

# PD8-154 & PD8-158 Explosion-Proof Annunciators

## Instruction Manual



IECEEx



- Fully Approved Explosion-Proof Annunciators
- Switch, Open Collector NPN Transistor, and Logic Level Inputs
- 4- or 8-Point Monitoring
- 8 Field Selectable ISA Sequences Including First-Out
- Multiple-Unit First-Out Indication
- Free Custom Message Labels
- Silence, Acknowledge, and Reset Functions
- Sunlight Readable Indication
- CapTouch Through-Glass Button Programming
- Annunciator Mountable at 0°, 90°, 180°, & 270°
- 24 VDC @ 200 mA Power Available to Drive Other Devices (AC Models)
- 2 SPDT Relays for Alarm Activated Devices
- Operating Temperature Range: -55 to 65°C (-67 to 149°F)
- CSA Certified as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof
- ATEX and IECEx Certified as Dust-Ignition-Proof / Flame-Proof
- Input Power Options Include 85-265 VAC or 12-36 VDC
- Built-in internal Audible Alarm with Silence Pushbutton
- Flanges for Wall or Pipe Mounting
- Explosion-Proof Aluminum or Stainless Steel NEMA 4X / IP68 Enclosures
- Four 3/4" NPT Threaded Conduit Openings
- Stainless Steel Pipe Mounting Kit
- Stainless Steel Tag Available
- 3-Year Warranty

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**PRECISION  
DIGITAL**

# The Complete **ProtEX<sup>TM</sup>** Series MAX

SP Ex IECEx CE



PD8-154  
**4-Point Alarm  
Annunciator**



PD8-6100  
**Strain Gauge Meter**



PD8-158  
**8-Point Alarm  
Annunciator**



PD8-6200  
**Analog Input  
Flow Rate/Totalizer**



PD8-765  
**Process &  
Temperature Meter**



PD8-6210  
**Analog Input Batch  
Controller**



PD8-6000  
**Process Meter**



PD8-6262  
**Analog Dual-Input  
Flow Rate/Totalizer**



PD8-6001  
**Feet & Inches  
Level Meter**



PD8-6300  
**Pulse Input  
Flow Rate/Totalizer**



PD8-6060  
**Dual-Input  
Process Meter**



PD8-6310  
**Pulse Input  
Batch Controller**



PD8-6080  
**Modbus® Scanner  
with Dual Analog Input**



PD8-6363  
**Pulse Dual-Input  
Flow Rate/Totalizer**



PD8-6081  
**Feet & Inches  
Modbus® Scanner**



PD8-7000  
**Temperature Meter**

Go to **PREDIG.COM** for details on the entire ProtEX-MAX Series Meters

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**⚠ CAUTION**

- Read complete instructions prior to installation and operation of the annunciator.

**⚠ WARNINGS**

- Risk of electric shock or personal injury.
- This product is not recommended for life support applications or applications where malfunctioning could result in personal injury or property loss. Anyone using this product for such applications does so at his/her own risk. Precision Digital Corporation shall not be held liable for damages resulting from such improper use.
- Failure to follow installation guidelines could result in death or serious injury. Make sure only qualified personnel perform the installation.
- Never remove the annunciator cover in explosive environments when the circuit is live.
- Cover must be fully engaged to meet explosion-proof/dust-ignition-proof/flame-proof requirements.

**⚠ WARNING**

Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**Limited Warranty**

Precision Digital Corporation warrants this product against defects in material or workmanship for the specified period under "Specifications" from the date of shipment from the factory. Precision Digital's liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit. See Warranty Information and Terms & Conditions on [www.predig.com](http://www.predig.com) for complete details.

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## Introduction

The ProtEX-MAX PD8-150 series offers easy-to-use explosion-proof annunciators that can be set up to respond to alarm conditions based on 8 field selectable alarm sequences, including first-out indication. With either 4 or 8 switch inputs, the alarm channels accept normally open, normally closed, NPN open collector transistor, and logic level inputs. The annunciator is housed in a field-mountable, NEMA 4X/IP68 rated enclosure available in either aluminum or stainless steel for convenient indoor and outdoor installation.

Three front panel pushbuttons are used during sequence operation to silence the audible alarm, acknowledge the first out alarm, and reset cleared channels as required by the sequences. These functions can also be operated from hazardous-area remote devices using the remote control signal connectors, or in hazardous areas using the CapTouch through-glass buttons.

The ProtEX-MAX PD8-150 series has two SPDT relays that can be used for additional external alarm indication, additional audible devices, or for process control.

To enhance the look of your ProtEX-MAX Annunciator, we strongly recommend you order Free custom message labels. These can be ordered at any time, just by filling out a convenient on-line form at [Free Custom Message Labels](#).

### Annunciator Front



### Custom Labels Sticker

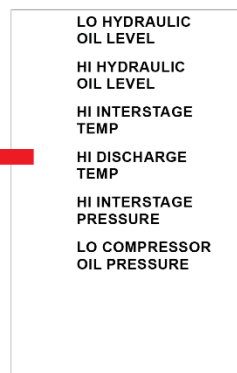


Figure 1. Example of Free Custom Message Label

## Ordering Information

### 85-265 VAC Models

#### Aluminum Enclosure

Model	Description
<a href="#">PD8-154-6R2-1</a>	4-Point Explosion-Proof Annunciator Powered from 85-265 VAC
<a href="#">PD8-158-6R2-1</a>	8-Point Explosion-Proof Annunciator Powered from 85-265 VAC
<a href="#">PD8-154-7R2-0</a>	4-Point Explosion-Proof Annunciator Powered from 12-24 VDC
<a href="#">PD8-158-7R2-0</a>	8-Point Explosion-Proof Annunciator Powered from 12-24 VDC

#### Stainless Steel Enclosure

Model	Description
<a href="#">PD8-154-6R2-1-SS</a>	4-Point Explosion-Proof Annunciator Powered from 85-265 VAC
<a href="#">PD8-158-6R2-1-SS</a>	8-Point Explosion-Proof Annunciator Powered from 85-265 VAC
<a href="#">PD8-154-7R2-0-SS</a>	4-Point Explosion-Proof Annunciator Powered from 12-24 VDC
<a href="#">PD8-158-7R2-0-SS</a>	8-Point Explosion-Proof Annunciator Powered from 12-24 VDC

### Accessories

Model	Description
<a href="#">PDAPLUG75</a>	3/4" Metal Conduit/Stopping Plug
<a href="#">PDA-SSTAG</a>	Custom Stainless Steel Tag (see website for convenient ordering form)
<a href="#">PDA6848-SS</a>	2" U-Bolt Kit Stainless Steel
-	<a href="#">Free Custom Message Labels</a>

## CapTouch Buttons

To make it possible to program and operate the ProtEX-MAX in a hazardous area, the programming buttons that are located behind the glass window can be operated without removing the cover by using the CapTouch through-glass buttons. The operator puts their finger on the glass over the button and the button is actuated.



## Helpful Videos

There are several videos that will help you get a better understanding of the features and functionality of the ProtEX-MAX products. Since the ProtEX-MAX annunciators have the same general features and functionality of the Vigilante II annunciators, appropriate videos for the Vigilante II annunciators are also included.

### ProtEX-MAX Products Overview

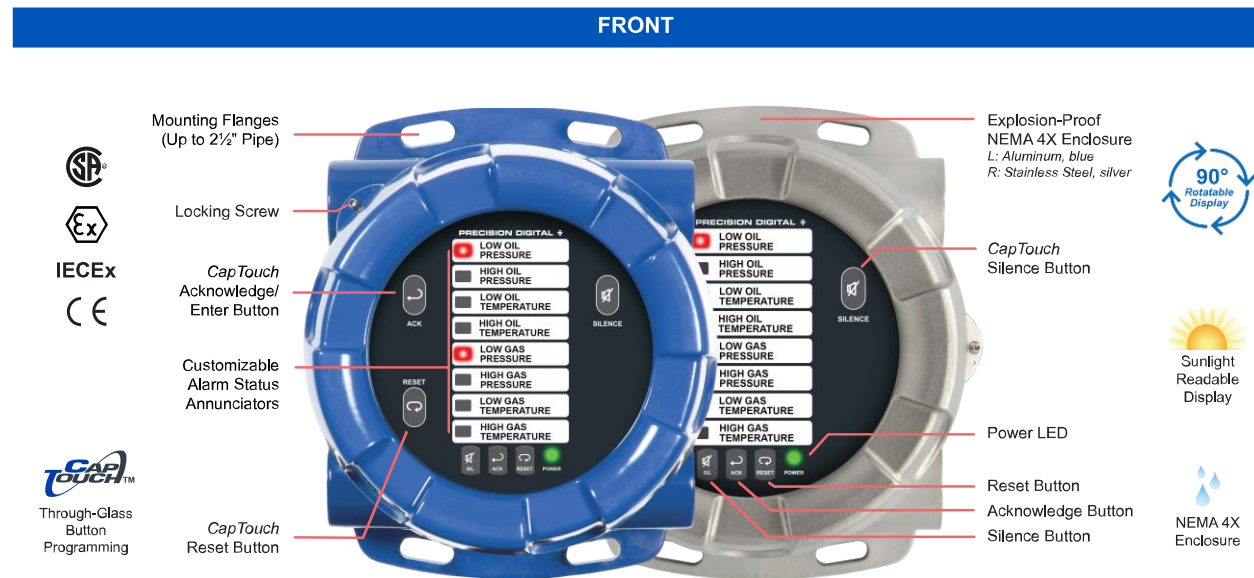
Learn about Precision Digital's 4- or 8-point annunciators feature alarming and monitoring capabilities for all of your level, pressure, flow, and other process switches..



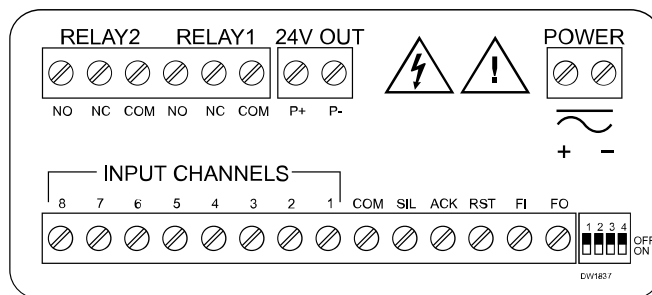
[https://www.predig.com/videos/10V1\\_vERpvU](https://www.predig.com/videos/10V1_vERpvU)



## Key Features



## CONNECTIONS



- Two Form C (SPDT) relays
- Removable terminal blocks
- Universal 85-265 VAC or 12/24 VDC input power
- Terminals for remote operation of Silence, Reset, Acknowledge

Connections for PD8-158-6R2-1

## The Only Explosion-Proof Annunciator You Will Ever Need

The ProtEX-MAX PD8-150 series offers full-featured multipurpose, easy-to use 4- or 8-point annunciators ideal for alarming and monitoring capabilities for all of your level, pressure, flow, and other process switches. The annunciator boasts specifications, features and functionality that make it the only hazardous area annunciator you will ever need.

The PD8-154 and PD8-158 have all the same features as our PD154 and PD158 1/8 DIN annunciators, as a fully approved explosion-proof product. The product is certified by CSA as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof, and is ATEX and IECEx certified as Dust-Ignition-Proof / Flame-Proof.

The first thing you notice about the PD8-154 and PD8-158 are their modern looking, rugged, explosion-proof housing with convenient mounting flanges, available in aluminum or stainless steel.

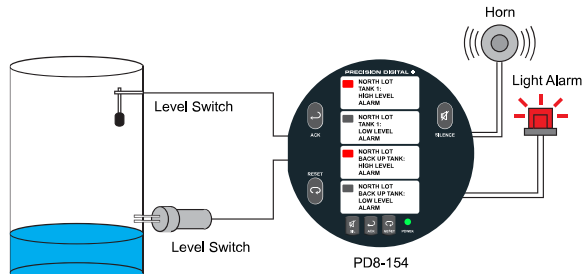
Housed inside these enclosures is a 4- or 8-point annunciator with high-intensity LEDs that can be seen in direct sunlight.

Three front panel pushbuttons are used during sequence operation to silence the audible alarm, acknowledge the first out alarm, and reset cleared channels as required by the sequences. These functions can also be operated from hazardous-area remote devices using the remote control signal connectors, or in hazardous areas using the CapTouch through-glass buttons.

