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3300/55 Dual Velocity Monitor

Bently Nevada™ Asset Condition Monitoring

Description

The 3300/55 Dual Velocity Monitor provides two channels of continuous on-line machinery vibration monitoring. The monitor accepts inputs from one or two Velomitor® transducers, High Temperature Velomitor Systems (HTVS), or Velocity Seismoprobe® transducers without the need for interface modules.

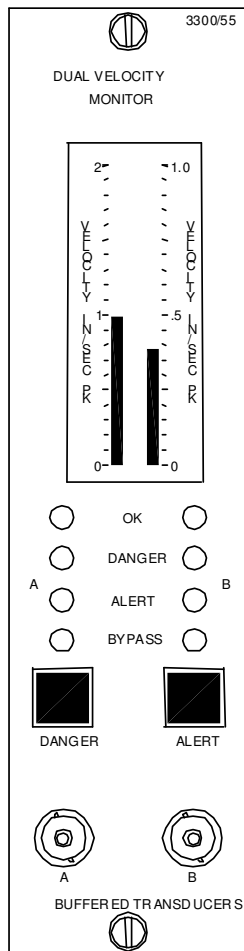
Flexibility is designed into the Dual Velocity Monitor. Many user-selectable options, such as high- and low-pass filter corner frequency options, can be easily (re)programmed in the field with plug-in jumpers.

Caution

If housing measurements are being made for overall protection of the machine, thought should be given to the usefulness of the measurement for each application. Most common machine malfunctions (imbalance, misalignment, etc.) originate at the rotor and cause an increase (or at least a change) in rotor vibration. In order for any housing measurement alone to be effective for overall machine protection, a significant amount of rotor vibration must be faithfully transmitted to the bearing housing or machine casing, or more specifically, to the mounting location of the transducer.

In addition, care should be exercised in the physical installation of the transducer. Improper installation can result in a decrease of the transducer amplitude and frequency response and/or the generation of signals that do not represent actual machine vibration.

Upon request, we can provide engineering services to determine the appropriateness of housing measurements for the machine in question and/or to provide installation assistance.



Specifications

Inputs

Signals:

Accepts signals from one or two Bently Nevada Velomitor transducers or 2-wire velocity Seismoprobe® transducers. (See Ordering Information for specifics).

Sensitivity:

500 mV/in/s, 145 mV/in/s, or
100 mV/in/s, jumper-programmable.

Power:

Nominal consumption of 1.5 Watts.

Signal Conditioning

Frequency Response:

(Without Filters).

Velocity Seismoprobe:

3 - 10,000 Hz (180-600,000 cpm);
-3dB nominal.

HTVS and Velomitor:

3 - 3,000 Hz (180-180,000 cpm);
-3dB nominal.

Note: Velomitor and HTVS options have built-in low pass filter to limit gain at high frequencies.

Filter Corner Frequencies:

High-pass can be selected from one of 450 frequencies, from 3 - 400 Hz (180 - 24,000 cpm). Low-pass can be selected from one of 500 frequencies, from 24 - 3000 Hz (1440 - 180,000 cpm). Corner frequencies are nominally -3dB down from the passband center frequency.

Filter Quality:

High-pass 2-pole (40 dB per decade, 12 dB per octave). Low-pass 2-pole (40 dB per decade, 12 dB per octave).

Integration:

Integration can be user-selected per channel except when the rms options are used (hence, not available with the 04 or 08 channel input options). The buffered displacement output signal has a scale factor of 200 mV/mil (8 V/mm).

Accuracy:

Specified at ambient temperature of +25°C (+77°F).

Within ±0.33% of full-scale typical,

±1% maximum, exclusive of rms circuitry, integration and filters.

±2% maximum, 2X Trip Multiply

±3% maximum, 3X Trip Multiply

Outputs

Recorder:

User-programmable for +4 mA to +20 mA, 0 Vdc to -10 Vdc, or

+1 Vdc to +5 Vdc. Voltage or current outputs are proportional to programmed monitor full-scale. Individual recorder outputs are provided for each channel. Monitor operation is unaffected by short circuits on recorder outputs.

