TM-8 | LONG PID

PRODUCT INSTALLATION DOCUMENT

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SECTION 1: INTRODUCTION

NOTE: Before proceeding, the installer should be familiar with the following documents.

NFPA Standards

- NFPA 72 National Fire Alarm and Signaling Code
- NFPA 70 National Electrical Code
- NFPA 92 Standard for Smoke Control Systems

Underwriters Laboratories Documents:

- UL 864 Standard for Control Units for Fire Protective Signaling Systems
- UL 2017 for General-Purpose Signaling Devices and Systems
- UL 2610 Standard for Commercial Premises Security Alarm Units and Systems
- ULC-S527-19 Standard for Control Units for Fire Alarm Systems
- ULC-S524 - Standard for the Installation of Fire Alarm Systems

Other:

- EIA-232E Serial Interface Standard
- EIA-485 Serial Interface Standard
- NEC Article 250 Grounding
- NEC Article 300 Wiring Methods
- NEC Article 760 Fire Protective Signaling Systems
- Applicable Local and State Building Codes
- Requirements of the local Authority Having Jurisdiction (AHJ)

This product has been certified to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems,

UL 864, 10th Edition. Operation of this product with products not tested for UL 864, 10th Edition has not been evaluated. Such operation

requires the approval of the local Authority Having Jurisdiction (AHJ).

For product compliance, refer to the UL listing cards located on the UL online certification directory at https://iq.ulprospector.com/en/ .

1.1 GENERAL

The TM-8 Transmitter Module offers 8 programmable Form-C relays and either remote station service or municipal box trip.

Four of the programmable Form-C relays are for low-current 2 A applications; the other four are for higher current 10 A applications. The programmable relays are configured using custom control-by-event programming at the Fire Alarm Control Panel (FACP). TM-8 relay contacts can be configured in the FACP's programming tool to reflect each relay's function, including off-site monitoring of specific fire alarm events. Relay 1 is special; its output will indicate off-normal when TM-8 has no power even if reprogrammed.

For remote station monitoring, the TM-8 provides three reverse polarity outputs that communicate Alarm, Trouble and Supervisory messages from the FACP. Supervisory events are a default that can be reprogrammed for other functions using the panel programming tool. When the municipal box connections are used, TM-8 will trip a Local Energy Municipal Box.

TM-8 communicates with compatible fire alarm control systems through the AIO bus. It mounts easily in standard module locations within the cabinet or an external box, including CAB-4/CAB-5 series and ABB/NBB series. The AIO bus supports more than one type of device on the same circuit; refer to the FACP's UL Listing Document for AIO circuit wiring requirements and capabilities. All field wiring connects to removable terminal blocks for easy installation and service.

UL 864 Compliance. This product has been certified to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864 10th Edition. Wiring methods used shall be in accordance with Standard for Installation and Classification of Burglar and Holdup Alarm Systems, UL 681. Installation in accordance with ANSI/NFPA 70.

