KYOWA STRAIN GAGES

KYOWA ELECTRONIC INSTRUMENTS CO., LTD.

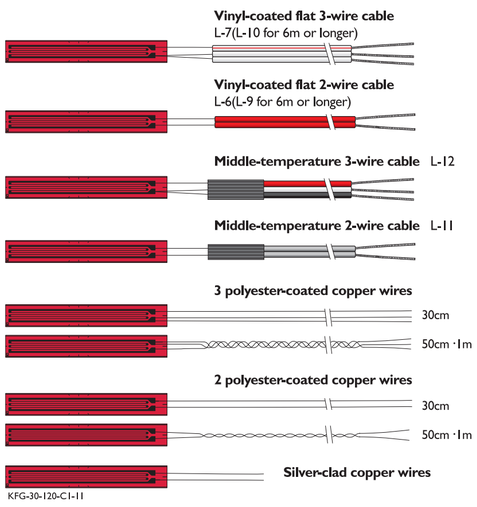
[FULL SCALE]

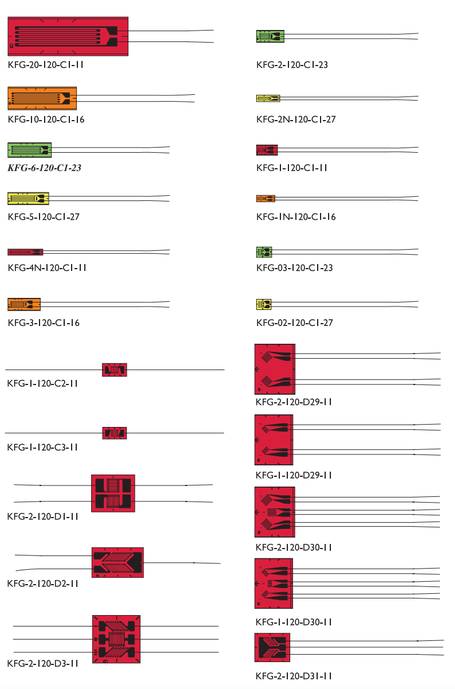
General Purpose Gages

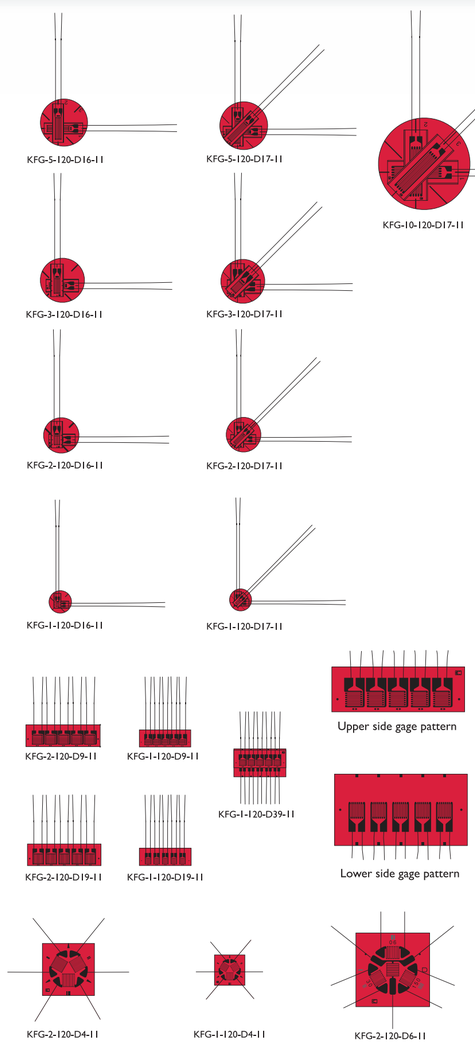
Optimum for stress measurement in general and for sensor manufacturing. Available in a broad lineup.