The PD8-150 series can be programmed for multiple sequences with first-out alarm indication. This feature indicates the first point of failure of a system when multiple alarms occur. If multiple annunciators are connected for multiple unit first-out indication, only one input from all connected devices will display as a first-out alarm.

## Customized Monitoring

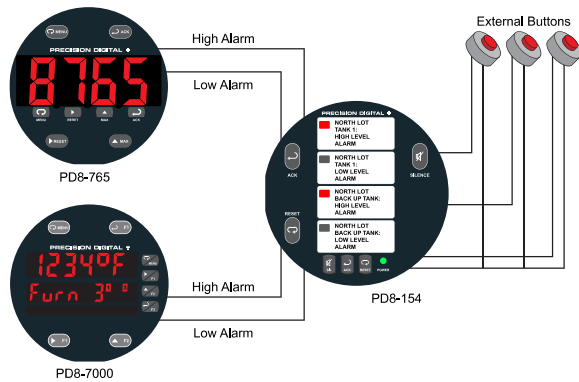
### Level Monitoring with Level Switches



The ProtEX-MAX Annunciator is ideal for tank level switch monitoring.

- Up to 8 Individually Labeled Level Switch Inputs
- 24 VDC Level Switch Power Supply
- Relays for External Horns and Light Alarms
- Sunlight Readable Indication

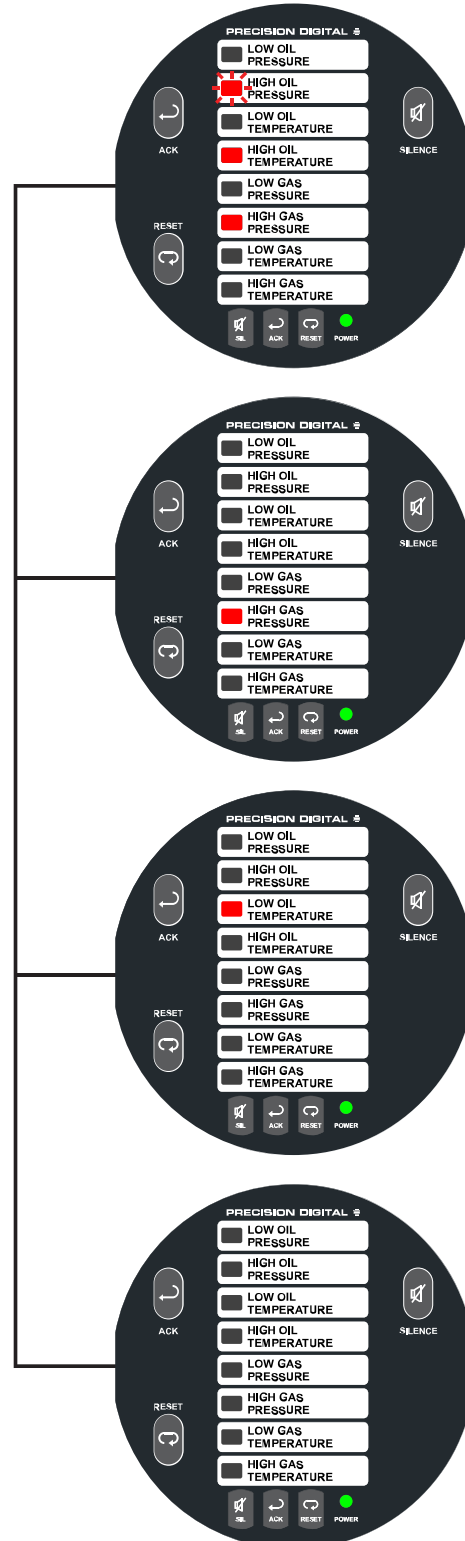
### Temp Monitoring with ProtEX-MAX Instruments



Connect PD8-765 and PD8-7000 alarm relays to the PD8-154 or PD8-158 for temperature alarm monitoring.

- First-Out Indication for Heating/Cooling Systems
- Multiple Unit First-Out Indication
- Remote Silence, Acknowledge, and Reset
- Fail-Safe Relays for Critical Applications

### Multiple Unit First-Out Alarm Indication



If multiple ProtEX-MAX annunciators are connected for multiple unit first-out indication, only one input from all connected devices will display as a first-out alarm.

## Physical Features

The ProtEX-MAX is designed for ease-of-use in safe and hazardous area applications, and is housed in a rugged NEMA 4X explosion-proof enclosure, available in either aluminum or stainless steel. It can operate over a wide temperature range (-55 to 65°C / -67 to 149°F) includes removable screw terminal connectors, and features through-glass buttons for easy controller operation without the need to remove the cover. All of these features are backed by a 3-year warranty.

## Super-Bright LED Display

The ProtEX-MAX features super-bright alarm LEDs, our brightest ever. These allow the display to be read in any lighting condition, even in direct sunlight.



## CapTouch Through-Glass Buttons

The ProtEX-MAX is equipped with four capacitive sensors that operate as through-glass buttons so that it can be programmed and operated without removing the cover (and exposing the electronics) in a hazardous area. These buttons can be disabled for security by selecting the DISABLE setting on the NO-CONTACT BUTTONS switch located on the back of the electronics module, inside the enclosure.

## Rugged, Heavy-Duty Enclosure

The ProtEX-MAX is housed in a rugged NEMA 4X, 7, & 9, IP68 aluminum or stainless steel enclosure, designed to withstand harsh environments in safe and hazardous areas.



## Wide Viewing Angle

Customers can't always look at the display from straight on, so the window and display module have been optimized to provide a wide viewing angle of approximately  $\pm 40^\circ$ ; nearly twice that of the competition.



## Built-In Mounting Flanges

The ProtEX-MAX is equipped with two slotted flanges for wall mounting or NPS 1½" to 2½" or DN 40 to 65 mm pipe mounting.



## Flexible Mounting & Wiring

The ProtEX-MAX features four ¾" NPT threaded conduit openings so that wiring can be routed to the most convenient conduit connection(s).



## Rotatable Display

The ProtEX-MAX rotatable display, along with four available conduit connections, provide for numerous installation options. The display can be rotated in 90° increments. Rotate it 90° for horizontal mounting.



Vertical Mounting



Horizontal Mounting

## Perfect & Secure Fit Every Time

The internal cast rails ensure the ProtEX-MAX assemblies together perfectly, quickly and securely; and everything lines up for optimal viewing every time. There are no standoffs to worry about breaking or getting out of alignment. The display module snaps into the built-in rails on the enclosure making assembly a snap, while pressing the display as close to the glass as possible to improve wide angle viewing. No tools are needed to install or remove it.

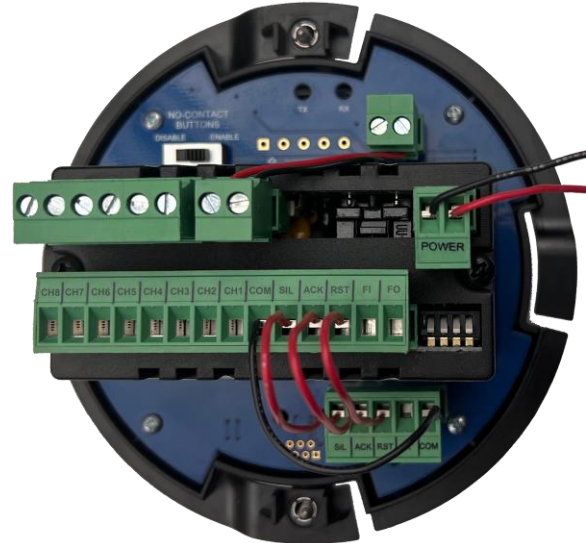
## Stainless Steel Tags

PDA-SSTAG is a laser etched stainless steel tag accessory for any of your Precision Digital meters. The tag features custom text for equipment identification, instruction, or whatever else is needed in your facility. Each tag comes with a stainless steel wire and lead seal for easy mounting wherever you need it.



## Removable Screw Terminals

Industrial applications require screw terminal connections for easy field wiring, and the ProtEX-MAX goes one step further in convenience by also making them removable.



## Hazardous Area Approvals

The ProtEX-MAX is certified by CSA as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof, and is ATEX and IECEx certified as Dust-Ignition-Proof / Flame-Proof.

## Wide Operating Temperature Range

The ProtEX-MAX can operate from -55 to 65°C (-67 to 149°F) meaning it can be installed in a wide variety of indoor and outdoor industrial applications.



## Quick Setup Guide

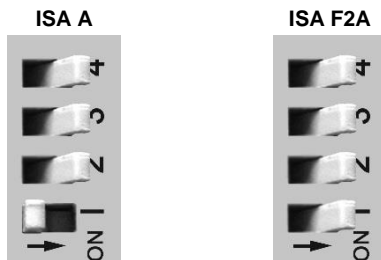
The following overview details how to set up the annunciator for most common uses.

## Order Custom Message Labels

To make your Vigilante Annunciator the best it can be, the first thing to do is order [Free Custom Message Labels](#) online.

## Sequence Selection

The two most common sequences are ISA A and ISA F2A. Select the sequence using the four-position switch on the rear of the unit above the signal connector. For complete sequence details, see page 32.



## NO/NC Inputs

Each input can be set for normally open (NO) or normally closed (NC) contacts. Each input channel is programmed individually. The default setting is for all inputs to be NO.

To set inputs to NC:

1. Press and hold **ACK** and **RESET** for 3 seconds until all LEDs cycle.
2. Press **ACK** within 3 seconds of release. All LEDs will blink. If **ACK** is not pressed within 3 seconds, the unit will return to run mode.
3. Press **ACK** again within 3 seconds of release. If **ACK** is not pressed within 3 seconds, the unit will return to run mode.

*The LED for the channel being programmed will display brightly on or off. All other channel indication LEDs will be at low intensity to indicate programming mode.*

4. Press the **RESET** pushbutton to turn LED 1 off for a NO input, or on for a NC input for channel 1.
5. Press **ACK** to accept the input type and program channel 2.
6. Repeat steps 4 and 5 for all input channels.
7. Press and hold **ACK** for five seconds to return to normal operation with the programmed input types.

## Basic Connections

All connections are made to removable screw terminal connectors located at the rear of the instrument. For complete connection details, see page 18.

### ⚠ WARNINGS

- Use copper wire with 60°C or 60/75°C insulation for all line voltage connections.
- Observe all safety regulations.
- Electrical wiring should be performed in accordance with all applicable national, state, and local codes to prevent damage to the instrument and ensure personnel safety.

### Connector Labeling

The connectors label, affixed to the instrument, shows the location of all connectors available with requested configuration. See *Vigilante II Electronics Module Layout for PD8-158-6R2* on page 21.

### Power Connections

Power connections are made to a two-terminal connector labeled POWER. The instrument will operate regardless of DC polarity connection. The + and - symbols are only a suggested wiring convention.

### Signal Connections

Input signal connections are made to a 14-terminal connector at terminals labeled INPUT CHANNELS. The COM (common) terminal is the return for all input channels.

### Relays and 24 V Output Connections

Relay connections are made to a six-terminal connector labeled RELAY1, RELAY2. The COM (common) terminals of the relays should not be confused with the COM (common) terminal of the signal connector. The 24 VDC output is available at the connector labeled 24V OUT, next to the relays connector.

### Additional Information

For additional setup and wiring information, please see the complete details further in this manual.



## Specifications

Except where noted all specifications apply to operation at +25°C.

