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COMPLIANCE

Underwriters Laboratories (UL)

Fire Alarm Subassembly
Kentec Electronics Ltd

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Installation Manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Any changes or modifications not expressly approved by Kentec Electronics Ltd could void the user's authority to operate this equipment under the rules and regulations of the FCC.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Installation

Install this product in accordance with NFPA 13, NFPA 72, NFPA 70, and NEC 70 and all local codes.

All field wiring should be installed using fire rated cables according to the NFPA 72. Riser conductors shall be installed in accordance with the survivability from attack by fire requirements in National Fire Alarm Code, NFPA 72, Section 12.3. Riser conductors shall employ either a 2 hour rated cable system, or meet requirements approved by the AHJ.

INTRODUCTION

Technical Support

For technical support, contact Kentec Electronics, Ltd at +44 (0)1322 222121 or techsupport@kentec.co.uk.

Prior to contacting technical support, have the following information available:

- Product part number
- Purchase order or order number
- Product serial number
- Current function of the product
- Expected function of the product
- Installation of the product

Return Material Authorization (RMA)

Contact Technical Support to obtain an RMA for any product to be returned. Returns will not be accepted without an accompanying RMA number. An RMA number is assigned when:

- Tech Support acknowledges a possible product failure.
- A product was damaged during shipping
- An incorrect product was shipped
- An order was placed using an incorrect part number *
- An order was placed using an incorrect part quantity *
- An order is no longer required *

* Restocking fees may apply.

All returned products are tested to confirm operating failures experienced in the field. If the product is found to be functional, contractors must absorb expenses for return shipping, as well as the cost and shipping of the advanced replacement product.

Prominently display the RMA number on all packages sent for return.

Ship all return products to:

Attention: RMA # _____
Kentec Electronics, Ltd
Units 25-27 Fawkes Avenue
Questor, Dartford
Kent. DA1 1JQ
United Kingdom

Warranty Service

Technical Support can replace or repair a defective product when the original purchase is within the warranty period defined in the sales contract. Check your contract for more information, or contact your sales representative about your specific warranty period.

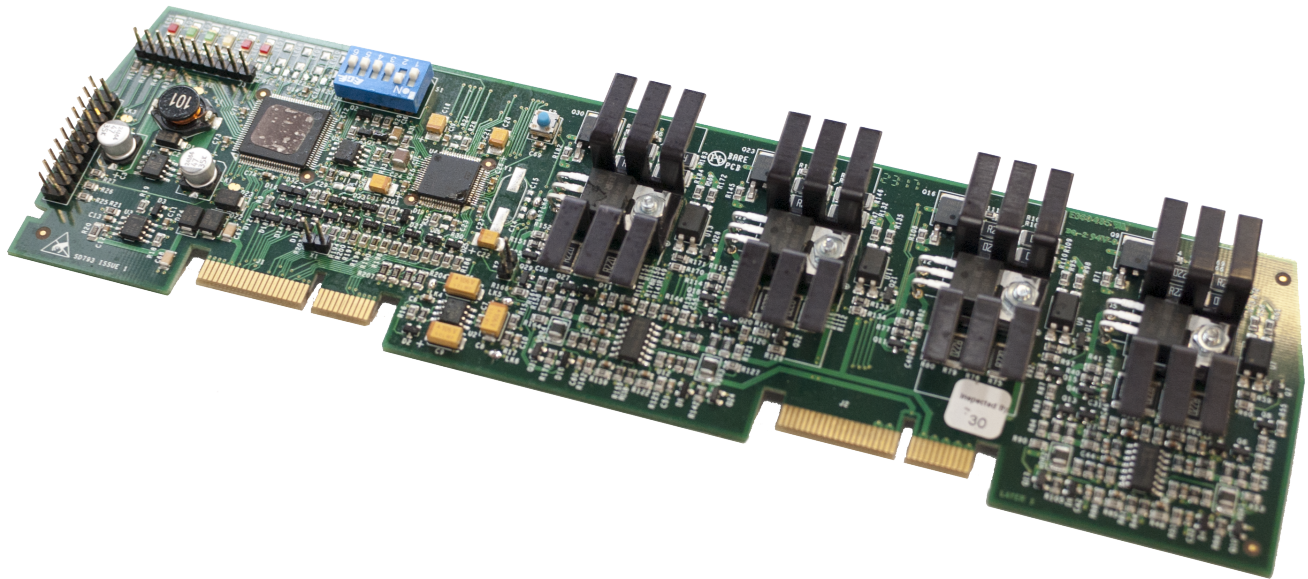
Advanced Replacements

Products that fail to operate in the field can be replaced quickly using the advanced replacement process. The advanced replacement process is available to all contractors who maintain an acceptable line of credit.

Initiate the advanced replacement process by requesting an RMA number from a Tech Support representative. Advanced replacements can be shipped to your location when the product is covered under warranty and when a replacement product is in stock.

