



# Strain Transducers KM/KM-HAS series CE

## Strain measurement in concrete, mortar and synthetic resin including their early stage of curing

These strain transducers are designed for measurement of strain in materials such as concrete, mortar or synthetic resin. Measurement is possible not only after the material is cured but also during the stage of curing.

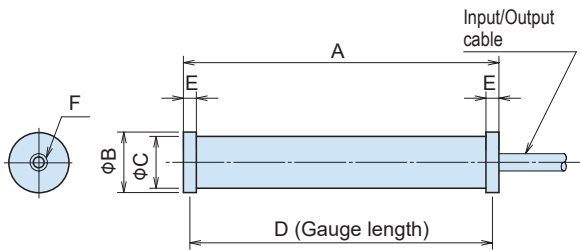
The elastic modulus of the transducers is equivalent to approximately 40N/mm<sup>2</sup>. Therefore, measurement is possible right after the concrete is placed.

The waterproof construction of the transducers makes the transducers totally impervious to moisture absorption and offers excellent stability for long-term strain measurement. The thermocouple-integrated transducers enable real temperature measurement simultaneously with strain measurement, greatly saving the wiring works. In addition to the internal strain measurement, surface strain measurement on concrete or steel such as H-beam steel is also available using various optional accessories.

The KM series is compliant to CE marking except for KM-30.

Protection ratings IP67 equivalent (KM-30)  
IP68 equivalent (KM-100B to KM-100BT)

### External dimensions



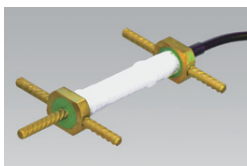
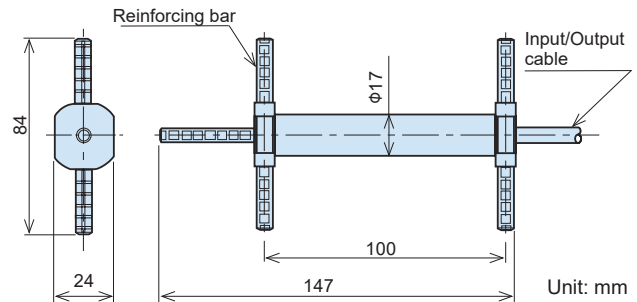
TYPE	Dimensions (mm)						Weight (g)
	A	φB	φC	D	E	F	
KM-30	34	12	10	31	3	M3 DP 4	12
KM-100B	104	20	17	100	4	M3 DP 6	75
KM-100HB	104	20	17	100	4	M3 DP 6	80
KM-100BT	104	20	17	100	4	M3 DP 6	75



### Features

- Self-temperature-compensation with coefficient of thermal expansion close to concrete
- Measurement from early stage of concrete curing possible due to the low elastic modulus
- Simultaneous measurement of strain and temperature possible (except KM-30)
- Surface strain measurement on bracing for earth retaining or steel sheet pile

### KM-100HAS for asphalt pavement



This transducer is embedded into asphalt for measurement of internal strain. It has reinforcing bar flanges at its both ends for good fixation to asphalt pavement materials. The operating temperature range of the transducer is -20 to +180°C, and it has fully waterproof construction.

### Specifications

Type	KM-30	KM-100B	KM-100HB	KM-100HAS	KM-100BT
Capacity	±5000 x 10 <sup>-6</sup> strain				
Gauge length	31mm	100mm			
Rated output (Approx.)	2.5mV/V (5000 x 10 <sup>-6</sup> )	2.5mV/V (5000 x 10 <sup>-6</sup> )			
Nonlinearity	1%RO				
Apparent elastic modulus	Approx. 40N/mm <sup>2</sup>				
Temperature measurement	N/A	**Strain gauge (350Ω Quarter bridge 3-wire method :50x 10 <sup>-6</sup> strain/°C)			** Thermocouple T
Allowable temperature range	-20~+60°C	-20~+80°C	-20~+180°C	-20~+80°C	
Input/Output resistance	120Ω Half bridge	350Ω Full bridge			

In addition to the above, special products such as for the use in asphalt or roller compacted concrete are available. Please contact us. <sup>\*\*1</sup> Relative temperature measurement possible <sup>\*\*2</sup> Real temperature measurement possible

