Instruction Leaflet **IL02401001E** Effective August 2009

CM52 Network Protector with Arc Flash Reduction Module

Contents

Powering Business Worldwide

⚠ WARNING

ONLY CERTIFIED AND COMPETENT PERSONNEL SHOULD ATTEMPT TO INSTALL OR MAINTAIN POTENTIALLY HAZARDOUS EQUIPMENT.

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH OR SEVERE PERSONAL INJURY CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING. ALWAYS FOLLOW SAFETY PROCEDURES.

EATON IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

⚠ CAUTION

OBSERVE ALL RECOMMENDATIONS, NOTES, CAUTIONS, AND WARNINGS RELATING TO THE SAFETY OF PERSONNEL AND EQUIPMENT. OBSERVE AND COMPLY WITH ALL GENERAL AND LOCAL HEALTH AND SAFETY LAWS, CODES, AND PROCEDURES.

⚠ CAUTION

A FLASH HAZARD ANALYSIS SHOULD BE DONE TO DETERMINE PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS.

1.0 General

Per the previous WARNING, it is highly recommended that maintenance be conducted on electrical equipment including circuit breakers with the system de-energized.

For situations that arise where this is not possible, the Maintenance Mode function of the CM52 Network Protector can reduce arc flash incident energy that is generated on a fault condition. This is accomplished by a analog trip circuit which, when armed, provides a fast acting response to the fault. The reduced arc condition will occur only in devices downstream of the unit in Maintenance Mode. The Maintenance Mode indicator LED is located in the upper portion of the unit.

2.0 Maintenance Mode Setting

The Maintenance Mode Setting is fixed at 2.5 times the rating of the installed Network Protector.

3.0 Arming Maintenance Mode

There are two ways to arm the Maintenance Mode Arc Flash Reduction setting.

A remote switch wired through the breaker secondary contacts can remotely arm the Maintenance Mode setting. A high quality, gold plated or palladium contact is required in this application. The blue LED on the unit's front will verify that the function is armed. (See wiring diagram on page three.)

A second method to arm the maintenance setting is via a communication device.

When Maintenance Setting is enabled via device communications, this setting must be disabled by device communications.

4.0 Remote Indicator

The CM52 breaker will be wired with a secondary contact which can be used to indicate remotely that the Maintenance Setting is armed. (Refer to diagram on page three for a wiring of this remote {blue light] indicator.)

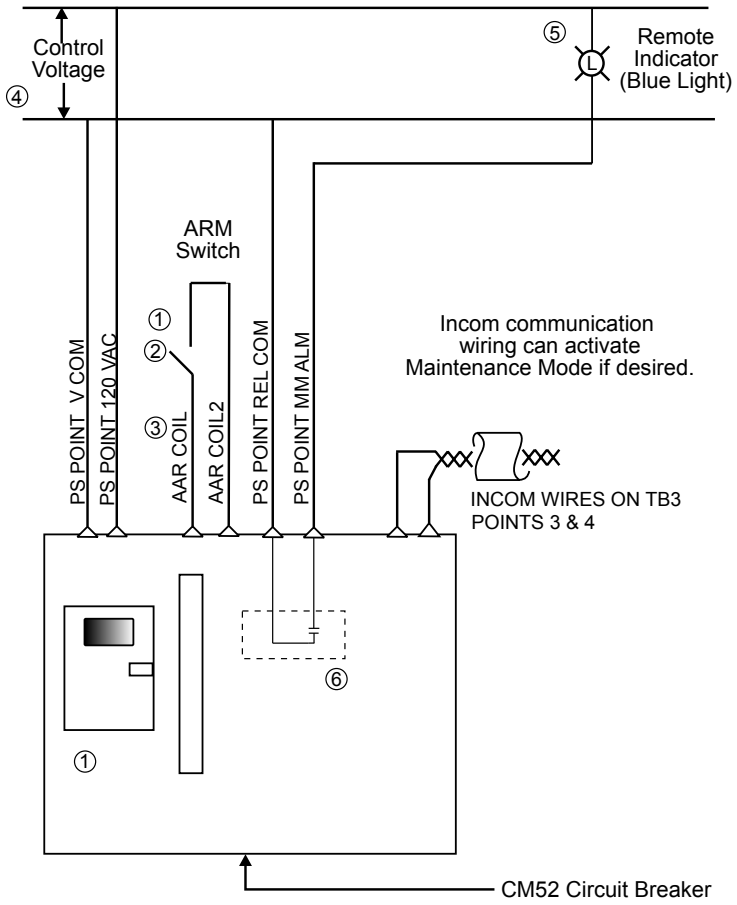
5.0 Tripping and Testing

The Maintenance Mode function will provide fast tripping to reduce the arc flash incident energy. The Maintenance Mode Trip LED position is used to indicate a trip initiated by the Maintenance Mode setting.

