Ziasiot

Instructions

Dynamic Torque Sensor

BPM812

attestation

ISO 9001:2015

Please read this instruction manual carefully before installation

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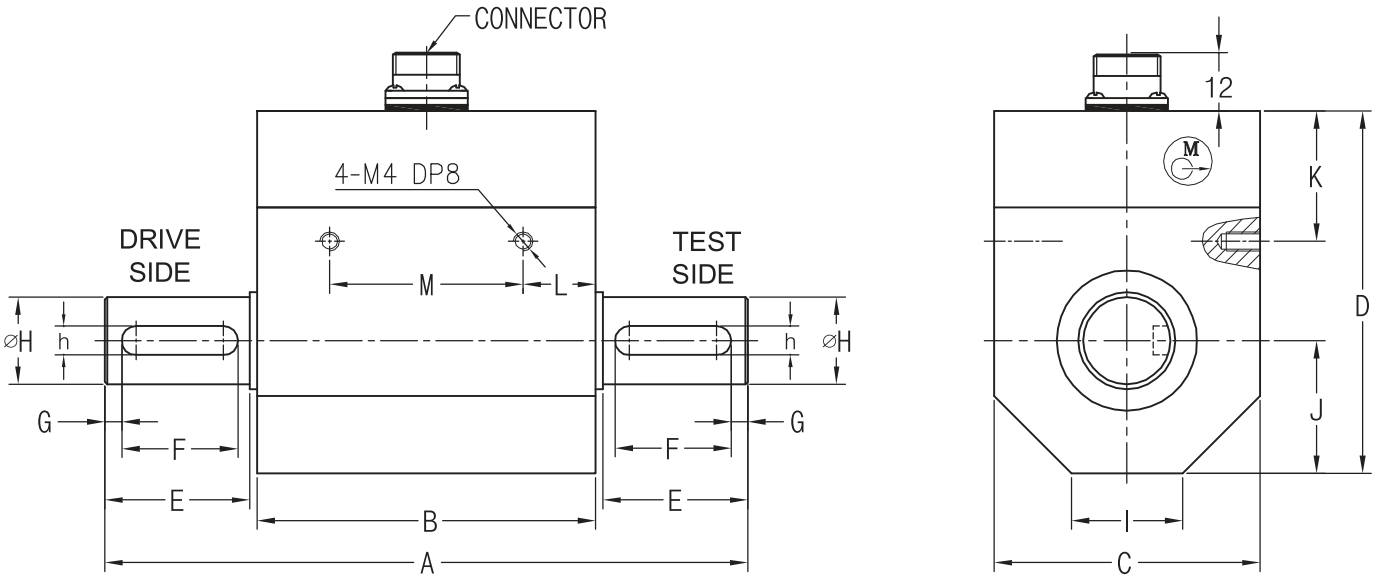
Content

- Non-contact
- Range 5-500Nm
- Output 10±5KHz, 4-20mA, ±5VDC, ±10VDC, RS485/232
- Stainless steel shaft
- Maximum speed 8000RPM
- Can be transferred to the speed output
- OLED panel can be used to display torque/revolutions/power

Technical Parameters

Range	5, 10, 20, 30, 50, 100, 200, 300, 500Nm
Torque output	10±5KHZ, 4-20mA, 0±5/10VDC, 0-5/10VDC, RS
Accuracy -%FS	485 ± 0.1,0.2
Supply electricity	12-30VDC
Zero point temperature effect-%RO/℃	The soldier is 0.02
Temperature effect of range-%RO/℃	The soldier is 0.02
Compensation temperature range-℃	-10 ~+60
working temperature -℃	-20~80
Electrical connections	6-pin or 8-pin
Safety overload-%RO	200
Shaft material	stainless steel
Sheathing material	aluminium

External dimensions (unit: mm)



Model	CAP (Nm)	A	B	C	D	E	F	G	H	h	I	J	K	L	M
WTQ2050A	5,10,20,30,50,100	133	70	55	75	30	24	3.5	18	6	23	27.5	27	15	40
WTQ2050B	200,300,500	144	70	65	85	35	30	3	28	8	29	32.5	28	12	46

