

Instructions for Connection of the Ground Fault Secondary Transformer Module

CAT. # PDGXFSTM and PDGXFSTM1A

Style # 70C2068

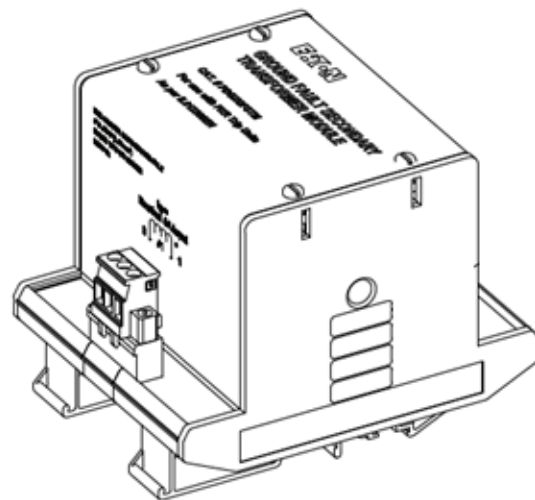
WARNING

- (1) ONLY QUALIFIED ELECTRICAL PERSONNEL SHOULD BE PERMITTED TO WORK ON THE EQUIPMENT.
 - (2) ALWAYS DE-ENERGIZE PRIMARY AND SECONDARY CIRCUITS IF A CIRCUIT BREAKER CANNOT BE REMOVED TO A SAFE WORK LOCATION.
 - (3) DRAWOUT CIRCUIT BREAKERS SHOULD BE LEVERED (RACKED) OUT TO THE DISCONNECT POSITION.
 - (4) ALL CIRCUIT BREAKERS SHOULD BE SWITCHED TO THE OFF POSITION AND MECHANISM SPRINGS DISCHARGED.
- FAILURE TO FOLLOW THESE STEPS FOR ALL PROCEDURES DESCRIBED IN THIS INSTRUCTION LEAFLET COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

WARNING

THE INSTRUCTIONS CONTAINED IN THIS IL AND ON PRODUCT LABELS HAVE TO BE FOLLOWED. OBSERVE THE FIVE SAFETY RULES:

- DISCONNECTING
 - ENSURE THAT DEVICES CANNOT BE ACCIDENTALLY RESTARTED
 - VERIFY ISOLATION FROM THE SUPPLY
 - EARTHING AND SHORT-CIRCUITING
 - COVERING OR PROVIDING BARRIERS TO ADJACENT LIVE PARTS
- DISCONNECT THE EQUIPMENT FROM THE SUPPLY. USE ONLY AUTHORIZED SPARE PARTS IN THE REPAIR OF THE EQUIPMENT. THE SPECIFIED MAINTENANCE INTERVALS AS WELL AS THE INSTRUCTIONS FOR REPAIR AND EXCHANGE MUST BE STRICTLY ADHERED TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE SWITCHBOARD.



1. Introduction

The PD5, PD6, PD-NF, and PD-RF circuit breakers each have ground fault protection as an option. When ground fault is ordered by the customer, three types of ground fault protection are available, the selection of which type is made electronically in the trip unit menu. The three types are residual ground fault source ground fault zero sequence ground fault protection.

For residual ground fault, the trip unit monitors all 3 phases of a 3-wire system, or all 3 phases and the neutral in a 4-wire system and sums these inputs to resolve a ground fault current if ground current is present. Residual ground protection does not require the Ground Fault Secondary Transformer. It may require an external neutral sensor if the neutral of a 4-wire system is mounted external to the circuit breaker.

For source ground fault protection, a sensor placed on the power systems transformer ground or grounding electrode is monitored by the trip unit. A normal relay class external CT with a ratio of, for example, 1200:5 amps is brought into the circuit breaker's source ground input through a secondary transformer to step down the current. This is the purpose of the Ground Fault Secondary Transformer Module (Style Number 70C2068). The module has a ratio of 5:0.1 amps (50:1)(70C2068G01) or 1:0.1 (10:1) (70C2068G02).

