3500/77M Recip Cylinder Pressure Monitor

Datasheet

Cordant™

147485 Rev. Y



Description

The Bently Nevada™ 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 pressure measurements for reciprocating compressors, 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 operations and maintenance personnel.

Depending on configuration, each channel typically conditions its input signal to provide various parameters called measured variables. Users can configure Alert setpoints for each active measured variable and Danger setpoints for any two of the active measured variables.

Each channel of the 3500/77M will provide eight measured variable values that relate to cylinder pressure operation. The five values that relate to a single chamber are as follows:

- Discharge Pressure
- Suction Pressure
- Maximum Pressure
- Minimum Pressure
- Compression Ratio

Baker Hughes

Specifications

Inputs

Signal	Accepts 1 to 4 channels of Bently Nevada approved positive voltage 3rd-party pressure transducers (psia)

Scale Factor

range†	95,000 mV/psi for 100 psia
range†	38,000 mV/psi for 250 psia
range†	19,000 mV/psi for 500 psia
range†	9,500 mV/psi for 1000 psia
range†	3,800 mV/psi for 2500 psia
range†	1,900 mV/psi for 5000 psia
range†	950 mV/psi for 10,000 psia

†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 the full-range psia value.

Signal Conditioning

Frequency Response	0 to 5.5 kHz on all configured pressure channels
Pressure Accuracy	Within ± 0.5% of pressure transducer full-range (9.5 Volts: From +0.5 to +10.0 Volts) @ +25°C (77° F) Within ± 1.0% of pressure transducer full-range (9.5 Volts: From +0.5 to +10.0 Volts) over –30°C to +65°C (-22°F to 150°F)

Measured Variables

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 kΩ
Power Consumption	7.8 Watts with 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.

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 ± 0.8 Vdc with 24.5 ma 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

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 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	0.20 kg (0.44 lb.)
Rack Space Requirements	
Monitor Module	1 full-height front slot
I/O Modules	1 full-height rear slot

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.

The lower limit for machine speed is 60 RPM in the standard product. For machine speeds down to 30 RPM, modification 135M8200-01 is required.

Ordering Information

For the detailed listing of country and product-specific approvals, refer to the *Approvals Quick Reference Guide (108M1756)*.

For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

Cylinder Pressure Monitor

3500/77M-AA-BB

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	cNRTLus
0 2	ATEX/IECEx/CSA

External Termination Blocks

Part Number	Description
125808-10	Cylinder Pressure External Termination Block (Euro Style connectors).
128015-10	Cylinder Pressure External Termination Block (Terminal Strip connectors).

Cable

3500 Transducer Signal to External Termination Block Cable

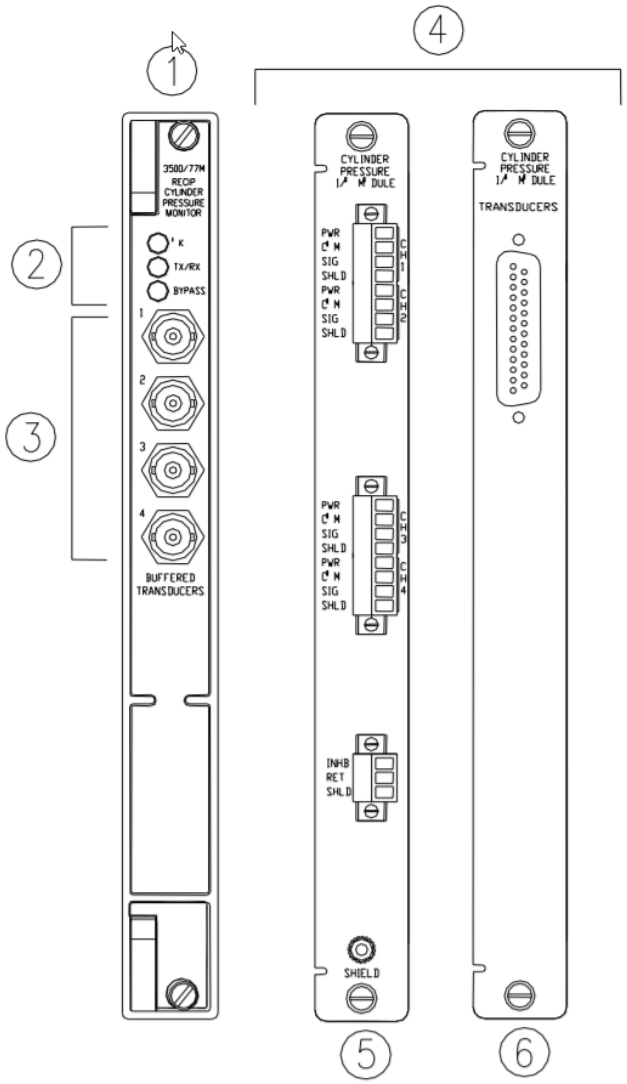
129525-AAAA-BB

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 and Accessories

Part Number	Description
176449-07	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)
283615	MTL 7796+ External Barrier (See Field Wiring Dwg 147729) (022000812 MTL 796(+) External Barrier is discontinued)
115M1270	Custom Band Type, dual track
114M1640	Custom Band Type, single track
111M8664-01	Installation manual for the band type
166M4363	Connector Header, Push-in-Spring Type (Alternative for PN 00580441)
166M2389	Connector Header, Push-in-Spring Type (Alternative for PN 00580434)

Graphs and Figures



1. Main 3500/77M Cylinder Pressure Monitor Module (front view).
2. Status LEDs.
3. Buffered transducer outputs. These provide an unfiltered output for each of the four transducers. All are short circuit protected.
4. I/O module rear views.
5. Cylinder Pressure I/O Module, Internal Termination.
6. Cylinder Pressure I/O Module, External Termination.

Figure 1: 3500/77M Front and Rear View