NTN®

guardian™
an **NTN** monitoring solution
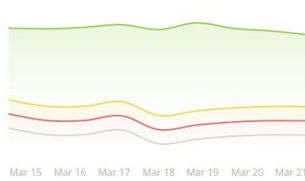
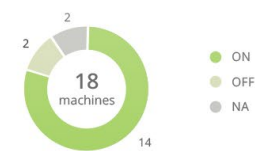**guardian™** / Dashboard **NTN®**

Current Plant Health
2
2
2
18 machines
12
- Good
- Warning
- Critical
- Unknown

Plant Health Trend
Last 7 days
Mar 15 Mar 16 Mar 17 Mar 18 Mar 19 Mar 20 Mar 21
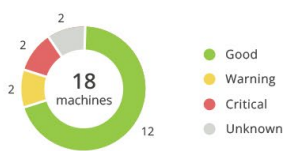
Current Plant Utilization
2
2
18 machines
14
- ON
- OFF
- NA

Machines

Machine	Condition ▲	State
Cooling Water Pump 2A	for 2 weeks	OFF
Control Valve 1042-C	for 6 days	OFF
Boiler Feed Pump 9A	for 3 months	ON
Cooling Tower Fan 1207	for 2 month	OFF
Condensate Pump 1A	for 1 year	ON
Cooling Water Pump 1B	for 1 year	ON

Activities

ID ▲	Event	Date
E10686	Jason Harris commented on Cooling Water Pump 2A	Mar 21st
E10685	Mote Battery Level Warning on Condensate Pump 1B	Mar 21st
E10684	William O'Brian commented on Control Valve 1042-C	Mar 20th
E10683	Mote Unreachable on Cooling Tower Fan 1209	Mar 19th

guardian™ **NTN**

Current Plant Health
2
2
2
18 machines
12
- Good
- Warning
- Critical
- Unknown

Machines (18)
- Cooling Water Pump 2A
- Control Valve 1042-C
- Boiler Feed Pump 9A
- Cooling Tower Fan 1207
- Condensate Pump 1A
- Cooling Water Pump 1B
- Return Steam Trap 804-2C
- Cooling Tower Fan 1205

NTN

guardian™

Optimize performance with advanced condition monitoring.

The NTN Guardian condition monitoring system empowers facilities to optimize asset performance and minimize unforeseen disruptions through simple-to-deploy wireless sensors and cloud-based condition monitoring software. Guardian's advanced machine learning alongside expert analysis tools provide critical insight into asset health and deliver instant alerts with actionable predictive maintenance recommendations.

SENSORS

Sensors collect asset data that is transmitted through WiFi to the cloud
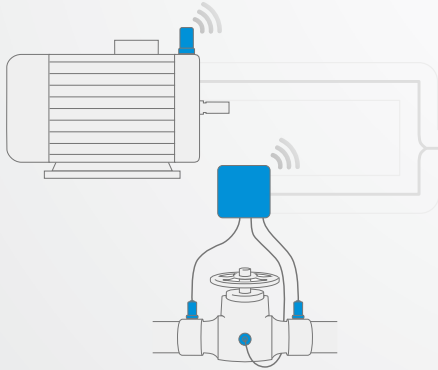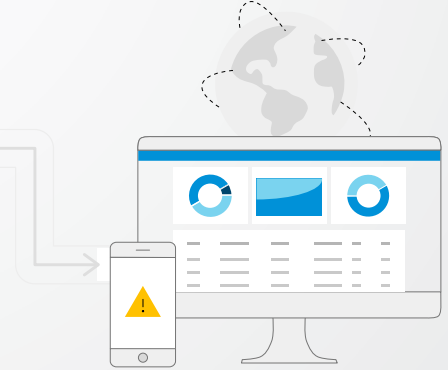
CLOUD

Machine learning models predict asset health

APPS

Asset performance is displayed and actionable alerts are sent in real time

Why use Guardian to monitor your assets?

Condition monitoring is a proven technology for increasing profitability and achieving your predictive maintenance (PdM) goals. Through regular machine monitoring, you can minimize unplanned downtime, optimize asset performance, and reduce maintenance costs.

NTN Guardian elevates your predictive maintenance program performance and plant savings through its intuitive, feature-rich software, powerful ML-analytics, advanced wireless sensing technology and expert condition monitoring support.

