SECTION 4: INSTALLATION

4-1 INTRODUCTION

This section describes mounting, wiring, startup and miscellaneous testing details associated with the IQ Analyzer. Earlier sections, especially Sections 1 and 2, should be reviewed prior to installing the IQ Analyzer.

WARNING

INSURE THAT ANY INCOMING AC POWER OR FOREIGN POWER SOURCES ARE TURNED OFF AND LOCKED OUT BEFORE PERFORMING ANY WORK ON THE IQ ANALYZER OR ITS ASSOCIATED EQUIPMENT. FAILURE TO OBSERVE THIS PRACTICE COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE. THE ONLY EXCEPTION IS WHEN CONNECTING OR DISCONNECTING RIBBON CABLES AT J2 OR J3. THIS CAN BE DONE AT ANY TIME IF CARE IS EXERCISED.

WARNING

TO AVOID EQUIPMENT DAMAGE, DO NOT HIGH-POT OR MEGGER THIS DEVICE.

4-2 PANEL PREPARATION

Panel preparation and mounting of the IQ Analyzer is described for the standard “Flush Mounted Approach” and the optional “Flange Mounted Approach.” The flange mounted approach is used when depth behind the panel is too limited to accommodate the IQ Analyzer (Figure **4-1**). The panel mounted flange permits most of the IQ Analyzer depth to extend from the panel front.

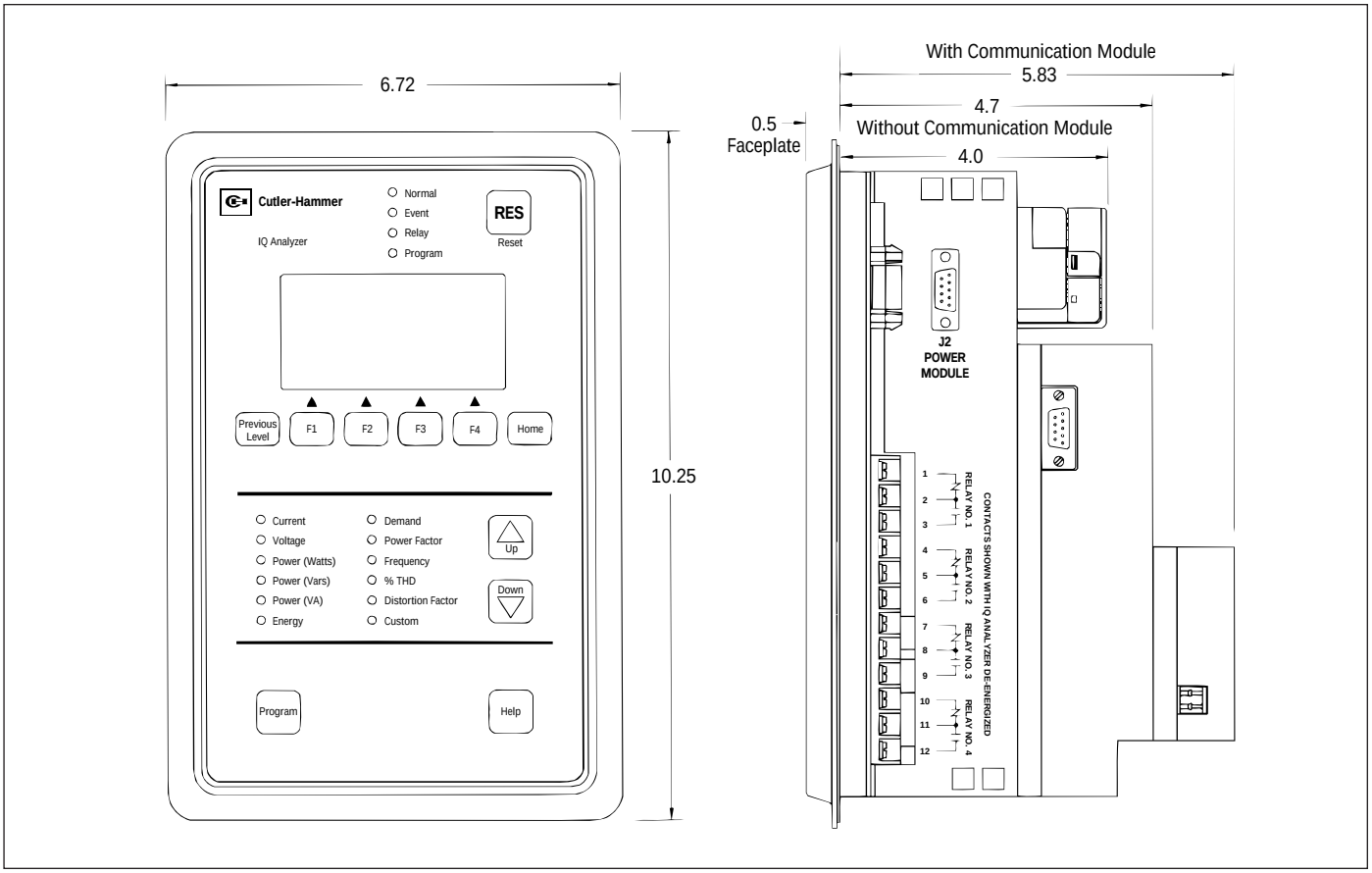


Figure 4-1 IQ Analyzer Dimensions and Cutout (inches)

4-2.1 STANDARD FLUSH MOUNTED CUTOUT

Since the IQ Analyzer is typically mounted on a enclosure door, it is necessary to prepare a cutout in which it will be placed. The dimensions for this cutout along with mounting hole locations are shown in Figure **4-2**. Note that the IQ Analyzer actually has ten mounting holes. Normally the top, bottom and center holes are used for a standard installation. If the installation is to be in a NEMA 3R or 12 enclosure, additional mounting holes are provided so that uniform pressure can be maintained on a customer supplied gasket all the way around the unit.

Before actually cutting the panel, be sure that the required 3-dimensional clearances for the IQ Analyzer chassis allow mounting in the desired location. IQ Analyzer dimensions with and without a Communication Module are shown in Figure **4-1**.

It is necessary to hold the tolerances shown when making the cutouts and placing the holes for the mounting screws. In particular, the horizontal dimensions between the center of the mounting holes and the vertical edge of the cutout must be within **0 and +0.050 in.**

4-2.2 STANDARD FLUSH MOUNTING

Do not use a tap on the face of the IQ Analyzer since this will remove excessive plastic from the holes. This will result in less threaded material to secure the unit to its mounting panel.

Place the IQ Analyzer through the cutout in the panel. Be sure the Operator Panel faces outward. Use the 0.5 in. long screws included with the unit to mount it on a single-thickness panel. Be sure to start the screws from INSIDE the panel, so they go through the metal first. Be careful not to overtighten.

If it is necessary to remove a Power Module from the IQ Analyzer and mount it separately from the chassis, do the following:

- Make sure the Power Module's mounting location allows for a cable connection between the IQ Analyzer chassis and the Power Module by means of one of the optional extension cables (IQACABLE or IQA45CABLE).
- Make sure the separated Power Module can physically fit in the location selected (Figure **4-3**).

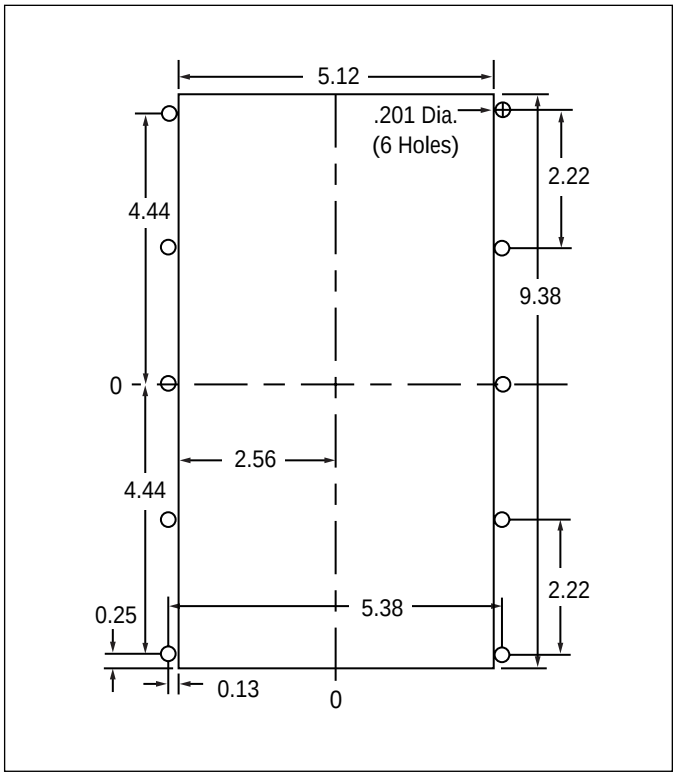


Figure 4-2 Flush Mounted Drilling Pattern (inches)

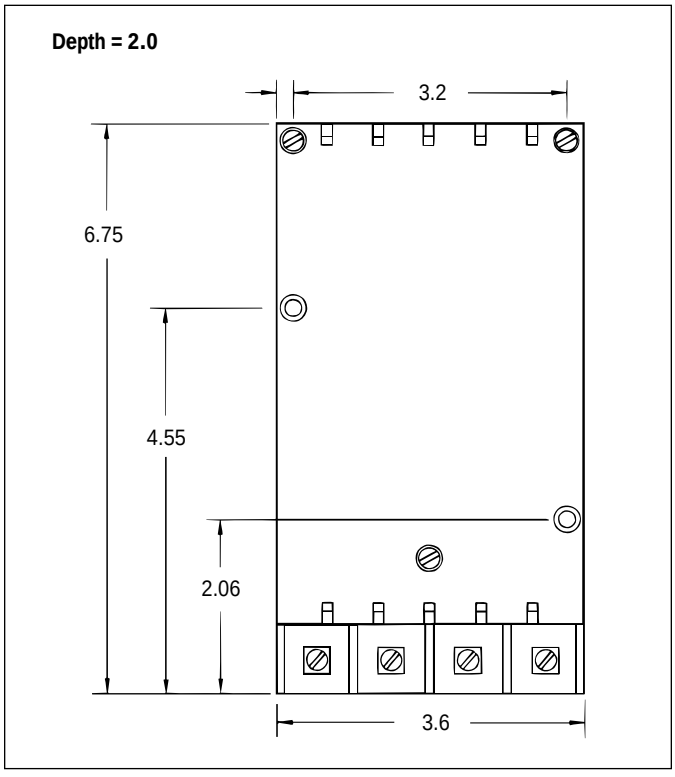


Figure 4-3 Separate Source/Self-Powered Power Module Dimensions (inches)

- Separate the Power Module from the IQ Analyzer by removing the two stacking screws holding it in place.
- Use the Power Module as a drilling template at the new mounting location.
- Use the two removed 8-32 screws to remount the Power Module in properly drilled and tapped holes.

NOTICE

When field installing an IPONI (INCOM Product Operated Network Interface), carefully follow all the installation instructions supplied with the IPONI.

4-2.3 OPTIONAL FLANGE MOUNTED CUTOUT AND MOUNTING

When flange mounting the IQ Analyzer, the cutout and mounting guidelines presented in paragraphs 4-2.1 and 4-2.2 should be followed, except for the drilling pattern.

Refer to Figure **4-4** for the flange mounted drilling pattern. The cutout opening in the panel when flange mounting is somewhat larger than the flush mounted cutout. This slightly larger opening facilitates flange mounted wiring. The flange permits an additional 2.5 inches of IQ Analyzer depth to protrude beyond the enclosure door (Figure **4-5**).

4-3 WIRING

Wiring of the IQ Analyzer must follow a suitable Wiring Plan Drawing. The phase Wiring Plan, as used here, refers to the drawings made for the specific application. It describes all electrical connections between the IQ Analyzer and external equipment. This drawing is made by the user or OEM. A network wiring diagram can also be helpful for networked systems (Figure **4-6)**. Specific IQ Analyzer Wiring Diagrams are useful when creating the overall Wiring Plan Drawing. IQ Analyzer Wiring Diagrams for each system possibility are addressed in Paragraph 4-3.2. Specific IQ Analyzer connection points are identified in Figures **4-7** and **4-8**.

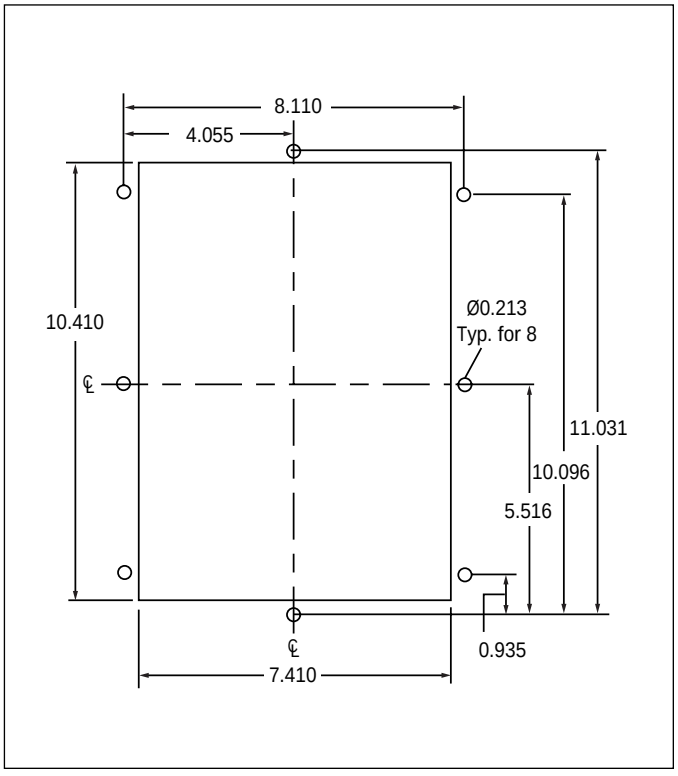
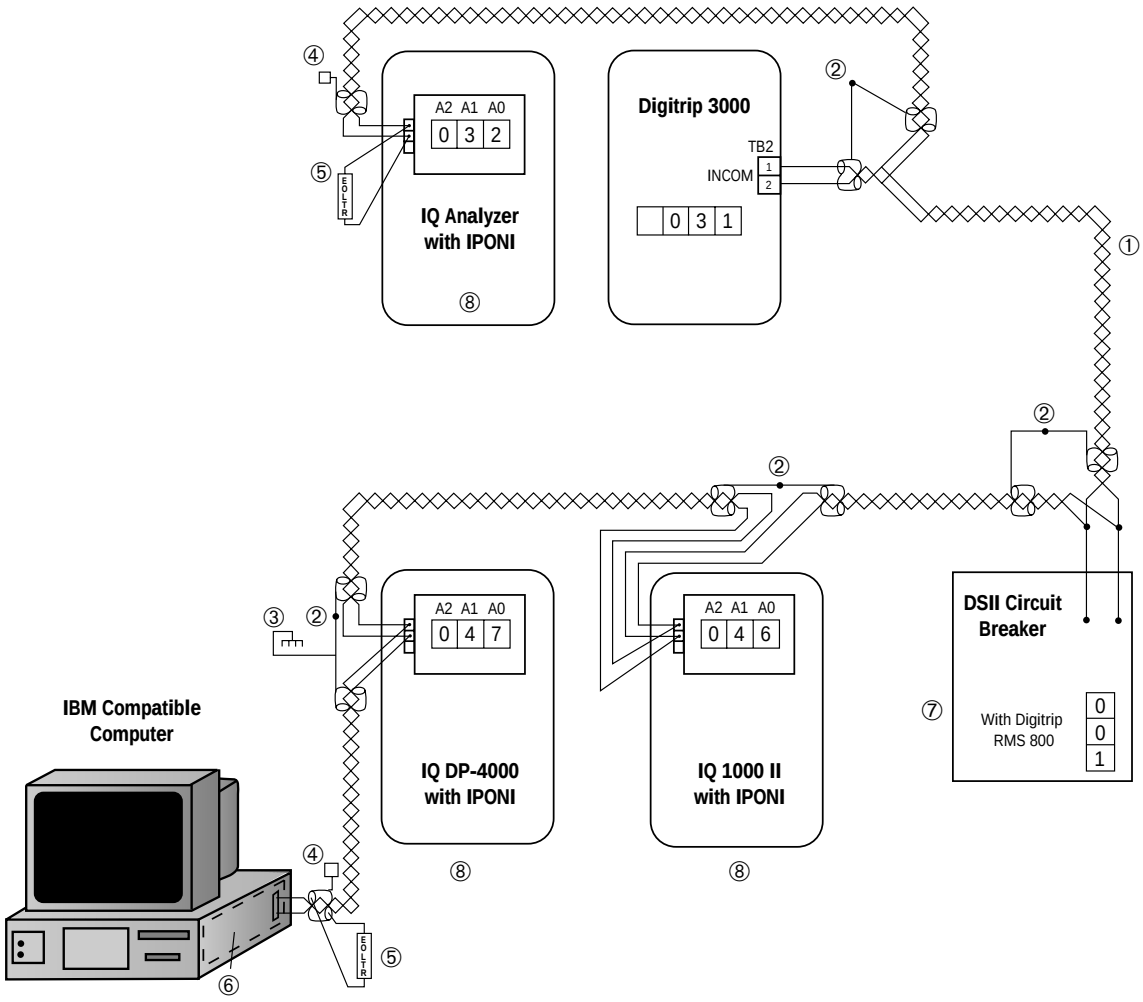


Figure 4-4 Flange Mounted Drilling Pattern (inches)

Figure 4-5 IQ Analyzer Shown Mounted Using a Mounting Flange



① For network interconnection cable, use Belden 9463 or Cutler-Hammer IMPCABLE.

