Transducer-specific strain gauge

TML strain gauges are used not only for the purpose of knowing strain/stress but also as sensors for strain gauge type transducers. A strain gauge type transducer converts physical quantity such as load, pressure or displacement into mechanical strain on the strain generating body (elastic body), and the mechanical strain is converted into electrical output using strain gauges mounted on the elastic body. We offer various types of transducer-specific strain gauges featuring highly reliable and stable performance.

Force transducers (Load Cells)
Pressure transducers
Acceleration transducers
Displacement transducers
Torque transducers

VARIOUS TYPES OF TML TRANSDUCER-SPECIFIC STRAIN GAUGES

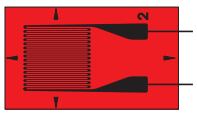
GAUGE PATTERN AND GAUGE LENGTH

Single, Rectangular 2-element, Torque (Shearing) strain measurement.

Pattern	Gauge length (mm)
Single axis	2、3
0°/90° 2-axis	2、3、6
Torque measurement	2

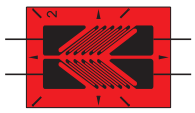
Pattern

Single axis



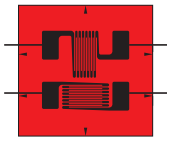
(LA)

Torque



(CT)

0°/90° 2-axis



(CB)

0°/90° 2-axis

(CM)

2 types of 0°/90° 2-axis gauge are lined-up with different pattern of gauge tab. CM-type has half-bridge configuration.

GAUGE RESISTANCE

Pattern	Gauge resistance (Ω)
Single axis	350, 1000
0°/90° 2-axis	120, 350
Torque measurement	350

Please note that 1000Ω gauge has less power consumption in bridge circuit comparing to 350Ω gauge's and limits Joule heat generation.

GAUGE BACKING MATERIALS

Unlike stress measurement gauges, the gauge backing materials for transducer-specific strain gauge cannot be determined based solely on the operating temperature and bonding method. To ensure maximum transducer performance, it is necessary to test various combinations using different stress-generating bodies (elastic bodies) to select the most suitable backing mateirals.

OPERATING TEMPERATURE

Operating temperature range differs from heat-resistive temperature. F series gauge (with epoxy backing) is also available for use of heat-curing type bonding adhesives. Refer to pages 89 and 90 for the details.

Gauge series	Gauge backing materials	Operating temperature
F	Special plastic resin	−20~+80℃
QF	Polyimide resin	−20~+200℃
EF	Polyimide resin	−20~+200℃

TEMPERATURE COMPENSATION

Similarly as general purpose strain gauges, self-temperature-compensated gauges are available in three types for mild steel, stainless steel and aluminium. Better temperature compensation is available by configuring a bridge circuit using self-temperature-compensated strain gauges. More precise temperature compensation is achieved by adding a resistor for zero point compensation in the bridge circuit.

Note) EF series gauges are self-temperature-compensated for mild steel only.

Gauge series	Self-temperature-compensation materials (Linear thermal expansion coefficient in ppm/°C)
F	-11: Mild steel -17: Stainless steel -23: Aluminium

CREEP ADJUSTMENT

The creep characteristic is particularly important in force transducers. The most common compensation system uses the material creep (+) of the stress-generating body (elastic body) and the gauge creep (–) to cancel each other. Various TML strain gauges are available for creep adjustment and are selectable by creep code.

Creep code

Gauge creep	Large → Small
Creep code	C2 > C4 > C6 > C8

TEMPERATURE SENSITIVITY COMPENSATION

Elastic modulus of strain-generating body (elastic body) varies with temperature. In the same manner, as ambient temperature around the strain-generating body varies, it results in a change of measured strain under loaded condition. To reduce such temperature influence, sensitivity compensation resistor is assembled in bridge circuit.

Coding system of Transducer-specific strain gauges

FLA -2 -350 -C2 -11 (-F)

- -2: Gauge length
- -350: Gauge length
- -C2: Creep code
- -11: Self-temperature-compensation number
  - 11: Mild steel
  - 17: Stainless steel
  - 23: Aluminium
- (-F): Option F : LEAD-free soldering of leadwire