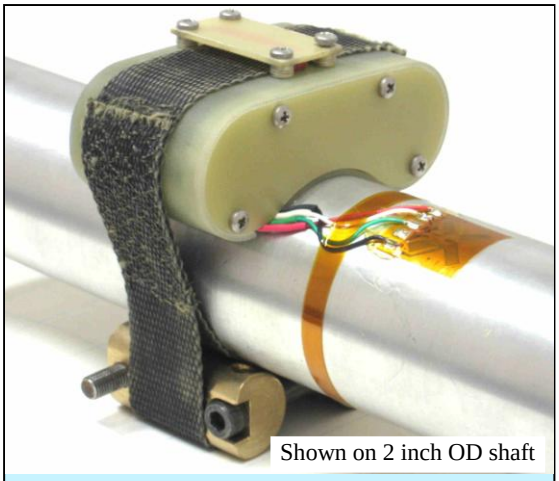


Shown on 2 inch OD shaft

Applications:

- Torque testing for half-shaft/ prop-shaft/ driveshafts
- Replacement of slip rings and in-line torque transducers
- Torsional vibration testing
- RTD temperature measurement
- Voltage measurement

Benefits:

- **Simplicity** - the AT-4500 transmitter is easy to apply, easy to operate, easy to calibrate, and requires no batteries.
- **High RPM capability**: >10000 RPM on a 2" OD, 4320 RPM on a 24.8" OD
- **Small size** — transmitter typically requires less than 1.4 inches of radial space around a shaft and 2.1 inches of axial length
- **Rugged, trouble-free construction.** Unlike sliprings, the wireless AT-4500 has no bearings or sliding contacts. Input connections are easily sealed from the environment, allowing use in corrosive or dirty environments.
- **Superb data quality** - 16-bit resolution/ high bandwidth/ EMI resistant data is digitized before transmission off the rotor, providing excellent data quality.

Accumetrics Associates, Inc.

Induction Powered Rotor Telemetry System
Kevlar® Strapped to Shaft

AT-4500 EasyApp

The AT-4500 EasyApp system is a rugged, high bandwidth, high speed, 16 bit rotor telemetry system primarily used for full bridge strain gage torque measurements, but also used for rotor voltage and RTD temperature signals. Without any needed shaft modifications, this system may be easily installed on a rotary shaft using a Kevlar® strap that is supplied with the product. Using wireless technology, sensor data can be directly acquired for broadly varied applications --from vehicle drive shaft torque to large generator excitation voltage.

The AT-4500 provides:

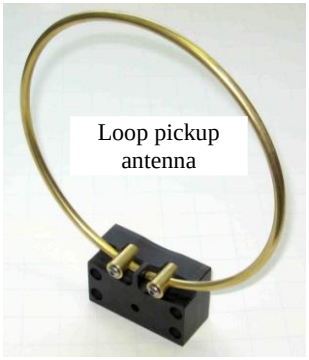
- Induction power for continuous use ***without batteries***
- Simple to apply Kevlar® straps (either 3000 or 10000 pound pull strength for small or large shaft diameters at high RPM)
- A single transmitter for reuse on varied shaft sizes
- Excellent rotor-to-pickup-antenna movement tolerance
- Environmentally tough packaging --mud/ ice/ oil resistant
- High precision/ low noise measurements, 16 bit resolution
- High sample rate (26484 Sa/sec) with bandwidth up to 8.3 kHz
- Remote shunt calibration control at any time
- Analog voltage output (+/- 10 volt or +/- 5 volt)

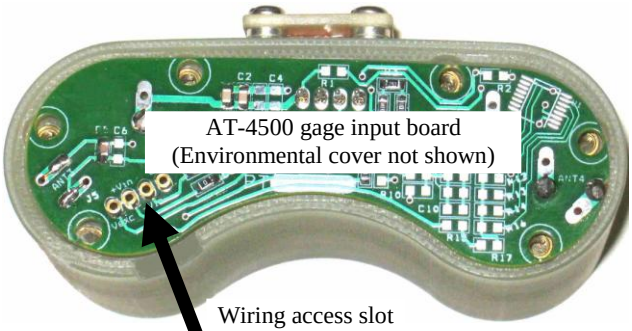
How to directly measure true torque:

- Install a full bridge strain gage on your shaft (install the gage yourself, use a third party installer, or send it to us).
- Apply the AT-4500 EasyApp transmitter with a Kevlar® strap sized by us for your shaft. Connect to the gage input right angle wiring adapter and optionally seal the environmental cover with a little electronic grade silicone (RTV162 or similar).
- Place a loop pickup antenna at the transmitter's axial location to induce power and to retrieve the digital data.
- Connect the receiver to your data acquisition system.
- Easily calibrate by using either end-to-end calibration from a known torque input to obtain resultant readings at your data acquisition system, or independently calibrate the telemetry using the built-in shunt calibration feature.

