

# INSTRUCTION MANUAL



**CLM33**  
CABLE LENGTH  
METER

**FINEST**® a world leader in test & measurement

## FINE INSTRUMENTS CORPORATION

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# Features

- 4 digit display with enunciators.
- Measures in FEET (ft) or METERS (m).
- Measures COPPER (CU) or ALUMINUM (AL) wire.
- User Select Mode.
- Resistance range for milliohm measurements.
- Automatic temperature compensation.
- User calibration mode. Calibration standard included.
- Sleep mode.
- Easy to use.

**WARNING: MAKE SURE WIRE UNDER TEST IS NOT ENERGIZED.  
NEVER APPLY VOLTAGE TO INPUTS.**

**NOTE:** Temperature affects accuracy of readings. Please see accuracy specifications. For best results, allow the CLM33 to attain the same ambient temperature as the wire under test. The length of time this will take depends on the ambient temperature. Typically it will take 10 to 15 minutes for the CLM33 to attain equal ambient temperature.

# Specifications

## Measurement Range:

**Overall range limit 0.1 to 30.00km  
0.15mm<sup>2</sup> to 240mm<sup>2</sup>**

Due to the minimum and maximum resistance limits, specific wires will have a range specific to that wire. Please refer to the following table to determine the minimum and maximum length that can be measured for specific gauge wires.

GAUGE(mm <sup>2</sup> )	Min(M)	Max(M)	Min(Ft)	Max(Ft)
240	29.5	30.00k	97.0	100.0k
185	26.1	30.00k	86.0	100.0k
150	24.1	30.00k	79.0	100.0k
120	20.0	30.00k	67.0	100.0k
95	16.0	30.00k	52.5	100.0k
70	12.2	30.00k	40.0	100.0k
50	8.5	30.00k	28.0	100.0k
35	6.1	30.00k	20.0	100.0k
25	4.2	30.00k	14.0	100.0k
16	2.7	30.00k	9.0	100.0k
10	1.7	30.00k	5.5	100.0k
6	1.0	30.00k	3.0	100.0k
4	0.7	22.73k	2.0	74.56k
2.5	0.4	14.06k	1.5	46.12k
1.5	0.3	8,417	1.0	27.61k
1	0.2	5,906	0.5	19.38k
0.75	0.1	4,210	0.5	13.81k
0.5	0.1	2,801	0.5	9,191
0.25	0.1	1,404	0.5	4,607
0.15	0.1	842.0	0.5	2,763

**Resolution:**

0.1m or 0.5 feet (Length)

1m (Resistance)

**Accuracy:** $\pm(1\% \text{ of reading} + 1\text{m or } 3\text{ft}) < 100\text{m or } 300\text{ft}$  at 18° to 23°C $\pm(1\% \text{ of reading}) > 100\text{m or } 300\text{ft}$  at 18° to 23°C $\pm(2\% \text{ of reading} + 1\text{m or } 3\text{ft}) < 100\text{m or } 300\text{ft}$  below 18° and above 23°C $\pm(2\% \text{ of reading}) > 100\text{m or } 300\text{ft}$  below 18° and above 23°C

;Ø Use the User Select mode for better measurement accuracies.

**Resistance:**0 to 10 :  $\pm(0.5\% \text{ of reading} + 3 \text{ LSD})$ 10 to 99.99 :  $\pm(0.5\% \text{ of reading} + 10 \text{ LSD})$ 

LSD = Least Significant Digit

**Operation Temperature:** 0° to 40°C**Operating Humidity:** 20% to 80%RH**Sleep mode:** After 15 minutes (Approx.)**Battery Life:**

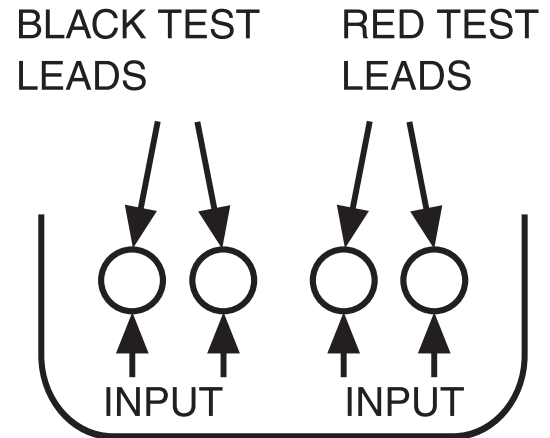
Depends on use. Typically 60 hours (180 hours in Sleep mode).