A secondary transformer is required for each breaker configured to source or zero sequence ground fault. The input to the circuit breaker is rated at a continuous 0.1 Amps RMS whereas most sensors have a 5 Amp continuous current output. Table 1 shows the sensors that are typically used for PXR-equipped circuit breakers.

Note: For UL 489 rated circuit breakers, the maximum continuous ground current that can be selected for Ig is 1200 Amps.

Sensor Ratio (Amps)	Secondary Transformer (Amps)	Trip Unit Cont. Ground Current (Amps)
800:1	1: 0.1	0.1
1200:1	1: 0.1	0.1
1600:1	1: 0.1	0.1
800:5	5: 0.1	0.1
1200:5	5: 0.1	0.1
1600:5	5: 0.1	0.1

Table 1 List of Typical Transformers

2. Basic Ground Fault Wiring Scheme

The following diagrams provide a basic schematic of the source and zero sequence ground fault connections using the Ground Fault Secondary Transformer Module:

The Blue/Black and Blue/Yellow wires that are exiting the PD5 circuit breaker from the wire trough are connected to the Ground Fault Secondary Transformer output leads. The sensor is wired to the Ground Fault Secondary Transformer input connector J1.

When wiring to the PD6 or PD-NF/RF circuit breaker the Ground Fault Secondary Module is wired to either the 26-pin connector mounted on the left side of the PD6 breaker, or in the case of the PD-NF/RF circuit breaker to the secondary contacts.

2.1 Source Ground Sensing

Depending upon the installation requirements, an alternate ground fault sensing scheme may be dictated. The ground return method is usually applied when ground fault protection is desired only on the main circuit breaker in a simple radial system. This method is also applicable to double-ended systems where a mid-point grounding electrode is employed. For this mode of sensing a single current sensor mounted on the equipment-bonding jumper directly measures the total ground current flowing in the grounding electrode conductor. The wiring is as displayed in Figure 1a, 1b, and 1c.

