INSTALLATION INSTRUCTIONS

Original Issue Date: **7/09**
Model: **ZCM-5 and ZCB-5 Automatic Transfer Bypass/Isolation Switches**
Market: **ATS**
Subject: **Controller Conversion Kit GM69378-S1**

Introduction

The conversion kit allows the replacement of the M340+ controller with an MPAC™ 1500 controller on model ZCM-5 and ZCB-5 bypass/isolation 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 is not applicable to ZCM-5 or ZCB-5 bypass/isolation switches. The optional accessory board (I/O) assembly shown in the figures is available separately.

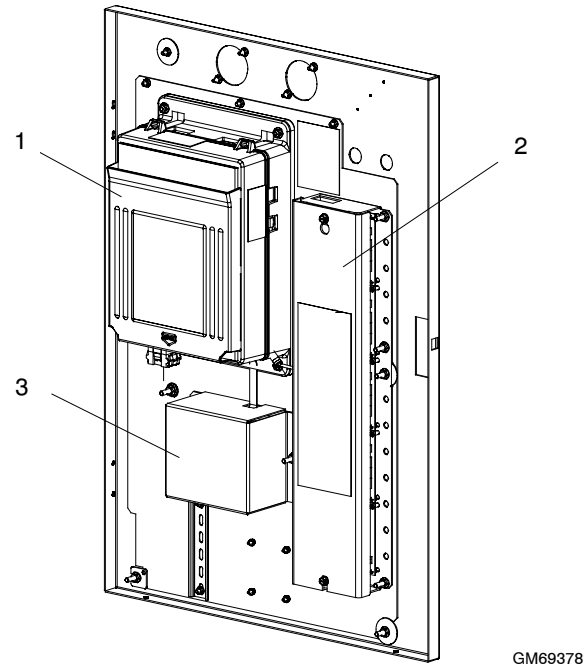
Current Sensing

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 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 higher 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 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.



1. MPAC 1500 controller assembly
2. Optional accessory board (I/O) assembly
3. Programmed-transition module, not applicable for this application

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
GM47965-S25	200	3
GM47965-S26	200	1
GM47965-S27	400	3
GM47965-S28	400	1

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

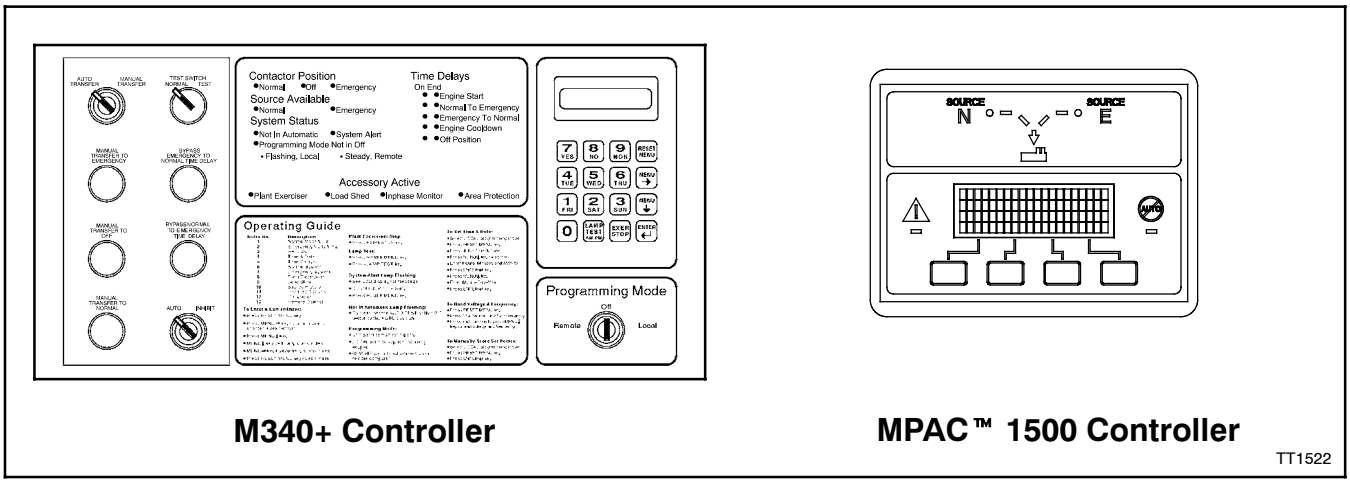
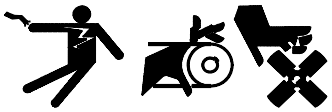


Figure 3 Controller Identification

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. 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.

