



# TQP Type TORQUE TRANSDUCER

## Instruction manual

No. 92

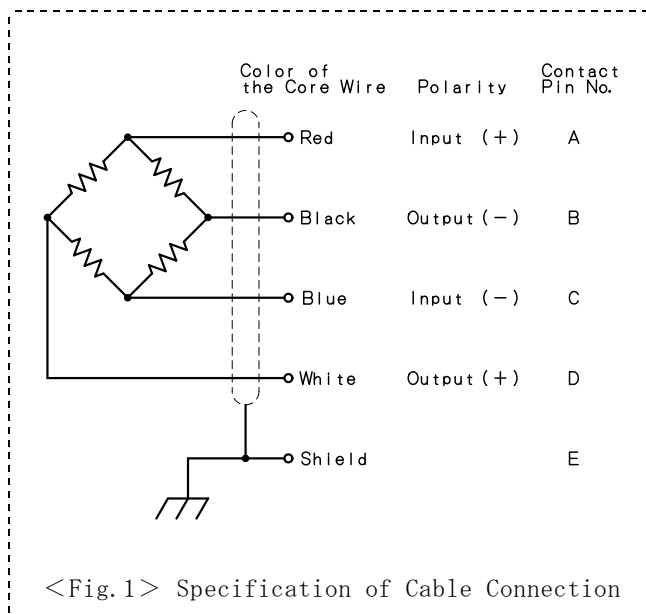
### ●Cable connection methods

Connection methods are shown in the <Fig 1>. If you have misconnecting, there might be troubles with zero balance and errors on output voltage under torque condition.

### ●Maximum Admissible Excitation Voltage

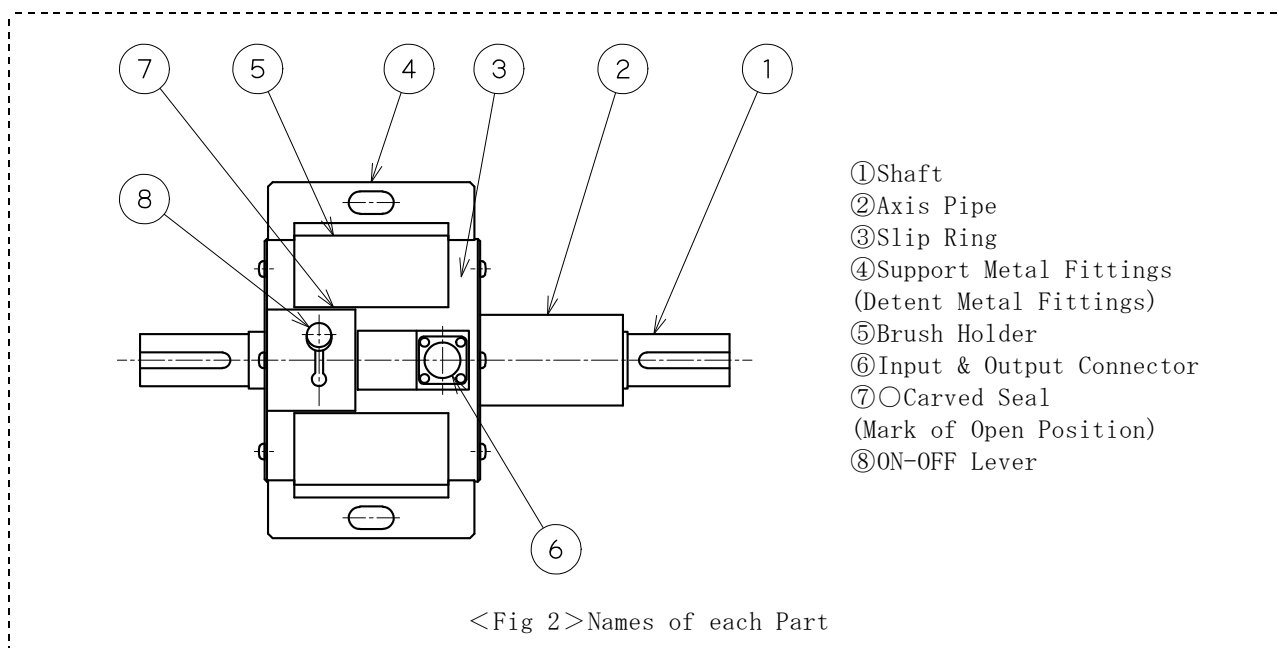
Maximum Admissible Excitation Voltage (AC/DC)	10 V
Normal Range of Excitation Voltage (AC/DC)	8 V