Option

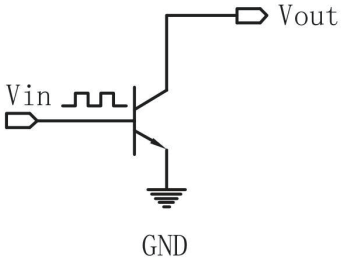
- Velocity measurement
- Speed -RPM.....0, 100,200-1000,2000,4000,6000,8000 RPM varies with range, specify when ordering
- It can be equipped with an OLED display that shows torque/revolutions/power at the same time
- The standard cable length is 5 meters. Please specify when ordering if you need to extend it
- Customizable

Appendix

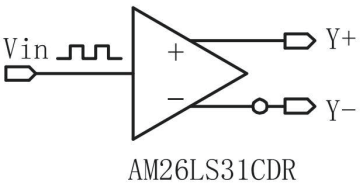
- Torque indicator
- Integrated instrument torque/revolutions/power
- Computer display software

External dimensions (unit: mm)

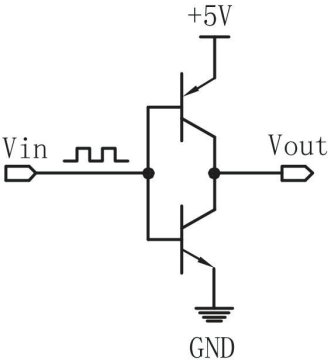
Open drain output



Differential output



Push out the output



	Mode of output	description
signal	Pulse open drain	For NPN open drain, users need to connect a pull-upresistor R to achieve pulse output. The output voltageis 5V when R is 330 Ω-1k Ω, 12V when R is 2k Ω-4.7kΩ, and 12V when R is 10k Ω-20k Ω.
		The default torque is 10±5KHz, and the default speed is 0-30KHz (60 pulses, 1KHz corresponds to 1000RPM)
		There is a special pulse frequency output, which should be specified when ordering.
	Pulse push pull	The default high level is +5V (also supports +12V),which should be specified when ordering
		The default torque is 10+5KHz, and the default speedis 0-30KHz(60 pulses,1KHz corresponds to 1000RPM)
		There is a special pulse frequency output, which should be specified when ordering.
	Pulse difference	The differential output chip is AM26LS31, and the recommended receiving chip is AM26LS32. It can alsodrive the optocoupler directly
		The default torque is 10±5KHz, and the default speed is 0-30KHz (60 pulses, 1KHz corresponds to 1000RPM)
		There is a special pulse frequency output, which should be specified when ordering.

signal	Voltage output	Full scale supports 0±1 0DCV, within the full scale range, users can arbitrarily specify the output range
		The default torque is 0±1 0DCV, and the default speed is 0-1 0DCV.
	Current output	Full scale supports 0-20mA, within the full scale range, users can arbitrarily specify the output range
		The torque is 4-12-20mA by default and the rotation speed is 4-20mA by default.
communication	RS485	Supported communication speed (bps): 115200,57600,38400,19200,9600,4800,2400. Default is 115200.
	RS232	Supported communication speed (bps): 115200,57600,38400,19200,9600,4800,2400. Default is 115200.
	CAN	Supported communication speed (bps): 1M,500K,250 K,100K,50K,10K,1K, default 1M.
The power supply is 24DCV by default, and the 12DCV power supply is specified when ordering. The 24DCV power supply has a maximum of 150mA, and the 12DCV power supply has a maximum of 300mA.		

Electrical connections

6-core electrical connection							
	needle	pigment	Pulse/ current/voltage	RS485	RS232	CAN	Pulse difference
source	Pin5	red	source Vin+				
	Pin6	black	source Vin-				
signal	Pin3	green	torsion	A+	TxD	H+	torsion A+
	Pin4	yellow	speed				speed B+
	Pin1	white	signal -(GND)	GND			torsion A-
	Pin2	blue	None (or empty)	B-	RxD	L-	speed B-
The signal ground (public end) must be white GND, not the input power supply-.							
Vin and Gnd are not at the same level, there is a voltage difference.							
Output signals and communication coexist							