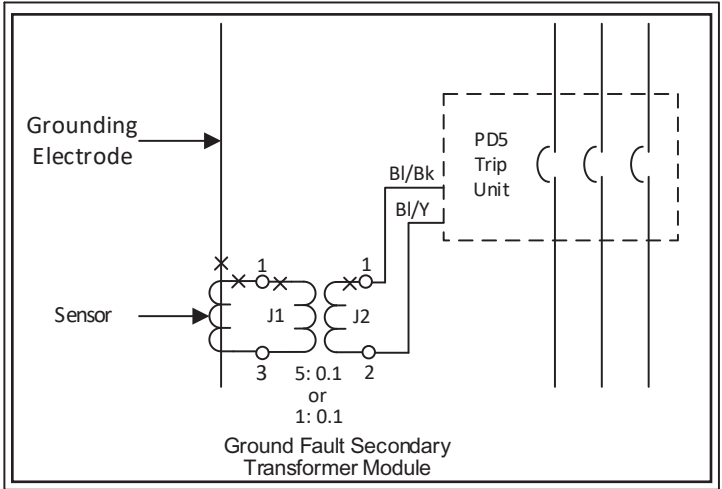


Figure 1a. Example Source Ground Connection with PD5 Trip Unit

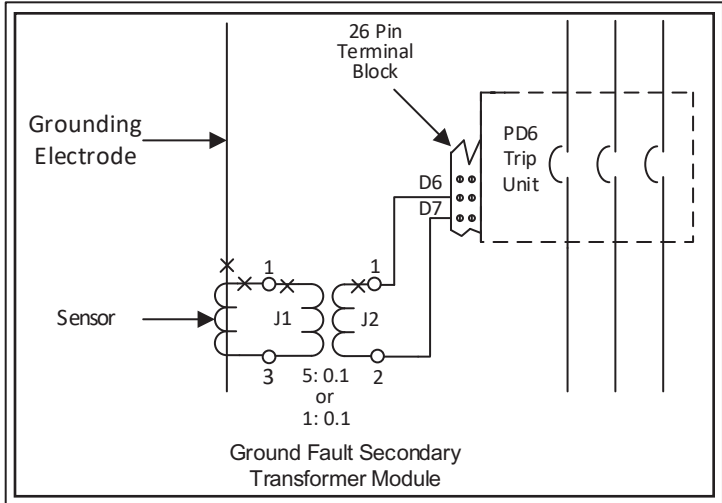


Figure 1b. Example Source Ground Connection with PD6 Trip Unit

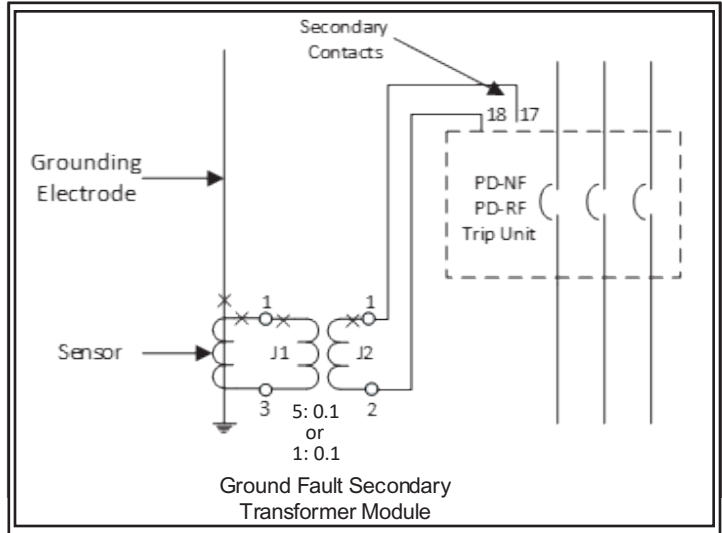


Figure 1c. Example Source Ground Connection with PD-NF/RF Trip Unit

2.2 Zero Sequence Sensing

Zero sequence sensing, also referred to as vectoral summation, is applicable to mains, feeders and special schemes involving zone protection. The wiring is as displayed in Figure 2a, 2b, and 2c.