The Maintenance Setting, external wiring (if any) and tripping functionality should be periodically verified by primary or secondary injection current testing.

6.0 Wiring Diagram

Maintenance Mode Wiring - CM52 Network Protector



NOTES:

① The CM52 Network protector can be armed via a remote switch as shown. In addition, the function can be activated via communications. A blue LED on the Network Protector unit verifies that Maintenance Mode is armed. (AAR) Arms Activation Relay

② The recommended selector switch for this low voltage application is Eaton part number #10250T1333-2E which includes a contact block rated for Logic Level and Corrosive use.

③ The maximum length of this wiring to remote “Arm” switch (or alternate relay contact) is three meters (9.78 feet). Use #20 AWG wire or larger.

④ Control voltage is 120VAC. Check circuit breaker front cover for Trip Unit power requirements.

⑤ A remote Stack Light, Annunciator Panel or other remote indication device can be connected to verify that the unit is in the Maintenance Mode (Part #NAS0430G02).

⑥ Relay in PS Module closes when Maintenance Mode is armed. Contact is rated:1A @ 120VAC or 0.5A @ 230VAC or 1A @ 24-48VDC or 0.35A @125VDC.

Figure 1. Maintenance Mode Wiring CM52 Network Protector.

7.0 ARM-IDM Retro-fit Field Installation Instructions

Please review the instruction sheet and fully understand the component placement prior to installation.

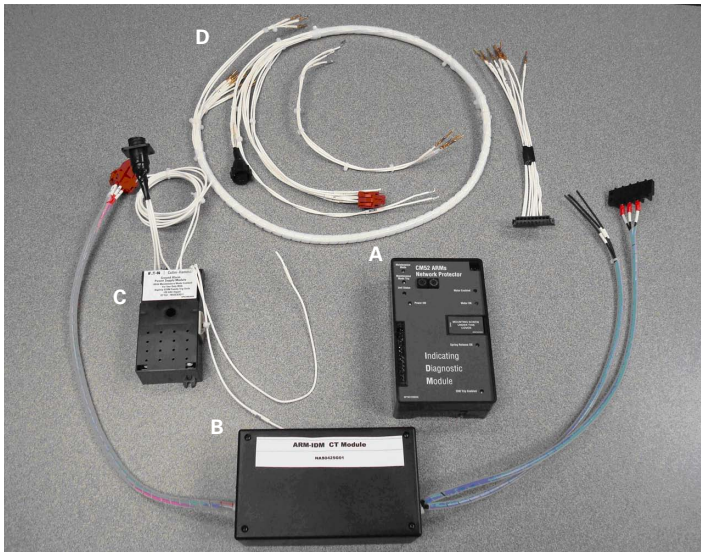


Figure 2. Components of the ARM-IDM Retro-fit Kit

Components in Kit

A. CM52 ARM-IDM
B. ARM CT Module
C. Ground Alarm Power Supply Module (GAPSm)
D. Secondary Harness to Relay Module
   – 3 Wire Harness- CM52 ARM-IDM to R/H Secondary Block
   – 9 Wire Harness w/ IDM connector to L/H Secondary Block
   – 10 ft (3.05 m)of AWG #16 Teflon wire, wire ties and butt splices (not shown)

Tools Required (Not Supplied with Kit)

- Small screwdriver with 1/8" (3 mm) wide blade
- Screwdriver with 1/4" (6 mm) wide blade
- #2 Phillips head screwdriver
- 7/16" wrench
- Wire cutters
- Wire stripper
- Wire connector crimp tool
- AMP™ pin extraction tool #305183-R
  (AMP is a Registered Trademark of TYCO International, LTD.)

Installation Instruction

Note The ARM-IDM Retro-fit Kit will only function on those CM52 breakers which utilize the Indicating Diagnostic Module (IDM). This kit **cannot** be applied to the first generation CM52 using the Voltage Regulator Device (VRD) as the breaker wiring is different from that of current production.

Installation of this kit should take approximately 2.5 hours. Please refer to your supplied wiring diagram as certain component add-ons can change the configuration of the relay module. For help, please contact EATON, Greenwood, SC (PH- 864-942-6211).

For ease of wiring to INCOM or any connections to be made outside of the network housing, it is suggested that you use the Bulkhead Entry Box, style number NFX0012G01.

STEP 1

Following all safety guidelines, open the network breaker and place it in the drawn out and disconnected position.

⚠ WARNING

ENSURE THAT THE BREAKER IS DE-ENERGIZED PRIOR TO PROCEEDING.

STEP 2

Remove the front cover of the CM52 breaker using the 10 mm socket supplied with the lever-out crank. Loosen the four cover bolts; they should be captive to the front cover.

