

# 2300 Vibration Monitors

Bently Nevada\* Asset Condition Monitoring

## Description

The 2300 Vibration Monitors provide cost-effective continuous vibration monitoring and protection capabilities for less critical and spared machinery. They are specifically designed to continuously monitor and protect essential medium to low criticality machinery in a wide range of industries including: oil & gas, power generation, water treatment, pulp & paper, manufacturing, mining, cement, and other industries.

The 2300 Vibration Monitors deliver vibration monitoring and high vibration level alarming. They include two channels of seismic or proximity measurement inputs from various accelerometer, velomitor and proximitors types, a speed input channel for time-synchronous measurements, and outputs for relay contacts. The 2300/20 monitor features a configurable 4-20 mA output which interfaces more points to a DCS. The 2300/25 monitor features System 1\* connectivity for Trendmaster SPA interface which enables users to leverage existing DSM SPA infrastructure.

The 2300 Vibration Monitors are designed for use on a broad range of machine trains or individual casings where the sensor point count fits the monitor's channel count and where advanced signal processing is desired.



## 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/velocity/proximity inputs with synchronized sampling for advanced diagnostics
- Key measurements (Direct pk, Direct rms, Derived pk, Velocity pk, Velocity rms, Displacement pp, Displacement rms, 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/velocity/proximity inputs with synchronized sampling for advanced diagnostics
- Key measurements (Direct pk, Direct rms, Derived pk, Velocity pk, Velocity rms, Displacement pp, Displacement rms, 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
- 100M9465-01 BN Monitor Configuration SW/FW DVD

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

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## Inputs / Outputs

### Power Input:

- DC Input: 18~36VDC, max 7.5W
- Supports ICP Accelerometers Channel Type:
  - Configurable Bandpass filter: 0.2 Hz to 20 kHz
  - Scale Factor range: 5 to 1000 mV/g
  - Full scale range: 2 to 80 g peak
  - Bias output voltage: -12VDC (for AM3100T2-Z2)
  - 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  $\pm$  5%
  - Open Circuit Voltage: -21 to -24 VDC
- Supports Velocity Channel Type:
  - Configurable Bandpass filter: 0.2 Hz to 20 kHz
  - Scale Factor range: 5 to 1000 mV/in/s
  - Full scale range: 0 to 50 in/s peak
  - 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)
- Supports Radial Vibration Channel Type:
  - Configurable Bandpass filter: 0.2 Hz to 20 kHz
  - Scale Factor range: 5 to 1000 mV/mil
  - Full scale range: 0 to 160 mil peak-peak
  - 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)
- Accuracy:  $\pm$ 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:  $\pm$ 1% of full scale range
  - Input Impedance: 3-wire Voltage Mode, 10 k $\Omega$
  - Rpm range: 1 to 120,000
- Proximity Switch Interface:
  - Supply Voltage: -10 to -24 VDC
  - Lower Not Ok limit: -2.75  $\pm$ 0.05 V
  - Rpm range: 1 to 120,000
- Magnetic Pick up:
  - Input voltage up to  $\pm$ 125V (250Vp-p)
  - Rpm range: 200 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 k $\Omega$
- De-activate: 150 k $\Omega$  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

#### **4-20mA Output (2300/20)**

- Two 4-20mA outputs
- 4 to 20mA output values are proportional to the full-scale of the associated measurement
- Each output can be software configured to output any variable
- Voltage compliance: 0 to +12Vdc range across load
- Load resistance: 0 to 600Ω
- Resolution: 0.3662uA
- Accuracy: 1% over operating temperature range
- Update rate: 100ms
- Configurable with default 2mA clamp current
- No output feedback determination

#### **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.

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## Communications

### Ethernet

- Ethernet, 10Base-T and 100Base-TX. Conforms to IEEE802.3
- RJ-45 for 10Base-T/100Base-TX Ethernet cabling
- Cable length: 100 meters (328 ft.) maximum

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## 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

### Vibration Limitation:

- 3g

### Battery Life for Real Time Clock:

- Powered: 38 years @ 50°C (122 °F)
- Un-powered: 12 years @ 50°C (122 °F)

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## Compliance and Certifications

### General and Electrical Safety:

UL Std. No. 61010-1 (3rd Edition)  
CAN/CSA C22.2 No. 61010-1-12

### 2014/35/EU Low Voltage Standard:

EN61010-1: 2010

### European Community Directives: LV Directive 2014/35/EU

### 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 2014/30/EU

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## Hazardous Area Approvals

For a detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (document 108M1756) located at the following website: [www.GEmeasurement.com](http://www.GEmeasurement.com).

