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3500/20 Rack Interface Module

Bently Nevada™ Asset Condition Monitoring



Description

The Rack Interface Module (RIM) is the primary interface to the 3500 rack. It supports a proprietary protocol used to configure the rack and retrieve machinery information. The RIM must be located in slot 1 of the rack (next to the power supplies).

The RIM supports compatible Bently Nevada external communications processors such as TDXnet, TDIX, and DDIX. While the RIM provides certain functions common to the entire rack, the RIM is not part of the critical monitoring path and has no effect on the proper, normal operation of the overall monitoring system. One RIM is required per rack.

For Triple Modular Redundant (TMR) applications, the 3500 System requires a TMR version of the RIM. In addition to all the standard RIM functions, the TMR RIM also performs "monitor channel comparison." The 3500 TMR configuration implements monitor voting using the setup specified in the monitor options. Using this method, the TMR RIM continually compares the outputs from three (3) redundant monitors. If the TMR RIM detects that the information from one of those monitors is no longer within a configured percentof the information of the other two monitors, it will flag that the monitor is in error and place an event in the System Event List.

imagination at work

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Specifications

Inputs

Power Consumption

4.75 watts, typical

Data

Front panel

Standard

RS232 serial communications

Data Rate

38.4 k baud.

I/O modules

Standards

RS232/RS422 serial communications

Internal modem communications

Data Rate

38.4 k baud maximum,serial communications

14.4 k baud, internal modem communications.

Outputs

Front Panel LEDs

OK LED

Indicates when the RIM is operating properly.

TX/RX LED

Indicates when the RIM is communicating with other modules in the 3500 rack.

TM LED

Indicates when the 3500 rack is in Trip Multiply.

CONFIG OK LED

Indicates that the 3500 rack has a valid configuration.

I/O Module OK Relay

Relay to indicate when the 3500 rack is operating normally or when a fault has been detected within the rack. User can select either an "OPEN" or "CLOSED" contact to annunciate a NOT OK condition. This relay always operates as "Normally Energized".

OK relay

Rated to 5A @ 24 Vdc/ 120 Vac, 120 Watts/600 VA Switched Power.

Normally closed contacts

Arc suppressors are provided.

Controls

Front Panel

Rack reset button

Clears latched alarms and Timed OK Channel Defeat in the rack. Performs same function as "Rack Reset" contact on I/O module.

Address switch

Used to set the rack address; 63 possible addresses.

Configuration Keylock

Used to place 3500 rack in either "RUN" mode or "PROGRAM" mode. RUN mode allows for normal operation of the rack and locks out configuration changes. PROGRAM mode allows for normal operation of the rack and also allows for local or remote rack configuration. The key can be removed from rack in either position, allowing switch to remain in either RUN or PROGRAM positions. Locking switch in the RUN position allows you to restrict unauthorized rack reconfiguration. Locking switch in PROGRAM position allows remote configuration of a rack at any time.

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I/O Module System Contacts

Trip multiply

Used to place 3500 rack in Trip Multiply.

Alarm inhibit

Used to inhibit all alarms in the 3500 rack.

Rack reset

Used to clear latched alarms and Timed OK Channel Defeat.

Maximum Current

<1 mA dc, Dry Contact to Common.

RS232/RS422 Switch (RS232/RS422 I/O module only)

Used to select between RS232 and RS422 for communications with the Bently Nevada host software.

Communications

Front Panel

Communications

RS232 serial communications only.

Protocol

Bently Nevada proprietary.

Data rate

38.4 k baud maximum (auto baud capable).

Purpose

Permits data collection and 3500 rack configuration.

Cable length

30 metres (100 feet) maximum.

RS232/RS422 I/O Module

Communications

RS232, RS422, or external modem.

Protocol

Bently Nevada proprietary.

Baud rate

38.4 k baud maximum (auto baud capable).

Purpose

Permits data collection and 3500 rack configuration.

Cable length

RS232

30 metres (100 feet) maximum.

RS422

1200 metres (4000 feet) maximum.

Modem

Consult modem manufacturer, typical 3 metres (10 feet).

Modem I/O Module

Communications

Hayes AT-compatible.

Protocol

Bently Nevada proprietary.

Baud rate

14.4 k baud maximum.

