INSTALLATION INSTRUCTIONS

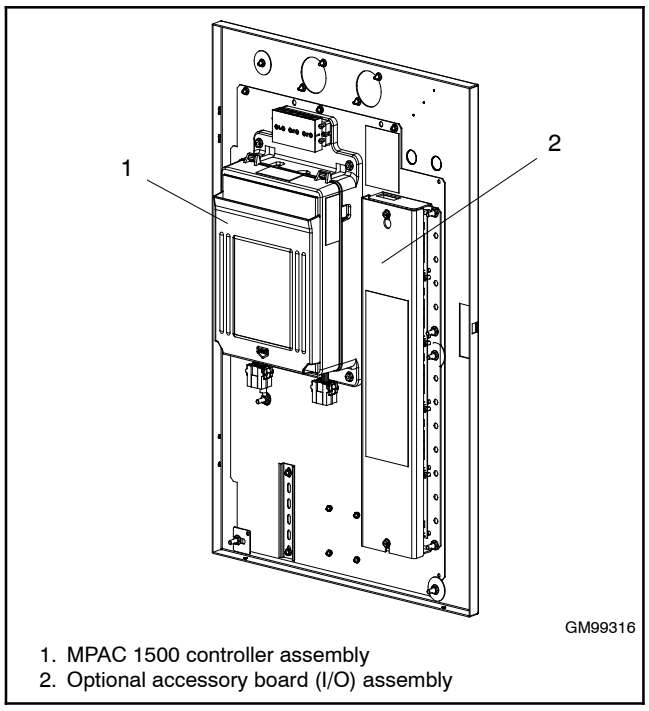
Original Issue Date: **3/16**
Model: **ZCM-6 and ZCB-6 Programmed-Transition Bypass/Isolation Switches**
Market: **ATS**
Subject: **Controller Conversion Kits GM99316-S4 and -S5**

Introduction

The conversion kit allows the replacement of the M340+ controller with a Decision-Maker® MPAC 1500 controller on model ZCM-6 and ZCB-6 programmed-transition bypass/ isolation switches.

See Figure 1 for an illustration of the installed kit. See Figure 2 for controller identification, if necessary.

Note: The optional accessory board (I/O) assembly shown in the figures is available separately.



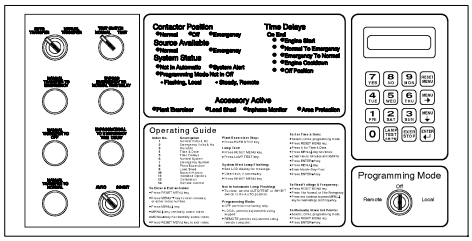
1. MPAC 1500 controller assembly
2. Optional accessory board (I/O) assembly

Figure 1 Decision-Maker® MPAC 1500 Controller Conversion Kit, Installed

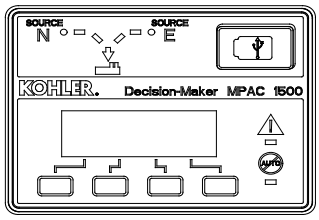
Tools and Materials Required:

- 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 in this publication before beginning installation. Refer to the wiring diagrams at the end of this publication as needed during the installation. Perform the steps in the order shown.



M340+ Controller



Decision-Maker® MPAC 1500 Controller

TT1684

Figure 2 Controller Identification

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
KOHLERPower.com

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

Controller Accessories

Many functions that required optional accessories with the M340+ controller are integrated into the Decision-Maker® MPAC 1500 controller operation. For example, an active time delay can be ended by pressing a button on the Decision-Maker® MPAC 1500 controller. Separate time delay bypass switches are not required. See Figure 3 for accessory information.

M340+	Decision-Maker® MPAC 1500
Bypass (end) Time Delay Switches	Integrated
Source Monitor	Integrated
Test Switch	Integrated
Override Switches	Integrated
Preferred Source Switch	Alarm Module required (see Figure 4)
Current Meter (amps)	Current Sensing Kit required (see Figure 6)
Plant Exerciser	Integrated
Manual Switch Operation	Supervised Transfer Control Switch (see Figure 5)
Voltage/Frequency Meters	Integrated
Load Shed Contact	Integrated Load Control Function (one output connection required)

Figure 3 Accessories

Accessory Modules

Optional accessory modules are listed in Figure 4. One module mounting kit holds up to five accessory modules.

Accessory Modules	Part Number
Module Mounting Assembly *	GM46258-S
Standard I/O Module	GM46888-S
High Voltage/Current I/O Module	GM46890-S
Alarm Module	GM40808-S
External Battery Supply Module	GM46889-S
* One mounting assembly holds up to 5 modules.	

Figure 4 Accessory Modules for Decision-Maker® MPAC 1500

Other Accessories

Other Decision-Maker® MPAC 1500 accessories are available. See Figure 5. Contact your local distributor/dealer for more information.

Other MPAC 1500 Accessories	Part Number
Controller Disconnect Switch	GM46770-S3
Supervised Transfer Control Switch †	GM40807-S1
† Includes alarm module GM40808-S.	

Figure 5 Other Accessories

Current Sensing

If current sensing is required (i.e. for current [amps] monitoring and display), obtain the appropriately rated current sensing kit (with 3 m [10 ft.] harness) before starting the conversion procedure. If the transfer switch is equipped with current transformers (CTs), they will need to be replaced with the new current transformers during the controller conversion procedure. See Figure 6 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 higher amp rating.

Kit Description		Current Sensing Kit Number
Amps	Phases	
200	3	GM89028-S3
200	1	GM89028-S21
400	3	GM89028-S6
400	1	GM89028-S24
1000	3	GM89028-S8
1000	1	GM89028-S26
1200	3	GM89028-S11
1200	1	GM89028-S28
2000	3	GM89028-S15
3000	3	GM89028-S17

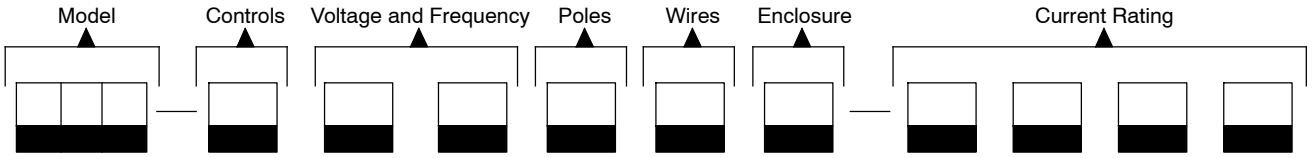
Figure 6 Current Sensing Kits

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator set distributor for availability.

Model Designation

To interpret the transfer switch model designation, see the model designation chart in Figure 7.

Record the transfer switch model number in the boxes below. The transfer switch model number defines characteristics and ratings as explained in the accompanying chart.



Kohler® Part Number Key

This chart explains the Kohler® transfer switch model numbering system. The sample model number shown is for a Model ZCB programmed-transition transfer switch with M340+ microprocessor electrical controls rated at 600 volts, 60 hertz, 3 phase, 3 poles, and 4 wires in a NEMA type 1 enclosure with a current rating of 1000 amperes. Not all possible combinations are available.

SAMPLE MODEL NUMBER

ZCB-660341-1000

Switch Classification or Family
ZCM: 150–400 amp automatic transfer and bypass isolation switch
ZCB: 150–4000 amp automatic transfer and bypass isolation switch

Electrical Controls
5: M340+ microprocessor
6: M340+ microprocessor with programmed transition

Voltage and Frequency (other codes possible)

53: 220 Volts, 60 Hz	60: 600 Volts, 60 Hz	62: 120 Volts, 60 Hz
63: 220 Volts, 50 Hz	64: 240 Volts, 60 Hz	66: 480 Volts, 60 Hz
68: 208 Volts, 60 Hz	71: 380 Volts, 50 Hz	72: 380 Volt, 60 Hz
73: 416 Volts, 50 Hz		

Number of Poles and Phase

2: 2 pole, 1 phase	3: 3 pole, 3 phase	4: 3 pole, 1 phase
6: 4 pole, 3 phase		

Number of Wires

3: 3 wire	4: 4 wire

Enclosure

0: Open unit*	1: NEMA type 1	2: NEMA type 12*
3: NEMA type 3R*		

* Contact the factory.

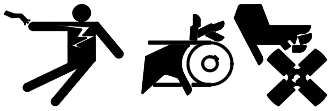
Current Rating
Numbers indicate the current rating of the switch in amperes

Figure 7 Model Designation Key

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.

⚠ 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.

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) Press the generator set off/reset button to shut down the generator set. (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

Note: The photos and diagrams shown in this procedure represent a typical transfer switch. They may not be an exact match for your ATS model.

1. Bypass the ATS to normal. Then rack the ATS out to the isolate position. See the bypass/isolation switch manual for instructions to bypass and isolate the transfer switch.

2. Place the generator set master switch in the OFF position or press the OFF/RESET button on the generator set controller.

3. Disconnect the power to the battery charger, if equipped.

4. Disconnect the generator set engine starting battery(ies), negative (–) lead first.

5. Disconnect power from the transfer switch on both sources, Normal and Emergency.

Remove M340+ Controller and Accessories

6. Remove the plastic protective panel that covers the electronic components on the bottom door of the enclosure. See Figure 8.

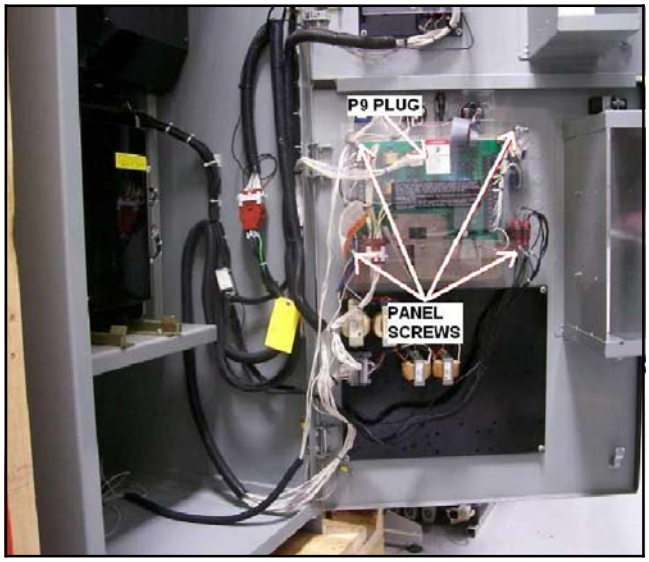
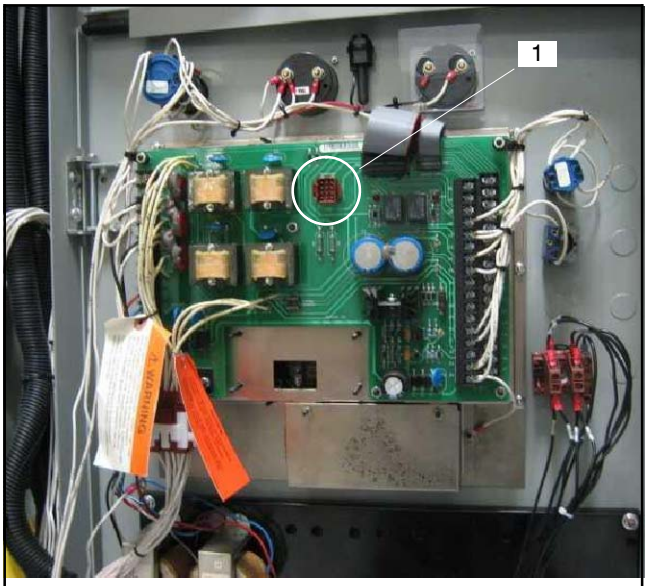


Figure 8 Plastic Panel on Bottom Door

7. Disconnect plug P9. See Figure 9.



1. P9 connection

Figure 9 Plug P9 Disconnected

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

9. Disconnect the Auto/Inhibit ATS disconnect switch. See Figure 10 and Figure 11. Do not remove the individual leads from the plug.

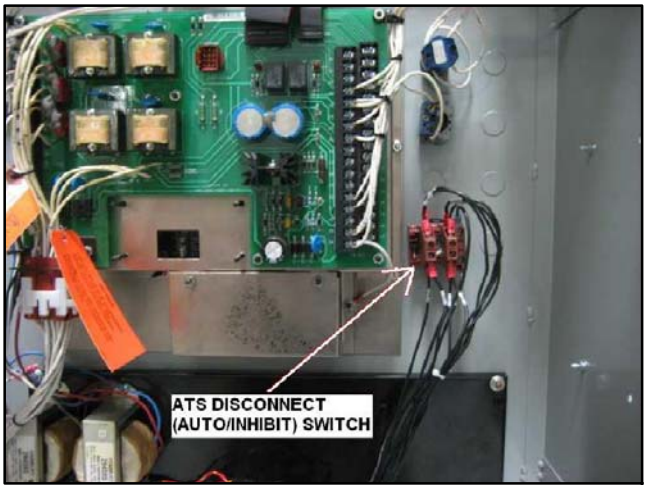


Figure 10 Auto/Inhibit ATS Disconnect Switch

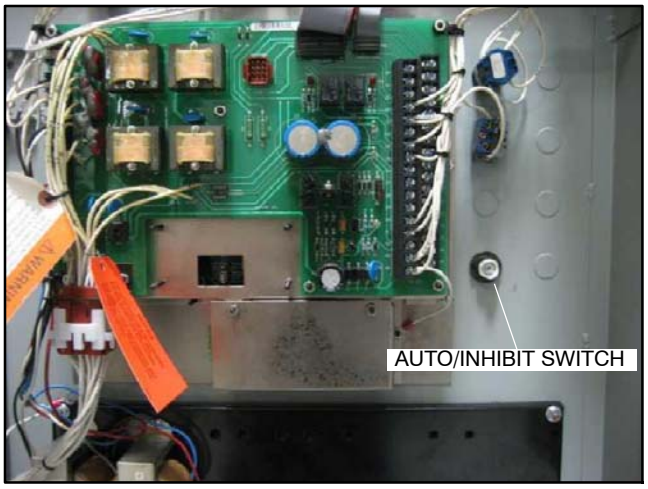


Figure 11 Auto/Inhibit Switch Disconnected

10. Disconnect the AUTO/TEST switch and the bypass time delay pushbutton. See Figure 12.

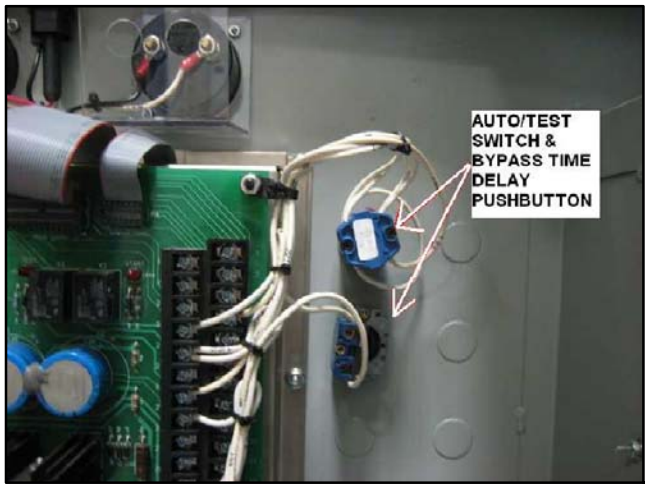


Figure 12 Disconnect the AUTO/TEST Switch and Bypass Time Delay Button

11. Remove the AUTO/TEST switch, the BYPASS TIME DELAY pushbutton, the ATS (AUTO/INHIBIT) disconnect switch, and any other optional switches in this area. See Figure 13.

    Keep the ATS (AUTO/INHIBIT) disconnect switch for reinstallation later in this procedure. Other switch functions are integrated into the new Decision-Maker® MPAC 1500 controller.