### General

<b>Display</b>	PD8-154; Four red LED channel/point indicators. PD8-158; Eight red LED channel/point indicators. One green LED power indicator.
<b>Alarm Messages</b>	Custom printed adhesive clear labels. Order <a href="#">Free Custom Message Labels</a> online. Area: PD8-154, 1.25" x .60" (32 mm x 15 mm), 4 messages PD8-158, 1.25" x .25" (32 mm x 6 mm), 8 messages User specified size and length, up to 4 lines (PD8-154) or 2 lines (PD8-158) of 14 characters of size 9 fonts.
<b>Audible Alarm</b>	These annunciators contain an internal audible alarm that, due to the nature of the heavy-duty metal enclosure, produces a very minimal sound.
<b>Programming Methods</b>	Rear 4-position switch for sequence selection and audible alarm operation. Three front panel pushbuttons for NO/NC input selection, sequence options, and sequence operation.
<b>Noise Filter</b>	40 ms debounce on inputs (including SIL, ACK, and RST).
<b>Shared First-Out Systems</b>	1 ms unit-to-unit delay. Maximum of 200 units in the shared first-out system.
<b>Non-Volatile Memory</b>	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
<b>Power Options</b>	85-265 VAC, 50/60 Hz 90-265 VDC, 20 W max or 12-36 VDC, 12-24 VAC, 6 W max
<b>Fuse</b>	Required external fuse: UL Recognized, 5 A max, slow blow. Up to 6 annunciators may share one 5 A fuse
<b>Isolated Power Supply</b>	24 VDC $\pm$ 10% @ 200 mA max Standard on 85-265 VAC powered units only.
<b>Isolation</b>	4 kV input/output-to-power line.
<b>Overvoltage Category</b>	Installation Overvoltage Category II: Local level with smaller transient overvoltages than Installation Overvoltage Category III
<b>Environmental</b>	T6 Class operating temperature range Ta = -55 to 60°C T5 Class operating temperature range Ta = -55 to 65°C Storage temperature range: -55 to 85°C (-67 to 185°F) Relative humidity: 0 to 90% non-condensing
<b>Max Power Dissipation</b>	Maximum power dissipation limited to 15.1 W

<b>Connections</b>	Removable screw terminal blocks for 12 to 22 AWG wire.
<b>Mounting</b>	Wall Mounting: Four (4) mounting holes provided for mounting annunciator to wall. See <i>Wall Mounting Instructions</i> on page 18 for additional details. Pipe Mounting: Optional pipe mounting kit (PDA6848) allows for pipe mounting. Sold separately. See <i>Pipe Mounting Instructions</i> on page 19 for additional details.
<b>Tightening Torque</b>	Power, signal, relays, mA out terminals: 5 lb-in (0.56 Nm)
<b>Overall Dimensions</b>	6.42" x 7.97" x 8.47" (W x H x D) (163 mm x 202 mm x 215 mm)
<b>Weight</b>	Aluminum: 14.7 lbs (6.67 kg) Stainless Steel: 23.5 lbs (10.66 kg)
<b>Warranty</b>	3 years parts and labor. See Warranty Information and Terms & Conditions on <a href="http://www.prediq.com">www.prediq.com</a> for complete details.


### Input

<b>Input Types</b>	NO or NC switches: No external excitation required Open collector transistor (NPN): Open circuit voltage approximately 3.3 VDC Logic Levels: LOW = 0 to 0.9 VDC HIGH = 2.4 to 28 VDC
<b>Update Rate</b>	41 ms following alarm state; 1 ms for alarm state clear
<b>Sequences</b>	Input follower, ISA Sequences A, F1A, F2A, F3A, M, F1M, F2M and F3M per ISA Standard ISA-18.1-1979 R2004.
<b>Sequence Options</b>	A, F1A, F2A, F3A, M, F1M, F2M, and input follower with selectable options -1 (silence pushbutton), -4 (no lock-in), and -6 (no audible alarm) per ISA Standard ISA-18.1-1979 R2004.

## Relays

<b>Rating</b>	2 SPDT (Form C); rated 3 A @ 30 VDC or 3 A @ 250 VAC resistive load; 1/14 HP @ 125/250 VAC for inductive loads
<b>Electrical Noise Suppression</b>	A snubber should be connected to each relay contact switching inductive loads to prevent disruption to the microprocessor's operation. Recommended snubber value: 0.01 $\mu$ F/470 $\Omega$ , 250 VAC ( <a href="#">PDX6901</a> ).
<b>Relay Operation</b>	Relay 1: Alarm state until alarm is acknowledged. Relay 2: Alarm state while any channel indicating alarm condition.
<b>Fail-Safe Operation</b>	Programmable Independent for each relay <b>Note:</b> In fail-safe mode, relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.

## Enclosure

<b>Material</b>	AL Models: ASTM A413 LM6 die-cast aluminum, copper-free, enamel coated SS Models: ASTM A743 CF8M investment-cast 316 stainless steel
<b>Gasket</b>	Fluoroelastomer
<b>Rating</b>	NEMA 4X, IP68 Explosion-proof
<b>Color</b>	AL: Blue SS: Silver
<b>Window</b>	Borosilicate glass
<b>Conduits</b>	Four 3/4" NPT threaded conduit openings
<b>Conduit Stopping Plugs</b>	Sold separately
<b>Flanges</b>	Two built-in flanges for wall and pipe mounting
<b>Tamper-Proof Seal</b>	Cover may be secured with tamper-proof seal
<b>Overall Dimensions</b>	6.42" x 7.97" x 8.47" (W x H x D) (163 mm x 202 mm x 215 mm)
<b>Weight</b>	AL: 14.7 lbs (6.67 kg) SS: 23.5 lbs (10.66 kg)
<b>ATEX</b>	 II 2 G D Ex db IIC Gb Ex tb IIIC Db IP66/IP68 Tamb: -55°C to +85°C Certificate Number: Sira 19ATEX1252U
<b>IECEX</b>	Ex db IIC Gb Ex tb IIIC Db IP66/IP68 Tamb: -55°C to +85°C Certificate Number: IECEX SIR 19.0075U
<b>CSA</b>	Class I, Division 1, Groups A, B, C, D Class II, Division 1, Group E, F, G Class III Ex db IIC Gb Ex tb IIIC Db Class I, Zone 1, AEx db IIC Gb Zone 21, AEx tb IIIC Db IP66/IP68/TYPE 4X Tamb: -55°C to +85°C Certificate Number: CSA19.80011200U
<b>UL</b>	Class I, Division 1, Groups A, B, C, D Class II, Division 1, Groups E, F, G Class III Class I, Zone 1, AEx db IIC Gb Zone 21, AEx tb IIIC Db Ex db IIC Gb Ex tb IIIC Db IP66/IP68/TYPE 4X Tamb: -55°C to +85°C Certificate Number: E518920

**Note:** The above approvals are for the enclosure only. See next page for approvals on the entire instrument.


## General Compliance Information

### Electromagnetic Compatibility

Emissions	EN 55022 Class A ITE emissions requirements
Radiated Emissions	Class A
AC Mains Conducted Emissions	Class A
Immunity	EN 61326-1 Measurement, control, and laboratory equipment EN 61000-6-2 EMC heavy industrial generic immunity standard
RFI - Amplitude Modulated	80 -1000 MHz 10 V/m 80% AM (1 kHz) 1.4 - 2.0 GHz 3 V/m 80% AM (1 kHz) 2.0 - 2.7 GHz 1 V/m 80% AM (1 kHz)
Electrical Fast Transients	±2kV AC mains, ±1kV other
Electrostatic Discharge	±4kV contact, ±8kV air
RFI - Conducted	10V, 0.15-80 MHz, 1kHz 80% AM
AC Surge	±2kV Common, ±1kV Differential
Surge	1KV (CM)
Power-Frequency Magnetic Field	30 A/m 70%V for 0.5 period
Voltage Dips	40%V for 5 & 50 periods 70%V for 25 periods
Voltage Interruptions	<5%V for 250 periods

### Product Ratings and Approvals

**CSA**  
Class I, Division 1, Groups B, C, D  
Class II, Division 1, Groups E, F, G  
Class III, Division 1, T5  
Class III, Division 1, T6 (Ta max = 60°C)  
Ex db IIC T5  
Ex db IIC T6 (Ta max = 60°C)  
Ex tb IIIC T90°C  
Ta = -55°C to +65°C  
Enclosure: Type 4X & IP66 / IP68  
CSA Certificate: CSA 12 2531731

**ATEX**  II 2 G D  
Ex db IIC T\* Gb  
Ex tb IIIC T90°C Db IP68  
Ta = -55°C to +\*°C  
\*T6 = -55°C to +60°C  
\*T5 = -55°C to +65°C  
Certificate Number: Sira 12ATEX1182X

**IECEx**  
Ex db IIC T\* Gb  
Ex tb IIIC T90°C Db IP68  
Ta = -55°C to +\*°C  
\*T6 = -55°C to +60°C  
\*T5 = -55°C to +65°C  
Certificate Number: IECEx SIR 12.0073X

#### ATEX/IECEx Specific Conditions of Use:

1. The equipment label and epoxy coating may generate an ignition-capable level of electrostatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
2. Flameproof joints are not intended to be repaired.
3. All entry closure devices shall be suitably certified as "Ex d", "Ex t" and "IP66/68" as applicable. Suitable thread sealing compound (non-setting, non-insulating, non-corrosive, not solvent based, suitable for the ambient rating) must be used at the NPT conduit entries to achieve the IPx8 rating while maintaining the Ex protection concept.

#### Year of Construction

This information is contained within the serial number with the first four digits representing the year and month in the YYMM format.

#### For European Community

The ProtEX-MAX must be installed in accordance with the ATEX directive 2014/34/EU, the product manual, and the product certificate Sira 12ATEX1182X.

## EU Declaration of Conformity

For shipments to the EU and UK, a Declaration of Conformity was printed and included with the product. For reference, a Declaration of Conformity is also available on our website [www.predig.com/docs](http://www.predig.com/docs).

## Safety Information

### ⚠ CAUTION

- Read complete instructions prior to installation and operation of the annunciator.

### ⚠ WARNINGS

- Risk of electric shock or personal injury.
- Hazardous voltages exist within enclosure. Installation and service should be performed only by trained service personnel.
- Service requiring replacement of internal components must be performed at the factory.
- In hazardous areas, conduit and conduit/stopping plugs require the application of non-setting (solvent free) thread sealant. It is critical that all relevant hazardous area guidelines be followed for the installation or replacement of conduit or plugs.

## Installation

*Install in accordance with applicable local and national regulations (e.g. NEC).*

### For Installation in USA

The ProtEX-MAX must be installed in accordance with the National Electrical Code (NEC) NFPA 70.

### For Installation in Canada

The ProtEX-MAX must be installed in accordance with the Canadian Electrical Code CSA 22.1. All power supplies below 36 V and all signal input circuits must be supplied from a CSA Certified Class 2 source.

### For European Community

The ProtEX-MAX must be installed in accordance with the ATEX directive 2014/34/EU, the product manual, and the product certificate Sira 12ATEX1182X.

### ⚠ WARNINGS

- Disconnect from supply before opening enclosure.
- Keep cover tight while circuits are live.
- Conduit seals must be installed within 18" (450 mm) of the enclosure.
- Use suitably certified and dimensioned cable entry device and/or plug.
- Cable must be suitable for 90°C.

Wiring connectors are accessed by opening the enclosure. To access electrical connectors, remove the electronics module. Connectors are on the rear of the electronics module.

## Unpacking

Remove the annunciator from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier.

If any part is missing or the annunciator malfunctions, please contact your supplier or the factory for assistance.

## Cover Jam Screw



The cover jam screw should be properly installed once the annunciator has been wired and tested in a safe environment. The cover jam screw is intended to prevent the removal of the annunciator cover in a hazardous environment without the use of tools. Using a M2 hex wrench, turn the screw clockwise until the screw contacts the annunciator. Turn the screw an additional 1/4 to 1/2 turn to secure the cover.

### ⚠ CAUTION

- Excess torque may damage the threads, screw head, and wrench.

## Mounting

The ProtEX-MAX has two slotted mounting flanges that may be used for pipe mounting or wall mounting. Refer to *Figure 2* and *Figure 3* below.

### **WARNING**

- Do not attempt to loosen or remove flange bolts while the annunciator is in service.

