Plantwide condition monitoring solutions

Something for every asset

In addition to the most important assets found in industrial facilities, there are often a host of "supporting" assets that make up the balance of the plant such as pumps, motors, blowers, heat exchangers, fans, and others. This auxiliary or plantwide equipment may be spared or unspared, and its impact on the process stream may vary from moderate to minor. Regardless, such machines—just like their more highly important counterparts—can benefit from condition monitoring. Bently Nevada provides affordable and effective portable and permanent condition monitoring platforms for these assets. All can be connected to Bently Nevada's plantwide System 1 software, resulting in a proven solution that is delivering tangible benefits for tens of thousands of customers around the globe.

Financial justification

For many assets, failure can mean substantial or total loss of production, often worth millions per day. Or it can lead to the release of hazardous substances, fires, and even explosions—resulting in a severe safety hazard as well as fines for violating environmental regulations.

Maintenance costs

When viewed on a per-asset basis, maintenance costs for plantwide assets can appear modest. However, when viewed collectively across the dozens, hundreds, or even thousands of assets in a typical plant, these costs can be appreciable. Reducing the maintenance costs on each asset through effective condition monitoring—even by a mere 10%—has a large impact on plant profitability. Condition monitoring is a predictive tool that allows more effective insight in planning and asset management, allowing maintenance to be done in advance of a functional failure.

Why Bently Nevada?

Bently Nevada provides affordable and effective portable and permanent condition monitoring platforms for these assets. All can be connected to Bently Nevada's plantwide System 1 software, resulting in a proven solution that is delivering tangible benefits for tens of thousands of customers around the globe.

We design and deliver solutions for all of your monitoring needs—including sensors, portable data analyzers, distributed and rack-based monitors, software, and supporting services—with the following goals in mind:

- Increased availability and production
- Lowered maintenance costs
- Reduced risk in terms of safety, environmental, and asset upsets

And we have impressive statistics to back up our extensive experience:

- More than 600 patents globally, issued and pending
- Over 500,000 assets monitored by Bently Nevada solutions globally
- 15,000+ wireless systems deployed
- 15,000+ speed detection systems deployed
- 38,000+ wind turbine monitoring systems deployed
- 100,000+ rack-based machinery protection systems deployed

60+
years of condition monitoring experience

140+
expert machinery diagnostic engineers worldwide

8 million+
sensor monitoring points installed on machines globally

Increased performance

15,000+
machine diagnostics projects completed

Informed priorities

60,000+
product services jobs performed

Drive focus and ROI

10,000+
System 1 users worldwide

1,200+
System 1 installations worldwide

The benefits of plantwide predictive maintenance

600%
Cost of unplanned events vs. planned maintenance

50%
Reduction in maintenance cost

60%
Reduction in mean time to repair

55%
Reduction in unplanned machine failures

70%
Reduction in maintenance breakdowns

25%
Increase in production

30%
Increase in plant machinery life

40%
Reduction in downtime

30%
Reduction in spare parts cost

90%
Reduction when process data was combined with condition monitoring data

30%
Increase in machinery availability

Portable condition monitoring

World-class portable instruments for route-based data collection and analysis

Not every asset can justify the expense of online monitoring. For some assets, a portable approach is exactly the right strategy, allowing operators, machinery specialists, and others to collect data at regular intervals and on demand. Our data collectors feature a powerful suite of capabilities, ensuring that a Bently Nevada solution delivers more than just System 1 integration—it delivers the sophisticated toolset and signal processing that today's practitioners expect for rolling element bearing diagnostics, balancing, bump testing, multi-channel analysis, and much more. And when it comes to ergonomics, we're blazing the trail with our innovative 200-series SCOUT and COMMTEST products. These data collectors detach the user interface from the data acquisition electronics through a hip-mounted design that wirelessly pairs the two via Bluetooth, freeing you to choose from a wide variety of off-the-shelf Android-based industrial tablets and smartphones. The result is light, easy to carry, with the flexibility to take pictures/videos, check email, track your location, create SOS alerts, and run other enterprise apps. Try doing all that on an old school data collector!
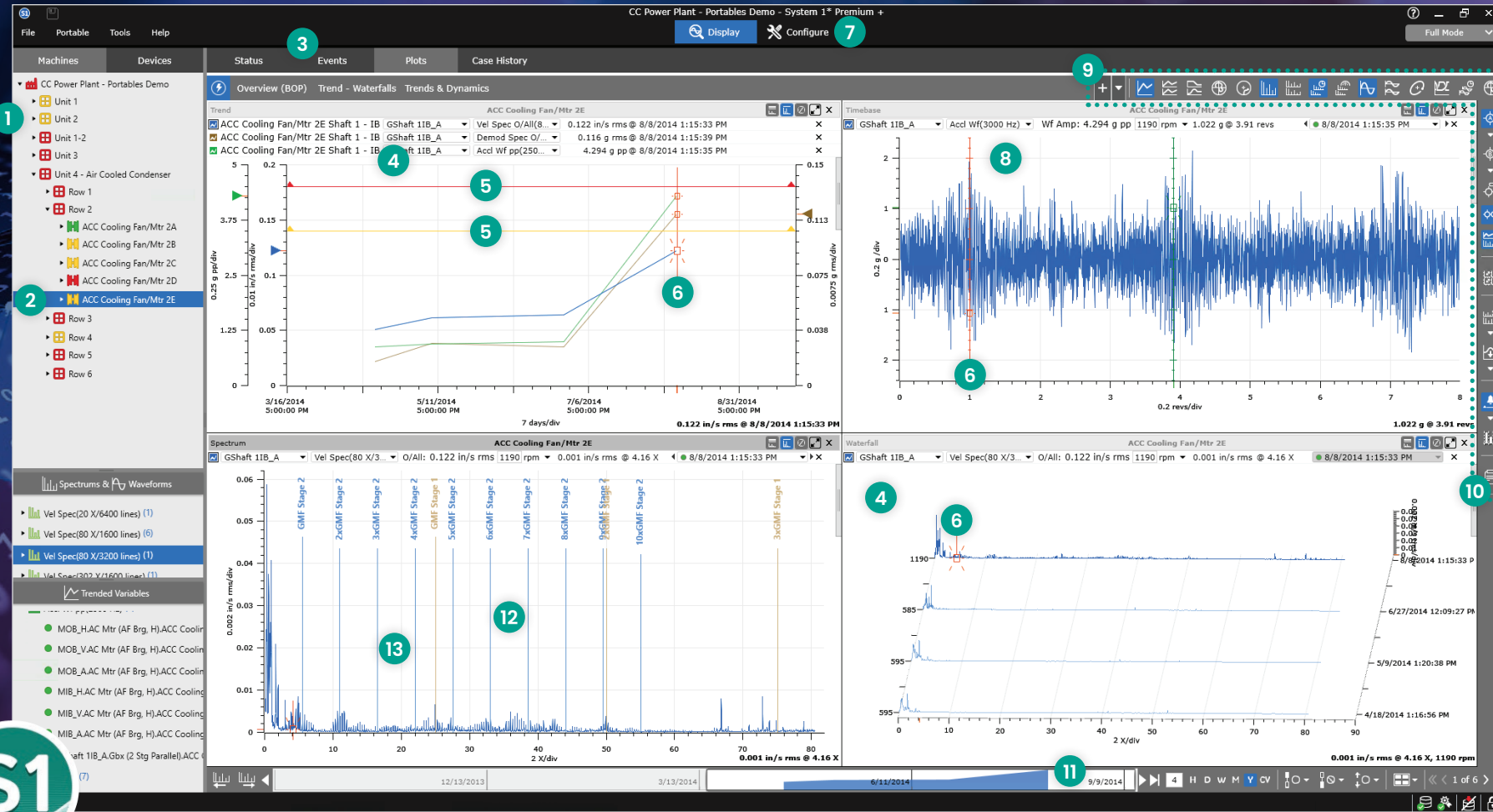
1. Industry-leading navigational intuitiveness by plant/unit/asset or by device.
2. Industry-leading alarm management tools, including statistical alarm calculations.
3. No need to look at every spectrum, every plot. Use the Alarms or Events list to focus on machines with degrading conditions.
4. Industry-leading trend tools.
5. Industry-leading alarm setpoint and alarm event identification.
6. Easily synchronize cursors across plots.
7. Ultra-fast, ultra-easy setup using "Quick Config" to address measurement parameters, alarm bands, and initial thresholds. Re-use setups across similar machines via User Templates.
8. Industry-leading time-waveform tools.
9. Industry-leading toolset and diagnostic capabilities for both rolling element and fluid-film bearings.
10. Comprehensive reporting of fault diagnosis, either within System 1 as Plot Records, or for sharing externally as professionally formatted Word documents.
11. Easily navigate to time period of interest using mini-trend.
12. Built-in rolling element bearing database with 180,000+ entries—configuration of cursors and spectral bands for bearing fault frequencies is a snap.
13. Industry leading spectral tools including powerful cursors and fault frequency indication.