KFG

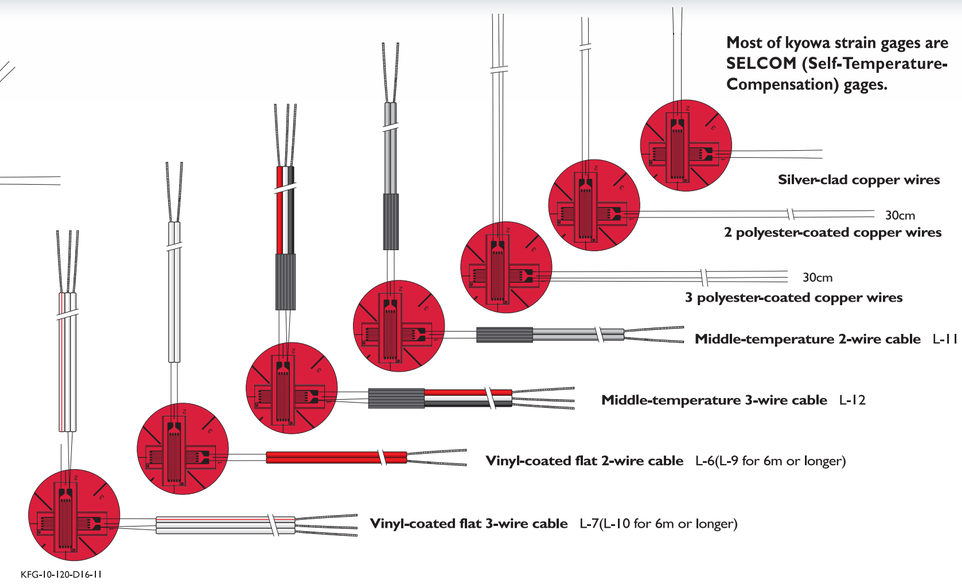
The KFG gages use polyimide resin for the base approximately 13μm thick, ensuring excellent flexibility. Besides indoor measurement, the outstanding moisture resistance lets them effectively perform outdoor measurement. Unless directly exposed to waterdrops, no coating treatment is required.



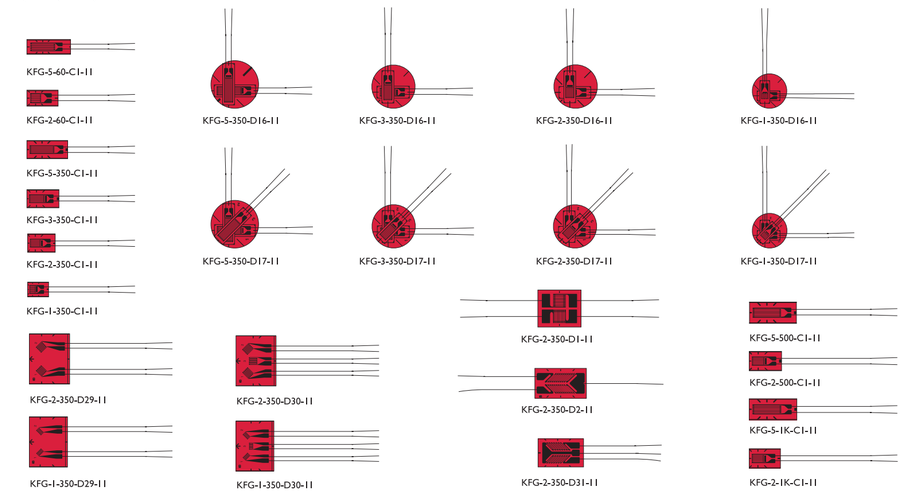




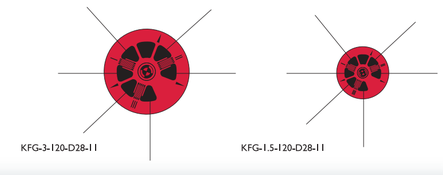
All KFG type strain gages introduced here are available with leadwires.



