



RM-350/OHM/115 & RM-350TB/OHM/115
 RM-350/OHM/230 & RM-350TB/OHM/230
DIGITAL PANEL METERS

INSTRUCTIONS



INTRODUCTION

The instruments described in these instructions are three and one-half-digit, fixed range, line-powered digital panel ohmmeters. The last three digits of the model number indicate the line voltage required for operation. Connections to the RM-350/OHM/115 & RM-350/OHM/230 are made via two card-edge connectors. Connections to the RM-350TB/OHM/115 & RM-350TB/OHM/230 are made via two terminal blocks.

The meters are available in any one of six ranges: 200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ or 20MΩ. Changing from one range to another is accomplished by changing a single resistor, either internally or externally.

The display consists of one-half-inch-high numerals, illuminated by light-emitting diodes. Calibration is readily accomplished by adjustment of two potentiometers accessible at front of the instrument.

SPECIFICATIONS

RESISTANCE RANGES: 0 to 199.9Ω / 1.999kΩ / 19.99kΩ / 199.9kΩ / 1.999MΩ or 19.99MΩ

ACCURACY: ±[0.25% Reading ±1 digit] (+18°C to +28°C)

DISPLAY: 0.5" high, LED, Red

UPDATE RATE: 3 rdg/sec, nominal

POWER:

RM-350/OHM/115 } 105 to 125 VAC
 RM-350TB/OHM/115 } 50 to 400 Hz

RM-350/OHM/230 } 210 to 250 VAC
 RM-350TB/OHM/230 } 50 to 400 Hz

SIZE: See figures 1 and 2

WEIGHT: Approx. 12 oz (340 g)

COMMON-MODE COMPLIANCE: ≥100V

DECIMAL LOCATION: May be positioned by jumper on connector to any one of three locations: X.X.X.X

OVERLOAD INDICATION: Left-most digit is the numeral 1; remaining digits are blank.

CONSTRUCTION

The RM Series Digital Panel Ohmmeters each contain two printed circuit board assemblies mounted one above the other. The lower assembly is the display/main board assembly which is essentially a DC voltmeter in the 2-volt range. The upper assembly contains a resistance-to-voltage converter, and a power supply. For the RM-350/OHM/115 or 230, all interconnections between upper and lower assemblies are made via the mating connectors. For the RM-350TB/OHM/115 or 230, all interconnections between upper and lower assemblies are made via terminal blocks.

MOUNTING DATA.

A rectangular panel cutout is recommended for mounting the instruments. The recommended dimensions are:

92 millimeters +1, -0 mm (3.622 inches +0.040, -0 in.)

43 millimeters +1, -0 mm (1.693 inches +0.040, -0 in.)

The meters will also fit the DIN/NEMA standard cutout, 92 mm x 45 mm (3.622 x 1.772 in.) and the widely used 99.7 mm x 42.72 mm (3.925 in. x 1.682 in.) cutout.

Any panel thickness from 1.524 mm (0.060 in.) to 4.57 mm (0.18 in.) may be used.

To mount the meter, remove the retaining spring from its holes in the sides of the meter at the rear. Insert the meter from the front

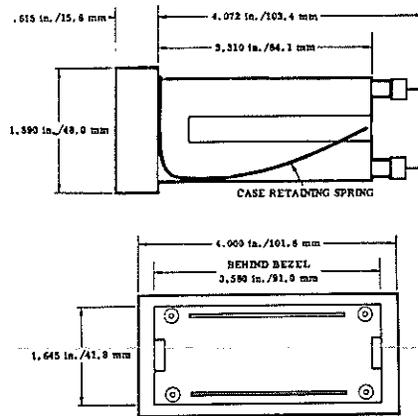


Figure 1. Card-Edge Configuration

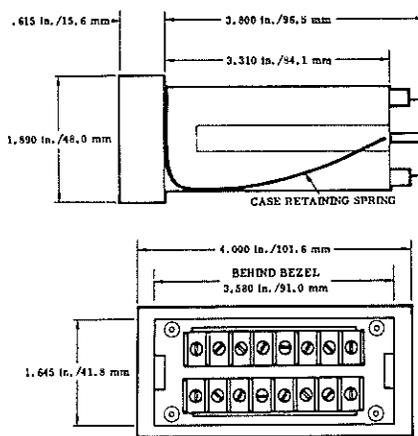


Figure 2. Terminal Block Configuration

of the panel cutout. Replace the retaining spring and slide it behind the mounting panel to fasten the meter in place. It does not matter whether the retaining spring swings from above or below the meter.