Note: Pull the manual closing handle completely forward to facilitate the removal of the front cover.

STEP 3

Remove the existing IDM by opening the cover on the right center of the IDM and removing the screw. Pull the IDM straight out from the breaker to avoid bending any of the contact pins.

STEP 4

Remove the mounting plate which supports the IDM. There are four Phillips head screws that hold this plate in position.

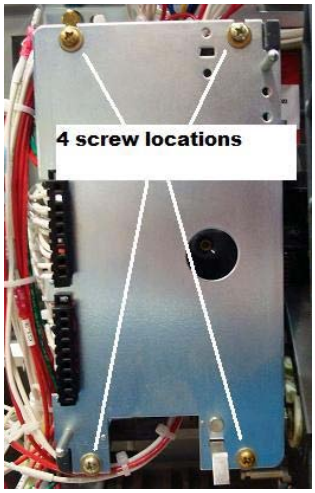


Figure 3. Location of the Screws to Be Removed

STEP 5

Apply the 3 Wire Harness labeled with wire numbers 1, 2, and 3 as shown in Figure 4. Note the difference in the connectors. The small loop connector fits the IDM terminal block. Make certain that the IDM contact is placed into the connector body in the correct orientation as shown below in Figure 5 with the locking tab of the contact engaging the slot in the connector body. Give wires a slight pull to ensure that the locking tab is engaged.

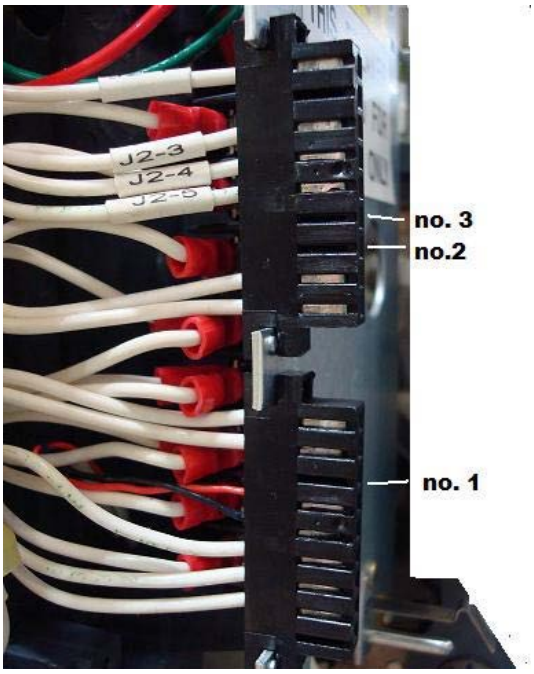


Figure 4. Wire Harness Labeled with Wire Numbers

Figure 5. Correct Orientation for the IDM

STEP 6

The 9 Wire Harness has an IDM terminal block attached. Feed the wires with the terminal block down from the top of the plate. Affix the terminal block to the lower cutout on the IDM mounting plate with the wires routed on the back side of the mounting plate (Refer to Figure 6). Note, the angled edge of the terminal block must face down and the block must be inserted such that the dimples on the mounting plate restrain the blocks movement (Refer to Figure 7). Make certain the twisted pair is located on the right hand side when viewed from the front.

Figure 6. Terminal Block Affixed to the IDM Mounting Plate

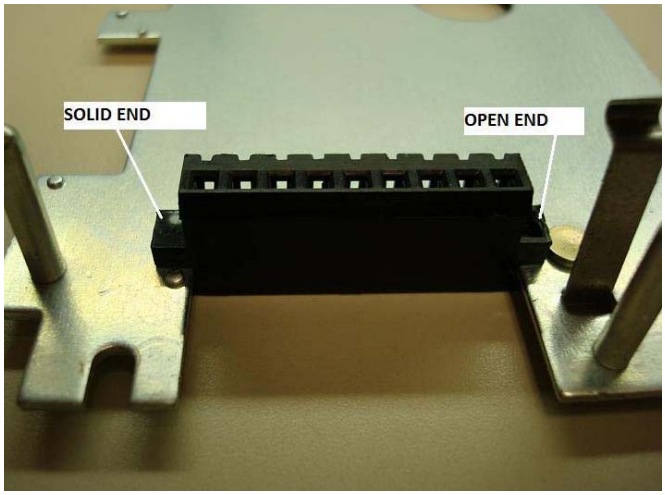


Figure 7. Terminal Block position on the IDM Mounting Plate

STEP 7

Re-attach the mounting plate using the four Phillips head screws, making sure that the nine leads are routed out the top of the mounting plate and are not pinched by the rear mounted terminal block.

