

# TRICONEX

Tricon Version 9-10 Systems

## *Field Terminations Guide for Tricon v9-v10 Systems*

Assembly No. 9700052-018

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This guide includes information on external termination products for Tricon v9 systems and Tricon v10 systems.

## Summary of Sections

- [Chapter 1, Introduction to Field Terminations](#) – introduces the Triconex external field termination products for the Tricon system.
- [Chapter 2, Field Termination Options and Installation](#) – provides information for determining field termination options using I/O module part numbers or I/O module types, and describes how to install and remove termination panels and fanned-out cables.
- [Chapter 3, Digital Input Termination Panels](#) – describes external field termination panels that you can use with digital input modules.
- [Chapter 4, Digital Output Termination Panels](#) – describes external field termination panels that you can use with digital output modules.
- [Chapter 5, Analog Input and Analog Output Termination Panels](#) – describes external field termination panels that you can use with analog input modules and analog output modules.
- [Chapter 6, Hazardous Location \(Nonincendive\) Termination Panels](#) – describes external field termination panels that you can use in hazardous locations.
- [Chapter 7, RG 1.180 Termination Panels](#) – describes external termination panels that you can use in nuclear power plant EMI/RFI environments.
- [Chapter 8, Fanned-Out Cables](#) – describes fanned-out cables that you can use with digital I/O modules.
- [Appendix A, Re-Keying Connectors](#) – explains how to re-key connectors by module type and voltage to protect modules from inadvertent connection to inappropriate voltages.
- [Appendix B, Fanned-Out Cable Pinouts](#) – provides pin-out information for connecting fanned-out cables and basic termination panels.
- [Appendix C, Recommended Replacement Parts](#) – contains a list of recommended parts that can be used to replace existing Tricon parts, or customize a Tricon system.
- [Appendix D, Panel Dimensions](#) – specifies the physical dimensions of the different types of termination panels.
- [Appendix E, Shield Ground](#) – illustrates how to connect a shield to earth.
- [Appendix F, Panel Labels](#) – illustrates how to apply termination panel labels.

- [Appendix G, Part Number Cross-Reference](#)— identifies the ETA part number and cable part number for each termination panel model number.
- [Appendix H, Minimum Bend Radiuses of Cables](#)— identifies the minimum bend radiuses of cables.
- [Appendix J, Using V8 ETAs with v9/v10 Systems](#)— identifies version 8 “low-density” external termination assemblies (ETAs) that can be used with version 9 systems.
- [Appendix K, Warning Labels](#)— describes General Hazard, Hazardous Voltage, and Hot Surface warning labels.

## Related Documents

- *Planning and Installation Guide for Tricon v9–v10 Systems*
- *Safety Considerations Guide for Tricon v9–v10 Systems*
- *TriStation 1131 Developer’s Guide, v4.3*

## Product and Training Information

To obtain information about Triconex products and in-house and on-site training, see the Triconex Web site or contact your regional Triconex support office.

### Web Site

<http://www.ips.invensys.com/en/triconex>

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Requests for support are prioritized as follows:

- Emergency requests are given the highest priority
- Requests from participants in the System Watch Agreement (SWA) and customers with purchase order or charge card authorization are given next priority
- All other requests are handled on a time-available basis

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## Introduction to Field Terminations

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## Overview

This chapter introduces the Triconex external field termination products for the Tricon system.

All cables and termination panels are built to withstand harsh industrial environments. The environmental specifications for components used on these products are the same as for a Tricon chassis. For more information, see the *Planning and Installation Guide for Tricon v9-v10 Systems*.

# External Termination Panels

An external termination panel (ETP) is an electrically-passive printed circuit board (PCB) to which field wiring is easily attached. A panel connector, terminal blocks, and optional components are mounted to the PCB and enclosed in a DIN-rail compatible plastic housing. A termination panel and associated cable pass input signals from the field directly to an input module, or pass output signals from an output module directly to field wiring. This arrangement permits the removal or replacement of I/O modules without disturbing field wiring.

Standard termination panels are best for remote marshaling of field wiring where maximum flexibility, high density and simple maintenance is desired. Standard termination panels allow you to marshal field signals in a separate enclosure up to 99 feet (30 meters) from a Tricon.

A standard termination panel consists of a PCB with all necessary components – such as two-piece terminal blocks, resistors, fuses and blown-fuse indicators – mounted on a DIN-rail compatible plastic housing. The housing snaps into mounting rails in accordance with DIN 50 22.

Compression terminals on the standard panel are designed for use with 24- to 12-gauge (0.3 mm<sup>2</sup> to 2.1 mm<sup>2</sup>) wiring. Some panels have an optional current-limiting series resistor, others have a fuse with a blown-fuse indicator, to protect the field wiring and field device.

Standard termination panels are pre-configured for a specific application. For instance, *commoned* standard termination panels can be ordered with commoned power-and-return, or redundant DC power configurations with a diode-ORing. The thermocouple input termination panel provides cold-junction temperature sensors and can be ordered with upscale, downscale, or programmable burnout detection. A standard termination panel for analog voltage inputs provides commoned or non-commoned signal returns, while the current-mode version has a precision resistor at each input point to convert current to voltage.

Each standard termination panel is packaged with a matched interface cable that connects the panel to the backplane of a Tricon chassis. A female connector at one end of the cable is keyed to match the male connector on the Tricon backplane. A male connector on the other end of the cable attaches to the standard termination panel.

In addition to standard termination panels, there are other types of termination panels, including:

- Basic termination panels
- Hazardous location (nonincendive) termination panels
- RG 1.180 Termination Panels
- Termination panels with interposing relays
- Bypass panels for digital inputs
- Termination panels with RTD/TC/AI input signal conditioning
- Termination panels for 3603B digital output modules
- Termination panels for 3806E analog output modules

## Basic Termination Panels

Basic termination panels are a low-cost means of connecting field wiring to a Tricon. Basic termination panels allow you to marshal field signals in a separate enclosure up to 99 feet (30 meters) from a Tricon chassis.

A basic termination panel consists of a PCB— with panel connector and terminal blocks — mounted on a DIN rail-compatible plastic housing. The housing snaps onto mounting rails in accordance with DIN 50 022. Current-to-voltage conversion resistors are also mounted on analog input panels configured for current input. You must provide any other components required for your application.

The panel connector and terminal blocks are directly interconnected via the PCB. The compression terminals on the terminal blocks are designed for use with 24- to 12-gauge (0.3 mm<sup>2</sup> to 2.1 mm<sup>2</sup>) wiring.

Refer to [Appendix B, Fanned-Out Cable Pinouts](#) for signal labels and connector pin numbers. Each signal label indicates the corresponding screw terminal on the termination panel. The panel connector's pin numbers match those on the Tricon backplane's connector.

A basic termination panel is packaged with a cable that connects between a Tricon chassis backplane and the basic termination panel. A female connector on one end of the cable is keyed to match the male connector on the Tricon backplane. A male connector on the opposite end of the cable is keyed to match the male connector on the termination panel.

Basic termination panels are available in these configurations:

- Digital input panels
- Digital output panels
- Relay output panels
- Analog input panels
- Analog output panels
- Pulse input panels
- Pulse totalizer input panels

## RG 1.180 Termination Panels

RG 1.180 termination panels are suitable for use in applications that need to meet the requirements of Regulatory Guide 1.180, "Guidelines for Evaluating Electromagnetic and Radio-Frequency Interference in Safety-Related Instrumentation and Control Systems, Revision 1" published by the U.S. Nuclear Regulatory Commission.

## Hazardous Location (Nonincendive) Termination Panels

Hazardous location (nonincendive) termination panels are suitable for use in Zone 2, and Class 1, Division 2 field circuits. These panels contain extra circuitry designed to limit power available to the field terminals and have been examined and certified by TÜV Rheinland as being nonincendive. This guarantees that if the field wires are accidentally opened, shorted, or



grounded, and the Tricon is operating normally, the wiring and attached devices will not release sufficient energy to cause ignition in the specified flammable atmosphere.

## Termination Panels with Interposing Relays

Termination panels with interposing relays can be used with most digital output modules and are recommended for these applications:

- Load currents greater than 2 amps
- Field voltages greater than 115 VAC
- Voltage-level conversions
- Motor-starter circuit compatibility

Interposing relay panels are available in these configurations:

- 16-point commoned
- 16-point non-commoned

The digital outputs of the interposing relays are not fault-tolerant. However, each relay provides an auxiliary contact that can be fed into a digital input to send a loopback signal to the control program. A user-written loopback check in the control program can ensure that the relay has achieved its commanded state. The loopback cable must be ordered separately.

Each interposing relay panel provides the capability to common power and return through a factory-mounted bus-bar arrangement.

Each interposing relay panel consists of:

- A 7 in x 19 in (36 cm x 48 cm) rack-mountable panel with terminals for 16 digital outputs and 16 digital inputs.
- Two ELCO connectors mounted on the panel for connecting to digital input modules using digital input cables 9141-010, 9142-010, or 9143-010.
- An EIA standard RS-310-C plate on which the termination panel is mounted.
- A digital output module and a cable compatible with the selected coil voltage.

## Bypass Panel for Digital Inputs

Bypass termination panels can be used to connect digital inputs using a bank of 32 pre-wired switches. Bypass panels have a master keyswitch and terminals for redundant +24 VDC power sources. Each input point contains an ON status indicator and can be energized only if the master keyswitch is ON and the corresponding point switch is ON. Each point has a location for a user-definable label.

Each bypass termination panel comes with one or two 10-foot (3-meter) cables for connecting the termination panel to a Tricon backplane.

## **Termination Panel with RTD/TC/AI Input Signal Conditioning**

Termination panels which use industry-standard analog signal conditioners provide a flexible, user-configurable interface to resistive thermal devices (RTDs), thermocouples, and 4-20 mA transmitters. Each termination panel supports 16 points and each analog module can support up to 2 panels. These termination panels are compatible with any signal conditioners in the 1 to 5 volt output range. For example, the 7B series of signal conditioners from Analog Devices™ are known to work well.

## **Termination Panel 9251-210 for Digital Output Module 3603B**

The special 16-point non-commoned digital output termination panel 9251-210 is required for use with the 16-point non-commoned digital output module 3603B.

## **Termination Panel 9863-710 for Analog Output Module 3806E**

The special analog output termination panel 9863-710, with buffered loopback signals, is available for use with the high-current analog output module 3806E.

# Cables

Three types of cables can be used with the Tricon:

- [Interface Cables](#)
- [Fanned-Out Cables](#)
- [Special Cables \(Relay Loopback\)](#)

## Interface Cables

Interface cables are packaged with all termination panels. Each interface cable has a female connector on one end for connection to the male connector on a Tricon chassis backplane. The opposite end has a keyed male connector for connection to a termination panel.

Although the standard length of all interface cables is 10 feet (3 meters), you may order any length cable up to 90 feet (27.4 meters) in 10-foot increments using the last two digits of the termination panel's model number to specify length in feet. For example, specify 9xxx-x50 if you want a 50-foot (15 meter) cable instead of the standard 10-foot (3-meter) cable.

## Fanned-Out Cables

Fanned-out cables are a lower-cost alternative to using external termination panels. Fanned-out cables allow you to marshal field signals in a separate enclosure up to 99 feet (30 meters) from a Tricon. One end of a fanned-out cable has a female connector that connects to a Tricon chassis backplane. The other end of the cable contains 50 fanned-out leads, each individually labeled with its corresponding connector pin number.

Each fanned-out cable has the following characteristics:

- PVC outer covering
- 56-pin connector at one end
- 50 stranded, stripped, tinned and labeled 22-gauge leads at opposite end

Fanned-out cables should only be used with digital input and digital output modules. They are not certified for use with analog signals. Contact the Triconex Customer Support Center if you need a fanned-out cable for handling analog signals.

Although the normal length of all fanned-out cables is 10 feet (3 meters), any length cable can be ordered up to 99 feet (30 meters) in 1-foot increments, using the last two digits of the cable model number to specify the length in feet. For example, the model number 9101-050 specifies a 50-foot cable instead of the normal 10-foot cable.

## Special Cables (Relay Loopback)

If your application requires a special cable, it must be ordered separately. For example, if you want to verify relay activation on a relay termination panel using a digital output module, you must order a relay loopback cable to connect between the relay termination panel and a digital input module. Currently, the only special cable available is the relay loopback cable (914x-010).



# 2

## Field Termination Options and Installation

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## Overview

This chapter provides information for determining field termination options using module part numbers or module types, and it describes how to install and remove termination panels and fanned-out cables.

## Determining Field Termination Options by Module Part Number

This table identifies which termination products you can use with a given I/O module. Match your module part number in the left column to termination options on the right.

**Table 1 Termination Product Options (Listed by Module Part Number)**

Module Part #	Module Description	Commoned Term Panels	Non-Common. Term Panels	Basic Term Panels	Nonincendive Term Panels	RG 1.180 Term Panels	Fanned-out Cables	Bypass Panels	ERT Loop-Back Cables/Panels
3501E 3501T	DI, 115 VAC/VDC, 32 pts.	9561-810	9561-110	9551-110	n/a	n/a	9101-010	n/a	9141-010
3502E	DI, 48 VAC/VDC, 32 pts.	9562-810	n/a	9552-610	n/a	n/a	9101-010	n/a	9142-010
3503E	DI, 24 VAC/VDC, 32 pts.	9563-810 9563-910	n/a	9553-610	9572-610	n/a	9101-010	BP9228-010	9143-010
3504E	DI, 24/48 VDC, non-isolated, 64 pts.	9566-810, 24V 9565-810, 48V	n/a  n/a	9750-310, 24V 9750-410, 48V	9570-610, 24V n/a	n/a	n/a  n/a	BP9229-010  n/a	n/a  n/a
3505E	DI, 24 VDC, low threshold, 32 pts.	9563-810 9563-910	n/a	9553-610	9572-610	n/a	9101-010	BP9228-010	9143-010
3510	PI, 20-20,000 Hz, 8 pts.	n/a	n/a	9753-110	n/a	n/a	n/a	n/a	n/a
3511	PI, 20-20,000 Hz, 8 pts.	n/a	n/a	9753-110	9793-110	9794-110	n/a	n/a	n/a
3515	Pulse totalizer, 24 VDC, 32 pts.	n/a	n/a	9753-110	9572-610	n/a	n/a	n/a	n/a
3564	DI, 24 VDC, single, 64 pts.	9566-710	n/a	9553-610	9571-610	n/a	9101-010	n/a	n/a
3601E	DO, 115 VAC, 16 pts.	9661-610 9663-610	9661-110 9664-110	9651-110	n/a	n/a	9101-010	n/a	9670-110 9670-610
3601T	DO, 115 VAC, 16 pts.	9663-610	9664-110	n/a	n/a	n/a	n/a	n/a	n/a
3603B	DO, 120 VDC, 16 pts.	n/a	9251-210	n/a	n/a	n/a	n/a	n/a	n/a

**Table 1 Termination Product Options (Listed by Module Part Number) (continued)**

Module Part #	Module Description	Commoned Term Panels	Non-Common. Term Panels	Basic Term Panels	Nonincendive Term Panels	RG 1.180 Term Panels	Fanned-out Cables	Bypass Panels	ERT Loop-Back Cables/Panels
3603E	DO, 120 VDC, 16 pts.	9661-910 9664-810	n/a	9651-110	n/a	n/a	9101-010	n/a	9673-810
3603T	DO, 120 VDC, 16 pts.	9664-810	n/a	n/a	n/a	n/a	n/a	n/a	9673-810
3604E	DO, 24 VDC, 16 pts.	9662-810	9662-110	9653-610	9671-610	n/a	9101-010	n/a	9671-810
3607E	DO, 48 VDC, 16 pts.	9667-810	9667-110	9652-610	n/a	n/a	9101-010	n/a	9672-810
3611E	DO, 115 VAC, 8 pts.	9661-510	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3613E	DO, 120 VDC, 8 pts.	9661-810	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3614E	DO, 24 VDC, 8 pts.	9662-910	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3615E	DO, 24 VDC, low power, 8 pts.	9662-710	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3617E	DO, 48 VDC, 8 pts.	9667-910	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3623	DO, 120 VDC, 16 pts.	9661-910	n/a	9651-110	n/a	n/a	9101-010	n/a	n/a
3623T	DO, 120 VDC, 16 pts.	9664-810	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3624	DO, 24 VDC, 16 pts.	9662-610	n/a	9653-610	9671-610	n/a	9101-010	n/a	n/a
3625	DO, 24 VDC, 32 pts.	9662-610	n/a	9653-610	9671-610	n/a	9101-010	n/a	n/a
3636R 3636T	Relay output (non-triplicated), 32 pts.	n/a	9668-110	9651-110	n/a	n/a	9101-010	n/a	n/a
3664	Dual DO, 24 VDC, self-protected, 32 pts.	9662-610	n/a	9653-610	9671-610	n/a	9101-010	n/a	9671-810
3674	Dual DO, 24 VDC, self-protected, 32 pts.	9662-610	n/a	9653-610	9671-610	n/a	9101-010	n/a	9671-810
3805E 3805H	AO, 4–20 mA, 8 pts.	n/a	n/a	9853-610	9861-610	9860-610	n/a	n/a	n/a
2870H	AO HART Interface	n/a	n/a	9853-610	9861-610	9860-610	n/a	n/a	n/a
3806E	AO, 6 4–20 mA outputs, 2 20–320 mA outputs	n/a	n/a	9863-710 (special panel)	n/a	n/a	n/a	n/a	n/a
3807	AO, 4 bipolar -60 to 60 mA outputs	9871-810	n/a	n/a	9871-810	n/a	n/a	n/a	n/a

**Table 1 Termination Product Options (Listed by Module Part Number) (continued)**

Module Part #	Module Description	Upscale	Downscale	Basic Term Panels	Nonincendive Term Panels	RG 1.180 Term Panels	Fanned-out Cables	Bypass Panels	ERT Loop-Back Cables/Panels
3706A	Thermocouple input, type J, K, T, differential, 32 pts.	9766-210	9766-510	n/a	9784-610, upscale 9785-610, downscale	n/a	n/a	n/a	n/a
3708E	Thermocouple input, type E, J, K, T, isolated, 16 pts.	9765-610	9765-610	n/a	9786-110	9782-110	n/a	n/a	n/a
Module Part #	Module Description	3-Wire 4-20 mA	Voltage	2-Wire 4-20 mA	Nonincendive Term Panels	RG 1.180 Term Panels	Basic	RTD/TC/AI	
3700 3700A	AI, 0-5 VDC, differential, 32 pts.	n/a	9763-810	9761-210, 0-5 V 9771-210, 0-5 V	9791-610, current input 9787-110, voltage input	9790-610, current input 9792-610, 4-20 mA, 0-5 V 48 VDC field 9783-110, voltage input 9764-310, RTD/TC/AI input	9753-110, 0-5 V	9764-310 <sup>1</sup>	
2770H	AI HART Interface	n/a	n/a	9761-210, 0-5 V	9791-610, current input	9790-610, current input	n/a	n/a	
3701	AI, 0-10 VDC, differential, 32 pts.	n/a	9763-810	9761-410	n/a	n/a	9753-110, 0-10 V	n/a	
3703E <sup>2</sup>	AI, 0-5/0-10 VDC, isolated, 16 pts.	n/a	9763-810	9762-210, 0-5 V 9762-410, 0-10 V 9771-210, 0-5 V	9791-610, current input 9787-110, voltage input	9790-610, 4-20 mA, 0-5 V 9792-610, 4-20 mA, 0-5 V 48 VDC field 9795-610, 4-20 mA, 0-10 V 9783-110, voltage input	9753-110, 0-5/0-10 V	n/a	
3704E <sup>2</sup>	AI, 0-5/0-10 VDC, non-isolated, 64 pts.	9765-210, 0-5V	n/a	9760-210, 0-5 V 9760-410, 0-10 V	9789-610, 4-20 mA	n/a	9750-210, 4-20 mA 9750-810, 0-5/0-10 V	n/a	
3720	AI, 0-5 VDC, single-ended, 64 pts.	9765-210, 0-5 V	n/a	9760-210, 0-5 V 9760-410, 0-10 V	9789-610, 4-20 mA	n/a	9750-210, 4-20 mA 9750-810, 0-5/0-10 V	n/a	



Module Part #	Module Description	3-Wire 4-20 mA	Voltage	2-Wire 4-20 mA	Nonincendive Term Panels	RG 1.180 Term Panels	Basic	RTD/TC/AI
3721	AI; 0 to 5 VDC or -5 to +5 VDC; differential; 32 pts.	n/a	9763-810	9761-210, 0-5 V 9761-410, 0-10 V 9771-210, 0-5 V	9791-610, current input 9787-110, voltage input	9790-610, 4-20 mA, 0-5 V 9792-610, 4-20 mA, 0-5 V 48 VDC field 9795-610, 4-20 mA, 0-10 V 9783-110, voltage input 9764-310, RTD/TC/AI input	9753-110, 0-5 V	

1. Signal conditioners must be ordered separately. A total of 16 is required for each termination panel.
2. Must be configured with TriStation.

## Determining Field Termination Options by Module Type

This section identifies external field termination products you can use with each type of module.

Topics include:

- [Digital Input Modules on page 14](#)
- [Pulse Input Modules on page 15](#)
- [Pulse Totalizer Input Modules on page 16](#)
- [Digital Output Modules on page 16](#)
- [Supervised Digital Output Modules on page 17](#)
- [Supervised/Non-Supervised Digital Output Modules on page 17](#)
- [Dual Digital Output Modules on page 18](#)
- [Relay Output Modules on page 18](#)
- [Analog Input Modules on page 19](#)
- [Thermocouple Input Modules on page 21](#)
- [Analog Output Modules on page 22](#)
- [HART Interface Modules on page 23](#)

### Digital Input Modules

This table identifies termination products you can use with 32-point digital input modules.

**Table 2 Termination Products for 32-Point Digital Input Modules**

Termination Option	115 V AC/DC (3501E/T)	48 V AC/DC (3502E)	24 V AC/DC (3503E)	24 VDC (3505E)
Standard termination panel, commoned	9561-810	9562-810	9563-810 9563-910	9563-810 9563-910
Standard termination panel, non-commoned	9561-110	n/a	n/a	n/a
Basic termination panel	9551-110	9552-610	9553-610	9553-610
Nonincendive termination panel	n/a	n/a	9572-610	9572-610
Bypass panel	n/a	n/a	BP9228-010	BP9228-010
Fanned-out cable	9101-010	9101-010	9101-010	9101-010
Relay cable	9141-010	9142-010	9143-010	9143-010

**Note** You need two termination panels (or cables) for each 32-point or 64-point DI module. Also, you can mix any combination of two termination products listed in a particular module's column. For example, for a 115 VAC/VDC module you may use two 9561-810

commoned panels, or one 9561-810 commoned panel and one 9561-110 non-commoned panel, or one 9551-110 basic panel and one 9101-010 fanned-out cable.

This table identifies termination products you can use with 64-point digital input modules.

**Table 3 Termination Products for 64-Point Digital Input Modules**

Termination Option	24/48 VDC (3504E)	24 VDC (3564)
Standard termination panel, commoned	9566-810 (24 V) 9565-810 (48 V)	9566-710
Basic termination panel	9750-310 (24 V) 9750-410 (48 V)	9553-610
Nonincendive termination panel	9570-610	9571-610
Bypass panel	BP9229-010	n/a
Fanned-out cable	n/a	9101-010

## Pulse Input Modules

This table identifies termination products you can use with pulse input modules. You can use only one termination listed in a particular module's column.

**Table 4 Termination Products for 8-Point Pulse Input Modules**

Termination Option	20 Hz-20 kHz (3510)	20 Hz-20 kHz (3511)
Basic termination panel	9753-110	9753-110
Nonincendive termination panel	n/a	9793-110
RG 1.180 Term Panel	n/a	9794-110

**Note** You need one termination panel for each 8-point PI module.

## Pulse Totalizer Input Modules

This table identifies termination products you can use with pulse totalizer input modules.

**Table 5 Termination Products for 32-Point Pulse Totalizer Input Modules**

Termination Option	0-1 kHz (3515)
Basic termination panel	9753-110
Nonincendive termination panel	9572-610
Fanned-out cable	Contact Triconex for availability of pulse totalizer fanned-out cables.

**Note** You need two termination panels for each 32-point pulse totalizer input module.

## Digital Output Modules

This table identifies termination products you can use with 16-point non-supervised digital output modules.

**Table 6 Termination Products for 16-Point Non-Supervised Digital Output Modules**

Termination Option	115 VAC (3601E)	115 VAC (3601T)	120 VDC (3603B)	120 VDC (3603E)	120 VDC (3603T)	24 VDC (3604E)	48 VDC (3607E)
Standard termination panel, commoned	9661-610 9663-610	9663-610	n/a	9661-910 9664-810	9664-810	9662-810	9667-810
Standard termination panel, non-commoned	9661-110 9664-110	9664-110	n/a	n/a	n/a	9662-110	9667-110
Basic termination panel	9651-110	n/a	n/a	9651-110	9651-110	9653-610	9652-610
Nonincendive termination panel	n/a	n/a	n/a	n/a	n/a	9671-610	n/a
Relay panel, commoned	9670-610	n/a	n/a	9673-810	9673-810	9671-810	9672-810
Relay panel, non-commoned	9670-110	n/a	n/a	n/a	n/a	n/a	n/a
Special panel, non-commoned	n/a	n/a	9251-210	n/a	n/a	n/a	n/a
Fanned-out cable	9101-010	n/a	n/a	9101-010	n/a	9101-010	9101-010

**Note** You need one termination panel (or cable) for each 16-point non-supervised DO module.

## Supervised Digital Output Modules

This table identifies termination products you can use with 8-point supervised digital output modules. You can use only one of the terminations listed in a particular module's column.

**Table 7 Termination Products for 8-Point Supervised Digital Output Modules**

Termination Option	115 VAC (3611E)	120 VDC (3613E)	24 VDC (3614E)	24 VDC (low power) (3615E)	48 VDC (3617E)
Standard termination panel, commoned	9661-510	9661-810	9662-910	9662-710	9667-910

**Note** You need one termination panel (or cable) for each 8-point or 16-point supervised DO module.

**Table 8 Termination Products for 16-Point Supervised Digital Output Modules**

Termination Option	120 VDC (3623)	120 VDC (3623T)	24 VDC (3624)
Standard termination panel, commoned	9661-910	9664-810	9662-610
Basic termination panel	9651-110	9651-110	9653-610
Nonincendive termination panel	n/a	n/a	9671-610
Fanned-out cable	9101-010	n/a	9101-010

## Supervised/Non-Supervised Digital Output Modules

This table identifies termination products you can use with 32-point supervised/non-supervised digital output modules.

**Table 9 Termination Products for 32-Point Supervised/Non-Supervised Digital Output Modules**

Termination Option	24 VDC (3625)
Standard termination panel, commoned	9662-610
Basic termination panel	9653-610
Nonincendive termination panel	9671-610
Fanned-out cable	9101-010

**Note** You need two termination panels (or cables) for each 32-point digital output module. Also, you can mix any combination of two termination products listed. For example, you may use two 9662-610 panels, or one 9653-610 basic panel and one 9101-010 fanned-out cable, and so on.

## Dual Digital Output Modules

This table identifies termination products you can use with dual digital output modules.

**Table 10 Termination Products for 32-Point Dual Digital Output Modules**

Termination Option	24 VDC (3664, 3674)
Standard termination panel, commoned	9662-610
Basic termination panel	9653-610
Nonincendive termination panel	9671-610
Relay panel, commoned	9671-810
Fanned-out cable	9101-010

**Note** You need two termination panels (or cables) for each 32-point dual digital output module. Also, you can mix any combination of two termination products listed. For example, you may use two 9662-610 panels, or one 9653-610 basic panel and one 9101-010 fanned-out cable, and so on.

