MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

BENTLY NEVADA

2300/25

TRENDMASTER SPA VIBRATION MONITOR

Used with the applicable 2300 Series SPA vibration monitor configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Bently Nevada 2300/20 and 2300/25 Monitors, 105M0340 Rev. AD.

2300/20 and 2300/25 2300 Vibration Monitors

Datasheet

Cordant™

105M0340 Rev. AD



Description

The Bently Nevada™ 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 and 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 Proximitor 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 Classic connectivity for Trendmaster SPA interface which enables users to leverage existing DSM SPA infrastructure.

The 2300 Vibration Monitors are designed for using 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.

Baker Hughes

Monitor Key Features

2300/20

- Two 4-20 mA outputs with internal current loop power supply.
- Continuous monitoring and protection
- Two acceleration/velocity/proximity inputs with synchronized sampling for advanced diagnostics.
- One dedicated speed channel supporting Proximity probes, Magnetic pickup and Proximity switch type sensors.
- Supports process variable on all three input channels.
- Key measurements (Acceleration pk, Acceleration rms, Velocity pk, Velocity rms, Displacement pp, Displacement rms, Speed) real-time provided with alarm configuration.
- Each channel has one measurement group, and can add additional two bandpass measurements and several nX measurements (depends on the device availability).
- LCD and LED for real time value and status display.
- Ethernet 10/100 Base-T communication for configuration using Bently Nevada Monitor Configuration software (Included) with RSA encryption.
- Local contacts for positive engagement of monitor bypass, configuration lockout, and latched alarm/relay reset.
- Two relay outputs with programmable setpoints.
- Three buffered transducer outputs (including Keyphasor signal) providing short circuit and EMI protection. Buffered outputs for each signal are through BNC connectors.
- Modbus over Ethernet.
- Alarm Data Capture

Caution: Two 4-20 mA outputs will **NOT** work with an external powered loop.

2300/25

- Trendmaster SPA interface.
- Continuous monitoring and protection.
- Two Acceleration/Velocity/Proximity inputs with synchronized sampling for advanced diagnostics.
- One dedicated speed channel supporting Proximity probes, Magnetic pickup and Proixmity switch type sensor.
- Support process variable on all three input channels.
- Key measurements (Acceleration pk, Acceleration rms, Velocity pk, Velocity rms, Displacement pp, Displacement rms, Speed) real-time provided with alarm configuration.
- Each channel has one measurement group, and can add additional two bandpass measurements and several nX measurements (depends on the device availability).
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- Modbus over Ethernet.
- Alarm Data Capture

Specifications

Inputs

Power Input	
DC Input	18~36 Vdc, max 7.5 W

Channel Types	
ICP Accelerometers	
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
Current Sink Source	3.3 mA ± 5%
Open Circuit Voltage	-21 to -24 Vdc
Velocity	
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
Radial Vibration	
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
Thrust Channel	
Scale Factor range	5 to 1000 mV/mil

Channel Types	
Process Variable Channel	
Support most of unit with default on Temperature	
Channel Hardware Specification	
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: ±1% of full scale range	
Independent 24-bit ADCs on input channels	
Supports Bently transducer or 2/3 wires custom transducer for Accelerometers, Velomitor and Proximitor.	
Speed/Keyphasor	
Keyphasor transducers support multiple events per revolution and event ratios for speed inputs up to 20 kHz.	
Threshold voltage resolution	0.1 Vdc

Interfaces	
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
Proximity Switch Interface	
Supply Voltage	-10 to -24 Vdc

Interfaces	
Lower Not Ok limit	-2.75 ±0.05 V
Rpm range	1 to 60,000

Other Inputs	
Magnetic Pick up	
Input voltage	Adapt to sensor 284947 output
RPM range	200 to 120,000
Contact Inputs	
Monitor provides 3 contact capabilities with input terminals	Configuration lock Latched alarm/relay reset function Monitor Bypass
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 • LCD contrast adjustment • Reset settings to default
Display Monitor Information	
Reset listed settings to **Default**	• User account name • IP Address • FW/HW version
Jumper Between COM & Chassis GND	
Jumpers are 2-pin terminal interfaces that connects COM to the Chassis ground (GND).	
Alternatively, COM can be connected to an earth ground separately through a terminal.	