SCOUT200 Series

Our next-generation, wearable data collectors deliver unparalleled ergonomics and a world-class feature set. Available in 2-channel + tach (SCOUT220-IS) and 4-channel + tach (SCOUT240-IS) versions, the SCOUT200 series goes everywhere—even hazardous areas with global Zone 0/1 and Division 1 approvals.

COMMTEST200 Series

Identical to our SCOUT200 series, but without hazardous area approvals. Same System 1 integration. Same powerful feature set. Same 2-channel (220) and 4-channel (240) versions. Same innovative ergonomics. And same unparalleled flexibility in Android-based user interface devices, whether tablet- or phone-sized.

SCOUT100 Series/vb Series

The predecessors to our 200-series models, these devices feature an incredibly rich feature set and the 2-handed button-based user interface that some users prefer. Available in 2-channel (SCOUT100 and vb7) and 4-channel (SCOUT140 and vb8) versions and with North American Div 2 hazardous location approvals (vb) and rest-of-world Zone 2 HazLoc approvals (SCOUT).

Portable instruments key features

	vb7	vb8	SCOUT100-EX	SCOUT140-EX	COMMTEST220	COMMTEST240	SCOUT220-IS	SCOUT240-IS
Channels	2	4	2	4	2	4	2	4
Fmax (max)	40 KHz	80 KHz	40 KHz	80 KHz	40 KHz	80 KHz	40 KHz	80 KHz
Lines of resolution	6,400	12,800	6,400	12,800	6,400	12,800	6,400	12,800
System 1	●	●	●	●	●	●	●	●
Cellular, Wifi, and Bluetooth					●	●	●	●
Integrated camera w/color display					●	●	●	●
Balancing	●	●	●	●	2021	2021	2021	2021
Tri-axial sensor		●		●		2021		2021
Signal processing	6Pack demodulation	6Pack demodulation	6Pack demodulation	6Pack demodulation	6Pack classic/ peak demodulation	6Pack classic/ peak demodulation	6Pack classic/ peak demodulation	6Pack classic/ peak demodulation
IP ratings	IP65	IP65	IP65	IP65	IP65	IP65	IP65	IP65
Hazardous area ratings	CSA CL1 DIV2	CSA CL1 DIV2	ATEX ZONE 2	ATEX ZONE 2	General purpose	General purpose	• ATEX ZONE 1 & 21 • CSA CL1 DIV1 • Grp A,B,C,D,E,F	• ATEX ZONE 1 & 21 • CSA CL1 DIV1 • Grp A,B,C,D,E,F
Memory	1GB	1GB	1GB	1GB	16GB Expandable	16GB Expandable	16GB Expandable	16GB Expandable
Warranty	5 year	5 year	5 year	5 year	• Collector, 5 year • Handheld, 3 year	• Collector, 5 year • Handheld, 3 year	• Collector, 5 year • Handheld, 3 year	• Collector, 5 year • Handheld, 3 year

Unmatched flexibility

When we decoupled the data acquisition hardware from the user interface in our new SCOUT200- and COMMTEST200-Series instruments, we revolutionized the industry. Our users told us they wanted choice—choice of screen size, choice of device form factor, and choice of additional complementary applications that could run on the same device.

We did this by selecting Android-powered devices as the basis for our user interfaces. Available from a variety of suppliers, with a variety of industrially ruggedized packaging, and a variety of hazardous area approvals, our users are free to select from one of our recommended and tested third-party devices or to choose from dozens of other available Android-powered devices suitable for industrial use.

Unmatched functionality

Goes everywhere

Our SCOUT200-series devices are intrinsically safe, and suitable for Zone 0/1 and Div 1 environments globally.

6Pack data collection

With a single press of a button, capture six readings simultaneously with spectrum and waveform of:

• Velocity

• Acceleration

• Demodulation

Simplified configuration

Our "Quick Config" feature automatically implements the "Proven Method*" + ISO 2372 & 10816 alarming methodology.

Advanced analysis

Within our comprehensive range of portables we have models which support balancing, bump-testing, modal impact testing, transient data capture, cross-channel phase, cross-channel spectrum, and FRF data collection for operating deflection shape (ODS) analysis.

* Technical Associates of Charlotte

System 1—online and offline convergence without compromise

Let's face it: portable users have special needs—configuration, analysis, alarming, and more. We understand that you don't want online software where offline is an afterthought, or vice-versa. System 1 perfectly blends these two worlds in a seamless environment with features that portable users will love. Easier, faster configuration. Tools designed especially for rolling element bearings, gears, and belts. A built-in library of more than 180,000 bearing types. Intuitive navigation. Statistical alarms. The ability to clone configurations. And much, much more. With System 1 it isn't about sacrificing functionality for the sake of integration—its about getting more functionality and the integration you demand. One system to learn. One system to support. One system to license. That's System 1. The world's #1 plantwide condition monitoring ecosystem.

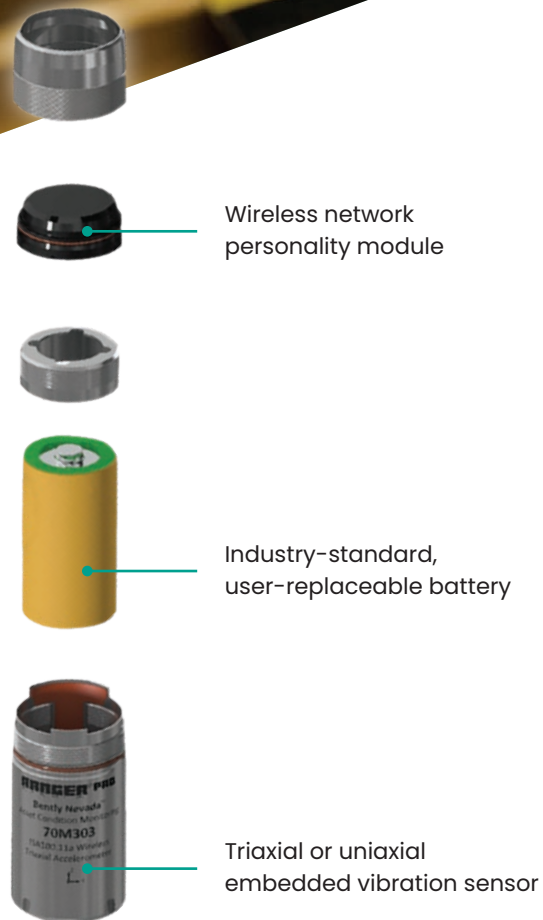# Wireless condition monitoring with Ranger Pro