### CSA/NRTL/C

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

### ATEX/IECEX

 II 3 G  
Ex nA nC [ic] IIC T4 Gc  
ATEX 2014/34/EU

### Intrinsic Safety Parameters:

#### For Proximito 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; li=150mA; Pi=560mW; Ci=0; Li=0

#### FOR SPA SIGNAL (2300/25 Only):

Ui=12V; li=12mA; Pi=36mW; Ci=0; Li=0

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## 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

For a detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (document 108M1756) located at the following website: [www.GEmeasurement.com](http://www.GEmeasurement.com).

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### 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)

**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 supply <sup>1</sup>)

**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 supply<sup>1</sup>)

**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 supply<sup>1</sup>)

**BB:** Approvals Option

**00**

None

**02**

Multiple Explosive Atmosphere Certifications (ATEX/IECEX/CSA)

**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 datasheet

(document 108M5214) for detailed ordering information.

- The maximum number of 2300 monitor connections is 350 in System 1 16.1. (This number will be increased in later versions.)
- AA option is for vbOnline Pro Device.

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

## Accessories

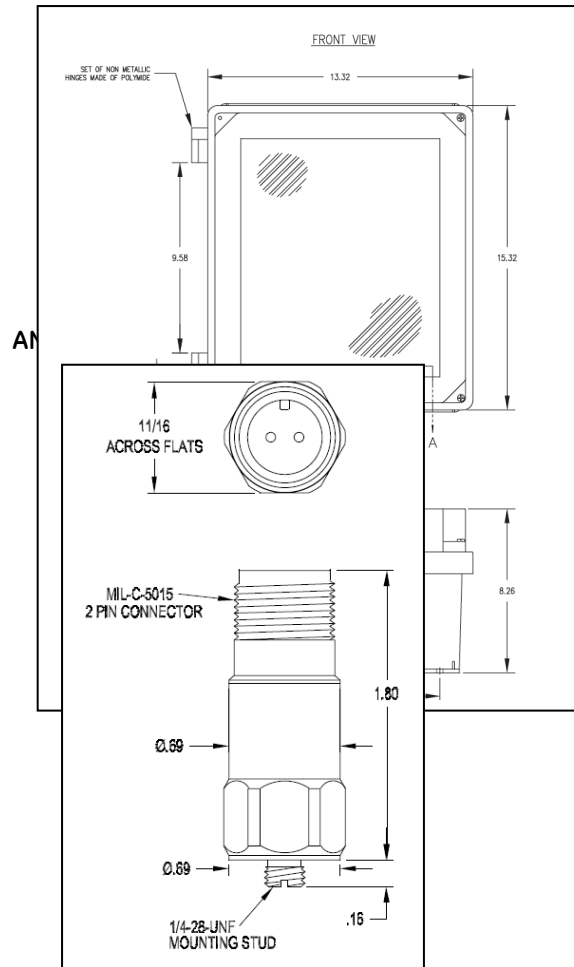
**106M7607-01** Power supply for DIN rail mounting, 100/240AC to 24DC/1.5A  
Certifications (ATEX)  
(-25°C ~70°C, 35\*99\*95 mm)  
(One power can drive max 4 monitors)

