

Model TMS 9250

DIN-Flange Torque Measurement System



DESCRIPTION

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 is durable and compact in size to fit those tight installations and comes standard with quick attach wiring connectors for rapid commissioning. 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.

FEATURES

- Digital telemetry, non-contact
- 0.05% full scale, total system accuracy
- DIN companion flange compatible
- High torsional stiffness
- Low rotating inertia
- Multiple, field selectable, analog outputs
- Scalable output "on the fly"
- Compact, modular design, ideal for customization
- Power supply adapter included (FCC compliant)
- Shunt calibration standard
- Remote shunt calibration option available
- Full software set-up
- No potentiometers or dip switches
- FCC and CE certified, meeting all EMC emission and susceptibility requirements

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.

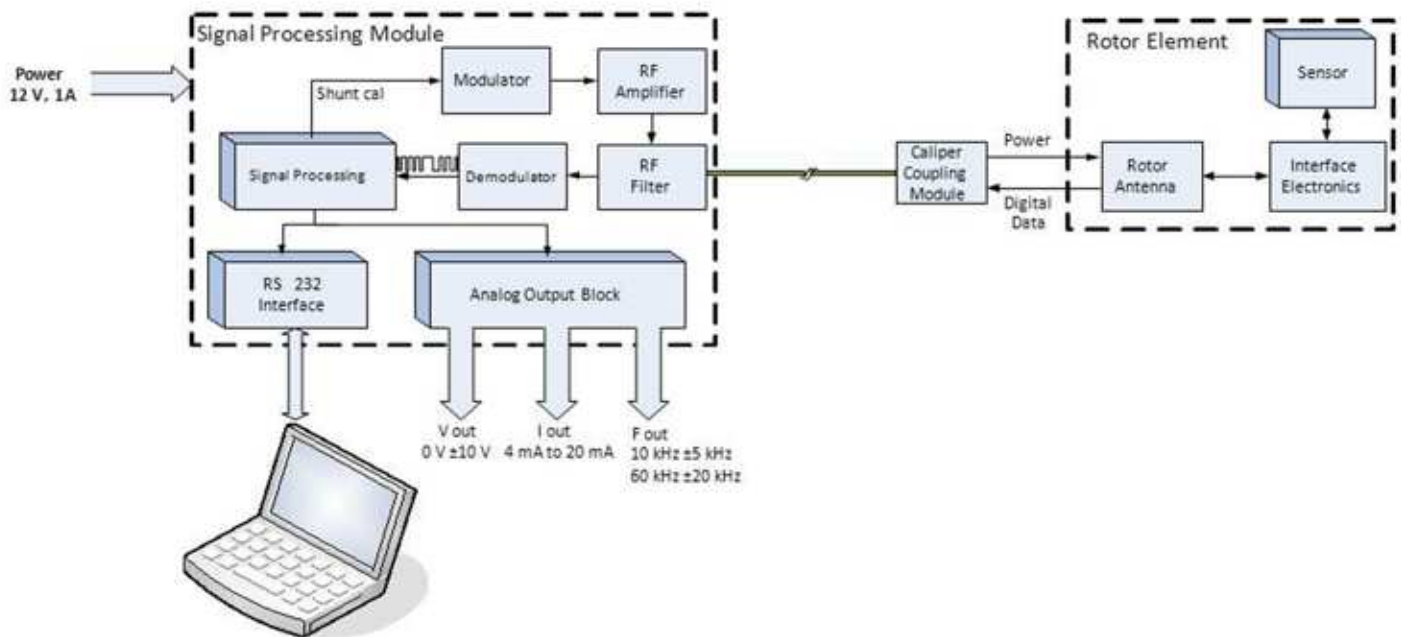
Honeywell's TMS 9250 is fully FCC, CE certified meeting all EMC emission and susceptibility requirements. This product will not cause RF interference with other equipment.

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



Model TMS 9250 - DIN



STANDARD DIN SIZES AVAILABLE

- TMS - DIN 65, Flange, 100Nm, 200Nm, 50lb-ft, 100lb-ft
- TMS - DIN 90, Flange, 300Nm, 500Nm, 250lb-ft, 500lb-ft
- TMS - DIN 120, Flange, 1KNm, 2KNm, 1Klb-ft
- TMS - DIN 150, Flange, 3KNm, 2Klb-ft, 3Klb-ft
- TMS - DIN 180, Flange, 5KNm, 4Klb-ft
- TMS - DIN 225, Flange, 10KNm, 8Klb-ft

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". Because of these enhanced technologies, the end result is a true advancement in telemetry-based torque systems.

