



**IDEAL INDUSTRIES, INC.**  
**TECHNICAL MANUAL**  
**MODEL: 61-609**

*The Service Information provides the following information:*

- Precautions and safety information
- Specifications
- Performance test procedure
- Calibration and calibration adjustment procedure
- Basic maintenance (replacing the battery and fuse)

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## Introduction

### Warning

**To avoid shock or injury, do not perform the verification tests or calibration procedures described in this manual unless you are qualified to do so. The information provided in this document is for the use of qualified personnel only.**

### Caution

**Model 61-609 contains parts that can be damaged by static discharge. Follow the standard practices for handling static sensitive devices.**

*For additional information about IDEAL INDUSTRIES, INC. and its products, and services, visit IDEAL INDUSTRIES, INC. web site at:*

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

## SAFETY

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use the product only as specified.

### CAUTION.

These statements identify conditions or practices that could result in damage to the equipment or other property.

### WARNING.

These statements identify conditions or practices that could result in personal injury or loss of life.

## Specific precautions

**Use proper Fuse.** To avoid fire hazard, use only the fuse type and rating specified for this product.


**Do not operate without covers.** To avoid personal injury, do not apply any voltage or current to the product without the covers in place.

**Electric overload.** Never apply a voltage to a connector on the product that is outside the range specified for that connector.

**Avoid electric shock.** To avoid injury or loss of life, do not connect or disconnect probes or test leads while they are connected to a voltage source.

**Do not operate in wet/damp conditions.** To avoid electric shock, do not operate this product in wet or damp conditions.

**General specifications**

Characteristics	Description
Display	3-3/4 Digits LCD display
Display Count	4000 count, maximum reading 3999
Overrange Indication	LCD shows "OL"
Sampling Rate	2 times/second
Operating Environment: Relative Humidity	0°C to 40°C (32°F to 104°F) 80% for temperatures up to 31°C Decreasing linearly to 50% at 40°C
Storage Environment:	-20°C to 60°C (-4°F to 140°F) at <80% relative humidity
Power source:	One 9V Battery (NEDA 1604)
Battery Live:	200 hours typical (alkaline)
Low Battery Indicator:	 symbol indicates low battery voltage
mA protection Fuse	500mA, 250V fast acting fuse
Dimensions	5.0" H X 2.8" W X 1.4" D 128mmH X 72mmW X 36mmD
Weight:	Approximately 7.0 oz. or 200g including battery

**RANGES and ACCURACY SPECIFICATION**

Function Setting	Ranges	Accuracy
AC Voltage	400 mV	± (1.8% + 4 digits) @45-100 Hz
	4 V, 40 V	± (1.3% + 4 digits) @45- 500Hz
	400V, 750 V	± (1.3% + 4 digits) @50- 60Hz
DC Voltage	400 m / 4 / 40 / 400 / 1000 V	± (1.0% + 1 digits)
AC Current	40 / 400 mA	± (1.5% + 4 digits)
	10 A	± (3.5% + 4 digits)
DC Current	40 / 400 mA	± (1.0% + 1 digit)
	10 A	± (3.0% + 1 digit)
Resistance	400 / 4K / 40K / 400K / 4M Ω	± (0.8% + 3 digits)
	40 MΩ	± (3.5% + 5 digits)
Diode Check	DCV 2V @ 0.3 mA approx.	± (3.0% + 3digits)

**AC Converter:** Average responding, RMS Calibrated to Sine Wave

**Overload Protection:** AC and DC Voltage: 1000 VDC or 750VAC rms for no more than 60 seconds.  
Resistance: 250VDC or peak AC  
10A input, un-fused for no more than 60 seconds.  
mA input, 500mA at 250V fast acting fuse.

## PERFORMANCE VERIFICATIONS

Perform the following analysis, if the meter conforms to the limits listed in Table 1 the meter is functioning correctly. If the meter does not conform to any of the listed limits the calibration procedure must be performed.

### Performance Verification Preparation

1. Turn on the calibrator, allow calibrator to warm up. Temperature stabilization should be reached after 30 minutes.
2. Remove battery cover and using a calibrated meter to ensure the battery measures a minimum of 7.5V DC. If the battery measures under 7.5V DC, replace the battery before beginning the performance test.
3. Input the values listed in Table 1.

**Table 1 Performance Verification**

Function Setting	Input	Low Limit	High Limit
ACV 400 mV	390.0 mV AC@ 60Hz	382.6	397.4
ACV 4 V	3.900 V AC@ 60Hz	3.845	3.955
ACV 40 V	39.00 V AC@ 60Hz	38.45	39.55
ACV 400 V	390.0 V AC@ 60Hz	384.5	395.5
ACV 750 V	700 V AC @60Hz	687	713
DCV 400 mV	390.0 mV DC	385.9	394.1
DCV 4 V	3.900 V DC	3.859	3.941
DCV 40 V	39.00 V DC	38.59	39.41
DCV 400 V	390.0 V DC	385.9	394.1
DCV 1000 V	900 V DC	890	910
ACmA 40 mA	39.00 mA AC @ 60Hz	38.37	39.63
ACmA 400 mA	390.0 mA AC @ 60Hz	383.7	396.3
AC A 10	9.00 A AC @ 60Hz	8.64	9.36
DCmA 40 mA	39.00 mA DC	38.60	39.40
DCmA 400 mA	390.0 mA DC	386.0	394.0
DC A 10	9.00 A DC	8.72	9.28
$\Omega$ 400	100.0 $\Omega$	98.9	101.1
$\Omega$ 4K	1.000K $\Omega$	0.989	1.011
$\Omega$ 40K	10.00K $\Omega$	9.89	10.11
$\Omega$ 400K	100.0K $\Omega$	98.9	101.1
$\Omega$ 4M	1.000M $\Omega$	0.989	1.011
$\Omega$ 40M	10.00M $\Omega$	9.60	10.40