Outputs

Buffered Output	
Three buffered outputs are available on the monitor through BNC connectors	2 Vibration Outputs 1 Speed Output
Relays	
Relays provide two dry-contact 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
Insulationresistance	1000 MΩ minimum @ 500 Vdc
Relay closed contact resistance	1 Ω maximum
Relay open contact resistance	1 MΩ minimum
Maximum switched contact voltage	250 Vac / 250 Vdc
Maximum breaking contact current	6 A @250 Vac / 6 A @24 Vdc
Maximum switched power	1500VA AC / 150 Watts DC

Relay Circuit Specification in Hazardous Area	
Maximum switched contact voltage and current	6 A @24 Vac / 5 A @ 30 Vac / 5.8 A @24 Vdc / 4 A @30 Vdc

4-20mA Output (2300/20)

Two 4-20 mA outputs with internal current loop power supply

4 to 20 mA output values are proportional to the full-scale of the associated measurement.

Software configuration may determine the variable of each output. Voltage compliance: 0 to +12 Vdc range across load.

Load resistance: 0 to 600 Ω

Resolution: 0.3662 µA

Accuracy: 1% over operating temperature range

Update rate: 100 ms

Configurable with default 2 mA clamp current

No output feedback determination

Caution: Two 4-20 mA outputs will **NOT** work with an external powered loop.

SPA Output (2300/25)

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

Relay Circuit Specification in Hazardous Area	
LEDs	
OK	Indicates when the monitor is operating properly.
Protection fault	Indicates 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/AUX channel status	Indicates the speed channel has valid speed signal input OR operating correctly when AUX.
Channel Alarm Status	
Alert LED	Engages if any channel is in alert state.
Danger LED	Engages if any channel is in danger state.

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 Cable length: 100 meters (328 ft.) maximum

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

Physical

Dimensions (Width x Depth x Height)	127 mm x 127 mm x 76.2 mm (5 in. x 5 in. x 3 in.)
Weight	1.03 kg (2.26 lbs)
Mounting	Panel mount or DIN rail (adapter included)

System 1 Evolution Connectivity

2300 monitors connect to System 1 Evolution and support current value and time-based data collection of all static values, waveforms, and spectral data. This includes System1 Software's full suite of plots and tools for condition monitoring and asset management.

When an alarm is triggered on the 2300 monitor, the following high-resolution alarm data is forwarded to System 1.

Trend Measurements:

	Duration	Intervals
Pre-Event Data	10 minutes	1 second
	20 seconds	100 milliseconds
Post-Event Data	10 seconds	100 milliseconds
	1 minute	1 second

Spectrums/Waveforms:

	Duration	Intervals
Pre-Event Data	2.5 minutes	10 seconds
Post-Event Data	1 minute	10 seconds

In the event of a network disruption between the 2300 and System 1, the 2300 can store up to at least 5 alarm data captures. (This requires System 1 Evolution 21.1 or newer and Firmware release 3.2 or newer for 2300.)

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

EN 61000-6-2 : 2005

EN 61000-6-4: 2007 +A1

EN 61326-1: 2013

EN 61326-2-3: 2013

EMC Directive 2014/30/EU

Electrical Safety

EN 61010-1: 2010

LV Directive 2014/35/EU

ATEX

EN 60079-0: 2012/A11:2013

EN 60079-11: 2012

EN60079-15: 2010

EN60079-7: 2015

ATEX Directive 2014/34/EU

RoHS

RoHS Directive 2011/65/EU

India - Battery EPR Marking

GE Oil & Gas India Private Limited

EPR Certificate No.: 1.1595372902047E+20

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, Division 2/ Zone 2

AEx nA nC [ic] IIC T4 Gc
Class I, Division 2, Groups A, B, C, and D; T4

ATEX/IECEx

2300/20

II 3 G
Ex na nC [ic] IIC T4 Gc
Ex ec nC [ic] IIC T4 Gc

T4 @ Ta = -30°C to +65°C

2300/25

II 3 G
Ex na nC ic [ic] IIC T4 Gc
Ex ec nC ic [ic] IIC T4 Gc

T4 @ Ta = -30°C to +65°C

Ordering Information

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.

