Model 1865
Non-Contact Rotary Torque Transducers

Description

Model 1865 rotating torque transducer (RTT) is developed to measure small rotary torque down to 5 milli Newton-meters (5 milli-Nm). The 1865 RTT is composed of a rotor, a stator and two mechanical bearings in between the rotor and the stator. The rotor acts as a shaft to measure torque, while the stator supplies electric power to the rotor and transmits torque signal from the rotor to a SSC (sensor signal conditioner).

Making advantages of the electromagnetic induction principle, model 1865 has no electric brush between the rotor and the stator for the power and signal transmission. Therefore, this RTT is an ideal device for applications which require long term durability and a few of maintenance of the mechanical bearings.

The measuring torque capacities of 1865 RTT can be of minimum 5 milli-Nm and of maximum 2 Nm with accuracy of 0.5%fs. Its output signal is ±6Vdc square wave frequencies, ranging from 5 kHz to 15 kHz for each of the torque capacities. Upon request, this 1865 RTT can be integrated with a speed sensor to measure rotor's speed. The rotor speed is measured by means of a tachometric wheel of the speed sensor at a rate of 60 pulses per revolution.

This RTT is designed for bidirectional (both clockwise and counterclockwise) torque measurement. Nevertheless, it can be also used for unidirectional (either clockwise or counterclockwise) torque measurement as well.

When 1865 RTT is installed in torque measuring systems, the input end of its rotor will be connected via a coupling to the output end of a gear box of motors, while its output end will be connected through a coupling to the input end of its load. Thanks to its ability to precisely measure very small rotary torque, one of its applications of 1865 RTT is to indirectly measure viscosity coefficient of viscose.

Features

- capacity: 0.005Nm, ..., 2Nm
- output signal: frequencies from 5kHz to 15kHz
- maximum allowed rotation speed: 5000rpm
- measuring accuracy: 0.5%fs
- for either bidirectional or unidirectional measurements

Applications

- very small rotation torque measuring or monitoring
- rotation torque dynamometers used for lab
- indirect measurement of viscosity coefficient

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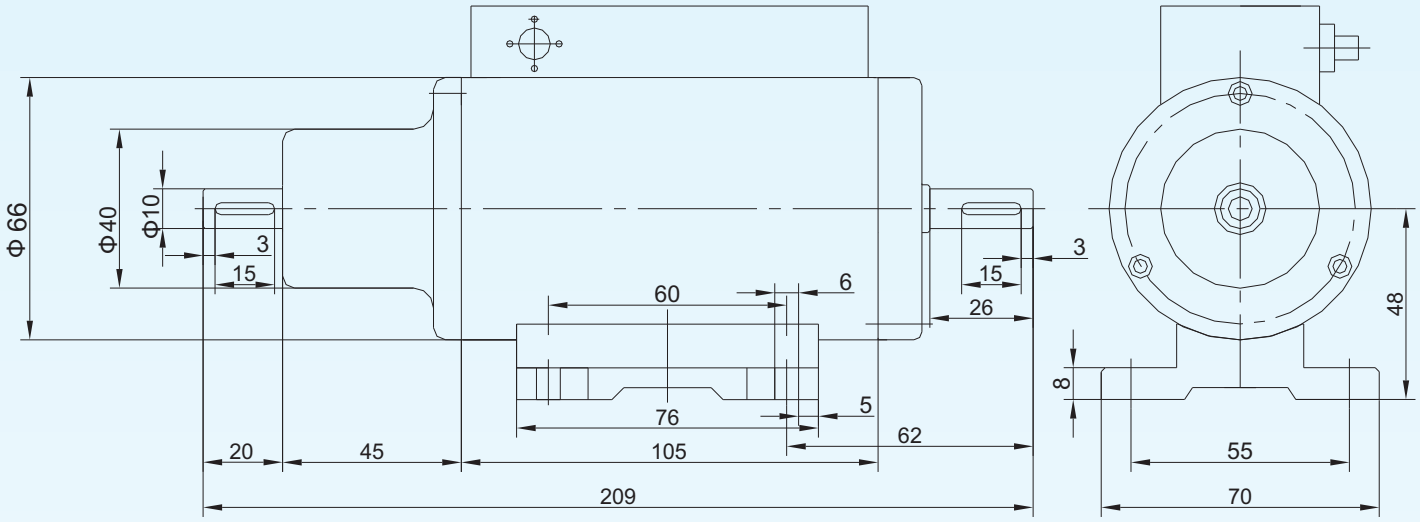
Dimensions (depending on capacity, listed below is an example of capacity of 1Nm)



Note: All dimensions are in mm.