- Advanced replacements can be expedited at the request of the contractor. Shipping costs associated with this process are the responsibility of the contractor.
- Products returned using the advanced replacement process must be received within 30 days of the RMA issue date.

OVERVIEW



4 Channel NAC Module (S793)

The 4 Channel NAC panel modules are typically used in applications that require more than the standard panel NAC outputs. Each of these modules adds 4 additional supervised NAC outputs, each of which can be individually programmed.

These modules may be mixed with 16 Channel I/O modules, 8 Channel Conventional Zone modules, or 8 Channel Relay modules to provide a very flexible system of I/O to satisfy almost any requirement. All inputs and outputs are configurable in the same way as devices connected to the loops and all may contribute to, or be acted upon, by cause and effect logic.

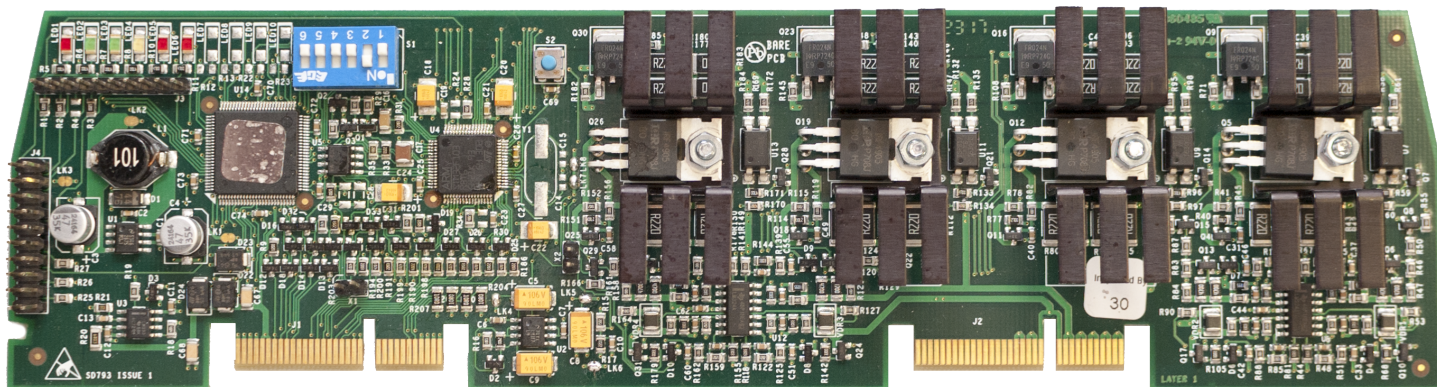
Package Contents

- (1) Installation sheet
- (1) Wiring Terminal Labels

- (1) S793 4 Channel NAC Panel Module
- (4) End-of-Line Diode (S2029)

INSTALLATION

This section explains the installation procedure for the 4 Channel NAC Panel Module.



- ☐ Using Loop Explorer 2, add the panel module to the existing configuration and configure it as required for the system. For detailed information on the configuration settings, refer to the [Configuration](#) section.
- ☐ Notify the monitoring center and location security that the Taktis Fire Alarm Control Panel will be temporarily out of service.
- ☐ Remove the module from its packaging and check its contents.
- ☐ Set the address of the module as configured in Loop Explorer 2. Refer to [Setting the Address](#) for details.
- ☐ Determine the slot (D or higher) where the panel module will be installed and place the provided sticker label on the corresponding field terminals.
- ☐ Connect field wiring and install appropriate end-of-line diodes (included with module).
- ☐ Transfer the new configuration from Loop Explorer 2 into the panel.
- ☐ Wait for the "Sending configuration to panel" (in LE2) and "Saving configuration" (on the panel) steps to complete.
- ☐ Remove AC and battery power from the panel.
- ☐ Remove the black plastic cover.
- ☐ Install the module into selected slot on the Main Back Board or an Extension Board of the panel.
- ☐ Restore AC and battery power.
- ☐ Wait for the panel start-up process to complete. Refer to the **Taktis Fire Alarm Control Panel Installation Manual (MAN-1431KE)** for more information.
- ☐ Test communication from the panel via the [LED Status Indicators](#)
- ☐ Resolve any troubles related to the new NACs.
- ☐ Activate each circuit and verify that all connected devices function properly.
- ☐ Replace the black plastic cover.

Install this product in accordance with NFPA 72, the National Electrical Code, and all local codes.

IMPORTANT! The module must be installed by personnel familiar with electronic components. Electronic components within the module are vulnerable to damage from electrostatic discharge. Ground straps must be worn by installers before handling to prevent electrostatic discharge damage.

