

MAINTENANCE

Generally, with normal usage, this calibrator should hold its rated specifications for at least 12 months. Beyond this, it should remain within 1.5X of its specification over its useful life, provided it is not abused or tampered with. If after the stated warranty period, the device falls out of calibration, it can be returned to Omega for re-calibration. Please call 1-800-826-6342 for pricing and return information.

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CL230 Hand-Held RTD Calibrator



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Customer Service: 1-800-622-2378 (USA & Canada only)
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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

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GENERAL DESCRIPTION

The CL230 is designed to be a simple to use, high accuracy RTD Calibrator capable of either simulating or reading several common RTD Types. When being used as an RTD simulator the CL230 can calibrate a wide range of RTD Transmitters and recording devices due to its low excitation current capability. The step and scroll keys allow the user to make output changes quick and easily.

INSTALLATION

UNPACKING

Remove the Packing List and verify that all equipment has been received. If there are any questions about the shipment, please call Omega's Customer Service Dept. at 1-800-826-6342.

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

SET-UP

Before beginning, become familiar with the keypad layout and the configuration of the input/output jacks. Remember, these jacks are used in multiple configurations so pay careful attention to the jack identification label on back of unit and how the test leads are connected for the specific application.

OPERATING PROCEDURE

1. Turn on power and select desired RTD type by depressing the Range key. Once the desired range has been selected it will remain in memory until a new range is selected.
2. Select either input or output by depressing the In/Out key.

NOTE: The display will read "OPEN" if the unit is not connected to either an RTD or RTD measuring device.
3. Connect the CL230 to the device under test as shown in the operating modes section.
4. If you are using the CL230 in the output mode use the Step or Scroll keys to set output.

The Step key will step in 100° increments and the Scroll key allows single degree increments which will increase in speed if the switch is depressed for several seconds.

OPERATING MODES

1. RTD Simulation Mode

One of the most common uses of the CL230 is for simulating an RTD when calibrating an RTD measuring device such as a transmitter, data logger, PLC or similar product. To understand how to calibrate an RTD measuring device, it's important to have a general understanding of how an RTD operates.

By design, an RTD is a resistive sensor which changes its resistance value (ohms) as a function of temperature. Unlike a thermocouple, it does not "put out" a voltage or current but is strictly a passive device. Because of this, a current must be passed through the RTD so that a voltage can be developed across the

RTD and then amplified by the measuring device. Ohm's Law is a simple algebraic expression which describes the relations between voltage, current and resistance.

Ohm's Law states: $V = I \times R$ where V = Voltage, I = Current, R = Resistance

From this equation, we can see that the voltage developed across the RTD is equal to the current traveling through it times its resistance. Therefore, for a fixed current, the voltage measured will be directly proportional to the temperature.

Figure 1 illustrates a typical example of how an RTD transmitter measures an RTD sensor using a fixed current.

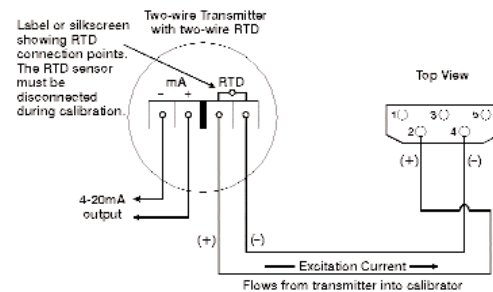


Figure 1

In this example a two-wire RTD transmitter is being calibrated using the CL230 in the simulation mode. The transmitter under test supplies an excitation current into the calibrator and the calibrator adjusts the voltage drop at the terminals to yield the desired resistance for a given temperature. For the CL230 to operate properly the excitation current must be in the range of 0.125mA to 2mA and the polarity must be correct. Too low of excitation current or pulsed excitation current will be indicated by the word "OPEN"

flashing on the display. Reverse polarity will be indicated by "REV.POL" on the display. If your device requiring calibration has a pulsed excitation current refer to the PTC-9002.

The example in Figure 1 shows an RTD Transmitter with the RTD sensor having two connection points. In many cases, however, RTD devices have 3 and 4 wire connections. Figures 2 and 3 illustrate the proper connection procedure.

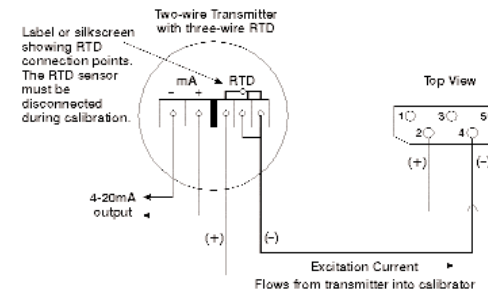


Figure 2

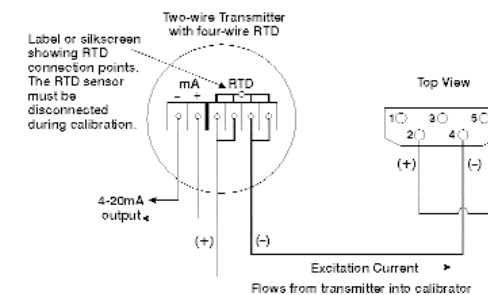


Figure 3

In both of these examples a jumper(s) must be made at the device under test for the circuit to work properly. The proper connections for these jumpers are generally shown by the label or silkscreen on the device under test. If proper RTD connections are not obvious refer to instruction manual for the device under test.

2. RTD Read Mode

The CL230 can also be used to read an RTD probe or similar RTD sensor. The CL230 only works in the 4 wire mode; however, 2 and 3 wire RTD's can be read as long as multiple connections are made at the RTD leads. Refer to the label on the rear of the CL230 for connection information.

SPECIFICATIONS

Ranges	PT385	-200 to 850°C
	PT392	-200 to 850°C
	Ni120	-80 to 320°C
	Jis.392	-200 to 850°C

Resolution	1°C or 1°F
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Accuracy	±1°C
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Excitation Current Range (Source Mode)	0.125 to 2.0mA continuous
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Operating Temp.	0 to 50°C
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Storage Temp.	-20 to 60°C
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Temperature Coef.	±0.01% F.S./°C
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Power ¹	9V alkaline battery
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Case Size	1.43" x 3.15" x 5.7"
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Weight	12 oz.
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Notes: ¹A low battery indication is given at 5.5 volts.