② When interconnecting devices, tie shield drain wires together for shield path continuity.

③ Connect the shield path to a solid earth ground at one point only.

④ On last device in network, tape shield drain wire back upon cable.

⑤ Use a 1/2 watt carbon or metal film resistor at each end of the network as an end of line termination resistor (EOLTR). EOLTR should be 100 ohms for 9600 baud communication rate networks or 150 ohms for 1200 baud communication rate networks.

⑥ Network interconnection to computer requires use of an IMPACC master (CONI or MINT).

⑦ On 9600 baud networks, Digitrip RMS 700/800 devices must be placed on AEM subnetwork.

⑧ Devices without built-in communications require network interface module (IPONI).

For detailed network wiring specifications, call the automatic fax retrieval system (FRED) at 412/490-6710 and request document 17513 or contact (PMAS) Power Management Applications Support on 1-800-809-2772. www.cutlerhammer.eaton.com

Figure 4-6 Typical Network Wiring Diagram

NOTICE

If this device is being used on a single phase system, wire to phase A.

The following general considerations should be complied with during the wiring process.

1) All wiring must conform to applicable Federal, State and Local codes.

2) The wires to the terminal blocks must not be larger than AWG No. 14. Larger wire will not connect properly to the terminal block. Larger size wires, however, can be used for CT connections with the use of appropriate ring terminals.

3) Terminal blocks have No. 6-32 sems pressure saddle screws.

4) Wiring Diagram contacts are shown in their de-energized position.

5) Because IQ Analyzer monitors the ground voltage, the chassis of the IQ Analyzer must be connected to ground. A good low impedance chassis ground is essential for proper functioning.

4-3.1 CURRENT AND POTENTIAL TRANSFORMER SELECTION

WARNING

PT AND CT SECONDARY CIRCUITS ARE CAPABLE OF GENERATING DANGEROUS VOLTAGES AND CURRENTS WITH THEIR PRIMARY CIRCUITS ENERGIZED, AND COULD CAUSE PERSONAL INJURY AND/OR DEATH.

The proper selection of any required current transformers or potential transformers is critical to the proper and accurate functioning of the IQ Analyzer. Instrumentation grade devices are required. **Shorting blocks for CTs and a three-phase switch or circuit breaker for voltage are recommended near the equipment for ease of installation.** If assistance with the selection process is desired, contact your Cutler-Hammer representative.

4-3.2 WIRING DIAGRAMS

Figures **4-9** through **4-34** present IQ Analyzer wiring diagrams for the different system possibilities.

4-4 INITIAL STARTUP

The information here is intended to be used when first applying control power to the IQ Analyzer.

4-4.1 BEFORE POWER APPLICATION

WARNING

STARTUP PROCEDURES MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL WHO ARE FAMILIAR WITH THE IQ ANALYZER AND ITS ASSOCIATED ELECTRICAL AND/OR MECHANICAL EQUIPMENT. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN PERSONAL INJURY, DEATH AND OR EQUIPMENT DAMAGE.

After all installation wiring is complete and before ac power is applied to the IQ Analyzer, perform the following:

a) Verify that the incoming ac power to the system is disconnected and, if possible, locked out.

b) Verify that all wiring is correct as shown on the Wiring Plan Drawing and any applicable Wiring Diagrams.

4-4.2 INITIAL POWER APPLICATION

a) Apply the appropriate ac power to the IQ Analyzer.

b) After a few seconds, the green Normal LED should begin to blink. This indicates that there is power to the unit and it has passed its own self-diagnostic test.

c) The absence of a green Normal LED indicates the unit failed its diagnostic test and a reason for the failure message flashes in the display window. If the Normal LED does not light at all, possibly the unit is not being powered. In either case, remove ac power from the unit and refer to the Troubleshooting Guide in Section 7.

d) The display of “High Neutral Voltage” or “Reverse Sequence” indicates a miswired voltage.

e) The display of inconsistent per phase power factors indicates either a miswired voltage, current or polarity.

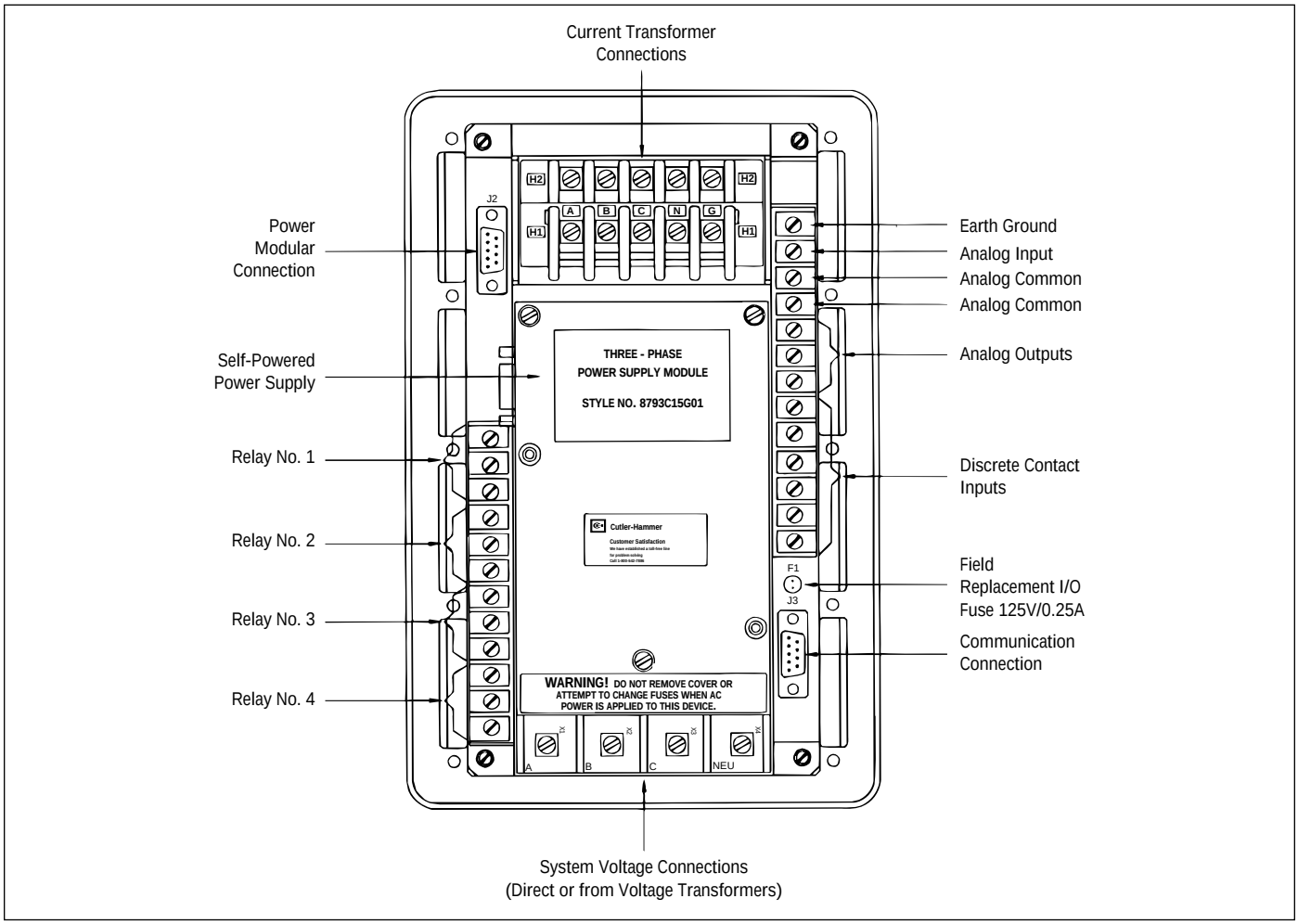


Figure 4-7 IQ Analyzer with Self-Powered Three Phase Power Module (Rear View)

NOTICE

Keep in mind that when an IQ Analyzer is initially powered up for use on a specific system, the displayed "Meter Menu" values may not be what is anticipated for that system. This is because the unit has not yet had necessary pieces of system information programmed into non-volatile memory.

4-5 QUICK START METERING

The intent here is to provide an operator with enough information to get an IQ Analyzer performing basic metering functions quickly without reviewing all the instructions provided in this manual. Whether or not more detailed information is required depends on the individual operator and the complexity of the application. In any case, it is still strongly recommended that the entire manual be reviewed at the earliest possible convenience to take advantage of the wide array of features offered by IQ Analyzer.

Proceed by reading and completing the following steps:

Step 1: Review all applicable material earlier in this section to ensure that the IQ Analyzer is mounted properly and wired in keeping with the appropriate wiring diagram for the application.

Step 2: Follow the initial startup instructions presented in paragraph 4-4, paying particular attention to all WARNINGS and NOTICES.

Step 3: Review the use of the display, LEDs and pushbuttons of the Operator Panel in Section 3,

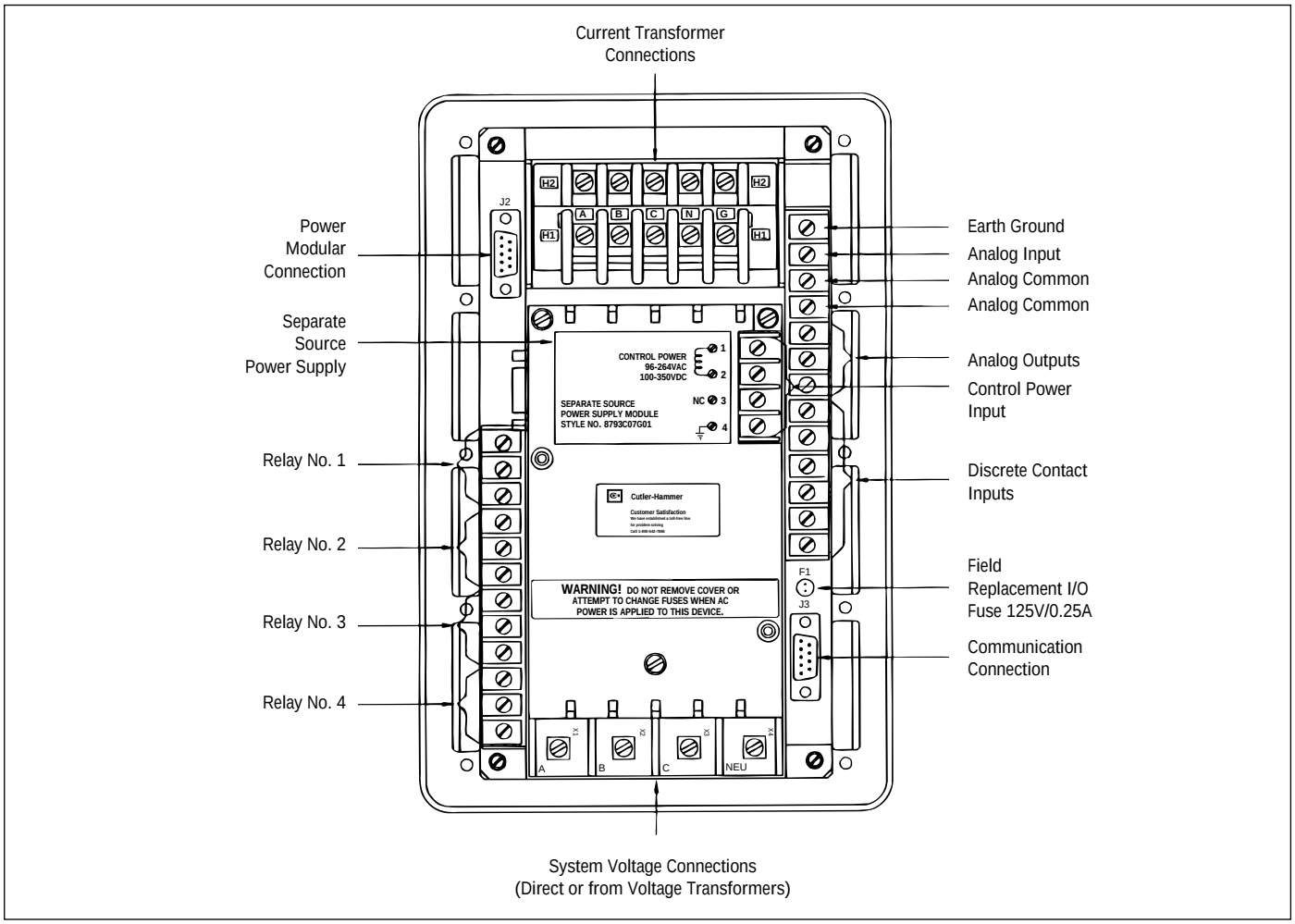


Figure 4-8 IQ Analyzer with Separate Source Power Module (Rear View)

especially Program Mode Screens and Meter Menu Screens.

Step 4: Paragraphs 6-1 through 6-2.5 in Section 6 entitled "Programming" provides the required basics for entering and moving around in the Program Mode. Review the material paying particular attention to paragraph 6-2.2 entitled "Password Entry."

Step 5: Program the General Setup portion of the IQ Analyzer to enable it to begin monitoring the system in which it is applied. To accomplish this, first review the General Setup Screens Tree (Figure **6-4**) and General Setup Settings Sheet in Appendix A. This will alert the operator to what information will be required during programming. To facilitate the programming process, make sure that all required information is readily available prior to beginning the actual programming.

Step 6: A review of the simple programming example in section 6-3 will provide the operator with additional familiarization of the programming process, although the intent here is to only program General Setup setpoints.

