



FOIL
STRAIN GAUGES

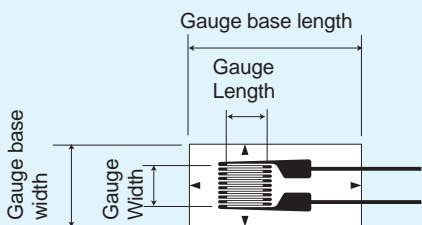
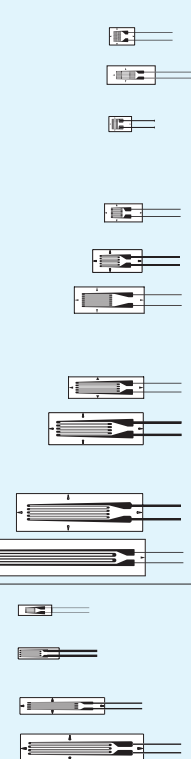


series F

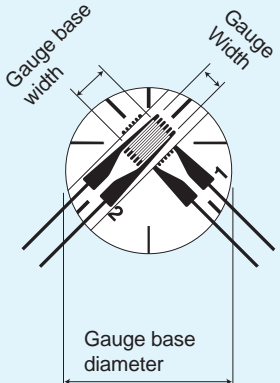
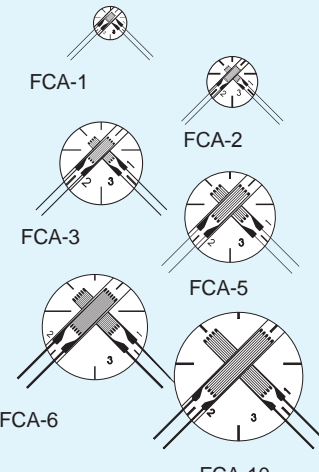
Suffix code for temperature compensation materials
-11: Mild steel (ferritic) -17: Stainless steel -23: Aluminium
For ordering, the above suffix code should be specified after basic gauge type.

Operating temperature range
-20°C  +80°C
Temperature compensation range
+10°C  +80°C

Applicable adhesives	CN	-20 ~ +80°C
	P-2	-20 ~ +80°C
	EB-2	-20 ~ +80°C

GENERAL USE

Gauge pattern	Basic type	Gauge size		Backing		Resistance Ω
		L	W	L	W	
<p>These gauges employ Cu-Ni alloy foils for the grid and epoxy resin for the backing. The epoxy resin backing exhibits excellent electrical insulation performance, and is color-coded to identify the objective material for self-temperature-compensation. Various types of strain gauges such as for residual stress measurement and are available in addition to general use gauges.</p> <p>Single element : FLG/FLA/FLK</p> <div></div> <div></div> <p>FLK type with narrow gauge width</p>		L : length W : width (Unit:mm)				
	<div> </div>	Each package contains 10 gauges.				
	FLG-02	0.2	1.4	3.5	2.5	120
	FLG-1	1	1.1	6.5	2.5	120
	FLA-03	0.3	1.4	3.0	2.0	120
	FLA-05	0.5	1.2	5.0	2.2	120
	FLA-1	1	1.3	5.0	2.5	120
	FLA-2	2	1.5	6.5	3.0	120
	FLA-3	3	1.7	8.8	3.5	120
	FLA-3-60	3	1.2	8.0	3.0	60
	FLA-5	5	1.5	10.0	3.0	120
	FLA-6	6	2.2	12.5	4.3	120
	FLA-6-1000	6	4.6	13.5	7.0	1000
	FLA-10	10	2.5	16.7	5.0	120
	FLA-30	30	2.0	36.1	5.1	120
	FLK-1	1	0.7	4.5	1.4	120
	FLK-2	2	0.9	5.5	1.5	120
	FLK-6	6	1.0	11.2	2.2	120
	FLK-10	10	1.6	16.2	3.8	120

0°/90° 2-element Rosette Stacked: FCA	Each package contains 10 gauges.				
 	FCA-1	1	0.7	φ 4.5	120
	FCA-2	2	0.9	φ 7.0	120
	FCA-3	3	1.7	φ 11.0	120
	FCA-5	5	1.9	φ 12.0	120
	FCA-6	6	2.4	φ 14.0	120
	FCA-10	10	2.5	φ 17.0	120

**FOIL
STRAIN GAUGES****series F**

Operating temperature range
 -20°C $+80^{\circ}\text{C}$
 Temperature compensation range
 $+10^{\circ}\text{C}$ $+80^{\circ}\text{C}$

