

INSTALLATION INSTRUCTIONS

Original Issue Date: **12/09**

Model: **ZCS-5 Automatic Transfer Switches**

Market: **ATS**

Subject: **Controller Conversion Kit GM69378-S2**

Introduction

Use conversion kit GM69378-S2 to replace the M340+ controller with an MPAC™ 1500 controller on model ZCS-5 standard-transition automatic transfer switches. Do not use this conversion kit on model ZCS-6 programmed-transition transfer switches.

See Figure 1 for an illustration of the installed kit. See Figure 3 for controller identification, if necessary.

Note: The programmed-transition module shown in Figure 1 and Figure 22 is not applicable to the ZCS-5 transfer switch. The optional accessory board (I/O) assembly shown in the figures is available separately.

If current sensing is required, obtain the appropriately rated current sensing kit before starting the conversion procedure. If the transfer switch is equipped with current transformers, they will need to be replaced with the new current sensing kit during the controller conversion procedure. See Figure 2 for current sensing kit numbers. Check the amp rating and number of phases of the transfer switch and select the closest current sensing kit with an equal or greater amp rating.

Tools and Materials Required:

- Phillips screwdriver
- Small flat tip screwdriver
- Wire cutter
- 7/16 nut driver
- 11/32 nut driver
- 5/16 nut driver

Read the entire installation procedure and compare the kit parts with the parts list at the end of this publication before beginning installation. Perform the steps in the order shown.

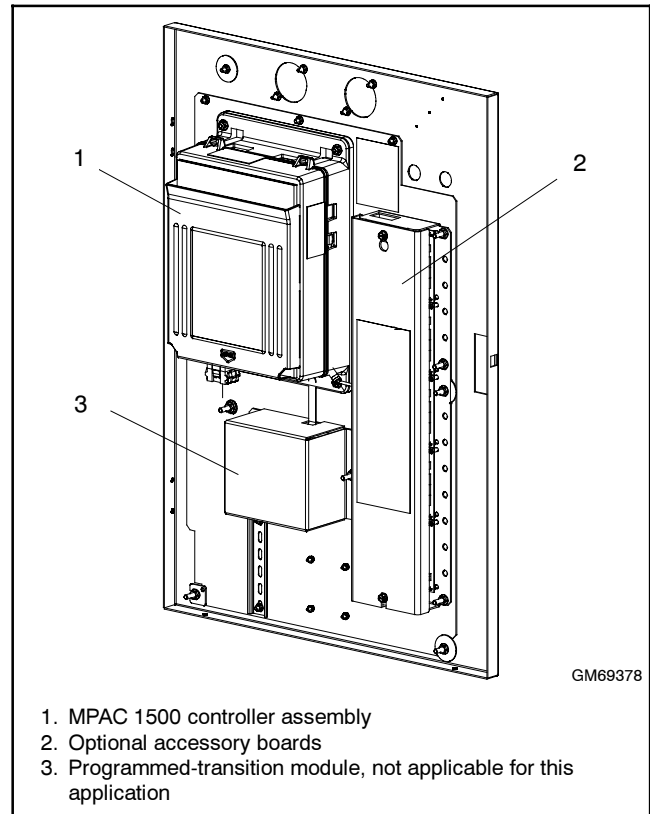


Figure 1 MPAC™ 1500 Controller Conversion Kit, Installed

Current Sensing Kit Number	Kit Description	
	Amps	Phases
GM47965-S19	1000	3
GM47965-S20	1200	3
GM47965-S21	2000	3
GM47965-S22	3000	3
GM47965-S23	1000	1
GM47965-S24	1200	1

Figure 2 Current Sensing Kits (with 3 m [10 ft.] harness)

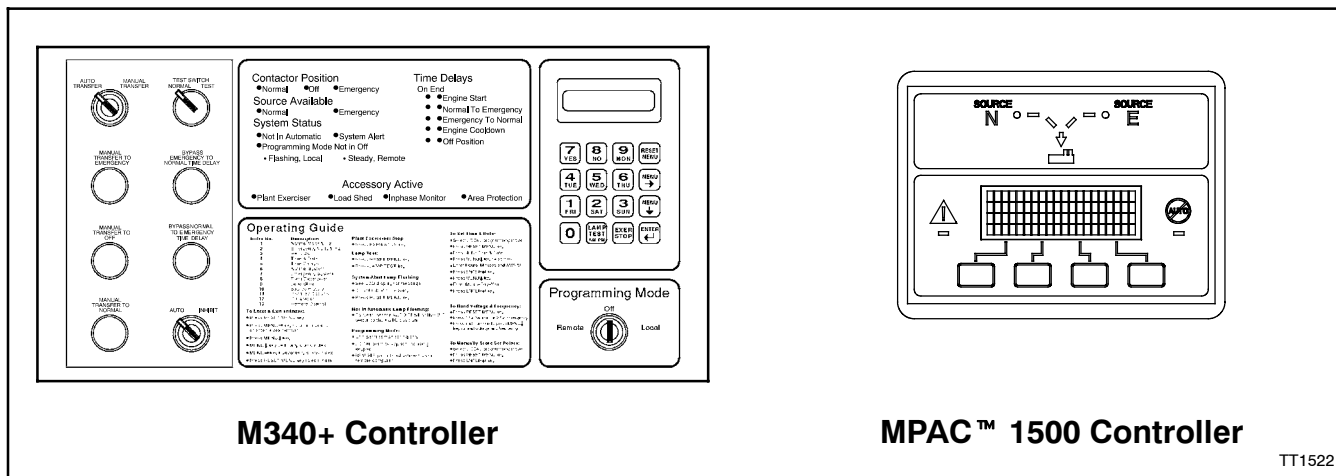


Figure 3 Controller Identification

Safety Precautions

Observe the following safety precautions while installing the kit.

⚠ WARNING

Accidental starting.
Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

⚠ DANGER

Hazardous voltage.
Will cause severe injury or death.

Disconnect all power sources before opening the enclosure.

Servicing the transfer switch. Hazardous voltage can cause severe injury or death. Deenergize all power sources before servicing. Turn off the main circuit breakers of all transfer switch power sources and disable all generator sets as follows: (1) Move all generator set master controller switches to the OFF position. (2) Disconnect power to all battery chargers. (3) Disconnect all battery cables, negative (-) leads first. Reconnect negative (-) leads last when reconnecting the battery cables after servicing. Follow these precautions to prevent the starting of generator sets by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer. Before servicing any components inside the enclosure: (1) Remove all jewelry. (2) Stand on a dry, approved electrically insulated mat. (3) Test circuits with a voltmeter to verify that they are deenergized.

Installation Procedure

1. Place the generator set master switch in the OFF position.
2. Disconnect the power to the battery charger, if equipped.
3. Disconnect the generator set engine starting battery(ies), negative (-) lead first.
4. Disconnect power from the transfer switch on both sources, Normal and Emergency.
5. Remove the plastic protective panel by removing the screws shown in Figure 4.