8-core electrical connection (with both output signal and communication)					
source	Pin5	red	source Vin+		
	Pin6	black	source Vin-		
signal			Pulse/current/voltage		Pulse difference
	Pin3	green	torsion		torsion A+
	Pin4	yellow	speed		speed B+
	Pin1	white	signal -(GND)		torsion A-
	Pin2	blue	None (or empty)		speed B-
communication			RS485	RS232	CAN
	Pin7	brown	A+	TxD	H+
	Pin8	grey	B-	RxD	L-

Applied range

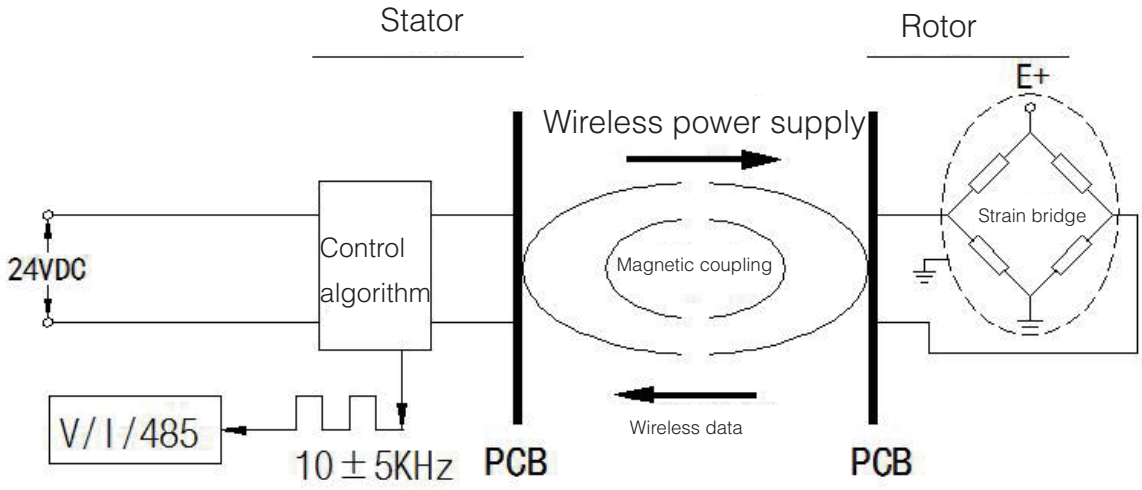
WTQ2050 series torque sensor is a kind of precision measurement instrument to measure various torque, speed and mechanical power. It has a wide range of applications, mainly used in:

1. Detection of output torque and power of rotating power equipment such as electric motor, engine and internal combustion engine;
2. Torque and power detection of fan, water pump, gearbox and torque wrench;
3. Torque and power detection of railway locomotives, automobiles, tractors, aircraft, ships and mining machinery;
4. Can be used for torque and power detection in sewage treatment system;
5. Can be used to make viscometer;
6. Can be used in process industry and process industry

Fundamental

1. Torque Measurement: Utilizing strain gauge-based electrical measurement technology, a strain bridge is constructed on the elastic shaft. By supplying power to the strain bridge, the electrical signal corresponding to torsional force can be detected.The acquired strain signal is amplified and then converted through voltage-to frequency conversion into a frequency signal proportional to the torsional deformation.

