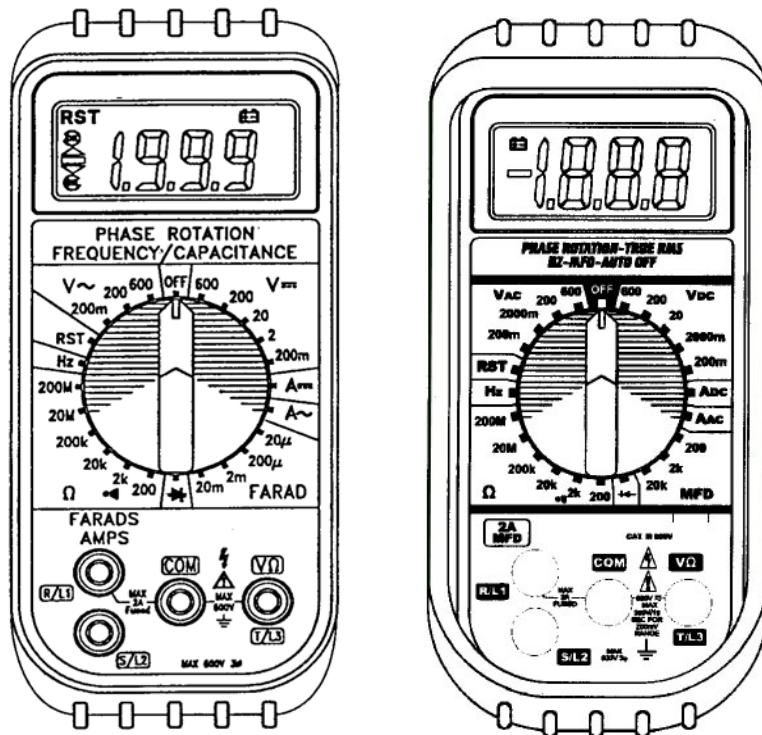




IDEAL INDUSTRIES, INC.
TECHNICAL MANUAL
MODEL: 61-361
MODEL: 61-361 True RMS {Modified 2002}

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 fuses)



Form number: TM61361
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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 61-361 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*

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

Model 61-361 and Model 61-361 True RMS {Modified}

Characteristics	Description
Display	3 ½ Digit LCD display
Display Count	2000 count, maximum reading 1999
Overrange Indication	“OL” displayed
Sampling Rate	3 time/second
Operating Environment: Relative Humidity	0°C to 50°C (32°F to 122°F) 70%RH
Storage Environment:	-20°C to 60°C (-4°F to 140°F) at <70 relative humidity
Power source:	9V Battery (NEDA 1604)
Battery Live:	200 hours typical (alkaline)
Low Battery Indicator:	⎓ symbol indicates low battery voltage
Auto Power Off mode	Approximately 25 minutes
A protection Fuse	2A/600V fast acting fuse Type LA-3893 and 0.1A/250V fast acting fuse, Type LA-3898
Dimensions	4.0” H X 7.5” W X 2.5” D
Weight:	Approximately 18.0 oz. including battery
Safety	UL1244, and Designed to comply with IEC 1010-1 Cat III

RANGES and ACCURACY SPECIFICATION**61-361**

Function Setting	Ranges	Accuracy
AC Voltage	200mV/200/600V, 50Hz to 500Hz	2.0% ± 4 digits
DC Voltage	200mV/2V/20V/200V/600.0V	1.2% ± 1 digits
AC Current	2A, 50Hz to 500Hz	3.0% ± 4 digits
DC Current	2A	3.0% ± 4 digits
RST(Phase)	50Hz to 500Hz / 80V to 450V	Not Specified ¹
Hz	10Hz to 100KHz	2.0% ± 3 digits
Resistance	200.0Ω/2.000KΩ/20.00KΩ/200.0KΩ 20.00MΩ 200.0MΩ	1.5% ± 4 digits 2.5% ± 4 digits 5.0% ± 20 digits
Continuity	Beep < 150Ω	Not Specified
Capacitance	20μ/200μ/2m/20m	4.0% ± 4 digits
Diode Check	DCV 2V @ 1.0 mA ± 0.6 mA	Not Specified

AC Converter: Average responding, RMS Calibrated to Sine Wave

Overload Protection: 200mV range, 500VDC or 350V RMS for no more that 15 sec.
 2V to 600V range, AC or DC Voltage: 600V DC or AC RMS.
 Resistance, Diode, Continuity: 500V DC or AC RMS.
 MFD input, 0.1A / 250V fast acting fuse.
 2A (R/L1) input, 2A / 600V fast acting fuse.
 R/L2 input, not fused.