### Mounting Dimensions

All units: inches (mm)

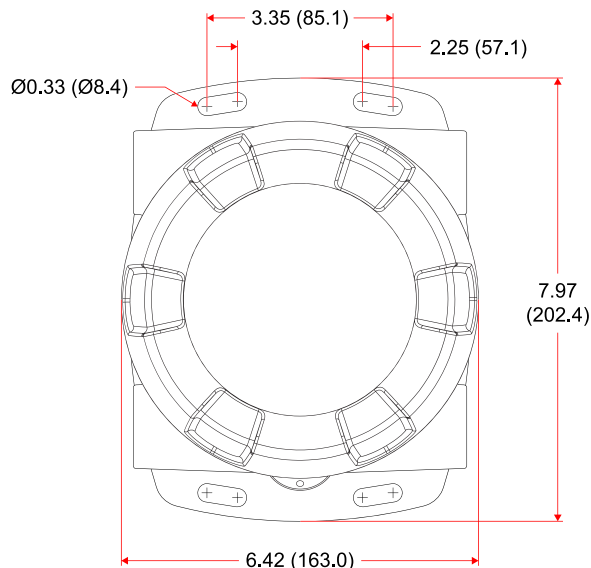


Figure 2. Enclosure Dimensions – Front View

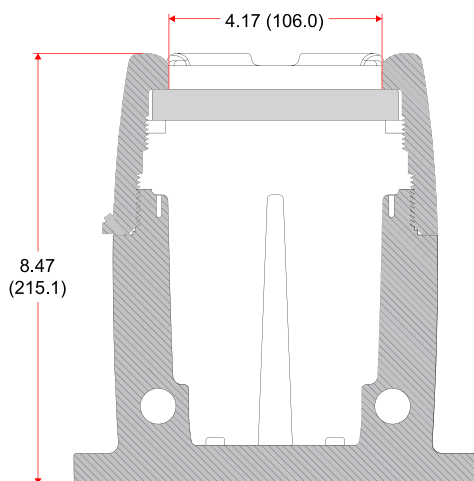


Figure 3. Enclosure Dimensions – Side Cross Section View

### Wall Mounting Instructions

The annunciator can be mounted to any wall or flat surface using the four provided mounting holes located in the built-in flanges. In addition, the internal electronic assembly can be rotated to allow the enclosure to be mounted in any position. To mount the annunciator to a wall, follow these instructions:

- Prepare a section of wall approximately 7" x 8.5" (178 mm x 216 mm) for annunciator mounting by marking with a pencil the mounting holes (shown in *Figure 2*) on the wall.
- Select the appropriate mounting screws for the mounting surface to be used. The mounting holes diameter is shown on *Figure 2*.

**Note:** Mounting screws are not included.

- Using a drill bit slightly smaller than the girth of the mounting screws, pre-drill holes at the mounting locations previously marked.
- Insert mounting screws into the four mounting holes and screw them into the pre-drilled holes.



Download free 3-D CAD files of these instruments to simplify your drawings!

[predig.com/documentation-cad](http://predig.com/documentation-cad)



### Pipe Mounting Instructions



The annunciator can also be mounted to a pipe using an optional U-Bolt kit. This kit includes two U-bolts, the necessary hardware, and is available in 316 stainless steel ([PDA6848-SS](#)).

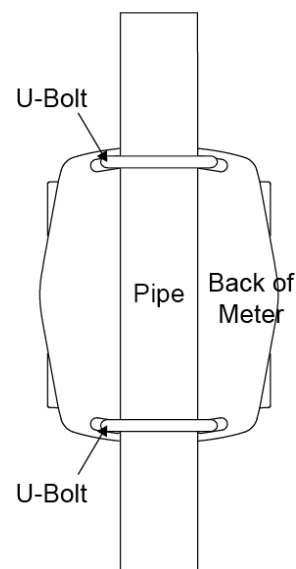


To mount the annunciator using a U-Bolt kit, follow these instructions:

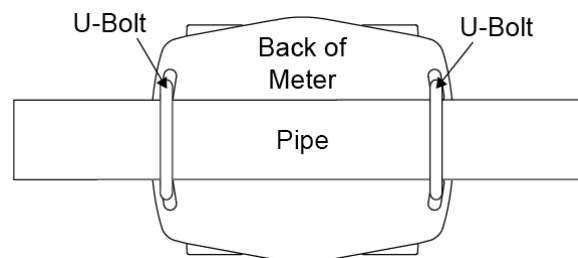
- Orient the groove on the back of the instrument with the pipe and secure it to the pipe with the two U-bolts and hardware provided.



### Vertical Pipe Mounting



### Horizontal Pipe Mounting



## Connections

All connections are made to removable screw terminal connectors located at the rear of the annunciator.

### CAUTION

- Use copper wire with 60°C or 60/75°C insulation for all line voltage connections. Observe all safety regulations. Electrical wiring should be performed in accordance with all applicable national, state, and local codes to prevent damage to the annunciator and ensure personnel safety.

### WARNINGS

- Observe all safety regulations. Electrical wiring should be performed in accordance with all agency requirements and applicable national, state, and local codes to prevent damage to the annunciator and ensure personnel safety.
- Static electricity can damage sensitive components.
- Observe safe handling precautions for static-sensitive components.
- Use proper grounding procedures/codes.
- If the instrument is installed in a high voltage environment and a fault or installation error occurs, high voltage may be present on any lead or terminal.
- Follow all fusing and wiring precautions requirements for the instrument integrated to the PD8 Series model number being connected.

To access the connectors, remove the enclosure cover. The electronics module is snapped into the back of the enclosure and is removed by pulling it straight out. Signal connections are made to de-pluggable connectors on the back of the electronics module.

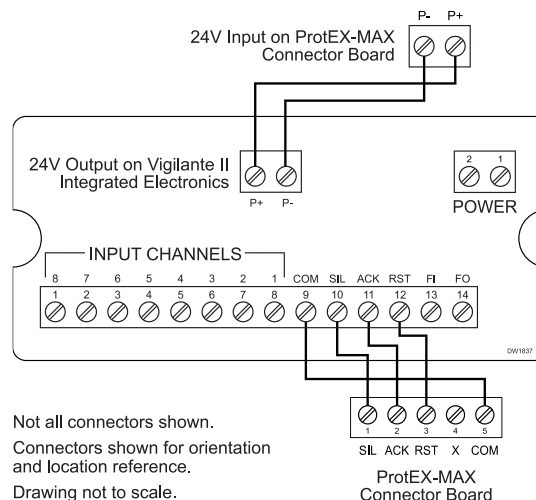
Some connectors may be provided already connected. These connections are required for proper operation of the ProtEX-MAX and should not be removed unless instructed to by this manual.

Grounding connections are made to the two ground screws provided on the base – one internal and one external.

After all connections have been completed and verified, apply power to the unit.

## Required Connections on AC-Powered Models

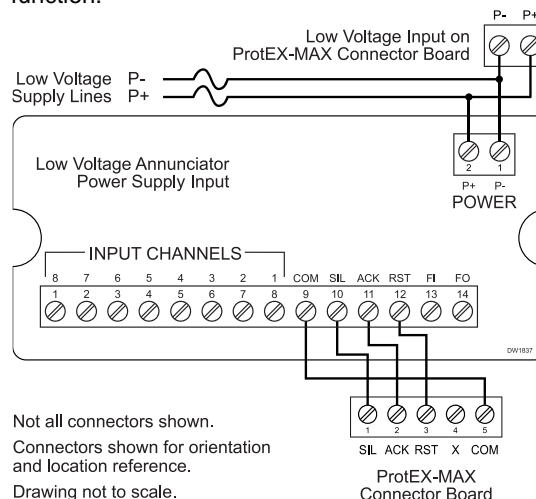
ProtEX-MAX units with Vigilante II integrated functionality have two factory wired connectors. Four wires connect the remote switch inputs of the annunciator. Two wires connect the DC power supply on the main annunciator electronics to the ProtEX-MAX connector board. These must remain connected as shown for the CapTouch Buttons to function on these models.



**Figure 4. Integrated Vigilante II Required Connections for AC-Powered Units**

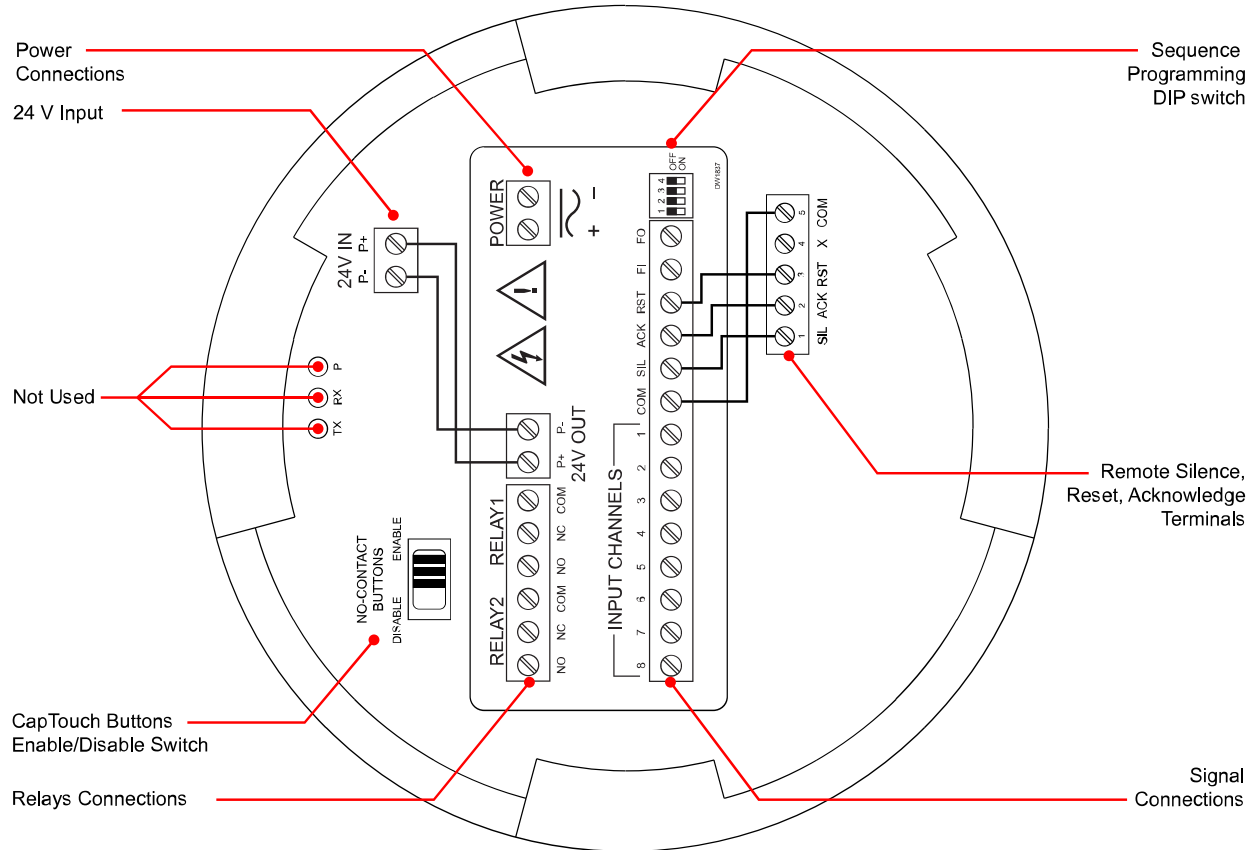
## Required Connections on DC-Powered Models

Low voltage PD8-154-7R2-0 and PD8-158-7R2-0 models require low voltage power to be supplied to the power supply connector on the ProtEX-MAX connector board as well as to the integrated Vigilante II connections as described in the Vigilante II Instruction Manual. In addition, four wires connect the remote switch inputs of the annunciator to the ProtEX-MAX connector board. These wires must remain connected for the CapTouch buttons to function.



**Figure 5. Integrated Vigilante II Required Connections for DC-Powered Units**

# Vigilante II Electronics Module Layout for PD8-158-6R2



The connectors label, affixed to the instrument, shows the location of all connectors available with requested configuration. See diagrams below for all possible configurations.