<Table 1>



### ●Names of each Part

TQP is structured that shaft (Axial of Rotation) on which strain gauges are put and slip rings are incorporated, and that torsion being applied on shaft convert to electric signal and then acquire output.



● Installation and Handling Cautions

- 1) Installation of TQP is based on the opposite shafts (the drive shaft & transmission sides).
- 2) Installation should be set so as not to be applied bending load and axis load on TQP.
- 3) Installation of TQP and the opposite shaft is fixed by parallel key using coupling.  
Refer to <Table 2> for keyway clearance and to <Table 3> for key clearance.

Rated Capacity(N・m)	5	10	20	50	100	200	500	1 k	2 k	5 k	10 k	20 k
t (mm)	$3^{+0.1}_0$	$3^{+0.1}_0$	$3^{+0.1}_0$	$4^{+0.2}_0$	$4^{+0.2}_0$	$5^{+0.2}_0$	$5^{+0.2}_0$	$7^{+0.2}_0$	$7^{+0.2}_0$	$8^{+0.2}_0$	$8^{+0.2}_0$	$11^{+0.2}_0$
b (mm)	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$7^{0}_{-0.036}$	$7^{0}_{-0.036}$	$10^{0}_{-0.036}$	$10^{0}_{-0.036}$	$18^{0}_{-0.043}$	$18^{0}_{-0.043}$	$24^{0}_{-0.052}$	$24^{0}_{-0.052}$	$32^{0}_{-0.062}$

<Table 2>Keyway Clearance

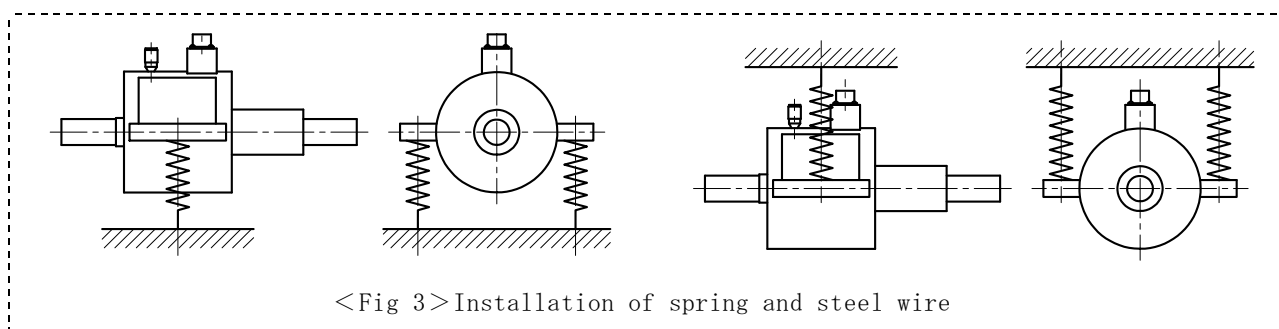
※JIS B 1301

Rated Capacity(N・m)	5	10	20	50	100	200	500	1 k	2 k	5 k	10 k	20 k
h (mm)	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$7^{0}_{-0.036}$	$7^{0}_{-0.036}$	$8^{0}_{-0.090}$	$8^{0}_{-0.090}$	$11^{0}_{-0.110}$	$11^{0}_{-0.110}$	$16^{0}_{-0.110}$	$16^{0}_{-0.110}$	$18^{0}_{-0.110}$
b (mm)	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	$7^{0}_{-0.036}$	$7^{0}_{-0.036}$	$10^{0}_{-0.036}$	$10^{0}_{-0.036}$	$18^{0}_{-0.043}$	$18^{0}_{-0.043}$	$24^{0}_{-0.052}$	$24^{0}_{-0.052}$	$32^{0}_{-0.062}$