COMMON INDUSTRIES & APPLICATIONS

NTN Guardian is designed to monitor virtually any rotating asset and detect early signs of equipment distress, including bearing wear, misalignment, imbalance, looseness, soft foot, and many other machine fault conditions.

Critical Facilities
- Air Handler Units
- Exhaust Fans
- Chillers

Oil & Gas
- Gas Compressors
- Centrifugal Pumps
- Gearboxes

Food & Beverage
- Mixers
- Electric Motors
- Conveyors

Metals Manufacturing
- Rolling Mills
- Overhead Cranes
- Baghouse Fans

Power Generation
- Chill and Boiler Pumps
- Cooling Towers
- Generator Fans

Mining & Aggregate
- Crushers
- Grinding Mills
- Conveyors & Bucket Elevators

Industrial internet of things condition monitoring sensors.

NTN Guardian wireless condition monitoring sensors collect triaxial vibration, temperature, and running speed data from rotating assets. The battery-powered sensors continuously monitor your machine and communicate data to the Guardian cloud, so you can monitor your data anywhere, at any time.

guardian™
an NTN. monitoring solution

Features & Benefits

- **Truly Wireless**
  Convenient remote data monitoring without the hassle and cost of wiring

- **Easy Installation**
  Install sensors within minutes using epoxy or stud mounting

- **Monitor Variable Speed Machines**
  Integrated magnetometer enables running speed detection for monitoring VFD assets

- **Smart Measurement Collection**
  Machine learning at the edge allows for state-based measurement collection based on machine speed and/or only when an asset is on

- **Enterprise-grade Security**
  Data is secured from sensor to cloud via TLS protocol and AES encryption

- **Rugged Industrial Enclosure**
  Certified to operate in food processing, outdoor and Class I, Division 2 environments

Advanced predictive analytics software.

MACHINE LEARNING ANALYTICS
Sophisticated machine learning algorithms analyze over 30 features to generate unique asset health scores. These single, easy-to-interpret health indicators allow you to quickly detect machine anomalies and plan corrective action weeks or months before they become critical.

REAL TIME ALERTS
Automated alerts are sent via email, SMS and mobile notifications to instantly alert users when abnormal machine behavior is detected. Notifications are highly flexible and can be configured to meet your facility's unique needs.

ENTERPRISE-GRADE SECURITY
The wireless sensors offer secure, fully encrypted and authenticated data transmission between the sensors, cloud and applications, ensuring that only authorized requests are initiated by the sensors.

BEARING HEALTH SCORE
Advanced signal processing techniques are used to provide numeric health scores that allows you to track the condition of rolling bearings over time and proactively plan maintenance.

MACHINE HEALTH DASHBOARD
Easily evaluate the condition of your facility's assets with intuitive color-coded health indicators.

VIBRATION ANALYSIS TOOLS
Explore interactive trend, waveform, spectrum and waterfall charts.

AUTOMATED DIAGNOSTICS
Physics-based models are used to automatically diagnose a wide range of common machine problems and provide recommended action.

INTEGRATE 3RD PARTY SYSTEMS
Easily integrate Guardian with third party systems, including process historians, EAM, and CMMS software, through REST APIs.

Choose your model.

The Guardian sensor is a battery-powered, WiFi-enabled sensor that monitors vibration and temperature. It is suitable for fixed-speed motors, pumps and fans.

The Guardian Pro sensor offers the same benefits as the Guardian sensor, but is also equipped with an integrated magnetometer, enabling speed detection and making it well-suited for monitoring variable-speed, batched, or spared machinery. The Guardian Pro sensor's higher frequency response allows for earlier bearing fault detection, making it a preferred option for your critical assets.

	NTN Guardian Sensor	NTN Guardian Pro Sensor
Accelerometer Type	Triaxial MEMS	Triaxial MEMS
Frequency Response	1.6 kHz	6 kHz
Temperature Sensor	✓	✓
Running Speed Sensor		✓
Ideal for detecting		
Machine Imbalance	✓	✓
Structural Looseness	✓	✓
Pump Cavitation	✓	✓
Shaft Misalignment	✓	✓
Late Stage Bearing Wear	✓	✓
Early Stage Bearing Wear		✓
Gear Mesh Defects		✓

