

## Description of strain gage type

### J-series Strain Gage

J gages are a series of Constantan alloy patterns on a highly flexible modified Polyimide backing. This strain gage series is most suitable for general-purpose sensor production and experimental stress analysis. It is available with fully encapsulated grid (Option A) and Silver plated copper leads (Option B).

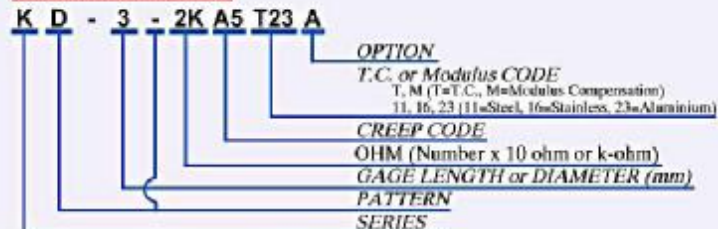
### K-series Strain Gage

K gages are a series of selected-foil Constantan patterns on a highly flexible modified Polyimide for very low creep variation with temperature. This strain gage series is especially suited for precision transducer production. It is available with fully encapsulated grid (Option A) and silverplated copper leads (Option B).

### Y-series Strain Gage

Y gages are a series of Evanohm alloy patterns on a highly flexible modified Polyimide backing. This strain gage series is suitable where higher resistance and long fatigue life are important for transducer manufacturing. Since Evanohm is a hard alloy, sharp bending during installation may lead to early fatigue failure. Option D, encapsulated grid with pre-tinned tabs is recommended for ease of lead attachment. Use appropriate solder to attach nickel-clad copper leads to the gage solder-tabs.

### Y-series Strain Gage



## Strain gage options

### Option A (with encapsulation)

#### J Series gages

A flexible Polyimide cover is laminated over the entire grid to fully encapsulate it against moisture and other elements.

#### K and Y Series gages

A proprietary coating is applied to fully encapsulate the grid against moisture and other corrosive elements while maintaining superior creep performance over temperature.

### Option B (with lead)

#### J and K Series gages

Silver-plated copper leads, 1.25 inch in length are soldered to the gage tabs with 425°F solder.

#### Y Series gages

Check with factory. Specify maximum operating temperature for application.

### Option C (encapsulated with leads)

Options A and B are combined appropriately for each gage series. The encapsulation completely covers the grid as well as the solder joint and the whole solder tab to provide protection for the entire strain gage.

### Option D (with pre-tinned solder tabs)

Encapsulated grid with pre-tinned tabs is recommended for ease of lead attachment. Use 425 F solder to attach leads to the gage solder tabs. Evanohm is registered trademark of Carpenter Technology.

## Creep Compensation

It is sometimes necessary to match the strain gage creep characteristics to the spring element to achieve a suitable creep specification for commercial transducers. Creep characteristic of a strain gage pattern is usually achieved by varying the length of end-loops for a fixed strand width. This is specified as an End-Tab-Ratio (ETR) of the strain gage. This is specified by a two-sharacter code, such as A5.

Larger the ETR for a strain gage, more positive its creep characteristic, most spring elements exhibit a positive creep. Select a strain gage with a negative creep characteristic to compensate for the positive creep of the spring element. Transducer creep depends upon several variables such as the spring element material, its heat treatment, type of adhesive used, designed strain field and operating temperature. Select the standard recommended creep code for general transducer application. For precision transducer applications, testing may be necessary to select the most suitable creep code for a strain gage.

$$ETR = X.X$$

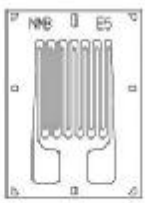
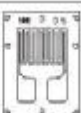




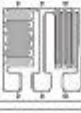

Example : E5 = 5.5

0~9  
A=1, B=2, C=3, D=4, E=5, ...

## Technical data

Specifications	K-Series	J-Series	Y-Series
Resistance tolerance (open face)		±0.15 %	
Resistance tolerance with other options		±0.2 %	
Gage factor, nominal (actual gage factor is given on package label)	2.0	2.0	2.0 to 2.5
Gage factor tolerance		±0.5 %	
Gage factor slope		In Package	
Transverse sensitivity		In Package	
Temperature range :	Without any options		
	-70 °C to 200 °C (-158 °F to 392 °F)		-70 °C to 300 °C (-158 °F to 572 °F)
	With Options A, B, C, -		
	ditto		-70 °C to 200 °C (-158 °F to 392 °F)
Long Term Stability (40 °C [104 °F], 95 %R.H. 1 000 hr) with Option C, Bonded.		<100 ppm	
Fatigue life (NAS942 ±1 500 μ ST)		>10 <sup>7</sup> cycles	
Safe bending radius		1.6 mm	3.0 mm
Recommended Adhesive to use		SP-4 or #8112	SP-4

