

# Torque Transducers

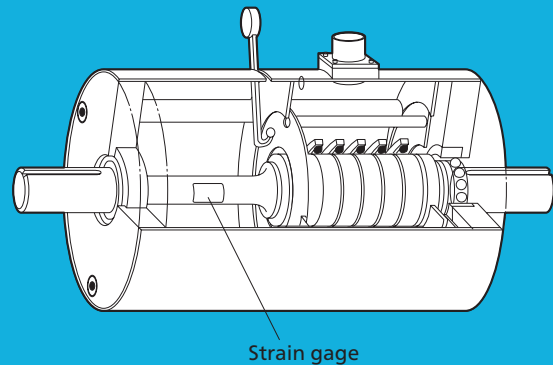
TRANSDUCERS

Kyowa's torque transducers convert torsion (surface shearing stress) corresponding to a torque of the shaft to an electric quantity (voltage), and then output signals through slip ring, brush, rotary transformer and photo transmittance. They ensure accurate and easy measurement of the torque transmitted from the target object under conditions of standstill to high-speed rotation.

Since all these transducers use strain gages for the sensing element, precise and stable measurement is assured even for long-term operation under severe conditions. Thus, they can widely be used not only for experiments and research but also for industrial measurement.

Kyowa's torque transducers are designed for use in combination with strain amplifiers. Kyowa's recorder/analyzer enables simultaneous measurement of torque and other variables such as temperature.

## ■ Torque Transducers



### Features

- Stable torque measurement under various conditions from stop to high-speed rotation
- Highly accurate torque measurement with minimal effect of bending or thrust of the shaft
- Little impact from shaft bending or sliding, enabling high accuracy torque measurements



Torque Transducers

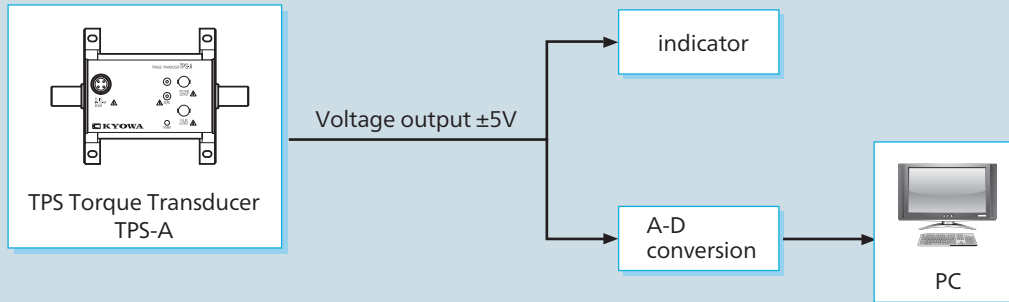
### To Ensure Safe Usage

Kyowa's torque transducers are designed to detect torsional deformation of a metal shaft by using a strain gage. Torque is measured on a shaft placed between a motor and a load. If torque exceeding the rated capacity is applied to the torque transducer, a shaft will be deformed plastically and then be destroyed. Also, if overload torque continues to be applied, this results in fatigue destruction of shaft.

In TP series, shafts are covered with metal case which prevents scattering broken pieces by destruction, but make sure to take countermeasures.

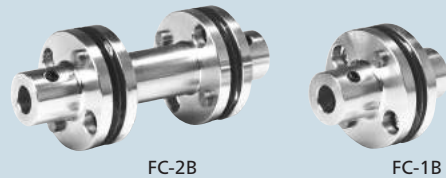
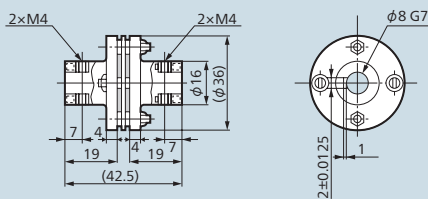
- (1) Kyowa's torque transducers are designed to transmit torsional torque. Make sure that the end of the shaft does not receive any radial or thrust load. Loads except torsional load may cause destruction of a shaft by applying excessive stress.
- (2) For TP series torque transducers, use a flexible coupling. Rigid flange coupling causes a shaft excessive stress leading to worsen performance and destruction.
- (3) If the load has a high inertia and the motor rotation rises up quickly, the transducer may momentarily be loaded with a large torque. Make sure to choose a suitable torque transducer which has enough rated capacity.
- (4) In dynamic torque measurement, pay attention to a natural frequency of a torsion which depends on relationships among both inertias of a motor and a load and a torsional rigidity of a torque transducer. Also, avoid rotating a shaft at a speed (rpm) approaching a natural frequency of a measurement system.

