

PCL431

Current Calibrator

Operator's Manual

M1889/0994

GENERAL DESCRIPTION

The OMEGA® PCL431 Hand-Held Current Calibrator is designed to be a complete 4-20mA loop calibrator delivering high accuracy in a small, easy to use package. Its microprocessor based circuitry gives the user a large number of input/output options and operating modes without unnecessary complexity.

Current can be sourced into loads up to 1000 ohms or simulated with external power supplies of up to 60VDC. When operated in the read mode the user can input a current from a signal source directly, or in the read/power mode the PCL431 will supply 24 volt loop power to a two wire device and simultaneously monitor the resultant loop current. Both read and source measurements can be displayed directly in milliamps or as a percentage of a 4-20mA loop.

Commonly used outputs (up to 3) can be stored in the PCL431's non-volatile memory for quick recall. In addition, an auto-step mode allows the calibrator to step through the selected setpoints at a user defined dwell time of 5 to 60 seconds.

INSTALLATION

UNPACKING

Remove the Packing List and verify that all equipment has been received. If you have any questions about the shipment, please call the OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

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.

Check to see if your calibrator kit is complete - it should include:

1. Carrying case (Qty=1)
2. Test leads (Qty=1 set)
3. 9V battery (Installed)
4. Operator's Manual (Qty=1)

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 how the test leads are connected for the specific application.

OPERATING PROCEDURE

1. Turn on power and select the desired range by depressing the "RANGE SELECT" key.
NOTE: When operating in the "%" range, 4mA=0% and 20mA=100%.
2. Connections are made as follows:
Current Source - Use jacks 1 and 2 (1 is +).
Current Simulate - Use jacks 2 and 3 (2 is +).
Current Read - Use jacks 3 and 4 (4 is +).
Current Read/Power - Use jacks 1 and 4 (1 is +).
3. The ▲ and ▼ keys adjust the output value up or down. Holding the ramp keys continuously for several seconds will increase the scroll rate. Going beyond the endpoints (0 and 24mA) will cause the output to wrap around, thus allowing a quick return to either end of the scale.
4. Three calibration points can be stored in non-volatile memory by scrolling to the desired output, depressing the Store key, and then the desired setpoint key.
5. The auto step will automatically step through the stored setpoints at pre-defined intervals. When the auto-step key is first depressed, the display will indicate the dwell time (in seconds) between steps. The factory set value is 15 seconds but you can set this value, from 5 to 60 seconds, by using the ▲ and ▼ keys when the dwell time is being displayed. Once you have scrolled to the desired dwell time, release the ▲ or ▼ key and wait approximately 3 seconds until the calibrator begins to automatically step through the 3 setpoints. The calibrator will continue the stepping process until any key is pressed. Your chosen dwell time will remain in a non-volatile memory location until you choose to change it.

OPERATING CONSIDERATIONS AND PRECAUTIONS

1. When operating in the current source mode, the PCL431 has the capability to drive loads up to 1000 ohms as shown in Figure 1.

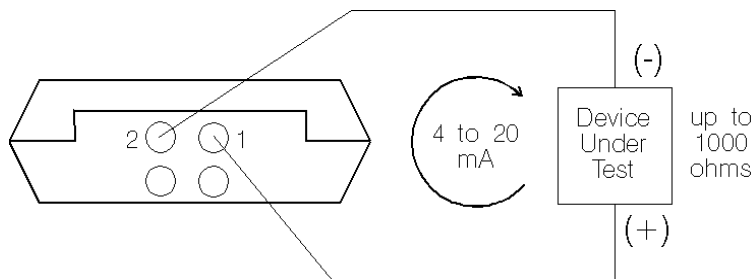


Figure 1 - Current Source Mode

2. When operating in the current simulate mode, the PCL431 acts like a two-wire transmitter controlling a current loop with an external voltage of up to 60 VDC as shown in Figure 2.