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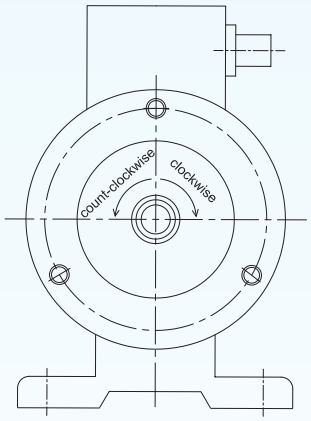
Technical Data

Parameters	Units	Specifications	Notes
capacity	Nm	±0.005, ±0.01, ±0.02, ±0.05, ±0.1, ±0.2, ±0.5, ±1, ±2	1
safe load limit	%fs	120	
ultimate overload	%fs	150	
output signal of torque measurement		5~15kHz frequency signal of ±6V square wave	
accuracy of torque measurement	%fs	better than ±0.5	
maximum allowed rotation speed	rpm	500, ..., 5000 depending on torque capacity	2
speed measuring range	rpm	up to the maximum allowed rotation speed	3
output signal of speed measurement	Vdc	0~5	
accuracy of speed measurement	%fs	better than ±0.1	
speed measuring rate	pulse/turn	60	
power supply	Vdc	24 (standard), ±15	
load current	mA	< 10	
response time	ms	0.1	
storage temp. range	°C	-40 ~ +80	
operating temp. range	°C	-30 ~ +80	
compensated temp. range	°C	0 ~ 40	
temp. coefficient of span	%fso/°C	⩽ ±0.2	
temp. coefficient of zero	%fso/°C	⩽ ±0.2	
material of rotor / stator		mild steel / mild steel	
environment protection		IP66	
mechanical interface		refer to dimension drawings	
electrical interface		M12 socket with either matting plug or matting plug of 1.5m PVC cable	
unit weight	kg	0.8, ..., 120 (capacity dependent, to be confirmed in case of order)	

Notes: 1. "+" refers to rotating clockwise, while "-" to counterclockwise, as shown in a sketch below:



2. Torque capacity vs maximum allowed rotation speed:

toque capacity (Nm)	maximum allowed rotation speed (rpm)
±0.005	500
±0.01, ..., ±2000	5000

3. This function is available if it is indicated in Ordering Code as a request.

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Ordering Information

position (pos.) 1: model

1865

pos. 2: torque capacities vs measuring range (^)

(-0.005/+0.005)Nm
(-0.01/+0.01)Nm
(-0.02/+0.02)Nm
(-0.05/+0.05)Nm
(-0.1/+0.1)Nm
(-0.2/+0.2)Nm
(-0.5/+0.5)Nm
(-1/+1)Nm
(-2/+2)Nm

(^): Any nominal range as listed above is a designed range or a physical capacity of a corresponding transducer, which is also called the full scale (fs) of this transducer. The measuring range is a range of physical quantity which Buyer wants to measure or monitor, and must be either within or maximum equal to the nominal range of the selected transducer. A right transducer can be selected if its nominal range just covers the measuring range in Buyer's application. Buyer must indicate the nominal range for "pos. 2" in Ordering Code. The nominal range (or the "fs") of transducers corresponds to a complete "bidirectional (clockwise and counterclockwise)" torque range with "+" for clockwise torque while "-" for counterclockwise torque. The transducer output span of frequencies (5~15 kHz) is calibrated to its fs.

For example, if Buyer wants to purchase a transducer to measure or monitor rotary torque from -0.5 Nm to +0.5 Nm, he had better select the transducer of nominal range from -0.5 Nm to +0.5 Nm by indicating (-0.5/+0.5)Nm for "pos. 2" when he defines Ordering Code. After having this done, with the selected transducer Buyer can obtain an output frequency signal of "5kHz of ±6V square wave (^^)" when the measured torque is "-0.5 Nm", "10kHz of ±6V square wave (^^)" when the measured torque is "0 Nm", and "15kHz of ±6V square wave (^^)" when the measured torque is "+0.5 Nm".

Another example is that, suppose Buyer wants to measure or monitor rotary torque from -0.4 Nm to +0.45 Nm, he needs still to purchase the transducer of nominal range of (-0.5/+0.5)Nm and indicate the (-0.5/+0.5)Nm for "pos. 2" in Ordering Code. As such, with the selected transducer Buyer can obtain an output frequency signal of "6kHz of ±6V square wave (^^)" when the measured torque is "-0.4 Nm", "10kHz of ±6V square wave (^^)" when the measured torque is "0 Nm", and "14.5kHz of ±6V square wave (^^)" when the measured torque is "+0.45 Nm".