### Input/Output cable

KM-30	2.4mm dia.	0.04mm <sup>2</sup>	3-core shielded Vinyl cable	2m cable-end free
KM-100B	9mm dia.	0.3mm <sup>2</sup>	5-core shielded chloroprene cable	2m cable-end free
KM-100HB/-100HAS	6mm dia.	0.3mm <sup>2</sup>	5-core shielded fluoroplastic cable	2m cable-end free
KM-100BT	9mm dia.	0.3mm <sup>2</sup>	4-core shielded T-thermocouple compound cable	2m cable-end free

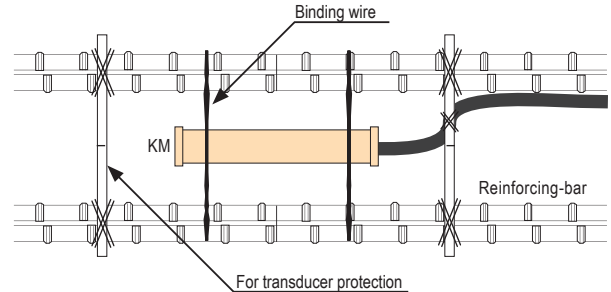
### When using for measurement of internal strain

Measurement of internal strain of concrete structure is possible not only for the behavior after the curing but also for strain during the curing. Strain in structure is caused by several factors such as external force, ambient temperature, drying shrinkage and material creep. This transducer is designed to measure every strain generated.

The gauge length of the strain transducer should be about three times the maximum diameter of the aggregate or larger. For the measurement from the early age of the concrete, use the strain transducer KM-100B or KM-100BT.

#### Installation example in reinforced concrete structures

When installing a strain transducer, wind a binding wire round two parts of the transducer body, and position the transducer in accordance with the marking previously marked on the reinforcing bars as in the figure.



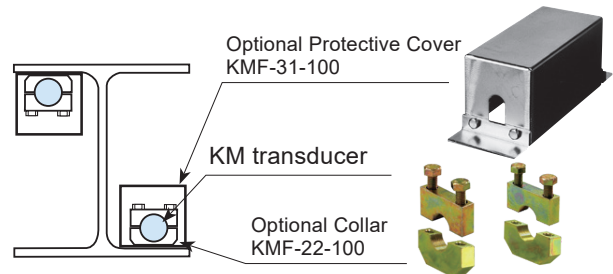
### For surface strain measurement

Surface strain measurement on steel or concrete structures is available with KM-100B or KM-100BT. (Optional fittings such as Spacer and Collar are available for fixing the transducer and positioning the gauge length.)

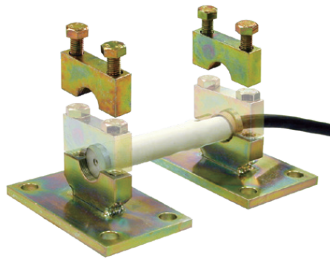
#### An installation onto the surface of steel structure



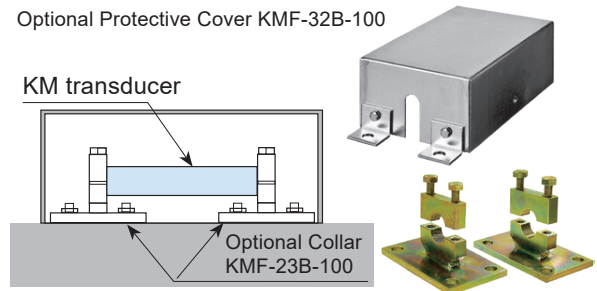
The KM model is combined with optional Collar KMF-22-100 to install onto the surface of steel by welding.



#### An installation onto the surface of concrete structure

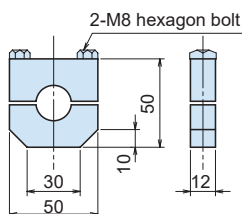


The KM model is combined with optional Collar KMF-23B-100 to install onto the surface of concrete structure with anchor bolts.

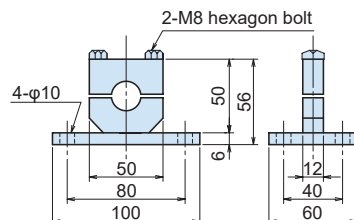


### Related products

For steel surfaces  
Optional Collar  
KMF-22-100



For concrete surfaces  
Optional Collar KMF-23B-100



Simulated strainmeter  
KMF-12-100  
(Except for KM-30)

