

Relay Adapter Kit Installation

The relay adapter installs into existing systems that have a Grayhill relay rack with faulty relays. The relay adapter intercepts the control signal from digital input/output (DIO). Signals normally transmitted to faulty relays on the Grayhill relay rack are bypassed to relays in an Opto relay rack connected to the relay adapter. The the remaining signals transmit to the Grayhill relay rack as usual. Typical installation consists of connecting a single channel Opto 22 relay rack (PN 29615) or a four channel Opto 22 relay rack (PN 15973) to the board in the center of the adapter. The adapter then connects to the Grayhill relay rack and DIO board.



Manuals and additional resources are available from Rice Lake Weighing Systems at www.ricelake.com/manuals

Warranty information can be found on the website at www.ricelake.com/warranties



WARNING: Always disconnect power before opening the enclosure.



CAUTION: A grounding wrist strap must be worn to protect components from electrostatic discharge (ESD) when working inside the equipment enclosure.

Parts Breakdown

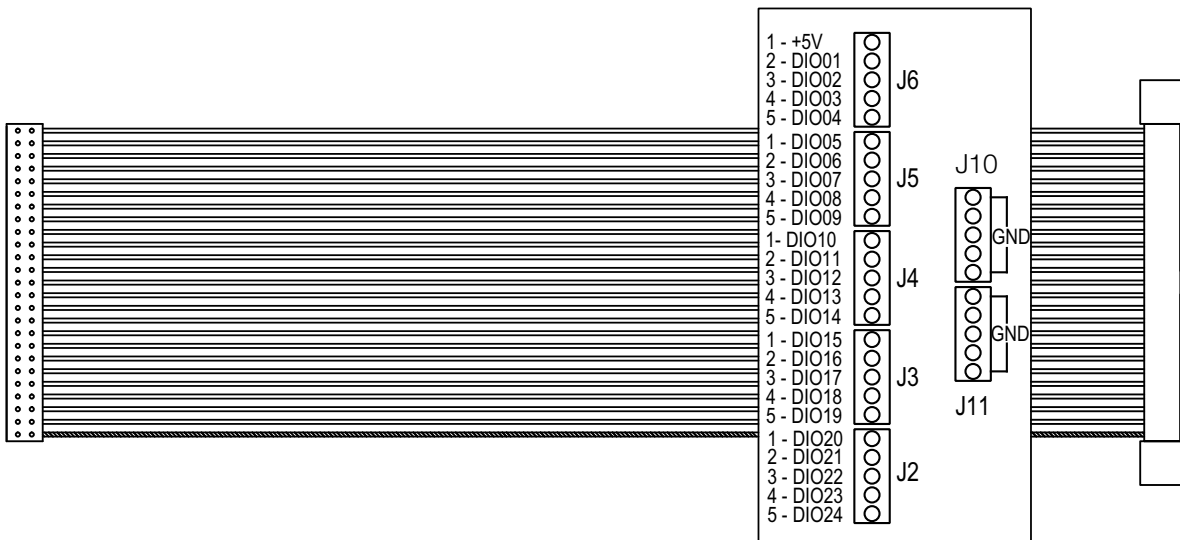


Figure 1. Relay Adapter Cable

Part No.	Description	Qty
209471	Relay Adapter Cable	1
31595	Support, Adhesive Post, PC Board (not displayed)	4
209468	Slotted Screwdriver (not displayed)	1

Table 1. Relay Adapter Kit Contents



NOTE: The relay adapter kit does not include an Opto 22 relay rack, relay module(s), mounting hardware or wires for connecting Opto 22 relay rack to the relay adapter board.

Relay Adapter Board Pinout Diagram

The following displays relay adapter board pinout information.