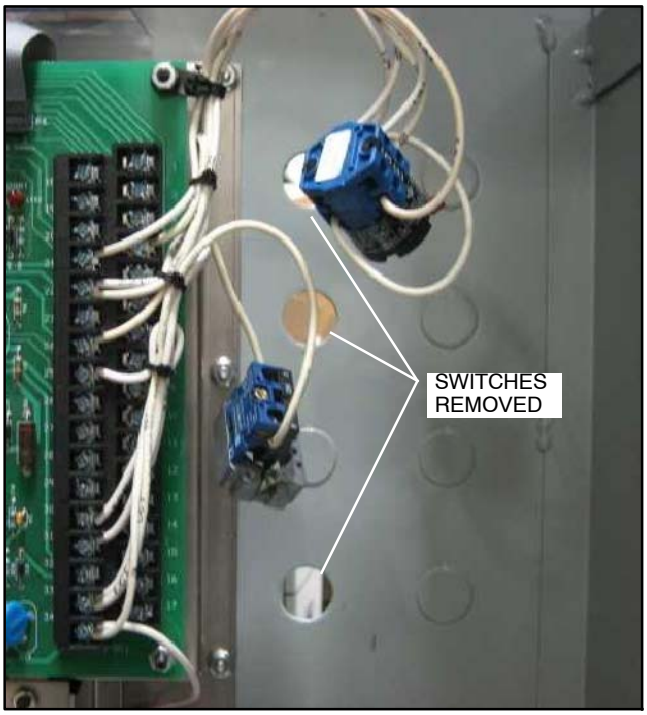


Figure 13 Switches and Pushbutton Removed

12. If the transfer switch is equipped with meters, disconnect and remove all meters and the selector switch. See Figure 14 and Figure 15.

    Note: Separate meters are not required with the MPAC 1500 controller. Voltage, frequency, and current (amps)* are shown on the controller display.

* For current monitoring and display, a current sensing kit is required. See Figure 6.

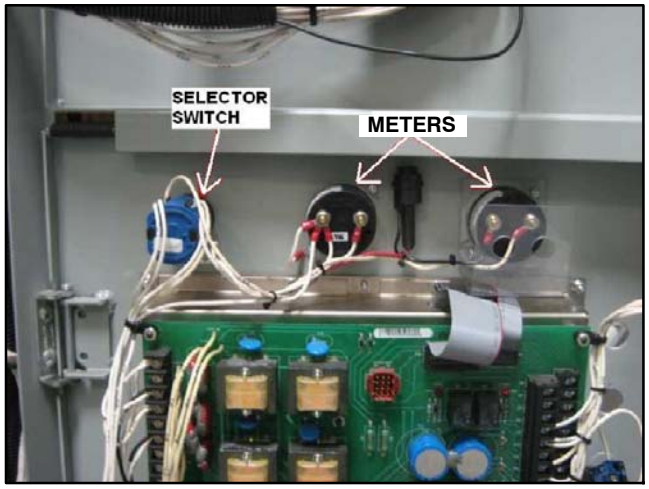


Figure 14 Disconnect the Meters and Selector Switch

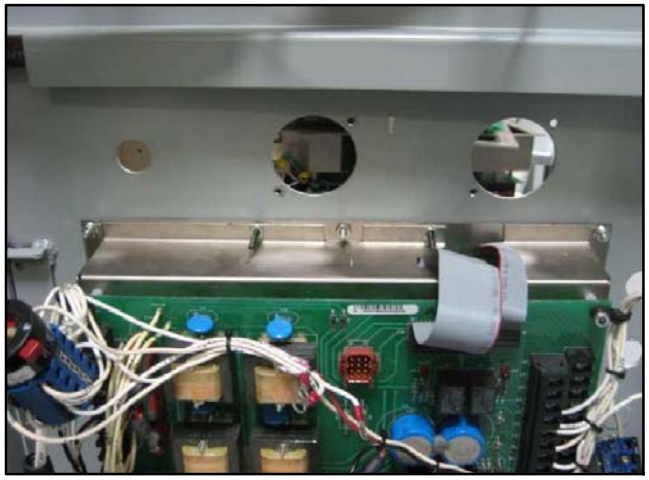


Figure 15 Meters and Selector Switch Removed

13. Disconnect plug P24 and ground connection. See Figure 16.

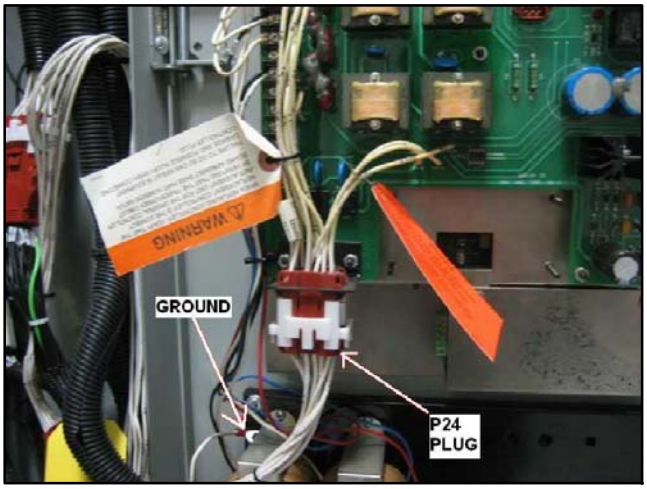


Figure 16 Disconnect P24 and Ground

14. Without disconnecting the leads, remove the mounting screws that secure transformers NCPT and ECPT and the terminal block to the lower panel. See Figure 17 and Figure 18.

    Note: Transformers NCPT and ECPT and the terminal block will be mounted onto the new mounting plate later.

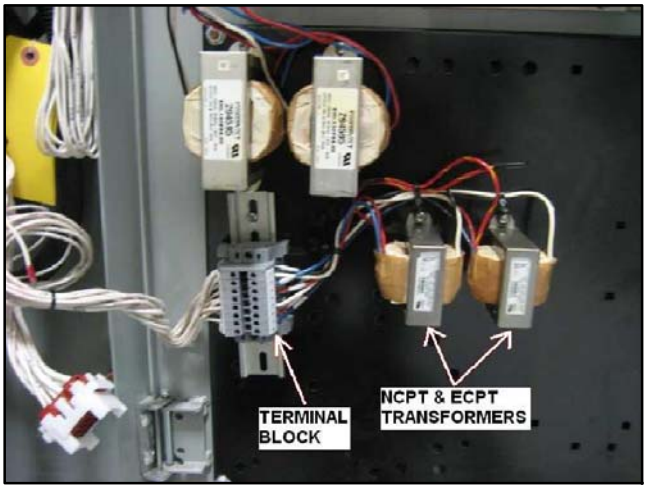


Figure 17 Transformers and Terminal Block on Lower Panel (do not disconnect electrical connections)

Figure 18 Transformers and Terminal Block Removed from Lower Panel but Not Disconnected

15. Remove the metal cover over the optional communication module, if present. See Figure 19.

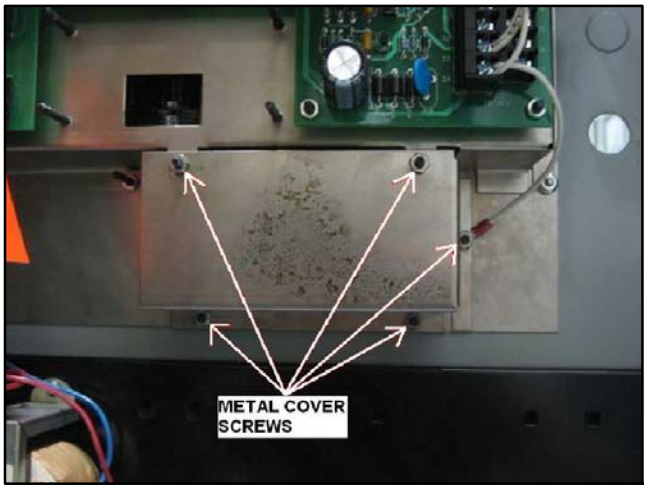


Figure 19 Remove Cover Screws

16. Remove the controller and the lower panel from the lower door of the enclosure. See Figure 20.

Figure 20 Controller and Lower Panel Removed

Mounting Plate and Cover Plate

Note: Refer to the notes in Figure 22 before installing the mounting plate and switch cover plate. Some door studs may need to be cut off and some mounting holes enlarged in the field, depending on the specific application.

17. Install conversion kit mounting plate GM99317. Use seven lock washers X-22-7 and seven nuts X-6210-4 to install the mounting plate as shown in Figure 21 and Figure 22. Install three flat washers X-25-122 with three nuts X-6210-2 as shown.

18. Install DIN rail GM47488 using two nuts X-6210-4. Install panel retainer GM70051. See Figure 21.

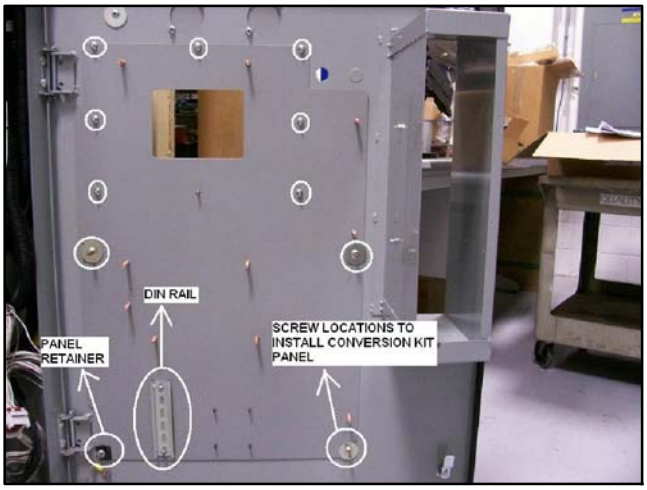


Figure 21 Mounting Plate Installation

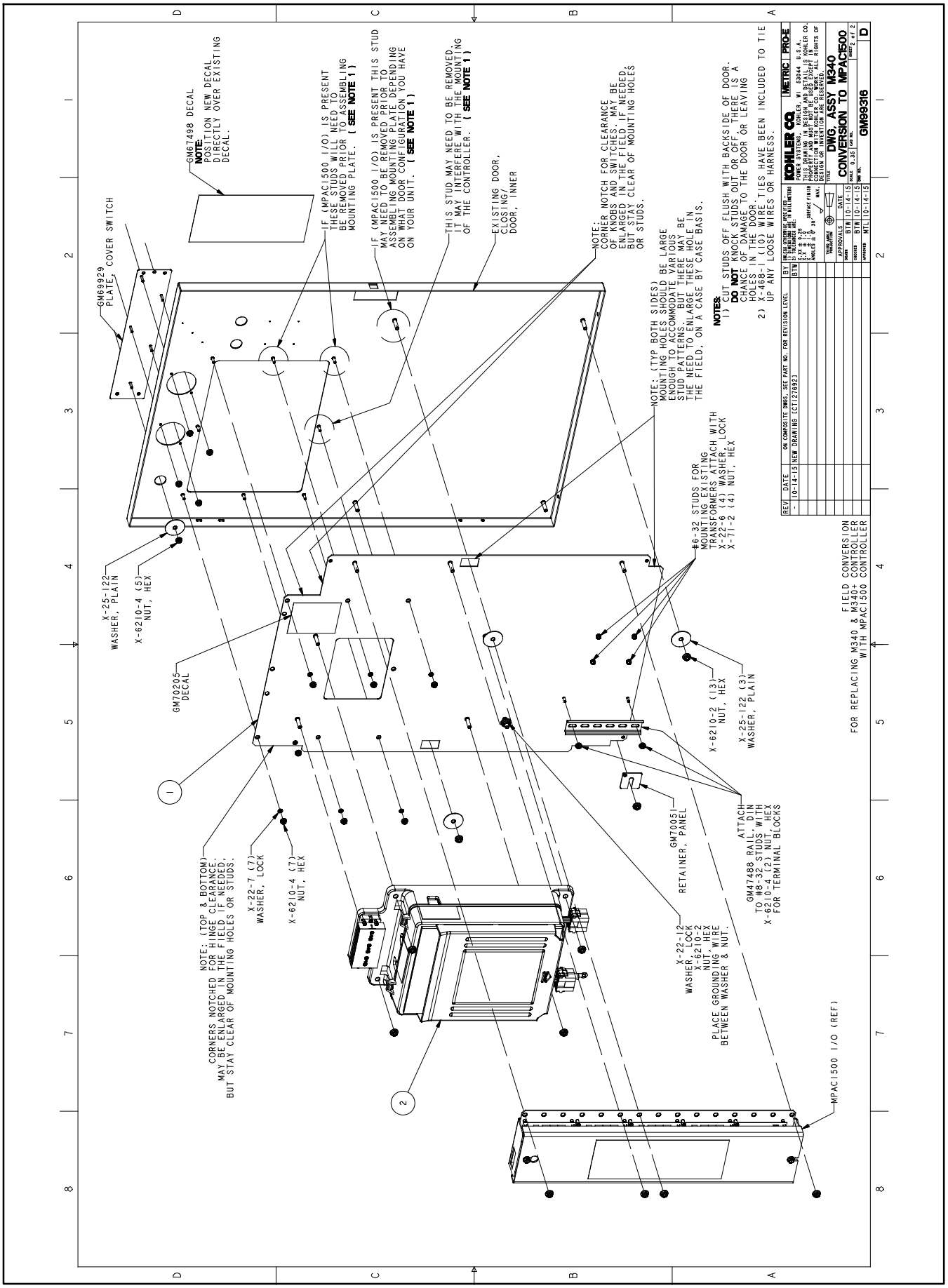


Figure 22 Conversion Kit Assembly

19. Install 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 23.

    The installed plates are shown in Figure 24.

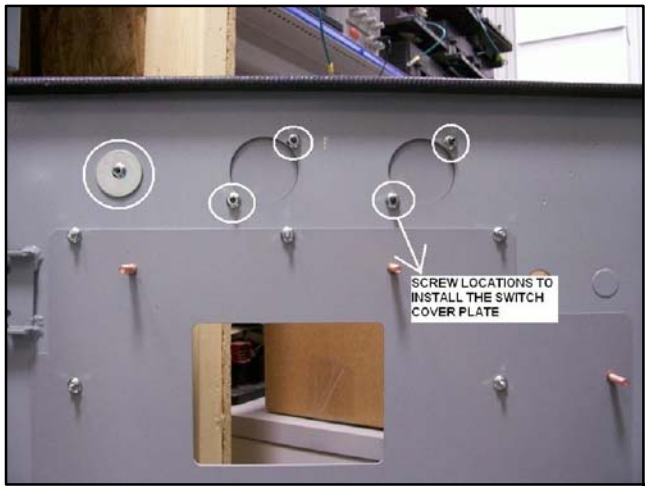
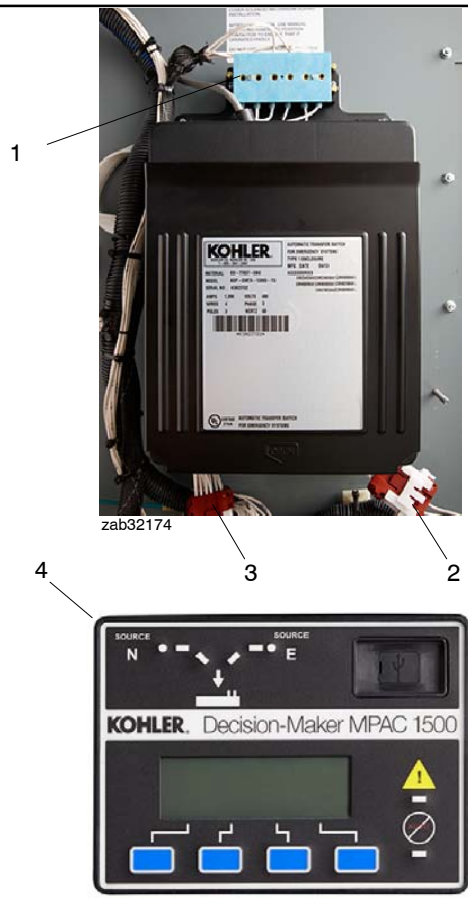


Figure 23 Switch Cover Plate GM69929

Figure 24 Door with Mounting Plate and Switch Cover Plate

Note: The illustrations in the following steps may not show the latest controller design. See Figure 25 for the updated current sensing kit terminal block, harness connection, and programmed-transition interface board connection.

