

3500/64 Dynamic Pressure Monitor

Bently Nevada* Asset Condition Monitoring

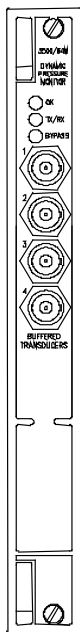
Description

The 3500/64 Dynamic Pressure Monitor is a single slot, 4-channel monitor that accepts input from various high temperature pressure transducers and uses this input to drive alarms. The monitor's one proportional value per channel is bandpass dynamic pressure. The 3500 Rack Configuration Software will configure the bandpass corner frequencies, along with an additional notch filter, if needed. The monitor provides a recorder output for control system applications.

The primary purpose of the 3500/64M 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 typically conditions its input signal into various parameters called "proportional values". The user can configure Alert and Danger setpoints for each active proportional value.



imagination at work

Specifications and Ordering Information
Part Number 141536-01
Rev. H (01/12)

Specifications

Inputs

Signal:

Accepts from 1 to 4 pressure transducer signals.

3 Wire Transducer Input Impedance:

10K Ω

2 Wire Transducer Input Impedance:

1.5M Ω with 3.5M Ω typical

Sensitivity

Dynamic Pressure:

100 mV/psi (1.45mV/mBar)

Outputs

Front Panel LED's:

OK LED:

Indicates when the 3500/64 is operating properly

TX/RX LED:

Indicates when the 3500/64 is communication with other modules in the 3500 rack.

Bypass LED:

Indicates when the 3500/64 is in the Bypass Mode.

Buffered Transducer

Outputs:

The front of each monitor has one coaxial connector for each channel. Each connector is short circuit protected. 1-> All "Cascade Mode" does not cascade the buffered transducer outputs

Output Impedance:

550 Ω

Transducer Supplies:

3 wire:

-24 Vdc

2 wire:

3.3 mA current source @ 22 Vdc (nominal)

Recorder Outputs:

+4 to +20 mA. Values are proportional to monitor full scale. Individual recorder values are provided 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

0.366uA per bit $\pm 0.25\%$ error at room temperature, -0.66 to +0.70% error over temperature range. Updated at 100 mS or less.

Signal Conditioning

Dynamic Pressure

Direct Filter

"Low Mode" 5Hz. To 4KHz*

"High Mode" 10Hz to 14.75KHz (Fixed Low Pass)

*if no LP filter is chosen, this extends to approximately 5.285KHz

"Low" and "High" filtering modes are options on a channel pair basis. It is possible to select different band pass options on each channel of a channel pair; however, the channels within the pair must

operate in the same filtering mode. Channels 1 and 2 form a pair and channels 3 and 4 form the other pair.

In addition, the signal processing can be set up so that the monitor feeds **ONLY** the channel 1 input to all four channels. This is "Cascade Mode" (denoted 1->ALL in the 3500 Configuration Software). In "Cascade Mode" the filter mode option selections are still on a channel pair basis. "Cascade Mode" was designed so that one transducer could be used to provide input to four channels for different filtering requirements. This allows four separate bandpass filter options and four separate full-scale ranges to be configured with just one transducer input.

The two modes of filtering provide different "qualities" of filtering.

LOW MODE:

Filter Quality:

High Pass

10-pole (200dB per decade, 60 dB per octave)

Low Pass (LP):

10-pole (200dB per decade, 60 dB per octave)

Fixed Low Pass:

(LP = none)

-78 dB minimum attenuation in the stop band.

HIGH MODE:

Filter Quality:

High Pass (HP):

Low Pass (LP):

6-pole (120 dB per decade, 36 dB per octave)-65 dB minimum attenuation in the stop band.

Line Rejection (Notch) Filter:

The line rejection filter has two settings, 50 or 60 Hz. Filter response and Center frequency selections are valid for both settings.

Filter Quality Response:

- 0.175 dB (98%) of Full Scale; at Center Frequency of +2 Hz And above
- 0.175 dB (98%) of Full Scale; at Center Frequency of -2 Hz and below
- 35 dB (1.8%) of Full Scale; from -0.5 Hz of Center Frequency to +0.5 Hz of Center Frequency

Alarms

Alarm Setpoints:

Alert and Danger levels are selectable for the direct values measured by the monitor. All alarm setpoints are set using 3500 Configuration software. Alarms are adjustable and can normally be set from 0 to 100% of Full Scale. The exception is when the full scale exceeds the range of the transducer, in which case the setpoint will be limited to the range of the transducer.

