

ORBIT 60 SERIES

System Overview

Datasheet

Cordant™

137M5182 Rev. AA



Plant-wide • One System

The Bently Nevada™ Orbit 60 Series Protection and Condition Monitoring System provides one continuous, online monitoring system for both critical and plant-wide applications.

Cyber Secure • Data Isolation

Orbit 60 Series data isolation creates a safe industrial data environment designed to meet IEC 62443-4-2 with world class network security features and segregation of protection and condition monitoring functions.

Modular • Flexible • Scalable

The Orbit 60 Series system is deployable in any combination of rackmounted and distributed hardware. This provides for better alignment of instrumentation to the machinery application.

High Speed Process Data Integration

Next generation architecture facilitates full bi-directional communications with plant control systems over a suite of standard protocols.

Extended Field Wiring Length

With the Orbit 60 Series distributed architecture, connection of multiple chassis through Bridge modules decreases overall electrical installation costs, reduces analog ground loops and noise issues, and moves key maintenance activities further from hazardous areas.

Industry Leading System Capabilities

The Orbit 60 Series supports monitoring of one or multiple machine trains in a single deployment. One System Interface Module (SIM) defines each system and can encompass up to 68 dynamic channels.

Protection Processing Module



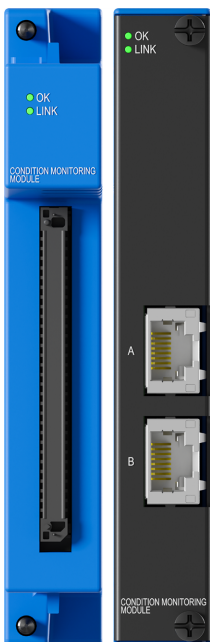
The Protection Processing Module (PPM) serves as the computational engine for the Bently Nevada™ Orbit 60 monitoring system. It extracts all machinery measurements for the protection system and performs alarm determinations. The PPM analyzes signals from transducers, generates measurements and statuses and publishes them to other modules for data collection and external communication. Each PPM occupies a single slot within the system.

Each PPM provides computational capacity for a large number of sensors and can support typical monitored machine trains. The PPM capacity is a function of the type of processing required on each input. If the system requires more processing than a single PPM can provide, additional PPMs can be added to the system for complex monitoring deployments. For protection systems, redundant PPMs are recommended.

The Orbit Studio Configuration Software provides a System Utilization Calculator to evaluate the remaining capacity of the PPMs in your system. If a PPM processing capacity reaches 90%, a warning indicator is displayed in Orbit Studio software, and it is recommended to add another PPM or two PPMs if the system is redundant.

For additional details, see the Protection Processing Module Datasheet (142M8515).

Condition Monitoring Module



The Condition Monitoring Module (CMM) listens to all information within the system, including all measurements, waveforms, digital transducer signals, system controls, status information, system configuration information, process data from external systems, and alarm and events logs. It only listens, with no capability to write, allowing interface to System 1 over the business networks, with no risk to the protection system.

