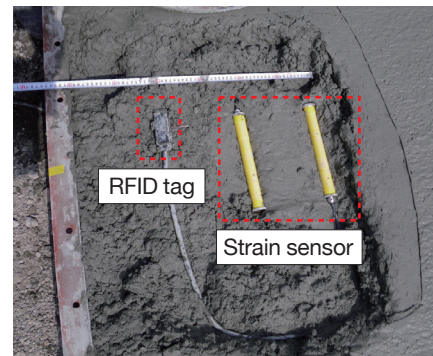
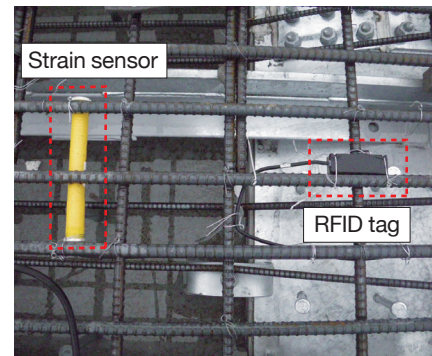
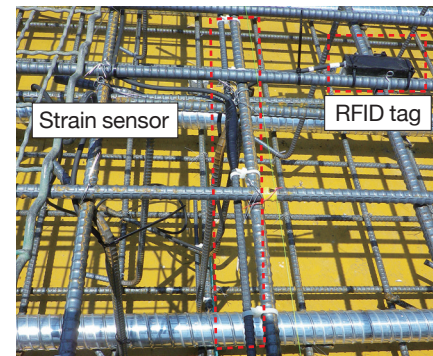
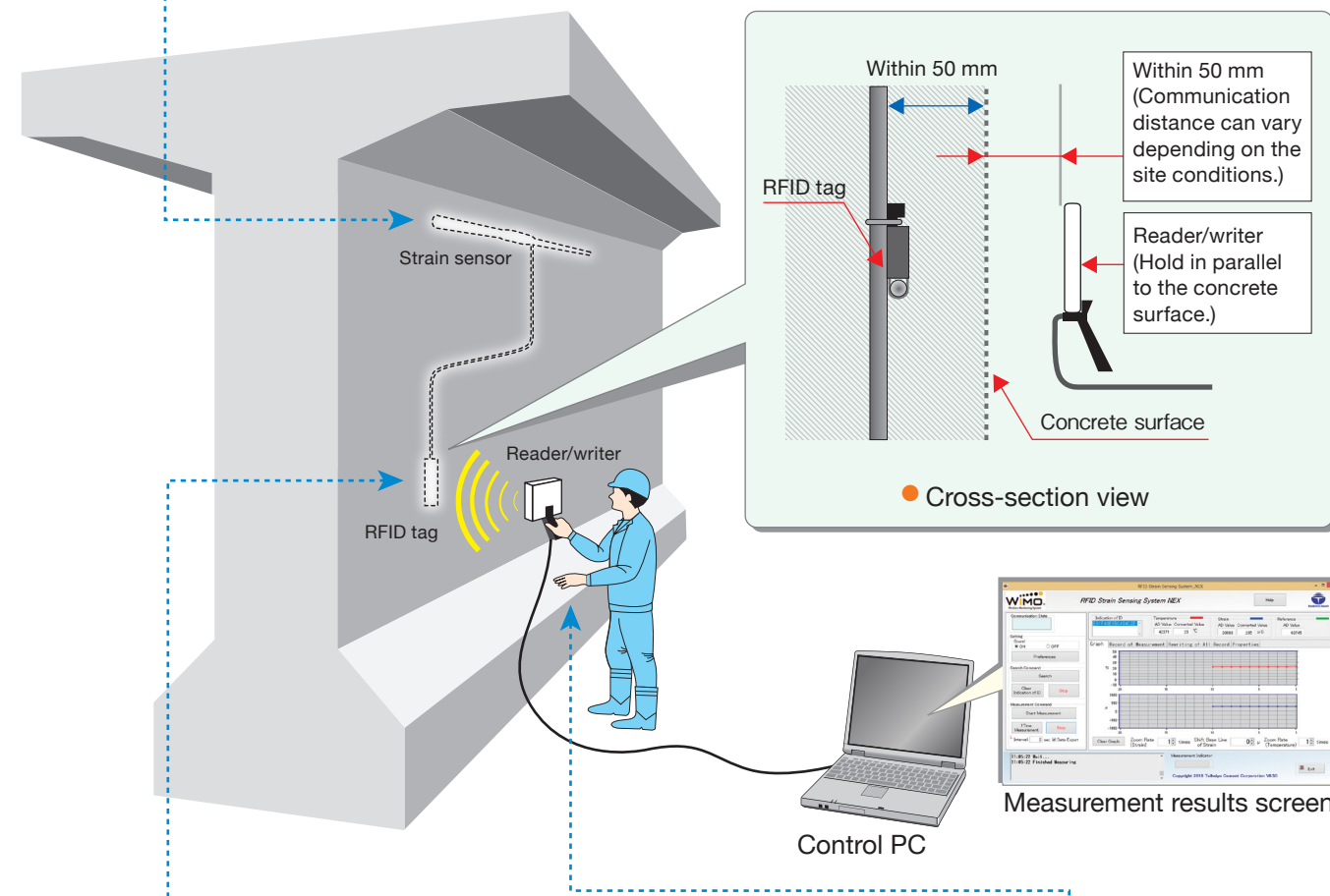