¹ **RST** R S T will be displayed in the upper left corner if all three supply lines are powered
 If meter indicates an “OK” message in display phase rotation is Clockwise
 If meter indicates An “ER” message in display phase rotation is Counter Clockwise

RANGES and ACCURACY SPECIFICATION 61-361 True RMS {modified}

Function Setting	Ranges	Accuracy
AC Voltage	200mV/2000mV/200V/600V, 50Hz to 500Hz	2.0% ± 4 digits
DC Voltage	200mV/2000mV/20V/200V/600V	0.5% ± 2 digits
AC Current	2A, 50Hz to 500Hz	3.0% ± 4 digits
DC Current	2A	2.5% ± 4 digits
RST(Phase)	50Hz to 500Hz / 80V to 500V	Not Specified ¹
Hz	10Hz to 100KHz	2.0% ± 3 digits
Resistance	200.0Ω/2.000KΩ/20.00KΩ/200.0KΩ 20.00MΩ 200.0MΩ	1.0% ± 4 digits 2.0% ± 4 digits 5.0% ± 10 digits
Continuity	beep < 30Ω	Not Specified
Capacitance	200μF/2KμF/20KμF	4.0% ± 10 Digits
Diode Check	DCV 2V @ 1.0 mA ± 0.6 mA	Not Specified

AC Converter: True RMS, RMS Calibrated to Sine Wave

Overload Protection: 200mV range, 500VDC or 350V RMS for no more that 15 sec.
2V to 600V range, AC or DC Voltage: 600V DC or AC RMS.
Resistance, Diode, Continuity: 500V DC or AC RMS.
MFD input, 0.1A / 250V fast acting fuse.
2A (R/L1) input, 2A / 600V fast acting fuse.
R/L2 input, not fused.

¹ **RST** R S T will be displayed in the upper left corner if all three supply lines are powered
If meter indicates an “OK” message in display phase rotation is Clockwise
If meter indicates An “ER” message in display phase rotation is Counter Clockwise

PERFORMANCE VERIFICATION

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 for the Standard 61-361
Input the values listed in Table 2 for the modified 61-361 True RMS units

Table 1 Performance Verification

61-361 Standard			
Function Setting /Range	Input	Low Limit	High Limit
ACV 200mV	190mV AC@ 50Hz	185.8	194.2
ACV 200mV	190mV AC@ 500Hz	185.8	194.2
ACV 200V	190V AC @ 50Hz	185.8	194.2
ACV 200V	190V AC @ 500Hz	185.8	194.2
ACV 600V	500V AC @ 50Hz	486	514
ACV 600V	500V AC@ 60Hz	486	514
DCV 200mV	190mV DC	187.6	192.4
DCV 2V	1.900V DC	1.876	1.924
DCV 20V	19.00V DC	18.76	19.24
DCV 200V	190.0V DC	187.6	192.4
DCV 600V	500V DC	493	507
ADC 2A	1.900 DCA	1.839	1.961
AAC 2A	1.900 AAC @ 50Hz	1.839	1.961
AAC 2A	1.900 AAC @ 500Hz	1.839	1.961
Ω 200	100.0	98.1	101.9
Ω 2K	1.000K	.981	1.019
Ω 20K	10.00K	9.81	10.19
Ω 200K	100.0K	98.1	101.9
Ω 20M	10.00M	9.71	10.29
Ω 200M	100.0M	93.0	107.0
20 μF	10.00μF	9.50	10.50
200 μF	100.0μF	95.0	105.0
2m	1mF	.950	1.050
20m	10mF	9.50	10.50
Diode Test	500mV DC	485	515
Continuity Test	50Ω	Beep off	
Continuity Test	20Ω	Beep on	
Hz	10KHz @10V	9.77	10.23
Hz	100KHz @ 10V	97.7	102.3

Phase Rotation Check. (RST)

¹ **RST** R S T will be displayed in the upper left corner if all three supply lines are powered
 If meter indicates an “OK” message in display phase rotation is Clockwise
 If meter indicates An “ER” message in display phase rotation is Counter Clockwise