### Strain Gage Specification

Gage Type	Actual Matrix Size mm (inch)	Grid Length mm (inch)	Grid Width mm (inch)	Overall Length mm (inch)	Overall Width mm (inch)	Resistance ohm	Gage Designation	E. T. R.
	6.9x4.7 (0.27x0.18)	3.00 (0.12)	2.53 (0.10)	4.83 (0.19)	3.00 (0.12)	350 350 350 350 350 350 350 120 175 700 1 000	K-3-100D5Txx K-3-70D5Txx K-3-17D5Txx K-3-12D5Txx K-3-35F0Txx K-3-35E5Txx K-3-35E0Txx K-3-35D5Txx K-3-35D0Txx K-3-35C5Txx K-3-35C0Txx	4.5 : 1 4.5 : 1 4.5 : 1 4.5 : 1 6.0 : 1 5.5 : 1 5.0 : 1 4.5 : 1 4.0 : 1 3.5 : 1 3.0 : 1
	5.5x4.0 (0.22x0.16)	1.50 (0.06)	2.35 (0.09)	3.80 (0.15)	2.60 (0.10)	350 1 000	K-2-35D5Txx Y-2-100D5Txx	4.5 : 1 4.5 : 1
	9.0x5.0 (0.35x0.20)	3.20 (0.13)	2.05 (0.09)	8.00 (0.31)	2.55 (0.10)	350 1 000	KG-3L-35D5Txx YG-3L-100D5Txx	4.5 : 1 4.5 : 1
	9.0x5.0 (0.35x0.20)	3.20 (0.13)	2.35 (0.09)	8.00 (0.31)	2.55 (0.10)	350 1 000	KG-3R-35D5Txx YG-3R-100D5Txx	4.5 : 1 4.5 : 1
	11.0x8.0 (0.43x0.31)	3.20 (0.13)	2.80 (0.11)	9.50 (0.37)	6.00 (0.24)	350 350 1 000 2 000	KD-3-35D5Txx KD-3-35E5Txx KD-3-100D5Txx YD-3-250D5Txx	4.5 : 1 5.5 : 1 4.5 : 1 4.5 : 1
	7.0x6.5 (0.28x0.26)	2.00 (0.08)	1.53 (0.06)	6.20 (0.24)	4.83 (0.19)	350	KD-2-35D5Txx	7.0 : 1
	5.6x5.6 (0.22x0.22)	1.20L (0.05L) 2.80R (0.11R)	2.98L (0.12L) 1.22R (0.05R)	4.50 (0.18)	4.26 (0.17)	350	KT-1-35D5Txx	7.0 : 1
	7.0x10.0 (0.28x0.39)	3.20 (0.13)	3.21 (0.13)	5.50 (0.22)	8.64 (0.34)	350 1 000	KT-3-35D5Txx YT-3-100D5Txx	6.0 : 1 6.0 : 1

### Custom strain gage and accessories

#### Custom Strain Gages

We welcome your requirements at times when your design may require a strain gage configuration or creep code not listed in our catalog. We have established facilities to quickly turn your concept into a production strain gage to fit your requirements.

#### Self Modulus Compensation

Y-series strain gages are also available with Self Modulus Compensation. Self Modulus compensation provides a negative gage factor to match the change in Young's Modulus of the transducer with temperature. Self-Modulus-Compensation provides correction for these temperature-induced effects by a controlled negative gage factor of the strain gage.

#### M-Series

Modulus Gages (12.3 ohm, 13.6 ohm, 20.0 ohm, 26.5 ohm, 33.6 ohm, 63.7 ohm)

#### Terminals

For connecting Strain gages to instrumentation lead.

### Adhesives and Coatings

#### Adhesive selection

Parts No.	Type	Base	Operating Temperature Range	Capacity
309	SP-4	Heat-curing epoxy-phenolic	-30 °C to 200 °C (-86 °F to 392 °F)	20 g bottle
306-3	#8112	Heat-curing 2-components	-195 °C to 300 °C (-383 °F to 572 °F)	3 g × 3 pieces

#### Coating selection

Parts No.	Type	Base	Operating Temperature Range	Capacity
315-1	SE9186	Silicon Resin	-50 °C to 200 °C (-122 °F to 392 °F)	100 g tube
317-3	#8112	Butyl rubber	-50 °C to 80 °C (-122 °F to 176 °F)	100 cm × 5 pieces