Recorder accuracy (in addition to signal conditioning accuracy):

All specified at +25°C (+77° F).

+4 to +20 mA: ±0.7% of signal, ±0.09 mA offset.

+1 to +5 Vdc: $\pm 1.1\%$ of signal, ± 10 mV offset.

0 to -10 Vdc: $\pm 1.1\%$ of signal, ± 15 mV offset.

Output Impedance (voltage outputs):

100 Ω . Minimum load resistance is 10 k Ω .

Voltage Compliance (current outputs):

0 to +12 Vdc range across load. Load resistance is 0 to 600 Ω when using +4 to +20 mA option.

Buffered Transducer Outputs:

One coaxial connector per channel on front panel and one terminal connection per channel on rear panel. All are short-circuit protected. Outputs are jumper-programmable for filtered or unfiltered, velocity or displacement with peak-to-peak options.

Alarms

Alarm Setpoints:

Both alarms (Alert and Danger) are digitally adjustable from 0 to 100% of full-scale and can be set within LCD resolution ($\pm 1.6\%$) to desired level. Once set, alarms are repeatable within $\pm 0.39\%$ of full-scale.

Relay Modules

Location:

One alarm relay module can be installed behind each monitor. At least one relay module must be ordered with each 3300 System.

Displays

Meter:

Nonmultiplexing vertical bargraph type Liquid Crystal Display (LCD). Individual 63-segment LCD per channel. LCD also displays error codes and monitor ADJUST mode.

Resolution:

Within $\pm 1.6\%$ of monitor full-scale.

Size:

83 mm (3.25 in), (vertical dimension).

LED Indicators

OK:

One green LED per channel when ON, indicates OK condition of monitor, transducers, and field wiring. When OFF, a NOT OK condition or a Channel Bypassed (red Bypass LED ON) is indicated. OK LED flashing at 1 Hz indicates channel has been NOT OK, but is now OK (if Timed OK/Channel Defeat is programmed). OK LED flashing at 5 Hz indicates error code(s) stored in memory.

Bypass:

Two red LEDs indicate status of Danger Bypass and Rack/Channel Bypass functions (individually per channel). LEDs flash when monitor is in Trip Multiply mode.

Environmental Limits

Operating Temperature:

0°C to +65°C (+32°F to +150°F).

Storage Temperature:

-40°C to +85°C (-40°F to +185°F).

Relative Humidity:

To 95%, noncondensing.

CE Mark Directives

EMC Directive

Certificate of Conformity: 158710

Low Voltage Directive

Certificate of Conformity: 135300

Hazardous Area Approvals


CSA/NRTL/C

Class I, Div 2
Groups A, B, C, D
T4 @ Ta = +65 °C

Certification Number

150368 – 1002151 (LR 26744)

ATEX

 II 3 G
EEx nC[L] IIC
T4 @ Ta = -20°C to +60°C

When installed per document number 132577-01.

Certification Number

BN26744C-55A

Physical

Rack Space Requirements:

One rack position (any position except 1 and 2, which are reserved for the Power Supply and System Monitor, respectively).

Weight:

1 kg (2.2 lbs.).

Ordering Information

For spares, order the complete catalog number as described below. This includes a front panel assembly, monitor PWAs with sheet metal, and appropriate relay module. This unit is optioned, tested and ready to install in your system. Spare relay modules can be ordered separately.