Alarm Time Delays:

Alarm time delays can be programmed using 3500 Configuration software. From 1 to 60 seconds, in 1 second intervals.

Alert:

From 1 to 60 seconds, in 1 second intervals.

Danger:

0.1 Seconds minimum and then from 1 to 60 seconds in 0.1 intervals.

Proportional Values

Dynamic Pressure Direct**

This is the primary value for each channel

Environmental Limits

Temperature:

-30 °C to 65 °C (-22 °F to 149 °F)
operating.

Humidity

95% non-condensing

Compliance and Certifications

EMC

Standards:

EN 61000-6-2 Immunity for Industrial Environments
EN 55011/CISPR 11 ISM Equipment
EN 61000-6-4 Emissions for Industrial Environments

European Community Directives:

EMC Directive 2004/108/EC

Electrical Safety

Standards:

EN 61010-1

European Community Directives:

2006/95/EC Low Voltage

Hazardous Area Approvals

North American

Approval Option (01)

Class 1, Div 2
Groups A, B, C, D
T4 @ Ta = -20 °C to +65 °C
(-4 °F to +150 °F)

North American

Approval Option (02)

Ex nC[L] IIC
Class 1, Zone 2
Class 1, Div 2, Groups A, B, C, D
T4 @ Ta -20 °C to +65 °C
(-4 °F to +150 °F)

ATEX:

Approval Option (02)

For Selected Ordering Options
with ATEX/North American
agency approvals:

 II 3/(3) G

Ex nCAL[L] IIC

T4 @ Ta = -20 °C to +65 °C

(-4 °F to +150 °F)

Brazil

Approval Option (02)

For Selected Ordering Options
with ATEX/North American
agency approvals:

BR-Ex nC [nL] IIC T4

T4 @ Ta = -20 °C to +65 °C

(-4 °F to +150 °F)

South Africa

Approval Option (02)

For Selected Ordering Options
with ATEX/North American
agency approvals:

Ex nCAL [ia] IIC T4

Ex nCAL [L] IIC T4

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.

For further certification and approvals information please visit the
following website:

www.ge-mcs.com/bently

Physical

Monitor Module (Main Board)

Dimensions (Height x Width x Depth):

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

Weight:

0.82 kg (1.8 lb.).

**I/O Modules
(non-barrier)****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:**

0.20 kg (0.44 lb.).

**I/O Modules
(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 lb.).

Ordering Information**Dynamic Pressure Module****3500/64-AXX-BXX****A: I/O Module Type**

- | | |
|------------|--|
| 0 1 | I/O Module with Internal Termination |
| 0 2 | I/O Module with External Termination's |

B: Agency Approval Option

- | | |
|------------|-----------------------------|
| 0 0 | None |
| 0 1 | CSA/NRTL/C (Class 1, Div 2) |
| 0 2 | ATEX/CSA (Class 1, Zone 2) |

Note: Agency Approval Option B 02 is only available with Ordering Option;A 01.

External Termination (ET) Blocks**128015-09**Dynamic Pressure ET Block,
(Terminal Strip connectors)**125808-09**Dynamic Pressure ET Block, (Euro
Style connectors)**128710-01**Recorder Out ET Block,(Terminal
Strip connectors)**128702-01**Recorder Out ET Block, (Euro Style
connectors)

Cables**3500 Dynamic Pressure Signal to ET Block Cable****129525-AXXX-BXX****Option Descriptions****A: Cable Length**

- | | |
|----------------|------------------------|
| 0 0 0 5 | feet (1.5 metres) |
| 0 0 0 7 | feet (2.1 metres) |
| 0 0 1 0 | 10 feet (3 metres) |
| 0 0 2 5 | 25 feet (7.5 metres) |
| 0 0 5 0 | 50 feet (15 metres) |
| 0 1 0 0 | 100 feet (30.5 metres) |

B: Assembly Instructions

- | | |
|------------|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

3500 Recorder Output to ET Block Cable**129529-AXXX-BXX****A: Cable Length**

- | | |
|----------------|------------------------|
| 0 0 0 5 | feet (1.5 metres) |
| 0 0 0 7 | 7 feet (2.1 metres) |
| 0 0 1 0 | 10 feet (3 metres) |
| 0 0 2 5 | 25 feet (7.5 metres) |
| 0 0 5 0 | 50 feet (15 metres) |
| 0 1 0 0 | 100 feet (30.5 metres) |

