

**Minebea**

**TORQUE TRANSDUCER**  
**TMR010- ✖ NM**

(For torque transducer)

**Instruction Manual**





Thank you for purchasing our TMR010 Torque Transducer.  
 Read this manual thoroughly before use for safety and optimal results.  
 And keep this instruction manual in a location where it is readily accessible to end users.

## Pictograms and Conventions Used in This Manual

This manual uses the following pictograms to indicate actions to avoid at all times, aspects requiring caution, and other noteworthy matters.

Be sure to read the descriptions provided alongside these pictograms.

	<p><b>Warning</b> This indicates circumstances in which incorrect handling may result in death or serious injury to users.                  Avoid the actions described here at all times.</p>
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	<p>This indicates operating or procedural precautions or restrictions.                  Be sure to read the details provided here to avoid incorrect operations.</p>
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### 1. Introduction

Thank you for purchasing our TMR010 Torque Transducer.  
 First, please check if there is any damage during transportation and any difference in product model  
 If there are any defects, please tell our sales office or the agent you purchased.  
 For specifications of each model, please check our product catalog or an outline document.

### 2. Overview

This equipment designs for low capacity torque transducers and be constructed with the torque detector shaft and an optical transformer that acquires signals optically without making contact with the shaft.  
 This equipment measures both static and dynamic torque. Using a sensor unit attaching a strain gauge, it has some specifications that high precision and long stability.

	<p><b>Warnin</b></p> <ul style="list-style-type: none"> <li>▪ Be sure to use the equipment within its rated operating capacity range.</li> <li>▪ Do not apply a voltage exceeding the supply voltage to the input voltage.</li> <li>▪ Do not connect the input voltage (supply supply) in reverse polarity.</li> <li>▪ When installing this equipment, use the Hexagon socket head bolt.                      The bolt size is described in this document and the outline document.</li> <li>▪ If loosing screws are concerned, re-tighten regularly or take anti-rotation.</li> <li>▪ When installing to medical equipment or other equipment related human life, prepare a protection circuit in case the function of the instrument stops.</li> <li>▪ If using in a special environment, please contact us before use.</li> </ul>
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3. Specifications