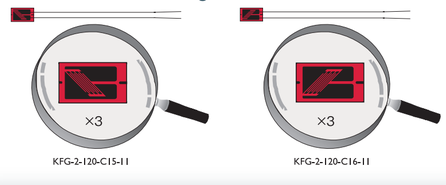
60, 350, 500, 1KΩ



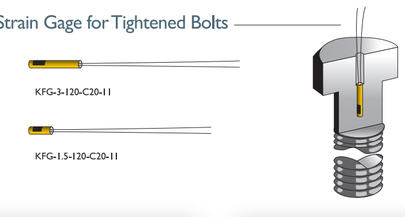
For Measurement of Residual Stress



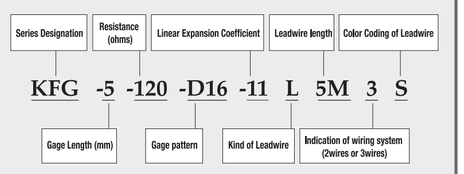
For Measurement of Shearing Strain



Strain Gage for Tightened Bolts



Kyowa strain-gage coding system



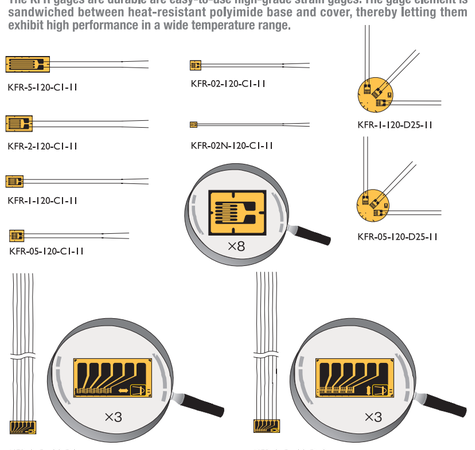
A variety of general purpose strain gages come with leadwires to save labor.
N: Solid copper wire, polyester insulation
L: Standard copper wire, flat cable, vinyl insulation

- Common steel
- Stainless steel
- Aluminum alloy
- Magnesium alloy

(The color of the base of the strain gage changes depending on the linear coefficient of expansion.)

KFR

The KFR gages are durable are easy-to-use high-grade strain gages. The gage element is sandwiched between heat-resistant polyimide base and cover, thereby letting them exhibit high performance in a wide temperature range.



KFGT

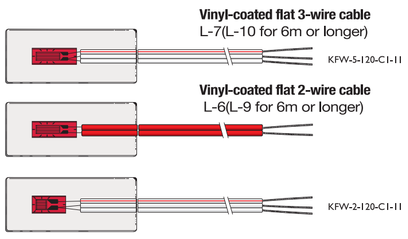
The KFGT gages are foil strain gages incorporating a T-type thermocouple for simultaneous measurement of strain and temperature. They ensure not only efficient strain measurement under environments where temperature change or temperature gradient necessitates simultaneous measurement of strain and temperature but also highly precise compensation of thermally-induced apparent strain. It is recommended to use KYOWA data logger UCAM-20PC or UCAM-60A as a mating measuring instrument.

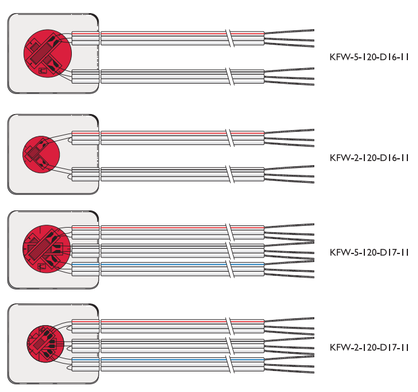
Waterproof Gages

Require no waterproof treatment for underwater or other harsh operating conditions, thus saving labor.

KFW

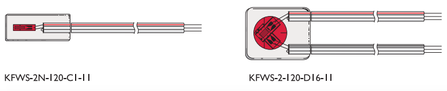
The KFW gages have the surface covered with a special resin for waterproofing. The waterproof structure enables these gages to serve for outdoor or underwater measurement merely by being bonded to measuring objects. The insulation resistance shows virtually no deterioration even after 100 hours of use under an underwater pressure of approximately 10MPa (100kgf/cm²). In addition, the covering resin is flexible enough to enable easy bonding to curved surfaces.





KFWS

The KFWS gages are small-sized waterproof gages suitable for outdoor or underwater strain measurement where gage bonding space is limited. The waterproofing resin is as thin as 1.3mm, making them flexible enough to be bonded to a curved surface of 10mm diameter.