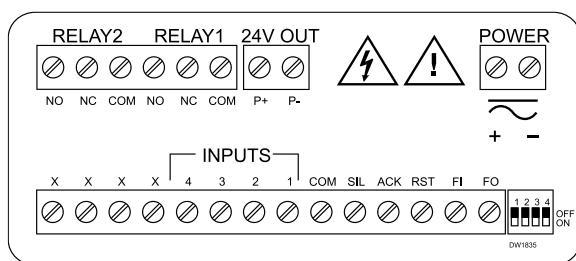


Figure 6. Connector Labeling for PD8-154-6R2-1

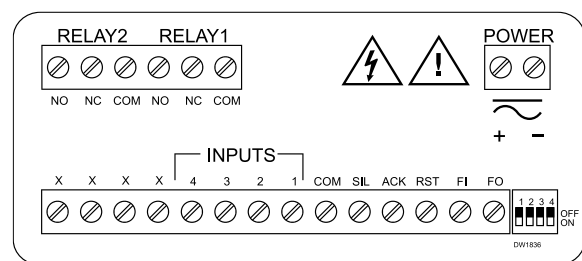


Figure 8. Connector Labeling for PD8-154-7R2-0

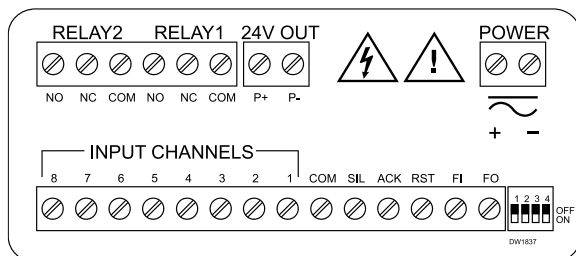


Figure 7. Connector Labeling for PD8-158-6R2-1

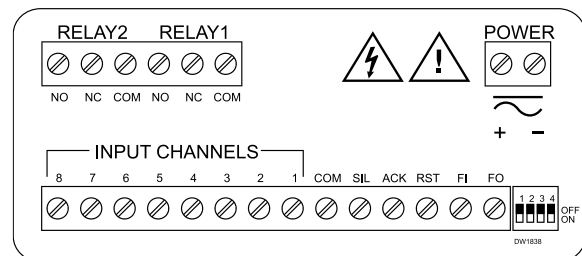
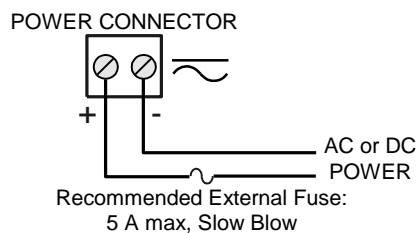


Figure 9. Connector Labeling for PD8-158-7R2-0

## Power Connections

Power connections are made to a two-terminal connector labeled POWER. See *Vigilante II Electronics Module Layout for PD8-158-6R2* on page 21. The instrument will operate regardless of DC polarity connection. The + and - symbols are only a suggested wiring convention.



**Figure 10. Power Connections**

## Signal Connections

Input signal connections are made to a 14-terminal connector at terminals labeled INPUT CHANNELS. See *Vigilante II Electronics Module Layout for PD8-158-6R2* on page 21. The COM (common) terminal is the return for all types of input signals.

### Normally Open (NO) or Normally Closed (NC) Switches

The following figure shows an example of normally open or normally closed contact inputs.

Programming a channel for a normally open or normally closed contact is done with the front panel pushbuttons (see page 29). All channels are initially set for normally open contacts. Each contact is wired across an input channel and common.

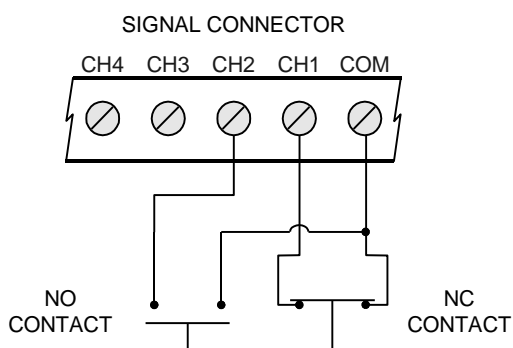


Figure 11. NO/NC Contact Inputs

### Open Collector NPN Transistor

Each transistor collector is connected to a separate input channel and all emitters connected to common. All channels are factory set for transistor inputs normally in the cutoff or “off” state. For normally active/saturation state or “on” transistors, program inputs for normally closed input operation; see page 29. Open circuit voltage is approximately 3.3 VDC provided by a 47 kΩ internal pullup resistor.

The following figure shows an example of open collector NPN transistor inputs.

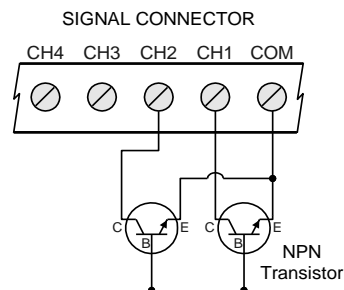


Figure 12. Open Collector NPN Transistor Inputs

### Logic Level Inputs

Each logic level input is connected to an input channel with common as the return.

Logic level inputs are factory set for normally high active logic level inputs. For normally low input logic levels, program inputs for normally closed input operation, see page 29.

Logic Level Low: 0 to 1.4 VDC

Logic Level High: 1.5 to 28 VDC

Input Impedance: Approximately 47 kΩ

### Relays and 24 V Output Connections

Relay connections are made to a six-terminal connector labeled RELAY1 and RELAY2. See *Connections* on page 20. The COM (common) terminals of the relays should not be confused with the COM (common) terminal of the signal connector. The 24 VDC output is available at the connector labeled 24V OUT, next to the relays connector.

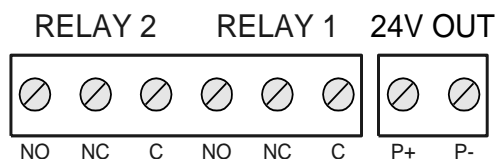


Figure 13. Relay & 24 V Output Connections



## Switching Inductive Loads

The use of snubbers to suppress electrical noise is strongly recommended when switching inductive loads to prevent disrupting the microprocessor's operation. The snubbers also prolong the life of the relay contacts. Suppression can be obtained with resistor-capacitor (RC) networks assembled by the user or purchased as complete assemblies. Refer to the following circuits for RC network assembly and installation:

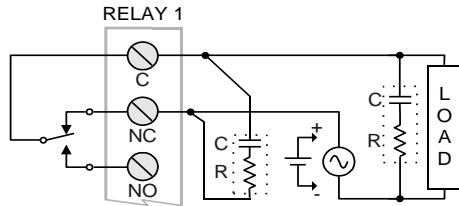


Figure 14. AC and DC Loads Protection

Choose R and C as follows:

R: 0.5 to 1  $\Omega$  for each volt across the contacts

C: 0.5 to 1  $\mu\text{F}$  for each amp through closed contacts

### Notes:

1. Use capacitors rated for 250 VAC.
2. RC networks may affect load release time of solenoid loads. Check to confirm proper operation.
3. Install the RC network at the annunciator's relay screw terminals. An RC network may also be installed across the load. Experiment for best results.

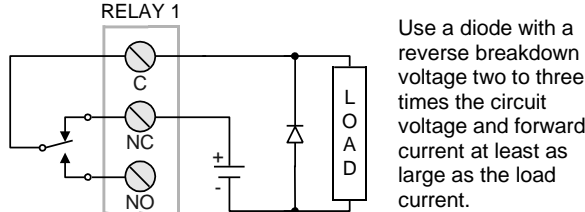


Figure 15. Low Voltage DC Loads Protection

## RC Networks (Snubbers) Available from Precision Digital

RC networks are available from Precision Digital and should be applied to each relay contact switching an inductive load. Part number: [PDX6901](#).

## External Input Types

The external Silence (SIL), Acknowledge (ACK), and Reset (RST) inputs may be contacts (i.e. pushbuttons, relay contacts, etc.), open collector inputs (OC), or TTL signals. However, throughout this manual, the term "pushbutton" is used to describe these external inputs. Please refer to the chart below for signal logic.

External Input Type	Active When
Switch/Contact	Closed
Open Collector (OC)	On
TTL	Low

## External Pushbutton Connections

The front panel pushbuttons may also be triggered with hazardous area-approved pushbuttons connected to the signal connector terminals. See *Connections* on page 20. Connect SIL to common for the silence pushbutton, ACK to common for the acknowledge pushbutton, and RST to common for the reset pushbutton.

The following figure shows external pushbutton wiring connections. Do not wire-short the external pushbutton contacts to common.

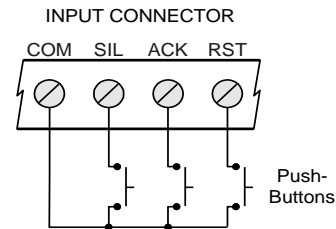


Figure 16. External Pushbutton Connections

## Multiple Unit First-Out Indication Connections

Multiple PD8-158 and PD8-154 units can keep a single first-out channel indicated for all connected units. An unlimited number of units may be connected. It is recommended that all units follow the same sequence.

The following figure shows shared first-out indication wiring connections for 3 units. Up to 200 units may be connected for first-out indication.

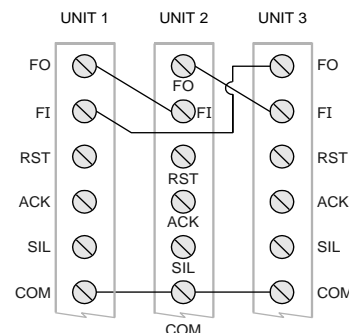


Figure 17. System with Multiple Units Share First-Out

## Setup and Programming

### Overview

There are no jumpers involved in the setup process of the annunciator. The sequence selector switch located on the rear of the annunciator above the signal connector must be set accordingly for annunciator sequence desired.

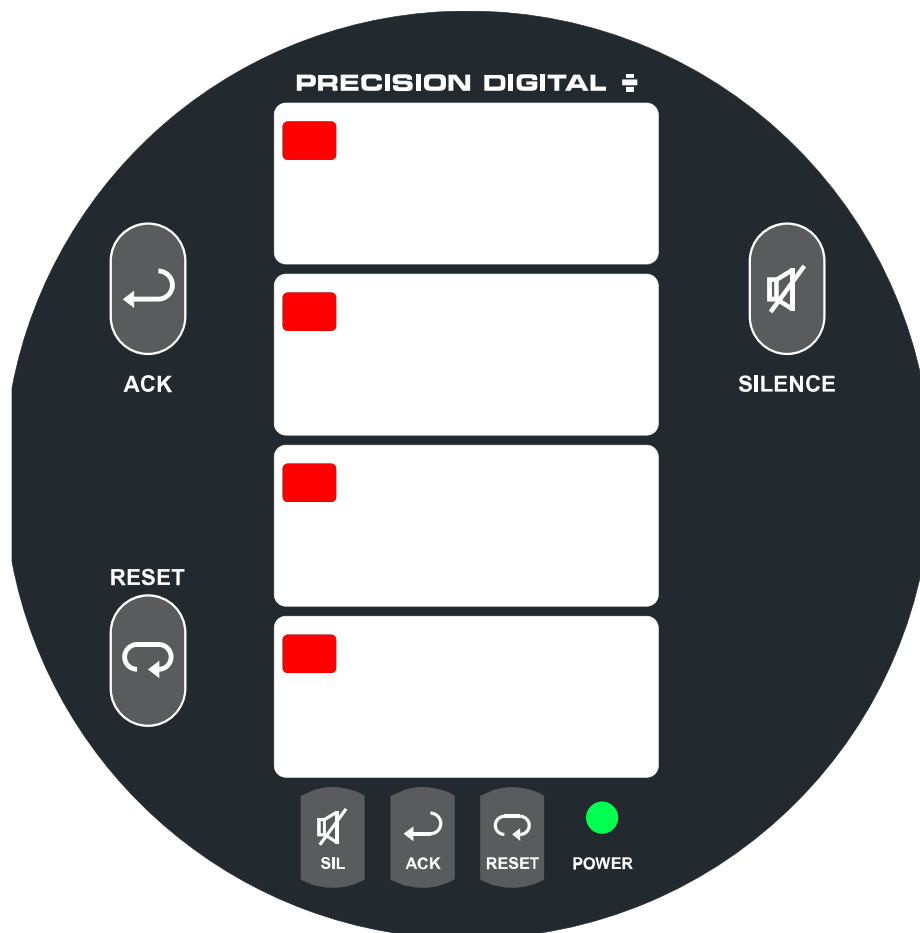
Normally open or normally closed input setup, relay fail-safe, and additional sequence options are programmed with the front panel pushbuttons.

After power and signal connections have been completed and verified, and the sequence selector switch has been set appropriately, apply power to the annunciator.