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.

6. Remove the plastic protective panel that covers the electronic components on the bottom door of the enclosure. See Figure 4.

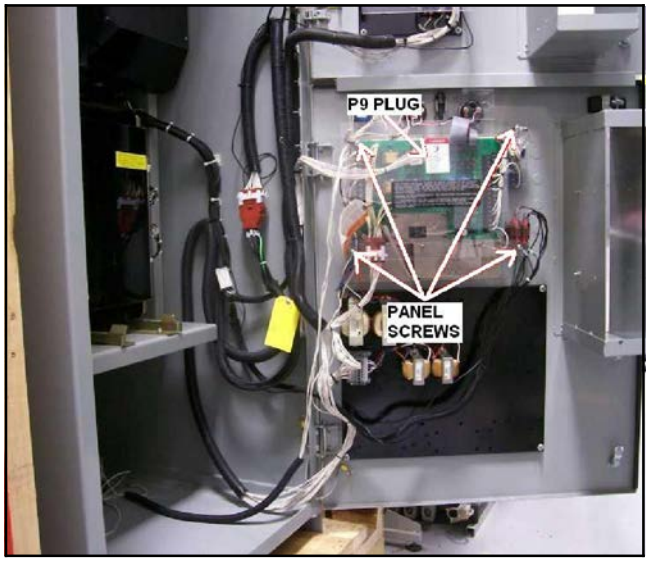


Figure 4 Plastic Panel on Bottom Door

7. Disconnect plug P9. See Figure 5.

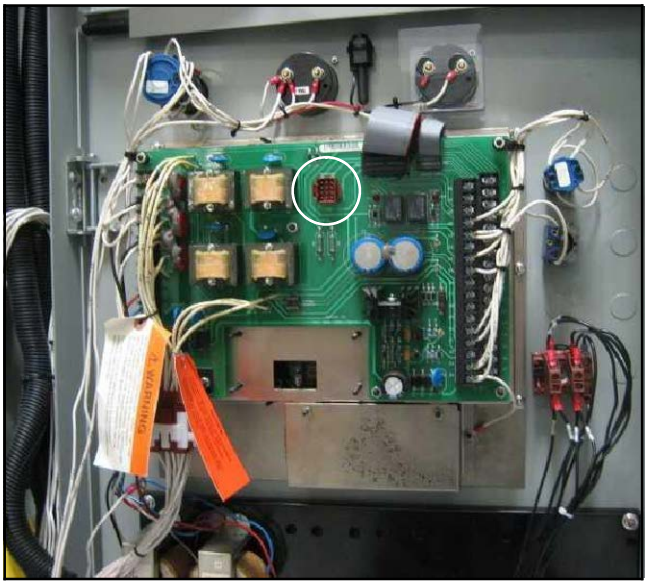


Figure 5 Plug P9 Disconnected

8. If the transfer switch is equipped with current transformers (CTs), remove all CTs from the power lines of the ATS. See Figure 6.

Figure 6 Current Transformers (CTs)