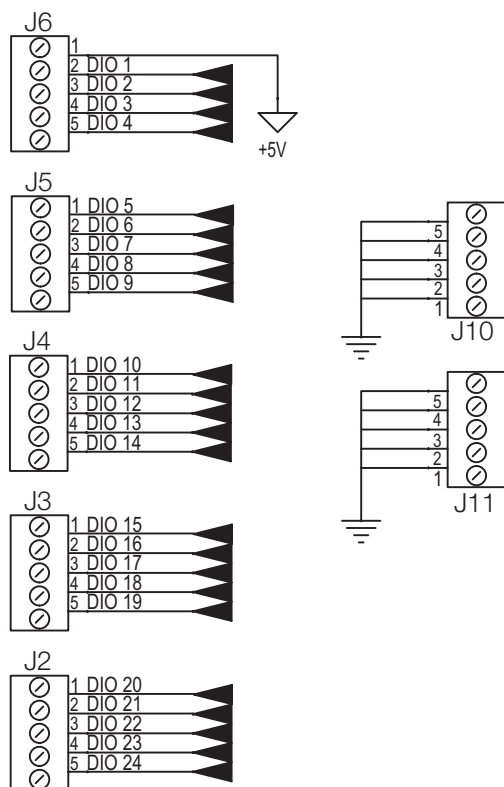


Figure 2. Relay Adapter Board Pinouts

Relay Adapter Installation

1. Turn off equipment and disconnect power.
2. Open enclosure.

 **NOTE:** See technical manual for enclosure opening instructions.

3. Disconnect ribbon cable from Grayhill relay rack.

 **NOTE:** Ensure ribbon cable remains connected to DIO.

4. Connect relay adapter cable male end to ribbon cable attached to the DIO.
5. Connect relay adapter cable female end to ribbon cable connector on Grayhill relay rack.

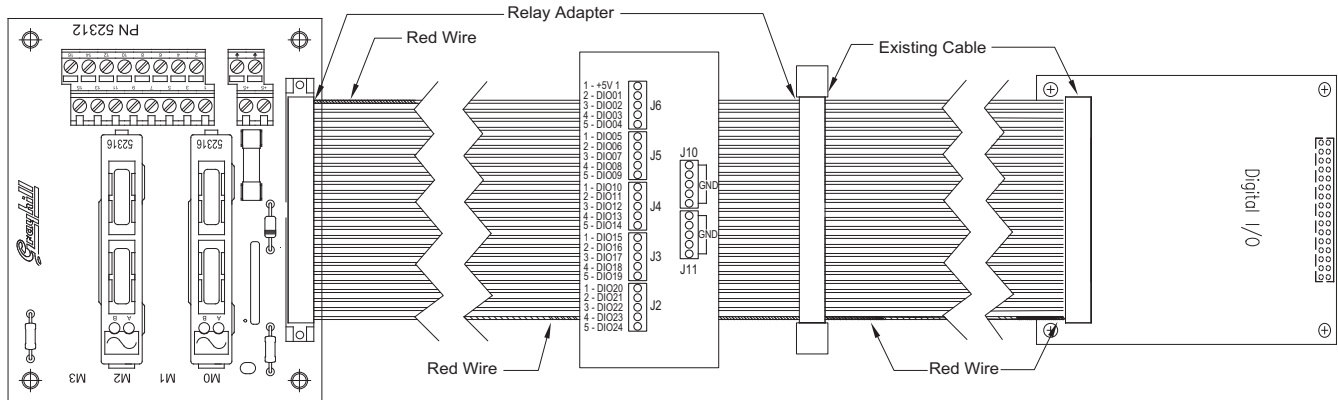


Figure 3. Adapter Cable Installation Example

6. Mount relay rack adapter board with adhesive feet (PN 31595) in enclosure.

Relay Adapter Wiring

Determine DIO Channel Numbers

The relay adapter board provides 24 DIO channels to accommodate all possible channels used on a 24 channel Grayhill relay rack. The Opto 22 relay rack must connect to same DIO channel numbers on the relay adapter board as those used by faulty Grayhill relays. Before attempting to wire Opto 22 relay to the adapter board, identify the required DIO channels numbers in the following table.

Grayhill Relay Connector	Channel 1	Channel 2
M0	DIO1	DIO2
M1	DIO3	DIO4
M2	DIO5	DIO6
M3	DIO7	DIO8
M4	DIO9	DIO10
M5	DIO11	DIO12
M6	DIO13	DIO14
M7	DIO15	DIO16
M8	DIO17	DIO18
M9	DIO19	DIO20
M10	DIO21	DIO22
M11	DIO23	DIO24

Table 2. Grayhill Relay Connector and DIO Numbers

Single Channel Opto 22 Relay Rack Wiring

The following table lists terminal connections for the single channel Opto 22 relay rack.