As illustrated in the diagram

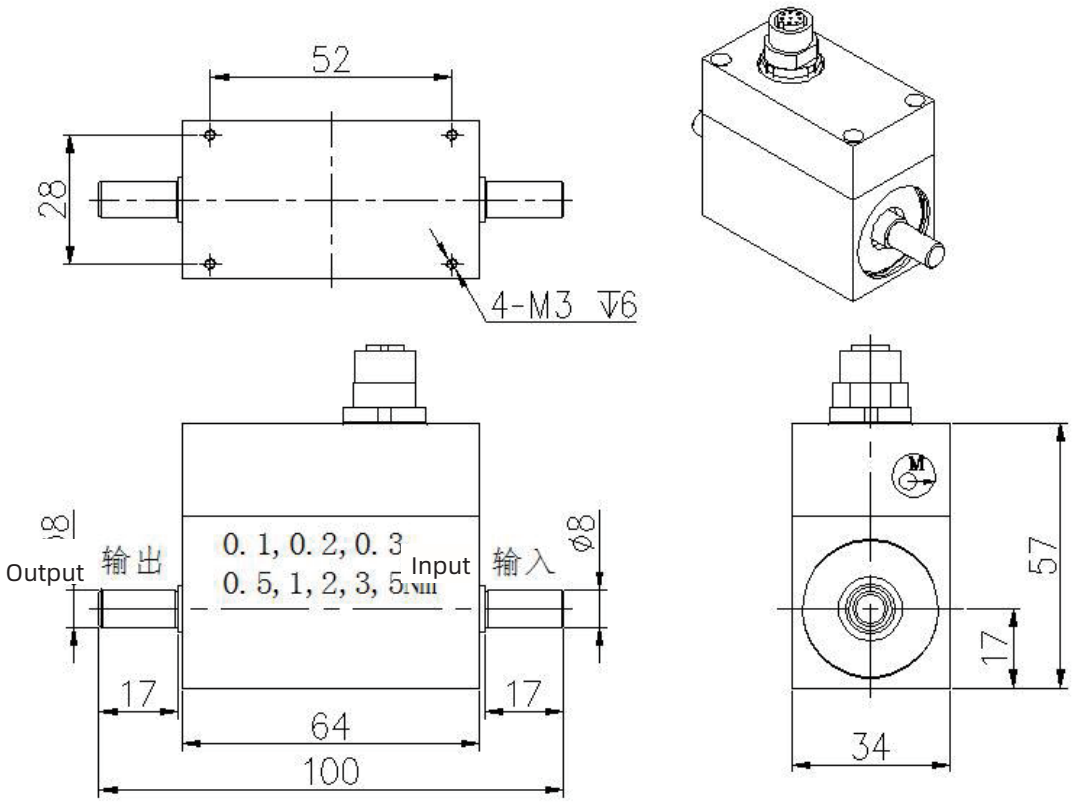


Application schematic

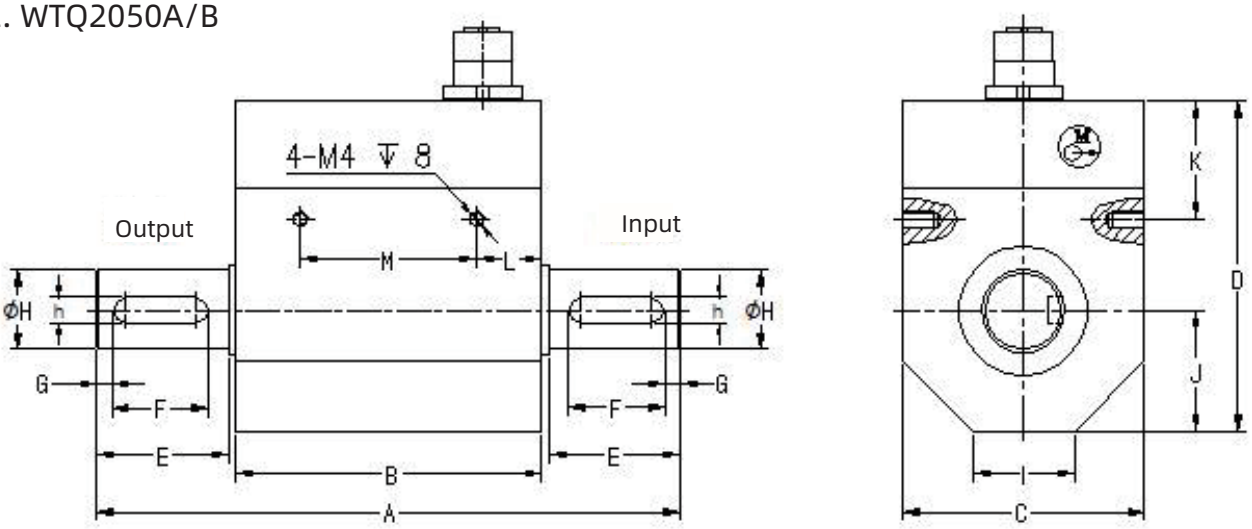
2. Speed Measurement: The speed measurement employs photoelectric induction technology. Each photoelectric code disk features 60 holes, and the shaft drives the code disk to generate 60 pulses per full rotation. The sensor achieves an accuracy of ± 0.1% to ±0.5% (F·S). This sensor utilizes built-in speed detection technology. When placing an order, customers must specify whether they require speed signal monitoring