3-1 Appearance

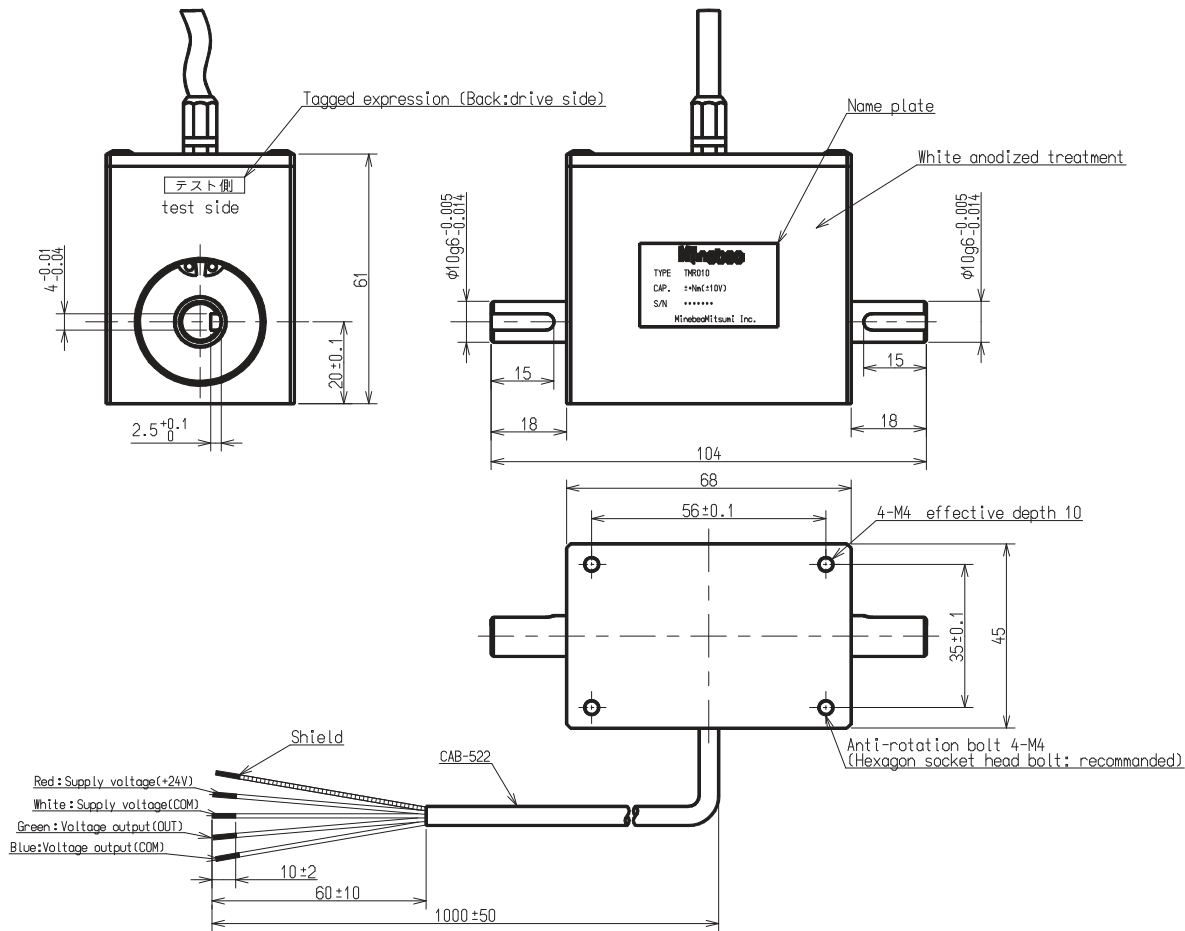


Fig. 1

3-2 Key dimensions (accessory)

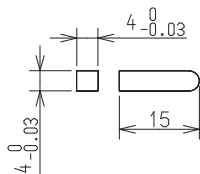


Fig. 2

3-3 Mechanical specifications

Rated cap. [Nm]	Spring constant [Nm/rad]	Max. speed rpm	Moment of inertia J[kgfm <sup>2</sup> ]	safe thrust load N	safe bending load N
2	350	8000	$1.79 \cdot 10^{-6}$	20	10
5	880	8000	$1.82 \cdot 10^{-6}$	50	50
10	1340	8000	$1.87 \cdot 10^{-6}$	50	50

#### 4. How to install

4-1 We recommend connecting both ends with a flexible coupling.

4-2 Prepare a coupling according to the shaft diameter and attached key.

Select a light coupling that has good rotational balance.

The fitting of the coupling is recommended to be an interference fit in order to prevent the key from settling.

4-3 Mounting direction: Make sure the “テスト側/Test side” on the nameplate is on the user's test side.

4-4 Please set the centering accuracy to the value recommended by the coupling manufacturer.

In case of high speed rotation, deviation of direct coupling accuracy may cause vibration, so it is recommended to set as shown in Fig. 3.

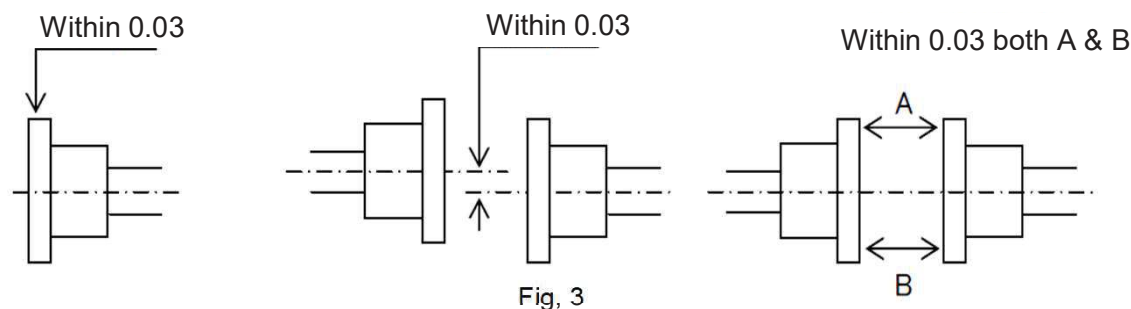


Fig. 3

#### 4-5 How to install (recommend)

This product can be used horizontally and vertically.