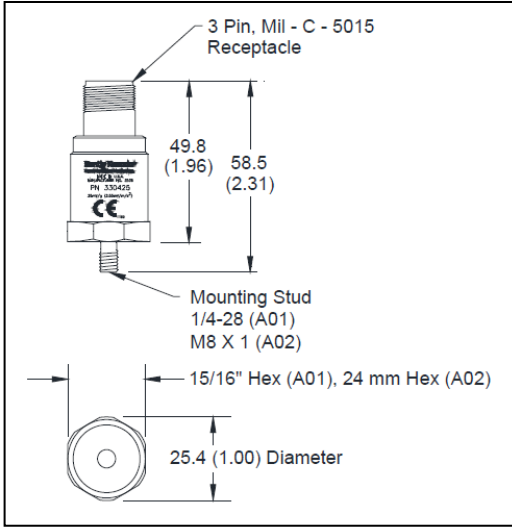
**110M7102-01** Power supply for DIN rail mounting, 100/240AC to 24DC/1.3A  
Certifications (CID2 by UL)  
(-25°C ~70°C, 22.5\*99\*107 mm)  
(One power can drive max 4 monitors.)

**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)

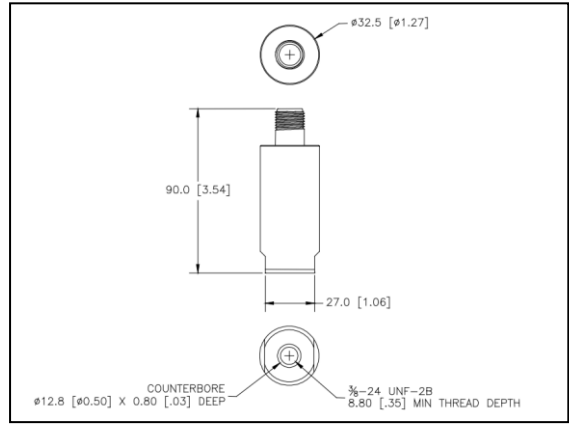
Dimensions:  
(Width x Depth x Height)  
338.3 x 389.1 x 209.8mm  
(13.3 x 15.3 x 8.2in)





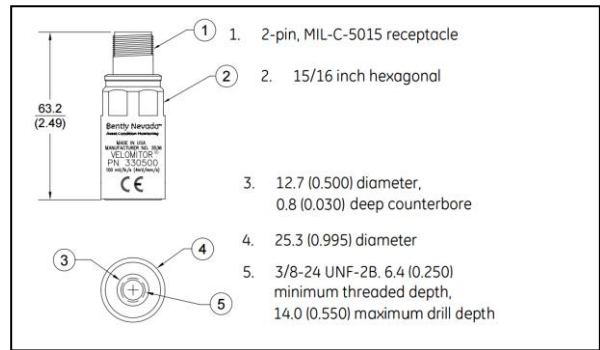
330400/330425 Accelerometer sensor

330500 Velomitor

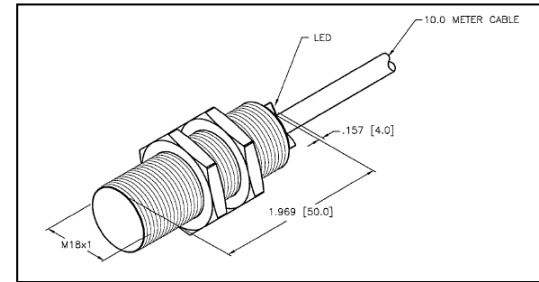
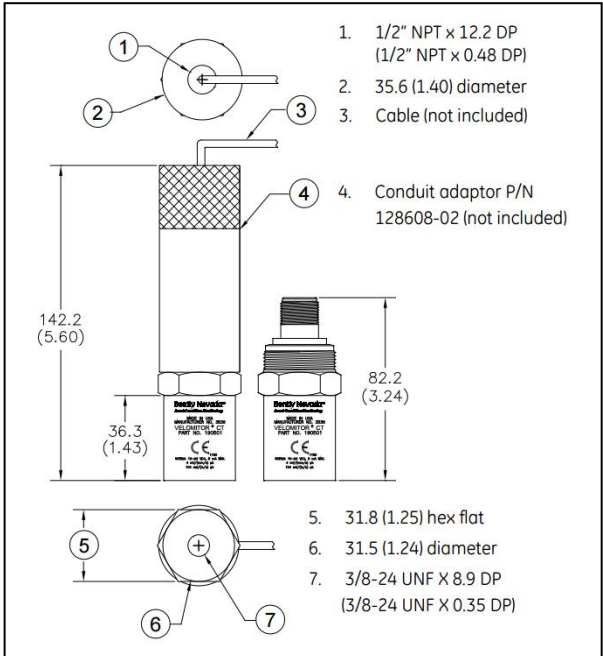
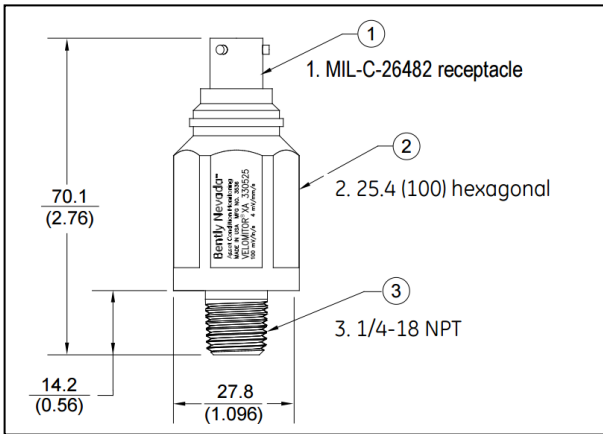


