

Large Capacity Flange  
Torque Measurement System  
**TMS 9250**



# Model TMS 9250 Large Capacity Flange Torque Measurement System

Honeywell's TMS 9250 torque measurement system provides a non-contact torque measurement through digital telemetry on rotating parts. The TMS 9250's fully digital, wireless design enables higher integrity of the torque data capture through higher resolution, higher sensitivity, faster response, and no mechanical interferences. The result is a more accurate indication of the actual torque being experienced, plus an increase in reliability. This digital wireless telemetry system also supplies excitation power to the rotating sensor across the gap, supports two-way communications, and supports virtually unlimited testing capabilities.

Honeywell's modular design can easily be adapted or customized to fit into many different types of test stands to meet specific test application requirements. The TMS 9250 physically integrates rotor electronics and telemetry into one element. With no slip rings or bearings to replace, the TMS 9250 saves time with less routine maintenance.

The TMS 9250's set-up is fully software driven; therefore, it is easily controlled through the computer software and its output type is selectable from the standard voltage, current, and frequency output selections. The TMS 9250 is a fully digital system with no dip-switches or potentiometers. The output can be scaled "on the fly" by the software.

Featuring "on-the-fly" edit capability, setup and operation of the rotating sensor can be controlled by the user at any time. Therefore, the parameters become real-time selectable allowing the user to make the necessary adjustments necessary to change their system without test interruption or affecting the calibration. Finally, all setup parameter and calibration information is stored in files and can be recalled on demand for repeat test conditions.

Honeywell's TMS 9250 is fully FCC, CE certified meeting all EMC emission and susceptibility requirements. This product will not cause RF interference with other equipment.

## *What makes our system better?*

- Smallest stator size across all the torque ranges
- Custom flange and shaft options designed per customers' request
- Recessed rotor antenna design protects antenna from damage
- FCC certified



***Smaller, caliper-type stator takes up less space in system design***

PERFORMANCE • CONFIGURABILITY  
AVAILABILITY • SERVICE

## Features and Benefits

### PERFORMANCE

Engineered as a bearingless, non-contact digital telemetry system, the TMS 9250 operates at **0.1 % full scale**, total system accuracy. Causes **no interference** to low-level signals of other sensitive sensing devices. **Repeatable torque control** through entire speed range.

### COMPACT, MODULAR DESIGN

The TMS 9250's smaller caliper-type stator **occupies less installation space** - by volume - than the competition. **Custom coupling configurations** meet specific system needs. In addition, the TMS 9250 features high torsional stiffness, low rotating inertia, and **multiple field-selectable analog outputs**.

*Scalable output, "on the fly"*

### CALIBRATION OPTIONS

Shunt calibration is standard on the TMS 9250. **Remote shunt calibration option** available.

*Durable: can run for months unattended*

### INSTALLATION EASE

Power supply adapter included with the TMS 9250 (FCC compliant). **Full software set-up** with no potentiometers or dip switches.

