GE Measurement & Control

2300 Series Vibration Monitors
Bently Nevada* Asset Condition Monitoring

Description

The 2300 Monitors feature two seismic channels and a speed channel, providing continuous monitoring and protection for BOP (Balance of plant) equipment. It is a perfect match for proactively managing your assets, rather than waiting until production outages to replace equipment.

The 2300 series monitors enable condition based monitoring and protection with support for various interfaces and functions. Inputs include seismic and speed transducers, and outputs include relays, buffered output, TCP/IP Ethernet, and an LCD display. This monitor is available with either 4-20 mA output (2300/20) or a TrendMaster SPA line interface (2300/25).

The 2300/20 Monitor can be used to replace legacy Bently Nevada monitors such as the 1900/27, but more importantly it is a full featured monitor for use in monitoring and protecting assets such as motors, pumps, and fans.

The monitor is software configurable, and includes configuration software. There is also an integrated LCD and multiple LEDs to show the channels’ real-time data and status locally.

Effective plant asset management, and particularly effective fleet management of machinery assets, often depends on remote access using condition monitoring software such as System 1* Evolution.
Monitor Key Features

### 2300/20
- Two 4-20mA outputs
- Two relay outputs with programmable setpoints
- Ethernet 10/100 Base-T communication for configuration using Bently Nevada Monitor Configuration software (included)
- One dedicated speed and Keyphasor* channel supporting Proximity probes, Magnetic pickup and Proximity switch type sensors
- Three buffered transducer outputs (including Keyphasor signal) providing short circuit and EMI protection. Buffered outputs for each signal are through BNC connectors.
- Continuous monitoring and protection
- LCD display showing vibration measurements, setpoints, and speed
- Two acceleration inputs with synchronized sampling for advanced diagnostics
- Key measurements (Direct 0-pk, pk-pk, Direct rms, Derived pk, integrated direct pk, Speed) real-time provided with alarm configuration
- LEDs show the monitor status
- Local contacts for positive engagement of channel bypass, configuration lockout, and reset
- Modbus® over Ethernet

### 2300/25
- Trendmaster SPA interface
- Two relay outputs with programmable setpoints
- Ethernet 10/100 Base-T communication for configuration using Bently Nevada Monitor Configuration software (included)
- One dedicated speed and Keyphasor channel supporting Proximity probes, Magnetic pickup and Proximity switch type sensors
- Three buffered transducer outputs (including Keyphasor signal) providing short circuit and EMI protection. Buffered outputs for each signal are through BNC connectors.
- Continuous monitoring and protection
- LCD display showing vibration amplitude, setpoints, and speed
- Two acceleration inputs with synchronized sampling for advanced diagnostics
- Key measurements (Direct 0-pk, pk-pk, Direct rms, Derived pk, integrated direct pk, Speed) real-time provided with alarm configuration
- LEDs show the monitor status
- Local contacts for positive engagement of channel bypass, configuration lockout, and reset
- Modbus® over Ethernet

#### Recommended for Demonstration Kit

2300/20_KIT-003-02-01
- 1 - 2300/20 Monitor
- 1 - 6 ft. (1.8M) shielded Ethernet cable
- 2 - Accelerometer sensors
- 2 - 15 ft. (4.8M) accelerometer cables

To be ordered separately:

110M7102-01  Power supply for DIN rail mounting, 100/240AC to 24DC/1.3A
-25°C ~70°C, 22.5*99*107 mm
Specifications

Inputs / Outputs

Power Input:
- DC Input: 18~36VDC, max 7.5W

Supports 2 seismic channels:
- Supports ICP accelerometers
  - Bandpass variable: 0.2 Hz High pass, 20 kHz Low pass
  - Scale Factor range: 5 to 575 mV/g
  - Full scale range: 2 to 80 g peak
  - Bias output voltage: -12VDC
  - Configurable Upper OK limit: -0.25 to -22 V (greater than lower ok)
  - Configurable Lower OK limit: -0.25 to -22 V (less than upper ok)
  - Current Sink Source: 3.3 mA ± 5%
  - Open Circuit Voltage: -21 to -24 VDC
  - Accuracy: ±1% of full scale range
- Supports custom accelerometers (2 or 3 wires)
- Independent 24-bit ADCs on both channels