SOFTWARE FEATURES

The toolkit software at the heart of the TMS 9250 system is designed to offer flexibility and adaptability. The software puts the operator fully in control and can be tailored to the test conditions required at the time. Standard or custom set ups can be saved to parameter files and recalled at any time. Selectable scaling creates an advantage for the user as it 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.

DIN-Flange Torque Measurement System

SPECIFICATIONS - ELECTRICAL

Characteristic	Measure	
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 (± 10 Vdc)	(zero torque = 0 Vdc)
	Voltage (± 10 Vdc) and Frequency 10 kHz ± 5 kHz	
	Voltage (± 10 Vdc) and Frequency 60 kHz ± 20 kHz	
	Frequency 10 kHz ± 5 kHz	(zero torque = 10 kHz)
	Frequency 60 kHz ± 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 ± 5 kHz	
	Current Loop (4 mA to 20 mA) and Frequency 60 kHz ± 20 kHz	
Output Drive Capability	4 mA to 20 mA output: 400 W max, including cable resistance ± 10 Vdc output: 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	Analog to digital (A/D) frequency, 24-bit (0.01 %FS) Normal mode frequency, 16-bit (0.01 %FS)	
RF Carrier Frequency	13.56 MHz	
Accuracy	System to read 0.05% FS typical	
Temperature Range	Operating, Sensor and CCM Only	-40° to 85° C (-40° to 185° F)
	Operating, SPM and Power Supply	0° to 40° C (32° to 104° F)
	Compensated for sensor and CCM	-10° to +50° C (14° to 122° F)
Temperature effect, zero	± 0.003 % full scale/°F	
Temperature effect, span	± 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)	1.2ms
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.

Model TMS 9250 - DIN

SPECIFICATIONS - MECHANICAL

DIN Size	Rated Capacity	Torsional Stiffness	Rotating Inertia	Overload Protection	Speed Rating	Bending Limit	Axial Limit	Bending Stiffness
	(lb-ft)	(lb-in/rad)	(lb-in-sec ²)	(lb-ft)	(rpm)	(lb-in)	(lb)	(lb-in/deg)
65	50	395000	0.001	100	20000	100	325	775000
	100	867000	0.002	200	20000	150	750	1460000
90	250	2750000	0.009	500	18000	325	1500	3800000
	500	5500000	0.009	1k	18000	750	3000	8900000
120	1k	13000000	0.05	2k	16000	1500	6000	10000000
150	2k	35000000	0.13	4k	14000	3000	9000	18000000
	3k	35000000	0.13	6k	14000	3000	9000	18000000
180	4k	80000000	0.26	8k	12000	6000	18000	33000000
225	8k	205000000	0.83	16k	8000	12000	25000	47000000

DIN Size	Rated Capacity	Torsional Stiffness	Rotating Inertia	Overload Protection	Speed Rating	Bending Limit	Axial Limit	Bending Stiffness
	(Nm)	(kNm/rad)	(kg-m ²)	(Nm)	(rpm)	(Nm)	(kN)	(kNm/deg)
65	100	98	0.0002	200	20000	17	3	165
	200	98	0.0002	400	20000	17	3	165
90	300	311	0.001	600	18000	37	7	430
	500	621	0.001	1k	18000	85	13	1000
120	1k	1470	0.006	2k	16000	170	27	1130
	2k	1470	0.006	4k	16000	170	27	1130
150	3k	3950	0.015	6k	14000	340	40	2050
180	5k	9000	0.029	10k	12000	680	80	3750
225	10k	23000	0.094	20k	8000	1,360	110	5300

DIN-Flange Torque Measurement System

LISTINGS

Order code	Description
92512-500FT-LBS,1AE,56J,61A	Model 92512 DIN 90, Flange, Digital Telemetry Torque Measurement System, 500 lbs-ft, 0.05 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92513-1KFT-LBS,1AE,56J,61A	Model 92513 DIN 120, Flange, Digital Telemetry Torque Measurement System, 1K lbs-ft, 0.05 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92514-3KFT-LBS,1AE,56J,61A	Model 92514 DIN 150, Flange, Digital Telemetry Torque Measurement System, 3K lbs-ft, 0.05 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92512-500Nm,1AE,56J,61A	Model 92512 DIN 90, Flange, Digital Telemetry Torque Measurement System, 500 N-m, 0.05 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92513-2KNm,1AE,56J,61A	Model 92513 DIN 120, Flange, Digital Telemetry Torque Measurement System, 2K N-m, 0.05 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency
92514-5KNm,1AE,56J,61A	Model 92514 DIN 150, Flange, Digital Telemetry Torque Measurement System, 5K N-m, 0.05 % accuracy, 5 °C to 75 °C [40 °F to 170 °F] temperature compensation, Voltage ±10 V output with sinusoidal frequency