### APPROVED!

**FCC and CE certified**, meeting all EMC emission and susceptibility requirements

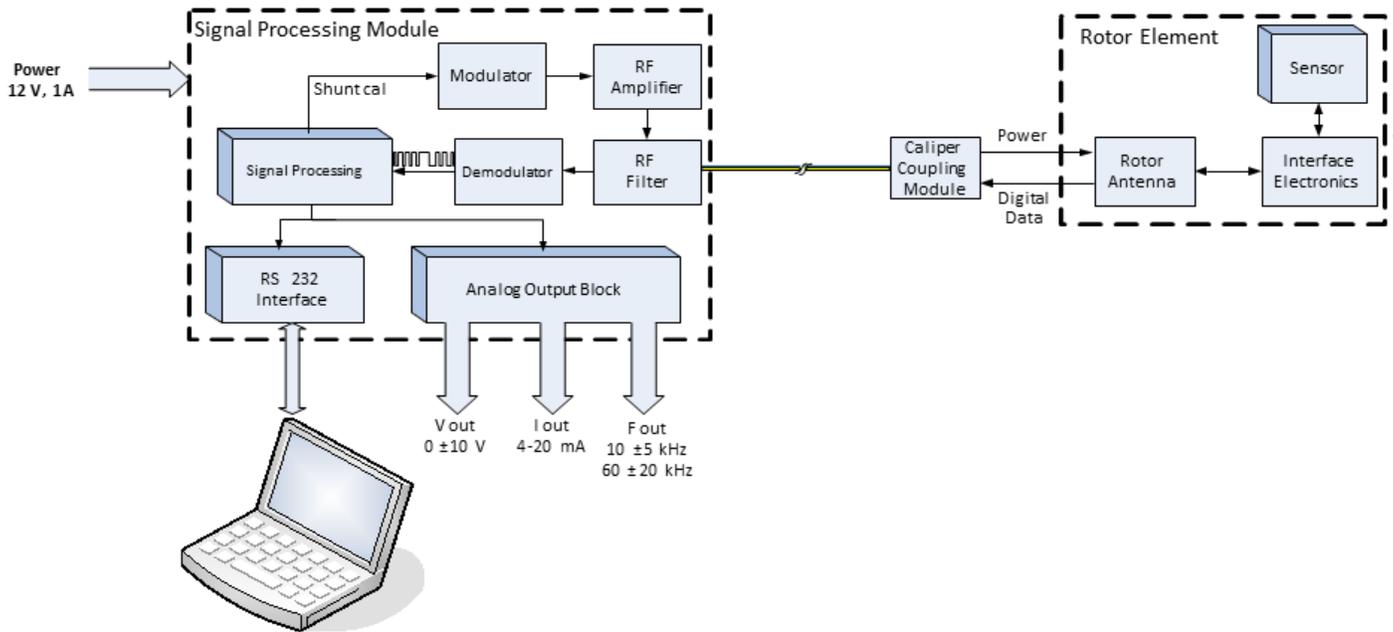
## Potential Applications



### TRANSPORTATION AND INDUSTRIAL APPLICATIONS

- Powertrain testing: engine, engine diagnostics, cold engine, transmission, driveshaft, & rear axle differential
- Dynamometer
- Brakes
- Wheel hub
- Drive wheels
- Continuous track, heavy equipment
- Oil & water pump testing
- Jet engine/turbine testing
- Wind power gearbox and torsion blade testing; propeller testing
- Turn up/Turn down gear box testing
- Industrial motor / generator testing
- Auxiliary component efficiency testing

# TMS 9250



## STANDARD DIN SIZES AVAILABLE

- 92533– 15K Nm, 20K Nm, 30K Nm
- 92534– 40K Nm, 50K Nm, 60K Nm
- 92535– 70K Nm, 80K Nm, 90K Nm

Consult factory for other ranges up to 160K Nm

## DYNAMICS OF THE TMS 9250

- The rotor electronics module is encapsulated to enhance protection against vibration, G Force and chemicals
- The rotating antenna is peripherally or centrally mounted on the rotor
- Four layer construction ensures enhanced strength with no exposed tracks in the outer region
- Designed to resist dust and fluid contamination. Provides power transmission and signal recovery via tri-axial cable

## ROTOR TRANSMITTER ELECTRONICS (RTE)

The RTE provides bridge excitation power for the torque sensor. Conditions the bridge output signal before transmitting a digitized signal to the SPM.

## CALIPER COUPLING MODULE (CCM)

The CCM is a tuned antenna connected to the signal processing module (SPM) RF board through RF tri-axial cable. The CCM is used to wirelessly induce power to the rotor antenna and wirelessly receives the rotor electronics signals to collect torque event data. The antenna is stationary and enables communication between the rotating part and the SPM.

## SIGNAL PROCESSING MODULE (SPM)

The SPM contains two separate microprocessors to share data processing and communications. Calibration is all digital characterization, via RS-232 link, eliminating zero and span adjustments, dip switches, and potentiometers. The durable unit has an external BNC connector for the tri-axial cable, internal 2-part plug and socket connectors for output signals, digital communication and dc power. The SPM external housing also features a “SHUNT CAL” button and LEDs to indicate “Power ON”, “Rotor Active” and “SHUNT CAL Mode”.

## SOFTWARE FEATURES

The toolkit software at the heart of the TMS 9250 system is designed to offer flexibility and adaptability. Standard or custom set ups can be saved to parameter files and recalled at any time. Selectable scaling allows coverage of a greater set of applications and test conditions. The software-driven SPM (Signal Processing Module) is offered with eight selectable analog output settings of four settings and eight modes. The software includes zero offset correction, auto zero.