## CALIBRATION

### Calibration Preparation

1. Turn on the calibrator, allow calibrator to warm up. Temperature stabilization should be reached after 30 minutes.
2. Disconnect the test leads and turn the range switch to "OFF".
3. Remove the screw from the back of the meter and uncover the back case. (refer to Figure 1)
4. The case bottom is secured to the case top by two internal snaps (at the LCD end). lift up on the battery end until the case un-snaps.
5. Using a calibrated meter ensure the battery measures a minimum of 7.5V DC. If the battery measures under 7.5V DC, replace the battery.

### Calibration Procedure

It is recommended that all IDEAL meters under go the following calibration procedure on an annual basis.

### Volts DC Calibration

1. Set the function / range to **DC V**
2. Connect the calibrator to the **V** and **COM** inputs on the meter.
3. Output 3.900V DC.  
Adjust **R42** (refer to Figure 2) until the display reads 3.900 +/-0.001 V

**Note:** *This is the only adjustment required for the 61-609. Calibration is complete.*

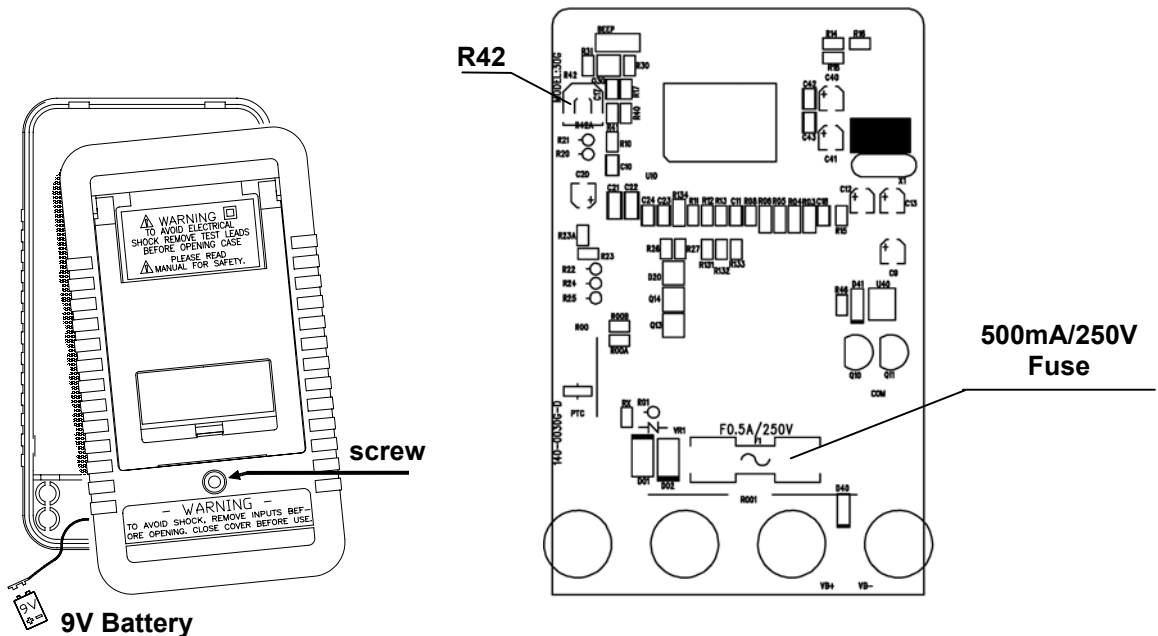


Figure 1

Figure 2

***Battery Replacement***

1. Disconnect the test leads from any circuit under test and turn off meter.
2. Remove the screw from the back of the meter and uncover the back case. (refer to Figure 1)
3. Install new 9V battery (NEDA #1604). An alkaline type is recommended.
4. Install new battery into compartment using care not to pinch or bind battery.
5. Replace bottom cover insuring that case is secured at the top by the internal snaps and replace screw.

***Replacing Fuse***

1. Disconnect the test leads and turn the range switch to "OFF".
2. Remove the screw from the back of the meter and uncover the back case. (refer to Figure 1)
3. The case bottom is secured to the case top by two internal snaps (at the LCD end).  
lift up on the battery end until the case un-snaps.
4. Remove the defective fuse (refer to Figure 2 for location of fuse) and replace with a 500mA, 250V fast acting fuse with Part #F-17 specifications. Always use fast acting, high interrupting type fuse.
5. Replace bottom cover insuring that case is secured at the top by the internal snaps and replace screw.