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CL514
RTD Calibrator

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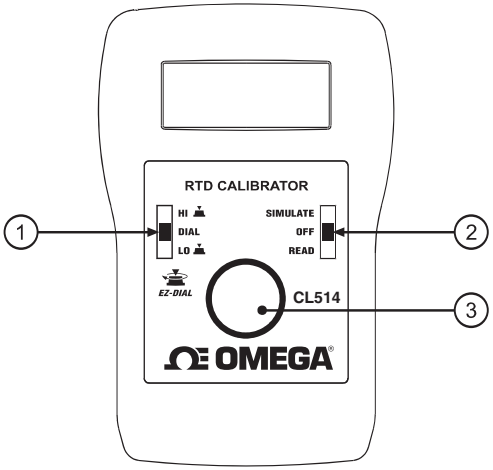
Basic Keypad Operations

1 EZ-Check™ Switch

Slide the switch to select from three user stored values for the desired calibration points. The user can select HI, DIAL, and LO positions. These values can easily be changed to suit the calibration requirements.



2 SIMULATE/OFF/READ Switch

Turn the CL514 on to SIMULATE to output a resistance corresponding to temperature. Turn the unit to READ to read RTD resistance directly in temperature.

3 EZ-Dial™ Knob

Turn the knob to change temperature in 0.1º increments. Push and turn for faster dialing. Push without turning to store new EZ-Check™ HI/LO points in SIMULATE mode, or to clear EZ-Check™ HI/LO points in READ mode.

CL514 Configuration

Instructions for Enabling and Disabling the Configuration Options

1. Turn the Model 512 on to SIMULATE or READ.
2. Press the EZ-Dial™ Knob while the "PRESS EZ-DIAL KNOB FOR CONFIGURATION" message is displayed.
3. Select options by turning the EZ-Dial™ Knob until the arrow points to the desired option.
4. The option can be enabled or disabled by tapping the EZ-Dial™ Knob.

The CL514 configuration menu will exit automatically after 5 seconds of inactivity and go to normal operation with the options selected. These options are recalled at turn on until they are changed again.

CL514 Configuration Menu

Auto Off **ON/OFF**

If Auto Off is ON, the unit will turn off after 30 minutes to save battery life, if there is no user activity. If Auto Off is OFF the unit will stay on until it is turned off from the keypad. This is typically useful for manual loading or continuous use.

Display Units **°C/°F**

Pressing the EZ-Dial™ Knob to toggles between °C or °F

RTD **Pt100 α=3850, Pt100 α=3902, Pt100 α=3916, Pt100 α=3926, Cu10 α=427, Ni110 Bristol, Ni120 α=672, Ω**

To change RTD type, press the EZ-Dial™ Knob. Turn the EZ-Dial™ Knob to scroll through the list of available types. Press again to save and return to the configuration menu.

Read Mode

Slide the SIMULATE/OFF/READ switch to READ for direct RTD input. The CL514 displays temperature corresponding to resistance input for the selected thermocouple type.

Automatic 2, 3, or 4 wire detect: Connect 2, 3, or 4 wires to the RTD sensor. Follow the connection diagrams. The CL514 indicates "2W", "3W", or "4W" in the lower left corner of the display. Use this feature for troubleshooting broken leads or sensors.

Slide the EZ-Check™ Switch to HI and LO to recall maximum and minimum saved readings. Press and hold the EZ-Dial™ Knob to clear saved readings. The display flashes "CLEARED" as a confirmation.

Be sure the switch is in the DIAL position to monitor input. Observe the "HI" and "LO" switch position indicators in the display.

Double-click the EZ-Dial™ Knob to return to the configuration menu.

Turning the EZ-Dial™ Knob has no effect in read mode.

Display Indications:

OVERRANGE or **UNDERRANGE**	The resistance input exceeds the range of the selected RTD type.
OPEN RTD	No RTD is connected.
MISCONNECT	The CL514 is incorrectly connected for a 3-wire reading. Both black leads are required.

Source Mode

Slide the SIMULATE/OFF/READ switch to SIMULATE for direct RTD output. The CL514 outputs resistance corresponding to temperature for the selected thermocouple type.