## Relay Output Modules

This table identifies termination products you can use with relay output modules.

**Table 11 Termination Products for 32-Point Relay Output Modules**

Termination Option	Non-Commoned, Normally Open (3636R, 3636T)
Standard termination panel, non-commoned	9668-110
Basic termination panel, non-commoned	9651-110
Fanned-out cable	9101-010

**Note** You need two termination panels (or cables) for each 32-point relay output module. Also, you can mix any combination of two termination products listed. For example, you may use two 9668-110 panels, two 9651-110 basic panels, or one 9668-110 panel and one 9651-110 basic panel.

## Analog Input Modules

This table identifies termination products you can use with analog input modules.

**Table 12 Termination Products for 16-Point Analog Input Modules**

Termination Option	0-5 VDC or 0-10 VDC (3703E)
Standard termination panel, voltage input	9763-810
Standard termination panel, current input	9762-210 (0-5 V) 9762-410 (0-10 V)
Standard termination panel, current input, user configurable	9771-210 (0-5 V)
Basic termination panel, voltage input	9753-110
Nonincendive termination panel, current input	9791-610
Nonincendive termination panel, voltage input	9787-110
RG 1.180 Term Panel	9790-610 (4-20 mA, 0-5 V) 9792-610 (4-20 mA, 0-5 V, 48 VDC field) 9795-610 (4-20 mA, 0-10 V) 9783-110 (voltage input)
Fanned-out cable	Contact Triconex for availability of analog fanned-out cables.

**Note** You need one termination panel for each 16-point AI module.

This table identifies termination products you can use with 32-point analog input modules.

**Table 13 Termination Products for 32-Point Analog Input Modules**

Termination Option	0-5 VDC (3700A)	0-10 VDC (3701)	0 to 5 VDC or -5 to +5 VDC (3721)
Standard termination panel, voltage input	9763-810	9763-810	9763-810
Standard termination panel, current input	9761-210	9761-410	9761-210
Standard termination panel, current input, user configurable	9771-210	n/a	9771-210 (0-5 V) 9761-410 (0-10 V)
Basic termination panel, voltage input	9753-110	9753-110	9753-110
Nonincendive termination panel, current input	9791-610	n/a	9791-610
Nonincendive termination panel, voltage input	9787-110	n/a	9787-110
RG 1.180 Term Panel	9790-610 (current input) 9792-610 (4-20 mA, 0-5 V, 48 VDC field) 9783-110 (voltage input) 9764-310, RTD/TC/AI input	n/a	9790-610 (4-20 mA, 0-5 V) 9792-610 (4-20 mA, 0-5 V, 48 VDC field) 9795-610 (4-20 mA, 0-10 V) 9783-110 (voltage input) 9764-310, RTD/TC/AI input
RTD/TC/AI panel	9764-310	n/a	n/a
Fanned-out cable	Contact Triconex for availability of analog fanned-out cables.		

**Note** You need two termination panels (or cables) for each 32-point AI module. Also, you can mix any combination of two termination products listed in a particular module's column. For example, with 0-5 VDC modules you may choose two 9763-810 panels, or a 9753-110 basic panel and a 9764-310 RTD/TC/AI panel, and so on.

**Table 14 Termination Products for 64-Point Analog Input Modules**

Termination Option	0-5 VDC or 0-10 VDC (3704E)	0-5 VDC (3720)
Standard termination panel, 3-wire Xmtr	9765-210	9765-210
Standard termination panel, current input	9760-210 (0-5 V) 9760-410 (0-10 V)	9760-210 (0-5 V) 9760-410 (0-10 V)
Basic termination panel, current input	9750-210 (0-5 V)	9750-210



**Table 14 Termination Products for 64-Point Analog Input Modules (continued)**

Termination Option	0-5 VDC or 0-10 VDC (3704E)	0-5 VDC (3720)
Basic termination panel, voltage input	9750-810 (0-5 V/0-10 V)	9750-810
Nonincendive termination panel, current input	9789-610	9789-610
Fanned-out cable	Contact Triconex for availability of analog fanned-out cables.	

**Note** You need two termination panels (or cables) for each 64-point AI module. Also, you can mix any combination of two termination products listed. For example, you may choose two 9760-210 panels, or a 9750-210 basic panel and a 9760-210 panel, and so on.

## Thermocouple Input Modules

This table identifies termination products you can use with 16-point thermocouple input modules. You can use only one termination listed in a particular module's column.

**Table 15 Termination Products for 16-Point Thermocouple Input Modules**

Termination Option	Type E, J, K, and T; High-Density (3708E)
Standard termination panel	9765-610
Nonincendive termination panel	9786-110
RG 1.180 Term Panel	9782-110

**Note** You need one termination panel for each 16-point thermocouple input module.

This table identifies termination products you can use with 32-point thermocouple input modules.

**Table 16 Termination Products for 32-Point Thermocouple Input Modules**

Termination Option	Type J, K, and T; Differential; Non-Isolated (3706A)
Standard termination panel, upscale	9766-210
Standard termination panel, downscale	9766-510
Nonincendive termination panel, upscale	9784-610
Nonincendive termination panel, downscale	9785-610

**Note** You need two termination panels for each 32-point thermocouple input module. Also, you can use a 9766-210 panel with a 9766-510 panel.

## Analog Output Modules

This table identifies termination products you can use with 8-point analog output modules.

**Table 17 Termination Products for 8-Point Analog Output Modules**

Termination Option	4-20 mA (3805E/H)	6, 4-20 mA; 2, 20-320 mA (3806E)
Basic termination panel	9853-610	n/a
Special panel (Recommended for use in turbine-control applications)	n/a	9863-710
Nonincendive termination panel	9861-610	n/a
RG 1.180 Term Panel	9860-610	n/a
Fanned-out cable	Contact Triconex for availability of analog fanned-out cables.	

**Note** You need one termination panel for each 8-point AO module.

This table identifies termination products you can use with 4-point bipolar analog output modules.

**Table 18 Termination Products for 4-Point BiPolar Analog Output Modules**

Termination Option	BiPolar -60 to 60 mA (3807)
Standard termination panel	9871-810
Nonincendive termination panel	9871-810
Fanned-out cable	Contact Triconex for availability of analog fanned-out cables.

**Note** You need one termination panel for each 4-point BPAO module.

## HART Interface Modules

This table identifies termination products you can use with HART AI and AO interface modules.

**Table 19 Termination Products for HART Interface Modules**

Termination Option	HART AI Interface (2770H)	HART AO Interface (2870H)
Standard termination panel, current input	9761-210	n/a
Basic termination panel	n/a	9853-610
Nonincendive termination panel	9791-610	9861-610
RG 1.180 termination panel	9790-610	9860-610

# Installation and Removal

This section explains how to install and remove termination panels and fanned-out cables.

Topics include:

- [Installing a Termination Panel on page 24](#)
- [Removing or Replacing a Termination Panel on page 30](#)
- [Installing a Fanned-Out Cable on page 31](#)
- [Removing or Replacing a Fanned-Out Cable on page 31](#)



Perform the installation, removal, and replacement procedures according to the safety requirements for your environment.



- To ensure safe operation, install the recommended fuse type and value. To avoid electrical shock and equipment damage while removing a blown fuse, use the fuse-extractor tool (#158000-01) supplied with the system.
- The connector on each external termination panel, interface cable, and special cable is factory-keyed by voltage and module type to protect against accidental connection to an incompatible product. If you use a fanned-out cable instead of a termination panel, you must re-key its connector according to [Appendix A, Re-Keying Connectors](#).

## Installing a Termination Panel

This procedure explains how to install a termination panel.

### Procedure

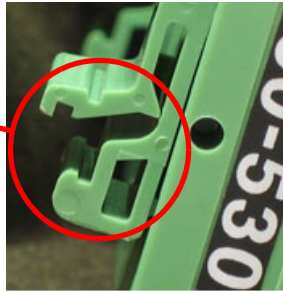
- 1 Set up the Tricon chassis and install the I/O modules as described in the *Planning and Installation Guide for Tricon v9-v10 Systems*.
- 2 Remove incoming power from the Tricon system (optional).
- 3 Mount the termination panel on a DIN rail as shown in these pictures.

**Note** These termination panels *cannot* be installed on a DIN rail. They must be installed on a standard 19 inch (47.5 cm) rack (Electronics Industries Association Standard #RS-310-C):

- 9251-210
- 9670-110
- 9670-610
- 9671-810
- 9672-810
- 9673-810

- BP9228-010
- BP9229-010
- 9764-310

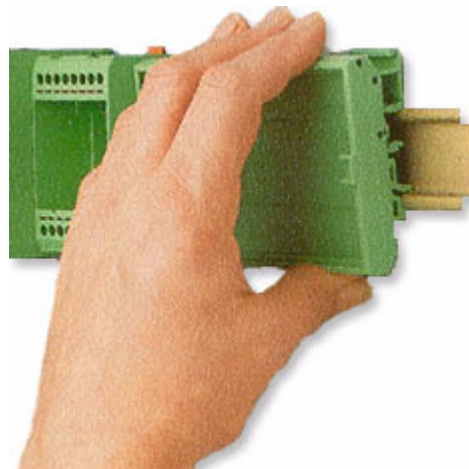
Place the bottom of the DIN rail into the lower brackets on the back of the term panel.



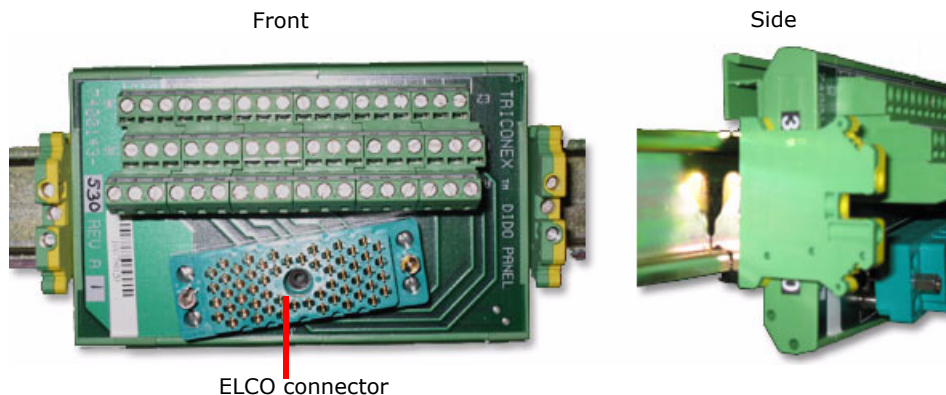
After placing the bottom of the DIN rail, place the top of the DIN rail into the upper brackets and snap the top rail edge into the grooves.



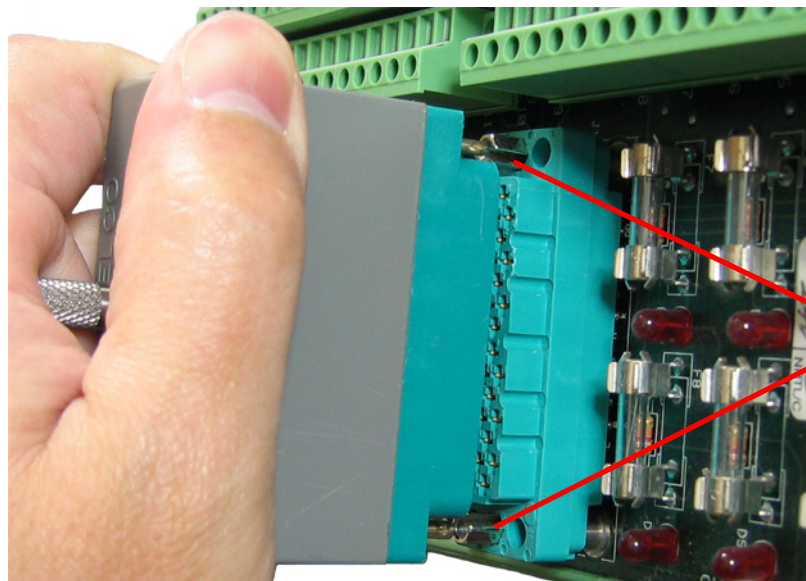
This picture shows a term panel being mounted properly on a DIN rail.



For applications requiring high shock/vibration or seismic immunity, attach a ground terminal block to the DIN rail at either end of the term panel (or string of term panels) to prevent the term panel(s) from sliding along the DIN rail, as shown in this picture. For Nuclear Class 1E applications, additional installation guidelines may be applicable and must be considered. Please contact the IPS Global Client Support (GCS) center for details.

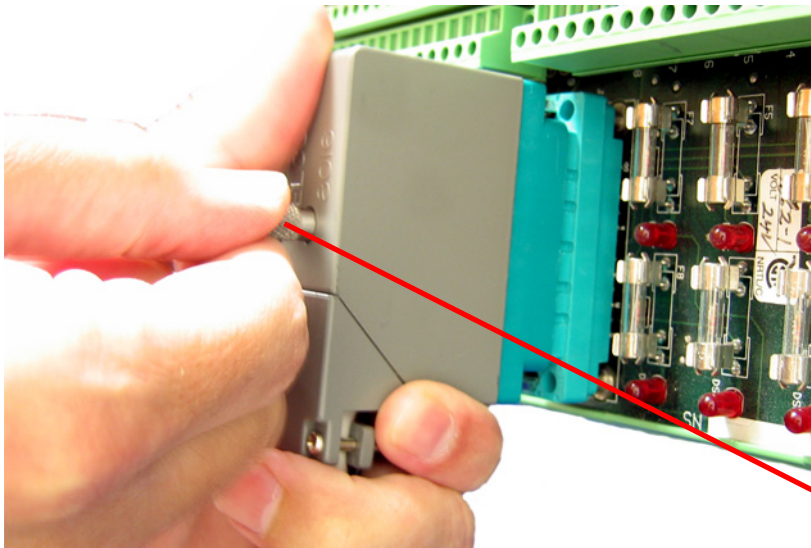


- 4 Attach one end of the interface cable to the ELCO connector on the termination panel.
  - Ensure that the mating surfaces of the ELCO connectors on the cable and the termination panel do not have any bent pins or other damage, and that both male and female keys match.
  - Position the connector on the cable so that it is aligned with the connector on the termination panel.

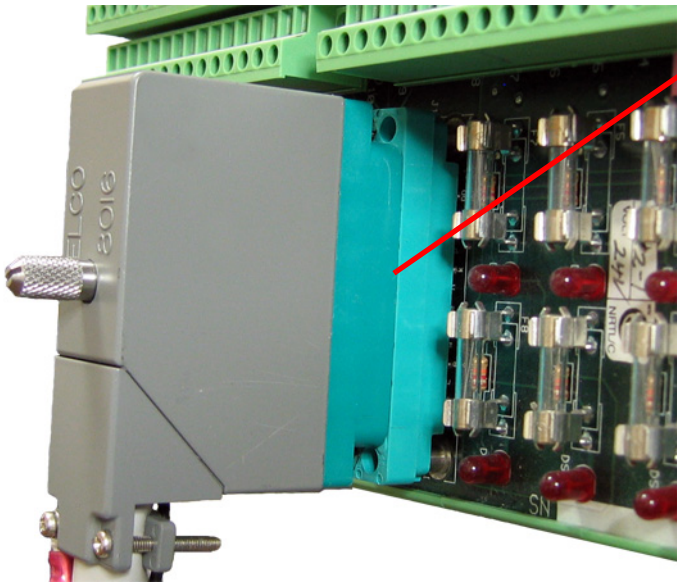


Ensure that the male and female keys match.

- Mate the two connectors together until the threaded end of the thumbscrew is making contact with the nut in the female connector. You may need to slightly rock the connector on the cable while mating it to the connector on the termination panel.
- As you apply pressure to the top of the connector on the cable, use your other hand to turn the thumbscrew clockwise until the connectors are mated completely. The minimum torque requirement is 8.85 lb<sub>f</sub> in (10.0 d-Nm).

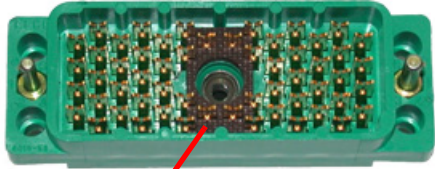
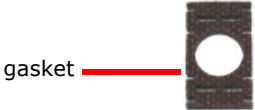


Turn the thumbscrew clockwise...  
...until the connectors are fully mated.



**! WARNING**

You *must* use gasket 2000098-100 on the male side of all ELCO connectors used in ATEX installations, and replace it before the end of its five-year life span. Triconex *recommends* that you use the gasket in all hazardous locations requiring nonincendive circuits. (Order Triconex part number 3000793-001 for a kit of 25 gaskets.)



installed gasket

- 5 Attach the other end of the interface cable to the ELCO connector directly above the corresponding I/O module on the Tricon backplane in the same manner as you connected the cable to the termination panel, as described in [step 4](#).
- 6 Attach the wires from your field devices to the screw terminals on the termination panel. See the [Torque Specifications for Field Wiring Terminals](#) section.
- 7 Perform a static check of the wiring.
- 8 If Tricon power was removed in step 1, restore power to the Tricon system.
- 9 Apply field power to the termination panel.
- 10 Verify that all I/O points are connected to the appropriate field devices and are operating correctly.
 

**Note** To inspect input points and force output points, see the *Planning and Installation Guide for Tricon v9–v10 Systems*.
- 11 Load and test the control program using TriStation.

If the program operates as intended, you are ready to enable the process equipment according to the safety requirements for your environment.

If you need additional information on how to install external field termination panels, contact the IPS Global Client Support (GCS) center.

## Torque Specifications for Field Wiring Terminals

Tighten the screws on the field wiring and power terminals of the ETPs in the list below to this torque:

4.425–5.310 lb<sub>f</sub> in (0.3688–0.4425 lb<sub>f</sub> ft) (0.5–0.6 Nm)

9551-110	9651-110	9664-110	9761-210	9787-110
9552-610	9652-610	9664-810	9761-410	9789-610
9553-610	9653-610	9667-110	9762-410	9790-610
9561-810	9661-610	9667-910	9762-210	9791-610
9561-110	9661-710	9667-610	9763-810	9792-610
9562-810	9661-110	9667-710	9765-210	9793-110
9563-810	9661-810	9667-810	9765-610	9794-110
9565-810	9661-510	9668-110	9766-210	9795-610
9565-710	9661-910	9750-410	9766-510	9853-610
9566-710	9662-110	9750-810	9771-210	9860-610
9566-810	9662-910	9750-210	9782-110	9861-610
9567-810	9662-610	9750-310	9783-110	9863-710
9570-610	9662-710	9753-110	9784-610	
9571-610	9662-810	9760-410	9785-610	
9572-610	9663-610	9760-210	9786-110	



Tighten the screws on the field wiring and power terminals of the ETPs in the list below to this torque:

12.0 lb<sub>f</sub> in (1.0 lb<sub>f</sub> ft) (1.36 Nm)

9670-110

9670-610

9671-610

9671-810

9672-810

9673-810

## Removing or Replacing a Termination Panel

This procedure explains how to remove or replace a termination panel.

### Procedure

- 1 Remove field power from the termination panel.
- 2 Detach all I/O points connected to the appropriate field wiring.
- 3 Detach the wires from your field devices to the screw terminals on the termination panel.
- 4 Detach the interface cable from the ELCO connector on the termination panel.
  - As you pull the connector on the cable, use your other hand to turn the thumbscrew counter-clockwise. You may need to rock the connector slightly while pulling.
  - Ensure that the mating surfaces of the ELCO connectors on the cable and the termination panel do not have any bent pins or other damage.
- 5 Detach the other end of the interface cable from the ELCO connector on the Tricon backplane in the same manner as you disconnected the cable from the termination panel, as described in [step 4](#).



Verify that power to the termination panel is off and that steps 1-4 have been followed. Dangerous voltage may be present on the ELCO connector.

- 6 Dismount the termination panel from the DIN or rack rail.
- 7 To replace a termination panel, follow the procedure in [Installing a Termination Panel on page 24](#).

## Installing a Fanned-Out Cable

This procedure explains how to install a fanned-out cable.

### Procedure

- 1 Set up the Tricon chassis and install the I/O modules as described in the *Planning and Installation Guide for Tricon v9-v10 Systems*.
- 2 Remove incoming power from the Tricon system (optional).
- 3 Re-key the female connector on the fanned-out cable to match the male connector on the Tricon backplane. For instructions, see [Appendix A, Re-Keying Connectors](#).
- 4 Attach the fanned-out cable connector to the panel connector that is above the corresponding I/O module.
- 5 Connect the fanned-out cable wires to the field devices or marshaling termination.
- 6 Perform a static check of the wiring.
- 7 If Tricon power was removed in step 1, restore power to the Tricon system.
- 8 Apply field power to the devices connected to the fanned out cable.
- 9 Verify the connection of all I/O points to the appropriate field wiring by using the TriStation software to inspect input points and force output points.
 

**Note** To inspect input points and force output points, see the *Planning and Installation Guide for Tricon v9-v10 Systems*.
- 10 Load and test the control program using TriStation.

If you need additional information on how to install fanned-out cables, contact the IPS Global Client Support (GCS) center.

## Removing or Replacing a Fanned-Out Cable

This procedure explains how to remove or replace a fanned-out cable.

### Procedure

- 1 Remove field power from the termination panel.
- 2 Detach the fanned-out cable connector that is above the corresponding I/O module.
- 3 Detach the fanned-out wires from the field termination panel or the field devices.



Verify that power to the termination panel is off and that steps 1-3 have been followed. Dangerous voltages may be present on the ELCO connector if power has not been removed from the termination panel.

- 4 To replace a fanned-out cable, follow the procedure in [Installing a Fanned-Out Cable on page 31](#).



# 3

## Digital Input Termination Panels

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16-Point Commoned Digital Input Term Panels	35
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Basic Digital Input Term Panels	57
Pulse Input and Pulse Totalizer Input Term Panels	70
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## Overview

This chapter describes external field termination panels you can use with digital input modules. Digital input termination panels are available in these configurations:

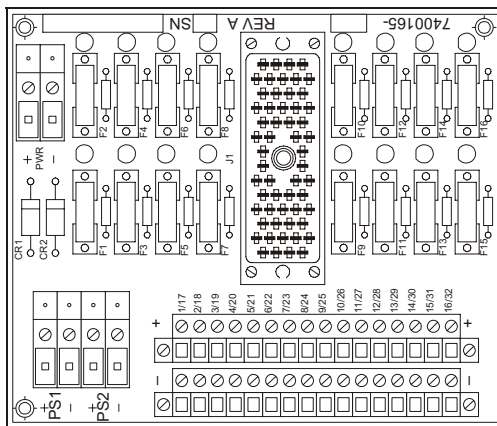
- 16-point commoned
- 32-point commoned
- Non-commoned
- Basic
- Bypass

# 16-Point Commoned Digital Input Term Panels

This section describes 16-point commoned digital input term panels. Model numbers of these term panels are:

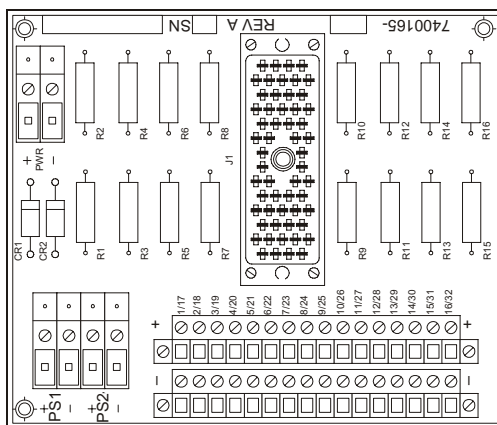
- 9561-810 (115 V, commoned, 16 pts.)
- 9562-810 (48 V, commoned, 16 pts.)
- 9563-810 (24 V, commoned, 16 pts.)
- 9563-910 (24 V, commoned, resistor protected, 16 pts.)

This figure represents a typical 16-point commoned digital input termination panel with fuses and blown-fuse indicators.



**Figure 1** Typical 16-Point Commoned DI Term Panel with Fuse Protection

This figure represents a typical 16-point commoned digital input termination panel with resistors.



**Figure 2** Typical 16-Point Commoned DI Term Panel with Resistor Protection

## 9561-810 (115 V, commoned, 16 pts.)

Termination panel 9561-810 is compatible with 115 volt digital input modules and has 16 input points and commoned power terminals (PWR+ and PWR-). Each input point is protected by a fuse with a blown-fuse indicator.

The modules compatible with 9561-810 have 32 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-16 and 17-32. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

### Specifications

This table describes specifications for 9561-810.

**Table 20 Specifications for Term Panel 9561-810**

Feature	Description
Panel type	Commoned
Points	16
Leakage current per point	Maximum: 3.3 mA Typical: 2.5 mA

### Compatible Modules

This table describes digital input modules compatible with 9561-810.

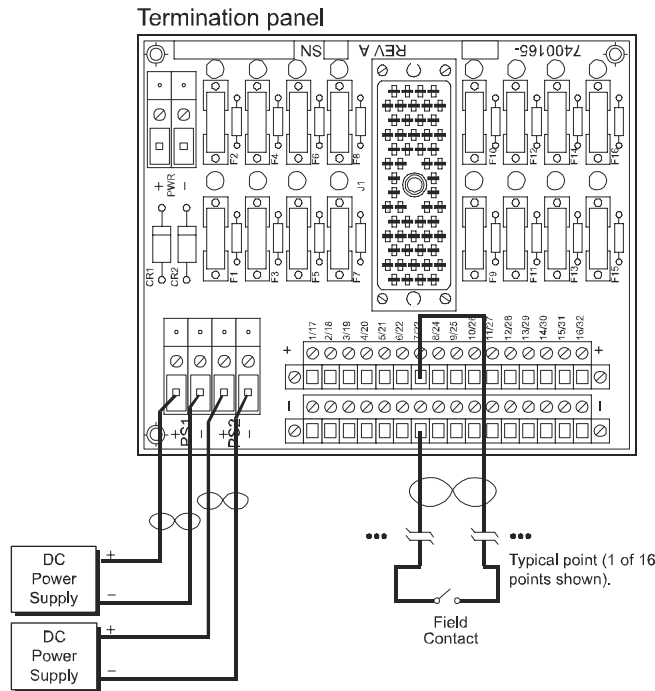
**Table 21 Modules Compatible with 9561-810**

Module Part Number	Points per Module	Module Description	Fuse
3501E	32	115 VAC/VDC, non-commoned, isolated, TMR	1A, slow
3501T	32	115 VAC/VDC, non-commoned, isolated, TMR	1A, slow



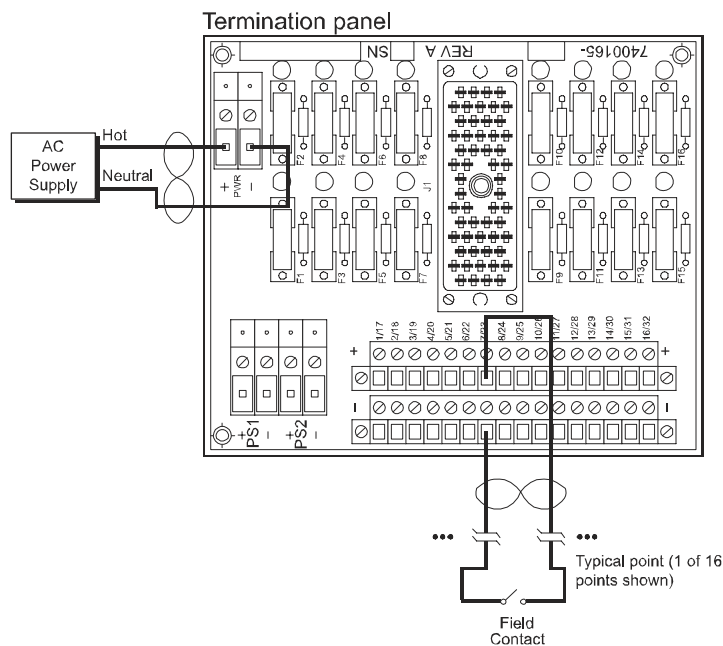
## Field Wiring Diagrams

This figure illustrates how to connect a 32-point digital input module and a 9561-810 with a DC power supply to the field.