## Installation and measurement

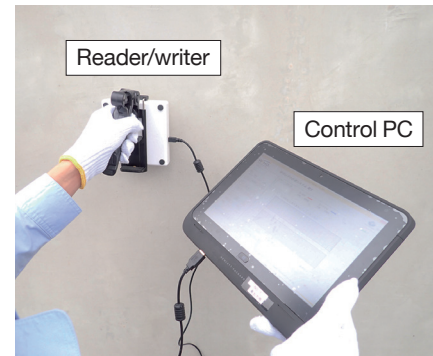
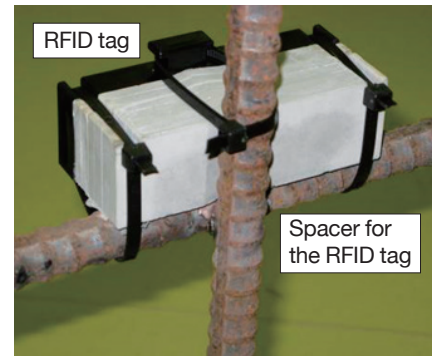
### How to install the strain sensor



Turn on the reader/writer, and start up the software.  
Hold the reader/writer over the position where the tag is embedded, within 50 mm from the concrete surface.



### How to install the RFID tag

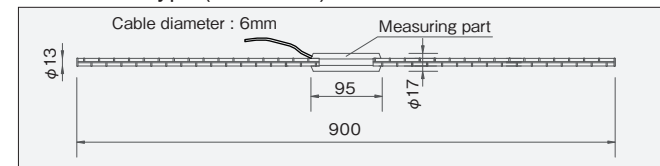


### Measurement using the reader/writer

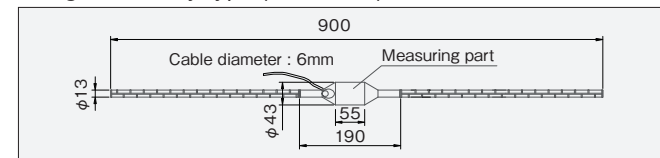
## Product specifications

### External dimensions and specifications

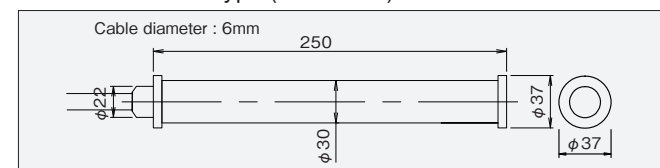
#### ● Standard type (SSN-1390)