The standard usage is to connect both shaft ends with a flexible coupling as shown in Fig. 4.

Bearings in the figure is not necessary in the case of the motor and the test product have built-in bearings.

For anti-rotating, Install a pedestal and fasten loosely. (use hard urethane resin etc.)

When rotating at high speed, the temperature of the main body rises due to self-heating of the bearing, so please install a aluminum pedestal that easily conducts heat and take measures against ventilation.

To reduce vibration, it is recommended to loosely fix this product to a hard urethane resin plate using screw holes or double-sided tape. When tightening, pay attention to the axial misalignment.

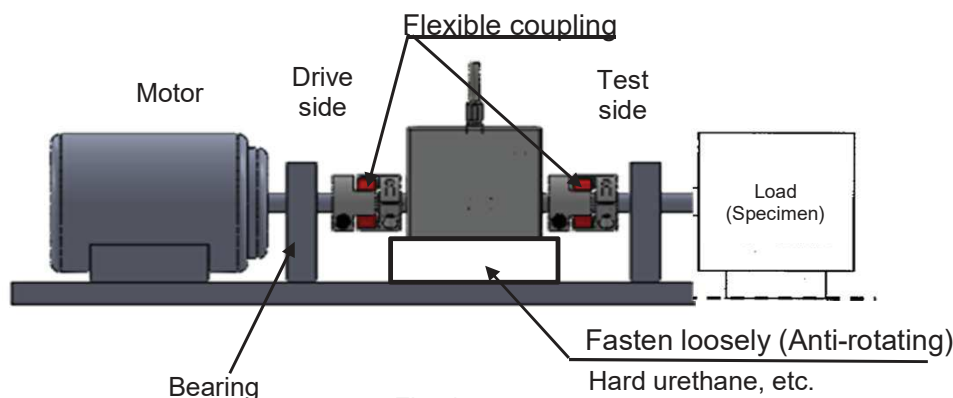


Fig. 4

#### 4-6 Notes on mounting

- ① If an excessive load is applied to the body and shaft in the radial and thrust directions, inaccuracy and abnormal heat generation of bearings may cause. Please be careful when mounting.  
Be especially careful when installing and removing the shaft so that it is not overloaded.
- ② Install with preventing heat conduct from being directly transferred from other devices to the shaft.
- ③ Please fix this product when installing it on one end.  
The fitting length of the screw should be more than the nominal screw diameter.
- ④ Make the body rotation stopper pedestal flat.
- ⑤ Install it so that dust or foreign matter is not caught.



5. Prepare measuring

①Wiring

	Input		Output		Shield
	(+)	(-)	(+)	(-)	
Cable read wire color	Red	White	Green	Blue	Net

②Input voltage (Supply voltage) 21.6V~26.4V

Check if the torque converter and power supply are connected correctly.

③Output voltage  $\pm 10 \pm 0.05V$  (When loading rated torque)

④Calibration / Confirm output

This torque converter has been conducted zero-adjustment and span-adjustment. If zero adjustment and span adjustment are required after installation in the equipment, please adjust on the user's equipment that receives the voltage output.

⑤The torque output produces a positive output when the rotor is twisted counterclockwise.

If you want to change the polarity, wiring output wire in reverse ( -: green, + : blue)

Be careful when changing the polarity because the input(-) and output(-) are connected.

⑥Pre-energization

After turning on the power, this torque converter will be in the operating state, but operating this torque meter stably, pre-energize for about 15 minutes before the measurement.

**Warning**

- Do not apply more than the maximum applied voltage to the input voltage. Also, do not connect the polarities in reverse. These can cause malfunctions.
- Be sure to ground the motor and motor controller. It is recommended to ground the motor directly from the body. If this is neglected, noise may be superimposed on the output voltage.

6. Trial run

Perform a trial run at low speed and confirm that there is no abnormal output, noise, heat generation (temperature), vibration, etc. before starting measurement.

7. Maintenance and inspection

Since this torque converter uses bearings, the bearing grease replacement limit is the bearing life. The grease replacement limit varies depending on the number of rotations. Convert it from Fig. 5. For products that have reached the replacement limit, request bearing replacement repair.

