

Instructions Manual

Tektronix

**CMM150
AC Current Probe
070-9937-00**



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CMM150 AC Current Probe

The CMM150 measures AC current (up to 300 A) when used with the DMM150 Digital Multimeter.

The current probe acts as a current to voltage transformer. The probe captures the current induced magnetic fields around a conductor (wire) and converts the fields to a proportional voltage that is displayed on the DMM150.

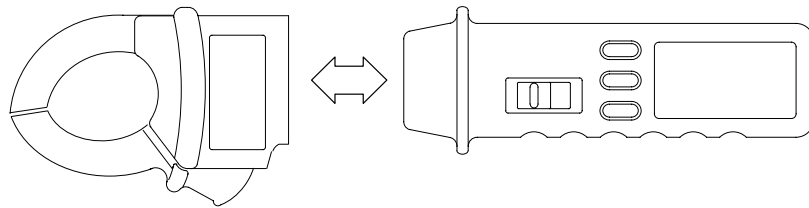


Figure 1: CMM150 AC Current Probe with DMM150 Digital Multimeter

CMM150 Specifications

Accuracies are $\pm(\% \text{ reading} + \text{number of digits})$ at $23^\circ \text{C} \pm 5^\circ \text{C}$ at less than 80% R.H. (relative humidity).

Table 1: General specifications

Characteristics	Description
Operating temperature	0 °C to 45 °C <75% R.H.
Storage temperature	-20 °C to +60 °C <75% R.H.
Temperature coefficient	0.15 \times (specified accuracy) / °C (<18 °C or >28 °C)
Dimensions (W \times L \times D) with holster	72 mm \times 102 mm \times 36 mm (2.83 in. \times 4.02 in. \times 1.42 in.)
Weight	130.1 g (0.29 lbs)
Maximum altitude	2000 m
Maximum jaw opening	30 mm (1.18 in)
Maximum conductor size	29 mm dia. (1.14 in.)

Table 2: Measurement characteristics

Characteristics	Description
Current range	0.1 A to 300 A AC _{RMS}
Output voltage	10 mV/A
Accuracy	$\pm(1.9\% + 0.5 \text{ A})$ 50 ~ 60 Hz $\pm(3.9\% + 1 \text{ A})$ 40 ~ 400 Hz
Maximum bare wire voltage	600 VAC _{RMS} CAT II
Sensor type	Induction coil
Maximum output impedance	120 Ω

Table 3: Certifications and compliances

EC Declaration of Conformity	Meets intent of Low Voltage Directive 73/23/EEC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities Low Voltage Directive 73/23/EEC: EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use
Certifications	Certified by CSA to CAN/CSA-C22.22 No. 231 and UL1244

Table 3: Certifications and compliances (cont.)

Overvoltage Category	<table> <tr> <td data-bbox="602 338 781 390">Category:</td> <td data-bbox="781 338 1461 390">Examples of Products in this Category:</td> </tr> <tr> <td data-bbox="602 390 781 432">CAT III</td> <td data-bbox="781 390 1461 432">Distribution-level mains, fixed installation</td> </tr> <tr> <td data-bbox="602 432 781 474">CAT II</td> <td data-bbox="781 432 1461 474">Local-level mains, appliances, portable equipment</td> </tr> <tr> <td data-bbox="602 474 781 537">CAT I</td> <td data-bbox="781 474 1461 537">Signal levels in special equipment or parts of equipment, telecommunications, electronics</td> </tr> </table>	Category:	Examples of Products in this Category:	CAT III	Distribution-level mains, fixed installation	CAT II	Local-level mains, appliances, portable equipment	CAT I	Signal levels in special equipment or parts of equipment, telecommunications, electronics
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CAT III	Distribution-level mains, fixed installation								
CAT II	Local-level mains, appliances, portable equipment								
CAT I	Signal levels in special equipment or parts of equipment, telecommunications, electronics								
Pollution Degree 2	As defined in EN 61010-1. Do not operate in environments where conductive pollutants may be present.								

CMM150 Performance Verification

This section contains the procedure to verify that the CMM150 AC Current Probe performs as warranted when installed on a DMM150 Digital Multimeter. If an instrument fails any of these checks, it needs adjustment and or repair.

The performance verification procedure provides a valid confirmation of instrument electrical characteristics and function under the following conditions:

- The CMM150 and DMM150 operate in an 18° to 28° C (64° to 82° F) ambient environment with a relative humidity of less than 75%.
- The DMM150 stabilizes at the stated ambient temperature for one hour.
- The DMM150 warms up for five minutes.
- The DMM150 is set to the 3 V AC mode.
- Allow the DMM150 to settle to its final value before taking the measurement.

The performance verification procedure should be performed annually or after every 2000 hours of operation if used infrequently.

Test Equipment

The performance verification procedure uses external traceable test equipment to directly check warranted characteristics.

Alternative test equipment must meet or exceed the intended minimum requirements specified in Table 4. If you substitute equipment, you may need to modify the procedures.