In the latter example, if Buyer's interest is only to measure or monitor rotary torque from -0.4 Nm to 0 Nm (or: from 0 Nm to +0.45 Nm), he has to purchase still the same transducer and indicate the (-0.5/+0.5)Nm for "pos. 2" in Ordering Code. With the selected transducer, Buyer can obtain an output frequency signal of "6kHz of ±6V square wave (^^)" when the measured torque is "-0.4 Nm" while "10kHz of ±6V square wave (^^)" when the measured torque is "0 Nm" (or: "10kHz of ±6V square wave (^^)" when the measured torque is "0 Nm" while "14.5kHz of ±6V square wave (^^)" when the measured torque is "+0.45 Nm").

(^^): The frequency "5 kHz" corresponds to the lowest limit of "counterclockwise torque", "10 kHz" to "zero torque", and "15 kHz" to highest limit of "clockwise torque" of the nominal range.

pos. 3: output signal of torque measurement

5/15kHz(±6V)

pos. 4: accuracy of torque measurement

0.5%fs

pos. 5: speed measurement

NS = No speed measurement (standard)
YS = Speed is measured with "0~5V" calibrated to the "maximum allowed rotation speed".
YS(2000) = Speed is measured with "0~5V" calibrated to 0~2000 rpm (&)

(&): When Buyer wants a transducer with rotation speed to be measured, he needs to indicate either "YS" or "YS(maximum speed in his application)" for pos. 5 in Ordering Code, e.g., the indication of "YS(2000)" refers to "2000 rpm" as the maximum rotation speed in Buyer's application. In case Buyer does not indicate the "maximum rotation speed in the application" but only indicates "YS", the output signal of "0~5V" will be calibrated to the "maximum allowed rotation speed". The "maximum allowed rotation speed" can be found in Note-2 for Technical Data in page 3 for each torque capacity of transducers.

pos. 6: electrical interface

M12 = M12 socket with mating plug
M12/4/PVC/1.5 = M12 socket with mating plug fixed with Ø4mm shielded PVC cable of 1.5 meter length.
M12/4/PVC/# = M12 socket with mating plug fixed with Ø4mm shielded PVC cable of "#" meter length.

Standard cable length is 1.5 meter, but Buyer may define "#" for a desired cable length, e.g., "…/PVC/3" refers to a PVC cable of 3 meter length.

pos. 7: customized specifications

If Buyer wants one or more customized specifications, he can indicate "(*), (**), (***)" as the code(s) at the end of the Ordering Code, and further define what is (are) the specific customized specification(s) for "*" (and "**", "***", …). If there is no customized

pos.1	pos. 2	pos. 3	pos. 4	pos. 5	pos. 6	pos. 7

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Examples of Ordering Code

- standard transducer:

  1865-(-0.5/+0.5)Nm-5/15kHz(±6V)-0.5%fs-NS-M12
  1865-(-0.5/+0.5)Nm-5/15kHz(±6V)-0.5%fs-YS-M12/4/PVC/3
  1865-(-0.5/+0.5)Nm-5/15kHz(±6V)-0.5%fs-YS(2000)-M12/4/PVC/1.5

- customized transducer:

  1865-(-0.5/+0.5)Nm-5/15kHz(±6V)-0.5%fs-NS-M12-(*)

  (*) = The calibration certificate of output signal corresponding to the measured torque has to be supplied with the purchased transducer.

  1865-(-0.5/+0.5)Nm-5/15kHz(±6V)-0.5%fs-NS-M12/4/PVC/3/molex0430250600-(*)-(**)

  (*) = An Molex plug of P/N 0430250600 has to be attached at the end of cable.
  (**) = The calibration certificate of output signal corresponding to the measured torque has to be supplied with the purchased transducer.

  1865-(-0.5/+0.5)Nm-5/15kHz(±6V)-0.5%fs-YS(2000)-M12/4/PVC/3/molex0430250600-(*)-(**)-(***)

  (*) = An Molex plug of P/N 0430250600 has to be attached at the end of cable.
  (**) = The calibration data of output signals corresponding to the measuring range of torque has to be supplied with the purchased transducer.
  (***) = The calibration certificate of output signal “0~5V” corresponding to the measured rotation speed “0~2000rpm” has to be supplied with the purchased transducer.

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