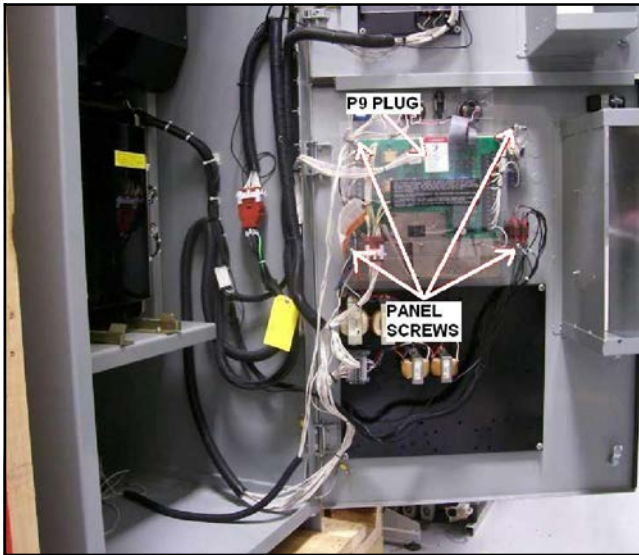


Figure 4 Plastic Panel

6. Disconnect plug P9.



Figure 5 Plug P9 Disconnected

7. If the transfer switch is equipped with current transformers (CTs), remove all CTs from the power lines of the ATS.



Figure 6 Current Transformers (CTs)

8. If the transfer switch is equipped with an Auto/Inhibit ATS disconnect switch mounted on the enclosure door, disconnect and remove the switch.

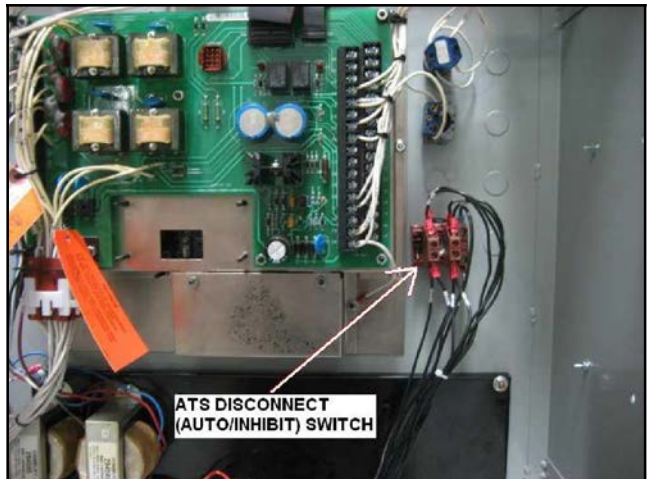


Figure 7 Auto/Inhibit ATS Disconnect Switch

9. If the transfer switch is equipped with gauges, disconnect and remove all gauges and the selector switch.

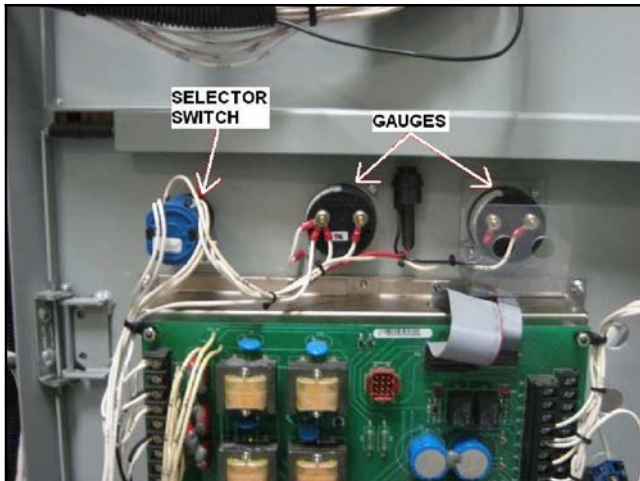


Figure 8 Disconnect the Gauges and Selector Switch

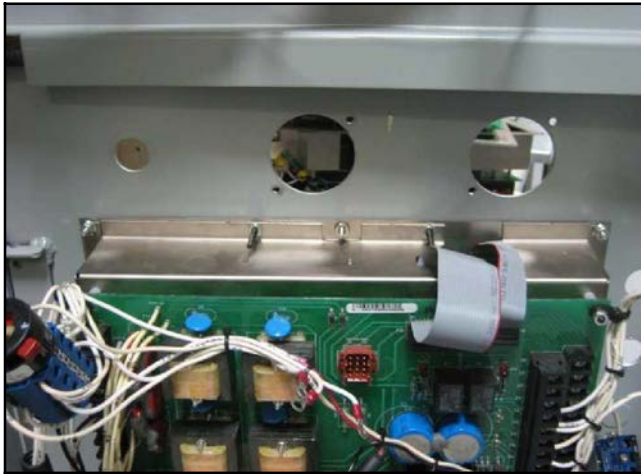


Figure 9 Gauges and Selector Switch Removed

10. Disconnect plug P24 and ground.

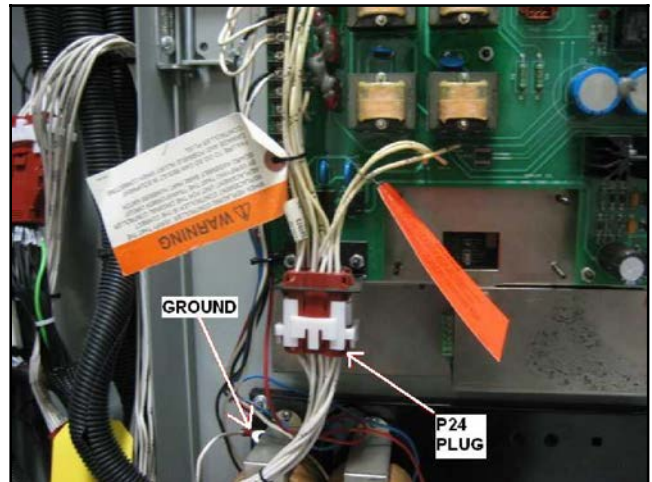


Figure 10 Disconnect P24 and Ground



Figure 11 P24 Disconnected

11. Without disconnecting the leads, remove the mounting screws that secure transformers NCPT and ECPT and the terminal block to the lower panel. See Figure 12 and Figure 13. The transformers and terminal blocks will be secured to the new mounting plate later.

