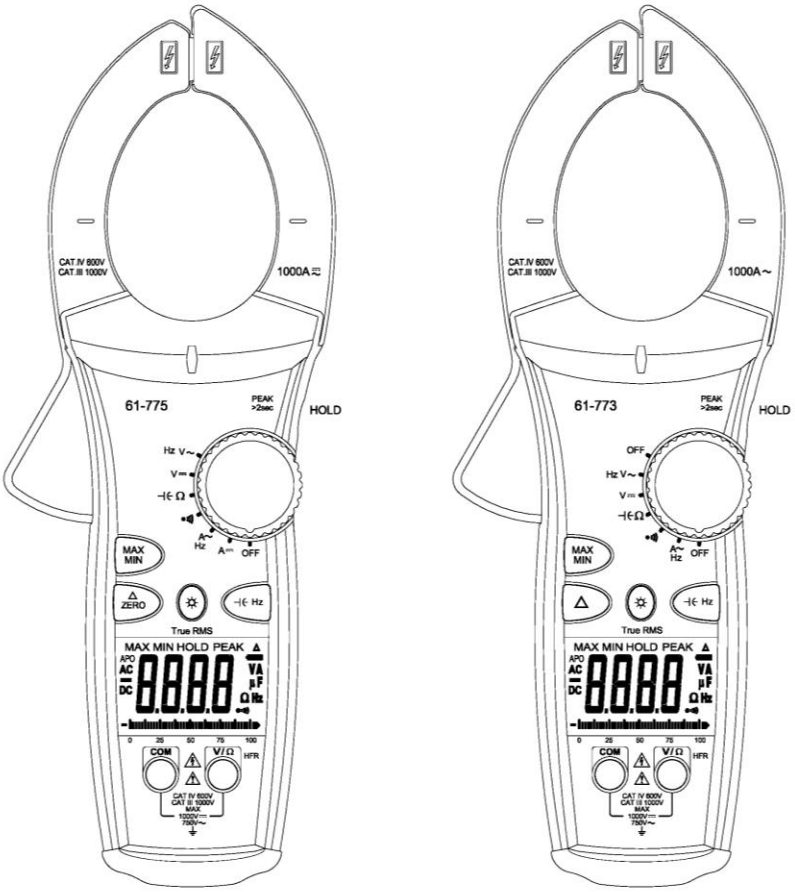
IDEAL INDUSTRIES, INC.
TECHNICAL MANUAL
MODELS: 61-773
61-775

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 61-770 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 (on VAC,VDC ranges)
	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.

High Voltage Warning (HI-V):

The meter beeps and lights an LED when >30V AC/DC voltage is present through test leads of the meter. This enhanced safety feature alerts the user that dangerous voltage is present across the leads even if the meter is set on an incorrect function or range.
Notes: This feature does not work through the clamp head as the clamp is intended to only measure current. Audible indication can be turned off by pressing and holding the MAX/MIN button while turning the function switch from OFF to the desired range position.

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 UL 61010-1,second edition, IEC 61010-2-032 second edition, IEC 61010-031)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	4 Digit LCD display
Display Count	9999 count, maximum reading 9999
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:	100 hours typical (alkaline) {61-773} 100 hours typical (alkaline) {61-775}
Low Battery Indicator:	 symbol indicates low battery voltage
Auto power off	Approximately 30 minutes
Dimensions	10.6" H X 4.1 " W X 1.9 " D 270mm H X 103mm W X 48.5mm D
Maximum Cable Size	ACA 2.0" (51mm)
Weight:	Approximately 1.1 lbs. or 500g 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

61-773

Function / Range	**Ranges**	**Accuracy**
AC Voltage (True RMS) (45-400Hz)		
	0.0V ~ 600.0V, 45Hz - 100Hz	1.0% + 5 digits
	600.0V ~ 750.0V, 45Hz - 100Hz	1.5% + 5 digits
	0.0V ~ 750.0V, 100Hz - 400Hz	6.0% + 5 digits
DC Voltage	0.0V ~ 600.0V	1.0% + 5 digits
	600.0V ~ 999.9V	1.5% + 5 digits
AC Current (True RMS) (45-400Hz)	0.0A ~ 999.9A, 45Hz - 60Hz	2.0% + 5 digits
	0.0A ~ 999.9A, 60Hz - 400Hz	6.0% + 5 digits
Resistance	0.0Ω ~ 999.9Ω, 1000Ω ~ 9999Ω	1.5% + 5 digits
Capacitance	0.0µF ~ 999.9uF	5.0% + 10 digits
Frequency	20.0Hz ~ 400.0Hz (Auto-ranging)	0.5% + 5 digits
Continuity	<30Ω on •)) Continuity	Not specified