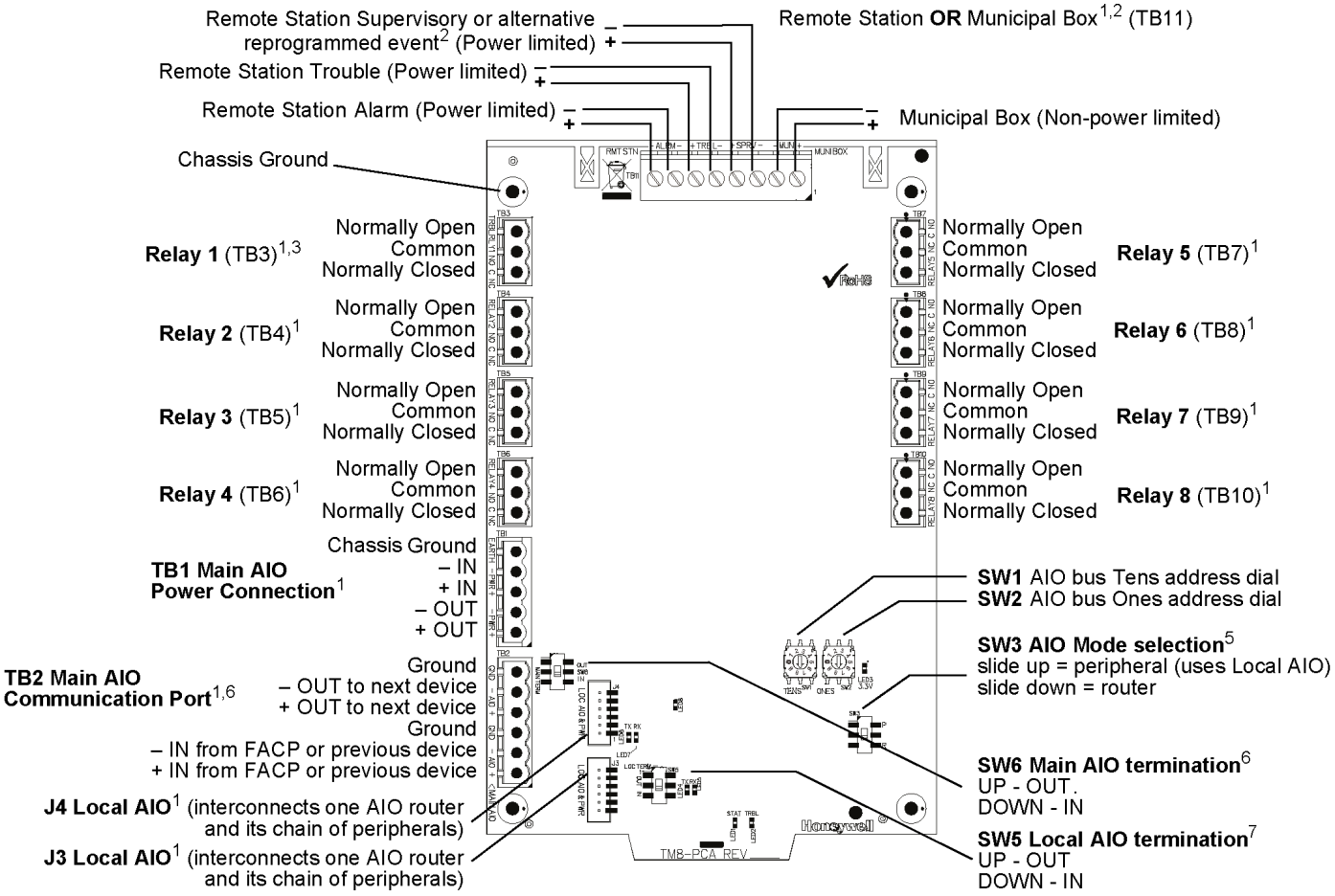


Figure 1.1: TM-8 Board Layout

01. **Power-limiting and supervision:** FACP power and AIO communication is power-limited (Class2) and supervised. Municipal Box connection is non-power limited, but is supervised for open circuits and ground faults unless user has programmed TM-8 for isolated power in programming. Remote Station connections are Power-Limited (Class2) and are supervised by the remote station. Relay Circuits are determined by the equipment connected. For details and terminal characteristics, see"3.3 UL Power-limited (Class 2) Wiring Requirements" on page 13.

02. **Remote Station and Municipal Box:** Both functions cannot be used simultaneously. Remote Station Supervisory circuit can be reprogrammed for other functions using the panel programming tool.

03. **Relay 1:** Function can be reconfigured in the panel programming tool; output will indicate off-normal when TM-8 has no power.

04. **Wiring methods used shall be in accordance with:** UL 681, Standard for Installation and Classification of Burglar and Holdup Alarm Systems, and UL 827, Standard for Central Station Alarm Services. Install in accordance with ANSI/NFPA 70 National Electrical Code (NEC).

05. **AIO Mode:** Use SW3 to configure device to function as a router or a peripheral.

06. **Main AIO termination:** For Class B/DCLB operation, enable SW6 for the last router of the Main AIO bus. For Class A/DCLA operation, disable SW6 and return wiring to FACP from last router's "OUT" terminal pins.

07. **Local AIO termination:** Enable SW5 for the router and last peripheral on a Local AIO bus. (Class B/DCLB circuits only).

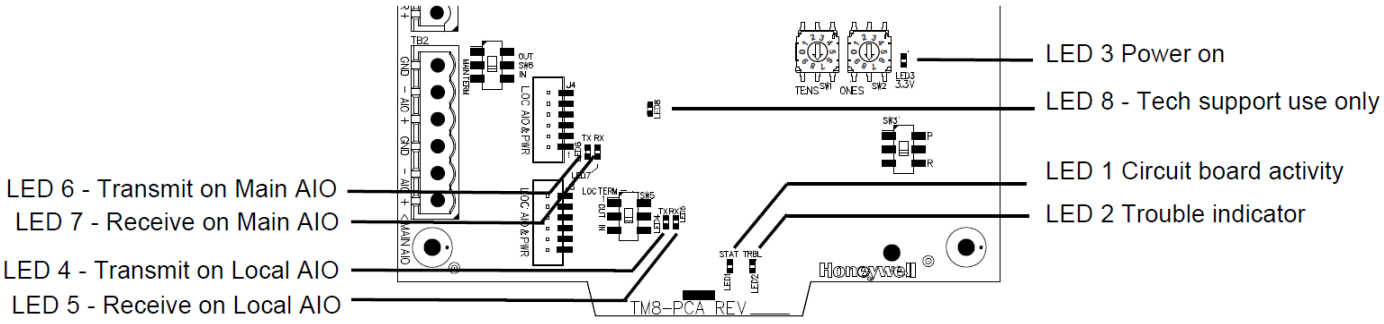


Figure 1.2: TM-8 LED Locations

The following table shows LED functions:

LED	Indicator	State When Active
LED 3	Power Green (normal, board has power)	LED 3 Power Green (normal, board has power)
LED 6	TXE(Main AIO Transmit)	Flickers when data transmits
LED 7	RXE(main AIO Receive)	Flickers when receives data
LED 4	TXI (Internal AIO transmit)	Flickers when data transmits
LED 5	RXI (Internal AIO receive)	Flickers when receives data

STAT(LED 1) and TRBL(LED 2) frequency

State	LED 1	LED 2
	STAT(green)	TRBL(yellow)
Offline	OFF	1Hz
Online (normal)	1Hz	OFF
Enrollment	1Hz	1Hz
Firmware Update	1Hz	2Hz

SECTION 2: SPECIFICATIONS

2.1 POWER REQUIREMENTS & ELECTRICAL RATINGS

The power source must be filtered, non-resettable, 24 VDC listed for fire-protective signaling use. Sources include FACP power supplies, auxiliary power supplies, and on-board power supplies integral to FACP. The power run to the module need not contain a power supervision relay because loss of power is inherently supervised through communication loss (AIO communication loss is registered at the control panel during loss of power to the AIO device). For details and terminal characteristics, see "3.3 UL Power-limited (Class 2) Wiring Requirements" on page 13.

2.1.1. ELECTRICAL RATINGS

Standard Current: 18VDC, 115mA ; 24VDC, 81mA (“System Normal” state with default General Trouble relay and the Remote Station Trouble relay energized.)

Maximum Alarm Current:18VDC, 693 mA; 24VDC, 499mA (All Relays and Municipal Output Energized.)

Input Voltage:18-30 VDC (must be power-limited and non-resettable). Use a regulated, power-limited, compatible power supply that is UL/ULC-Listed for Fire Protective Signaling use.

Main Data Communications Port (TB2): AIO Communications (must be power-limited (Class 2))

Relays: Eight (8) programmable relays (See Table 2.1)

- Low-current Relays 1-4 (TB3-TB6)

  - Maximum switched current (resistive): 2A @ 30 VDC

- High-current Relays 5-8 (TB7-TB10)

  - Maximum switched current (resistive):

- 10A @ 28V DC
- 12A @ 125 VAC
- 6A @ 250 VAC
- 5A @ 277 VAC
- - Maximum switched current (inductive, 0.35 PF):
- 2A @ 28V DC

- 4A @ 125 VAC
- 2A @ 250 VAC

Remote Station: Three (3) isolated reverse polarity outputs (See "3.2.1. Remote Station Connections" on page 11.)

- Maximum current per output: 15mA
- Voltage: 24 VDC nominal

Fire Municipal Box trip (Local Energy) (See "3.2.2. Municipal Box Connections" on page 12.)

- Supervisory current: 250 µA
- Maximum Trip current: 0.35 A
- Maximum Rated Voltage: 26.4 VDC
- Trip coil impedance: 14.5 ohms

2.1.2. PRIMARY AND STANDBY POWER CALCULATIONS

If TM-8 is powered from the control panel, relay power must be considered when calculating the primary and secondary power requirements for the system. Determine the maximum number of relays which can be activated simultaneously given the system configuration and programming and use that in the TM-8 power calculations. TM-8 current draw with all relays activated PLUS current draw of any other AIO device installed on the system must not exceed FACP's power output circuit capacity. Relay current draw depends on system configuration and programming: system designer must determine the maximum number of relays which can be activated.

If the current draw dedicated to the TM-8 must be calculated as a separate figure, refer to the table below:

Circuit	Current Draw
TM-8 Standby	81 mA ("System Normal" state with default General Trouble relay and the Remote Station Trouble relay energized
TM-8 Alarm	85 mA
	Add 9.6mA if TB11 is used for Remote Station Service or Municipal Box
Relays 1-4	8.3 mA per relay*
Relays 5-8	15 mA per relay
Remote Station Supervisory	9.6 mA
* If Relay 1 is used as Trouble relay (default), its current draw is already included in the TM-8 Standby current draw.	

Table 2.1 TM-8 Current Draw Calculations

SECTION 3: WIRING/CONNECTIONS

3.1 AIO CONNECTIONS BETWEEN DEVICES ON THE LOCAL AIO BUS

TM-8 can be a Router on the AIO Bus for the FACP or Network Display, or it can be a Peripheral on the Local AIO bus. AIO device types can be mixed.

Select an appropriate knockout on the enclosure for the wiring to run through and snap it out.Pull all AIO circuit wiring through the knockout into the enclosure and connect to the removable terminal blocks. See the FACP installation document for AIO circuit requirements.

> NOTE: All power must be turned off when connecting the 24 VDC power to the AIO device. Reapply power according to the instructions in the control panel manual.

The Main AIO terminals connect the TM-8 as a router on the FACPs AIO Bus with wiring possible to additional routers. The Local AIO bus connects peripheral devices to the router or to other peripherals. Any AIO device configured as a peripheral will not communicate with the FACP using the Main Data Communications Port. See FACP UL Listing document for AIO specifications. Order cable kit AIO-CBL whenever connecting peripherals. The kit includes three (3) 6" ribbon cables and one (1) 48" ribbon cable.