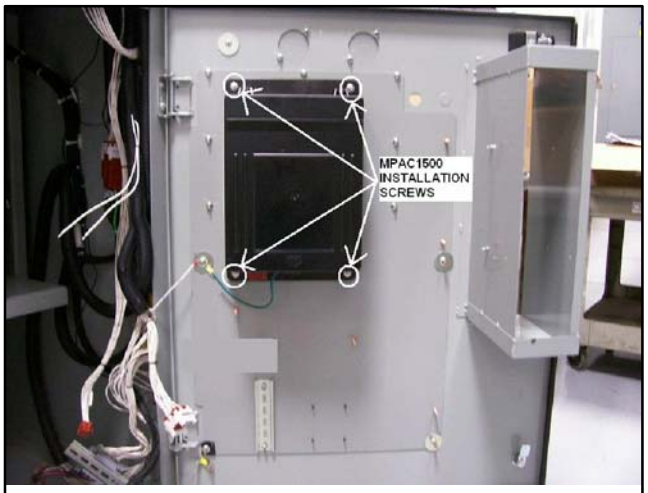


1. Current sensing terminal block with insulation and harness (optional)
2. Programmed-transition interface board connection
3. Contactor harness
4. Controller user interface

Figure 25 Decision-Maker® MPAC Controller Updated Features

Decision-Maker® MPAC 1500 Controller Assembly

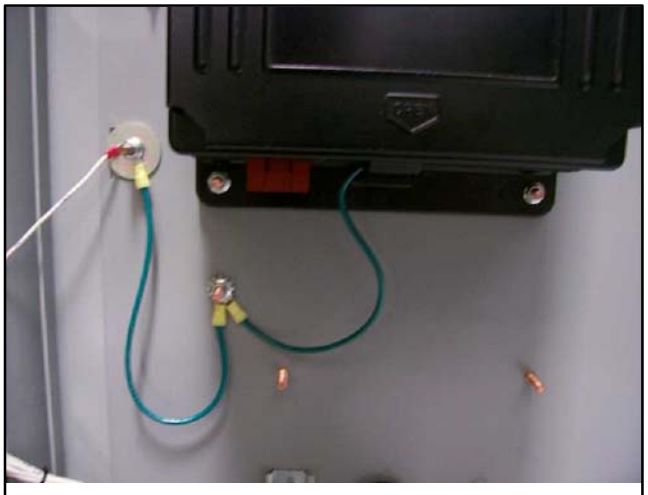
20. Install Decision-Maker® MPAC 1500 controller assembly GM85884-4 onto the conversion kit mounting plate using four nuts X-6210-2. See Figure 26.



Note: This photo does not show the latest controller design. See Figure 25.

Figure 26 Controller Assembly Installation

21. See Figure 27 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 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.



Note: This photo does not show the latest controller design. See Figure 25.

Figure 27 Ground Lead Connections

Transformers and Terminal Block

22. Reinstall the transformers and terminal block that were removed in step 14. See Figure 28 and Figure 29.

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

    b. Mount the terminal block onto the DIN rail, which was installed in step 18.

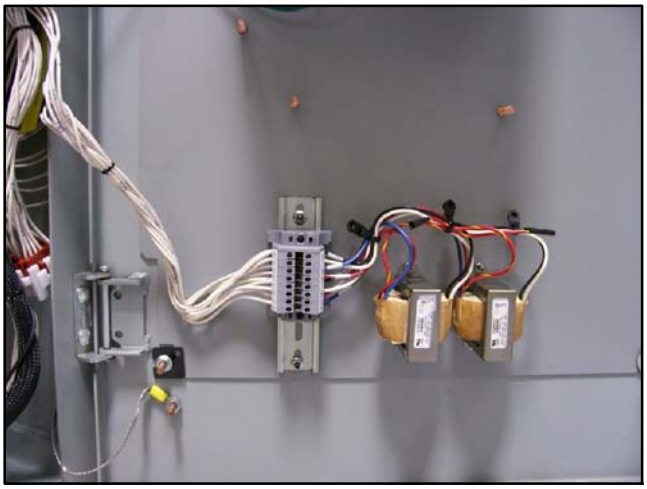


Figure 28 Transformer and Terminal Block Installation

Note: This photo does not show the latest controller design. See Figure 25.

Figure 29 Transformers and Terminal Block Installed

Decals

Note: The photos on this page do not show the latest controller design. See Figure 25.

23. Remove the existing switch decal, if necessary. Verify that the surface is clean and dry, and affix conversion kit decal GM67498 over the old decal on the outside of the bottom door. See Figure 30 and Figure 31.

Figure 30 Before Decal Installation

Figure 31 After Decal Installation

Disconnect Switch

24. Re-install the (AUTO/INHIBIT) disconnect switch through the conversion kit mounting plate. See Figure 32 and Figure 33.

Figure 32 Disconnect Switch Re-Installed

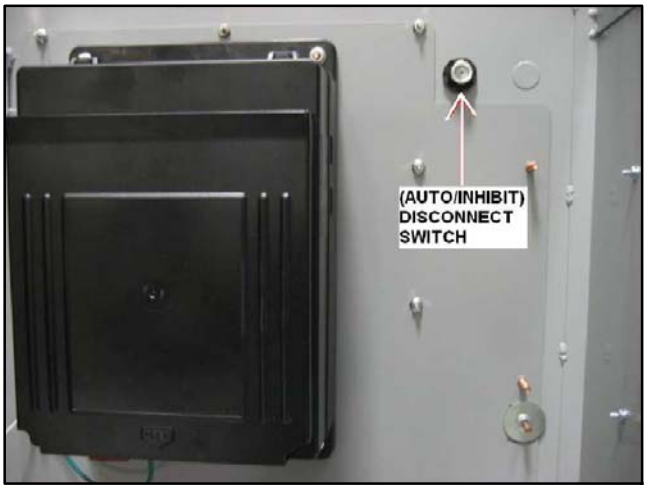


Figure 33 Disconnect Switch (inside door)

25. Connect the AUTO/INHIBIT disconnect switch to the existing plug that was disconnected in step 9. See Figure 34.

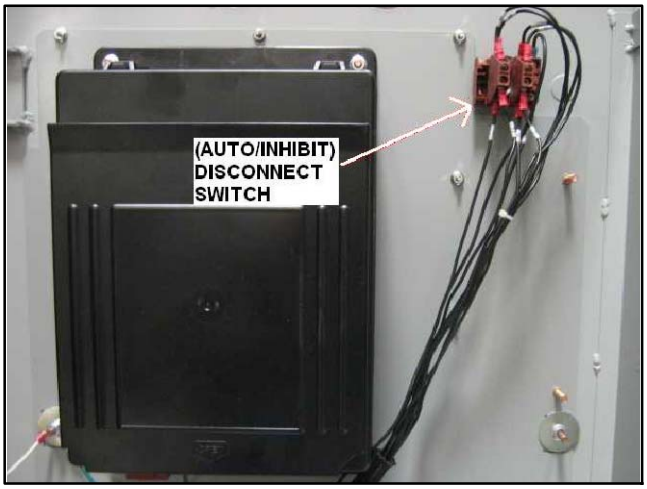


Figure 34 AUTO/INHIBIT Switch Connection

Conversion Kit Wiring Harness

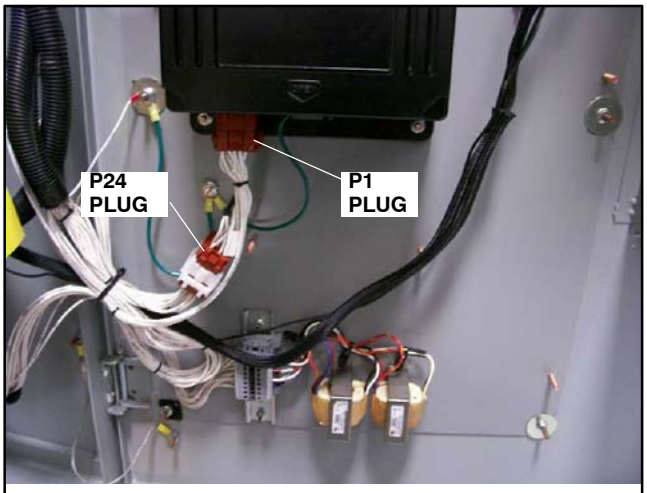
26. At this point in the procedure, you will start to connect the conversion kit wiring harness.

    - **Model ZCM** switches use conversion kit harness GM77518, included in kit GM99316-S4. See Figure 36.

    - **Model ZCB** switches use conversion kit harness GM77826, included in kit GM99316-S5. See Figure 37.

27. Connect plug P24 of the conversion kit harness to contactor harness plug P24, which was disconnected from the M340+ controller in step 13. See Figure 35.

28. Connect plug P1 of the conversion kit wire harness to the MPAC 1500 controller. See Figure 35.



Note: This photo does not show the latest controller design. See Figure 25.

Figure 35 Conversion Kit Harness Connection to Controller Assembly (PTIB not shown)

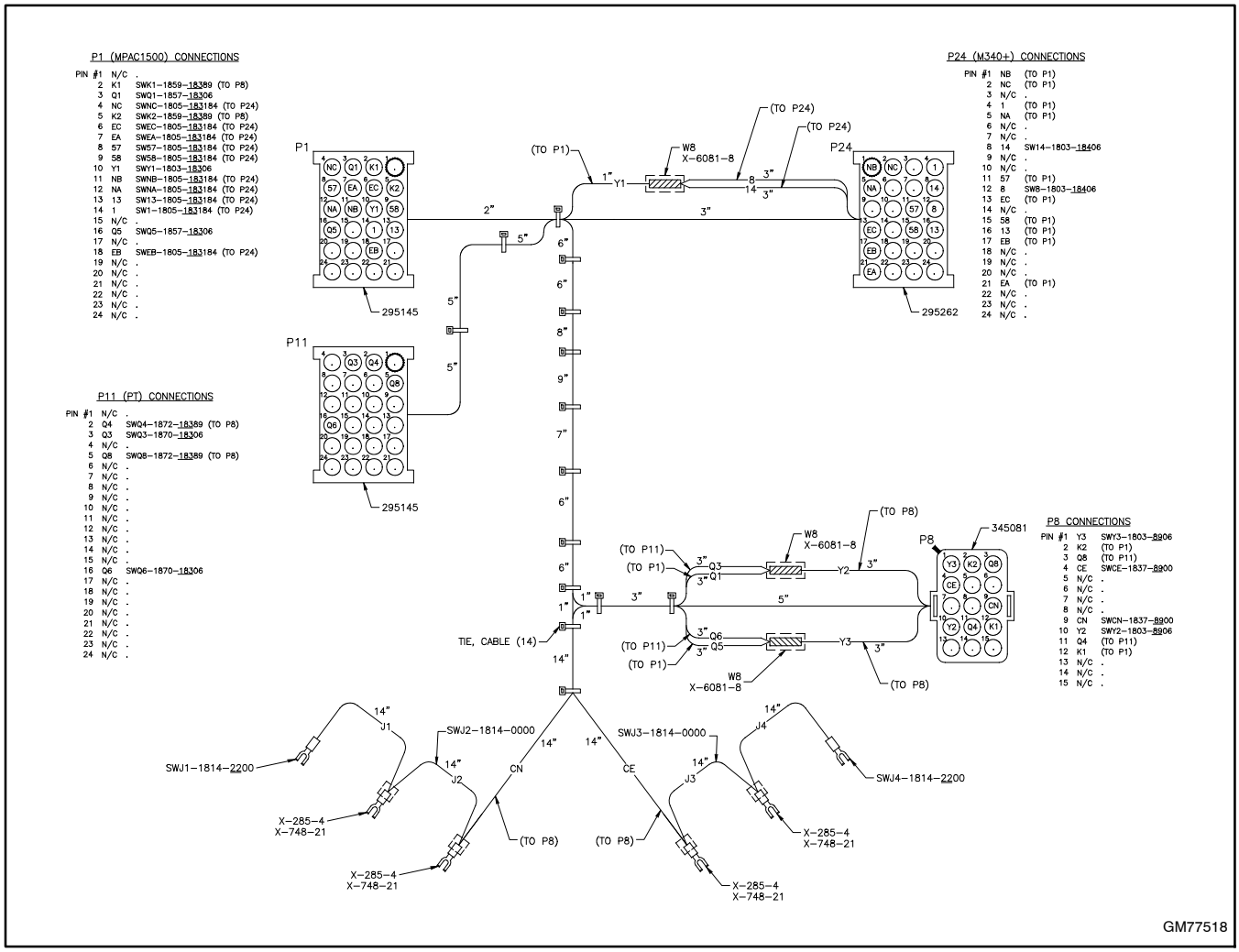


Figure 36 Conversion Kit Harness GM77518 for Model ZCM-6

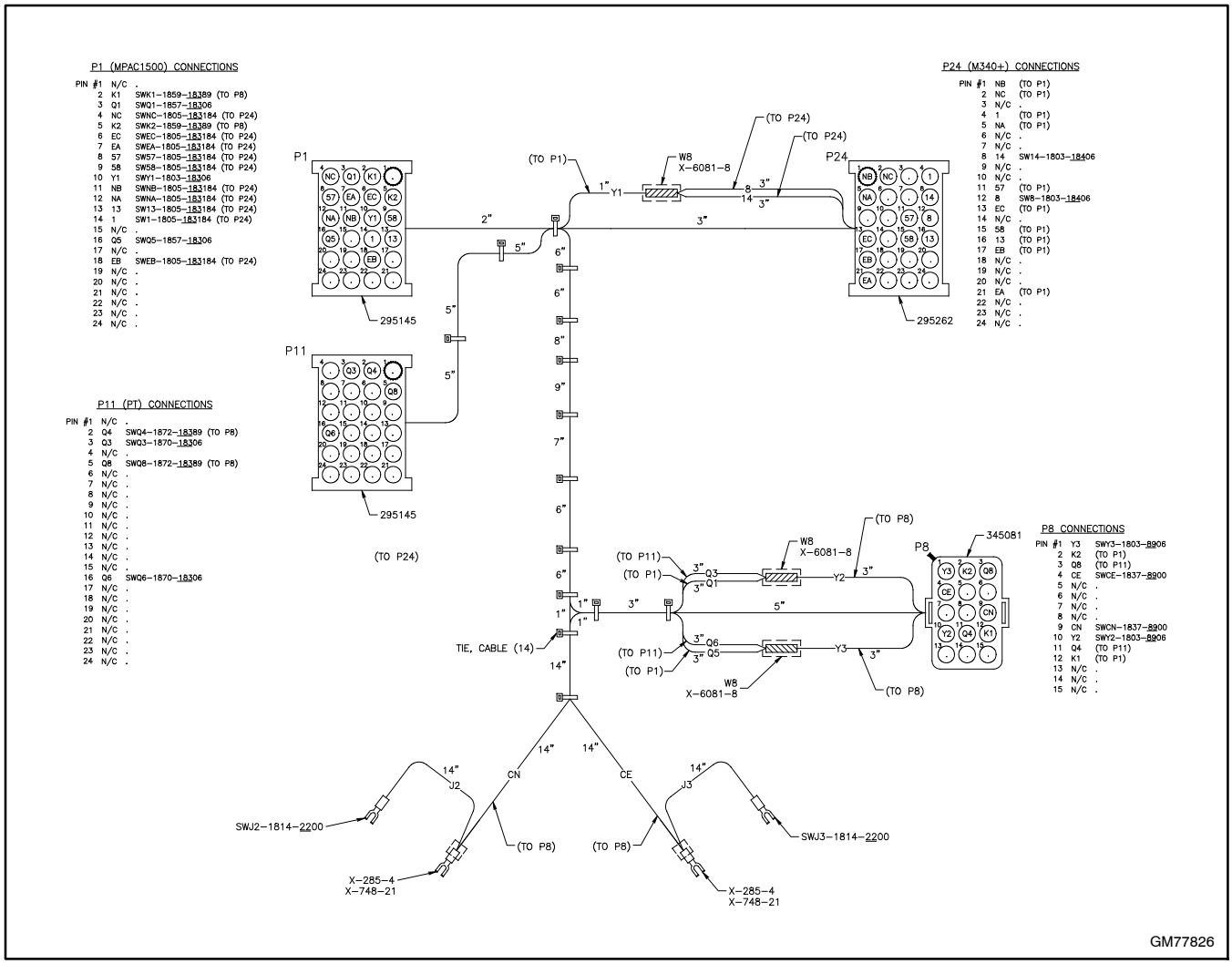


Figure 37 Conversion Kit Harness GM77826 for Model ZCB-6

Interface Panel

29. Remove the plastic cover from the interface panel components on the upper door. See Figure 38.

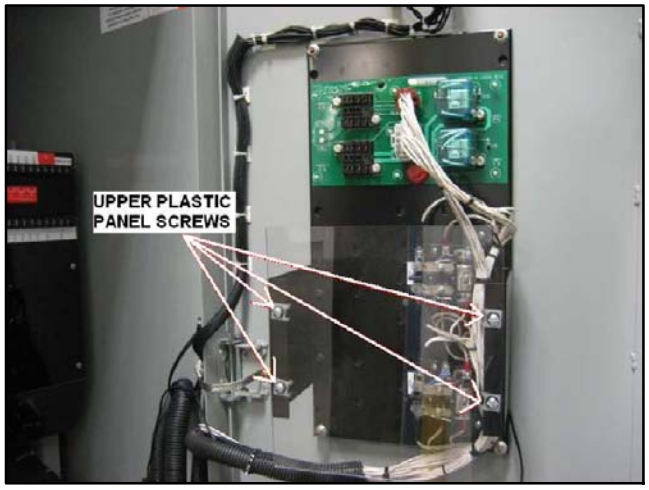


Figure 38 Remove Plastic Cover on Interface Panel

30. On the interface panel assembly, disconnect lead 20 from terminal 1 on the four relays CCN, CCE, CCEO, and CCNO. See Figure 39 and Figure 40. Also see the wiring diagrams at the end of this document.