Speed/Keyphasor Inputs
- Supported Keyphasor transducers include:
  - Proximity probe
  - Proximity switch
  - Magnetic Pickup
- Supports multiple events per revolution and event ratios for speed inputs up to 20 kHz
- Threshold voltage resolution: 0.1VDC
- Proximity Transducer Interface:
  - Supply Voltage: -22.8 to -25.2 VDC
  - Maximum Rated Current: 15 mA
  - Short Circuit Current: 15.1 mA to 23.6 mA
  - Accuracy: ±1% of full scale range
  - Input Impedance: 3-wire Voltage Mode, 10 kΩ
  - Rpm range: 1 to 120,000

Contact Inputs
Monitor provides the capability of 3 contact inputs with terminals. One is used for configuration lock, one is for latched alarm/relay reset function, and the 3rd one is used for monitor Alarm/Relay Inhibit.
- Activate: 0 to 10 kΩ
- De-activate: 150 kΩ to infinite

Button Inputs
- External button to reset latched alarm and relay
- One buried button provides 3 functions:
  - Display monitor information including:
    - User account name
    - IP address
    - FW/HW version
  - LCD contrast adjustment
  - Reset settings to default including:
    - User account name
    - Password
    - Network configuration

Jumper between COM & Chassis GND
- There is a 2-pin terminal interface which allows connection of COM and Chassis GND together.
- Alternatively, COM can be connected to earth ground separately through a terminal.

Buffered Output
- There are three buffered outputs available on the monitor through BNC connectors:
  - 2 Vibration Outputs
  - 1 Speed Output
Relay Output
- There are two dry-contact relay outputs
- May be normally energized or de-energized
- No output feedback determination
- Relay circuit specification in Non-Hazardous area:
  - Type: Single pole, double throw
  - Sealing: Epoxy sealed
  - Contact life: 100,000 cycles @ 5 amps 250 VAC
  - 200,000 @ 1 amp, 24 VDC
  - Insulation resistance: 1000 MΩ minimum @ 500 VDC
  - Relay closed contact resistance: 1 Ω maximum
  - Relay open contact resistance: 1 MΩ minimum
  - Maximum switched contact voltage: 250V AC / 250V DC
  - Maximum breaking contact current: 6A @250VAC / 6A @24VDC
  - Maximum switched power: 1500VA AC / 150 Watts DC
- Relay circuit specification in Hazardous area:
  - Maximum switched contact voltage and current: 6A @24VAC / 5A @30VAC / 5.8A @24VDC / 4A @30VDC

SPA Output (2300/25)
- Input signal range
  - High AC: 8Vpp
  - Low AC: 1.6Vpp
  - DC GAP: 0 to -20Vdc [max measurable AC signal is 1Vpp]
- Accuracy
  - High/Low AC: ±1% of Full-Scale at 100Hz
  - DC GAP: ±0.5V (measurable AC accuracy: ±20mV)
- Frequency response
  - 10Hz to 3000Hz ±5%

LEDs
- OK: Indicates when the monitor is operating properly
- Protection fault: Indicates that there is a hardware fault that is impacting alarm determination
- User inhibit: indicates the alarm/relays have been intentionally inhibited from operation
- Bypass: indicates user initiated bypass action
- Relay status: indicates if relays have been activated
- TX/RX: Indicates the Ethernet status and monitor communicating with remote software
- Speed channel status
- Channel Alarm Status:
  - Alert LED: engages if any channel is in alert state
  - Danger LED: engages if any channel is in danger state

LCD
LCD display allows viewing machine speed, vibration measurements value, setpoints, and configuration information.

Communications

Ethernet
- Ethernet, 10Base-T and 100Base-TX. Conforms to IEEE802.3
- RJ-45 for 10Base-T/100Base-TX Ethernet cabling
Environmental Limits

Operating Temperature:
• -30 °C to +65 °C (-22 °F to +149 °F)

Storage Temperature:
• -40 °C to +85 °C (-40 °F to +185 °F)

Humidity:
• Up to 95%, non-condensing

Battery Life for Real Time Clock:
• Powered: 38 years @ 50°C (122 °F)
• Un-powered: 12 years @ 50°C (122 °F)

Compliance and Certifications

General and Electrical Safety:
UL Std. No. 61010-1 (3rd Edition)
CAN/CSA C22.2 No. 61010-1-12
2006/95/EC Low Voltage
Standard:
EN61010-1: 2010

European Community Directives:
2006/95/EC Low Voltage

EMC Standards:
EN61000-6-2 Immunity for Industrial Environments
EN61000-6-4 Emissions for Industrial Environments
EN61326-1 Electrical equipment for measurement, control and laboratory use - EMC requirements

European Community Directives:
EMC Directive 2004/108/EC

Hazardous Area Approvals

CSA/NRTL/C
Class I, Division 2/Zone 2
AEx/Ex nA nC [ic] IIIC T4 Gc
Class I, Div. 2, Groups A, B, C, D