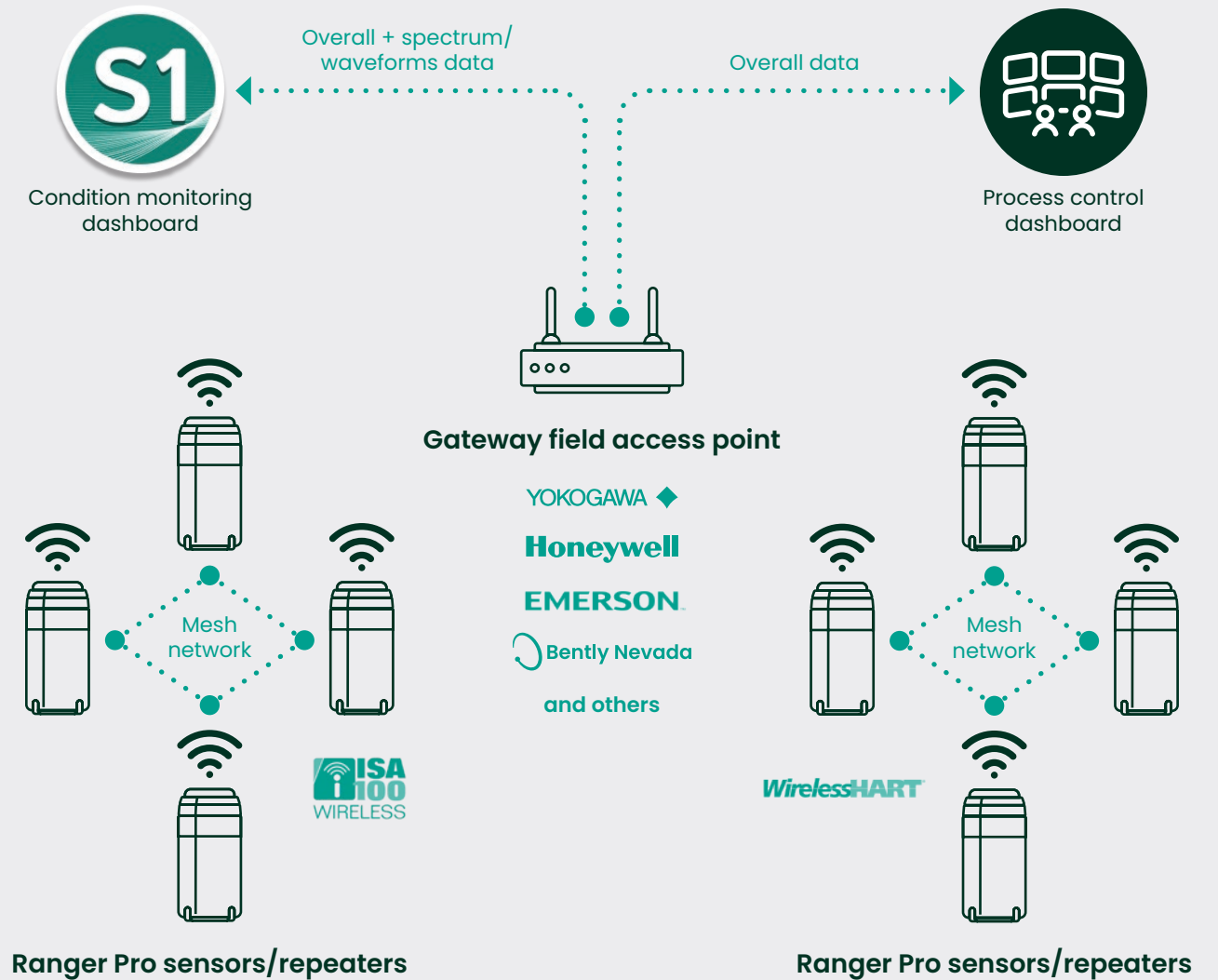**A reliable, online solution to complement reliability/maintenance**

Cost-effective entry to condition monitoring

Ranger Pro features

- Truly wireless: sensors, power, and radio embedded in a single package
- Velocity (5-2 kHz), acceleration (5-10 kHz)
- Supports both ISA100 and WirelessHART protocols
- Replaceable lithium-thionyl chloride battery
- IP67 hermitically sealed electronics
- CSA, ATEX, and IECEx approvals for Div 1 and Zone 0/1
- Temperature: -40°C to +85°C
- Range: 100 meters (line of sight)
- Security: 128-bit AES encryption
- Long battery life: up to 5 years
- System 1 connectivity—full dynamic and static data capture and display
- DCS connectivity via Modbus for static data

Wireless network personality module

Industry-standard, user-replaceable battery

Triaxial or uniaxial embedded vibration sensor

Ranger Pro data and comunications

Overall + spectrum/ waveforms data

Overall data

Condition monitoring dashboard

Process control dashboard

Gateway field access point

YOKOGAWA ◆
Honeywell
EMERSON
Bently Nevada
and others

Mesh network

Mesh network

ISA100 WIRELESS

WirelessHART

Ranger Pro sensors/repeaters

Ranger Pro sensors/repeaters

Ranger Pro is designed for hard-to-reach environments where wired solutions are impractical or cost-prohibitive. It does this without sacrificing the data collection frequency and rich data set of both static and dynamic data essential for proper condition monitoring. Ranger Pro sensors deliver both vibration and temperature data via an embedded temperature element and an embedded uniaxial or triaxial accelerometer that measures velocity, acceleration, and acceleration enveloping (or demodulation) from each axis. Because it features global approvals for Div 1 and Zone 0/1, it can be installed in even the most stringent hazardous area classifications and ensures that you no longer have to manually collect data in hard-to-reach or hazardous environments. Because it supports both ISA100 and WirelessHART protocols, it can be mixed with other sensors using these industrial standards to deliver comprehensive data to both process control operators and machinery specialists.

Economical online wired condition monitoring

While all machinery may not warrant continuous, dedicated machinery protection from Bently Nevada Orbit 60, 3500, 2300, ADAPT, or 1900/65A platforms, many require more frequent surveillance than the weekly, monthly, or quarterly rounds made with a portable data collection instrument. Augmenting our wireless Ranger Pro system are the vbOnline Pro and Trendmaster systems, offering the improved performance of wired data acquisition while maintaining economical installation costs.

vbOnline Pro

The vbOnline Pro has 12 channels that can accommodate 2-wire IEPE accelerometer-based measurements, all sampled simultaneously along with 2 channels dedicated to speed. It is particularly appropriate for unprotected machine trains with rolling element bearings and/or gearboxes. Because it has 12 vibration channels and 2 speed channels, it is frequently applied to a grouping of smaller machines or a single larger machine that consumes most or all of the available channels.

Built-in memory provides buffering of up to 8 hours of waveform data in the event of network loss, automatically synchronizing with System 1 when the connection is restored. This feature is particularly useful when the device is installed with wireless communications that may be less reliable than wired connections. Separate Ethernet connections are provided for simultaneous, independent connection to both System 1 via Bently Nevada protocol and plant control systems/historians via Modbus TCP protocol.