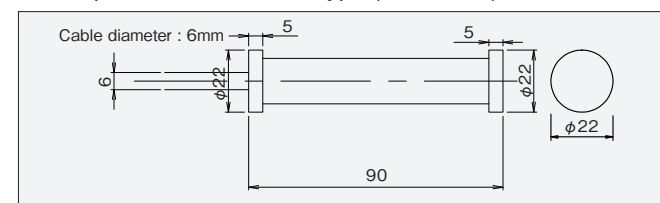
#### ● High durability type (SSD-1390)



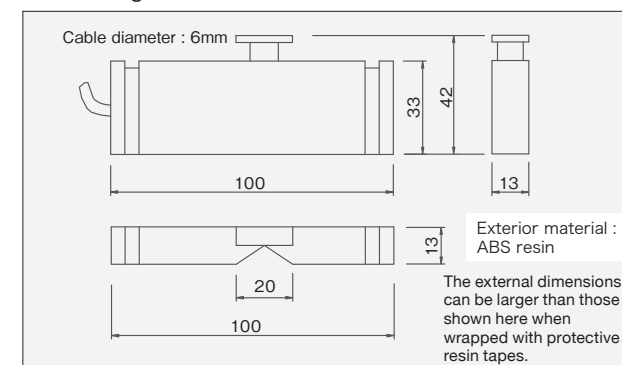
#### ● Concrete strain type (SSC-3725)



#### ● Compact concrete strain type (SSC-2290)



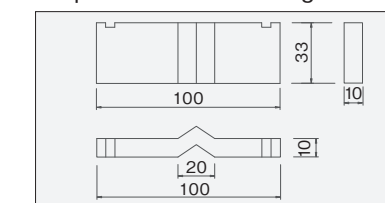
#### ● RFID tag



RFID frequency band	13.56MHz (HF band)
Communication distance	100mm or above (in air)
Memory capacity	All measurement values (6 inspection events)
Measurable temperature range	0~65°C
Power	Wireless supply from the reader/writer (No batteries required)
Cable length	0.5m *

\* The total cable length is 1m. Use extension cables as required.

#### ● Spacer for the RFID tag



<https://www.taiheiyo-cement.co.jp/rd/rfid/>

WiMO is a registered trademark of Taiheiyo Cement Corporation in Japan.

#### 〈Precautions〉

- Taiheiyo Cement Corporation assumes no responsibility whatsoever for any secondary damage resulting from the use of this product.
- Do not allow any person other than the manufacturer's repair technician to disassemble, repair or alter this product.
- Do not drop or subject this product to impact or vibration.
- Avoid condensation.
- When the strain sensor is stored for an extended period of time, wrap it in anticorrosive paper specified by the manufacturer.
- If the reader/writer is not used for an extended period of time, remove the battery or unplug the power cable.
- This product is a consumable. Its durability performance is tested, but no guarantee is provided after the delivery.
- The communicable range of the RFID-tag and the reader/writer antenna can vary depending on the rebar arrangement, materials, water content of concrete or local conditions.

#### 〈Precautions related to the Radio Act〉

This product (reader/writer) complies with the Radio Act of Japan, and Technical Regulations Conformity Certification has been acquired. This product may require separate or further compliance certifications or further approvals under local laws or regulations for use in other countries. Be sure to observe the following instructions:

- Do not disassemble or alter this product. Such actions are prohibited by law.
- Do not remove the label of Technical Regulations Conformity Certification.

Manufactured and distributed by :

**TAIHEIYO CEMENT CORP.**  
**Central Research Laboratory**  
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285-8655 JAPAN  
Phone: +81-43-498-3811 Fax: +81-43-498-3819

Product specifications are subject to change without notice.  
202006

## Easy wireless strain measurement

# RFID Strain Measurement System



**WiMO**  
Wireless Monitoring System

Wireless sensing

Wireless power supply  
—no batteries required


Easy information management by unique IDs

**TAIHEIYO CEMENT**



What is the RFID Strain Measurement System?

The system measures strains generated in steel reinforcement in reinforced concrete structures by using radio signals at the structure surface.



