

DIGITAL TELEMETRY ROTARY TORQUE MEASUREMENT APPLICATIONS

An Application Note





Background Precision torque measurement is essential in engine and transmission testing, turbine testing, pump testing, and testing of gear trains and power measurement within propulsion systems. Monitoring torque can be critical to optimizing the design of axles, drive trains, gear drives, and electric and hydraulic motors as well as gas and steam turbines. In short, if it rotates or spins on a shaft, spindle or axle, it creates torque that can be measured. Therefore, it can benefit from improved, more accurate torque measurement.

Rotary torque applications currently utilize traditional flange drive and keyed shaft drive torque sensors. As testing requirements demand higher frequency response, simplified installation and reduced down time associated with bearing wear, users demand a more accurate, versatile non-contact rotary torque sensor. With the technology incorporated in the Honeywell TMS 9250 Torque Measurement System, the industry has evolved from slip rings and bearings to the digital age. As the latest technology for torque measurement, digital telemetry can provide these advantages for end users and manufacturers of dynamometers and test stands in transportation, aerospace/defense, heavy equipment, wind energy, and industrial or factory automation applications.



TMS 9250: *Digital Telemetry*

TMS 9250 Key Features

- Digital telemetry, non-contact
- 0.05 % full scale, total system accuracy
- DIN & SAE and companion flange compatible
- Shaft-to-shaft and integral coupling compatible
- High torsional stiffness
- Large capacity flange available
- 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 needed
- FCC and CE certified, meeting all EMC emission and susceptibility requirements

The Solution

Honeywell’s TMS 9250 Torque Measurement System represents an advanced generation of rotary transformer sensors designed to operate completely in the digital domain for accurate measurement and output versatility. The TMS 9250 offers new options for mounting, installing, sensing, controlling, actuating, collecting data and reporting data. It’s fast, accurate, flexible, requires less maintenance and is simple to install.

The TMS 9250 provides non-contact torque measurement through digital telemetry on rotating parts and its 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 and supports virtually unlimited testing capabilities.

True torque measurement. Slip ring and rotary transformers are less reliable methods to measure true torque, offering only limited transmission speeds and providing lower resolution data. Mechanical in nature, they create friction and are subject to mechanical wear. Since there is no mechanical interference with Honeywell’s TMS 9250 non-contact digital telemetry design, users realize more accurate data measurement with faster response and better performance. Digital input ensures greater integrity of the overall system data through higher resolution torque data capture, resulting in 0.05 % full scale, total system accuracy. The high torsional stiffness inherent in the TMS 9250 is less impacted by any

external variables while its low rotating inertia gives a clearer, better data response.

Easy configuration. Honeywell's modular design is readily adapted to many different types of test stands to meet specific test application requirements, such as flanges, shafts, integral couplings and so on. Multiple mechanical configurations are available, including DIN, SAE, integral coupling, shaft-to-shaft and custom mounting.

Simple installation, setup and operation. The TMS 9250 is light, compact and has quick-attach wiring connectors for fast commissioning. Its easy setup parameters are readily accessible through the software system, enabling test parameter adjustments "on the fly." The system architecture and software allow for the utilization of different calibrations performed on the same sensor, which can be saved and imported to the system as needed. This allows one sensor to be reconfigured in a variety of characterization arrangements. Users can select not only the sensing range, but also the sensor analog output type from eight selections, including options for voltage, current, or frequency.

Proven reliability. Because Honeywell's TMS 9250 is a non-contact system for torque measurement, it's not only low maintenance but more reliable. Its design also results in fewer sensor and instrumentation wiring issues.

FCC, CE and EMC compliant. The TMS 9250 complies with all regulatory standards for safe RF emission standards and will not cause RF interference with other equipment.



Engine/Transmission Applications

The Honeywell TMS 9250 provides improved, exceptional torque measurement in a variety of automotive and heavy equipment applications, including powertrain, engine, transmission, driveshaft and rear axle differential testing; brake, wheel hub, drive wheels and continuous track; dynamometers, engine diagnostics, cold engine, and oil/water pump testing.



Engine Testing

The TMS 9250 is engineered to accurately measure torque while operating in extremely harsh environments, such as jet engine testing. It may also be used to verify jet engine performance after assembly or maintenance.

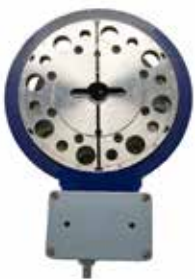


Aerospace and Alternative Energy Applications

Digital telemetry is the latest technology to be utilized for accurate torque measurement in applications for the aerospace and alternative energy industries, such as jet engine/turbine testing; wind power gearbox and torsion blade testing; propeller testing, turn up/turn down gear box testing; industrial motor/generator testing; and auxiliary component efficiency testing.

Honeywell TMS 9250 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: Digital Telemetry System

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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.