**Figure 3** Field Wiring for 9561-810 with a 3501E or 3501T Module and a DC Power Supply

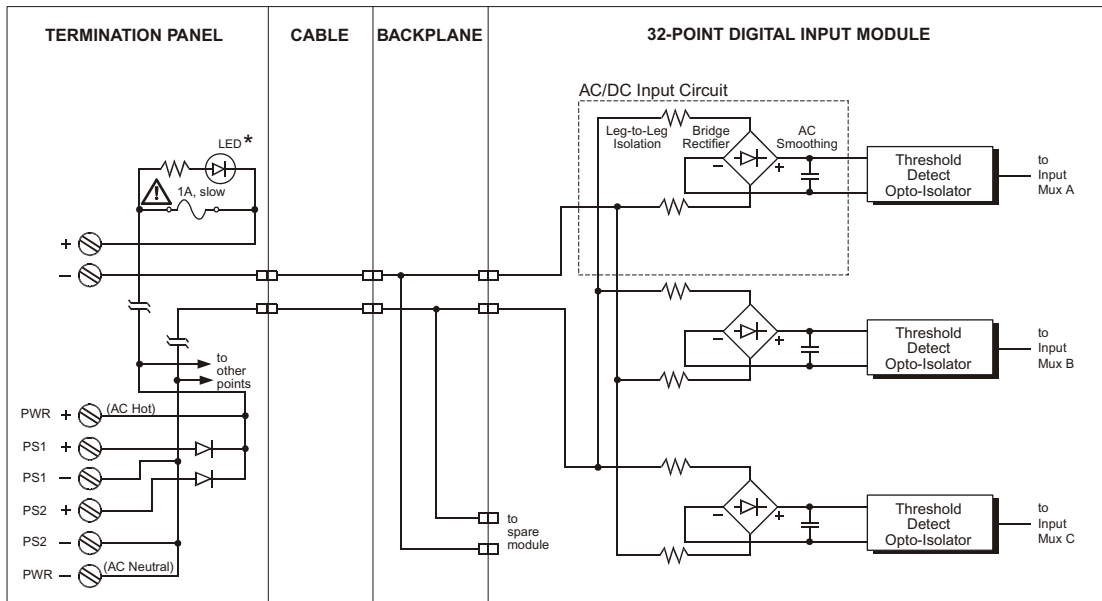
This figure illustrates how to connect a 32-point digital input module and a 9561-810 with an AC power supply to the field.



**Figure 4** Field Wiring for 9561-810 with a 3501E or 3501T Module and an AC Power Supply

## Simplified Schematics

This is a simplified schematic of a typical 32-point commoned digital input module with a commoned digital input panel (1 of 32 module points shown).



\* LEDs are blown-fuse indicators

**Figure 5** Simplified Schematic of a 3501E or 3501T DI Module with a 9561-810 Panel

## 9562-810 (48 V, commoned, 16 pts.)

Termination panel 9562-810 is compatible with 48 volt digital input modules and has 16 input points and commoned power terminals (PWR+ and PWR-). Each input point is protected by a fuse with a blown-fuse indicator.

The modules compatible with 9562-810 have 32 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-16 and 17-32. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

## Specifications

This table describes specifications for 9562-810.

**Table 22** Specifications for Term Panel 9562-810

Feature	Description
Panel type	Commoned
Points	16
Leakage current per point	Maximum: 3.5 mA Typical: 2.0 mA

## Compatible Modules

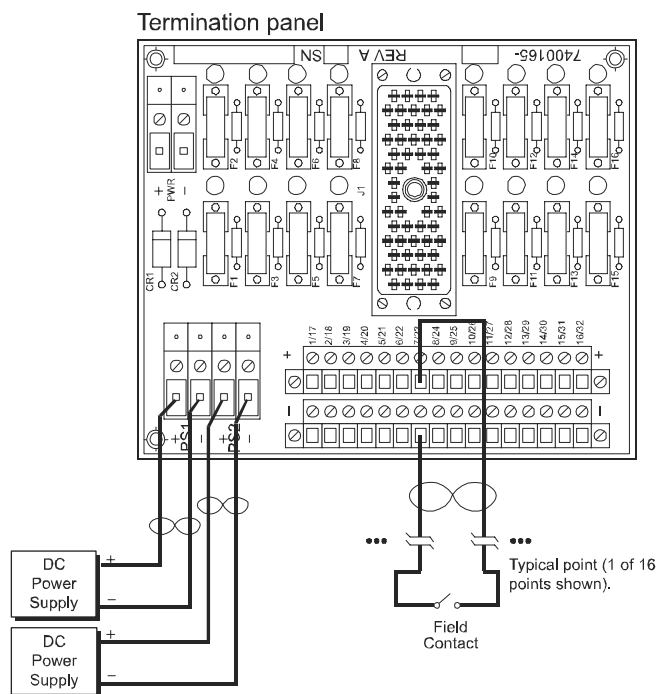
This table describes digital input modules compatible with 9562-810.

**Table 23 Modules Compatible with 9562-810**

Module Part Number	Points per Module	Module Description	Fuse
3502E	32	48 VAC/VDC, commoned in groups of 8, TMR with self-test	1A, slow

## Field Wiring Diagrams

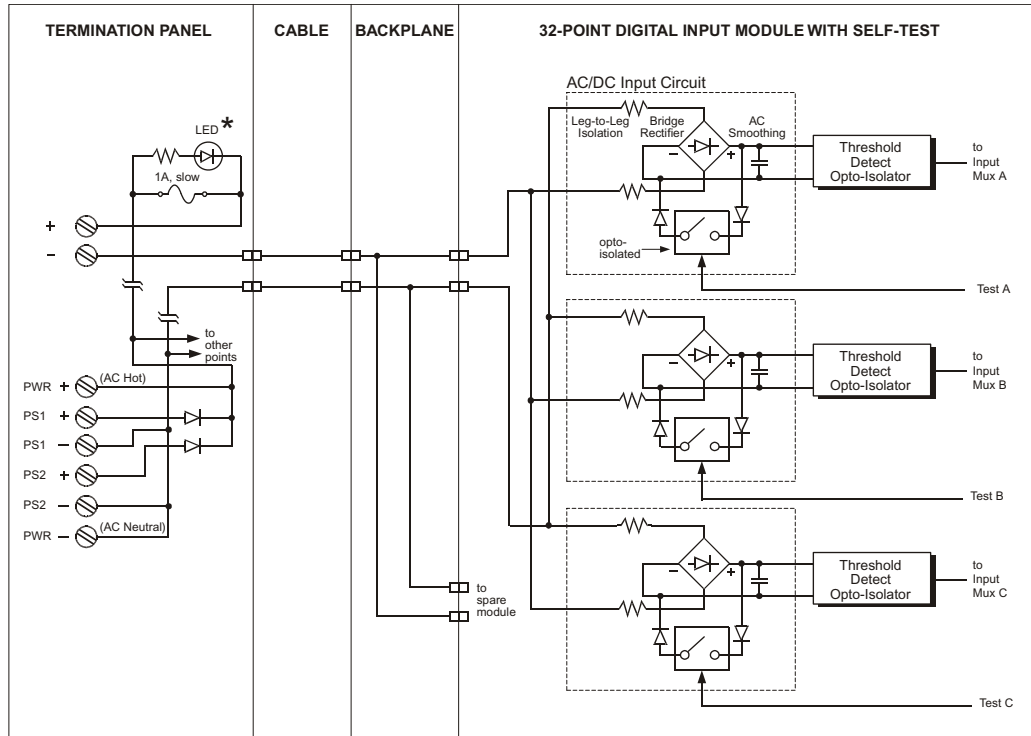
This figure illustrates how to connect a 32-point digital input module and a 9562-810 to the field.



**Figure 6** Field Wiring for 9562-810 with a 3502E Module

## Simplified Schematics

This is a simplified schematic of a typical 32-point commoned digital input module with self-test (1 of 32 module points shown).



\* LEDs are blown-fuse indicators

**Figure 7** Simplified Schematic of a 3502E DI Module with a 9562-810 Panel

## 9563-810 (24 V, commoned, 16 pts.)

Termination panel 9563-810 is compatible with 24 volt digital input modules and has 16 input points and commoned power terminals (PWR+ and PWR-). Each input point is protected by a fuse with a blown-fuse indicator.

The modules compatible with 9563-810 have 32 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-16 and 17-32. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

### Specifications

This table describes specifications for 9563-810.

**Table 24 Specifications for Term Panel 9563-810**

Feature	Description
Panel type	Commoned
Points	16
Leakage current per point	Maximum: 3.3 mA Typical: 2.5 mA

### Compatible Modules

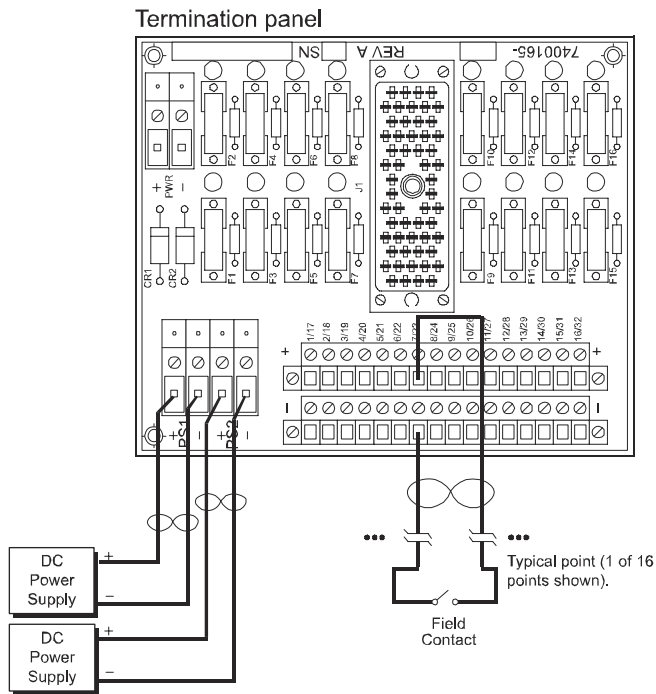
This table describes digital input modules compatible with 9563-810.

**Table 25 Modules Compatible with 9563-810**

Module Part Number	Points per Module	Module Description	Fuse
3503E	32	24 VAC/VDC, commoned in groups of 8, TMR with self-test	1A, slow
3505E	32	24 VDC, low-threshold, commoned in groups of 8 with self test, TMR	1A, slow

## Field Wiring Diagrams

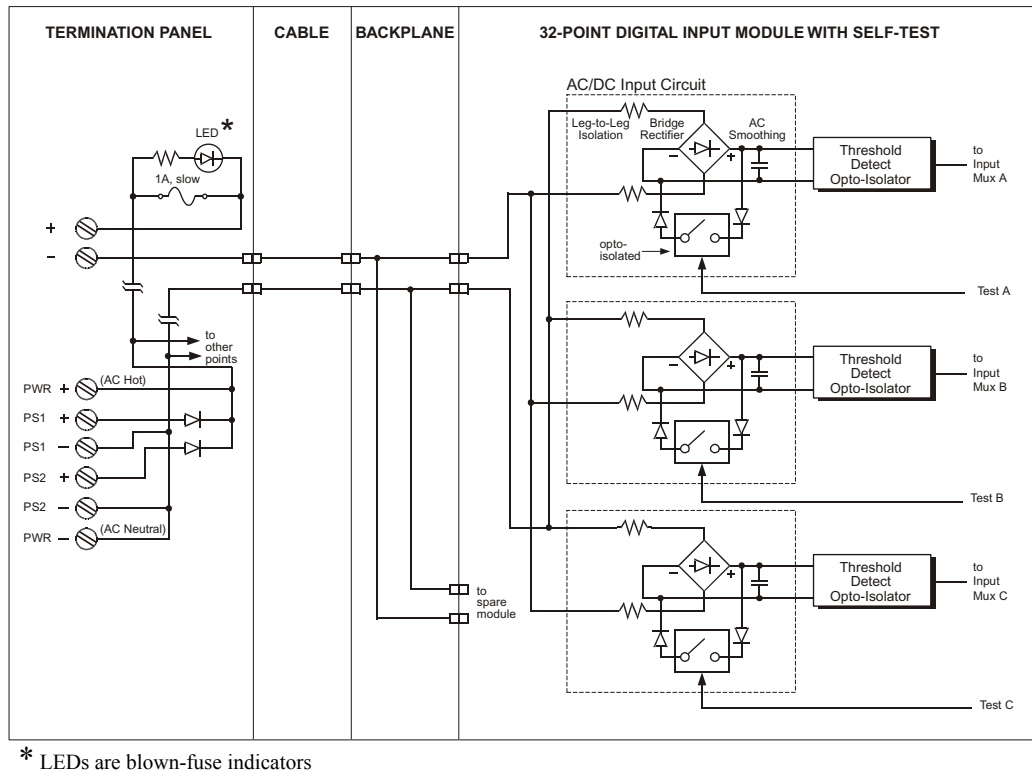
This figure illustrates how to connect a 32-point digital input module and a 9563-810 to the field.



**Figure 8** Field Wiring for 9563-810 with a 3503E or 3505E Module

## Simplified Schematics

This is a simplified schematic of a typical 32-point commoned digital input module with self-test (1 of 32 module points shown).



**Figure 9** Simplified Schematic of a 3503E or 3505E DI Module with a 9563-810 Panel

## 9563-910 (24 V, commoned, resistor protected, 16 pts.)

Termination panel 9563-910 is compatible with 24 volt digital input modules and has 16 input points and commoned power terminals (PWR+ and PWR-). Each input point is protected by a 180 ohm resistor.

The modules compatible with 9563-910 have 32 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-16 and 17-32. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

## Specifications

This table describes specifications for 9563-910.

**Table 26 Specifications for Term Panel 9563-910**

Feature	Description
Panel type	Commoned, resistor protected
Points	16

## Compatible Modules

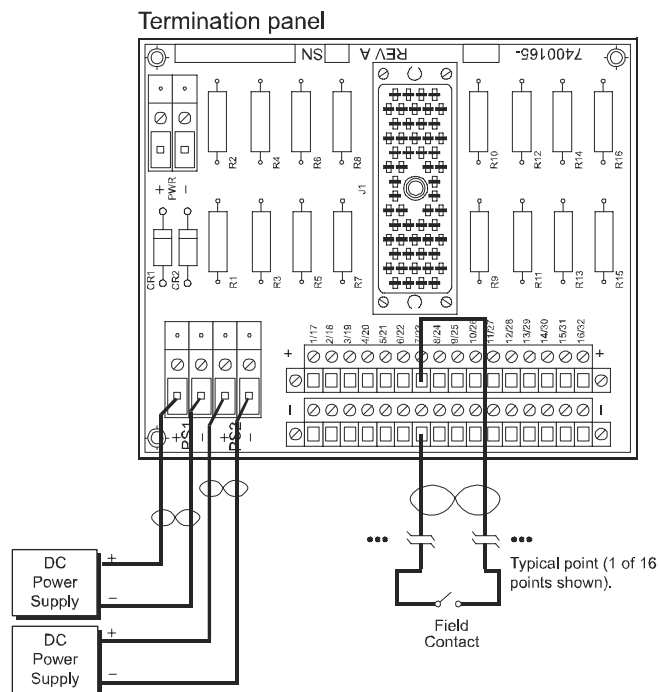
This table describes digital input modules compatible with 9563-910.

**Table 27 Modules Compatible with 9563-910**

Module Part Number	Points per Module	Module Description
3503E	32	24 VAC/VDC, commoned in groups of 8, TMR with self-test
3505E	32	24 VDC, low-threshold, commoned in groups of 8, TMR with self-test

## Field Wiring Diagrams

This figure illustrates how to connect a 32-point digital input module and a 9563-910 to the field.

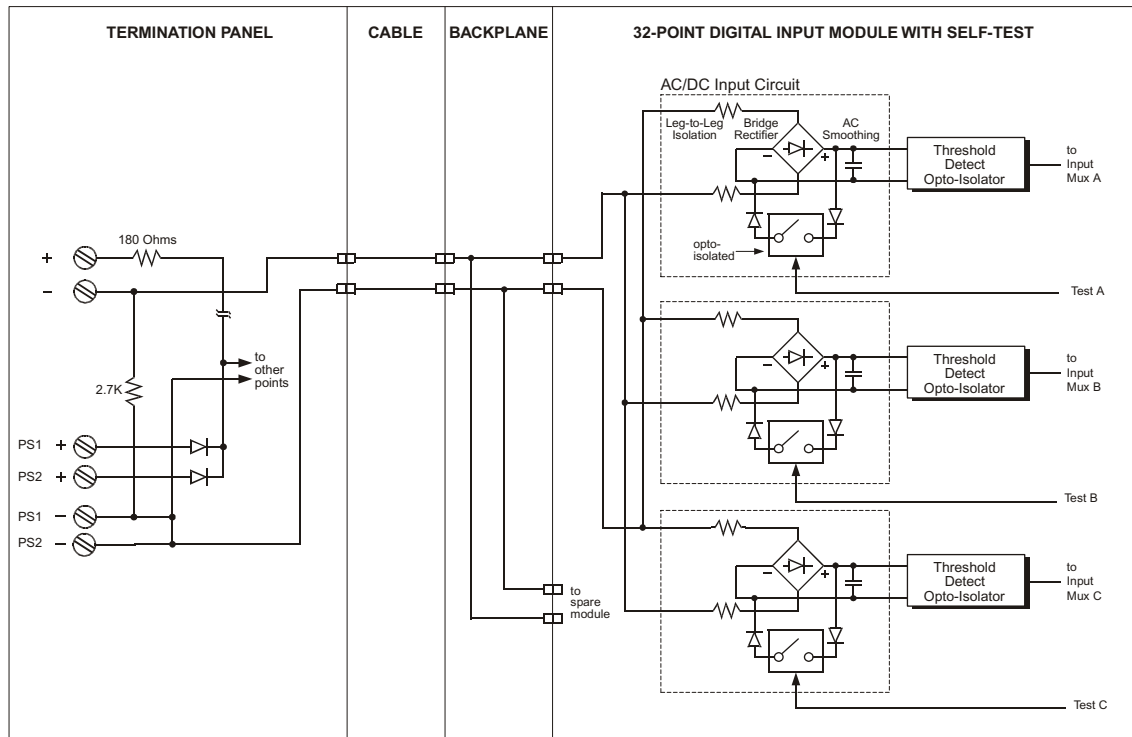


**Figure 10** Field Wiring for 9563-910 with a 3503E or 3505E Module



## Simplified Schematics

This is a simplified schematic of a typical 32-point commoned digital input module with self-test (1 of 32 module points shown).



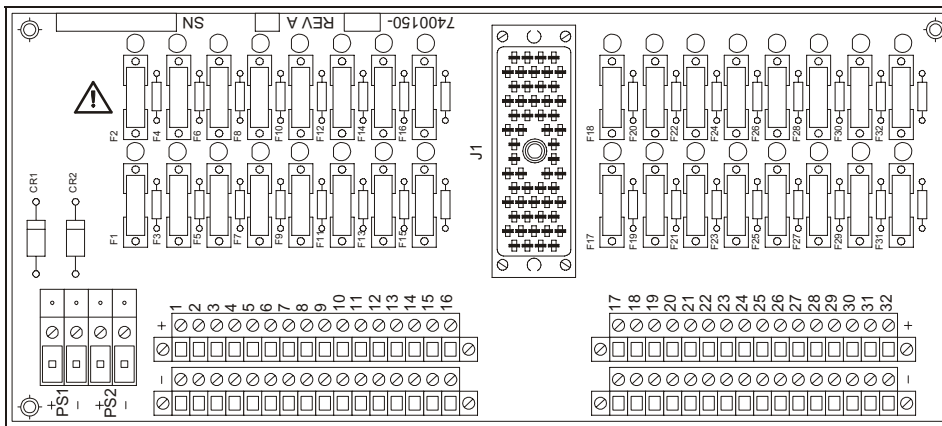
**Figure 11** Simplified Schematic of a 3503E or 3505E DI Module with a 9563-910 Panel

## 32-Point Commoned Digital Input Term Panels

This section describes 32-point commoned digital input term panels, which are available with fuses and blown fuse indicators or resistors for field device protection. Model numbers of these term panels are:

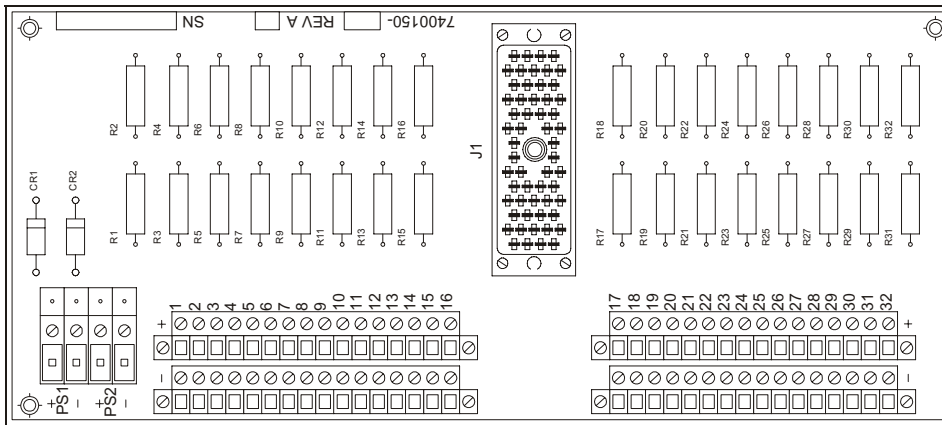
- 9565-810 (48 VDC, commoned, 32 pts.) (fuse protection)
- 9566-710 (24 VDC, commoned, 32 pts.) (resistor protection)
- 9566-810 (24 VDC, commoned, 32 pts.) (resistor protection)

This figure represents a typical 32-point commoned digital input term panel that has fuses and blown-fuse indicators for field device protection.



**Figure 12** Typical 32-Point Commoned DI Term Panel with Fuse Protection

This figure represents a typical 32-point commoned digital input term panel that has resistors for field device protection.



**Figure 13** Typical 32-Point Commoned DI Term Panel with Resistor Protection

## 9565-810 (48 VDC, commoned, 32 pts.)

Termination panel 9565-810 is compatible with 24/48 volt DC digital input modules and has 32 input points and commoned power terminals (PWR+ and PWR-). Each input point is protected by a fuse with a blown-fuse indicator. You should use term panel 9565-810 in 48 volt applications.

The modules compatible with 9565-810 have 64 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-32 and 33-64. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

### Specifications

This table describes specifications for 9565-810.

**Table 28 Specifications for Term Panel 9565-810**

Feature	Description
Panel type	Commoned
Points	32
Leakage current per point	Maximum: 3.5 mA Typical: 2.0 mA

### Compatible Modules

This table describes digital input modules compatible with 9565-810.

**Table 29 Modules Compatible with 9565-810**

Module Part Number	Points per Module	Module Description	Fuse
3504E	64	24/48 VDC, commoned, high-density, DC-coupled, TMR	1A, slow

## Field Wiring Diagrams

This figure illustrates how to connect a 64-point digital input module and a 9565-810 to the field.

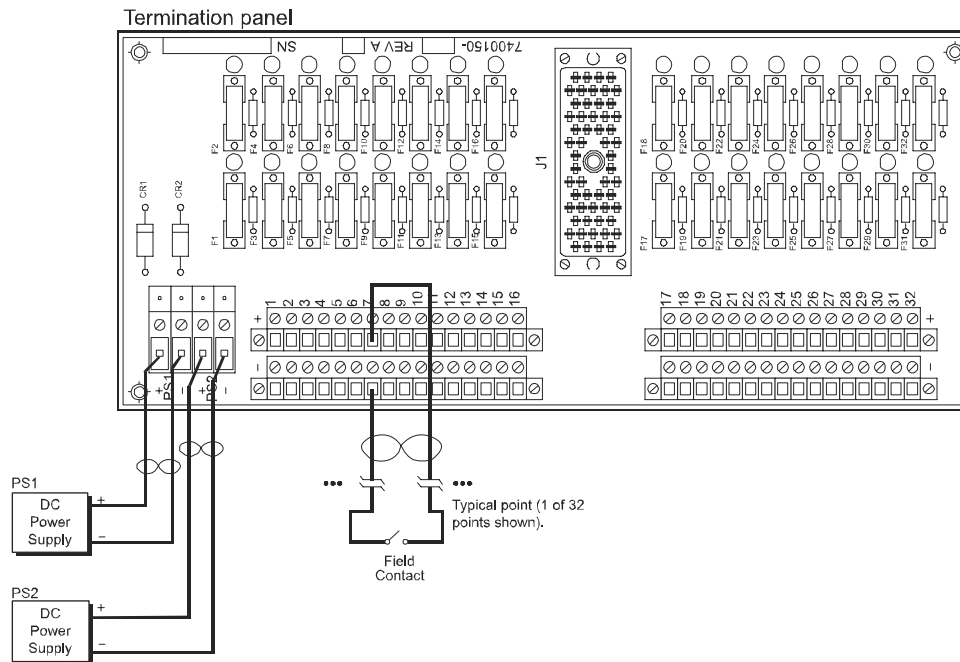


Figure 14 Field Wiring for 9565-810 with a 3504E Module

## Simplified Schematics

This is a simplified schematic of a typical 64-point commoned 48 VDC high-density DC-coupled digital input module (1 of 64 module points shown) with a 9565-810.

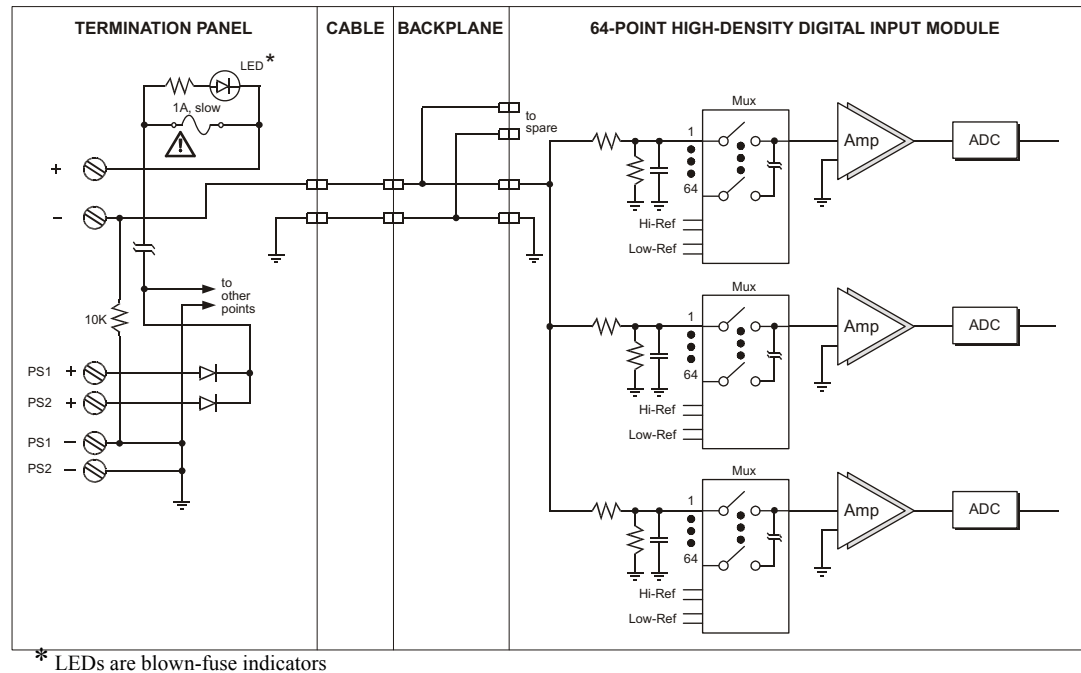


Figure 15 Simplified Schematic of a 3504E DI Module in a 48 V Application with a 9565-810 Panel

## 9566-710 (24 VDC, commoned, 32 pts.)

Termination panel 9566-710 is compatible with 24 VDC digital input modules and has 32 input points and commoned power terminals (PWR+ and PWR-). Each input point is protected by a 180 ohm current-limiting resistor.