2300 Series Vibration Monitor

2300/20-AA: Monitor with 4-20 ma Outputs

(including DIN rail mount assembly, manual and monitor configuration software)

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

2300/25-AA: Monitor with SPA Outputs

(including DIN rail mount assembly, manual and monitor configuration software)

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

2300/20 KIT-AAA-BB

Bently Nevada 2300/20 Condition Monitoring System Kit

A: Configuration	
001	**2 Sensors and 1 Housing** • 1 - 2300/20 Monitor • 1 - 6 ft. (1.8 m) shielded Ethernet cable • 1 - Housing Kit: 105M6193-01 (fiberglass housing for nonhazardous area) or 105M6193-03 (stainless steel housing for hazardous area) 18.03 x 15.04 x 6.3 in. • 2 - Accelerometer sensors (AM3100T2-Z2) • 2 - 17 ft. (5.2 m) cables (9571) • (Excluding Keyphasor sensor and 24 Vdc power supply1)
002	**1 Sensor and 1 Housing** • 1 - 2300/20 or 2300/25 Monitor • 1 - 6 ft. (1.8 m) shielded Ethernet cable • 1 - Housing Kit: 105M6193-01 (fiberglass housing for nonhazardous area) or 105M6193-03 (stainless steel housing for hazardous area) 18.03 x 15.04 x 6.3 in. • 1 - Accelerometer sensor (AM3100T2-Z2) • 1 - 17 ft. (5.2 m) cable (9571) • (Excluding Keyphasor sensor and 24 Vdc power supply1)
003	**2 Sensors** • 1 - 2300/20 Monitor • 1 - 6 ft. (1.8 m) shielded Ethernet cable • 2 - Accelerometer sensors (AM3100T2-Z2) • 2 - 12 ft. (3.6 m) cables (9571) • (Excluding Keyphasor sensor and 24 Vdc power supply1)