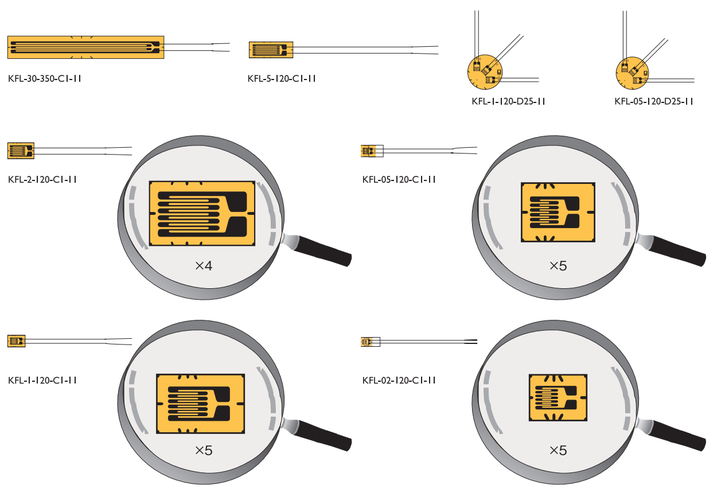


KCW

The KCW gages are weldable foil strain gages ensuring easy handling in the field. They require no coating for use under severe underwater conditions.T
Withstand water pressure
Approx. 10MPa

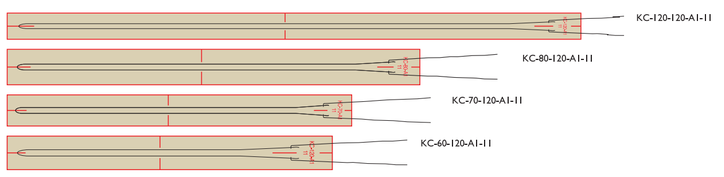
KFL

The gage element is made of NiCr alloy, which exhibits excellent characteristics under low-temperature environments and is sandwiched between polyimde films. Thus, the KFL gages are suitable for strain measurement of tanks and vessels containing low-temperature liquids such as LNG and LPG.



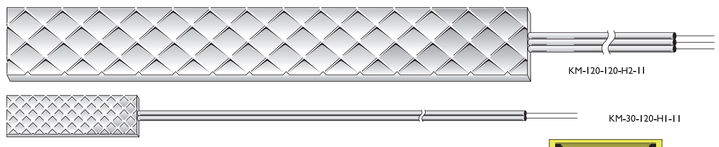
KC

Featuring a longer gage length, the KC gages are wire strain gages suitable for mean strain measurement of concrete under test. Usually, a model with the gage length over 3 times longer than the maximum diameter of the aggregate is selected for the purpose.



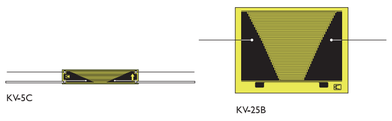
KM

The KM gages are designed to be embedded in mortar or concrete for the purpose of measuring the internal stress. To ensure better adhesion to mortar or the like, the KM gages feature a specially treated surface. They also provide suitable waterproofness and elastic modulus for the intended purpose.



KV

Different from usual strain gages,the grid of the KV series gages is cut along with crack development,resulting in resistance change.

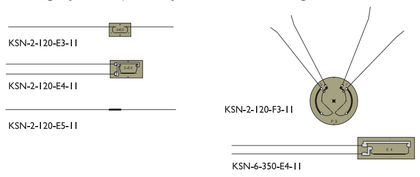


Semiconductor Gages

Provide high gage factors, 60 to 200, and are ideal for sensing micro-strains or use in high-sensitivity sensors.

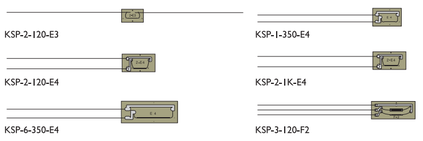
KSN

The KSN gages use an n-type silicon for the resistive element to control the resistance temperature coefficient of the material according to the linear expansion coefficient of the measuring object. Thus, thermally-induced resistance change is minimized.



