

# Ranger\* Pro Wireless Condition Monitoring

## Datasheet

### Bently Nevada\* Asset Condition Monitoring

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## Product Datasheet

The Ranger\* Pro Wireless Condition Monitoring wireless vibration sensor allows you to monitor velocity, acceleration, and temperature. It's built for plant managers and operators in power generation, oil and gas, and related industrial markets.

The Bently Nevada Ranger\* Pro Wireless Condition Monitoring sensor enables you to:

- Monitor and optimize the reliability of low- and medium-criticality machines.
- Establish or expand existing reliability programs.
- Make maintenance decisions based on current data.
- Reduce maintenance costs.
- Decrease unplanned machine failures.
- Increase machinery life.

Ranger\* Pro Wireless Condition Monitoring is a simple, easy to implement solution for use in hazardous or difficult to access environments where wired solutions are impractical.

Use Ranger\* Pro Wireless Condition Monitoring to get immediate notifications, short- and long-term trending data, and diagnostic reporting. No more "reporting by walking around." Quickly publish data through OPC Data Access to Bently Nevada System 1 or other third-party tools.



# Machinery Applications

Ranger\* Pro Wireless Condition Monitoring is a vibration sensor for machines with roller-element bearings including:

- Agitators
- Air compressors
- Ball mills
- Blowers
- Centrifuges
- Cooling tower fans and pumps
- Motors
- Small reciprocating compressors
- Small hydro and steam turbines

## Hardware Features

You can configure Ranger\* Pro Wireless Condition Monitoring to work in a variety of environments and applications.

- Uniaxial and tri-axial capable velocity and acceleration detection.
- Environment temperature reporting.
- Mounting hardware options to fit most applications.
- Replaceable lithium-thionyl chloride battery.
- IP67 dust and water resistant.
- Embedded sensors connect using the ISA100 wireless network protocol.
- Can act as a router for other Ranger\* Pro Wireless Condition Monitoring sensors.

Wireless range varies depending on environmental obstacles, gateway antenna type, and the orientation of the sensor relative to the gateway antenna.

## Network Installation

A typical network installation uses several Ranger\* Pro Wireless Condition Monitoring sensors, Ranger\* Pro Wireless Condition Monitoring repeaters, wireless device managers, and access points. Ranger\* Pro Wireless Condition Monitoring is available in either uniaxial or tri-axial vibration detection.

Quickly provision devices over-the-air or using a USB docking station.

## Hazardous Area Approvals

Ranger\* Pro Wireless Condition Monitoring has been tested and certified for use in hazardous locations. This includes:

- CSA Class I, Division 1




WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT. POTENTIAL ELECTROSTATIC CHARGING HAZARD. The equipment shall only be cleaned with a damp cloth when deployed in a hazardous area.

## Compliance and Certifications

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

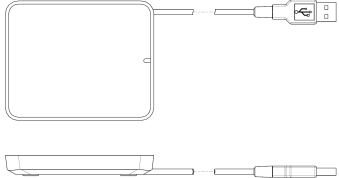
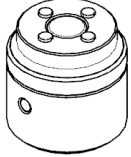
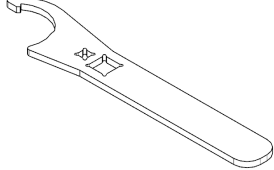
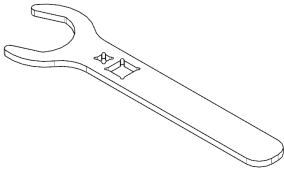
# Specifications

Accelerometers	Axis	1 or 3 axis
	Sensing element	Piezoelectric ceramic
	Amplitude range	±20 g peak
	Measurement accuracy	±5% (160 Hz) Z-axis ±10% (160 Hz) X and Y axis
	Transverse sensitivity (Typ.)	7% (100 Hz)
Data acquisition	Acceleration frequency range	Z axis: 5 Hz (±3dB) to 10 kHz (±3dB) X and Y axis: 5 Hz (±3dB) to 4 kHz (±3dB) (Tri-axial sensor only)
	Acceleration amplitude range	0 – 200 m/s <sup>2</sup> (0 - 20 g)
	Acceleration sub-unit	Peak or RMS
	Velocity frequency range	5 – 1000 Hz
	Velocity amplitude range	0 – 50 mm/s (0 - 2 in/s)
	Velocity sub-unit	Peak or RMS
	Measurement interval	10 minutes to 24 hours
	Output data	Overall values via Modbus from device gateway
Temperature sensor	Measurement range	-40°C to 120°C (-40 °F to 248°F) (Temperature sensor range. Not to be confused with allowable operating temperatures. Limited by battery and ambient conditions.)
	Resolution	0.1°C
	Output data	Overall values via Modbus from device gateway
Wireless	Network standard	ISA100.11a
	Network topology	Star or mesh
	Radio standard	IEEE 802.15.4
	Radio frequency	2.45 GHz ISM band
	Provisioning/ firmware updates	Over-the-air using ISA100 network or via the USB docking station.
	Encryption/ security	128-bit AES encrypted packets
	Output power (peak)	10 mW, maximum
Battery and power	Wireless range	150 meters sensor to access point, 100 meters sensor to sensor, line of sight. (Actual range depends on obstacles present, gateway antenna type, and orientation of the sensor relative to the gateway antenna.)
	Type	Replaceable D size 3.6V lithium-thionyl chloride. <div style="border: 2px solid black; padding: 5px; display: inline-block;"> <b>Warning: Use only one of the following batteries: Tadiran TL-5930/S, Tadiran SL-2780, or Xeno Energy XL-205F.</b></div>
	Life	Up to five years depending on the operating mode and configuration.
Operating conditions	Operating temperature	-40°C to 85°C (-40°F to 185°F) (Operating at extreme temperatures or beyond negatively affects battery life and may damage the sensor.)
	Vibration limit	20g peak