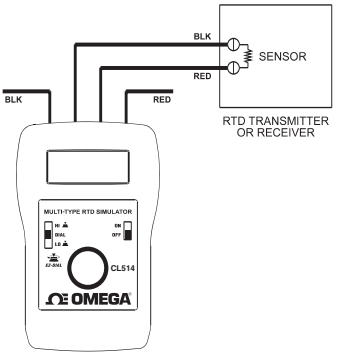
Turn the EZ-Dial™ Knob to change temperature, push and turn for faster dialing.

Slide the EZ-Check™ Switch to HI or LO to recall stored settings. While in the HI or LO position, dial a new setting and press the EZ-Dial™ Knob to store. The DIAL position always holds the last setting dialed there.

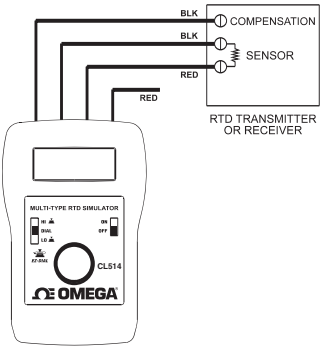
Double-click the EZ-Dial™ Knob to return to the configuration menu.

Connection Diagrams

Two Wire Connection to Transmitter

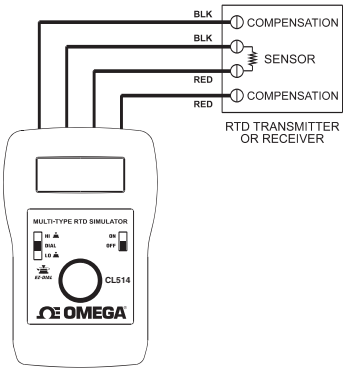


Three Wire Connection to Transmitter



Connection Diagrams

Four Wire Connection to Transmitter



Specifications

General Specifications:

(Unless otherwise indicated all specifications are rated from a nominal 23 °C, 70 % RH for 1 year from calibration)

Temperature Range	-25 to 60 °C (-10 to 140 °F)
Relative Humidity Range	10 % ≤RH ≤90 % (0 to 35 °C), Non-condensing
	10 % ≤RH≤ 70 % (35 to 60 °C), Non-condensing
Size	4.9 X 3.15 X 1.82 inches (125.5 X 80 X 46.2 mm)
Weight	9.1 oz (258 grams)
Battery	9V Alkaline provides 45 hours of continuous use
Miscellaneous	Low battery indication with nominal 1 hour of operation left
	Protection to 60V for up to 30 seconds in duration
	High contrast graphic liquid crystal display with 0.357” (9.07 mm) high digits
Resolution	°C or °F / 0.01 Ω
Span	0.00-410.00 Ω
Accuracy	±(0.015 % of Ω + 0.05) Ω (see accuracy tables for temperature error)
Temperature Coefficient	±0.01 % of span in Ω/°C ambient

RTD Simulation Specifications:

Allowable Excitation Current	100 µA to 10.2 mA, steady or pulsed/intermittent/smart
for accuracies below 100µA add	±10µV/Excitation Current (units are in Ω)
Pulsed Excitation Current Compatibility	DC to 0.01 second pulse widths

RTD Read Specifications:

Excitation Current	1.0 mA nominal

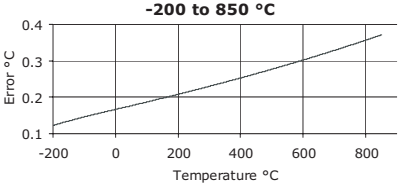
Available Options:

Carrying Case	Part Number: SC-540

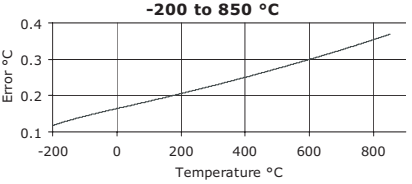
Temperature Accuracy

The following charts give worst-case temperature accuracy based on stated resistance accuracy of ±(0.015 % + 0.05) Ω.

