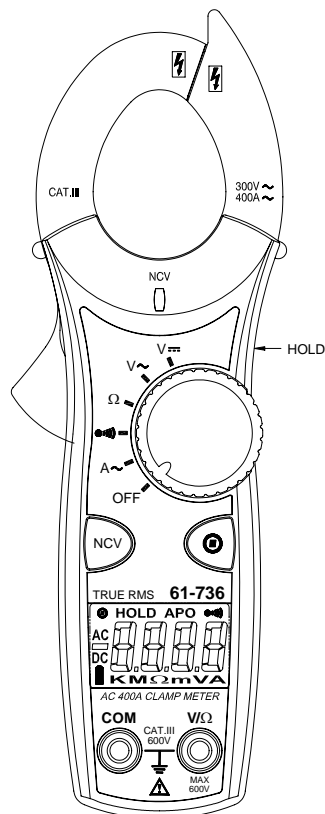




**IDEAL INDUSTRIES, INC.**  
**TECHNICAL MANUAL**  
**MODELS: 61-732**  
**61-736**

*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: TM61732-6  
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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 61-730 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](http://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, UL61010B-1, UL 61010B-2-032 specifications            |
| Input rating          | 600V DC Category III  |
|                       | 600V AC Category III; Clamp rated at 300V 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:<br>Relative Humidity | 0°C to 50°C (32°F to 122°F)<br>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) {61-732}<br>250 hours typical (alkaline) {61-736}   |
| Low Battery Indicator:                      |  symbol indicates low battery voltage |
| Auto power off                              | Approximately 10 minutes   |
| Dimensions                                  | 7.4” H X 2.6” W X 1.5” D<br>187mm 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

**61-732**

| Function / Range | Ranges                              | Accuracy        |
|------------------|-------------------------------------|-----------------|
| AC Voltage       | 400V, 50Hz - 500Hz                  | 1.2% + 5 digits |
|                  | 600V, 50Hz - 500Hz                  | 1.5% + 5 digits |
| DC Voltage       | 400V/600V                           | 0.5% + 2 digits |
| AC Current       | 40A/400A, 50Hz - 60Hz               | 1.7% + 6 digits |
|                  | 40A/400A, 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 $\rightarrow$ ) Continuity | Not Specified   |

**61-736**

| 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, 50Hz - 60Hz               | 1.7% + 10 digits |
|                  | 40A/400A, 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 $\rightarrow$ ) Continuity | Not specified    |

**AC Converter:** 61-732 is Average responding, RMS Calibrated to Sine Wave.  
61-736 is True RMS responding.

**Overload Protection:**

- AC and DC Voltage: Not to exceed 600V DC or VAC RMS.
- AC Current: Not to exceed 400A 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 using a calibrated meter to ensure the batteries measures a minimum of 2.4VDC. If the batteries measures 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      | 61-732       |
| V AC 400V       | 350V AC @ 50Hz  | 345.0     | 355.0      | 61-736       |
| V AC 400V       | 350V AC @ 500Hz | 345.3     | 354.7      | 61-732       |
| V AC 400V       | 350V AC @ 500Hz | 345.0     | 355.0      | 61-736       |
| V AC 600V       | 500V AC @ 50Hz  | 487       | 513        | 61-732       |
| V AC 600V       | 500V AC @ 50Hz  | 484       | 516        | 61-736       |
| V AC 600V       | 500V AC @ 500Hz | 487       | 513        | 61-732       |
| V AC 600V       | 500V AC @ 500Hz | 484       | 516        | 61-736       |

**Table 2 DC Voltage Test**

| Function /Range | Input | Low Limit | High Limit | Model Number   |
|-----------------|-------|-----------|------------|----------------|
| V DC 400V       | 350V  | 348.0     | 352.0      | 61-732, 61-736 |
| V DC 600V       | 500V  | 495       | 505        | 61-732, 61-736 |


**Table 3 AC Current Test**

| Function /Range | Input          | Low Limit | High Limit | Model Number |
|-----------------|----------------|-----------|------------|--------------|
| A AC 40A        | 10A AC @ 50Hz  | 9.77      | 10.23      | 61-732       |
| A AC 40A        | 10A AC @ 50Hz  | 9.73      | 10.27      | 61-736       |
| A AC 40A        | 10A AC @ 400Hz | 9.64      | 10.36      | 61-732       |
| A AC 40A        | 10A AC @ 400Hz | 9.60      | 10.40      | 61-736       |
| A AC 400A       | 100A AC @50Hz  | 97.7      | 102.3      | 61-732       |
| A AC 400A       | 100A AC @50Hz  | 97.3      | 102.7      | 61-736       |
| A AC 400A       | 100A AC @400Hz | 96.4      | 103.6      | 61-732       |
| A AC 400A       | 100A AC @400Hz | 96.0      | 104.0      | 61-736       |