The modules compatible with 9566-710 have 64 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-32 and 33-64. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

## Specifications

This table describes specifications for 9566-710.

Table 30 Specifications for Term Panel 9566-710

Feature	Description
Panel type	Commoned
Points	32

## Compatible Modules

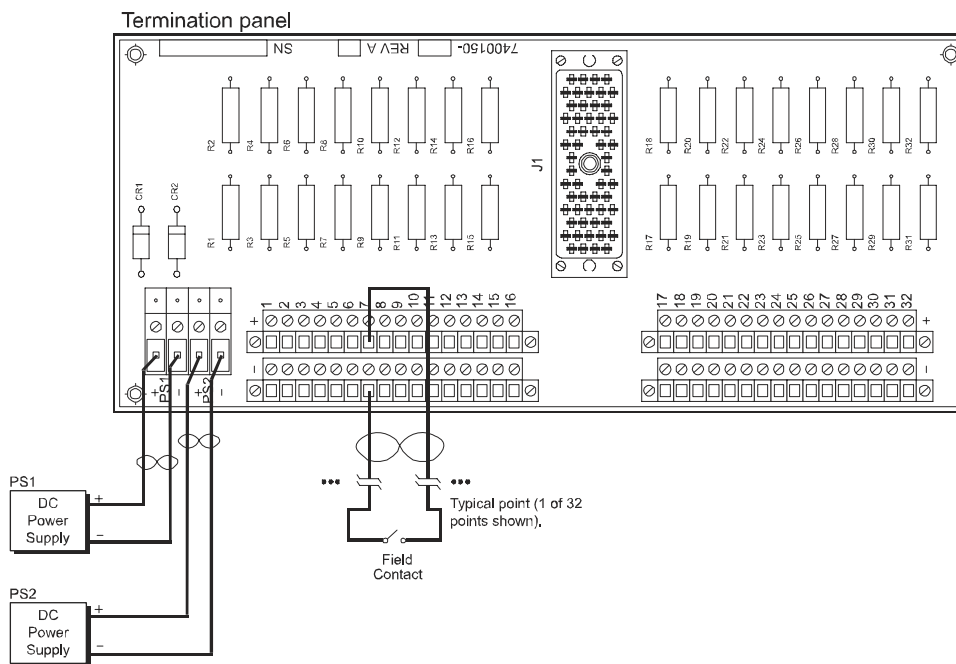
This table describes digital input modules compatible with 9566-710.

**Table 31 Modules Compatible with 9566-710**

Module Part Number	Points per Module	Module Description
3564	64	24 VDC, commoned, single

## Field Wiring Diagrams

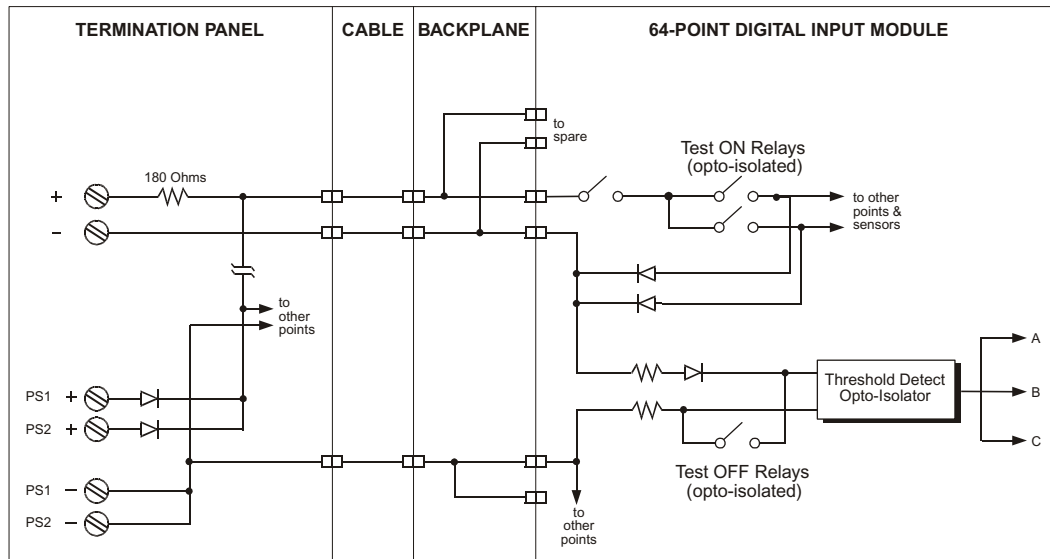
This figure illustrates how to connect a 64-point digital input module and a 9566-710 to the field.



**Figure 16** Field Wiring for 9566-710 with a 3564 Module

## Simplified Schematics

This is a simplified schematic of a typical 64-point commoned 24 VDC digital input module with a 9566-710 (1 of 64 module points shown).



**Figure 17** Simplified Schematic of a 3564 DI Module with a 9566-710 Panel

## 9566-810 (24 VDC, commoned, 32 pts.)

Termination panel 9566-810 is compatible with 24/48 VDC digital input modules and has 32 input points and commoned power terminals (PWR+ and PWR-). Each input point is protected by a 180 ohm current-limiting resistor. You should use term panel 9566-810 in 24 volt applications.

The modules compatible with 9566-810 have 64 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-32 and 33-64. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

## Specifications

This table describes specifications for 9566-810.

**Table 32** Specifications for Term Panel 9566-810

Feature	Description
Panel type	Commoned
Points	32

## Compatible Modules

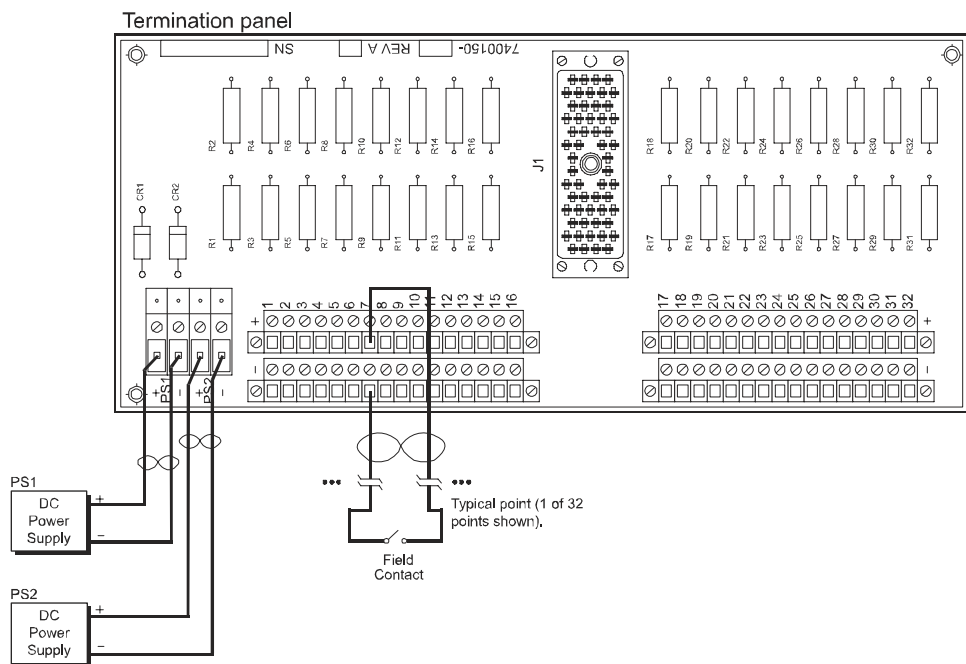
This table describes digital input modules compatible with 9566-810.

**Table 33 Modules Compatible with 9566-810**

Module Part Number	Points per Module	Module Description
3504E	64	24/48 VDC, commoned, high-density, DC-coupled, TMR

## Field Wiring Diagrams

This figure illustrates how to connect a 64-point digital input module and a 9566-810 to the field.

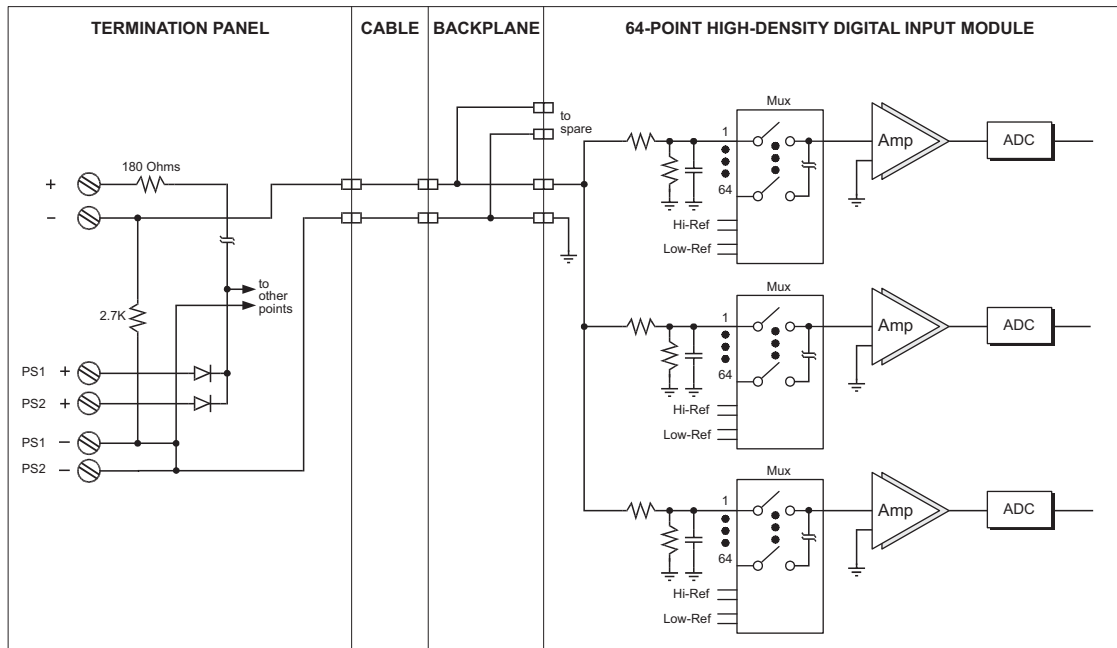


**Figure 18** Field Wiring for 9566-810 with a 3504E Module



## Simplified Schematics

This is a simplified schematic of a typical 64-point commoned high-density 24 VDC digital input module with a 9566-810 (1 of 64 module points shown).



**Figure 19** Simplified Schematic of a 3504E DI Module in a 24 V Application with a 9566-810 Panel

## 16-Point Non-Commoned Digital Input Term Panels

This section describes non-commoned digital input term panels. Model numbers of these term panels are:

- 9561-110 (115 V, non-commoned, 16 pts.)

This figure represents a typical 16-point non-commoned digital input termination panel with fuses and blown-fuse indicators.

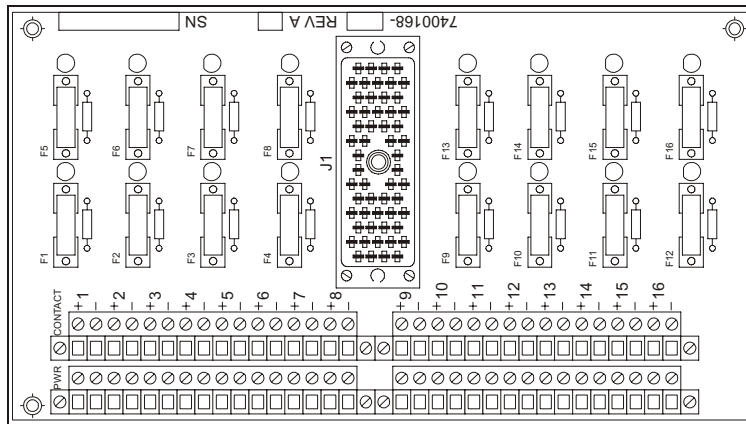


Figure 20 Typical 16-Point Non-Commoned DI Term Panel

### 9561-110 (115 V, non-commoned, 16 pts.)

Termination panel 9561-110 is compatible with 115 VAC/VDC digital input modules and has 16 input points and 16 power terminals (PWR+ and PWR-). Each input point is protected by a fuse with a blown-fuse indicator.

The modules compatible with 9561-110 have 32 points, which means you must use two term panels for each digital input module.

Each term panel comes with two sets of labels: 1-16 and 17-32. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

### Specifications

This table describes specifications for 9561-110.

Table 34 Specifications for Term Panel 9561-110

Feature	Description
Panel type	Non-commoned
Points	16
Leakage current per point	Maximum: 3.3 mA Typical: 2.5 mA

## Compatible Modules

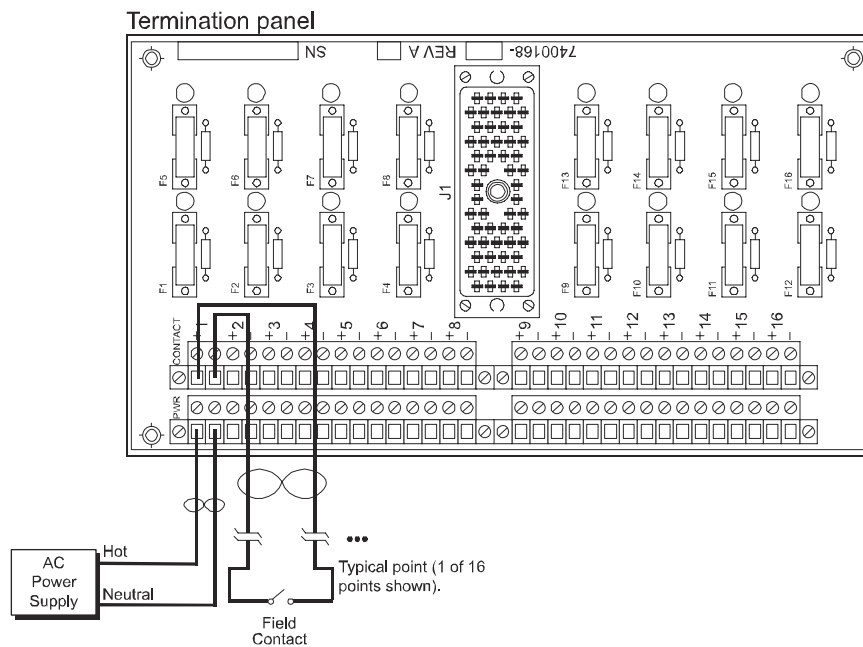
This table describes digital input modules compatible with 9561-110.

**Table 35 Modules Compatible with 9561-110**

Module Part Number	Points per Module	Module Description	Fuse
3501E	32	115 VAC/VDC, non-commoned, isolated, TMR	1A, slow
3501T	32	115 VAC/VDC, non-commoned, isolated, TMR	1A, slow

## Field Wiring Diagrams

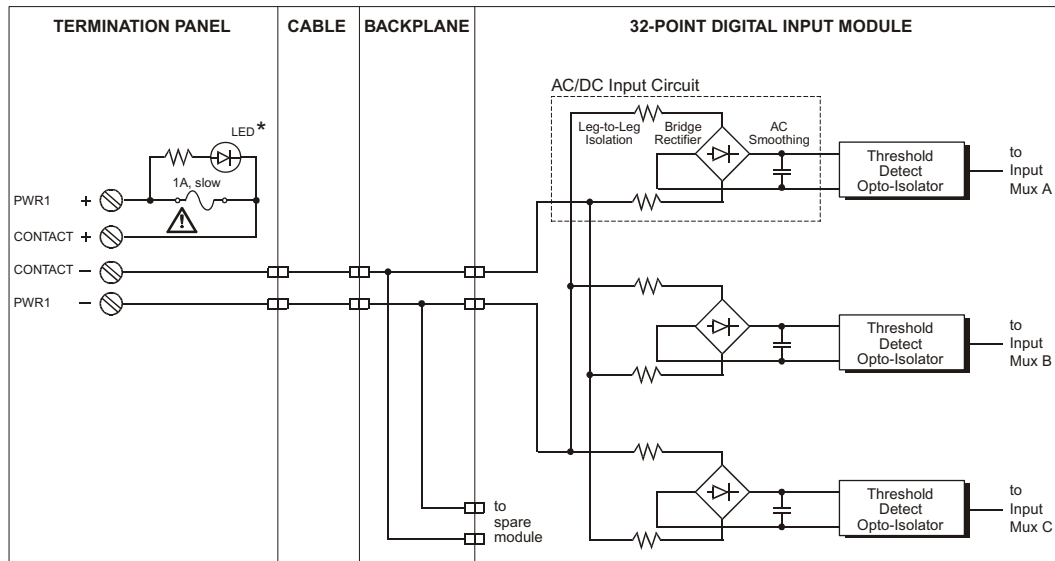
This figure illustrates how to connect a 32-point digital input module and a 9561-110 to the field.



**Figure 21 Field Wiring for 9561-110 with a 3501E or 3501T Module**

## Simplified Schematics

This is a simplified schematic of a typical 32-point non-commoned digital input module with a 9561-110 (1 of 32 module points shown).



\* LEDs are blown-fuse indicators

**Figure 22** Simplified Schematic of a 3501E or 3501T DI Module with a 9561-110 Panel

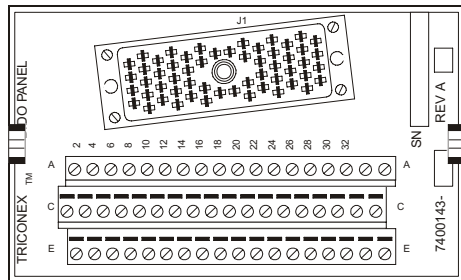
## Basic Digital Input Term Panels

This section describes basic digital input term panels, which are available in 16-point and 32-point configurations.

Model numbers of these term panels are:

- 9551-110 (115 V, basic, 16 pts.)
- 9552-610 (48 V, basic, 16 pts.)
- 9553-610 (24 V, basic, 16/32 pts.)
- 9750-310 (24 VDC, basic, 32 pts.)
- 9750-410 (48 VDC, basic, 32 pts.)

This figure represents a typical 16-point or 32-point basic digital input termination panel.



**Figure 23** Typical 16-Point/32-Point Basic DI Term Panel

### 9551-110 (115 V, basic, 16 pts.)

Termination panel 9551-110 is compatible with 115 VAC/VDC digital input modules and has 16 input points.

The modules compatible with 9551-110 have 32 points, which means you must use two term panels for each digital input module.

### Specifications

This table describes specifications for 9551-110.

**Table 36** Specifications for Term Panel 9551-110

Feature	Description
Panel type	Basic
Points	16

## Compatible Modules

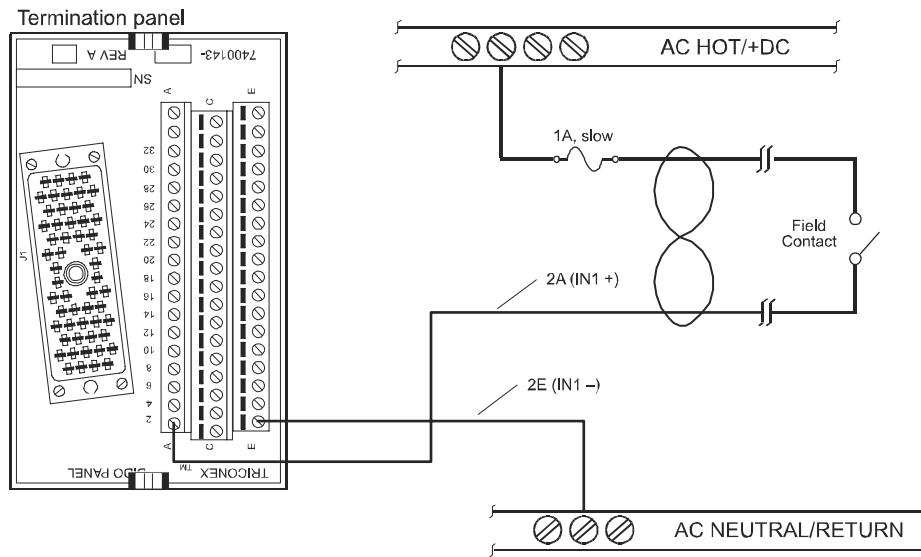
This table describes digital input modules compatible with 9551-110.

**Table 37 Modules Compatible with 9551-110**

Module Part Number	Points per Module	Module Description
3501E	32	115 VAC/VDC, non-commoned, isolated, TMR
3501T	32	115 VAC/VDC, non-commoned, isolated, TMR

## Field Wiring Diagrams

This figure illustrates how to connect a 32-point digital input module and a 9551-110 to the field.



**Figure 24** Field Wiring for 9551-110 with a 3501E or 3501T Module

## Simplified Schematics

This is a simplified schematic of a typical 32-point digital input module without self-test and a 9551-110 (1 of 32 module points shown).

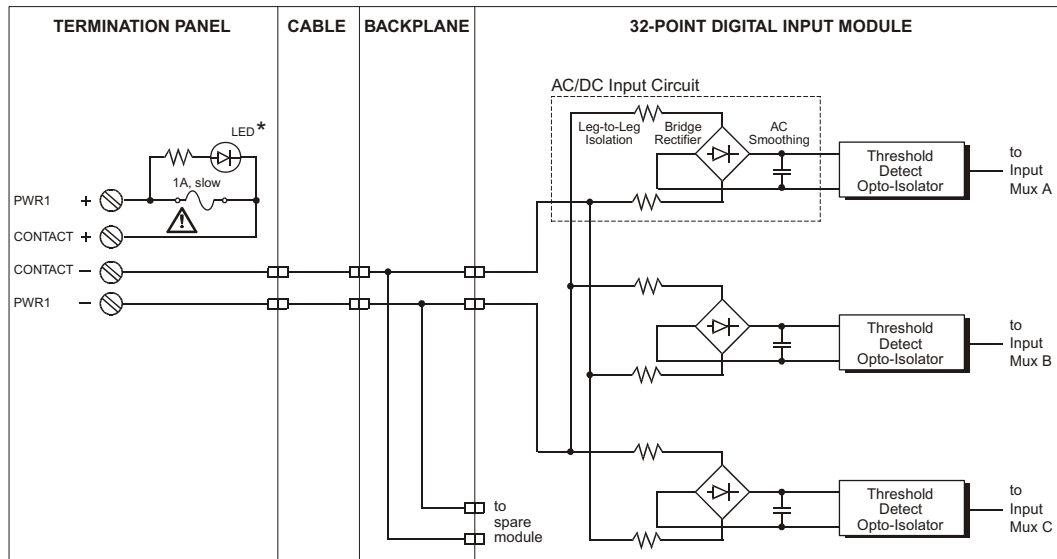


Figure 25 Simplified Schematic of a 3501E or 3501T DI Module with a 9551-110 Panel

## 9552-610 (48 V, basic, 16 pts.)

Termination panel 9552-610 is compatible with 48 VAC/VDC digital input modules and has 16 input points.

The modules compatible with 9552-610 have 32 points, which means you must use two term panels for each digital input module.

## Specifications

This table describes specifications for 9552-610.

Table 38 Specifications for Term Panel 9552-610

Feature	Description
Panel type	Basic
Points	16

## Compatible Modules

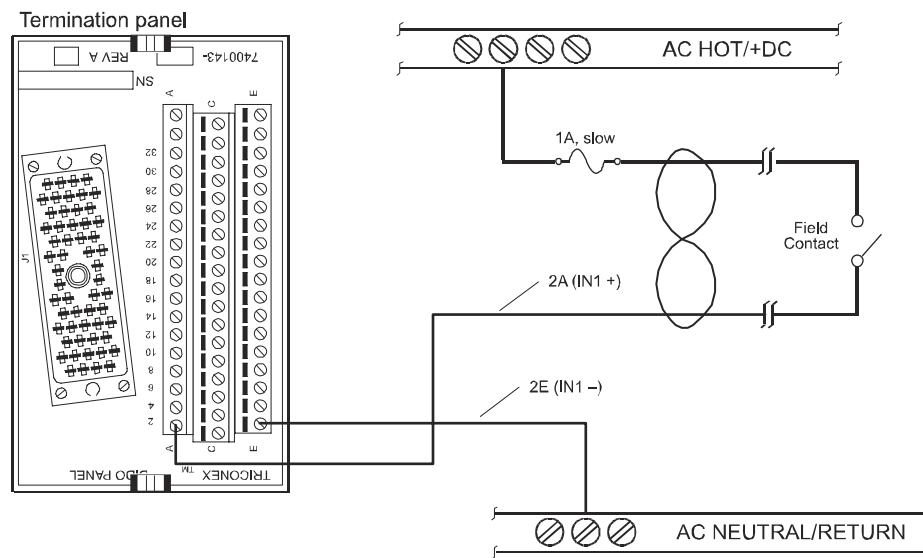
This table describes digital input modules compatible with 9552-610.

**Table 39 Modules Compatible with 9552-610**

Module Part Number	Points per Module	Module Description
3502E	32	48 VAC/VDC, commoned in groups of 8 with self test, TMR

## Field Wiring Diagrams

This figure illustrates how to connect a 32-point digital input module and a 9552-610 to the field.



**Figure 26** Field Wiring for 9552-610 with a 3502E Module



## Simplified Schematics

This is a simplified schematic of a typical 32-point digital input module with self-test and a 9552-610 (1 of 32 module points shown).