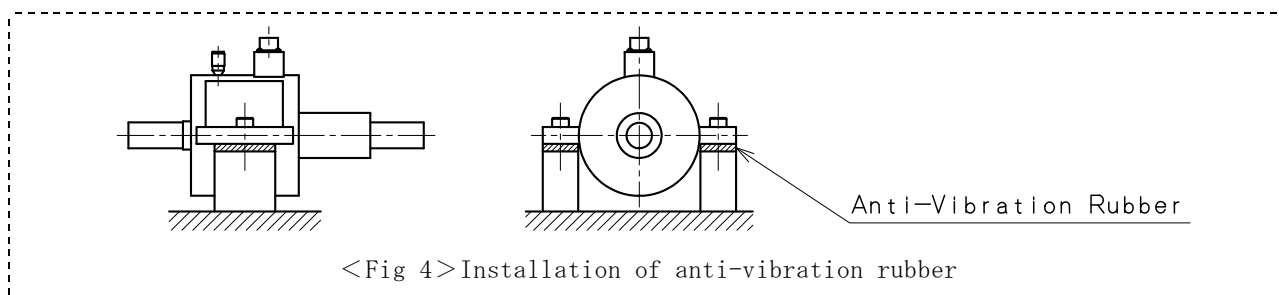
<Table 3>Key Clearance

※JIS B 1301

- 4) After installation of TQP and the opposite shafts, support metal fittings ④. is fixed on outer side <Fig 2> avoiding rotation of TQP itself <Fig 3&4>.



<Fig 3> Installation of spring and steel wire



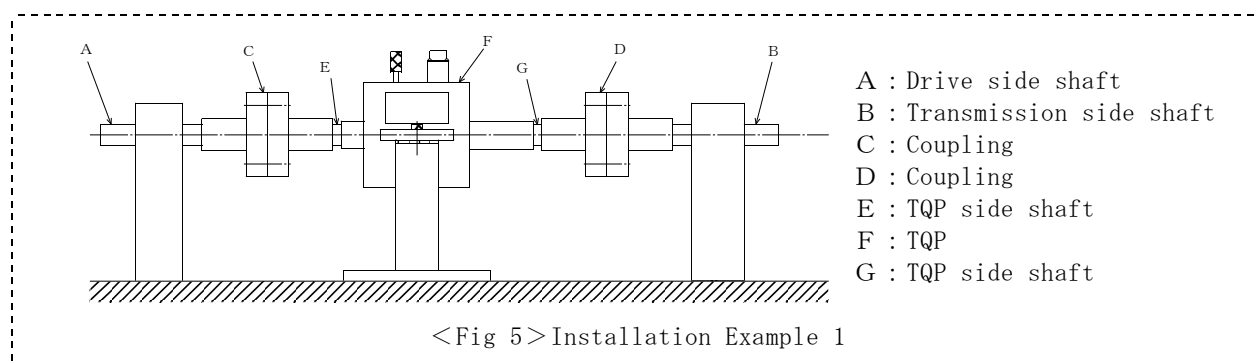
<Fig 4> Installation of anti-vibration rubber

As the above installation example is based on all shafts of opponent, if <Fig 2> excessive force is applied to TQP by fastening support metal fittings ④ tightly, unnecessary heat may be generated for TQP bearing at eccentricity, and so forth.  
So, please install it padding as <Fig 3> and <Fig 4>.

- 5) Installation supporting parts of TQP are designed based on the opponent shafts though installation methods of TQP are provided by directions for use of coupling. If <Fig 2> support metal fittings ④ and axis pipe ② are not adjusted in parallel, it can't be fixed as Plumber Block due to insufficient strength as way of fixation.

Basic installation examples are shown on <fig 5> and <Fig 6>.

