

**1 YEAR**  
WARRANTY

# Ω OMEGA® User's Guide



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## **PCL422A** **Rugged, Handheld** **Process Calibrators**



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## **WARNING**

Before attempting to interface the PCL422A with any other device, carefully read the following instructions.

### **1. Introduction**

The OMEGA Model PCL422A is designed to be a simple, low cost voltage/current calibrator for field and laboratory purposes. It combines the latest digital and analog circuitry to achieve its rated specifications in a small, reliable package.

The unit is capable of sourcing at ranges of 200mV, 2V, 20V, and 24mA. Each range is displayed on the LCD readout. Upon power-up, the Model PCL422A will return to the range selected before the unit was turned off.

This unit has the capability to store and recall up to two values in the setpoints provided by the SP1 and SP2 keys.

The ◀ ▶ keys and the ▲ ▼ keys help achieve needed values by selecting and scrolling digits.

The PCL422A has an RS-232 jack which can be accessed via a custom interface cable available from OMEGA.

### **1.1 Customer Service**

#### **OMEGA Engineering**

Tel: (203) 359-1660  
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email: info@omega.com

### **1.2 Unpacking**

1. Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of 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 re-shipment is necessary.

2. Remove the Packing List and verify that all equipment has been received. If there are any questions about the shipment, please call OMEGA.

#### **Set-up**

Become familiar with the designations and polarities of the four output jacks located on the top of the calibrator. Refer to the back panel label for polarity information.

## 2. Operating Procedure

1. After power-up, select the desired output range. The 200mV, 2V, 20V, and 24mA ranges can be selected by pressing the RANGE key until the desired range is shown on the LCD readout.
2. Observe the proper polarity when connecting the output jacks. Red is (+) and Black is (-).
3. Adjust output using the control keys.

When pressed, the ◀ ▶ keys select a digit on the LCD readout to be scrolled. When these keys are pressed and held down, a blinking cursor appears and covers up one of the digits indicating which digit is selected. After a second more, the cursor starts to move in the direction selected.

The ▲ ▼ keys scroll the digit up or down, respectively. As the outputs are scrolled, the integral LCD readout displays the voltage or current present at the output jacks.

4. The SP1 or SP2 keys will store or recall a value when pressed.

To store a value in SP1 or SP2, scroll to the desired output. Press and hold down the SP1 or SP2 keys until the word "STORED" flashes onto the LCD readout.

To recall a value in SP1 or SP2: momentarily press the SP1 or SP2 keys, and the value needed from that particular setpoint should appear on the LCD display.

5. The voltage output jacks are disabled while in the current output mode. Likewise, the current output jacks are disabled when in the voltage output mode. Therefore, only one type of output, either voltage or current can be simulated at one time.
6. The purpose of the RS-232 jack on the PCL422A is to allow data from the PCL422A to be transferred to a data collection device such as a PC or a printer. When connecting the PCL422A to a computer, the following specifications will apply:
  - a. Baud Rate 2400
  - b. 8 data bits with 1 stop bit
  - c. No Parity

Other commands can be sent to the PCL422A from the computer to do all of the functions such as range change, output adjust, setpoint control, etc.

NOTE: A custom RS-232 cable from OMEGA will be needed. The part number is C232SJ and can be ordered directly from OMEGA.

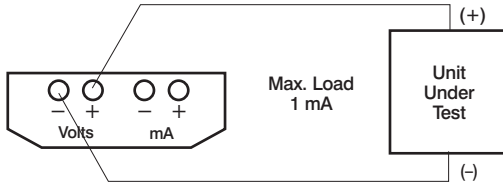
When connected to a computer, the PCL422A will begin to send data as soon as the calibrator is turned on.



### 3. Operating Considerations and Precautions

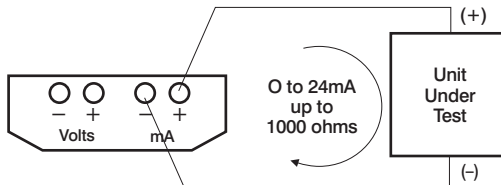
1. While operating in the voltage mode, the calibrator's output circuitry can sink or source up to 1mA max. Loads greater than 1mA may cause the calibrator to drop out of its accuracy specification. (See Figure 1)

When there is an excessive load, the word "OVERLOAD" will appear intermittently on the LCD readout. Long term short circuit conditions will not harm the calibrator but will cause the battery to decay. Maximum short circuit is 25 mA.



