OPERATING INSTRUCTIONS

GENERAL

INITIAL SETUP

The Omega CL627A is internally configurable for ease of use. Simply remove the four corner screws, flip a few DIP switches and follow the simple instructions given below (a condensed guide is found within the calibrator housing). The choices are based on the type of instruments in your shop or plant. For instance if your plant has only type E and your instruments display to 1°C, set up the CL627A to lock out T/C type selection, choose full time use and display with 1°C resolution.

CONFIGURING TEMPERATURE SCALES

°F
°C

LOCKING IN 1° RESOLUTION

The CL627A may be internally configured for 0.1° or 1° resolution. Select 1° resolution for less critical applications or 0.1° for increased resolution when necessary.

CHANGING T/C TYPES

Up to 14 T/C types plus millivolts may be selected each time the CL627A is turned on.

To change T/C types:

1) Repeatedly press and hold the SCROLL pushbutton when switching the unit on or while a T/C type is displayed, press and hold the SCROLL button for 3 seconds after the unit is turned on.
2) Continue to hold the SCROLL pushbutton. The LCD will scroll through the list of T/C types & mV.
3) Release the SCROLL pushbutton when the desired T/C type is displayed.

Changing the list of available T/C types:

You may create your own T/C list which can be changed at any time.
1) Turn the Model CL627A off & remove the 4 corner screws.
2) Set DIP Switch 2 up (see Configuring Operating Modes below).
3) Turn the CL627A on.
4) Turn the digital pot (Source Adjustment Knob) to scroll through each T/C type.
5) Press the STORE/SCROLL pushbutton to select (Steady) or deselect (Flashing) T/C types to add to the T/C list.
6) Continue turning the digital pot to review the selections. Press STORE/SCROLL pushbutton to change any selections.
7) Turn the CL627A off, place DIP Switch 2 down & replace the 4 corner screws.

CONNECTIONS

The CL627A has connections for both miniature thermocouple connectors and for direct thermocouple wires. It is essential for accurate calibration that thermocouple wire is used to connect the CL627A to the device being calibrated. Miniature or subminiature thermocouple connectors with thermocouple wire allow for the easiest connection. Different size thermocouple connectors may be used with an adapter of the same thermocouple type. Copper wires, Copper connectors or Copper adaptors are not recommended as they will cause errors in cold junction compensation. Copper is used only for millivolt applications.

T/C Wire

Miniature T/C Connector

T/C Standard to Miniature Adapter

250.0

250.0

250.0

OVER RANGE/UNDER RANGE

OUT

UNDER

TURN-ON

8.8.8.8

Each time the CL627A is turned on, the LCD will display all segments for about 1 second. It then displays the currently selected thermocouple type for approximately 3 seconds. The currently selected temperature scale of °C or °F will then display for about 3 seconds. Depending on the configuration, from 1 to 14 T/C types, millivolts or °C or °F may be selected during the thermocouple turn-on mode.
1) Move the power switch to SOURCE or READ
2) All segments on the LCD are turned on during self test
3) The display will indicate the selected T/C type for 3 seconds. Repeatedly press or press and hold the SCROLL pushbutton to change to the desired T/C type.
4) The display will indicate the selected temperature scale for 3 seconds. Press the SCROLL pushbutton to switch between °C & °F (based on configuration).
If a single T/C type, fixed °C or fixed °F have been selected, the user prompts for these selections are skipped during turn-on.
The three "QUIK-CHEK" temperature values will be the same as previously stored. Each time a different T/C type is selected, the three "QUIK-CHEK" values for that type will be recalled.

Changing Battery

Low battery is indicated by BAT on the LCD Display. Approximately 10 Hours of operation remain before the LCD goes blank and the CL627A shuts itself down. Turn the CL627A off, remove the four corner screws and lift the unit out of the case. The battery is fastened to the bottom printed circuit board and is easily removed. Replace screws and turn on when ready to use.