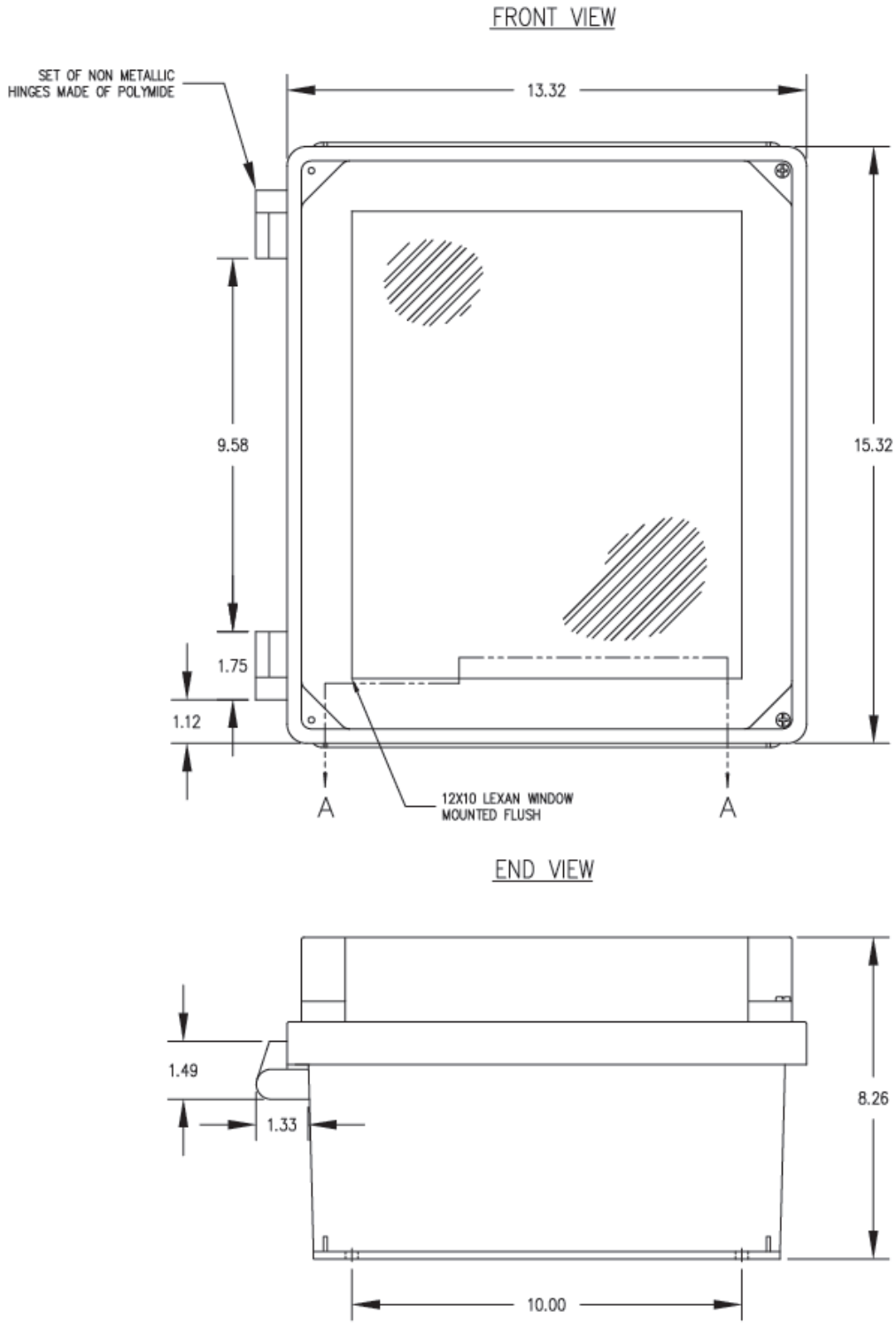


Figure 2: 105M6193-01 Weatherproof Housing

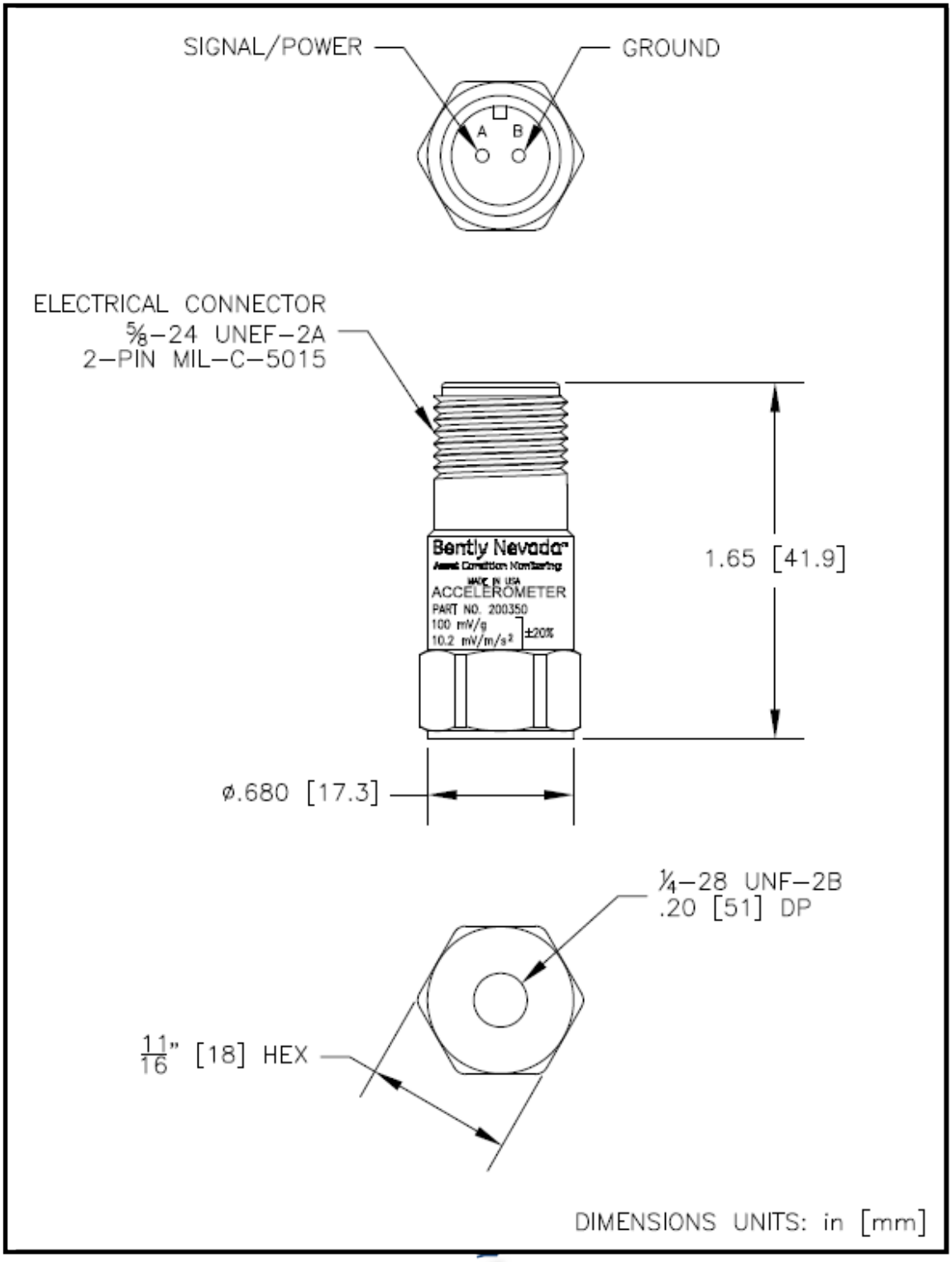