Purpose

Permits data collection and 3500 rack configuration.

Cable length

2.1 metres (7 feet) maximum.

Modem

To phone jack.

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Rack ConnectorCommunications

RS422 only.

Protocol

Bently Nevada proprieatry.

Baud rate

38.4 k baud maximum.

Purpose

Allows multiple 3500 racks to be daisy-chained together for communications with 3500 Host Software.

Cable length

1200 metres (4000 feet) maximum.

Data Manager I/O Module (2 sets of ports)

Communications

Bently Nevada proprietary.

Protocol

Bently Nevada prioprietary.

Baud rate

9600 baud fixed.

Purpose

Permits static and dynamic data collection by Bently Nevada Transient Data Interface External or Dynamic Data Interface External Communication Processors.

Cable length

3 metres (10 feet) maximum.

Environmental Limits

Rack Interface Module and RS232/RS422 I/O

Operating Temperature:

-30 °C to +65 °C (-22 °F to +150 °F).

Storage Temperature:

-40 °C to +85 °C (-40 °F to +185 °F).

Modem I/O Module

Operating Temperature:

0 °C to +50 °C (+32 °F to +122 °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

EN50082-2:

Electrostatic Discharge

EN 61000-4-2, Criteria B

Radiated Susceptibility

ENV 50140, Criteria A

Conducted Susceptibility

ENV 50141, Criteria A

Electrical Fast Transient

EN 61000-4-4, Criteria B

Surge Capability

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EN 61000-4-5, Criteria B

Magnetic Field

EN 61000-4-8, Criteria A

Power Supply Dip

EN 61000-4-11, Criteria B

Radio Telephone

ENV 50204, Criteria B

Low Voltage Directives:

EN 61010-1

Safety Requirements

Hazardous Area Approvals

CSA/NRTL/C:

Approval Option (01)

Class I, Div 2

Groups A, B, C, D

T4 @ Ta = -20 °C to +65 °C

(-4 °F to +150 °F)

Certification Number

CSA 150268-1002151 (LR 26744)

Physical

RIM

Dimensions (Height x Width x Depth):

241.3 mm x 24.4 mm x 241.8 mm

(9.5 in. x 0.96 in. x 9.52 in.).

Weight:

0.91 kg (2.0 lb.).

RS232/RS422 I/O

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:

0.45 kg (1.0 lb.).

Modem I/O

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

0.45 kg (1.0 lb.).

Data Manager I/O

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:

0.45 kg (1.0 lb.).

Rack Space Requirements

RIM Main Board:

1 full-height front slot.

RIM I/O Modules:

1 full-height rear slot.

Data Manager I/O Modules:

1 full-height rear slot.

Ordering Information

3500/20-AXX-BXX-CXX

A: Rack Interface Type

- **0 1** Standard RIM (Use for standard monitoring applications)
- **0 2** TMR RIM (Use only for application that requires a Triple Modular Redundant Configuration)

B: Type of I/O Module

- **0 1** I/O module with built-in modem
- **0 2** I/O module with RS232/RS422 interface

C: Agency Approval Option

- **0 0** None

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0 1 CSA/NRTL/C

Spares

125744-02

Standard Rack Interface Module

125744-01

TMR Rack Interface Module

135031-01

RIM I/O Module with Modem Interface

125768-01

RIM I/O Module with RS232/RS422 Interface

125760-01

Data Manager I/O Module

04425545

Grounding Wrist Strap (single use)

00801286

Real-Time Clock IC

128755-01

Firmware IC (for PWA 125744-01 Rev P or later, or for PWA 125744-02 Rev N or later)

00580441

Connector Header, Internal Termination, 3-position, Green

00580436

Connector Header, Internal Termination, 6-position, Green

129768-01

RIM Operation and Maintenance Manual

Cables

02290860

RS232 Modem cable from: 3500 Rack External Modem Host Computer to External Modem

130119-01

Host Computer to RS232/RS422 Converter Cable RS232

129386-01

TDIX - Static Data Cable

129387-01

DDIX - Static Data Cable

02290160

DDIX/TDIX - Dynamic Data Cable

02230411

RS232 to RS422 Converter 110 Vac

02230412

RS232 to RS422 Converter 220 Vac

Host Computer to 3500 Rack Cable, RS232

130118-AXXXX-BXX

A: Cable Length

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

RS232/RS422 Converter to 3500 Rack Cable, RS422, PVC Insulated

130120-AXXXX-BXX

A: Cable Length

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)
0 2 5 0	250 feet (76 metres)
0 5 0 0	500 feet (152 metres)

