Bently Nevada 136703-01

Internal Barrier I/O Module



Bently Nevada 136703-01 is the discrete internal-barrier tachometer I/O module with internal terminations for the specified 3500 monitoring arrangement. Its rear I/O interface incorporates the barrier function used with approved intrinsically safe transducer circuits, while the associated tachometer monitor processes the shaft signal for configured speed, acceleration or direction monitoring. The internal-barrier selection is a defining feature of this spare and requires the approved system and transducer combination. It is distinct from standard 133442-01 I/O, and the internal-barrier arrangement does not support magnetic-pickup tachometer applications.

Technical Specifications

Product Identity	
Part number	136703-01
Component	Discrete internal-barrier I/O with internal terminations
I/O dimensions (H x W x D)	241.3 x 24.4 x 163.1 mm
Rack space	One full-height rear slot
Functional Configuration	
Applicable documented family	3500/50M tachometer
Magnetic pickup support	Not supported by the internal-barrier /50 system
Required barrier-system earth	3500/04-01 IS Earthing Module in each rack with internal barriers
External termination / TMR	Not available for internal-barrier I/O
Application exclusion	Not for speed control or overspeed protection
Performance & Power	
Internal-barrier input impedance	7.15 kOhm
Environment	
Hazardous-location ambient limit	3500/50M internal-barrier configuration: T4, –20 to +65 °C under the applicable marking and drawing 138547

Selected original manufacturer material follows on pages 3–7.

Compatibility & Selection Guide

System compatibility. The associated monitor supplies the configured speed-related measurement functions. For 3500/50M use, verify the documented TDI and software environment; the monitor is not compatible with any 3500/20 version. The internal-barrier option adds system requirements, and the tachometer remains unsuitable for speed-control or overspeed-protection service.

Wiring & Installation Reference

Internal-barrier signal requirements

1. Verify the sensor system Use the compatible transducer list and the installation approval requirements for the actual assembly.

2. Retain the barrier architecture Do not substitute external-termination or TMR I/O arrangements into an internal-barrier installation.

IS earth, separation and cabinet space

1. Check the IS earth position Reserve the dedicated monitor position required for the IS Earthing Module.

2. Check routing and clearance Follow the manufacturer 50 mm safe/hazardous wiring separation and cabinet-routing guidance; retain access for maintenance.

Installation precautions

Do not use the tachometer for speed control or overspeed protection. Internal-barrier wiring must retain the required IS earth and separation between safe and hazardous circuits.

View installation requirements (PDF) — page 6 · View installation requirements (PDF) — page 6

WARNING

PRODUCT MISUSE

Risk of personal injury or equipment damage.

Do **not** use the 3500/50M Tachometer Module independently or as a component of a speed control or an overspeed protection system because it does **not** provide protective redundancy or the response speed needed for reliable operation as a speed control or overspeed protection system.

The analog proportional output is suitable for data logging, chart recording, or display purposes only. Speed alert setpoints are suitable for annunciation purposes only.

Magnetic Pickups:
Do not use magnetic pickups for the reverse rotation option or zero speed option. Otherwise, false indications of rotation direction may occur. The transducers do not provide a clean edge for the detection circuit during low speeds.

Cables

3500 Tachometer Signal to ET Block Cable 135101-AAAA-BB

A: I/O Cable Length	
0005	5 feet (1.5 metres)
0007	7 feet (2.1 metres)
0010	10 feet (3.0 metres)
0025	25 feet (7.6 metres)
0050	50 feet (15.2 metres)
0100	100 feet (30.5 metres)
B: Assembly Instructions	
01	Not Assembled
02	Assembled

3500 Recorder Output to ET Block Cable 129529-AAAA-BB

A: I/O Cable Length	
0005	5 feet (1.5 metres)
0007	7 feet (2.1 metres)
0010	10 feet (3.0 metres)
0025	25 feet (7.6 metres)
0050	50 feet (15.2 metres)
0100	100 feet (30.5 metres)
B: Assembly Instructions	
01	Not Assembled
02	Assembled

Spares

Part Number	Description
288062-02	3500/50M Tachometer Module
133442-01	I/O Module with Internal Terminations
136703-01	Discrete Internal Barrier I/O Module with Internal Terminations
133434-01	I/O Module with External Terminations
133450-01	TMR I/O Module with External Terminations
134938	3500/50M Tachometer User Guide
04425545	Grounding Wrist Strap Single use only
00580434	Connector Header Internal Termination 8-position Green
00580436	Connector Header Internal Termination 6-position Green
00502133	Connector Header Internal Termination 12-position Blue
166M2390	Connector Header Push-in-Spring Type (Alternative for PN 00580436)
166M2389	Connector Header Push-in-Spring Type (Alternative for PN 00580434)

Installation Guidelines

The internal barriers for a 3500 rack are incorporated in special Monitor I/O Modules. These barriers provide explosion protection for transducer systems that are connected to the 3500 system. An intrinsically safe (IS) earthing module provides the IS earth connection through the 3500 system backplane.