Before You Begin

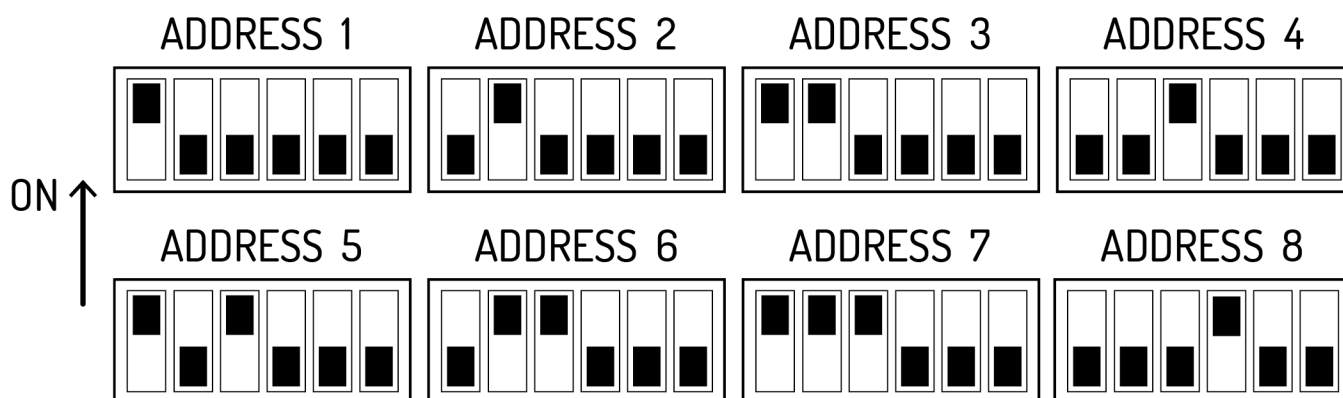
Before you begin the installation, take a few minutes to review the installation information, gather the required items, and complete the tasks listed below to make the installation as quick and easy as possible:

1. Acquire the following items that are not included with the 4 Channel NAC Module, but may be required for installation:
 - **Ground Strap** - A ground strap is required for handling circuit boards. The ground strap is not provided in the packaging of the 4 Channel NAC Module.

Setting the Address

Panel modules should use addresses 1-8. Each panel module of the Taktis Fire Alarm Control Panel must contain a unique setting before being connected to the Main Back Board. The binary setting of the DIP switch sets the specific address for the panel module. The numeric order of the address setting between modules does not impact operation, but each panel module must be assigned a separate / unique address.

The black portion of the DIP switch identifies the switch actuator.



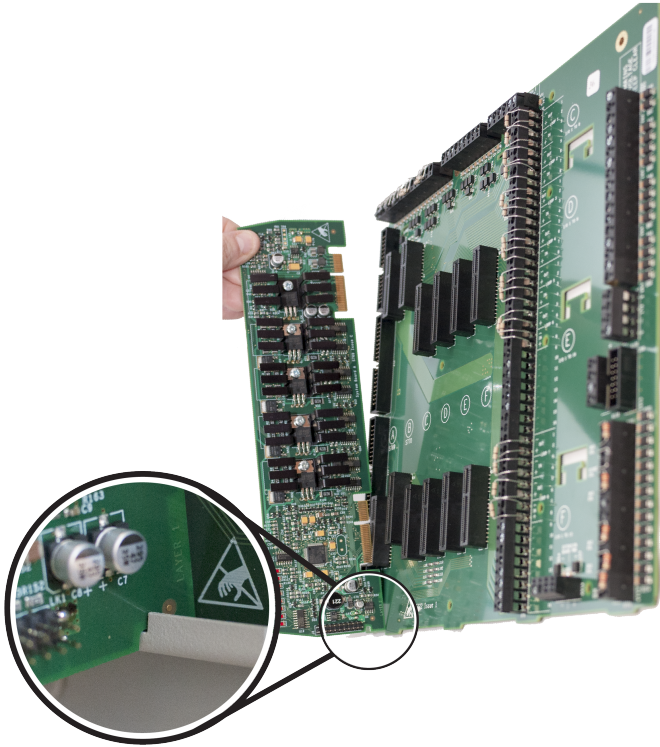
Placement

To install modules on the Taktis Fire Alarm Control Panel:

1. Disconnect AC power and standby batteries prior to performing the module installation.
2. Remove the retaining screw and plastic cover.



3. Remove the panel module from the protective packaging using adequate electrostatic protection.
4. Point the conductor side of the panel module toward the backplate.
5. Insert the notched end of the panel module in the metal guide notch of the backplate at an angle, as shown.



The photo above is an example of panel module placement and may not be representative of the specific module and slot placement described in this guide. Refer to the checklist above for details on placement.

6. Rotate the panel module until all conductors are securely inserted into connectors of the Main Back Board.
7. Replace the cover onto the Main Back Board.
8. Reconnect the batteries and restore AC power.