For *Quick Setup Guide* go to page 13.

### LED Status Indicators

#### PD8-154

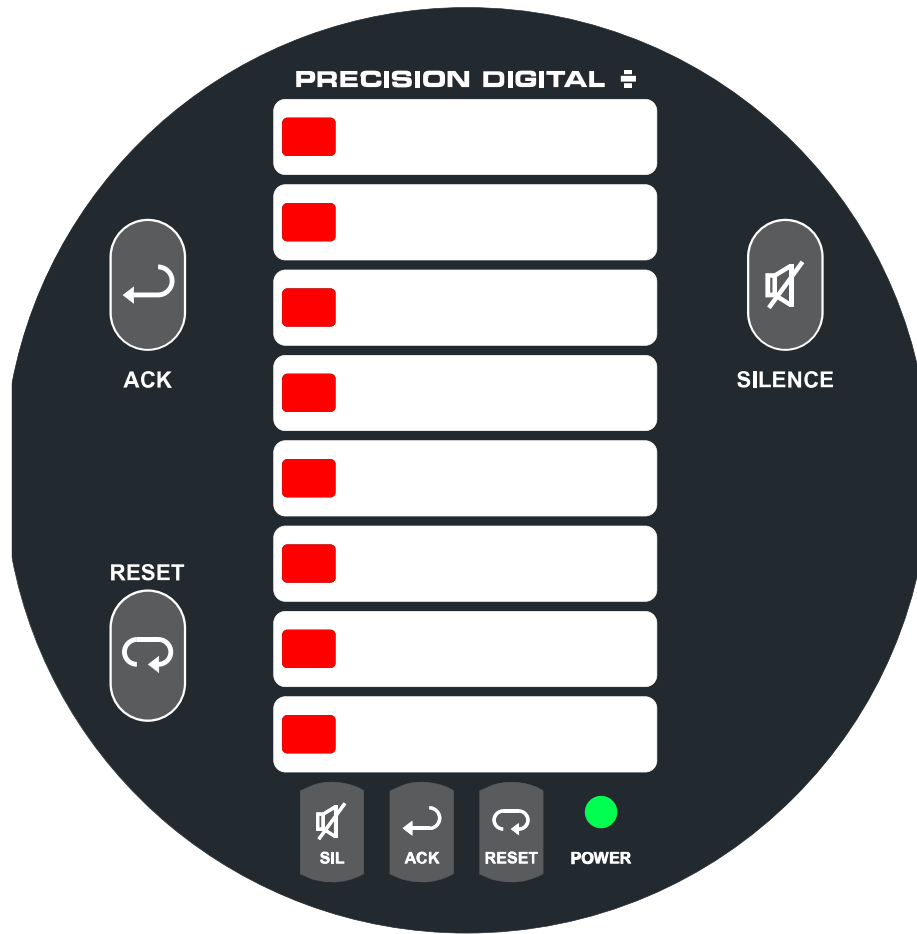


LED	Description
Red Indicators <sup>1</sup>	Channel status indicators
Green Indicator	Indicates power is on.

1. Quantity 4 red LED on the PD8-154  
Quantity 8 red LED on the PD8-158

[Be sure to include Free Custom Message Labels with your order!](#)

## PD8-158






LED	Description
Red Indicators <sup>1</sup>	Channel status indicators
Green Indicator	Indicates power is on.

1. Quantity 4 red LED on the PD8-154  
Quantity 8 red LED on the PD8-158

[Be sure to include Free Custom Message Labels with your order!](#)

## Programming Buttons

Button	Description
 SILENCE	Silence Audible Alarm
 ACK	Acknowledge Alarms
 RESET	Reset / Clear Input Channels

- Press the Silence button to silence the audible alarm without affecting the indication sequence states. This pushbutton may be disabled (see *Audible Alarm Enable/Disable*, page 31).
- Press the Acknowledge button to acknowledge alarmed channels. See *Full Sequence Descriptions* on page 32 for more details.
- Press the Reset button to reset all acknowledged channels. This button is not used on ISA sequences A, F1A, and F2A, which reset acknowledged channels automatically.
- Press and release the Silence and Acknowledge pushbuttons to flash the channel indicator LEDs for a lamp test.

## CapTouch Buttons

The ProtEX-MAX is equipped with three capacitive sensors that operate as through-glass buttons so that they can be operated without removing the cover (and exposing the electronics) in a hazardous area or harsh environment.

CapTouch buttons are designed to protect against false triggering and can be disabled for security by selecting DISABLE on the switch labeled NO-CONTACT BUTTONS located on the connector board.

To actuate a button, press one finger to the window directly over the marked button area. When the cover is removed or replaced, the CapTouch buttons can be used after the meter completes a self-calibrating routine. The sensors are disabled when more than one button is pressed, and they will automatically re-enable after a few seconds. When the cover is removed, the three mechanical buttons located on the bottom of the faceplate are used.

The CapTouch Buttons are configured by default to duplicate the function of the front panel mechanical pushbuttons associated with the integrated annunciator.

### CapTouch Button Tips:

- Keep the glass window clean.
- Tighten the cover securely.
- Use a password to prevent tampering.



## Full Function Test

Press and hold **SILENCE** and **ACK** for 5 seconds to perform a function test. This tests the sequence operation and hardware by simulating alarm inputs that are cleared in the normal sequence progression. During the function test, all channels enter a simulated alarm state for 3 seconds. All LEDs, pushbuttons, relays, and the audible alarm will follow the selected sequence as if the simulated alarm inputs were real. After 3 seconds, the alarms may be cleared as normal for the selected sequence.

## Multiple Unit First-Out Indication

If multiple ProtEX-MAX PD8-150 series annunciators are connected for multiple unit shared first-out indication (see page 24), only one input from all connected devices will display as a first-out alarm.

Each individual annunciator will acknowledge and reset the channels on that unit using the pushbuttons on that unit, and independent of all other connected units. Only the unit displaying the first-out will sound the audible alarm.

It is recommended that all connected units be set for the same first-out sequence.

## Shared Front Panel Buttons

To control all the units from any of the front panels, connect the SIL, ACK, RST, and COM terminals on each unit.

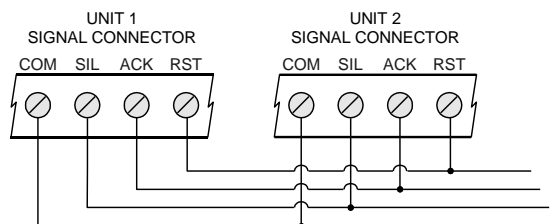


Figure 18. Shared Pushbutton Connections

## Annunciator Sequence Selection

The alarm sequence is selected with the DIP switch located above the signal connector.

Changing sequences while the unit is on will restart the unit.

### Sequence Programming

Set switches to the positions shown below for the desired sequence. The annunciator will immediately restart and operate with the new sequence.

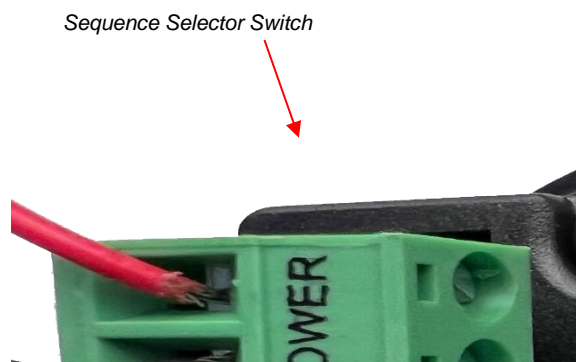
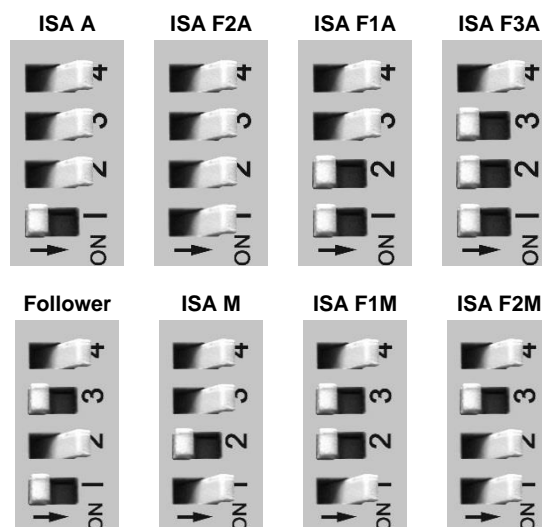


Figure 19. DIP Switch Location



## Sequence Descriptions

See Page 32 for complete sequence descriptions.



## Normally Open/Normally Closed Input Setup

Each input channel is independently programmed for a normally open or normally closed input. All channels are initially programmed at the factory for normally open inputs.

### Alarm Conditions for normally open inputs:

1. A closed contact between an input channel and common will cause an alarm condition.
2. An "on" or active transistor between an input channel and common will cause an alarm condition.
3. An active logic level low on an input channel will cause an alarm condition.

### Alarm Conditions for normally closed inputs:

1. An open contact between an input channel and common will cause an alarm condition.
2. An "off" or cutoff state transistor between an input channel and common will cause an alarm condition.
3. An active logic level high or no supplied active logic level on an input channel will cause an alarm condition.

## Programming NO/NC Inputs

1. Press and hold **ACK** and **RESET** for 3 seconds until all LEDs cycle, then release
2. Press **ACK** within 3 seconds of release while LEDs cycle.<sup>1</sup>
3. Press **ACK** within 3 seconds of release while LEDs blink.<sup>1</sup>
4. Press the **RESET** pushbutton to turn LED 1 off for a NO input, or on for a NC input on input channel 1.
5. Press **ACK** to accept the input type and program channel 2.
6. Repeat steps 4 and 5 for all input channels.
7. Press and hold **ACK** for five seconds to return to normal operation with the programmed input types.

During programming, the LED for the channel being programmed will display as either off or brightly on. All other LEDs will be dim.

The green power LED will blink slowly to indicate the unit is in NO/NC setup mode. The unit will automatically leave setup mode if no pushbutton is pressed for 3 minutes.

<sup>1</sup>The unit will automatically leave setup mode if steps 2 and 3 are not followed.

## NO/NC Programming Example

The following is an example of NO/NC setup. Input channel 1 and 2 are changed from the default settings of NO to be NC inputs.

1. Press and hold **ACK** and **RESET** for 3 seconds. When all LEDs cycle, release.
2. Press **ACK** within 3 seconds. All LEDs blink in unison.
3. Press **ACK** again while LEDs blink

4. LED 1 will be off indicating a NO input for channel 1. All other LEDs will be dim.



5. Press **RESET** to change LED 1 from off to on, setting channel 1 for a NC input.



6. Press **ACK** to confirm the NC setting and proceed to program channel 2.



7. Press **RESET** to change LED 2 from off to on, setting channel 2 for a NC input.



8. Press **ACK** to confirm the NC setting and program channel 3.
9. Press and hold **ACK** for five seconds to return to normal operation.

## Relay Operation

Relays 1 and 2 have standard functionality as defined below.

### Relay 1 Operation

Relay 1 enters alarm state when there is a new alarm. This relay will clear when the alarm is acknowledged, generally by pressing the **ACK** pushbutton.

### Relay 2 Operation

Relay 2 enters alarm state when any channel displays in alarm state. This relay will clear when all indication LEDs are cleared.

### Relay Fail-Safe

In fail-safe operation, a relay coil is energized in non-alarm condition. In case of power failure, relays will go to alarm state. Fail-safe operation is set independently for each relay.

### Programming Relay Fail-Safe

1. Press and hold **ACK** and **RESET** for 3 seconds. When all LEDs cycle, release.
2. Press **RESET** within 3 seconds of release while LEDs cycle.<sup>1</sup>
3. Press **RESET** within 3 seconds of release while LEDs blink.<sup>1</sup>
4. Press the **RESET** pushbutton to turn LED 1 off for normal operation, or on for fail-safe operation of Relay 1.
5. Press **ACK** to accept the type of operation for Relay 1.
6. Press the **RESET** pushbutton to turn LED 2 off for normal operation, or on for fail-safe operation of Relay 2.
7. Press **ACK** to accept the type of operation for Relay 2.
8. Press and hold **ACK** for five seconds to return to operation.

