3500/65 16-Channel Temperature Monitor

Datasheet

Cordant™

172930 Rev. P

Description

The Bently Nevada™ 3500/65 monitor provides 16 channels of temperature monitoring and accepts both resistance temperature detector (RTD) and isolated tip thermocouple (TC) temperature inputs. The monitor conditions these inputs and compares them against user-programmable alarm setpoints.

The monitor is programmed using the 3500 Rack Configuration Software. You can configure the 16-Channel Temperature Monitor to accept isolated tip thermocouples, 3-wire RTD, 4-wire RTD, or a combination of TC and RTD inputs.

In Triple Modular Redundant (TMR) configurations, you must install temperature monitors in groups of 3 adjacent monitors. In this configuration the monitor uses 2 types of voting to ensure accurate operation and to avoid single-point failures.

Baker Hughes

Specifications

Inputs

Power Consumption	3 watts nominal
Signal	Accepts from 1 to 16 RTD or isolated tip TC transducer signals.
Input Impedance	Greater than 1 MΩ for each lead input.

Transducers

TCs	
Type E	-100°C to +1000°C, (-148°F to +1832°F)
Type J	0°C to +760 °C (32°F to +1400 °F)
Type K	0°C to +1370°C (32°F to +2498°F)
Type T	-160°C to +400°C, (-256°F to +752°F)
RTDs	
100 Ω 3-wire and 4-wire platinum RTD (α = 0.00385)	-200°C to +850°C (-328°F to +1562°F)
100 Ω 3-wire and 4-wire platinum RTD (α = 0.00392)	-200°C to +700°C (-328°F to +1292°F)
120 Ω 3-wire and 4-wire nickel RTD	-80°C to +260°C (-112°F to +500°F)
10 Ω 3-wire and 4-wire copper RTD	-100°C to +260°C, (-148°F to +500°F)

Platinum RTDs with α = 0.00385 are the worldwide industrial standard and are the recommended RTDs for all applications.

Outputs

Front Panel LEDs	
OK LED	Indicates when the 3500/65 is operating properly.
TX/RX LED	Indicates when the 3500/65 is communicating with other modules in the 3500 rack.
Bypass LED	Indicates when the 3500/65 monitor is in Bypass Mode.
RTD Current-Source Value	913 ± 7 µA @ 25°C per transducer (1 supply for the 4-wire RTD and 2 supplies for the 3-wire).

Signal Conditioning

Specified at +25°C (+77° F). Full-scale range for each channel is set in the field via 3500 Configuration Software. No calibration is required

RTDs and TCs	
Resolution	1°C or 1 °F.
Accuracy	
Internal Termination	Bulkhead Rack: ±3°C at +25°C (±5.4°F at +77°F). Standard Rack: ±3°C at +25°C (±5.4°F at +77°F).
External Termination	Bulkhead Rack: ±3°C at +25°C (±5.4°F at +77°F) Standard Rack: ±3°C at +25°C (±5.4°F at +77°F) Cold Junction Compensation Sensor (used for TC measurements) ±2°C at +25°C (±3.6°F at +77°F).

Alarms

Alarm Setpoints	You can use software configuration to set Alert and Danger setpoints for the value measured by the monitor. Alarms are adjustable from 0 to 100% of full-scale for each measured value. The exception is when the full-scale range exceeds the range of the sensor. In this case, software will limit the setpoint to the range of the sensor. Accuracy of alarms are to within 0.13% of the desired value. The 3500/65 16-channel temperature monitor has both under- and over-alarm setpoints.
Alarm Time Delays	You can use software to program alarm delays as follows:
Alert Delay	From 1 to 60 seconds in 1-second increments.
Danger Delay	From 1 to 60 seconds in 0.5-second increments.

Proportional Values

Proportional values are temperature measurements used to monitor the machine. The 16-channel temperature monitor returns temperature proportional values.

Environmental Limits

Operating Temperature:	-30°C to +65°C (-22°F to +150°F)
Storage Temperature:	-40°C to +85°C (-40°F to +185°F)

Physical

Main 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	0.45kg (1.0 lb.).
Rack Space Requirements	
Main Module	1 full-height front slot
I/O Modules	1 full-height rear slot

Compliance and Certifications

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

EMC

European Community Directive:

EMC Directive 2014/30/EU

Standards:

EN 61000-6-2 Immunity for Industrial Environments
EN 61000-6-4 Emissions for Industrial Environments

Electrical Safety

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 61010-1

RoHS

European Community Directive:

RoHS Directive 2011/65/EU

China RoHS

Cables associated with the product(s) mentioned in this datasheet have an EFUP designation of 15 years, in accordance with SJ/T 11364-2024.

Maritime

ABS-Marine and Offshore Applications

DNV GL Rules for Classification – Ships, Offshore Units, and High Speed and Light Craft

Hazardous Area Approvals

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.

cNRTLus

Class I, Zone 2: AEx/Ex nA nC ic IIC T4 Gc;
Class I, Zone 2: AEx/Ex ec nC ic IIC T4 Gc;
Class I, Division 2, Groups A, B, C, and D;

T4 @ Ta= -20˚C to +65˚C (-4˚F to +149˚F)
When installed per drawing 149243 or 149244.

ATEX/IECEx

II 3 G

Ex nA nC ic IIC T4 Gc
Ex ec nC ic IIC T4 Gc

T4 @ Ta= -20˚C to +65˚C
(-4˚F to +149˚F)
When installed per drawing 149243 or 149244.

