

3500/42M Proximator/Seismic Monitor



Description

The 3500/42M Proximator®/Seismic 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 3500/42M using the 3500 Rack Configuration Software to perform any of the following functions:

- Radial Vibration
- Thrust Position
- Differential Expansion
- Eccentricity
- REBAM®
- Acceleration
- Velocity
- Shaft Absolute
- Circular Acceptance Region

Note: The monitor channels are programmed in pairs and can perform up to two of these functions at a time. Channels 1 and 2 can perform one function, while channels 3 and 4 perform another (or the same) function.

The primary purpose of the 3500/42M 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

Standard I/O

10 k Ω (Proximity® and Acceleration Inputs).

TMR I/O

The effective impedance of three Bussed TMR I/O channels wired in parallel to one transducer is 50 k Ω .

Power Consumption

7.7 Watts, typical.

Sensitivity

Radial Vibration

3.94 mV/ μ m (100 mV/mil) or
7.87 mV/ μ m (200 mV/mil).

Thrust

3.94 mV/ μ m (100 mV/mil) or
7.87 mV/ μ m (200 mV/mil).

Eccentricity

3.94 mV/ μ m (100 mV/mil) or
7.87 mV/ μ m (200 mV/mil).

Differential Expansion

0.394 mV/ μ m (10 mV/mil) or
0.787 mV/ μ m (20 mV/mil).

REBAM®

40 mV/ μ m (1000 mV/mil) or
80 mV/ μ m (2000 mV/mil).

Acceleration and Acceleration²

10 mV/(m/s²) (100 mV/g).

Velocity and Velocity²

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).

Shaft Absolute, Radial Vibration

3.94 mV/ μ m (100 mV/mil) or
7.87 mV/ μ m (200 mV/mil).

Shaft Absolute, Direct

3.94 mV/ μ m (100 mV/mil) or
7.87 mV/ μ m (200 mV/mil).

Shaft Absolute, 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).

Circular Acceptance Region

See Radial Vibration.

Outputs

Front Panel LEDs

OK LED

Indicates when the 3500/42M is operating properly.

TX/RX LED

Indicates when the 3500/42M is communicating with other modules in the 3500 rack.

Bypass LED

Indicates when the 3500/42M 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

550 Ω

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

Shaft Absolute Buffered Outputs

The Shaft Absolute I/O modules have one output for each channel group. Each output is short-circuit protected.

Shaft Absolute Output Impedance

300 Ω

Signal Conditioning

Note: Specified at +25 °C (+77 °F) unless otherwise noted

Radial Vibration

Frequency Response

Direct filter

User-programmable, 4 Hz to 4000 Hz or 1 Hz to 600 Hz.

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

Within $\pm 0.33\%$ of full-scale typical, $\pm 1\%$ maximum.

1X and 2X

Within $\pm 0.33\%$ of full-scale typical, $\pm 1\%$ maximum.

Smax

Within $\pm 5\%$ maximum.

Not 1X

$\pm 3\%$ for machine speeds less than 30,000 cpm.

$\pm 8.5\%$ 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 $\pm 0.33\%$ of full-scale typical, $\pm 1\%$ maximum.

Eccentricity

Frequency Response

Direct filter

-3 dB at 15.6 Hz.

Gap filter

-3 dB at 0.41 Hz.

Accuracy

Within $\pm 0.33\%$ of full-scale typical, $\pm 1\%$ maximum.

Acceleration

Frequency Response

The following table shows the frequency ranges if both channels of a channel pair are enabled:

Output Type	Without Filter	Low- or High-Pass Filter	With Integration
RMS	10 to 30,000 Hz	10 to 9,155 Hz	10 to 9,155 Hz
Peak	3 to 30,000 Hz	3 to 9,155 Hz	10 to 9,155 Hz

The following table shows the frequency ranges if a single channel is enabled for a channel pair.

Output Type	Without Filter, Low- or High-Pass Filter	With Integration
RMS	10 to 30,000 Hz	10 to 14,500 Hz
Peak	3 to 30,000 Hz	10 to 14,500 Hz

Filter quality

High-Pass

Ex nCAL[L] IIC
T4 @ Ta = -20°C to +65°C
(-4°F to +150°F)

Note: When used with Internal Barrier I/O Module, refer to specification sheet 141495-01 for approvals information.

Physical

Monitor Module (Main Board)

*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

0.91 kg (2.0 lbs.).

