3500/25 Enhanced Keyphasor Module

Datasheet

Cordant™

141532 Rev. Y



Description

The Bently Nevada™ 3500/25 Enhanced Keyphasor Module is a half-height, two-channel module used to provide Keyphasor signals to the monitor modules in a 3500 rack. The module receives input signals from proximity probes or magnetic pickups and converts the signals to digital Keyphasor signals that indicate when the Keyphasor mark on the shaft coincides with the Keyphasor transducer. The 3500 Machinery Protection System can accept up to four Keyphasor signals for normal configuration and up to eight Keyphasor signals in a paired configuration.

Keyphasor signal is a once-per-turn or multiple-event-per-turn pulse from a rotating shaft or gear used to provide a precise timing measurement. This allows 3500 monitor modules and external diagnostic equipment to measure shaft rotative speed and vector parameters such as 1X vibration amplitude and phase.

The Enhanced Keyphasor Module is an improved 3500 system module. It offers expanded Keyphasor signal processing capabilities over the previous design while maintaining complete downward-compatibility in terms of form, fit and function with existing Keyphasor modules for use in legacy systems. The Keyphasor module, PWA 125792-01, is completely replaced by the updated 149369-01 module.

When a system Keyphasor input is required for Triple Modular Redundant (TMR) applications, the 3500 system should employ two Keyphasor modules. In this configuration, the modules work in parallel to provide both a primary and secondary Keyphasor signal to the other modules in the rack.

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Environmental Limits

Operating Temperature	-30°C to +65°C (-22°F to +150°F) when used with Keyphasor I/O Module other than the Internal Barrier version. 0°C to +65°C (32°F to +150°F) when used with Keyphasor Internal Barrier I/O Module (Internal Termination).
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
Humidity	95%, non-condensing

Physical

Main Module	
Dimensions Height x Width x Depth)	119.9 mm x 24.4 mm x 256.5 mm (4.72 in x 0.96 in x 10.10 in).
Weight	0.34 kg (0.76 lbs.)
I/O Module	
Dimensions (Height x Width x Depth)	241.3 mm x 24.4 mm x 103.1 mm (9.50 in x 0.96 in x 4.06 in)
Weight	0.46 kg (1.01 lbs.).

Rack Space Requirement

Main Module	1 half-height front slot The half-height main modules require a special mounting adapter for mounting in the full-height slots. The user can place the main modules in any one of the 14 available slots. Each rack may have no more than two main modules, one in a top half-slot and one in a bottom half-slot.
I/O Modules	1 full-height rear slot

Ordering Considerations

General

- External Termination (ET) 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.
- There are many technical considerations involved in using the expanded signal processing functions of the Enhanced Keyphasor Module. A qualified Bently Nevada sales representative should be consulted prior to specifying or ordering modules for such applications.

Internal Barrier I/O Module

Consult the 3500 Internal Barrier specification sheet document (141495) if the Internal Barrier Option is selected.

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.

Enhanced Keyphasor Module

3500/25-AA-BB-CC

A: Number of channels	
01	Single half-height 2-channel Keyphasor card (order for 2-channels)
02	Two half-height 2-channel Keyphasor cards (order for 4-Channels)
B: Type of I/O Module	
01	I/O module with Internal Terminations
02	I/O module with External Terminations
03	Internal Barrier I/O with Internal Terminations
04	Isolated I/O module with Internal Terminations (Designed for use with Magnetic Pickups)
05	Isolated I/O module with External Terminations (Designed for use with Magnetic Pickups)
C: Agency Approval Option	
00	Not required
01	cNRTLus (Class 1, Div 2)
02	ATEX/IECEx/CSA (Class 1 Zone 2)

External Termination Blocks

128718-01	Keyphasor External Termination Block (Euro Style Connectors)
128726-01	Keyphasor External Termination Block (Terminal Strip Connectors)

Cables

3500 Keyphasor (KPH) Signal to External Termination (ET) Block Cable

129530-AAAA-BB

A:Cable Length	
0005	5 feet (1.5 metres)
0007	7 feet (2.1 metres)
0010	10 feet (3 metres)
0025	25 feet (7.5 metres)
0050	50 feet (15 metres)
0100	100 feet (30.5 metres)
B: Assembly Instructions	
01	Not assembled
02	Assembled