NTN Guardian & Guardian Pro Specs

NTN Guardian	
Accelerometer	Triaxial MEMS sensor
Frequency Response	2 to 1,600 Hz (+/- 3 dB)
Measurement Range	+/- 2g to +/- 16g
AD Conversion	16 Bit
Resolution	Up to 4,000 LOR
Sampling Rate	Up to 6.6 kHz
Magnetic Flux Detection	Not Available
Peer-to-Peer Synchronization	Not Available
Connectivity	
Wireless Protocol	802.11 b/g/n Wi-Fi 2.4 GHz

NTN Guardian Pro	
Accelerometer	Triaxial MEMS sensor
Frequency Response	2 to 6,000 Hz (+/- 3 dB)
Measurement Range	+/- 2g to +/- 16g
AD Conversion	16 Bit
Resolution	Up to 6,000 LOR
Sampling Rate	Up to 26.7 kHz
Magnetic Flux Detection	Integral magnetometer detects machine running speed and on/off condition
Peer-to-Peer Synchronization	Allows for measurement synchronization between multiple Guardian Pro sensors on the same asset
Connectivity	
Wireless Protocol	802.11 b/g/n Wi-Fi 2.4 GHz and Bluetooth Low Energy

The following features are common to both models

Physical	
Dimensions (including mounting base)	Height: 3.54 inches (90 mm) Width: 1.73 inches (43.8 mm) Depth: 1.18 inches (30 mm)
Materials	Cover: Flame Retardant, UV Stabilized Polycarbonate Base: Corrosion-resistant stainless steel (SS316)
Mounting (epoxy or stud)	Epoxy: Thermally conductive two-part epoxy Stud: 6.35 mm (¼") 28 UNF tapped hole
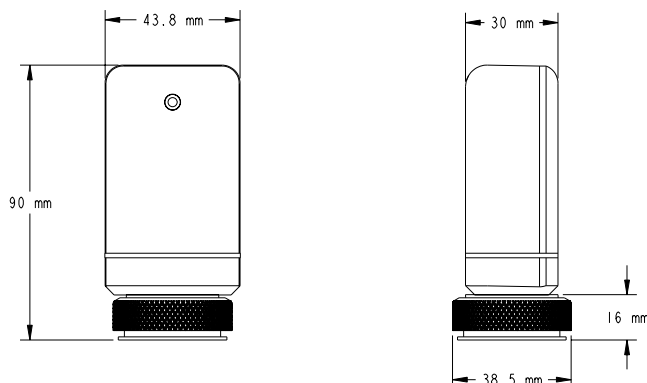
Configuration & Storage	
User Interface (web + mobile)	Web: Internet browser access Mobile: iOS application
Security	Network: WPA3, 802.1X Data: TLS 1.2 with AES encryption
Qualifications	IP67, FCC, CE, RoHS Compliant Intrinsically safe Class 1 Div 1, ATEX Zone 0 version pending final certification

Environmental	
Temperature Measurement Range	-20°C to 75°C (-4°F to 167°F)
Operating Temperature Range	-20°C to 75°C (-4°F to 167°F)
Storage Temperature	5°C to 35°C (41°F to 95°F) without battery

Power	
Source	2x CR123A Lithium 1500 mAh 3V battery
Battery Life	Typically between 1-5 years depending on measurement interval configuration

Beyond Bearings

Training. Installation Support. Troubleshooting. And more.

When you choose NTN, your team is equipped with all the necessary tools and resources to get the job done right. From installation to problem solving, we'll be there with the hands-on support you need to take on your toughest challenges. This includes extra services such as:

Technical Training Unit
On-site, mobile training unit offering specialized, hands-on instruction from NTN engineers

Product Training School
Three days of in-depth instruction from NTN engineers at NTN headquarters or other regional locations around the country
(**go.ntnamericas.com/trainingschool**)

eKnowledge
WEB-BASED TRAINING PROGRAM

Eight online product training modules covering different bearing types and nomenclature
(**www.ntnamericas.com/eknowledge**)

NTN Bearing Finder
Customizable search tool featuring exhaustive data sets, comprehensive part interchanges and interactive CAD drawings
(**bearingfinder.ntnamericas.com**)

Sign Up for NTN Insider
A monthly email from various NTN experts with tech tips, product information, and special announcements
(**ntnamericas.com/ntn-insider**)

Ready to get rolling? Contact us today for full details at 1-800-323-2358 or eng@ntnamerica.com.

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NTN BEARING CORPORATION OF AMERICA • 1501 E. Woodfield Road, Suite 400E, Schaumburg, IL 60173
Tel: 847-298-7500 • Fax: 847-294-1205 • www.ntnamericas.com

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