330505 Velomitor

330525 Velomitor



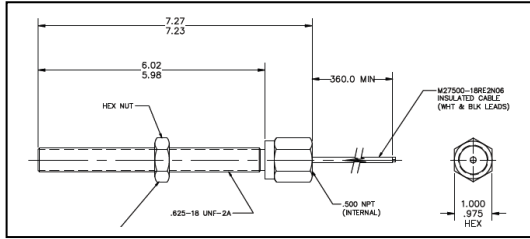
190501 Velomitor



100M0741 Proximity Switch



**284947** Magnetic Pickup



**Proximity Probes**

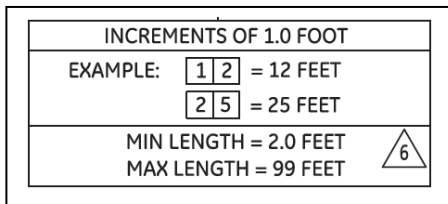
Please refer to proximity probe datasheet for details

172036	3300 5mm
141194-01	3300XL 8mm
146256-01	3300XL 11mm
147385-01	3300XL NSV

**02120015** Bulk Cable from Proximity sensor to monitor (500 ft.)

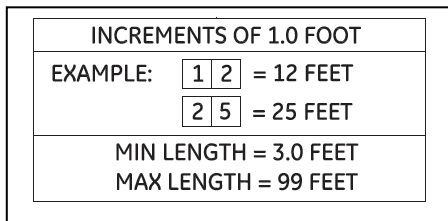
**9571-AA\*** Low cost cable for accelerometer

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



**84661-AA\*** Armored cable for accelerometer

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



**CB2W100-AAA** Cable for Velomitor CT

**AAA:**

<b>0 1 5</b>	15 ft. (4.8 m)
<b>0 3 2</b>	32 ft. (9.8 m)
<b>0 6 4</b>	64 ft. (19.5 m)
<b>1 1 2</b>	112 ft. (34.1 m)
<b>1 2 5</b>	125 ft. (38.1 m)
<b>1 5 0</b>	150 ft. (45.7 m)
<b>2 0 0</b>	200 ft. (61.0 m)
<b>2 5 0</b>	250 ft. (76.2 m)

**Splash Proof Cable for AM3100T2-Z2 Accelerometer**

**9571 Mod : 285031-AA\*** Cable for 2 wire extension with a splash proof connection. This cable assembly will provide an equivalent IP66 level of protection.

**\*Note :** Cable lengths greater than 30 meters (100 feet) will experience some attenuation of amplitudes at higher frequencies when using the AM3100T2-Z2 Accelerometer.