    Note: Relays CCEO and CCNO are not shown in Figure 39.

31. On Model ZCM switches, also disconnect lead 20 from terminal 1 on the two relays SLN and SLE. See Figure 40.

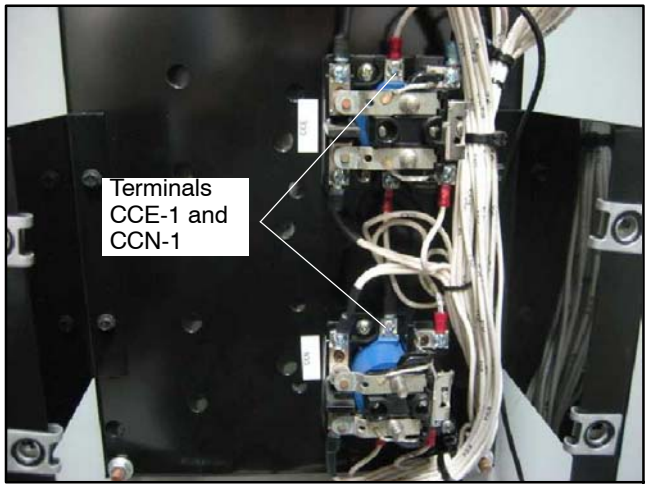
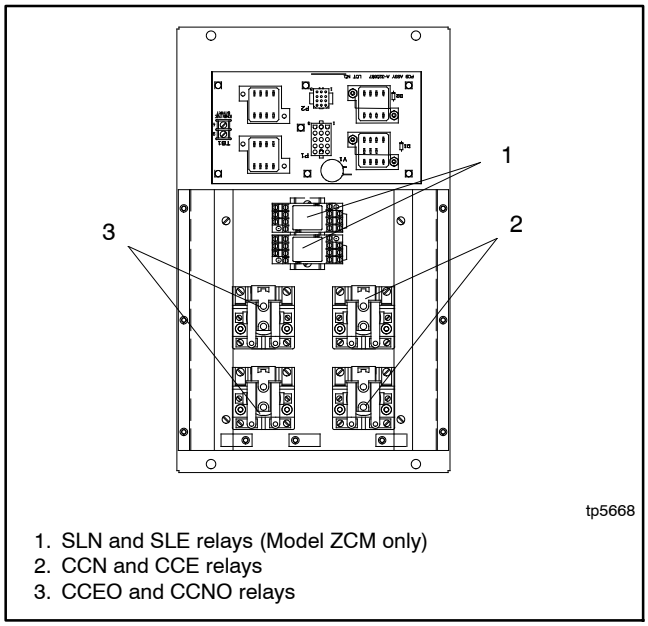


Figure 39 Disconnect Lead 20 from CCN-1 ,CCE-1, CCEO-1 (not shown) and CCNO-1 (not shown)



1. SLN and SLE relays (Model ZCM only)
2. CCN and CCE relays
3. CCEO and CCNO relays

Figure 40 Interface Panel Assembly Relays

32. Find the longer lead 20 that routes through the harness from connector P1. Cut the forked terminal from the end of the lead near the relay. See Figure 41.

    Note: Lead 20 from connector P1 will be connected to the MPAC 1500 controller later in this procedure.

33. Separate the leads labeled 20 from the harness and discard the short jumper leads that were connected between the relays.

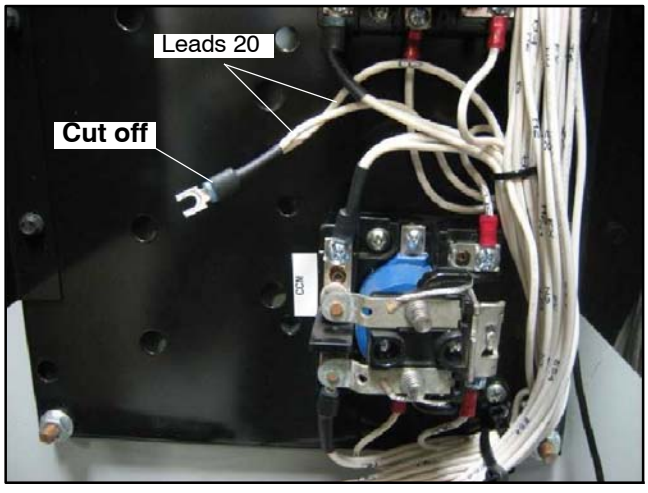


Figure 41 Cut Off Terminal

34. Disconnect plug P8 from the upper board. See Figure 42.

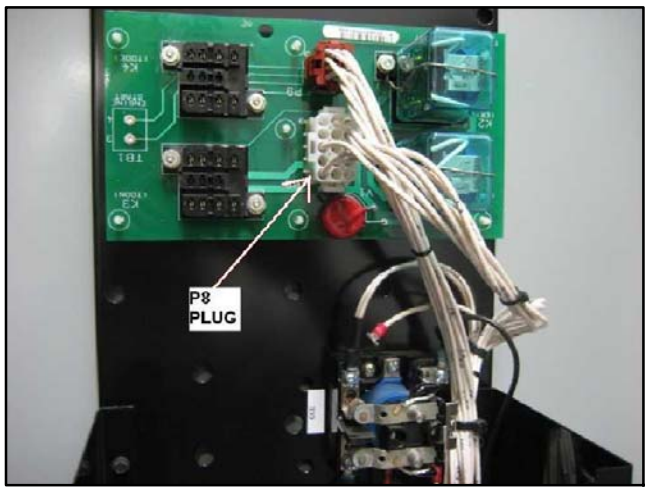


Figure 42 Disconnect Plug P8

35. Cut lead 33 (pin location: 15 on plug P8). See Figure 43. Lead 33 will be connected to the MPAC 1500 controller later in this procedure.

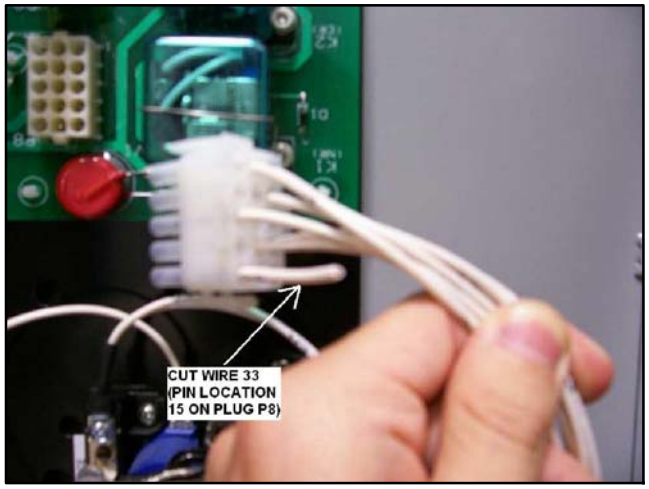


Figure 43 Cut Lead 33 at Pin 15 on Plug P8

36. Connect the conversion kit wire harness (GM77518 or GM77826) connector P8 to plug P8 that was disconnected from the upper board in the previous step. See Figure 44.

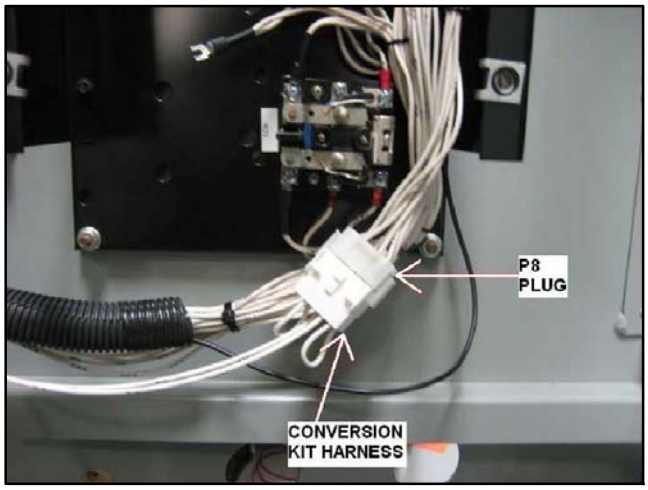


Figure 44 Connect Conversion Kit Wire Harness Connector P8 to Plug P8

37. Disconnect plug P9 from the upper board. See Figure 45. Cut the cable ties to separate the harness from the other wiring and discard the P9 harness. (The other end of this harness was disconnected in step 7.)

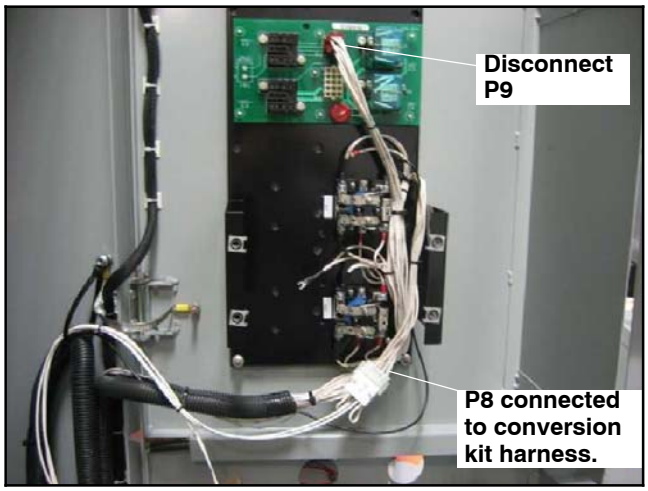


Figure 45 Disconnect P9

38. Cut the cable ties to release leads 33 and 20. See Figure 46.

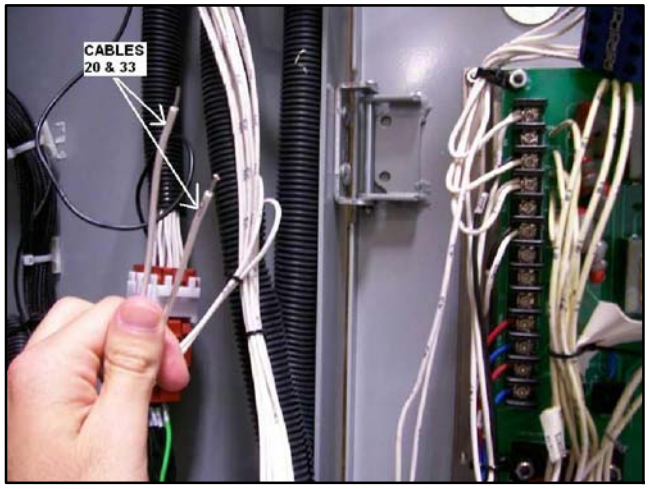


Figure 46 Leads 20 and 33

39. Re-route leads 33 and 20 and connect them to the MPAC1500 Programmable Input 1. Connect lead 33 to MPAC 1500 TB1-1. Connect lead 20 to MPAC 1500 TB1-2. See Figure 47.

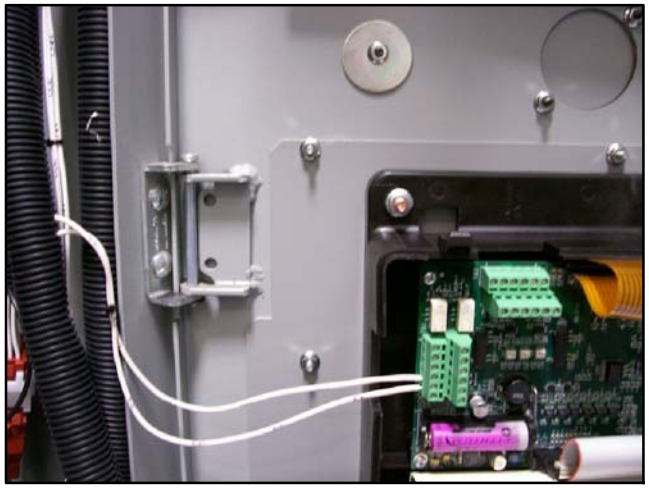


Figure 47 Connect Leads 20 and 33 to Programmable Input 1 on New Controller

40. Connect the conversion kit harness to the interface panel assembly relays as follows. See Figure 48 through Figure 50 and refer to the wiring diagram for your transfer switch. See Figure 59 for the drawing number.

- For Model ZCM switches, proceed to step 41.
- For Model ZCB switches, proceed to step 42.

41. **For Model ZCM** switches, use conversion kit harness GM77518 (shown in Figure 36).

    a. Connect leads CN and J2 from the conversion kit wire harness to terminal 1 on relay CCN.

    b. Connect leads CE and J3 from the conversion kit wire harness to terminal 1 on relay CCE.

    c. Connect leads J1 and J2 to terminal 1 on relay CCEO.

    d. Connect leads J3 and J4 to terminal 1 on relay CCNO.

    e. Connect single lead J1 to terminal 10 on relay SLN.

    f. Connect single lead J4 to terminal 10 on relay SLE.

    g. Proceed to step 43.

42. **For Model ZCB** switches, use conversion kit harness GM77826 (shown in Figure 37).

    a. Connect leads CN and J2 from the conversion kit wire harness to terminal 1 on relay CCN.

    b. Connect leads CE and J3 from the conversion kit wire harness to terminal 1 on relay CCE.

    c. Connect Single lead J2 to terminal 1 on relay CCEO.

    d. Connect single lead J3 to terminal 1 on relay CCNO.

    e. Proceed to step 43.

Figure 48 CCN and CCE Relay Location (see Figure 49 for other relays)

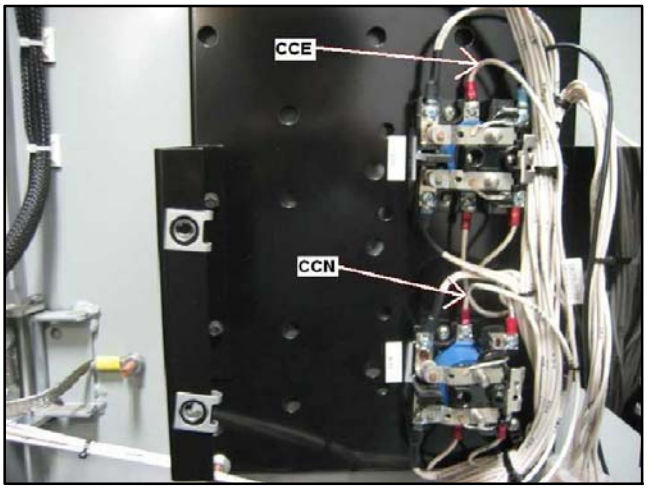
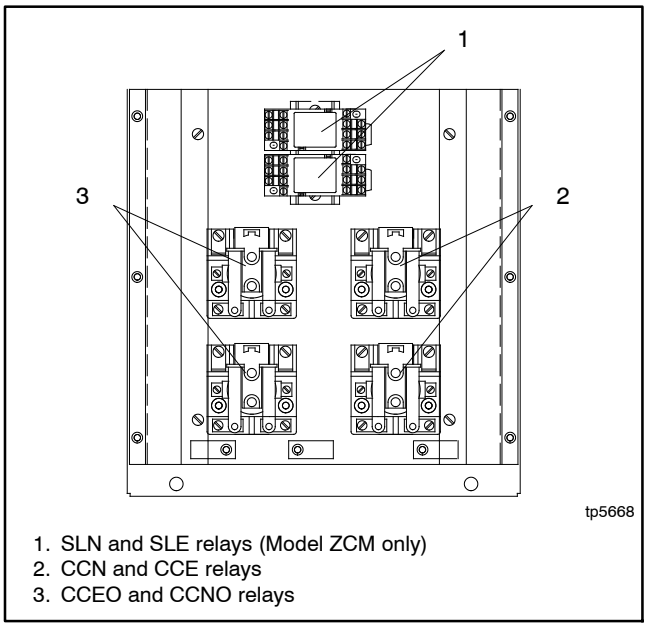


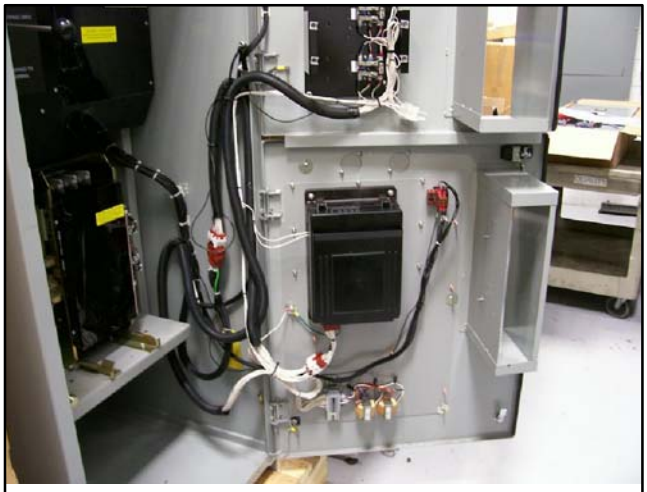
Figure 50 Connections to CCN and CCE Relays (other relays not shown)



1. SLN and SLE relays (Model ZCM only)
2. CCN and CCE relays
3. CCEO and CCNO relays

Figure 49 Relay Locations

43. Route the conversion kit wire harness appropriately using the cable ties provided. See Figure 51.



Note: This photo does not show the latest controller design. See Figure 25.

