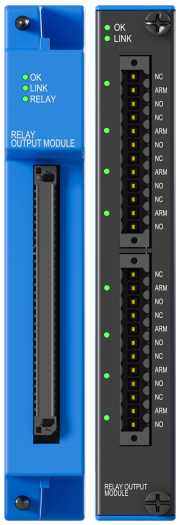
# ORBIT 60 SERIES
# Relay Modules
## Datasheet

Bently Nevada Machinery Condition Monitoring

137M0699 Rev. B


## Description

Relay modules may be programed to actuate based on alarm conditions defined in other modules. Use standard logic elements (True AND, Normal AND, OR and NOT) to combine various alarms and statuses (e.g. OK statuses, Bypass, Protection State, Inhibit, Attention, Protection Fault, etc.) into relay activation conditions. Orbit Studio is used to program the voting logic.

Relays can operate as a system or group protection fault relay, if programmed to do so, especially when the protection fault relay on the SIM does not provide adequate granularity of system health - typically for multiple machines in one system.

Pairs of relays within the module function as a single Double-Pole, Double-Throw relay when appropriately configured. Both relay types are available for SIL system implementation. See Orbit 60 SIL User Guide (134M0398) for additional details and design considerations.

### Electromechanical Relay (EMR)

This relay drives a load directly, or through, an interposing relay. This module takes two slots. It features **8 Epoxy Sealed, Single-Pole Double-Throw Electromechanical Relays.** This module supports an AC voltage range of 5-250 Vac for loads of 100 mA to 4 A. The module also supports DC voltages and loads of 5-30 Vdc at 4 A.

### Solid State Relay (SSR)

This relay connects to an external system's discrete input for low current communication. It occupies a single slot and features **8 Solid-State Relays.** This module supports

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secondary voltages from 1 Vdc up to 125 Vdc and loads of 0.01 to 125 mA.

## Electromagnetic Relay (EMR)

| Electromagnetic Relay (EMR) | |
|---|---|
| **Power Consumption** | |
| Typical | 6 watts |
| Maximum | 11 watts |
| **Characteristics** | |
| Type | Electromechanical Single-Pole, Double-Throw |
| Number of Relay Outputs | 8 |
| Environmental | Epoxy Sealed |
| Arc Suppressor | 250 Vrms, installed standard |
| Contact Life | 100,000 cycles @ 5 A, 24 Vdc or 240 Vac |
| Operation | Each relay is configurable for Normally De-Energized or Normally Energized |
| **Contact Rating for Standard Systems** | |
| Minimum Switched Current | 100 mA |
| DC Maximum Switched Current | 4 A @ 30 Vdc |
| DC Minimum Switched Voltage | 5 Vdc |
| DC Maximum Switched Voltage | 30 Vdc |
| AC Maximum Switched Voltage | 250 Vrms |
| AC Maximum Switched Current | 4 A |
| Maximum Switched Power | 180 W or 1800 VA |

| Electromagnetic Relay (EMR) | |
|---|---|
| **Contact Rating for Hazardous Area Systems** | |
| Maximum Switched Current | 4 A |
| DC Maximum Switched Voltage | 30 Vdc |
| AC Maximum Switched Voltage | 160 Vrms |

## Solid State Relay (SSR)

| Solid State Relay (SSR) | |
|---|---|
| **Power Consumption** | |
| Typical | 5 watts |
| Maximum | 9 watts |
| **Characteristics** | |
| Type | Solid State Single-Pole, Double-Throw |
| Number of Relay Outputs | 8 |
| Environmental | Plastic Encapsulated |
| Arc Suppressor | 150 Vdc, installed standard |
| Maximum Cycling Rate | 1 Hz |
| Operation | Each relay is configurable for Normally De-Energized or Normally Energized |
| Switching Properties | Limited to non-inductive loads |
| **Contact Rating for Standard Systems** | |
| Current Range | 0.0 1-125 mA |
| DC Maximum Switched Current | 125 mA @ 125 Vdc |
| Voltage Range | 1-125 Vdc |

| Solid State Relay (SSR) | |
|---|---|
| Maximum Switched Power | 650 mW |
| **Contact Rating for Hazardous Area Systems** | |
| Current Range | 0.0 1-125 mA |
| Voltage Range | 1-50 Vdc |

| Environmental Limits | |
|---|---|
| Chassis Operating Temperature Range<br><br>(indoor use only) | 3U Chassis:<br>-30°C to +70°C<br>(-22°F to 158°F)<br>6U Chassis:<br>-30°C to +65°C<br>(-22°F to 149°F)<br>Temperatures over 50°C (122°F) require forced air convection with a minimum airspeed of 0.5 m/s.<br>3U Bridged System<br>-30°C to +70°C<br>(-22°F to 158°F)<br>When using a Bridge module, temperatures over 58°C (136°F) require forced air convection with a minimum airspeed of 0.5 m/s. |
| Module Temperature Rating Certification | -30°C to +70°C<br>(-22°F to 158°F)<br>You must still meet the Chassis Operating Temperature Range defined above. |

| Environmental Limits | |
|---|---|
| Storage Temperature Range | -40°C to +85°C<br>(-40°F to 185°F) |
| Relative Humidity | 0% to 95% rH non-condensing operating and storage |
| Vibration | Without Isolators:<br>0 g to 0.35 g @ 57-500 Hz<br>With Isolators:<br>0 g to 5 g @ 57-500 Hz |
| Shock | 2” Incline Drop |
| Altitude | < 2000 m (6,562 ft)<br>Higher altitudes are possible but are site specific applications. Contact Bently Nevada support if you require higher altitudes. |
| 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.

For SIL 2 compliance, two relay modules must be ordered and installed to act redundantly.

# 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

Ⓔx 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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## Electromechanical Relay Module

| Ordering Option | Description |
|---|---|
| **60R/RLY01-AAA-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 |
| 1 | SIL 1 |

## Solid State Relay Module

| Ordering Option | Description |
|---|---|
| **60R/RLY02-AAA-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 |
| 1 | SIL 1 |



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