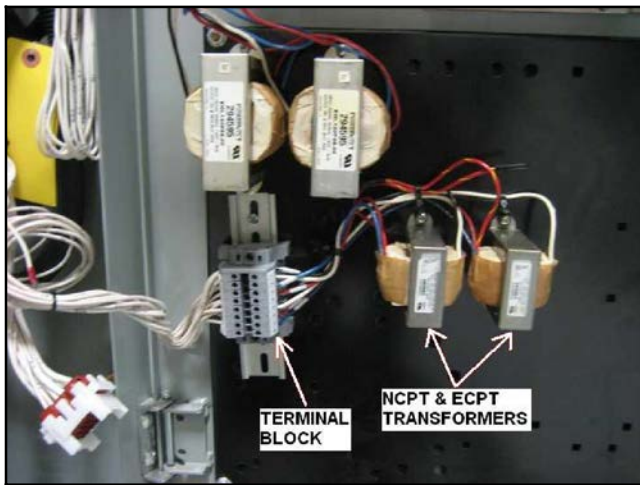


Figure 12 Transformers and Terminal Block on Lower Panel (do not disconnect electrical connections)



Figure 13 Transformers and Terminal Block Removed from Lower Panel but Not Disconnected

12. Remove the metal cover over the communication module, if present.

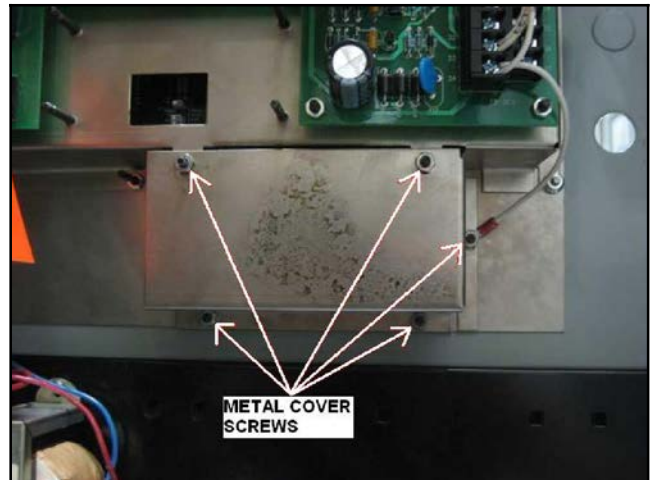


Figure 14 Remove Cover Screws



Figure 15 Cover Removed

13. Remove the controller and the lower panel.

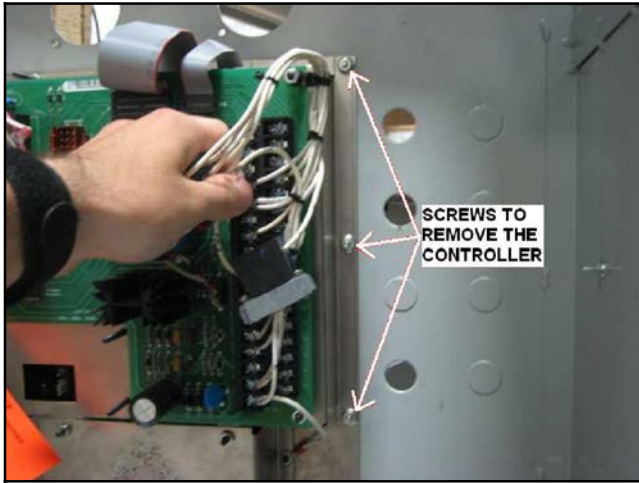


Figure 16 Remove Controller Screws

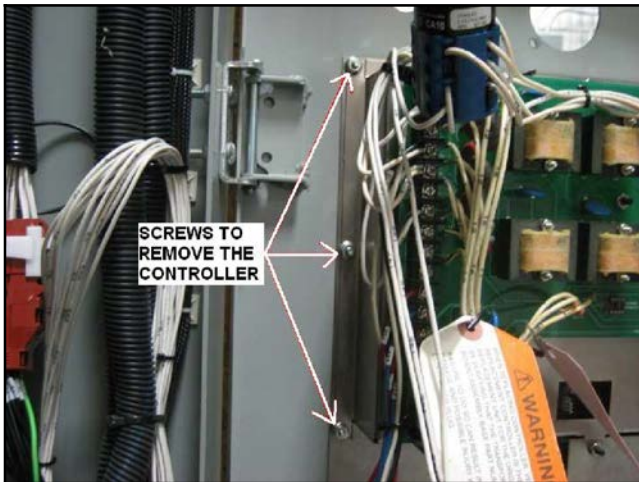


Figure 17 Remove Controller Screws

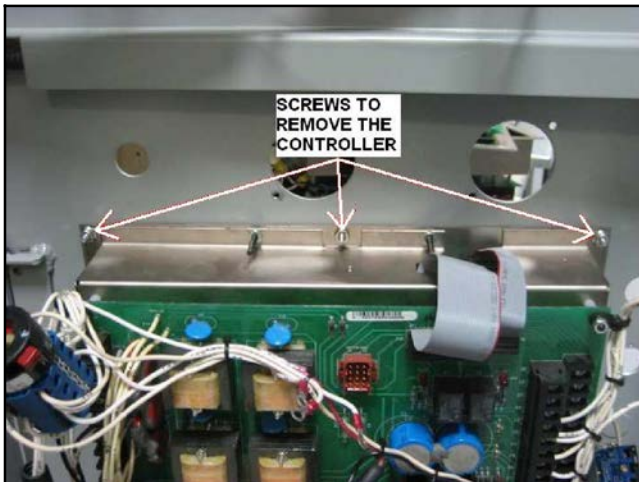


Figure 18 Remove Controller Screws

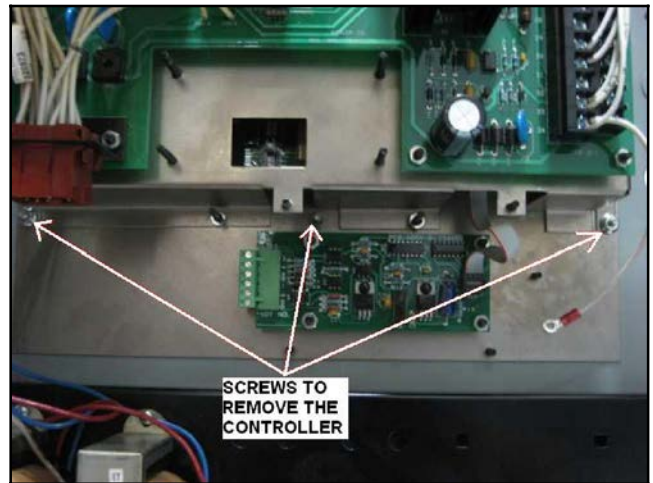


Figure 19 Remove Controller Screws

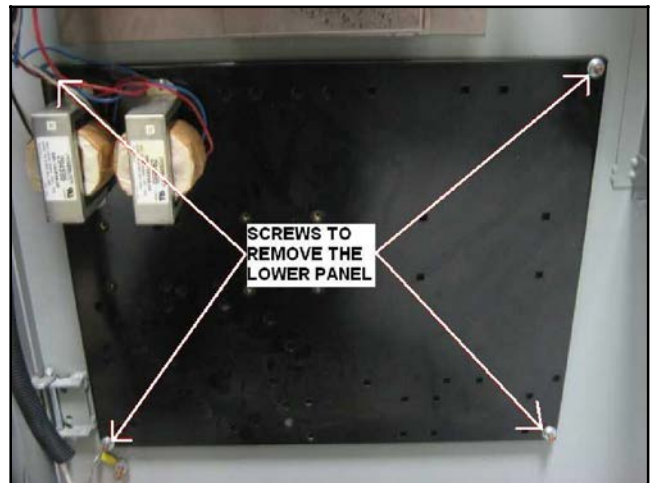


Figure 20 Remove Lower Panel Screws



Figure 21 Controller and Lower Panel Removed

Figure 22 Conversion Kit Assembly

Note: Refer to the notes in Figure 22 before installing the mounting plate and switch cover plate.