### Block Diagram of Measurement System of TPS Torque Transducers

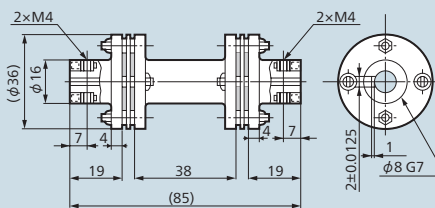


### Flexible Couplings Dedicated to TP-D/E/M

- FC-1B, Single Type  
(For use where there is no eccentricity but only declination)
- FC-2B, Double Type  
(For use where there are both eccentricity and declination)


**FC-1B**


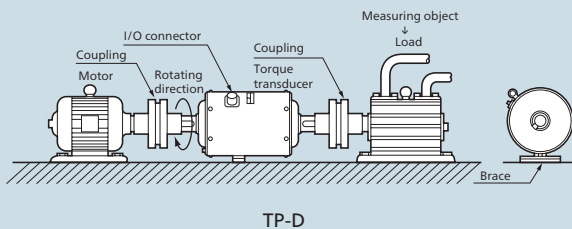
Max. Angular Deviation: 0.8°  
 Torsion Spring Constant: Approx. 800 N·m/rad  
 Weight: Approx. 40 g

**FC-2B**


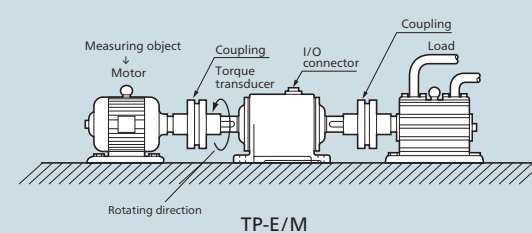
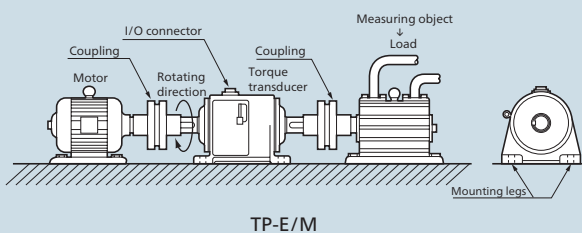
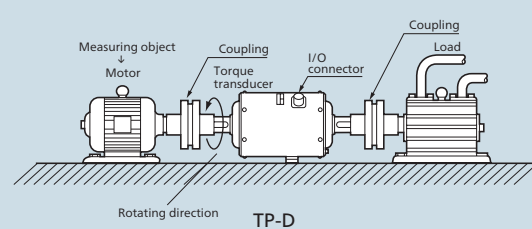
Max. Eccentricity: 0.5 mm  
 Max. Angular Deviation: 0.8°  
 Torsion Spring Constant: Approx. 800 N·m/rad  
 Weight: Approx. 80 g

### Method how to install TP Torque Transducer (Check the I/O connector position and measuring object when installing.)

#### ● To measure load torque



#### ● To measure motor torque



Mounting bolts are not included in accessories to the transducer.