Figure 3: 200350 Accelerometer Sensor

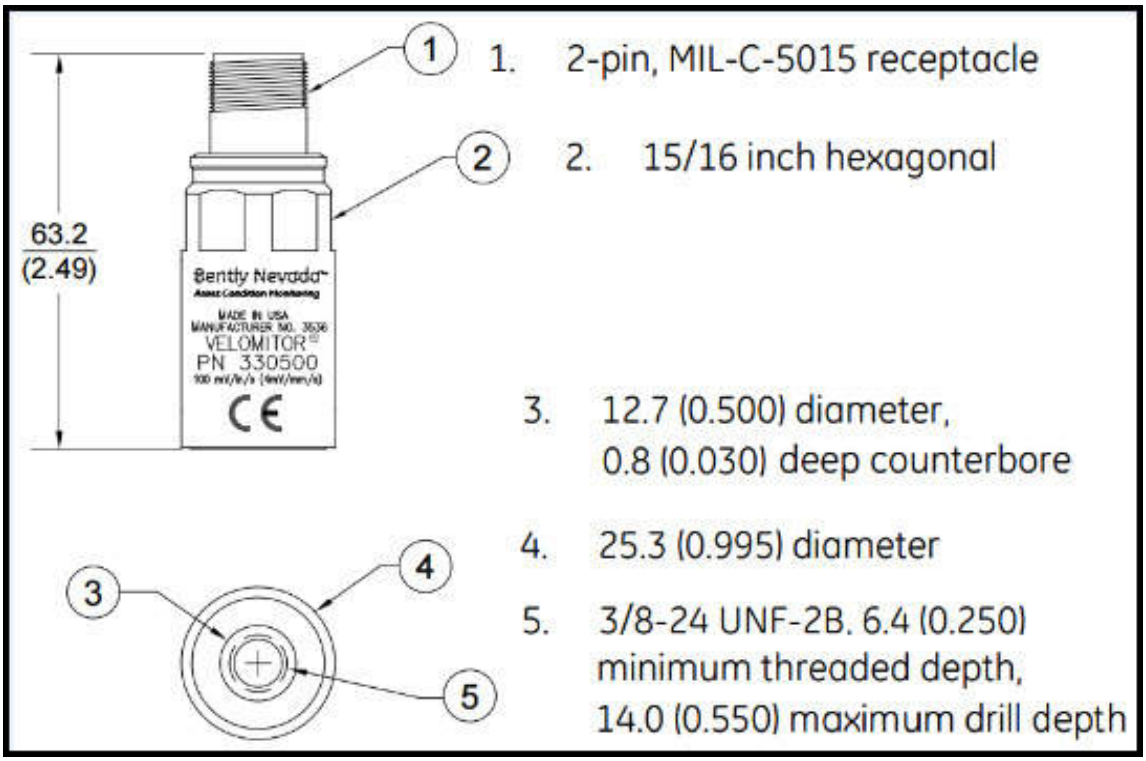


Figure 6: 330500 Velomitor

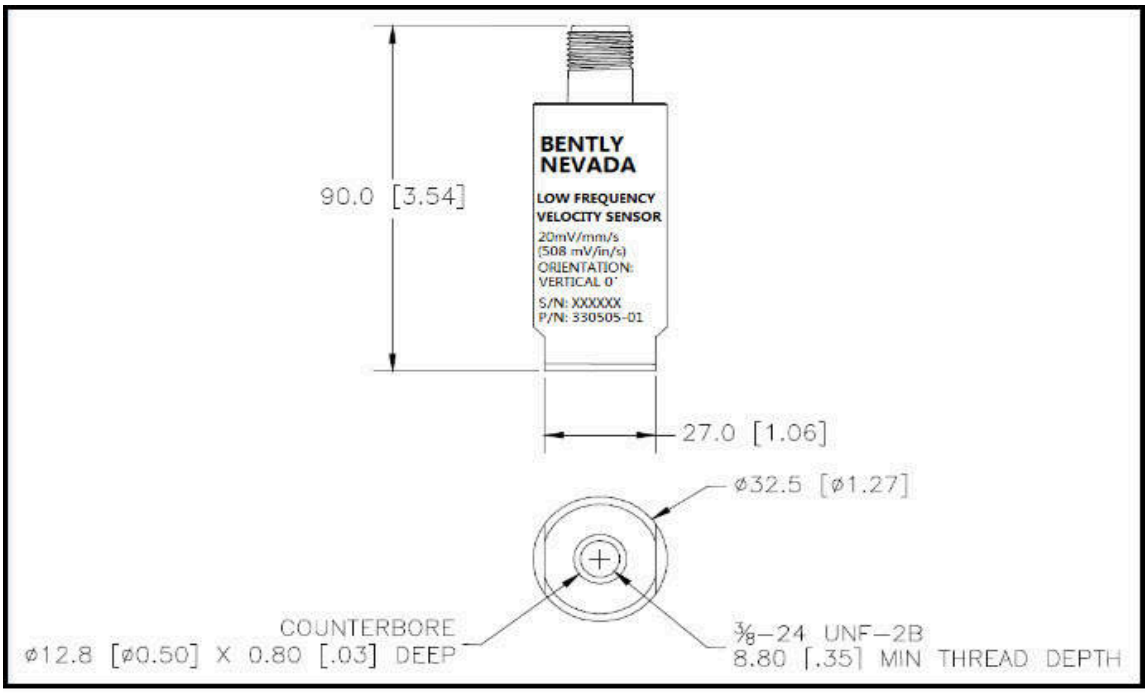


