

## FSG load cells



### Description

The **FSG load cells** are a spool of high strength heat treated alloy steel that withstands in the severe environments normally associated with construction activity. Foil strain gages are bonded by wheatstone bridge configurations to the periphery of the spool for temperature stability and for compensation of eccentric loading.

**FSG load cells** are designed to be Hollow that is used for earth anchor measurement.

For the most reliable results, the bearing plates must be cast with its upper face flat and perpendicular to the anchor and the anchor is centralized.

The FSG load cells are compensated for eccentric loading during normal operations. The load cells are designed for obtaining long-term stable readings and enduring severe environment.

The greatest advantage of the FSG load cell is to have single generation with the automatic compensation even if applied the severe eccentric load and easy to measure due to the automatic temperature compensation.

If using our FSG load cell indicator model ACE-40D, you can check the loads on the site directly by digital value.

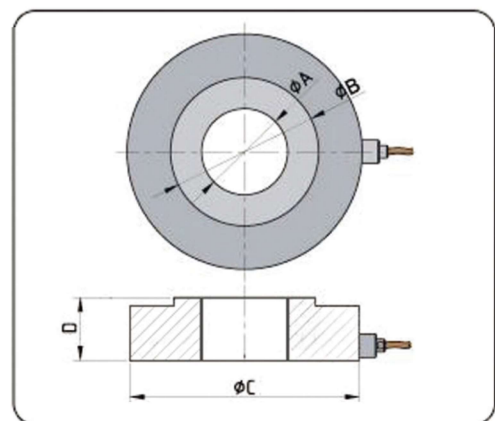
### Applications

The FSG load cells are designed to measure loads in tiebacks, anchors, struts, rock bolts and strands in structure.

- To set with strain gage at strut and measure the load and strain.
- Long term measurement of the load in tiebacks, struts, rock bolts and anchors.
- To measure the load and stain of strut dynamically.



[1200ton-f Material testing machine]



[Dimensions]

### Dimensions

Model	4102	4103	4105	4110	4115	4120	4125	4130	4140	4150	4160	4170	
Load (ton · f)	40	80	140	140	140	200	200	200	300	500	1000	1500	
Size	A	38.5	50	100	125	75	100	125	150	150	150	50	50
	B	74	100	148	166	133	161	178	196	210	223	198	240
	C	135	174	231	245	219	267	280	294	321	348	350	398
	D	35	40	45	45	45	52	52	52	75	82	115	145
Bearing area (mm <sup>2</sup> )	3,137	5,890	9,349	9,371	9,475	12,504	12,613	12,500	16,965	21,386	28,827	43,275	

(mm)

## FSG load cells

### Specification

Model	4102	4103	4105	4110	4115	4120	4125	4130	4140	4150	4160	4170
Rated capacity(ton · f)	40	80	140	140	140	200	200	200	300	500	1000	1500
Sensor element	Foil strain gage (wheatstone bridge circuit)											
Safe overload	120% FSR											
Accuracy	±0.5% FSR (Optional ±0.1% FSR)										±0.5% FSR	
Non-linearity	±1.0% FSR (Optional ±0.5% FSR)										±1.0% FSR	
Rating output	1.5mV/V (1,500×10 <sup>-6</sup> )											
Exciting voltage recommended	Less than 5 VDC											
Resistance	700Ω (8 strain gages)											
Insulation resistance	More than 100MΩ / 500V											
Operating temperature	-30~80°C											
Temp range compensated	-10~70°C											
Waterproof	105m H <sub>2</sub> O											
Material of cell	SCM series steel											
Sealing materials	High grade silicone potting											
Weight (kg)	3.6	6.8	12.0	12.3	11.7	19.6	20.1	18.5	37.2	49.8	81.0	125.3
Signal cable	Ø10mm, 0.5mm <sup>2</sup> ×5C shielded PVC sheath cable											

### The readout

It is electric resistance sensor that generates mV and can be used by connecting with strain meter or data logger that can read strain

- ACE-600 (FSG readout)
- ADL-200A (Smart logger)

### Features

- Stability and reliability in extreme environment
- Accurately measurement of eccentric load
- Different models according to load and use
- Precision of cell process is under 0.05 (shaking, parallel straightness)
- Bearing plate with high confidence
- Dynamic measurement is possible

### Ordering information

- Application field
- Capacity
- Quantity of strands, center hole diameter
- Keeping readout unit
- Cable length

### Ancillary equipments

- Bearing plates for earth anchors
- Universal terminal box (model 7012/7024)