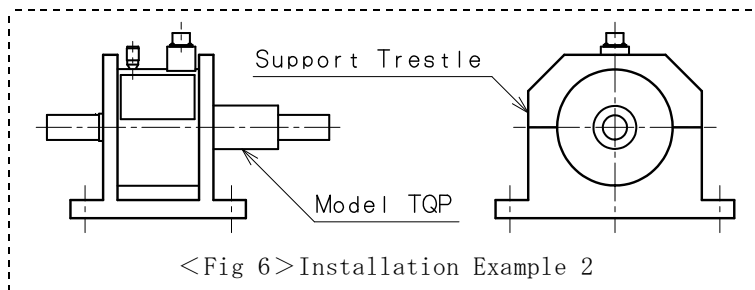
### Installation Example 1.



- 1) This installation sample is based on the opponent side shaft.
- 2) Installation should be set so as not to be applied bending load and axial load on TQP.
- 3) Coaxial and parallel degrees of drive side shaft and transmission side shaft should be adjusted within 2/100 to 3/100mm.
- 4) Fixed coupling should be basically used for “C” and “D” couplings.

### Installation Example 2.

In case of when you fix TQP and use gear and universal coupling, etc., you need to fix it with support trestle as <Fig 6> and then remove support metal fittings ④ as <fig 2>.



※1. Please contact our sales department if you need to have detailed explanation about jig installation procedure.

### ●Rotatory Direction

In case of seeing TQP from transmission side, output voltage is positive polarity at anti-clockwise though it can be also used at clockwise.

In case of changing polarity, <Fig 1> it should be worked at the input terminal sides (A,C terminal) of cable connection specifications.

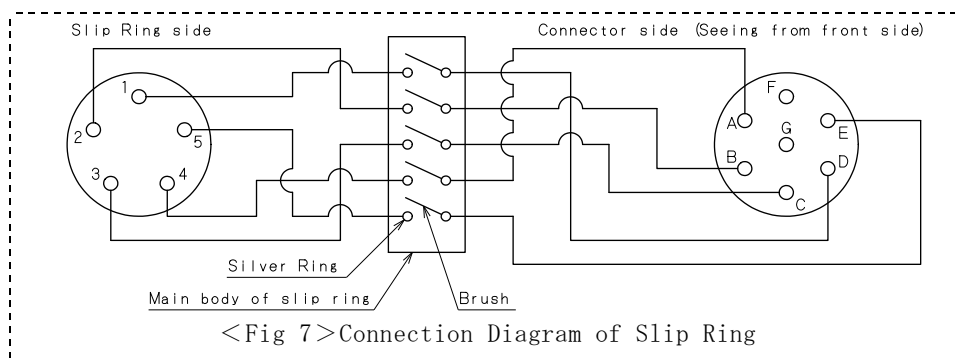
### ●ON-OFF Operation for Rotor (Silver Ring) and Stator (Brush)

Silver Ring and brush are switched at ON-OFF lever ⑧ of <Fig 2>. Measuring condition is set at the position ON and then electric signal is output.

ON-OFF operation can be worked at the time of rotating but please be sure to set the position OFF even it's rotating if you do not measure. (※2) It's extremely influenced for the lift of slip ring.

When you operate ON-OFF lever, please slightly slide it lifting up the lever.

Please refer to <Fig 7> for connection of slip ring.



※2. <Fig 8> Please refer to rotor friction time conversion graph.

## ●Cleaning of Brush and Silver Ring

In case of when it is used for many hours, brush is worn and wear debris (abrasion powder) are adhered to silver ring and then noise may be louder at the end.  
TQP is therefore structured that brush holder can be easily removed and be cleaned up wear debris smoothly.