Terminal	Connection	
	Output	Input
1	VAC Hot or Neutral/VDC Positive	VAC Hot or Neutral/VDC Positive
2	VAC Hot or Neutral/VDC Negative	VAC Hot or Neutral/VDC Negative
3	VCC (+5 VDC)	VCC (+5 VDC)
4	Control	Control
5	Ground	Ground

Table 3. Single Channel Opto 22 Terminal Connections

Connect the single channel Opto 22 relay rack to the relay adapter board by performing the following:

1. Install a relay module into the Opto 22 relay rack.
2. Wire Opto 22 Control terminal 3 to relay adapter board J6-1 (+5V).
3. Wire Opto 22 terminal 4 to the DIO on the relay adapter board that matches the DIO for the faulty Grayhill relay. See [Table 2 on page 3](#) for DIO numbers associated with Grayhill relay channels.



NOTE: In this example, Opto 22 Terminal 4 is wired to J6-4 (DIO03) on the relay adapter board. This wiring bypasses a faulty relay on M1 channel 1 in the Grayhill relay rack.

4. Wire Opto 22 terminal 5 to relay adapter board J10-1 (ground).
5. Disconnect wire associated with the faulty relay from the terminal strip on Grayhill relay rack and wire it to the corresponding Opto relay rack terminal channel.

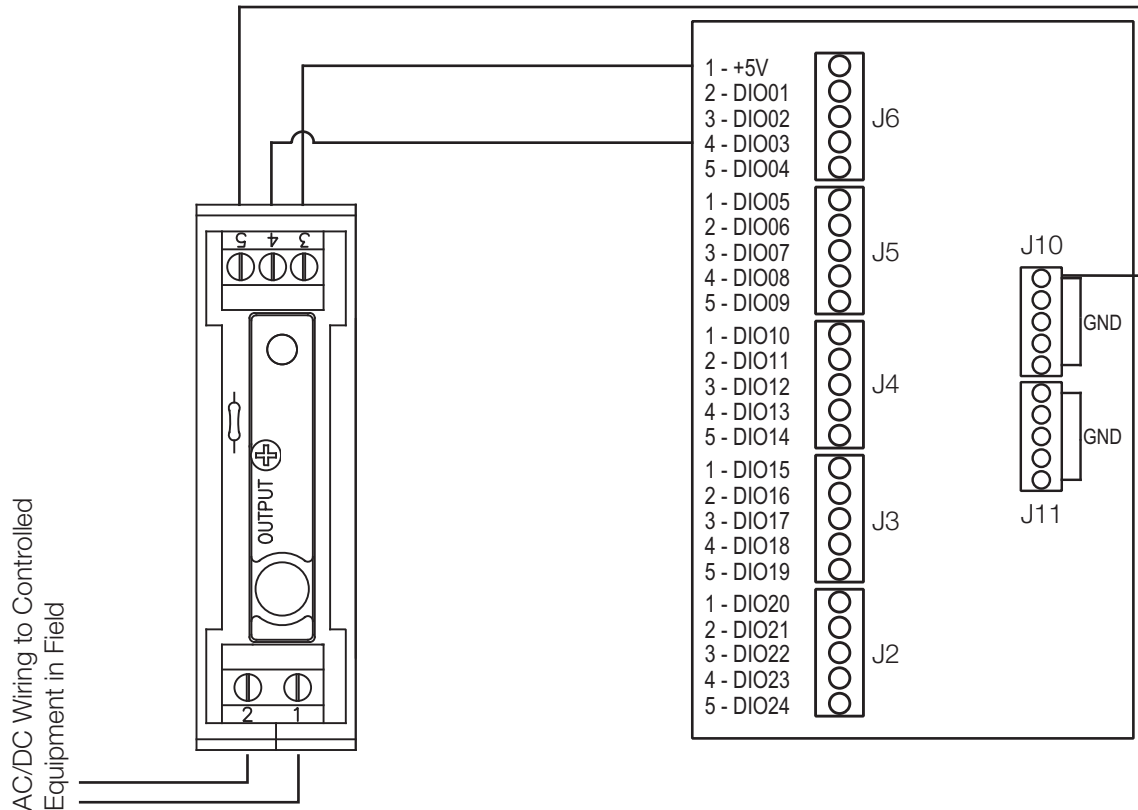


Figure 4. Opto 22 Single Channel Relay Wiring Diagram

6. Mount Opto 22 relay rack to DIN rail inside enclosure.
7. Close the enclosure.

Multi-Channel Opto 22 Relay Rack Wiring

The following table lists terminal connections for the four channel Opto 22 relay rack.