**AA :**

<b>1 6</b>	16 ft. (4.8 m)
<b>3 2</b>	32 ft. (9.8 m)
<b>6 4</b>	64 ft. (19.5 m)

**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)

**AAA:**

	Cable Length
<b>0 0 6</b>	6 ft. (1.8 m)
<b>0 1 0</b>	10 ft. (3.0 m)
<b>0 2 5</b>	25 ft. (7.6 m)
<b>0 4 0</b>	40 ft. (12.2 m)
<b>0 5 0</b>	50 ft. (15.2 m)
<b>0 7 5</b>	75 ft. (22.9 m)
<b>0 8 5</b>	85 ft. (25.9 m)
<b>1 0 0</b>	100 ft. (30.5 m)

**Spares**

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

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## Software

- 100M9465-01** BN Monitor Configuration SW/FW  
DVD
- BNMC version 5.2 or greater
  - 2300 series monitor firmware
- (DVD includes 2300 Series Software Guide)

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## User Manuals

2300 Series Operation and Maintenance Manual  
(Document 105M0341)

2300 Field Wiring Diagram (Document 106M5801)

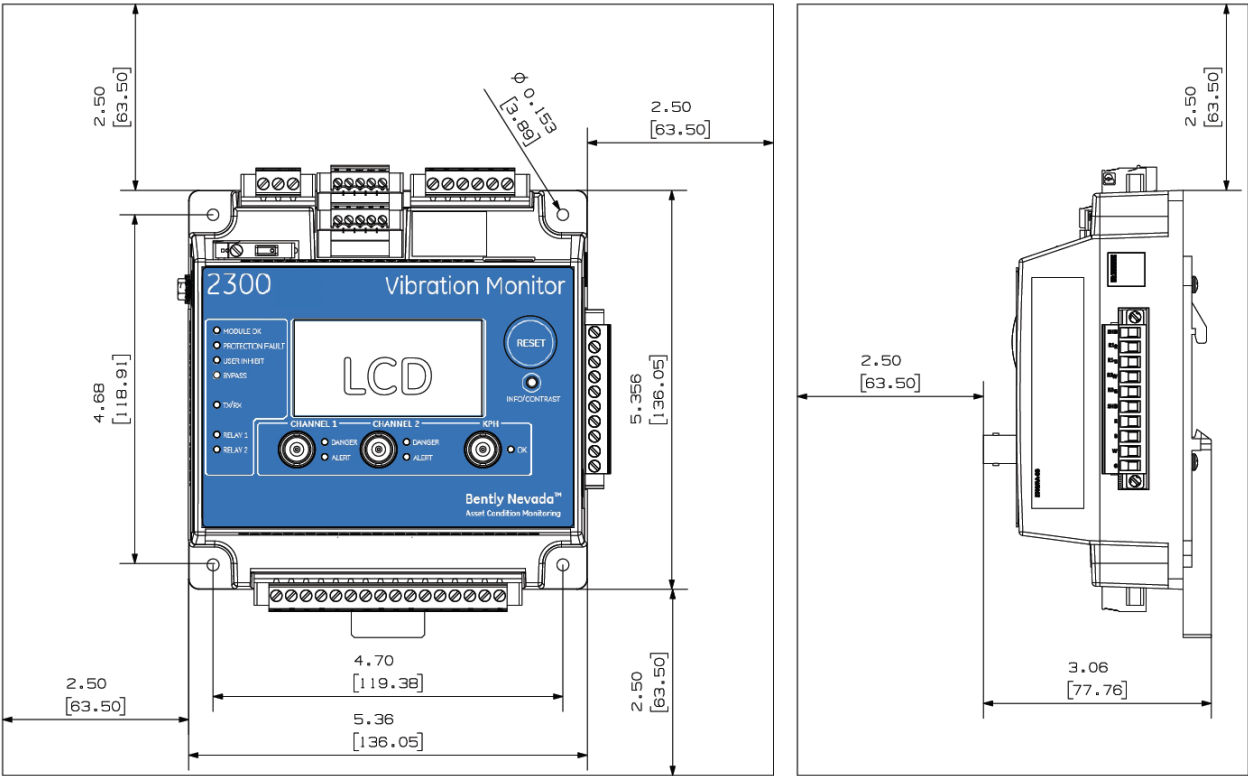
2300 Series Software Guide (Document 107M7626)