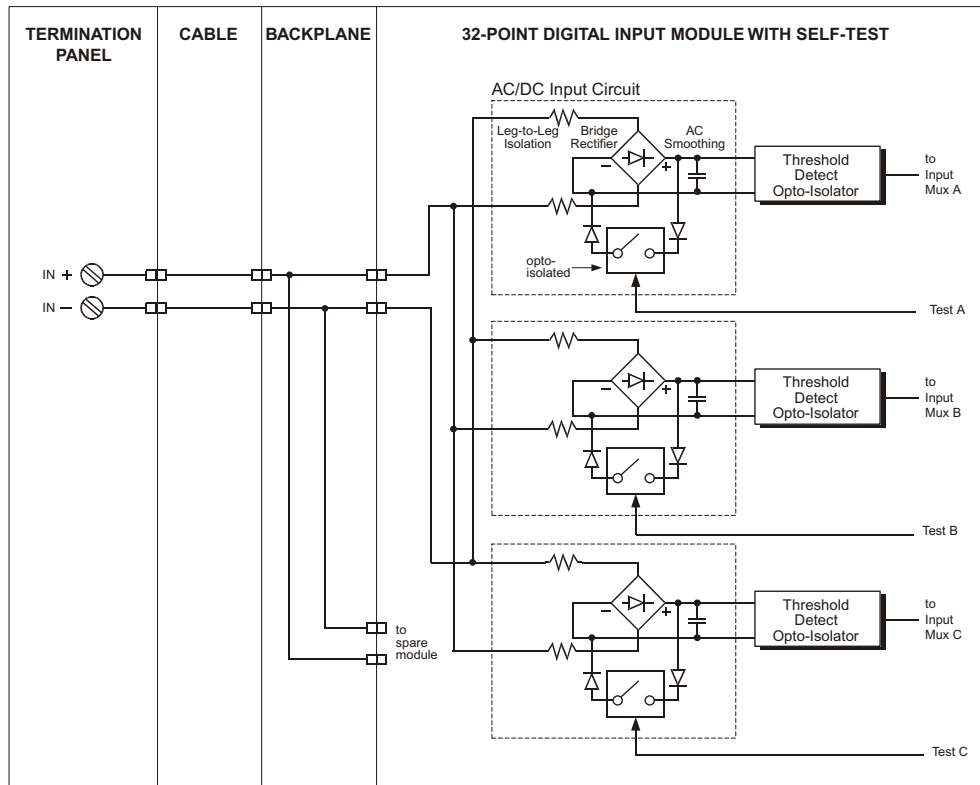


Figure 27 Simplified Schematic of a 3502E DI Module with a 9552-610 Panel

## 9553-610 (24 V, basic, 16/32 pts.)

Termination panel 9553-610 is compatible with 24 VAC/VDC and 24 VDC digital input modules and has 16 input points when used with 32-point modules and 32 input points when used with 64-point modules.

You must use two term panels for each digital input module.

## Specifications

This table describes specifications for 9553-610.

Table 40 Specifications for Term Panel 9553-610

Feature	Description
Panel type	Basic
Points	16 when used with 32-point modules 32 when used with 64-point modules

## Compatible Modules

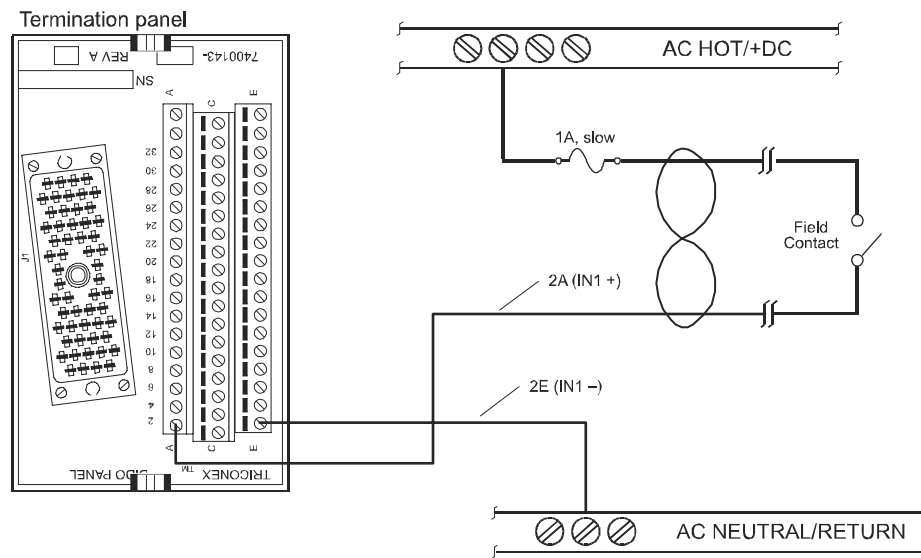
This table describes digital input modules compatible with 9553-610.

**Table 41 Modules Compatible with 9553-610**

Module Part Number	Points per Module	Module Description
3503E	32	24 VAC/VDC, commoned in groups of 8 with self test, TMR
3505E	32	24 VDC, low-threshold, commoned in groups of 8, TMR
3564	64	24 VDC, commoned, single

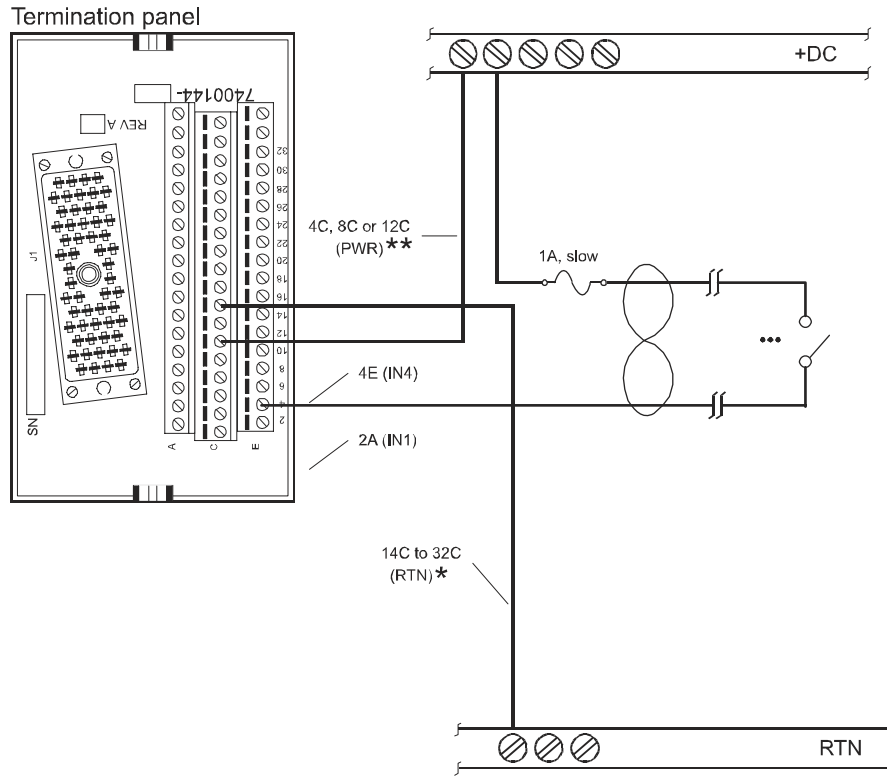
## Field Wiring Diagrams

This figure illustrates how to connect a 32-point digital input module and a 9553-610 to the field.



**Figure 28** Field Wiring for 9553-610 with a 3503E or 3505E Module

This figure illustrates how to connect a 64-point digital input module and a 9553-610 without commoned return to the field.



- \* One RTN connection is required. More than one is okay.
- \*\* One PWR connection is required. More than one is okay.

**Figure 29** Field Wiring for 9553-610 with a 3564 Module

### Simplified Schematics

This is a simplified schematic of a typical 32-point digital input module with self-test and a 9553-610 (1 of 32 module points shown).

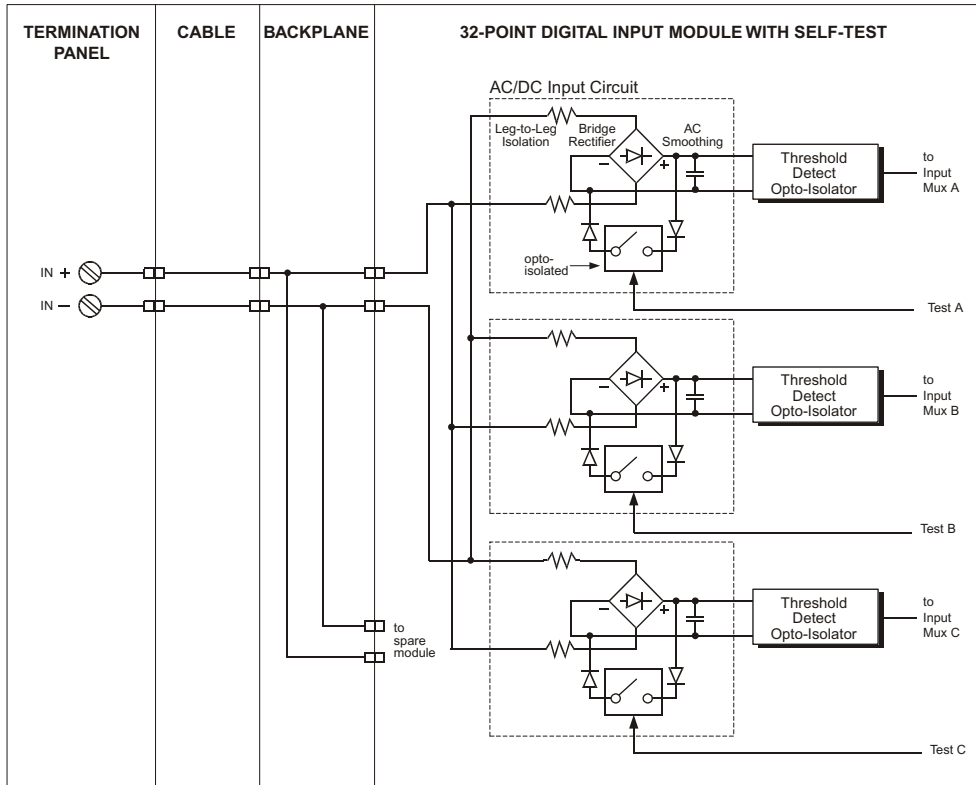


Figure 30 Simplified Schematic of a 3503E or 3505E DI Module with a 9553-610 Panel

This is a simplified schematic of a typical 64-point commoned digital input module and a 9553-610 (1 of 32 module points shown).

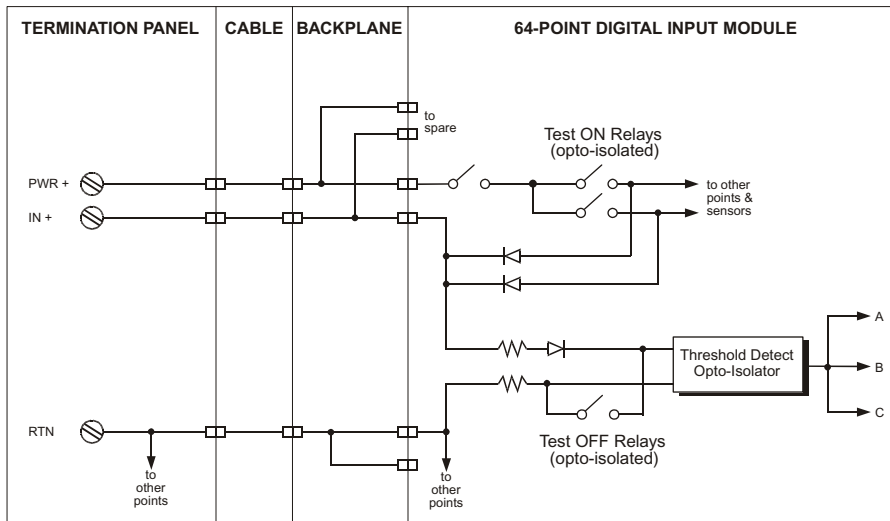


Figure 31 Simplified Schematic of a 3564 DI Module with a 9553-610 Panel

## 9750-310 (24 VDC, basic, 32 pts.)

Termination panel 9750-310 is compatible with 24/48 VDC digital input modules and has 32 input points.

The modules compatible with 9750-310 have 64 points, which means you must use two term panels for each digital input module.

### Specifications

This table describes specifications for 9750-310.

**Table 42 Specifications for Term Panel 9750-310**

Feature	Description
Panel type	Basic
Points	32

### Compatible Modules

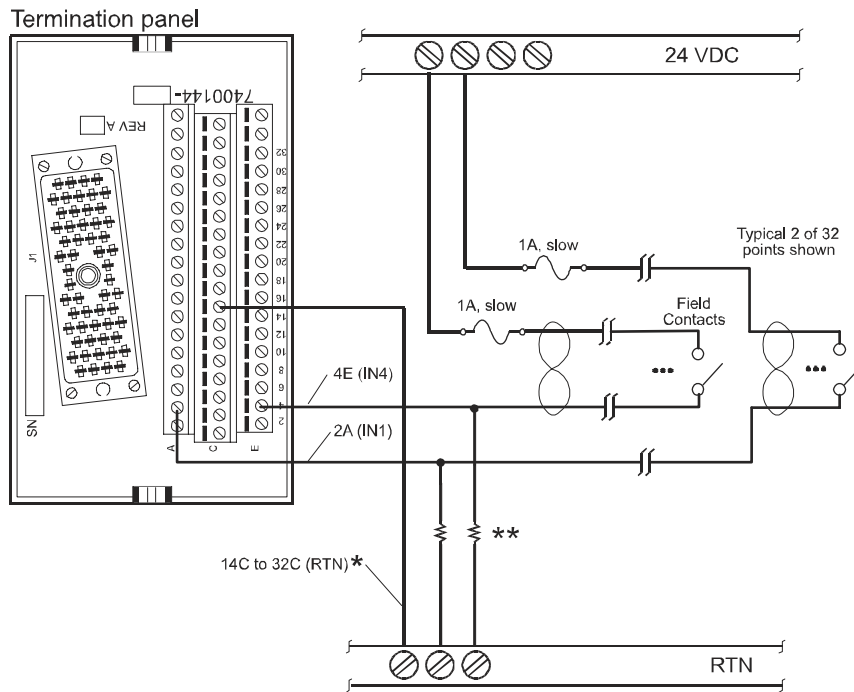
This table describes digital input modules compatible with 9750-310.

**Table 43 Modules Compatible with 9750-310**

Module Part Number	Points per Module	Module Description
3504E	64	24/48 VDC, commoned, high-density, DC-coupled, TMR, configured as 24 VDC when used with 9750-310

## Field Wiring Diagrams

This figure illustrates how to connect a 64-point digital input module and a 9750-310 to the field.



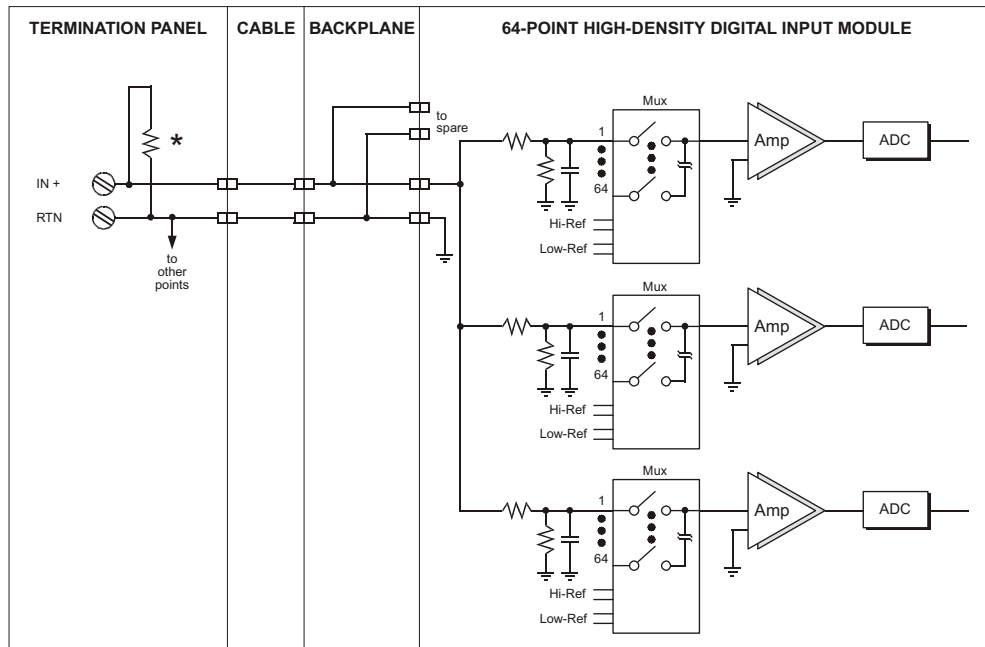
\* One RTN connection is required. More than one is okay.

\*\* Optional ballast resistor.

**Figure 32** Field Wiring for 9750-310 with a 3504E DI Module

## Simplified Schematics

This is a simplified schematic of a typical 64-point commoned 24/48 VDC high-density DC-coupled digital input module with a 9750-310 (1 of 32 module points shown).



\* For maximum noise immunity, install a 1W, 2.7k ohms ballast resistor.

**Figure 33** Simplified Schematic of a 3504E DI Module with a 9750-310 Panel

## 9750-410 (48 VDC, basic, 32 pts.)

Termination panel 9750-410 is compatible with 24/48 VDC digital input modules and has 32 input points.

The modules compatible with 9750-410 have 64 points, which means you must use two term panels for each digital input module.

## Specifications

This table describes specifications for 9750-410.

**Table 44** Specifications for Term Panel 9750-410

Feature	Description
Panel type	Basic
Points	32

## Compatible Modules

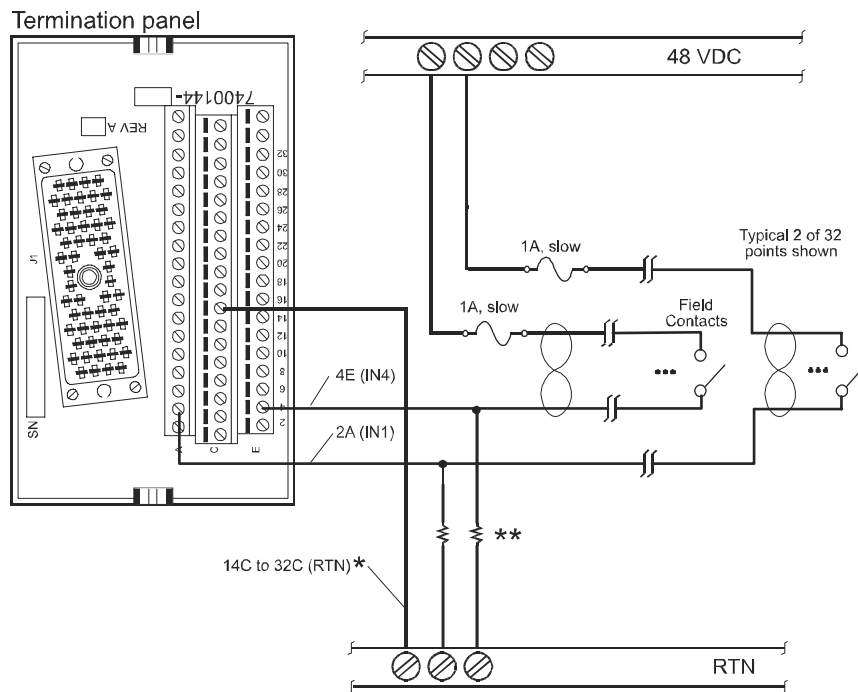
This table describes digital input modules compatible with 9750-410.

**Table 45 Modules Compatible with 9750-410**

Module Part Number	Points per Module	Module Description
3504E	64	24/48 VDC, commoned, high-density, DC-coupled, TMR, configured as 48 VDC when used with 9750-410

## Field Wiring Diagrams

This figure illustrates how to connect a 64-point digital input module and a 9750-410 to the field.



\* One RTN connection is required. More than one is okay.

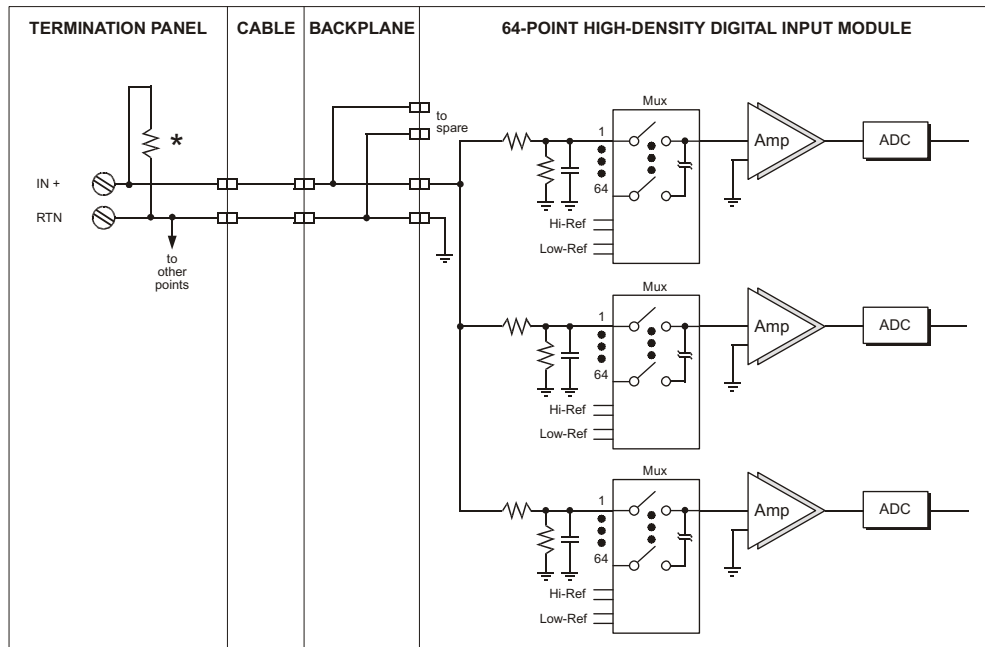
\*\* Optional ballast resistor.

**Figure 34** Field Wiring for 9750-410 with a 3504E DI Module



## Simplified Schematics

This is a simplified schematic of a typical 64-point commoned 24/48 VDC high-density DC-coupled digital input module with a 9750-410 (1 of 32 module points shown).



\* For maximum noise immunity, install a 1W, 10k ohms ballast resistor.

**Figure 35** Simplified Schematic of a 3504E DI Module with a 9750-410 Panel

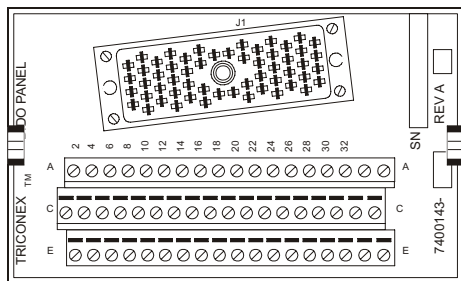
## Pulse Input and Pulse Totalizer Input Term Panels

This section describes pulse input and pulse totalizer input term panels.

Model numbers of these term panels are:

- 9753-110 (8 PI pts./16 PTI pts.)

This figure represents a typical 8-point pulse input or 16-point pulse totalizer input termination panel.



**Figure 36** Typical 8-Point Pulse Input or 16-Point Pulse Totalizer Input Term Panel

### 9753-110 (8 PI pts./16 PTI pts.)

Termination panel 9753-110 is compatible with pulse input modules and pulse totalizer input modules.

When used with pulse input modules, 9753-110 has 8 differential-input signal terminals (IN+ and IN-).

When used with pulse totalizer input modules, 9753-110 has 16 input signal terminals (IN+ and IN-). The pulse totalizer input modules compatible with 9753-110 have 32 points, which means you must use two term panels for each pulse totalizer input module.

### Specifications

This table describes specifications for 9753-110.

**Table 46** Specifications for Term Panel 9753-110

Feature	Description
Panel type	Basic
Points	8 when used with pulse input modules 16 when used with pulse totalizer input modules

## Compatible Modules

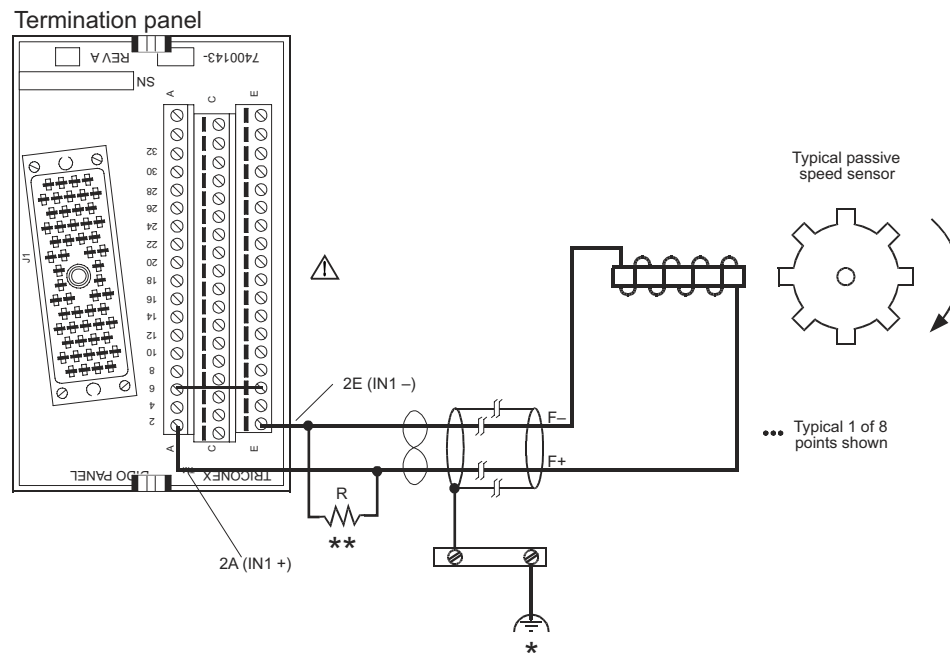
This table describes pulse input and pulse totalizer input modules compatible with 9753-110.

**Table 47 Modules Compatible with 9753-110**

Module Part Number	Points per Module	Module Description
3510	8	20 Hz to 20 KHz pulse input, non-commoned, AC-coupled, 50 ms typical input update rate
3511	8	20 Hz to 20 KHz pulse input, non-commoned, AC-coupled, 25 ms typical input update rate
3515	32	0 to 1 kHz pulse totalizer input, non-commoned

## Field Wiring Diagrams

This figure illustrates how to connect an 8-point pulse input module and a 9753-110 to the field.



\* Functional earth ground (quiet ground) is recommended for shield connections.  
For shield grounding instructions, see Appendix E.

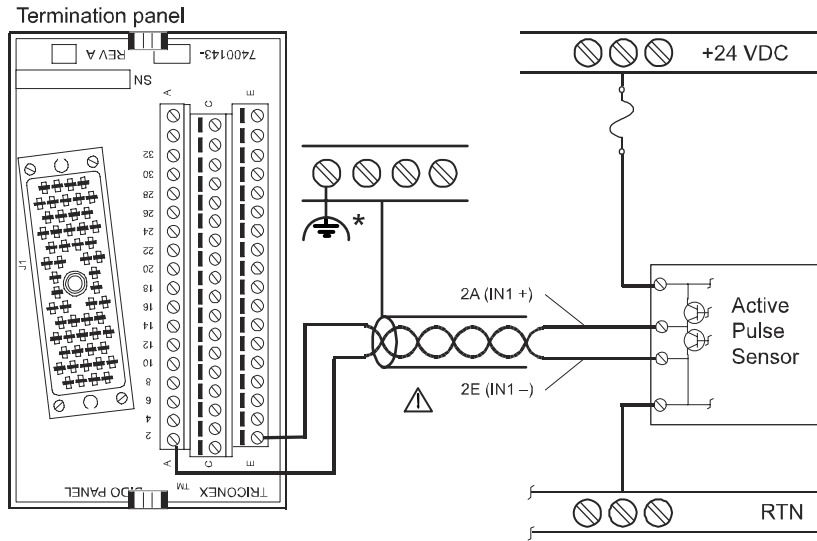
\*\* When possible, install a terminating resistor as shown. For further information, see Technical Application Note (TAN) #006.

**Figure 37** Field Wiring for 9753-110 with a 3510 or 3511 PI Module

**CAUTION**

Unused points must be shorted together.