ORDER CODE NOMENCLATURE

Combine the order code, range code, and options code. For example:

92513 -1KFTLBS, 1AE,56J,61A

Order code Range code Options code

92513	1KFTLBS	1AE		56J	61A		
Order Code	Range	Temperature Compensation	Shunt Calibration Option	Output Signal Settings	Frequency Output	Speed Measurements	Mechanical Balance for Rated Speed
92511 DIN 65, Flange, 100 Nm, 200 Nm, 50 lb-ft, 100 lb-ft, Digital Telemetry Torque Measurement System	100 Nm	1AE 5 °C to 75 °C [40 °F to 170 °F]	None	56J Voltage ±10 V	61A Sinusoidal wave	None	None
92512 DIN 90, Flange, 300 Nm, 500 Nm, 250 lb-ft, 500 lb-ft, Digital Telemetry Torque Measurement System	200 Nm		3D Remote buffered shunt calibration	56K Voltage ±10 V Freq. 10 KHz ±5 KHz	61B Square wave	62A Zero velocity speed sensing	63A Dynamic balance to ISO 1940 G2.5
92513 DIN 120, Flange, 1K Nm, 2K Nm, 1K lb-ft, Digital Telemetry Torque Measurement System	300 Nm			56L Voltage ±10 V Freq. 60 KHz ±20 KHz			
92514 DIN 150, Flange, 3K Nm, 2K lb-ft, 3K lb-ft, Digital Telemetry Torque Measurement System	500 Nm			56M Freq. 10 KHz ±5 KHz			
92515 DIN 180, Flange, 5K Nm, 4K lb-ft, Digital Telemetry Torque Measurement System	1K Nm			56N Freq. 60 KHz ±20 KHz			
92516 DIN 225, Flange, 10K Nm, 8K lb-ft, Digital Telemetry Torque Measurement System	2K Nm			56P Current loop 4 mA to 20 mA			
	3K Nm			56R Current loop 4 mA to 20 mA Freq. 10 KHz ±5 KHz			
	5K Nm			56S Current loop 4 mA to 20 mA Freq. 60 KHz ±20 KHz			
	10K Nm						
	50 FTLBS						
	100 FTLBS						
	250 FTLBS						
	500 FTLBS						
	1K FTLBS						
	2K FTLBS						
	3K FTLBS						
	4K FTLBS						
	8K FTLBS						



SPECIAL REQUIREMENTS (CONSULT FACTORY)

Need a special modification or complete custom design to meet your unique requirements? Consult our factory by calling +1 614-850-5000 (800-848-6564) or visit us online at <http://measurementsensors.honeywell.com>.

Model TMS 9250 - DIN

ORDER CODES

Order code	Description
92511	DIN 65, Flange, 100 Nm, 200 Nm, 50 lb-ft, 100 lb-ft, Digital Telemetry Torque Measurement System
92512	DIN 90, Flange, 300 Nm, 500 Nm, 250 lb-ft, 500 lb-ft, Digital Telemetry Torque Measurement System
92513	DIN 120, Flange, 1K Nm, 2K Nm, 1K lb-ft, Digital Telemetry Torque Measurement System
92514	DIN 150, Flange, 3K Nm, 2K lb-ft, 3K lb-ft, Digital Telemetry Torque Measurement System
92515	DIN 180, Flange, 5K Nm, 4K lb-ft, Digital Telemetry Torque Measurement System
92516	DIN 225, Flange, 10K Nm, 8K lb-ft, Digital Telemetry Torque Measurement System

RANGE CODES

Range Code	Available ranges
-100 NM	100 Nm
-200 NM	200 Nm
-300 NM	300 Nm
-500 NM	500 Nm
-1K NM	1K Nm
-2K NM	2K Nm
-3K NM	3K Nm
-5K NM	5K Nm
-10K NM	10K Nm
50 FTLBS	50 ft-lb
100 FTLBS	100 ft-lb
250 FTLBS	250 ft-lb
500 FTLBS	500 ft-lb
1K FTLBS	1K ft-lb
2K FTLBS	2K ft-lb
3K FTLBS	3K ft-lb
4K FTLBS	4K ft-lb
8K FTLBS	8K ft-lb