61-775

Function / Range	**Ranges**	**Accuracy**
AC Voltage (True RMS) (20-400Hz)	0.0V ~ 100.0V, 20Hz - 100Hz	1.0% + 5 digits
	100.0V ~ 600.0V, 45Hz - 100Hz	1.0% + 5 digits
	600.0V ~ 750.0V, 45Hz - 100Hz	1.5% + 5 digits
	0.0V ~ 750.0V, 100Hz - 400Hz	6.0% + 5 digits
DC Voltage	0.0V ~ 600.0V	1.0% + 5 digits
	600.0V ~ 999.9V	1.5% + 5 digits
AC Current (True RMS) (20-400Hz)	0.0A ~ 999.9A, 20Hz - 100Hz	2.0% + 5 digits
	0.0A ~ 999.9A, 100Hz - 400Hz	6.0% + 5 digits
DC Current	0 ~ 999.9A	2.0% + 5 digits
Resistance	0.0Ω ~ 999.9Ω, 1000Ω ~ 10000Ω	1.5% + 5 digits
Capacitance	0.0µF ~ 999.9uF	5.0% + 15 digits
Frequency	20.0Hz ~ 400.0Hz (Auto-ranging)	0.5% + 5 digits
Continuity	<30Ω on •)) Continuity	Not specified

AC Converter: 61-773, 61-775 – True RMS sensing
Overload Protection:
AC and DC Voltage: Not to exceed 1000V DC or 750VAC RMS
AC Current: Not to exceed 1000A AC
DC Current: Not to exceed 1000A DC
Resistance: Not to exceed 600V DC or VAC RMS
Capacitance, Frequency, Continuity: Not to exceed 600V DC or VAC RMS

[1] **Frequency Sensitivity:** 5V rms on AC VOLTS range
Frequency can be measured through clamp head.
(5AAC at 20 to 100Hz) (10AAC at 100 to 400Hz),
Frequency Overload protection: 1000AAC, 1000VDC or 750VAC 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 750V	120V AC @ 45Hz	118.3	121.7	61-773, 61-775
V AC 750V	120V AC @ 400Hz	112.3	127.7	61-773, 61-775
V AC 750V	700V AC @ 45Hz	689.0	711.0	61-773, 61-775
V AC 750V	700V AC @ 400Hz	657.5	742.5	61-773, 61-775

Table 2 DC Voltage Test

Function /Range	Input	Low Limit	High Limit	Model Number
V DC 1000V	350V	346.0	354.0	61-773, 61-775
V DC 1000V	900V	886.0	914.0	61-773, 61-775

Table 3 AC Current Test

Function /Range	Input	Low Limit	High Limit	Model Number
A AC 1000A	10A AC @ 50Hz	9.3	10.7	61-773, 61-775
A AC 1000A	10A AC @ 400Hz	8.9	11.1	61-773, 61-775
A AC 1000A	900A AC @ 50Hz	881.5	918.5	61-773, 61-775
A AC 1000A	500A AC @ 400Hz	469.5	530.5	61-773, 61-775

Table 4 DC Current Test

Function /Range	Input	Low Limit	High Limit	Model Number
A DC 1000A	100A DC	97.5	102.5	61-775
A DC 1000A	900A DC	881.5	918.5	61-775

Table 5 Resistance Test

Function /Range	Input	Low Limit	High Limit	Model Number
Ω 1000	100Ω	98.5	101.5	61-773, 61-775
Ω 10000	1KΩ	985	1015	61-773, 61-775

Table 6 Capacitance and Frequency Tests

Function /Range	Input	Low Limit	High Limit	Model Number
Hz {through clamp}	50Hz @ 5A	49.70	50.30	61-773, 61-775
Hz {auto} {through clamp}	200Hz @ 10A	198.5	201.5	61-773, 61-775
Hz {VΩ and COM jacks}	60Hz @ 120V	59.2	60.8	61-773, 61-775
MFD 500µF	100µF	94.0	106.0	61-773, 61-775

Table 7 Continuity Check

Function /Range	Test Value	Low limits	High Limit	Model Number
•))) Continuity	20Ω beep on			61-773, 61-775
	40Ω beep off			

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 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 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.

