



## IVC-222HP II

Precision Voltage/Current  
Calibrator

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# IVC-222HP11

## **WARNING**

Before attempting to interface the IVC-222HP11 with any other device, carefully read the following instructions.

### 1. Introduction

The Martel Model IVC-222HP11 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 IVC-222HP11 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 IVC-222HP11 has an RS-232 jack which can be accessed via a custom interface cable available from Martel.

## 1.1 Customer Service

### Corporate Office:

[www.martelcorp.com](http://www.martelcorp.com)

e-mail: [sales@martelcorp.com](mailto:sales@martelcorp.com)

Tel: (603) 434-8179 800-821-0023

Fax: (603) 434-1653

### **Martel Electronics**

PO Box 770

1F Commons Drive

Londonderry, NH 03053

## 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 Martel Electronics at 800-821-0023.

## 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. purpose of the RS-232 jack on the IVC-222HP11 is to allow data from the IVC-222HP11 to be transferred to a data collection device such as a PC or a printer. When connecting the IVC-222HP11 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 IVC-222HP11 from the computer to do all of the functions such as range change, output adjust, setpoint control, etc.

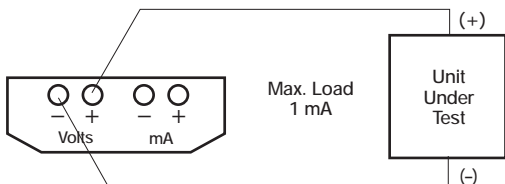
**NOTE:** A custom RS-232 cable from Martel Electronics will be needed. The part number is C232SJ and can be ordered directly from Martel.

When connected to a computer, the IVC-222HP11 will begin to send data as soon as the calibrator is turned on.

### 3. Operating Considerations and Precautions

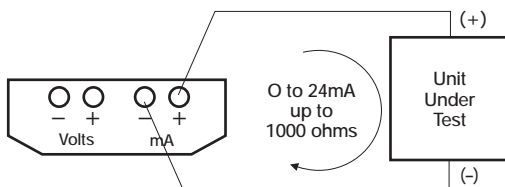
1. While operating in the voltage mode, the calibrator's output circuitry can sink or source up to 1mA max. Loads greater than 1mA may cause the calibrator to drop out of its accuracy specification. (See Figure 1)  
When there is an excessive load, the word "OVERLOAD" will appear intermittently on the 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.



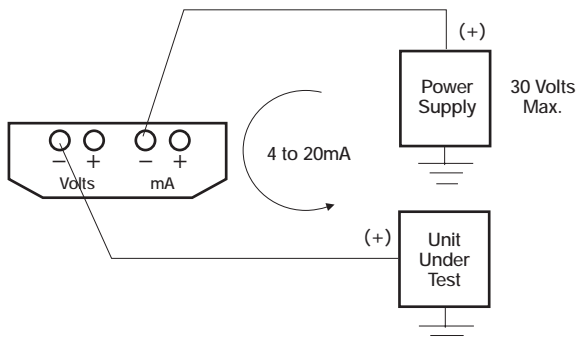
**Figure 1**  
**IVC-222HP11 operating as a Precision Voltage Source**

2. In the current mode, the maximum load driving capacity of the IVC-222HP11 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**  
**IVC-222HP11 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**  
**IVC-222HP11 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 IVC-222HP11 is checked against an NIST 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

Generally, with normal usage, the calibrator should hold its rated specifications for at least 12 months. Beyond this, it should be returned for re-calibration annually. If after the stated warranty period, the device falls out of calibration, or needs repair, it can be returned to Martel Electronics for re-calibration. Please use our website [www.martelcorp.com](http://www.martelcorp.com) under Customer Service for return information.

## 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

	<b>Voltage Output</b>	<b>mA Output</b>
<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 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.	
<i>Specifications subject to change without notice</i>		





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