The system can also be configured for state-based applications to alarm and pinpoint machinery problems on applications involving variable speeds and loads where different alarm conditions must pertain to each operating regime. Patented, built-in algorithms within the hardware ensure that processing occurs "at the edge" whether a network connection is available or not, reliably detecting fault modes on complex gearboxes as well as rolling element bearing defects in both high-speed and low-speed applications.
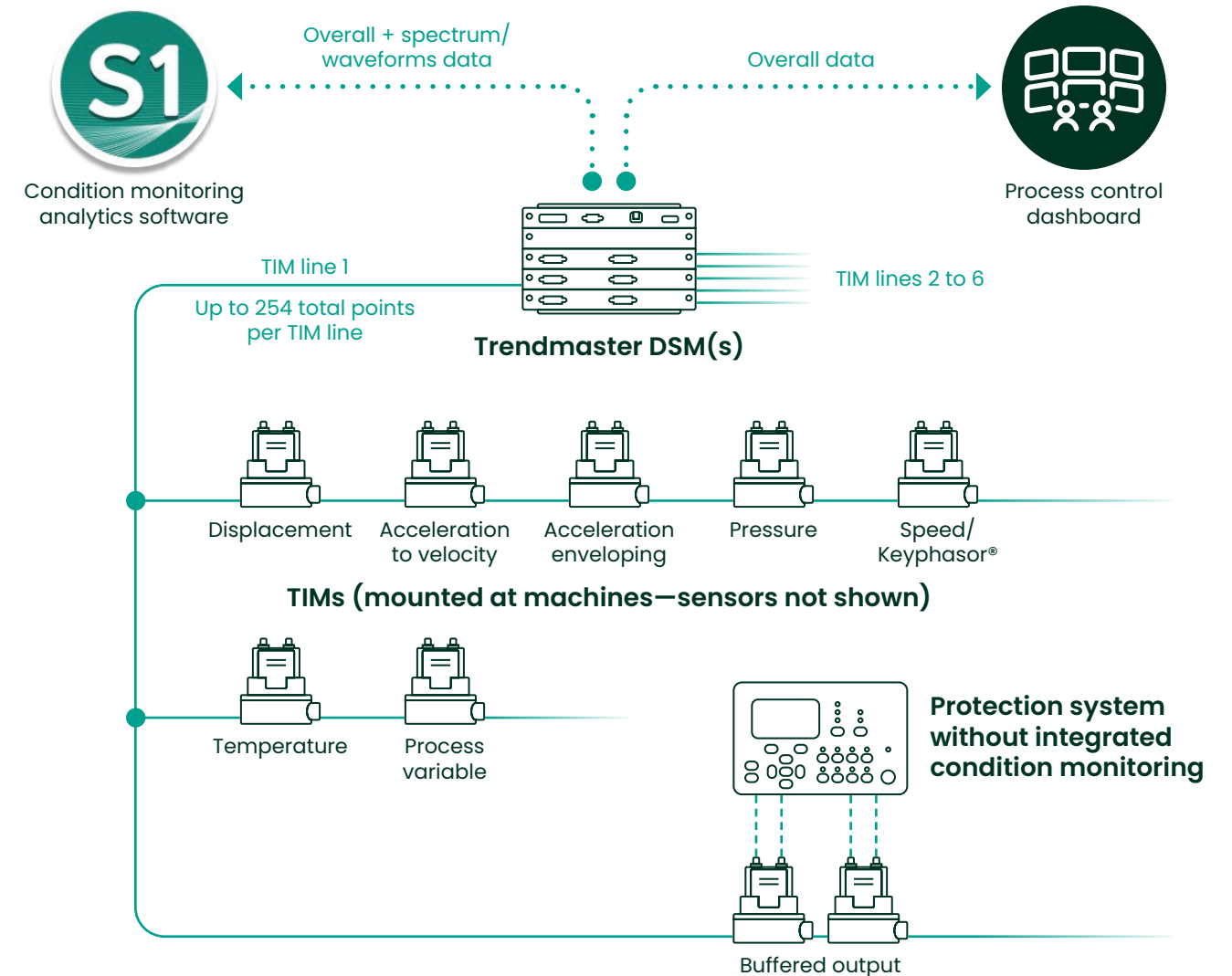
Trendmaster

The Bently Nevada Trendmaster system is in use at hundreds of facilities globally as a cost-effective means of condition monitoring for thousands of permanently wired points via an innovative "sensor bus" architecture. It is particularly economical in hazardous areas (up to Zone 0) due to its need for only a single pair of I.S. barriers for an entire line, rather than one for each sensor. Numerous input types are supported, and sensor bus lengths of up to 4,000 ft (1,200 m) can be run. Each sensor connects to an associated TIM (Transducer Interface Module) that provides a unique sensor address on the bus.

Compact, centralized signal processing stations, known as Dynamic Scanning Modules (DSMs) are strategically placed throughout your plant and accept multiple sensor bus cables, resulting in a distributed network of condition monitoring sensors. All sensors on each bus are polled sequentially every few minutes, allowing the system to collect condition monitoring data from thousands of connected points, yet without the installation and hardware costs associated with traditional, centralized architectures relying on separate wires for each sensor. Either wired or wireless Ethernet is supported from each DSM to the System 1 server, allowing flexibility and optimized installation costs.

Up to six sensor buses (known as TIM lines) can be connected to each DSM, and each TIM line supports up to 254 sensors. The system is backward compatible with two prior generations of TIM devices as well as current-generation ProTIM (programmable TIM) devices. DSMs can reside in hazardous area classifications up to Zone 2/Division 2 while TIMs and sensors can be placed in even more stringent Zone 0/1 and Division 1 locations by using a single pair of I.S. barriers (or a Galvanic Isolator) for each TIM line.

	vbOnline Pro	Trendmaster
Input channels	• 12 x vibration • 2 x speed	• Up to 255 sensors per TIM line. • Up to 6 TIM lines per Trendmaster DSM chassis.
Vibration input types	• 2-wire IEPE accelerometers • Proximity probes (spd only) • Proximity switches (spd only)	Accel, velocity, proximity, pressure, generic process variables, temperature, speed, Keyphasor®, monitor buffered outputs
Outputs	• 2 x Ethernet • 14 x buffered output	• 1 x Ethernet • 1 x RS232 serial[1]
Supported protocols	• System 1 • Modbus TCP	• System 1 • Modbus TCP
System 1 (dynamic data)	●	●
Signal processing	Acceleration enveloping	Acceleration enveloping
Hazardous area ratings	• CSA CL1 DIV2 • ATEX ZONE 2	• CSA CL1 DIV1[2] • ATEX ZONE 0/1[2]
Warranty	3 Year	3 Year

1. Serial port used only for factory service; Modbus serial protocol is not supported at this port.
2. DSMs are approved only for up to Div 2/Zone 2 areas. Sensors and TIMs can be mounted in Zone 0/1 and Div 1 areas when a pair of I.S. barriers or a Galvanic Isolator is installed on each SPA line.

Overall + spectrum/waveforms data → Overall data

S1 Condition monitoring analytics software

Process control dashboard

TIM line 1

TIM lines 2 to 6

Up to 254 total points per TIM line

Trendmaster DSM(s)

Displacement — Acceleration to velocity — Acceleration enveloping — Pressure — Speed/Keyphasor®

TIMs (mounted at machines—sensors not shown)

Temperature — Process variable

Protection system without integrated condition monitoring

Buffered output

Wired protection and condition monitoring

1900/65A and 2300

Affordable, continuous vibration, and temperature monitoring

For the assets in your plant that warrant continuous monitoring and/or machinery protection, but not the channel count and costs associated with a more full-featured rack-based system, the Bently Nevada 1900/65A and 2300 monitoring devices are a perfect fit. These self-contained packages incorporate the functionality and integrity necessary for auto-shutdown protection of general-purpose machinery.

The 1900/65A is an 8-channel monitor that supports four vibration (proximity, accelerometer, and velocity in any mix) and four temperature inputs.