How it works:

A set of antennas (one inside the transmitter, and one stationary loop antenna) induce power across an air gap, regardless of RPM, for both sensor excitation and for powering the telemetry transmitter.
The rotor sensor or voltage signal is amplified, anti-alias filtered and then digitized. EMI resistant digital data is transmitted off the rotating shaft to the pickup antenna, which is connected to the receiver by coaxial cabling. The receiver converts the digital data to high bandwidth analog voltage. The voltage output signal is then connected to the user's data acquisition system.

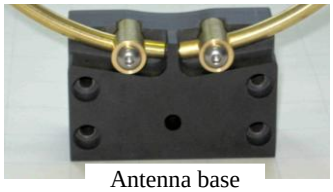

Loop pickup antenna


AT-4500 gage input board (Environmental cover not shown)

Wiring access slot


Kevlar strap

Input cable (one of three supplied)


Antenna base (1.25x1.61x2.94”

Receiver front/ back (7.1x10.5x3.0”)


Counterbalance & strap tightening yokes


Tuning Enclosure (4.7x3.5x2.4”)


In-line PC style power supply

System Specifications (typical)

- Digital Sampling: 16 bit resolution; 26484 samples per second continuously.
- Bandwidth: DC to 2 kHz standard transmitter anti-alias filter setting.
  Optional: DC to 8.3 kHz, and/or AC coupled input (2.8Hz -3dB typical).
- Zero Drift: <.001%/°F.
- Gain Drift: <.001%/°F.
- DC Resolution: <.003% of full scale.
- Noise Spectral Density: <.0005% of full scale per √Hz typical (of signal at transmitter input, at ±2.778mV/V range).
- Linearity: .05% of full scale.
- Full Scale Input-strain gage: ± 2.778mV/V or ±9.091mV/V full scale input range. (For 120 ohm use: ±4.53mV/V or ±8.34mV/V).
- Full Scale Voltage/ RTD: Voltage: mV to 100V peak (or 2700V with use of optional HV cable); RTD: -40 /+ 300C

Strain Gage (Note: the strain gage is not included; contact Accumetrics for strain gaging if needed).

- Bridge Resistance: 350 or 1000 ohms preferred. Contact Accumetrics if 120 ohms bridge resistance is required.
- Bridge Excitation: 5 VDC (ratiometric signal measurement is used).
- Shunt Calibration: Unipolar shunt calibration may be invoked from the receiver at any time.

System Outputs and User Adjustments

- DC coupled Voltage: +/-5 V or +/-10V receiver output corresponding to a full scale signal sensor input.
- AC coupled Voltage: AC coupled secondary output. High pass filtering: 5 to 725 Hz. AC output gain: 1 to 9X.
- Frequency Output: (Optional) 10 kHz ±5kHz can be provided as an analog signal alternative to voltage output data.
- Output Filter: 2000, 1000, 200, 20 and 2 Hz output filtering selectable. (Optionally, up to 8.3 kHz bandwidth).
- Output Gain: User selectable factors of 0.25 to 1.5x.
- Zero (offset): Trim pot and coarse adjustment total of ±40% of full scale range.
- Symmetry: Trim pot adjustment ±0.5% of full scale + or – single side adjustment range.

Shaft diameter range: 2” to large shaft outside diameters (smaller ODs possible if used with optional shims).

Maximum RPM/ Shaft OD: >10k RPM on 2”OD (with 3000 pound pull strength strap); 4320 RPM on 24.8”OD (10000 lb strap).

Transmitter Mounting Requirements: Radial height needed above shaft (including strap and tightening yokes, but not including stationary pickup antenna): <1.4” typical,. Axial length required: 1.79”.

Antenna spacing (typical) to pickup: Small diameters (<10” shaft OD): 2” air gap; Large diameters: 1”; near metal plates: call Accumetrics.

Cables: -Strain gage input cable (quantity 3 supplied): 6” long, 26 AWG Teflon, with 4 position 0.100” header
-Receiver to Tuning Enclosure: two 25 foot coaxial cables (Data: BNC connector, RF power: TNC).
-Tuning enclosure to Pickup Antenna: two 8 AWG Litz wires (in one cable sheath), 10 foot long.

Power and Data frequency: Power: 106 kHz (rectified by transmitter to provide 5VDC on rotor). Data: 13.56MHz.

Power for the receiver: 9 to 15 VDC input, 30 watts. Mains: 90-264VAC 47-63 Hz to included 12V 5A in-line power supply.

Receiver Indicator LEDs: AC Power: *Yellow*; Shunt Calibration On: *Green*; Data: *Green*.

Signal Strength LEDs: Data signal strength: LED bar graph. Low transmitter induction power: Red LED.

Temperature: Transmitter: -40 to 85°C; Receiver: 0 to 50°C; Power supply: 0 to 40°C.

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