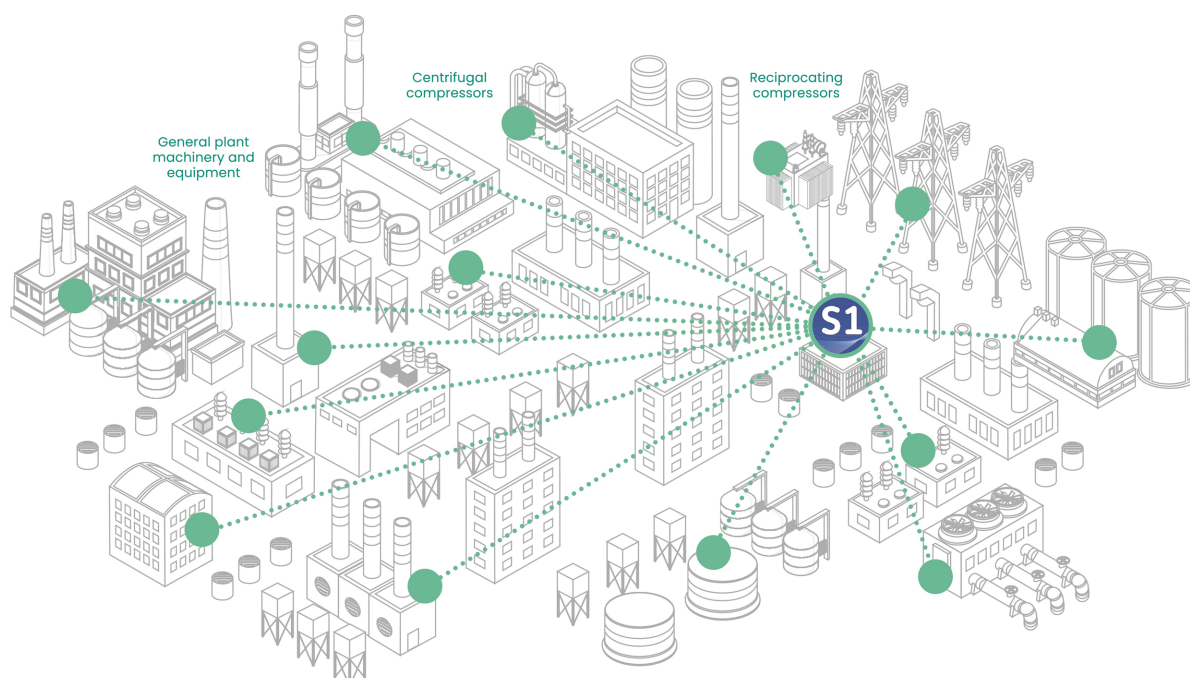
Each module occupies either one slot (60R/CMM02) or two slots (60R/CMM01) within the system. Placing multiple CMM modules allows the connection of two independent System 1 clients to the Bently Nevada™ Orbit 60 System. Data is transferred to System 1 continuously, but in the event the connection is lost, non-volatile storage buffers historical data until the information is off-loaded to the host software. System 1 can configure the CMM module to extract additional measurements and waveforms from system sensor data. Without System 1, the customer can use the CMM module to collect data to diagnose machinery issues when an alarm event occurs in the hardware.

For additional details, see the Condition Monitoring Module Datasheet (145M9028).

System 1 Integration

Offering plant-wide condition monitoring insights to reduce risk, increase productivity, and minimize unplanned downtime, System 1 streamlines decision-making processes by bringing machine data into a single platform, providing clarity and context to your operations and enterprise. Harnessing the power of Bently Nevada's decades of machinery research and advanced diagnostics expertise, this powerful tool is a key component of successful digital transformation in any industrial facility. By combining its Connectivity, Analytics, and Visualization capabilities, System 1 is the premier Edge historian and condition monitoring platform among industrial operators.

Take full advantage of System 1 Condition Monitoring Software in conjunction with Orbit 60 Series for complete monitoring and advanced diagnostics for all machine types, including roller-element bearings. Use the Orbit 60 Series Condition Monitoring Module (CMM) for a read-only access point to provide a cyber-secure approach for obtaining data through the business network or other systems.



Bently Nevada has a rich heritage in helping customers solve industrial maintenance challenges that is over 60 years strong. Through user research in 25 countries with more than 500 end users, we have studied our customers' team dynamics, site processes, and technology suites to determine how System 1 can best support plant-wide machinery management. The resulting platform is the most comprehensive and user-intuitive condition monitoring solution ever developed.

System 1 Support for Orbit Channels and Measurements

The Orbit 60 Condition Monitoring Module (CMM) interfaces with System 1. Data is transferred from Orbit 60 to System 1 continuously.

- You can view Orbit 60 alarms and system health events in System 1.
- When a measurement triggers an alarm in Orbit 60, the alarm and system events are visible in System 1.

Recip Hyper Plunger	
Low Pass Corner Frequency	0.01 Hz to 5.00 Hz
1X and 2X	
Accuracy (Amplitude)	If input signal $\geq 100\text{mV pp}$ and speed $\geq 30\text{rpm}$: $\pm 1\%$ of configured full scale range (on all input modules excluding Keyphasor module) $\pm 2\%$ of configured full scale range (on Keyphasor module)
Accuracy (Phase)	If input signal $\geq 100\text{mV pp}$ and speed $\geq 30\text{rpm}$: $\pm 1\%$ of configured full scale range (on all input modules)
Units	mil pp $\mu\text{m pp}$
Minimum Speed	25 rpm to 500 rpm
Maximum Speed	25 rpm to 500 rpm