Wiring

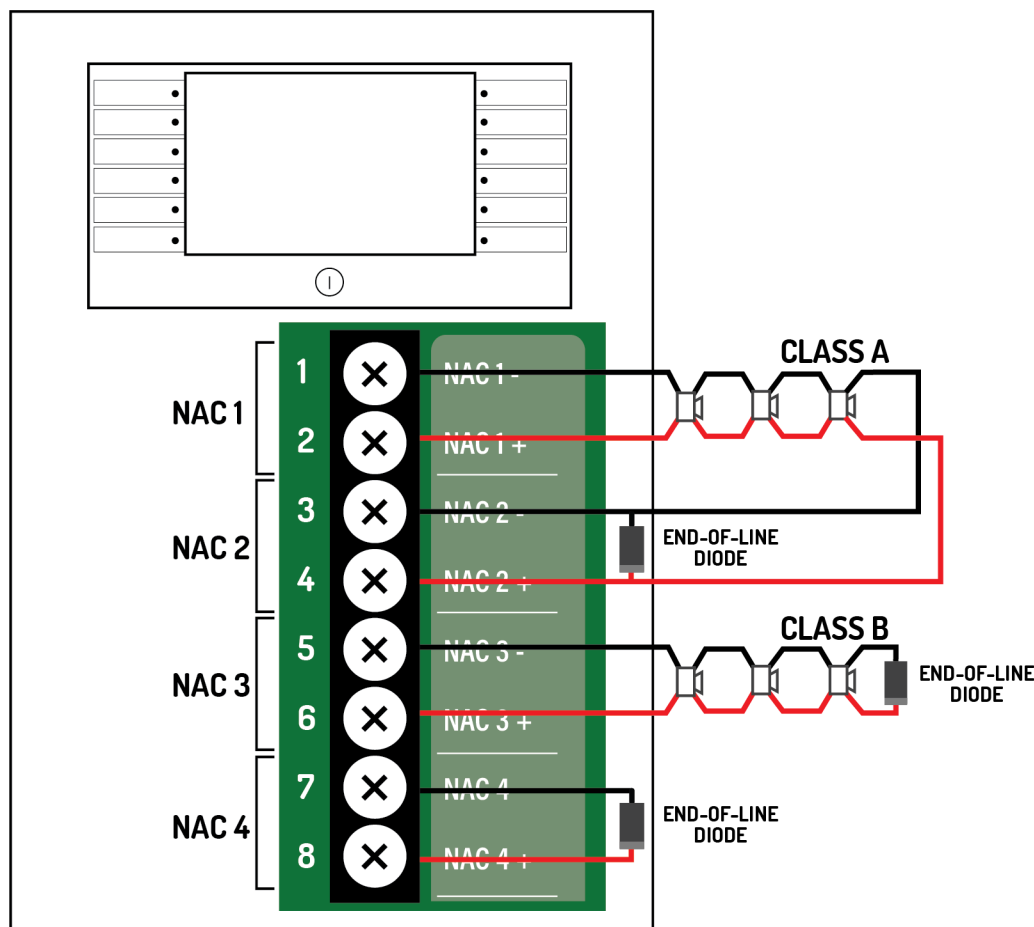
Circuits

The 4 Channel NAC panel module has 4 supervised output circuits (Class B). Pairs of these output circuits can be configured to form individual Class A circuits. Class A operation can be assigned to the first pair of notification appliance circuits (NAC1&2) or the second pair (NAC3&4) or both pairs.

By default, all circuits are programmed Class B. When circuits are wired Class A but not programmed to match (and vice versa), circuits will report wiring trouble.

Field Wiring

All devices on a given circuit need to be connected in a daisy-chain. For Class A circuits, only one of the two End-of-Line diodes is used. Install the diode on the +/- terminals of the second NAC in the pair. For Class B circuits, the End-of-Line diode must be placed after the last device on the circuit. Unused circuits must be terminated with an End-of-Line diode or they will report a trouble condition.

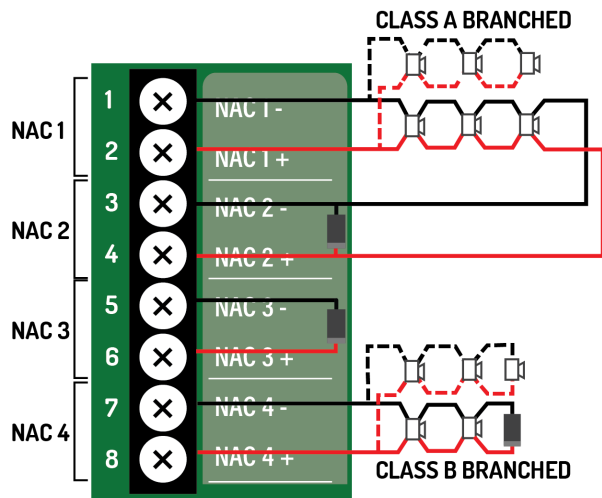


Refer to the **Taktis Fire Alarm Control Panel Installation Manual (MAN-1431KE)** for cabling specifications.