I/O Module (non- barrier)

*Dimensions (Height
x Width x Depth)*

241.3 mm x 24.4 mm x 91.1 mm
(9.50 in x 0.96 in x 3.90 in).

Weight

0.20 kg (0.44 lbs.).

I/O Module (barrier)

*Dimensions (Height
x Width x Depth)*

241.3 mm x 24.4 mm x 163.1 mm
(9.50 in x 0.96 in x 6.42 in).

Weight

0.46 kg (1.01 lbs.).

Rack Space Requirements

Monitor Module

1 full-height front slot.

I/O Modules

1 full-height rear slot.

Ordering Information

General

The 3500/42M Module requires the following (or later) firmware, and software revisions:

3500/01 Software – Version 2.50

3500/02 Software – Version 2.20

3500/03 Software – Version 1.21

External Termination Blocks cannot be used with Internal Termination I/O Modules.

When ordering I/O Modules with External Terminations the External Termination Blocks and Cable must be ordered separately for each I/O Module.

Bussed External Termination Blocks are to be used with TMR I/O Modules only.

Internal Barrier I/O Modules

The 3500 Internal Barrier specification sheet (part number 141495-01) should be consulted if the Internal Barrier Option is selected.

Shaft Absolute

The Shaft Absolute Channel Type requires the following (or later) firmware and software revisions:

3500/42M Module Firmware – Revision B

3500/01 Software – Version 2.61

DM2000 Software - Version 3.10.

Requires the M version of the 3500 Proximitor®/Seismic Monitor.

REBAM®

The REBAM® channel type requires the following (or later) firmware, and software revisions:

3500/40M Module Firmware – Revision 2.1

3500/01 Software – Version 3.30

3500/02 Software – Version 2.40

3500/03 Software – Version 1.40

DM2000 Software - Version 3.40.

Requires the M version of the 3500 Proximitor® Monitor.

Acceleration II

The Acceleration II channel type requires the following (or later) firmware, and software revisions:

3500/42M Module Firmware – Revision 2.10

3500/01 Software – Version 3.20

DM2000 Software - Version 3.30.

128015-08	Proximator®/Velomitor® External Termination Block (Terminal Strip connectors).	00530843	TMR I/O Module with External Terminations
Cables			
3500 Transducer (XDCR) Signal to External Termination (ET) Block Cable		143489-01	3500/42M Prox/Seismic I/O Module four-pin connector shunt
129525 -AXXXX-BXX			3500/42M Monitor Manual
A: Cable Length		135489-01	
	0 0 0 5 5 feet (1.5 metres)		
	0 0 0 7 7 feet (2.1 metres)		
	0 0 1 0 10 feet (3.0 metres)		
	0 0 2 5 25 feet (7.6 metres)	135489-02	
	0 0 5 0 50 feet (15.2 metres)		
	0 1 0 0 100 feet (30.5 metres)		
B: Assembly Instructions		135489-03	
	0 1 Not assembled		I/O Module with Internal Barriers (Internal Terminations) (4 x Prox/Accel).
	0 2 Assembled		
3500 Recorder Output to External Termination (ET) Block Cable			
129529 -AXXXX-BXX		138708-01	I/O Module with Internal Barriers (Internal Terminations) (2 x Prox/Accel + 2 x Velomitor®)
A: Cable Length			
	0 0 0 5 5 feet (1.5 metres)		
	0 0 0 7 7 feet (2.1 metres)	138700-01	
	0 0 1 0 10 feet (3.0 metres)		
	0 0 2 5 25 feet (7.6 metres)		
	0 0 5 0 50 feet (15.2 metres)	00517018	
	0 1 0 0 100 feet (30.5 metres)		
B: Assembly Instructions		140471-01	
	0 1 Not assembled		Shaft Absolute I/O Module with Internal Terminations
	0 2 Assembled		
Spares		140482-01	
140734-02			
	3500/42M Proximator®/Seismic Monitor	00561941	Prox/Velom I/O Module with External Terminations
128229-01			
	Prox/Seismic I/O Module with Internal Terminations	00580434	3500/42M Prox/Velom I/O Module ten-pin connector shunt
128240-01			
	Prox/Seismic I/O Module with External Terminations	00580432	Internal I/O Module connector header, Euro style, 8-pin. Used on I/O modules 128229-01 and 138708-01.
126632-01			