



AT-4400 Series High Performance Wireless Torque Telemetry System

High Resolution/ High Accuracy Torque Telemetry



Typical Applications

- Replacement of slip rings for torque measurement
- Torsional vibration testing
- Automotive driveshaft testing
- Off-road vehicle driveshafts
- Marine driveshafts
- Dynamometers
- Industrial drives- process monitoring
- Machine tools

Highlights

- **Simplicity** - the AT-4400 is easy to apply, easy to operate, requires no calibration, and requires no battery changes.
- **Superb data quality** - 16-bit resolution/high bandwidth, with data that is digitized before transmission, provides incomparable data quality with high EMI resistance.
- **Rugged, trouble-free construction** Unlike sliprings or rotary transformers, the AT-4400 has no bearings or sliding contacts and can operate in corrosive or dirty environments.
- **Design flexibility** - Have a special need? Accumetrics will customize to meet your special need or OEM requirement.

The AT-4400 is a precision 16-bit digital telemetry system designed specifically to measure torque on existing shafts without machine modification or precision alignment. By mounting strain gages directly on their shafts and clamping the AT-4400 split collar around the shaft, users can obtain torque measurements without needing to interrupt existing shaft systems to install in-line torque transducers.

The AT-4400 provides:

- 16 bit resolution digital telemetry
- very low noise/ very high accuracy
- 26484 samples/second continuous sampling rate/ dc to 8.3 khz bandwidth available (standard bandwidth is 2 khz)
- High EMI immunity (usable near variable frequency drives)
- Induction power for continuous use (no batteries)
- Analog voltage output, with frequency output also available
- Flexible output gain, offset, and filtering
- Remote shunt calibration

Unlike older analog FM rotary telemetry systems that are limited in accuracy and also subject to noise and dropouts, the AT-4400 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 (+/- 10V or less) and optionally 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. (~32mm) of shaft length and 1.125 in. (~29mm) 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. A cylindrical transmitter module is typically mounted within the transducer body and the transmitter antenna is supplied in a pressed on collar, available in various sizes. This style of construction also lends itself to custom nonshaft-mounted collar end user applications.



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.

Pickup Coil:
 --Stationary machined phenolic induction power / coax data connection to Receiver

Receiver: (rear view)
 --Digital to Analog conversion and +/- 10 V output



AT-4400 Receiver showing gain, offset, symmetry, gain, range, zero/added offset and output filtering options



AT-4400 Receiver Power Supply (90-240 VAC to 12VDC output)



Technical Specifications		Model Number	AT-4400
Input		Model Number	AT-4400
Full Scale Input	±1.51mV/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.	Calibration	
Bridge Excitation	5VDC	Shunt Calibration	Unipolar shunt calibration may be invoked from the receiver during rotor operation
Bridge Resistance	350 ohms minimum	User Adjustments	
System Performance (Typical)		Gain	User selectable factors of 0.25 to 1.5 based on +/- 10V FS output
Digital Sampling	16 bit data, 26484 samples per second	Zero (offset)	Trim pot adjustment ±40% FS range
Bandwidth	DC to 2 kHz standard, custom filtering to 8.3 kHz available. Anti-alias filtered on-rotor.	Symmetry	Trim pot adjustment ±0.25% of FS adjustment range Indicator LED's
Zero Drift	<.001%/°F	Indicator LED's	
Gain Drift	<.001%/°F	AC Power	Yellow
DC Resolution	<.003%FS	Shunt Calibration On	Green
Noise Spectral Density	<.0005%FS per √Hz typical (of signal at transmitter input, at 1.51mV/V range)	Transducer Power Low	Red (indicates insufficient power transfer to transmitter)
Noise	0.33 microvolts/V RMS typical input noise (at full scale of 1.51mV/V, with 2 kHz bandwidth)	Data	Green (indicates detection of data stream from transmitter)
Linearity:	.05%FS	Power	
System Outputs		9 to 18 VDC input, 15 watts. 0 to 40 °C , 90-240VAC 50-60 Hz desktop style adapter is supplied	
Output interface	DB-25 female connector	Temperature	
Analog Voltage	±5V to +/-10V output for a full scale signal input to the transmitter	Receiver	0 to 50 °C (0 to 122 °F)
Digital Output	QSPI high speed streaming digital data output	Transmitter:	-40 to 85 °C (125 °C available)
Frequency Output	(Optional) 10 kHz ±5kHz (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 2Hz)		



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About Accumetrics:

Founded in 1991, and a part of PCB Group (2013), Accumetrics is a world leader in rotor telemetry, pioneering in every phase of rotor telemetry, from quickly applied single channel dependable torque systems to advanced aerospace systems with hundreds of high bandwidth channels. No matter your industry or what your telemetry requirement, chances are we can provide a system that will meet your needs.

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