	Chemical resistance	Stainless steel and high temperature, solvent-resistant PPS plastic.
	Shock resistance	0.5 meter drop onto concrete
Physical	Weight	230 grams (without battery; 300 grams with battery)
	Dimensions	Height: 88 mm; diameter: 40 mm
	Case material	316 stainless steel body and glass-reinforced, impact-resistant PPS top
	Mounting hole	M6 x 1mm X 5mm deep internal thread
	IP rating	IP67 dust and water resistant (pending)
Regulatory compliance	EMC conformity standards	IEC 61326-1, ETSI EN 301 489-1, CISPR22, ETSI EN 301 489-17
	Radio spectrum	ETSI EN 300 328
	Safety	ETSI EN 61010-1, IEC 62479
	Hazardous atmosphere	CSA Class 1 Division 1 Groups A, B, C, D ATEX/IECEx Zone 0 (pending)
	Conformity	Compliant with all CE and FCC/IC requirements
Compatible Gateways	Yokogawa	YFGW 410 Field Wireless Management Station
		YFGW 510 Field Wireless Access Points
	Honeywell	WDMX R300 Wireless Device Manager
		FDAP Field Device Access Point






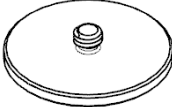
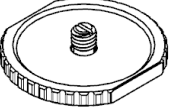
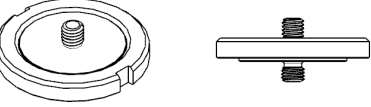

# Accessories

The installation kit (121M7992) includes a USB Docking Station, a battery installation tool, two installation wrenches, and five spare O-rings. These can also be ordered individually.

Product or Document	Item	
121M7992	Installation kit, including five parts below.	
121M7996	USB configuration docking station	
121M7993	Battery installation tool	
121M7994	C-spanner wrench, for Ranger* Pro Wireless Condition Monitoring sensor and M6x1 to 1/4-28 and M6x1 to 3/8-24 25 tri-axial alignment stud	
121M7995	Wrench, for M6x1 to M8x1.25 tri-axial alignment stud	
121M7998	O-ring	
125M3923	Xeno XL-205F D-size lithium-thionyl chloride 3.6V battery	
121M7997	Ranger* Pro Wireless Condition Monitoring configuration software (available for download from <a href="#">BN technical support</a> )	
125M6113	<i>Ranger* Pro Wireless Condition Monitoring User Guide</i>	
125M7374	<i>Ranger* Pro Wireless Condition Monitoring Quick Start Guide</i>	

# Spare Mounting Adapters

Illustrations shown are not to scale. All mounting adapters are made from 316 stainless steel.

Part Number	Size	Illustration
<b>Standard Studs</b>		
121M7987	M6x1 to M6x1 stud	
121M7988	M6x1 to 1/4-28 adapter stud	
121M7989	M6x1 to M8x1.25 adapter stud	
121M7990	M6x1 to 10-32 adapter stud	
125M3920	M6x1 to 3/8-24 adapter stud	
<b>Universal Magnetic Mounting Adapter</b>		
02200371	1.85" Ø x 1.09" H (47 x 27.7 mm), 100 lbf (45kg) pull, 2-pole, 1/4-28 UNF thread	
<b>Adhesive Studs</b>		
121M7991	M6x1 epoxy cementing pad	
<b>Tri-axial Alignment Studs</b>		
121M7986	M6x1.0 to M8x1.25	
125M3921	M6x1 to 1/4-28	
125M3922	M6x1 to 3/8-24	

# Ordering Information

For a detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide*, document 108M1756C, at [www.GEmeasurement.com](http://www.GEmeasurement.com).

## Ranger\* Pro Wireless Condition Monitoring Tri-Axial Sensor

70M303 – AXX – BXX – CXX – DXX

Description: Tri-axial wireless accelerometer and integral temperature sensor.

