

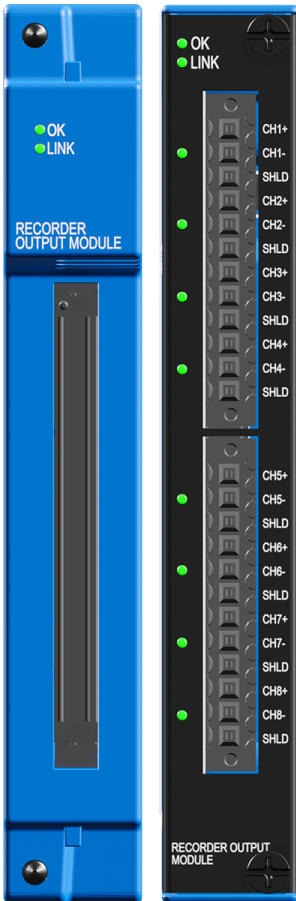
# ORBIT 60 SERIES

## Recorder Output Module

### Datasheet

Bently Nevada Machinery Condition Monitoring

137M0704 Rev. -



## Description

The recorder output module is a 8-channel single slot width module that provides an analog output signal based on a processed measurement from any of the proportional measurements within the system. The output of the recorder output channel is proportional to the associated measurement value within the measurement's full scale range.

The recorder output module is software-selectable to operate in several output modes, providing the following analog output signal ranges:

- 4 to 20 mA
- 1 to 5 V
- 0 to 10 V

When configured for a 4–20 mA output, the recorder channel supports the extended output range of 3.8 mA to 20.5 mA to align with the NAMUR NE43 standard.

These differing signal ranges can accommodate connections to various interfacing equipment designed to consume and interpret the proportional analog signals.

The recorder output module provides analog outputs for any proportional signal measurements available within the Orbit 60 system including the following examples:

- Processed Vibration measurements (Direct, 1X Amplitude, 1X Phase, etc.)
- Temperature measurements
- Position measurements

The recorder output channels' configuration includes several options for clamp output levels, providing an indication of an invalid health status of the associated measurement. The system will also attempt to output the configured clamp



signal when any fault within the Recorder Output channel or output load is detected.

The configuration also includes the option to include Recorder Output channels within the protection path so that detected faults within the Recorder module or wiring can be annunciated through Protection Fault relays. (See SIL User Guide 134M0398 for additional details when using the Recorder Output channels in a SIL application.)

## Recorder Output Module

Recorder Outputs	
<b>Power Consumption</b>	
Typical	6 Watts
Maximum	11 Watts
<b>Front Panel LEDs</b>	
Module OK LED	Indicates when the module is functioning properly
Channel OK LEDs	Indicates when the recorder channels are functioning properly
<b>Outputs</b>	
Output Types	4 to 20 mA range across load 1 to 5 V range across load 0 to 10 V range across load
Signal Load for Current Output	600 $\Omega$ or lower
Signal Load of Voltage Output	100 k $\Omega$ or higher
Maximum Current Load	22 mA
Short Circuit Protection	A short circuit on any recorder output will not impact adjacent recorder outputs.
Maximum Output error	1% of signal output range

Output Characteristics	
Signal Output	Value is proportional to full-scale range defined for the measurement scaled over the configured output range.
Clamp Output	A user-configured output level used to indicate an invalid status of the associated measurement or a detected fault within the Recorder channel or wiring.
<b>4 mA to 20 mA Output Type</b>	
Range	4 to 20 mA range across load  When configured for a 4-20 mA output, the recorder channel supports the extended output range of 3.8 mA to 20.5 mA to align with the NAMUR NE43 standard.
Lower limit	4 mA (If measurement < bottom-scale, analog output limited to 3.8 mA minimum)

Upper limit	20 mA (If measurement > top-scale, analog output limited to 20.5 mA maximum)
Clamp Options	2 mA, 22 mA, or any level within the 4 mA to 20 mA output range

Voltage range	0 to 12 Vdc
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**1 V to 5 V Output Type**

Range	1 to 5 V range across load
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Lower limit	1 V (If measurement < bottom-scale, analog output limited to 1 V minimum)
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Upper limit	5 V (If measurement > top-scale, analog output limited to 5 V maximum)
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Clamp Options	0.5 V or any level within the 1 V to 5 V range
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**0 V to 10 V Output Type**


Range	0 to 10 V range across load
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Lower limit	0 V (If measurement < bottom-scale, analog output limited to 0 V minimum)
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Upper limit	10 V (If measurement > top-scale, analog output limited to 10 V maximum)
Clamp Options	Any level within the 0 V to 10 V range

Environmental Limits	
Chassis Operating Temperature Range  (indoor use only)	<p><u>3U Chassis:</u>            -30°C to +70°C            (-22°F to 158°F) </p> <p><u>6U Chassis:</u>            -30°C to +65°C            (-22°F to 149°F) </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>
	<p><u>3U Bridged System</u>            -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, temperatures over 58°C (136°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;">  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)
Relative Humidity	0% to 95% rH non-condensing operating and storage
Vibration	<p>Without Isolators:            0 g to 0.35 g @ 57-500 Hz</p> <p>With Isolators:            0 g to 5 g @ 57-500 Hz</p>

Environmental Limits	
Shock	2" Incline Drop
Altitude	<p>&lt; 2000 m (6,562 ft)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  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

 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.

SIL 2 (when operating in the 4-20 mA output mode)

### 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](http://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

 II 3 G  
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 \(108M1756\)](#).

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## Recorder Output Module

Ordering Option	Description
<b>60R/REC01-AAA-B</b>	
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

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