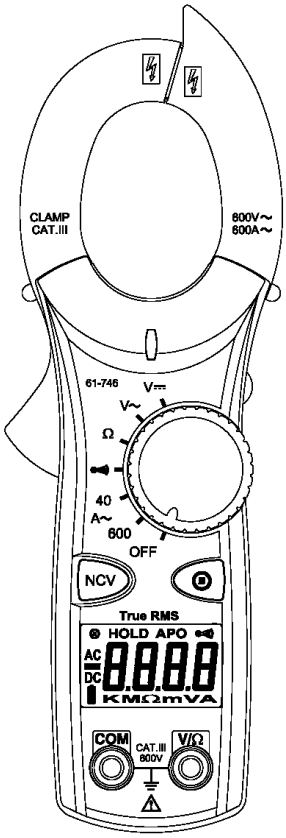
IDEAL INDUSTRIES, INC.
TECHNICAL MANUAL
MODELS: 61-744
61-746

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)



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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
The 61-740 series 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

Precautions and Safety Information

Use the meter only as described in the *Users Manual*. If you do not do so, the protection provided by the meter may be impaired. Read the "Safety Information" page before servicing this product. In this manual, a **Warning** identifies conditions and actions that pose hazard (s) to the user; a **Caution** identifies conditions and actions that may damage the meter or the test instruments.

The Symbols

The symbols used on the meter and in this manual are explained in Table A.

Table A Symbols

Symbol	Description	Symbol	Description
	Battery	**NCV**	Non-Contact indicator
	Cautionary or important information in manual		Continuity indicator
	Danger- Risk of electrical shock		
	Double Insulation- Protection Class II		
CAT III	IEC Over-voltage Category III		

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

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.

Certifications and compliances

Safety	Designed to EN 61010-1, EN 61010-2-032, UL61010-1, UL 61010-2-032 specifications
Input rating	600V DC Category III
	600V AC Category III; Clamp rated at 600V AC Category III only
Over voltage category	CAT III: Distribution level mains, fixed installation.
	CAT II: Local level mains, appliances, and portable equipment.
	CAT I: Signal level, special equipment or parts of equipment, telecommunication, electronics.

General specifications

Characteristics	Description
Display	3¾ Digit LCD display
Display Count	4000 count, maximum reading 3999
Over range Indication	"OL" is displayed
Sampling Rate	2.0 times/second
Operating Environment: Relative Humidity	0°C to 50°C (32°F to 122°F) 0 ~ 70% RH
Storage Environment:	-20°C to 60°C (-4°F to 140°F) at <80% relative humidity
Power source:	1.5V Battery x 2 (R03/Size AAA)
Battery Life:	400 hours typical (alkaline) {61-744} 250 hours typical (alkaline) {61-746}
Low Battery Indicator:	symbol indicates low battery voltage
Auto power off	Approximately 10 minutes
Dimensions	8.0" H X 2.6" W X 1.5" D 203mm H X 65mm W X 37mm D
Maximum Cable Size	ACA 1¼" (32mm)
Weight:	Approximately 6.7 oz. or 190g including battery

RANGES and ACCURACY SPECIFICATION

Accuracy: Accuracy specifications at 23°C ±5°C (73.4°F ±9°F) less than 75% RH.

Temperature Coefficient: 0.1 times the applicable accuracy specification per degree C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F)

Electrical Specification: Accuracy are ±(reading plus number of digits) at 23°C ±5°C (73.4°F ±9°F) <75% RH

61-744

Function / Range	Ranges	Accuracy
AC Voltage	400V, 50Hz - 500Hz	1.2% + 5digits
	600V, 50Hz - 500Hz	1.5% + 5 digits
DC Voltage	400V/600V	0.5% + 2 digits
AC Current	40A/400A/600A, 50Hz - 60Hz	1.7% + 6 digits
	40A/400A/600A, 60Hz - 400Hz	3.0% + 6 digits
Resistance	400Ω/4KΩ/40KΩ/400KΩ	1.0% + 4 digits
	4MΩ	1.5% + 4 digits
	40MΩ	3.0% + 5 digits
Continuity	<400Ω on •)) Continuity	Not Specified

61-746

Function / Range	Ranges	Accuracy
AC Voltage	400V, 50Hz - 500Hz	1.2% + 8 digits
	600V, 50Hz - 500Hz	1.5% + 8 digits
DC Voltage	400V/ 600V	0.5% + 2 digits
AC Current	40A/400A/600A, 50Hz - 60Hz	1.7% + 10 digits
	40A/400A/600a, 60Hz - 400Hz	3.0% + 10 digits
Resistance	400Ω/4KΩ/40KΩ/400KΩ	1.0% + 4 digits
	4MΩ	1.5% + 4 digits
	40MΩ	3.0% + 5 digits
Continuity	<400Ω on •)) Continuity	Not specified

AC Converter: 61-744 is Average responding, RMS Calibrated to Sine Wave.
61-746 is True RMS responding.

