



## MODEL AT-4500

# INDUCTION POWERED TELEMETRY

- Simplicity – easy to install and operate
- Small size – transmitter typically requires less than 1.4" (35.56 mm) of radial shaft clearance
- Environmentally rugged transmitter, mud/ice/splash resistant
- High data integrity and noise immunity
- Excellent rotor-to-pickup-coil movement tolerance
- High sample rate (26 484 Sa/sec), bandwidth up to 8.3 kHz
- Adjustable analog voltage output (factory setting  $\pm 10$  V full scale)

## TYPICAL APPLICATIONS

- Torque testing for half-shafts / propshafts and driveshafts
- Replacement of slip rings and in-line torque transducers
- Torsional strain testing
- RTD temperature measurement
- Voltage measurement

## TELEMETRY SIMPLIFIED

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. AT-4500 can also be used for rotor voltage and RTD temperature signals. The system is easily installed, without any shaft modification, with an aramid fiber strap. As an induction powered system, no batteries are required. Using wireless technology, sensor data can be directly acquired for broadly varied applications – from vehicle drive shaft torque to large generator excitation voltage.

AT-4500 uses a set of coils (one inside the transmitter, and one stationary loop coil) to induce power across an air gap, for both sensor excitation and to power 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 coil, which is connected to the receiver by coaxial cabling. The receiver converts the digital data to high bandwidth analog voltage output (adjustable from  $0 \pm 1.0$  to  $\pm 10$  volts). The voltage output signal is then connected to the user's data acquisition system. Rotation is not required for the system to operate.

SPECIFICATIONS	
Performance	
Digital Sampling	16-bit resolution; 26 484 samples per second continuously
Bandwidth	DC to 2 kHz standard transmitter anti-alias filter setting Optional: DC to 10 kHz, and/or AC coupled input (2.8 Hz -3 dB typical)
Zero Drift	.001%/°F
Gain Drift	.001%/°F
DC Resolution	<.003% of full scale
Noise Spectral Density	<.0005% of full scale per $\sqrt{\text{Hz}}$ typical (of signal at transmitter input, at $\pm 2.778$ mV/V range)
Linearity	.05% of full scale
Full Scale Input-Strain Gage	1.51, 2.78, 5.55, 9.09 mV/V full scale input range
Full Scale Voltage/RTD	Voltage: mV to 100 V peak (or 2700 V with use of 32 to 355 °F optional HV voltage dropping assembly cable); RTD: 0 to 180 °C
Strain Gage <sup>[1]</sup>	
Bridge Resistance	350 or 1000 ohms preferred
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	Adjustable (optional) receiver output corresponding to a full scale signal sensor input
AC Coupled Voltage	Optional AC coupled secondary output. High pass filtering: 5 to 725 Hz. AC output gain: 1 to 9X.
Frequency Output	(Optional) 10 kHz $\pm 5$ kHz 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 $\pm 40\%$ of full scale range
Symmetry	Trim pot adjustment $\pm 0.5\%$ of full scale + or - single side adjustment range
Shaft Diameter Range	2" (50.8 mm) and greater to large shaft outside diameters by varied strap lengths (smaller ODs if used with optional shims)
Transmitter Mounting Requirements	Radial height needed above shaft (including strap and tightening yokes, but not including stationary pickup coil <1.4" (35.56 mm) typical. Axial length required: 1.81" (46.0 mm)
Airgap Spacing (Typical) to Pickup	Radial air gap 0.5-1.0" (12.7 to 25.4 mm), depending on application
Power and Data Frequency	Power: 106 kHz (rectified by transmitter to provide 5 VDC on rotor). Data: 13.56 MHz

SPECIFICATIONS (continued)	
Temperature	Transmitter: -40 to 185 °F (-40 to 85 °C), Receiver: 32 to 125 °F (0 to 50 °C), Power Supply: 32 to 105 °F (0 to 40 °C)
<b>Receiver</b>	
Power	9 to 15 VDC input, 30 W
Accessories	Mains: 90-264 VAC 47-63 Hz to included 12 V 5 A in-line power supply
Dimensions (H x W x D)	3.0 x 10.5 x 7.1 in (76.2 x 266.7 x 180.3 mm)
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
<b>Supplied Accessories</b>	
Cables <sup>[2]</sup>	Strain gage input cable (quantity 3 supplied): 6'/152.4 mm long, 26 AWG TFE, with 4 position 0.100" header
	Receiver to Tuning Enclosure: two 24 foot coaxial cables (Data: BNC connector, RF power: TNC)
	Tuning enclosure to Pickup Coil: two 8 AWG Litz wires (in one cable sheath), 10 foot long

[1] The strain gage is not included; contact Accumetrics for strain gaging if needed  
[2] Contact factory if longer cables are required



AT-4500 Transmitter



Receiver Front/Back



Transmitter Housing

Transmitter Housing for > 2.0" (50.8 mm) Diameters	
Radial Height	1.25 in to 1.55 in (31.75 mm to 39.37 mm)
Axial Length	1.8 in (45.72 mm)
Weight	0.45 lb (0.204 kg)