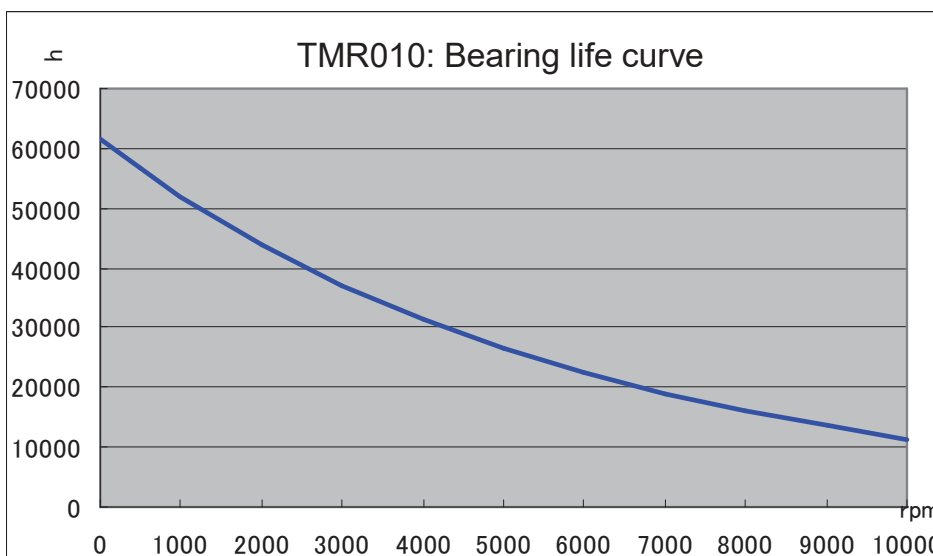


Fig. 5



## 8. Caution on usage

- ① Be sure to attach a protective cover to prevent scattering.
- ② Since the unbalance that occurs when mounting the coupling may cause vibration, adjust the dynamic balance comprehensively after combining the product and the coupling.
- ③ If there is an impact load or vibration, a dynamic load that is an acceleration of a static load acts on the torque transducer. Therefore, make sure that the loading considering the acceleration does not exceed the rated capacity of the torque transducer.
- ④ The response of this product is 500Hz. Set the appropriate low-pass filter for the output voltage, taking into account the torsional natural vibration of the rotating system including this product.
- ⑤ If an overload may be applied to the torque converter, install a safety device against damage.
- ⑥ Make sure that the installation location has sufficient strength.
- ⑦ Use this product at the ambient temperature within the temperature compensation range.
- ⑧ Avoid sudden temperature changes and direct heat.
- ⑨ Check the protection grade and use it in an environment with no condensation.
- ⑩ The cable should be separated with the power line of the motor. (Wiring 50cm or more apart)
- ⑪ Avoid noise in environments with strong electric and magnetic fields, as noise may occur.
- ⑫ Do not excessively bend or pull the cable outlet.
- ⑬ When carrying, do not hang this product by the cable.
- ⑭ In a vibrating environment, fix the cord near the cable outlet to prevent vibration.
- ⑮ If loosening screws are concerned, re-tighten regularly or take anti-rotation.
- ⑯ When installing to medical equipment or other equipment related human life, prepare a protection circuit in case the function of the instrument stops.
- ⑰ Do not disassemble the torque transducer.
- ⑱ Do not drop any objects or give a shock to the torque transducer.
- ⑲ When disposing, please consider the environment.

## 9. Treatment of abnormal

If an excessive rotation speed, overload of torque, bending or thrust direction is applied, be sure to recalibrate to see if it can be used normally.

If indicate unstable or abnormal, check that the connection with the instruments is correct and secure, check the caution on usage, and then perform the following checks on the torque transducer.

- ① Check if the output changes when you twist the shaft by hand.
- ② Check that the output (zero balance) at no load is not greatly deviated.

If any of the above measured values are abnormal, please contact us.

And if you have any questions about the connection method or other matters, please also contact us.

## 10. Warranty

The warranty for this equipment is valid for a period of one year from the date of delivery. For repairs or service during the warranty period, please contact us or the dealer you purchased.

The information provided in this manual is subject to change without notice.







●The contents of this manual may subject to change without notice.

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