The 2300 is a compact 3-channel monitor that accepts up to two vibration inputs (two proximity, two acceleration, or two velocity) plus a Keyphasor®/speed input. It can also be configured for 3 channels of process variable signals (proportional DC voltages) when used for temperature or other process-related measurements. The 2300 features built-in connectivity to System 1 either via Ethernet or via an available Trendmaster interface (2300/25 only).

Both platforms provide the level of alarming programmability, configuration flexibility, and signal processing normally associated with larger, more expensive systems. They also provide 4-20 mA and relay outputs along with the ability to communicate via Modbus TCP with plant historians and process/machine control systems.

Certifications and field installation options

Both the 2300 and 1900/65A are intended primarily for field installation at or near the machine. Global approvals for Div 2/Zone 2 hazardous areas are available along with weatherproof housings meeting IP66. The monitors feature local displays (standard on 2300, optional on 1900/65A) that allow personnel to verify readings and alarm statuses in the field.

Diagnostic capabilities

Predictive maintenance teams can use the BNC connector(s) on the front of both monitors for supplemental data collection and analysis by portable instruments. For the 2300, full System 1 connectivity is available, allowing comprehensive dynamic and static data capture for rich diagnostic capabilities and supplemental software alarming to augment the device's hardware alarms. The 1900/65A can be connected to System 1 via Trendmaster TIM devices when full dynamic data is required, or using the Modbus TCP capabilities when only static data is required.

	1900/65A	2300
Input channels	4 vibration AND 4 temperature	2 vibration + tach OR 3 process variables
Sensor types	Acceleration, velocity, thrust, position, speed, and proximity	Accelerometers, proximity, piezo-velocity, moving-coil velocity, magnetic speed pickups, proximity switch speed pickups
Vibration channel types	Radial vibration, acceleration, velocity, axial position, speed, recip acceleration, recip velocity, position	Radial vibration, acceleration, velocity, axial position, speed
Temperature input types	Thermocouples (Type E, J, K, or T) and 2- or 3-wire RTDs	Any[2]
Outputs	• 6 x relays • 4 x 4-20 mA • Modbus TCP • 1 x buffered out[1]	• 2 x relays • 2 x 4-20 mA • Modbus TCP • 3 x buffered out
System 1 (dynamic data)	Static data only	●
Machinery protection	●	●
Local display	Optional (removable)	Standard (integral)
Signal processing	Acceleration enveloping	Acceleration enveloping
Hazardous area ratings	• CSA CL1 DIV2 • ATEX ZONE 2	• CSA CL1 DIV2 • ATEX ZONE 2
Warranty	3 Year	3 Year

1. Selectable for any vibration channel.
2. Requires third-party interface device to convert RTD or thermocouple sensor to proportional negative DC voltage.
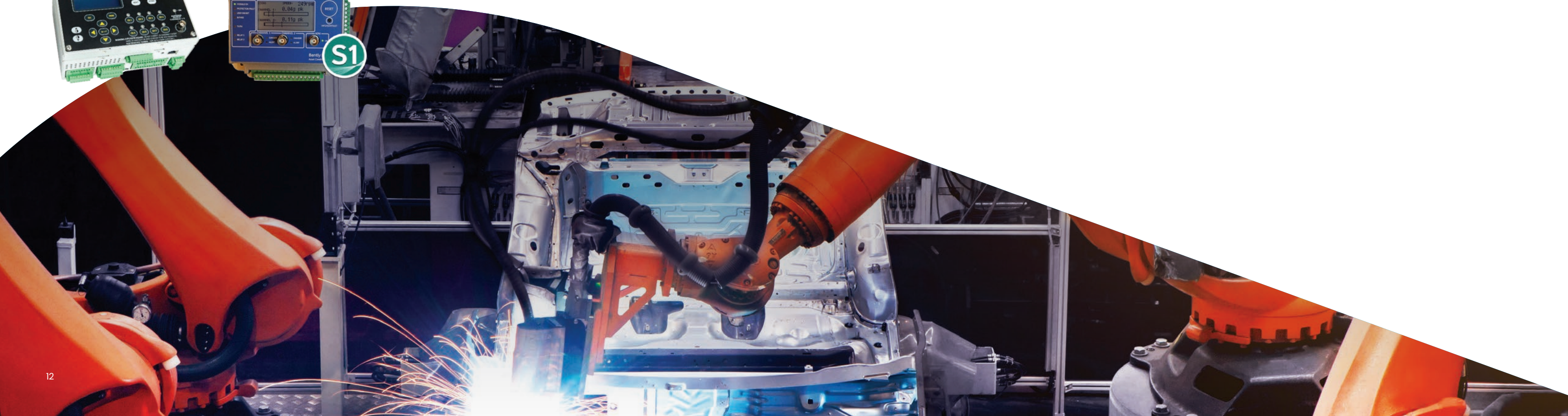
Setting the new standard for machinery protection systems with Orbit 60

When the world's leader in machinery protection systems—the company that practically wrote the book—delivers a next-generation platform, you can be assured that it takes state-of-the-art to a whole new level.

Say hello to Orbit 60. Our fifth generation machinery protection platform.

It's everything you've come to know and love in prior generations of our machinery protection platforms but with a host of revolutionary new features that deliver more flexibility, more connectivity, more cybersecurity—and most importantly, more value.

Flexible

Orbit 60 is designed to reduce installation costs because it is the most flexible architecture we have ever produced. Prior systems limited a "rack" to a single physical chassis. Not with Orbit 60. Using our Xtend™ technology, multiple chassis can be bridged using a high-speed, virtual backplane. This allows you to place input modules close to the machines, dramatically reducing wiring costs while placing processor(s), communication module(s), and displays remotely to support multiple remote chassis.

Channel count has been increased as well. A single system can host up to 80 dynamic channels, hundreds of static channels (such as temperature), and thousands of process variables. Orbit 60 delivers physical flexibility as well. Racks are smaller with a height of 3U instead of 6U as in our popular 3500 Series. When two chassis are stacked vertically, they fit in the same cutout as a 3500 rack, making retrofits easy. And, racks can be mounted in panel cutouts, on 19 in. EIA rails, and bulkhead-style while consuming approximately half the space for the same channel count.
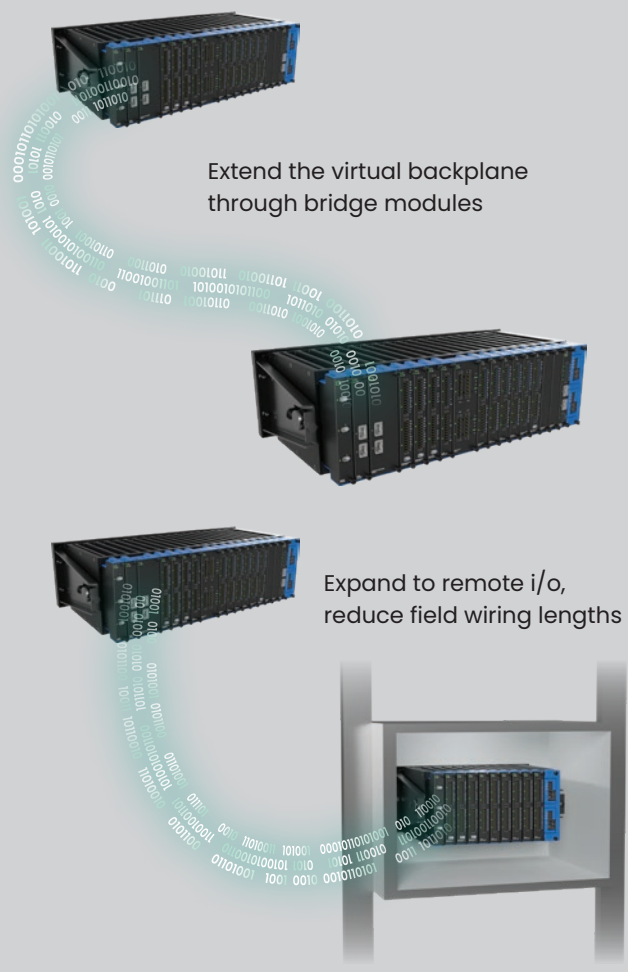
Connected