Figure 51 Harness Routing

44. Remove the circuit board from the upper panel. See Figure 52.

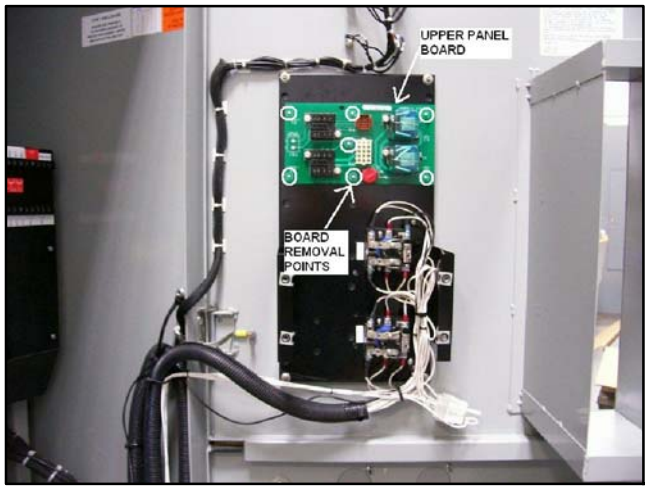


Figure 52 Remove the Upper Panel Circuit Board

45. Re-install the upper plastic cover, and finish routing the conversion kit wire harness neatly using the cable ties provided. See Figure 53.

Figure 53 Re-Install Plastic Cover

Current Sensing Kit Installation

46. If current sensing is required (i.e. for current [amps] monitoring and display), obtain the appropriately rated current sensing kit with 10 foot harness, and install according to Figure 54. See Figure 6 or the Parts Lists for current sensing kit numbers.

47. Connect the current transformers as shown in Figure 55.

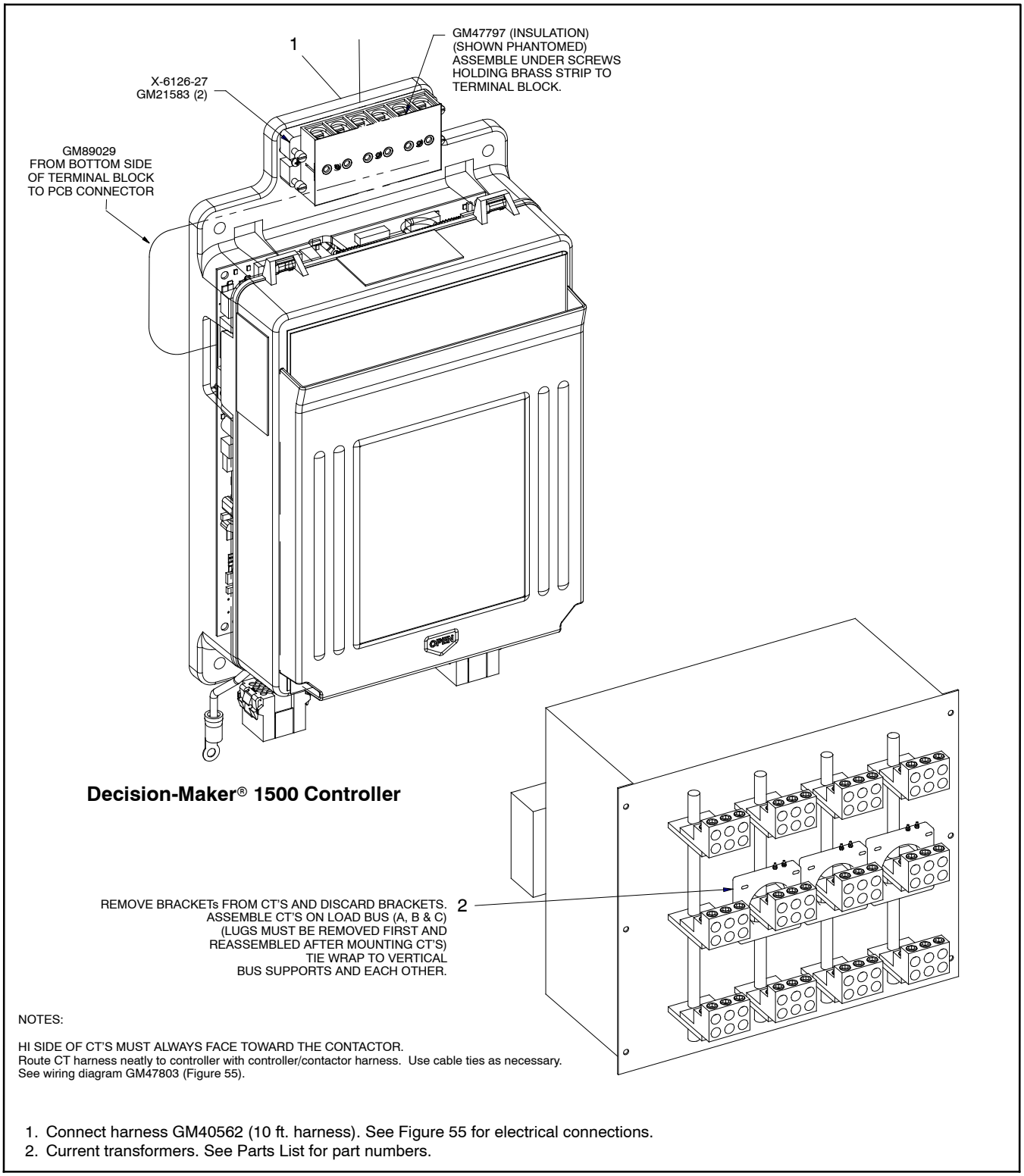


Figure 54 Current Sensing Kit Installation

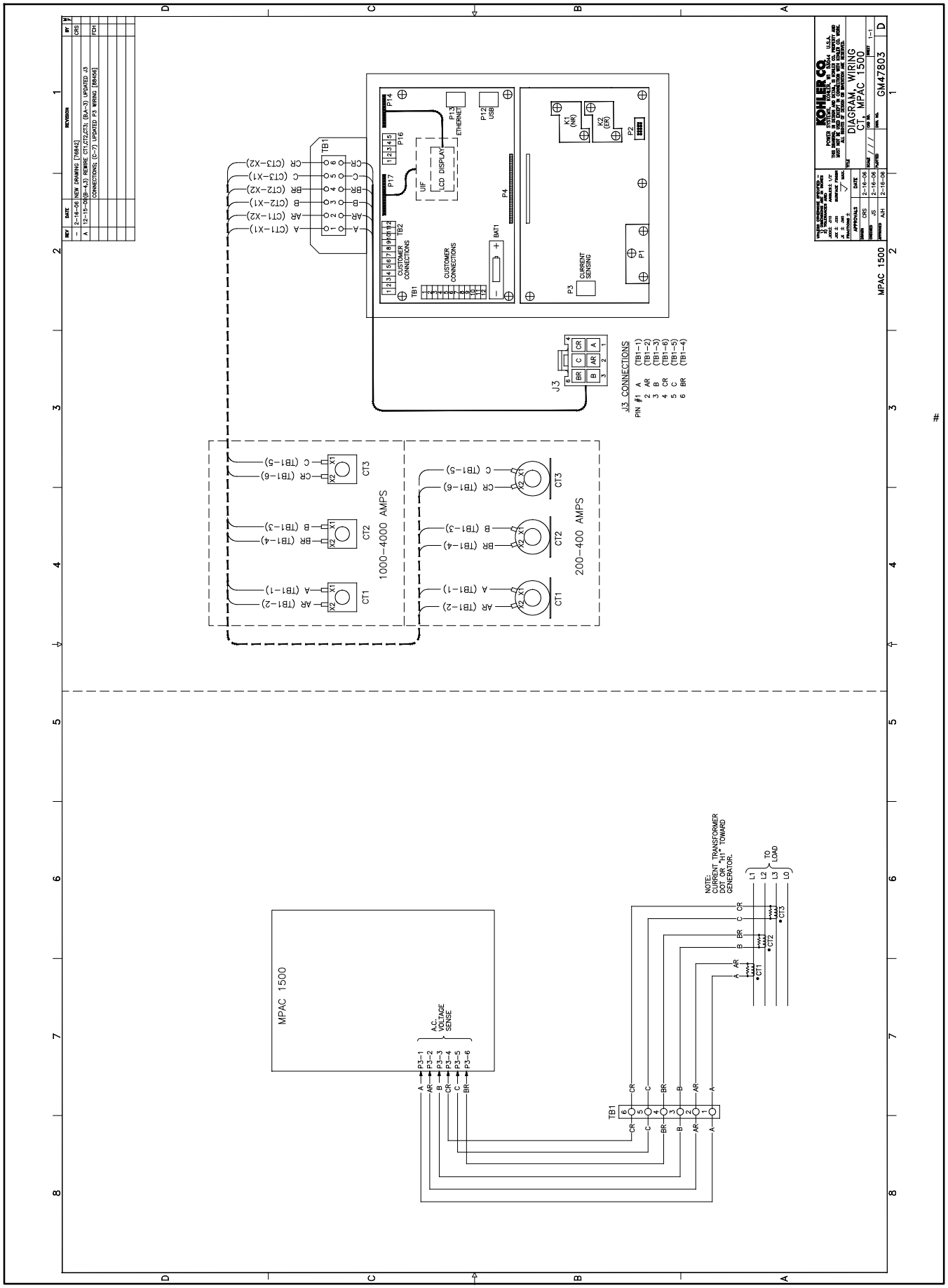


Figure 55 Current Sensing Kit Wiring Diagram, GM47803

48. Record the required information on decal GM70205 (see Figure 56). See Figure 6 or the Parts Lists for the current sensing kit number. See Figure 59 for the wiring diagram number.

49. Verify that the surface is clean and dry, and place decal GM70205 on the mounting plate as shown in Figure 57.

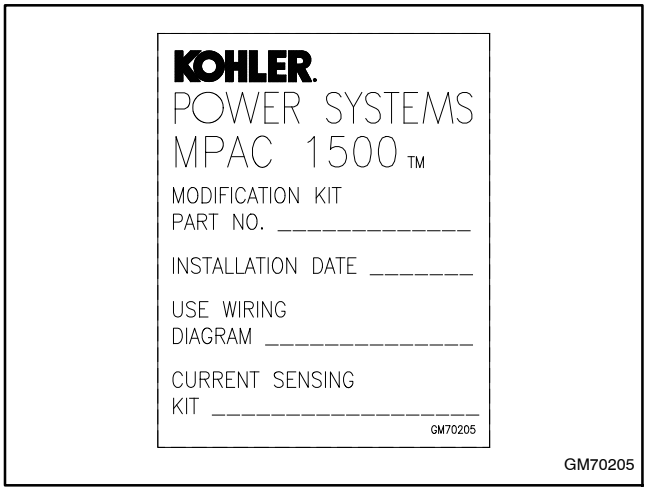


Figure 56 Decal GM70205

Note: This photo does not show the latest controller design. See Figure 25.

Figure 57 Decal GM70205 Location

Accessories

50. If optional accessory modules are used, attach the accessory mounting kit to the conversion kit mounting plate (GM77130). See Figure 22. Then refer to instruction sheet TT-1449, provided with the accessory mounting kit, to install and connect the modules.

51. For installation of other optional accessories, refer to the instructions provided with the accessory kit or see the Decision-Maker® MPAC 1500 Operation Manual, TP-6883.

Setup and Test

52. Reconnect power to the transfer switch.

53. Check that the generator set master switch is in the OFF position.

54. Reconnect the generator set engine starting battery, negative (–) lead last.

55. Reconnect power to the battery charger, if equipped.

56. On the MPAC 1500 controller , program the system parameters shown in Figure 58. Refer to the transfer switch nameplate for the ATS ratings. **Assign programmable input 1 to Bypass Contactor Disable.** Also check time delays and other settings that affect the ATS operation. See TP-6883, Operation Manual, for instructions.

System Parameter	Factory Setting
Standard or programmed transition	Set these parameters to match the transfer switch †
Single/three phase	
Operating voltage	
Operating frequency (50 or 60 Hz)	
Rated current	
Phase rotation	ABC
Commit to transfer (yes or no)	No
Operating mode: Generator-to-Generator, Utility-to-Generator, or Utility-to-Utility	Utility-to-Generator
In-phase monitor	Disabled
In-phase monitor transfer angle	5°
† See the ATS nameplate.	

Figure 58 System Parameters

57. Run the operation tests outlined in Operation Manual TP-6883 to verify system operation.

58. Keep these installation instructions and wiring diagrams with the transfer switch documentation for future reference.