Terminating the AIO circuit: AIO circuits use switches to enable termination resistors on the last device on the Main AIO circuit and last device on the Local AIO circuit. All other AIO devices should have these switches set to OUT. (See "Figure 1.1: TM-8 Board Layout" on page 6.)

Shielding the AIO circuit: See the FACP installation document for AIO Bus shielding requirements and limitations.

3.1.1. SET ADDRESS AND AIO FUNCTION

Set address and AIO function on each individual board before matching all settings in the FACP programming tool.

- **Use SW1 and SW2** to address the individual board. Turn the arrow with a small flat-head until it points to the correct digit.
  SW1 selects the Tens digit of the address.
  SW2 selects the Ones digit of the address.
- **Use SW3** to set peripheral/router function of TM-8. Slide up for peripheral; slide down for router. See Figure 3.1 for switch operation; see "Figure 1.1: TM-8 Board Layout" on page 6 for location on the board.

See your control panel documentation for valid addresses, general AIO configuration information, and AIO mapping details.

These addresses and functions must match the FACP programming tool.

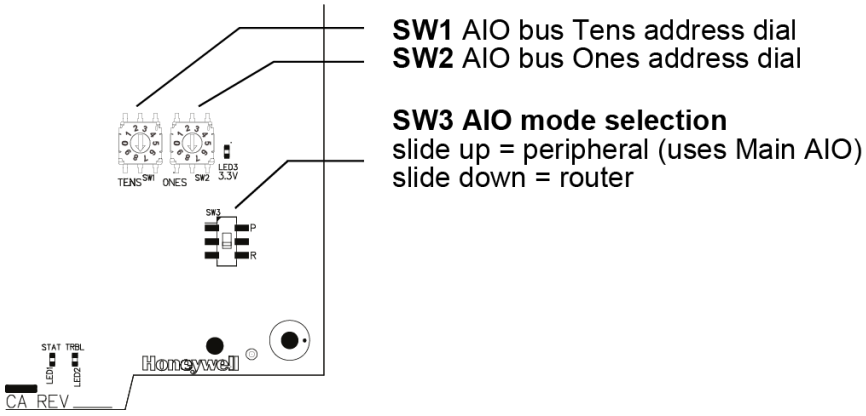


Figure 3.1: AIO Switch Functions

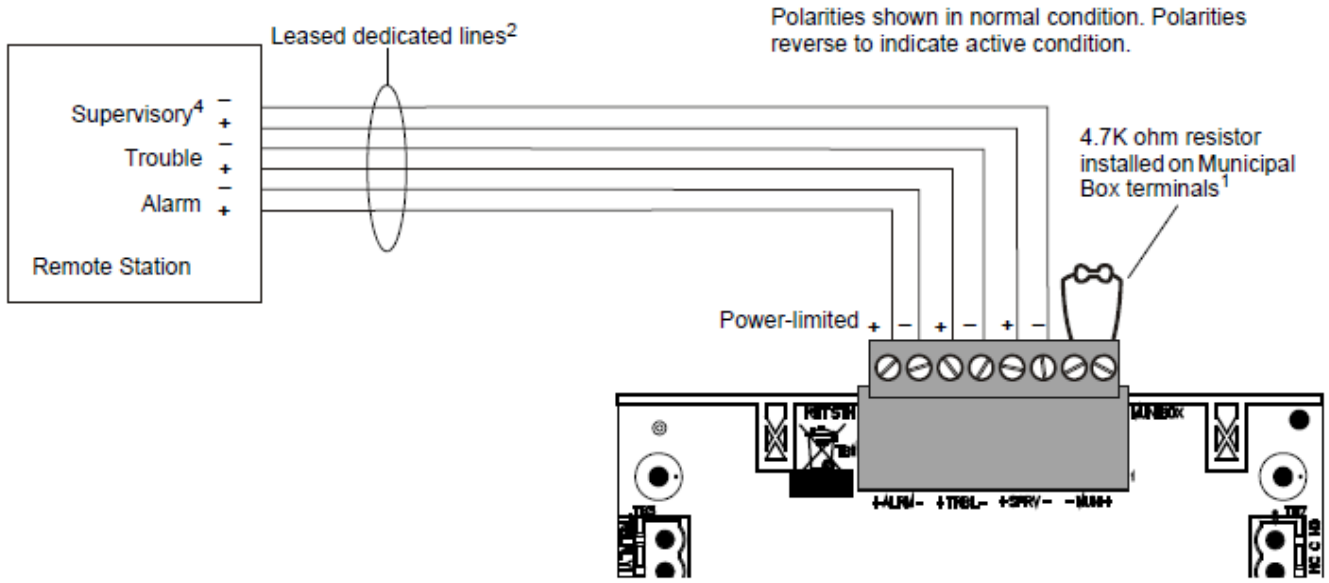
3.2 REMOTE STATION SERVICE OR MUNICIPAL BOX WIRING

TB11 is used for either Remote Station Service or Municipal Box. Only one of the two applications can function at a time. This product ships with a 4.7K ohm dummy load resistor. The resistor must be connected for Remote Station Service and removed for Municipal Box, as shown in "3.2.1. Remote Station Connections" below and "3.2.2. Municipal Box Connections" on the next page. Configure AIO board settings to match in the FACP panel programming tool.