Outline dimension

1. WTQ2050

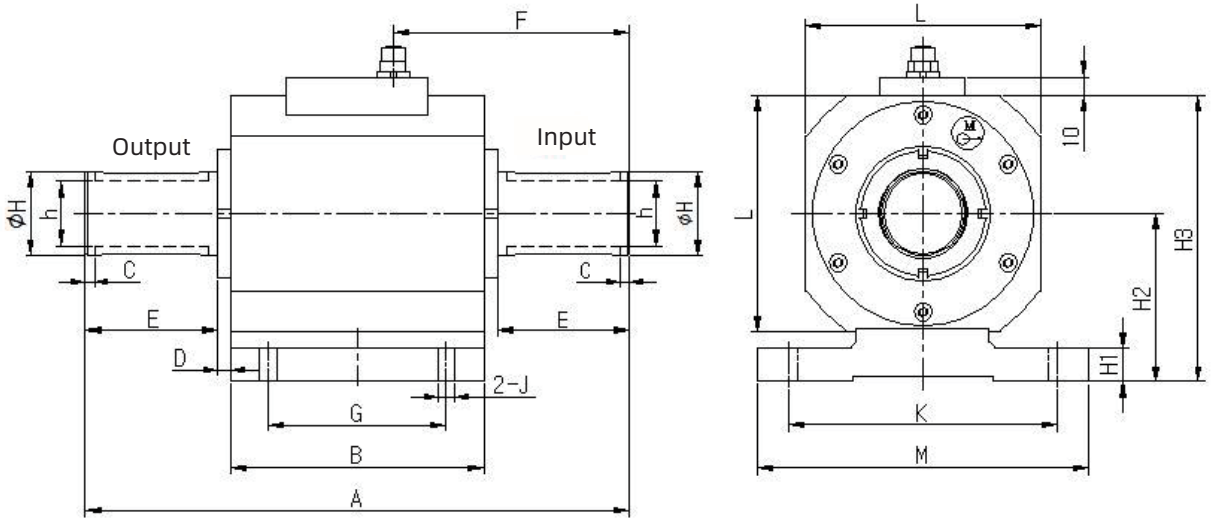


2. WTQ2050A/B



Range （Nm）	A	B	C	D	E	F	G	H	h	I	J	K	L	M	Key b*h*1
5,10,20,30,50,100	133	70	55	75	30	22	3.5	18	6	23	27.5	27	15	40	6*6*22
200,300,500	144	70	65	85	35	30	3	28	8	29	32.5	28	12	46	8*7*30

3. WTQ2051/2052/2053/2054



range (Nm)	A	B	C	D	E	F	G	H	h	J	K	L	M	H1	H2	H3	Key b*h*1*n
500-100	185	111	3.5	7	30	73.5	80	18	14.5	6.5	8.3	70	100	10	53.5	88.56	6*6*22*1
200-500	198	114	3	7	35	80	84	28	24	6.5	97	85	114	10	61	103.5	8*7*30*1
1k-2k	288	134	5	7	70	125	94	45	34	9	142	125	175	18	89	151.5	14*9*60*2
3k-5k	355	141	4	7	100	158.5	100	75	60	11	181	160	220	20	110.5	190.5	20*12*93*2
5-100Nm. No key is required when the speed is greater than 10000RPM																	

Product features

1. You can enter the working state after starting up, without preheating process.
2. The detection accuracy is high, the stability is good and the anti-interference is strong.
3. Positive and reverse torque can be measured continuously without repeated zero adjustment.
4. Small size, light weight and easy to install.
5. The sensor can be used independently from the secondary instrument and directly output a frequency signal or analog quantity proportional to the torque.