Ordering Considerations

If you add the 3500/65 to an existing 3500 System your system will require the following or later firmware and software versions:

3500/22 Module Firmware	Revision 1.50
3500/01 Software	Version 3.85
3500/02 Software	Not supported*
3500/03 Software	Not supported*
3500/93 Module Firmware	Revision 2.02
System 1 Software	Revision 5.2 with Service Pack 2 or later

*Attempting to use the 3500/65 with 3500/02 or 3500/03 software may prevent proper operation of the software.

You cannot use external termination blocks with internal termination I/O modules.

When ordering I/O Modules with external terminations, you must order the external termination blocks and cables separately.

When ordering I/O Modules for use with 4-Wire RTDs, order with Modification 179952-01. For further information, see the 3500/65 User Guide.

This will result in an I/O Module Mismatch and 562 ADC Failure in the System Event List.

Ordering Information

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

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3500/65-AA-BB

A: I/O Module Type	
01	**RTD/Isolated Tip TC with Internal Terminations**
02	RTD/Isolated Tip TC with External Terminations
B: Agency Approval Option	
00	**None**
01	CSA/NRTL/C
02	CSA/ATEX

Agency Approval Option B 02 is only available with Ordering Option A 01.

External Termination Block

172115-01	RTD/Isolated Tip TC External Termination Block (Euro Style connectors).

Cables

3500/65 Transducer (XDCR) Signal to External Termination (ET) Block Cable

134544-AAAA-BB

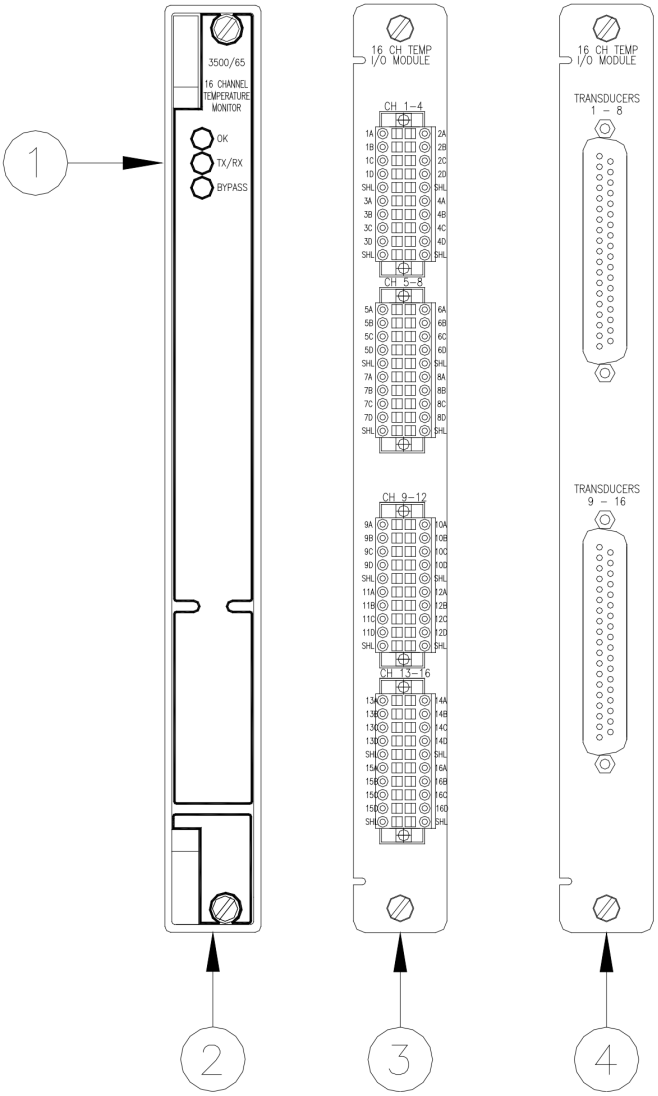
A: Cable Length	
0005	5 feet (1.5 metres)
0007	7 feet (2.1 metres)
0010	10 feet (3 metres)
0025	25 feet (7.5 metres)
0050	50 feet (15 metres)
0100	100 feet (30.5 metres)
B: Assembly Instructions	
01	Not Assembled
02	Assembled

Spares

Part Number	Description
172931	3500/65 User Guide
145988-02	3500/65 Monitor
172103-01	3500/65 RTD/Isolated Tip TC I/O Module, Internal Terminations
173005	Connector Header, Internal Termination, 20-position, Black
172109-01	3500/65 RTD/ Isolated Tip TC I/O Module, External Terminations
172115-01	RTD/Isolated Tip TC External Termination Block (Euro Style Connectors) Specifications

When replacing an older I/O module with a newer one,172109-01 Rev D, 172103-01 Rev F, 172115-01 Rev E, or future revisions; it is necessary to upgrade the firmware to the monitor with the latest released version. You must remove the I/O module before upgrading the monitor to the latest firmware. Failure to do this will result in an I/O Module Mismatch and 562 ADC Failure in the System Event List.

Graphs and Figures



1. Status LEDs.
2. 3500/65 16 Channel Temperature Monitor
3. 16 CH RTD/TC w Internal Term (172103-01)
4. 16 CH RTD/TC w External Term (172109-01)

Figure 1: Front and rear views of the 3500/65 16 Channel Temperature Monitor

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