[High capacity of FSG load cell]

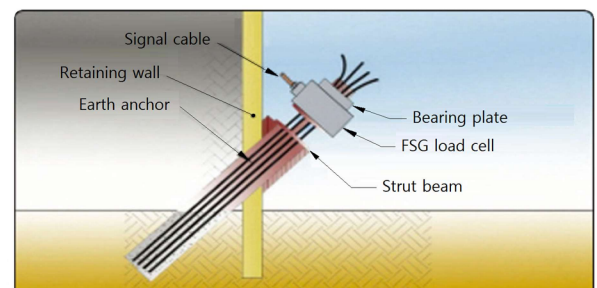
### Recommendation

The bearing plates must be cast with its upper and lower face flat and have sufficient strength to avoid significant distortion under load. Positioning and alignment of the cells is important to their reliable performance

Load expected by design	Optimum thick of bearing plates
0~150 ton · f	30~40mm
150~300 ton · f	40~60mm
300~500 ton · f	60~80mm
Spherical type	25~50mm

### The cause of error

- The lack of the flatness of the bearing plate and omission of heat treatment
- The lack of processing precision of strand cone
- The extending of strand cable
- Not become established the earth anchor (In case of using less Ø100mm drill)
- The lack of squareness of strut bracket installation



[Installation of FSG load cell]

## FSG load cells

[Digital indicator]



The digital indicator is directly connected to our FSG load cell and displayed in units of direct load(ton-f), which can be useful for emergency situations or maintenance on site.

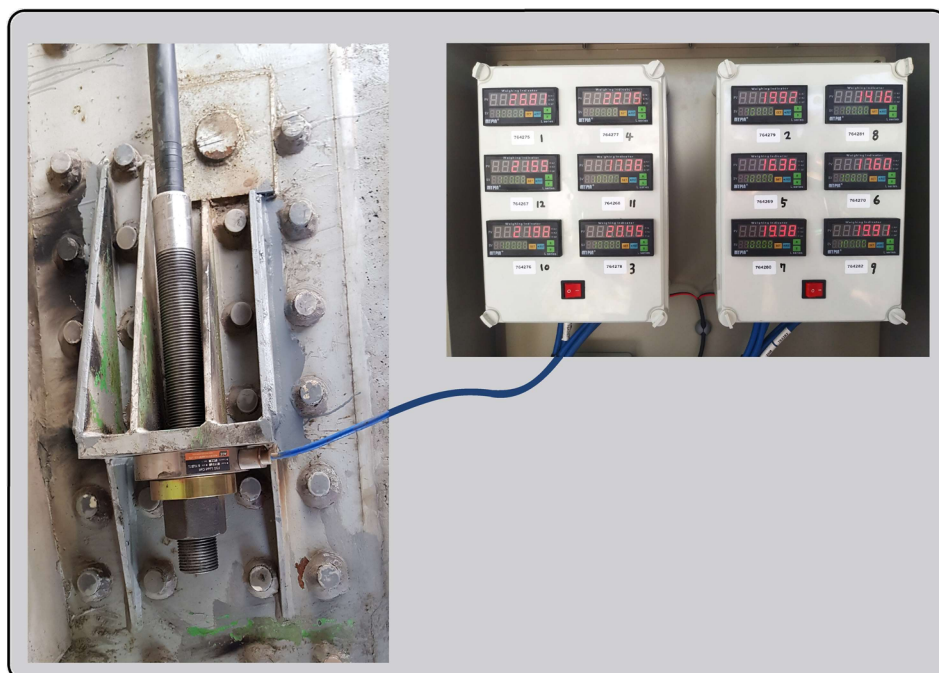
There is an ON/OFF switch so that it can be turned on and checked only during use, so you can use it for months without replacing the battery. It can also be operated in an emergency state as ON state.

This product is manufactured to the highest waterproof level of IP68 and can be used in the field.

In addition, it is also possible to install the indicator directly connected to the FSG load cell installed in multiple locations in a multi-box,

### Specification

Model	ACE-40D
Measurement range	-30~+30mV/V
Display	ton-f (Decimal 2 unit)
Applied voltage	5 VDC (Load cell applied)
Sampling rate	50 time/sec
Accuracy	±0.1% FSR
Operating temperature	-10~50°C
Power	DC 6V (Alkaline battery)
Continuous use time	6 Hr
Dimensions	150 x 150 x 100mm
Waterproof grade	IP68



[Photos of load indicator directly connected to our FSG load cell installed in the bridge support system]