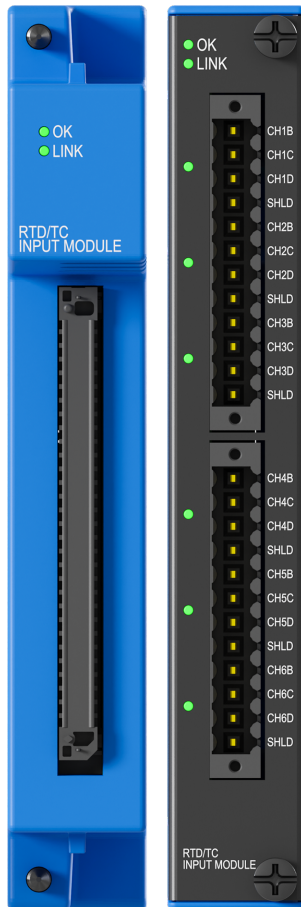


ORBIT 60 SERIES Temperature Module

Datasheet

Cordant™

137M0706 Rev. C



Description

TC/RTD and Isolated TC Temperature Modules

The primary purpose of temperature modules is to interface to the temperature transducers and convert the signal into a digital representation. These modules condition and digitize the inputs at a rate that completely encompasses the signal content and allows for removal of typical noise sources.

The Bently Nevada™ Orbit 60 Series TC/RTD Temperature Input Modules provide six channels of either Thermocouple (TC) or Resistive Temperature Detector (RTD) temperature input sensors.

The Orbit 60 Series Isolated TC Temperature Input Modules provide six isolated channels of Thermocouple (TC) input sensors.

Each channel of the Orbit 60 Series TC/RTD and isolated TC input modules are individually configurable for sensor type and range using Orbit Studio configuration software.

The RTD/TC inputs reference the internal system ground, and for this reason, should only connect to transducers isolated at the sensing end. Each Isolated TC input is isolated from system common and other input channels within the module.

These modules occupy a single slot. The module OK LEDs indicate proper functioning and the LINK LEDs indicate good system communication. Six Channel Status LEDs on the utility side of the module indicate a connected sensor in OK condition.

Both the TC/RTD and Isolated TC input modules are offered with either internal or external termination options.





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Module Variants




Figure 1: Module Variants: EXT TERM RTD/TC INPUT MODULE, ISO TC INPUT MODULE, and EXT TERM ISO TC INPUT MODULE


TC/RTD Temperature


Temperature	
Thermocouple (TC) Temperature	
Thermocouple	Type J, K, E, T
Channel Supported	6
Nominal Error	±1C
Max Error	±3C
RTD Temperature	
RTD Type	Pt100 (385), Pt100 (392), Ni120, Cu10
Max Error	±1C, except Cu10 ±3C
<p> To achieve +/-3C MAX Error with Cu10 RTD with external termination wiring, a calibration process must be completed.</p> <p> Platinum RTD's with 0.00385 alphas are the worldwide industrial standard and are recommended for all applications.</p>	
Power Consumption	
Maximum	6 W
Typical	3 W
LEDs	
Channel Status LED (Rear Utility Side)	1 per unit channel indicates when the connected sensor is in an OK condition
Module OK LED	Indicates when the module is functioning properly

Temperature	
System Communication LED	Indicates when the module is communicating to the rest of the system
Physical Characteristics	
Required Rack Space	1 Slot
Environmental Limits	
Chassis Operating Temperature Range	<p>3U Chassis: -30°C to +70°C (-22°F to 158°F) </p> <p>6U Chassis: -30°C to +65°C (-22°F to 149°F) </p> <p>(indoor use only)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  Temperatures over 50°C (122°F) require forced air convection with a minimum airspeed of 0.5 m/s. </div>
Module Temperature Rating Certification	<p>-30°C to +70°C (-22°F to 158°F)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  When using a Bridge module in a 3U chassis, temperatures over 55°C (131°F) require forced air convection with a minimum airspeed of 0.5 m/s. </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  You must still meet the Chassis Operating Temperature Range defined above. </div>
Storage Temperature Range	-40°C to +85°C (-40°F to 185°F)