STEP 8

Connect the three wires marked 1, 2, and 3 to the right hand secondary disconnect block (ID'd as B secondary on wiring diagrams) starting from the left with #1. Note, these are connected on the left hand side, bottom row of the block (Refer to Figure 8). If you make a mistake in pin location, use the AMP™ extraction tool to remove the contact from the block.

Once the wires have been inserted, give them a slight pull outward to ensure that the terminal has been locked into the secondary disconnect block.

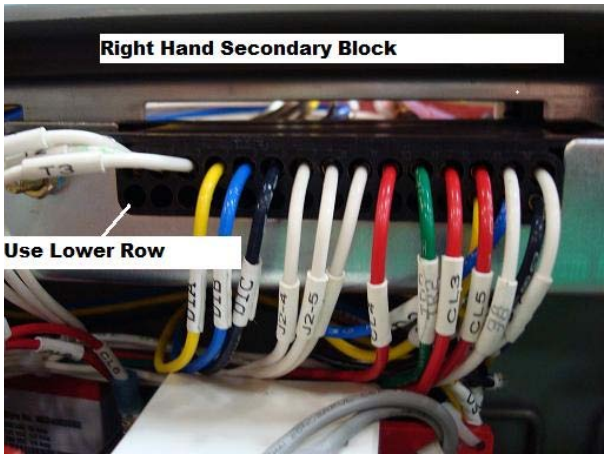


Figure 8. Wire Connections on the Block

STEP 9

Connect the nine leads, which have been routing behind the IDM mounting plate, to the left hand secondary disconnect block (ID'd as A secondary on wiring diagrams). Note, again these will be connected starting on the left hand side, bottom row of the block (Refer to Figure 4). The left hand wire is marked I9. They are inserted from left to right—I9, I8, I7, I6, I5, I4, and I3, followed by the INCOM twisted pair. There is no polarity to the twisted pair. Once the wires have been inserted, give them a slight pull outward to ensure that the terminal has been locked into the secondary disconnect block.

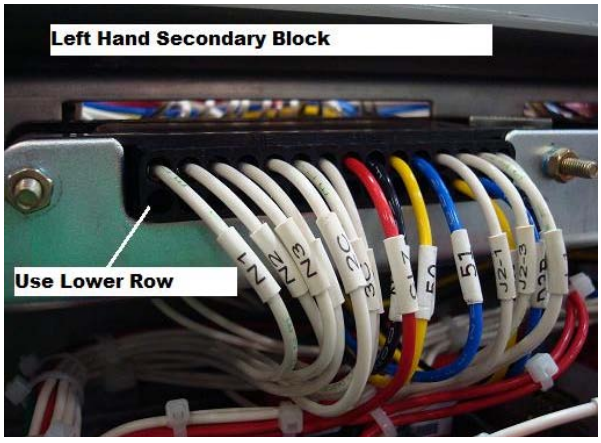


Figure 9. Wiring Connections on the Left Hand Secondary Disconnect Block

STEP 10

Install the CM52 ARM IDM and then re-install the breaker front cover. Remember to hold the manual charging arm in the complete down position to facilitate the front cover placement.

DO NOT OVER TIGHTEN THE FRONT COVER BOLTS.

STEP 11

⚠ WARNING

INTERNAL FUSES AND/OR EXTERNAL FUSES AND DISCONNECT LINKS MUST BE REMOVED PRIOR TO PROCEEDING AS THE UPPER INTERPHASE BARRIER SYSTEM MUST BE REMOVED. FOR COMPLETE SAFETY, USE AN INSULATED BLANKET TO PROHIBIT FRONTAL ACCESS TO EITHER THE TRANSFORMER OR NETWORK SIDE BUS WORK. MAKE CERTAIN THAT THE BREAKER REMAINS IN THE DISCONNECT POSITION.

Remove the clear "dead front cover" by removing the four thumb nuts. Remove the two bolts which are located on the top side of the secondary disconnect bracket. The entire interphase barrier assembly can slide forward and be set aside. See Figure 10 for location of these two bolts. Once the interphase barrier has been removed, blanket this entire bus structure to prevent an accidental short circuit.