Step 7: Program the IQ Analyzer with the system information collected in Step 5.

Step 8: Once programming is complete, exit the Program Mode. Table **5.1** outlines the types of displayed parameters available from the Meter Menu.

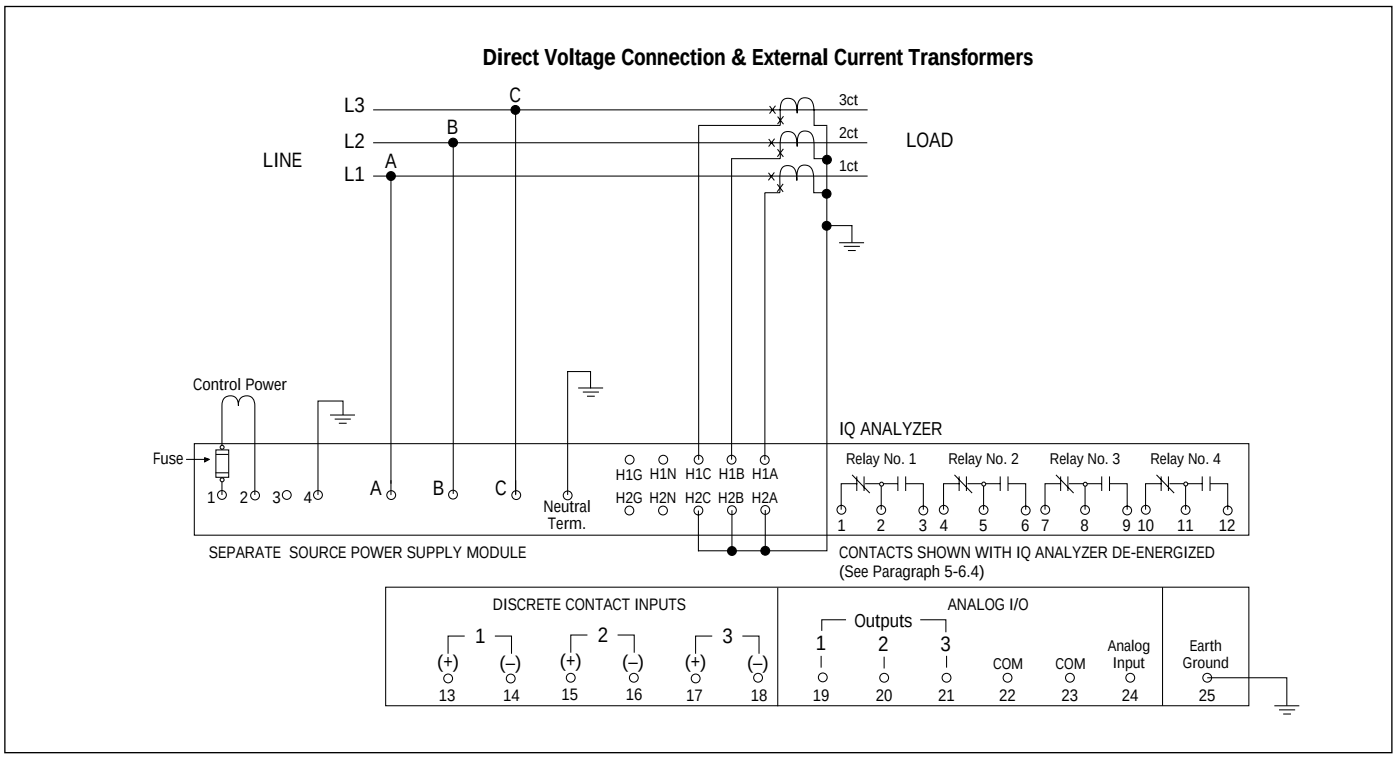


Figure 4-9 3-Phase 3-Wire (Up to 600 Volts) Wiring Diagram

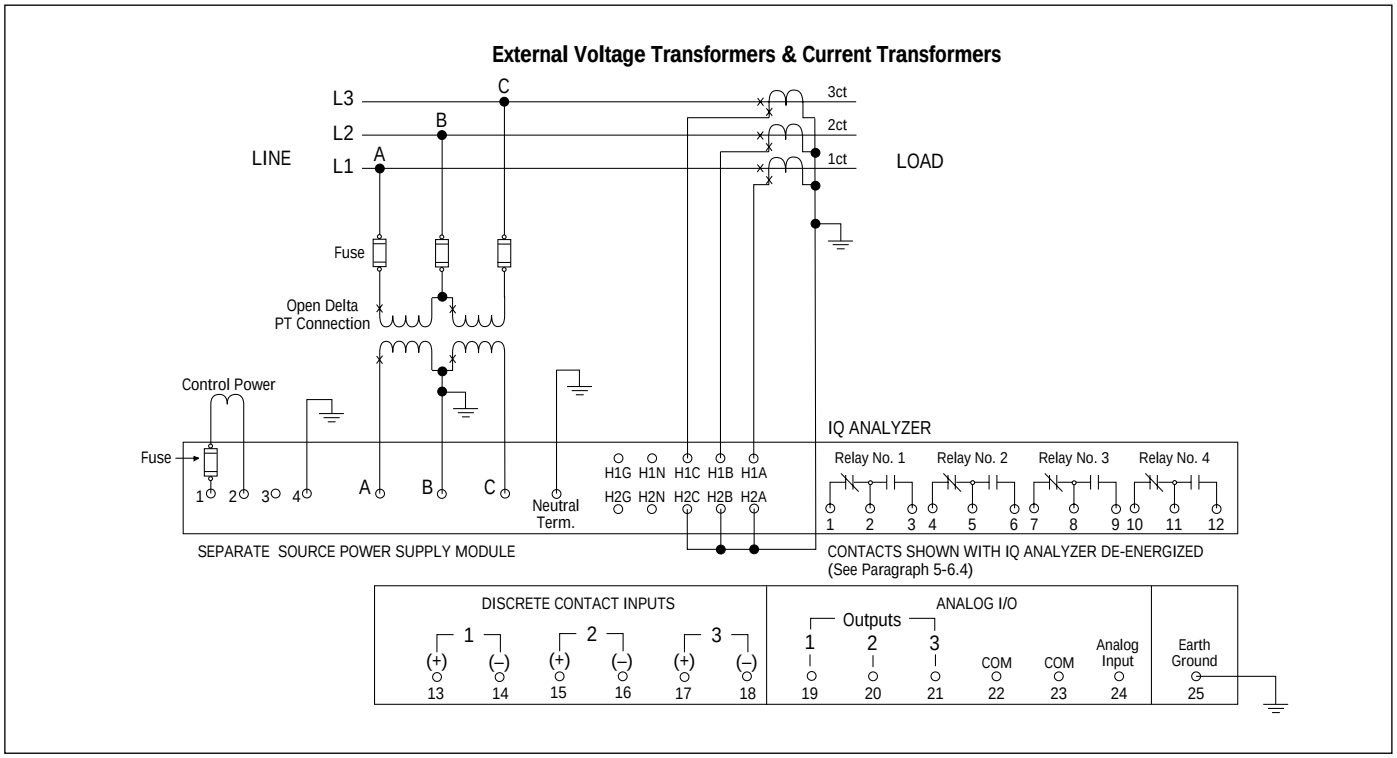


Figure 4-10 3-Phase 3-Wire (Above 600 Volts) Wiring Diagram

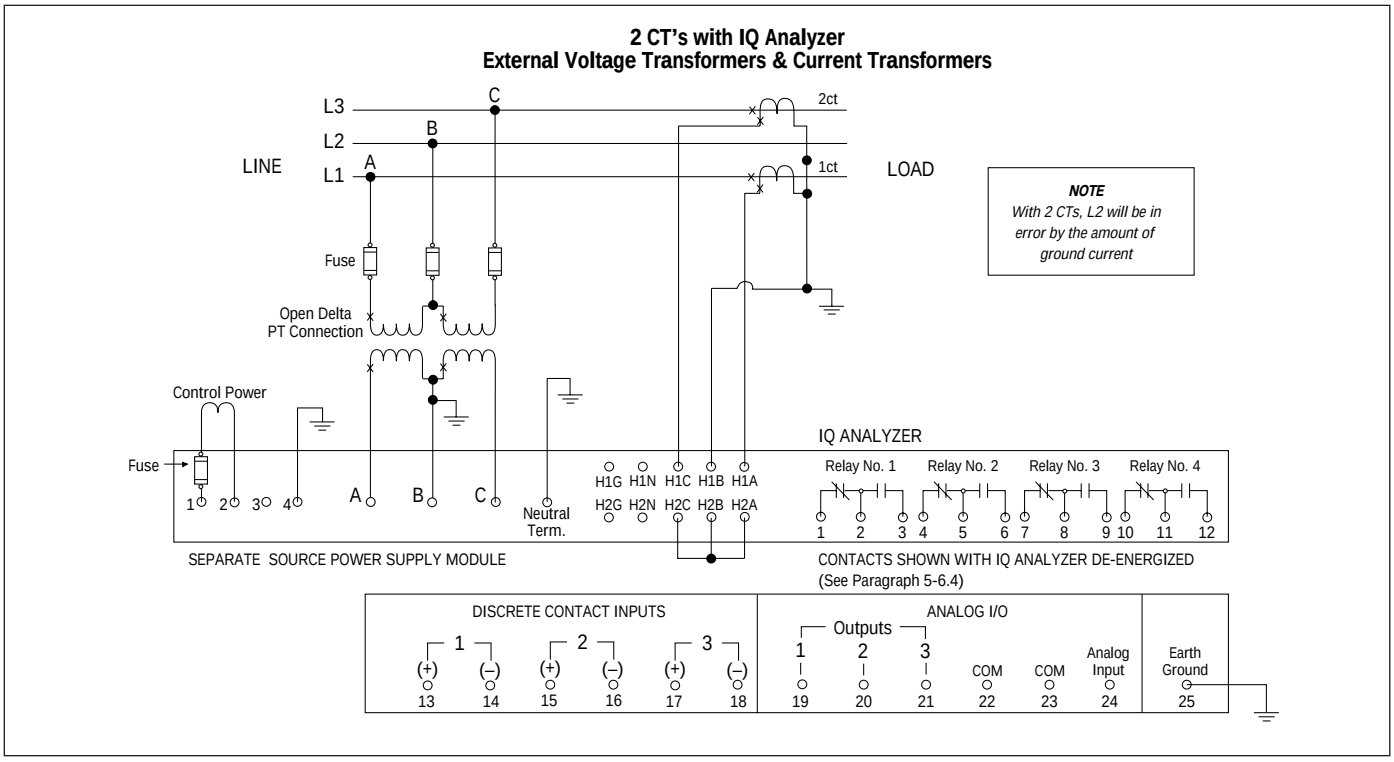