B: Assembly Instructions

0 1	Not Assembled
0 2	Assembled

RS232/RS422 Converter to 3500 Rack Cable, RS422, Teflon® Insulated

131106-AXXXX-BXX

A: Cable Length

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)
0 2 5 0	250 feet (76 metres)
0 5 0 0	500 feet (152 metres)

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B: Assembly Instructions

0 1	Not Assembled
0 2	Assembled

Host Computer to 3500 Rack Cable, RS422, PVC Insulated

132632-AXXX-BXX

A: Cable Length

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)
0 2 5 0	250 feet (76 metres)
0 5 0 0	500 feet (152 metres)

B: Assembly Instructions

0 1	Not Assembled
0 2	Assembled

Host Computer to 3500 Rack Cable, RS422, Teflon® Insulated

132633-AXXXX-BXX

A: Cable Length

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)
0 2 5 0	250 feet (76 metres)
0 5 0 0	500 feet (152 metres)

B: Assembly Instructions

0 1	Not Assembled
0 2	Assembled

3500 Rack to 3500 Rack Cable, RS422, PVC Insulated

130122-AXXXX-BXX

A: Cable Length

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)
0 2 5 0	250 feet (76 metres)
0 5 0 0	500 feet (152 metres)

B: Assembly Instructions

0 1	Not Assembled
0 2	Assembled

3500 Rack to 3500 Rack Cable, RS422, Teflon® Insulated

131107- AXXXX-BXX

A: Cable Length

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)
0 2 5 0	250 feet (76 metres)
0 5 0 0	500 feet (152 metres)

B: Assembly Instructions

0 1	Not Assembled
0 2	Assembled

500 Foot (152 metres) Extension Cable, RS422 (Used with Cables 130120, 131106, 130122 and 131107 for lengths greater than 500 feet (152 metres)).

130121 - AXX BXX

A: Assembly Instructions

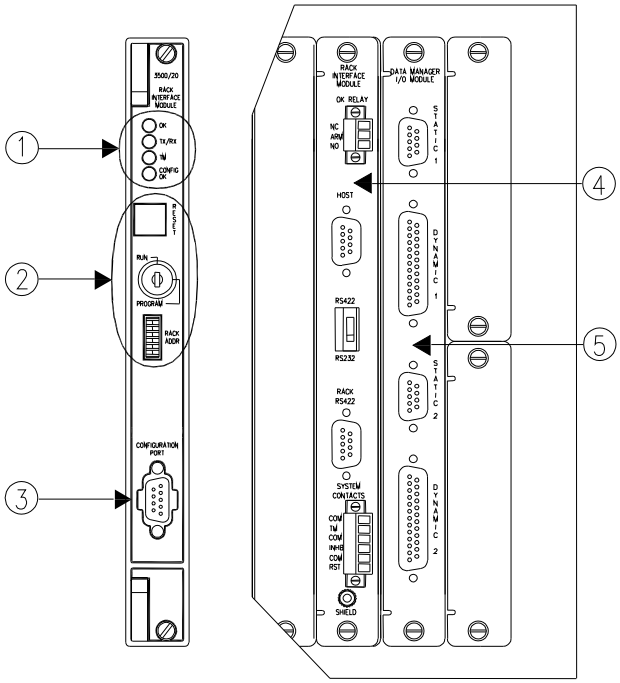
0 1	Not Assembled
0 2	Assembled

B: Insulation

0 1	PVC Insulated
0 2	Teflon® Insulated

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Graphs and Figures



1) **LEDs:** Indicate the operating status of the module
2) **Hardware Switches:**
3) **Configuration Port:** Configure or retrieve machinery data from only this rack using RS-232 protocol.
4) **Rack Interface I/O Module:** Daisy chain or configure racks using RS-232 and RS-422 protocol
5) **Data Manager I/O Module:** Connect two Bently Nevada Communication Processors to the 3500 rack.

Figure 1: Front and rear view of the Rack Interface Module

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