OPTION CODES

Available Ranges	100 Nm, 200 Nm, 300 Nm, 500 Nm, 1K Nm, 2K Nm, 3K Nm, 5K Nm, 10K Nm, 50 ft-lb, 100 ft-lb, 250 ft-lb, 500 ft-lb, 1K ft-lb, 2K ft-lb, 3K ft-lb, 4K ft-lb, 8K ft-lb
Temperature Compensation	5 °C to 75 °C [40 °F to 170 °F]
Shunt Calibration	3D. Remote buffered shunt calibration
Output Signal Settings	56J. Voltage ± 10 V 56K. Voltage ± 10 V; Freq. 10 KHz ± 5 KHz 56L. Voltage ± 10 V; Freq. 60 KHz ± 20 KHz 56M. Freq. 10 KHz ± 5 KHz 56N. Freq. 60 KHz ± 20 KHz 56P. Current loop, 4 mA to 20 mA 56R. Current loop 4 mA to 20 mA; Freq. 10 KHz ± 5 KHz 56S. Current loop 4 mA to 20 mA; Freq. 60 KHz ± 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

DIN-Flange Torque Measurement System

DIMENSIONS IN MILLIMETERS

DIN Size	Measuring Range	A1	A2	A3	A4	A5	A6	B	C
65	100 & 200 Nm	21.1	1.8	43.9	1.5	9.9	7.1	45°	90°
90	300 & 500 Nm	17	2.5	43.9	2	9.9	7.1	22.5°	45°
120	1k & 2k Nm	12.7	2.8	63.5	2	15.2	7.1	22.5°	45°
150	3k Nm	12.7	3.3	63.5	2	15.2	7.4	22.5°	45°
180	5k Nm	15.2	3.8	63.5	2	20.3	7.4	22.5°	45°
225	10k Nm	15.2	5.3	63.5	2	20.3	7.4	22.5°	45°

DIN Size	Measuring Range	D1	D2	D3 (H7)	D4 (g6)	D5	D6	E	F	G
65	100 & 200 Nm	65	106.7	35	35	65	52	4 X 6.9	4 X 11.2	4 x M6
90	300 & 500 Nm	89.9	132.1	47	47	89.9	74.5	8 X 8.9	8 X 14.2	8 x M8
120	1k & 2k Nm	119.6	162.6	75	75	119.6	101.5	8 X 10.7	8 X 17.3	8 x M10
150	3k Nm	149.6	190.5	90	90	149.6	130	8 X 12.7	8 X 19.3	8 x M12
180	5k Nm	179.6	221	110	110	179.6	155.5	8 X 14.7	8 X 22.6	8 x M14
225	10k Nm	224.5	266.7	140	140	224.5	196	8 X 16.8	8 X 22.6	8 x M16