Orbit 60 doesn't just connect to System 1. It connects to your DCS, process historian, or other automation platform, allowing access to all of the rich process data in these repositories. Prior systems simply published data from the protection system to the process control system. Orbit 60 features our conneX™ technology, a revolutionary bi-directional interface* that eliminates the need for multiple interfaces—one to ingest process data, one to publish protection system data, and still another to publish condition monitoring system data. The result is lower integration costs, more powerful monitoring capabilities, and more value.
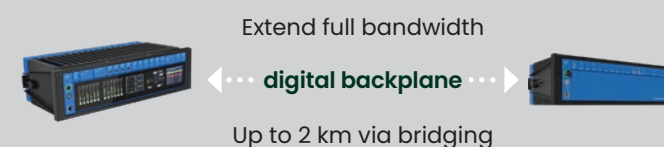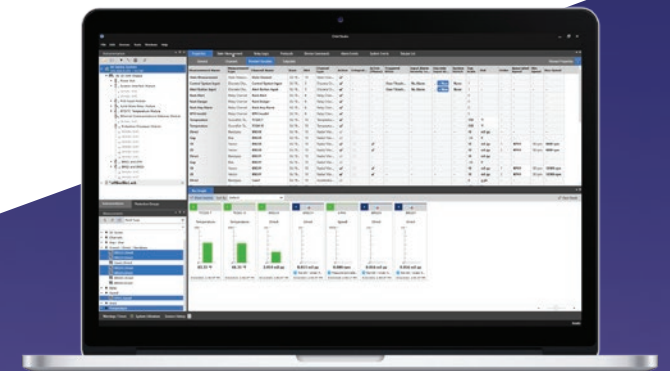
* Planned for release in 2021.
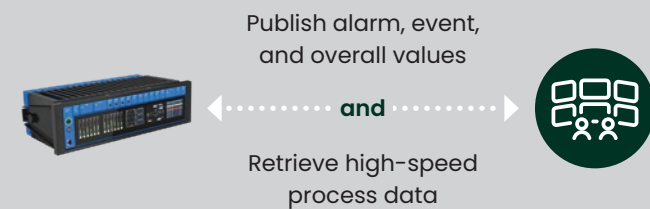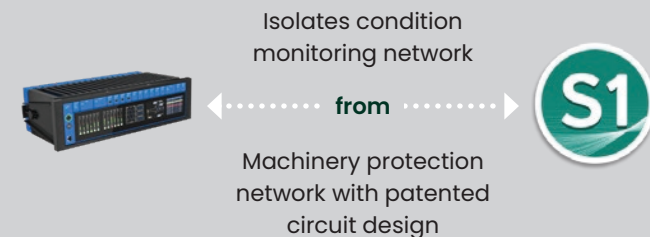
Secure

When we designed Orbit 60, customers told us their #1 priority was cybersecurity. We listened. And we innovated. The result is patent-pending technology that completely isolates the machinery protection network from the condition monitoring network. It's like a diode—only better. Diodes block all inbound communication with the rack. Our design allows users to communicate with the condition monitoring functions—which often need to be changed and optimized on-the-fly—while blocking all access to the protection functionality at the circuit board trace level. It completely eliminates the possibility of a breach. We call it our aXess™ technology and it delivers the best of both worlds: world-class security meeting IEC 62443 and world-class accessibility.

Flexible deployments

Extend the virtual backplane through bridge modules

Expand to remote i/o, reduce field wiring lengths

Orbit conneX

Publish alarm, event, and overall values

and

Retrieve high-speed process data

Orbit aXess

Isolates condition monitoring network

from

Machinery protection network with patented circuit design

Orbit Xtend

Extend full bandwidth

digital backplane

Up to 2 km via bridging

Full featured continuous vibration monitoring and protection systems

3701 ADAPT

Our 3701 ADAPT platform is designed for specific machine types and applications including aeroderivative gas turbines, low- and high-speed rolling element bearing machinery with or without gearboxes, smaller hydroturbine generators, OEM turbine blade monitoring, and overspeed/emergency shutdown device (ESD) protective systems. The small form-factor packaging allows it to be easily mounted on the machine skid when required, without sacrificing the rich functionality normally found only in larger systems.

The 3701 platform boasts our most powerful signal processing capabilities for selected applications and is recommended when equivalent capabilities are not yet available in our Orbit 60 platform. Like all other Bently Nevada protection systems, full connectivity to plant and machinery control systems is supported via Modbus TCP and Ethernet Global Data (EGD) protocols. And, of course, full connectivity to System 1.

3500 Series

For more than two decades, the 3500 Series has been the industry standard in machinery protection. No other system enjoys such widespread use or is trusted by so many customers for mission-critical applications. During the last 25 years, the system has undergone continuous improvement to ensure it delivers the functionality required in new installations while retaining necessary global approvals and certifications that allow customer to continue to specify it with confidence.

With the introduction of our Orbit 60 platform, 3500 will not go away. There remains a place for both systems— particularly for customers with a large installed base of 3500 and/or where equivalent channel types have not yet been introduced in the Orbit 60 platform. You can continue to specify 3500 with confidence in such instances, secure in the knowledge of ongoing 3500 platform support for years to come. In fact, a similar situation existed in 1995 when 3500 was introduced, co-existing alongside our 3300 Series platform. Full 3300 support continued for more than 20 years until it was eventually retired in 2018. You can count on similar support and longevity for 3500.

80,000+ 3500 racks in service globally	3rd Gen circuit boards and functionality
50+ available channel types	25 Years leading the industry

Probes, sensors, and transducers

Bently Nevada offers the largest catalog of proximity, acceleration, and velocity sensors of any condition monitoring provider. This is supplemented by specialty pressure, position, torsional, and other sensors used for machinery measurements, along with a broad selection of all necessary brackets, housings, junction boxes, and accessories for comprehensive installation solutions. Our installed base of more than 10 million vibration transducers for continuous monitoring applications is the largest in the world.

Packaged systems

Bently Nevada has packaged thousands of systems over the years to exacting customer requirements including enclosure types, color matching of existing panels, and inclusion of auxiliary systems such as purges, fans, coolers, heaters, convenience outlets, UPSs, and lighting— to name just a few. Our factory acceptance testing (FAT) capabilities are second-to-none and include not just the monitoring systems but the communications with plant controls and condition monitoring software as well.

We deliver more than a cabinet—we deliver an engineered solution from either our standard package designs or your own specifications when a customized solution is needed. Every detail is carefully reflected in our craftsmanship incorporating six decades of field experience designing and working in industrial panels. This ensures every Bently Nevada panel incorporates industry best practices for lighting, serviceability, convenience, RFI protection, conductor segregation, labeling, and documentation.

Improve equipment reliability, uptime, and efficiency with System 1

System 1 is the heart of our plantwide condition monitoring solution. And while it integrates all of your assets into a single dashboard, it's far more than a dashboard. It's a combination of technologies and capabilities that deliver what matters most to your organization: results. Improved asset reliability, improved uptime, and improved efficiency. By staying connected to our customers—and by using our own tools—we have continually advanced what you need in a condition monitoring platform ranging from cybersecurity to scalability to world-class usability innovations and enhancements. After more than two decades on the market, System 1 is better than ever and represents a major area of ongoing product development investment.