9. Disconnect the Auto/Inhibit ATS disconnect switch. See Figure 7 and Figure 8.

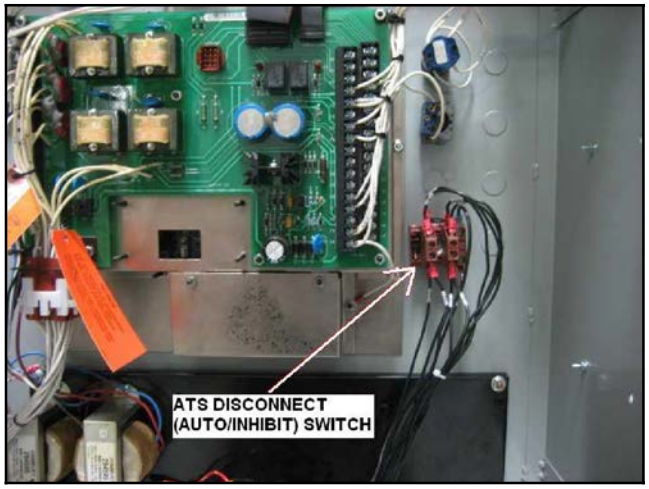


Figure 7 Auto/Inhibit ATS Disconnect Switch

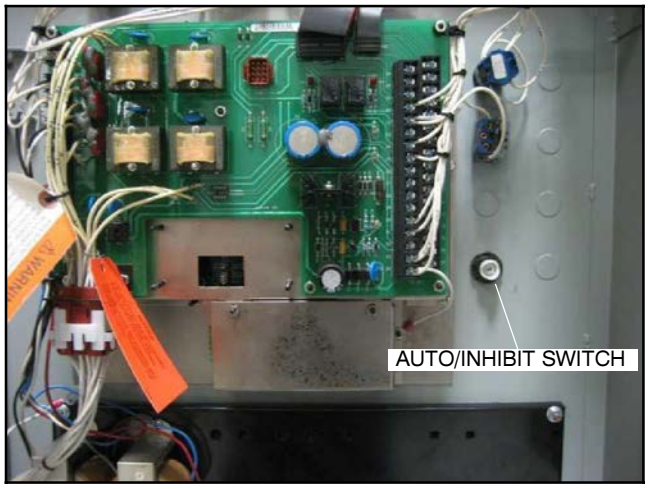


Figure 8 Auto/Inhibit Switch Disconnected

10. Disconnect the AUTO/TEST switch and the bypass time delay pushbutton. See Figure 9.

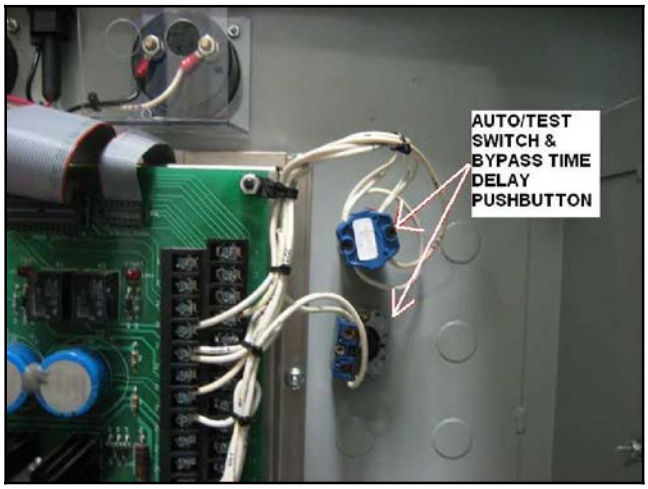


Figure 9 Disconnect the AUTO/TEST Switch and Bypass Time Delay Button

11. Remove the AUTO/TEST switch, the BYPASS TIME DELAY pushbutton, and the ATS (AUTO/INHIBIT) disconnect switch. See Figure 10.

Figure 10 Switches and Pushbutton Removed

12. If the transfer switch is equipped with meters, disconnect and remove all meters and the selector switch. See Figure 11 and Figure 12.

    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 2.