This figure illustrates how to connect a 32-point pulse totalizer input module and a 9753-110 to the field.



\* Quiet earth

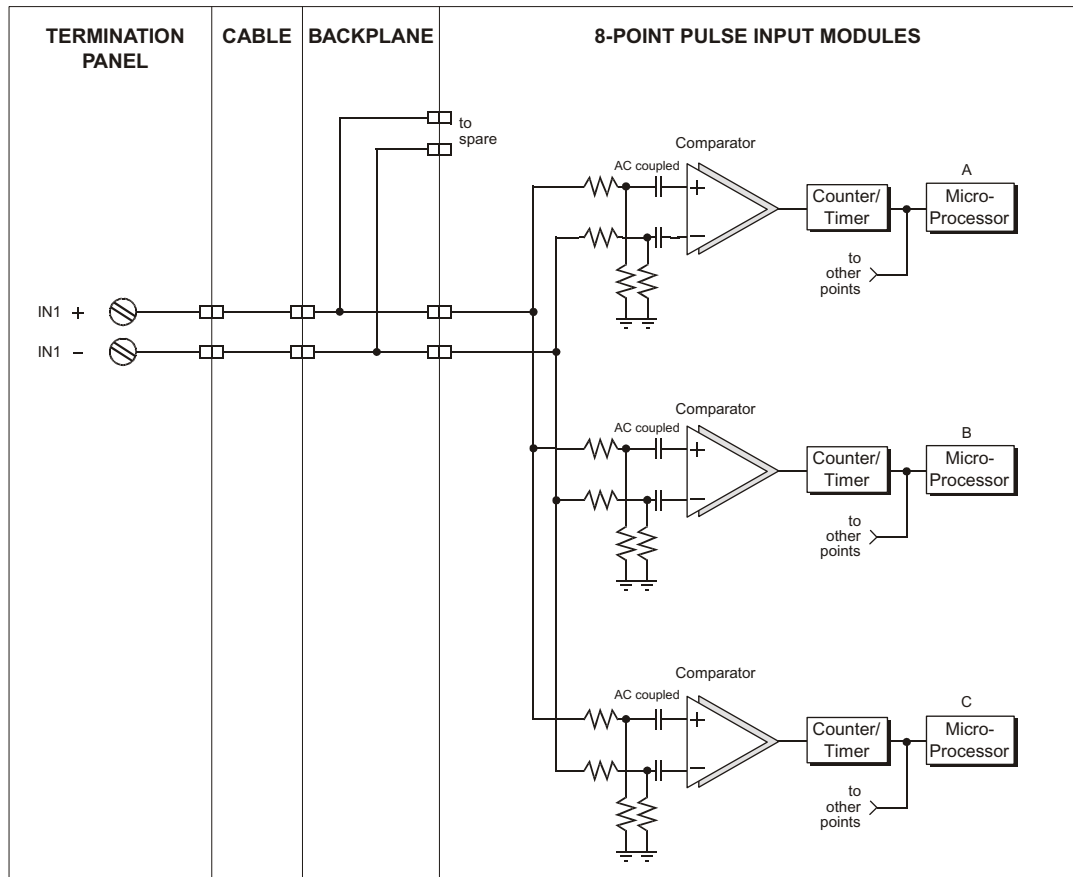
**Figure 38** Field Wiring for 9753-110 with a 3515 Pulse Totalizer Input Module

### CAUTION

With the 3515 pulse totalizer input module, sensor pulse outputs should be the push-pull type. You may use high-side or low-side, solid-state output, but maximum frequency may be reduced based on cable distance. Do not use mechanical relay/switch contacts. To prevent point-to-point cross-talk, use individually shielded, twisted-pair wire for lengths greater than 50 feet (15 meters).

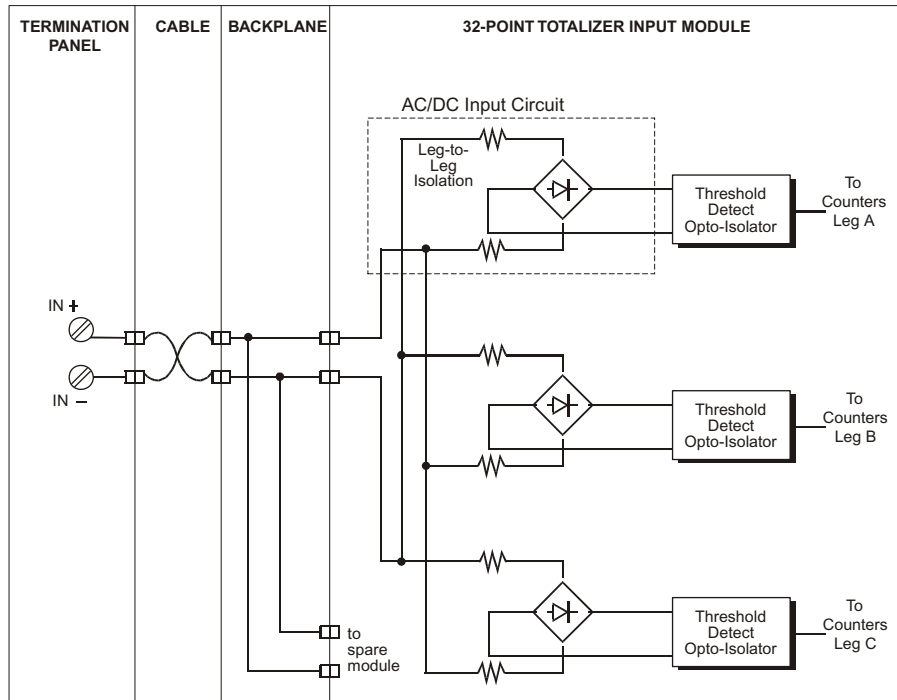
## Simplified Schematics

This is a simplified schematic of a typical 8-point non-commoned pulse input module with a 9753-110 (1 of 8 module points shown).



**Figure 39** Simplified Schematic of a 3510 or 3511 PI Module with a 9753-110 Panel

This is a simplified schematic of a typical 32-point non-commoned pulse totalizer input module with a 9753-110 (1 of 32 module points shown).



**Figure 40** Simplified Schematic of a 3515 Pulse Totalizer Input Module with a 9753-110 Panel

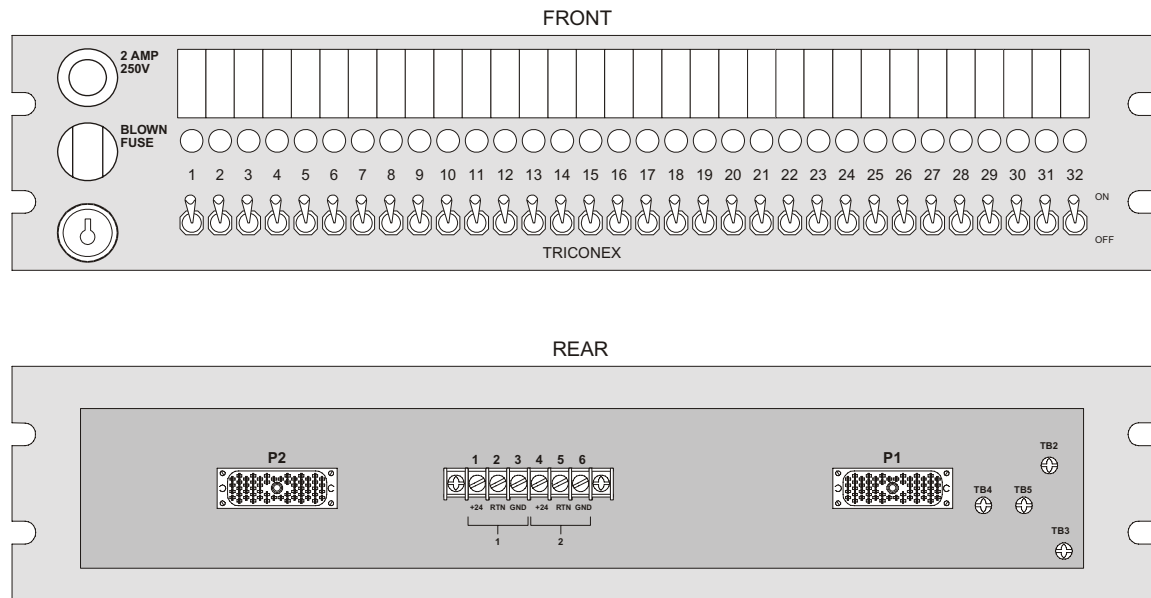
## Bypass Term Panels

This section describes bypass term panels, which are available for 32-point and 64-point digital input modules.

Model numbers of these term panels are:

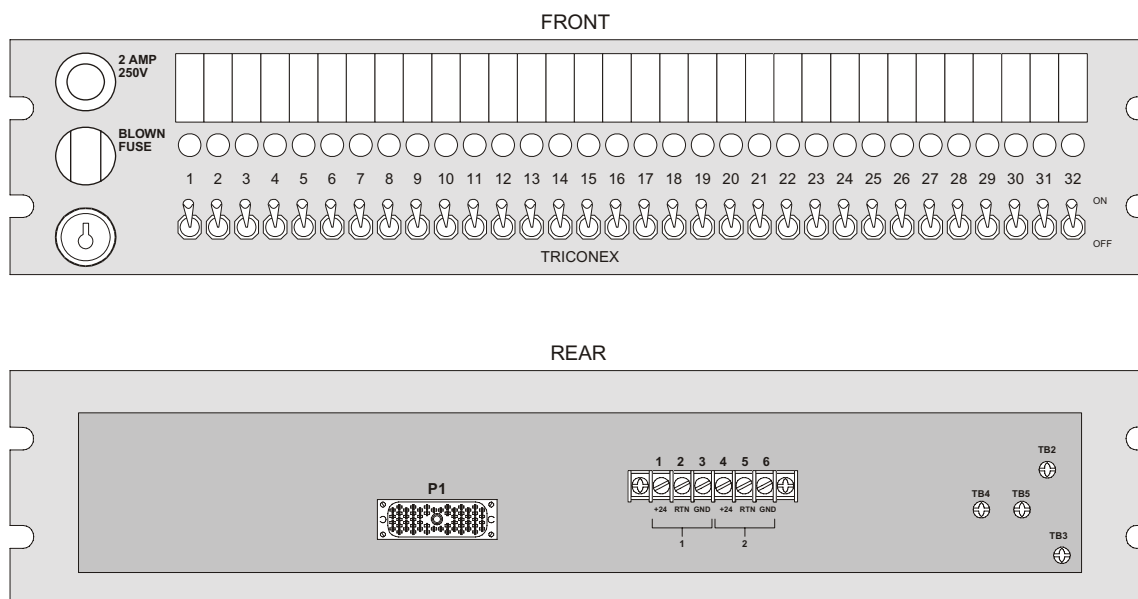
- BP9228-010 (24 V, bypass, 32 pts., for 32 pt. modules)
- BP9229-010 (24 V, bypass, 32 pts., for 64 pt. modules)

This figure represents a typical 32-point bypass termination panel that is compatible with 32-point digital input modules.



**Figure 41** Typical 32-Point Bypass Term Panel for 32-Point DI Modules

This figure represents a typical 32-point bypass termination panel that is compatible with 64-point digital input modules.



**Figure 42** Typical 32-Point Bypass Term Panel for 64-Point DI Modules

For more description of bypass termination panels, see [Bypass Panel for Digital Inputs](#) on page 5.

## BP9228-010 (24 V, bypass, 32 pts., for 32 pt. modules)

Termination panel BP9228-010 is compatible with 24 VAC/VDC and 24 VDC digital input modules, has 32 input points, and is supplied with two interface cables.

The panel is 3.5 inches high, 4.0 inches deep, and 19 inches wide (88.9 mm x 101.6 mm x 482.5 mm) and complies with EIA Standard RS-310-C. Each cable is keyed to the appropriate digital input module. P1 connects points 1-16, and P2 connects points 17-32. A 6-terminal barrier strip has terminals for redundant 24 VDC power with diode ORing provided on the panel. Each screw terminal accepts either #6 ring-lug terminals, or 24-gauge to 12-gauge (0.2 mm<sup>2</sup> to 3.3 mm<sup>2</sup>) wires.

### Specifications

This table describes specifications for BP9228-010.

**Table 48** Specifications for Term Panel BP9228-010

Feature	Description
Panel type	Bypass
Points	32



## Compatible Modules

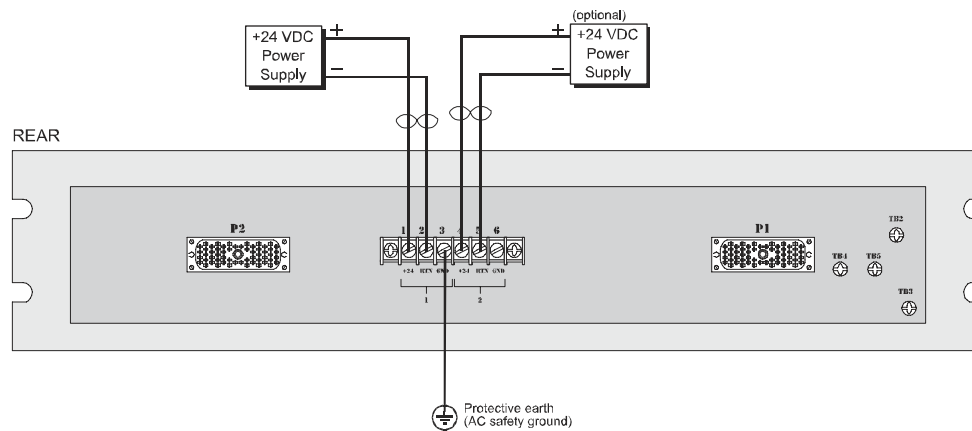
This table describes digital input modules compatible with BP9228-010.

**Table 49** Modules Compatible with BP9228-010

Module Part Number	Points per Module	Module Description
3503E	32	24 VAC/VDC, commoned in groups of 8 with self-test
3505E	32	24 VDC, low-threshold, commoned in groups of 8 with self-test

## Field Wiring Diagrams

This figure illustrates how to connect a 32-point digital input module and a BP9228-010.



**Figure 43** Field Wiring for BP9228-010 with a 3503E or 3505E DI Module

## Simplified Schematics

This is a simplified schematic of a typical 32-point digital input module with a BP9228-010 (1 of 32 module points shown).

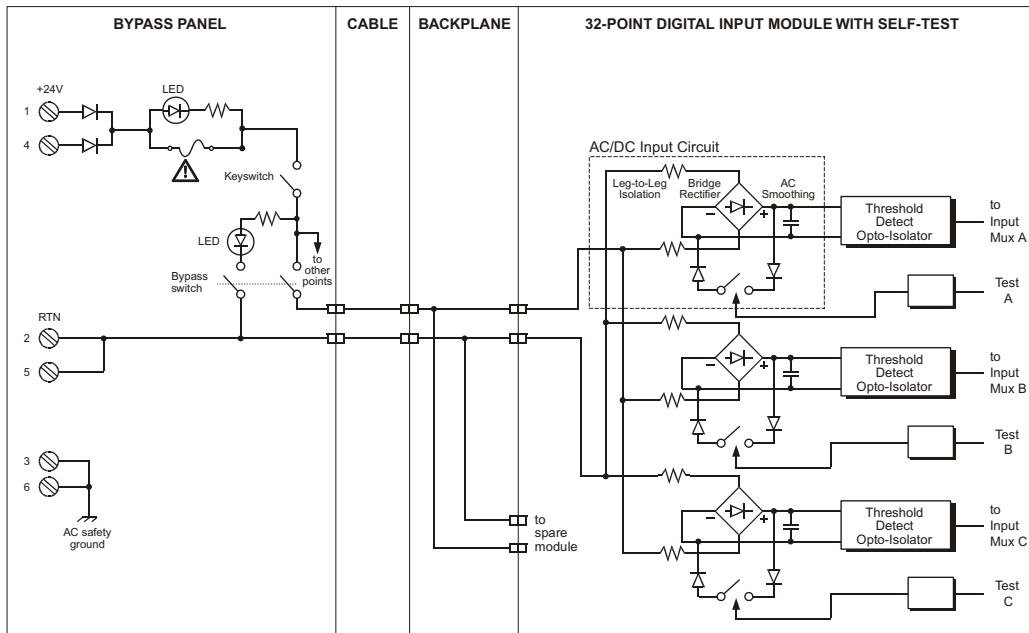


Figure 44 Simplified Schematic of a 3503E or 3505E DI Module with a BP9228-010 Panel

## BP9229-010 (24 V, bypass, 32 pts., for 64 pt. modules)

Termination panel BP9229-010 is compatible with 24 VDC digital input modules and has 32 input points.

The panel is 3.5 inches high, 4.0 inches deep, and 19 inches wide (88.9 mm x 101.6 mm x 482.5 mm), and complies with EIA Standard RS-310-C. The cable is keyed to the appropriate digital input module. P1 connects points 1-32. A 6-terminal barrier strip has terminals for redundant 24 VDC power with diode ORing provided on the panel. Each screw terminal accepts either #6 ring-lug terminals, or 24-gauge to 12-gauge (0.2 mm<sup>2</sup> to 3.3 mm<sup>2</sup>) wires.

The modules compatible with BP9229-010 have 64 points, which means you must use two term panels for each digital input module.

## Specifications

This table describes specifications for BP9229-010.

Table 50 Specifications for Term Panel BP9229-010

Feature	Description
Panel type	Bypass
Points	32

## Compatible Modules

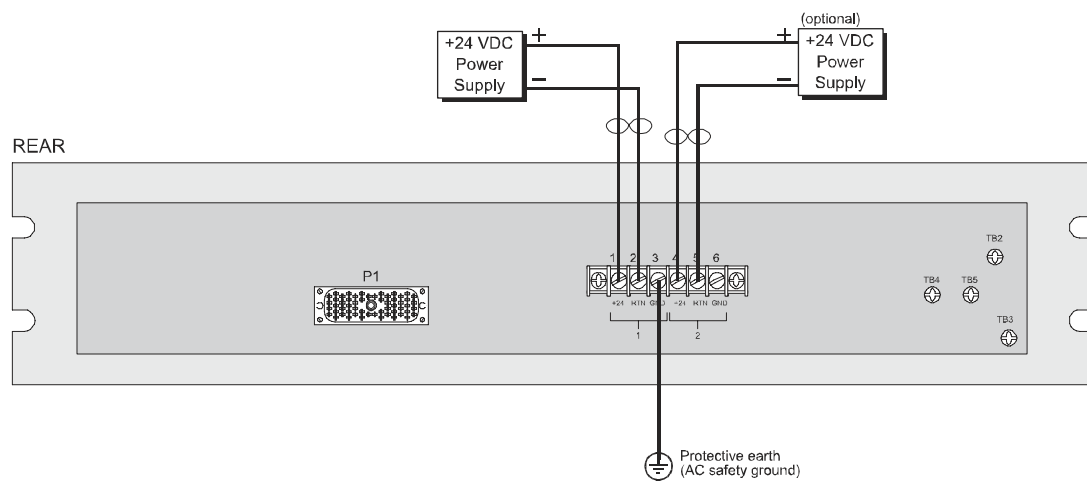
This table describes digital input modules compatible with BP9229-010.

**Table 51 Modules Compatible with BP9229-010**

Module Part Number	Points per Module	Module Description
3504E	64	24 VDC, commoned

## Field Wiring Diagrams

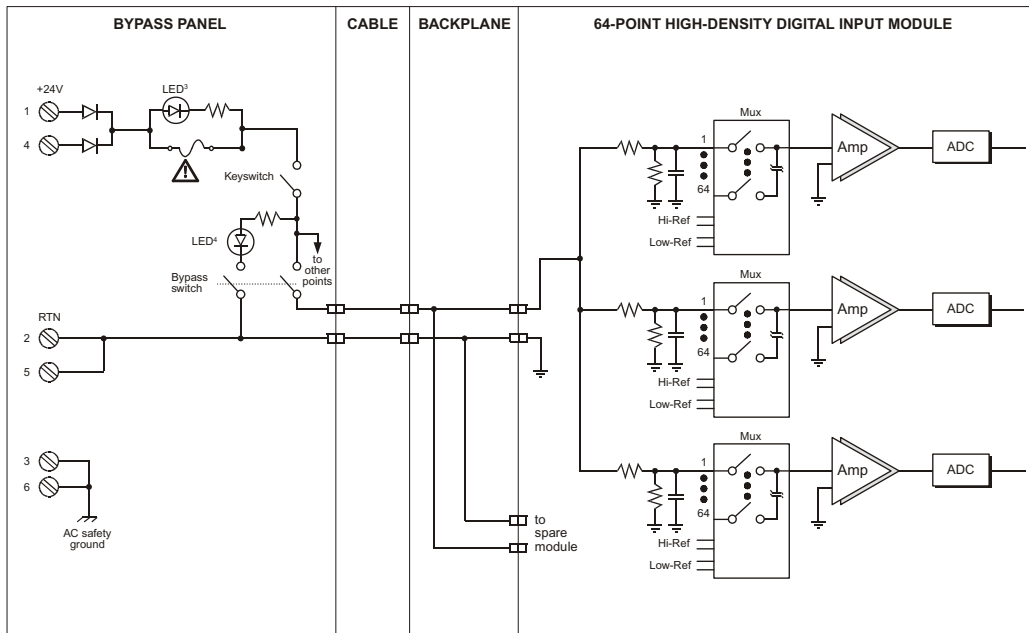
This figure illustrates how to connect a 64-point digital input module and a BP9229-010.



**Figure 45** Field Wiring for BP9229-010 with a 3504E DI Module

## Simplified Schematics

This is a simplified schematic of a typical 64-point digital input module with a BP9229-010 (1 of 32 module points shown).



**Figure 46** Simplified Schematic of a 3504E DI Module with a BP9229-010 Panel

# 4

## Digital Output Termination Panels

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Overview	82
8-Point Commoned Digital Output Term Panels	83
16-Point Commoned Digital Output Term Panels	99
16-Point Non-Commoned Digital Output Term Panels	121
Basic Digital Output Term Panels	135
Commoned Interposing Relay Term Panels	150
Non-Commoned Interposing Relay Term Panels	164

## Overview

This chapter describes external field termination panels you can use with digital output modules. Digital output termination panels are available in these configurations:

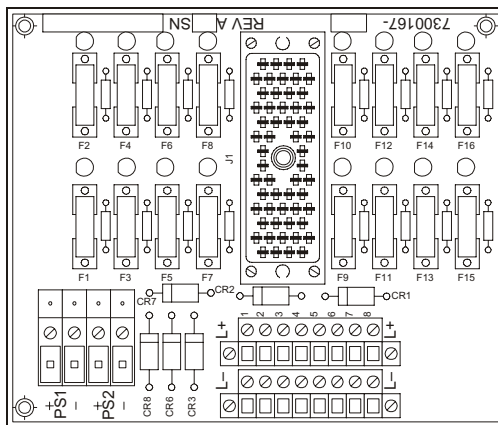
- 8-point commoned
- 16-point commoned
- Non-commoned
- Basic
- Commoned interposing relay
- Non-commoned interposing relay

## 8-Point Commoned Digital Output Term Panels

This section describes 8-point commoned digital output term panels, which are available in AC versions or DC versions. Model numbers of these term panels are:

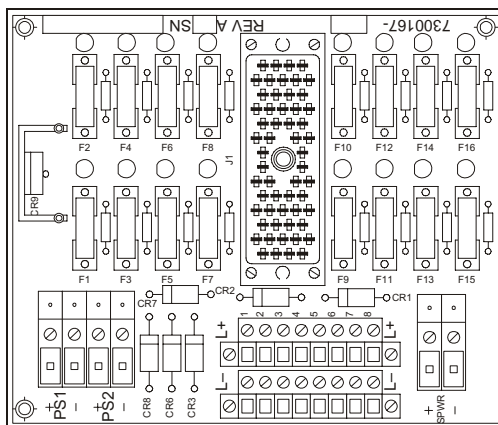
- 9661-510 (115 VAC, commoned, 8 pts.)
- 9661-810 (120 VDC, commoned, 8 pts.)
- 9662-710 (24 VDC low-power, commoned, 8 pts.)
- 9662-910 (24 VDC, commoned, 8 pts.)
- 9667-910 (48 VDC, commoned, 8 pts.)

This figure represents a typical 8-point commoned AC digital output termination panel with fuses and blown-fuse indicators.



**Figure 47** Typical 8-Point Commoned AC DO Term Panel

This figure represents a typical 8-point commoned DC digital output termination panel with fuses and blown-fuse indicators.



**Figure 48** Typical 8-Point Commoned DC DO Term Panel

This table identifies primary and secondary fuse locations for each output point on an 8-point commoned digital output term panel.

**Table 52 Fuse Identification for 8-Point Commoned DO Term Panels**

Point	Primary Fuse	Secondary Fuse
1	F1	F9
2	F2	F10
3	F3	F11
4	F4	F12
5	F5	F13
6	F6	F14
7	F7	F15
8	F8	F16

## 9661-510 (115 VAC, commoned, 8 pts.)

Termination panel 9661-510 is compatible with 115 VAC digital output modules and has 8 load terminals and commoned power terminals (PWR+ and PWR-). Each output point is protected by a fuse with a blown-fuse indicator.

### Specifications

This table describes specifications for 9661-510.

**Table 53 Specifications for Term Panel 9661-510**

Feature	Description
Panel type	Commoned
Points	8

### Compatible Modules

This table describes digital output modules compatible with 9661-510.

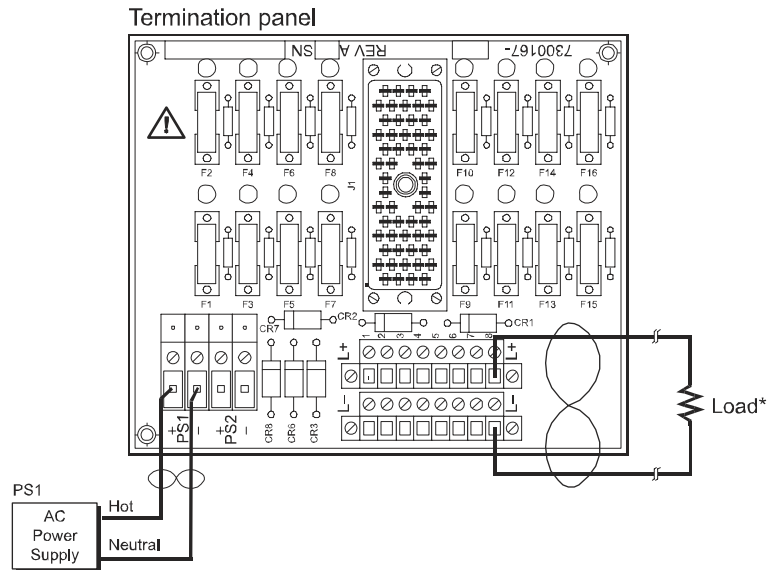
**Table 54 Modules Compatible with 9661-510**

Module Part Number	Points per Module	Module Description	Primary Fuse	Secondary Fuse
3611E	8	115 VAC, commoned, supervised, galvanically-isolated, TMR	2.5A, fast	None



## Field Wiring Diagrams

This figure illustrates how to connect an 8-point supervised AC digital output module with shorted load detection and a 9661-510 to the field.

