

# Bently Nevada 3500 Series Service Manual

3500/61 163179-02

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## 1. Description

Manufacturer : Bently Nevada

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## 3. Product Information



Manufacturer : Bently Nevada

Product No. : 163179-02

Product type : 3500/60 Temperature Monitor

Made in U.S.A

#### Specifications

##### Inputs

Signal Accepts from 1 to 6 RTD or TC transducer signals.

##### Input

##### Impedance

10 MΩ for each lead input.

##### Power Consumption

3500/61 Nominal consumption of 9 watts.

##### Transducers

##### TCs

Type E -100 °C to +1000 °C, (-148 °F to +1832 °F).

When using any of the isolated thermocouple I/O modules (-03 or -04 I/O ordering option) with Type E thermocouples, the available full-scale range will be reduced if the 3500 system is operated in an ambient temperature above +35C. The reduced range will be -60C to +1000C (-76F to +1832F). Rack configuration software will allow the user to configure a channel down to -100C but the system will not function properly in this scenario and therefore should not be configured to operate with these settings.

Type J -18 °C to +760 °C, (+0 °F to +1400 °F).

Type K -18 °C to +1370 °C, (+0 °F to +2498 °F)

.Type T -160 °C to +400 °C, (-256 °F to +752 °F).

##### RTDs

100Ω 3-wire

& 4-wire

platinum

RTD (alpha

= 0.00385)

-200° C to +850° C

(-328 °F to +1562 °F).

With external barriers:

-50 °C to +850 °C

(-122 °F to +1562 °F).

100Ω 3-wire

& 4-wire

platinum

RTD (alpha

= 0.00392)

-200 °C to +700 °C

(-328 °F to +1292 °F).

With external barriers:

-50 °C to +260 °C



(-122 °F to + 1292 °F).

120Ω 3-wire

& 4-wire

nickel RTD

-80 °C to +260 °C

(-112 °F to +500 °F).

With external barriers:

-50 °C to +260 °C

(-122 °F to + 500 °F).

10Ω 3-wire &

4-wire

copper RTD

-100 °C to +260 °C,

(-148 °F to +500 °F).

With external barriers:

-50 °C to +260 °C

(-122 °F to +500 °F).

Platinum RTD's with

0.00385 alphas are the

worldwide industrial

standard and are

recommended for all

applications

I/O Modules

Isolated I/O Module

System Isolation: 500Vdc

Channel to Channel Isolation:

250 Vdc

Isolation is only required for

fault scenarios and these

voltages will not be present on

the I/O module inputs when a

wiring or field fault occurs.

Outputs

Front Panel LEDs

OK LED Indicates when the

Temperature Monitor is

operating properly.

TX/RX LED Indicates then the Temperature

Monitor is communicating with

other modules in the 3500 rack.

Bypass LED Indicates when the

Temperature Monitor is in

Bypass Mode.

RTD Current Source Value

925 ±15 µA @ 25° C per transducer (single

supply for the 4-wire RTD and two supplies for

the 3-wire).

Recorder

+4 to +20 mA. Values are proportional to

monitor full-scale. Individual recorder values

are provided for each channel. Monitor

operation is unaffected by short circuits on

recorder outputs.

Voltage Compliance (current output)

0 to +12 Vdc range across load. Load

resistance is 0 to 600 Ω.

Resolution

0.3662 µA per bit ±0.15% error at room



temperature  $\pm 0.4\%$  error over temperature range.

#### Signal Conditioning

Specified at  $+25\text{ }^{\circ}\text{C}$  ( $+77\text{ }^{\circ}\text{F}$ ) unless otherwise noted.

Full-scale range for each channel is set in the field via 3500 Configuration Software. No calibration is required.

RTDs and TCs (except for  $10\Omega$  Copper RTDs)

Resolution  $1\text{ }^{\circ}\text{C}$  or  $1\text{ }^{\circ}\text{F}$

#### Accuracy

##### Internal

##### Termination

##### NonIsolated

##### Bulkhead

##### Rack

$\pm 3\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 5.4\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

##### Standard

##### Rack

$\pm 3\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 5.4\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

##### External Termination Non-Isolated

##### Bulkhead

##### Rack

$\pm 3\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 5.4\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

##### Standard

##### Rack

$\pm 1\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 1.8\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

##### Internal Termination Isolated

##### Bulkhead

##### Rack

$\pm 2\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 3.6\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

$\pm 3\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

$\pm 5.4\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

##### Standard

##### Rack

$\pm 3\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

$\pm 5.4\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

##### External Termination Isolated

##### Bulkhead

##### Rack

$\pm 1\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 1.8\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

##### Standard

##### Rack

$^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 1.8\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ )

$10\text{ }\Omega$  Copper RTDs

Resolution  $1\text{ }^{\circ}\text{C}$  or  $1\text{ }^{\circ}\text{F}$

Accuracy  $\pm 3\text{ }^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$

( $\pm 5.4\text{ }^{\circ}\text{F}$  at  $77\text{ }^{\circ}\text{F}$ ).

Cold Junction Compensation Sensor (used for TC measurements)

Accuracy  $\pm 1^{\circ}\text{C}$  at  $25\text{ }^{\circ}\text{C}$



(±1.8 °F at 77 °F).

#### Alarm

##### Setpoints

The user can set Alert and

Danger setpoints for the value

measured by the monitor using

software configuration. 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,

the range of the sensor will limit

the setpoint. Accuracy of alarms

are to within 0.13% of the desired

value. The Temperature

Monitors have both under and

over alarm setpoints.

##### Alarm Time Delays

The user can program alarm delays using

software as follows:

Alert From 1 to 60 seconds in 1 second

intervals.

Danger From 1 to 60 seconds in 0.5

second intervals

##### Environmental Limits

##### Operating

##### Temperature

-30°C to +65°C (-22°F to +150

°F) when used with

Internal/External Termination

##### I/O Modules

0°C to +65 °C (32 °F to +150 °F)

when used with Internal Barrier

I/O Modules (Internal

Termination)

##### Storage

##### Temperature

-40°C to +85°C (-40°F to

+185°F)

##### 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)

##### Rack Space Requirements

##### Monitor

##### Module

1 full-height front slot

##### Compliance and

##### Certifications (Approvals

pending)

##### FCC

This device complies with part 15 of the

FCC Rules. Operation is subject to the



following two conditions:

I This device may not cause harmful interference.

I 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

Cyber Security

Designed to meet IEC 62443

Maritime

DNV GL rules for classification – Ships, offshore units, and high speed and light craft

ABS Rules for Condition of Classification,

Part 1

I Steel Vessels Rules

I Offshore Units and Structures

Functional Safety

SIL 2