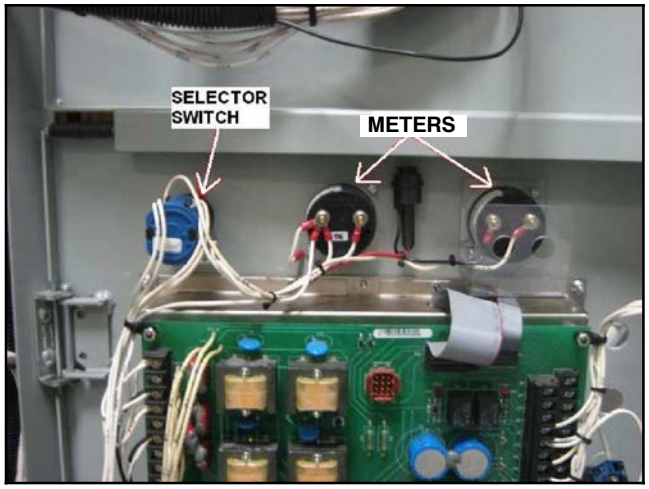


Figure 11 Disconnect the Meters and Selector Switch

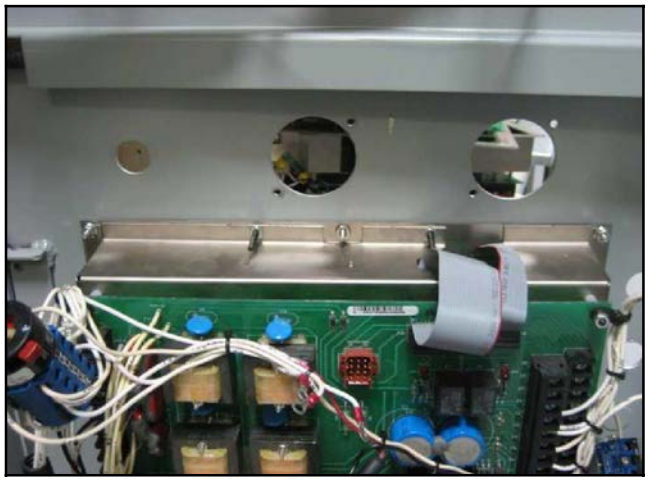


Figure 12 Meters and Selector Switch Removed

13. Disconnect plug P24 and ground. See Figure 13 and Figure 14.

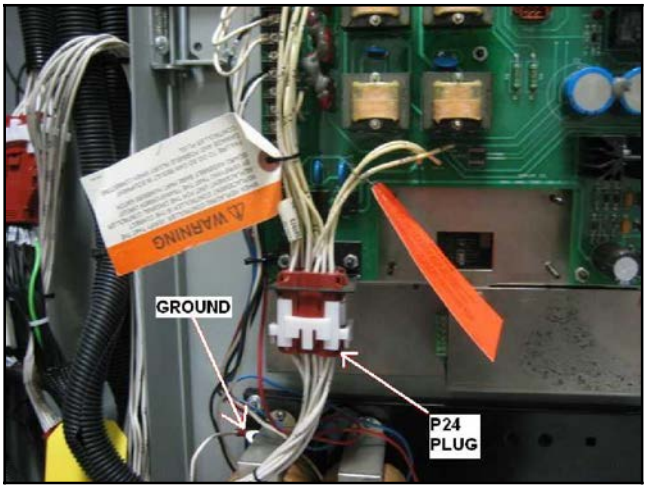


Figure 13 Disconnect P24 and Ground

Figure 14 P24 Disconnected

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 15 and Figure 16.

    Note: The transformers and terminal blocks will be secured to the new mounting plate later.

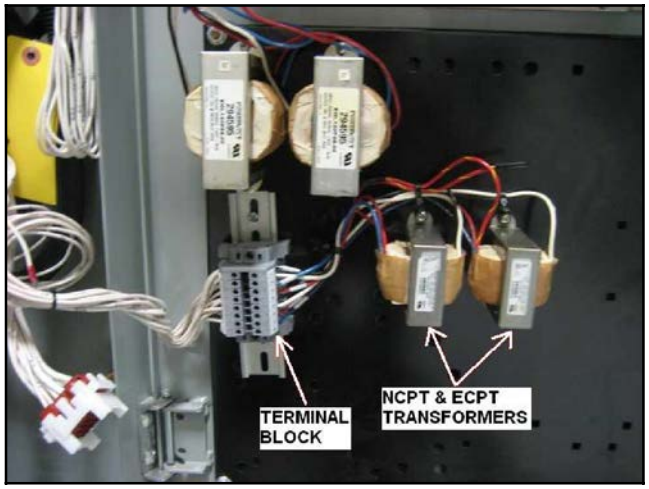


Figure 15 Transformers and Terminal Block on Lower Panel (do not disconnect electrical connections)

Figure 16 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 17 and Figure 18.