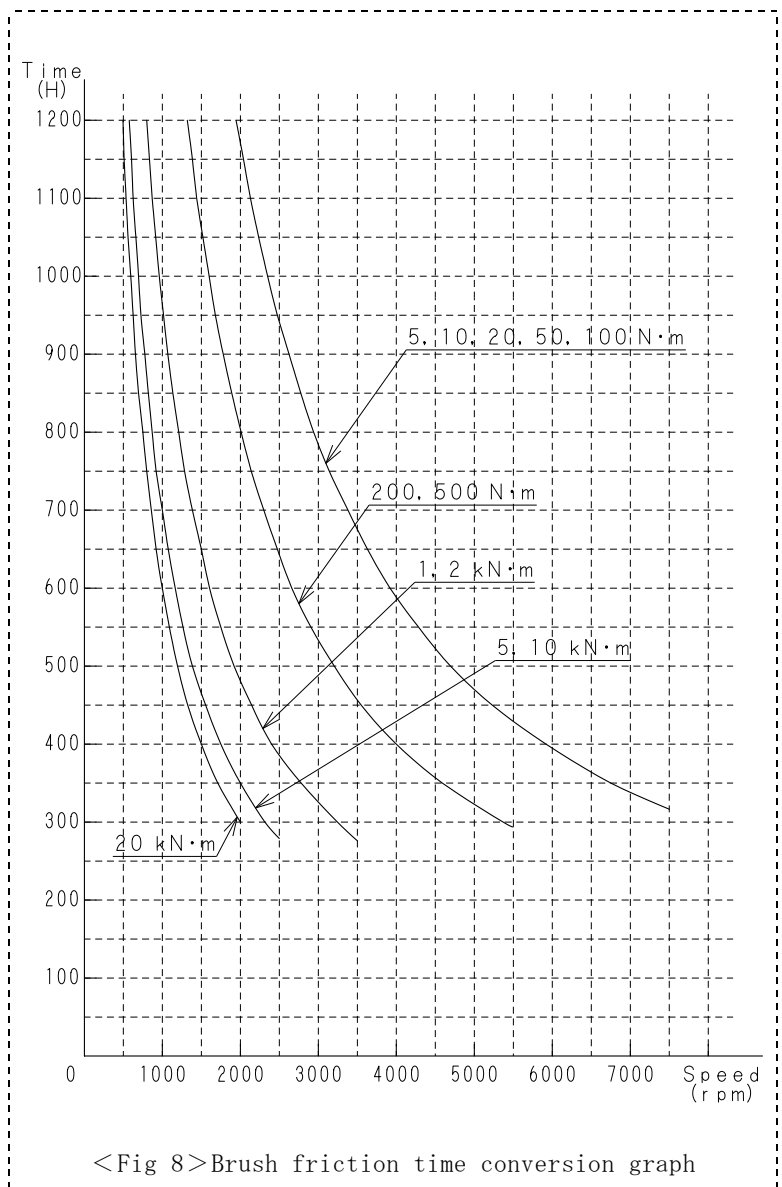
Please follow methods of cleaning as under:

- 1) Remove support metal fittings ④ of <Fig 2>.
- 2) Loosen M4 screws of 4 corners by which clear plate of brush holder ⑤ is fixed.
- 3) Insert slotted driver, etc. from ○carved seal side and then remove clear plate of brush holder ⑤.
- 4) Remove brush holder as plug-type terminal can be removed.
- 5) Clean up powders which are accumulated at each part by wear.  
Of the part of ring face in inner side, work after removal of brush holder and opening it.
- 6) After clean up, put plug-type terminal back and then fit up brush holder at original position.
- 7) Fasten M4 screws tightly as noise is occurred if screws are loosen.

## ●Replacement of Brush Holder

- 1) Amount of wear is relative to rotary speed.  
Check brush life integrating times as <Fig 8>.
- 2) Of replacement of brush, work as methods of cleaning up brush and silver ring and then fit up a new brush.

※ 3. Please contact our sales department if you need to have detailed explanations directly from us such as methods of replacement of brush holders, etc..