KSP

The KSP gages are stable-performance semiconductor strain gages usable for general stress measurement and transducers. The F2 type has a half-bridge formed with 2 elements, positive and negative, for self-temperature compensation and is suitable for strain measurement of steel products.

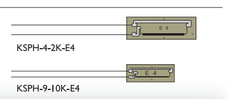


KSPL

The KSPL gage features a superior linearity of resistance change against strain in a comparatively wide range, thereby making it suitable as a sensing element of transducers.

KSPH

The KSPH gages have the resistance especially increased, thereby making high bridge voltage applicable to obtain high output voltage.

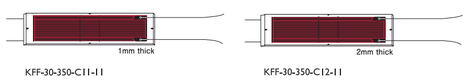


Bending Gages

Enables measurement of internal strain from the outer surface of a measuring object such as a tank.

KFF

The KFF gages have one sensing element on both the upper and lower sides of the thick plastic base. Thus, if a gage cannot be bonded directly to the inside of the object under testing as in the case of measuring stress due to internal pressure in high-pressure vessels or stress measurement in box structures such as bridge girders, the KFF gages can be bonded to the surface to obtain strain at the rear.



High-temperature Gages

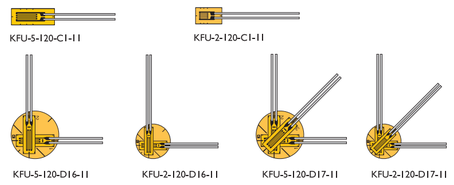
For measurement at high temperatures on nuclearequipment, space equipment, engines, etc.

KFH (250℃)

The base is made of highly heat-resistant polyimide and the gage element is made of NiCr alloy foil, thereby ensuring less thermal output and excellent temperature characteristics.

KFU (350℃)

The base is made of highly heat-resistant polyimide and the gage element is made of NiCr alloy foil, thereby letting the KFU gages exhibit superior characteristics over a wide temperature range.



KH (350℃)

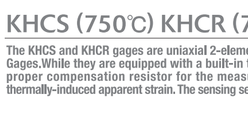
The G4 type KH gages are 350Ω gages with a metal base which enables easy mounting with a compact spot welder.

KHCX (950℃)

The KHCX gages are uniaxial 2-element temperature compensation Encapsulated Gages. Equipped with a built-in temperature compensation element, these gages can measure doth static strain and dynamic strain at a maximum operating temperature of 950℃.The sensing section and MI cable are made of inconel 600.

KHCV (800℃)

The KHCV gages are uniaxial 1-element Encapsulate Gages. Matching instruments are bridgeboxes DB-120A/L and signal conditioners in CDV series.

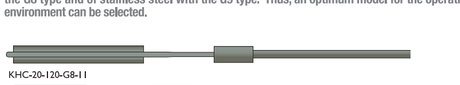


KHCS (750℃) KHCR (750℃)

The KHCS and KHCR gages are uniaxial 2-element temperature compensation Encapsulated Gages.While they are equipped with a built-in temperature compensation element,use of a proper compensation resistor for the measuring object enables further reduction of thermally-induced apparent strain. The sensing section and MI cable are made of inconel 600.

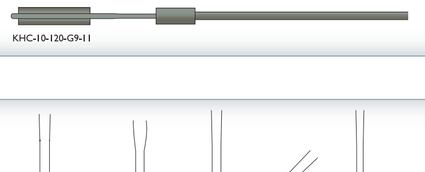
KHCM (650℃)

The KHCM gages are uniaxial 2-element temperature compensation Encapsulated Gages.Equipped with a built-in temperature compensation element,these gages can measure doth static strain and dynamic strain at a maximum operating temperature of 650℃. The sensing section and MI cable are made of inconel 600.



KHC (550℃)

The KHC gages are uniaxial temperature compensation Capsule Gages with 2 elements, active and dummy, forming a half bridge. The sensing part and MI cable are made of Imconel 600 with the G8 type and of stainless steel with the G9 type. Thus, an optimum model for the operating environment can be selected.