Main performance and electrical indicators

Torque accuracy	±0.5% F • S, ±0.2% F • S, ±0.1% F • S (optional)
Frequency response	200μs (default), 1000us (maximum,specify at order)
nolinear	±0.1 % F• S
Repetitiveness	±0.1 % F• S
Return difference	±0.1 % F• S
The time of zero point drift	±0.2 % F• S
Zero point temperature drift	±0.2 % F• S /10℃
End-use temperature	-20 ~ 50℃ (custom-made for special temperature, specify when ordering)
storage temperature	- 40 ~ 70℃
supply voltage	24VDC (default), 12VDC (optional)
Torque signal output	5KHz—15KHz、0-20mA、4-20mA、0-5V、0-10V、1-5V、0±5V、0-10V, RS485, RS232 (optional)
Speed signal	60 Pulse, 4-20mA, 0-5/10V, RS485, RS232 (optional)
Speed signal	0-100,200-1000,2000,4000,6000,8000,10000,12000,15000RPM (specify when ordering)

Selection of sensor range

The selection of torque sensor range should be based on the maximum torque measured in practice. In general, a certain amount of allowance should be left to prevent damage caused by overload.

Calculation formula: M=9550×P/N

M: Torque unit： N.m

P: Motor unit： KW

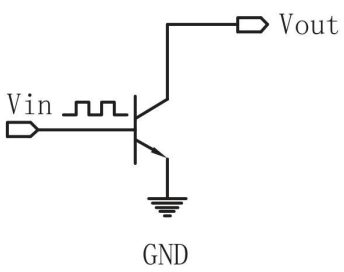
power N: Unit: r/min

RPM

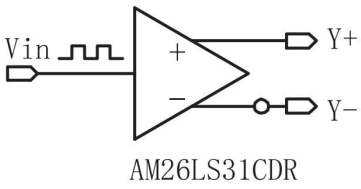
If the motor you use is a three-phase induction motor, it is recommended that the torque range should be 2-3 times of the rated torque due to the large instantaneous torque of the motor startup.

Definition of electrical wiring

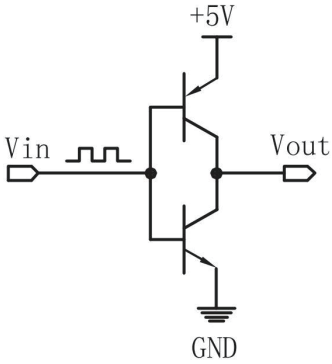
Open drain output



Differential output



Push out the output



	Mode of output	description
signal	Pulse open drain	For NPN open drain, users need to connect a pull-upresistor R to achieve pulse output. The output voltageis 5V when R is 330 Ω-1k Ω, 12V when R is 2k Ω-4.7kΩ, and 12V when R is 10k Ω-20k Ω.
		The default torque is 10±5KHz, and the default speed is 0-30KHz (60 pulses, 1KHz corresponds to 1000RPM)
		There is a special pulse frequency output, which should be specified when ordering.

