TECAT
PERFORMANCE SYSTEMS

WIRELESS WITH AN EDGE

The TECAT WISER Model 4000 torque measurement and monitoring system is a wireless data acquisition system for measuring live torque. It is small, light, power efficient, easy-to-use and non-invasive. The wireless system has the optional ability to measure 3-axis acceleration, pressure and temperature all within the same incredibly small footprint.

The WISER Model 4000 is comprised of three subsystems. The remote unit, shown above, consists of the data capture electronics, transceiver and battery. The base unit plugs directly into a PC USB port, and houses an antenna, transceiver, and up to four analog outputs. The WISER Data Viewer software is used for system configuration and calibration, live monitoring, and data logging.

BENEFITS
- Small footprint enables torque measurement in places never before accessed
- Long battery life for uninterrupted testing
- High accuracy enables development work on a wide range of applications
- Non-invasive system can be removed, and does not alter the unit under test

FEATURES

Data Viewer: The WISER data viewer enables system configuration, calibration, live monitoring and data logging. The strip chart view can be customized to display the channels and ranges of interest.

Remote Data Logging with Triggering: The remote transceiver is capable of storing data at up to 2kHz in order to capture high speed events without PC connectivity. Set triggering events to initiate data collection until the buffer is full. The data can then be downloaded once PC connectivity is available, for post event analysis.

Programmable Analog Outputs: Define the four analog output channels that you wish to collect through your DAQ system with the data viewer interface.

Remote Flash: Easily update the firmware on your remote transceiver without removing it from the unit under test.

User Selectable Data Rate: With data rates ranging from 250Hz to 4kHz, optimize the system by selecting the required rate, while ensuring maximum battery life. With a 2kHz rate and the standard 400 mAh Li-Poly battery, users can expect uninterrupted testing for up to 80 hours, before needing to recharge the battery.

Strain Calculator: Quickly estimate the theoretical slope of torque / strain gauge voltage for your application, so as to optimize system resolution.
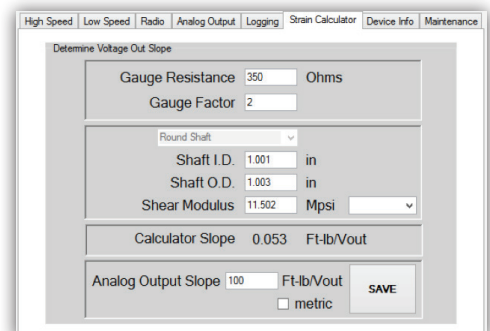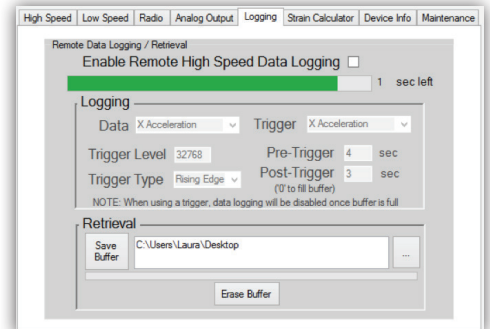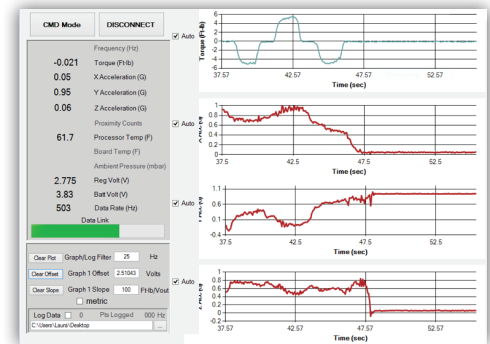
HARDWARE

WISER comes in a rugged carrying case complete with all of the hardware, software, and cables needed to run the system.

1. Remote Transceiver
2. Base Transceiver
3. Antenna
4. Rechargeable Li-Poly Battery
5. Car Power Adapter
6. AC Power Adapter
7. Micro-USB Cable
8. Remote Power Cable
9. Strain Gauge Cable
10. USB drive containing
    - WISER Data Viewer Program
    - Driver for USB Base Unit
    - Microsoft .NET 4.0 Framework Installer
    - User's Manual PDF

ACCESSORIES

The following optional accessories are available for use with the WISER system:
- Additional Li-Poly Battery (400mAh or 850mAh)
- Antenna Extension Cable 4.5m (15ft) or 6.0m (20ft)
- Antenna Cable w/ Magnetic Mount 4.0m (13ft)
- 350 Ω Full-Bridge Strain Gauge
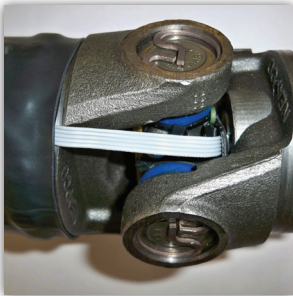- Remote enclosures, shown here
    Black: Base
   Red: Remote Top
   White: Battery Top

APPLICATIONS

Given the small footprint, light weight, and power efficient design of the WISER, new applications for the system arise daily. Here are just a few applications where WISER has proven itself in the past.