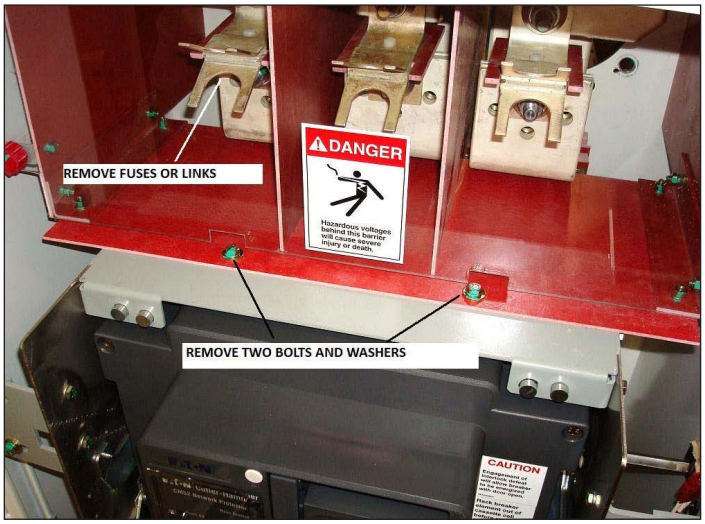


Figure 10. Bolt Locations

Using a 7/16" wrench or socket, remove two 1/4-20 bolts, with washers, from each side of the secondary contact support bracket and rotate the bracket away from you. It should now be upside down.

Taking the long secondary harness; carefully push the end of the harness which has the 6 and 4 point connector, plus some flying leads, through the wiring port on the left hand side of the relay module. Taking the other end of the harness, which has the secondary pins attached; insert the harness as per Figure 11, starting with wire I9 on the left hand block, left hand side and wire #1 on the right hand block, left hand side. You will need a long pair of needle nose pliers to aid in locating the pins into the secondary block. Note, you will be using the top row locations of the secondary contact blocks, since the entire secondary bracket has been turned upside-down. The wires must run under the metal frame of the secondary bracket. Once the wires have been inserted, give them a slight pull outward to ensure that the terminal has been locked into the secondary disconnect block. Wire tie the new harness to the existing harness.

Rotate and re-attach the secondary contact bracket using the four 1/4-20 bolts with washers.

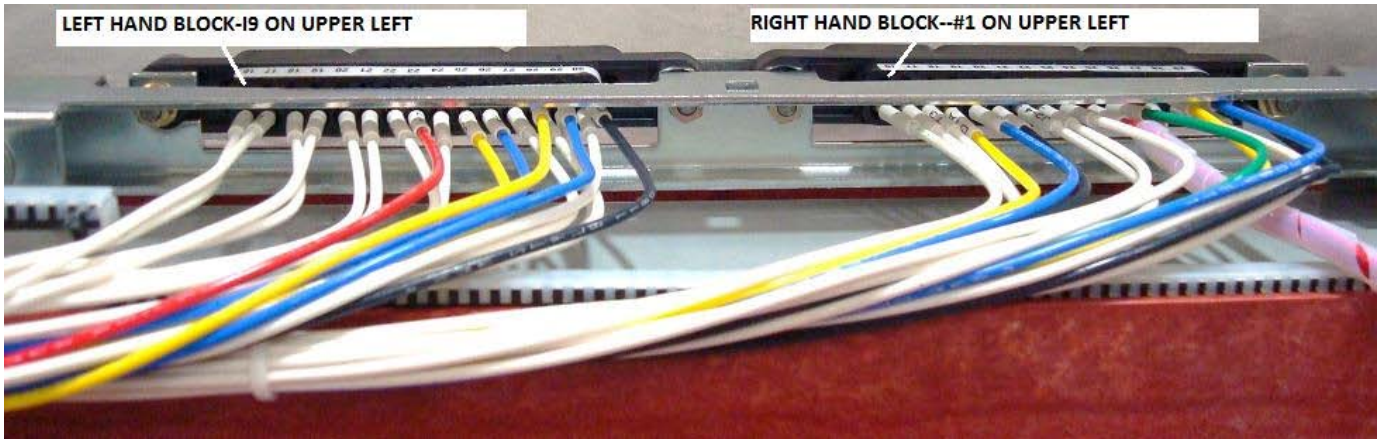


Figure 11. Wiring Harness Connections

Re-install the Upper Interphase Barrier Assembly.

STEP 12

Route the new harness beside the original secondary harness and wire tie the new harness to the original harness starting from the top and working downward. Note, leave a small loop around the 28 pt plug/socket bracket. Cut the free ends of the wire ties off with a pair of side cutters

STEP 13

Using the photo in Figure 12 for location and proper orientation, attach the Ground Alarm Power Supply Module (GAPs module) to the inside left hand side sheet of the relay module by removing the protective paper covering the adhesive strips.