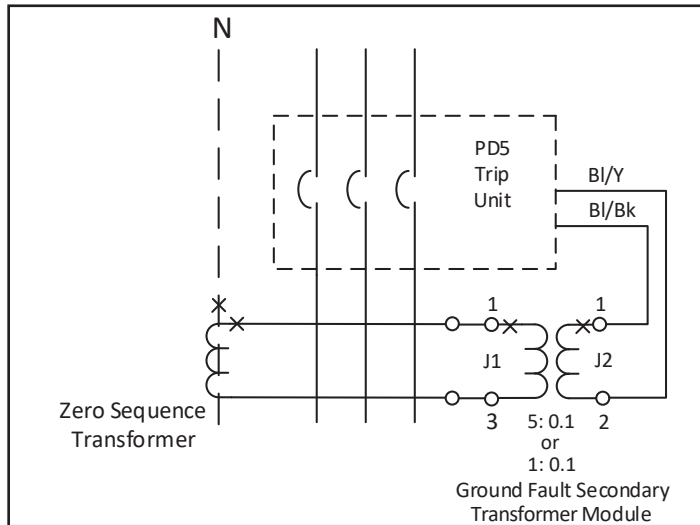


Figure 2a. Example Zero Sequence Connection with PD5 Trip Unit

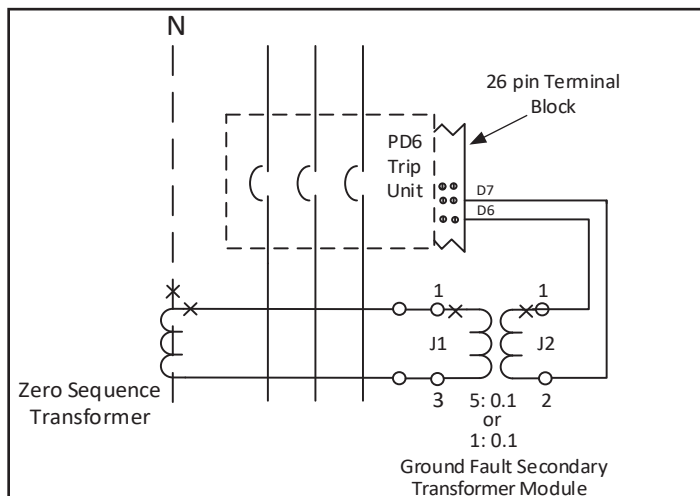


Figure 2b. Example Zero Sequence Connection with PD6 Trip Unit

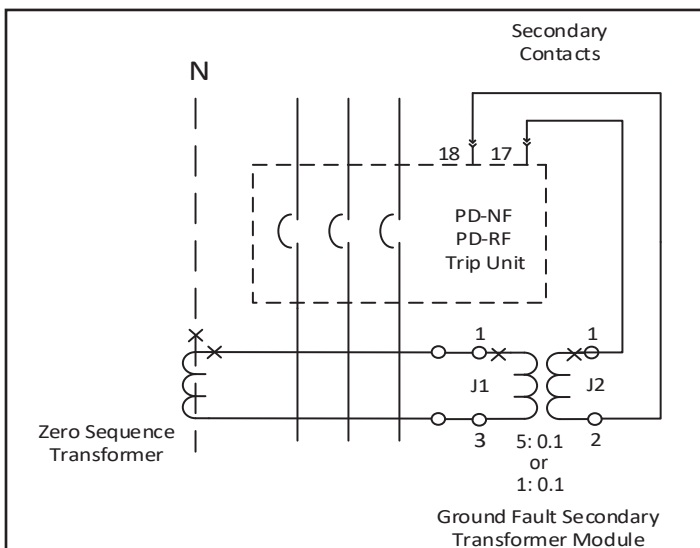


Figure 2c. Example Zero Sequence Connection with PD-NF/RF Trip Unit

3.0 Trip unit configuration

To select source ground/Zero sequence ground enter the settings menu of the trip unit, then scroll to the Unit menu where you will find GF Method. Selecting Source will enable source and zero sequence ground fault protection. The same setting for ground fault pick-up is used for all three ground fault protection methods. Only one ground fault method can be enabled, therefore the settings are shared.

4.0 Enclosure Dimensions

As mentioned previously in the document, the ground fault secondary transformer is DIN rail mountable on standard 35mm top hat section DIN rail. The dimensions are shown in the following figures.

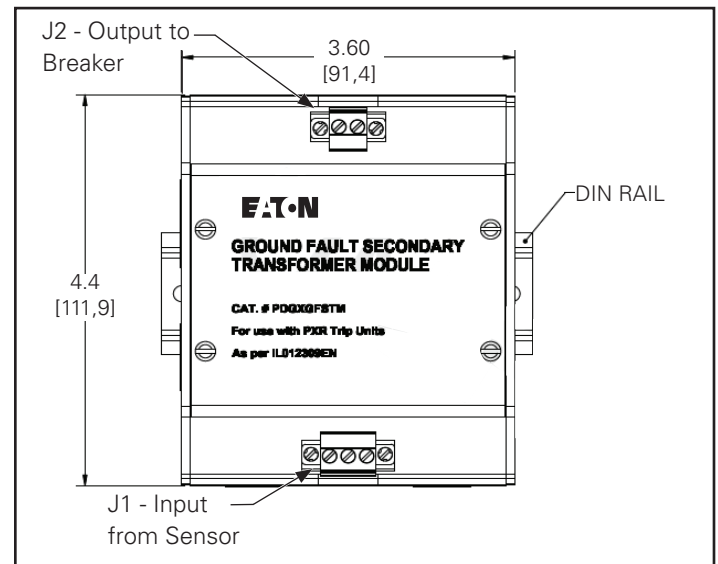


Figure 3. Front View of the Ground Fault Secondary Transformer Module (Style # 70C2068)