# Large Capacity Flange Torque Measurement System

**Table 1. Specifications**

Characteristic	Parameter	
Power supply adapter*	Input	90 Vac ~ 264 Vac; 47 Hz~ 63 Hz 20 W
	Output	12 Vdc, 1 A
	Protection	Short circuit and over voltage protection for the power supply and SPM
Recommended system warm-up time	30-45 minutes	
Analog outputs	Voltage ( $\pm 10$ Vdc)	(zero torque = 0 Vdc)
	Voltage ( $\pm 10$ Vdc) and Frequency 10 kHz $\pm 5$ kHz	
	Voltage ( $\pm 10$ Vdc) and Frequency 60 kHz $\pm 20$ kHz	
	Frequency 10 kHz $\pm 5$ kHz	(zero torque = 10 kHz)
	Frequency 60 kHz $\pm 20$ kHz	(zero torque = 60 kHz)
	Current Loop (4 mA to 20 mA)	(zero torque = 12 mA)
	Current Loop (4 mA to 20 mA) and Frequency 10 kHz $\pm 5$ kHz	
	Current Loop (4 mA to 20 mA) and Frequency 60 kHz $\pm 20$ kHz	
Output drive capability	Current: 4 mA to 20 mA output: 400 W max. including cable resistance Voltage: $\pm 10$ Vdc: 2 kW min. Frequency output: 4 V p-p for 100 kW and 2.3 V p-p for min. load of 1 kW	
Digital resolution	Normal mode, 16-bit (0.01 %FS)	
RF carrier frequency	13.56 MHz	
Accuracy	System 0.1 % FS typical	
Temperature range	Operating, Sensor and CCM Only	-40 °C to 85 °C [-40 °F to 185 °F]
	Operating, SPM and Power Supply	0 °C to 40 °C [32 °F to 104 °F]
	Compensated for sensor and CCM	-10 °C to +50 °C [14 °F to 122 °F]
Temperature effect, zero	$\pm 0.003$ % full scale/°F	
Temperature effect, span	$\pm 0.003$ % full scale/°F	
Frequency response	Input sampling rate	17,656 samples/sec
	Anti-aliasing filter fixed	4.1 kHz
	Telemetry update rate	8.828 kHz
	Fast mode data throughput rate	8.828 kHz
	Normal mode data throughput rate	1.104 kHz
	Group delay (typical, normal mode)	2.5 ms
	Group delay (typical, fast mode)	1.2 ms
Digital filtering	IIR mode	Recursive algorithm with selectable filter levels and filter steps

\* to be FCC/CE compliant, the use of a Honeywell power supply is required.

# TMS 9250

**Table 2. Specifications, Mechanical**

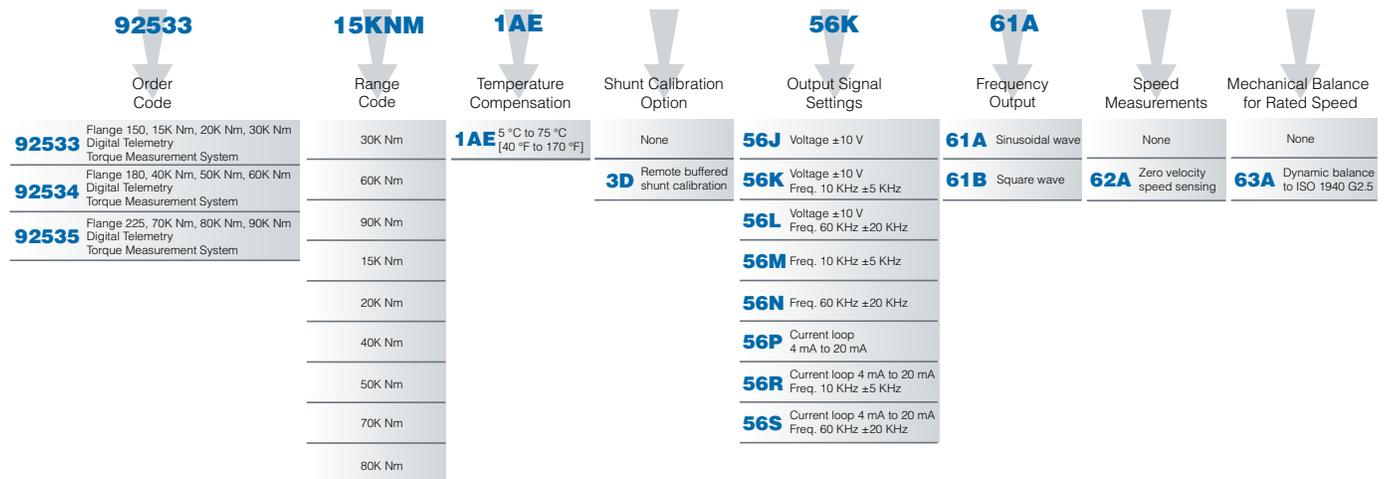
	Rated Capacity	Torsional Stiffness	Rotating Inertia	Overload Protection	Speed Rating	Bending Limit	Axial Limit	Bending Stiffness
Model No.	(Nm)	(kNm/rad)	(kg-m <sup>2</sup> )	(Nm)	(rpm)	(Nm)	(kN)	(kNm/deg)
92533	30k	8,500	0.68	45k	6,000	4,050	200	6,200
92534	60kw	16,000	1.50	90k	5,000	8,120	334	14,800
92535	90k	44,000	6.52	135k	4,000	12,200	512	19,200