14. Install the conversion kit mounting plate (GM60611). Use seven lock washers (X-22-7) and seven nuts (X-6210-4) to install the mounting plate as shown in Figure 22 and Figure 23. Install three flat washers (X-25-122) with three nuts (X-6210-2) as shown.
15. Install the DIN rail (GM47488) using two nuts (X-6210-4).
16. Install the panel retainer (GM70051).

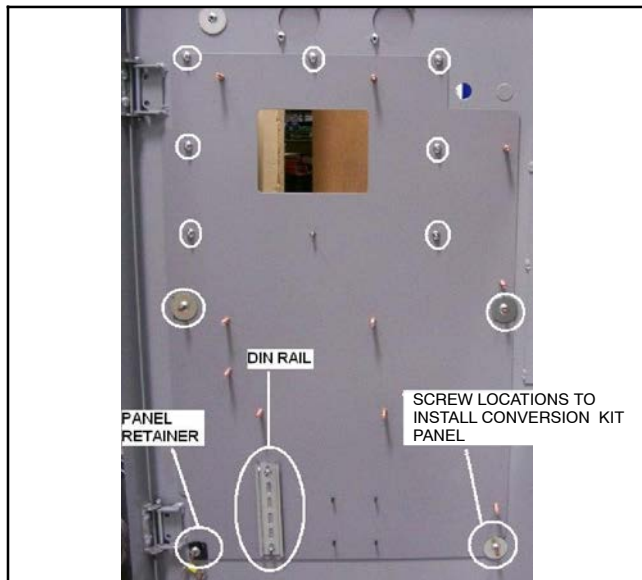


Figure 23 Mounting Plate Installation

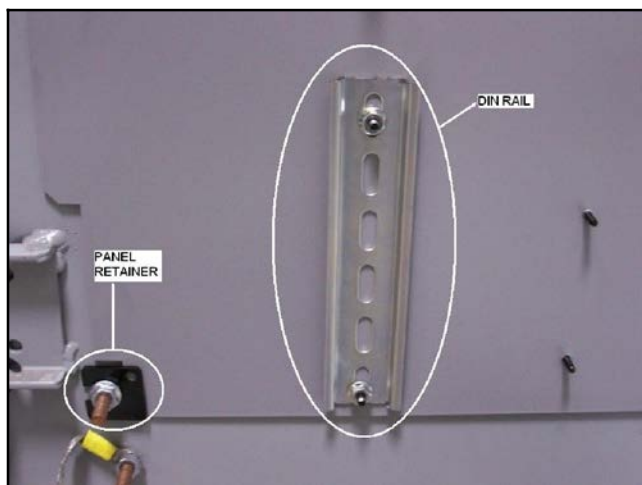


Figure 24 DIN Rail and Panel Retainer

17. Install the switch cover plate (GM69929). Use one washer (X-25-122) and five nuts (X-6210-4) to install the cover plate as shown in Figure 22 and Figure 25.



Figure 25 Switch Cover Plate GM69929



Figure 26 Door with Mounting Plate and Switch Cover Plate

18. Install the MPAC 1500 controller assembly (GM46733-1) onto the conversion kit mounting plate using four nuts (X-6210-2). See Figure 27.

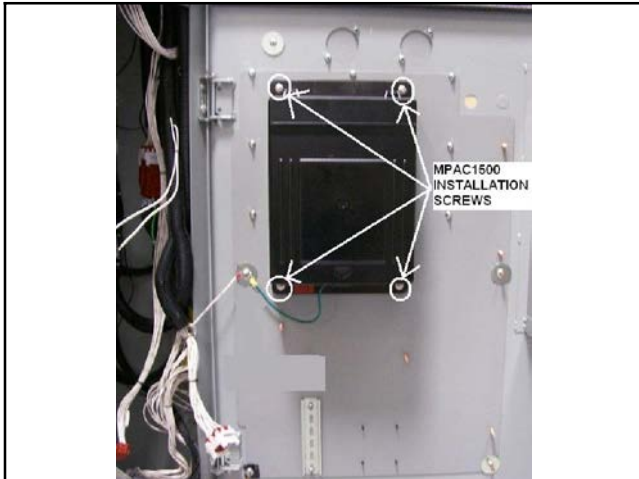


Figure 27 Controller Assembly Installation

19. See Figure 28 for ground connections. Use green grounding lead LK-1212-1515 to connect the ground stud on the conversion panel to the ground lug on the door. Using a lock washer (X-22-12), connect the ground wires to the ground stud on the door. Place the grounding wires between the washer and the nut.



Figure 28 Ground Lead Connections

20. Use four lock washers (X-22-6) and four nuts (X-71-2) to re-install transformers NCPT and ECPT and the terminal block onto the conversion kit mounting plate.

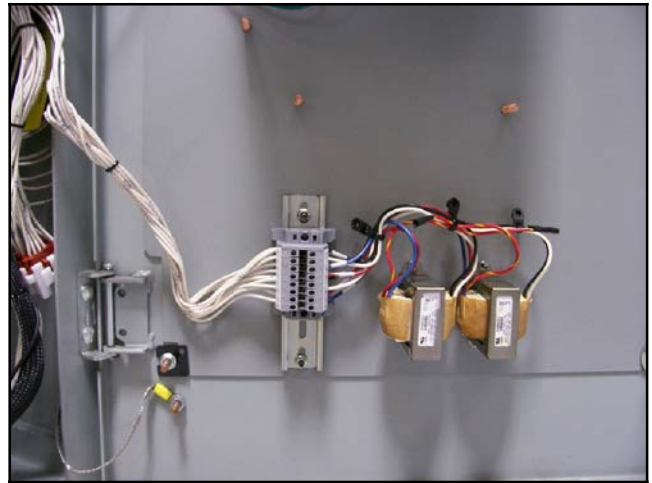


Figure 29 Transformer and Terminal Block Installation



Figure 30 Transformers and Terminal Block Installed

21. Remove the existing switchplate, if necessary. Affix conversion kit decal GM67498 (for disconnect switch) or GM70533 over the old decal on the outside of the ATS door.



Figure 31 Before Decal Installation



Figure 32 After Decal Installation (decal GM67498 shown)

22. If the transfer switch was equipped with an Auto/Inhibit disconnect switch mounted on the enclosure door, re-install the disconnect switch through the conversion kit mounting plate. Otherwise, proceed to step 24.



Figure 33 Disconnect Switch Re-Installed



Figure 34 Disconnect Switch (inside door)

23. Connect the AUTO/INHIBIT disconnect switch.

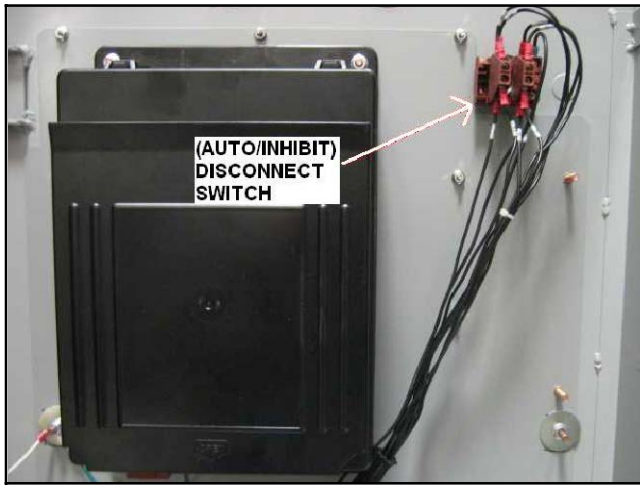


Figure 35 AUTO/INHIBIT Switch Connection

24. See Figure 37 for conversion kit wire harness GM69403 and Figure 36 for harness connections.

Connect plug P24 of the conversion kit wire

harness (GM69403) to J24 of the ATS harness, which was disconnected in step 10. Connect plug P1 of the conversion kit harness to the MPAC 1500 controller. Route the conversion kit wire harness appropriately using the cable ties provided.