Wireless Monitoring System

**Making structural diagnosis easier and more handy.**

WiMO is the technology for evaluating the structural integrity developed under the concept that anyone can easily perform non-destructive quantitative testing.



Features

- 1 Non-destructive**

The embedded passive RFID tag obtains sensor outputs wirelessly.
- 2 Long-term inspection**

The system requires no external wiring or power supply (batteries) and is good for long-term maintenance and inspection.
- 3 Temperature measurement**

Temperature can be measured simultaneously with strain measurement.

- 4 History storage**

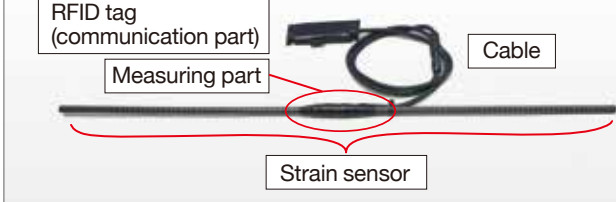
Measurement results and histories of up to six inspection events can be stored in the RFID memory.
- 5 Stable measurement**

Stable measurement without temperature drift is achieved by using the 4-gauge method.
- 6 Easy to install and use**

Easy installation of the sensor requires no adjustment, and simple operation allows anyone to perform measurement.

Product appearance

Standard RFID rebar strain sensor Model: SSN-1390




RFID tag (communication part)

Measuring part

Cable

Strain sensor

High durability RFID rebar strain sensor Model: SSD-1390




RFID tag (communication part)

Measuring part

Cable

Strain sensor

RFID concrete strain sensor Model: SSC-3725

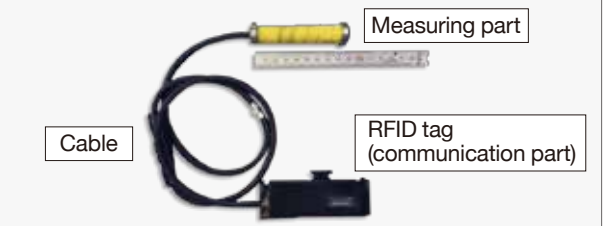


RFID tag (communication part)

Measuring part

Cable

Compact RFID concrete strain sensor Model: SSC-2290



Measuring part


Cable

RFID tag (communication part)

Types	SSN-1390 (Standard type)	SSD-1390 (High durability type)	SSC-3725 (Concrete strain type)	SSC-2290 (Compact concrete strain type)
Strain measurement range	±1000×10 <sup>-6</sup>			±3000×10 <sup>-6</sup>
Strain sensor length	900mm		250mm	90mm
Diameter	Base reinforcement: D13 deformed bars	Base reinforcement: D13 deformed bars; Measurement unit: 43 mm	37mm	22mm
Weight	870g	1290g	600g	125g
Elastic modulus	200GPa	200GPa	800MPa	20MPa
Cable length	0.5m			

Options


**Extension cable**



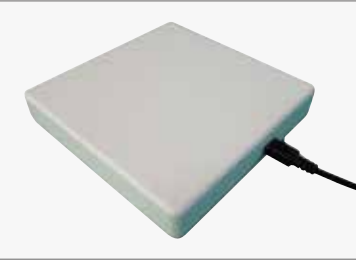
**Cable diameter : 6mm**


Length	Model number
1 m	SC-E0100
2 m	SC-E0200
4 m	SC-E0400
6 m	SC-E0600
9 m	SC-E0900
14 m	SC-E1400

**Spacer for the RFID tag (ceramic, 10mm thick)**



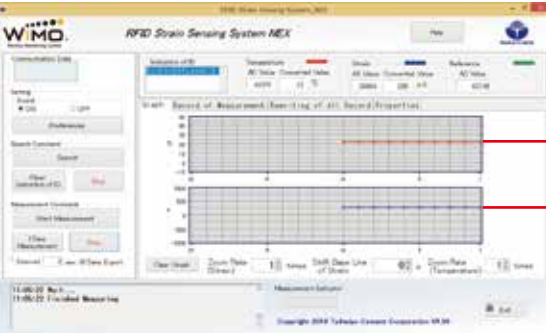
Reader/writer





RFID frequency band	13.56MHz
Category by the Japanese Radio Act	Inductive reading and writing radio communication equipment
External size	125 (D) x 125 (W) x 30 (H) mm
Weight	220g
Power	USB (5 V DC, 15 mA max.)