Overload Protection:

AC and DC Voltage: Not to exceed 600V DC or VAC RMS.
AC Current: Not to exceed 600A AC.
Resistance: Not to exceed 600V DC or VAC RMS
Continuity: Not to exceed 600V DC or VAC RMS

PERFORMANCE VERIFICATIONS

Perform the following analysis; if the meter conforms to the limits listed in Table 1 through 5 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 use a calibrated meter to ensure the batteries measure a minimum of 2.4VDC. If the batteries measure under 2.4V DC, replace the batteries (see Battery Replacement on page 9) before beginning the performance test.
3. Input the values listed in Table 1 through 5.

Table 1 AC Voltage Test

Function /Range	Input	Low Limit	High Limit	Model Number
V AC 400V	350V AC @ 50Hz	345.3	354.7	61-744
V AC 400V	350V AC @ 50Hz	345.0	355.0	61-746
V AC 400V	350V AC @ 500Hz	345.3	354.7	61-744
V AC 400V	350V AC @ 500Hz	345.0	355.0	61-746
V AC 600V	500V AC @ 50Hz	487	513	61-744
V AC 600V	500V AC @ 50Hz	484	516	61-746
V AC 600V	500V AC @ 500Hz	487	513	61-744
V AC 600V	500V AC @ 500Hz	484	516	61-746

Table 2 DC Voltage Test

Function /Range	Input	Low Limit	High Limit	Model Number
V DC 400V	350V	348.0	352.0	61-744, 61-746
V DC 600V	500V	495	505	61-744, 61-746

Table 3 AC Current Test

Function /Range	Input	Low Limit	High Limit	Model Number
A AC 40A	10A AC @ 50Hz	9.77	10.23	61-744
A AC 40A	10A AC @ 50Hz	9.73	10.27	61-746
A AC 40A	10A AC @ 400Hz	9.64	10.36	61-744
A AC 40A	10A AC @ 400Hz	9.60	10.40	61-746
A AC 400A	100A AC @50Hz	97.7	102.3	61-744
A AC 400A	100A AC @50Hz	97.3	102.7	61-746
A AC 400A	100A AC @400Hz	96.4	103.6	61-744
A AC 400A	100A AC @400Hz	96.0	104.0	61-746
A AC 600A	500A AC @50Hz	485	515	61-744
A AC 600A	500A AC @50Hz	481	519	61-746
A AC 600A	500A AC @400Hz	479	521	61-744
A AC 600A	500A AC @400Hz	475	525	61-746

Table 4 Resistance Test

Function /Range	Input	Low Limit	High Limit	Model number
Ω 400	100Ω	98.6	101.4	61-744, 61-746
Ω 4K	1KΩ	.986	1.014	61-744, 61-746
Ω 40K	10KΩ	9.86	10.14	61-744, 61-746
Ω 400K	100KΩ	98.6	101.4	61-744, 61-746
Ω 4M	1MΩ	.981	1.019	61-744, 61-746
Ω 40M	10MΩ	9.65	10.35	61-744, 61-746

Table 5 Continuity Check

Function /Range	Test Value	Low Limits	High Limit	Model number
•)) Continuity	20Ω beep on	19.5	20.5	61-744, 61-746
	400Ω beep off	390.0	410.0	

CALIBRATION

Calibration Preparation

1. Turn on the calibrator, allow calibrator to warm up. Perform calibration at 23±2°C (73.4°F ±3.5°F) at relative humidity of < 70%. Temperature stabilization should be reached after 30 minutes.
2. Disconnect the test leads and turn the range switch to "OFF".
3. Remove the two screws holding the case bottom.
4. Remove the case bottom using care not to damage the battery connector.
5. Using a calibrated meter ensure the batteries measure a minimum of 2.4V DC. If the batteries measure under 2.4V DC, replace the batteries (see Battery Replacement on page 9).

Calibration Procedure

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

The class of calibrator or equipment should have an accuracy that exceeds, by an expectable ratio the accuracy of this instrument.

V DC Calibration
61-744 ***(Refer to Figure 1A),*** **61-746** ***(Refer to Figure 2A)***
1. Set the function / range to 400mV DC.
2. Connect the calibrator to the **V** and **COM** inputs on the meter.
3. Output 390.0mV DC.
   Adjust VR1 (VR 470Ω) until unit display reads 390.0 ± 1 digit.
4. De-energize source and remove test leads.

V AC Zero Calibration
61-746 ***(Refer to Figure 2A)***
1. Set the function / range to 600V AC.
2. Short the **V** and **COM** inputs on the meter.
3. Adjust VR4 (VR 220KΩ) until unit display reads 000.
4. De-energize source and remove test leads.

V AC Calibration:
61-746 only ***(Refer to Figure 2A)***
1. Set the function/range to the 400V AC.
2. Connect the calibrator to the **V** and **COM** inputs on the meter.
3. Output 390.0VAC/50Hz
   Adjust VR3 (VR 200KΩ) until unit display reads 390.0 ± 1 digit.
4. De-energize source and remove test leads.

