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TEAC

Strain gauge load cell Instructions for Use

TU-GR-G

Tension/Compression Load Cell

Introduction

Thank you for purchasing the TU-GR-G 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.

Eye bolts
M8 × 2 (200 kN)
M10 × 4 (500 kN, 1000 kN)
Test report × 1
Instructions for Use (this document) × 1

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.)
- Conduct load calibrations periodically.

Installation procedures

- Install this unit in a place where the structure is level and can sufficiently bear the load being used. Output precision could be affected if the attachment surface does not meet parallelism and flatness requirements.
- Refer to Figure 1 for use with only compression loads. Refer to Figure 2 for use with tension/compression loads.
- Attach a load button when using with compression. When using with tension, attach a load rod, for example.

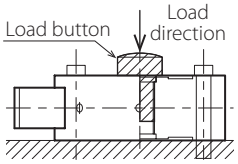


Figure 1. Compression

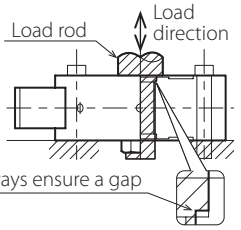


Figure 2. Compression/ tension

- The size of the screws used and their number depends on the rated capacity (model name) of the load cell as shown below.

Screw types and tightening torques

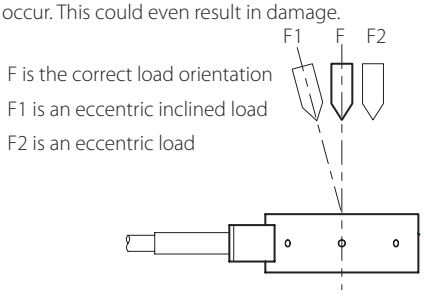
Rated capacity	Load rod section		Flange bolt section	
	Tightening torque	Dimension of load cell screw hole	Tightening torque	Dimension of load cell screw hole
5 kN	220 N·m	M18 × 1.5	25 N·m	M8
10 kN	220 N·m	M18 × 1.5	25 N·m	M8
20 kN	220 N·m	M18 × 1.5	25 N·m	M8
50 kN	480 N·m	M24 × 1.5	43 N·m	M10
100 kN	1.4 kN·m	M36 × 2	190 N·m	M16
200 kN	4.0 kN·m	M50 × 2	650 N·m	M24
500 kN	17 kN·m	M85 × 2	1.3 kN·m	M30
1000 kN	44 kN·m	M110 × 3	1.3 kN·m	M30

Use screws with a strength grade of 12.9.
In addition, the length of thread engagement for the screw and the mounting part (internal threads) should be about twice the nominal diameter of the screw.
Please consult with us if you are uncertain about screw selection, for example.

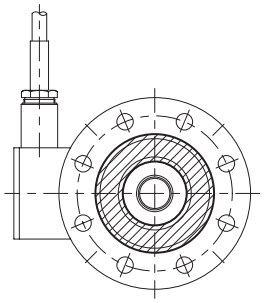
- Tighten with the torque shown in the "Screw types and tightening torques" table to prevent the load button or load rod from becoming loose. Be sure not to apply torque that exceeds the tightening torque shown in the table even when removing an attached load button or load rod. A thread-locking fluid can be used on the screw, but be aware that this could prevent removal of the load button or load rod.
- When tightening the load button or load rod with the torque shown in the "Screw types and tightening torques" table, do not let the counterforce be applied to the load cell. (Do not hold the entire load cell in place while tightening the nut.)
  If twisting force is applied between the central screw part and the surrounding screw holes, that force could be transferred to the load detection part and damage it.
- When connecting a load button or load rod to this unit (or disconnecting one), check the values in the Values Table of the Specifications.
- When using with tension, consider the detent of the screws, and conduct inspections before starting use, for example.
- Consider examinations to prevent accidents caused by falling objects due to damaged load cells resulting from overloads and unbalanced loads, for example.

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.



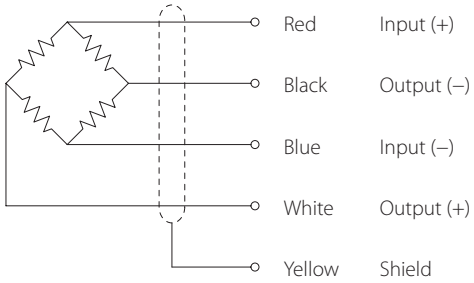
- If the load receiving area is contacted by something that is at a different temperature and the load is increased, the values output by this device could become unstable, making accurate measurement impossible. In such a case, wait until the temperature difference ceases to exist before measuring.
- Do not apply any load to the area shown by shading with diagonal lines in the illustration below. Applying a load to the shaded area will break the load cell.



Electrical connection of load cell

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

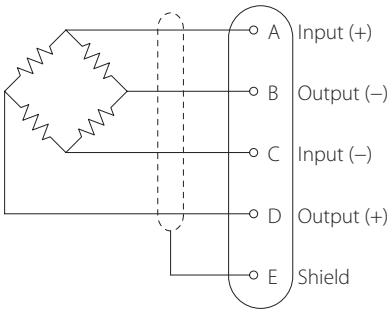


- This unit does not support remote sense.

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.)

