

**TEAC****Strain gauge load cell Instructions for Use****TU-FSRSP2(T)-G3**

**Tension/Compression Load Cell**
**Introduction**

Thank you for purchasing the TU-FSRSP2(T)-G3 load cell. Please read this document completely before using this load cell to achieve its best performance and ensure safe and proper operation.

- Company names and product names in this document are the trademarks or registered trademarks of their respective owners.

**Included accessories**

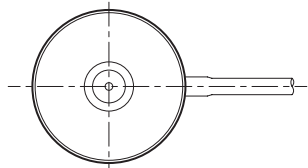
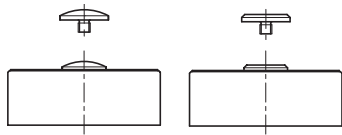
If anything is missing or damaged, contact the retailer where you purchased the product.

- Test report × 1
- Instructions for Use (this document) × 1
- Curved load button × 1
- Flat load button × 1

**Installation procedures**

To use this product, install one of the included load buttons (two types) or a part that you have prepared in the central M2 internal thread as shown in the illustration below.

- Tighten the included load button by hand to the position where the screw stops.
- Since it could loosen during use, we recommend coating the screw part with threadlocker. Doing so, however, will make removing the load button more difficult.

**Curved load button Flat load button**

- When attaching a part other than one of the included load buttons, make certain that it does not touch the cover. (Refer to the dimensional drawings.) Since the space between the cover and the attachment area of the loadbearing part is not always uniform, we recommend using a part that is smaller than the diameter of the component attachment area. Furthermore, since the attached part will sink by more than 30 μm when a load is applied, leave a sufficient gap between the part and the cover.
- Install this unit in a place where the structure is level and can sufficiently bear the load being used.
- Screw holes for attachment are located in four places.

**IMPORTANT SAFETY INSTRUCTIONS****⚠ WARNING****If something abnormal occurs**

Request repair from the retailer where you purchased the product.

**Do not open the cover.**

Never remove the cover from this unit. Doing so could cause malfunction. Request inspection and repair from the retailer where you purchased the product. Do not alter this unit. Doing so could cause malfunction.

**Do not put foreign objects or water, for example, into the unit.**

Do not place a container that holds water, for example, on top of this unit. If liquid is spilled, for example, and enters the unit, this could cause malfunction.

**Do not use the unit with any power supply voltage other than that specified.**

Do not use the unit with any power supply voltage other than that specified. Doing so could cause malfunction.

**⚠ CAUTION****Unsuitable installation locations**

Do not place the unit in the following types of locations. Doing so could cause malfunction.

- Locations where it might be exposed to smoke or steam, such as near a kitchen table or humidifier
- Unstable locations, including unsteady stands and tilted places
- Locations that are very humid or dusty
- Locations that are exposed to direct sunlight

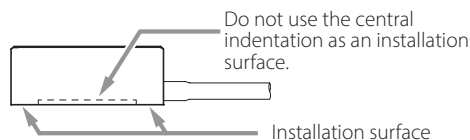
**When not using the unit for a long time**

For safety, cut the power supply when not using this unit for a long time.

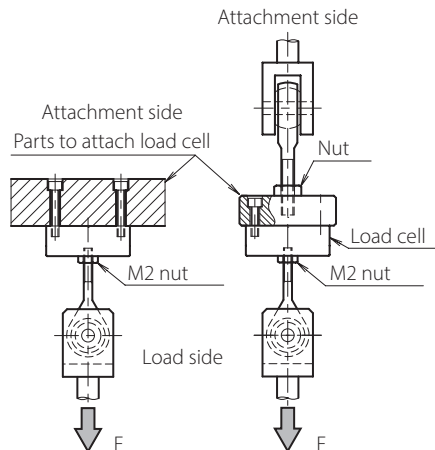
**Do not operate a damaged unit.**

- The screw size is shown in the table below.

Model	Screw size	Tightening torque
TU-FSRSP2(T)-G3	M2.6 (depth 3)	0.65 N·m



- Refer to the following illustration when using with tension loading. Moreover, undertake safety measures to, for example, prevent dropping in the unlikely event the damage should occur.