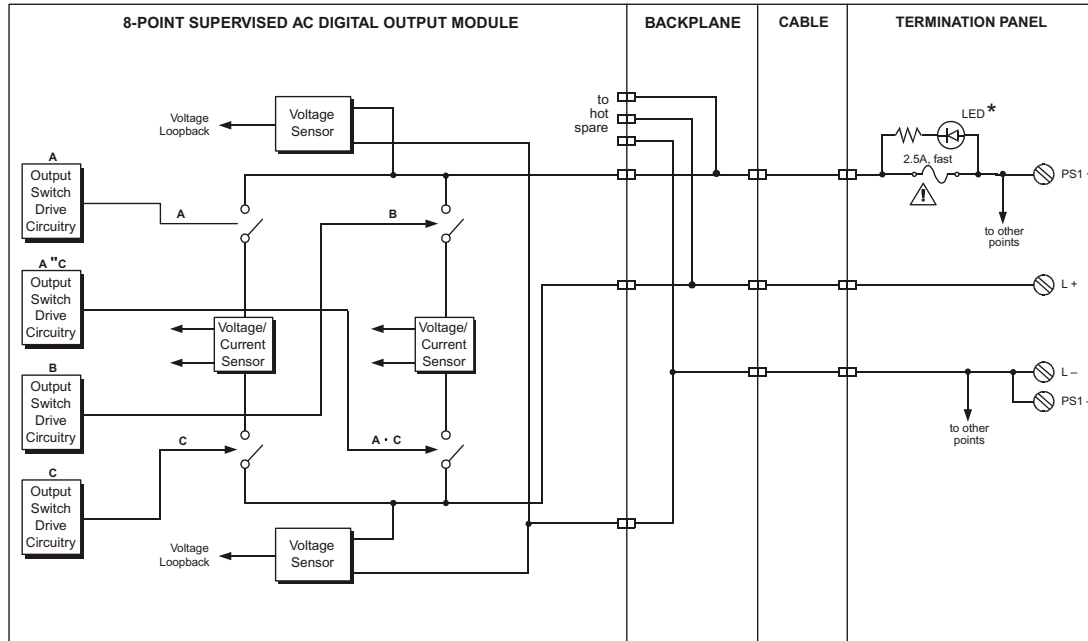


\* A load must be installed at every point to prevent missing-load alarm.  
If a field load is not available, install a 2.2k ohm, 10W load resistor.

**Figure 49** Field Wiring for 9661-510 with a 3611E Module

### Simplified Schematics

This is a simplified schematic of a typical 8-point commoned supervised AC digital output module with a commoned digital output panel (1 of 8 points shown).



\* LEDs are blown-fuse indicators

Figure 50 Simplified Schematic of a 3611E DO Module with a Commoned DO Panel

### 9661-810 (120 VDC, commoned, 8 pts.)

Termination panel 9668-810 is compatible with 120VDC digital output modules and has 8 load terminals and commoned power terminals (PWR+ and PWR-). Each output point is protected by a fuse with a blown-fuse indicator.

### Specifications

This table describes specifications for 9661-810.

Table 55 Specifications for Term Panel 9661-810

Feature	Description
Panel type	Commoned
Points	8

## Compatible Modules

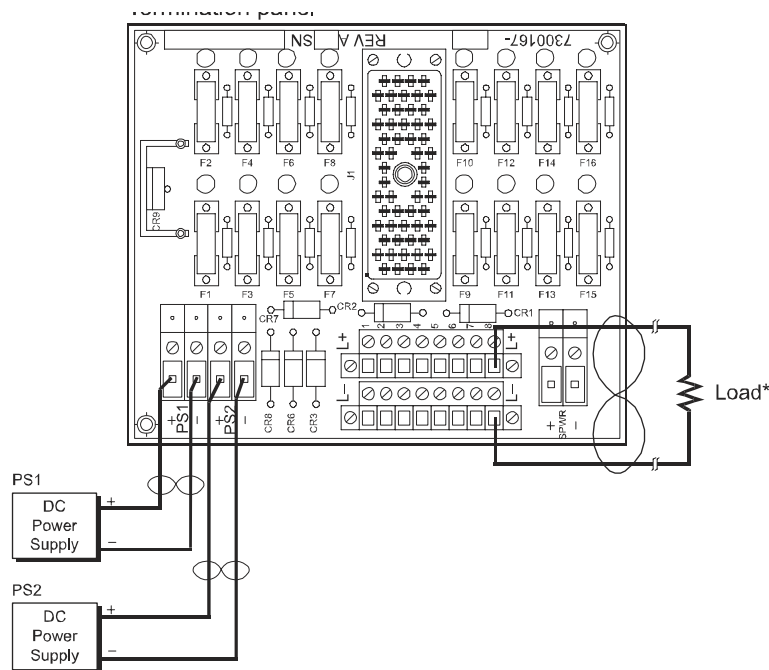
This table describes digital output modules compatible with 9661-810.

**Table 56** Modules Compatible with 9661-810

Module Part Number	Points per Module	Module Description	Primary Fuse	Secondary Fuse
3613E	8	120 VDC, commoned, supervised, galvanically-isolated, TMR	1A, fast	0.125A, fast

## Field Wiring Diagrams

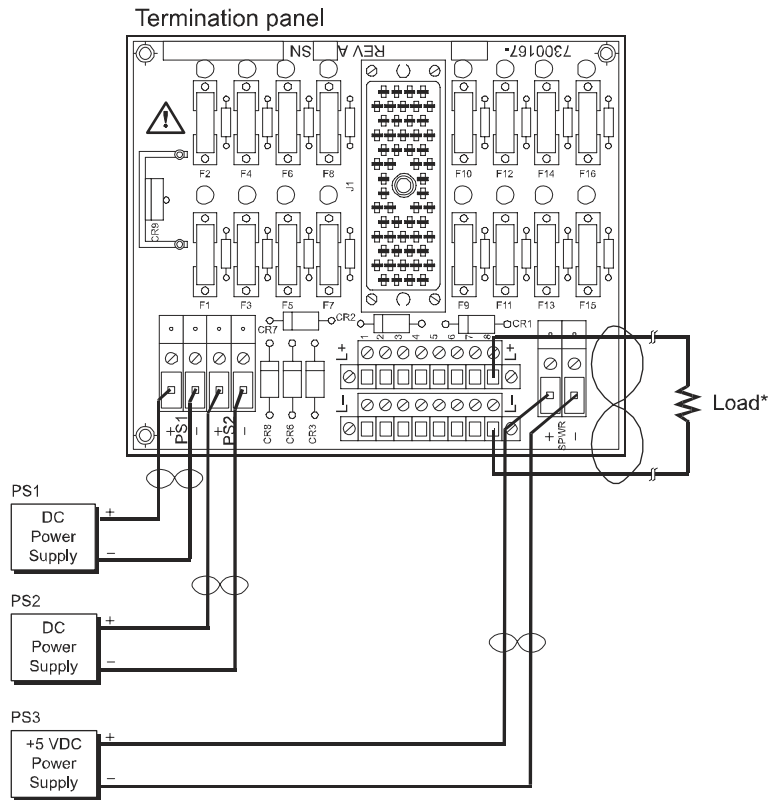
This figure illustrates how to connect an 8-point supervised DC digital output module and a 9661-810 to the field without shorted load detection.



\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 2.2 k ohm, 10 W load resistor.

**Figure 51** Field Wiring for 9661-810 with a 3613E Module and No Shorted Load Detection

This figure illustrates how to connect an 8-point supervised DC digital output module and a 9661-810 to the field with shorted load detection.

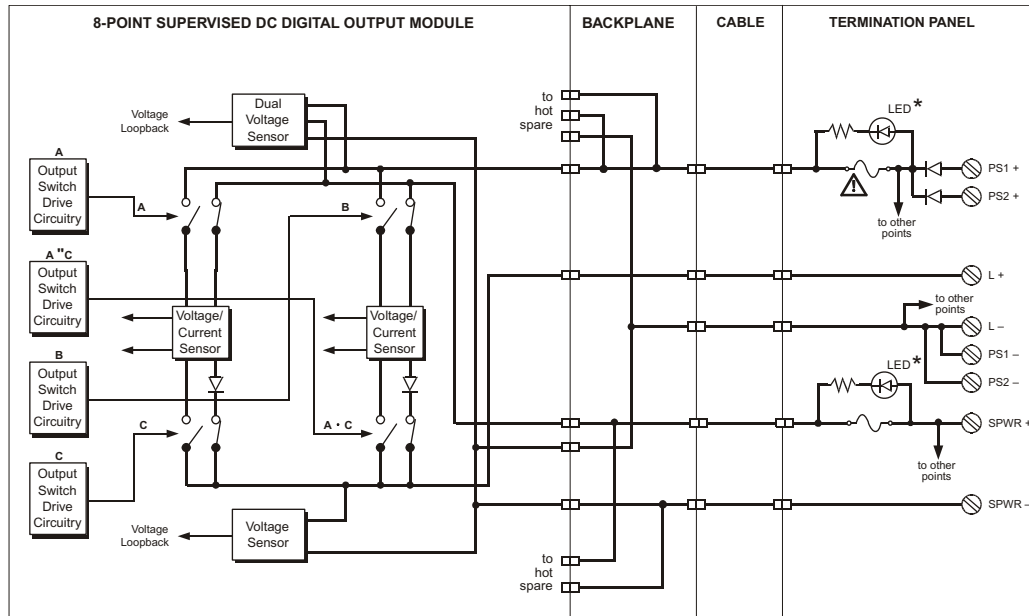


\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 2.2 k ohm, 10 W load resistor.

**Figure 52** Field Wiring for 9661-810 with a 3613E Module and Shorted Load Detection

## Simplified Schematics

This is a simplified schematic of a typical 8-point commoned supervised DC digital output module with a commoned digital output panel (1 of 8 points shown).



\* LEDs are blown-fuse indicators

**Figure 53** Simplified Schematic of a 3613E DO Module with a Commoned DO Panel

## 9662-710 (24 VDC low-power, commoned, 8 pts.)

Termination panel 9662-710 is compatible with 24 VDC low-power digital output modules and has 8 load terminals and commoned power terminals (PWR+ and PWR-). Each output point is protected by a fuse with a blown-fuse indicator.

## Specifications

This table describes specifications for 9662-710.

**Table 57** Specifications for Term Panel 9662-710

Feature	Description
Panel type	Commoned
Points	8

## Compatible Modules

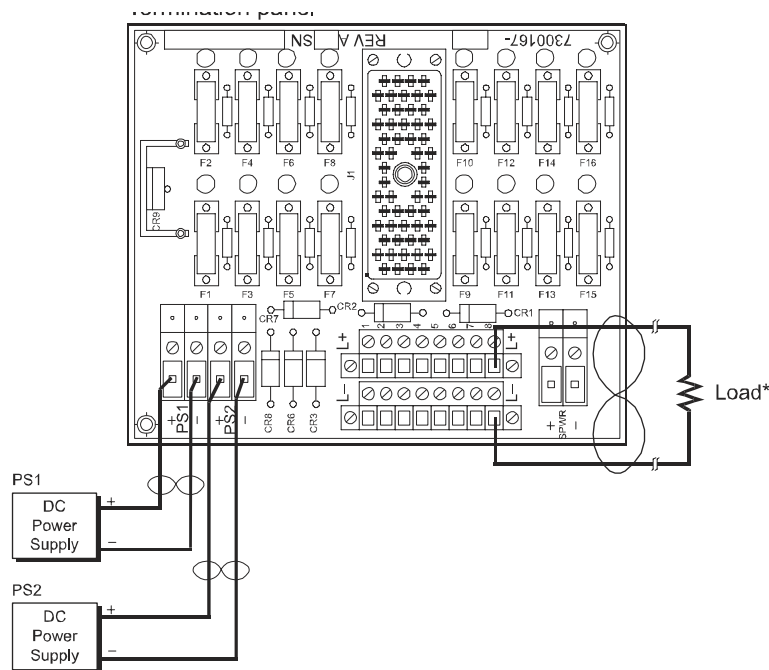
This table describes digital output modules compatible with 9662-710.

**Table 58** Modules Compatible with 9662-710

Module Part Number	Points per Module	Module Description	Primary Fuse	Secondary Fuse
3615E	8	24 VDC, low-power, commoned, supervised, galvanically-isolated, TMR	0.25A, fast	0.125A, fast

## Field Wiring Diagrams

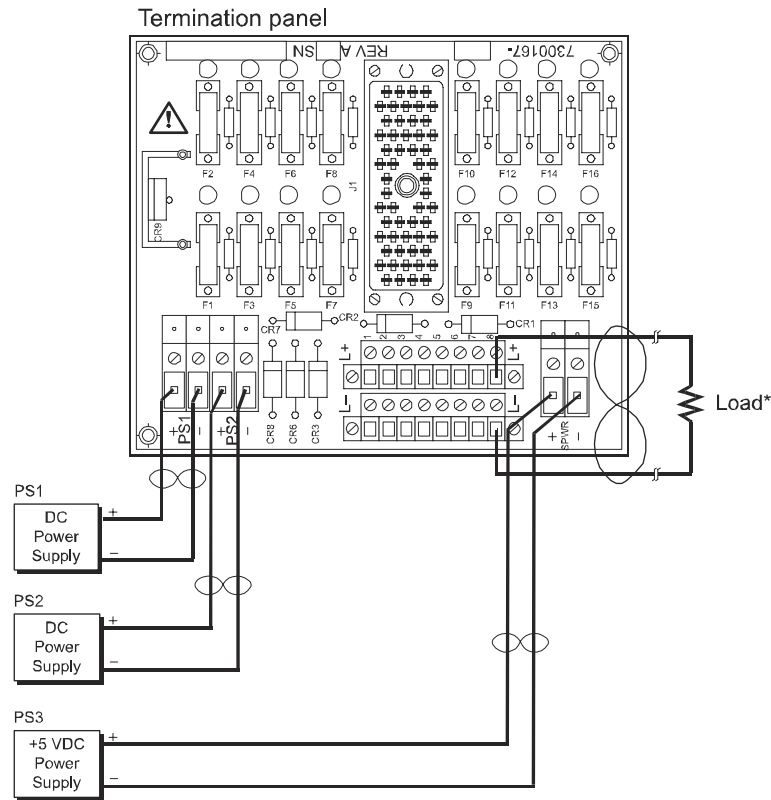
This figure illustrates how to connect an 8-point supervised DC digital output module and a 9662-710 to the field without shorted load detection.



\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 470 ohm, 10 W load resistor.

**Figure 54** Field Wiring for 9662-710 with a 3615E Module and No Shorted Load Detection

This figure illustrates how to connect an 8-point supervised DC digital output module and a 9662-710 to the field with shorted load detection.

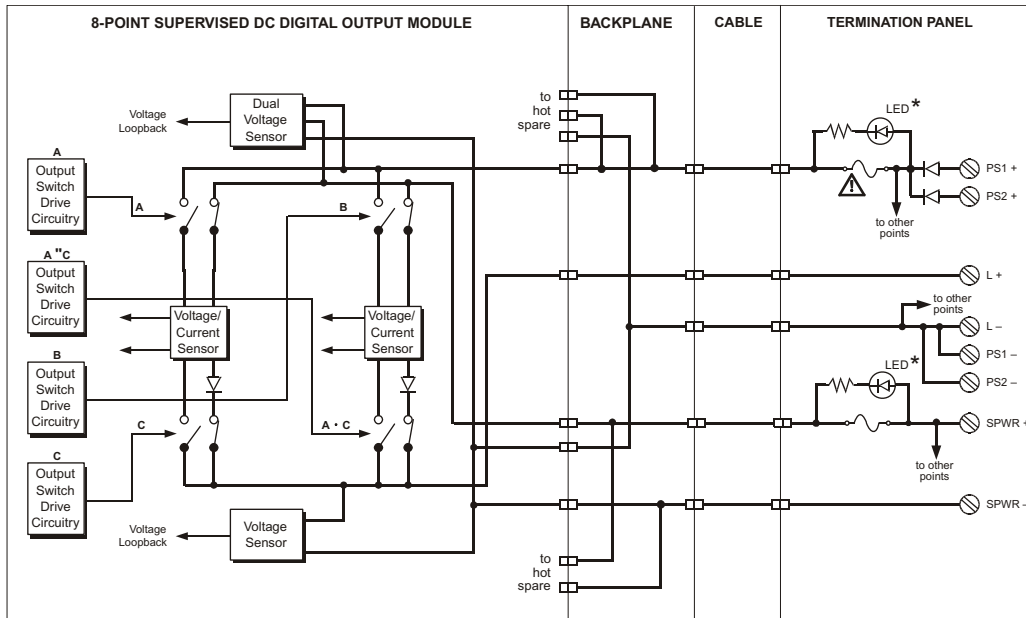


\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 470 ohm, 10 W load resistor.

**Figure 55** Field Wiring for 9662-710 with a 3615E Module and Shorted Load Detection

### Simplified Schematics

This is a simplified schematic of a typical 8-point commoned supervised DC digital output module with a commoned digital output panel (1 of 8 points shown).



\* LEDs are blown-fuse indicators

Figure 56 Simplified Schematic of a 3615E DO Module with a Commoned DO Panel

### 9662-910 (24 VDC, commoned, 8 pts.)

Termination panel 9662-910 is compatible with 24 VDC digital output modules and has 8 load terminals and commoned power terminals (PWR+ and PWR-). Each output point is protected by a fuse with a blown-fuse indicator.

### Specifications

This table describes specifications for 9662-910.

Table 59 Specifications for Term Panel 9662-910

Feature	Description
Panel type	Commoned
Points	8



## Compatible Modules

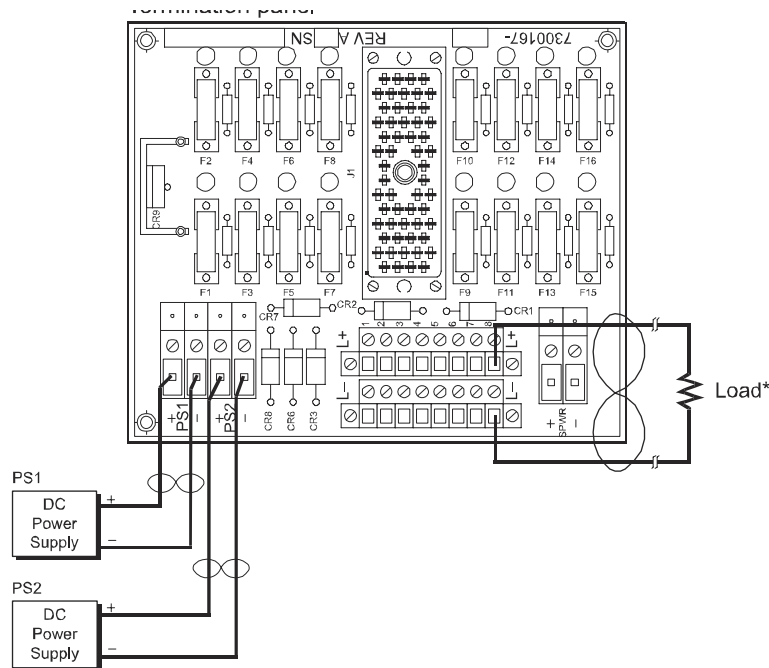
This table describes digital output modules compatible with 9662-910.

**Table 60** Modules Compatible with 9662-910

Module Part Number	Points per Module	Module Description	Primary Fuse	Secondary Fuse
3614E	8	24 VDC, commoned, supervised, galvanically-isolated, TMR	1A, fast	0.125A, fast

## Field Wiring Diagrams

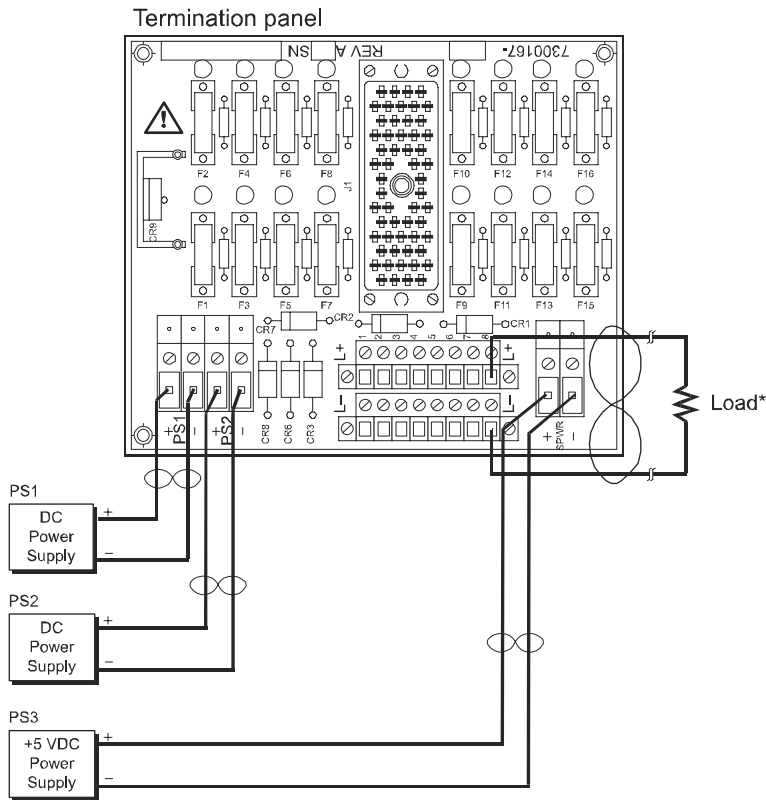
This figure illustrates how to connect an 8-point supervised DC digital output module and a 9662-910 to the field without shorted load detection.



\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 470 ohm, 10 W load resistor.

**Figure 57** Field Wiring for 9662-910 with a 3614E Module and No Shorted Load Detection

This figure illustrates how to connect an 8-point supervised DC digital output module and a 9662-910 to the field with shorted load detection.

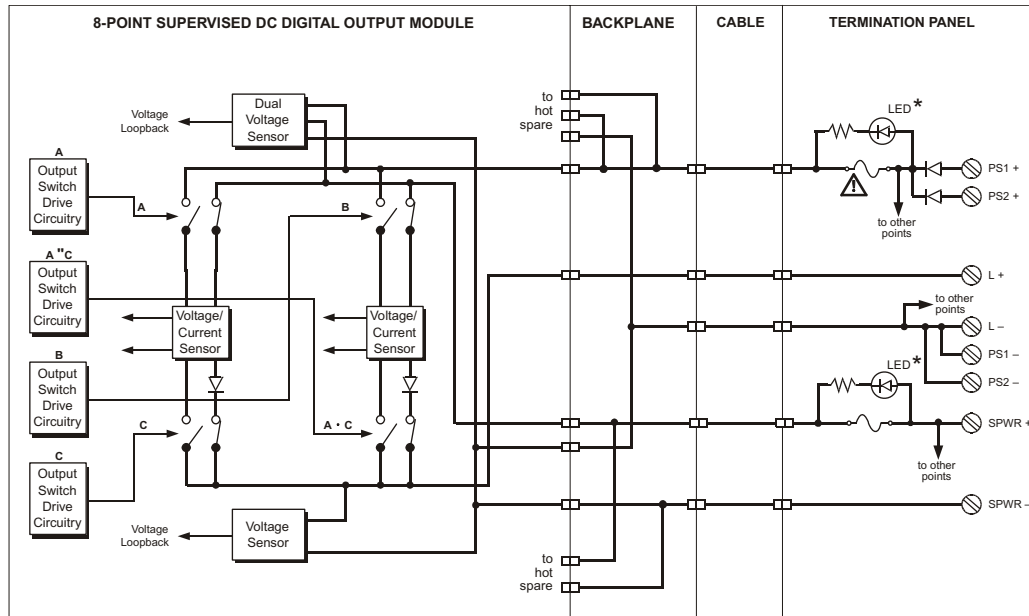


\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 470 ohm, 10 W load resistor.

**Figure 58** Field Wiring for 9662-910 with a 3614E Module and Shorted Load Detection

## Simplified Schematics

This is a simplified schematic of a typical 8-point commoned supervised DC digital output module with a commoned digital output panel (1 of 8 points shown).



\* LEDs are blown-fuse indicators

**Figure 59** Simplified Schematic of a 3614E DO Module with a Commoned DO Panel

## 9667-910 (48 VDC, commoned, 8 pts.)

Termination panel 9667-910 is compatible with 48 VDC digital output modules and has 8 load terminals and commoned power terminals (PWR+ and PWR-). Each output point is protected by a fuse with a blown-fuse indicator.

## Specifications

This table describes specifications for 9667-910.

**Table 61** Specifications for Term Panel 9667-910

Feature	Description
Panel type	Commoned
Points	8

## Compatible Modules

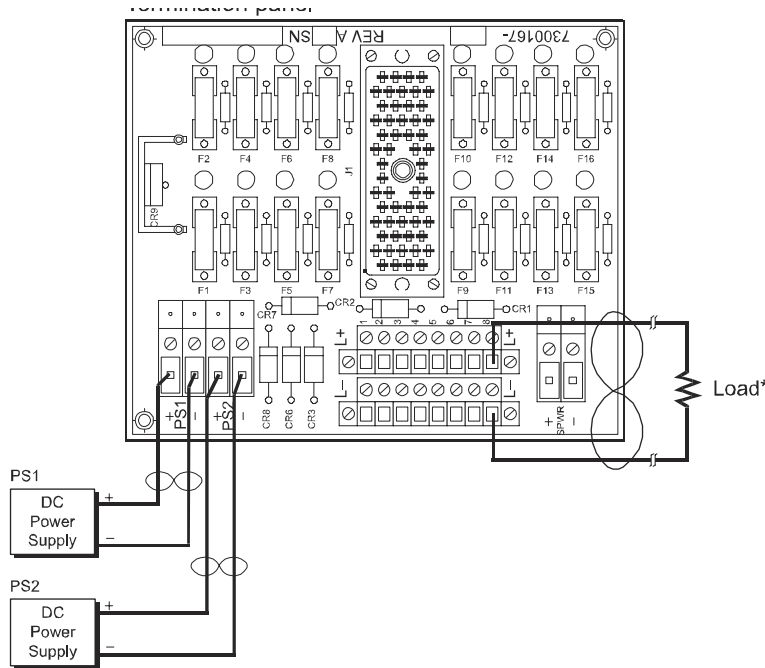
This table describes digital output modules compatible with 9667-910.

**Table 62 Modules Compatible with 9667-910**

Module Part Number	Points per Module	Module Description	Primary Fuse	Secondary Fuse
3617E	8	48 VDC, commoned, supervised, galvanically-isolated, TMR	1.25A, fast	0.125A, fast

## Field Wiring Diagrams

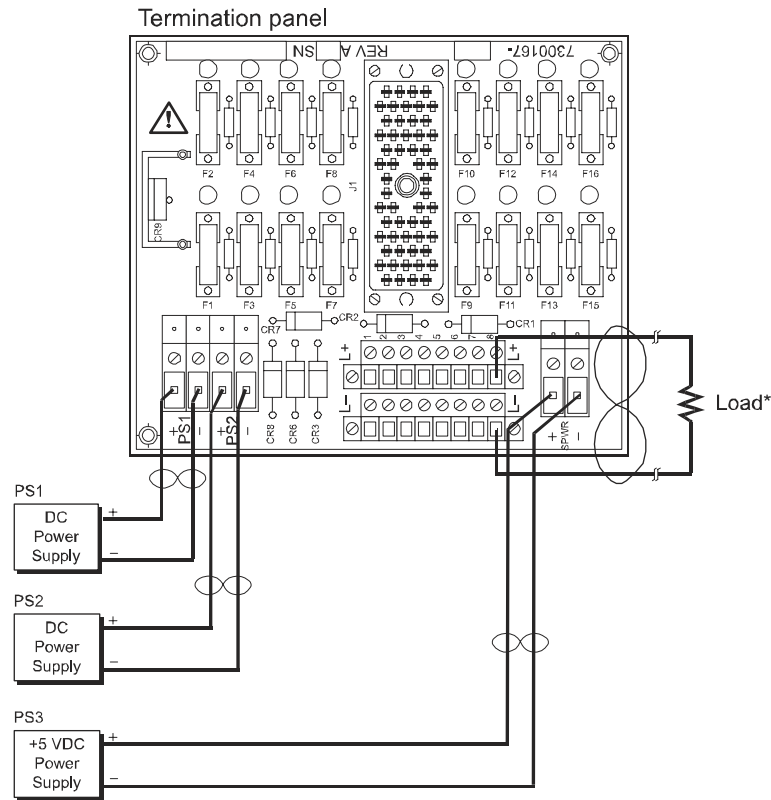
This figure illustrates how to connect an 8-point supervised DC digital output module and a 9667-910 to the field without shorted load detection.