**Table 3. Product Listings**

Order code	Description
92533-15KNM-1AE-56K-61A	Model 92533 Digital Telemetry Torque Measurement System, 15,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92533-20KNM-1AE-56K-61A	Model 92533 Digital Telemetry Torque Measurement System, 20,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92533-30KNM-1AE-56K-61A	Model 92533 Digital Telemetry Torque Measurement System, 30,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92534-40KNM-1AE-56K-61A	Model 92534 Digital Telemetry Torque Measurement System, 40,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92534-50KNM-1AE-56K-61A	Model 92534 Digital Telemetry Torque Measurement System, 50,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92534-60KNM-1AE-56K-61A	Model 92534 Digital Telemetry Torque Measurement System, 60,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92535-70KNM-1AE-56K-61A	Model 92535 Digital Telemetry Torque Measurement System, 70,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92535-80KNM-1AE-56K-61A	Model 92535 Digital Telemetry Torque Measurement System, 80,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92535-90KNM-1AE-56K-61A	Model 92535 Digital Telemetry Torque Measurement System, 90,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency

## ORDER CODE NOMENCLATURE

For example, a **92533 15KNM,1AE,56K,61A** part number would define a Model 92533 Digital Telemetry Torque Measurement System, 15,000 Nm, 0.1 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency.



**NOTE:** This product also supports custom torque ranges. With custom torque ranges, the standard range codes are not used. Instead, a new range code is formed as per the requested torque range.

# Large Capacity Flange Torque Measurement System

## ORDER CODES

Order code	Description
92533	15K Nm, 20K Nm, 30K Nm, Digital Telemetry Torque Measurement System
92534	40K Nm, 50K Nm, 60K Nm, Digital Telemetry Torque Measurement System
92535	70K Nm, 80K Nm, 90K Nm, up to 160K Nm Digital Telemetry Torque Measurement System

## RANGE CODES

Range code	Available ranges
-15KNm	15K Nm
-20KNm	20K Nm
-30KNm	30K Nm
-40KNm	40K Nm
-50KNm	50K Nm
-60KNm	60K Nm
-70KNm	70K Nm
-80KNm	80K Nm
-90KNm	90K Nm

## OPTION CODES

Option	Codes
Available Ranges	15K Nm, 20K Nm, 30K Nm, 40K Nm, 50K Nm, 60K Nm, 70K Nm, 80K Nm, 90K Nm (up to 160 KNm)
Temperature Compensation	5 °C to 75 °C [40 °F to 170 °F]
Shunt Calibration	3D. Remote buffered shunt calibration
Output Signal Settings	56J. Voltage $\pm 10$ V 56K. Voltage $\pm 10$ V; Freq. 10 KHz $\pm 5$ KHz 56L. Voltage $\pm 10$ V; Freq. 60 KHz $\pm 20$ KHz 56M. Freq. 10 KHz $\pm 5$ KHz 56N. Freq. 60 KHz $\pm 20$ KHz 56P. Current loop, 4 mA to 20 mA 56R. Current loop 4 mA to 20 mA; Freq. 10 KHz $\pm 5$ KHz 56S. Current loop 4 mA to 20 mA; Freq. 60 KHz $\pm 20$ KHz
Frequency Output	61A. Sinusoidal wave 61B. Square wave
Speed and Measurements	62A. Zero velocity speed sensing
Mechanical Balance for Rated Speed	63A. Dynamic balance to ISO 1940 G2.5