3.2.1. REMOTE STATION CONNECTIONS

NOTE

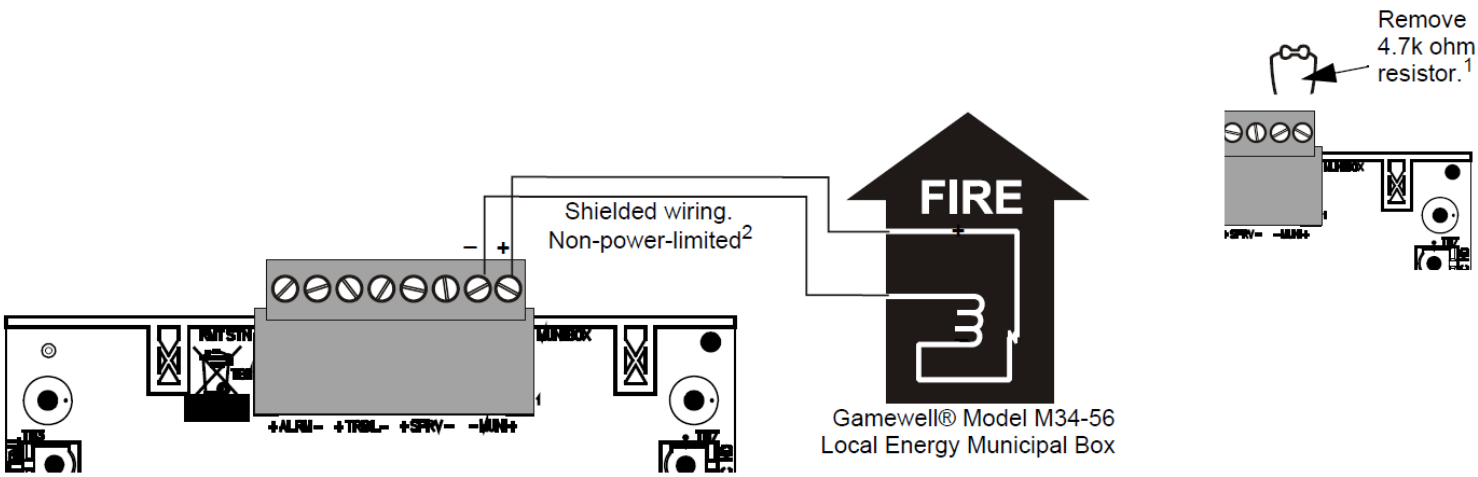
1. Remote Station Service cannot be used on the TM-8 when the Municipal Box wiring is being used. The 4.7k ohm resistor must be connected.
2. TB11: Minimum wire gauge of AWG26 for field wiring.
3. Panel programming tool: Enter AIO Board Settings for Alarm reverse polarity output (Remote Station Service)
4. Remote Station Supervisory circuit can be reprogrammed for other functions using the panel programming tool.



3.2.2. MUNICIPAL BOX CONNECTIONS

NOTE

1. Municipal Box application cannot be used on the TM-8 when the Remote Station application is being used. Remove 4.7k ohm resistor.
2. TB11: Minimum wire gauge of AWG26 for field wiring.
3. Panel programming tool: Enter AIO Board Settings for Municipal Box.



3.3 UL POWER-LIMITED (CLASS 2) WIRING REQUIREMENTS

Power-limited (Class 2) and non-power-limited circuit wiring must remain separated in the cabinet. All power limited (Class 2) circuit wiring must remain at least 0.25" away from any non-power-limited circuit wiring. Furthermore, all powerlimited (Class 2) circuit wiring and non-power-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. A typical wiring diagram for the TM-8 is shown below. Relays are non-power-limited circuits; FACP power and AIO communications circuits are power-limited (Class 2). Where power-limited (Class 2) and non-power-limited circuits are close, use adhesive fasteners to ensure separation. Different applications may require different conduit knockouts to be used. Any conduit knockouts may be used provided that the non-power-limited wiring remain separated from the power-limited (Class 2) wiring. Requirements for power-limited (Class 2) and non-power-limited circuits on the same module are as follows:

01. If a mix of power-limited (Class 2) and non-power-limited circuits are connected to relays, skip a set of dry contacts to maintain 0.25" spacing between power-limited (Class 2) and non-power-limited circuits.

02. If only power-limited (Class 2) or non-power-limited circuits are being employed, all relays may be used without skipping any for spacing purposes.

03. Relays TB3 through TB6 may be used to run all power-limited (Class 2) circuits while TB7 through TB10 are being used to run all non-power-limited circuits, when routed through different knockouts.

