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Model 1300

Gauge Installation Tester

A compact, battery-powered instrument used to verify the electrical quality of a strain gauge installation BEFORE it is placed in service.

- Reads with the Push of a Button: No Warp-Up.
- Reads Insulation Resistance (Leakage) to 20,000 M Ω with 15 Vdc.
- Measures Deviation of Installed Gauge Resistance from Precise Standards to a Resolution of 0.02%.
- Ohmmeter Scale for Troubleshooting Questionable Installations.
- Verifies the Complete Gauge Circuit Including Leadwires.



DESCRIPTION

Two of the most important measurements used to verify the quantity of a strain gauge installation are insulation resistance (leakage to ground) and shift in gauge resistance due to installation procedures. While these two measurements are not a complete guarantee of eventual proper strain gauge performance, any installation which produces questionable values should not be relied upon where accuracy of results is necessary.

Several sources of variations in insulation resistance and shifts in gauge resistance are:

Insulation resistance in excess of 20,000 M Ω should be expected for foil strain gauges when installed under laboratory conditions. A value of 10,000 M Ω should be considered minimum. A reading below this value generally indicates trapped foreign matter, moisture, residual flux or backing damage due to soldering, as well as incomplete solvent evaporation from an overcoating.

Deterioration of the insulation resistance with time may be an indication of an improperly coated installation.

At higher test temperatures, particularly above +300°F (+150°C), it is normal to expect lesser values. 10 M Ω is considered to be the lower allowable value.

A voltage difference between the specimen and strain gauge frequently exists. A very high insulation resistance will help keep this voltage differential from introducing extraneous signals during strain measurement.

Shifts in gauge resistance during installation should not normally exceed 0.5% when using room-temperature-curing adhesives. Resistance shifts greater than 0.5% generally indicate damage to the gauge due to improper handling or clamping. However, strain gauges installed using elevated-temperature-curing adhesives may exhibit greater shifts in resistance due to adhesive lock-up at elevated temperatures (difference in linear coefficient of thermal expansion between the strain gauge and specimen). These shifts will vary depending upon the specific cure temperature and materials used. The shifts should never exceed 2% and should be uniform within 0.5%.

The Model 1300 was jointly designed by the Micro-Measurements and Instruments Divisions of the Measurements Group for maximum usability. The unit's payback is very short as it will identify faulty gauge installations that could ruin a costly test program.



Complete strain gauge installation is easily verified using the Model 1300. Once initial wire connections are made, measurements are accomplished simply by pushing the appropriate buttons.

Specifications

INPUT CIRCUITS

Gauges: 3-wire quarter bridge (120 Ω and 350 Ω) and half bridge. Other value quarter bridges using customer's reference, at readily accessible panel terminals. As ohmmeter: 2 leads (500 Ω and 500 M Ω midscale).

INPUT LEADS

4-ft. (1.2-m) 4-conductor AWG #26 (0.4-mm dia.) twisted Teflon-insulated cable supplied (with ground clip and 3 tinned leads).

METER

3.5-in size [3.00-in (76-mm) scale length] with mirror. Tracking accuracy $\pm 1\%$ full range.

MODE SWITCH

5 momentary push buttons: battery check, $\pm 5\%$ deviation, $\pm 1\%$ deviation, gauge resistance (ohms) and insulation resistance (megohms).

DEVIATION MODE

Two ranges, $\pm 1\%$ and $\pm 5\%$ F.S. (50 graduations either side of zero).

Accuracy: 1% range: 0.04% ΔR (2 meter graduation)

5% range: 0.2% ΔR (2 meter graduation)

Excitation: 1.0 Vdc per gauge.

INSULATION RESISTANCE MODE

Graduated 5 M Ω to 20,000 M Ω (500 M Ω mid-scale).

Accuracy: 1 scale div.

Test Voltage: 15 Vdc open circuit

OHM MODE

Graduated 5 Ω to 20 k Ω (500 mid-scale).

Accuracy: 1 scale div.

Test Voltage: 2 Vdc open circuit (0.4 Vdc @ 120 Ω).

ENVIRONMENTAL

+15° to +125°F (-10° to +50°C); up to 90% relative humidity, non-condensing.

SIZE

Aluminum case (separable lid)

5 H x 7 W x 5 D in with lid

(125 x 180 x 135 mm).

WEIGHT

3.6 lb (1.6 kg) with batteries.

POWER SUPPLY

Four 9V NEDA 1604 batteries (Eveready 216 or equiv.)

Life: Will fully test 1,000 - 5,000 installations.



Momentary action, color-coded push-button switches enable easy selection of meter scales- ohms/megohms, $\pm 1\%$ deviation, $\pm 5\%$ deviation and battery check.