MATING CONNECTORS (RM-350/OHM/115 or 230)

1. SOURCES. Any of the following connectors may be used to mate with the RM-350/OHM/115 or 230

Manufacturer	Connector Part No.
Viking	2VH15/LAB5 091-0024-000*
Stanford Applied Engineering	SAM-15S/1-2 007900*
Masterite Industries	S014GR15-SR-H-X 60217-1*
Microplastics, Inc.	MP-0156-15-SP-1 04-0001-000*

*Polarizing Key Part No.
 The mating connector for the display/main board assembly (the lower assembly) should have a polarizing key installed between contacts 1 and 2. This connector with polarizing key installed is available from NLS; part number is 46-107-1. The mating connector for the resistance-to-DC converter and power supply assembly (upper assembly) should have a polarizing key installed between contacts 2 and 3. The NLS part number for this connector with key installed is 46-107-2. One each of these connectors is furnished with each instrument.

2. MOUNTING. Before mounting the connectors, check to ensure that one of them has a polarizing key between contacts 1 and 2 and the other has a polarizing key between contacts 2 and 3. The first connector mounts between the lower bosses and the second between the upper bosses. The locations of the polarizing keys should correspond to slots in the printed circuit boards. Use the screws provided (4-40 x 7/16" RHD PHN) to fasten the connectors to the case.

3. WIRING. Figure 3 provides wiring information for the connectors. Connect contacts 1, 3, 9 and 11 of the upper connector to the corresponding contacts on the lower connector. Connect the unknown resistance between contacts 5 and 7 of the upper connector. To display a decimal point, jumper between contact 5 and contact 7, 13 or 15 on the lower connector, depending upon which decimal point is to be displayed. See below.

DECIMAL LOCATION 1 . 0 . 0 . 0
 CONTACT NO. 15 13 7

Connect the AC power to contacts 13 and 15 on the upper connector; the neutral side to contact 13 and the "hot" side to contact 15.

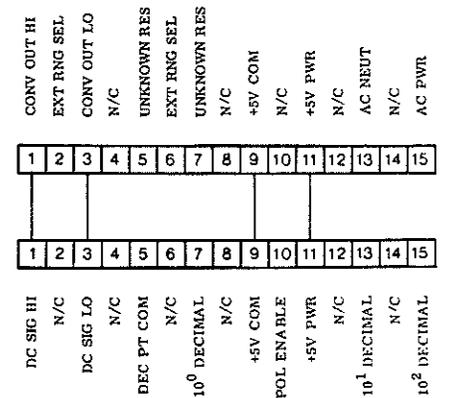


Figure 3. Connector Diagram for RM-350/OHM/115 or 230

TERMINAL BLOCK WIRING (RM-350TB/OHM 115 or 230)

Figure 4 provides wiring information for the terminal blocks. Connect terminals 1, 2, 5 and 6 of the upper terminal block to the corresponding terminals on the lower terminal block. Connect the unknown resistance between terminals 3 and 5 of the upper terminal block. To display a decimal point, jumper between terminal 3 and terminal 4, 7 or 8 on the lower terminal block, depending upon which decimal point is to be displayed. See below.

DECIMAL LOCATION 1 . 0 . 0 . 0
 TERMINAL NO. 8 7 4

Connect the AC power to terminals 7 and 8 of the upper terminal block; the neutral side to terminal 7 and the "hot" side to terminal 8.