Table 2 Performance Verification

61-361 True RMS			
Function Setting /Range	Input	Low Limit	High Limit
ACV 200mV	190mV AC@ 50Hz	185.8	194.2
ACV 200mV	190mV AC@ 500Hz	185.8	194.2
ACV 2000mV	1900mV @ 50Hz	1862	1938
ACV 2000mV	1900mV @ 500Hz	1862	1938
ACV 200V	190V AC @ 50Hz	185.8	194.2
ACV 200V	190V AC @ 500Hz	185.8	194.2
ACV 600V	500V AC @ 50Hz	486	514
ACV 600V	500V AC@ 60Hz	486	514
DCV 200mV	190mV DC	188.9	191.1
DCV 2000mV	1900mV DC	1889	1911
DCV 20V	19.00V DC	18.89	19.11
DCV 200V	190.0V DC	188.9	191.1
DCV 600V	500V DC	496	504
ADC 2A	1.900 DCA	1.848	1.952
AAC 2A	1.900 AAC @ 50Hz	1.839	1.961
AAC 2A	1.900 AAC @ 500Hz	1.839	1.961
Ω 200	100.0	98.6	101.3
Ω 2K	1.000K	.986	1.014
Ω 20K	10.00K	986	10.14
Ω 200K	100.0K	98.6	101.4
Ω 20M	10.00M	9.76	10.24
Ω 200M	100.0M	94.0	106.0
200 μ F	100.0 μ F	95.0	105.0
2mF	1mF	.950	1.050
20mF	10mF	9.50	10.50
Diode Test	500mV DC	485	515
Continuity Test	50 Ω	Beep off	
Continuity Test	20 Ω	Beep on	
Hz	10KHz @10V	9.77	10.23
Hz	100KHz @ 10V	97.7	102.3

Phase Rotation Check. (RST)

- ¹ **RST** R S T will be displayed in the upper left corner if all three supply lines are powered
 If meter indicates an “OK” message in display phase rotation is Clockwise
 If meter indicates An “ER” message in display phase rotation is Counter Clockwise

Note 1: Three-phase rotation test can be performed on any known three-phase source.

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 holding the bottom case cover, just above the battery cover.
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 undergo the following calibration procedure on an annual basis.

Volts DC Calibration

1. Set the Function/Range Switch to the "200mV DC" position.
2. Set the output of the DC calibrator for 190.0mV and connect it to the "V-Ohm" and "COM" input terminals.
3. Adjust VR1 (VR 200 ohm) until the display reads 190.0mV +/- 1 digit.
4. Set the Function/Range switch to the "200mV AC" position.
5. Set the output of the AC calibrator for 190.0mV/50Hz and connect it to the "V-Ohm" and "COM" input terminals.
6. Adjust VR2 (VR 200 ohm) until the display reads 190.0mV +/- 1 digit.

Note : *This is the only adjustment required for the 61-361. Calibration is complete.*

Battery Replacement (refer to Figure 1)

1. Disconnect the test leads from any circuit under test and turn off meter.
2. Remove the three screws for the back case cover.
3. Remove battery from compartment noting the "+" and "-" position of the Battery terminals.
4. Remove the Battery plastic sleeve and place it on the new battery
(Damage can occur to circuit if Plastic sleeve is not replace with new Battery)
5. Install new 9V battery into compartment and assure proper polarity of battery.
(An alkaline type NEDA #1604 is recommended.)
6. Install bottom case cover and secure with screws.

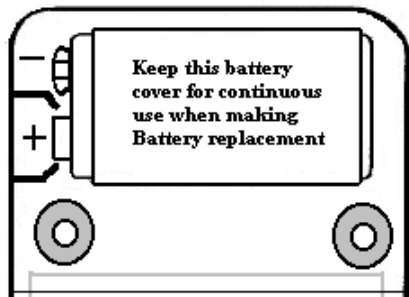


Figure 1

Replacing Fuse

1. Disconnect the test leads and turn the range switch to “OFF”.
2. Remove the three screws holding the bottom case cover
3. Use a digital multimeter in low resistance {ohms} mode to check the two fuses
MFD input, 0.1A / 250V fast acting fuse.
2A (R/L1) input, is a 2A / 600V fast acting fuse
R/L2 input, is not fused
4. Remove the defective fuse and replace with the recommended fuse
LA-3893 (2A / 600V) and LA-3898 (0.1A / 250V) types are recommended.
5. Install bottom case cover and secure with screws.