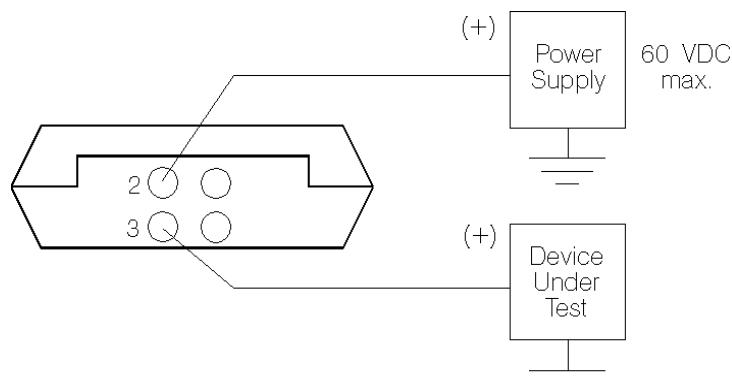


Figure 2 - Current Simulate Mode

- When reading a current loop, the PCL431 can measure over a range of 0-24mA. Connections are shown in Figure 3.

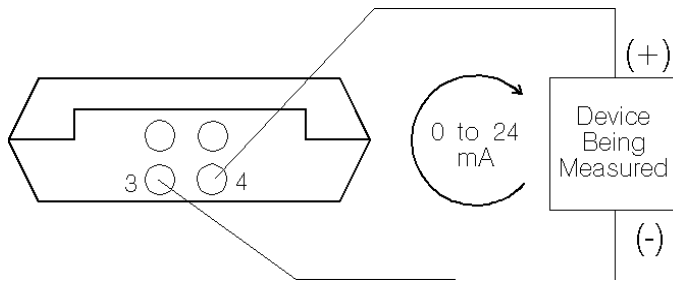


Figure 3 - Current Loop Readings

- The PCL431 can simultaneously power a device with 24 volts and display the current flowing through the loop. This is particularly useful when calibrating a two-wire transmitter. A typical application is shown in Figure 4.

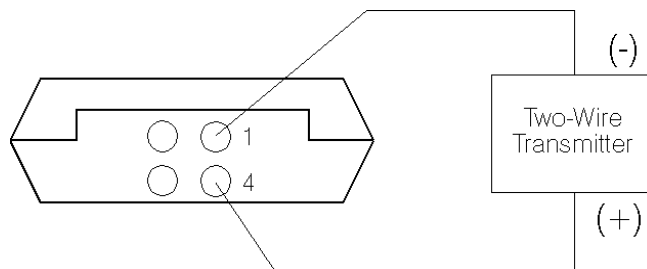


Figure 4 - PCL431 Simultaneous Power/Display

ACCURACY

The PCL431 is checked against an NIST traceable reference before shipment to verify that each range falls within the 0.05%, ± 1 count, of full scale accuracy specification. Long term accuracy should remain within 0.1%, ± 1 count, of FSR. All of these ratings are based on a 25°C ambient temperature. A change of 10°C will cause approximately a 1000 ppm change (based on 100 ppm/C temp.) in the output or the equivalent of a 0.1% output change. Therefore, allowances must be made for error caused by wide temperature variations.

SPECIFICATIONS

Input/output Ranges	0.00 to 24.00 or $\pm 25.0\%$ to 125.0%
Accuracy	$\pm 0.05\%$ ± 1 LSD
Maximum Load Driving	1000 ohm (24V compliance)
Operating Modes	Source Simulate Read Read/Pwr } All can be done in either % or mA
Operating Temperature	0 to 50°C (32 to 122°F)
Storage Temperature	-20 to 60°C (-4 to 140°F)
Temperature Stability	0.01% F.S./°C
Setpoints	3 user programmed calibration points stored in non-volatile RAM.
Power	9V alkaline battery
Auto Step Function	Toggle through SP1, SP2 and SP3 with user defined display.
Case Size	1.43" x 3.15" x 5.7" (36.3 x 80.0 x 144.8mm)
Weight	12 oz (340g)

MAINTENANCE

Generally, with normal usage, this calibrator should hold its rated specifications for at least 6 months. Beyond this, it should remain within 0.05% of FSR 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 Engineering, Inc. for re-calibration.