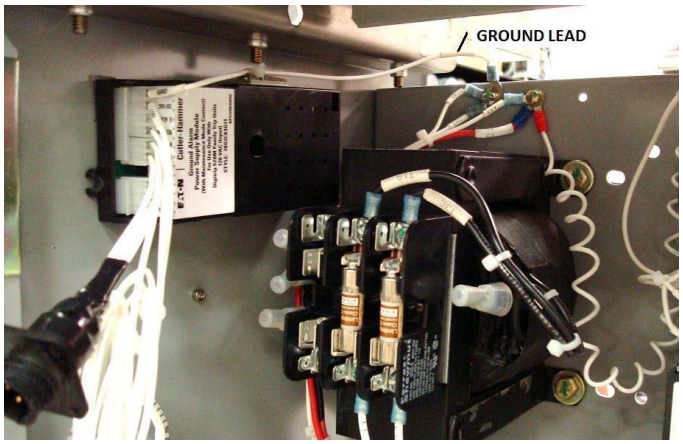


Figure 12. Location of the GAPs Module

STEP 14

Connect the four point twist connector from the new secondary harness to its mate on the GAPs module.

From the six pin connector mounted on the GAPs module, the wire marked GRD should be located facing toward the roof sheet of the relay module. Connect the GRD wire to the ground point on the rear sheet of the relay module as shown of Figure 12. Referring to Figure 13, connect the 120 V lead to the second point from the left (front side) on the gray Phoenix terminal block. Note, you will end up with two wires at the terminal point marked L1. There will be two free flying leads marked I3 and I3A as part of the secondary harness which are used for a hard wired ON-OFF switch.

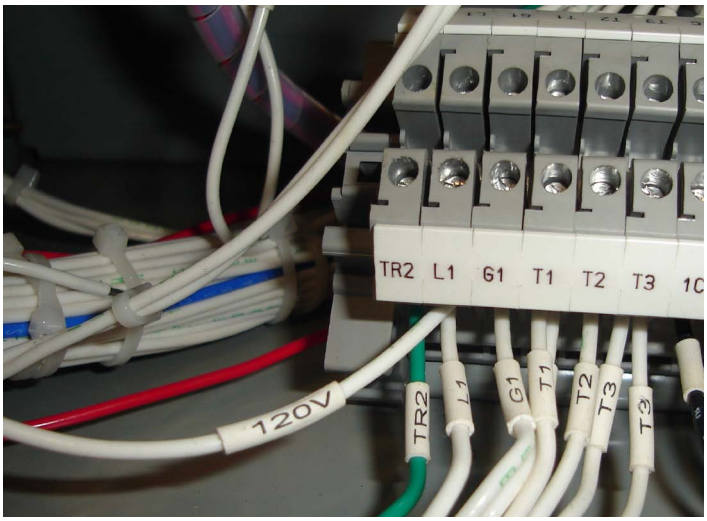


Figure 13. Connection of the 120 V Lead to the Phoenix Terminal Block.

STEP 15

Remove the three leads marked 1C, 2C, and 3C from the lower side of the DIN rail gray Phoenix terminal block using a small 1/8"blade screwdriver (Refer to Figure 14). Attach these three leads to the black four point terminal block, marked 1C, 2C, and 3C which have wires connected to the ARM CT module. Remove the paper from the adhesive backing on the terminal block and mount with the dimensions as shown in Figure 15. This should be approximately 8.75 inches from the left hand relay module side sheet and mounted as close as possible to the DIN rail terminal block. Attach the six point plug of the new secondary harness to the six point socket of the ARM CT module as shown in Figure 16. Turn the module so you are viewing its base and remove the protective paper from the adhesive strip. Locate the module such that the flying leads marked (1C, 2C, and 3C) are as close as practical to the front edge of the DIN rail terminal block (Refer to Figure 17 for location). Seat the ARM CT Module to the bottom sheet of the relay module. Secure the flying leads 1C, 2C and 3C which are attached to the ARM CT module into the now empty positions marked 1C, 2C, and 3C (Refer to Figure 15).