Dual Velocity Monitor

3300/55-AXX-BXX-CXX-DXX-EXX-FXX-GXX-HXX

Factory-set Option Descriptions

A: Channel Input Option

- 01** Dual Velocity Inputs: Channels A & B indicate in peak velocity.
- 02** Dual Velocity Inputs: Channel A indicates in peak velocity units, Channel B indicates in peak-to-peak displacement.
- 03** Dual Velocity Inputs: Channels A & B indicate in peak-to-peak displacement.
- 04** Dual Velocity Inputs: Channels A & B indicate in rms velocity.
- 05** Single Velocity Input: Channels A & B indicate in peak velocity.
- 06** Single Velocity Input: Channel A indicates in peak velocity units, Channel B indicates in peak-to-peak displacement.
- 07** Single Velocity Input: Channels A & B indicate in peak-to-peak displacement.
- 08** Single Velocity Input: Channels A & B indicate in rms velocity.

B: Transducer Type Option

- 01** 9200 or 74712, 500 mV/in/s (2-wire, 10 kΩ input impedance).
- 02** 47633 or 86205, 500 mV/in/s (2-wire, 24.9 kΩ input impedance)
- 03** 145 mV/in/s (CEC 4-126)
- 04** Velomitor 100 mV/in/s
- 05** HTVS 145 mV/in/s

Note: The transducer voltage must be selected for 24 Vdc in the power supply when the Velomitor or HTVS option is used.

C: Channel A Full-scale Range Option

- 01** 0 - 0.5 in/s pk
- 02** 0 - 1 in/s pk

Specifications and Ordering Information
Part Number 141516-01
Rev. H (06/07)

- 03 0 - 2 in/s pk
- 04 0 - 5 mils pp
- 05 0 - 10 mils pp
- 06 0 - 20 mils pp
- 07 0 - 0.5 in/s rms
- 08 0 - 1 in/s rms
- 09 0 - 2 in/s rms
- 11 0 - 10 mm/s pk
- 12 0 - 20 mm/s pk
- 13 0 - 50 mm/s pk
- 14 0 - 100 µm pp
- 15 0 - 200 µm pp
- 16 0 - 500 µm pp
- 17 0 - 10 mm/s rms
- 18 0 - 20 mm/s rms
- 19 0 - 50 mm/s rms

Internal Safety Barrier option is not available with the Velomitor, HTVS, or with Quad Relays.

G: Alarm Relay Option

- 00 No Relays (Velocity Seismoprobe)
- 01 Epoxy-sealed (Velocity Seismoprobe)
- 02 Hermetically-sealed (Velocity Seismoprobe)
- 03 Quad Relay (four relays per monitor Epoxy-sealed only) (Velocity Seismoprobe)
- 04 No Relays (Velomitor)
- 05 Epoxy-sealed (Velomitor)
- 06 Hermetically-sealed (Velomitor)
- 07 Quad Relay (Velomitor)
- 08 No Relays (HTVS)
- 09 Epoxy-sealed (HTVS)
- 10 Hermetically-sealed (HTVS)
- 11 Quad Relay (HTVS)
- 12 Spare Monitor-No SIM/SIRM

Notes:

At least one relay module must be ordered with each 3300 System. If one common relay module per system has been ordered, all monitors of this type must be jumper programmed at the factory to activate a relay bus. Order SCK (Special Configuration Kit) 157555-128 for bus one or 157555-129 for bus two.

Agency Approval places limitations on the relay module. Refer to the Relay Module data sheet for information.

D: Channel B Full-scale Range Option

- 01 0 - 0.5 in/s pk
- 02 0 - 1 in/s pk
- 03 0 - 2 in/s pk
- 04 0 - 5 mils pp
- 05 0 - 10 mils pp
- 06 0 - 20 mils pp
- 07 0 - 0.5 in/s rms
- 08 0 - 1 in/s rms
- 09 0 - 2 in/s rms
- 11 0 - 10 mm/s pk
- 12 0 - 20 mm/s pk
- 13 0 - 50 mm/s pk
- 14 0 - 100 µm pp
- 15 0 - 200 µm pp
- 16 0 - 500 µm pp
- 17 0 - 10 mm/s rms
- 18 0 - 20 mm/s rms
- 19 0 - 50 mm/s rms

E: Agency Approval Option

- 00 Not Required
 - 01 CSA/NRTL/C
 - 02 ATEX self certification
- Note:** ATEX approval requires the monitor rack be installed in a weatherproof housing.