Control Terminal	Connection	Field Terminal	Connection		Relay
			Output	Input	
1	VCC (+5 VDC)	-	-	-	-
2	Ground	2	VAC Hot or Neutral/VDC Positive	VAC Hot or Neutral/VDC Positive	1
3	Control	3	VAC Hot or Neutral/VDC Negative	VAC Hot or Neutral/VDC Negative	
4	-	4	VAC Hot or Neutral/VDC Positive	VAC Hot or Neutral/VDC Positive	2
5	Control	5	VAC Hot or Neutral/VDC Negative	VAC Hot or Neutral/DC input Negative	
6	-	6	VAC Hot or Neutral/VDC Positive	VAC Hot or Neutral/VDC Positive	3
7	Control	7	VAC Hot or Neutral/VDC Negative	VAC Hot or Neutral/DC input Negative	
8	-	8	VAC Hot or Neutral/VDC Positive	VAC Hot or Neutral/VDC Positive	4
9	Control	9	VAC Hot or Neutral/VDC Negative	VAC Hot or Neutral/DC input Negative	

Table 4. Four Channel Opto 22 Terminal Connections

Connect the four channel Opto 22 relay rack to the relay adapter board by performing the following:

1. Install relay modules into the four channel Opto 22 relay rack.
2. Wire Opto 22 Control terminal 1 to relay adapter board J6-1 (+5V).
3. Wire Opto 22 Control terminal 2 to relay adapter board J10-1 (ground).
4. Wire Opto 22 Control terminals (3, 5, 7 or 9) to the DIO on the relay adapter board that matches the DIO for the faulty Grayhill relays. See [Table 2 on page 3](#) for DIO numbers associated with Grayhill relay channels.

NOTE: In this example Opto 22 Control terminal 3 is wired to J6-4 (DIO03) and Opto 22 control terminal 5 is wired to J6-5 (DIO 04) on the relay adapter board. This wiring bypasses a faulty relay module on M1 (channels 1 and 2) on the Grayhill relay rack and uses Opto 22 relays 1 and 2.