CHANGING OPERATING MODES

(Setting DIP Switches)

1) Turn the Model CL627A OFF
2) Remove the 4 corner screws and lift faceplate assembly out of the case
3) Set the DIP switches for your options as diagrammed below

Fixed °C

Fixed °C

Fixed °F

Fixed °F

Factory Settings (All switched down)

Selectables T/C Types

Fixed 0.1°C

Switch Up

Switch Down

Changing T/C List

Fixed 1°C

Selectables T/C Types

Fixed °C

Switch up

Switch Down

*Factory Settings (All switched down)
**SPECIFICATIONS**

(Unless otherwise indicated, specifications are in ±% of span @ 23°C)

**GENERAL**

GENERAL ACCURACY: ±(0.009% of reading +0.006 millivolts)

COLD JUNCTION COMPENSATION: Built-in for specified thermo-couple type, characterized to 1°C curve.

COLD JUNCTION TEMPERATURE EFFECT: Within 0.05° per °C change in ambient temperature over operating range

OPERATING TEMPERATURE RANGE: -5 to +140°F (-20 to +60°C)

STORAGE TEMPERATURE RANGE: -22 to +175°F (-30 to +80°C)

RELATIVE HUMIDITY: 10 to 90%, non-condensing

ZERO STABILITY: Included in Cold junction effect

WARM UP TIME: 1 Minute to full rated accuracy

OVERLOAD PROTECTION: 120 volts AC/DC for 30 seconds on connecting leads, in any mode

BATTERY LIFE: 9 Volt Alkaline: Nominal 40 hours

LOW BATTERY: "BAT" indication on LCD at 7 Volts nominal, approximately 10 hours left. Batteries should be removed when storing the unit >3 months.