04. Use adhesive fasteners to ensure vertical separation as needed. (For example, if Relays TB3 through TB6 are used for non-power-limited circuits, adhesive fasteners can keep wires separate from TB1/TB2 and from TB11 Remote Station Alarm.)

05. Refer to the Power-limited (Class 2)label located on the FACP door. Make a notation on the label for each circuit being employed as a non-power-limited circuit. (Refer to the example on the label).

TB3-TB6	Low-current relays (2A)	Non power limited
TB7-TB10	High-current relays (10A)	Non power limited
TB1	Power Connection (Auxiliary Power Output)	Power-limited(Class 2)
TB2	AIO Communication	Power-limited(Class 2)
J3/J4	AIO Interconnection	Power-limited(Class 2)
TB11*: MUNI	Municipal Box	Non power limited
TB11*: ALRM/TRBL/SPRV	Remote Station Alarm	Power-limited(Class 2)
*** NOTE: Do not connect both functions of TB11 at the same time!** See "3.2 Remote Station Service or Municipal Box Wiring" on page 11		

Table 3.1Terminal Characteristics

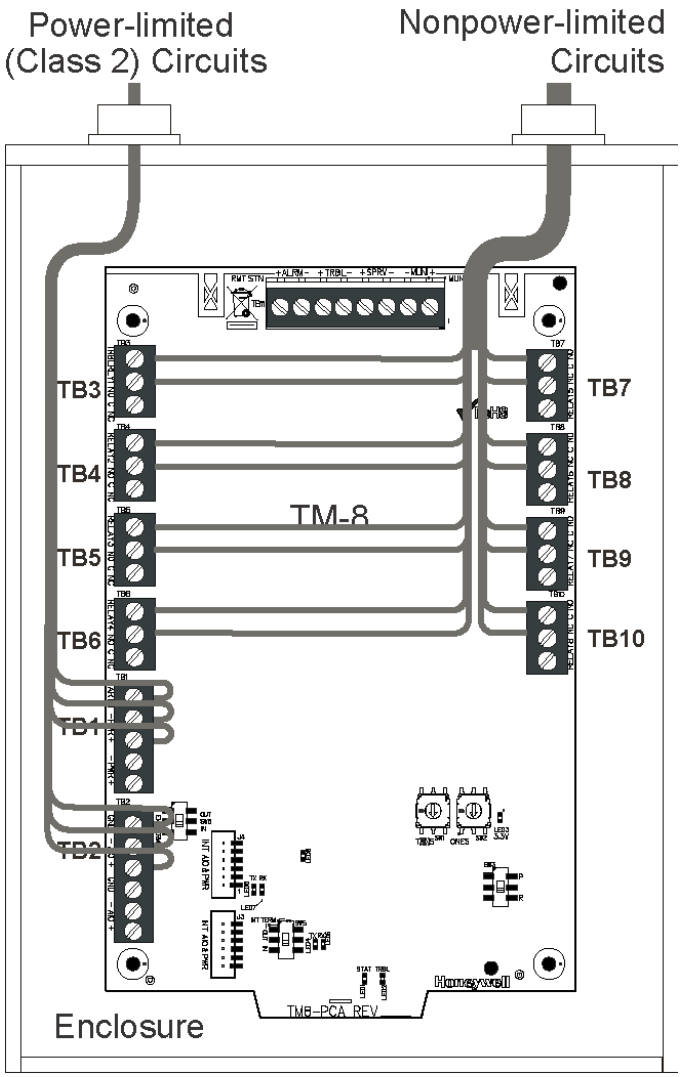


Figure 3.2: Typical Wiring Separation

NOTE: Drawing shows one possible way to separate power-limited(Class2) from non-power-limited circuits.

SECTION 4: CABINET AND CHASSIS MOUNTING

TM-8 is designed to mount in standard option module positions on a variety of chassis compatible with cabinet series CAB-5 and CAB-4, or on the back wall of ABB-1, ABB-2, and NBB-2 behind door-mounted equipment.

Install according to the standard option board mounting instructions provided with your fire alarm control panel (FACP) and cabinet hardware. To mount TM-8 in front of another board, use standoffs to attach the rear board to the chassis, and follow steps 1-3 to mount TM-8 onto those standoffs. Screws and standoffs are supplied with the TM-8.

Due to the configuration and height of terminal blocks, the TM-8 must be the upper-most module installed in a stack, or the only one. Refer to chassis and cabinet mounting instructions for specifics such as use of CHSADP adaptor plate to mount CHS-4, CHS-4L, or CHS-4N in a CAB-5 series backbox.

Cabinets and backboxes must be mounted and grounded; AIO circuit must be shielded and termination resistor set. Wiring options are up to 8 relays, and either remote station connections or municipal box connections.

Route & secure wires to ensure compliance with UL power-limited (Class 2) wiring requirements ("3.3 UL Power-limited (Class 2) Wiring Requirements" on page 13). Configure and program the system using the FACP programming tool.