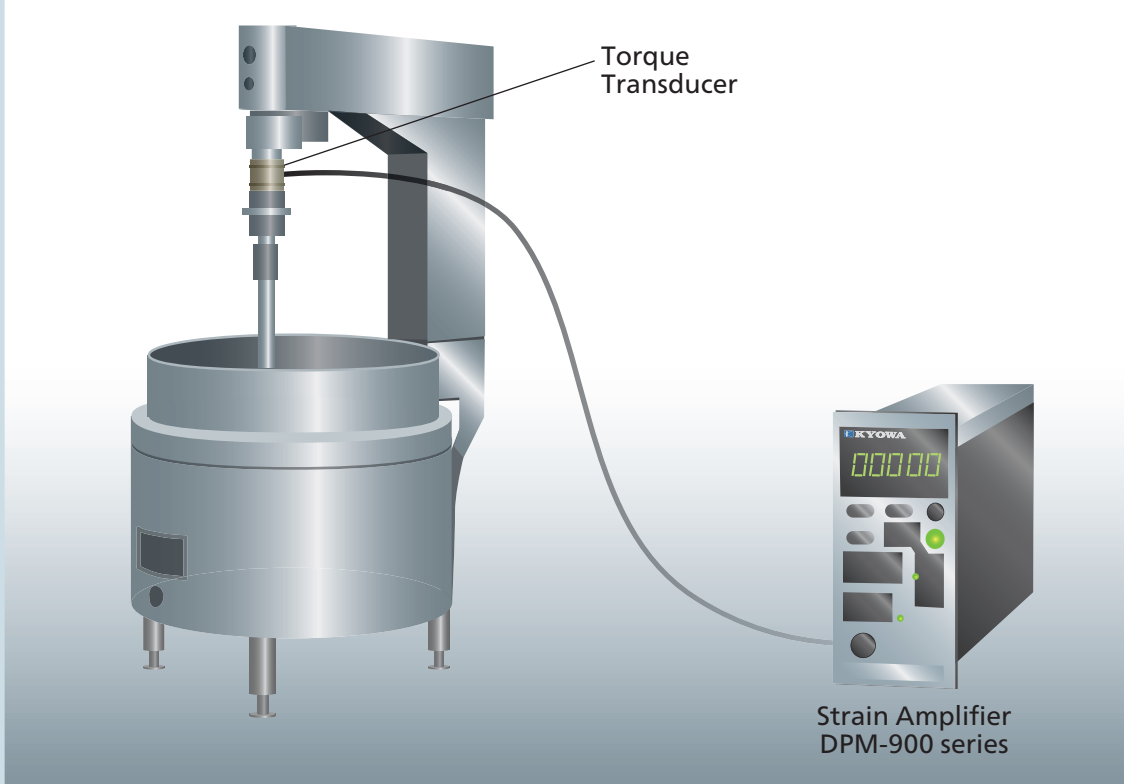




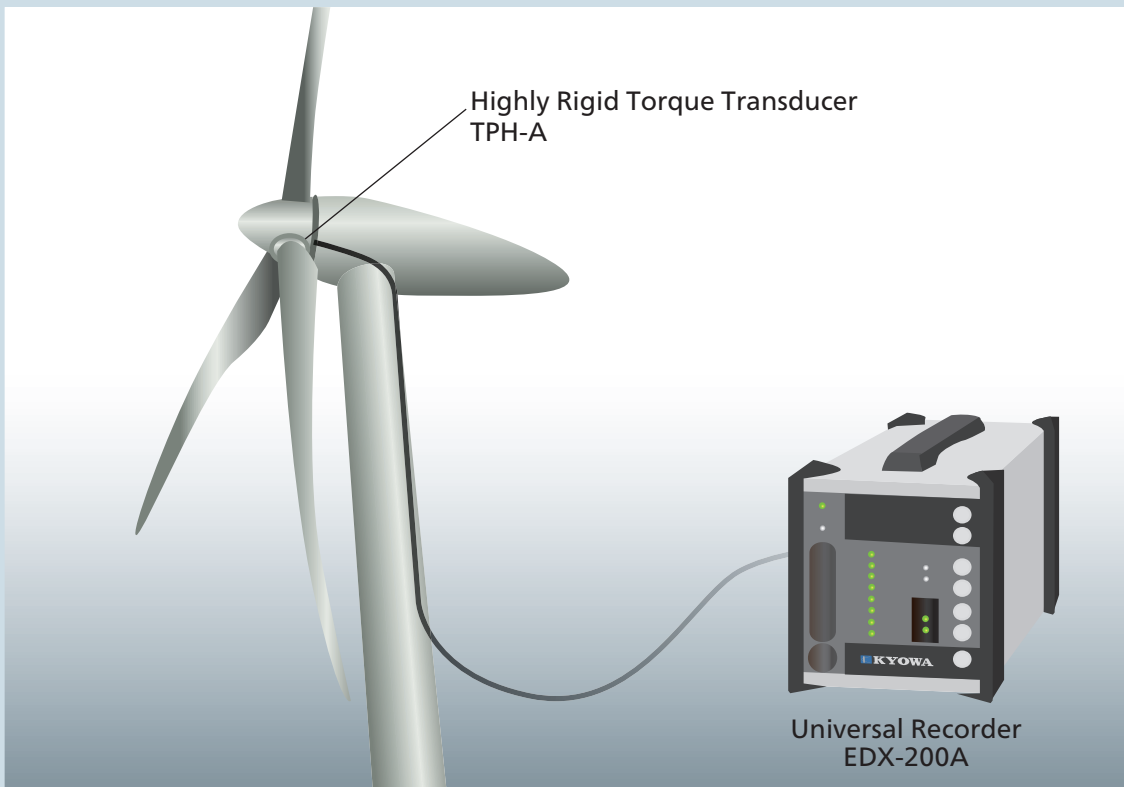
## Torque Transducers measurement examples