Extended measurement times can lower battery life to no less than 12 hours.

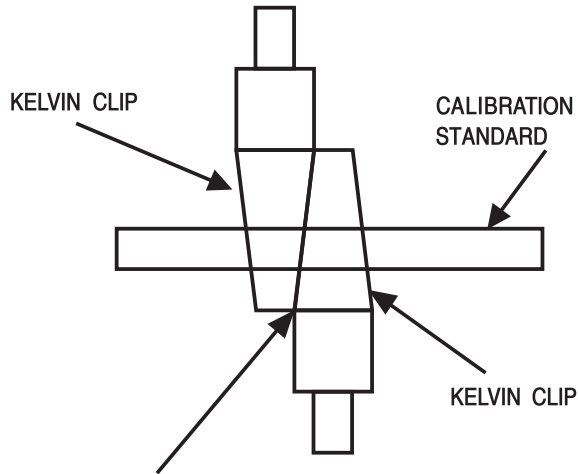
# Calibration Procedure

(Perform this function before testing)

1. Turn the rotary selector from off to any position to turn the meter on.
2. Set the rotary selector to "R" on the dial.
3. Insert the black test leads into one pair of input jacks and the red test leads into the other pair of input jacks. (Ignore the gray marking on the banana plug.) This is very important to ensure that the meter works correctly. If black and red test leads are mixed the meter will give false readings. (See picture)



- Connect the Kelvin clips to the calibration standard. Make sure the clips are as close together as possible. (See picture below)  
**NOTE:** Make sure the calibration standard is clean. The Kelvin clips must be connected across the diameter of the standard. Use the abrasive pad to clean the calibration standard.



**NOTE:** Make sure clips are as close together as possible. Use the tips of the Kelvin clips when performing measurements on small diameter wire.

- Press and hold the "CAL" button until all segments in the display illuminate. This completes the calibration procedure and will ensure all measurements are as accurate as possible.
- Disconnect the leads from the standard.

## Measuring Length of Wire

- Turn the CLM33 on and perform the calibration procedure in the "R" position.
- Allow the CLM33 to attain the same temperature as the wire under test.  
**NOTE:** Temperature affects accuracy of readings. Please see accuracy specifications. For best results, allow the CLM33 to attain the same ambient temperature as the wire under test.  
**WARNING: MAKE SURE WIRE UNDER TEST IS NOT ENERGIZED. NEVER APPLY VOLTAGE TO INPUTS.**
- Strip the insulation back on each end of the wire being tested.  
**NOTE:** Make sure both ends of the wire under test are clean and the conductor is fully exposed. The insulation must be stripped away so the Kelvin clips can be connected across the diameter of the wire. Use the abrasive pad to clean the wire ends.
- Using the selector on the CLM33, turn to the size of wire under test.
- Press the "COPPER" button if copper wire is being tested. The "Cu" enunciator will illuminate in the top of the display.
- Press the "ALUM" button if copper wire is being tested. The "Al" enunciator will illuminate in the top of the display.
- Press the "FT" button if you require readings to be in feet. The "ft" enunciator will illuminate in the display.
- Press the "M" button if you require readings to be in meters. The "m" enunciator will illuminate in the display.
- Connect a Kelvin clip to one of the wire and the other Kelvin clip to the other end of the wire.
- Read the length of wire directly from the display. Please note the "k" enunciator illuminates if measurements are at or above 10000 meters / feet.  
 For example, when the "k" enunciator is on and you are measuring in feet, a reading of 15km would indicate a length of 15000m.
- Disconnect the test leads from the meter when not in use.

# User Select Mode

This mode allows you to save the resistance of a user wire (See NOTE below) for additional measurements of unknown lengths of the same gauge wire. In addition, it enables you to accurately measure the length of standard gauge wires. In this mode, you can measure the length of any metal wire, the resistance of which can be measured, as well as Copper or Aluminum wires.