Figure 4-11 3-Phase 3-Wire (Above 600 Volts) Wiring Diagram

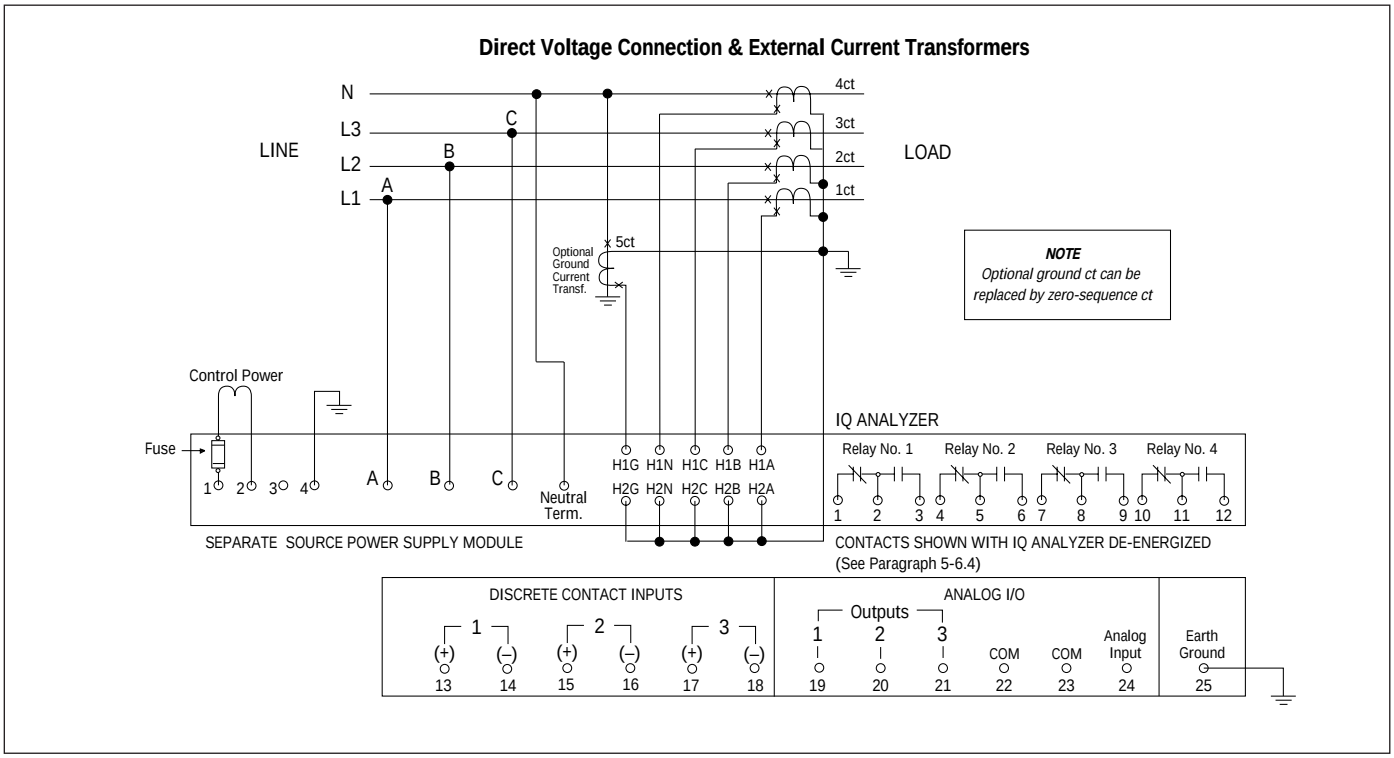


Figure 4-12 3-Phase 4-Wire (Up to 600 Volts) Wiring Diagram

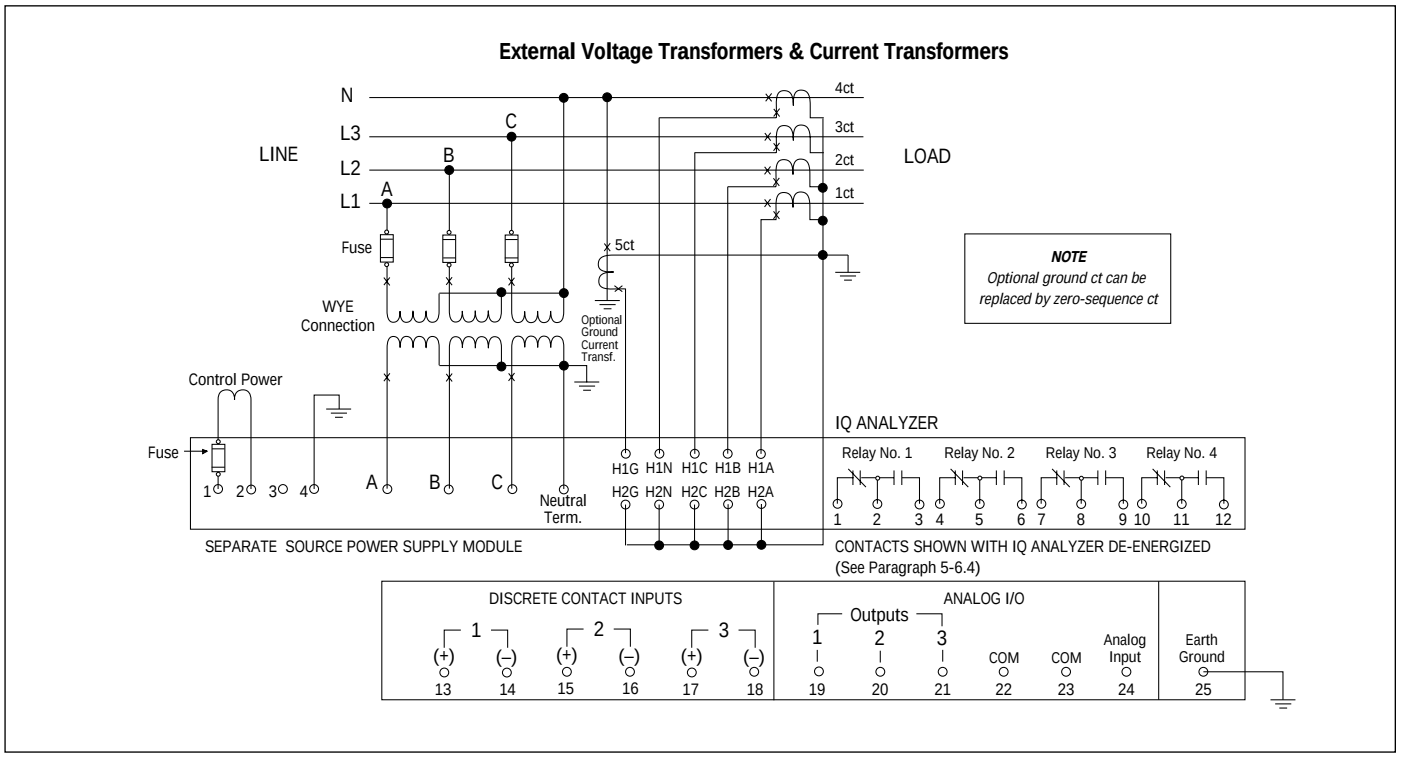


Figure 4-13 3-Phase 4-Wire (Above 600 Volts) Wiring Diagram

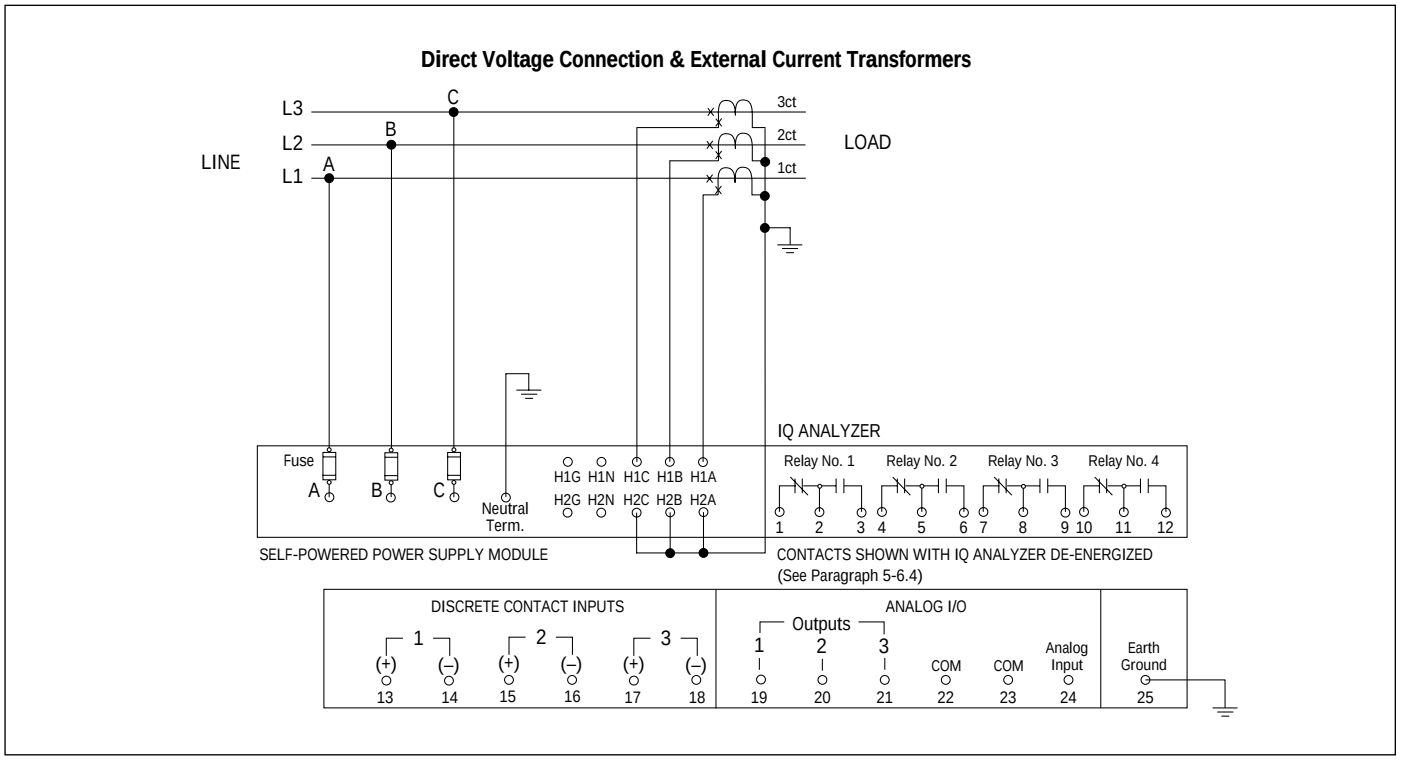


Figure 4-14 3-Phase 3-Wire (96 to 600 Volts) Wiring Diagram

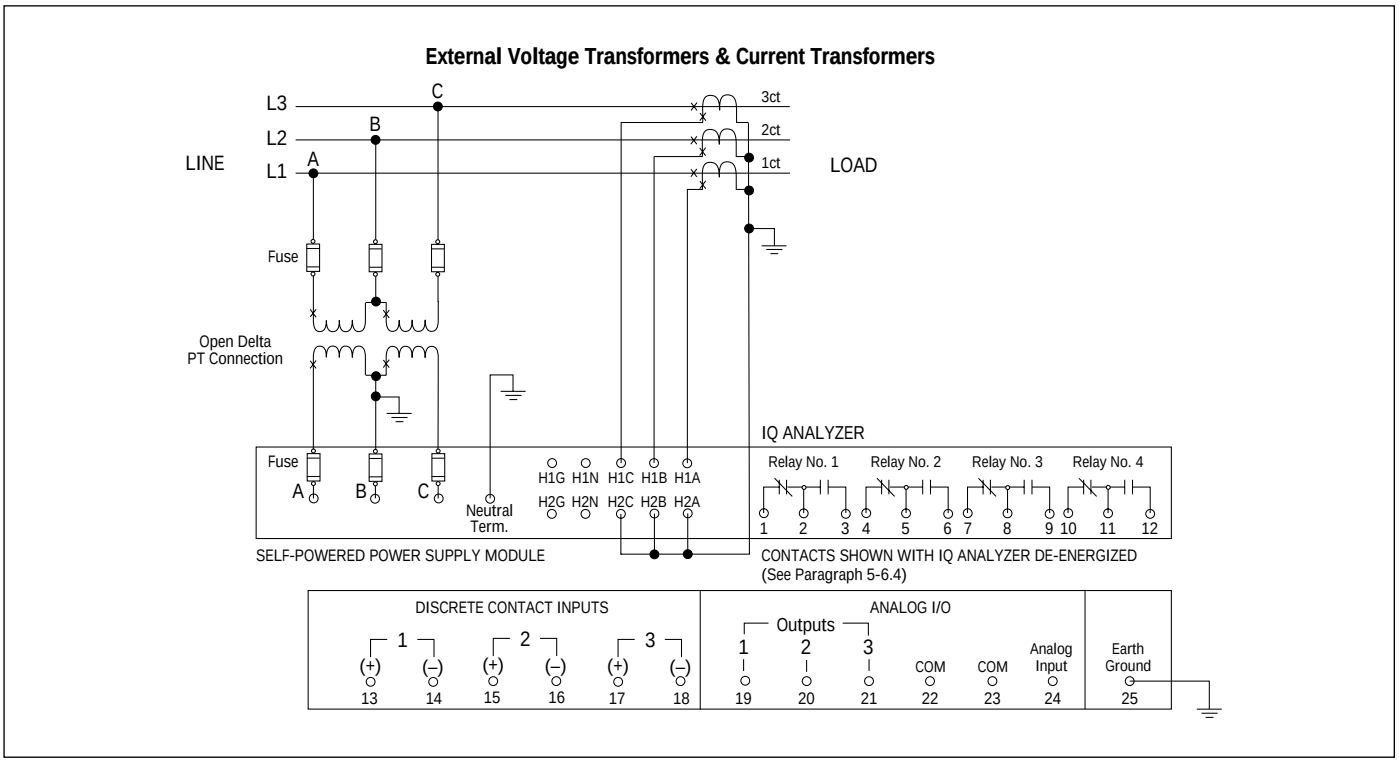


Figure 4-15 3-Phase 3-Wire (Above 600 Volts) Wiring Diagram

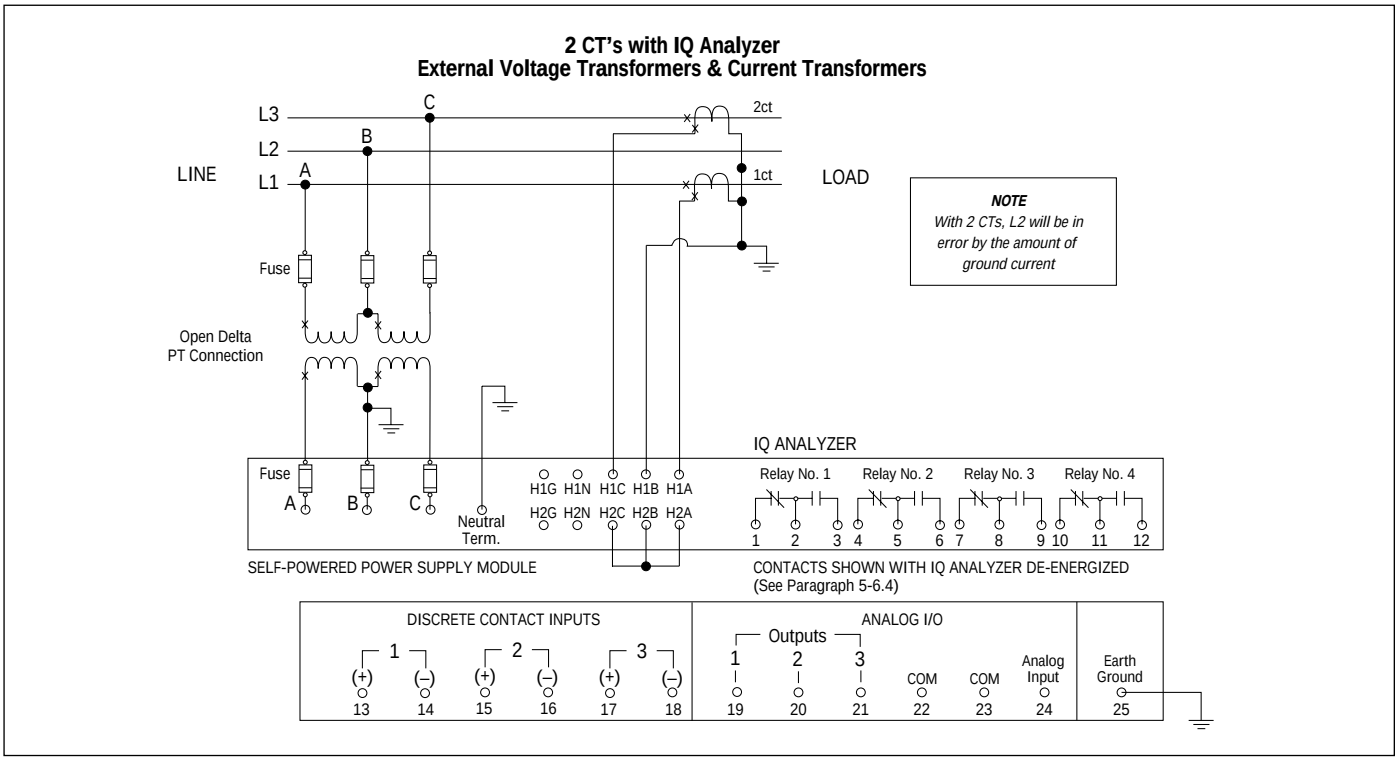