Figure 7: 330505 Velomitor

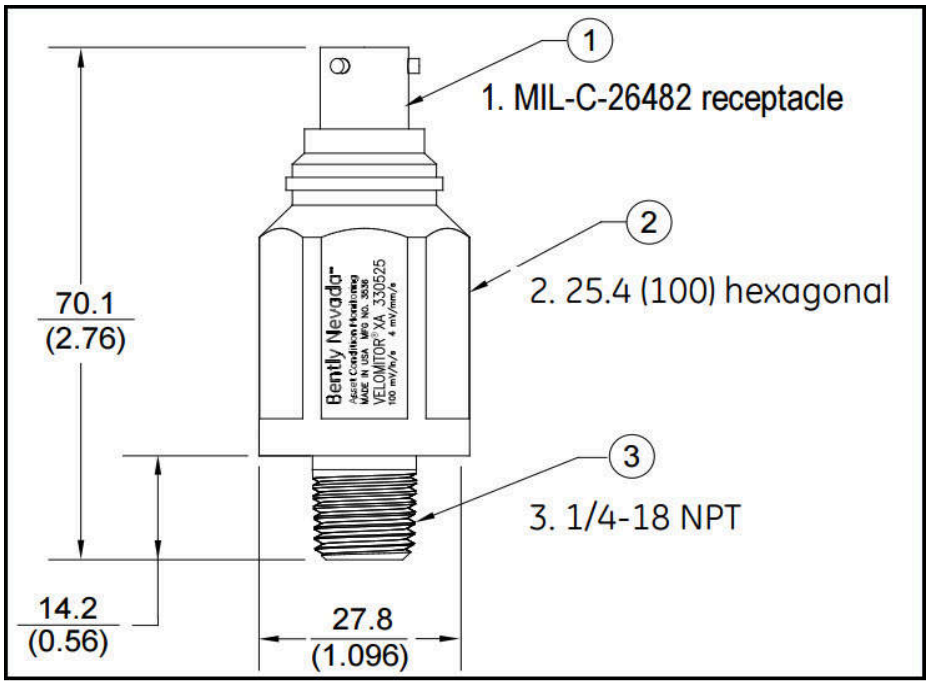


Figure 8: 330525 Velomitor

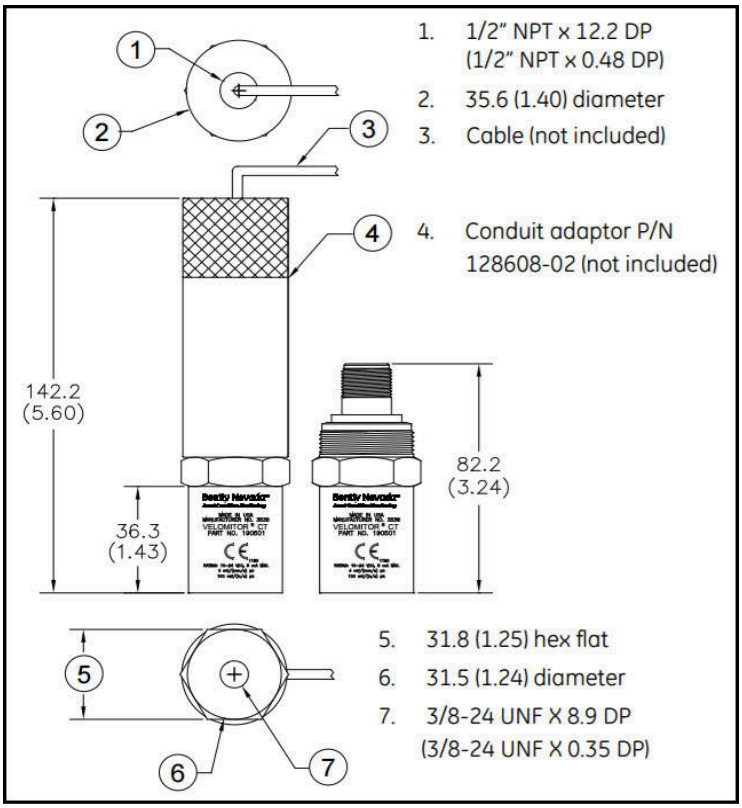