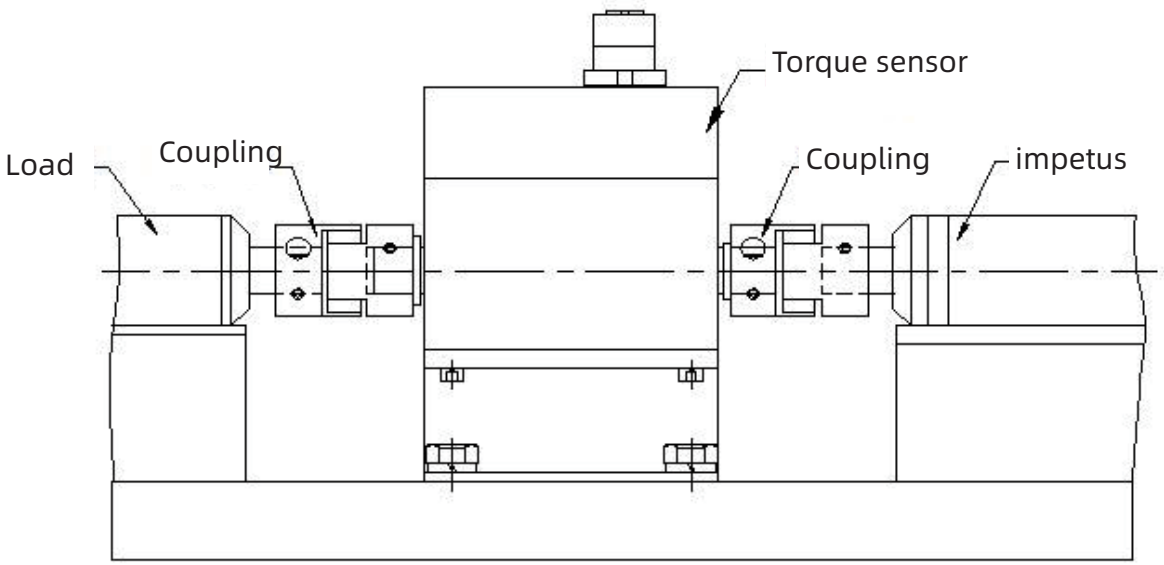
Selection of sensor range

	Mode of output	description
signal	Pulse push pull	The default high level is +5V (also supports +12V),which should be specified when ordering
		The default torque is 10+5KHz, and the default speedis 0-30KHz(60 pulses,1KHz corresponds to 1000RPM)
		There is a special pulse frequency output, which should be specified when ordering.
	Pulse difference	The differential output chip is AM26LS31, and the recommended receiving chip is AM26LS32. It can alsodrive the optocoupler directly
		The default torque is 10±5KHz, and the default speed is 0-30KHz (60 pulses, 1KHz corresponds to 1000RPM)
		There is a special pulse frequency output, which should be specified when ordering.
	Voltage output	Full scale supports 0±1 0DCV, within the full scale range, users can arbitrarily specify the output range
		The default torque is 0±1 0DCV, and the default speed is 0-1 0DCV.
	Current output	Full scale supports 0-20mA, within the full scale range, users can arbitrarily specify the output range
		The torque is 4-12-20mA by default and the rotation speed is 4-20mA by default.
communication	RS485	Supported communication speed (bps): 115200,57600,38400,19200,9600,4800,2400. Default is 115200.
	RS232	Supported communication speed (bps): 115200,57600,38400,19200,9600,4800,2400. Default is 115200.
	CAN	Supported communication speed (bps): 1M,500K,250 K,100K,50K,10K,1K, default 1M.
The power supply is 24DCV by default, and the 12DCV power supply is specified when ordering. The 24DCV power supply has a maximum of 150mA, and the 12DCV power supply has a maximum of 300mA.		

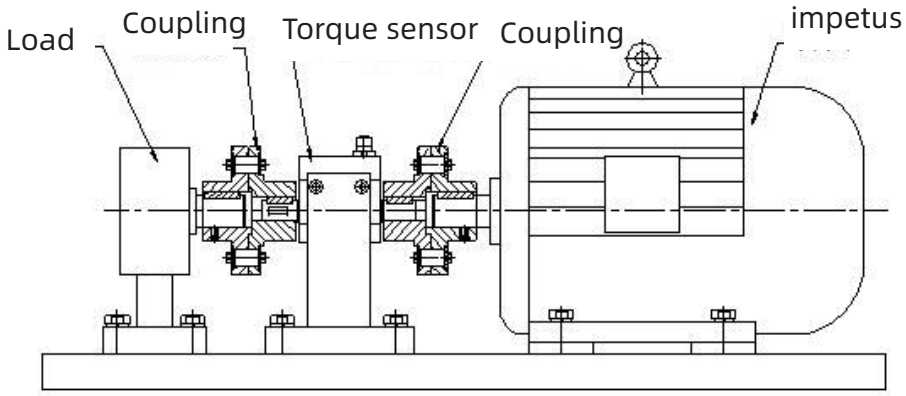
8-core electrical connection (with both output signal and communication)					
source	Pin5	red	source Vin+		
	Pin6	black	source Vin-		
signal			Pulse/current/voltage		Pulse difference
	Pin3	green	torsion		torsion A+
	Pin4	yellow	speed		speed B+
	Pin1	white	signal -(GND)		torsion A-
	Pin2	blue	None (or empty)		speed B-
communication			RS485	RS232	CAN
	Pin7	brown	A+	TxD	H+
	Pin8	grey	B-	RxD	L-

