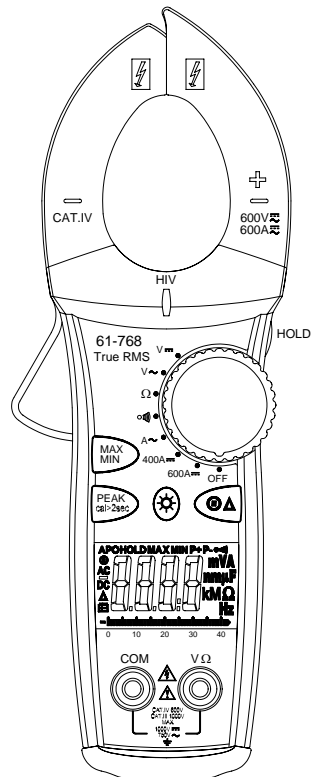




IDEAL INDUSTRIES, INC.
TECHNICAL MANUAL
MODELS: 61-764
61-766
61-768

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)



Form number: TM61764-6-8
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Introduction



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.



The 61-760 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	HI-V	High Voltage Indicator >30 V indicator is on
	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		
CAT IV	IEC Over-voltage Category IV		

TightSight™ Display Notes:

Only AC/DC amps units of measure are displayed in the TightSight™ display since primary use is for viewing current measurements in tight locations. The display will show numerical values only for other functions. The main display is to be used to view units of measure for all other functions.

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, UL 61010B-1, UL 61010B-2-032 specifications
Input rating	1000V DC Category III
	600V DC Category IV
	750V AC Category III
	600V AC Category IV
Over voltage category	CAT IV: Outside and service entrance.
	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 time/second
Operating 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:	9V Battery (NEDA 1604)
Battery Life:	400 hours typical (alkaline) {61-764} 200 hours typical (alkaline) {61-766} 150 hours typical (alkaline) {61-768}
Low Battery Indicator:	 symbol indicates low battery voltage
Auto power off	Approximately 30 minutes
Dimensions	8.7” H X 3.1 ” W X 1.8 ” D 222mm H X 80mm W X 45.5mm D
Maximum Cable Size	ACA 1¼” (36mm)
Weight:	Approximately 12.4 oz. or 350g 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

61-764

Function / Range	Ranges	Accuracy
AC Voltage	400mV, 50Hz - 60Hz	1.2% + 5 digits
	4V/40V/400V, 50Hz - 500Hz	1.2% + 5 digits
	750V, 50Hz - 500Hz	1.5% + 5 digits
DC Voltage	400mV/4V/40V/400V/1000V	0.5% + 2 digits
AC Current	400A/600A, 50Hz - 60Hz	1.7% + 6 digits
	400A/600A, 60Hz - 400Hz	3.0% + 6 digits
Resistance	400Ω/4KΩ/40KΩ/400KΩ	1.0% + 4 digits
	4MΩ	5% + 4 digits
	40MΩ	12% + 5 digits
Continuity	<400Ω on \rightarrow Continuity	Not Specified

61-766

Function / Range	Ranges	Accuracy
AC Voltage (True RMS)	400mV, 50Hz - 60Hz	1.2% + 8 digits
	4V/40V/400V, 50Hz - 500Hz	1.2% + 8 digits
	750V, 50Hz - 500Hz	1.5% + 8 digits
DC Voltage	400mV/4V/40V/400V/1000V	0.5% + 2 digits
AC Current (True RMS)	40A/400A/600A, 50Hz - 60Hz	1.7% + 10 digits
	40A/400A/600A, 60Hz - 400Hz	3.0% + 10 digits
Capacitance	4μF	3.0% + 10 digits
	40μF/400μF	3.0% + 5 digits
	4mF	5.0% + 20 digits
Frequency	20Hz ~ 400Hz (Auto-ranging)	0.1% + 3 digits
Resistance	400Ω/4KΩ/40KΩ/400KΩ	1.0% + 4 digits
	4MΩ	5% + 4 digits
	40MΩ	12% + 5 digits
Continuity	<400Ω on \rightarrow Continuity	Not specified