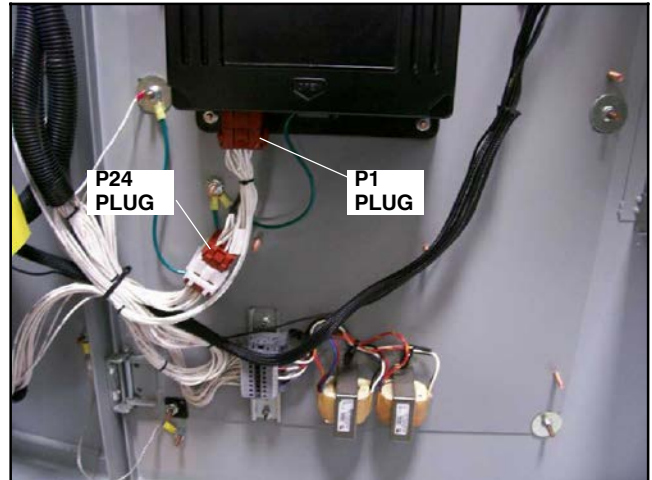


Figure 36 Conversion Kit Harness Connection to Controller Assembly

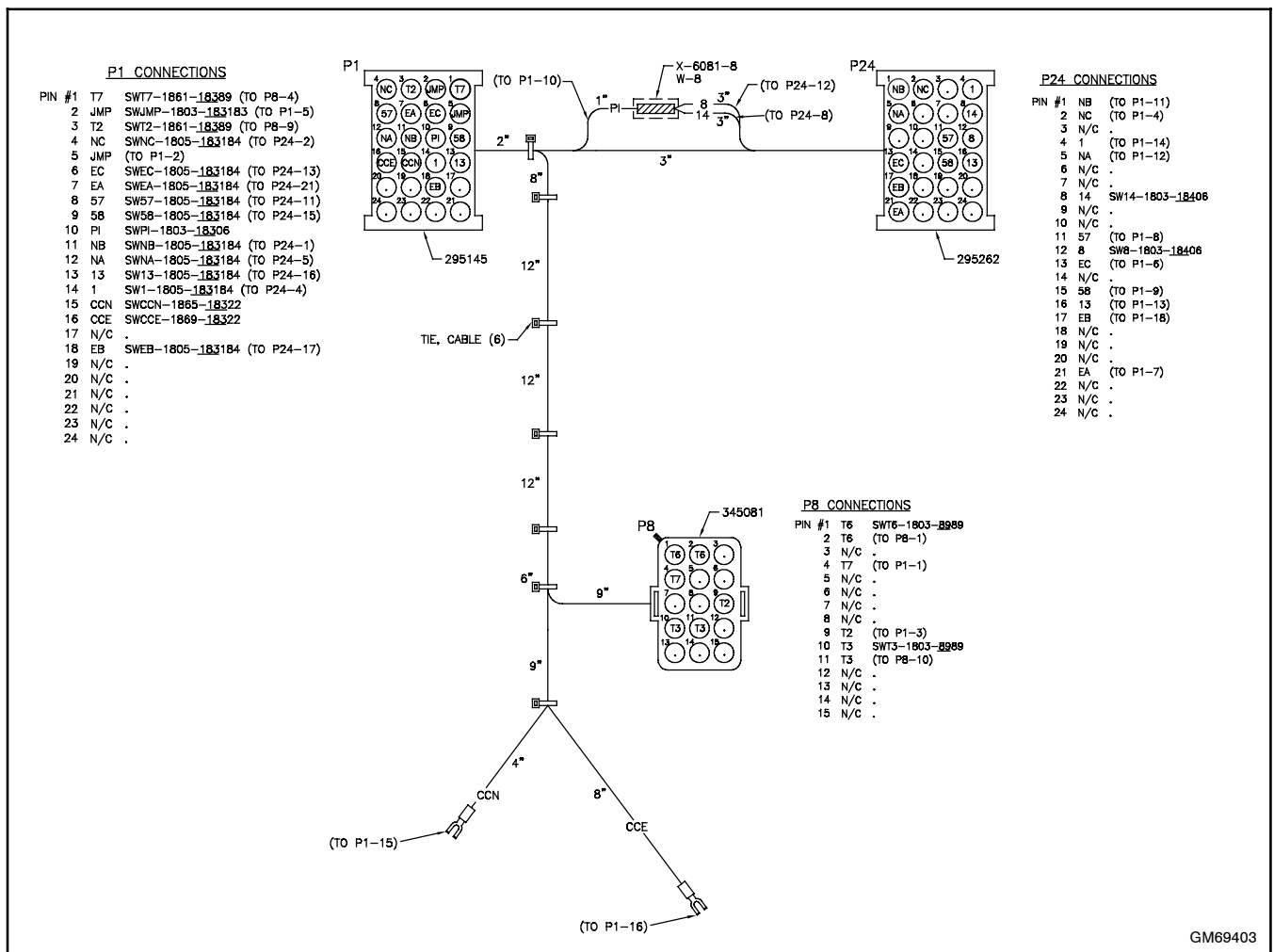


Figure 37 Conversion Kit Harness GM69403

25. Remove the upper plastic panel.

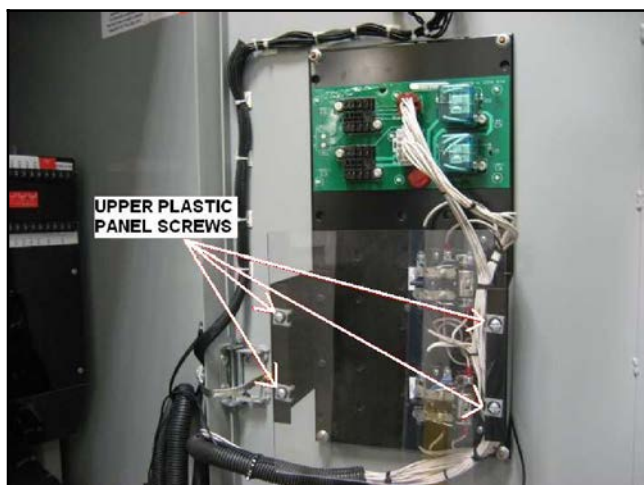


Figure 38 Plastic Panel on Upper Assembly



Figure 39 Upper Assembly with Plastic Panel Removed

26. Disconnect the leads labelled 33 from terminals CCN-1 and CCE-1. See Figure 40.

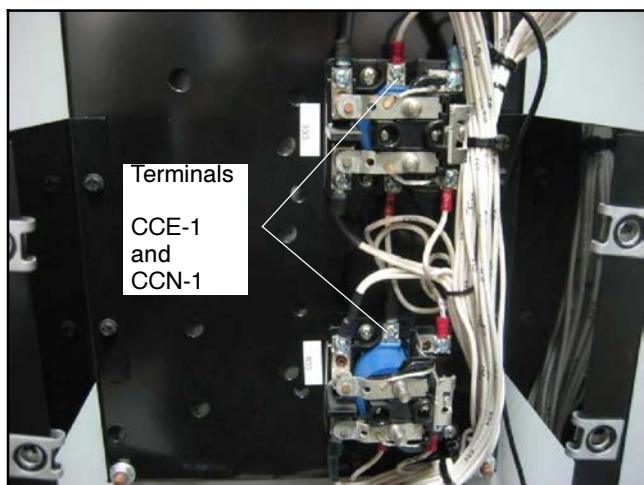


Figure 40 Disconnect Lead 33 from CCN-1 and CCE-1

27. Cut the terminal from the pair of leads marked 33 and separate the leads. See Figure 42. Discard the short jumper lead (33) that was connected from CCE-1 to CCN-1. See Figure 41. The remaining lead 33 will not be used.

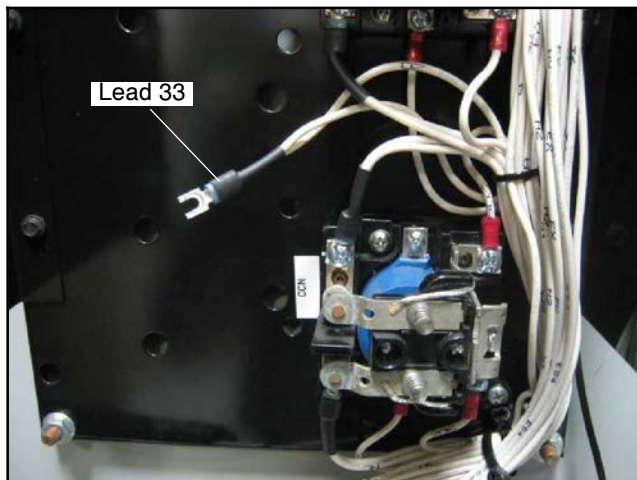


Figure 41 Cut Connector from Two Leads Labelled 33

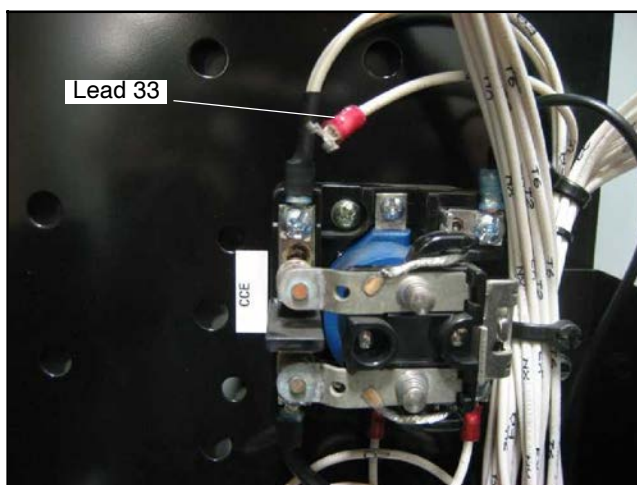


Figure 42 Single Jumper Lead 33 (separate and discard)

28. Disconnect plug P8 from the upper board.

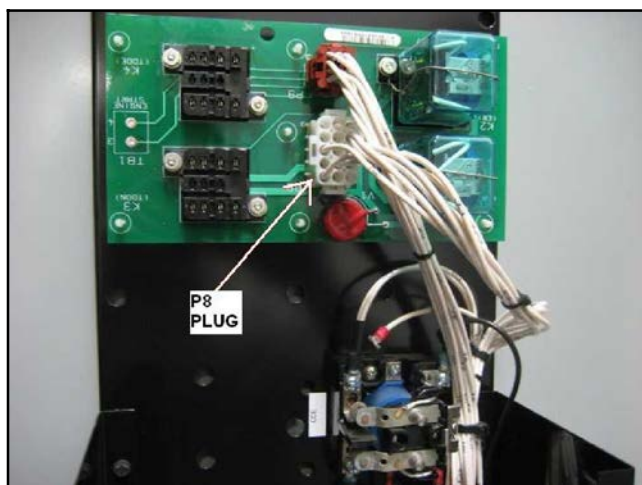