## MOUNTING FOR TMS 9250 LARGE CAPACITY FLANGE

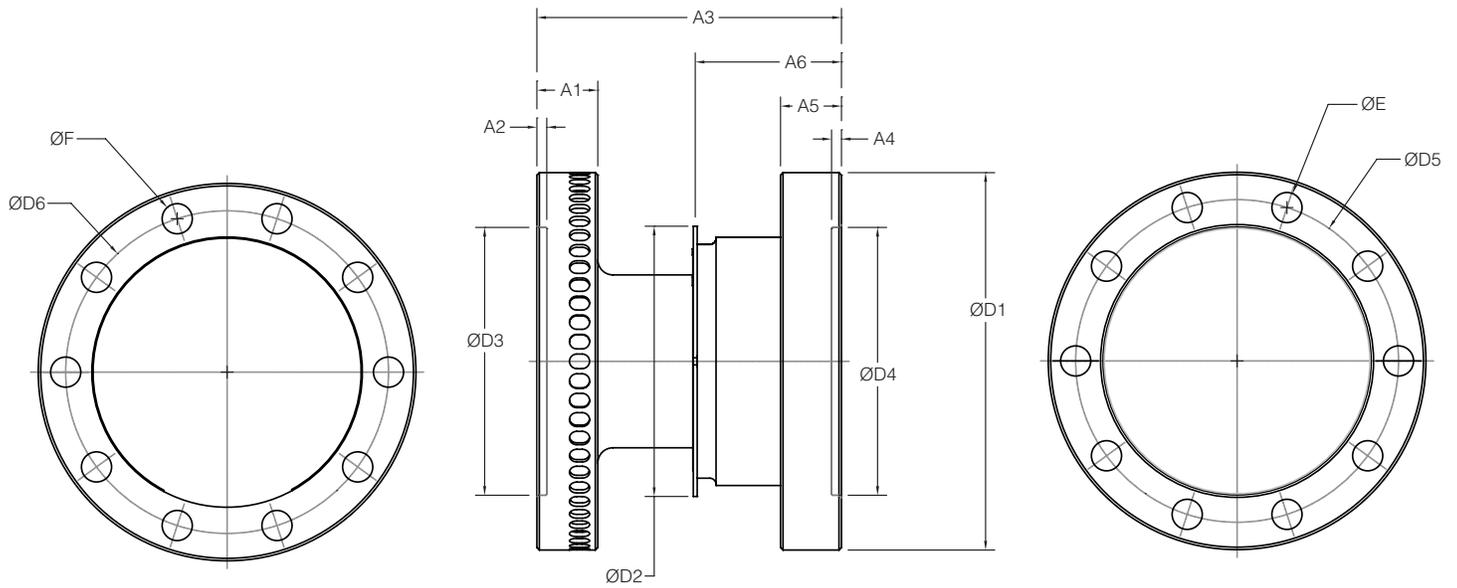


Table 4. Dimensions in millimeters

Model No.	A1	A2	A3	A4	A5	A6
92533	50	8.0	240	8.0	50	120
92534	50	8.1	250	8.1	50	120
92535	60	10.0	320	10.0	60	152

Model No.	D1	D2	D3 (H7)	D4 (H7)	D5	D6	E	F
92533	258	192	186	186	222	222	20.7	20.7
92534	310	224	220	220	265	265	24.7	24.7
92535	430	267	300	300	360	360	37.5	37.5

# Large Capacity Flange Torque Measurement System

## NOTES

\* To be FCC/CE compliant, the use of a Honeywell power supply is required.

## This Honeywell datasheet supports the following Model TMS 9250 Series Listings

92533  
92534  
92535

## ADDITIONAL INFORMATION

The following associated literature is available on the Web at [measurementsensors.honeywell.com](http://measurementsensors.honeywell.com):

- Product installation instructions
- Product user manual

### WARNING

#### PERSONAL INJURY

**DO NOT USE** these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

### WARNING

#### MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

## WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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