Figure 9: 190501 Velomitor

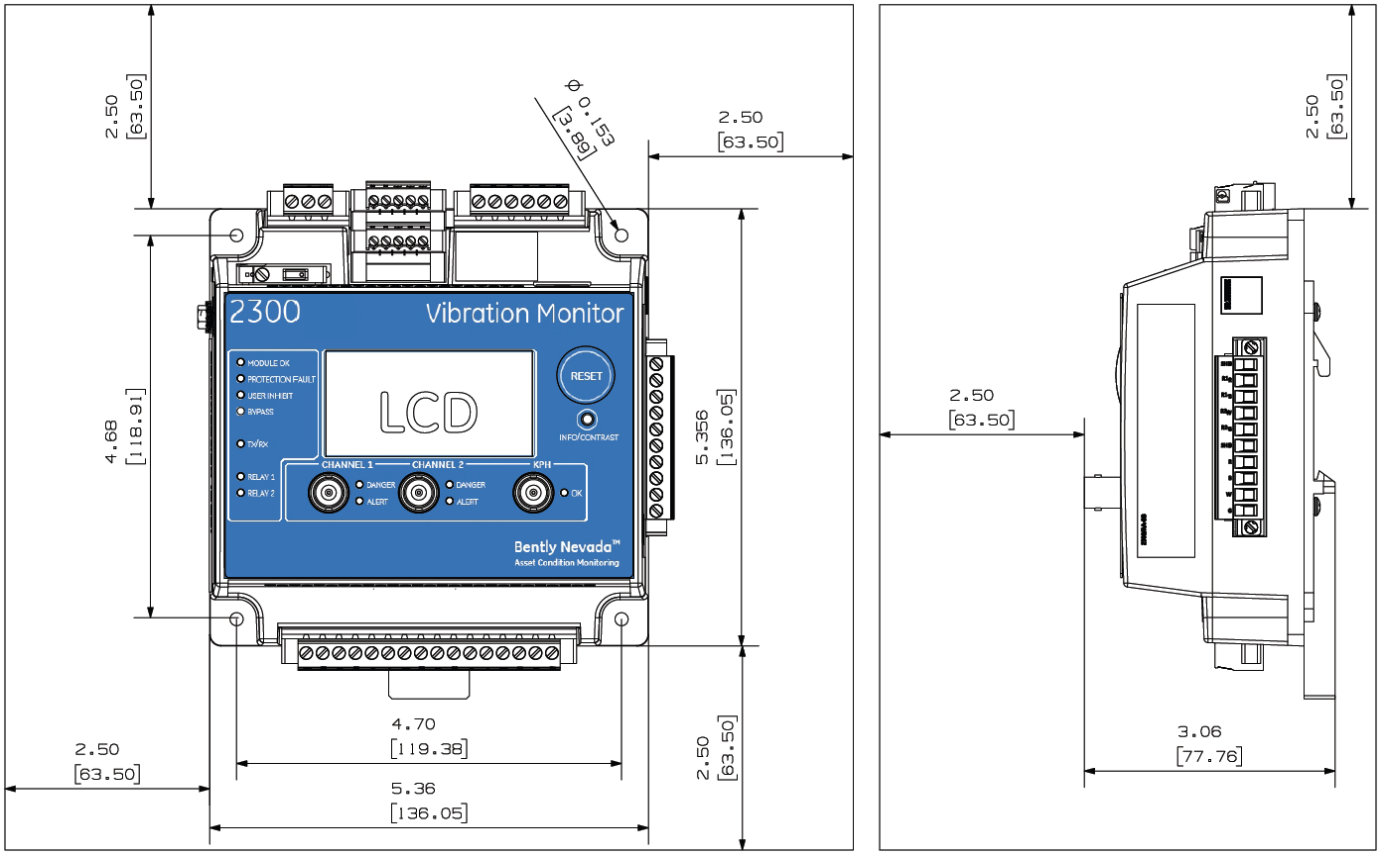


Figure 12: 2300 Series Monitor Recommended Clearance