61-768

Function / Range	Ranges	Accuracy
AC Voltage (True RMS)	400mV, 50Hz - 60Hz	1.2% + 8 digits
	4V/40V/400V, 50Hz - 500Hz	1.2% + 8 digits
	750V, 50Hz - 500Hz	1.5% + 8 digits
DC Voltage	400mV/4V/40V/400V/1000V	0.5% + 2 digits
AC Current (True RMS)	400A/600A, 50Hz - 60Hz	1.7% + 10 digits
	400A/600A, 60Hz - 400Hz	3.0% + 10 digits
DC Current	400A	1.5% + 5 digits
	600A	2.0% + 5 digits
Resistance	400Ω/4KΩ/40KΩ/400KΩ	1.0% + 4 digits
	4MΩ	9% + 4 digits
	40MΩ	20% + 5 digits
Continuity	<400Ω on \rightarrow Continuity	Not specified

AC Converter: 61-764 - Average responding, RMS Calibrated to Sine Wave
61-766, 61-768 – True RMS sensing

Overload Protection:

AC and DC Voltage: Not to exceed 1000V DC or 750VAC RMS

Resistance: Not to exceed 600V DC or VAC RMS

Capacitance, Frequency, 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 7 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 (see Battery Replacement page 11) before beginning the performance test.
3. Input the values listed in Table 1 through 7.

Table 1 AC Voltage Test

Function /Range	Input	Low Limit	High Limit	Model Number
V AC 400mV	350mV AC @ 50Hz	345.3	354.7	61-764
V AC 400mV	350mV AC @ 50Hz	345.0	355.0	61-766, 61-768
V AC 4V	3.5V AC @ 50Hz	3.453	3.547	61-764
V AC 4V	3.5V AC @ 500Hz	3.453	3.547	61-764
V AC 4V	3.5V AC @ 50Hz	3.450	3.550	61-766, 71-768
V AC 4V	3.5V AC @ 500Hz	3.450	3.550	61-766, 71-768
V AC 40V	35V AC @ 50Hz	34.53	35.47	61-764
V AC 40V	35V AC @ 500Hz	34.53	35.47	61-764
V AC 40V	35V AC @ 50Hz	34.50	35.50	61-766, 61-768
V AC 40V	35V AC @ 500Hz	34.50	35.50	61-766, 61-768
V AC 400V	350V AC @ 50Hz	345.3	354.7	61-764
V AC 400V	350V AC @ 500Hz	345.3	354.7	61-764
V AC 400V	350V AC @ 50Hz	345.0	355.0	61-766, 61-768
V AC 400V	350V AC @ 500Hz	345.0	355.0	61-766, 61-768
V AC 750V	700V AC @ 50Hz	684	716	61-764
V AC 750V	700V AC @ 500Hz	684	716	61-764
V AC 750V	700V AC @ 50Hz	681	719	61-766, 61-768
V AC 750V	700V AC @ 500Hz	681	719	61-766, 61-768

Table 2 DC Voltage Test

Function /Range	Input	Low Limit	High Limit	Model Number
V DC 400mV	350mV	348.0	352.0	61-764, 61-766, 61-768
V DC 4V	3.5V	3.480	3.520	61-764, 61-766, 61-768
V DC 40V	35V	34.80	35.20	61-764, 61-766, 61-768
V DC 400V	350V	348.0	352.0	61-764, 61-766, 61-768
V DC 1000V	900V	893	907	61-764, 61-766, 61-768

Table 3 AC Current Test

Function /Range	Input	Low Limit	High Limit	Model Number
A AC 400A	100A AC @ 50Hz	97.7	102.3	61-764
A AC 400A	100A AC @ 50Hz	97.3	102.7	61-766, 61-768
A AC 400A	100A AC @ 400Hz	96.4	103.6	61-764
A AC 400A	100A AC @ 400Hz	96.0	104.0	61-766, 61-768
A AC 600A	500A AC @ 50Hz	485	515	61-764
A AC 600A	500A AC @ 50Hz	481	519	61-766, 61-768
A AC 600A	500A AC @ 400Hz	479	521	61-764
A AC 600A	500A AC @ 400Hz	475	525	61-766, 61-768

Table 4 DC Current Test

Function /Range	Input	Low Limit	High Limit	Model Number
A DC 400A	100A DC	98.0	102.0	61-768
A DC 600A	500A DC	485	515	61-768


Table 5 Resistance Test

Function /Range	Input	Low Limit	High Limit	Model Number
Ω 400	100 Ω	98.6	101.4	61-764, 61-766, 61-768
Ω 4K	1K Ω	.986	1.014	61-764, 61-766, 61-768
Ω 40K	10K Ω	9.86	10.14	61-764, 61-766, 61-768
Ω 400K	100K Ω	98.6	101.4	61-764, 61-766, 61-768
Ω 4M	1M Ω	.946	1.054	61-764, 61-766
Ω 4M	1M Ω	.906	1.094	61-768
Ω 40M	10M Ω	8.75	112.5	61-764, 61-766
Ω 40M	10M Ω	7.95	120.5	61-768