Figure 4-16 3-Phase 3-Wire (Above 600 Volts) Wiring Diagram

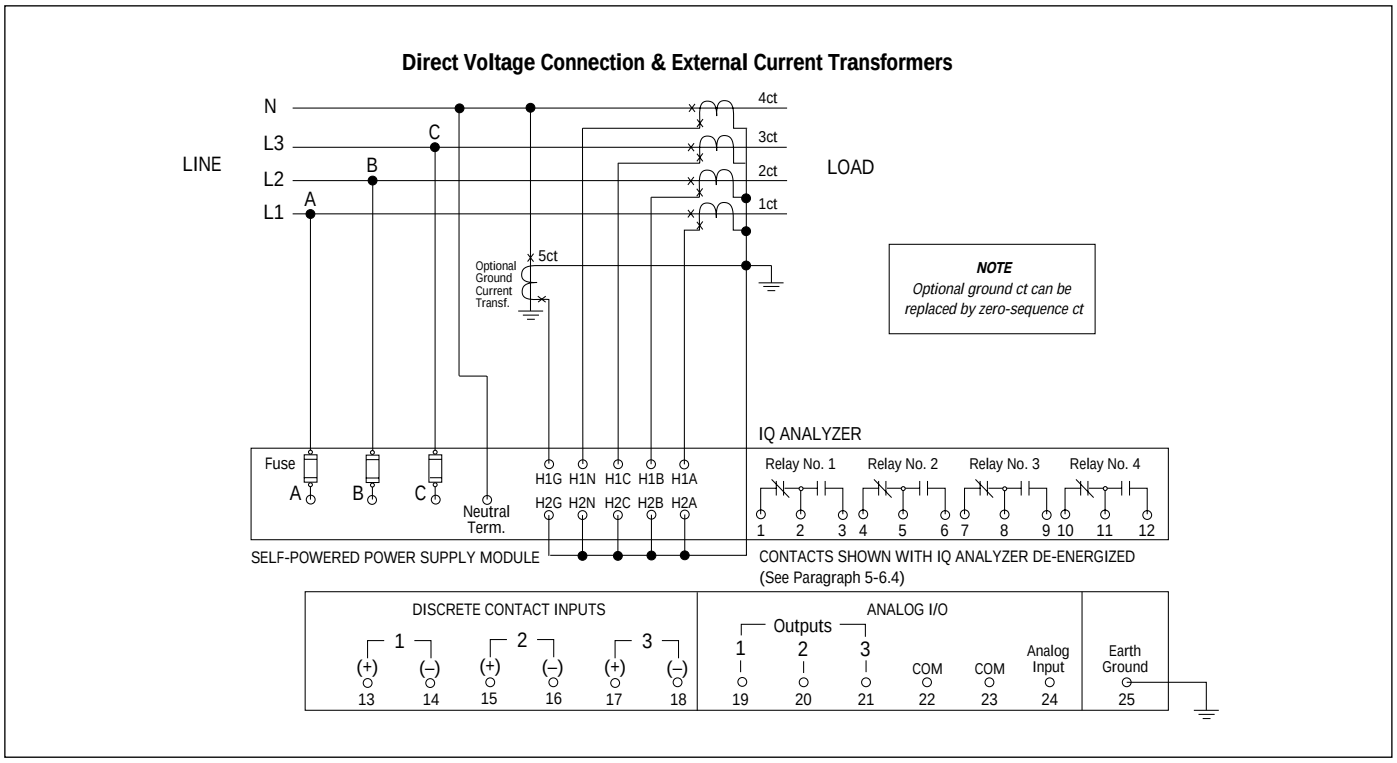


Figure 4-17 3-Phase 4-Wire (96 to 600 Volts) Wiring Diagram

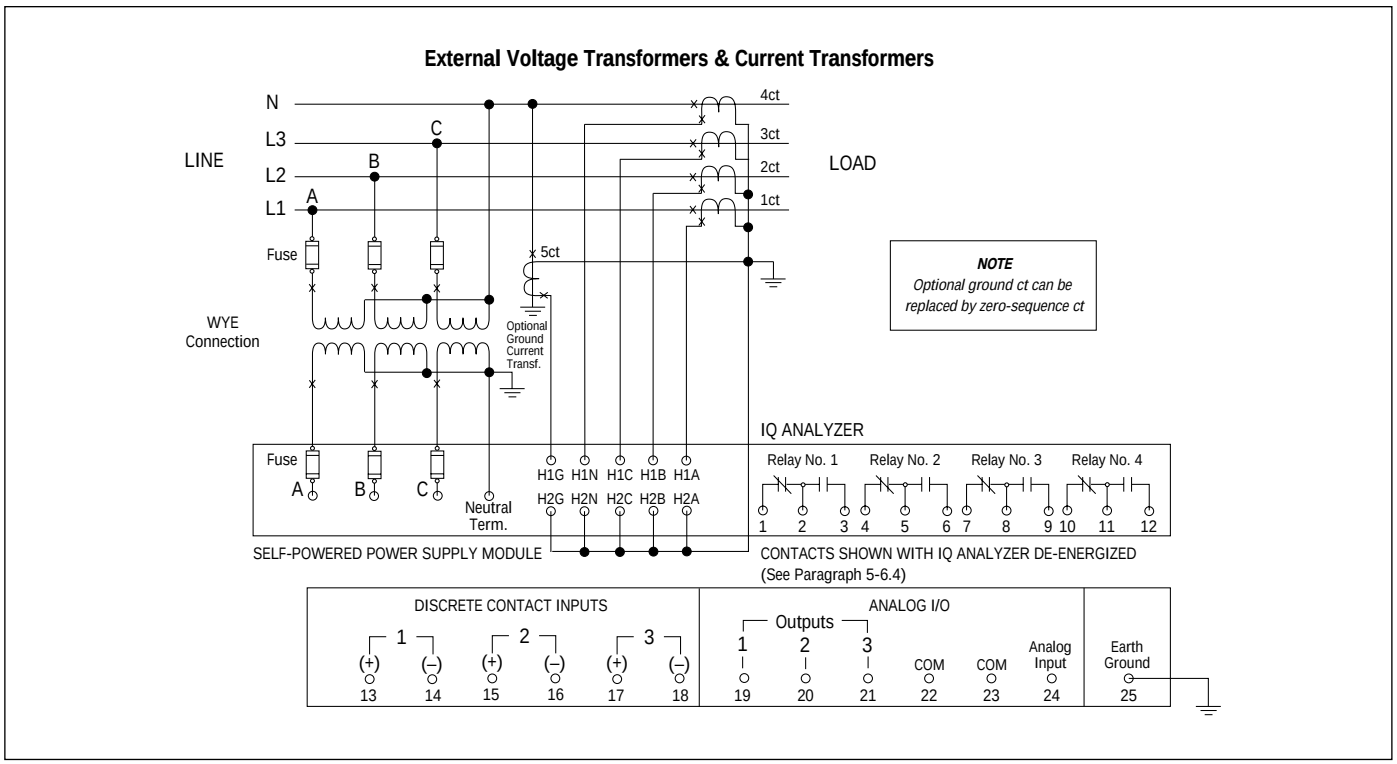


Figure 4-18 3-Phase 4-Wire (Above 600 Volts) Wiring Diagram

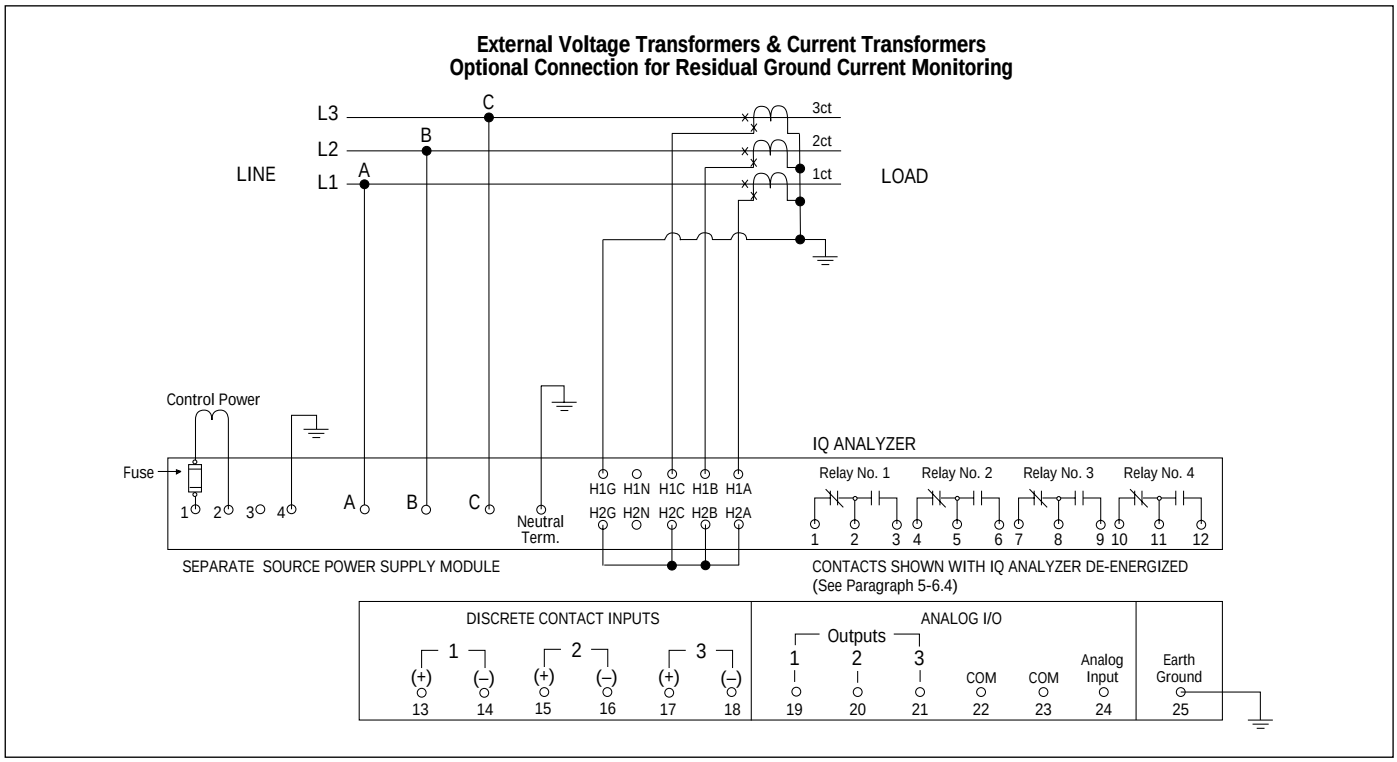


Figure 4-19 3-Phase 3-Wire (Up to 600 Volts) Wiring Diagram

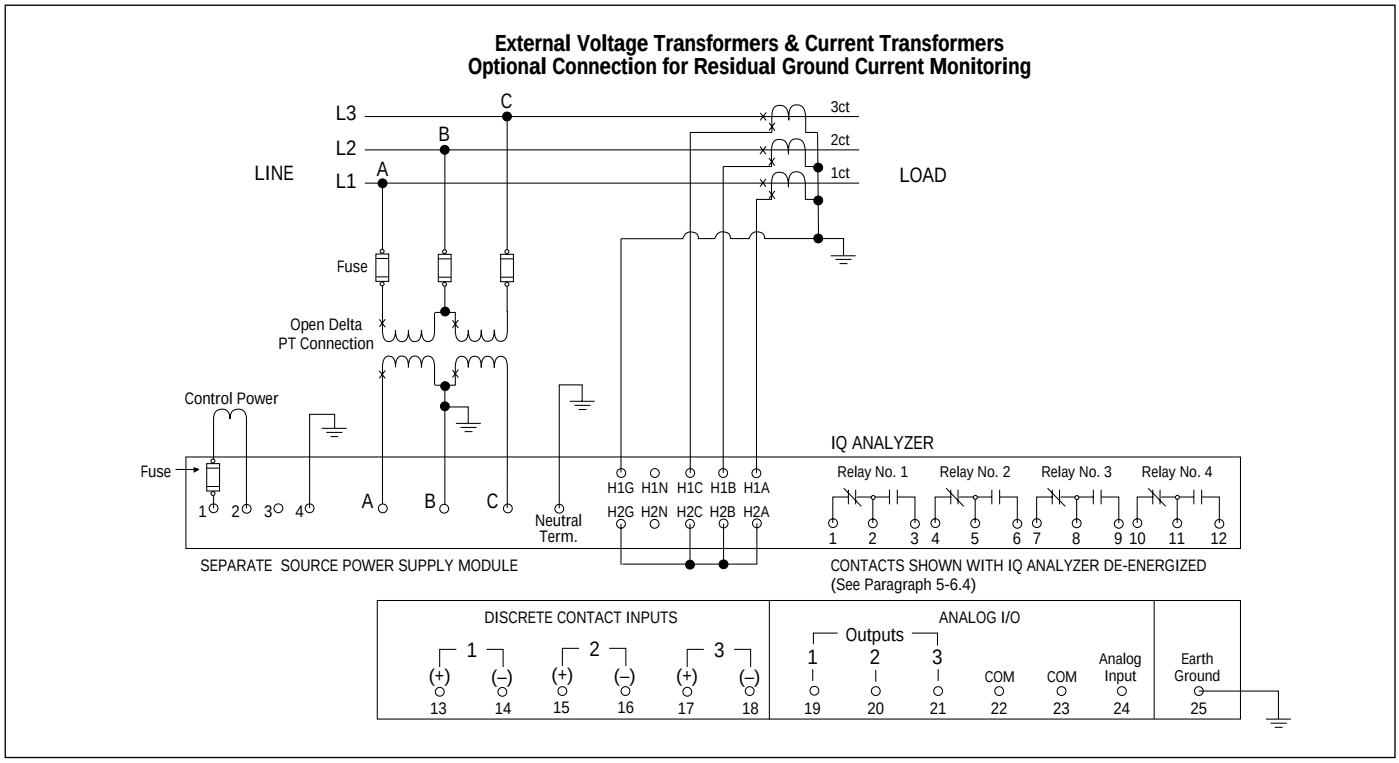


Figure 4-20 3-Phase 3-Wire (Above 600 Volts) Wiring Diagram