Installation and connection method

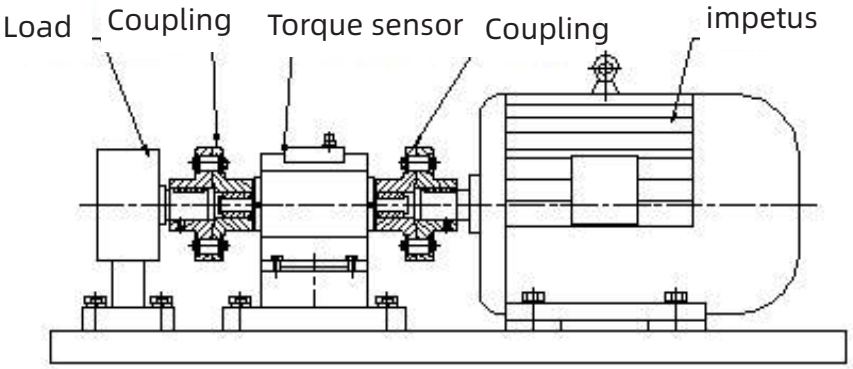
1. Installation: can be installed horizontally and vertically



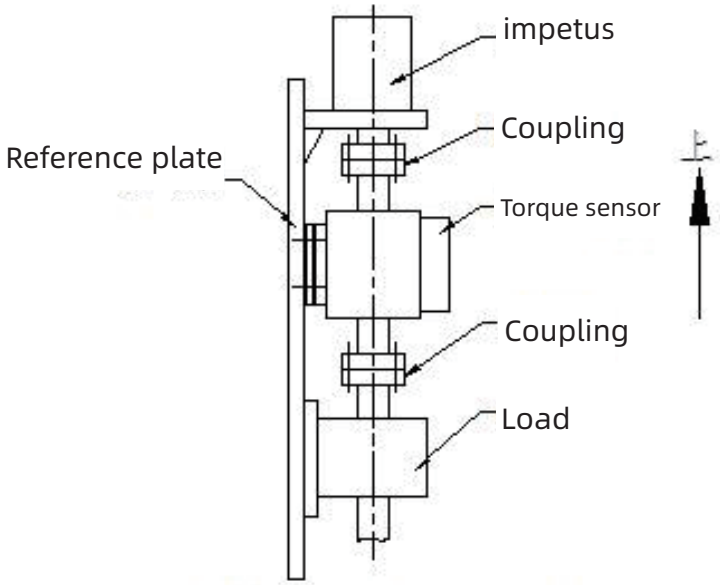
Schematic diagram of horizontal installation of WTQ2050 torque sensor



Schematic diagram of horizontal installation of WTQ2050A/B torque sensor



WTQ20501/2/3/4 Schematic diagram of horizontal installation of torque sensor



Torque sensor

Schematic diagram of vertical installation of torque sensor

3. Installation requirements:
(1) Torque sensors can be installed horizontally or vertically
(2) As shown in the figure, power equipment, sensors and load equipment should be installed on a firm base to avoid excessive vibration, otherwise data may be unstable, measurement accuracy may be reduced or even damage the sensor.
(3) Use elastic pin coupling or rigid coupling.
(4) The concentricity of the shaft axis of power equipment, sensor and load equipment should be less than Φ0.05mm.
4. The shape and size of the installation interface shall be selected according to the external dimension selection table.
5. Installation steps:
(1) According to the connection form of the shaft and the length of the torque sensor, determine the distance between the prime mover and the load, adjust the distance between the axis of the prime mover and the load relative to the reference plane, so that the coaxiality of their axes is less than Φ0.03mm, and fix the prime mover
and the load on the reference plane.
(2) Mount the coupling on its respective shaft.
(3) Adjust the distance between the torque sensor and the reference plane so that the coaxiality of its axis with the prime mover and load axis is less than Φ 0.03mm, the fixed torque sensor is on the reference plane.
(4) Tighten the coupling and install it.