Table 6 Capacitance and Frequency Test

Function /Range	Input	Low Limit	High Limit	Model Number
Hz {through clamp}	50Hz @ 5A	.047	.053	61-766
Hz {auto} {through clamp}	200Hz @ 10A	.197	.203	61-766
MFD 4 μ F	1 μ F	.960	1.040	61-766
MFD 40 μ F	10 μ F	9.65	10.35	61-766
MFD 400 μ F	100 μ F	96.5	103.5	61-766
MFD 4mF	1mF	.930	1.070	61-766

Table 7 Continuity Check

Function /Range	Test Value	Low limits	High Limit	Model Number
 Continuity	20 Ω beep on	19.5	20.5	61-764, 61-766, 61-768
	400 Ω beep off	390.0	410.0	

CALIBRATION

Calibration Preparation

1. Turn on the calibrator, allow calibrator to warm up. Perform calibration at $23\pm 2^{\circ}\text{C}$ ($73.4^{\circ}\text{F} \pm 3.5^{\circ}\text{F}$) 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 screws holding the battery cover, one at the jaw, and the screw for the TightSight™ cover.
4. Remove the case bottom using care not to damage the leads of battery snap and spring to the continuity beeper. (Beeper is attached to the bottom case cover.)
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 (see Battery Replacement page 11).

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:

61-764 (Refer to Figure 1A), 61-766 (Refer to Figure 2A), 61-768 (Refer to Figure 3A)

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 1K Ω) until unit display reads 390.0
4. De-energize source and remove test leads

V AC Zero Calibration:

61-766 (Refer to Figure 2A), 61-768 (Refer to Figure 3A)

1. Set the function /range to 750V AC.
2. Short the **V** and **COM** input on the meter.
3. Adjust VR3 (VR 220k Ω) until display reads 000.
4. De-energize source and remove test leads.

V AC Calibration:

61-766 (Refer to Figure 2A), 61-768 (Refer to Figure 3A)

1. Set the function/range to the 400mV AC.
2. Connect the calibrator to the **V** and **COM** inputs on the meter.
3. Output 390.0mVAC/50Hz.
Adjust VR2 (VR 220K Ω) until unit display reads 390.0 ± 1 digit.
4. De-energize source and remove test leads.

A AC Calibration:

61-764 (Refer to Figure 1B), 61-766 (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 2K Ω) for a display reading of 100.0 ± 1 digit. (61-764)
Adjust VR4 (VR 2K Ω) for a display reading of 100.0 ± 1 digit. (61-766)
5. De-energize source and remove test leads.

Calibration Procedure (cont'd)

A DC Zero Calibration

61-768 (Refer to Figure 3B)

1. Set the function/range to 400A DC.
2. Short the **V** and **COM** inputs on the meter.
3. Adjust VR4 (VR 10K Ω) until display reads 000.
4. De-energize source and remove test leads.

A DC Calibration

61-768 (Refer to Figure 3B)

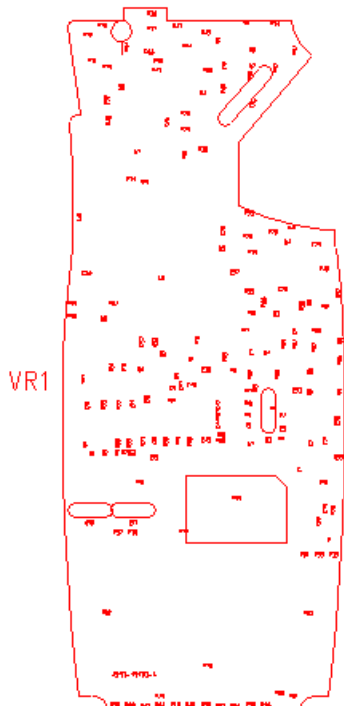
1. Set the function / range to the 400A DC.
2. Set output of the DC calibrator for $+10.00A \pm 0.01\%$ and connect it to Coil = 10N = +100.0A DC.
3. Clamp the jaws to the coil = 10N.
4. Adjust VR5 (VR 2K Ω) for a display reading of 100.0 ± 1 digit.
5. De-energize source and remove test leads.