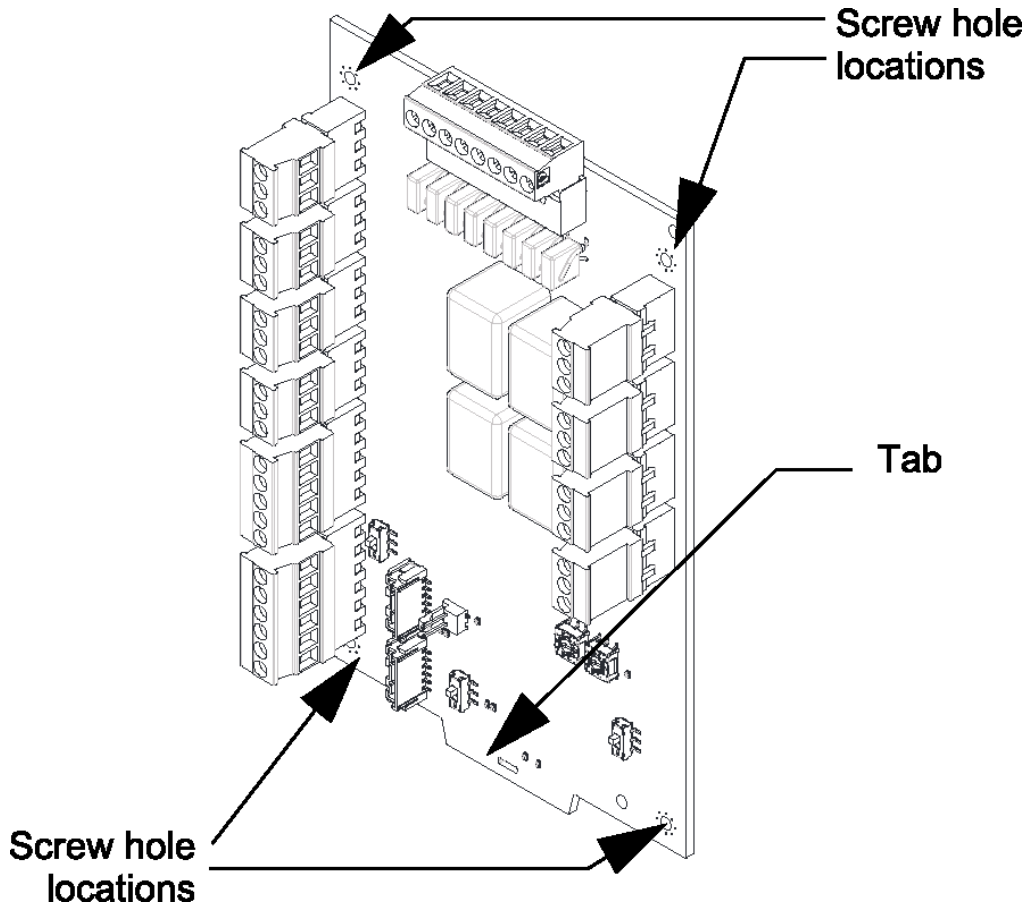


Figure 4.1: Screw hole locations

4.1 IN A CHASSIS

To mount the TM-8 in a compatible chassis:

01. Carefully insert the board's tab into the chassis slot.
02. Align the screws with the appropriate standoffs.
03. Screw the board to the chassis using the four Philips-head screws provided with TM-8 (¼" [6.35mm] #4-40).

Do not put another module in front of TM-8.
Do not install in the same backbox as HS-NCM because of that device's non-standard mounting requirements.