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## Training Materials Link

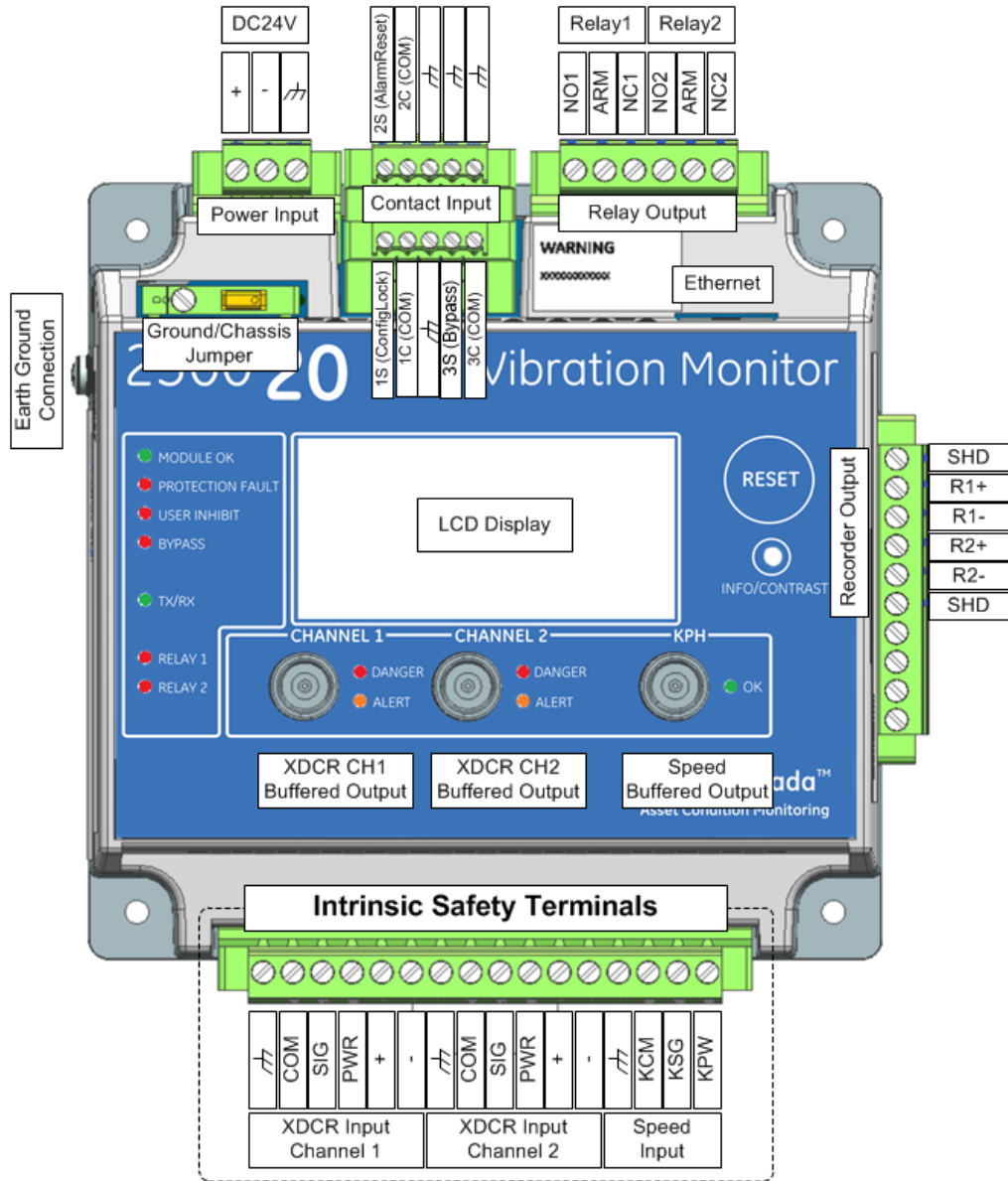
<http://ge-energy.turnstilesystems.com/ProgramDetail.aspx/2300Monitor>