Software



Temperature measurements

Strain measurements

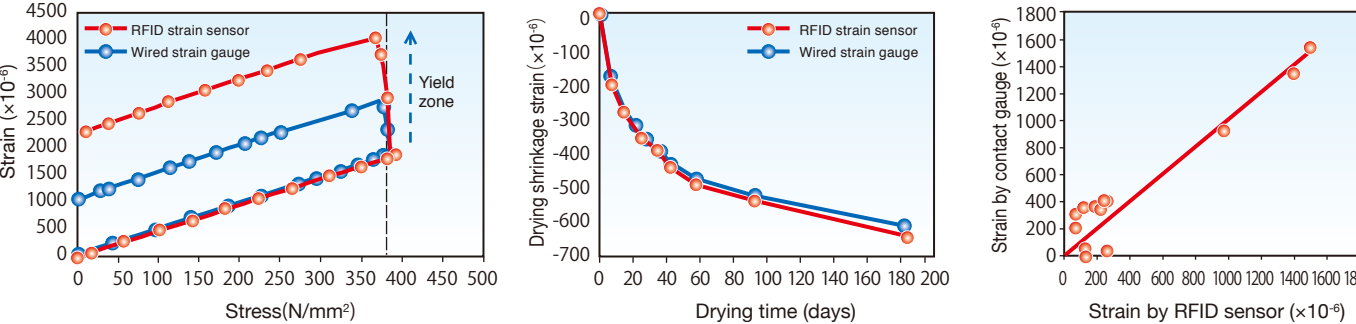
Measurement results screen



Inspection history check screen

\*See the separate manual for the details of the software.  
\*Screen layouts are subject to change without notice.

Examples of measurement data



Evaluation by direct tensile test

Standard RFID rebar strain sensor vs. wired strain gauge

<Test conditions>

- The wired gauge was fixed to the center of the steel bar of the RFID strain sensor.
- Strain was measured when the steel bar was tensioned to the yield point, and then when the stress was removed.

Evaluation of drying shrinkage strain

Compact RFID concrete strain sensor vs. wired embedded strain gauge

<Test conditions>

- Concrete mix: W/C = 48%
- Size: 100\*100\*400 mm
- Drying shrinkage strain was measured from 7days of age.

Evaluation of ASR expansion behavior

Compact RFID concrete strain sensor vs. contact gauge

<Test conditions>

- Concrete mix: W/C = 32%
- Size: 400\*400\*600 mm
- ASR-induced expansion behavior was measured for 780 days during an outdoor exposure test in Kyushu.

A variety of applications

Concrete structures may lose their strength and cannot fulfill its original performance as being degraded by earth pressure, wind pressure, traffic flows, earthquakes and many other loads. By simply measuring the strain and understanding the internal condition with this system, you can make maintenance and management of these structures more efficient.

- Management of stress in dams.
- Management of deformation of and stress in earth retaining walls.
- Management of deformation of and stress in segments.
- Monitoring of expansion induced by alkali silica reaction.
- Management of stress from service load in floor slabs and piers.
- Monitoring of creep deformation of concrete structures.
- Management of stress during application of prestress.
- Management of stress in tunnel lining concrete.
- Other soundness check and management of various structures.



Examples of construction

Construction quality evaluation on the superstructure of a bridge



- Stress management during application of prestress.
- Monitoring of residual prestress during long-term service period.

Soundness management on tunnel lining concrete



- Stress management during application of prestress.
- Monitoring of load acting on the lining concrete.

Quality control of steel parts



- Monitoring of strain in the steel parts.

Soundness management on concrete structures



- Monitoring of thermal stress and strain.
- Soundness check after an earthquake.