms or less. A blown fuse will have a very high reading and generally show as an open circuit.
4. If a blown fuse is found replace with the enclosed spare fuse.
5. To order more fuses contact ecom instruments GmbH.

C. Calibration

The PTC 400 should hold its rated specifications for a minimum of one year. Given this, annual re-calibration is required for best performance.

5. Specifications

T/C Ranges:	J, K, T, E, R, S, N, B, L, U including – 10 to 75 mV range
RTD Ranges:	Pt 385 (100, 200, 500, 1000 ohms) Pt 392, JIS, Ni 120, CU10, YSI 400
Ohms Ranges:	0 to 400.00 and 400.0 to 3200.0
Accuracy:	T/C Type J: $\pm 0.3^{\circ}\text{C} \pm 10 \mu\text{V}$ ($\pm 0.4^{\circ}\text{C}$ total error) RTD PT100: $\pm 0.1^{\circ}\text{C} \pm 0.075 \Omega$ ($\pm 0.3^{\circ}\text{C}$ total error) Ohms (400): $\pm 0.1 \Omega$ Ohms (3200): $\pm 1.0 \Omega$
RTD IEX-range:	0.01 mA to 3 mA
RTD Frequency Response:	10 mS – works with all pulsed XMTR's
Oper. Temp:	-10°C to 50°C
Storage Temp:	-40°C to 60°C
Power Supply:	4 AA Alkaline Cells, 30 hours typical operating time
Size:	7.5" x 4" x 1.5" (190 x 102 x 38 mm)

Range & Accuracy

Range	Min	Max	Accuracy
ohms Read (low)	0.00 Ω	400.00 Ω	$\pm 0.1 \Omega$
ohms Read (high)	400.0 Ω	1500.0 Ω	$\pm 0.5 \Omega$
	1500.0 Ω	3200.0 Ω	$\pm 1.0 \Omega$

Range	Min	Max	Excitation Current	Accuracy
Ohms Source (low)	5.00 Ω	400.00 Ω	0.1 to 0.5 mA	0.15 Ω
	5.00 Ω	400.0 Ω	0 0.5 to 3 mA	0.1 Ω
Ohms Source (high)	400.0 Ω	1500.0 Ω	0.05 to 0.8 mA	0.5 Ω
	1500.0 Ω	3200.0 Ω	0.05 to 0.4 mA	1.0 Ω

Thermocouple Read and Source (All errors included)			
Range in $^{\circ}\text{C}$	Min	Max	Accuracy
J Thermocouple	-200.0	0.0	0.6 $^{\circ}\text{C}$
	0.0	1200.0	0.4 $^{\circ}\text{C}$
K Thermocouple	-200.0	0.0	0.8 $^{\circ}\text{C}$
	0.0	1370.0	0.5 $^{\circ}\text{C}$
T Thermocouple	-200.0	0.0	0.8 $^{\circ}\text{C}$
	0.0	400.0	0.5 $^{\circ}\text{C}$
E Thermocouple	-200.0	0.0	0.5 $^{\circ}\text{C}$
	0.0	950.0	0.4 $^{\circ}\text{C}$
R Thermocouple	-20	0.0	2.4 $^{\circ}\text{C}$
	0	500	1.7 $^{\circ}\text{C}$
	500	1750	1.3 $^{\circ}\text{C}$
S Thermocouple	-20	0	2.4 $^{\circ}\text{C}$
	0	500	1.7 $^{\circ}\text{C}$
	500	1750	1.4 $^{\circ}\text{C}$
B Thermocouple	600	800	2.1 $^{\circ}\text{C}$
	800	1000	1.7 $^{\circ}\text{C}$
	1000	1800	1.3 $^{\circ}\text{C}$
L Thermocouple	-200	0.0	0.45 $^{\circ}\text{C}$
	0.0	900.0	0.4 $^{\circ}\text{C}$
U Thermocouple	-200	0.0	0.7 $^{\circ}\text{C}$
	0.0	400.0	0.45 $^{\circ}\text{C}$
N Thermocouple	-200	0.0	1.1 $^{\circ}\text{C}$
	0.0	1300.0	0.6 $^{\circ}\text{C}$
mV Read/Source	-10.00	75.00	0.015 % ± 2 dig.

RTD Read and Source				
Range in °C	Min	Max	Accuracy	
Ni120 (672)	-80.0	260.0	0.2°C	
Pt100 (385)	-200.0	800.0	0.33°C	
Pt100(3926)	-200.0	630.0	0.3°C	
Pt100(3916)	-200.0	630.0	0.3°C	
Pt200(385)	-200.0	630.0	0.8°C	
Pt500(385)	-200.0	500.0	0.3°C	
	500.0	630.0	0.4°C	
Pt1000(385)	-200.0	100.0	0.2°C	
	100.0	630.0	0.3°C	
Cu10	-100.0	250.0	2.2°C	
YSI400	15.00	50.00	0.05°C	

6. Repairs

Repair work is subject to the nationally valid regulations and directives. We therefore recommend that such work be performed by ecom instruments GmbH, Germany, as all repairs must be examined to ensure functional safety.

7. Warranty and liability

Under the general terms and conditions of business, ecom instruments GmbH offers a 2-year warranty for function and materials on this product under the specified operating and maintenance conditions. Not covered are all wearing parts (e.g. batteries, sensors, displays, lamps, etc.) as well as calibrations.

This warranty does not extend to products that have been used improperly, altered, neglected, damaged by accident or subjected to abnormal operating conditions or improper handling. In the event of a warranty claim, the faulty device should be sent in. We reserve the right to readjust, repair or replace the unit.

The above warranty terms represent the sole rights of the purchaser to compensation and apply exclusively and in place of all other contractual or statutory warranty obligations. ecom instruments GmbH does not accept liability for specific, direct, indirect, incidental or consequential damages or losses, including the loss of data, regardless of whether they are caused by breach of warranty, lawful or unlawful actions, actions in good faith or other actions.

If in certain countries the restriction of statutory warranty and the exclusion or restriction of incidental or consequential damages is unlawful, then it may be possible that the above restrictions and exclusions do not apply for all purchasers. If any clause in these warranty terms should be found to be invalid or unenforceable by a competent court, then such a judgement shall not affect the validity or enforceability of any other clause contained in these warranty terms.



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