The IS Earth Module requires a dedicated I/O module position and precludes the use of this monitor position for other 3500 System modules. This limits a standard 19-inch rack to 13 monitor positions. Furthermore, a number of installation options are not available when internal barriers are installed in a 3500 rack.

New Rack Installations

The same rack can contain both internal barrier and standard I/O module types without compromising the separation between hazardous and safe area field wiring.

The External Termination option is not available for I/O modules with internal barriers because hazardous area approvals do not allow the use of intrinsically safe wiring within a multi-cored cable assembly.

Monitors that contain Triple Modular Redundant (TMR) rack options cannot use internal barrier I/O modules since connecting a transducer to multiple I/O module inputs will compromise the integrity of the IS system.

A rack that contains any internal barrier module must have a 3500/04-01 IS Earthing Module to provide the Barrier Module IS earth connection.

I/O Module Positioning

Internal barrier I/O modules have an increased depth over that of standard barrier I/O modules. Consider the rack position with respect to adjacent modules to ensure that you can easily access the I/O modules during maintenance.

Internal barrier I/O and IS Earthing modules can occupy any general-purpose rack position and can be adjacent to standard I/O module types without compromising the 50 mm (2 in) physical separation requirement between safe and hazardous area field wiring.

Follow these guidelines when positioning I/O modules:

- Group all internal barrier I/O modules in adjacent rack positions to simplify the installation.
- Place the IS Earthing Module in a rack position that provides easy access for routine online maintenance.
- Consider the IS Earthing Module's positioning relative to adjacent internal barrier I/O modules and cabinet bulkheads.

If you plan to install standard I/O modules or the IS Earthing Module between a pair of internal barrier I/O modules, allow a minimum of two rack positions so that you can easily access the standard I/O or IS Earthing Module online without disturbing the adjacent I/O modules.

Upgrading a 3500 Rack

To upgrade a 3500 rack with standard I/O modules to a rack containing one or more internal barrier I/O modules, replace the standard I/O modules with the appropriate internal barrier modules. You can order the IS Earthing Module separately. See Ordering Information on page 7. for more information.

> The IS Earthing Module must be installed in a dedicated monitor position.

Revision 2.3 or later of 3500 Rack Configuration software is required to enable the use of internal barriers with the following monitor types:

- 3500/25
- 3500/40
- 3500/42
- 3500/50
- 3500/60
- 3500/61
- 3500/62
- 3500/70
- 3500/72

The following firmware revisions are required:

Monitor	Firmware Version	Firmware Rev
3500/25	1.06	D or later
3500/50	1.05	E or later
3500/60	1.06	E or later
3500/61	1.06	E or later
3500/62	1.06	C or later

No firmware revisions are required for the following monitors:

- 3500/40M
- 3500/42M
- 3500/70M
- 3500/72M

Cabinet and Panel Installations

The internal barrier I/O modules add approximately 50 mm (2 in) to the depth of the rack to provide the 50 mm (2 in) physical separation between safe and hazardous area field wiring. Hence, a standard rack with internal barrier modules will not fit into a 400 mm cabinet.

The bulkhead rack version is available for installations that require this cabinet type. A standard rack with internal barrier modules will fit comfortably in a 600 mm cabinet and the 3500/06 Weatherproof Housing.

We recommend the following installation guidelines for the internal barriers within a cabinet or panel:

- The positioning of the hazardous and safe area connectors dictates installations route the hazardous area field wiring above the 3500 rack and safe area wiring below the 3500 Rack.
- Installations should carefully route the safe area wiring from the bulkhead version along the top of the 3500 rack to maintain the 50 mm (2 in) separation between safe and hazardous area wiring.

When multiple racks are installed within the same cabinet, hazardous area and safe area wiring can share the same cable trays as long as a separator is physically insulating the wires from one another.

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.