TRANSDUCER-SPECIFIC STRAIN GAUGES

TML gauges are not only used for strain measurement, but also as sensors for strain gauge-type transducers. Strain gauge-type transducers convert various types of physical quantities to mechanical strain in the stress-generating body (elastic body) and use strain gauges to convert mechanical strain to electric output. Strain gauge-type transducers are generally categorized into the following types.

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

VARIOUS TYPE OF TML TRANSDUCER-SPECIFIC SRAIN GAUGES

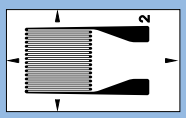
GAUGE SHAPE AND GAUGE LENGTH

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

Pattern	Gauge length (mm)
Single-element	2, 3
90° 2-element	2, 3, 6
Torque (Shearing strain) use	2

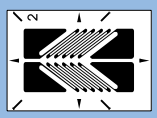
Pattern

Single-element



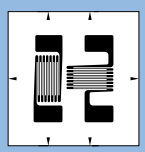
(LA)

Torque



(CT)

90° 2-element



(CB)

90° 2-element

(CM)

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

GAUGE RESISTANCE

Pattern	Gauge resistance (Ω)
Single-element	350, 1000
90° 2-element	120, 350
Torque (Shearing strain) use	350

＊1000-ohm gauge has less power consumption in bridge circuit comparing to 350-ohm gauge's and limits Joule's 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 operational 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 materials.

Operational temperature

Operational temperature range differs from heat-resistive temperature's.
F series gauge (with epoxy backing) is also available for use of heat-curing type bonding adhesives. Refer to page 61-62 for the details.

Gauge series	Gauge base materials	Operational temperature
F	Epoxy resin	−20～+80℃
QF	Polyimide resin	−20～+200℃
EF	Polyimide resin	−20～+200℃

OPERATIONAL TEMPERATURE RANGE

Operational temperature differs from heat-resistant temperature. F series gauge having epoxy resin is available with heat-curing type bonding adhesive.

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

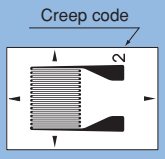
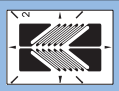
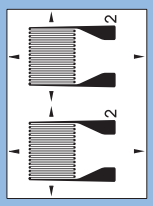
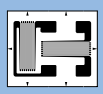
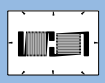
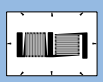
TEMPERATURE SENSITIVITY COMPENSATION

Elasticity modulus of srain-generating body (elastic body) varies with temperature variation. In the same manner, as ambient temperature around the strain-generating body varies, resulting in change of apparent strain. To reduce such temperature influence, sensitivity compensation resistor is assembled in bridge circuit.

■Coding system of Transducer-specific strain gauges

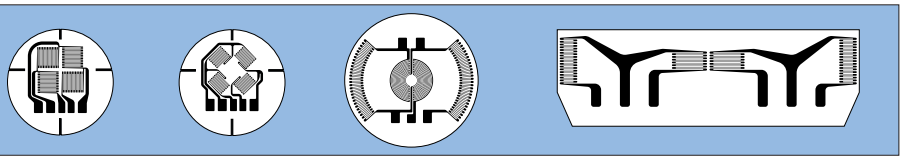
FLA-2-350-C2-11

- Gauge length
- Creep code
- 11 Mild steel
- 17 Stainless steel
- 23 Aluminium

Gauge pattern	Type	Gauge size L	Gauge size W	Backing L	Backing W	Resistance in Ω
●Single-element (G.F. 2.1 approx.)  FLA-2-350-C2-11  (Not actual size shown)	FLA-2-350 (QF) -C2 C4 C6 C8 -11 17 23	L : length	W : width (Unit : mm)			
	FLA-3-350 (QF) -C2 C4 C6 C8 -11 17 23	2	2.9	6.8	4.6	350
	FLA-3-1000 (QF) -C2 C4 C6 C8 -11 17 23	3	3.2	8.5	5.0	350
		3	4.2	9.2	5.8	1000
●Torque (Shearing strain) measurement  FCT-2-350-C2-11  (Not actual size shown)	FCT-2-350 (QF) -C2 C4 C6 C8 -11 17 23	2	1.7	7.6	5.3	350
●Single-axis 2-element  FLA-2-350-C2-2H-11  (Not actual size shown)	FLA-2-350 (QF) -C2-2H C4-2H C6-2H C8-2H -11 17 23	2	2.9	6.8	9.2	350
	FLA-3-350 (QF) -C2-2H C4-2H C6-2H C8-2H -11 17 23	3	3.2	8.5	10.0	350
●90° 2-element  FCB-2-11  FCB-3-350  FCB-6-350  FCB-2.8-350  FCM-2.8-350  EFCM-2-350  EFCMX-3-350  EFCMY-3-350	FCB (QF) -2 -11	2	1.5	8.2	8.0	120
	FCB (QF) -3-350 -11	3	3.2	10.5	9.1	350
	FCB (QF) -6-350 -11	6	2.0	10.0	13.0	350
	FCB (QF) -2.8-350 -11	2.8	2.8	12.0	8.5	350
	FCM-2.8-350	2.8	2.8	12.0	8.5	350
	EFCM-2-350-11	2.5	1.4	3.0	12.2	350
	EFCMX-3-350-11	3	1.6	8.0	7.5	350
	EFCMY-3-350-11	3	1.6	10.0	6.5	350

●In addition to those shown above, various other gauges for transducers are available.

Bending (Force transducer use)
Shearing (Torque transducer use)
Diaphragm (Pressure transducer use)



●Detailed specifications must be discussed and decided before ordering gauges for transducers. Consult a sales representative.