3500/33 16-Channel Relay Module

Datasheet

Cordant™

162301 Rev. AC



Description

The Bently Nevada™ 3500/33 16-Channel Relay Module is a full-height module that provides 16 relay outputs. You can place any number of 16-channel relay modules in any of the slots to the right of the Transient Data Interface (TDI) Module.

Each output of the 3500/33 16-Channel Relay Module can be independently programmed to perform voting logic.

Each relay of the module includes Alarm Drive Logic. Programming for the Alarm Drive Logic uses AND and OR logic and may use the following:

- Alarming inputs (alert and danger statuses)
- Not-OK
- Individual Measured Variables from any monitor channel or any combination of monitor channels in the rack

You can program the Alarm Drive using the 3500 Rack Configuration Software.

Baker Hughes

Specifications

Inputs

Power Consumption	5.8 watts typical

Outputs

Front Panel LEDs	
OK LED	Illuminated when the 3500/33 16-Channel Relay Module is operating properly.
TX/RX LED	Transmit and receive flashes when the 3500/3316-Channel Relay Module is communicating with other modules in the 3500 rack.
CH Alarm LED	Illuminated when Relay channel is in an alarm state.
Relay Type	Single-pole Double-throw (SPDT)
Relay Environmental Sealing	Epoxy-sealed
Relay Arc Suppressor	250 Vrms Installed as standard
Relay Contact Life	10,000 cycles
Relay Operation	Four groups of four channels are switch selectable for Normally De-energized (ND) or Normally Energized (NE) operation.

Physical

Main Module	
Dimensions (height x width x depth)	241 mm x 24.4 mm x 242 mm (9.50 in x 0.96 in x 9.52 in)
Weight	0.7 kg (1.6 lb)
I/O Module	
Dimensions (height x width x depth)	241 mm x 24.4 mm x 99.1 mm (9.50 in x 0.96 in x 3.90 in)
Weight	0.4 kg (1.0 lb)

Rack Space Requirements

Main Module	1 full-height front slot
I/O Modules	1 full-height rear slot

Contact Ratings for Standard Systems

Standard Relays

Min Switched Current	100 mA @ 5 Vdc
DC Specifications (Resistive Load)	
Max Switched Current	5 A
Max Switched Power	70 W @ 24 Vdc 10 W @ 48 Vdc 9 W @ 60 Vdc
Max Switched Voltage	125 Vdc
AC Specifications (Resistive Load)	
Max Switched Current	5 A
Max Switched Power	1200 VA
Max Switched Voltage	250 Vac

	WARNING
	**HAZARDOUS VOLTAGE** **RISK OF ELECTRIC SHOCK OR BURN** When you connect the field wiring to the 3500/3316-Channel Relay Module, conductors may be exposed, creating a shock hazard at high voltages.

Contact Ratings for Failsafe Systems and Hazardous Area Systems

Standard Relays

Min Switched Current	100 mA @ 5 Vdc
DC Specifications (Resistive Load)	
Max Switched Current	5 A
Max Switched Voltage	30 Vdc

- Minimum switched load for standard (silver) contacts is 100 mA @ 5 Vdc.
- Minimum switched load for Low Current (gold-plated) contacts is 1 mA @ 1 Vdc.

	WARNING
	**EXPLOSION HAZARD** **RISK OF BODILY INJURY** Disconnect power prior to servicing. Do not disconnect while circuit is live unless area is known to be non-hazardous. Consult manual prior to servicing.

Contact Ratings for Special Low Current Relay Applications

Low Current Relays

DC Specifications (Resistive Load)	
Min Switched Current	1 mA @ 1 Vdc
Max Switched Current	100 mA @ 48 Vdc

Specific to AC up to 120VAC:

- The Minimum switching current for Gold plated is 1m A
- The maximum switching current before damaging the Gold relays is 5m A

For relay contact selection, see Front and Rear View of the 3500/33 16-Channel Relay Module on page 8.

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

Maritime

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

ABS Rules for Condition of Classification, Part 1

- Steel Vessels Rules
- Offshore Units and Structures

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

Ex 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 Information

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

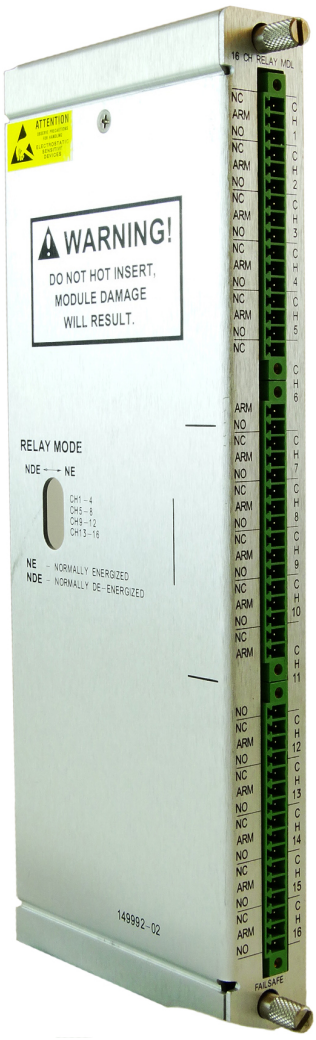
For additional technical documentation, please log in to bntechsupport.com and access the Bently Nevada Media Library.