REFERENCE DRIFT: <10 PPM/°C

**RANGES & ACCURACIES**

<table>
<thead>
<tr>
<th>TC TYPE</th>
<th>RANGE</th>
<th>ACCURACY</th>
<th>F RANGE</th>
<th>ACCURACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>-180.0 TO -18.0</td>
<td>±0.3°</td>
<td>-346.0 TO -292.0</td>
<td>±0.5°</td>
</tr>
<tr>
<td></td>
<td>-180.0 TO -50.0</td>
<td>±0.2°</td>
<td>-292.0 TO -58.0</td>
<td>±0.4°</td>
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<tr>
<td></td>
<td>50.0 TO 500.0</td>
<td>±0.1°</td>
<td>58.0 TO 932.0</td>
<td>±0.2°</td>
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<tr>
<td></td>
<td>500.0 TO 1200.0</td>
<td>±0.2°</td>
<td>932.0 TO 2192.0</td>
<td>±0.4°</td>
</tr>
<tr>
<td></td>
<td>1200.0 TO 1371.1</td>
<td>±0.3°</td>
<td>2192.0 TO 2500.0</td>
<td>±0.5°</td>
</tr>
<tr>
<td>K</td>
<td>-200.0 TO -18.0</td>
<td>±0.6°</td>
<td>-360.0 TO -328.0</td>
<td>±1.1°</td>
</tr>
<tr>
<td></td>
<td>-200.0 TO -50.0</td>
<td>±0.5°</td>
<td>-328.0 TO -58.0</td>
<td>±0.9°</td>
</tr>
<tr>
<td></td>
<td>-50.0 TO 500.0</td>
<td>±0.2°</td>
<td>58.0 TO 932.0</td>
<td>±0.4°</td>
</tr>
<tr>
<td></td>
<td>0.0 TO 400.0</td>
<td>±0.1°</td>
<td>932.0 TO 725.0</td>
<td>±0.2°</td>
</tr>
<tr>
<td>T</td>
<td>-200.0 TO -18.0</td>
<td>±0.4°</td>
<td>-400.0 TO -328.0</td>
<td>±0.7°</td>
</tr>
<tr>
<td></td>
<td>-200.0 TO -50.0</td>
<td>±0.3°</td>
<td>-328.0 TO -140.0</td>
<td>±0.4°</td>
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<tr>
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<td>-50.0 TO 1500.0</td>
<td>±0.2°</td>
<td>140.0 TO 1562.0</td>
<td>±0.2°</td>
</tr>
<tr>
<td></td>
<td>1562.0 TO 1600.0</td>
<td>±0.1°</td>
<td>1562.0 TO 1822.0</td>
<td>±0.4°</td>
</tr>
<tr>
<td>R</td>
<td>-18.0 TO 250.0</td>
<td>±1.2°</td>
<td>1 TO 482.0</td>
<td>±2.2°</td>
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<tr>
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<td>250.0 TO 575.0</td>
<td>±0.6°</td>
<td>482.0 TO 1380.0</td>
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<tr>
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<td>575.0 TO 1600.0</td>
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<td>1380.0 TO 2912.0</td>
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<td>1600.0 TO 1707.6</td>
<td>±0.6°</td>
<td>2912.0 TO 3214.0</td>
<td>±1.1°</td>
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<tr>
<td>S</td>
<td>-18.0 TO 100.0</td>
<td>±1.2°</td>
<td>-1 TO 212.0</td>
<td>±2.1°</td>
</tr>
<tr>
<td></td>
<td>100.0 TO 400.0</td>
<td>±0.8°</td>
<td>212.0 TO 752.0</td>
<td>±1.4°</td>
</tr>
<tr>
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<td>400.0 TO 1700.0</td>
<td>±0.6°</td>
<td>752.0 TO 3090.0</td>
<td>±1.1°</td>
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<tr>
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<td>1700.0 TO 1787.6</td>
<td>±0.7°</td>
<td>3090.0 TO 3214.0</td>
<td>±1.3°</td>
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<tr>
<td>B</td>
<td>315.6 TO 550.0</td>
<td>±1.8°</td>
<td>600.0 TO 1022.0</td>
<td>±3.2°</td>
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<tr>
<td></td>
<td>550.0 TO 900.0</td>
<td>±1.1°</td>
<td>1022.0 TO 1652.0</td>
<td>±2.0°</td>
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<tr>
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<td>900.0 TO 1150.0</td>
<td>±0.7°</td>
<td>1652.0 TO 2102.0</td>
<td>±1.3°</td>
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<td>1150.0 TO 1820.0</td>
<td>±0.6°</td>
<td>2102.0 TO 3298.0</td>
<td>±1.1°</td>
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<tr>
<td>U</td>
<td>-75.0 TO 100.0</td>
<td>±0.3°</td>
<td>-120.0 TO 103.0</td>
<td>±0.5°</td>
</tr>
<tr>
<td></td>
<td>100.0 TO 600.0</td>
<td>±0.1°</td>
<td>103.0 TO 1122.0</td>
<td>±0.2°</td>
</tr>
</tbody>
</table>

**SOURCE MODE**

OUTPUT IMPEDANCE: <0.1 ohms

SOURCE CURRENT: up to 8 mA (drives 80mV into 10 Ohms)

OUTPUT NOISE: <4 microvolts p-p for frequencies of 10 Hz or below

OVERLOAD: Indicates OVER and blanks digits on the display

**READ MODE**

INPUT IMPEDANCE: >10 Megohms

OPEN THERMOCOUPLE: DETECTION: 450 millisecond check pulse

Nominal threshold: 10 K Ohms. Displays "—" for open circuit

NORMAL MODE REJECTION: 50/60 Hz, 50 dB

COMMON MODE REJECTION: 50/60 Hz, 120 dB

Specifications subject to change without notice

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France: 9, Rue Denis Papin, 78190 Trappes
Tel: 33 (1) 30.62.14.00 FAX: 33 (1) 30.69.91.20
Toll Free in France: 05-4-OMEGA
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FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:
1. P.O. 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.