NOTE. Before beginning the performance verification procedure, warm up the test equipment according to the manufacturer's recommendations.

Table 4: Test equipment

Description	Minimum requirements	Example product
Universal Calibration System	Resolution & accuracy 4 times greater than the multimeter display reading	Wavetek 9100 with option 200 current coil set

Set Up

To prepare for the performance verification checks, do the following steps.

1. Attach the CMM150 to the DMM150 and allow them to stabilize at the ambient temperature for one hour before testing.
2. Turn the DMM150 on by pushing the slide switch to $V \sim V \overline{=}$.

NOTE. You need to keep the DMM150 powered on throughout the warm-up period and throughout the entire verification procedure.

3. Warm up the DMM150 for five minutes.
4. Photocopy the test record on page 7 to record your test results.

Verification Procedure

Implement the following checks to verify the performance of your CMM150 AC Current Probe.



WARNING. To avoid electric shock, avoid touching exposed connections.

AC Ampere Check

Perform the following steps to verify the AC ampere measurement accuracy.

1. Set the DMM150 slide switch to $V \sim V \overline{=}$.
2. Push the Blue function button to select AC volts.
3. Press the RANGE button to select the 3 V range.
4. Select the appropriate coils as necessary to multiply the AC current calibrator output to each of the values given in the Test Record. For more information, refer to the user manual of your calibrator.
5. Position the clamp around the current loop of the current calibrator and release the clamp trigger. Ensure that the clamp is entirely closed.
6. Verify that the multimeter reads within the specified Display minimum and maximum limits.
7. Turn the calibrator output off.
8. Remove the clamp from the current loop.

CMM150 Test Record

Serial number	Procedure performed by	Date

CMM150 test record

Test input	Tolerance	Display minimum	Reading	Display maximum
AC ampere test (50 Hz or 60 Hz)				
0.1 A	$\pm 1.9\% + 0.5 \text{ A}$	-.005		.007
10.0 A	$\pm 1.9\% + 0.5 \text{ A}$.094		.106
100.0 A	$\pm 1.9\% + 0.5 \text{ A}$.976		1.024
300.0 A	$\pm 1.9\% + 0.5 \text{ A}$	2.938		3.062

CMM150 Adjustment Procedures

This section contains procedures to adjust the CMM150 AC Current Probe. Perform these procedures once a year or if the *CMM150 Performance Verification* procedure indicates the need for calibration.

In this section you will find the following information:

- A list of adjustments
- A list of test equipment needed to make the adjustments
- Instructions on how to prepare the instrument for adjustment
- Step-by-step adjustment procedures

The procedures in this section do not verify performance. To confirm that your multimeter meets factory specifications, perform the procedures in the *CMM150 Performance Verification* section.

Test Equipment

The test equipment listed in Table 4 on page 5 is a complete list of equipment needed for the adjustment procedures. This procedure assumes that the test equipment is operating within tolerance.

Alternative test equipment must meet or exceed the intended minimum requirements specified in Table 4. If you substitute equipment, you may need to modify the procedures.

Test Accessories

In addition to the test equipment, some additional test accessories are required to perform the adjustment procedure.

Table 5: Test accessories

Description	Qty	Example product
Couplers	2	ITT Pomona 5635
Patch cords	2	ITT Pomona B8

Preparation for Adjustment

The following guidelines apply to all CMM150 adjustments:

- Perform all adjustments in a 21° to 25° C ambient environment with a relative humidity of 75% or less.
- Warm up the DMM150 for at least 15 minutes.
- Do not alter any setting without reading the entire adjustment procedure first.
- Do not alter a setting unless a performance characteristic cannot be met at the current setting.
- Read the *Safety Summary* at the beginning of this manual.

Adjustment

1. Connect the CMM150 to the DMM150 as shown in Figure 2.

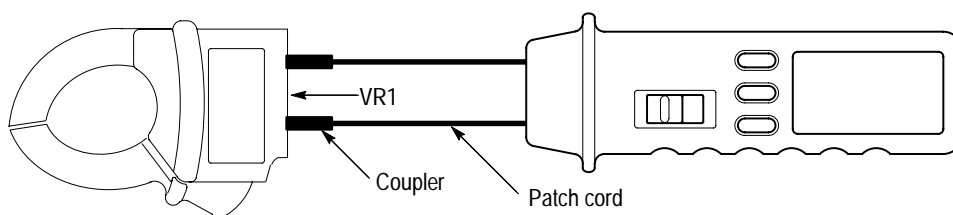


Figure 2: Adjustment location

2. Set the DMM150 to measure AC volts.
3. Select the appropriate coil to multiply the AC current calibrator output to 100.0 Amps at 60 Hz.
4. Position the clamp around the current loop of the current calibrator and release the clamp trigger. Ensure that the clamp is entirely closed.
5. Adjust VR1 for a reading of 1.000.
6. Turn the calibrator output off.
7. Remove the clamp from the current loop.