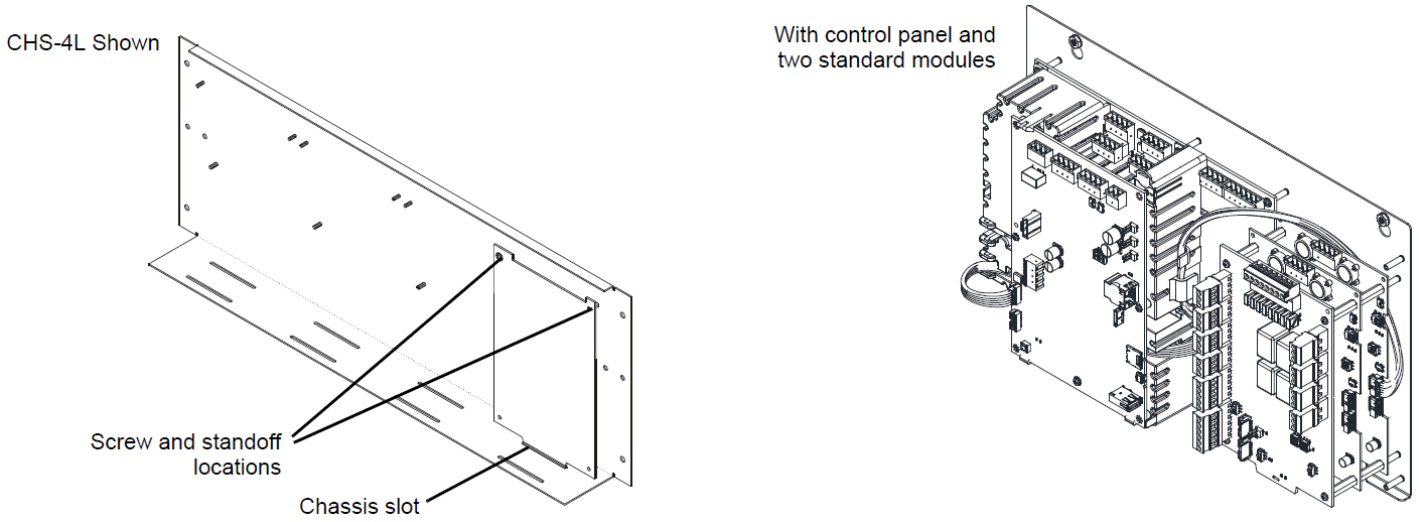


Figure 4.2: Mounting in a Chassis

4.2 IN A BACKBOX OR REMOTE BOX

TM-8 can be mounted in standard module position on the back wall of ABB-1, ABB-2, or NBB-2.

- Align the TM-8's screw hole locations with the standoffs on the back of the cabinet and fasten with four Philips-head screws provided.
- Route wires to keep power limited(Class2) and non-power limited wires separated (see "3.3 UL Power-limited (Class 2) Wiring Requirements" on page 13).

NOTE: Do not put another module in front of TM-8.
Do not install in the same backbox as HS-NCM because of that device's non-standard mounting requirements.

For cabinet specifications see ABB Product Installation Document LS10249-000GE-E or NBB-2 Product Installation Document LS10250-000GE-E.

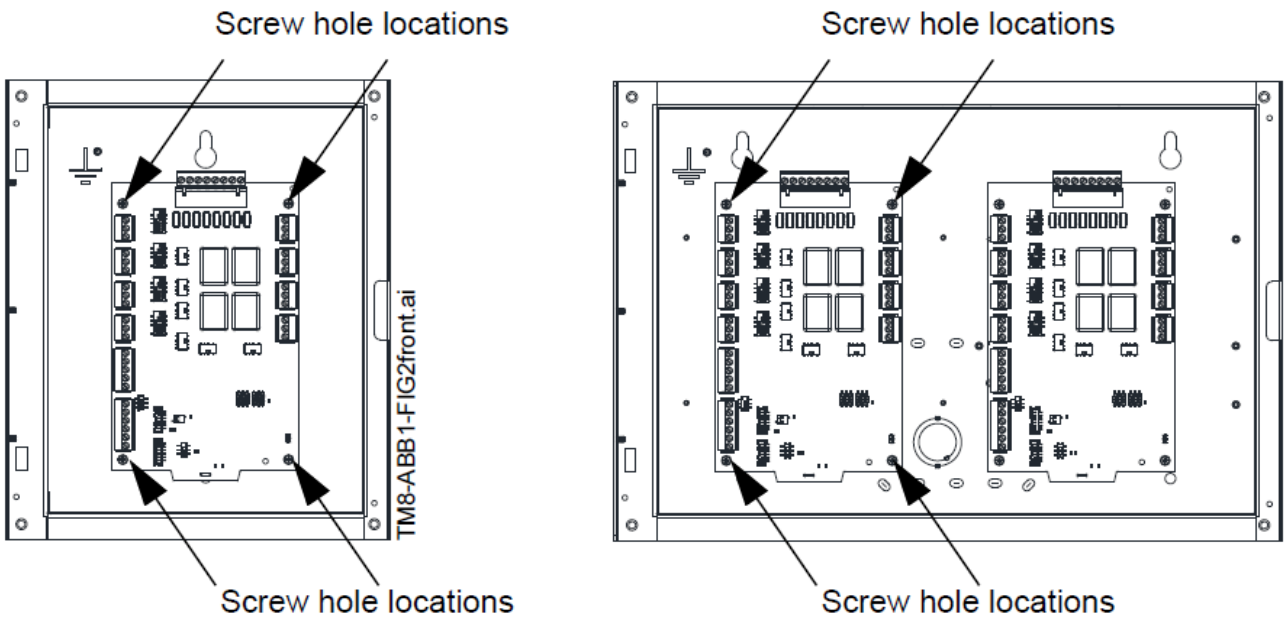


Figure 4.3: Mounting in a Remote Box (ABB-1 and ABB-2 shown)

SECTION 5: PROGRAMMING

The TM-8 is programmed through the FACP programming tool, under the AIO Board Settings on the System Programming screens. Refer to the FACP's installation documents for more details.

SECTION 6: TESTING AND MAINTENANCE

The ALARM and MUNI BOX outputs on TB11 can be disabled for testing and maintenance from the FACP. While the outputs are disabled, a trouble message is displayed on the FACP. To disable the outputs.

- Tap the SETTINGS.
- Tap ABOUT.
- Scroll down and then tap AIO DEVICES.
- From the list of AIO devices, find the TM-8 to disable and tap it.
- The TM-8 will say "(Alarm Disconnect)" next to it and a trouble message will be displayed on the FACP.

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