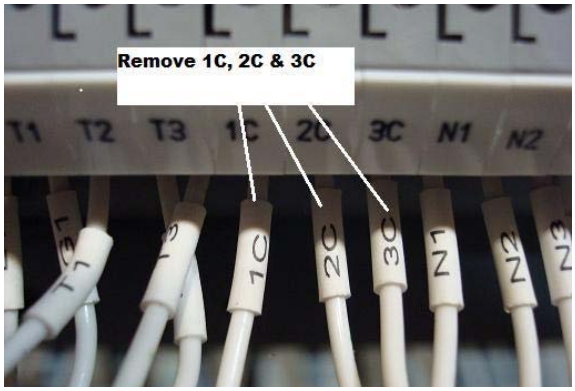


Figure 14. Leads to Be Removed form the Phoenix Terminal Block

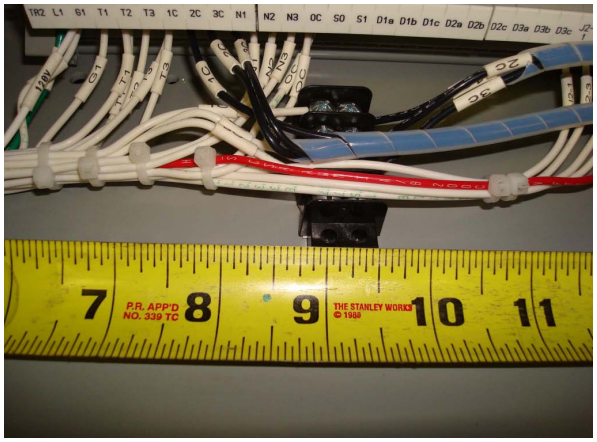


Figure 15. Mounting the Terminal Block

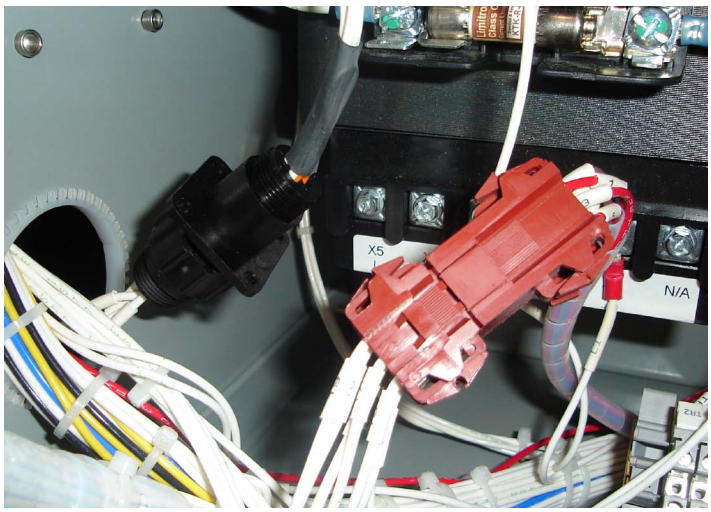


Figure 16. Six Point Secondary Harness Plus Attached to the ARM CT Module

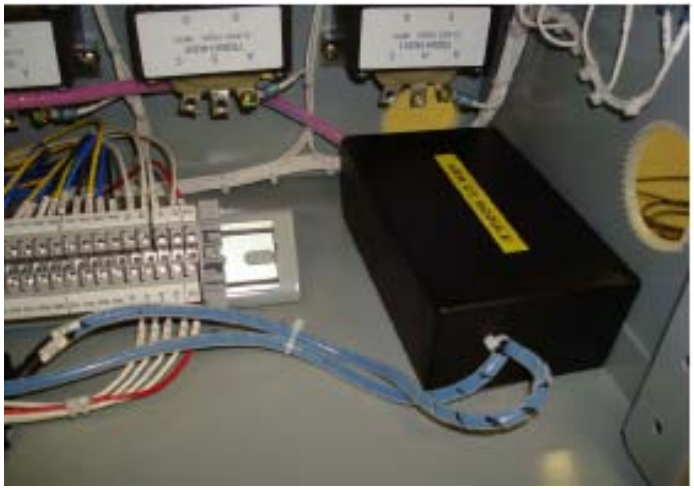


Figure 17. Location of the ARM CT Module

STEP 16

If remote communication command and control of the ARM-IDM is required, the twisted pair wire can be connected to the INCOM lead on the MPCV relay (doubling up the wire already connected at that point). If a hard wired ON-OFF switch is required at the vault entrance, then the wires marked I3 and I3A must be connected to one of the pairs going into the bulkhead entrance box. These can be connected using the supplied insulated butt splices.

STEP 17 Testing the CM52 ARM-IDM

A. Set the INCOM address on the CM52 ARM-IDM by using the two dials located near the top if the IDM. It is important that this address be unique and has not been used on any other ARM-IDM's or MPCV relay (Refer to Figure 18).

Figure 18. Location of the Dials on the CM52 ARM-IDM

B. Power up the breaker using a 3 phase test set.

Note: For operation of the CM52 ARM-IDM to function, the MPCV relay must be connected.

C. The following LED's must be illuminated upon power-up:

1. Power ON
2. Motor Enabled
3. Motor OK
4. Spring Release OK
5. IDM Trip Enabled
6. Unit Status (flashes at 1 second intervals)

D. Enable the CM52 ARM-IDM, either with the communications link or a hard wired switch. The Maintenance Mode LED should now be illuminated. Once the actual current reaches between 2.1 & 2.5 times the breaker CT rating, the Maintenance Mode Trip LED will be illuminated and the breaker will trip. This rating of current cannot be driven by the 3-phase test sets. As long as the Maintenance Mode Trip LED is illuminated, the motor close of the network breaker is disabled.