B: Assembly Instructions

- | | |
|------------|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

Spares**176449-05**3500/64 Dynamic Pressure
Module**140471-02**

I/O Module, Internal Termination

140482-02

I/O Module, External Termination

143729-01Cylinder Pressure I/O, Internal
Termination

04425545

Grounding Wrist Strap

04400037

IC Removal Tool

00580434

Connector Header, Int..
Termination, 8 position, Green

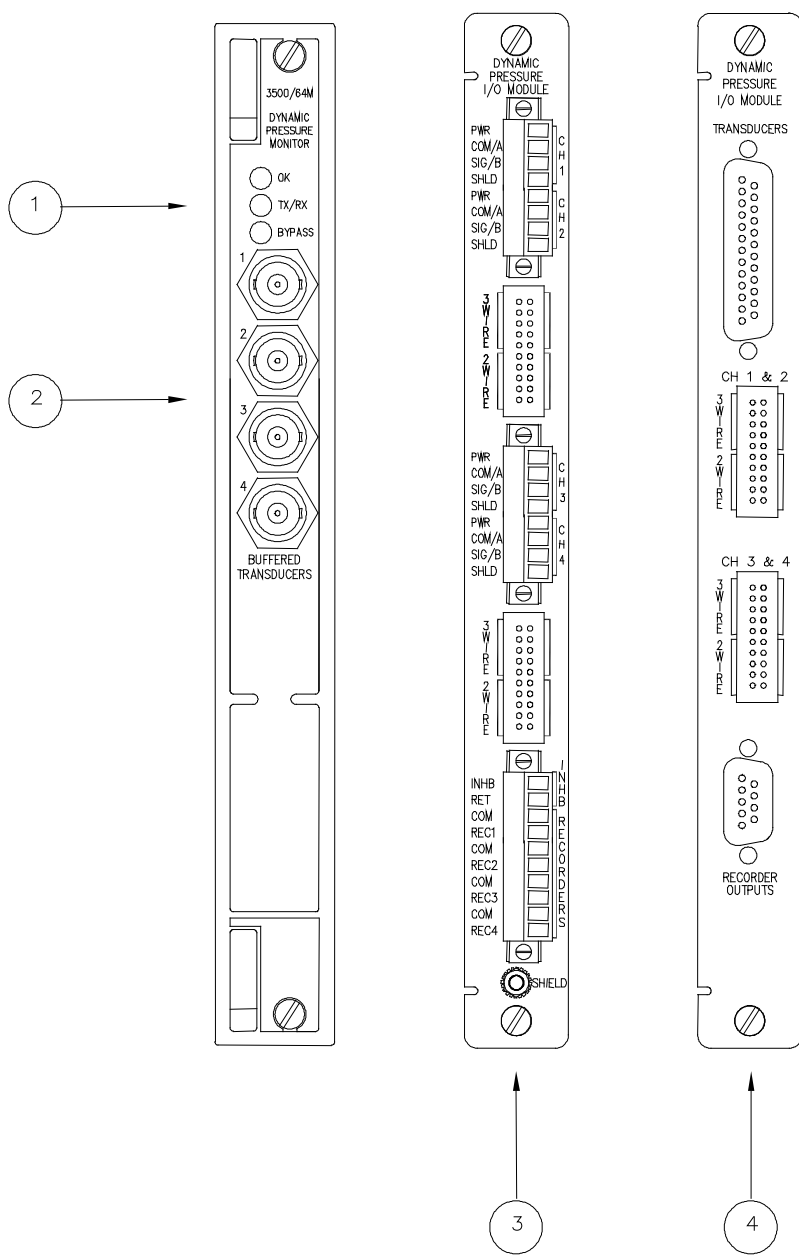
00580436

Connector Header, Int..
Termination, 6 position, Green

00502133

Connector Header, Int..
Termination, 12 position, Blue

Graphs and Figures



- 1. Status LED's
- 2. Buffered Transducer Outputs
- 3. I/O Module, Internal Terminations
- 4. I/O Module, External Terminations

Figure 1: Front and rear views of the Dynamic Pressure Module

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