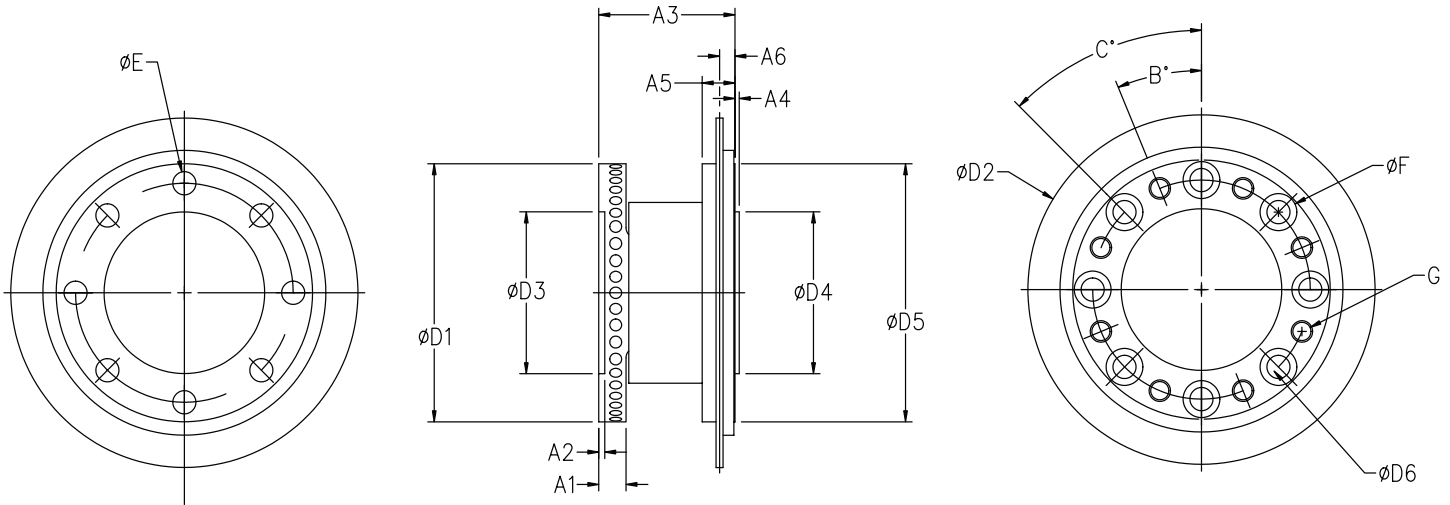
DIMENSIONS IN INCHES

DIN Size	Measuring Range	A1	A2	A3	A4	A5	A6	B	C
65	50 & 100 Lb-Ft	0.83	0.07	1.73	0.06	0.39	0.28	45°	90°
90	250 & 500 Lb-Ft	0.67	0.1	1.73	0.08	0.39	0.28	22.5°	45°
120	1000 Lb-Ft	0.5	0.11	2.5	0.08	0.6	0.28	22.5°	45°
150	2000 Lb-Ft	0.5	0.13	2.5	0.08	0.6	0.29	22.5°	45°
180	4000 Lb-Ft	0.6	0.15	2.5	0.08	0.8	0.29	22.5°	45°
225	8000 Lb-Ft	0.6	0.21	2.5	0.08	0.8	0.29	22.5°	45°

DIN Size	Measuring Range	D1	D2	D3 (H7)	D4 (g6)	D5	D6	E	F	G
65	50 & 100 Lb-Ft	2.56	4.2	1.378	1.378	2.56	2.047	4 x .27	4 x .44	4 x M6
90	250 & 500 Lb-Ft	3.54	5.2	1.8504	1.8504	3.54	2.933	8 x .35	8 x .56	8 x M8
120	1000 Lb-Ft	4.71	6.4	2.9528	2.9528	4.71	3.996	8 x .42	8 x .68	8 x M10
150	2000 Lb-Ft	5.89	7.5	3.5433	3.5433	5.89	5.118	8 x .50	8 x .76	8 x M12
180	4000 Lb-Ft	7.07	8.7	4.3307	4.3307	7.07	6.122	8 x .58	8 x .89	8 x M14
225	8000 Lb-Ft	8.84	10.5	5.5118	5.5118	8.84	7.716	8 x .66	8 x .89	8 x M16

Model TMS 9250 - DIN

MOUNTING FOR TMS 9250 DIN



Measuring Range		A1	A2	A3	A4	A5	A6	B	C
50 & 100 Lb-Ft	100 & 200 N-m	0.83	0.07	1.73	0.06	0.39	0.28	45°	90°
250 & 500 Lb-Ft	300 & 500 N-m	0.67	0.10	1.73	0.08	0.39	0.28	22.5°	45°
1000 Lb-Ft	1k & 2k N-m	0.50	0.11	2.50	0.08	0.60	0.28	22.5°	45°
2000 Lb-Ft	3k N-m	0.50	0.13	2.50	0.08	0.60	0.29	22.5°	45°
4000 Lb-Ft	5k N-m	0.60	0.15	2.50	0.08	0.80	0.29	22.5°	45°
8000 Lb-Ft	10k N-m	0.60	0.21	2.50	0.08	0.80	0.29	22.5°	45°

Measuring Range		D1	D2	D3 (H7)	D4 (g6)	D5	D6	E	F	G
50 & 100 Lb-Ft	100 & 200 N-m	2.56	4.2	1.3780	1.3780	2.56	2.047	4 x .27	4 x .44	4 x M6
250 & 500 Lb-Ft	300 & 500 N-m	3.54	5.2	1.8504	1.8504	3.54	2.933	8 x .35	8 x .56	8 x M8
1000 Lb-Ft	1k & 2k N-m	4.71	6.4	2.9528	2.9528	4.71	3.996	8 x .42	8 x .68	8 x M10
2000 Lb-Ft	3k N-m	5.89	7.5	3.5433	3.5433	5.89	5.118	8 x .50	8 x .76	8 x M12
4000 Lb-Ft	5k N-m	7.07	8.7	4.3307	4.3307	7.07	6.122	8 x .58	8 x .89	8 x M14
8000 Lb-Ft	10k N-m	8.84	10.5	5.5118	5.5118	8.84	7.716	8 x .66	8 x .89	8 x M16

Model TMS 9250 - DIN

NOTES

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

Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office. To learn more about Honeywell's test and measurement products, call **+1-614-850-5000**, visit **<http://measurementsensors.honeywell.com>**, or e-mail inquiries to **info.tm@honeywell.com**

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DIN-Flange Torque Measurement System

Warranty. 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 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.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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 datasheet is for reference only. DO NOT USE this document as product installation information.
- 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.

Honeywell