Spares

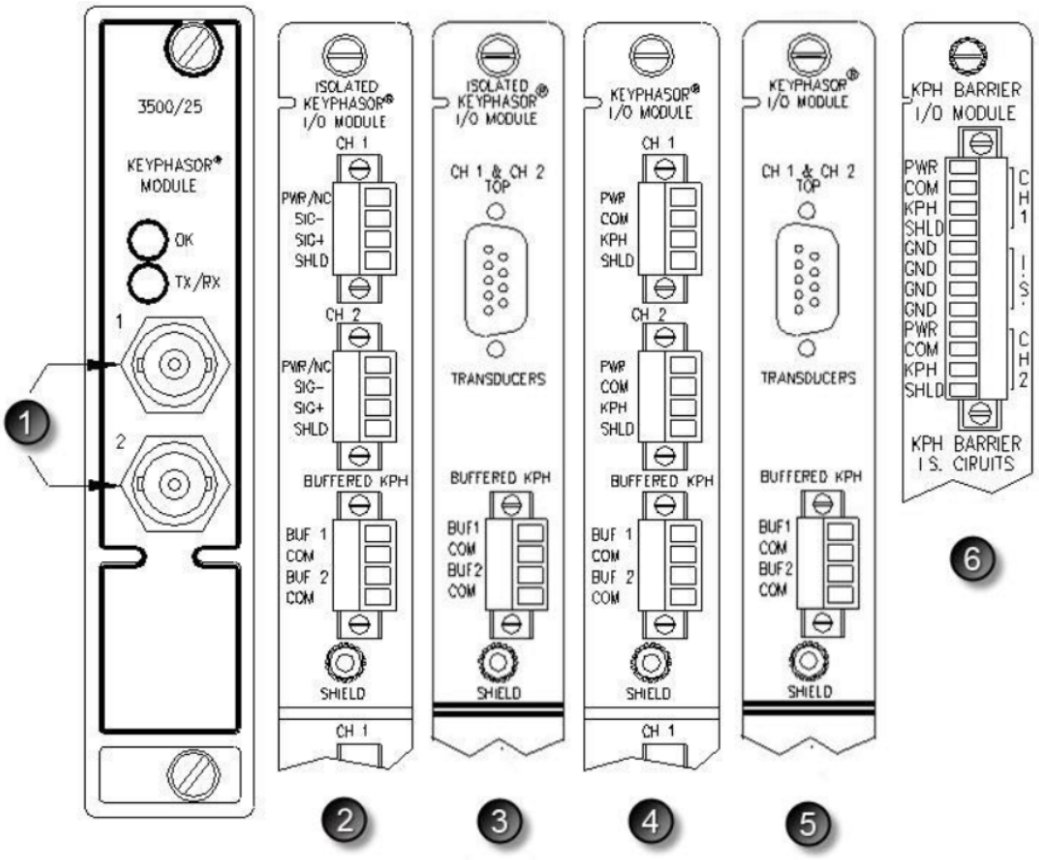
149369-01	Enhanced Keyphasor Module

This module may be ordered as a direct plug-in replacement for Keyphasor Module 125792-01.

125800-01	Keyphasor I/O Module (Internal Terminations)
126648-01	Keyphasor I/O Module (External Terminations)
125800-02	Isolated Keyphasor I/O Module (Internal Terminations) (Designed for use with Magnetic Pickups)
126648-02	Isolated Keyphasor I/O Module (External Terminations) (Designed for use with Magnetic Pickups)
135473-01	Keyphasor I/O Module (Internal Barriers and Internal Terminations.
04425545	Grounding Wrist Strap (single use)
00580438	Connector Header, Internal Termination, 4-Position, Green
166M2391	Connector Header, Push-in-Spring Type (alternative for PN 00580438)
00502133	Connector Header, Internal Termination, 12-Position, Blue
129770	Keyphasor Module User Guide
Half-height Blank Monitor Cover Kit	
131151-01	Half-height Blank Front Panel Cover (qty 1, includes screws)