ATEX/IECEx
Ex nA nC [ic] IIIC T4 Gc

Intrinsic Safety Parameters:
For Proximitor Transducer:
Uo: 24V; Io: 46mA; Co: 200nF; Lo: 1mH

For Accelerometer Transducer:
Uo: 24V; Io: 3.3mA; Co: 200nF; Lo: 1mH

FOR SPA POWER (2300/25 Only):
Ui=15V; Ii=150mA; Pi=560mW; Ci=0; Li=0

FOR SPA SIGNAL (2300/25 Only):
Ui=12V; Ii=12mA; Pi=36mW; Ci=0; Li=0

Physical

Dimensions (Width x Depth x Height)
127mm x 127mm x 76.2mm (5in x 5in x 3in)

Weight
1.03kg (2.26lbs)

Mounting
Panel mount or DIN rail (adapter included)
Ordering Information


2300 Series Vibration Monitor

2300/20-AA-BB: Monitor with 4-20ma Outputs
   (including DIN rail mount assembly, manual and monitor configuration software)

2300/25-AA: Monitor with SPA Outputs
   (including DIN rail mount assembly, manual and monitor configuration software)

AA: Approvals Option
   00
   None
   02
   Multiple Explosive Atmosphere Certifications (ATEX/IECEx/CSA)²

BB: Software License for System 1 Evo Connection
   00
   Monitor without License
   01
   Monitor with License

2300/20_KIT-AAA-BB-CC: Bently Nevada 2300/20 Condition Monitoring System Kit

2300/25_KIT-AAA-BB: Bently Nevada 2300/25 Condition Monitoring System Kit

AAA: Configuration
   001
   1 - 2300/20 or 2300/25 Monitor
   1 - 6 ft. (1.8m) shielded Ethernet cable
   1 – 13 x 15 x 8 in. (338 x 389 x 209mm) fiberglass housing with window
   2 - Accelerometer sensors
   2 – 15 ft. (4.8m) accelerometer cables
   (Excluding Keyphasor sensor and 24 VDC power supply³)

   002
   1 - 2300/20 or 2300/25 Monitor
   1 - 6 ft. shielded Ethernet cable
   1 - 13x15x8 in. fiberglass housing with window
   1 - Accelerometer sensor
   1 - 15 ft. (4.8m) accelerometer cable
   (Excluding Keyphasor sensor and 24VDC power supply³)

   003
   1 - 2300/20 or 2300/25 Monitor
   1 - 6 ft. shielded Ethernet cable
   2 - Accelerometer sensors
   2 – 15 ft. (4.8m). accelerometer cables
   (Excluding Keyphasor sensor, enclosure and 24 VDC power supply³)

BB: Approvals Option
   00
   None
   02
   Multiple Explosive Atmosphere Certifications (ATEX/IECEx/CSA)²

CC: Software License for System 1 Evo Connection
   00
   Monitor without License
   01
   Monitor with License

3071/13-AA-BB: System 1 2300 Series Device Import

AA: Not available for 2300 monitor
   00

BB: Quantity of 2300 Monitoring Systems
   ## - Numeric Entry [1->n]

Notes:

- 3071/13 is only applicable for 2300 monitors that are installed/purchased without the System 1 Evolution device license.
- System 1 Evolution software requires a separate order. Refer to the System 1 Evolution datasheet (document 108M5214) for detailed ordering information.
• The maximum number of 2300 monitor connections is 50 in System 1 Evolution 16.1. (This number will be increased in later versions.)

• AA option is for vbOnline Pro Device.

1 We provide 3 kinds of power supplies with different temperature range and different power. Please check Accessories below for the details.

2 For 2300/25 monitor, it is necessary to use metal conduit for the SPA line and Transducer input channels (2 Inputs + 1 Speed). The installation must have ground connections at both ends of the conduit to provide the needed electrical shielding and the best performance.
Accessories

106M7607-01  Power supply for DIN rail mounting,
100/240AC to 24DC/1.5A
Certifications (ATEX)
(-25°C ~70°C, 35*99*95 mm)
(One power can drive max 4 monitors)

110M7102-01  Power supply for DIN rail mounting,
100/240AC to 24DC/1.3A
Certifications (CID2 by UL)
(-25°C ~70°C, 22.5*99*107 mm)
(One power can drive max 4 monitors.)

106M6694-01  Power supply for DIN rail mounting,
110/220AC to 24VDC/5A
Certifications (ATEX, IECEx, CID2 by UL)
(-40°C ~70°C, 40*130*125 mm)
(One power can drive max 10 monitors.)