Purpose-built historian

Your process historian can handle massive volumes of process data. But what it can't deal with is the high-bandwidth waveform data that is essential to condition monitoring and proper diagnostics. System 1 handles it with ease— even Terabytes worth when necessary. The data you need, when you need it.

Core analytics

Trend plots can only get you so far when it comes to isolating faults, their severity, and ultimately root cause. Machinery diagnostics is a discipline involving deep dives into the nuances of spectral content, orbit shapes, and much more. One set of tools for fluid-film bearings, and another for rolling element bearings. Special tools for gear analysis, torsional analysis, cylinder performance, mode shapes, rubs. There is simply no richer set of tools for every machine in your plant than what we deliver in System 1.

Performance analytics

Not all problems are mechanical in nature. In fact, some of your most costly problems can be related to machinery efficiency— fuel costs, wasted energy, excess emissions. System 1 combines both mechanical and thermodynamic condition into a single, integrated environment. No more switching between applications. No more cumbersome manual correlation of process, vibration, and performance trends. We bring it together in one convenient, powerful place.

Decision Support analytics

Plowing through reams of data looking for anomalies is not a good use of anyone's time. Your time needs to be spent solving problems—not looking for them. That's why there's decision support—an embedded AI application within System 1 that sifts through your data and automatically spots malfunctions for you. Because asset management is really about management by exception—spending your time on the assets that need attention rather than those that don't.
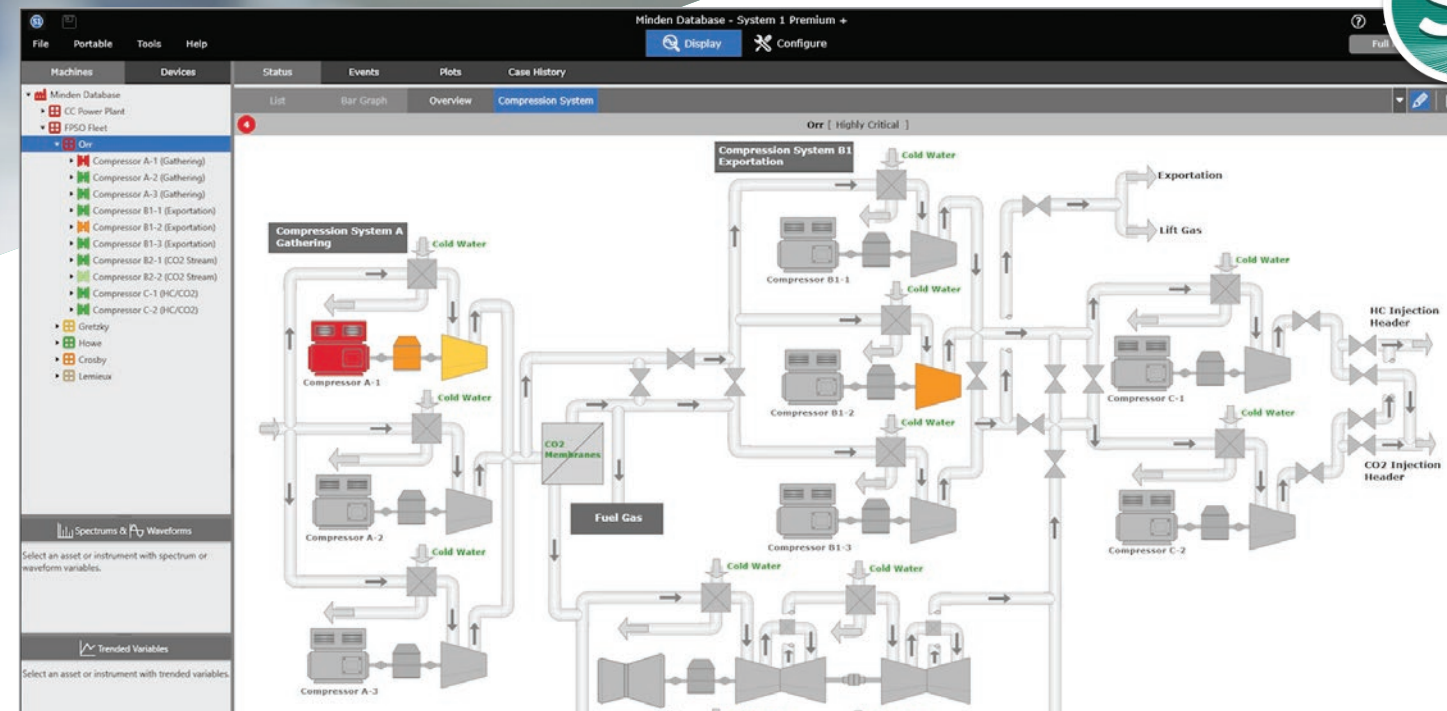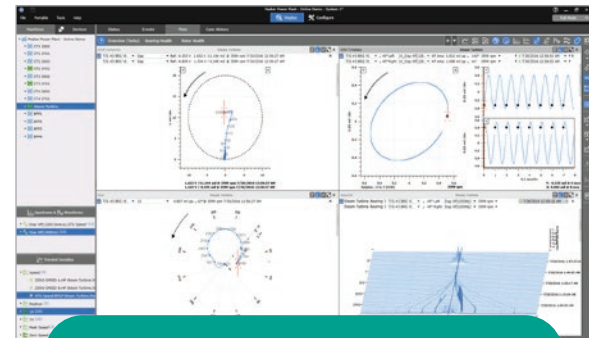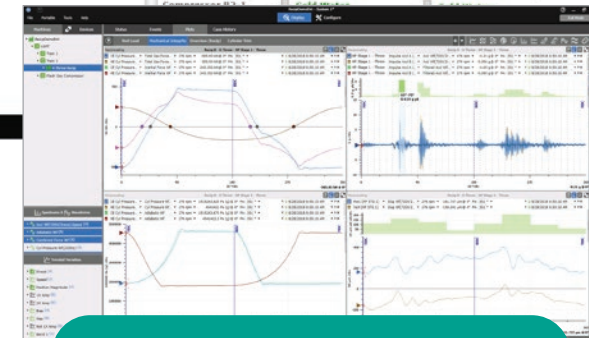
Surveillance

Online

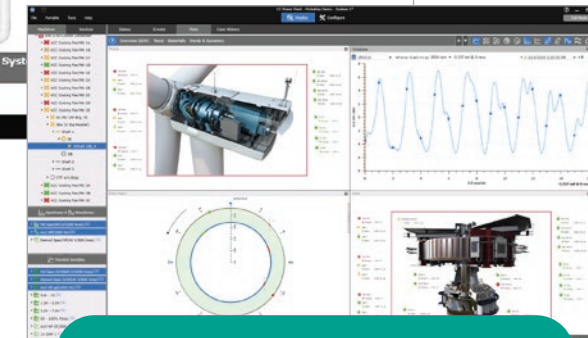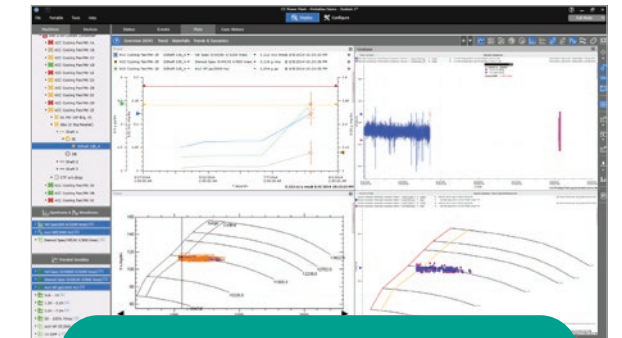Manual

