

3500/53 Electronic Overspeed Detection System

Bently Nevada™ Asset Condition Monitoring

Description



The Bently Nevada™ Electronic Overspeed Detection System for the 3500 Series Machinery Detection System provides a highly reliable, fast response, redundant tachometer system intended specifically for use as part of an overspeed protection system. It is designed to meet the requirements of American Petroleum Institute (API) Standards 670 and 612 pertaining to overspeed protection.

3500/53 modules can be combined to form a 2-out-of-2 or a 2-out-of-3 (recommended) voting system.

The Overspeed Detection System requires the use of a 3500 rack with redundant power supplies.



imagination at work

Specifications and Ordering Information

Part Number 141539-01

Rev. B (03/07)

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Specifications

Inputs

Signal:

Each Overspeed Detection module accepts a single transducer signal from a proximity probe transducer or magnetic pickup. The input signal range is +10.0 V to -24.0 V. The module internally limits signals that exceed this range.

Input Impedance:

20 k Ω .

Power Consumption:

8.0 watts, typical.

Transducers:

Bently Nevada 3300 8 mm
Proximity 3300 16 mm HTPS,
7200 5 mm, 8 mm, 11 mm, and 14
mm Proximity; 3300 RAM
Proximity, or Magnetic pickups.

Outputs

Front Panel LEDs

OK LED:

Indicates when the 3500/53 Module is operating properly.

TX/XR LED:

Indicates when the 3500/53 Module is communicating with other modules in the 3500 rack.

Bypass LED:

Indicates when the 3500/53 Module is in Bypass Mode.

Test Mode LED:

Indicates when the 3500/53 is in Test Mode.

Alarm LEDs:

Indicates that an alarm condition has occurred with the associated relay.

Buffered Transducer Outputs:

The front of each module has one coaxial connector for buffered output. Each connector is short circuit and ESD protected.

Output Impedance:

550 Ω .

Transducer Power Supply:

-24 Vdc, 40 mA maximum.

Recorder:

+4 to +20 mA. Values are proportional to module full-scale range (rpm). Module operation is unaffected by short circuits on recorder output.

Voltage Compliance (current output):

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

Resolution:

0.3662 μ A per bit $\pm 0.25\%$ error at room temperature $\pm 0.7\%$ error over temperature range. Update rate approximately 100 ms.

Relays

Type:

Single-pole, double-throw (SPDT) relays.

Environmental Sealing:

Epoxy sealed.

Arc Suppressors:

250 Vrms, installed as standard.

Contact Ratings

Max switched power:	Transducer Conditioning		
dc: 120 W	Auto Threshold:		
ac: 600 VA.	Use for any input above 0.0167 Hz (1 rpm for 1 event/revolution). Minimum signal amplitude for triggering is 1 volt peak-to-peak.		
Resistive Load	Manual Threshold:		
Max switched current:	User selectable from +9.9 Vdc to -23.9 Vdc. Minimum signal amplitude for triggering is 500 millivolts peak-to-peak.		
5A	Hysteresis:		
Min switched current:	User selectable from 0.2 to 2.5 volts.		
100 mA @ 5 Vdc	Alarms		
Max switched voltage:	Alarm Setpoints:		
dc: 30 Vdc	Under and Over Alert levels (setpoints) can be set for speed. In addition, a Danger (Overspeed) setpoint can be set for speed. All alarm setpoints are set using software configuration. Alarms are adjustable and can normally be set from 0 to 100% of full-scale of speed full-scale range.		
ac: 250 Vac.			
Contact Life:	Alarm Time Delays:		
100,000 @ 5 A, 24 Vdc or 120 Vac.	Less than 30 ms above 300 Hz.		
Operation:	Proportional Values		
Each relay is switch selectable for Normally De-energized or Normally Energized.	Proportional values are speed measurements used to monitor a machine. The Overspeed Detection Module returns the following proportional values:		
Signal Conditioning	Overspeed Speed:		
Specified at +25 °C (+77 °F).	The primary value for the channel. This value can be included in contiguous registers in the Communications Gateway Module.		
Frequency Response	Peak Speed:		
Speed Input:	Peak Speed proportional values are for display purposes only. No		
The 3500 Overspeed Protection Module will support from 1 to 255 events per revolution with a maximum full-scale range of 99,999 rpm and a maximum input frequency of 20 kHz. Minimum input frequency for proximity transducers is 0.0167 Hz (1 rpm for 1 event/revolution) and for passive magnetic pickups is 3.3 Hz.			
RPM Accuracy:			
Less than 100 rpm = ± 0.1 rpm, 100 to 10,000 rpm = ±1 rpm, 10,000 to 99,999 rpm = ± 0.01%.			

alarming is provided for Peak Speed.

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:

95%, non-condensing.

CE Mark Directives

EMC Directives:

EN50081-2:

Radiated Emissions
EN 55011, Class A
Conducted Emissions
EN 55011, Class A

EN50082-2:

Electrostatic Discharge
EN 61000-4-2, Criteria B
Radiated Susceptibility
ENV 50140, Criteria A
Conducted Susceptibility
ENV 50141, Criteria A
Electrical Fast Transient
EN 61000-4-4, Criteria B
Surge Capability
EN 61000-4-5, Criteria B
Magnetic Field
EN 61000-4-8, Criteria A
Power Supply Dip
EN 61000-4-11, Criteria B
Radio Telephone
ENV 50204, Criteria B

Low Voltage Directives:

EN 61010-1

Safety Requirements

Hazardous Area Approvals

CSA/NRTL/C

Approval Option (01)

Class I, Div 2
Groups A, B, C, D
T4 @ Ta = -20 °C to +65 °C
(-4 °F to +150 °F)

Certification Number

CSA 150268-1002151 (LR 26744)

Physical

Monitor Module

Dimensions (Height x Width x Depth):

241.3 mm x 24.4 mm x 241.8 mm
(9.50 in x 0.96 in x 9.52 in).

Weight:

0.82 kg (1.8 lb.).

I/O Modules

Dimensions (Height x Width x Depth):

241.3 mm x 24.4 mm x 99.1 mm
(9.50 in x 0.96 in x 3.90 in).

Weight:

0.45 kg (1.0 lb.).

Rack Space Requirements

Monitor Module:

1 full-height front slot/per channel.

I/O Modules:

1 full-height rear slot/per channel.

Ordering Considerations

General

If the 3500/53 is added to an existing 3500 System the following firmware and software versions (or later) are required:

3500/20 Module Firmware – Revision G
3500/01 Software – Version 2.00
3500/02 Software – Version 2.03
3500/03 Software – Version 1.13

The use of redundant power supplies in a 3500 rack containing the Overspeed Detection System is required.

Ordering Information

Electronic Overspeed Detection System

3500/53-AXX-BXX

A: Channel Option

0 2 Two Channel System
0 3 Three Channel System

B: Agency Approval Option

0 0 None
0 1 CSA/NRTL/C

Spares

133388-01

3500/53 Overspeed Detection
Module

133396-01

Overspeed Detection I/O Module

04425545

Grounding Wrist Strap (single use)

04400037

IC Removal Tool

134129-01

Firmware IC

00580438

Connector Header, Internal
Termination, 4-position, Green

00580436

Connector Header, Internal
Termination, 6-position, Green

00580432

Connector Header, Internal
Termination, 10-position, Green

134939-01

3500/53 Overspeed Detection
Manual