3500/33 AA-BB

A: Output Module	
01	16-Channel Relay Output Module
02	16-Channel Failsafe Relay Output Module
03	Low Current 16-Channel Relay Output Module
04	Low Current 16-Channel Failsafe Relay Output Module
B: Hazardous Area Approval Option	
00	None
01	cNRTLus (Class 1, Division 2)
02	ATEX / IECEx / CSA (Class 1, Zone 2)

Spares

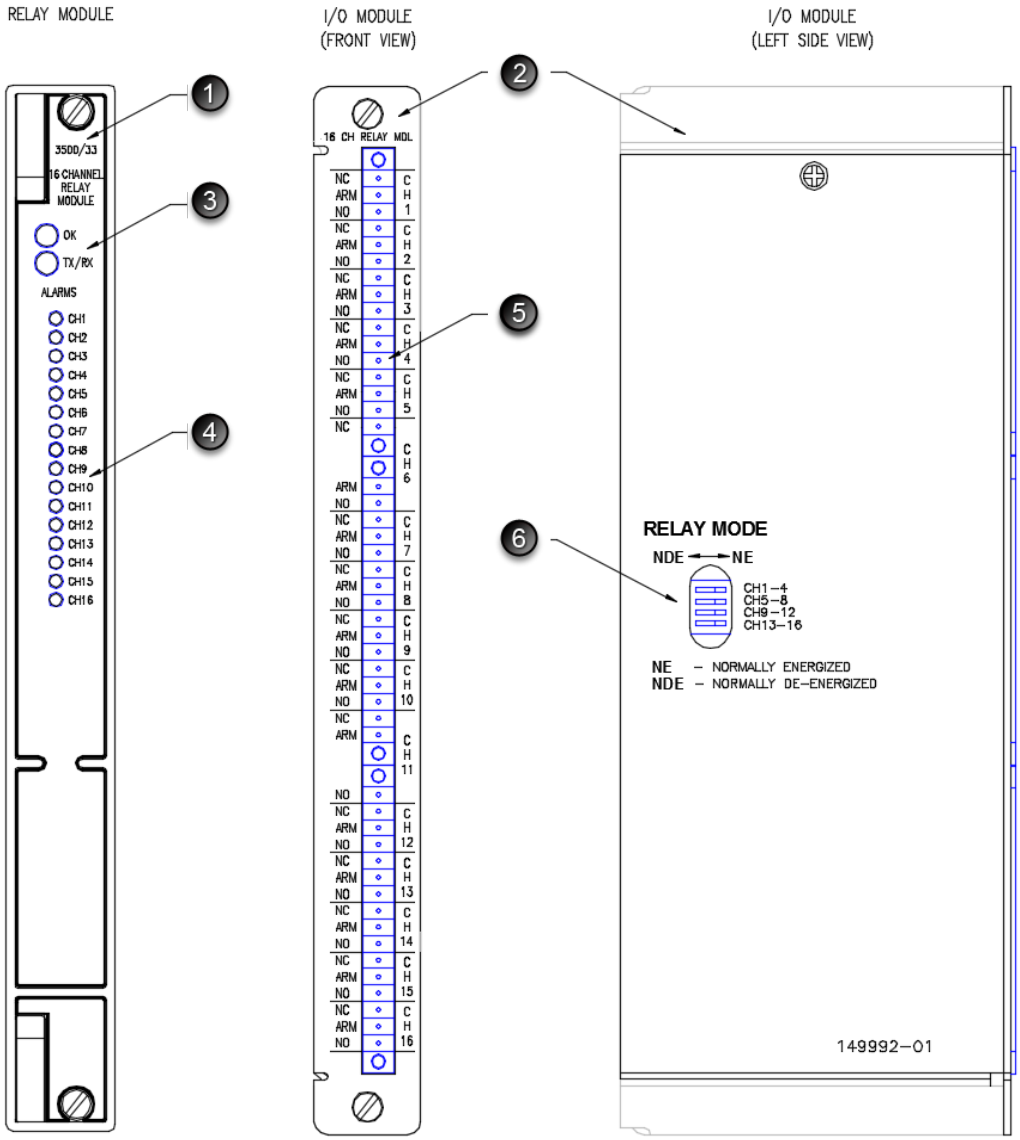
149986-01	Spare 16-Channel Relay Control Module
149992-01	Spare 16-Channel Relay Output Module
149992-02	Spare 16-Channel Failsafe Relay Output Module
149992-03	Spare 16-Channel Low Current Relay Output Module
149992-04	Spare 16-Channel Low Current Failsafe Relay Output Module
04425545	Grounding Wrist Strap (single use)
162291	16-Channel Relay Module User Guide
00580453	Connector Header Internal Termination 16-position Green
166M2381	Connector Header Push-in-Spring Type (Alternative for PN 00580453)