### A: Mounting hardware options

- 00 No stud
- 01 M6x1 to M8x1.25 tri-axial Alignment Stud
- 02 M6x1 to M8x1.25 Adapter Stud
- 03 M6x1 to M6x1 Stud
- 04 M6x1 to ¼-28 Adapter Stud
- 05 M6x1 to 10-32 Adapter Stud
- 06 M6x1 to 3/8-24 Adapter Stud
- 07 M6x1 to ¼-28 tri-axial Alignment Stud
- 08 M6x1 to 3/8-24 tri-axial Alignment Stud
- 09 M6x1 Epoxy Cementing Pad

### B: Radio Option

- 01 ISA 100

### C: Battery Option

- 00 No battery
- 01 Battery supplied, not installed

### D: Agency Approval Option

- 00 No approvals
- 01 North America
- 02 NA, IECeX

## Ranger\* Pro Wireless Condition Monitoring Single Axis Sensor

70M301 – AXX – BXX – CXX – DXX

Description: Uniaxial wireless accelerometer and integral temperature sensor.

### A: Mounting Hardware Option

- 00 No stud
- 01 M6x1 to M8x1.25 tri-axial Alignment Stud
- 02 M6x1 to M8x1.25 Adapter Stud
- 03 M6x1 to M6x1 Stud
- 04 M6x1 to ¼-28 Adapter Stud
- 05 M6x1 to 10-32 Adapter Stud
- 06 M6x1 to 3/8-24 Adapter Stud
- 07 M6x1 to ¼-28 tri-axial Alignment Stud
- 08 M6x1 to 3/8-24 tri-axial Alignment Stud
- 09 M6x1 Epoxy Cementing Pad

### B: Radio Option

- 01 ISA 100

### C: Battery Option

- 00 No battery
- 01 Battery supplied, not installed

### D: Agency Approval Option

- 00 No approvals
- 01 North America
- 02 NA, IECeX

## Ranger\* Pro Wireless Condition Monitoring Repeater

70M300 – AXX – BXX – CXX – DXX

Description: Wireless repeater.

### A: Mounting Hardware Option

- 00 No stud
- 01 M6x1 to M8x1.25 tri-axial Alignment Stud
- 02 M6x1 to M8x1.25 Adapter Stud
- 03 M6x1 to M6x1 Stud
- 04 M6x1 to ¼-28 Adapter Stud
- 05 M6x1 to 10-32 Adapter Stud
- 06 M6x1 to 3/8-24 Adapter Stud
- 07 M6x1 to ¼-28 tri-axial Alignment Stud

**08** M6x1 to 3/8-24 tri-axial  
Alignment Stud

**09** M6x1 Epoxy Cementing Pad

**B:** Radio Option

**01** ISA 100

**C:** Battery Option

**00** No battery

**01** Battery supplied, not installed

**D:** Agency Approval Option

**00** No approvals

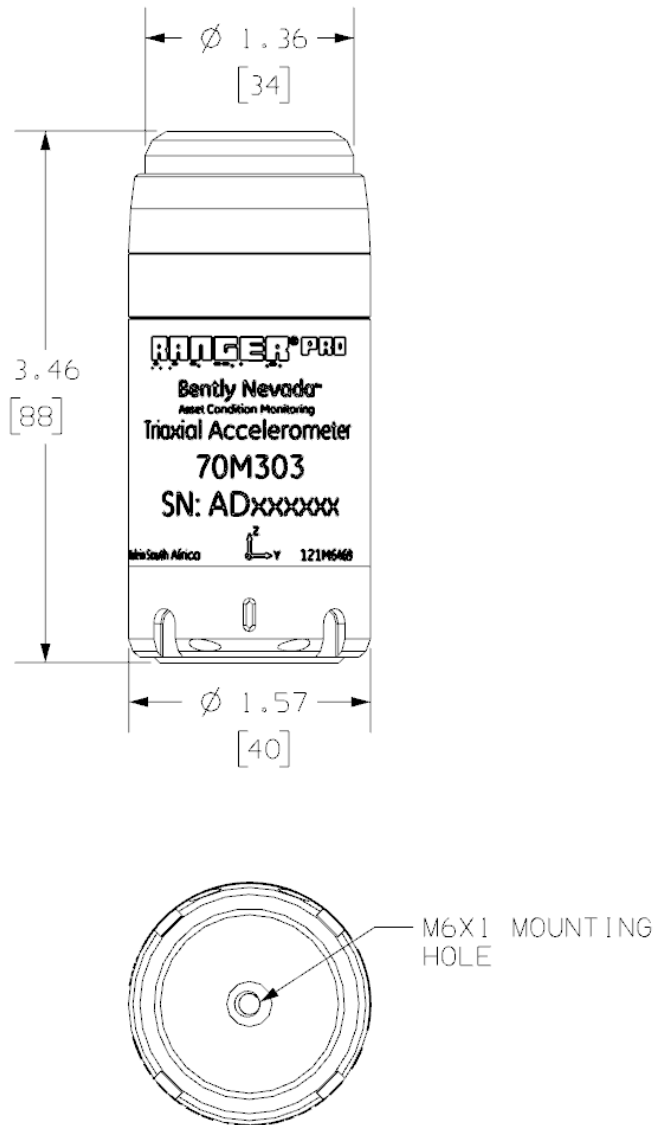
**01** North America

**02** NA, IECeX



# Dimensional Drawings and Figures

**Note:** Dimensions are given in inches [millimeters] unless noted otherwise.



**Figure 1: Ranger\* Pro Wireless Condition Monitoring 70M303 sensor (Identical specifications for the 70M300 and 70M301)**

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