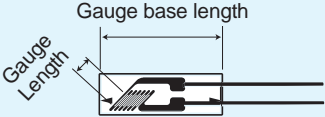


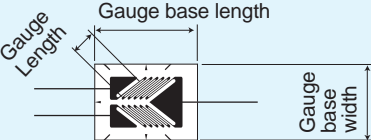


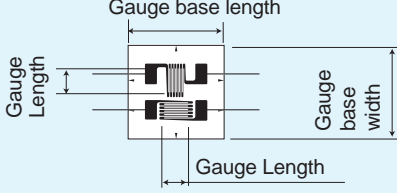

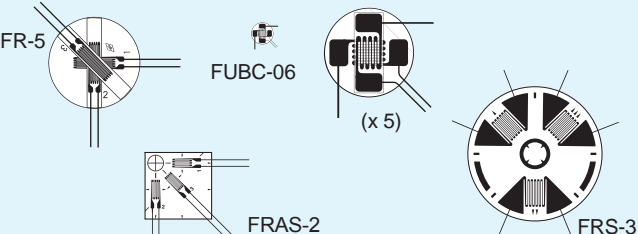
Applicable adhesives

CN	$-20 \sim +80^{\circ}\text{C}$
P-2	$-20 \sim +80^{\circ}\text{C}$
EB-2	$-20 \sim +80^{\circ}\text{C}$

GENERAL USE

Gauge pattern	Basic type	Gauge size		Backing Diameter	Resistance Ω
		L	W		
0°/45°/90° 3-element Rosette Stacked: FRA	Each package contains 10 gauges.				
 FRA-1 FRA-2 FRA-3 FRA-5 FRA-6 FRA-10	FRA-1	1	0.7	ϕ 4.5	120
	FRA-2	2	0.9	ϕ 7.0	120
	FRA-3	3	1.7	ϕ 11.0	120
	FRA-5	5	1.9	ϕ 12.0	120
	FRA-6	6	2.4	ϕ 14.0	120
	FRA-10	10	2.5	ϕ 17.0	120

SPECIAL USE

Gauge pattern	Basic type	Gauge size L W		Backing Diameter		Resistance Ω	
Shearing strain measurement : FLT 		L : length W : width (Unit:mm)					
	Each package contains 10 gauges.						
	 Left 45°	FLT-05A	0.5	0.66	4.0	1.3	120
	 Right 45°	FLT-05B	0.5	0.66	4.0	1.3	120
Torque measurement : FCT 	Each package contains 10 gauges.						
		FCT-2	2	1.5	8.7	6.5	120
		FCT-2-350	2	1.5	7.6	5.3	350
0°/90° 2-element Rosette Plane : FCB 	Each package contains 10 gauges.						
		FCB-2	2	1.5	8.2	8.0	120
		FCB-6-350	6	2.0	10.0	13.0	350
Residual stress measurement : FR/EUBC/FRS 	Each package contains 10 gauges.						
	FR-5	5	1.5	ϕ 12	120		
	EUBC-06	0.6	0.7	ϕ 2.4	120		
	FRAS-2	2	1.1	9.0 9.0	120		
	FRS-2	1.5	1.3	ϕ 9.5	120		
	FRS-3	3	2.6	ϕ 17.5	120		

FOIL STRAIN GAUGES series F



Operating temperature range
-20°C +80°C

Temperature compensation range
+10°C +80°C



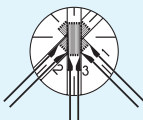
Suffix code for temperature compensation materials
-8: Glass, Ceramic

For ordering, the above suffix code should be specified after basic gauge type.

Applicable adhesives

CN	-20 ~ +80°C
P-2	-20 ~ +80°C
EB-2	-20 ~ +80°C

GLASS, CERAMIC

Gauge pattern	Basic type	Gauge size L W		Backing L W		Resistance Ω	
		L : length W : width (Unit:mm)					
Single element : FLA		Each package contains 10 gauges.					
FLA-5-8  (x 2)	FLA-2	2	1.5	6.5	3.0	120	
	FLA-5	5	1.5	10.0	3.0	120	
0°/90° 2-element Rosette stacked: FCA		Each package contains 10 gauges.					
FCA-2-8 	FCA-2	2	0.9	ϕ 7.0		120	
	FCA-5	5	1.9	ϕ 12.0		120	
0°/45°/90° 3-element Rosette stacked: FRA		Each package contains 10 gauges.					
FRA-5-8 	FRA-2	2	0.9	ϕ 7.0		120	
	FRA-5	5	1.9	ϕ 12.0		120	

STRESS CONCENTRATION MEASUREMENT





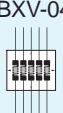
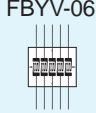
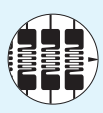

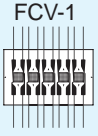
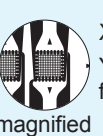



Suffix code for temperature compensation materials
-11: Mild steel (ferritic) -17: Stainless steel -23: Aluminium

For ordering, the above suffix code should be specified after basic gauge type.