## ●Models and Specifications

Rated Capacity(N・m)	5	10	20	50	100	200
Reel Torsion Number of Vibrations(kHz)	14.0	14.0	14.0	4.0	4.8	2.5
Reel Rating Torsion Corner(° )	0.212	0.146	0.281	0.225	0.825	0.470
Moment of Inertia(kg・cm <sup>2</sup> )	0.615	0.615	0.615	0.715	0.725	4.925
Rotary Spring Constant(kN・m/rad)	1.324	2.452	3.923	5.884	6.767	23.54
Permissible Gudgeon Load(N)	7.845	13.73	23.54	24.52	32.36	329.9

Rated Capacity(N・m)	500	1 k	2 k	5 k	10 k	20 k
Reel Torsion Number of Vibrations(kHz)	4.7	2.1	3.3	2.3	3.6	2.1
Reel Rating Torsion Corner(° )	0.647	0.382	0.435	0.372	0.567	0.407
Moment of Inertia(kg・cm <sup>2</sup> )	5.075	48.75	49.50	261.3	267.5	1170
Rotary Spring Constant(kN・m/rad)	43.15	166.7	255.0	755.1	980.7	2769
Permissible Gudgeon Load(N)	142.2	196.1	382.5	755.1	1.520 k	1.961 k

## ●Use Environment and Caution

1. In case of when this is not used for many hours, please operate it in advance and then remove oxide film on slip ring before use again.
2. This unit is not waterproof. Please avoid water and moisture.
3. Please avoid corrosion.
4. Please do not stretch or bend the cable. It might be broken. If the cable is not stable, Please fix the cable.
5. Compensated temperature range is -10~45°C
6. Please avoid to be affected by noisy lines or AC lines to prevent malfunction of connection line of this unit.

## ●Maintenance

We suggest you to have a yearly maintenance and calibration (both with the extra Charge) to maintain the quality of this product.