Auto Calibration:

Set the short circuit 2-pin connector, mounted on PC board, from J2 to J1 position. Replace the case bottom of the meter. It is allowed to do calibration for any one of the following functions individually that is inaccurate. There is no need to do calibration for all functions.

V AC Calibration

1. Set Function Switch from OFF to ACV position.
2. Short the **VΩ** and **COM** inputs on the meter. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 000.0V ± 1 digit. Zero adjustment is complete.
3. Connect the calibrator to the **VΩ** and **COM** inputs on the meter.
4. Output AC 50V/50Hz. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 48V ~ 50V. Adjustment is complete.
5. Output AC 500V/50Hz. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 500.0V ± 2 digits. Adjustment is complete.

V DC Calibration

1. Set the function switch to DCV range. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 000.0 ± 1 digit. Zero adjustment is complete.
2. Connect the calibrator to the **ΩV** and **COM** inputs on the meter.
3. Output DC +500V. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 500.0V ± 2 digits. Adjustment is complete.

Continuity Calibration

1. Set the function switch to Continuity range. Short the **VΩ** and **COM** inputs on the meter. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 000.0 ± 1 digit. Zero adjustment is complete.
2. Connect the calibrator to the **ΩV** and **COM** inputs on the meter.
3. Output 800.0Ω. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 800.0Ω ± 2 digits. Adjustment is complete.

Resistance Calibration

1. Set the function switch to Ω range. Short the **VΩ** and **COM** inputs on the meter. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 000.0 ± 1 digit. Zero adjustment is complete.
2. Connect the calibrator to the **VΩ** and **COM** inputs on the meter.
3. Output 800.0Ω. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 800.0Ω ± 2 digits. Adjustment is complete.
4. Output 8KΩ. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 8000Ω ± 2 digits. Adjustment is complete.

Capacitance Calibration

1. Set the function switch to Capacitance range. Do not insert any capacitor. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 000.0 ± 1 digit. Zero adjustment is complete.
2. Plug a 390uF standard capacitor to **VΩ and COM** inputs. Press MAX/MIN button until unit display reads 390.0 ± 5 digits. Adjustment is complete.

A DC Calibration (61-775 only)

1. Set the function switch to DCA range. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 000.0 ± 1 digit. Zero adjustment is complete.
2. Set output of the DC calibrator for 7.8A DC and connect it to Coil = 50N = 390.0A DC.
3. Clamp the jaws to the coil = 50N.
4. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 390.0A ± 2 digits. Adjustment is complete.

A AC Calibration

1. Set the function switch to ACA range. When a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 000.0 ± 1 digit. Zero adjustment is complete.
2. Set output of the AC calibrator for 1.0A/50Hz and connect it to Coil = 50N = 50.0A AC.
3. Clamp the jaws to the coil = 50N.
4. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads about 48A ~ 50A. Adjustment is complete.
5. Set output of the AC calibrator for 7.8A AC/50Hz and connect it to Coil = 50N = 390.0A AC.
6. Clamp the jaws to the coil = 50N.
7. After a reading in the LCD is settled (about 5 seconds), press MAX/MIN button until unit display reads 390.0A ± 2 digits. Adjustment is complete.

Calibration of the 61-770 series is complete.
Remove all leads from the calibrator and equipment.
Open the case bottom again, and set the short circuit 2-pin connector on PC board from J1 back to J2 position, then replace the case bottom of the meter.
Turn the Function Switch from OFF to any position to restart the meter.

Battery Replacement (Refer to Figure 1)

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.

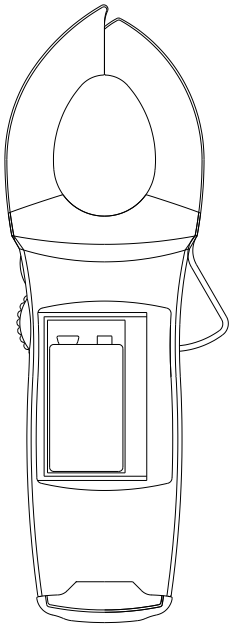


Figure 1