Torque-Link-200 - Specialized analog sensor node designed to fit over rotating shafts for wireless strain and torque measurements

The Torque-Link-200 allows users to transform standard driveshafts into wireless torque transducers by application of one strain bridge. The node supports high resolution, low noise data collection from 1 differential input channel at a sample rate up to 1 kHz. An integrated hall effect sensor enables reporting of RPM and total pulses allowing for the derivation of real-time power in torque applications.

LORD Sensing Wireless Sensor Networks enable simultaneous, high-speed sensing and data aggregation from scalable sensor networks. Our wireless sensing systems are ideal for test and measurement, remote monitoring, system performance analysis, and embedded applications.

PRODUCT HIGHLIGHTS
- Two to six inch diameter shaft (standard), more sizes available on request
- One differential input channel (standard) for full-bridge strain gauge integration (two channels optional)
- Ideal for static and dynamic torque measurements with full temperature compensation and bending cancellation
- Alternative gauge configurations enable axial and bending measurements
- Rugged ABS housing designed for remote, long-term installation on cylindrical shafts
- Application-specific designs available on request

FEATURES AND BENEFITS
HIGH PERFORMANCE
- Lossless data throughput
- Node-to-node synchronization of ±50 μS
- Up to 1024 Hz sampling
- Noise as low as 1 μV p-p
- High resolution 24-bit data
- Datalog up to 8 million data points

EASE OF USE
- Installs over existing strain elements and shafts with no mechanical modifications
- Configurable housing geometry will accommodate any shaft size
- Wireless data transmission allows installation on rotating components without a slip ring
- Battery operated or optional near field power for battery-free operation.

APPLICATIONS
- Condition-based monitoring (CBM)
- Health monitoring of rotating components, aircraft, industrial equipment, and vehicles
- Static and dynamic torque measurements
- Contact sales for details about mining, agriculture, and construction applications
Wireless Torque Sensor Specifications

### General
- **Sensor input channels**: 1 Differential analog input, 1 RPM/pulse, 1 internal temperature
- **Data storage capacity**: 16 M Bytes (up to 8,000,000 data points)

### Analog Input Channels
- **ADC Resolution**: 24-bit
- **Digital filter**: Configurable SINC4 low pass filter for reducing noise
- **Bridge excitation voltage**: Configurable: 1.5 V or 2.5 V (100 mA)
- **Adjustable gain**: 1 to 128
- **Temperature stability**: 0.172 μV/°C (typical)
- **Strain calibration**: Onboard shunt resistor for deriving linear strain calibration coefficients
- **Shunt calibration resistor**: 499k Ohm (± 0.1%)

### Integrated Temperature Channel
- **Accuracy**: ±0.25°C
- **Measurement Range**: -40 to +105°C

### Operating Parameters
- **Wireless comm range**: Line of sight: 1 km (ideal), 400 m (typical)
- **(RF) Radio frequency transceiver carrier**: License-free 2.405 to 2.480 GHz with 16 channels
- **RF communication protocol**: IEEE 802.15.4
- **Power source**: High performance: 1.5 V Lithium AAA (L92) recommended; Lower performance: Alkaline AAA - decreased temperature range and battery life
- **Power consumption**: Configuration dependent (see user manual section 13.4)
- **Operating temperature**: -40°C to +60°C
- **Angular acceleration limit**: 500g sustained, 1000g intermittent
- **Maximum RPM**: Operating condition dependent (see user manual)

### Sampling
- **Sampling modes**: Continuous, periodic burst, or event triggered
- **Sampling rates**: Up to 1024 Hz
- **Sample rate stability**: ±5 ppm
- **Network capacity**: Up to 127 nodes per RF channel depending on settings: http://www.microstrain.com/configure-your-system
- **Synchronization between nodes**: ± 50 μsec

### RPM Sensing
- **Sensor input**: Open collector, open drain or digital pulses from hall effect or other source
- **Range**: 0.1 to 100 Hz (6 to 6000 RPM)
- **Accuracy**: ±0.1% (typical)

### Physical Specifications
- **Dimensions**: See image below
- **Environmental rating**: IP 66, tested to DO-160 standards for temperature variation, humidity, and vibration
- **Enclosure material**: ABS thermoplastic

### Integration
- **Compatible gateways**: All WSDA gateways
- **Software**: SensorCloud™, SensorConnect™, Windows 7, 8 & 10 compatible
- **(SDK) Software development kit**: http://www.microstrain.com/software/mscl
- **Regulatory compliance**: FCC (U.S.), IC (Canada), CE, RoHS (EU), MIC (Japan)

### Network capacity
- **Up to 127 nodes per RF channel depending on settings**: http://www.microstrain.com/configure-your-system

### Example Diameters (other sizes available)

<table>
<thead>
<tr>
<th>Shaft Diameter</th>
<th>Torque-Link Thickness</th>
<th>Torque-Link Outer Dia.</th>
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<tbody>
<tr>
<td>2.00in [50.8mm]</td>
<td>.675in [17.1mm]</td>
<td>3.37in [85.6mm]</td>
</tr>
<tr>
<td>3.00in [76.2mm]</td>
<td>.646in [16.4mm]</td>
<td>4.31in [109.5mm]</td>
</tr>
<tr>
<td>4.00in [101.5mm]</td>
<td>.618in [15.7mm]</td>
<td>5.26in [133.5mm]</td>
</tr>
<tr>
<td>5.00in [127.0mm]</td>
<td>.589in [15.0mm]</td>
<td>6.20in [157.4mm]</td>
</tr>
<tr>
<td>6.00in [152.4mm]</td>
<td>.560in [14.2mm]</td>
<td>7.14in [181.4mm]</td>
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