Driveshaft: The WISER system shown here is mounted to the end of the driveshaft, with the strain gauge attached along the shaft itself. Several driveshaft applications require long term testing. With a 1000 mAh Li-Poly battery, the system has been used to obtain over 200 hours of 2kHz data before needing to be recharged. Recharging is accomplished overnight, and the system is sent out again.
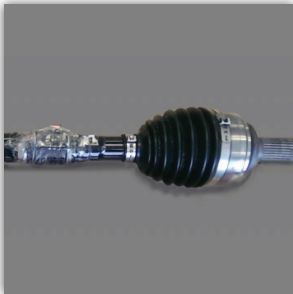
Halfshaft: Measuring torque output to the wheels helps automotive engineers understand torque losses throughout the engine and driveline system. This application requires a durable system, as testing often includes revving the engine and dumping the clutch, sending high load spikes through the halfshafts. In this example, the system is mounted with high strength fiber tape.
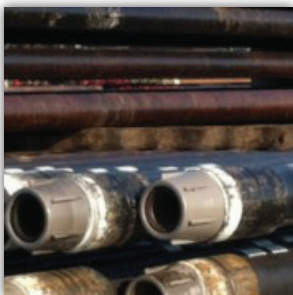
Drilling: In the oil and gas industry, the WISER system has been used in pigging operations, locating underground valves and piping anomalies. With WISER, operators were able to pinpoint dig locations throughout miles of underground piping.
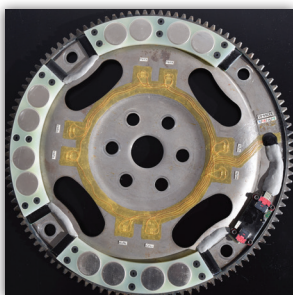
Flex Plate: Flex plates pose a challenging application, given the tight space constraints and high temperatures that flex plates see in the real world. But torque data at the flex plate is highly sought after information, as it can yield insights into real-world, actual engine out torque. TECAT has developed several flex plate solutions, through innovative package designs. TECAT's test facility contains a rig in an environmental chamber, designed specifically for flex plate testing. Each flex plate application requires a custom mounting configuration.

WISER Model 4000 Wireless Data Sensor

SPECIFICATIONS

Power	
Power Supply Remote Unit	3V DC to 6V DC, absolute maximum of 6V DC
Power Supply Base Unit	5V DC unregulated
DC Sensor Driver	10 mA absolute maximum
Lithium Battery	Standard: 3.7V Single Cell Li-Poly (400mAh) Option 1: 3.7V Single Cell Li-Poly (850mAh) Option 2: 3.7V Single Cell Li-Poly (1000mAh)
Power Consumption	WISER remote with 350 Ω strain gauge- active gauge: 3.8mA, inactive: 25.0µA (note: data current consumption varies with over-sampling and data packet size)
Physical - Remote Unit	
Dimensions	36 mm x 23 mm x 4 mm (circuit board w/o mounting tabs and connectors) 45 mm x 23 mm x 6 mm (circuit board w/mounting tabs)
Weight	6.5 g (remote transceiver with epoxy coating) 9.0 g (400 mAh li-poly battery)
Communications	
Radio Frequency Transceiver Carrier	2.45 GHz direct sequence spread spectrum, license free worldwide (2.405 to 2.480 GHz) - 16 channels, radiated power @ 3.5dBm (2.2mW)
RF Data Packet Standard	IEEE 802.15.4 capable, open communication architecture
Range for RF Link	30m (100ft) line-of-sight
Base to Host Transfer	COMM Port via USB – up to 230400 baud; 8 data bits; no parity; 1 stop bit – open
Base Unit	USB (mounts as COM port), 0-5V Analog Output Channels (2.5V nominal centered)
Environmental	
Remote Operating Temp	-40˚C to +120˚C
Electrical	
Sensor Input	Full Wheatstone bridge gauge 350Ω resistance or higher
Accelerometer Range	Standard: none Option 1: 16G Option 2: 400G
Measurement Accuracy	±0.1% full scale typical (digital out)
DC Bridge Excitation	Vg = +2.048V DC at 10 mA max (pulsed to sensors to conserve power)
Shunt Calibration	2 independent shunt cal legs: • Signal + to Ground with 100k resistor • Signal - to Ground with 100k resistor
Analog Gain	User selectable: 1X; 2X; 10X; 200X
Digital Gain	User selectable: 1X; 2X; 4X; 8X; 16X
Digital Offset	User selectable: ±100% full scale
Differential Input Range	Factory selectable: 0-5mV; 0-10 mV; 0-20 mV
Oversampling	1X, 2X, 4X, 8X, 16X, 32X
A/D Converter	Successive approximation type, 16 bit Δ-Σ (increases resolution and accuracy, increases current consumption)
Data Rate	User selectable: 250Hz - 4kHz
Compatible Software	WISER Data Viewer or User Supplied (WDV Requires Windows 2000/XP/Vista/Windows 7 or newer; .NET4.0; 512MB memory; 1Ghz processor or faster)

Note: All specifications are for 1kHz data rate; 16 bit; 350Ω gauge; 6" ribbon cable connection; 3.7V Li-Poly battery