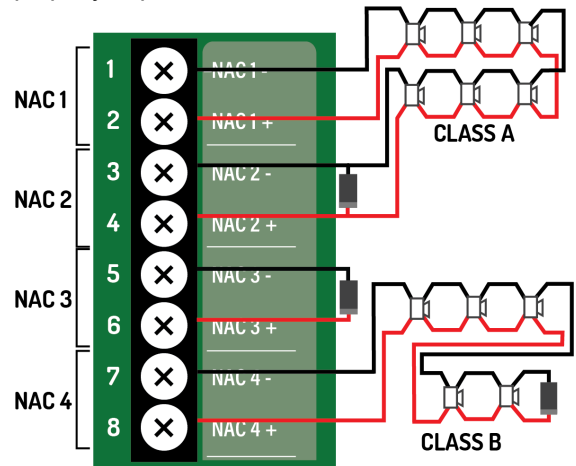
Branching of Class A or Class B notification appliance circuits prevents proper circuit supervision and is not permitted by UL and most AHJs.

IMPORTANT! Dotted lines indicate unsupervised branch

circuits.



Reroute wiring as shown, to ensure all wiring is properly supervised.



Testing the Installation

1. Confirm communication from the panel via the LED status indicators. LED indicators provide functional and diagnostic information as shown below.
2. Resolve any troubles related to the new NACs.
3. Activate each circuit and verify that all connected devices function properly.

Refer to the [Troubleshooting](#) section for information on clearing abnormal conditions.

LED Label	Name	Color	Description
LED 1	Heartbeat	Red	Flashes every 2 seconds when the board is operating.
LED 2	Rx Comms	Green	Flashes every 2 - 3 seconds when the module is receiving data from the panel.
LED 3	Tx Comms	Green	Flashes every 2 - 3 seconds when the module is transmitting data to the panel.
LED 4	Trouble	Yellow	Flashes every 2 seconds when one or more outputs have a trouble condition.
LED 5	Input Active LED	Red	Not used.
LED 6	Output Active LED	Red	Flashes every 2 seconds when one or more outputs are active (supplying 24V).

CONFIGURATION

The 4 Channel NAC Panel Module can be configured via LE2 or the Panel GUI.

NOTE The panel module must be added to the configuration via Loop Explorer 2 or an Autolearn on the panel.

NAC Module Properties

1. Set the **Circuit Current Limit**, between 0.5 A- 2.3 A. This is the maximum current that can be provided by each circuit. This setting applies to all output circuits of this module, whether Class A or Class B. The default setting is 2.3 A.

NOTE The maximum operating current for all 4 channels combined is 5 A.

2. Set the **Wiring Class** to A or B for each circuit. Wiring class can only be selected in output pairs. When Class A is selected, the output pair forms a single circuit. When Class B is selected, the output pair forms two independent circuits.

By default, all circuits are programmed Class B. When circuits are wired Class A but not programmed to match (and vice versa), circuits will report wiring trouble.

Channel Properties

4 Channel NAC Module - NAC 01

Output Properties | **Disablesments**

Options

- ☐ General Alarm
- ☐ CO Output
- ☐ Auxiliary Output
- ☐ Pre Alarm Output
- ☐ Supervisory Output
- ☐ Trouble Output
- ☐ Security Output
- ☐ Day/Night Sensitivity Output
- ☐ Delay Mode Output
- ☐ One Shot Mode
- ☐ Timer Output: None (Classified as Audible Device)

Alarm Silence

☐ Silenceable

Output Invert

☐ Off upon activation, normally On

Delay

☒ Ignore Global Delays

First Delay: 0 Min:

Second Delay: 0 Min:

Duration

Hour: 0 Minute: 0 Seconds: 0

Notification Circuit Parameters

☐ Strobe Output ☐ Strobe Silence ☒ Pattern Output

Pattern

Continuous

Note: Uncheck General Alarm if Output is to be controlled only by Cause & Effects.

Location Text

Map to Zone: 0

Save **Cancel**

3. **Notification Circuit Parameters.** The Notification Circuit Parameter should be selected first because it defines which of the three broad categories the output will use. The three categories are:

- [Pattern Output \(default\)](#)
- [Strobe Output](#)
- [Power Output](#)

Pattern Output

To configure a continuous 24 V output (i.e., to power one or more notification appliances that are not required to be synchronized) during activation, select Pattern Output, then Continuous from the Pattern drop-down menu.

To configure a pulsing 24 V output (i.e., to power a simple bell) during activation, select Pattern Output, then Panel Global Pattern from the Pattern drop-down menu. This selection will follow the panel pattern setting, configured in the panel settings.

Strobe Output

To use a built-in manufacturer's synchronization protocol, select Strobe Output. By default, the Alarm Silence button on the panel will silence only horns. Select Strobe Silence to configure the Alarm Silence button to silence the horns and strobes.

Power Output

To configure the output to supply power for a non-NAC application, deselect Strobe Output and Pattern Output. The following options are available from the AUX 24V DC drop-down menu.