**Table 4 Resistance Test**

| Function /Range | Input | Low Limit | High Limit | Model number   |
|-----------------|-------|-----------|------------|----------------|
| Ω 400           | 100Ω  | 98.6      | 101.4      | 61-732, 61-736 |
| Ω 4K            | 1KΩ   | .986      | 1.014      | 61-732, 61-736 |
| Ω 40K           | 10KΩ  | 9.86      | 10.14      | 61-732, 61-736 |
| Ω 400K          | 100KΩ | 98.6      | 101.4      | 61-732, 61-736 |
| Ω 4M            | 1MΩ   | .981      | 1.019      | 61-732, 61-736 |
| Ω 40M           | 10MΩ  | 9.65      | 10.35      | 61-732, 61-736 |

**Table 5 Continuity Check**

| Function /Range  | Test Value    | Low Limits | High Limit | Model number   |
|--|---------------|------------|------------|----------------|
|  Continuity | 20Ω beep on   | 19.5       | 20.5       | 61-732, 61-736 |
|  | 400Ω 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 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 measures a minimum of 2.4V DC.  
If the batteries measures 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**

**61-732 (Refer to Figure 1A), 61-736 (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 1K $\Omega$ ) until unit display reads 390.0
4. De-energize source and remove test leads.

**V AC Zero Calibration**

**61-736 (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 220K ) until unit display reads 000.
4. De-energize source and remove test leads.

**V AC Calibration:**

**61-736 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 200K $\Omega$ ) until unit display reads 3900V $\pm$  1 digit.
4. De-energize source and remove test leads.

**A AC Calibration:**

**61-732 (Refer to Figure 1B), 61-736 (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 $\Omega$ ) for a display reading of 100.0  $\pm$ 1 digit
5. De-energize source and remove test leads.

Calibration of the 61-730 series is complete.

Remove all leads from the calibrator and equipment.

Return unit to proper operating condition.

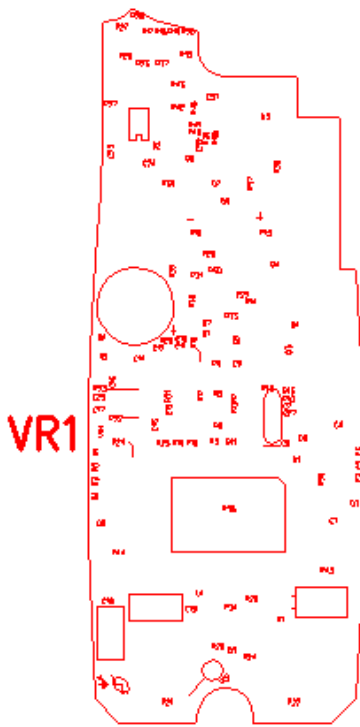


Figure 1A (61-732)

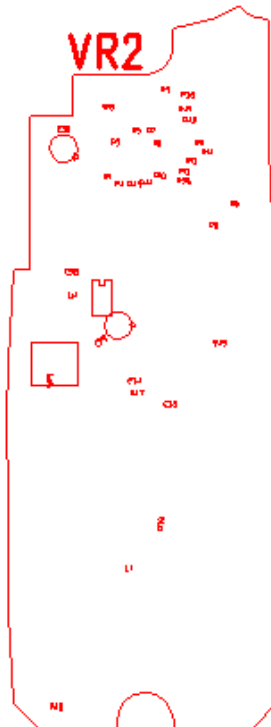


Figure 1B (61-732)



Figure 2A (61-736)

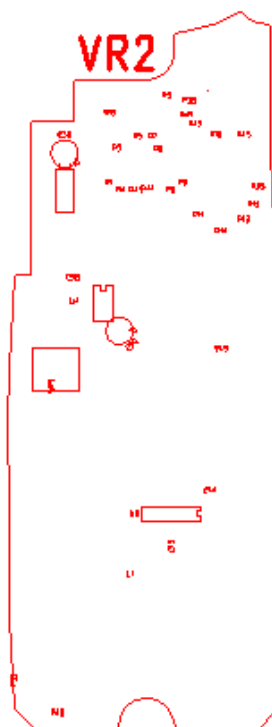
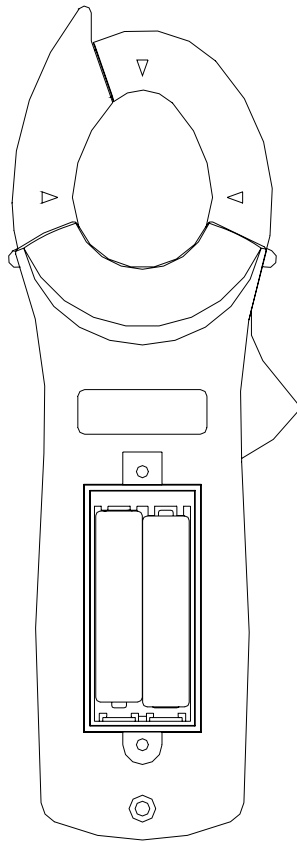


Figure 2B (61-736)

**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**