

## Strain gauge load cell Instructions for Use

## TC-USR(T)-G3



## Compression Load Cell

## Introduction

Thank you for purchasing the TC-USR(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.

## 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

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## 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.

## 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 calibration periodically.

## Installation procedures

- 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.
- The screw hole dimensions are different for each load cell rated capacity. The screw dimensions are shown in the table below.

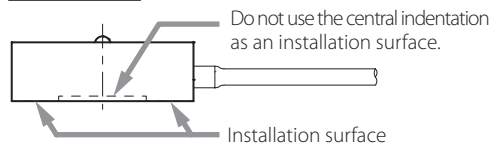
Model	Screw size	Tightening torque
TC-USR(T)23-G3	M2 through	0.088 N·m
TC-USR(T)29-G3	M3 through	1 N·m
TC-USR(T)30-G3	M2.6, depth 3	0.18 N·m
TC-USR(T)34-G3	M4 through	3 N·m

Dimensions in millimeters (mm)

- The TC-USR(T)17-G3 does not have attachment screw holes.

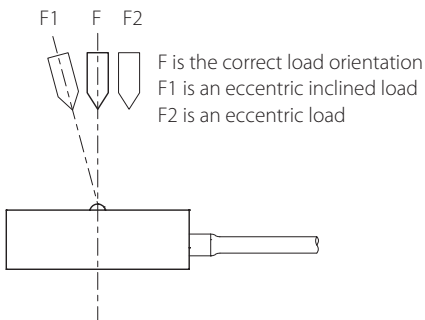
Remove any oil from the mounting surface and attach it with double-sided tape or adhesive, for example.

## ATTENTION



## Precautions when placing loads on the unit

- Make sure the load is perpendicular to the surface to which this unit is attached.
- 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.

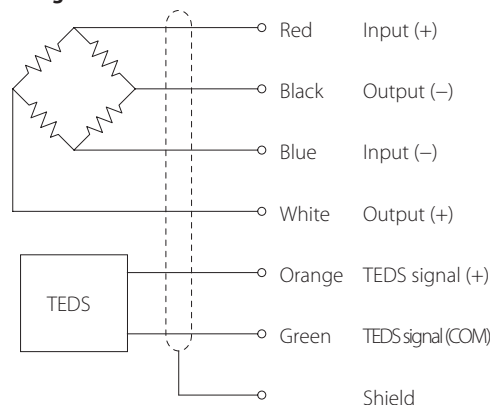


- Be careful to avoid turning and twisting from lateral loads. This could cause troubles like those described in the previous item.
- Be careful to avoid applying loads that exceed the rated capacity. In particular, use caution when there are vibrations because loads that exceed the rated capacity could 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.

## 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.

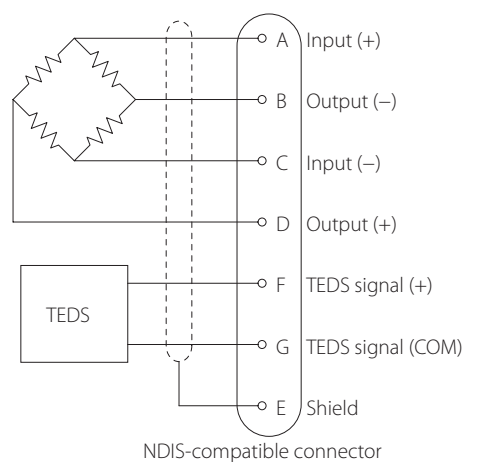
## Using a cable with bare lead wires



- 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, for example, arrange to ground the shield to a part other than the body of this unit.
- 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.

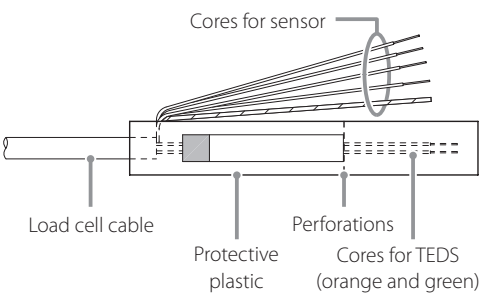
Moreover, take measures to prevent the orange and green cores from touching other terminals.

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 wire.



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

Explanations related to TEDS are available on our website. <https://loadcell.jp/en/info/teds.html>

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 installed, 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

Rated capacity: 0.5 N, 1 N, 2 N, 5 N, 10 N, 20 N, 50 N, 100 N, 200 N, 500 N, 1 kN, 2 kN

Overload limit: 300% R.C.