- Continuous Constant Power - Continuous constant power provides a voltage output comparable to AUX 24V.
- Door Holder - Door Holder outputs lose power during fire alarm conditions and/or during AC power loss.
- Resettable - Resettable causes power loss that lasts 4-5 seconds each time the panel is reset.

NOTE Refer to [NAC Power Output Modes](#) for more information on these options.

4. Select the desired **Output** options. This selection will activate the circuit when the selected event(s) occur. To use cause and effect programming, LE2 must be used for configuration and all output options must be deselected.
5. Set whether the output will be **Silenceable**. Each NAC is configurable in reaction to the Alarm Silence button on the front panel. Check the box if the NAC should return to normal standby when Alarm Silence is active.
6. Each output circuit is normally Off, but On upon activation. Selecting **Output Invert** will set the circuit to be normally On, but Off upon activation.
7. **Ignore Global Delays**. This setting controls the delay of the activation of the output. If unchecked, it will activate based on the Global Delay settings in the Panel Settings. If checked, it will activate based on the settings in the **First Delay** and **Second Delay** fields. **Second Delay** is only visible if the output is silenceable. For UL compliance, both delays must be set to 0.

NOTE If checked,

- the initial activation of the output will be delayed based on the settings in the First Delay field.
- if the output is silenceable, subsequent re-sounding of the output will be delayed based on the settings in the Second Delay field.

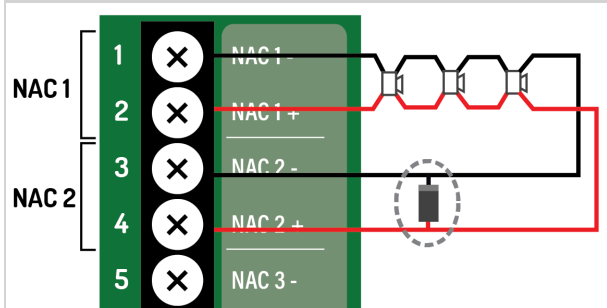
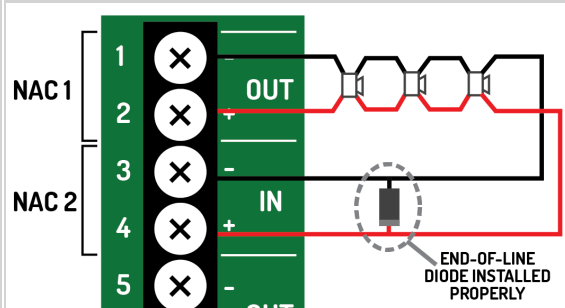
8. Enter a **Duration** to select how long an output will be active. If set to 0, it will remain active until the system is reset. For UL compliance, this field should be set to 0.
9. Set the **Location Text**, up to 80 characters. This text is displayed when the circuit reports trouble.
10. Use the **Map to Zone** field to set the zone number for the circuit. Allowable values are 0-2000.

UL Compliance Limitations

In order for the product to comply with the requirements in the **Standard for Control Units and Accessories for Fire Alarm Systems, UL 864 10th Edition**, certain programming features or options must be limited to specific values or not used at all as indicated below.

Field	Configurable Range	UL Permitted Value / Range
Duration	0 seconds - 23 hours, 59 minutes, 50 seconds	0 seconds
First Delay	0 minutes - 10 minutes	0 minutes
Second Delay	0 minutes - 10 minutes	0 minutes

TROUBLESHOOTING

Problem	Solution(s)
<p>Open Circuit. End-of-Line Diodes are installed backwards, causing a trouble event: "NAC Output # has a full open circuit trouble".</p> 	<p>Install the End-of-Line Diode in the proper orientation.</p> 
<p>Open Circuit. A break in the wiring pathway exists and causes a trouble event: "NAC Output # has a full open circuit trouble".</p>	<p>Investigate the wiring problem and correct any interruptions in the circuit. When the wiring issue is resolved, the trouble on the panel will restore.</p>
<p>Trouble NAC Output # has a Voltage Limit Trouble. Voltage on the circuit is dropping excessively. When NACs are activated, they will shut down within milliseconds of activation. This process will repeat 3 times and then NACs will shut down completely and the panel will display a Voltage Limit Trouble. This is typically caused by an excessively overloaded circuit.</p>	<p>Recalculate the load on the system and remove the number of devices necessary to ensure the circuit's current limit is not exceeded. To test the current limit, activate the NAC circuits and verify proper operation. If panel posts a Current Limit Trouble, refer to NAC Current Limit Trouble below.</p>
<p>Short Circuit. A connection exists between a positive and negative conductor on the wiring pathway.</p>	<p>Investigate the wiring, looking for an obvious cause of a short circuit. If not obvious cause exists, perform the following procedure.</p> <ol style="list-style-type: none"> 1. Disconnect the field wiring from the panel (both ends of a Class A circuit). The trouble should change to an Open Circuit Trouble. 2. Break the connection at the halfway point of the wiring pathway. 3. Using an ohm meter, determine which half of the path