105M6193-01  Fiberglass NEMA 4X/IP68
weatherproof housing with window in door (includes mounting plate for monitor)
Dimensions:
(Width x Depth x Height)
338.3 x 389.1 x 209.8mm
(13.3 x 15.3 x 8.2in)

AM3100T2-Z2  Accelerometer sensor

100M0741  Proximity Switch

284947  Magnetic Pickup

Proximity Probes
Please refer to proximity probe datasheet for details

141194-01  3300XL 8mm
146256-01  3300XL 11mm
147385-01  3300XL NSV
02120015  Bulk Cable from Proximity sensor to monitor (500 ft.)

9571-AA  Low cost cable for accelerometer

AA: From "20" to "99" Increments of 1.0 foot

<table>
<thead>
<tr>
<th>INCREMENTS OF 1.0 FOOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXAMPLE:</td>
</tr>
<tr>
<td>1 2 = 12 FEET</td>
</tr>
<tr>
<td>2 5 = 25 FEET</td>
</tr>
<tr>
<td>MIN LENGTH = 2.0 FEET</td>
</tr>
<tr>
<td>MAX LENGTH = 99 FEET</td>
</tr>
</tbody>
</table>

84661-AA  Armored cable for accelerometer

AA: From "30" to "99" Increments of 1.0 foot

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CB2W100-AAA  Cable for accelerometer

AAA:

<table>
<thead>
<tr>
<th>Cable Length</th>
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<tbody>
<tr>
<td>0 1 5 15 ft. (4.8 m)</td>
</tr>
<tr>
<td>0 3 2 32 ft. (9.8 m)</td>
</tr>
<tr>
<td>0 6 4 64 ft. (19.5 m)</td>
</tr>
<tr>
<td>1 1 2 112 ft. (34.1 m)</td>
</tr>
<tr>
<td>1 2 5 125 ft. (38.1 m)</td>
</tr>
<tr>
<td>1 5 0 150 ft. (45.7 m)</td>
</tr>
<tr>
<td>2 0 0 200 ft. (61.0 m)</td>
</tr>
<tr>
<td>2 5 0 250 ft. (76.2 m)</td>
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</tbody>
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Note: Cable lengths greater than 30 meters (100 feet) will experience some attenuation of amplitudes at higher frequencies.

285031-AA  Cable for 2 wire extension with a splash proof connection. This cable assembly will provide an equivalent IP66 level of protection.

AA:

<table>
<thead>
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<tr>
<td>1 6 16 ft. (4.8 m)</td>
</tr>
<tr>
<td>3 2 32 ft. (9.8 m)</td>
</tr>
<tr>
<td>6 4 64 ft. (19.5 m)</td>
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</tbody>
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286244  Magnetic mounting base ¼-28 threaded hole

**Ethernet Cables**

138131-AAA  Standard 10 Base-T/100 Base-TX Shielded Category 5 Cable with RJ-45 connectors (solid conductor)

**Spares**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>105M6203-01</td>
<td>35mm DIN rail mount and screws (included with 2300/20 monitor)</td>
</tr>
<tr>
<td>106M3210</td>
<td>10 pins 4-20mA output connector</td>
</tr>
<tr>
<td>106M2223</td>
<td>5 pins contact input connector (Alarm Reset)</td>
</tr>
<tr>
<td>106M3408</td>
<td>5 pins contact input connector (Alarm Inhibit, Config lock)</td>
</tr>
<tr>
<td>106M3211</td>
<td>16 pins transducer input connector</td>
</tr>
<tr>
<td>106M3212</td>
<td>6 pins relay output connector</td>
</tr>
<tr>
<td>106M2231</td>
<td>3 pins power input connector</td>
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**Software**

<table>
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<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>100M9465-01</td>
<td>BN Monitor Configuration SW/FW DVD</td>
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<tr>
<td></td>
<td>- BNMC version 5.2 or greater</td>
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<td></td>
<td>- 2300 series monitor firmware (DVD includes 2300 Series Software Guide)</td>
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**User Manuals**

2300 Series Operation and Maintenance Manual (Document 105M0341)

2300 Series Software Guide (Document 107M7626)

2300 Field Wiring Diagram (Document 106M5801)

**Training Materials Link**

http://ge-energy.turnstilesystems.com/ProgramDetail.aspx/2300Monitor
Graphs and Figures

2300 Series Monitor Recommended Clearance
Wiring Diagram

2300/20 Wiring Diagram
Note: 2300/20 and 2300/25 use the same interface connector for recorder output or SPA output.