\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 470 ohm, 10 W load resistor.

**Figure 60** Field Wiring for 9667-910 with a 3617E Module and No Shorted Load Detection

This figure illustrates how to connect an 8-point supervised DC digital output module and a 9667-910 to the field with shorted load detection.

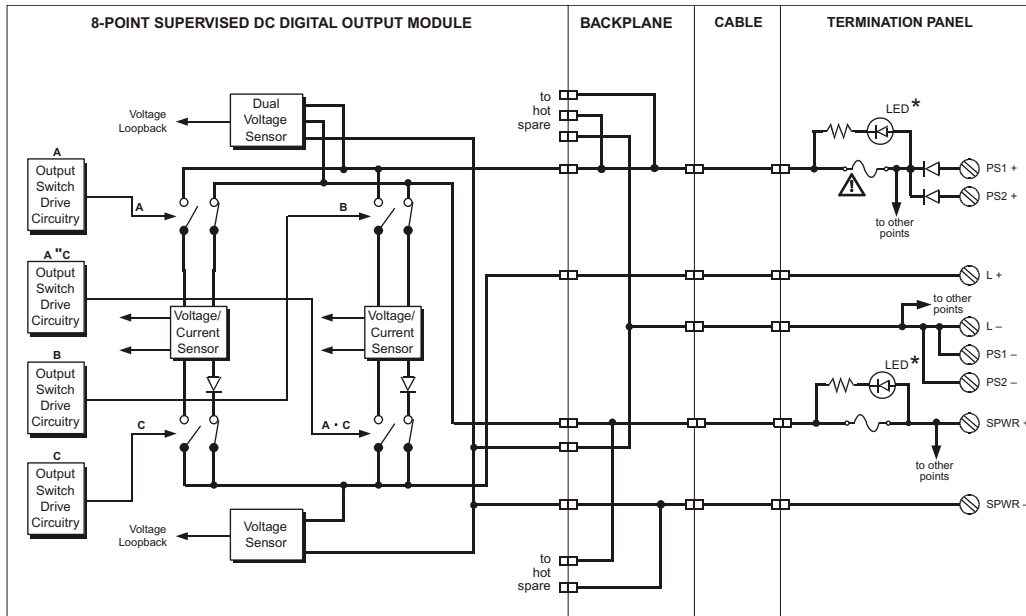


\* To prevent missing-load alarm, install a load at each unused point.  
If a field load is not available, install a 470 ohm, 10 W load resistor.

**Figure 61** Field Wiring for 9667-910 with a 3617E Module and Shorted Load Detection

## Simplified Schematics

This is a simplified schematic of a typical 8-point commoned supervised DC digital output module with a commoned digital output panel (1 of 8 points shown).



\* LEDs are blown-fuse indicators

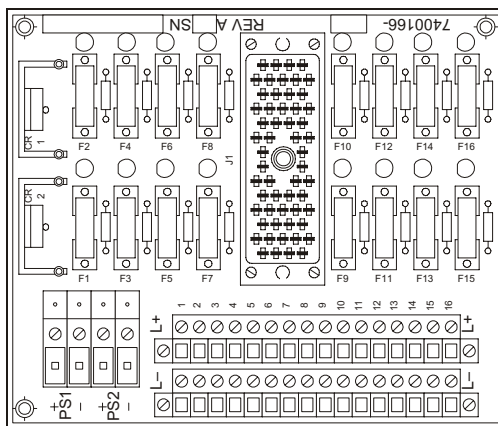
Figure 62 Simplified Schematic of a 3617E DO Module with a Commoned DO Panel

## 16-Point Commoned Digital Output Term Panels

This section describes 16-point commoned digital output term panels, which are available in AC versions or DC versions, and with fuses or without fuses. Model numbers of these term panels are:

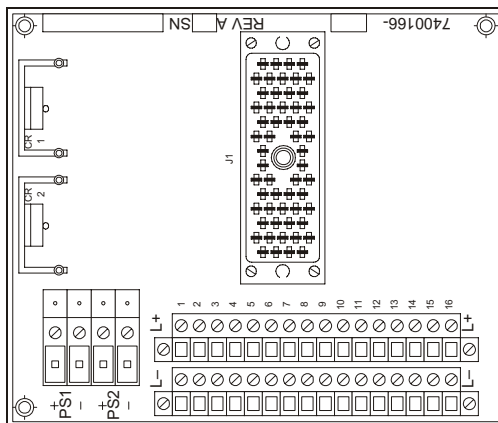
- 9661-610 (115 VAC, commoned, 16 pts.)
- 9661-910 (120 VDC, commoned, 16 pts.)
- 9662-610 (24 VDC, commoned, 16 pts.)
- 9662-810 (24 VDC, commoned, 16 pts.)
- 9663-610 (115 VAC, commoned, 16 pts.)
- 9664-810 (120 VDC, commoned, 16 pts.)
- 9667-810 (48 VDC, commoned, 16 pts.)

This figure represents a typical 16-point commoned DC digital output termination panel with fuses and blown-fuse indicators.



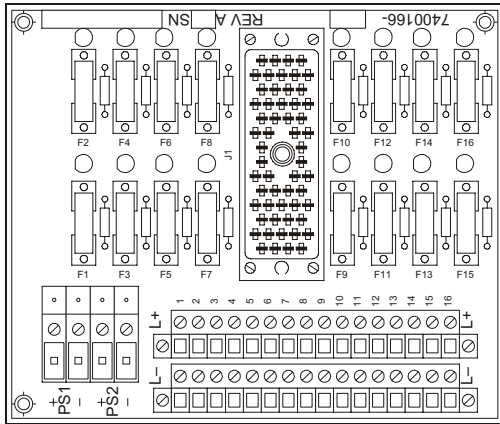
**Figure 63** Typical 16-Point Commoned DC DO Term Panel with Fuses

This figure represents a typical 16-point commoned digital output panel without fuses.



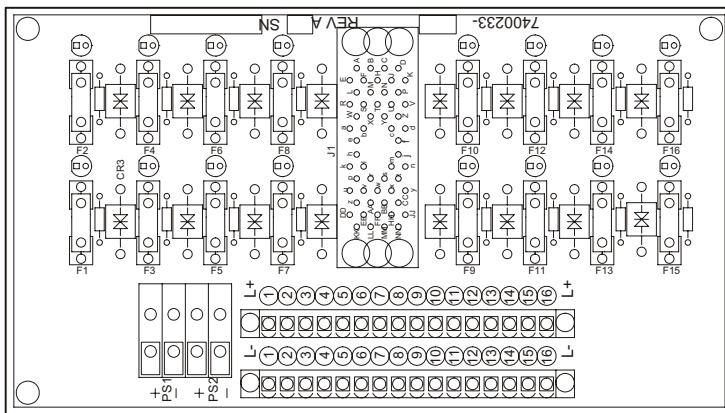
**Figure 64** Typical 16-Point Commoned DO Term Panel without Fuses

This figure represents a typical 16-point commoned AC digital output termination panel with fuses and blown-fuse indicators for the 3601E module.



**Figure 65** Typical 16-Point Commoned AC DO Term Panel with Fuses for 3601E

This figure represents a typical 16-point commoned AC digital output termination panel with fuses and blown-fuse indicators for the 3601T module.



**Figure 66** Typical 16-Point Commoned AC DO Term Panel with Fuses for 3601E or 3601T

## 9661-610 (115 VAC, commoned, 16 pts.)

Termination panel 9661-610 is compatible with 115 VAC digital output modules and has 16 load terminals and commoned power terminals (PWR+ and PWR-). Each output point is protected by a fuse with a blown-fuse indicator.



## Specifications

This table describes specifications for 9661-610.

**Table 63 Specifications for Term Panel 9661-610**

Feature	Description
Panel type	Commoned
Points	16
Maximum total current	30 amps

## Compatible Modules

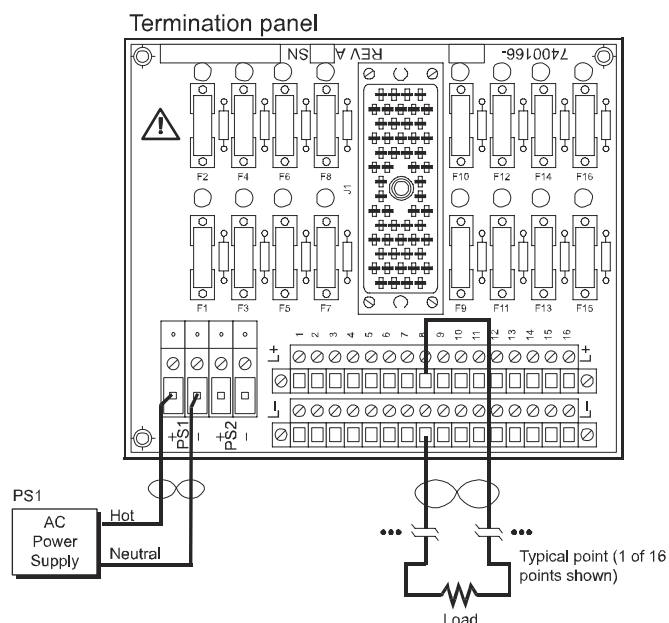
This table describes digital output modules compatible with 9661-610.

**Table 64 Modules Compatible with 9661-610**

Module Part Number	Points per Module	Module Description	Primary Fuse
3601E	16	115 VAC, non-commoned, opto-isolated, TMR	3A, fast

## Field Wiring Diagrams

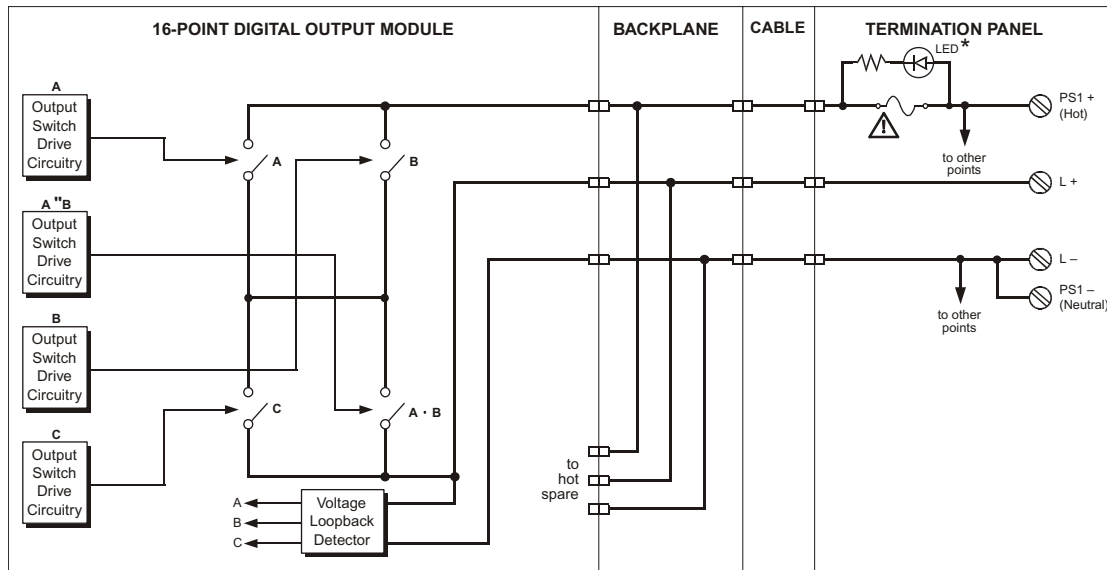
This figure illustrates how to connect the 16-point AC digital output module 3601E and a 9661-610 to the field.



**Figure 67** Field Wiring for 9661-610 with a 3601E Module

## Simplified Schematics

This is a simplified schematic of a typical 16-point non-commoned AC digital output module with a commoned digital output panel (1 of 16 points shown).



\* LEDs are blown-fuse indicators

**Figure 68** Simplified Schematic of a 3601E DO Module with a Commoned DO Panel

## 9661-910 (120 VDC, commoned, 16 pts.)

Termination panel 9661-910 is compatible with 120 VDC digital output modules and has 16 load terminals and commoned power terminals (PWR+ and PWR-). Each output point is protected by a fuse with a blown-fuse indicator.

## Specifications

This table describes specifications for 9661-910.

**Table 65** Specifications for Term Panel 9661-910

Feature	Description
Panel type	Commoned
Points	16
Maximum total current	16 amps

## Compatible Modules

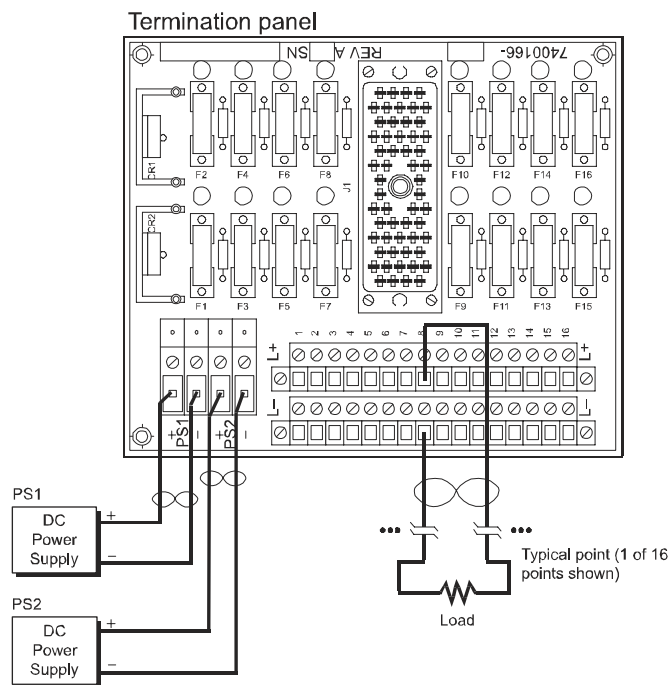
This table describes digital output modules compatible with 9661-910.

**Table 66** Modules Compatible with 9661-910

Module Part Number	Points per Module	Module Description	Primary Fuse
3603E	16	120 VDC, commoned, opto-isolated, TMR	1A, fast
3623	16	120 VDC, commoned, supervised, opto-isolated, TMR	1A, fast

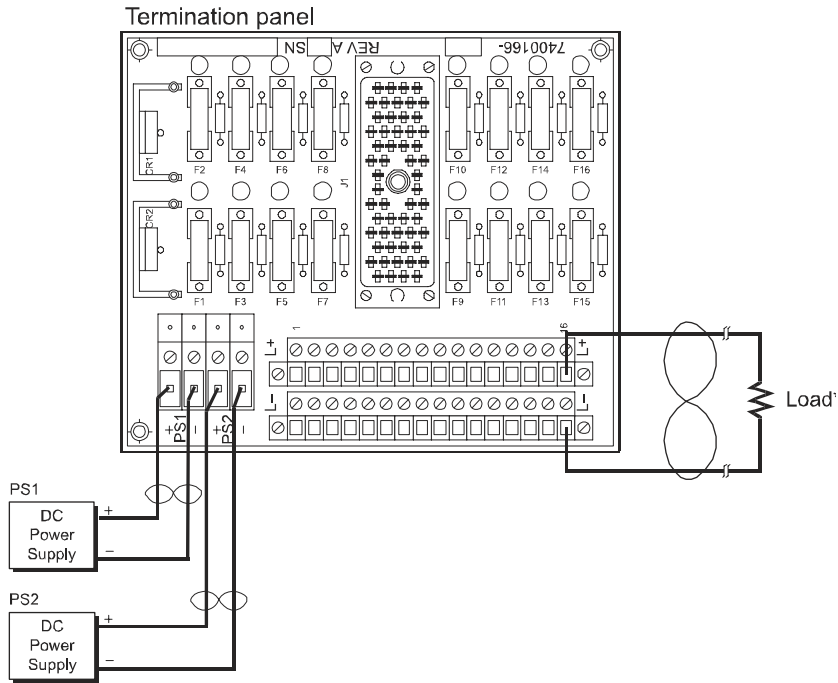
## Field Wiring Diagrams

This figure illustrates how to connect a 16-point DC digital output module and a 9661-910 to the field (1 of 16 points shown).



**Figure 69** Field Wiring for 9661-910 with a 3603E Module

This figure illustrates how to connect the 16-point supervised DC digital output module 3623 and a 9661-910 to the field (8 of 16 points shown).

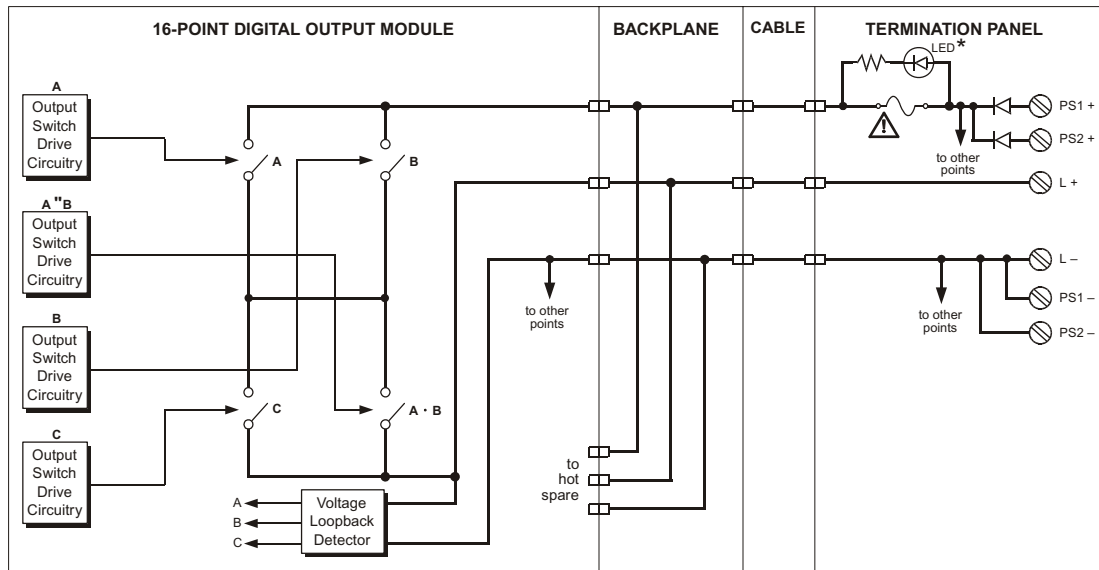


\* A load must be installed at every point to prevent a missing-load alarm.  
If a field load is not available, install a 2.2k ohm, 10W load resistor.

**Figure 70** Field Wiring for 9661-910 with a 3623 Module

## Simplified Schematics

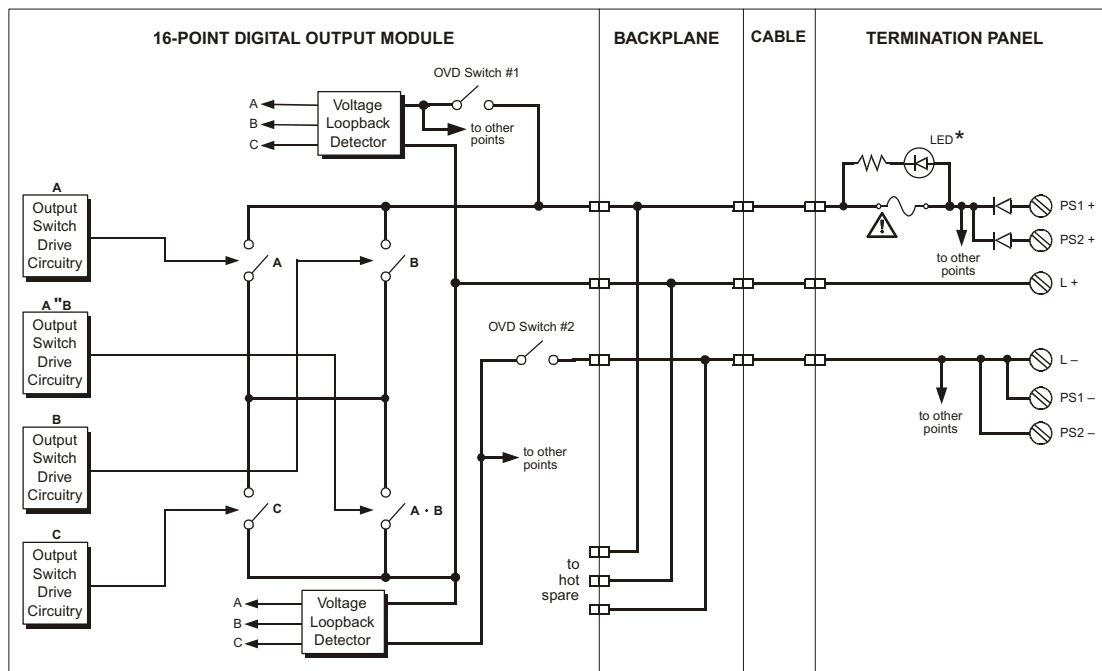
This is a simplified schematic of a typical 16-point commoned DC digital output module with a commoned digital output panel (1 of 16 points shown).



\* LEDs are blown-fuse indicators

**Figure 71** Simplified Schematic of a 3603E DO Module with a Commoned DO Panel

This is a simplified schematic of a typical 16-point commoned supervised DC digital output module with a commoned digital output panel (1 of 16 points shown).



\* LEDs are blown-fuse indicators

**Figure 72** Simplified Schematic of a 3623 DO Module with a Commoned DO Panel

## 9662-610 (24 VDC, commoned, 16 pts.)

Termination panel 9662-610 is compatible with 24 VDC digital output modules and has 16 load terminals and commoned power terminals (PWR+ and PWR-).

### CAUTION

Use termination panel 9662-610 with self-protected modules only.

When using 32-point modules, you must use two term panels for each digital output module. Each term panel comes with two sets of labels: 1-16 and 17-32. For information on how to apply the labels, see [Appendix F, Panel Labels](#).

## Specifications

This table describes specifications for 9662-610.

**Table 67 Specifications for Term Panel 9662-610**

Feature	Description
Panel type	Commoned
Points	16
Maximum total current <sup>1</sup>	16 amps

1. When the 9662-610 panel is used with the Model 3625 DO Module, the maximum total current is 10 amps per termination panel to limit the power dissipation of the module.

## Compatible Modules

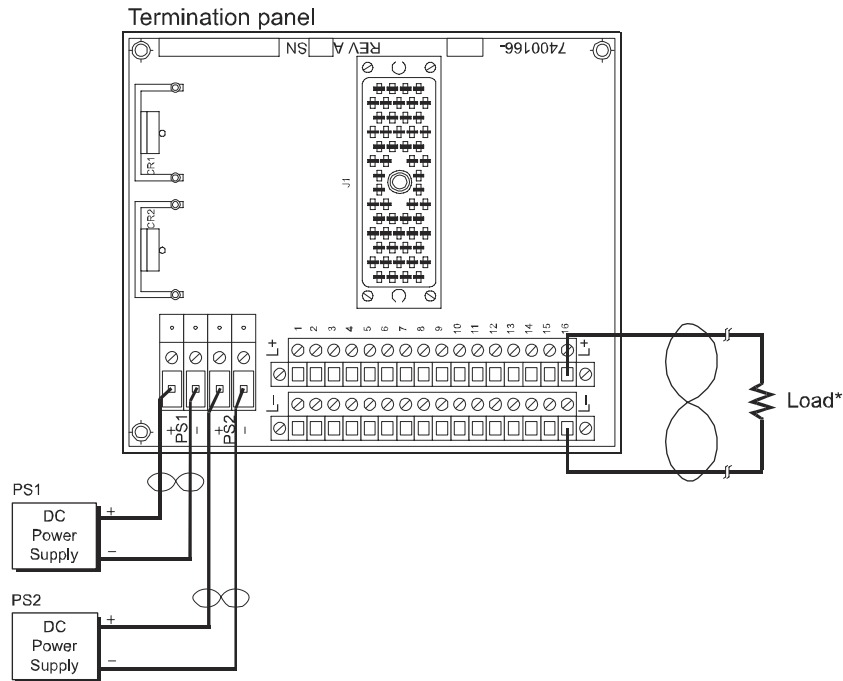
This table describes digital output modules compatible with 9662-610.

**Table 68 Modules Compatible with 9662-610**

Module Part Number	Points per Module	Module Description
3624	16	24 VDC, commoned, supervised, opto-isolated, self-protected, TMR
3625	32	24 VDC, commoned, supervised/non-supervised, opto-isolated, self-protected, TMR
3664	32	24 VDC, commoned, opto-isolated, self-protected, dual
3674	32	24 VDC, commoned, opto-isolated, self-protected, dual

## Field Wiring Diagrams

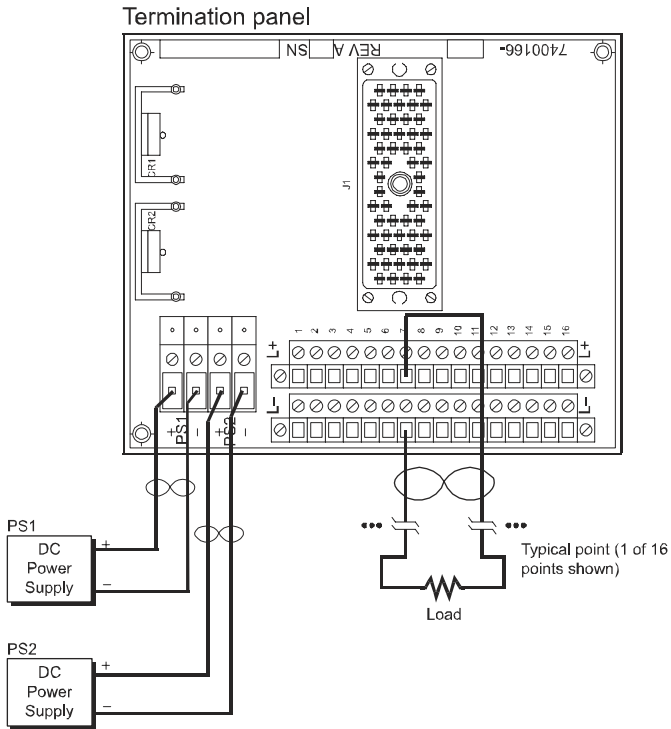
This figure illustrates how to connect a 16-point or 32-point supervised DC digital output module with self protection and a 9662-610 to the field (1 of 16 points shown).



\* When using a Model 3624 or 3625 module, a load must be installed at every point to prevent missing-load alarm. If a field load is not available, install a 470 ohm, 10 W load resistor.

**Figure 73** Field Wiring for 9662-610 with a 3624 or 3625 Module

This figure illustrates how to connect a 32-point DC dual digital output module with self protection and a 9662-610 to the field (1 of 32 points shown).



**Figure 74** Field Wiring for 9662-610 with a 3664 or 3674 Module