F: Intrinsic Safety Barriers

- 00 None
- 01 External (01, 02, 03 Transducer types)
- 02 Internal (01, 02, 03 Transducer types)
- 03 External (04, 05 Transducer types)

Notes:

External Safety Barriers must be ordered separately.

H: Trip Multiply Option

- 00 None
- 01 2X
- 02 3X

Spare Relay Module Assemblies

(Order the option in parenthesis for ATEX approved spares)

84137-01(02)

Seismic No Relays

84143-01(02)

Seismic Dual Epoxy Relays

84149-01(02)

84154-01(02)	Seismic Dual Hermetic Relays	6 seconds
88844-03(06)	Seismic Quad Relays	Nonlatching Latching
88844-02(05)	Seis No Relays, Int Barriers	Note: If Timed OK/Channel Defeat is enabled, OK Mode must be nonlatching.
88844-01(04)	Seis Dual Epoxy Relays, Int Barriers	Alert Mode Option Latching Nonlatching
130731-01(02)	Seis Dual Hermetic Relays, Int Bar	
130730-01(02)	Velomitor No Relays	Danger Mode Option Latching Nonlatching
130733-01(02)	Velomitor Dual Epoxy Relays	
130732-01(02)	Velomitor Dual Hermetic Relays	Danger Bypass Option Disabled Enabled
130735-01(02)	Velomitor Quad Relays	
130734-01(02)	HTVS No Relays	Recorder Outputs Option +4 to +20 mA +1 to +5 Vdc 0 to -10 Vdc
130737-01(02)	HTVS Dual Epoxy Relays	
130736-01(02)	HTVS Dual Hermetic Relays	Recorder Clamping Option (+4 to +20 mA only with Timed OK/Channel Defeat enabled)
	HTVS Quad Relays	Not OK = 4 mA Not OK = 2 mA

Field-programmable Options

These options are field-programmable via plug-in jumpers. **Bold text** indicates options as shipped from the factory.

First Out Option

Enabled

Disabled

Alarm Time Delay Option

1 second

3 seconds

Danger Relay Voting Option

OR voting for relay drive

AND voting for relay drive

Note: For Quad relays, AND voting must be done externally by wiring the contacts in series.

High-pass Filter Option for Channel A

None
450 corner frequencies from 3 to 400 Hz (180 to 24,000 cpm)

**High-pass Filter
Option for
Channel B**

None
450 corner frequencies from 3 to 400 Hz (180 to 24,000 cpm)

**Low-pass Filter
Option for
Channel A**

None
500 corner frequencies from 24 to 3000 Hz (1440 to 180,000 cpm)

**Low-pass Filter
Option for
Channel B**

None
500 corner frequencies from 24 to 3000 Hz (1440 to 180,000 cpm)



Caution

The Timed OK/Channel Defeat function may not prevent generation of alarms caused by Velocity Seismoprobe wiring faults under worst-case conditions. For applications where false trip protection is critical, it is recommended that two transducers be used with AND voting in the monitor. This will minimize the possibility of a single transducer and/or wiring fault from generating false monitor alarms.

**Timed
OK/Channel
Defeat Option**

Enabled
Disabled

Notes:

1. If Timed OK/Channel Defeat is enabled, OK Mode must be nonlatching.

2. For applications that monitor reciprocating equipment, it is recommended that Timed OK/Channel Defeat be Disabled.

**Channel A
Integrator/
Filter
Positioning**

Integrator after filtering
Integrator before filtering

**Channel B
Integrator/
Filter
Positioning**

Integrator after filtering
Integrator before filtering

**Channel A
Buffered
Transducer
Output**

Unfiltered
Filtered

Note: For an integrated signal, this option can be selected only when the integrator/gain stage is before the filtering stage or when no filtering is performed.