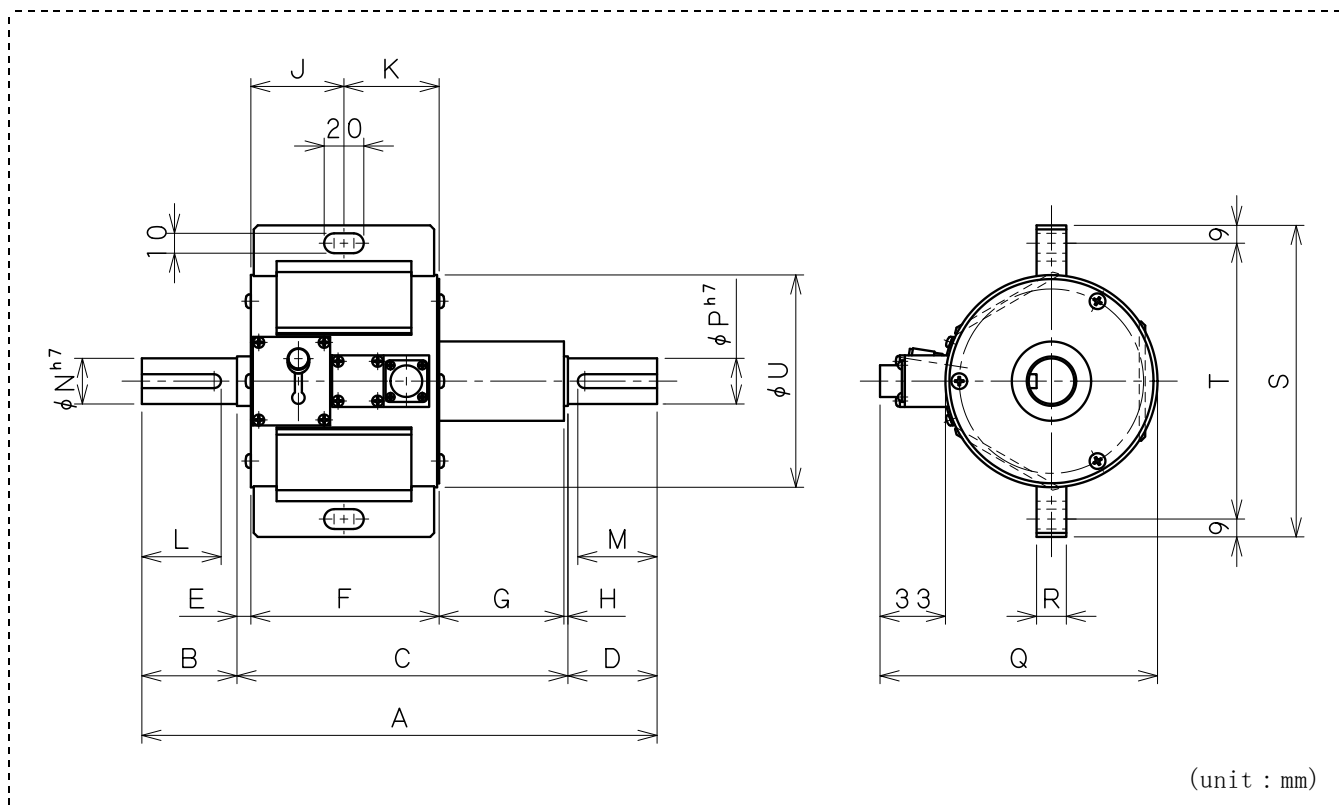
## ●Warranty

This product has a warranty of one year after purchases. When there is any troubles or machine break down, we will repair the machine without any additional charges.

But for your misuse or disassembly, then we are not responsible for guarantee.

Please understand the situation that sometimes the machine is beyond repair due to the unlimited overload and voltage.

## ●Dimensional Drawing



## ●Dimensional Chart (unit : mm)

Model	Rated Capacity	A	B	C	D	E	F	G	H	J	K	L M	N P	Q	R	S	T	U
TQP- 5NB	5 N · m	268	47	173	48	7	95	63	8	47	48	35	20	140	15	157	139	107
TQP- 10NB	10 N · m	268	47	173	48	7	95	63	8	47	48	35	20	140	15	157	139	107
TQP- 20NB	20 N · m	268	47	173	48	7	95	63	8	47	48	35	20	140	15	157	139	107
TQP- 50NB	50 N · m	260	48	167	45	7	95	63	2	47	48	40	23	140	15	157	139	107
TQP-100NB	100 N · m	260	48	167	45	7	95	63	2	47	48	40	23	140	15	157	139	107
TQP-200NB	200 N · m	300	65	175	60	7	105	63	/	52	53	50	38	140	15	157	139	107
TQP-500NB	500 N · m	300	65	175	60	7	105	63	/	52	53	50	38	140	15	157	139	107
TQP- 1KNB	1 kN · m	385	97	191	97	3	114	74	/	56	58	80	63	168	15	179	161	135
TQP- 2KNB	2 kN · m	385	97	191	97	3	114	74	/	56	58	80	63	168	15	179	161	135
TQP- 5KNB	5 kN · m	500	140	219	141	4	129	86	/	64	65	115	90	205	20	216	198	172
TQP-10KNB	10 kN · m	500	140	219	141	4	129	86	/	64	65	115	90	205	20	216	198	172
TQP-20KNB	20 kN · m	680	190	254	236	10	139	105	/	69.5	69.5	160	115	243	20	251	233	210

# SPECIFICATIONS

TYPE	T Q P
Rated Capacity	5 N · m ~ 20 kN · m
Safe Overload Rating	120 %R. O.
Ultimate Overload Rating	150 %R. O.
Rated Output	5 ~ 20 N · m : 0.5 mV/V ± 1 % 50 N · m : 1 mV/V ± 1 % 100 N · m ~ 20 kN · m : 1.5 mV/V ± 1 %
Linearity	0.3 %R. O.
Hysteresis	0.2 %R. O.
Repeatability	0.2 %R. O.
Admissible Excitation Voltage	10 V, Normal Range 8 V
Input Resistance	350 Ω
Output Resistance	350 Ω
Compensated Temperature Range	-10 ~ +60 °C
Safe Temperature Range	-15 ~ +75 °C
Temperature Effect on Zero Bance	0.01 %R. O. /°C
Temperature Effect on Output	0.01 %/°C
Connector	PRC03-21A10-7F
Remarks	Attached Cable : L-A-5 (A connector of both ends is PRC03-12A10-7M) Brush Materials : Silver Graphite Ring Materials : Ternary Alloy Silver Base

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