# Special Use Sensors—Magnetic Field Strain Gages

Intense, time-varying electromagnetic fields with steep gradients in field strength can cause troublesome noise in strain gage circuits. In severe magnetic environments, with low signal levels, the noise amplitude may be several times larger than the strain signal from the gage. Micro-Measurements H-Series noninductive strain gages have been specially designed to minimize noise pickup in the gage grid due to electromagnetic fields.

H-Series strain gages consist of two identical grids, with one stacked directly above and insulated from, the other. The upper and lower grid elements are connected in series so that current flows in opposite directions through the two grids. With this arrangement, noise voltages induced in the grid tend to be self-cancelling. The counter-current principle employed in H-Series gages is particularly effective against magnetic field gradients parallel to the test surface.

H-Series strain gages have been used very successfully in fusion research applications and similar environments with flux densities to 50 000 gauss.

## CONSTRUCTION

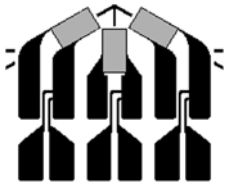
H-Series strain gages are constructed with two 350-ohm constantan alloy foil grids on a glass-fiber-reinforced epoxy phenolic carrier. These fully encapsulated gages include closely spaced, heavy copper terminals for direct leadwire attachment. H-Series gages are available in both a single axis and a delta (60°) rosette pattern. The available S-T-C number is 06.

## ADHESIVES

Micro-Measurements M-Bond 600 or AE-15 adhesive systems are particularly recommended; M-Bond 600 produces the thinnest glueline. Adhesive cure temperature should not exceed the maximum sensor operating temperature of +250°F (+120°C).

## LEADWIRES

In many cases, the leadwire system itself is the principal source of magnetic noise induction in the measuring circuit. Careful attention to details as outlined in Micro-Measurements Tech Note TN-501, “Noise Control in Strain Gage Measurements”, is strongly recommended.

| GAGE PATTERN AND DESIGNATION | | RES. IN OHMS | DIMENSIONS (inch / millimeter) Legend: ES = Each Section | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | GAGE LENGTH | OVERALL LENGTH | GRID WIDTH | OVERALL WIDTH | MATRIX Length | MATRIX Width |
| H06A-AC1-125-700 |  | 700 ± 0.5% | 0.125 | 0.49 | 0.125 | 0.125 | 0.61 | 0.22 |
| | | | 3.18 | 12.4 | 3.18 | 3.18 | 15.5 | 5.6 |
| | | | Single-axis pattern with integral copper terminals. | | | | | |
| H06A-AD3-125-700 |  | 700 ± 0.5% | 0.125 ES | 0.56 | 0.080 ES | 0.620 | 0.65 | 0.70 |
| | | | 3.18 ES | 14.2 | 2.03 ES | 15.75 | 16.5 | 17.8 |
| | | | Three-element 60° delta rosette with integral copper terminals. | | | | | |

Where magnetic noise is likely to be encountered, the selection of the strain gage grid alloy should be given careful consideration. If the grid alloy is magnetic, it will be subject to extraneous physical forces in a magnetic field; and, if magnetoresistive, will undergo spurious resistance changes. Similarly, if the alloy is magnetostrictive, the grid will tend to change length in the magnetic field. While constantan is comparatively free from magnetic effects over its normal operating temperature range, specific measurement applications may indicate desirability of a different sensing grid alloy. Contact our Applications Engineering Department for details.

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