Environmental Limits	
Relative Humidity	0% to 95% rH non-condensing operating and storage
Vibration	Without Isolators: 0 g to 0.35 g @ 57-500 Hz With Isolators: 0 g to 5 g @ 57-500 Hz
Shock	2" Incline Drop
Altitude	< 2000 m (6,562 ft) <div style="border: 1px solid black; padding: 5px; background-color: #e6f2e6;">  Higher altitudes are possible but are site specific applications. Contact Bently Nevada support if you require higher altitudes. </div>
Pollution Degree	Pollution Degree 2
Installation Category	Category II

Isolated TC	
Characteristics	
Channels	6
Isolation	500 V Channel to System and 250 V Channel to Channel isolation

 Verify that temperature ratings on the wiring cables match the operating temperature range.



CAUTION



LOCATION TEMPERATURE AND HUMIDITY

While the system has been tested and capable of achieving the design life when operating in environments up to 70°C, whenever operating any electronics system in elevated humidity or temperatures exceeding 40°C, adding environmental controls maximizes the operational life of the system.

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;
EN 61010-2-201;

RoHS

European Community Directive:

RoHS Directive 2011/65/EU

Cyber Security

Designed to meet IEC 62443-4-2

*Maritime

ABS Rules for Condition of Classification,
Part 1

- Steel Vessels Rules
- Offshore Units and Structures

*Recorder Output module, Bridge module, and 6U systems approvals pending

Functional Safety

SIL 2

See the SIL User Guide (134M0398) for details regarding SIL implementation.

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 ec nC IIC T4 Gc;
Class I, Zone 2: AEx/Ex nA nC IIC T4 Gc;
Class I, Division 2, Groups A, B, C, D T4;
Class I, Division 2, Groups A, B, C, D T4
(N.I.);

T4 @ Ta= -30°C to +70°C (-22°F to +158°F)

ATEX/IECEx



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

T4 @ Ta= -30°C to +70°C (-22°F to +158°F)

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.

RTD / TC Temperature Module

Ordering Option	Description
60R/INP07-AA-B	
AA – Hazardous Area Certifications	
00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)
XXX	Country Specific Approvals
B – SIL Level	
0	No SIL
2	SIL 2

EXT RTD / TC Temperature Module

Ordering Option	Description
60R/INP11	
AAA – Hazardous Area Certifications	
00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)
XXX	Country Specific Approvals
B – SIL Level	
0	No SIL

Ordering Option	Description
2	SIL 2

Isolated TC Temperature Module (ITC)

Ordering Option	Description
60R/INP08	
AAA – Hazardous Area Certifications	
00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)
XXX	Country Specific Approvals
B – SIL Level	
0	No SIL
2	SIL 2

EXT ISO TC Temperature Module

Ordering Option	Description
60R/INP12	
AAA – Hazardous Area Certifications	
00	No Hazardous Area
01	CSA/NRTL/C (Class I, Div 2)
02	Multi (CSA, ATEX, IECEx)
XXX	Country Specific Approvals
B – SIL Level	
0	No SIL
2	SIL 2

Accessories

Part Number	Description
60X/BTC01	Buffered Transducer Breakout Kit
60X/ETA01	Ext Termination Adapter - Universal
60X/ETB02	Ext Termination Block - TC
129525-0005-02	EXT Termination Block Cable 5 ft (1.5 m)
129525-0007-02	EXT Termination Block Cable 7 ft (2.1 m)
129525-0010-02	EXT Termination Block Cable 10 ft (3.0 m)
129525-0025-02	EXT Termination Block Cable 25 ft (7.5 m)
129525-0050-02	EXT Termination Block Cable 50 ft (15 m)
129525-0100-02	EXT Termination Block Cable 100 ft (30.5 m)



When using ETB temperature modules with thermocouple (TC) sensors, installation of a 60X/ETB02 block is required to ensure proper functionality.

External Galvanic Isolators

Part Number	Description
103M7134	3-pin Transducer Isolator
103M7134	2-pin Transducer Isolator
154M1361	Thermocouple Isolator
103M7138	RTD Isolator



"Ext Termination Block - TC" cannot be used with Internal Termination I/O modules.

External Barriers

Part Number	Description
175502	3-pin Transducer Barrier
177241	2-pin Velomitor Barrier
175990 or 170M3559	Thermocouple Barrier
170M3559	RTD Barrier

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