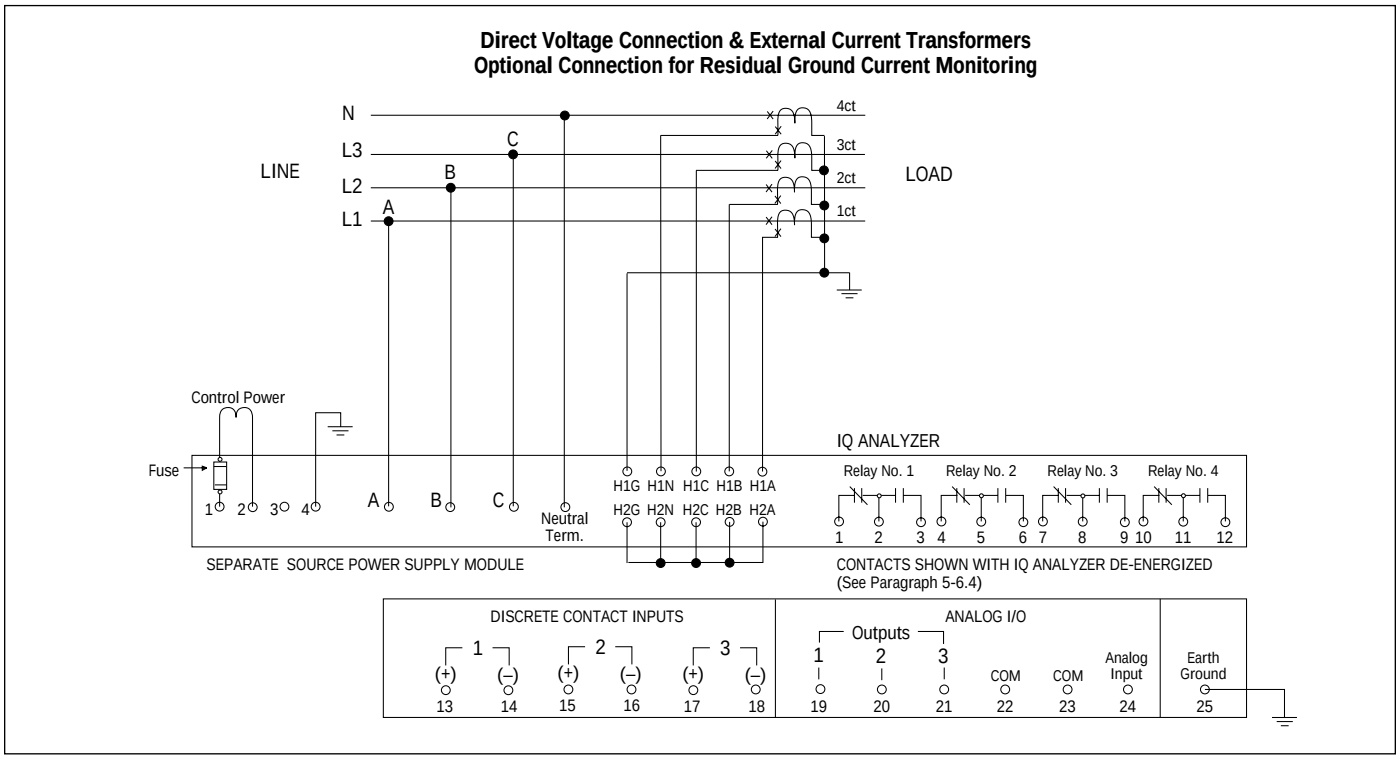


Figure 4-21 3-Phase 4-Wire (Up to 600 Volts) Wiring Diagram

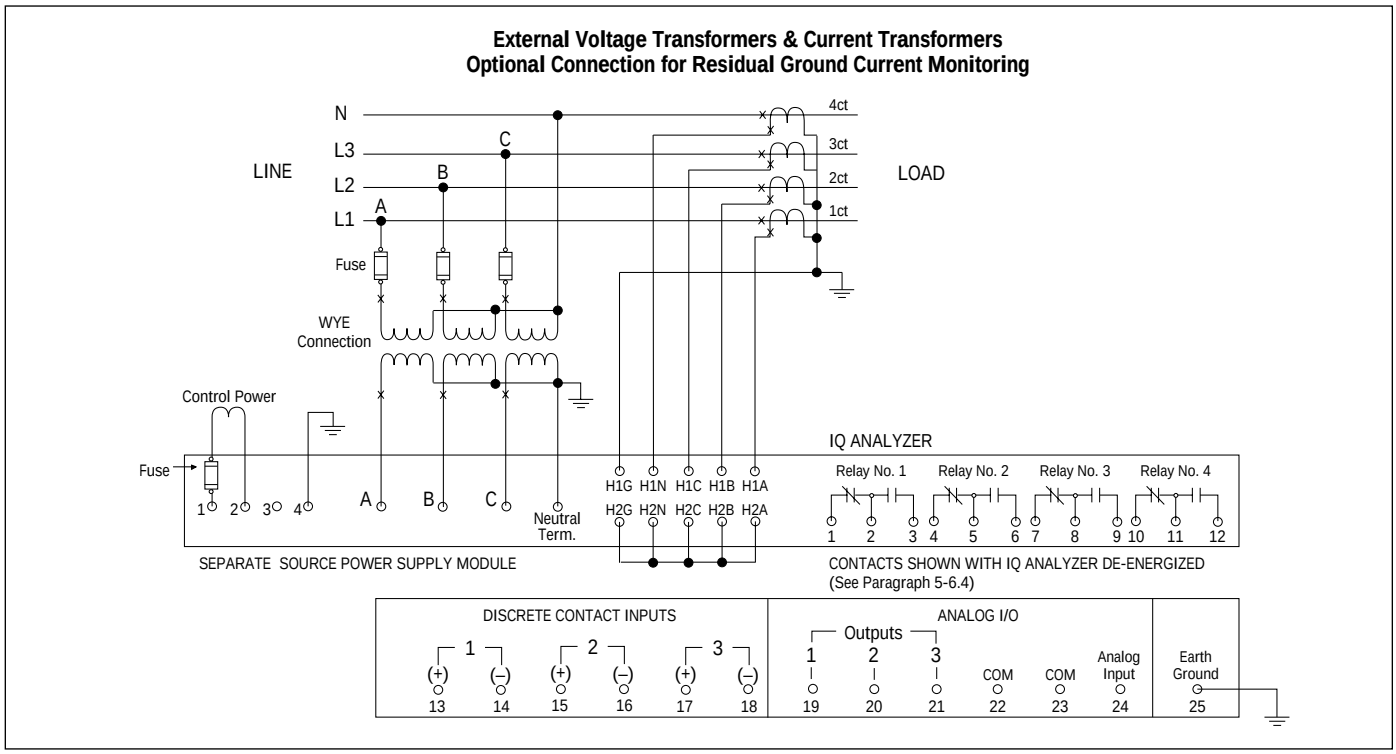


Figure 4-22 3-Phase 4-Wire (Above 600 Volts) Wiring Diagram

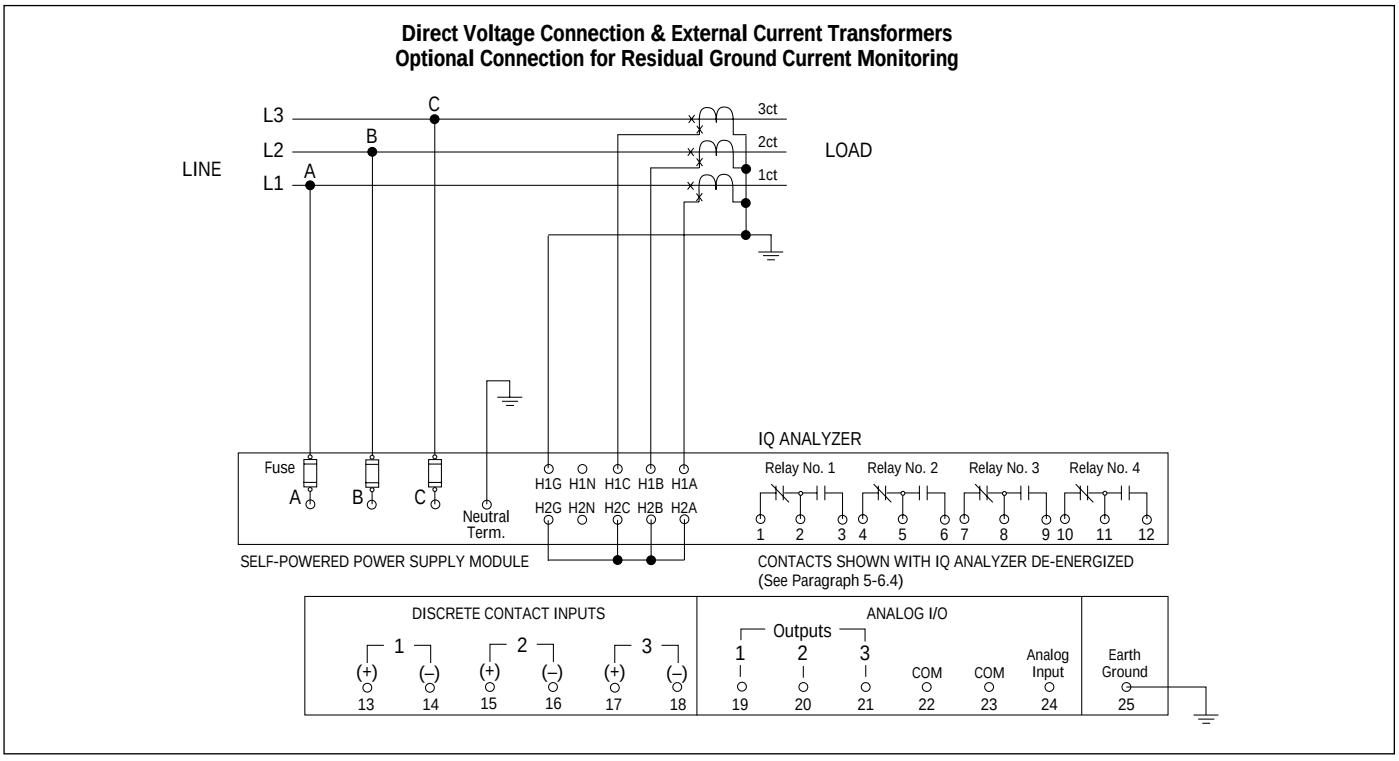


Figure 4-23 3-Phase 3-Wire (Up to 600 Volts) Wiring Diagram

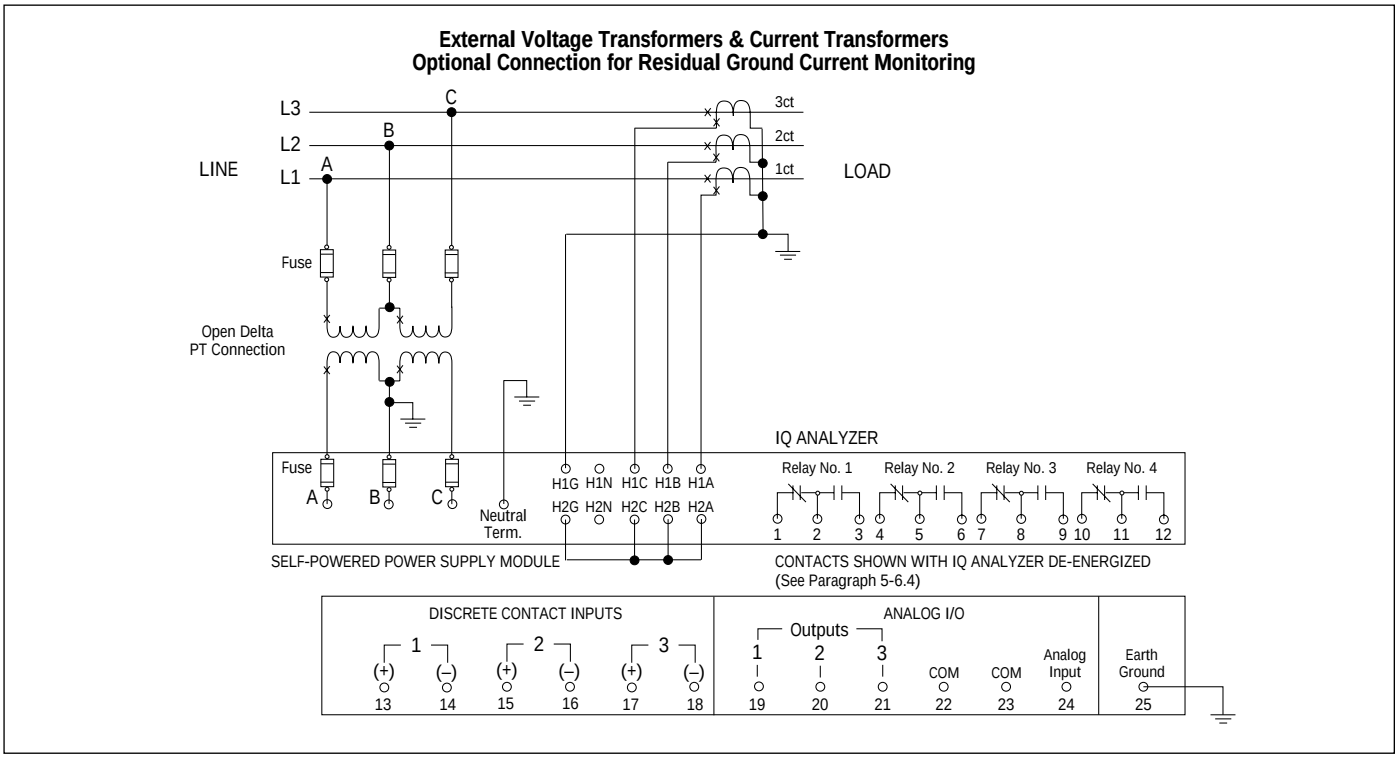


Figure 4-24 3-Phase 3-Wire (Above 600 Volts) Wiring Diagram

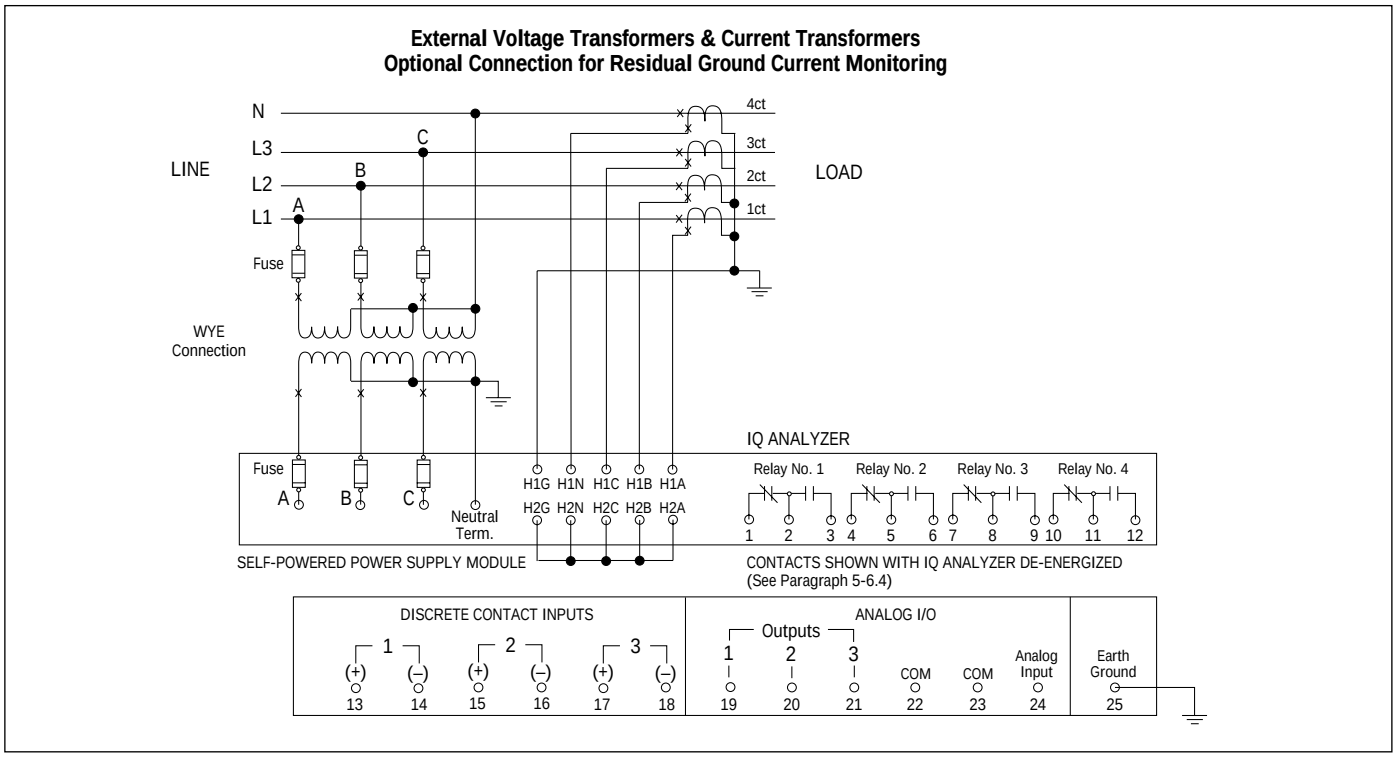


Figure 4-25 3-Phase 4-Wire (Above 600 Volts) Wiring Diagram