Peak Calibration

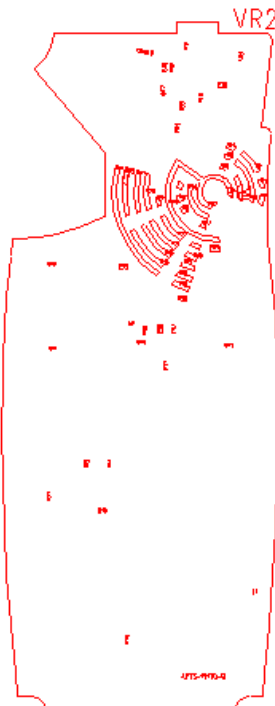
If a more accurate "PEAK" measurement is required, then perform the following function.

Depress the "PEAK" button for >2 seconds until "CAL" appears in the display. The meter self-calibrates to $\pm 3\% + 60$ digits accuracy. (400m/4VAC/40AAC ranges unspecified)

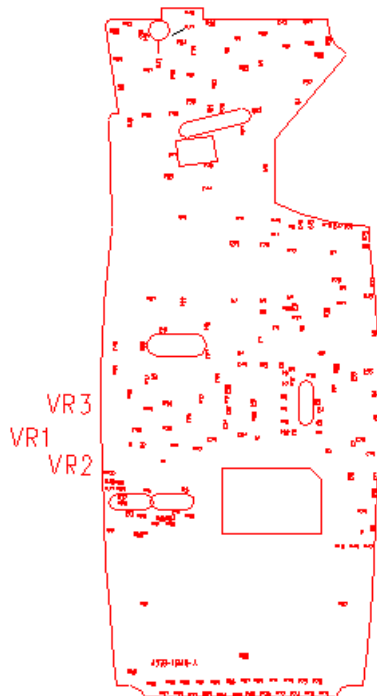
Calibration of the 61-760 series is complete.
Remove all leads from the calibrator and equipment.
Return unit to proper operating condition.



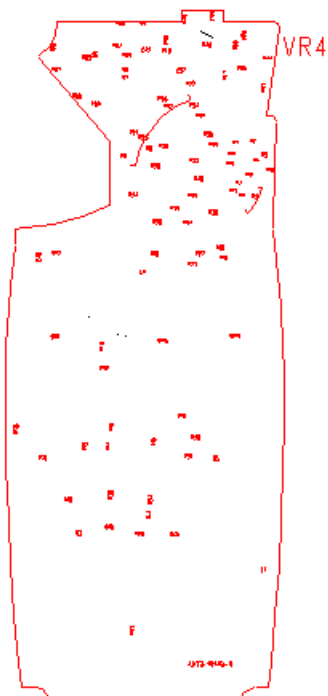
61-764 (Figure 1A)



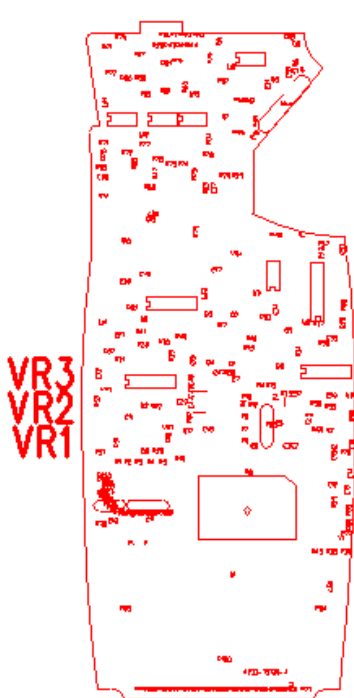
61-764 (Figure 1B)



61-766 (Figure 2A)



61-766 (Figure 2B)



61-768 (Figure 3A)



61-768 (Figure 3B)

Battery Replacement (Refer to Figure 4)

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 battery from the battery compartment.
4. Install new 9V battery (NEDA #1604). An alkaline type is recommended.
5. Install new battery into compartment using care to install to proper polarity.
6. Reinstall battery cover.

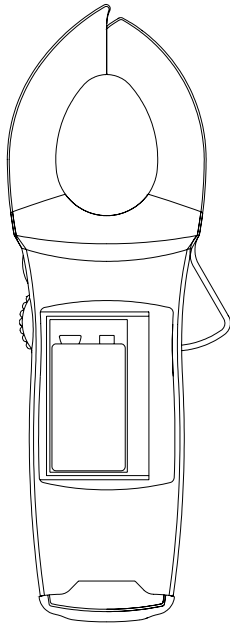


Figure 4