Half-height Card Adapter

125388-01	Half-height Chassis
125565-01	Card Guide
04300111	Assembly Screws (Order Qty. 3)



1. Buffered Transducer Outputs
2. I/O Module, Isolated Internal Termination
3. I/O Module, Isolated External Termination
4. I/O Module, Non-Isolated Internal Termination
5. I/O Module, Non-Isolated External Termination
6. Barrier I/O Module, Internal Termination

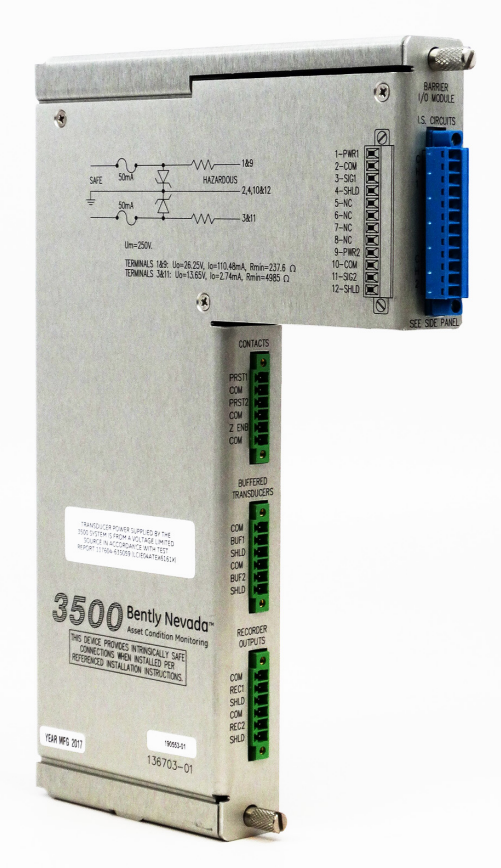
Figure 2: Front and Rear View of 3500/25 Keyphasor module

3500/04 Internal Barriers

Datasheet

Cordant™

141495 Rev. R



Description

Bently Nevada™ 3500 Internal Barriers are intrinsically safe interfaces that provide explosion protection for transducer systems connected directly to the 3500 Machinery Protection System.

The internal barriers are fully compatible with the 3500 System and provide a convenient and cost-effective solution for installing all types of transducer systems within a hazardous area.

> Unlike external barriers, 3500 Internal Barriers are an integral part of the 3500 System and will not degrade the system's performance.

We offer Bently Nevada transducer systems with comprehensive approvals for hazardous area installations. The transducer systems are matched to those of the 3500 Internal Barriers. See Compatible Monitors and Transducers on page 8.

Each component complies both individually and as part of a system with the safety requirements of North American and international standards. Hence, you don't have to reference individual certificates to verify the compatibility between components.

Standard and internal barrier monitors can reside within the same 3500 rack. You can upgrade standard monitors by replacing existing I/O modules with those that contain internal barriers.

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Specifications

Physical Information

Internal Barrier I/O Module	
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)
Internal Barrier Earthing Module	
Dimensions (Height x Width x Depth)	241 mm x 24.4 mm x 103.1 mm (9.50 in. x 0.96 in. x 4.06 in.)
Weight	0.201 kg (0.443 lb.)

Proximity and Acceleration

The following information also applies to aeroderivative and dynamic pressure.

Bandwidth	30 kHz
Amplitude Accuracy	3% @ 10 kHz, -15/+10% @ 30 kHz
Phase Accuracy	-11° @ 10 kHz
Channel Parameters	U_m = 250 V U_o = 27.45 V I_o = 113.24 mA C_o = 0.086 uF L_o = 2.77 mH P_o = 726.96 mW
Circuit Parameters	
Power (PWR)	U_o = 26.25 V Rmin = 237.6 Ω I_o = 110.48 mA
Signal (SIG)	U_o = 13.65 V Rmin = 4985 Ω I_o = 2.74 mA

Velomitor Sensor

Amplitude Accuracy	±1%
Circuit Parameters	U_o = 26.25 V Rmin = 297 Ω I_o = 88.39 mA
Channel Parameters	U_m = 250 V U_o = 26.25 V I_o = 88.39 mA C_o = 0.097 uF L_o = 4.55 mH P_o = 580.02 mW