Figure 43 Disconnect Plug P8

29. Connect the conversion kit wire harness GM69403 to plug P8, which was disconnected from the upper board in the previous step.

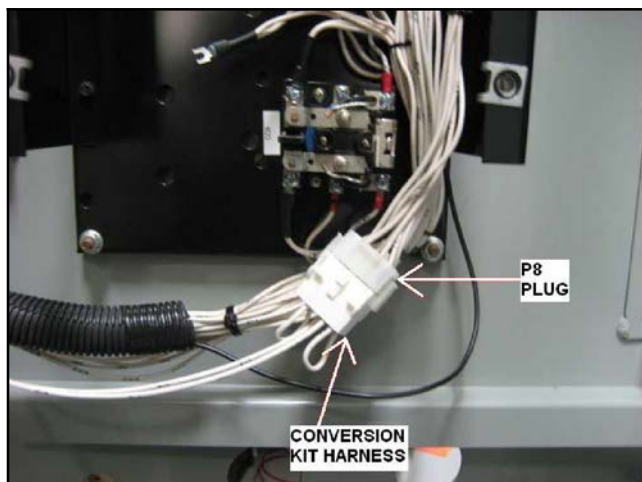


Figure 44 Connect Conversion Kit Wire Harness GM69403 to Plug P8



Figure 45 P8 has been disconnected from the upper board and connected to conversion kit harness GM69403.

30. Connect lead CCN from the conversion kit wire harness to CCN-1 on the CCN relay.

Connect lead CCE from the conversion kit wire harness to CCE-1 on the CCE relay. Route the conversion kit wire harness appropriately using the cable ties provided.



Figure 46 CCN and CCE Relay Location

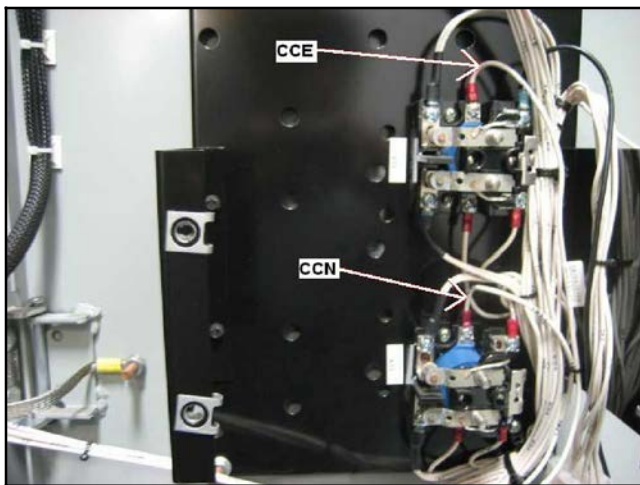


Figure 47 Connections to CCN and CCE Relays



Figure 48 Harness Routing

31. Remove the circuit board from the upper panel.



Figure 49 Remove the Upper Panel Circuit Board



Figure 50 Upper Circuit Board Removed

32. Re-install the upper plastic panel, and finish routing the conversion kit wire harness neatly using the cable ties provided.