During programming, LEDs 1 through 4 will light. The LED being programmed will display as either off or brightly on. The other 3 LEDs will be dim. On a PD8-158, LEDs 5 through 8 will be off.

The green power LED will blink quickly to indicate the unit is in the advanced programming mode. The unit will automatically leave setup mode if no pushbutton is pressed for 3 minutes.

**Note:** LED 3 and 4 are used for the silence pushbutton enable/disable option (see page 31) and no lock-in option (see page 31)

<sup>1</sup>The unit will automatically leave setup mode if steps 2 and 3 are not followed.

## Relay Fail-Safe Programming Example

The following is an example of relay fail-safe setup. Relays 1 and 2 are changed from the default settings of normal operation to fail-safe operation.

1. Press and hold **ACK** and **RESET** for 3 seconds. When all LEDs cycle, release.
2. Press **RESET** within 3 seconds of release while LEDs cycle. All LEDs blink in unison.
3. Press **RESET** again within 3 seconds while LEDs blink

4. LED 1 will be off indicating normal operation of relay 1. LEDs 2 through 4 will be dim.



5. Press Reset to change LED 1 from off to on, setting relay 1 for fail-safe operation.



6. Press **ACK** to confirm the setting for relay 1 and proceed to program relay 2.



7. Press **RESET** to change LED 2 from off to on, setting relay 2 for fail-safe operation.

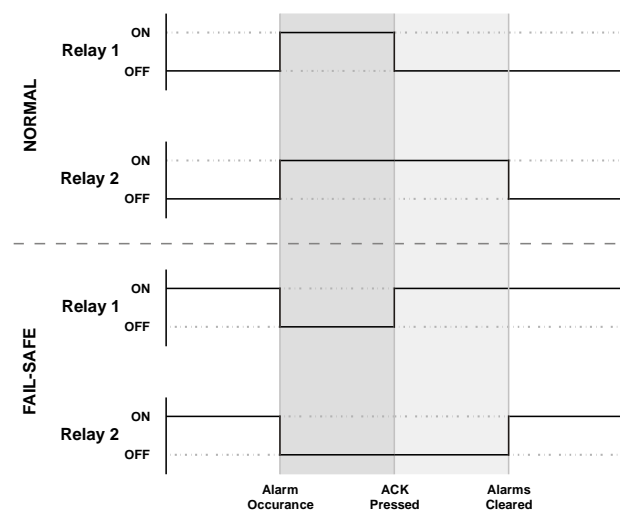


8. Press **ACK** to confirm the setting for relay 2.
9. Press and hold **ACK** for 5 seconds to return to normal operation.

**Note:** LEDs 3 and 4 are used for the silence pushbutton enable/disable option (see page 31) and no lock-in option (see page 31)

## Relay Operation Overview

The following figure illustrates the operation of the relays.



**Relay On:** Relay is energized

**Relay Off:** Relay is de-energized.

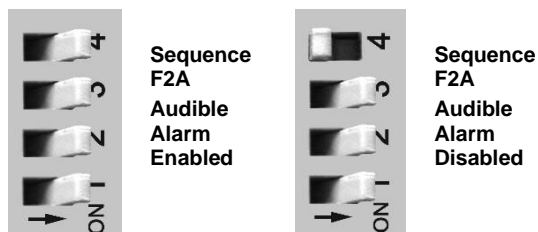
**Alarm Occurrence:** A new alarm occurs when there is no previous unacknowledged alarm.

**ACK Pressed:** The Acknowledge pushbutton is pressed, acknowledging the alarm.

**Alarms Cleared:** All LED indicators are cleared of alarm state indication

## Audible Alarm Enable/Disable

The annunciator contains an audible internal alarm. This audible alarm may be disabled with the rear-mounted switch located above the signal connector. To enable the audible alarm, move switch 4 to the ON position. To disable the audible alarm, move switch 4 to the OFF position.



## Enabling/Disabling Silence Option

ISA sequence option 1, *Silence Pushbutton*, includes a silence pushbutton. This option may be disabled, removing any effects of the silence pushbutton or silence pushbutton external contact. This option is enabled by factory default.

## Silence Pushbutton Enable/Disable

1. Press and hold **ACK** and **RESET** for 3 seconds until all LEDs cycle, then release.
2. Press **RESET** within 3 seconds of release while LEDs cycle.<sup>1</sup>
3. Press **RESET** within 3 seconds of release while LEDs blink.<sup>1</sup>
4. Press the **ACK** pushbutton twice until LED 3 is either off or brightly on.
5. Press the **RESET** pushbutton to turn LED 3 off to disable the silence pushbutton or brightly on to enable the silence pushbutton.
6. Press **ACK** to accept the silence pushbutton setting.
7. Press and hold **ACK** for five seconds to return to normal operation.

The green power LED will blink quickly to indicate the unit is in the advanced programming mode. The unit will automatically leave setup mode if no pushbutton is pressed for 3 minutes.

**Note:** LED 1 and 2 are used for relay fail-safe setup (see page 30)

<sup>1</sup>The unit will automatically leave setup mode if steps 2 and 3 are not followed.

## No Lock-In Sequence Option

ISA sequence option 4 *no lock-in*, may be added to any sequence. Momentary alarms will clear without the **ACK** pushbutton. Sequences A, F1A, F2A, and F3A will automatically clear any momentary alarm. Sequences M, F1M, and F2M will clear all momentary alarms when the **RESET** pushbutton is used, regardless of what channels have previously been acknowledged with **ACK**.

### Selecting No Lock-In Operation

1. Press and hold **ACK** and **RESET** for 3 seconds until all LEDs cycle, then release.
2. Press **RESET** within 3 seconds of release while LEDs cycle.<sup>1</sup>
3. Press **RESET** within 3 seconds while LEDs blink.<sup>1</sup>
4. Press the **ACK** pushbutton three times until LED 4 is either off or brightly on.
5. Press the **RESET** pushbutton to turn LED 4 off to disable the no lock-in option or on to enable the no lock-in option.
6. Press **ACK** to accept the option setting.
7. Press and hold **ACK** for five seconds to return to operation.

The green power LED will blink quickly to indicate the unit is in the advanced programming mode. The unit will automatically leave setup mode if no pushbutton is pressed for 3 minutes.

**Note:** LED 1 and 2 are used for relay fail-safe setup (see page 30), and LED 3 is used for silence pushbutton enable/disable (see page 31).

<sup>1</sup>The unit will automatically leave setup mode if steps 2 and 3 are not followed.

## Full Sequence Descriptions

The following section describes the operation of the various sequences available in the ProtEX-MAX PD8-150 series alarm annunciator.

### Features

**Acknowledge Pushbutton:** Momentary alarms will not clear until the alarmed channels have been acknowledged with the **ACK** pushbutton. This will also reset the first out indication. Used in all ISA sequences.

**Automatic Reset:** Acknowledged momentary alarms will clear automatically when the inputs return to normal. The automatic reset is present in all automatic (A) sequences.

**First-Out Indication:** The sequence provides a distinct visual indication for the first channel to alarm.

**First-Out Reset Pushbutton:** Resets the first-out display and assigns the first-out channel to display as a subsequent alarm without any other changes to the sequence. The next alarm input will be a new first-out alarm. Used only in sequence F3A.

**Reset Pushbutton:** Acknowledged momentary alarms will only clear when reset with the **RESET** pushbutton. Used in any manual reset (M) sequence.

### Sequence Condition Descriptions

The following terms are used in describing the sequence behavior in the following tables:

**Alert:** The input is in alarm state, and the channel has not been acknowledged with the **ACK** pushbutton.

**Acknowledge:** The alarm state is acknowledged with the **ACK** pushbutton. This will restart the first-out indication.

**First Out Reset (F3A Only):** The **RESET** pushbutton is used to reset the first-out indication only.

**Normal:** Inputs are in the normal state.

### LED Condition Descriptions

**1<sup>st</sup> Pt:** Indicates the behavior of the first-out channel only.

**Next Pt:** The behavior of subsequent alarm channels; channels that enter the alarm state after the first-out alarm.

## ISA Sequence A

Acknowledge Pushbutton and Automatic Reset

### Momentary Alarm

Condition	LED	Audible Alarm
Normal	Off	Off
Alert	Flash	On
Normal	Flash	On
<b>ACK Pushbutton</b>		
Acknowledge	Off	Off

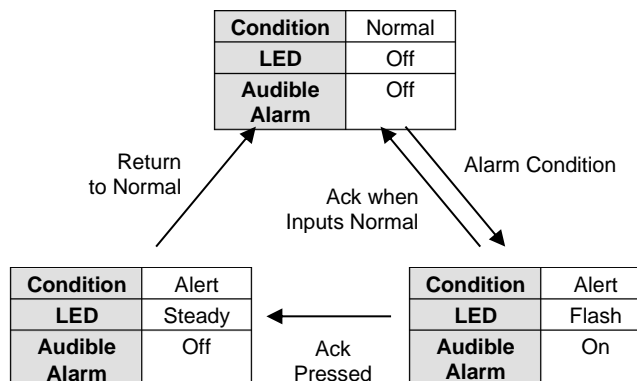
### Maintained Alarm

Condition	LED	Audible Alarm
Normal	Off	Off
Alert	Flash	On
<b>ACK Pushbutton</b>		
Acknowledge	Steady	Off
Normal	Off	Off

### Sequence A Switch Positions



### Sequence A Flow Chart



### Relay Operation

For complete details on relay function, see page 30.

#### Relay 1 Operation

Relay 1 enters alarm state when there is a new alarm. This relay will clear when the alarms are acknowledged.

#### Relay 2 Operation

Relay 2 enters alarm state when any channel displays in alarm state. This relay will clear when all indication LEDs are cleared.

## ISA Sequence F2A

First-Out Indication with Acknowledge Pushbutton and Automatic Reset

### Momentary Alarm

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
Normal	Flash	Steady	On
ACK Pushbutton			
Acknowledge	Off	Off	Off

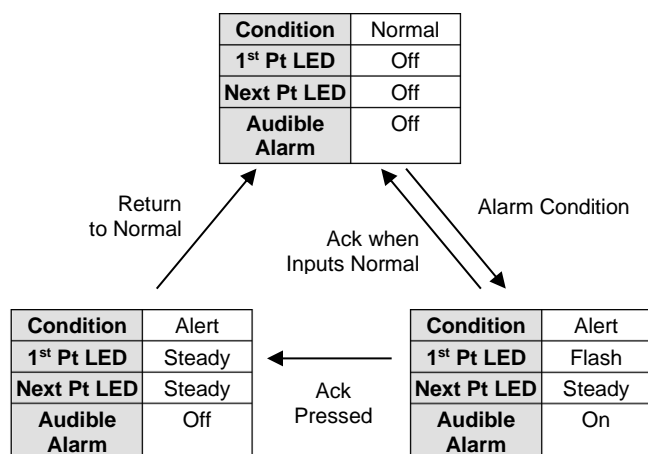
### Maintained Alarm

Condition	LED		Audible alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
ACK Pushbutton			
Acknowledge	Steady	Steady	Off
Normal	Off	Off	Off

### Sequence F2A Switch Positions



### Sequence F2A Flow Chart



## ISA Sequence F1A

First-Out Indication with Acknowledge Pushbutton, No Lock-In of Subsequent Alarms, and Automatic Reset

### Momentary Alarm

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
Normal	Flash	Off	On
ACK Pushbutton			
Acknowledge	Off	Off	Off

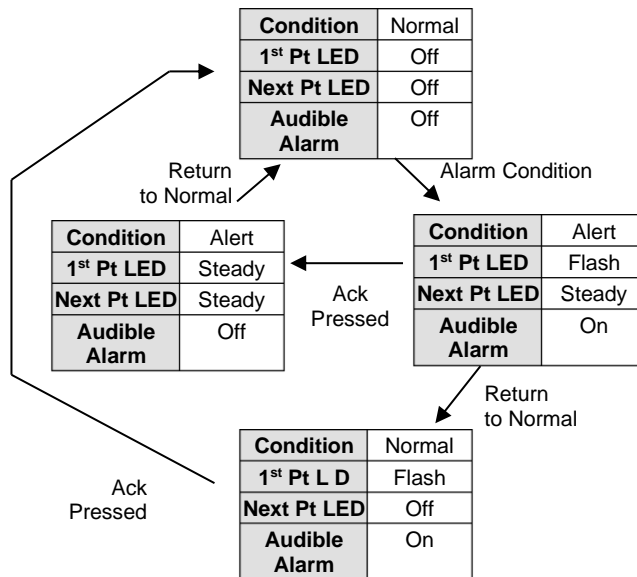
### Maintained Alarm

Condition	LED		Audible alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
ACK Pushbutton			
Acknowledge	Steady	Steady	Off
Normal	Off	Off	Off