**NOTE: The sample length of user wires must be 5m in METER or 20ft in FEET mode.**

**“The User Select mode is effective for the wires of less than 1.5mm<sup>2</sup>”**

## How to save the resistance of a user wire

**Note: You will need a 5M (or 20ft in feet mode) sample length of the wire you are programming into the meter. This will measure the resistance of that wire and store a value to correctly measure longer lengths.**

1. Turn the CLM33 on and perform the calibration procedure in the “R” position.
2. Allow the CLM33 to attain the same temperature as the user wire.  
**WARNING: MAKE SURE USER WIRE IS NOT ENERGIZED. NEVER APPLY VOLTAGE TO INPUTS.**
3. Strip the insulation back on each end of the user wire.  
**NOTE: Make sure both ends of the user wire are clean and the conductor is fully exposed. The insulation must be stripped away so the Kelvin clips can be connected across the diameter of the wire. Use the abrasive pad to clean the wire ends.**
4. Using the selector on the CLM33, turn to a required memory location in the User Select range. The meter has 8 internal memory locations from 1 to 8, and the selected memory location number will illuminate at the top left corner of the display.  
If the selected memory location is occupied, the display shows “0000”.  
If the selected memory location is empty, the display shows “00”.
5. Press the “FT” or “M” button to select the measurement unit.
6. Connect a Kelvin clip to one end of the 5m section of the user wire and the other Kelvin clip to the other end of the wire.
7. Press “MEM” button to enter the Memory function. The “MEM” enunciator will illuminate in the top of the display.

8. Press “CAL” button to store the resistance of the user wire.
9. If there is any stored resistance value in the selected memory location, the meter will display “5UR E”. In this case, press “CAL” button again to store the new resistance value.
10. Press “MEM” button or turn the selector to any position in order to exit Memory function.

## Measuring Length of Wire in the User Select Mode

1. Turn the CLM 33 on and perform the calibration procedure in the “R” position.
2. Allow the CLM33 to attain the same temperature as the wire under test.

**WARNING: MAKE SURE USER WIRE IS NOT ENERGIZED. NEVER APPLY VOLTAGE TO INPUTS.**

3. Strip the insulation back on each end of the wire being tested.  
**NOTE: Make sure both ends of the wire under test are clean and the conductor is fully exposed. The insulation must be stripped away so the Kelvin clips can be connected across the diameter of the wire. Use the abrasive pad to clean the wire ends.**
4. Select the required memory location in the User Select Mode using the selector and the Listing label on the bottom case.
5. Press the “FT” or “M” button to select the measurement unit.
6. Connect a Kelvin clip to one of the wire under test and the other Kelvin clip to the other end of the wire.
7. Read the length of wire directly from the display.
8. Disconnect the test leads from the meter when not in use.

## Clearing Memory

1. Disconnect the test leads from the meter.
2. Select the required memory location to be cleared in the User Select range using the selector.
3. Press “MEM” button to enter the Memory function. The “MEM” enunciator will illuminate in the top of the display.
4. Press “CAL” button. Then, the meter will display “5UR E”.
5. Press “CAL” button again to clear the stored data.
6. Press “MEM” button or turn the selector to any position in order to exit Clearing memory function.

## Low Battery Indication

The “**BAT**” enunciator will illuminate in the top right side of the display to indicate battery voltage is low. The battery should be changed immediately to ensure proper function and accuracy. Only alkaline 9 volt batteries should be used.

## Measuring Resistance

1. If the resistance to be measured is wire, follow steps 1 through 3 under “Measuring Length of Wire”. Then follow step 2 below. If a discrete resistor is being measured, perform the calibration procedure in the “R” position.
2. Read the resistance of the wire directly from the display.

# Operational Hints

- Never apply voltage to the inputs.
- Temperature affects readings. Allow the CLM 33 to attain the ambient temperature of the wire under test.
- The sample length of user wires for the User Select Mode must be 5m in METER or 20ft in FEET mode.
- The Listing label on the bottom case of the meter enables users to make a short memo of each user wire for the User Select Mode.
- Use a 9 volt alkaline battery only.
- If the meter is on and inactivate for approximately 15 minutes, the meter will automatically enter into Sleep mode and display “- - -”. Reactivate the meter by turning the selector to any position or pressing any button.
- Use the test leads that come with the meter only. Other leads will not work.
- Ensure that the test leads are clean and in good working order.
- Use an abrasive pad similar to the one provided to ensure the wire under test is clean and free of oxidation.
- Ensure that the alligator clips are connected across the diameter of the wire under test.
- When measuring wire for insertion into conduit, add extra wire to compensation for the accuracy of the meter. For example, 104m of wire needed to run inside a piece of conduit that is 100m long. (This would allow 2m on each end to attach the wire.) At 104m and 21°C, the cable length meter has an accuracy of  $\pm 1\text{m}$ . In this case, it would be safer to measure out 105m of wire. This would ensure that enough wire is available for the application.