Figure 51 Re-Install Plastic Panel

33. For current sensing, obtain the appropriately rated current sensing kit, and install according to Figure 54. Connect the current transformers as shown in Figure 55. See the Parts List at the end of this document for current sensing kit numbers.
34. Place decal GM70205 on the mounting plate as shown in Figure 53 and record the required information on the decal.

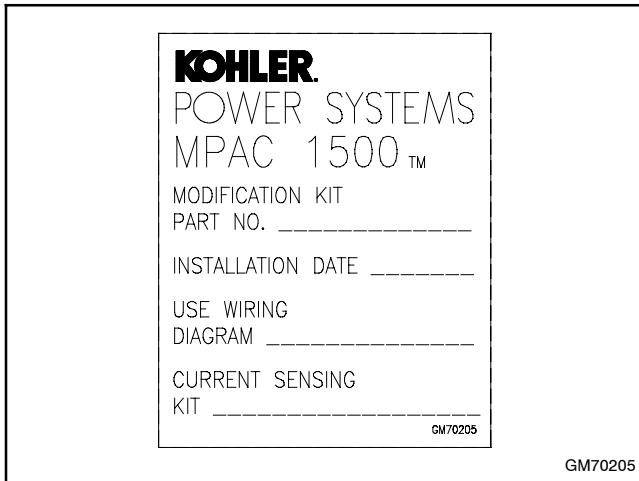
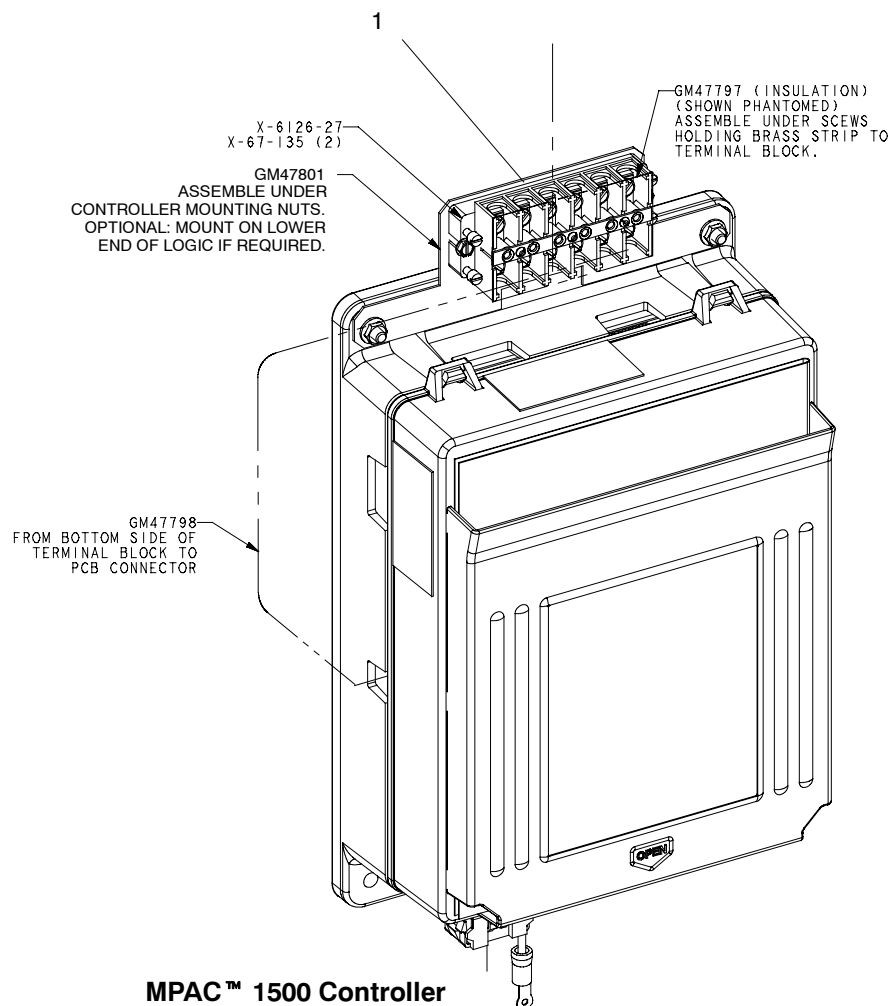


Figure 52 Decal GM70205

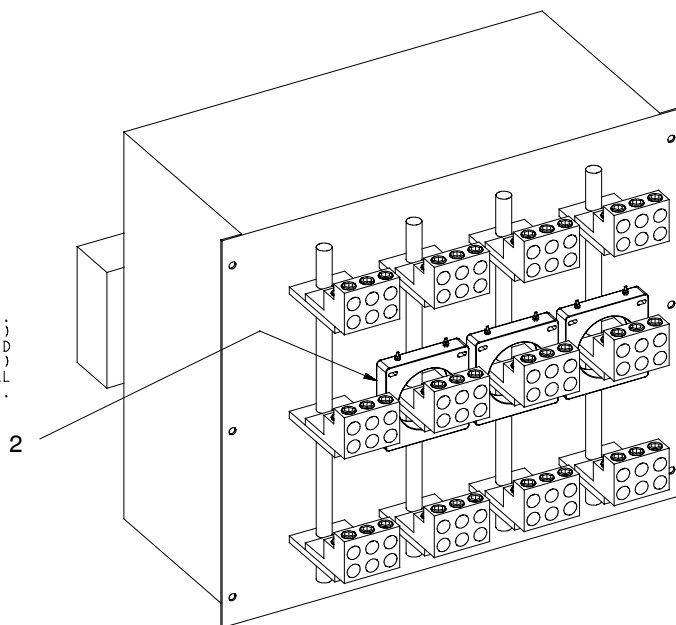


Figure 53 Decal GM70205 Location

35. The controller installation is now complete. For installation of optional accessories, refer to the instructions provided with the accessory kit or to the MPAC™ 1500 Operation/Installation manual, TP-6714.
36. Reconnect power to the transfer switch.
37. Check that the generator set master switch is in the OFF position.
38. Reconnect the generator set engine starting battery, negative (-) lead last.
39. Reconnect power to the battery charger, if equipped.
40. Program the MPAC1500 controller voltages, time delays, and system phases. See TP-6714, Operation Manual, for instructions.
41. Run the operation tests outlined in Operation Manual TP-6714 to verify system operation.



REMOVE BRACKETS FROM CT'S AND DISCARD BRACKETS.
ASSEMBLE CT'S ON LOAD BUS (A, B & C)
(LUGS MUST BE REMOVED FIRST AND
REASSEMBLED AFTER MOUNTING CT'S)
TIE WRAP CT'S TO VERTICAL
BUS SUPPORTS AND EACH OTHER.