TRANSDUCERS

- Torque measurement and control of a stir machine when food is stirred

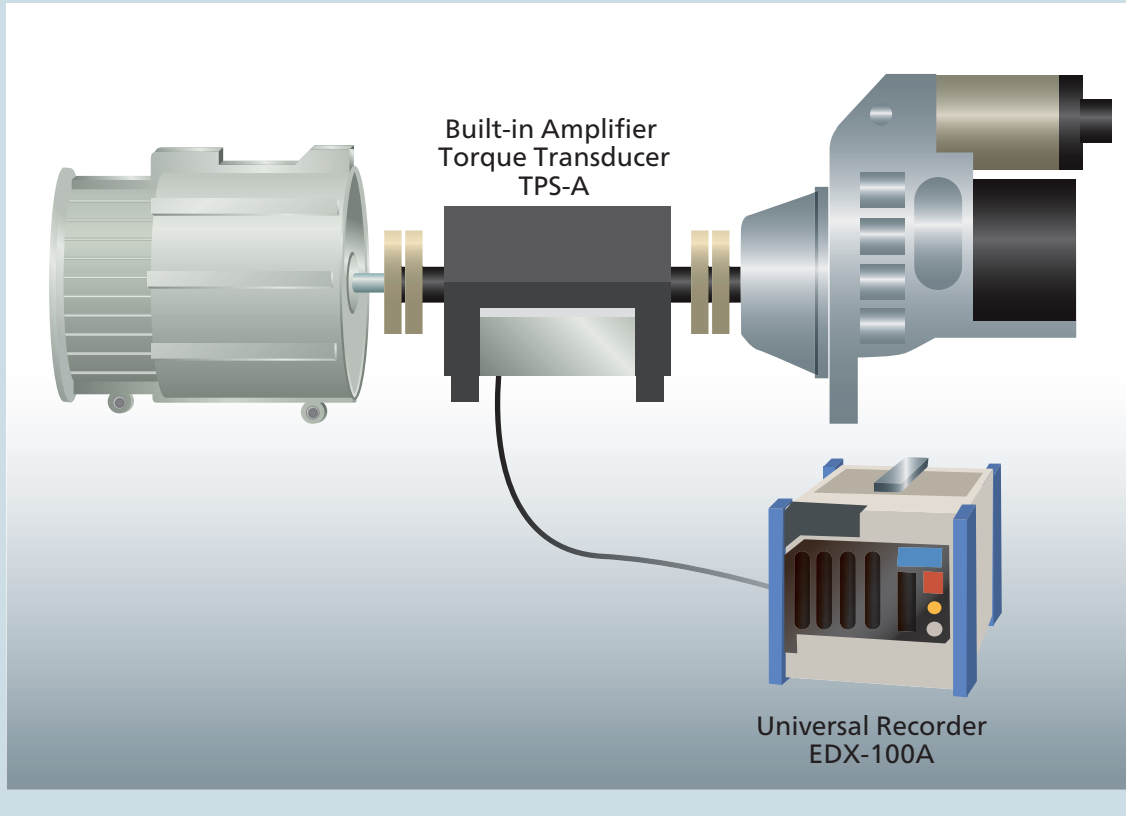


- Torque measurement of wind power generators and dynamos









Torque Transducers

## ● Torque evaluation of motors



## Torque Transducer Selection Chart

Models		Rated capacity															Pages		
		N-m										kN-m							
		0.2	0.5	1	2	5	10	50	100	200	500	1	2	5	10	20		40	50
Compact	Compact, small capacity <b>TP-D</b> 	Yes	Yes	Yes	Yes														2-144
	Compact, small capacity <b>TP-E</b> 	Yes	Yes	Yes	Yes														2-144
For High Speed	Rotation Speed 3000 to 15000 rpm <b>TP-M</b> 	Yes	Yes	Yes	Yes	Yes													2-145
Built-in Amplifier	Compact lightweight <b>TPS-A</b>  <b>NEW</b>			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes						2-139
Highly Rigid	Noncontact, Optical Transmission <b>TPH-A</b> 										Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2-141
Non-revolving type	Compact, High capacity <b>TPR-S-10KNMSA48</b>  <b>NEW</b>														Yes				2-147