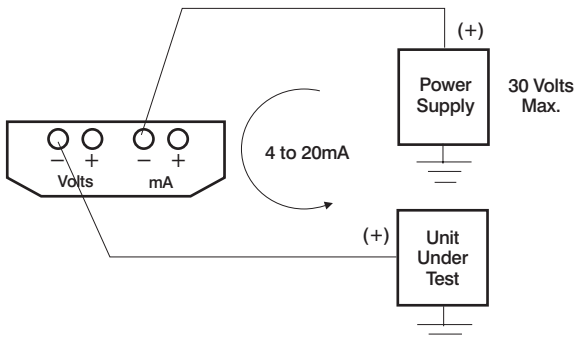
**Figure 1**  
**PCL422A operating as a Precision Voltage Source**

2. In the current mode, the maximum load driving capacity of the PCL422A is 1000 ohms. If connections to the mA jacks are open or the load is greater than the compliance voltage while trying to source a current, the word "OPEN LOOP" will appear intermittently on the LCD readout. (See Figure 2)



**Figure 2**  
**PCL422A operating as a Current Source**

3. Current loop devices that derive their power supply from an external power supply can be calibrated as shown in Figure 3.



**Figure 3**  
**PCL422A indicating current using an external power supply**

4. This instrument is equipped with an automatic low battery indicator. When the LCD “BAT” indicator appears, the battery should be replaced immediately so that the calibrator’s output accuracy is maintained.

## **4. Accuracy**

The PCL422A is checked against a traceable reference before shipment to verify that each range falls within the .015%,  $\pm 2$  counts of accuracy specification. Long term accuracy, beyond one year, should remain within .030%,  $\pm 2$  counts of FSR. All of these ratings are based on a 18°C to 28°C ambient temperature.

From 18°C to 0°C and from 28°C to 50°C, there is an accuracy change of .005% of full scale per °C. Therefore, allowances must be made for error caused by wide temperature variations.

## **5. Maintenance**

Only qualified service personnel should perform calibration, repairs, or servicing not covered in this manual. If the calibrator fails, check the batteries first, and replace them if needed.

Verify that the calibrator is being operated as explained in this manual. If the calibrator is faulty, call OMEGA's customer service department for an AR number to return the unit. Be sure to pack the calibrator securely, using the original shipping container if it is available.

## **6. Rechargeable Battery Option**

When continual service is required, a rechargeable “Ni-Cad” 9V battery and wall mount AC adapter/charger may be purchased. The AC adapter may be left on continually to keep the charge up on the battery while the instrument is in use or can be used to recharge a low battery over a 12-14 hour period. The AC adapter/charger can also be used solely as an AC power supply without battery installed.

When using the “Ni-Cad” battery, it is advisable to occasionally allow the instrument to operate until the “BAT” indicator appears then recharge. This procedure will cycle the battery and prevent any “memory” effects that are associated with this type of battery.

## 7. Specifications

|                               | Voltage Output                            | mA Output |
|-------------------------------|---|-----------|
| <b>Output Range:</b>          | 200mV 2V 20V                              | 24mA      |
| <b>Resolution:</b>            | 0.01mV 0.1mV 1mV                          | 1mA       |
| <b>Accuracy 18°C to 28°C:</b> | ±0.015% of Reading ±2 count               |           |
| <b>Temperature Stability:</b> | 0 to 18°C ±50 ppm/C degrees<br>28 to 50°C |           |
| <b>Load Capability:</b>       | ±1mA for rated accuracy                   | 1000 ohms |
| <b>Capacitive Load:</b>       | No limitations                            | N/A       |
| <b>Output Protection:</b>     | Current limited Internal Resettable fuse  |           |
| <b>Power:</b>                 | 9V Alkaline battery or optional NiCd      |           |
| <b>Case Dimensions:</b>       | 1.43" x 3.15" x 5.7"                      |           |
| <b>Weight:</b>                | 12 oz.                                    |           |

*Specifications subject to change without notice*







## 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.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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