Temperature

Temperature Accuracy	±1 °C @ +25 °C, ±15 °C over operating temperature
Phase Accuracy	-11° @ 10 kHz
Channel Parameters	U_m = 250 V U_o = 7.71 V I_o = 89.17 mA C_o = 9.3 uF L_o = 4.55 mH P_o = 132.41 mW
Circuit Parameters	
Channel B	U_o = 5.36 V Rmin = 133.25 Ω I_o = 40.23 mA
Channel C	U_o = 6.51 V Rmin = 133.25 Ω I_o = 48.86 mA

Process Variable

Channel Parameters	U_m = 250 V U_o = 27.98 V I_o = 279.34 mA C_o = 0.083 uF L_o = 0.455 mH P_o = 842.89 mW

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.

3500/04-AA-BB

A: I/O Module type: Earthing module	
01	Earthing I/O Module
B: Agency Approval	
00	None
01	North Americal Hazloc
02	Multi (CSA, ATEX, IECEx)

When ordering internal barriers, specify the appropriate I/O module type for each monitor module.

Install an IS Earthing Module in each rack containing internal barriers.

Refer to each monitor module's datasheet for specifications and ordering information.

Spares

136719-01	Earthing I/O Module
138257-01	Earthing Module Front Panel
135473-01	3500/25 I/O Module with Internal Barriers and Internal Terminations
135489-01	3500/42, /70, /72 I/O Module with Internal Barriers (4 prox/accel channels) and Internal Terminations
135489-02	3500/42, /70 I/O Module with Internal Barriers (2 prox/accel + 2 Velomitor channels) and Internal Terminations
135489-03	3500/42, /70 I/O Module with Internal Barriers (4 Velomitor channels) and Internal Terminations
135489-04	3500/40 I/O Module with Internal Barriers and Internal Terminations
136703-01	3500/50 I/O Module with Internal Barriers and Internal Terminations
136711-01	3500/60 I/O Module with Internal Barriers and Internal Terminations
136711-02	3500/61 I/O Module with Internal Barriers and Internal Terminations
137110-01	3500/62 I/O Module with Internal Barriers and Internal Terminations

Compatible Monitors and Transducers

Compatible Monitors	3500/25 Keyphasor Monitor 3500/40M Proximitor Monitor 3500/42M Proximitor/Seismic Monitor 3500/44M Aeroderivative (only with mods) 3500/50 Tachometer Monitor 3500/60 Temperature Monitor 3500/61 Temperature Monitor with Recorders 3500/62 Process Variable Monitor 3500/64 Dynamic Pressure Monitor (only with mods) 3500/70M Recip Impulse/Velocity Monitor 3500/72M Recip Rod Position Monitor
Compatible Transducer Systems	
Proximity	3300 XL Proximitor Sensor 3300 5 mm Proximitor Sensor 3300 XL 8 mm Proximitor Sensor 3300 RAM Proximitor Sensor 7200 5 & 8 mm Proximitor Sensor
Acceleration	23733-03 Standard Acceleration Transducer 330400 Standard Integral Acceleration Transducer 330425 Standard Integral Acceleration Transducer 49578-01 Standard Acceleration Transducer Modified 86517 Interface Module
Velocity	Velomitor Sensor High Temperature Velomitor Sensor
Temperature	**3-wire Thermocouples:** Type J Type K Type E Type T **3-wire RTDs:** 10 Ω 3-wire Copper 100 Ω 3-wire Platinum 120 Ω 3-wire Nickel
Process Variable	+4 to +20 mA

The Internal Barrier system does not support the following transducer systems:

- 11 mm, 14 mm, 16 mm, 25 mm, 35 mm, or 50 mm Proximitor Sensors
- Velocity Seismoprobe Sensors (/42)
- Velocity-to-Displacement Converter (/40)
- Magnetic pick-up (/50)
- 4-wire RTDs and Thermocouples (/60, /61)
- 1-5 Vdc Process Variables (/62)
- 0-10 Vdc Process Variables (/62)

Internal barriers are compatible with **approved** Bently Nevada transducer systems. For all other transducer systems, please consult your local Bently Nevada sales professional.