Problem	Solution(s)
	<p>contains the short.</p> <ol style="list-style-type: none"> Repeat steps 2 and 3 until the short is located. Repair the cause of the short, reconnect all of the breaks, and reconnect the field wiring to the panel.
<p>Wiring Trouble. If a wiring trouble occurs when NACs are activated, the likely cause is an excessive wire resistance condition that exists on an active Class A circuit, resulting in reduced voltage at the IN terminals of the panel. This results in a trouble being reported and the panel powering both the IN and OUT terminals.</p> <p>This type of trouble will clear when Reset System is pressed on the panel.</p>	<p>If the wiring path is excessively long, a lower gauge wire may need to be used. Use the calculator in Loop Explorer 2 to verify that the appropriate wire was used during installation.</p> <p>If the appropriate wire was used, there may a high resistance connection somewhere on the circuit.</p> <ol style="list-style-type: none"> To locate the cause, disconnect the field wiring from the IN terminals. Activate the circuit. Determine whether the last device on the circuit is still operational. If not, locate the last operational device along the path. The voltage drop is likely between the operational and non-operational device. Move to step 6. If all devices are operational, measure the voltage at the OUT terminal and the IN terminal for comparison. Starting from the OUT terminal, measure the circuit voltage at various locations until a significant voltage drop is located. Repair the loose connection between these two devices. If no loose connections are found, temporarily run new wire between the two devices and determine if this corrects the trouble. If this corrects the issue, permanently replace the wire between the two devices.
<p>Wiring Trouble. If pressing Reset System does not clear the trouble, the likely cause is that the panel has detected Class A wiring on a circuit programmed Class B OR Class B wiring on a circuit programmed Class A.</p>	<p>Correct the programming so that it matches the wiring configuration.</p>
<p>Trouble NAC Output # has a Current Limit Trouble. Devices on the circuit are exceeding the current limit. When NACs are activated, they will shut down within milliseconds of activation. This process will repeat 3 times and then</p>	<p>Verify the programmed current limit. If the limit is set correctly, verify that the installed devices do not exceed the programmed current limit. Then, check for defective devices</p>

Problem	Solution(s)
NACs will shut down completely and the panel will display a Current Limit Trouble.	on the circuit.

SPECIFICATIONS

This appendix provides electrical and environmental specifications for the 4 Channel NAC Panel Module.

Overall Module Electrical Ratings

Supply Voltage Range	24 V DC
Quiescent Current	28 mA
Maximum Current (with MAX NAC Load)	5A
Maximum Current (No Load)	40mA ¹

¹ For use with load calculations.

Operating Environment

Dry indoor use only.

Temperature Range	-5°C – 49°C or 23°F – 120°F
Relative Humidity	Up to 95%, non-condensing

Physical Specifications

Dimensions	234.6mm x 62.8mm or 9¼" x 2½"
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NAC Outputs

Each NAC, whether Class A or Class B, has the following ratings:

AUX Power Output Range	Channels configured to power non-NAC devices are rated special application 20V - 26.4V at 2A max, power-limited. Refer to NAC Power Output Modes for compatible devices.
Current per NAC Output	2.3 A per circuit, power-limited
Fuse (Electronic)	Average Current Limit: 0.5 to 2.3 A, programmable Peak Current Limit: 3.0 A, fixed per channel
Supervision	Reverse-polarity
End-of-Line Device	Diode (S2029)
Short Circuit Threshold	130 Ohms +/- 20%
Maximum Line Impedance	4V loss (load-dependent)

Regulated NAC Outputs

NAC outputs operate in a regulated mode when conforming to specific levels of continuous or pulsed DC. NAC outputs meet requirements for regulated levels when the output current does not exceed the constraints described below.

Regulated Non-Pulsing Output Current	Currents cannot exceed 2.3A from any single NAC output: <ul style="list-style-type: none"> Combined currents of all four NAC outputs cannot exceed 5A
	NOTE System must not exceed maximum power supply output rating.
Regulated Pulsing Output Current	<ul style="list-style-type: none"> 5.25A Power Supply - Regulated pulsing DC output = Max 500mA total across all NACs 10.25A Power Supply - Regulated pulsing DC output = Max 600mA from any NAC output, Combined currents of all four NAC outputs cannot exceed 2.4 A
	NOTE System must not exceed maximum power supply output rating.

Refer to Specifications for operating NAC outputs in the regulated mode.

Special Application NAC Outputs

NAC outputs can operate in a special application mode. NACs configured for special application have specific loading limitations, as detailed below.