Operating temperature range
-20°C +80°C

Temperature compensation range
+10°C +80°C

Gauge pattern	Basic type	Gauge size L W		Backing L W		Resistance Ω	
		L : length W : width (Unit:mm)					
5-element Single-axis : FXV/FYV/FBXV/FBYV		Each package contains 10 gauges.					
FXV-1-11-002LE 	Gauge pitch 2mm	FXV-1-002LE	1	1.3	5.0 12.0	120	
FYV-1-11-002LE 		FYV-1-002LE	1	1.4	5.0 12.0	120	
X-axis magnified 	Y-axis magnified 	-002LE: Polyimide sheathed gauge lead of 2-cm pre-attached					
FBXV-04 	Gauge pitch 1mm	FBXV-04-005LE	0.4	1.3	5.4 7.4	120	
FBYV-06 		FBYV-06-005LE	0.6	0.8	5.3 7.0	120	
magnified 	magnified 	-005LE: Polyimide sheathed gauge lead of 5-cm pre-attached					
10-element 2 axes : FCV		Each package contains 10 gauges.					
FCV-1 	Gauge pitch 2mm	FCV-1-005LE	1	1.4	7.5 12.0	120	
X and Y axes Y-axis leadwire is marked for identification. 		-005LE: Polyimide sheathed gauge lead of 5-cm pre-attached					
Single element : FBX/FBY/FLX		Each package contains 10 gauges.					
Single element cut away from the above Stress Concentration gauge.							
FBX-04		(x 3)	FBX-04-005LE	0.4	1.3	5.4 1.0	120
FBY-06		(x 3)	FBY-06-005LE	0.6	0.8	5.3 1.0	120
FLX-1		(x 3)	FLX-1-002LE	1	1.3	5.0 2.0	120
			-005LE: Polyimide sheathed gauge lead of 5-cm pre-attached				
			-002LE: Polyimide sheathed gauge lead of 2-cm pre-attached				



Operating temperature range
 -20°C +80°C
 Temperature compensation range
 +10°C +80°C

Applicable adhesives

CN	-20 ~ +80°C
P-2	-20 ~ +80°C
EB-2	-20 ~ +80°C

STRESS CONCENTRATION MEASUREMENT

Gauge pattern	Basic type	Gauge size L W	Backing L W	Resistance Ω
		L : length W : width (Unit:mm)		
Chain Strain Gauges CCFXX, CCFYX		Each package contains 10 gauges.		
 X-axis 10-element	 Y-axis 10-element	Gauge pitch 1.5mm		
		CCFXX-1-002LE	1 1.5	16.4 4.5 120
		CCFYX-1-002LE	1 1.5	16.4 4.5 120

These gauges are specially designed to use Complete correction method for strain and need our Data Logger TDS-530 with built-in the method. For the details, contact TML.

Example of type number designation.

FLA-5 -11 -3L/-3LT (2-wire/3-wire)

Length in meter and type of integral leadwire (*1)
 Self-temperature-compensation number (*2)
 Basic strain gauge type

*1: Not mentioned for gauges without integral leadwire.

*2: Following numbers are available for

- F-series gauges
- 11: Mild steel (11ppm/°C)
- 17: Stainless steel, Copper alloy (17ppm/°C)
- 23: Aluminium (23ppm/°C)
- 8: Composite, Glass (8ppm/°C) *3

*3 Available only for gauges specified accordingly

Point**■ Gauge size**

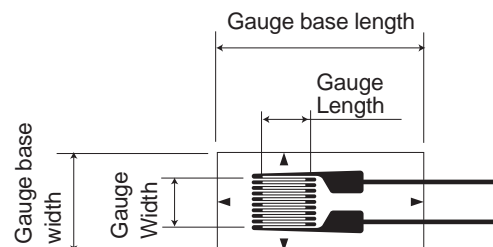
The location of strain gauge installation and the material on which the strain gauge is installed impose restrictions on the strain gauge size. In addition, because leadwires are connected to connecting terminals and coating materials are applied for moisture-proofing, the space required for them must also be considered.

● Gauge length

Strain gauges with short gauge lengths are used to measure localized strain, while strain gauges with long gauge lengths can be used to measure averaged strain over a large area.

● Gauge width

Strain gauges with the same gauge lengths are also available in narrower gauge widths in FLK types. Use the FLK types for strain measurement in axial direction of thin specimens such as cylindrical pipes, rods, etc.



FLK type

FLA type