Wireless

Process

Portable

Turbomachinery

Gears and rolling element bearings

Reciprocating compressors

Renewable power

Performance and emissions

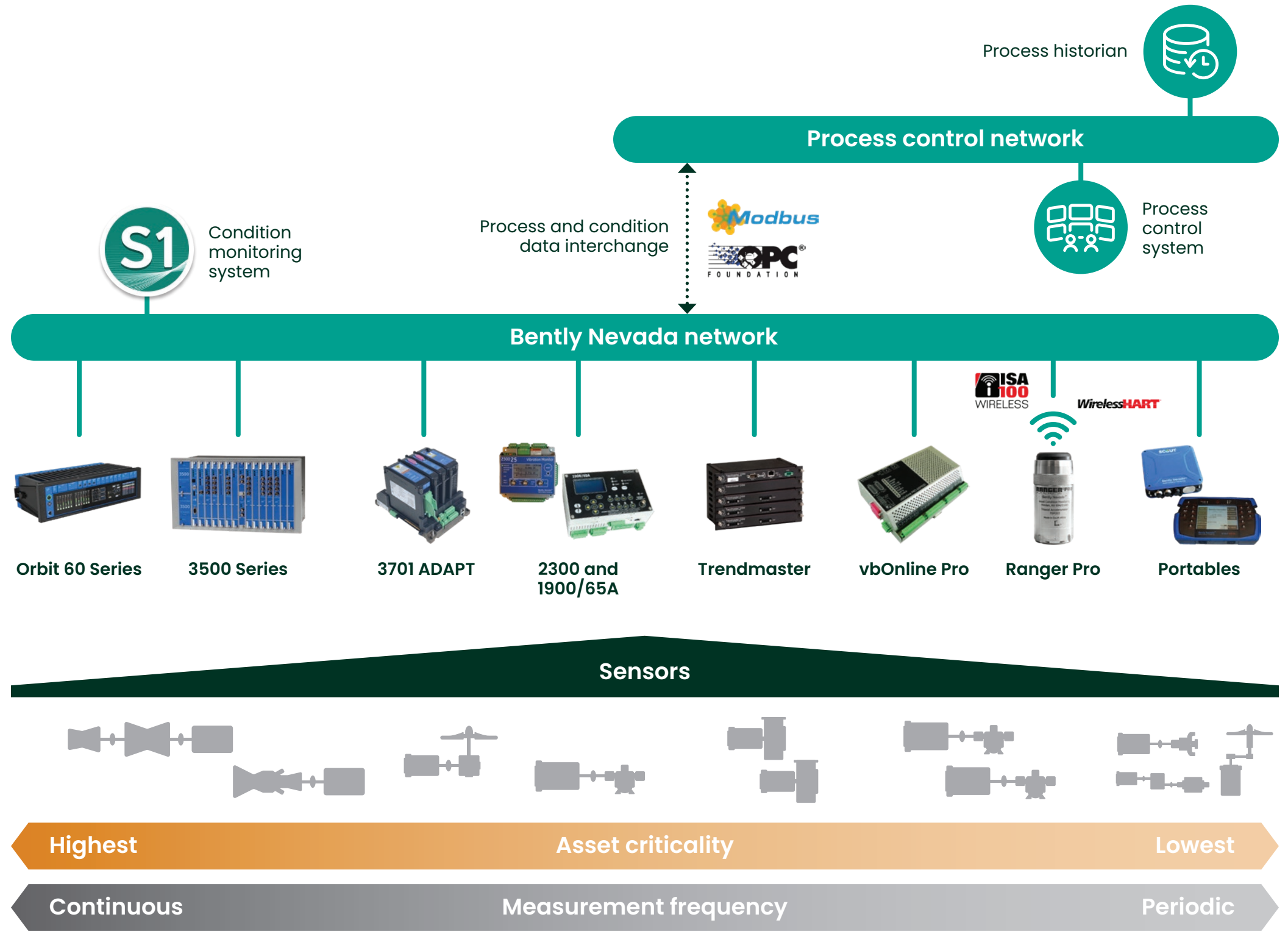# One unified solution, endless possibilities

Bently Nevada's condition monitoring ecosystem

Our machine condition monitoring solutions combine advanced hardware, intelligent software, and trusted service and support—providing a comprehensive, connected view of your operations. Together, they enable you to mitigate risk, boost safety, and reduce maintenance costs. From mission-critical to less-critical equipment, our technology enables better data collection and improved insights across your operations.

Process data

Very few machinery problems can be solved when armed only with vibration data. Only by understanding the conditions that surround the machine—pressures, flows, levels, temperatures, viscosities, gas compositions, and other parameters—can the cause-effect interactions between process and asset be properly understood. That's why we've taken such care to ensure process data can be easily integrated with System 1, and relevant machinery data can be shared with operators via their process control screens.

Our architecture provides numerous ways to get data in and out—at both the hardware level and the software level—because one size does not always fit all. We use de-facto and recognized industry standards like ISA SP50, OPC, Modbus, ISA100, and WirelessHART. The result is a condition monitoring ecosystem that isn't an island—it's a seamless part of your larger plant control and automation ecosystem, ensuring everyone has the data they need, when they need it.

Process historian

Process control network

Process control system

S1 Condition monitoring system

Process and condition data interchange

Modbus

OPC FOUNDATION

Bently Nevada network

ISA 100 WIRELESS

WirelessHART

Orbit 60 Series

3500 Series

3701 ADAPT

2300 and 1900/65A

Trendmaster

vbOnline Pro

Ranger Pro

Portables

Sensors

Highest	Asset criticality	Lowest

Continuous	Measurement frequency	Periodic

Bently Nevada service menu

		Key benefits	
Implementation services	**Get it right the first time** • Ensure your assets are protected and monitored when you're ready to start up • Avoid costly delays and rework • One source to design, plan, manage, and execute the installation • Avoid startup trips due to improper installation and configuration	**Up to $1M/day** Avoided cost from lost production, secondary process, and equipment damage	**100%** Service work guarantee 1 year warranty standard on all service work
Proactive support	**Keep your system healthy and optimized** • Prevent instrumentation-related false trips • Prevent and minimize potential data loss events • Keep up to date and compliant with the best technologies available • Access the expert support you need when you need it most	**80%** Industry-wide percentage of alarms and events due to instrumentation and not machinery	**>90%** Typical reduction in non-actionable alarms and events
Asset health and consulting	**Actionable insights you can trust** • Understand your asset health to optimize outage and maintenance planning • Plug into our global network of machinery experts with remote monitoring • Professional OEM-agnostic machinery diagnostics when and where you need them • Tailored alarming and customized artificial intelligence to detect specific malfunctions	**100% ROI** A single machine save often results in complete monitoring contract payback and more	**5–10X** Cost reduction for well-planned maintenance outage vs. unplanned, reactive outage
Cybersecurity[1]	**Stay ahead of evolving cyber threats** • Ensure your system is up to date and protected as threats continually evolve • Identify and mitigate cybersecurity risks to your operation • Keep your system both secure and accessible with advanced security technologies and architectures leveraging data diodes and database replication	**29%** Patch management can reduce your attack surface up to 29%	**243 days** Average time before detection that a system is compromised
Training and education	**Critical skills that amplify your machinery management capabilities** • Enable your personnel to operate and maintain your monitoring and protection systems • Enable your organization to maximize the value of your systems, leveraging expert product and application training and knowledge	**400+** Customer courses delivered each year in 10 languages and over 45 global locations	

1. https://us-cert.cisa.gov/sites/default/files/documents/Seven%20Steps%20to%20Effectively%20Defend%20Industrial%20Control%20Systems_S508C.pdf

Baker Hughes