Parts Lists

ZCM-6 M340+ to Decision-Maker® MPAC 1500 Conversion Kit

Kit: GM99316-S4		
Qty.	**Description**	**Part Number**
1	Rail, din	GM47488
1	Decal, conversion	GM67498
1	Plate, cover switch	GM69929
1	Retainer, panel	GM70051
1	Decal, KPS MPAC 1500	GM70205
1	Harness, wiring controller	GM77518
1	MPAC1500 assembly	GM85884-4
1	Plate, mounting	GM99317
1	Lead	LK-1212-1515
1	Operation manual - MPAC1500	TP-6883
1	Installation instructions	TT-1684
1	Washer, lock .743 OD	X-22-12
5	Washer, lock .285 OD	X-22-6
8	Washer, lock .333 in. OD	X-22-7
5	Washer, plain 1.5 in OD	X-25-122
10	Cable tie	X-468-1
2	Cable tie, nylon	X-468-3
13	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

ZCB-6 M340+ to Decision-Maker® MPAC 1500 Conversion Kit

Kit: GM99316-S5		
Qty.	**Description**	**Part Number**
1	Rail, din	GM47488
1	Decal, conversion	GM67498
1	Plate, cover switch	GM69929
1	Retainer, panel	GM70051
1	Decal, KPS MPAC 1500	GM70205
1	Harness, wiring controller	GM77826
1	MPAC1500 assembly	GM85884-4
1	Plate, mounting	GM99317
1	Lead	LK-1212-1515
1	Operation manual - MPAC1500	TP-6883
1	Installation instructions	TT-1684
1	Washer, lock .743 in. OD	X-22-12
5	Washer, lock .285 in. OD	X-22-6
8	Washer, lock .333 in. OD	X-22-7
5	Washer, plain 1.5 in. OD	X-25-122
10	Cable tie	X-468-1
2	Cable tie, nylon	X-468-3
13	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

Current Sensing Kit Parts

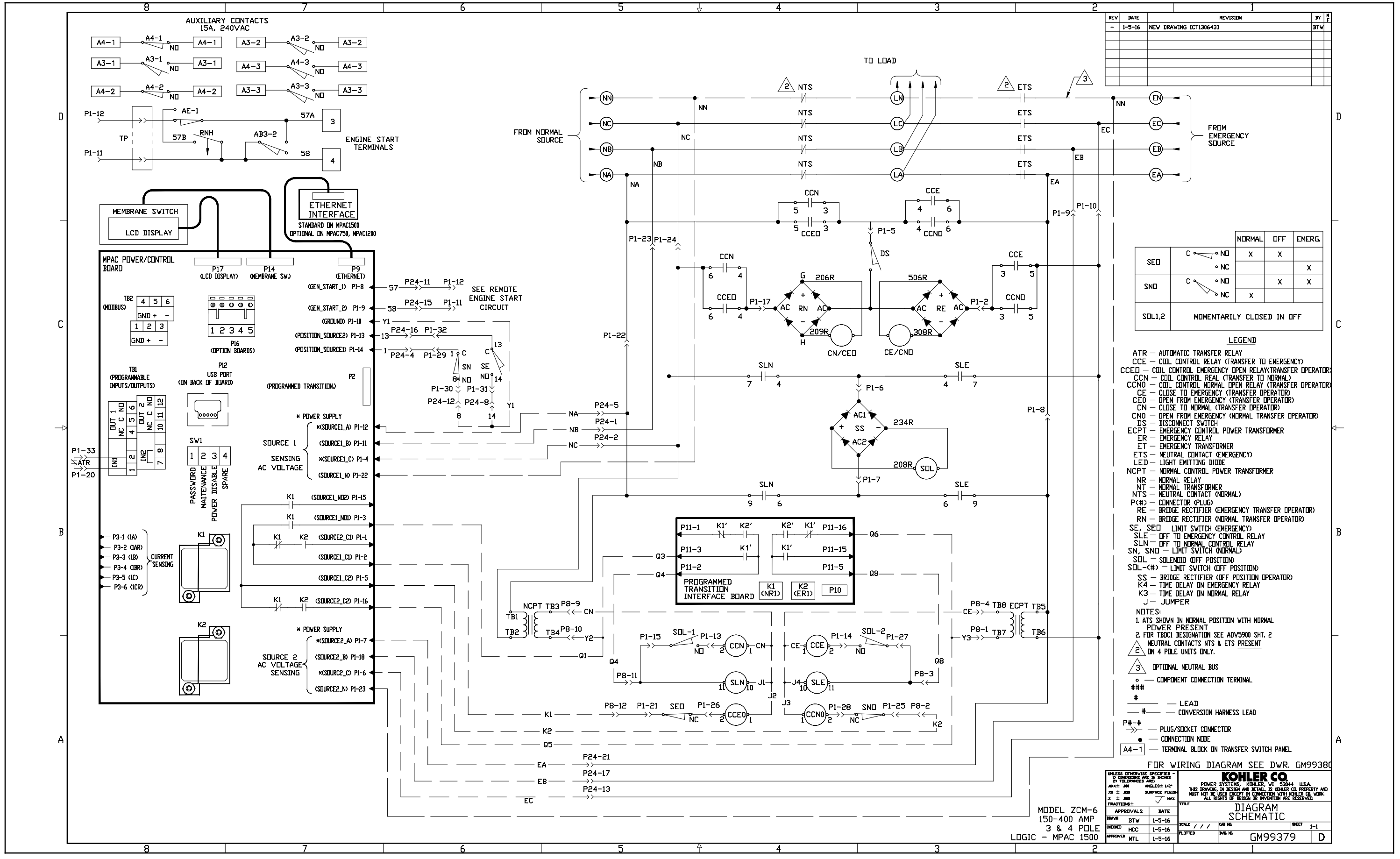
		Part Quantity									
		Kit number GM89028:									
		-S3	-S6	-S8	-S11	-S15	-S17	-S21	-S24	-S26	-S28
Description	**Part Number**	200 A 3 ph	400 A 3 ph	1000 A 3 ph	1200 A 3 ph	2000 A 3 ph	3000 A 3 ph	200 A 1 ph	400 A 1 ph	1000 A 1 ph	1200 A 1 ph
Screw, Plastic Tapping	GM21583	2	2	2	2	2	2	2	2	2	2
Harness, CT 10 FT.	GM40562	1	1	1	1	1	1	1	1	1	1
Transformer, Current	GM47788	3						2			
Transformer, Current	GM47789		3						2		
Transformer, Current	GM47790			3						3	
Transformer, Current	GM47791				3						2
Transformer, Current	GM47792					3					
Transformer, Current	GM47793						3				
Insulation, Terminal Block	GM47797	1	1	1	1	1	1	1	1	1	1
Bracket, CT Mounting	GM47800										1
Diagram, Wiring CT MPAC 1500	GM47803	1	1	1	1	1	1	1	1	1	1
Drawing, Assembly Current Sensing	GM89028	1	1	1	1	1	1	1	1	1	1
Harness, CT	GM89029	1	1	1	1	1	1	1	1	1	1
Terminal Block	X-6126-27	1	1	1	1	1	1	1	1	1	1
Nut, Flange Spirallock	X-6210-2										4
Screw, Thread Forming	X-67-114										8

ATS Wiring Diagrams and Schematics

Use the table below to identify the drawings for your ZCB-6 or ZCM-6 bypass/isolation switch. The M340+ and bypass schematic drawing numbers are shown for reference only. The MPAC 1500 conversion drawings are arranged **in alpha-numeric order** by drawing number on the following pages.

ATS Model *	Poles*	Amps	M340+ Drawing Numbers (for reference only)		Bypass Schematic (for reference only)	MPAC 1500 Conversion Drawings	
			Schematic	Wiring Diagram		Schematic	Wiring Diagram
ZCB-6	2	150–400	321470	321475	321443	GM99383	GM99384
	3						
	4						
ZCM-6	2	150–400	GM29805	GM29806	GM29807	GM99379	GM99380
	3						
	4						
ZCB-6	3	600–3000	321472	321477	321490	GM99381	GM99382
	4						
* See Figure 7 to interpret the model designation, if necessary.							

Figure 59 Drawing Numbers



REV	DATE	REVISION	BY	N F
-	1-5-16	NEW DRAWING (CT1306443)	BTW	

		NORMAL	OFF	EMERG.
SEO	C — NO	X	X	
	NC			X
SNO	C — NO		X	X
	NC	X		
SOL1,2	MOMENTARILY CLOSED IN OFF			

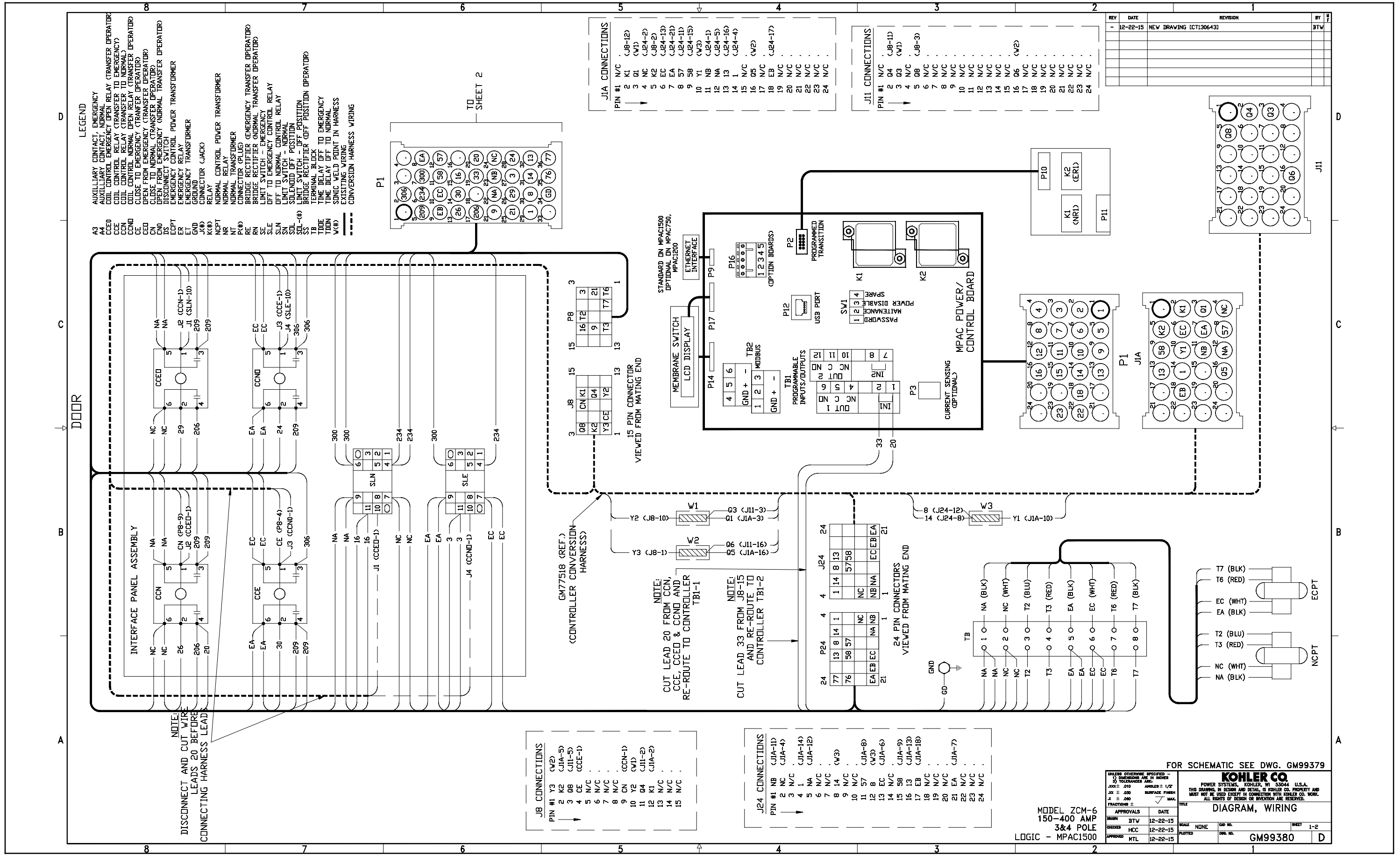
LEGEND

ATR — AUTOMATIC TRANSFER RELAY
CCE — COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
CCEO — COIL CONTROL EMERGENCY OPEN RELAY(TRANSFER OPERATOR)
CCN — COIL CONTROL REAL (TRANSFER TO NORMAL)
CCNO — COIL CONTROL NORMAL OPEN RELAY (TRANSFER OPERATOR)
CE — CLOSE TO EMERGENCY (TRANSFER OPERATOR)
CEO — OPEN FROM EMERGENCY (TRANSFER OPERATOR)
CN — CLOSE TO NORMAL (TRANSFER OPERATOR)
CNO — OPEN FROM EMERGENCY (NORMAL TRANSFER OPERATOR)
DS — DISCONNECT SWITCH
ECPT — EMERGENCY CONTROL POWER TRANSFORMER
ER — EMERGENCY RELAY
ET — EMERGENCY TRANSFORMER
ETS — NEUTRAL CONTACT (EMERGENCY)
LED — LIGHT EMITTING DIODE
NCPT — NORMAL CONTROL POWER TRANSFORMER
NR — NORMAL RELAY
NT — NORMAL TRANSFORMER
NTS — NEUTRAL CONTACT (NORMAL)
P(#) — CONNECTOR (PLUG)
RE — BRIDGE RECTIFIER (EMERGENCY TRANSFER OPERATOR)
RN — BRIDGE RECTIFIER (NORMAL TRANSFER OPERATOR)
SE, SEO — LIMIT SWITCH (EMERGENCY)
SLE — OFF TO EMERGENCY CONTROL RELAY
SLN — OFF TO NORMAL CONTROL RELAY
SN, SNO — LIMIT SWITCH (NORMAL)
SOL — SOLENOID (OFF POSITION)
SOL-(#) — LIMIT SWITCH (OFF POSITION)
SS — BRIDGE RECTIFIER (OFF POSITION OPERATOR)
K4 — TIME DELAY ON EMERGENCY RELAY
K3 — TIME DELAY ON NORMAL RELAY
J — JUMPER

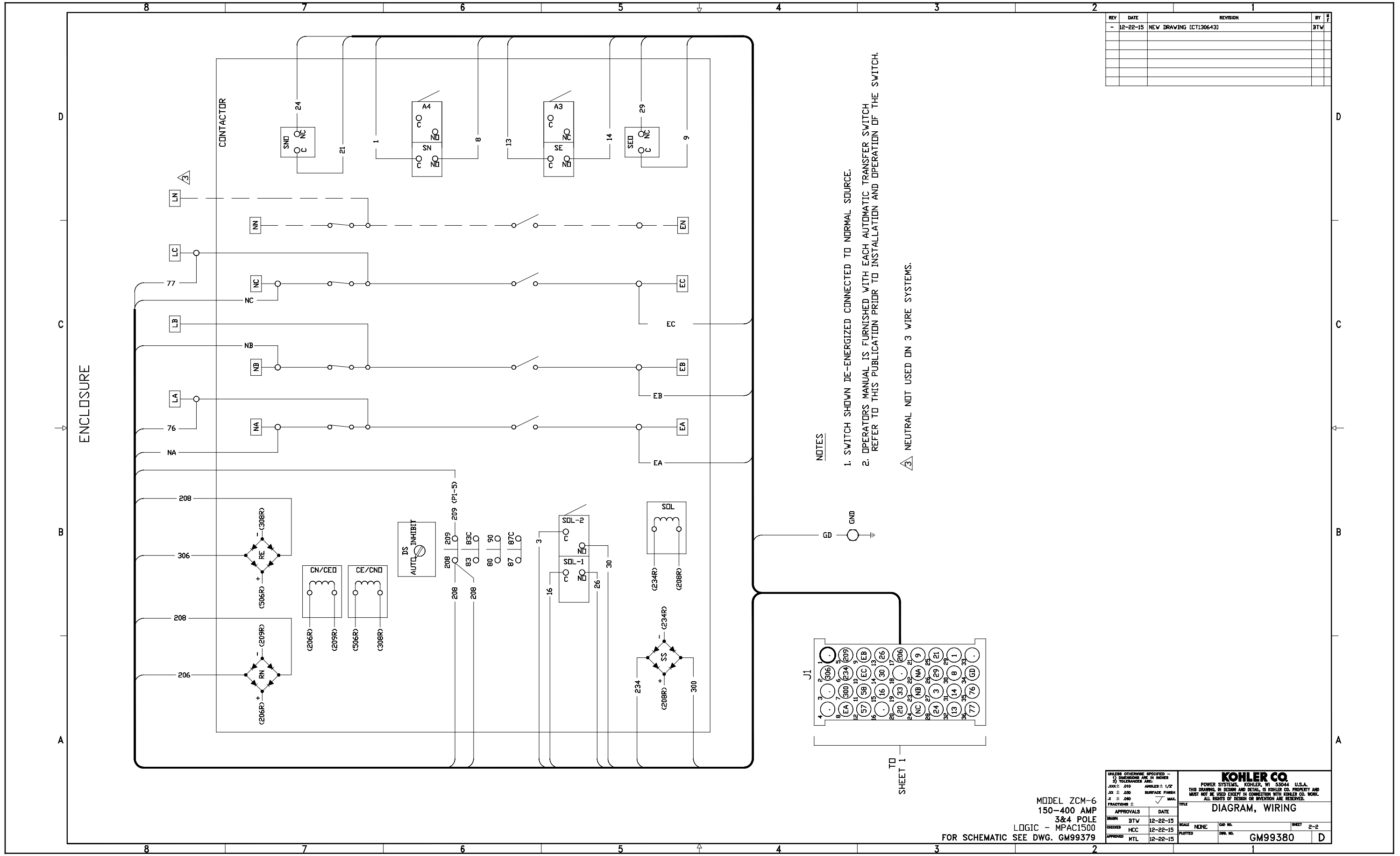
NOTES:
1. ATS SHOWN IN NORMAL POSITION WITH NORMAL POWER PRESENT
2. FOR TBDC1 DESIGNATION SEE ADV5900 SHT. 2
2 NEUTRAL CONTACTS NTS & ETS PRESENT ON 4 POLE UNITS ONLY.
3 OPTIONAL NEUTRAL BUS
○ — COMPONENT CONNECTION TERMINAL
— LEAD
— CONVERSION HARNESS LEAD
P#-# — PLUG/SOCKET CONNECTOR
● — CONNECTION NODE
A4-1 — TERMINAL BLOCK ON TRANSFER SWITCH PANEL

