3500/42E Vibration Monitor

Bently Nevada* Asset Condition Monitoring

Description

The 3500/42E Vibration Monitor is a 4-channel monitor that accepts input from proximity and seismic transducers, conditions the signal to provide various vibration and position measurements, and compares the conditioned signals with user-programmable alarms. The user can program each channel of the 3500/42E using the 3500 Rack Configuration Software to perform any of the following functions:

- Radial Vibration

- Thrust Position

- Differential Expansion

- Shaft Absolute

- Eccentricity

- Acceleration

- Velocity

3500 ENCORE series is available in two configurations:

3500 ENCORE Rack Upgrade: In this configuration the 3500/42E is installed as part of a 3500 ENCORE upgrade of a 3300 Monitor System where the 3300 chassis and IO remain in place. When used in a rack upgrade the monitor is limited to two channels and uses the pre-existing 3300 series IO Module and the relays located on the 3300 series IO.

3500 ENCORE System: In this configuration there will be a 3500 ENCORE System Rack with 3500 ENCORE IO modules. 3500/42Es that are used in a 3500 ENCORE rack have all four channels available. Monitor channels are programmed in pairs and can perform up to two of the monitoring functions at a time. Channels 1 and 2 can perform one function, while channels 3 and 4 perform another (or the same) function.
Monitors in 3500 ENCORE Systems use a logic programmable Relay Module to drive alarm relays.

The primary purpose of the 3500/42E monitor is to provide:

1. Machinery protection by continuously comparing monitored parameters against configured alarm setpoints to drive alarms.

2. Essential machine information for both operations and maintenance personnel.

Each channel, depending on configuration, typically conditions its input signal to generate various parameters called "static values". The user can configure Alert setpoints for each active static value and Danger setpoints for any two of the active static values.

Specifications

Inputs

Signal

Accepts from 1 to 4 proximity, velocity or acceleration transducer signals.

Input Impedance

10 kΩ (Proximitor and Acceleration Inputs).

Power Consumption

6.8W Typical

Sensitivity

Radial Vibration

3.94 mV/μm (100 mV/mil), or

7.87 mV/μm (200 mV/mil).

Thrust

3.94 mV/μm (100 mV/mil), or

7.87 mV/μm (200 mV/mil).

Eccentricity

3.94 mV/μm (100 mV/mil), or

7.87 mV/μm (200 mV/mil).

Differential Expansion

0.394 mV/μm (10 mV/mil), or

0.787 mV/μm (20 mV/mil).

Acceleration

10 mV/(m/s^2) (100 mV/g).

Velocity

20 mV/(mm/s) pk (500 mV/(in/s) pk), or

5.8 mV/(mm/s) pk (145 mV/(in/s) pk), or

4 mV/(mm/s) pk (100 mV/(in/s) pk).

Outputs

Front Panel LEDs

OK LED

Indicates when the 3500/42E is operating properly.

DANGER LED

Indicates the 3500/42E has detected a danger condition and is driving the danger alarm.

ALERT LED

Indicates the 3500/42E has detected an Alert condition and is driving the alert alarm.

Bypass LED

Indicates when the 3500/42E is in Bypass Mode.

Buffered Transducer Outputs

The front of each monitor has one coaxial connector for each channel. Each connector is short-circuit protected.

Output Impedance

499 Ω

Relay Contacts

In the case of a 3500 ENCORE Rack Upgrade, the 3500/42E will drive the relays for the various 3300 SIRM options.

Transducer Power Supply

-24 Vdc

Recorder

+4 to +20 mA. Values are proportional to monitor full-scale. The monitor provides individual recorder values for each channel. Monitor operation is unaffected by short circuits on recorder outputs.

*Voltage
Compliance
(current output)*

0 to +12 Vdc range across load. Load resistance is 0 to 600 Ω.

Resolution

0.3662 µA per bit

±0.25% error at room temperature

±0.7% error over temperature range.

Update rate 100 ms or less.

Signal Conditioning

Note: Specified at +25 ºC (+77 ºF) unless otherwise noted.

Radial Vibration

*Frequency
Response*

Direct filter

User-programmable, single-pole, -3db at 4 Hz to 4000 Hz or 1 Hz to 600 Hz, ± 1% accuracy.

Gap filter

-3 dB at 0.09 Hz.

Not 1X filter

60 cpm to 15.8 times running speed. Constant Q notch filter. Minimum rejection in stopband of -34.9 dB.

Smax

0.125 to 15.8 times running speed.

*1X and 2X
Vector filter*

Constant Q Filter. Minimum rejection in stopband of -57.7 dB.

Note: 1X & 2X Vector, Not 1X, and Smax parameters are valid for machine speeds of 60 cpm to 60,000 cpm.

Accuracy

*Direct and
Gap*

Exclusive of filtering, within ±0.33% of full-scale typical, ±1% maximum.

1X and 2X

Within ±0.33% of full-scale typical, ±1% maximum.

Smax

Within ±5% maximum.

Not 1X

±3% for machine speeds less than 30,000 cpm.

±8.5% for machine speeds greater than 30,000 cpm.

Thrust and Differential Expansion

*Frequency
Response*

Direct filter

-3 dB at 1.2 Hz.

Gap filter

-3 dB at 0.41 Hz.

Accuracy

Within ±0.33% of full-scale typical, ±1% maximum.

Eccentricity

*Frequency
Response*

Direct filter

-3 dB at 15.6 Hz.

Gap filter

-3 dB at 0.41 Hz.

Accuracy

Within ±0.33% of full-scale typical, ±1% maximum.

Acceleration II

*Frequency
Response*

Bias filter

-3 dB at 0.01 Hz

Not OK filter

-3 dB at 2400 Hz