### Sequence F1A Switch Positions



### Sequence F1A Flow Chart



## ISA Sequence F3A

First-Out Indication with Acknowledge Pushbutton, Automatic Reset, and First-Out Reset Pushbutton

### Sequence F3A Switch Positions



### Momentary Alarm (RESET before ACK)

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Intermittent Flash	Fast Flash	On
Normal	Intermittent Flash	Fast Flash	On
<b>RESET Pushbutton</b>			
1 <sup>st</sup> Out Reset	Fast Flash	Fast Flash	On
<b>ACK Pushbutton</b>			
Acknowledge	Off	Off	Off

### Momentary Alarm (ACK before RESET)

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Intermittent Flash	Fast Flash	On
Normal	Intermittent Flash	Fast Flash	On
<b>ACK Pushbutton</b>			
Acknowledge	Slow Flash	Off	Off
<b>RESET Pushbutton</b>			
Reset	Off	Off	Off

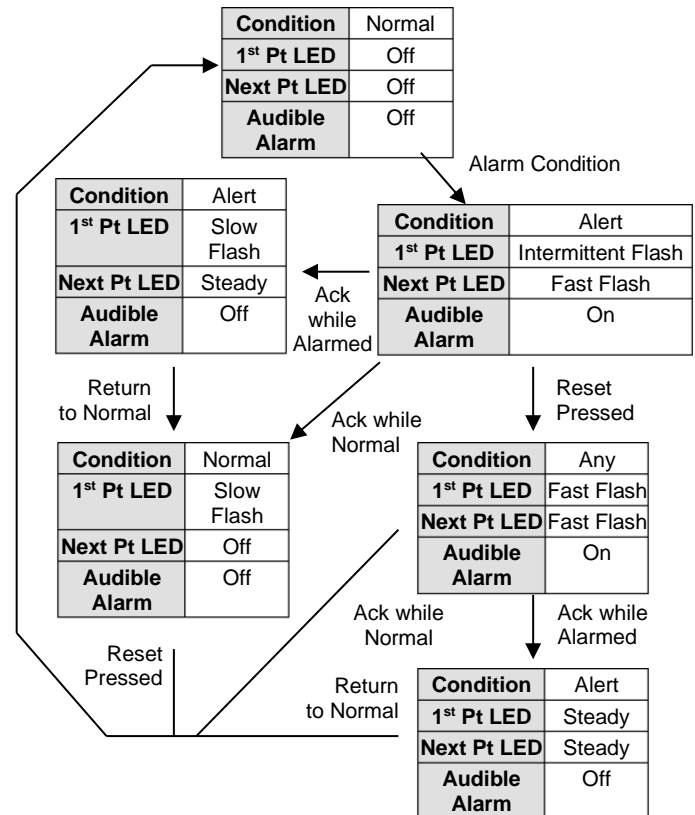
### Maintained Alarm (RESET before ACK)

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Intermittent Flash	Fast Flash	On
<b>RESET Pushbutton</b>			
1 <sup>st</sup> Out Reset	Fast Flash	Fast Flash	On
<b>ACK Pushbutton</b>			
Acknowledge	Steady	Steady	Off
Normal	Off	Off	Off

### Maintained Alarm (ACK before RESET)

Condition	LED		Audible alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Intermittent Flash	Fast Flash	On
<b>ACK Pushbutton</b>			
Acknowledge	Slow Flash	Steady	Off
<b>RESET Pushbutton</b>			
1 <sup>st</sup> Out Reset	Steady	Steady	Off
Normal	Off	Off	Off

### Sequence F3A Flow Chart





## Input Follower Indication

### Simple Indication

Condition	LED	Audible Alarm
Normal	Off	Off
Alert	Steady	On
Normal	Off	Off

### Switch Positions



## ISA Sequence M

Acknowledge and Reset Pushbuttons

### Momentary Alarm

Condition	LED	Audible Alarm
Normal	Off	Off
Alert	Flash	On
Normal	Flash	On
ACK Pushbutton		
Acknowledge	Steady	Off
RESET Pushbutton		
Reset	Off	Off

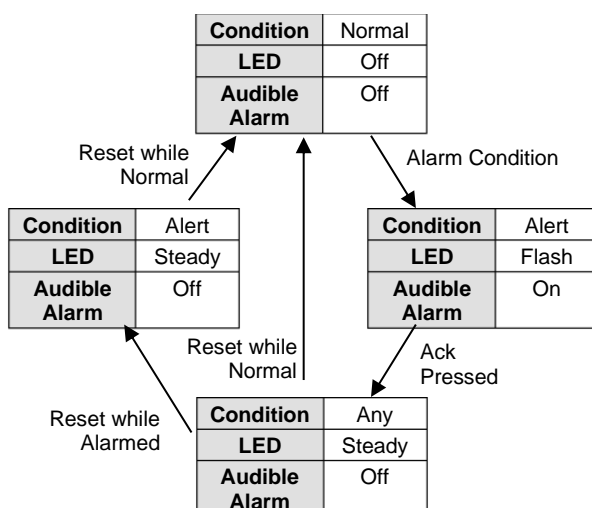
### Maintained Alarm

Condition	LED	Audible Alarm
Normal	Off	Off
Alert	Flash	On
ACK Pushbutton		
Acknowledge	Steady	Off
Normal	Steady	Off
RESET Pushbutton		
Normal	Off	Off

### Sequence M Switch Positions



### Sequence M Flow Chart



## ISA Sequence F1M

First-Out Indication with Acknowledge and Reset Pushbuttons, and No-Lock-In of Subsequent Alarms

### Momentary Alarm

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
Normal	Flash	Steady	On
RESET Pushbutton			
Reset	Flash	Off	On
ACK Pushbutton			
Acknowledge	Steady	Off	Off
RESET Pushbutton			
Normal	Off	Off	Off

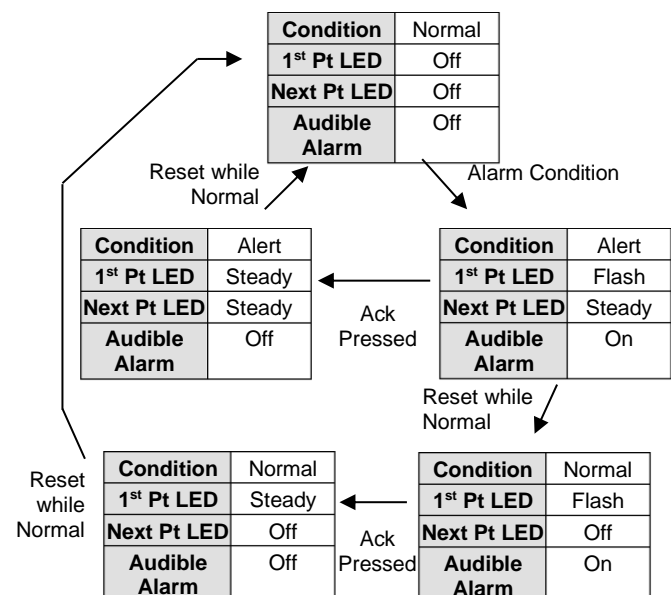
### Maintained Alarm

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
RESET Pushbutton			
Alert	Flash	Steady	On
ACK Pushbutton			
Acknowledge	Steady	Steady	Off
Normal	Steady	Steady	Off
RESET Pushbutton			
Normal	Off	Off	Off

### Sequence F1M Switch Positions



### Sequence F1M Flow Chart



## ISA Sequence F2M

First-Out Indication with Acknowledge and Reset Pushbuttons

### Momentary Alarm

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
Normal	Flash	Steady	On
<b>ACK Pushbutton</b>			
Acknowledge	Steady	Steady	Off
<b>RESET Pushbutton</b>			
Reset	Off	Off	Off

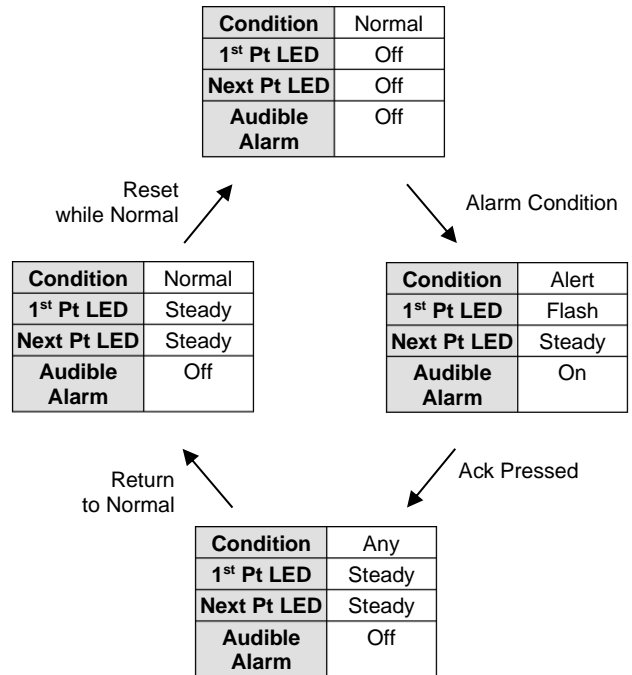
### Maintained Alarm

Condition	LED		Audible Alarm
	1 <sup>st</sup> Pt	Next Pt	
Normal	Off	Off	Off
Alert	Flash	Steady	On
<b>ACK Pushbutton</b>			
Acknowledge	Steady	Steady	Off
Normal	Steady	Steady	Off
<b>RESET Pushbutton</b>			
Normal	Off	Off	Off

### Sequence F2M Switch Positions



### Sequence F2M Flow Chart



## Troubleshooting

### Reset to Factory Defaults

1. Hold the **ACK** and **RESET** pushbuttons for 3 seconds until all red LEDs cycle. Release once the LEDs begin to cycle.
2. Press and hold the **RESET** button for 5 seconds. If the **RESET** button is not pressed within 3 seconds of releasing **ACK** and **RESET**, the unit will return to run mode without reset.
3. Reset the 4-position switch on the rear of the control to the indicated default settings.

**Factory Default  
Switch Positions**



## Troubleshooting Tips

If the annunciator is not working as expected, refer to the recommendations below.

Symptom	Check/Action
POWER LED off	Check power at power connector
Audible alarm does not sound when alarm state detected	Check: <ol style="list-style-type: none"> <li>1. Rear switch position 4 is ON.</li> <li>2. No external pushbutton contacts on the input connector are shorted.</li> </ol>
Power light blinks and channel/point indicators flash intermittently when powered up.	Check that no external pushbutton contacts on the signal connector are shorted to common.
Display sequence does not function as expected.	Check: <ol style="list-style-type: none"> <li>1. Verify sequence selection as shown on page 28.</li> <li>2. Check that no external pushbutton contacts on the input connector are shorted.</li> </ol>
If the display locks up or the unit does not respond at all	Cycle the power to restart the microprocessor.
Relay operation is reversed	Check: <ol style="list-style-type: none"> <li>1. Fail-safe settings as shown on page 30.</li> <li>2. Wiring of relay contacts</li> </ol>
CapTouch buttons do not respond	<ol style="list-style-type: none"> <li>1. Check if slide switch on connector board is in DISABLE position, switch to ENABLE.</li> <li>2. Be sure to hold the initial CapTouch button for 5 seconds to wake it up.</li> </ol>
POWER LED Indicator is off	Check: <ol style="list-style-type: none"> <li>1. Modular cable connection</li> <li>2. Power to the device</li> </ol>
Other symptoms not described above	Call Technical Support for assistance.

To reset unit to factory default settings of sequence F2A-1, first out indication with silence and acknowledge pushbuttons with automatic reset, see *Reset to Factory Defaults* on page 37.

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