UNLESS OTHERWISE SPECIFIED - DIMENSIONS ARE IN INCHES TOLERANCES ARE:		KOHLER CO. POWER SYSTEMS, KOHLER, WI 53044 U.S.A. THIS DRAWING, IN DESIGN AND DETAIL, IS KOHLER CO. PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH KOHLER CO. WORK. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED.	
APPROVALS	DATE	TITLE	DIAGRAM SCHEMATIC
DRAWN BTW	1-5-16	SCALE	CAD NO. SHEET 1-1
CHECKED HCC	1-5-16	PLOTTED	DWG. NO. GM99379 D
APPROVED MTL	1-5-16		

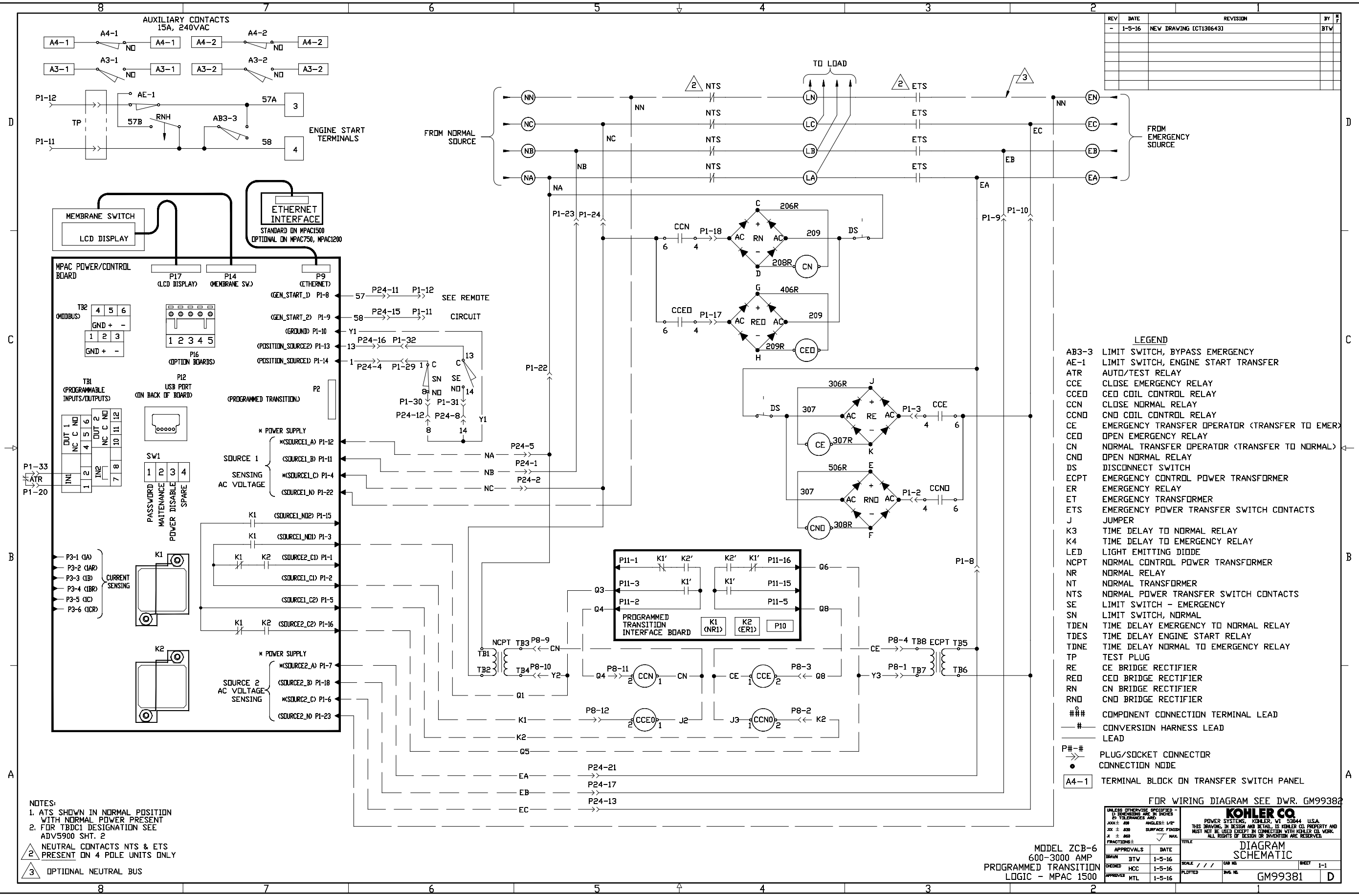
Schematic, Model ZCM-6 Programmed Transition with MPAC 1500 Controls, 150-400 Amps, GM99379



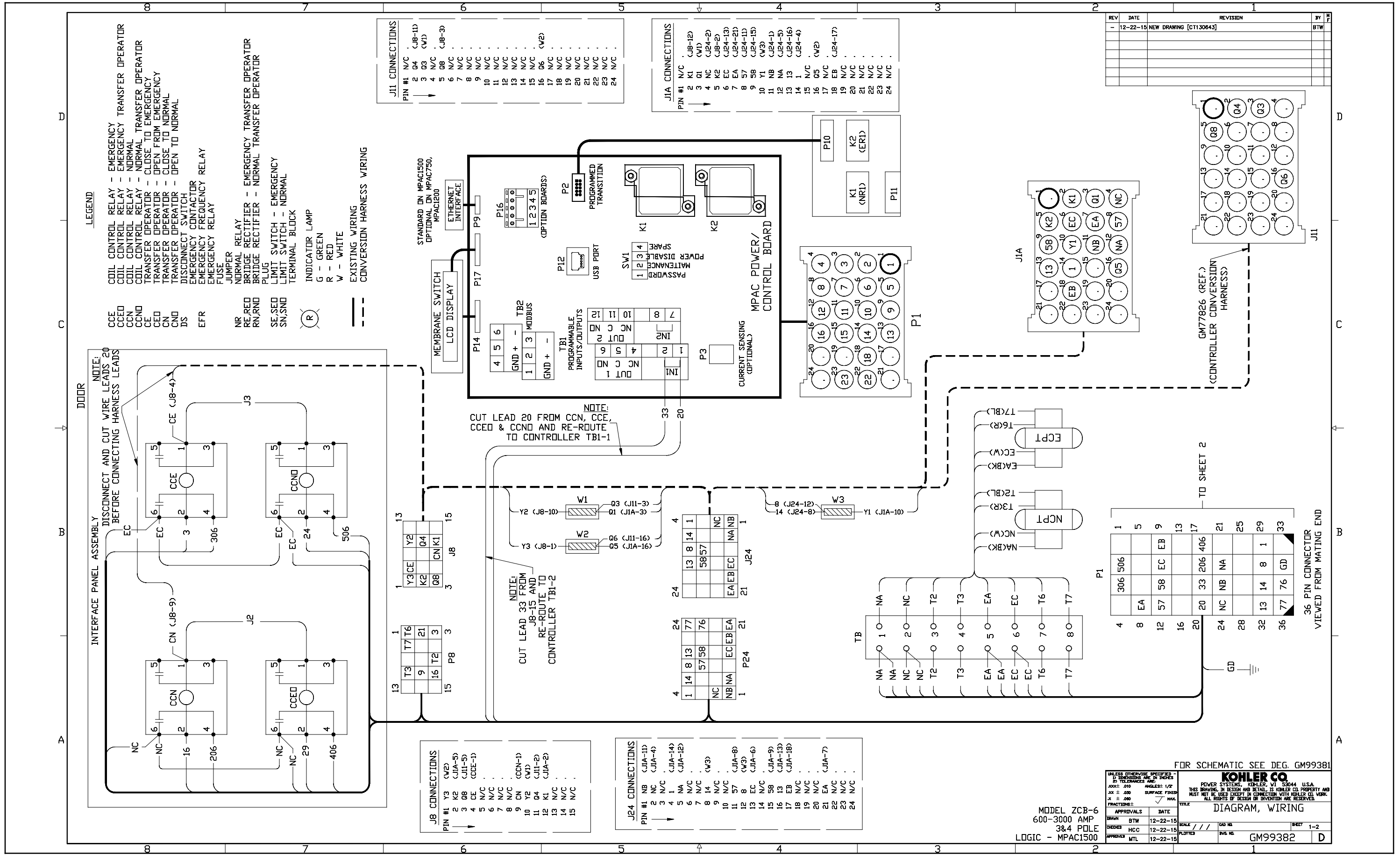
Wiring Diagram, Model ZCB-6 Programmed Transition with MPAC 1500 Controls, 150-400 Amps, GM99380 Sheet 1



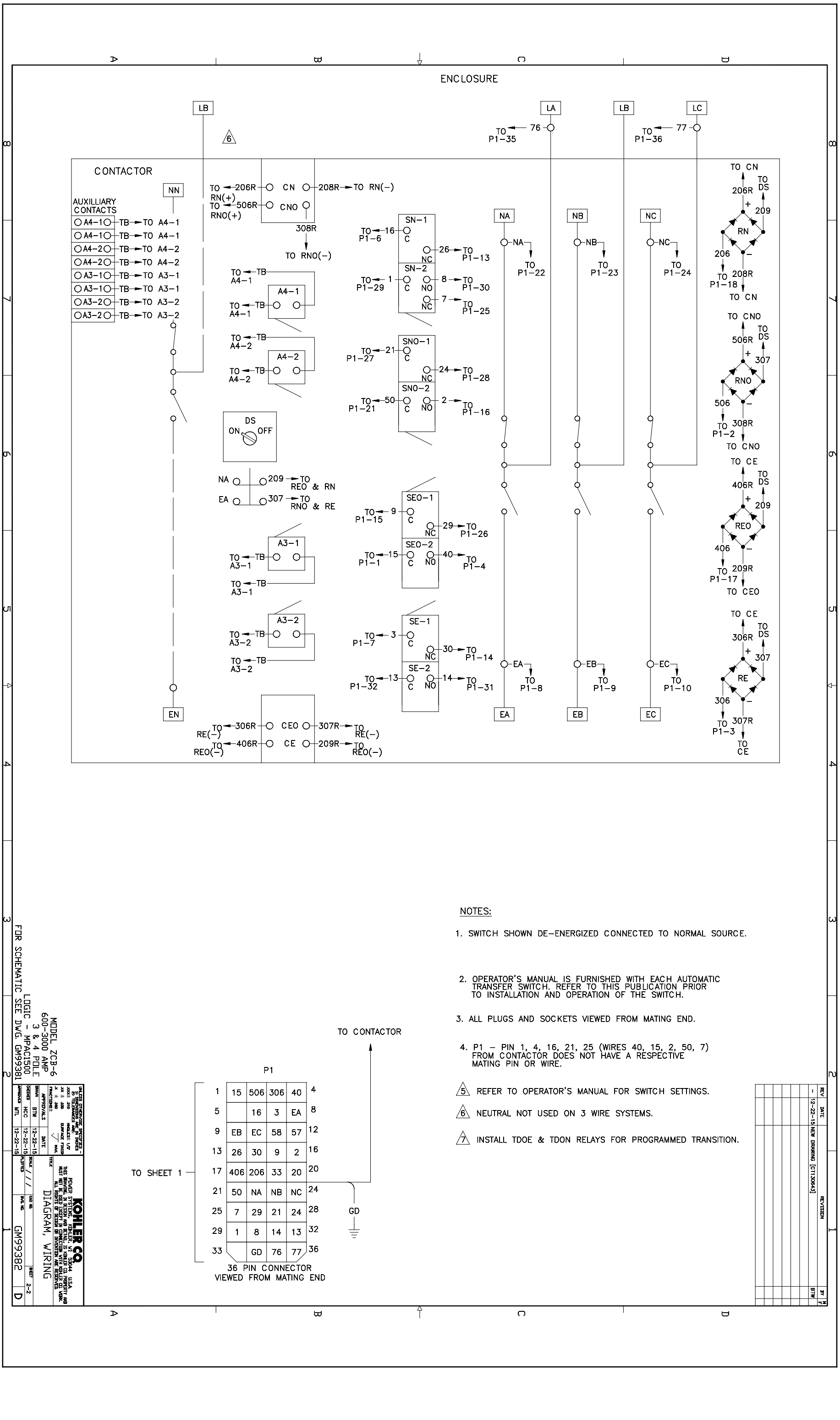
Wiring Diagram, Model ZCB-6 Programmed Transition with MPAC 1500 Controls, 150-400 Amps, GM99380 Sheet 2



Schematic, Model ZCB-6 Programmed Transition with MPAC 1500 Controls, 600-3000 Amps, GM99381



Wiring Diagram, Model ZCB-6 Programmed Transition with MPAC 1500 Controls, 600-3000 Amps, GM99382 Sheet 1



NOTES:

1. SWITCH SHOWN DE-ENERGIZED CONNECTED TO NORMAL SOURCE.

2. OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.

3. ALL PLUGS AND SOCKETS VIEWED FROM MATING END.

4. P1 – PIN 1, 4, 16, 21, 25 (WIRES 40, 15, 2, 50, 7) FROM CONTACTOR DOES NOT HAVE A RESPECTIVE MATING PIN OR WIRE.

5 REFER TO OPERATOR'S MANUAL FOR SWITCH SETTINGS.

6 NEUTRAL NOT USED ON 3 WIRE SYSTEMS.

7 INSTALL TDOE & TDON RELAYS FOR PROGRAMMED TRANSITION.

TO CONTACTOR

P1

1	15	506	306	40	4
5		16	3	EA	8
9	EB	EC	58	57	12
13	26	30	9	2	16
17	406	206	33	20	20
21	50	NA	NB	NC	24
25	7	29	21	24	28
29	1	8	14	13	32
33		GD	76	77	36

TO SHEET 1

GD

36 PIN CONNECTOR VIEWED FROM MATING END

REV	DATE	REVISION	BY
–	12-22-15	NEW DRAWING [CT130643]	BTW

MODEL ZCB-6
600-3000 AMP
3 & 4 POLE
LOGIC - MPAC1500
SEE DWG. GM99381

FOR SCHEMATIC

DRAWN	BTW	12-22-15
CHECKED	HCC	12-22-15
APPROVED	MTL	12-22-15

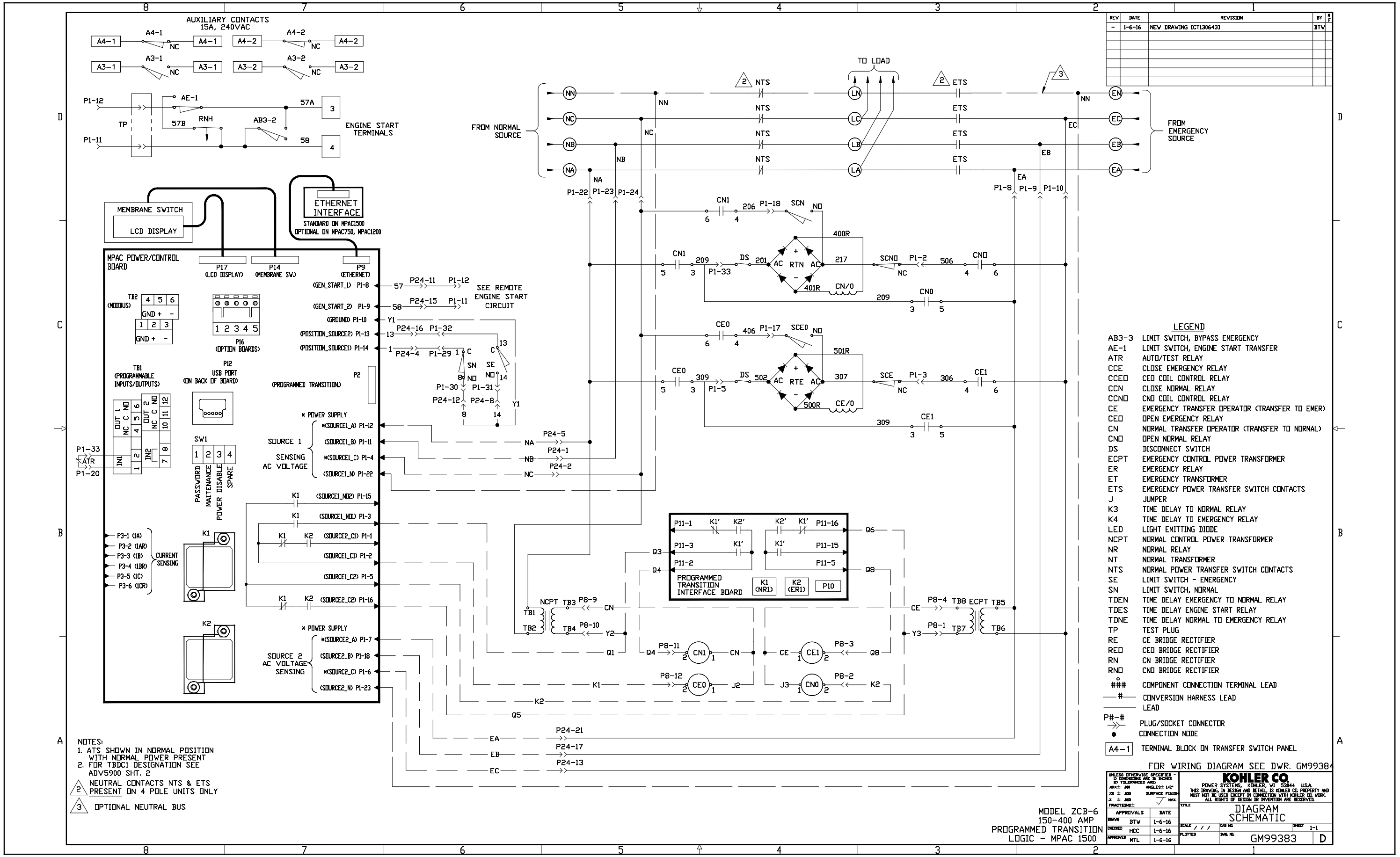
DATE

UNLESS OTHERWISE SPECIFIED - DIMENSIONS ARE IN INCHES
DECIMALS .XX± .010 .XXX± .005
ANGLES± 1/2°
3X ± .030 2X ± .060
FRACTIONS± 1/32
SURFACE FINISH 125 MAX.