Ordering Considerations

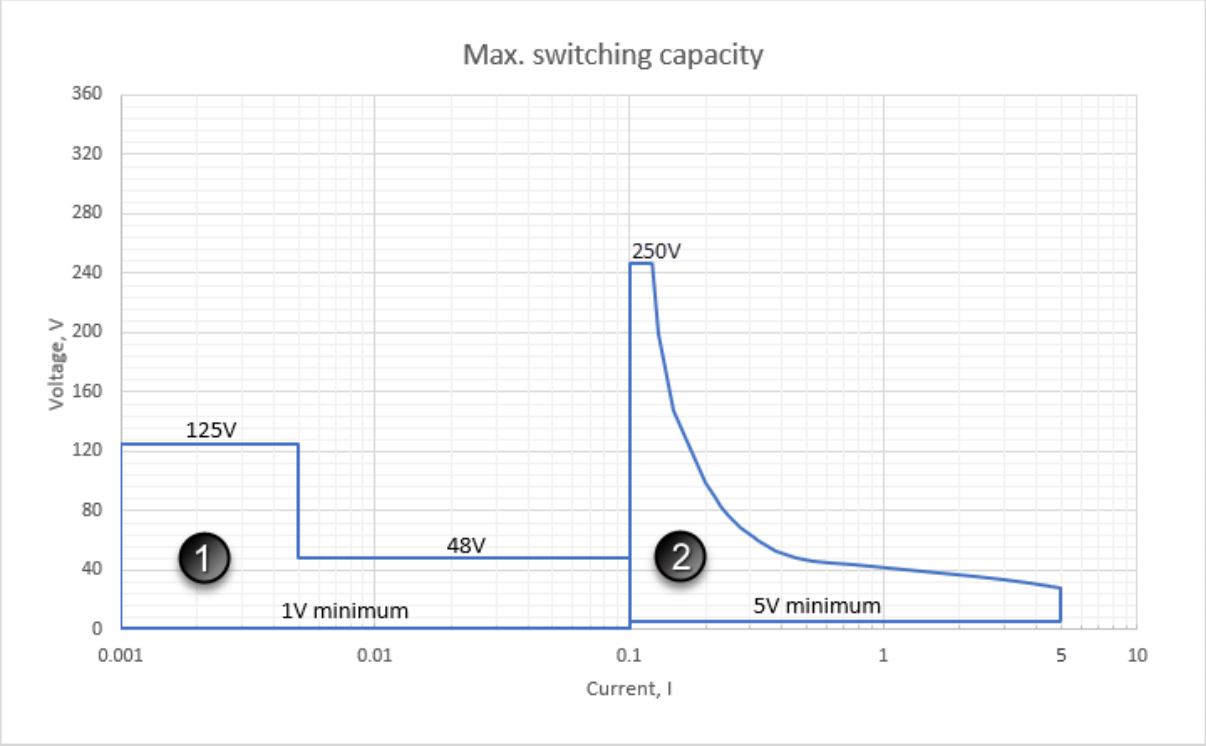
- The 3500/33 16-Channel Relay Module requires the 3500 Rack Config, version 3.3 or later.
- The 3500/33 requires the 3500 Data Acquisition Software, version 2.40 or later.
- The 3500/33 16-Channel Relay Module requires the 3500 Data Display Software, version 1.40 or later.
- When ordered with the multiple approvals option (-02), the 3500 monitor is certified to Zone 2 standards, including ATEX and North American zones.
- The Zone 2 standards specify increased spacing requirements at higher voltages. The 3500/33 16-Channel Relay Module does not meet these spacing requirements. Thus, the module ordered with the multiple approvals option is limited to a lower voltage than those with the other approvals options.
- Using higher voltages violates the hazardous area certificates associated with the multiple approvals option.
- The North American Division 2 standards associated with the CSA-only approvals option (-01) have been de-rated to 30 Vrms to comply with 61010-1 type test requirements.
- If the 3500/33 16-Channel Relay Module is part of a functional safety (SIL) system, the functional safety certificate requires the restricted voltage. Higher voltages are not allowed for functional safety (SIL) systems.

Graphs and Figures



1. Relay Module
2. I/O Module
3. Status LEDs
4. Relay Channel LEDs
5. Relay Contacts
6. Relay Mode Selection Switch

Figure 1: Front and Rear View of the 3500/33 16-Channel Relay Module



1. Low Current Output Modules (Ordering options A03 and A04) use gold-plated relay contacts
2. Standard Output Modules (Ordering options A01 and A02) use silver relay contacts

If the application is at the transition between the low current region and the high current region, the most appropriate choice is to select the Low Current option (with gold-plated contacts). If the gold plating is damaged by excessive load, the contacts will still behave as standard silver contacts.

Figure 2: Relay Contact Selection for DC Loads

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