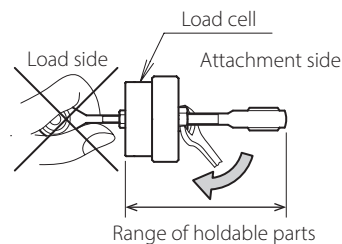
- Be sure to use parts that have enough strength to handle the tension load.
- For the 4 screws used to attach the load cell and for the central M2 screw, use steel screws with a strength class of at least 10.9 or screw components with equivalent strength. Use the longest possible thread engagement lengths (screw depths) when attaching.

**Precautions for use**

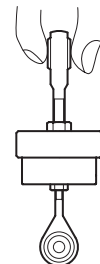
- This unit is not built to be water or splash resistant, and it cannot be used in conditions when the relative humidity is high. Moreover, use in atmospheres with corrosive gases should be avoided.
- Be careful to prevent water, oil and other substances from getting on the unit.
- Avoid use in conditions where condensation could occur.
- Connect cores to the load cell after discharging (eliminating) static electricity from your body.
- If the surrounding temperature changes suddenly, the values output by this device could become unstable, making accurate measurement impossible. (This could occur, for example, in a location blown by warm or cold air.)
- If a cable of this unit needs to be bent and shifted, make the curvature of the bent part at least 50 mm. Do not apply tension to the cable.
- Conduct load calibrations periodically.

- For the jigs above and below, use something that can absorb load vibrations like rod end bearings.

- When tightening the bolt (nut) on the attachment side, do not hold the part attached to the load side of the load cell.

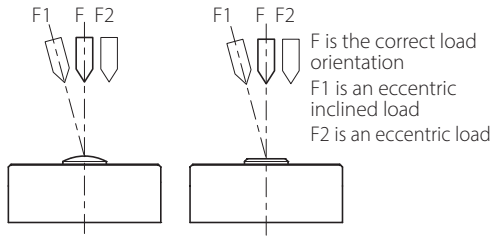


- After installing the part, hold it so that the load is applied toward the load cell center in the direction of gravity.



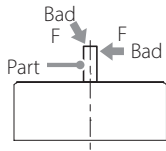
## Precautions when placing loads on the unit

- Make sure the load is perpendicular to the surface to which this unit is attached.
- When using a flat load button, use it so that the load is equally distributed within a  $\varnothing 7\text{mm}$  range.
- Apply the load so that it is centered on the center of the unit. If the load is not centered (eccentric load), twisting, for example, and measurement errors could occur. This could even result in damage.

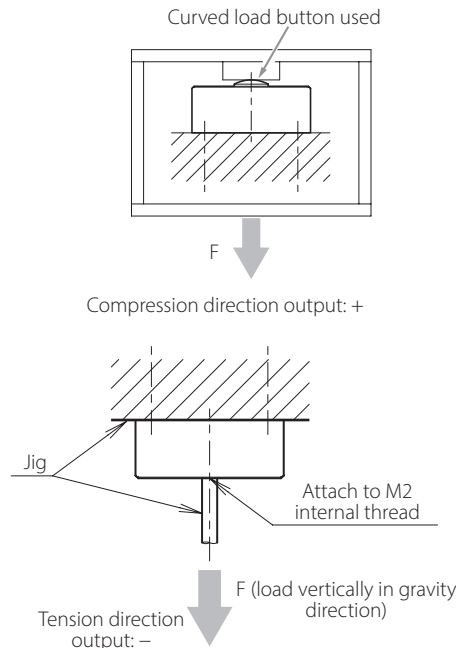


### Curved load button Flat load button

- Be careful to avoid turning and twisting from lateral loads. This could cause troubles like those described in the previous item.
- Take extra care if the part that you have prepared is cylindrical. Even during installation, do not allow loads to be applied from the side or at an angle as shown in the illustration below. Doing so could cause the screw part to bend and damage internally. Moreover, when securing the part, tighten with a torque of no more than 0.18 N·m or use a thread locker and tighten gently by hand.



- Load testing during production is conducted as shown in the illustration below. The results are used in the test report, and the output value in the direction of compression is recorded in the TEDS data. Since the load point, load direction and other conditions differ when using a flat load button or when using a jig with a different structure for tension, results could differ from those measured during production.