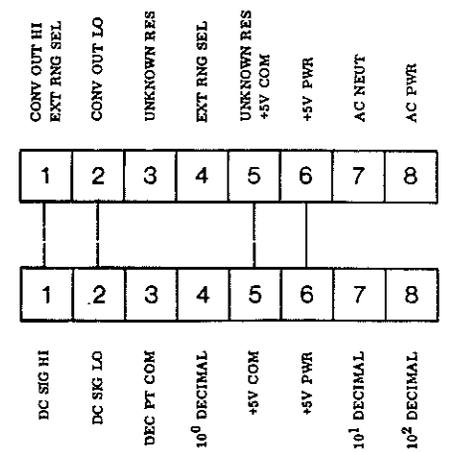


Figure 4. Terminal Block Diagram for RM-350TB/OHM/115 or 230

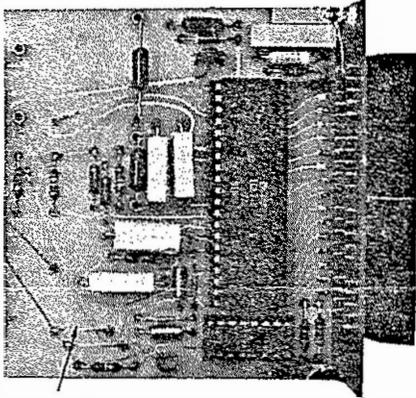
DISPLAY BLANKING OR DIMMING.

The display is energized via an internal jumper on the lower board assembly. See figure 5.

To gain access to the components within the instrument, perform the first five steps under Range Modification. To blank the display, remove the jumper. To dim the display, replace the jumper with a resistor. To obtain desired dimming effect, the value of the

resistor is best determined experimentally.

On the RM-350/OHM/115 or 230 meters, blanking or dimming may also be controlled externally. First remove the internal jumper (figure 5). Then to restore full brightness, connect a jumper between contacts 10 and 11 on the lower connector. To dim the display, connect a resistor of suitable value between these two contacts.



NUMBER DISPLAY
JUMPER

Figure 5. Location of Blanking and Dimming Jumper

CALIBRATION.

1. Using a knife or a small screwdriver blade, carefully pry off the front panel to gain access to the calibration potentiometers.
2. Ensure that line voltage is within limits set forth in Specifications.
3. Allow a 5-minute warm-up period.
4. Short circuit leads which connect to unknown resistance. Adjust potentiometer at upper right of display panel until display reads 000.

5. Remove short circuit and connect leads to a standard resistance as follows:

RANGE OF INSTRUMENT	STANDARD* RESISTANCE
200 Ohms	190.0 Ohms
2 kOhms	1.900 kOhms
20 kOhms	19.00 kOhms
200 kOhms	190.0 kOhms
2 MOhms	1.900 MOhms
20 MOhms	19.00 MOhms

*Actual value is not critical as long as it is near full scale.

6. Adjust potentiometer at lower right of display panel until display agrees with standard resistance.
7. Disconnect standard resistance and power input.
8. Replace front panel.

RANGE MODIFICATION.

As indicated in table I, the ohmmeter range is determined by the value of R7 on the upper board assembly. The ohmmeter is furnished with R7 mounted internally. However, this resistor may be mounted externally for applications requiring frequent range changes.

Table I. Value of R7 for Range Modification

RESISTANCE RANGE	R7* ON UPPER BOARD ASSEMBLY
200 Ohms	249 Ohms
2 kOhms	2.49 kOhms
20 kOhms	24.9 kOhms
200 kOhms	249 kOhms
2 MOhms	2.49 MOhms
20 MOhms	24.9 MOhms

*1% Tolerance, 50 ppm/°C temp. coefficient

The procedure for changing ranges is as follows:

1. Remove all sources of power from the meter.

2. (RM-350OHM/115 or 230) Remove the four screws fastening mating connectors to meter case and unplug the two mating connectors.

3. Remove front panel (see step 1 under Calibration).
4. Remove the two screws and the two retaining brackets behind front panel.
5. Slide meter out of case.

6. Install resistor specified in Table I to attain desired range. Note that this resistor should be placed in the upper board assembly between P.C. pads E5 and E6. (Pad identification is etched on the P.C. board.) If external mounting of this resistor is desired, remove resistor from P.C. board.

7. Reassemble meter.

8. For external mounting of the range resistor on an RM-350/OHM/115 or 230, mount the resistor between upper mating connector pins 2 and 6. For external mounting of this resistor on an RM-350TB/OHM/115 or 230, mount the resistor between terminal block terminals 1 and 4.

9. Calibrate meter.

10. If a decimal indication is required, refer to the applicable paragraphs on wiring (connectors or terminal blocks).

MAINTENANCE.

1. GENERAL. To facilitate maintenance, all six integrated circuits on the lower board assembly are plug-in components. They can be easily removed and installed without soldering. They include the four LED displays, the ICL7107-CPL chip and the CD4049AE chip.

2. COMPONENT ACCESS. To gain access to the components within the meter, perform the first five steps under Range Modification.



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