500% R.C. (TC-USR(T)17-G3, TC-USR(T)23-G3)

Safe overload rating: 150% R.C.

120% R.C. (TC-USR(T)30-G3)

Rated output: 0.5 mV/V or higher

0.75 mV/V or higher (TC-USR(T)29-20N-G3 to TC-USR(T)29-100N-G3 and TC-USR(T)34-G3)

Linearity: 0.1% R.O.

0.3% R.O. (TC-USR(T)17-G3, TC-USR(T)23-G3)

Hysteresis: 0.1% R.O.

0.3% R.O. (TC-USR(T)17-G3, TC-USR(T)23-G3)

Repeatability: 0.1% R.O.

0.3% R.O. (TC-USR(T)17-G3, TC-USR(T)23-G3)

Zero balance: ±10% R.O.

Safe excitation voltage: 6 V

Input terminal resistance: 420 ±20 Ω

390 ±20 Ω (TC-USR(T)23-2N-G3, TC-USR(T)23-5N-G3, TC-USR(T)29-10N-G3 to TC-USR(T)29-100N-G3, TC-USR(T)34-200N-G3 to TC-USR(T)34-2KN-G3)

Output terminal resistance: 350 ±20 Ω

Insulation resistance: 1000 MΩ or more (DC 50 V)

Compensated temperature range: 0 to 60°C

Permissible temperature range: -10 to 60°C

-5 to 70°C (TC-USR(T)30-0.5N-G3 and TC-USR(T)30-1N-G3)

Temperature effect on zero balance: 0.3% R.O./10°C

Temperature effect on output: 0.1% R.C./10°C

0.3% R.C./10°C (TC-USR(T)30-0.5N-G3 and TC-USR(T)30-1N-G3)

Cable: Ø3mm 6-core shielded robot cable

3m direct connection with bare lead wires

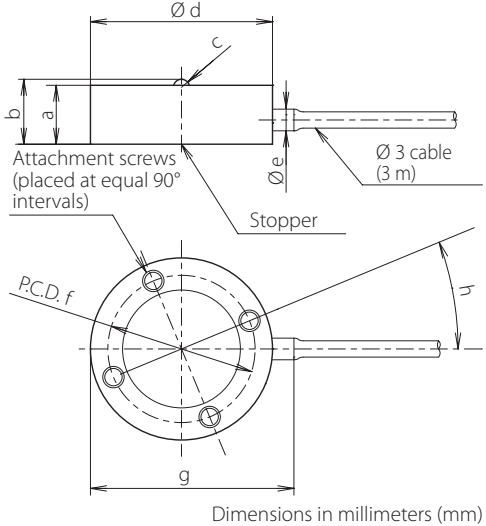
Body material: stainless steel

aluminum (TC-USR(T)30-G3, TC-USR(T)17-10N-G3, TC-USR(T)23-10N-G3, TC-USR(T)29-10N-G3)

Environmental compliance: RoHS (10 substances)

Other: built-in TEDS, stopper included

Dimensional drawings



TC-USR(T)17-2N-G3, TC-USR(T)17-5N-G3

a	b	c	d	e	f	g	h
5	6	SR1	17	(3.5)	-	22.5	-

TC-USR(T)23-2N-G3, TC-USR(T)23-5N-G3

a	b	c	d	e	f	g	h
5.5	6.5	SR1	23	(3.5)	20	28.5	22.5°

TC-USR(T)29-10N-G3, TC-USR(T)29-20N-G3, TC-USR(T)29-50N-G3, TC-USR(T)29-100N-G3

a	b	c	d	e	f	g	h
8.5	9.5	SR1	29	(3.5)	24	33	22.5°

TC-USR(T)30-0.5N-G3, TC-USR(T)30-1N-G3

a	b	c	d	e	f	g	h
12.5	13.5	SR1	30	(3.5)	22.5	35	45°

TC-USR(T)34-200N-G3, TC-USR(T)34-500N-G3, TC-USR(T)34-1KN-G3

a	b	c	d	e	f	g	h
11	12	SR1.5	34	(4)	27.5	38	22.5°

TC-USR(T)34-2KN-G3

a	b	c	d	e	f	g	h
12.5	13.5	SR1.75	34	(4)	27.5	38	22.5°

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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