- Attached the bottom to the jig using 4 screws (class 12.9 strength steel) for both compression and tension. 0.65N·m tightening torque
- Be careful to avoid applying loads that exceed the rated capacity. In particular, use caution when there are

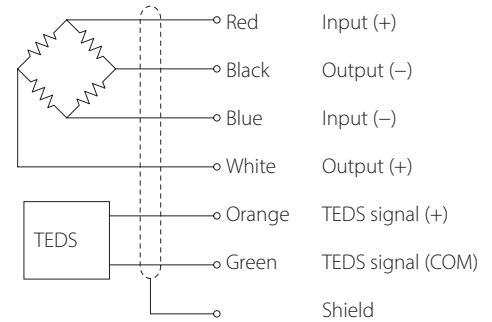
vibrations because loads that exceed the rated capacity could occur due to sympathetic vibrations, for example.

- If the load receiving area (spherical surface) is contacted by something that is at a different temperature and the load is increased, the values output by this device could become unstable, making accurate measurement impossible. In such a case, wait until the temperature difference ceases to exist before measuring.
- Do not use for both tension and compression (alternating loads).

## Electrical connection of load cell with built-in TEDS

Connect as shown in the illustration below. Incorrect connections could result in inability to balance and in errors occurring in the output voltage when loads are applied.

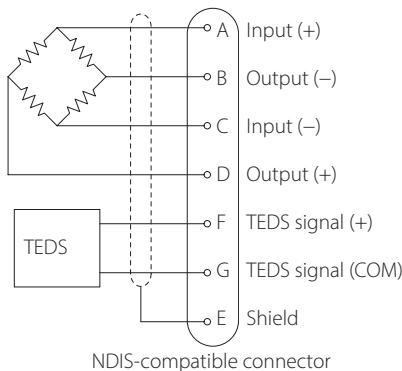
### Using a cable with bare lead wires



- This unit has a built-in TEDS function.
- The orange and green cores in the cable and the F and G pins in the connector are wired for TEDS.
- This unit does not support remote sense. See the operation manuals of indicators and strain amps that support remote sense for how to connect sensors with those units.

- The shield is not connected to the main body of this product. For this reason, if grounding is necessary because of external noise or another issue, arrange to ground the shield to a part other than the body of this unit, for example.
- Since the cable is directly connected to this unit, use a specialized cable to increase the length. (Please consult with us.)
- When conducting insulation resistance tests, limit them to the red, black, blue and white cores. Do not apply to the TEDS cores (orange and green).

### Using a connector (optional)



## TEDS overview

TEDS (Transducer Electronic Data Sheet) is a memory chip that can electronically read and write sensor-specific data. The TEDS built into this unit has serial number, load cell rated output and manufacturer name data recorded on it. By connecting an indicator that supports TEDS, the TEDS data of the connected load cell will be automatically read and equivalent input calibration will be completed. (For details, read the operation manual of the connected indicator.) Refer to the connection diagrams in "Electrical connection of load cell with built-in TEDS" as well as the operation manual for the indicator being connected for procedures to make connections.

TEAC indicators and signal conditioners that support TEDS include the TD-01 Portable, TD-700T, TD-260T, TD-9000T and TD-SC1. For details, inquire at the retailer where you purchased the unit.

If not using the TEDS function, do not connect the orange and green load cell cores.

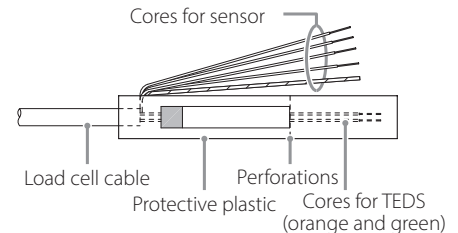
Moreover, take measures to prevent the orange and green cores from touching other terminals.

Data recorded in TEDS are tested values from calibration conducted at room temperature during inspection before shipping from our company.

Load cell output will be affected by the environmental temperature where used, even when within the compensated temperature range established in the specifications. Although load cell output is calculated from the calibration value saved in TEDS, when the environmental temperature differs greatly from room temperature, the temperature impacts increase on the zero point and the output. For this reason, consideration of the effect on output voltage is necessary. Output voltage changes will be within the specification range as long as the unit is used at temperatures within the specification range.