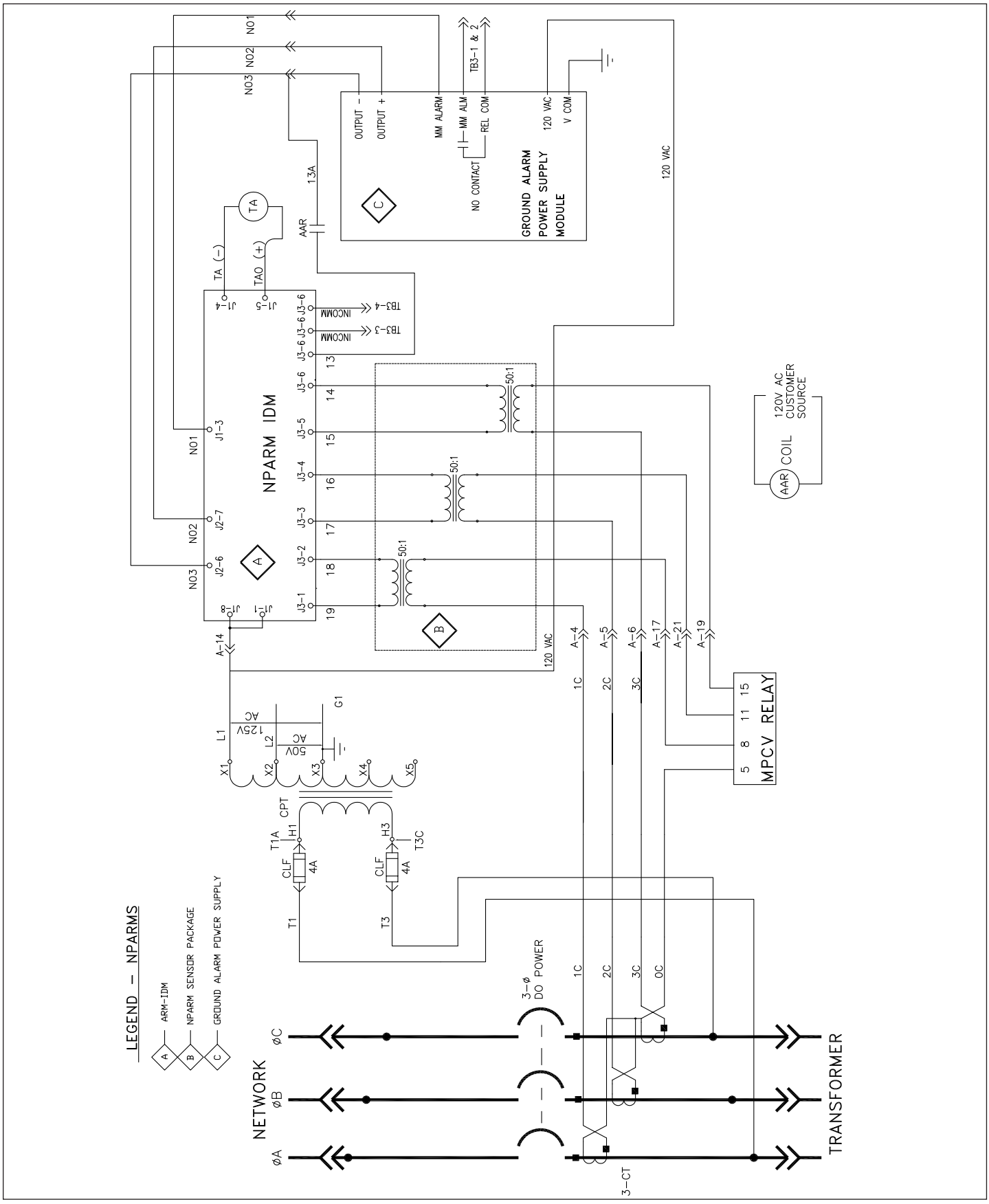


Figure 19. ARMS Schematic

Notes:

CM52 Network Protector with Arc Flash Reduction Module

This instruction leaflet is published solely for information purposes and should not be considered all-inclusive. If further information is required, you should consult an authorized Eaton sales representative.

The sale of the product shown in this literature is subject to the terms and conditions outlined in appropriate Eaton selling policies or other contractual agreement between the parties. This literature is not intended to and does not enlarge or add to any such contract. The sole source governing the rights and remedies of any purchaser of this equipment is the contract between the purchaser and Eaton.

NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, OR WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE, ARE MADE REGARDING THE INFORMATION, RECOMMENDATIONS, AND DESCRIPTIONS CONTAINED HEREIN. In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information, recommendations and description contained herein.

2210 Highway 72/221 E
Greenwood SC 29649
United States
877-737-8328
networkprotectors.net

Printed in USA
Publication No. IL02401001E/TBG000251
August 2009

Powering Business Worldwide

PowerChain Management®