



MODEL AT-4400

WIRELESS TORQUE TELEMETRY

- Easy installation and operation with no batteries required
- 16-bit resolution – high bandwidth and high accuracy
- No bearings or sliding contacts – operates in corrosive or dirty environments
- High EMI immunity – usable near variable frequency drives
- Analog voltage output, with frequency output also available
- Flexible output gain, offset, and filtering
- Remote shunt calibration

TYPICAL APPLICATIONS

- Replacement of slip rings for torque measurement
- Torsional vibration testing
- Driveshaft testing – automotive, off-road vehicles, marine
- Dynamometers
- Industrial drives-process monitoring
- Machine tools

HIGH RESOLUTION & HIGH ACCURACY

Unlike older analog FM rotary telemetry systems that are limited in accuracy and also subject to noise and dropouts, the AT-4400 Wireless Torque Telemetry System conditions and digitizes strain gage signals within a miniature transmitter module right on the rotor. With precision signal conditioning circuitry, 16-bit digital resolution, and digital data transmission off of the rotor, the AT-4400 provides extremely high precision torque transducer measurement capability. This single-channel telemetry system is inductively powered, allowing long-term monitoring without the need for batteries. A built-in shunt calibration function ensures the highest levels of accuracy and integrity.

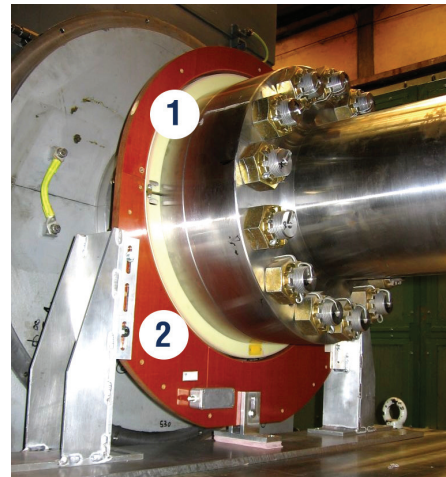
AT-4400 systems may be customized to meet a wide variety of applications. All systems include a rotor-mounted transmitter/signal conditioning module, a rotating power/data transfer coil, a non-rotating pick-up coil, and a remote receiver unit. Measurement outputs from this receiver can be provided in analog voltage (± 10 V or less) and optional frequency formats.

When supplied as a shaft-mounted system, the transmitter module and rotating antenna are mounted in a split clamp-on collar customized to match the shaft diameter. This collar requires just 1.25 in. (~32 mm) of shaft length and 1.125 in. (~29 mm) of radial height. Users need only to adhesive bond strain gages to the shaft, clamp on the collar and mount the pick-up loop antenna to make torque measurements. Alternatively, AT-4400 series OEM-style telemetry kits allow manufacturers of precision torque transducers to configure their products without the use of sliprings, bearings or rotary transformers, creating an entirely new class of rotary torque transducers.

SPECIFICATIONS	
Input	
Full Scale Input	± 1.51 mV/V FS standard; also available ± 2.78 and 16.6 mV/V (755, 1390, and 8300 microstrain for a full strain gage bridge output, with a Gain Factor of 2.0). Custom input ranges are available, but with reduced gain drift performance.
Bridge Excitation	5 VDC
Bridge Resistance	350 ohms minimum
System Performance Typical	
Digital Sampling	16-bit data, 26 484 samples per second
Bandwidth	DC to 2 kHz standard, custom filtering to 8.3 kHz available. Anti-alias filtered on-rotor.
Zero Drift	<.001%/°F
Gain Drift	<.001%/°F
DC Resolution	<.003%/FS
Noise Spectral Density	<.0005%FS per $\sqrt{\text{Hz}}$ typical (of signal at transmitter input, at 1.51 mV/V range)
Noise	0.33 microvolts/V RMS typical input noise (at full scale of 1.51 mV/V, with 2 kHz bandwidth)
Linearity	.05% FS
System Outputs	
Output Interface	DB-25 female connector
Analog Voltage	± 5 V to ± 10 V output for a full scale signal input to the transmitter
Digital Output	QSPI high speed streaming digital data output
Frequency Output	(Optional) 10 kHz ± 5 kHz [as an analog signal alternative to voltage output data]
AC Output	(Optional) AC coupled output in addition to the DC coupled output. High pass filtering: 5 to 725 Hz AC output gain: 1 to 9x.
Analog Output Filter	Four user-determined output filter frequencies may be selected. (2000 Hz with no filtering; with filtering: 1000, 200, 20, and 2 Hz
Calibration	
Shunt Calibration	Unipolar shunt calibration may be invoked from the receiver during rotor operation
User Adjustments	
Gain	User selectable factors of 0.25 to 1.5 based on ± 10 V FS output
Zero (Offset)	Trim pot adjustments $\pm 40\%$ FS range
Symmetry	Trim pot adjustments $\pm 0.25\%$ of FS adjustment range indicator LED's
Indicator LED's	
AC Power	Yellow
Shunt Calibration On	Green

[1] 257 °F (125 °C available)

SPECIFICATIONS (continued)	
Transducer Power Low	Red (indicates insufficient power transfer to transmitter)
Data	Green (indicates detection of data stream from transmitter)
Power	9 to 18 VDC input, 15 watts. 0 to 40 °C, 90-240 VAC 50-60 Hz desktop style adapter is supplied
Temperature	
Receiver	0 to 122 °F (0 to 50 °C)
Transmitter	-40 to -185 °F (-40 to 85 °C) ^[1]



1 - Transmitter (Shown mounted on a 21.3" OD, 3000 RPM shaft)

Rotating clamp-collar assembly supplying excitation to user-installed strain gage and transmitting digital strain gage data to Pickup Antenna

2 - Pickup Coil

Stationary machined phenolic induction power / coax data connection to Receiver



AT-4400 Receiver

Displays gain, offset, symmetry, gain, range, zero/added offset, and output filtering options