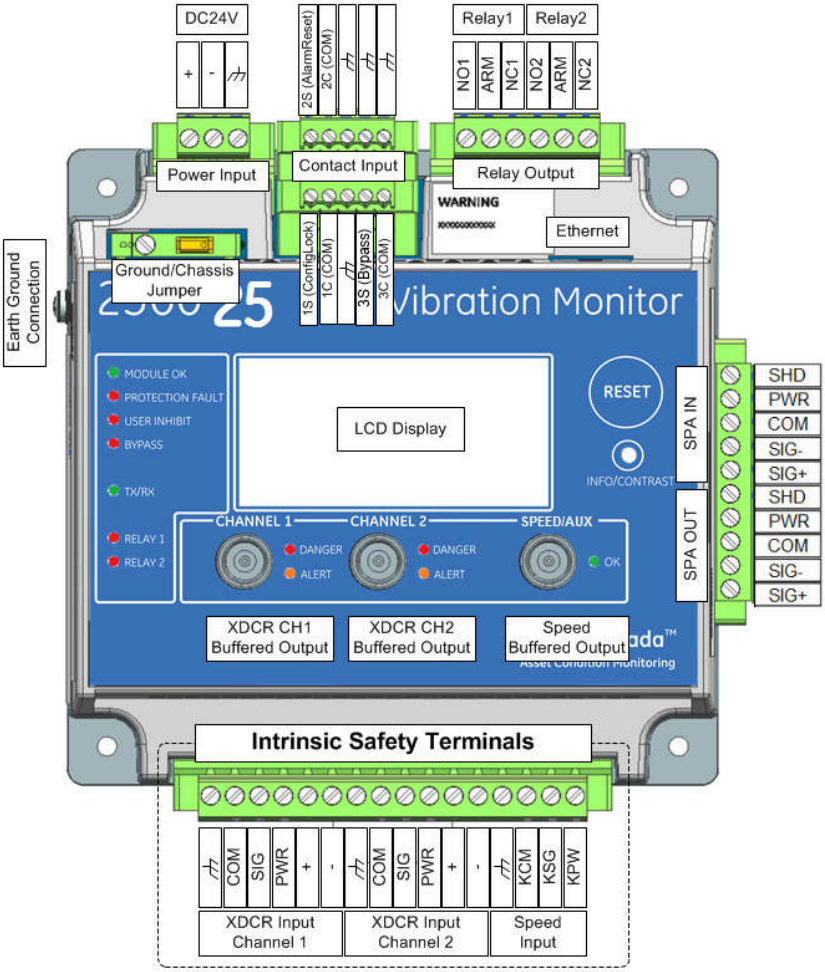


Figure 14: 2300/25 Wiring Diagram

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