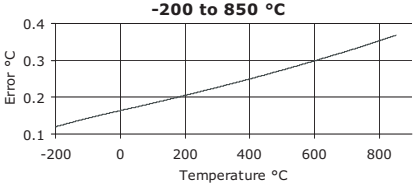
Pt100 TCR=0.00385
-200 to 850 °C



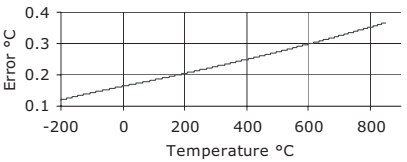
Pt100 TCR=0.003902
-200 to 850 °C



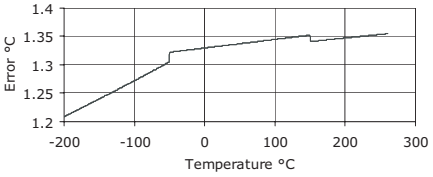
Pt100 TCR=0.003916
-200 to 850 °C



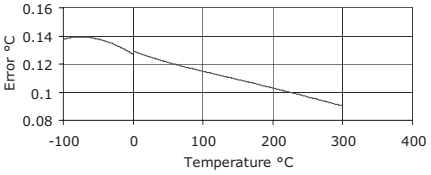
Pt100 TCR=0.003926
-200 to 850 °C



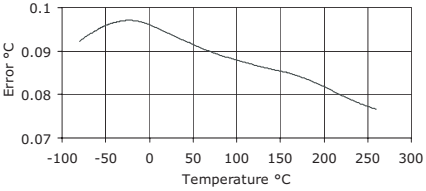
Cu10 TCR=0.00427
-200 to 260 °C



Ni110 TCR=0.00530
-100 to 300 °C



Ni120 TCR=0.00672
-80 to 260 °C



CL514 Field Calibration Procedure

Equipment Needed:

1. Precision OHM Meter with accuracy of 0.0068% at 400Ω.
2. Precision OHM Source with accuracy of 0.0068% at 400Ω.

Enabling Calibration:

Place in a fresh battery and allow 15 minutes for the CL514 to stabilize to the ambient temperature. Remove the EZ-Dial™ Knob, battery cover and the four black Phillips head screws. While holding the CL514 face down in one hand, carefully separate the top and bottom of the housing. Place the unit into calibration mode by shorting the calibration via located on the bottom right side on the PCB with tweezers and turning the UUT on. Verify the CL514 is in calibration mode by viewing the bottom center of the LCD for the word "CAL".

Simulate Ω Calibration:

Connect the CL514 terminals to an OHM Meter in four-wire configuration.
Switch the CL514 to SIMULATE Mode.

LO Calibration:

1. Slide the EZ-Check™ Switch to the LO position indicated by displaying a "LO" on the left side of the LCD.
2. Dial the CL514 so the meter reads 0.00 Ω.
3. Press the EZ-Dial™ Knob down.
4. The display will flash "STORED" to confirm that the value was stored.

HI Calibration:

1. Slide the EZ-Check™ Switch to the HI position indicated by displaying a "HI" on the left side of the LCD.
2. Dial the CL514 so the meter reads 400.00 Ω.
3. Press the EZ-Dial™ Knob down.
4. The display will flash "STORED" to confirm that the value was stored.

Read Ω Calibration:

Switch the CL514 into READ Mode.

LO Calibration:

1. Slide the EZ-Check™ switch to the LO position indicated by displaying a "LO" on the left side of the LCD.
2. Short all 4 input terminals of the UUT.
3. Press the EZ-Dial™ Knob down.
4. The display will flash "STORED" to confirm that the value was stored.

HI Calibration:

1. Slide the EZ-Check™ switch to the HI Position indicated by displaying a "HI" on the left side of the LCD.
2. Connect a precision 400 _ standard resistor to the UUT.
3. Press the EZ-Dial™ Knob down.
4. The display will flash "STORED" to confirm that the value was stored.

Completion of Calibration:

Turn the CL514 OFF. Next time the unit is turned on the CL514 will be calibrated and in normal operational mode.

NOTES

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **37 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **three (3) 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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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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