NOTES:

HI SIDE OF CT'S MUST ALWAYS FACE TOWARD THE CONTACTOR.

Route CT harness neatly to controller/contactor harness. Use cable ties as necessary.
See wiring diagram GM47803.

1. Connect harness GM40562 (10 ft. harness)
2. Current transformers. See Parts List for part numbers.

Figure 54 Current Sensing Kit Installation

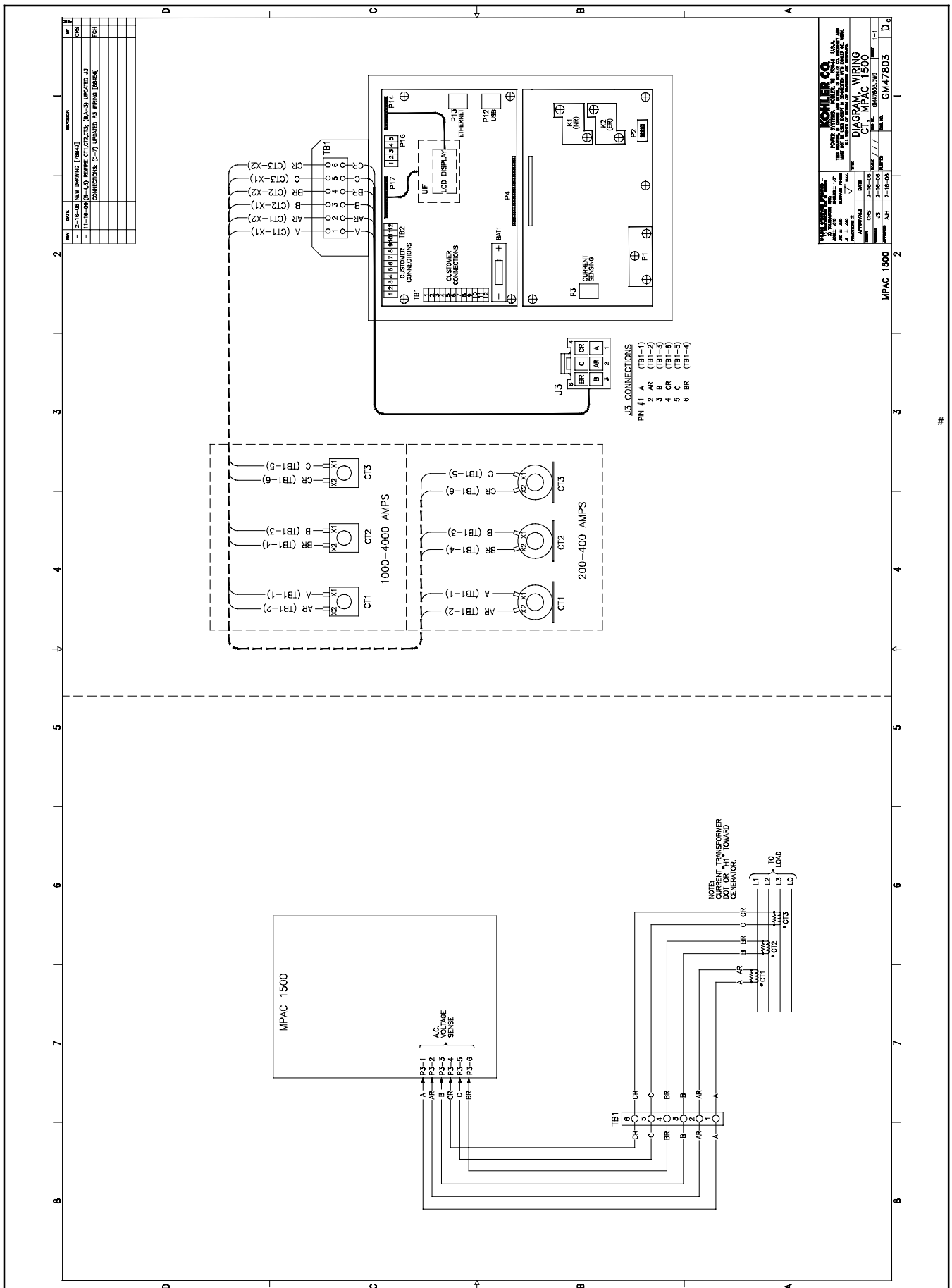


Figure 55 Current Sensing Kit Wiring Diagram, GM47803

Parts Lists

Conversion Kit, M340+ to MPAC1500 (ZCS-5)

Kit: GM69378-S2		
Qty.	Description	Part Number
1	Logic, MPAC1500 Assembly	GM46733-1
1	Rail, Din	GM47488
1	Plate, Mounting	GM60611
1	Harness, Wiring Controller	GM69403
1	Plate, Cover Switch	GM69929
1	Retainer, Panel	GM70051
1	Decal, Kohler Power Systems MPAC 1500	GM70205
1	Decal, ATS M340 To MPAC1500 Conversion	GM70355
1	Lead	LK-1212-1515
1	O/M MPAC 1500 Controls , ATS	TP-6714
1	O/I/M Model ZCS with MPAC 1500, ATS	TP-6720
1	TT MPAC 1500 Convsn Kit for Model ZCS	TT-1526
1	Washer, lock.262 ID x.743 in.OD	X-22-12
5	Washer, lock.146 ID x .285 in.OD	X-22-6
8	Washer, lock.172 ID x.333 in.OD	X-22-7
5	Washer, plain, .312 ID x 1.5 in. OD	X-25-122
10	Cable Tie	X-468-1
2	Cable tie, nylon	X-468-3
10	Nut, flange spiralock, 1/4-20	X-6210-2
15	Nut, flange whiz, 8-32	X-6210-4
5	Nut, hex machine screw, 6-32	X-71-2

Wiring Diagrams

The schematic and wiring diagrams for the transfer switch with MPAC™ 1500 controls are arranged in numerical order on the following pages.

Drawing Description	Drawing Number
Schematic, 600-1200 A	GM70985
Wiring Diagram, 600-1200 A	GM70986
Schematic, 1600-3000 A	GM71181
Wiring Diagram, 1600-3000 A	GM71182

Current Sensing Kits

Description	Part Number	Part Quantity					
		Kit number GM47965:					
		-S19	-S20	-S21	-S22	-S23	-S24
		1000 A 3 ph	1200 A 3 ph	2000 A 3 ph	3000 A 3 ph	1000 A 1 ph	1200 A 1 ph
Harness, CT 10 FT.	GM40562	1	1	1	1	1	1
Transformer, Current	GM47790	3				2	
Transformer, Current	GM47791		3				2
Transformer, Current	GM47792			3			
Transformer, Current	GM47793				3		
Insulation, Terminal Block	GM47797	1	1	1	1	1	1
Harness, CT	GM47798	1	1	1	1	1	1
Bracket, Terminal Block Mounting	GM47801	1	1	1	1	1	1
Diagram, Wiring CT MPAC 1500	GM47803	1	1	1	1	1	1
Drawing, Assembly Current Sensing	GM47965	1	1	1	1	1	1
Terminal Block	X-6126-27	1	1	1	1	1	1
Screw, Hex, Washer, Thread-forming	X-67-135	2	2	2	2	2	2