Manufacturer	Maximum No. of Devices per Channel	Maximum Current Draw per Channel	Power Supply	Maximum Current Draw Across All NACs ¹
Amseco	26	2.3A	S406 5.25A	2.5A
			S408 10.25A	5A
Gentex	29	2.3A	S406 5.25A	2.5A
			S408 10.25A	5A
System Sensor	20	1.32A	S406 5.25A	2.1A ¹
			S408 10.25A	5A
Wheelock	38	2.3A	S406 5.25A	2.5A
			S408 10.25A	5A

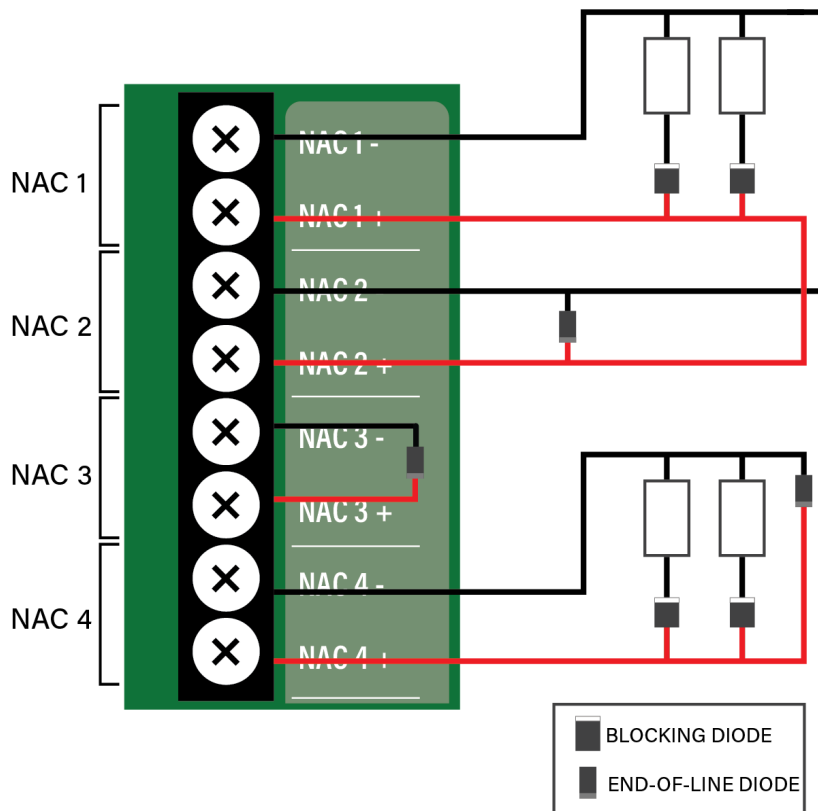
¹ When System Sensor is used in combination with any other manufacturer, the 2.1A limit applies across all NACs.

Refer to Specifications for operating NAC outputs in the special application mode.

NAC Power Output Modes

Connections for NAC Power Output Modes

There are 3 NAC power output modes: continuous constant power, door holder, and resettable. NAC power outputs can be wired as 2-wire or 4-wire circuits as shown. When wired using 2-wire configuration, select "Class B" in the configuration menu. When wired using 4-wire configuration, select "Class A" in the configuration menu.



When using a NAC in a power output mode, each device requires a blocking diode (not provided) to be connected in series. These diodes can be any of the following:

- Diodes, Inc., Part No.: 6A1-T
- SMC Diode Solutions, Part No.: 6A1TA
- Micro Commercial Co., Part No.: 6A1-TP
- Any equivalent standard silicon diode with parameters of:
 - Radial Lead Diameter: 1.0 mm minimum
 - Peak Reverse Voltage: 40 V minimum
 - Average Forward Rectified Current: 6.0 A minimum

This example shows:
NAC 1 and 2 combined to form a 4-wire circuit, and
NAC 4 wired as a 2-wire circuit.

Continuous Constant Power

Regardless of the wiring schema, when the NAC is used in **continuous constant power** mode, it is a special application output with a voltage range of 20.0 - 26.4V. It can be used to power ASB and ASB-L sounder bases.

When powering these devices, the circuit acts as a Class B pathway. The wiring loss must not exceed 4V. If devices other than those listed are powered by this circuit, the circuit may not meet the Class B supervision requirements.

Door Holder

Regardless of the wiring schema, when configuring for **door holder**, the circuit is a regulated 24V output and meets the requirements for a Class D circuit.

Resettable

When the NAC is used in **resettable** mode, it is a special application output with a voltage range of 20.0 - 26.4V. To meet Class B supervision requirements, it must be wired as a 2-wire circuit, have an EOLR-1 as the last device on the circuit, and the relay contacts must be supervised.

It can be used to power the following:

- System Sensor i3 series Models: 4W-B, 4WT-B, 4WTA-B, 4WTR-B, 4WTAR-B, 4WITAR-B
- System Sensor i4 Series Models: COSMO-4W, COSMOD4W
- System Sensor End-of-Line Relay: EOLR-1

The wiring loss must not exceed 8V. Refer to the **System Sensor Installation Instructions** for wiring information.