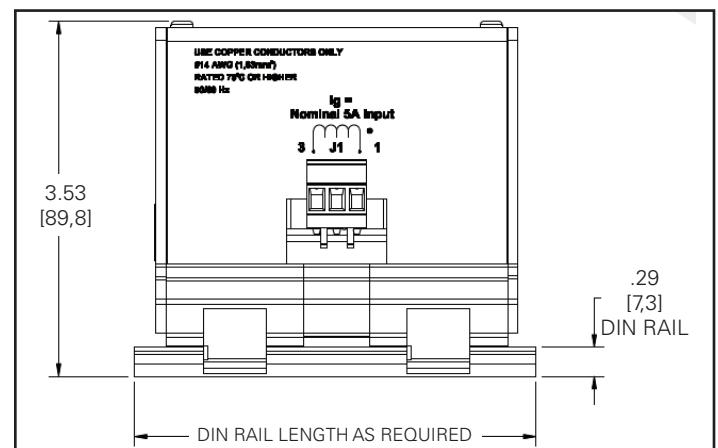


Figure 4. Input side of the Ground Fault Secondary Transformer Module

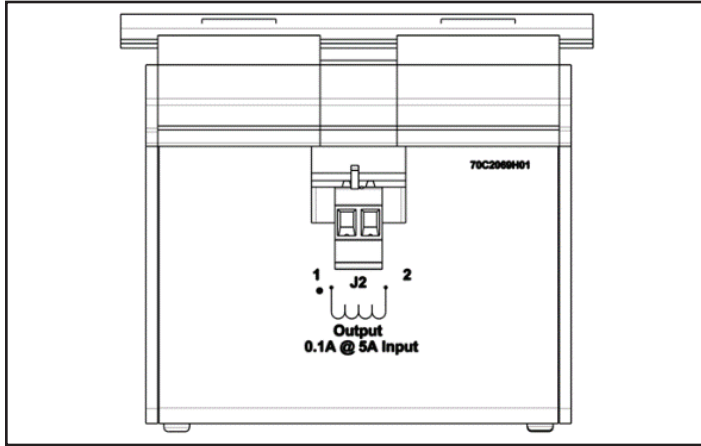


Figure 5. Output side of the Ground Fault Secondary Transformer Module

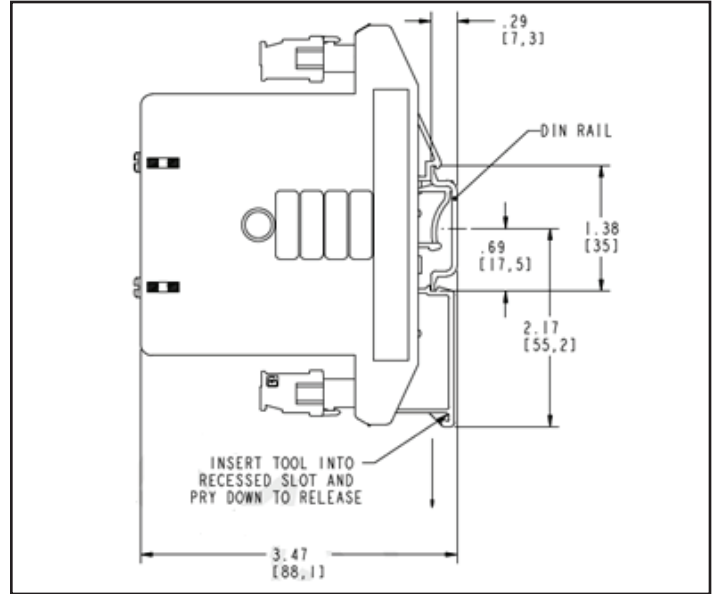


Figure 6. Din Rail and Enclosure Dimensions

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