**Channel B
Buffered
Transducer
Output**

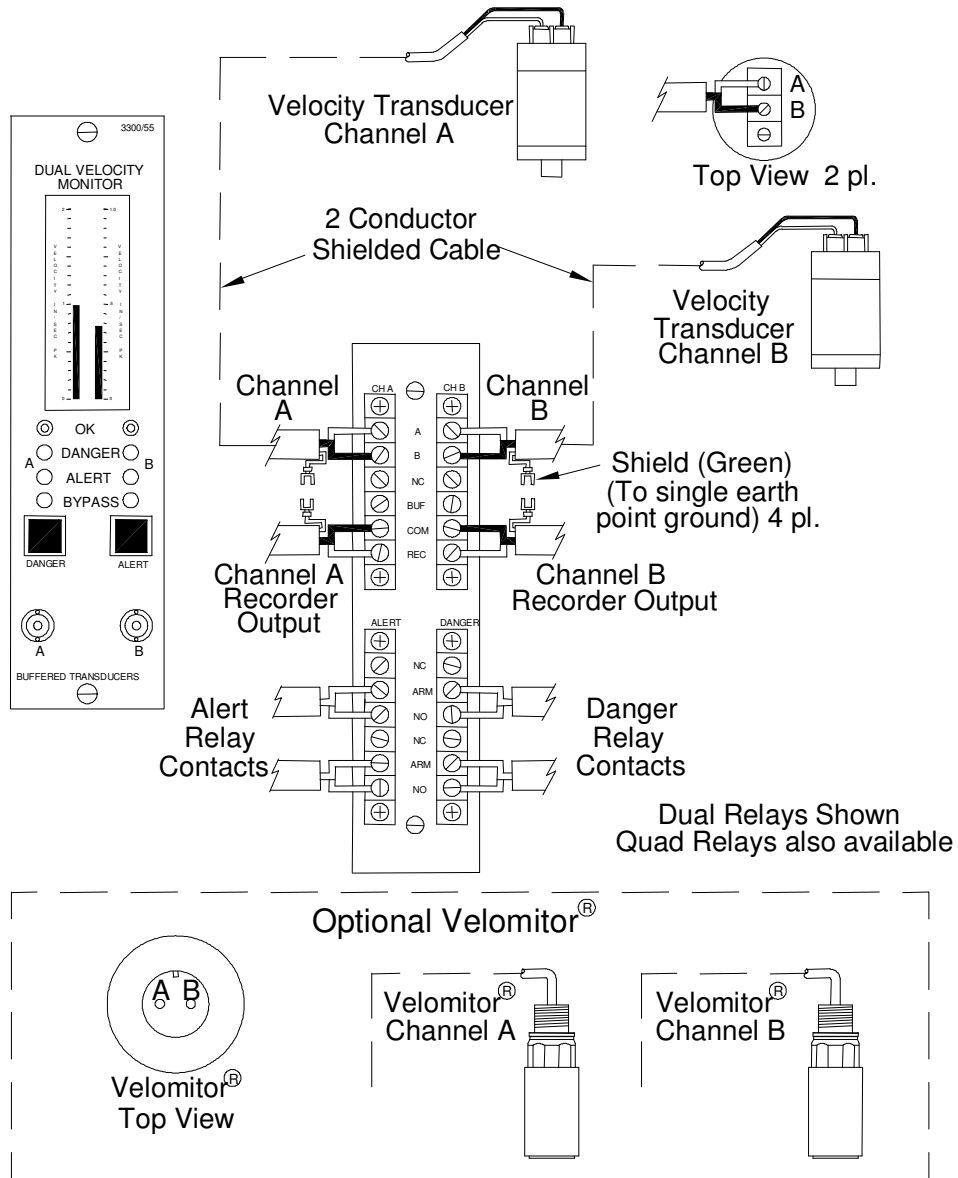
Unfiltered
Filtered

Accessories

02245000	9200, 74712, 86205 External Barrier
02295055	HTVS or Velomitor External Barrier
02200214	Surge Protector

Field wiring diagrams

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