A AC Calibration:
61-744 ***(Refer to Figure 1B), 61-746 (Refer to Figure 2B) (Adjustments made under front panel label.)***
1. Set the function / range to the 400A AC.
2. Set output of the AC calibrator for 10.00A/60Hz +/- 0.01% and connect it to Coil = 10N = 100.0A AC.
3. Clamp the jaws to the coil = 10N.
4. Adjust VR2 (VR 1KΩ) for a display reading of 100.0 ±1 digit
5. De-energize source and remove test leads.

Calibration of the 61-740 series is complete.
Remove all leads from the calibrator and equipment.
Return unit to proper operating condition.

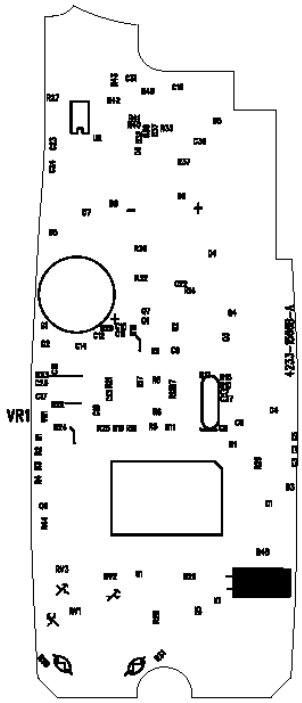

Figure 1A (61-744)

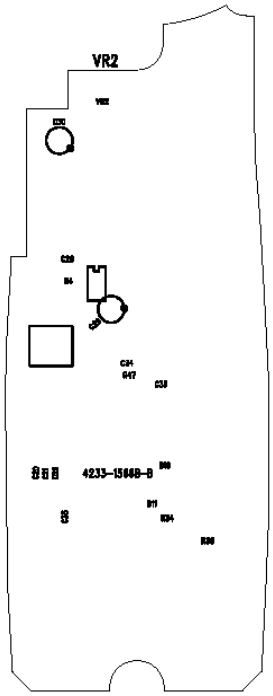

Figure 1B (61-746)

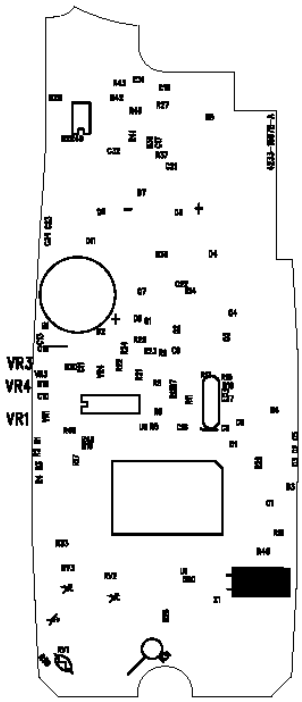

Figure 2A (61-746)

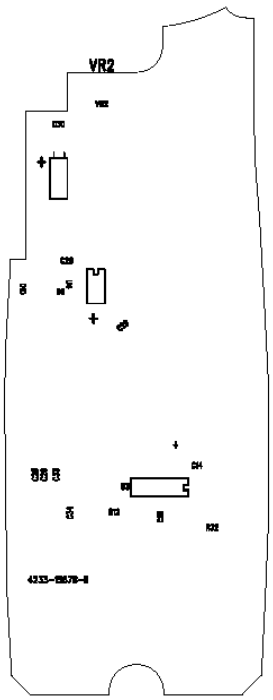

Figure 2B (61-746)

Battery Replacement (refer to Figure 3)

1. Disconnect the test leads from any circuit under test and turn off meter.
2. Use a Philips head screwdriver to remove the screws on battery cover.
3. Remove batteries from the battery compartment.
4. Install new 1.5V batteries (R03/Size AAA). Alkaline type is recommended.
5. Install new batteries into compartment using care to install to proper polarity.
6. Reinstall battery cover.

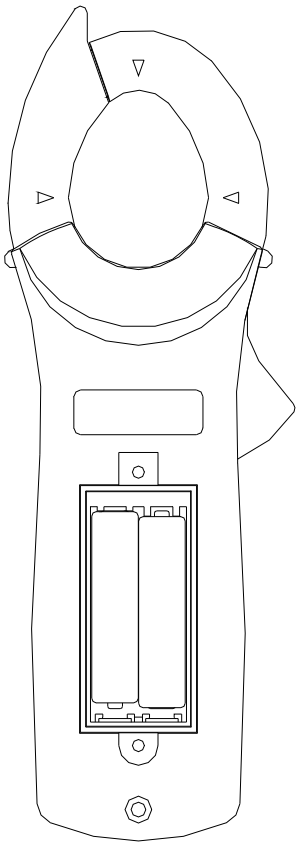

Figure 3