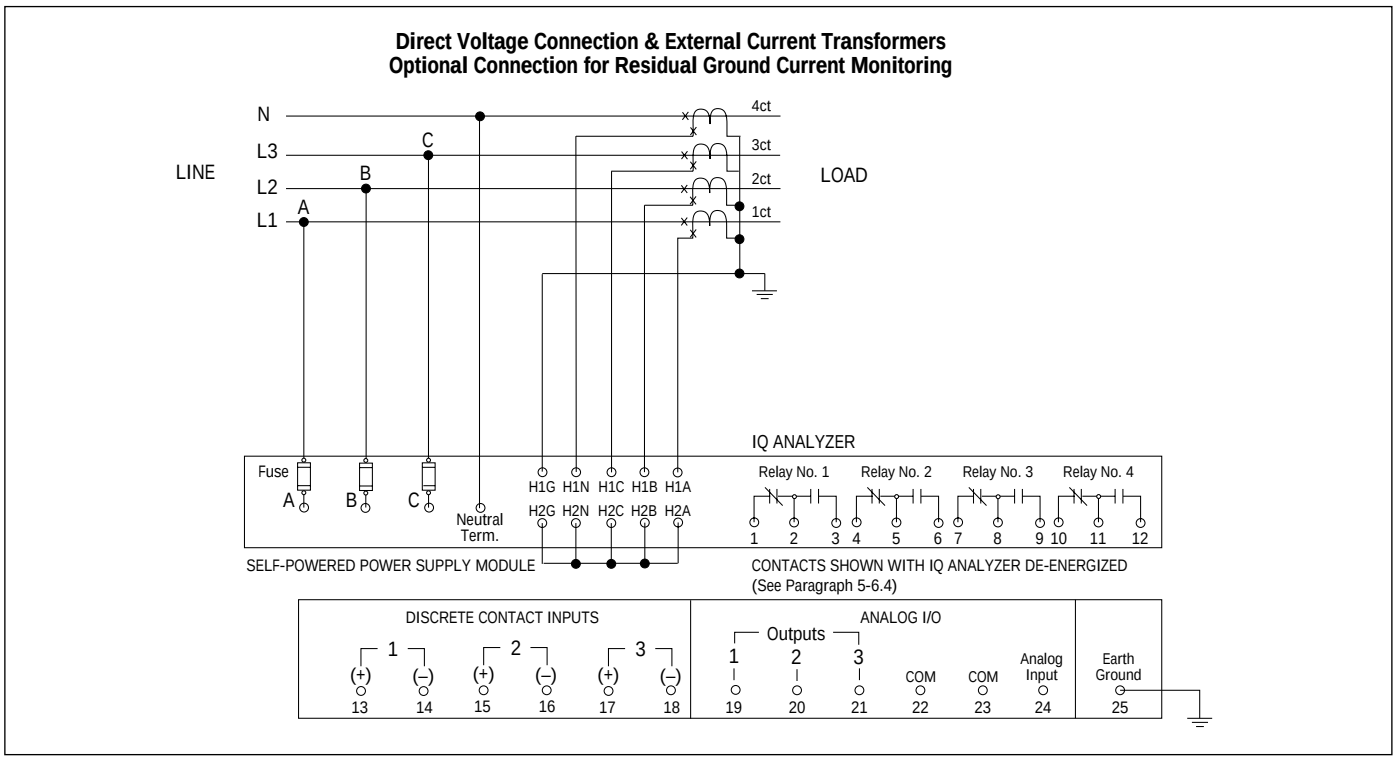


Figure 4-26 3-Phase 4-Wire (96 to 600 Volts) Wiring Diagram

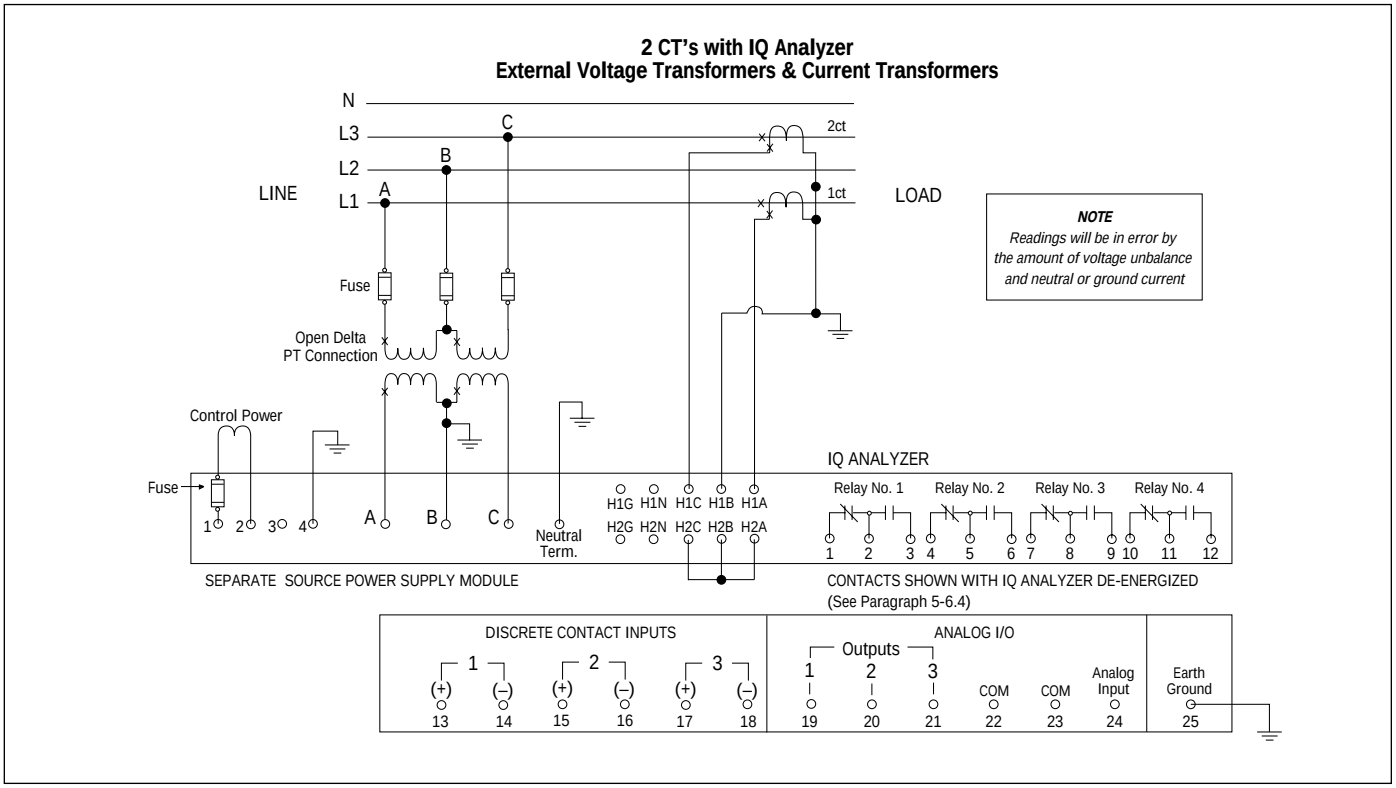


Figure 4-27 3-Phase 4-Wire (Above 600 Volts) Wiring Diagram

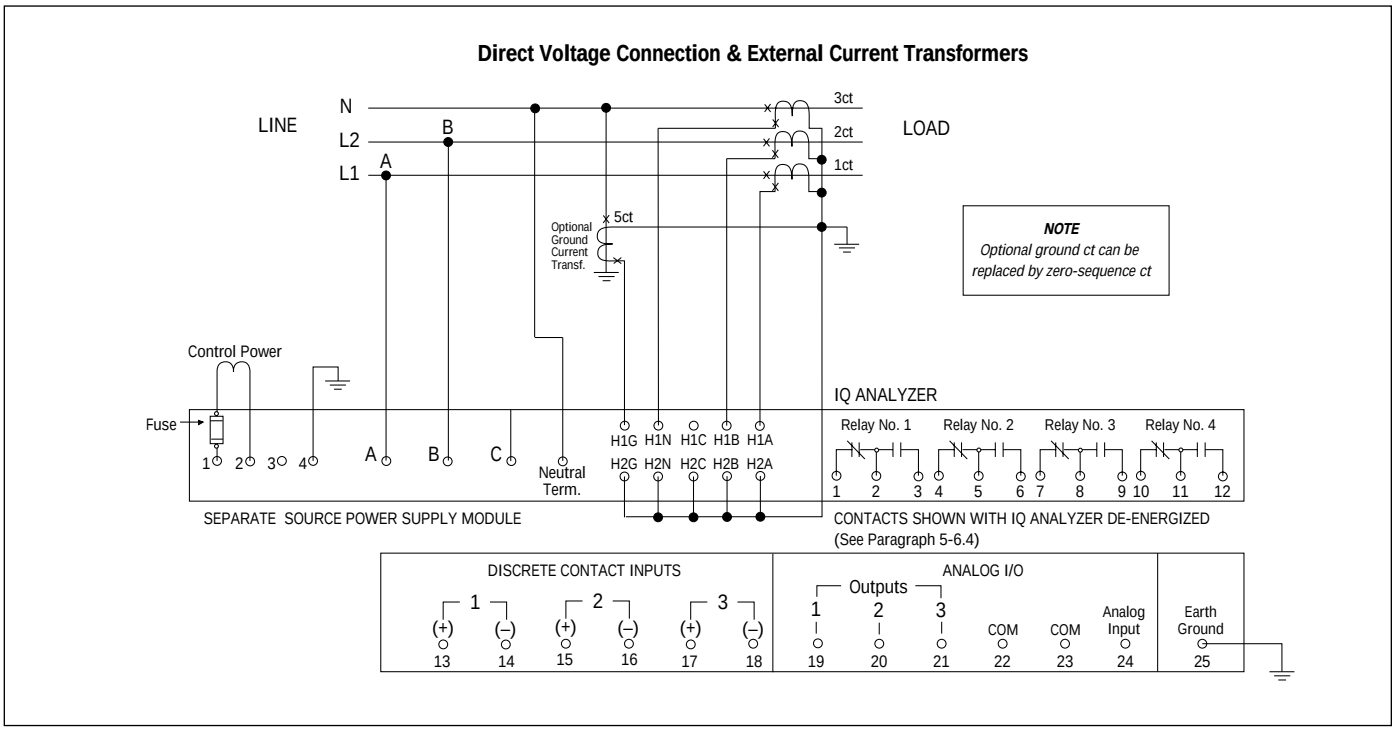


Figure 4-28 Single-Phase 3-Wire (Up to 600 Volts) Wiring Diagram

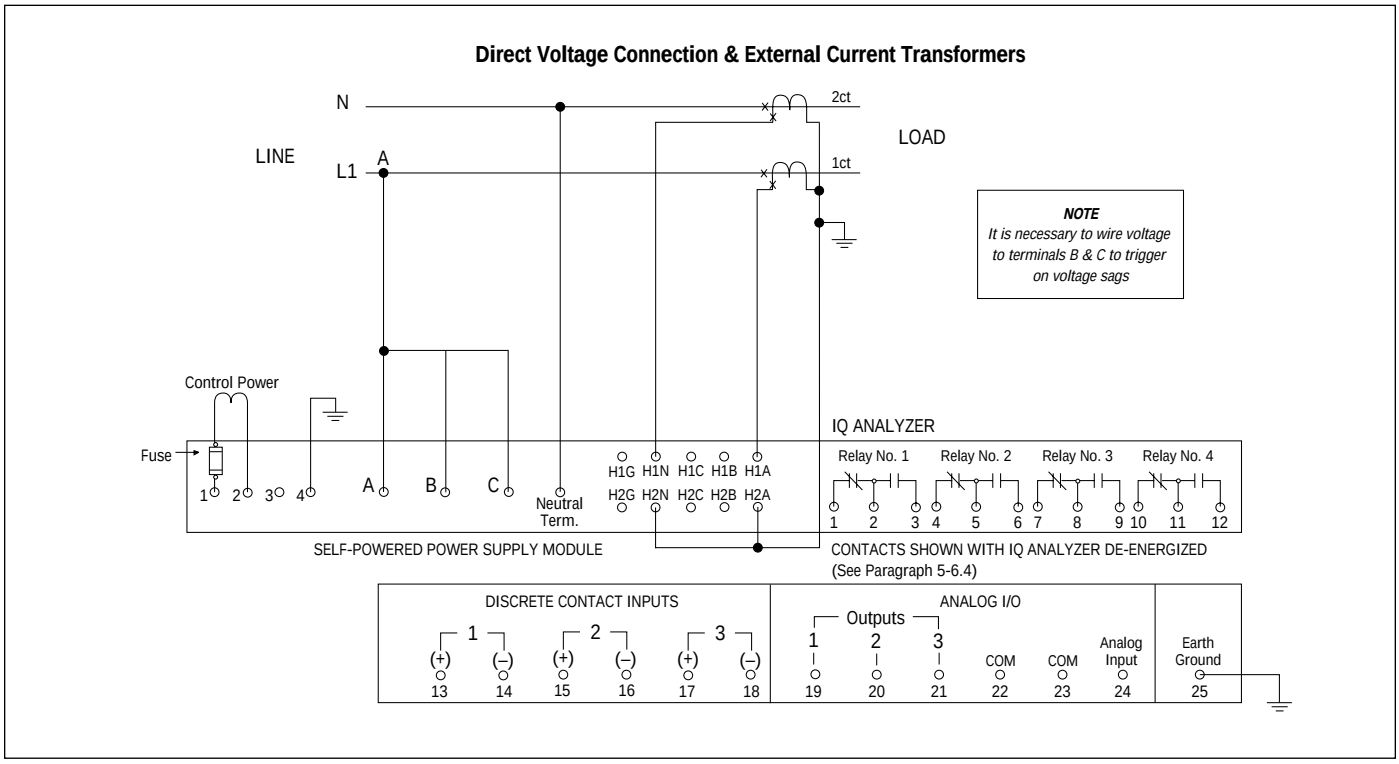
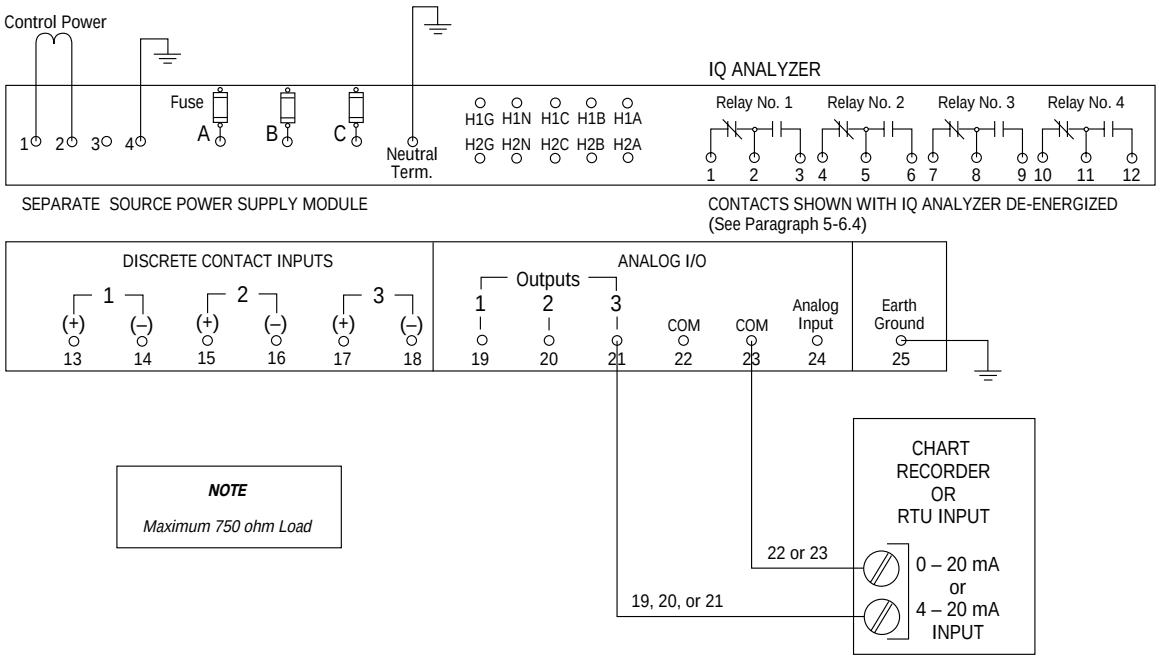


Figure 4-29 Single-phase 2-Wire (Up to 600 Volts) Wiring Diagram

(4-20mA or 0-20mA)