Condition Monitoring Module

Condition Monitoring Module (CMM)	
Power Consumption	
Maximum	14.2 W
Typical	10.5 W
Data Communications	
2 Ethernet ports - utility or rear side	Independent Ethernet ports 1000/100/10 Base-T Auto-negotiation
Connector	RJ-45
Cable Length	100 meters (328 feet) max

Condition Monitoring Module (CMM)	
LEDs	
Module OK LED	Indicates when the module is functioning properly
LINK LED	indicates when the module is communicating to the rest of the system
Physical	
Required Rack Space	2 slot (60R/CMM01) 1 slot (60R/CMM02)

Power Input Module

Power Input Module (PIM)	
Electrical	
Voltage Input	+21 to +32 Vdc
Current Draw	
3U 19" full load	7.1 Amps @ 24 Vdc
6U 19" full load	10.5 Amps @ 24 Vdc
Out of Range Protection	An undervoltage does not harm the PIM. An overvoltage causes the fuse to open.
Physical	
Width	0.8" (2.03 cm)
Height	5.2" (13.21 cm)
Depth	9.67" (24.56 cm)

Bridge

Bridge Module (BRG)	
Communications	
1 Fiber Optic Port for Bridge-to-Bridge Connection	10 Gbps – Single Mode, OS1/OS2 fiber required

Compliance and Certifications

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

EMC

European Community Directive:

EMC Directive 2014/30/EU

Standards:

EN 61000-6-2; Immunity for
Industrial Environments
EN 61000-6-4; Emissions for
Industrial Environments

Electrical Safety

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 61010-1;
EN 61010-2-201;

†India – Battery EPR Marking

GE Oil & Gas India Private Limited

EPR Certificate No.: 1.1595372902047E+20

†Applies to 60R/BRG01, 60R/CGW01
60R/SIM01, 60R/PPM01, and
60R/CMM01

RoHS

European Community Directive:

RoHS Directive 2011/65/EU

Cyber Security

Designed to meet IEC 62443-4-2

*Maritime

ABS Rules for Condition of Classification,
Part 1

- Steel Vessels Rules
- Offshore Units and Structures

*Recorder Output module, Bridge
module, and 6U systems
approvals pending

Functional Safety

SIL 1 Certified / SIL 2 Capable

See the *Orbit 60 Series SIL User Guide*
(134M0398) for details regarding SIL
implementation for SIL 1 simplex and SIL 2
redundancy applications.

PROFINET Field Device Certification Standards

PROFINET V2.4MU3

Hazardous Area Approvals



For the detailed listing of country and product-specific approvals, refer to the [Approvals Quick Reference Guide \(108M1756\)](#).

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

cNRTLus

Class I, Zone 2: AEx/Ex ec nC IIC T4 Gc;
Class I, Zone 2: AEx/Ex nA nC IIC T4 Gc;
Class I, Division 2, Groups A, B, C, D T4;
Class I, Division 2, Groups A, B, C, D T4
(N.I.);

T4 @ Ta= -30°C to +70°C (-22°F to +158°F)

ATEX/IECEx



II 3 G
Ex ec nC IIC T4 Gc
Ex nA nC IIC T4 Gc

T4 @ Ta= -30°C to +70°C (-22°F to +158°F)

Ordering Option	Description
XXX	Country Specific Approvals

B – SIL Level

0	No SIL
---	--------

System Interface Module

Ordering Option	Description
60R/SIM01-AAA-B • System Interface Module	

AAA – Hazardous Area Certifications

00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)
XXX	Country Specific Approvals

B – SIL Level

0	No SIL
---	--------



For an Orbit 60 safety system, SIL certification for the SIM is not required.

Communications Gateway Module

Ordering Option	Description
60R/CGW01-AAA-B • RJ-45 Ethernet Comm Gateway	

AAA – Hazardous Area Certifications

00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)

Ordering Option	Description
XXX	Country Specific Approvals

B – SIL Level

0	No SIL
---	--------

Protection Processor Module

Ordering Option	Description
60R/PPM01-AAA-B • Protection Processor Module	

AAA – Hazardous Area Certifications

00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)
XXX	Country Specific Approvals

B – SIL Level

0	No SIL
2	SIL 2

Condition Monitoring Module

Ordering Option	Description
60R/CMM01-AAA-B (Two-Slot)	

AAA – Hazardous Area Certifications

00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)
XXX	Country Specific Approvals

B – SIL Level

0	No SIL
---	--------