## When using the TEDS function

This product's cores for TEDS (orange and green) are protected by a plastic cover as shown in the illustration. This is to prevent miswiring and contact with other connectors during use, for example, which could cause shorting. To use the TEDS function, remove the tip of the plastic cover, following the perforations, from the end of the cables. Then, connect the TEDS cores (orange and green) to the indicator. Refer to "Electrical connection of load cell with built-in TEDS" for how to connect each core.



## When not using the TEDS function

If not using the TEDS function, remove the entire protective plastic cover and cut off the TEDS cores (orange and green) around where the plastic cover was attached to the cable. If you use it without removing these cores, do not remove the protective plastic or make other arrangements to prevent the cores from touching other places. Refer to "Electrical connection of load cell with built-in TEDS" for how to connect each wire.

## Note about the tag attached to the TEDS cable

### NOTE

Explanations related to TEDS are available on our website.

### ATTENTION

Since the protective plastic and tag are not suitable for the entire temperature range of this unit's specifications, do not expose them to high temperatures.

## Handling after use

- When moving this unit while it is attached, take protective measures to prevent it from being shaken or subjected to excessive external forces.
- When storing it, keep it in a dry place where it will not be exposed to water or oil, for example.

## Specifications

### TU-FSRSP2(T)-G3

Rated capacity: 10 N, 20 N, 50 N, 100 N

Safe overload rating: 120% R.C.

Rated output: 1 mV/V  $\pm$ 50%

Linearity: 1% R.O.

Hysteresis: 1% R.O.

Repeatability: 0.5% R.O.

Zero balance:  $\pm$ 30% R.O.

Safe excitation voltage: 5 V

Input terminal resistance: 350  $\pm$ 20  $\Omega$

Output terminal resistance: 350  $\pm$ 20  $\Omega$

Insulation resistance: 1000 M $\Omega$  or more (DC 50 V)

Compensated temperature range: 5 to 40°C (no condensation)

Permissible temperature range: 0 to 50°C (no condensation)

Temperature effect on zero balance: 2% R.O./10°C

Temperature effect on output: 1% R.C./10°C

Cable:  $\varnothing$ 3mm 6-core shielded robot cable

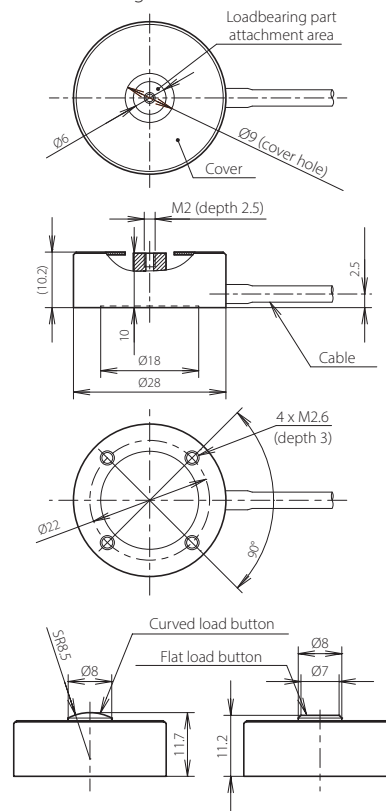
3m direct connection with bare lead wires

Body material: stainless steel

Environmental compliance: RoHS (10 substances)

Other: built-in TEDS

## Dimensional drawings



## Warranty explanation

- The warranty period for this device is one year from the date of purchase.
- Be aware that repairs will require payment in the following cases even during the warranty period.
  - 1) Malfunction or damage due to misuse
  - 2) Malfunction or damage caused by modifications or repairs conducted by any party other than our company or a service person designated by our company
  - 3) Malfunction or damage caused by dropping, transportation or similar handling after product delivery
  - 4) Malfunction or damage caused by fire, earthquake, water, lightning or other natural disaster
  - 5) Malfunction or damage caused by external factors, including power supplies and equipment environmental conditions, that deviate from the operation requirements of this product
  - 6) Malfunction or damage if the product was not purchased from our company or an agent designated by our company
- We offer paid service after the conclusion of the warranty period. For details, please contact the retailer where you purchased the unit.
- Be aware that our company will bear no responsibility for any secondary damages resulting from the operation of this device or related to data.
- Information is given about products in this manual only for the purpose of example and does not indicate any guarantees against infringements of third-party intellectual property rights and other rights related to them. TEAC Corporation will bear no responsibility for infringements on third-party intellectual property rights or their occurrence because of the use of these products.

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