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OPERATING INSTRUCTIONS

SOURCE MODE  (Millivolt output or Simulate T/C temperatures)

SOURCE
1) Set up the CL627A for the correct T/C type and temperature scale (°C or °F)
2) Disconnect the input wires from the device to be calibrated or checked
3) Connect the CL627A to the device to be calibrated, being careful to observe proper polarity & T/C type
4) Adjust the digital pot to the desired output value

Whenever SOURCE mode is selected the word SOURCE will appear on the LCD display. To change the output value, turn the speed sensitive digital pot. Turning the pot slowly will cause a gradual change in the output. A faster change will occur when the pot is turned faster. This function operates in all three output positions (HI, SET & LO).

STORE
1) Switch to HI or LO
2) Turn the digital pot to desired value
3) Press the STORE/SCROLL pushbutton. The LCD will flash once to show that the value was saved

If a value is in the SET position and you want that value stored in HI or LO, press and hold the STORE/SCROLL pushbutton while moving the switch to HI or LO. Then release the STORE button.

“QUIK-CHEK”
Any time you need a stored value just throw the “QUIK-CHEK” switch. Any value in the T/C range may be stored in HI & LO. The CL627A remembers the HI, LO and SET values for all T/C types (45 memories) and millivolts for you with the power on or off. Each time a different T/C type is selected, the latest three “QUIK-CHEK” values for that type will be recalled.

OVERLOAD
The CL627A will indicate OVER and blank the digits on the display when the output leads have been shorted or when the device being calibrated requires more than 10mA.

READ MODE  (MEASURE THERMOCOUPLES)

READ
1) Set up the CL627A for the correct T/C type and temperature scale (°C or °F)
2) Disconnect the wires from the thermocouple to be read or checked
3) Connect the CL627A to the sensor, being careful to observe proper polarity & T/C type
4) Display present reading, Maximum or Minimum temperatures

Whenever READ mode is selected the word READ will appear on the LCD. The CL627A can measure temperatures for all T/C types with resolutions of 0.1° and 1°. The display is updated twice per second to continuously track fast moving temperatures.

MIN/MAX
To read the Maximum or Minimum temperature since INPUT mode was entered, simply switch to MAX or MIN. The value will appear on the LCD along with the word MAX or MIN. The MAX/MIN values are automatically updated and may be viewed at any time without disturbing the other values. Pressing the RESET/SCROLL pushbutton will transfer the present temperature into both MAX and MIN and will update them as the measured temperature changes.

OPEN THERMOCOUPLES
The CL627A checks for open or high resistance thermocouples. Open or burned out T/Cs are indicated by “— — — —” on the display. Temperatures out of range for the T/C TYPE selected will be indicated by OVER and UNDER on the display.

PYROMETER CALIBRATION

Some thermocouple input pyrometers and controllers operate on the D'Arsonval meter movement principle. Millivolts from the thermocouple input drive a low resistance coil directly. For example, a coil may have a typical resistance of 60 ohms. Since the pyrometer resistance is so low, resistance of the input thermocouple leads must be taken into account. Pyrometers of this type have fixed or adjustable series resistance which corrects for lead length resistance.

To use the CL627A to drive low resistance loads:
1) Disconnect the sensing thermocouple leads at the thermocouple head.
2) Connect leads from the CL627A to the extension wires going to the pyrometer, using the screw connectors in the head. (If the sensing thermocouple sheath is within 1/4 to 2 times the length of the CL627A lead length, the error due to resistance will be negligible).
3) Set the temperatures to be used for calibration per the recommendation of the pyrometer manufacturer.

If the thermocouple head cannot be accessed:
1) Determine the installed length of extension wire between the head and the pyrometer.
2) Select thermocouple extension wire of the same type, wire size and length as the installed wire between the head and the pyrometer to make up a calibrating wire.
3) Replace the active thermocouple extension wire with the calibrating wire at the pyrometer terminals.
4) Connect the other ends of the calibrating wire to the CL627A and calibrate the pyrometer.

Note: A resistor of the same ohm value as the wire between the head and the pyrometer may be used in series with one lead instead of a length of calibrating wire. Make certain that both input and output leads to the resistor are the same temperature.
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