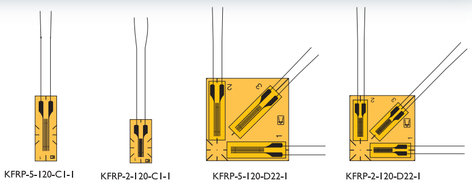


Gages for Composite Materials

SELCOM gages matching linear expansion coefficients of 1 ~ 9ppm/°C on CFRP, GFRP, etc.

KFRP

The KFRP gages are self-temperature compensation gages (SELCOM gages) suitable for strain measurement of composite materials such as CFRP and GFRP. The special gage pattern minimizes the effect of self-heating due to gage current and the effect of reinforcement against low-elasticity materials.



High-elongation Gages

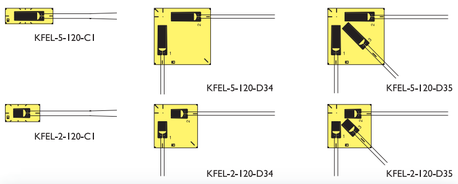
Strain limits: 6 to 20%. Suitable for measuring strains in the plastic region on metals, plastics, etc.

KFEM

KFEM serise ultra high-elongation foil gages can measure strain in elastic to plastic region on structures.The material modification from 20 to 30% can be measured.

KFEL (Strain limit: 15%)

Developed to measure strain in elastic to plastic regions on structures, the KFEL gages can measure strain as large as 10 to 15% with simple tension strain. Thus, these gages are applicable for large strain measurement and destructive testing of metals (steel, stainless steel and aluminum) and plastics (polyethylene and polypropylene).

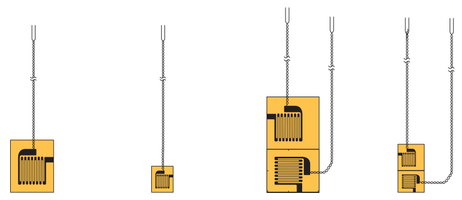


Noninductive and Shield Gages

Optimum for measuring in high magnetic fields such as superconductive coils, large-capacity transformers and motors, etc.

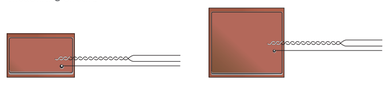
KFN

The gage element is made of a special alloy which provides less magnetoresistant effect; also, the shape is designed to eliminate induction. Thus, the KFN gages can accurately measure strain under AC magnetic field environments.



KFS

The KFS gages are shielded by the copper foil covering the whole body. Thus, if a large current flows to or around the gage bonding site, noise is prevented from entering the measuring circuit.

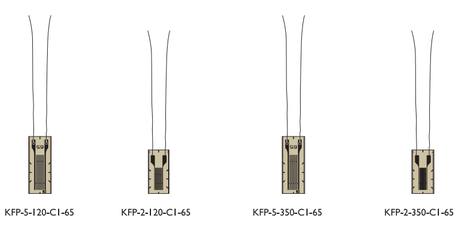


Gages for Plastics

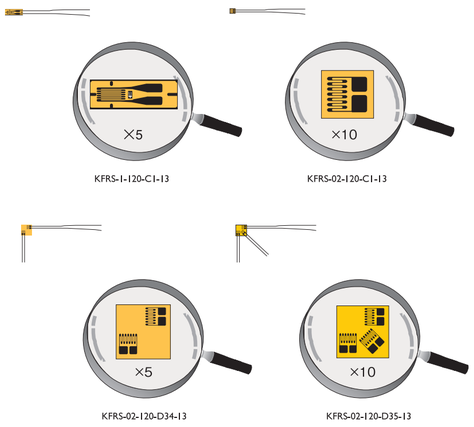
SELCOM gages matching a linear expansion coefficient of 65ppm/°C, for acrylic model testing, etc.

KFP

The KFP gages of which the applicable linear expansion coefficient is 65×10⁻⁶/°C are suitable for strain measurement of plastics materials such as acrylic resin.



Gages for Printed Boards

KFRS

Printed boards are used for varieties of products including cellular phones, car navigation systems and digital cameras. To evaluate the mechanical and thermal characteristics of these printed boards, the KFRS gages were developed by integrating the advantageous features of KFG and KFR gages.