Using a connector (optional)



NDIS-compatible connector

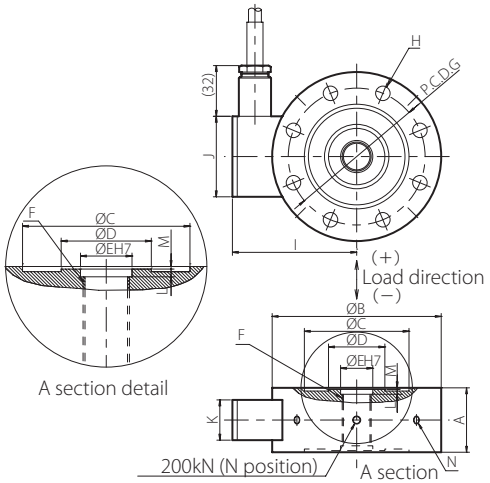
Handling after use

- 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.

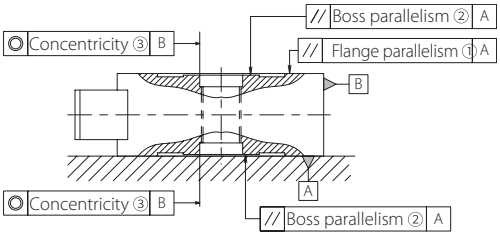
Specifications

TU-GR 5KN-G to TU-GR 1000KN-G
Rated capacity: 5 kN, 10 kN, 20 kN, 50 kN, 100 kN, 200 kN, 500 kN, 1000 kN
Safe overload rating: 150% R.C.
Rated output: 2 mV/V ±1%
Linearity: 0.05% R.O. (5 kN to 200 kN)
0.15% R.O. (500 kN, 1000 kN)
Hysteresis: 0.1% R.O. (5 kN to 200 kN)
0.15% R.O. (500 kN, 1000 kN)
Repeatability: 0.03% R.O. (5 kN to 200 kN)
0.1% R.O. (500 kN, 1000 kN)
Zero balance: ±10% R.O.
Safe excitation voltage: 20 V
Input terminal resistance: 350 Ω ±1%
Output terminal resistance: 350 Ω ±1%
Insulation resistance: 1000 MΩ or more (DC 50 V)
Compensated temperature range: –10 to 60°C
Permissible temperature range: –30 to 80°C
Temperature effect on zero balance: 0.05% R.O./10°C
Temperature effect on output: 0.1% R.C./10°C
Cable: Ø8mm 4-core shielded cable, 5m direct connection with bare lead wires
Body material: alloy tool steel
Environmental compliance: RoHS (10 substances)
Other: eye bolts
M8 × 2 pcs (200 kN)
M10 × 4 pcs (500 kN, 1000 kN)
TEDS: not supported

Dimensional drawings



Geometric tolerance tables



Model	Flange parallelism ①	Boss parallelism ②	Concentricity ③
TU-GR 5KN	0.01	0.02	0.07
TU-GR 10KN	0.01	0.02	0.07
TU-GR 20KN	0.01	0.02	0.07
TU-GR 50KN	0.01	0.02	0.07
TU-GR 100KN	0.01	0.02	0.07
TU-GR 200KN	0.02	0.04	0.15
TU-GR 500KN	0.02	0.04	0.15
TU-GR 1000KN	0.03	0.06	0.25

Rated capacity		A	ØB	ØC	ØD	ØE (H7)	F	ØG	H	I	J	K	L	M	N
5 kN	510 kgf	40	105	65	35	20	M18 × 1.5	85	8-Ø9	77	50	25	3	1	–
10 kN	1.02 tf	40	105	65	35	20	M18 × 1.5	85	8-Ø9	77	50	25	3	1	–
20 kN	2.04 tf	40	105	65	35	20	M18 × 1.5	85	8-Ø9	77	50	25	3	1	–
50 kN	5.1 tf	50	120	74	40	26	M24 × 1.5	95	8-Ø11	86	50	25	4	1	–
100 kN	10.2 tf	65	160	100	60	40	M36 × 2	130	8-Ø18	108.5	55	30	5	1	–
200 kN	20.4 tf	80	220	140	80	55	M50 × 2	180	8-Ø26	140.5	55	30	5	1	2-M8
500 kN	51 tf	100	330	200	135	90	M85 × 2	265	8-Ø33	203.5	70	40	7	2	4-M10
1000 kN	102 tf	140	460	280	190	115	M110 × 3	370	16-Ø33	270.0	70	40	7	2	4-M10

Values Table

Model	Allowable bending moment		Allowable lateral load		Allowable torque	Natural frequency (kHz)	Weight (kg)
	Extent of precision compensation	Extent that will not cause mechanical damage	Extent of precision compensation	Extent that will not cause mechanical damage			
TU-GR 5KN	1.6 N·m	15.4 N·m	285.6 N	2.7 kN	2.9 N·m	3.5	2.2
TU-GR 10 KN	3.6 N·m	34.6 N·m	642.6 N	6.1 kN	14.6 N·m	5.0	2.2
TU-GR 20KN	10.7 N·m	101.8 N·m	1.4 kN	13.4 kN	52.5 N·m	7.6	2.2
TU-GR 50KN	38.9 N·m	370.4 N·m	3.6 kN	34.3 kN	213.9 N·m	8.8	3.7
TU-GR 100KN	125.7 N·m	1.2 kN·m	7.1 kN	68.3 kN	696.3 N·m	7.0	8.5
TU-GR 200KN	364.8 N·m	3.4 kN·m	14.5 kN	138.2 kN	2.1 kN·m	5.6	20.0
TU-GR 500KN	849.4 N·m	8.0 kN·m	20.2 kN	192.9 kN	12.9 kN·m	5.9	54.0
TU-GR 1000KN	2.0 kN·m	19.8 kN·m	40.5 kN	385.9 kN	26.3 kN·m	3.3	140.0

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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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