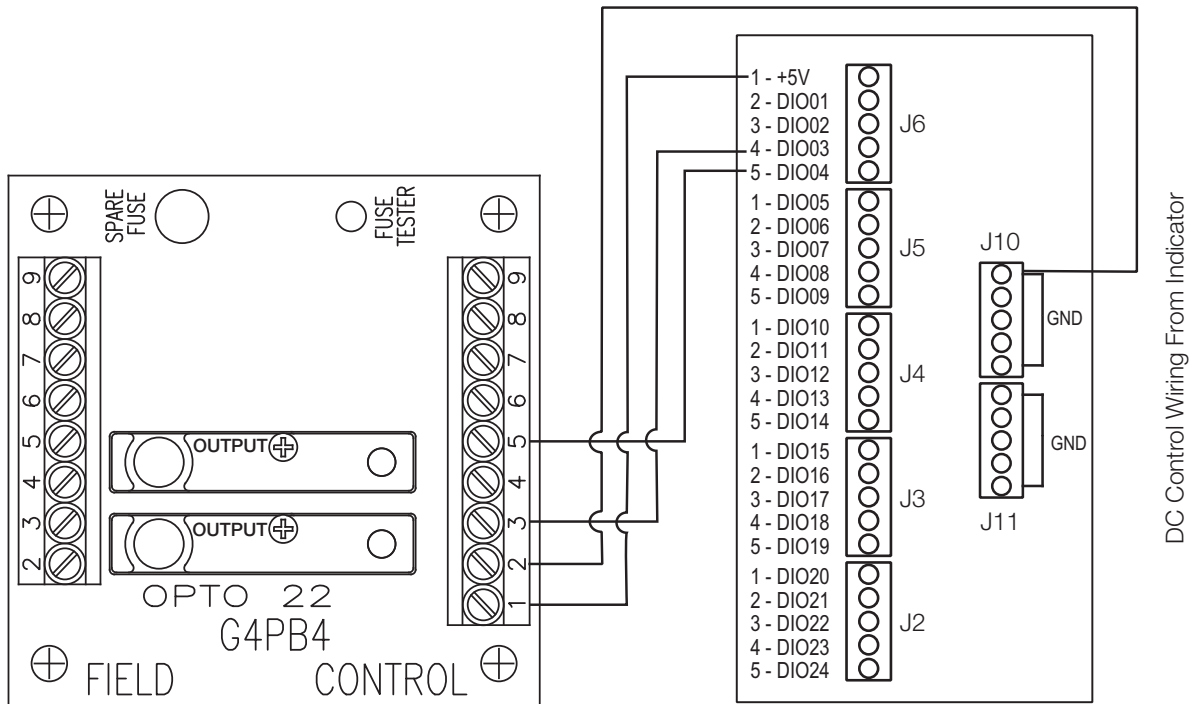


Figure 5. Opto 22 Four Channel Relay Wiring Diagram

5. On the Grayhill relay rack, disconnect wires from Field terminals that corresponds with the faulty relays.
6. Attach disconnected wires to Opto 22 relay rack Field terminals that correspond to new relays.



NOTE: Two Field terminals are associated with one relay on the Grayhill and Opto 22 relay racks. [Table 5](#) lists field terminal and relay associations. Observe Field terminal numbers vary between Grayhill and Opto 22 relay racks. Grayhill relay rack Field terminals start with pin 1, while Opto 22 4 channel relay rack Field terminals start with pin 2.

Example: Relay 4 from a Grayhill relay rack was bypassed with relay 2 on the Opto 22 relay rack. Grayhill Field terminal pins 7 and 8 are associated with relay 4, while Opto 22 Field terminal pins 4 and 5 are associated with relay 2. Grayhill Field terminal pin 7 wire transfers to Opto 22 Field terminal pin 4, while Grayhill Field terminal pin 8 wire transfers to Opto 22 Field terminal pin 5.

Grayhill Relay Rack Four Channel to Twenty Four Channel			
Field Terminal	Relay	Field Terminal	Relay
Pin 1	1	Pin 25	13
Pin 2		Pin 26	
Pin 3	2	Pin 27	14
Pin 4		Pin 28	
Pin 5	3	Pin 29	15
Pin 6		Pin 30	
Pin 7	4	Pin 31	16
Pin 8		Pin 32	
Pin 9	5	Pin 33	17
Pin 10		Pin 34	
Pin 11	6	Pin 35	18
Pin 12		Pin 36	
Pin 13	7	Pin 37	19
Pin 14		Pin 38	
Pin 15	8	Pin 39	20
Pin 16		Pin 40	
Pin 17	9	Pin 41	21
Pin 18		Pin 42	
Pin 19	10	Pin 43	22
Pin 20		Pin 44	
Pin 21	11	Pin 45	23
Pin 22		Pin 46	
Pin 23	12	Pin 47	24
Pin 24		Pin 48	

Opto 22 Relay Rack Four Channel	
Field Terminal	Relay
Pin 2	1
Pin 3	
Pin 4	2
Pin 5	
Pin 6	3
Pin 7	
Pin 8	4
Pin 9	

Table 5. Field Terminals and Relay Associations



NOTE: If the relay is an output type, one of the terminals is for voltage while the other connects to the load. If the relay is an input type, one terminal receives switched voltage while the other returns the voltage (neutral for AC input relays). Wiring varies according to combinations of input/output and relay types selected for the application.

The following diagrams display two wiring possibilities:

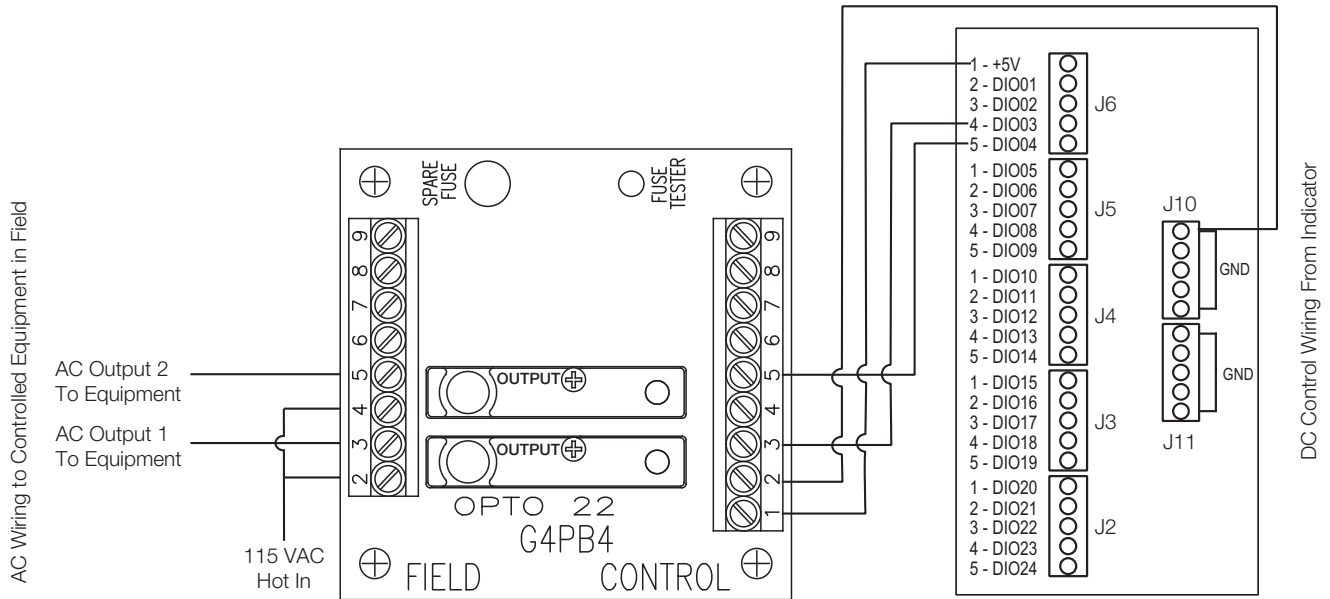


Figure 6. Field Terminal Output Wiring Example

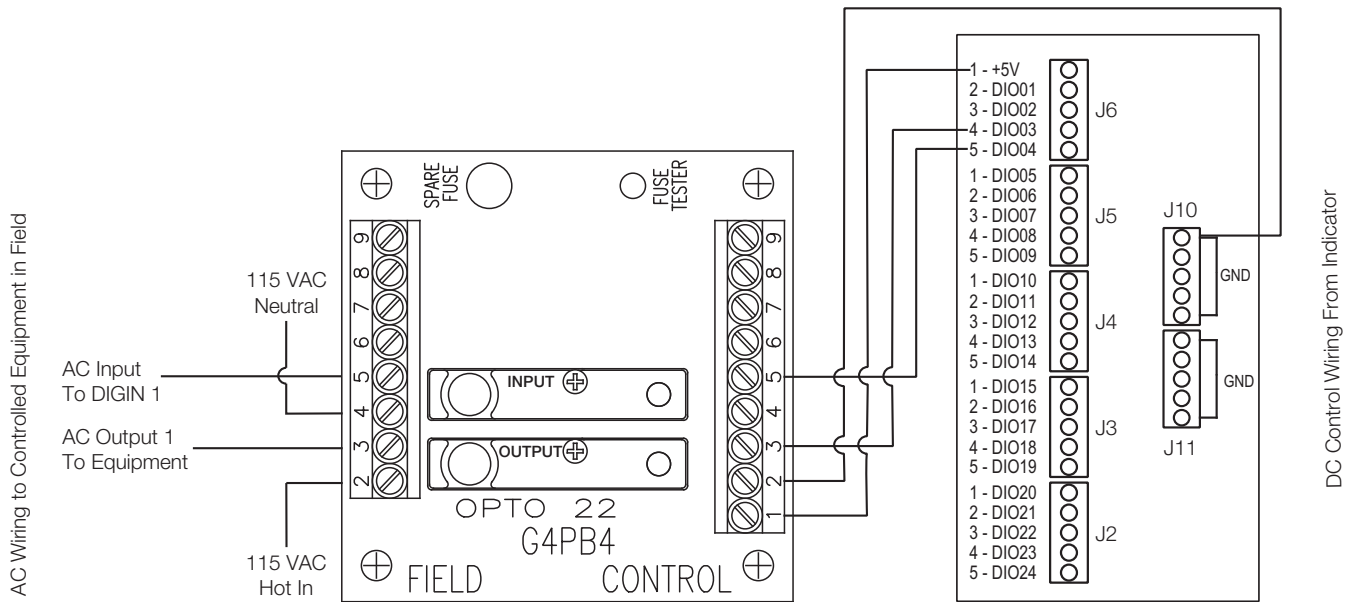


Figure 7. Field Terminal Input/Output Wiring Example

7. Mount Opto 22 relay rack with mounting holes in each corner using the preferred method inside enclosure.
8. Close the enclosure.



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