

3500/77M Recip Cylinder Pressure Monitor



Description

The 3500/77M Recip Cylinder Pressure Monitor is a 4-channel monitor that accepts input from Bently Nevada approved pressure transducers, conditions the signal to make various reciprocating compressor cylinder pressure measurements, and compares the conditioned signals with user-programmable alarms.

The primary purpose of the 3500/77M monitor is to provide:

- Machinery protection by continuously comparing monitored parameters against configured alarm setpoints to drive alarms.
- Essential machine information for both operations and maintenance personnel.

Each channel, depending on configuration, typically conditions its input signal into various parameters called "proportional values," also referred to as PPL's. Alert setpoints can be configured for each active proportional value (PPL) and danger setpoints can be configured for any two of the active proportional values.

Each channel of the 3500/77M will provide eight PPL values that relate to cylinder pressure operation. Five PPL values relate to a single chamber and are as follows:

- Discharge Pressure
- Suction Pressure
- Maximum Pressure
- Minimum Pressure
- Compression Ratio
- Three PPL values use one or more channel's values in combination with configured mechanical parameters to compute their value:
 - Peak Rod Compression
 - Peak Rod Tension
 - Degree of Rod Reversal



Specifications

Inputs

Signal:

Accepts from 1 to 4 channels of Bently approved positive voltage third party pressure transducers (psia)

Scale Factor

95,000 $\mu\text{V}/\text{psi}$ for 100 psia range*

38,000 $\mu\text{V}/\text{psi}$ for 250 psia range*

19,000 $\mu\text{V}/\text{psi}$ for 500 psia range*

9,500 $\mu\text{V}/\text{psi}$ for 1000 psia range*

3,800 $\mu\text{V}/\text{psi}$ for 2500 psia range*

1,900 $\mu\text{V}/\text{psi}$ for 5000 psia range*

950 $\mu\text{V}/\text{psi}$ for 10000 psia range*

*All pressure transducers will be supplied with scale factor specifications that include pressure/voltage values at two points. The above data assumes +0.5 Vdc at 0 psia and +10.0 Vdc at full-range.

Signal Conditioning

Frequency

Response

0 to 5.5 kHz on all configured pressure channels

Pressure

Accuracy

Within $\pm 0.5\%$ of pressure transducer full-range (9.5 volts: From +0.5 to +10.0 volts) @ +25°C

Within $\pm 1.0\%$ of pressure transducer full-range (9.5 volts: From +0.5 to +10.0 volts) over -30°C to +65°C

Proportional Values

Cylinder Pressure

Discharge Pressure, Suction Pressure, Maximum Pressure, Minimum Pressure, Compression Ratio, Peak Rod Compression, Peak Rod Tension, Degree of Rod Reversal

Input Impedance

Internal/ External

Termination

Cylinder Pressure

I/O:

50 k Ω

Power

Consumption

7.8 Watts, transducer supplies at full load.

Outputs

Front Panel LEDs

OK LED

Indicates when the 3500/77M is operating properly.

TX/RX LED

Indicates when the 3500/77M is communicating with other modules in the 3500 rack.

Bypass LED

Indicates when the 3500/77M 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.

Note: The Buffered Transducer Outputs on monitors using the Cylinder Pressure I/O module will be inverted and offset by -2.265 Vdc.

Output Impedance

550 Ω

Transducer Power

Supply

+23.0 \pm 0.8 Vdc with 24.5ma current limiting on each channel.

Environmental Limits

Operating Temperature

When used with

Internal/External

Termination Cylinder

Pressure I/O Module:

-30°C to +65°C (-22°F to +150°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

<i>EN50082-2 Electrostatic Discharge</i>	EN 61000-4-2, Criteria B
<i>Radiated Susceptibility</i>	ENV 50140, Criteria A
<i>Conducted Susceptibility</i>	ENV 50141, Criteria A
<i>Electrical Fast Transient</i>	EN 61000-4-4, Criteria B
<i>Surge Capability</i>	EN 61000-4-5, Criteria B
<i>Magnetic Field</i>	EN 61000-4-8, Criteria A
<i>Power Supply Dip</i>	EN 61000-4-11, Criteria B
<i>Radio Telephone</i>	ENV 50204, Criteria B

**Low Voltage
Directives**
EN 61010-1

Safety Requirements

Hazardous Area Approvals

CSA/NRTL/C

When used with Internal/External Termination I/O Module: Class I, Division 2, Groups A through D

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

0.91 kg (2.0 lbs.)

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

0.20 kg (0.44 lb.)

**Rack Space
Requirements**
Monitor Module

1 full-height front slot

I/O Modules

1 full-height rear slot

Ordering Information

Ordering Considerations

General

The 3500/77M Module requires the following (or later) firmware, and software revisions:

- 3500/77M Module Firmware – Revision L
- 3500/01 Software – Version 3.00
- 3500/02 Software – Version 2.30
- 3500/03 Software – Version 1.30

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 Cables must be ordered separately.

List of Options and Part Numbers

Cylinder Pressure Monitor

3500/77M-AXX-BXX

A: I/O Module Type

0 3 Cylinder Pressure I/O with Internal Terminations.

0 4 Cylinder Pressure I/O with External Terminations

B: Agency Approval Option

0 0 None

0 1 CSA/NRTL/C

External

Termination Blocks

125808-10

Cylinder Pressure External Termination Block (Euro Style connectors).

128015-10

Cylinder Pressure External Termination Block (Terminal Strip connectors).

3500 Transducer Signal to External Termination Block Cable

129525 -AXXXX-BXX

A: Cable Length

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 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

- 146282-01 3500/77M Monitor Manual.
- 140734-07 3500/77M Cylinder Pressure Monitor.
- 143729-01 Cylinder Pressure I/O Module with Internal Terminations for Bently Approved Third Party Pressure Transducers.
- 143737-01 Cylinder Pressure I/O Module with External Terminations for Bently Approved Third Party Pressure Transducers.
- 00580434 Internal I/O Module connector header, Euro Style, 8 pin. Used on I/O modules 143729-01.
- 00580441 Internal I/O Module connector header, Euro Style, 3 pin. Used on I/O modules 143729-01.
- 146973-01 Recip Multi-Event Wheel Kit.
- 145732-01 Recip Multi-Event Wheel.
- 146622-01 Recip Multi-Event Wheel Stud.
- 165855-XX Recip Cylinder Pressure Transducer.
(See 165855 data sheet)

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