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Gage Installation Tester

FEATURES

- A compact, battery-powered instrument used to verify the electrical quality of a strain gage installation BEFORE it is placed in service
- Reads with the push of a button—no warm-up
- Reads insulation resistance (leakage) to 20 000 megohms with 15 Vdc
- Measures deviation of installed gage resistance from precise standards to a resolution of 0.02 percent
- Ohmmeter scale for troubleshooting questionable installations
- Verifies the complete gage circuit, including leadwires

DESCRIPTION

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

For example, a voltage difference between the specimen and strain gage frequently exists. A low insulation resistance will permit this voltage differential to introduce extraneous signals during strain measurement.

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

- Insulation resistance in excess of 20 000 megohms should be expected for foil strain gages when installed under laboratory conditions. A value of 10 000 megohms 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. Ten megohms is considered to be the lower allowable value.
- Shifts in gage 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 gage due to improper handling or clamping. However, strain gages 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 gage 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%.

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Gage Installation Tester

SPECIFICATIONS

Input Circuits:
Gages: Three-wire quarter bridge (120Ω and 350Ω) and half bridge. Other value quarter bridges using customer's reference, at readily accessible panel terminals.
As ohmmeter: Two leads (500Ω and 500 MΩ midscale).

Input Leads:
4-ft [1.2 m] 4-conductor AWG #26 [0.4-mm diameter] twisted Teflon®-insulated cable supplied (with ground clip and three tinned leads).

Meter:
3.5-in size (3.00-in [76-mm] scale length) with mirror. Tracking accuracy ±1% full range.

Mode Switch:
Five momentary push buttons: battery check, ±5% deviation, ±1% deviation, gage resistance (ohms), and insulation resistance (megohms).

Deviation Mode:
Two ranges, ±1% and ±5%, F.S. (50 graduations either side of zero).
Accuracy:
1% range: 0.04% ΔR (2 meter graduations)
5% range: 0.2% ΔR (2 meter graduations)
Excitation: 1.0 Vdc per gage.

Insulation Resistance Mode:
Graduated 5 MΩ to 20 000 MΩ (500 MΩ mid-scale).
Accuracy: 1 scale division.
Test Voltage: 15 Vdc open circuit.

Ohm Mode:
Graduated 5Ω to 20 kΩ (500Ω mid-scale).
Accuracy: 1 scale division.
Test Voltage: 2 Vdc open circuit (0.4 Vdc @120Ω).

Environmental:
+15° to +125°F [–10° to +50°C]; up to 80% relative humidity, non-condensing.

Size:
Aluminum case (separable lid) 5 H x 7 W x 5 D in with lid [125 x 180 x 126 mm].

Weight:
3.6 lb [1.6 kg] with batteries.

Power Supply:
Four 9V NEDA 1604 batteries (Eveready® 216 or equivalent).
Life: Will fully test 1000-5000 installations.

All specifications are nominal or typical @ +23°C unless noted.

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