KOHLER CO.
KOHLER, WI 53044 USA
POWER SYSTEMS

TITLE: DIAGRAM, WIRING

SCALE	/ / /
PLOTTED	
DWG NO.	GM99382
CAD NO.	
SHEET	2-2
D	



REV	DATE	REVISION	BY	N F
-	1-6-16	NEW DRAWING (CT1306443)	BTW	

Schematic Diagram, Model ZCB-6 Programmed Transition w/MPAC 1500 Controls, 150-400 Amps, GM99383

NOTE:
DISCONNECT AND CUT WIRE LEADS 20 BEFORE CONNECTING HARNESS LEADS

DOOR

INTERFACE PANEL ASSEMBLY

NC, NA, EC, EA
CN1 (CN (J8-9))
CE1 (CE (J8-4))
CED
CND
J2, J3
309, 209, 406, 506

LEGEND

CCE	COIL CONTROL RELAY - EMERGENCY
CCED	COIL CONTROL RELAY - EMERGENCY TRANSFER OPERATOR
CCN	COIL CONTROL RELAY - NORMAL
CCND	COIL CONTROL RELAY - NORMAL TRANSFER OPERATOR
CE	TRANSFER OPERATOR - CLOSE TO EMERGENCY
CED	TRANSFER OPERATOR - OPEN FROM EMERGENCY
CN	TRANSFER OPERATOR - CLOSE TO NORMAL
CND	TRANSFER OPERATOR - OPEN TO NORMAL
DS	DISCONNECT SWITCH
	EMERGENCY CONTACTOR
EFR	EMERGENCY FREQUENCY RELAY
	EMERGENCY RELAY
	FUSE
	JUMPER
NR	NORMAL RELAY
RE,RED	BRIDGE RECTIFIER - EMERGENCY TRANSFER OPERATOR
RN,RND	BRIDGE RECTIFIER - NORMAL TRANSFER OPERATOR
	PLUG
SE,SED	LIMIT SWITCH - EMERGENCY
SN,SND	LIMIT SWITCH - NORMAL
	TERMINAL BLOCK
(R)	INDICATOR LAMP G - GREEN R - RED W - WHITE
———	EXISTING WIRING
- - -	CONVERSION HARNESS WIRING

J8 CONNECTIONS

PIN		
#1	Y3	(W2)
2	K2	(J1A-5)
3	Q8	(J11-5)
4	CE	(CCE-1)
5	N/C	.
6	N/C	.
7	N/C	.
8	N/C	.
9	CN	(CCN-1)
10	Y2	(W1)
11	Q4	(J11-2)
12	K1	(J1A-2)
13	N/C	.
14	N/C	.
15	N/C	.

P8: T3, T7, T6, 9, 21, 16, T2, 3
J8: Y3, CE, Y2, K2, Q4, Q8, CN, K1

NOTE:
CUT LEAD 33 FROM J8-15 AND RE-ROUTE TO CONTROLLER TB1-2

NOTE:
CUT LEAD 20 FROM CCN, CCE, CCED & CCND AND RE-ROUTE TO CONTROLLER TB1-1

W1, W2, W3
Y3 (J8-1), Y2 (J8-10), Q6 (J11-16), Q5 (J1A-16), Q3 (J11-3), Q1 (J1A-3), 8 (J24-12), 14 (J24-8), Y1 (J1A-10)

J24 CONNECTIONS

PIN		
#1	NB	(J1A-11)
2	NC	(J1A-4)
3	N/C	.
4	1	(J1A-14)
5	NA	(J1A-12)
6	N/C	.
7	N/C	.
8	14	(W3)
9	N/C	.
10	N/C	.
11	57	(J1A-8)
12	8	(W3)
13	EC	(J1A-6)
14	N/C	.
15	58	(J1A-9)
16	13	(J1A-13)
17	EB	(J1A-18)
18	N/C	.
19	N/C	.
20	N/C	.
21	EA	(J1A-7)
22	N/C	.
23	N/C	.
24	N/C	.

P24: 1, 14, 8, 13, 77, 57, 58, 76, NC, NB, NA, EC, EB, EA
J24: 13, 8, 14, 1, 58, 57, NC, EA, EB, EC, NA, NB

TB
NA, NA, NC, NC, T2, T3, EA, EA, EC, EC, T6, T7
1, 2, 3, 4, 5, 6, 7, 8
NA, NC, T2, T3, EA, EC, T6, T7

NCPT: NA(BK), NC(W), T3(R), T2(BL)
ECPT: EA(BK), EC(W), T6(R), T7(BL)

MEMBRANE SWITCH
LCD DISPLAY
STANDARD ON MPAC1500
OPTIONAL ON MPAC750, MPAC1200
ETHERNET INTERFACE
P14, P17, P9
P16 (OPTION BOARDS)
TB2 MODBUS: 4 5 6 GND + -; 1 2 3 GND + -
TB1 PROGRAMMABLE INPUTS/OUTPUTS
P12 USB PORT
P2 PROGRAMMED TRANSITION
SW1: 1 2 3 4 PASSWORD MAITENANCE POWER DISABLE SPARE
K1, K2
P3 CURRENT SENSING (OPTIONAL)
MPAC POWER/ CONTROL BOARD
P10, K1 (NR1), K2 (ER1), P11

J11 CONNECTIONS

PIN		
#1	N/C	.
2	Q4	(J8-11)
3	Q3	(W1)
4	N/C	.
5	Q8	(J8-3)
6	N/C	.
7	N/C	.
8	N/C	.
9	N/C	.
10	N/C	.
11	N/C	.
12	N/C	.
13	N/C	.
14	N/C	.
15	N/C	.
16	Q6	(W2)
17	N/C	.
18	N/C	.
19	N/C	.
20	N/C	.
21	N/C	.
22	N/C	.
23	N/C	.
24	N/C	.

J1A CONNECTIONS

PIN		
#1	N/C	.
2	K1	(J8-12)
3	Q1	(W1)
4	NC	(J24-2)
5	K2	(J8-2)
6	EC	(J24-13)
7	EA	(J24-21)
8	57	(J24-11)
9	58	(J24-15)
10	Y1	(W3)
11	NB	(J24-1)
12	NA	(J24-5)
13	13	(J24-16)
14	1	(J24-4)
15	N/C	.
16	Q5	(W2)
17	N/C	.
18	EB	(J24-17)
19	N/C	.
20	N/C	.
21	N/C	.
22	N/C	.
23	N/C	.
24	N/C	.

P1 (J1A): 21 . 17 . 13 13 9 58 5 K2 1 .; 22 . 18 EB 14 1 10 Y1 6 EC 2 K1; 23 . 19 . 15 . 11 NB 7 EA 3 Q1; 24 . 20 . 16 Q5 12 NA 8 57 4 NC

P1: 24 . 20 . 16 16 12 12 8 8 4 4; 23 23 19 . 15 15 11 11 7 7 3 3; 22 22 18 18 14 14 10 10 6 6 2 2; 21 . 17 . 13 13 9 9 5 5 1 1

J11: 21 . 17 . 13 . 9 . 5 Q8 1 .; 22 . 18 . 14 . 10 . 6 . 2 Q4; 23 . 19 . 15 . 11 . 7 . 3 Q3; 24 . 20 . 16 Q6 12 . 8 . 4 .

P1
4: 306, 506
8: EA
12: 57, 58, EC, EB
16:
20: 20, 33, 206, 406
24: NC, NB, NA
28:
32: 13, 14, 8, 1
36: 77, 76, GD
1, 5, 9, 13, 17, 21, 25, 29, 33
TO SHEET 2

36 PIN CONNECTOR
VIEWED FROM MATING END

GM77826 (REF.)
(CONTROLLER CONVERSION HARNESS)

FOR SCHEMATIC SEE DWG. GM99383

MODEL ZCB-6
150-400 AMP
3&4 POLE
LOGIC - MPAC1500

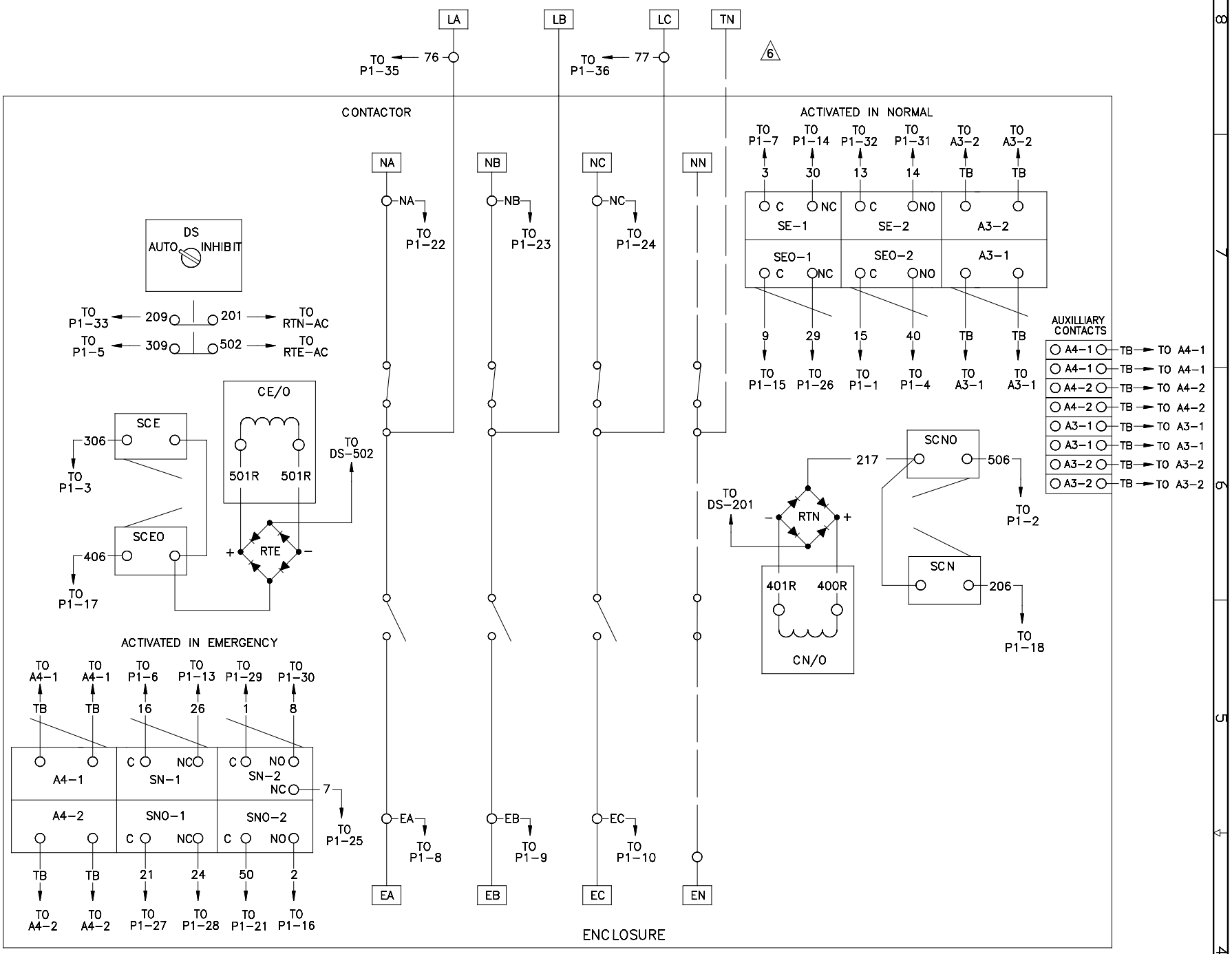
REV	DATE	REVISION	BY	N F
-	12-22-15	NEW DRAWING [C11309643]	BTW	

APPROVALS		DATE
DRAWN	BTW	12-22-15
CHECKED	HCC	12-22-15
APPROVER	MTL	12-22-15

UNLESS OTHERWISE SPECIFIED - DIMENSIONS ARE IN INCHES
DECIMALS: .XX ± .010 .XXX ± .005
ANGLES: ± 1/2°
SURFACE FINISH: 125 MAX.
FRACTIONS ± 1/64

KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 USA
THIS DRAWING, IN DESIGN AND DETAIL, IS KOHLER CO. PROPRIETARY AND MUST NOT BE COPIED OR REPRODUCED IN WHOLE OR IN PART. ALL RIGHTS OF DESIGN OR INVENTION ARE RESERVED. WORK.

TITLE: DIAGRAM, WIRING
SCALE: / / /
PLOTTED:
CAD NO.
DWG NO. GM99384
SHEET 1-2
SIZE D



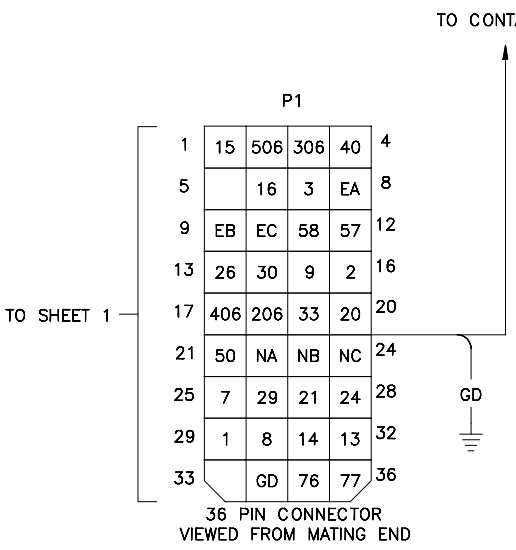
NOTES:

1. SWITCH SHOWN DE-ENERGIZED CONNECTED TO NORMAL SOURCE.
2. OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
3. ALL PLUGS AND SOCKETS VIEWED FROM MATING END.
4. P1 – PIN 1, 4, 16, 21, 25 (WIRES 40, 15, 2, 50, 7) FROM CONTACTOR DOES NOT HAVE A RESPECTIVE MATING PIN OR WIRE.

5 REFER TO OPERATOR'S MANUAL FOR SWITCH SETTINGS.

6 NEUTRAL NOT USED ON 3 WIRE SYSTEMS.

7 INSTALL TDOE & TDON RELAYS FOR PROGRAMMED TRANSITION.



FOR SCHEMATIC LOGIC - MPAC1500 SEE DWG GM99383

MODEL ZCB-6
150-400 AMP
3 & 4 POLE

REV	DATE	REVISION	BY
–	12-22-15	NEW DRAWING [C113094A3]	BTW

UNLESS OTHERWISE SPECIFIED - DIMENSIONS ARE IN INCHES
TOLERANCES ARE: .XXX± .010 .XX ± .030 X ± .060 FRACTIONS± ANGLES± 1/2° SURFACE FINISH MAX.

APPROVALS	DATE
DRAWN BTW	12-22-15
CHECKED HCC	12-22-15
APPROVER MTL	12-22-15

KOHLER CO. POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: DIAGRAM, WIRING

SCALE: / / / CAD NO. SHEET 2-2
PLOTTED 12-22-15 DWG NO. GM99384 D

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