# Graphs and Figures

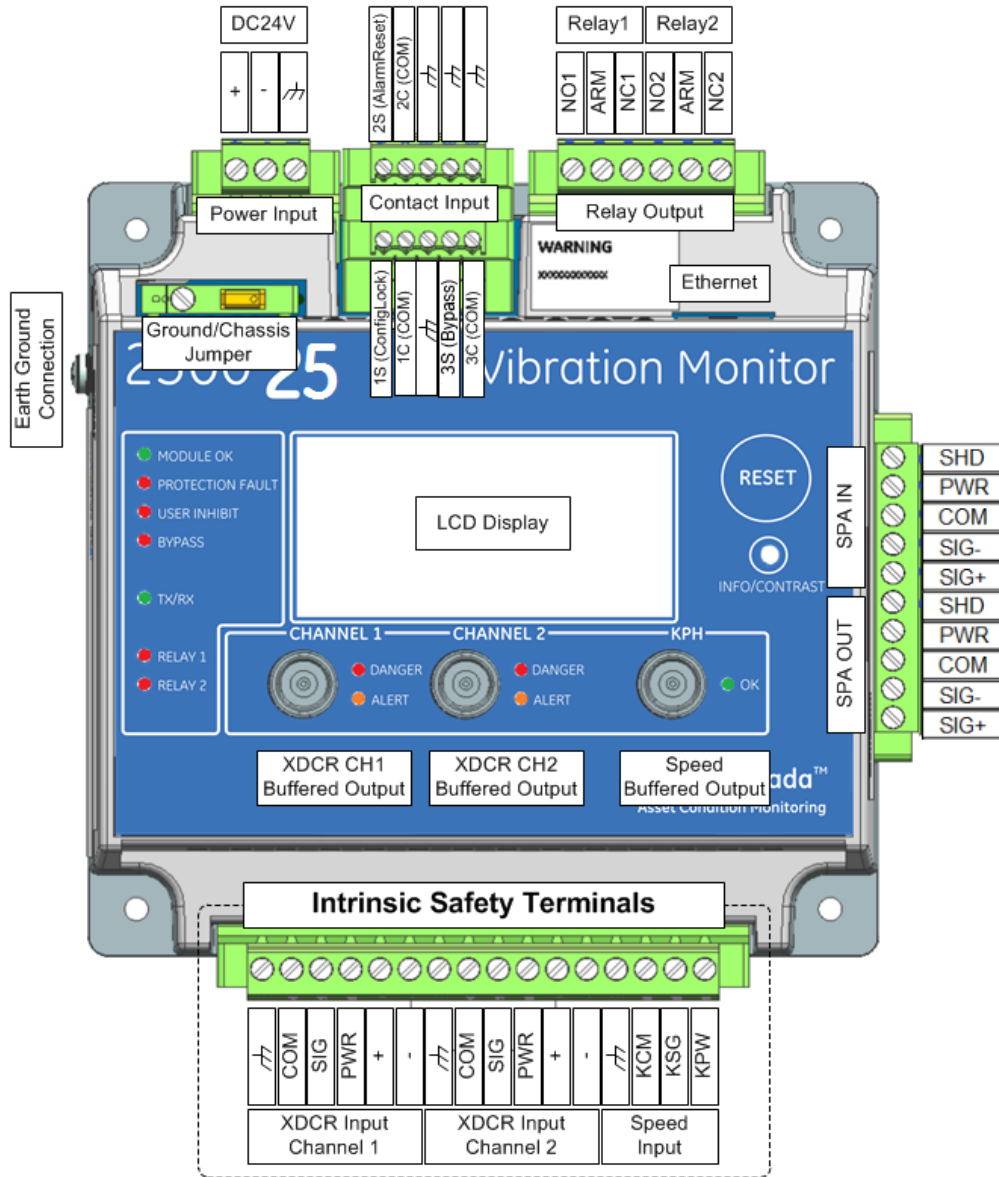


2300 Series Monitor Recommended Clearance

# Wiring Diagram



2300/20 Wiring Diagram



**2300/25 Wiring Diagram**

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

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