Output to Chart Recorder of RTU Input



Output to Analog Meter

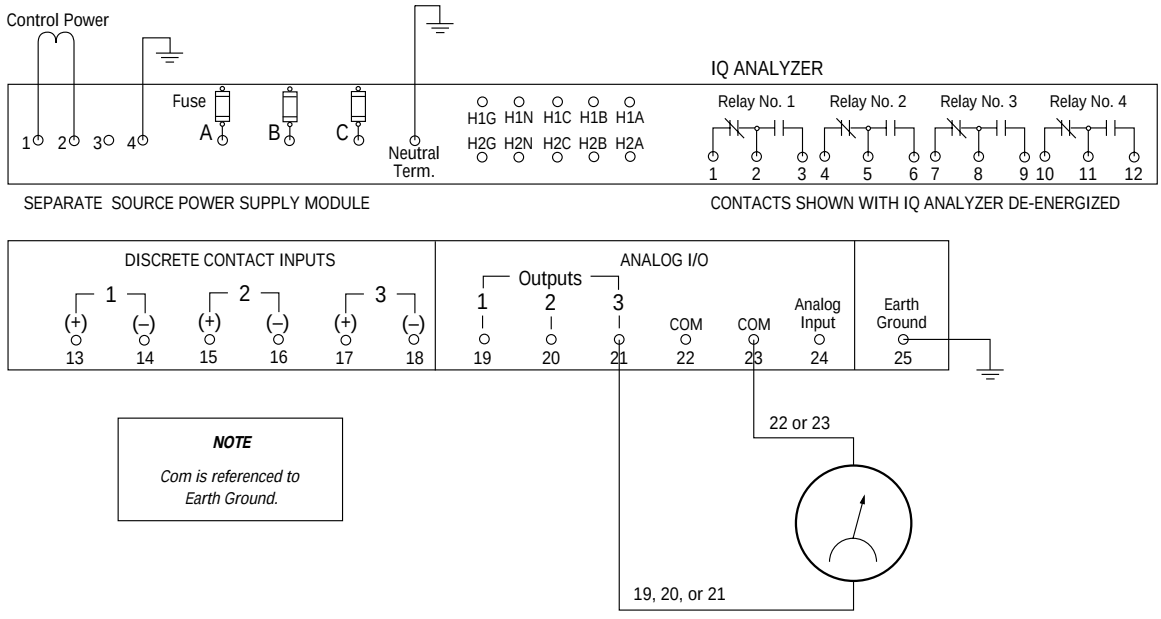


Figure 4-30 Analog Outputs

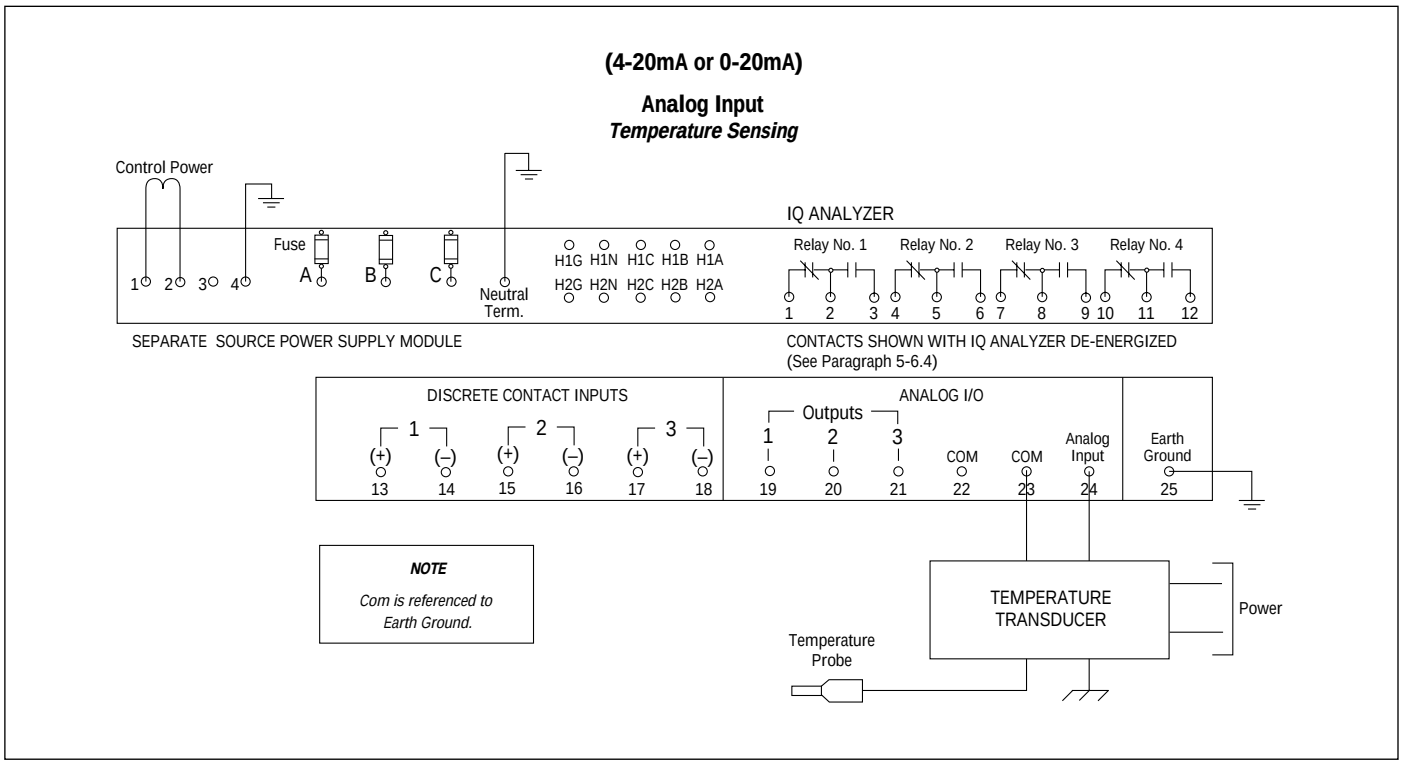


Figure 4-31 Analog Input (Auxiliary Current Input Connections)

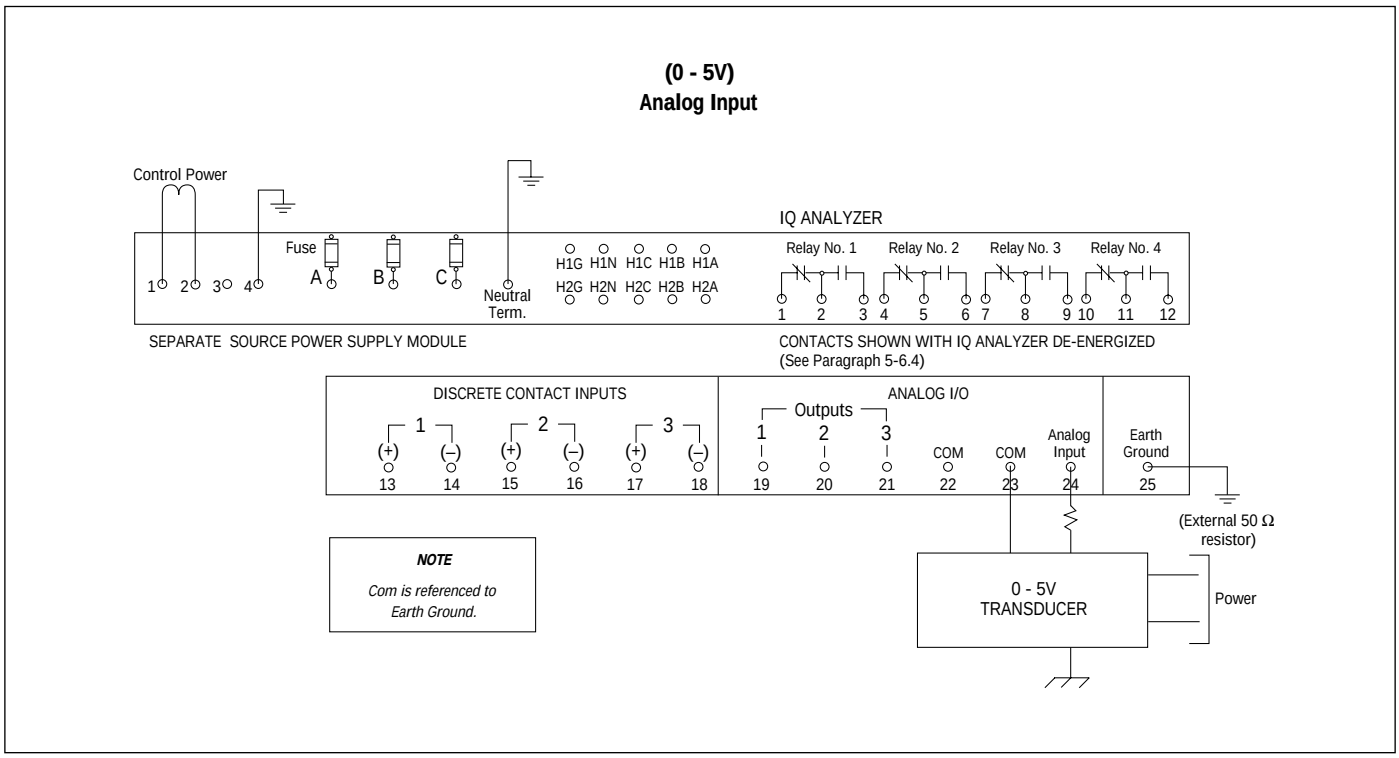


Figure 4-32 Analog Input (Auxiliary Current Input Connections)

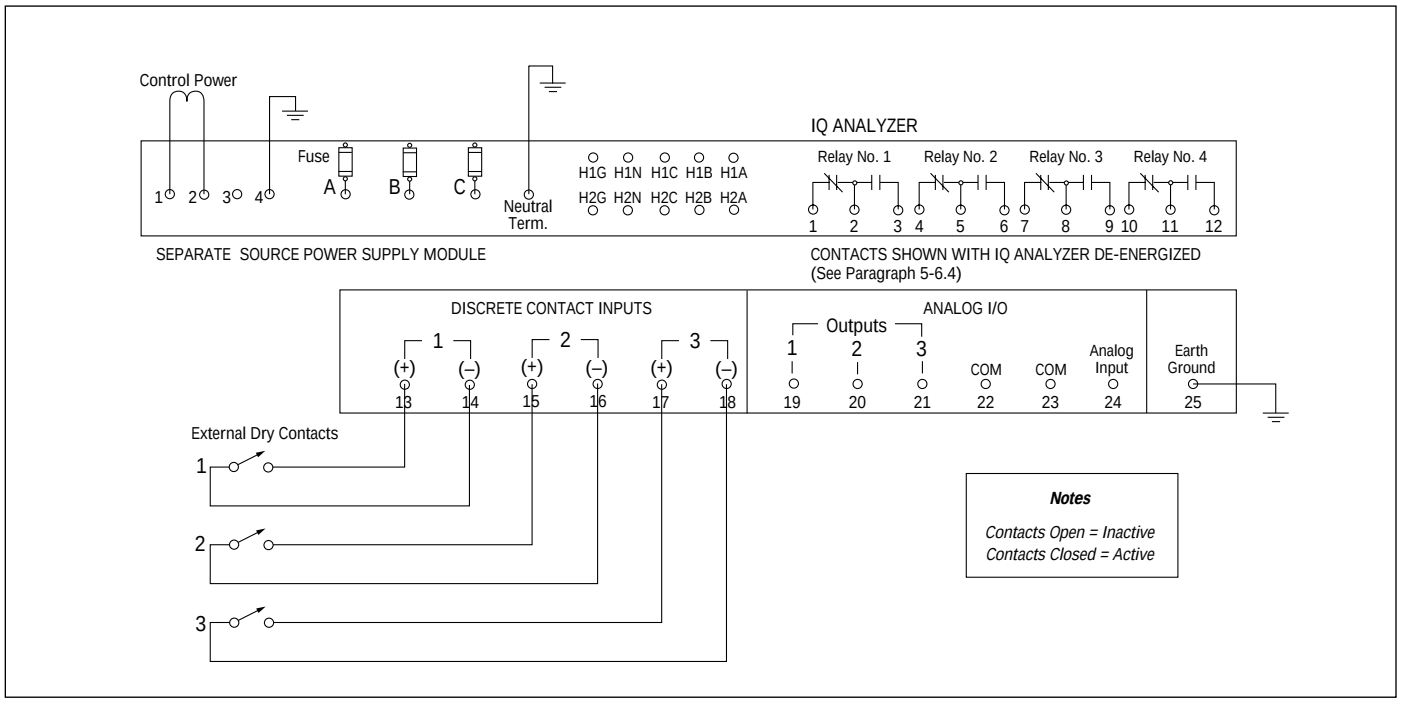


Figure 4-33 Discrete Contact Inputs

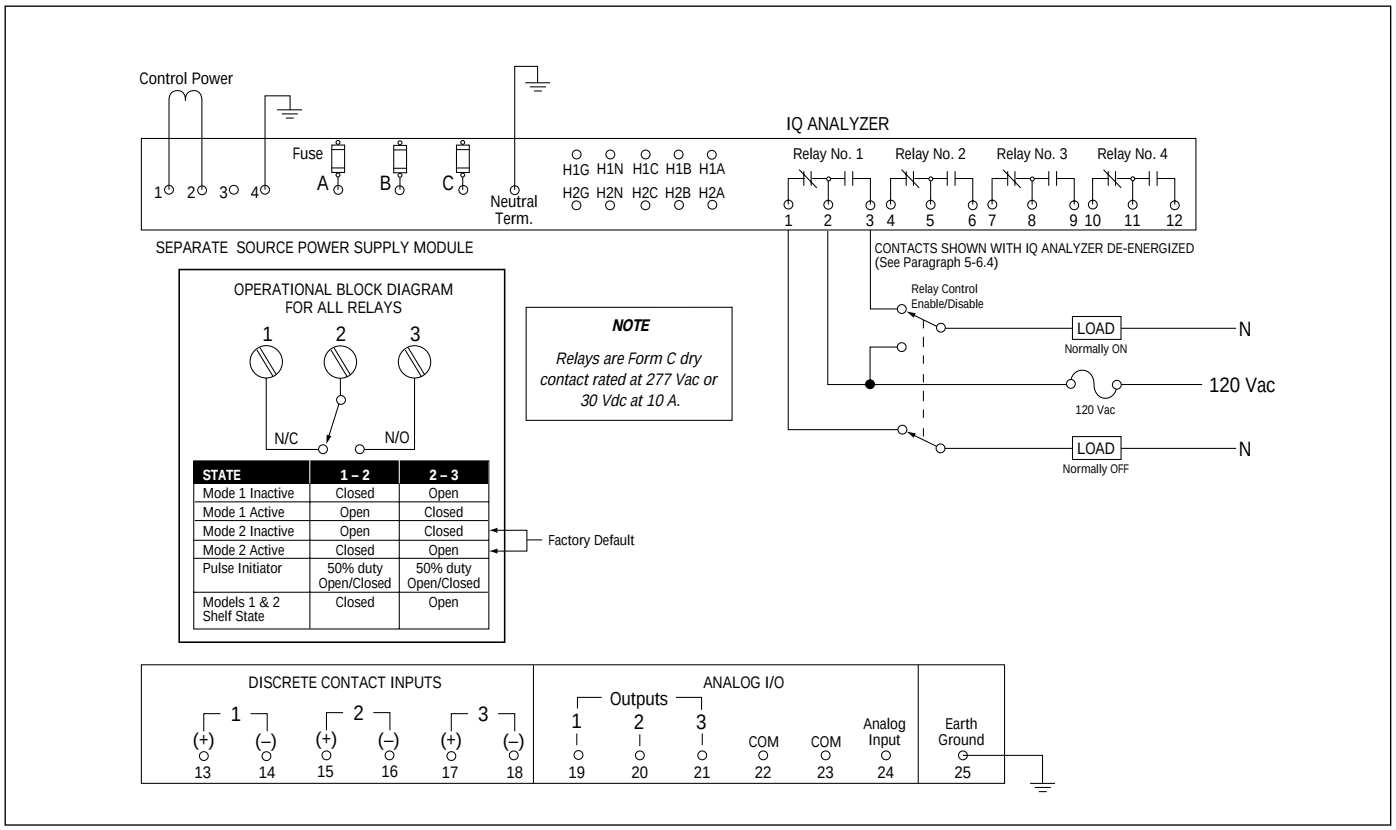


Figure 4-34 Control Relay Connections