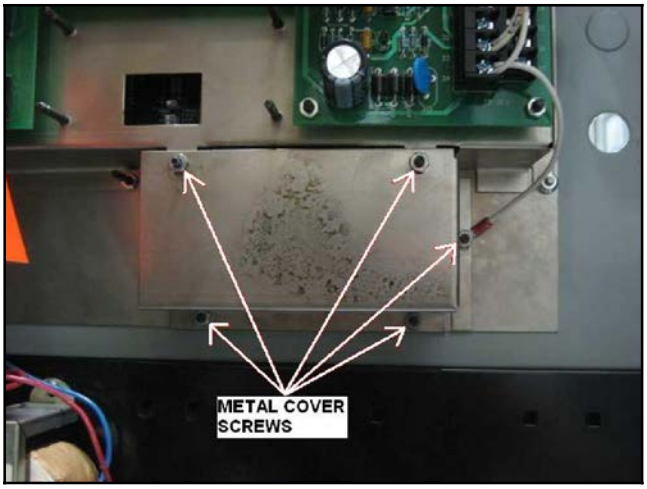


Figure 17 Remove Cover Screws

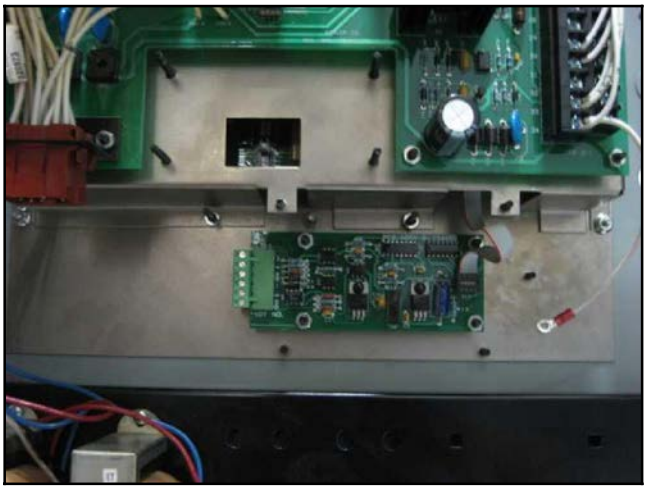


Figure 18 Cover Removed

16. Remove the controller and the lower panel. See Figure 19 through Figure 24.

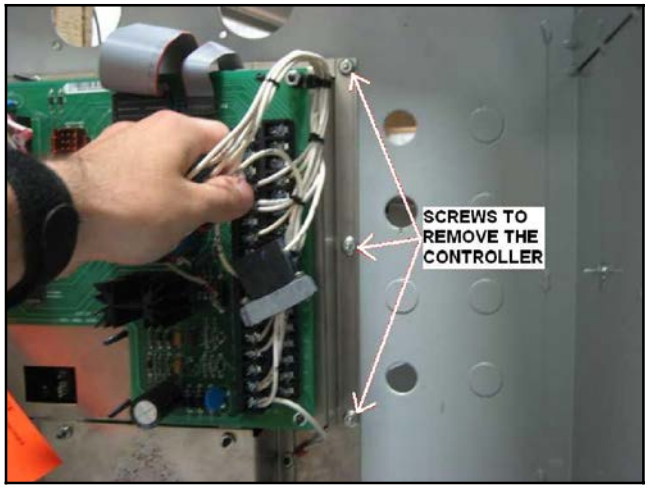


Figure 19 Remove Controller Screws

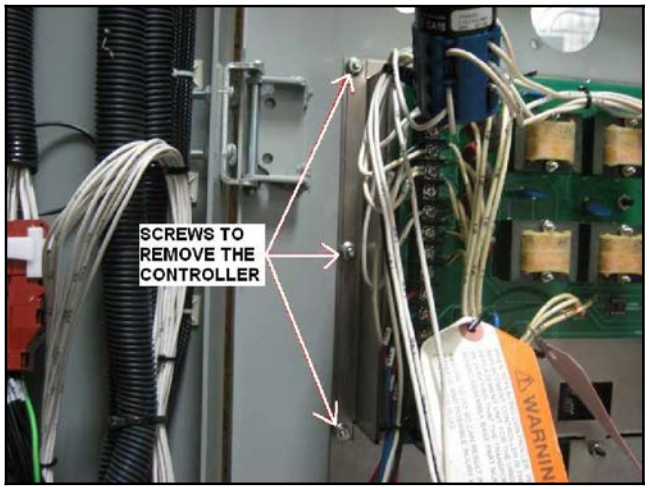


Figure 20 Remove Controller Screws

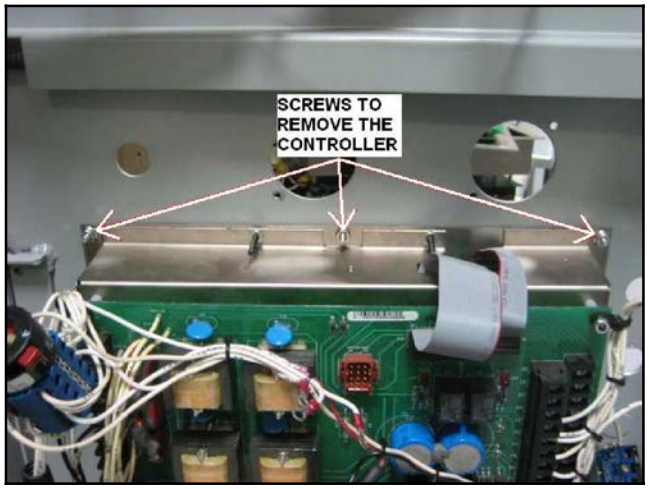


Figure 21 Remove Controller Screws

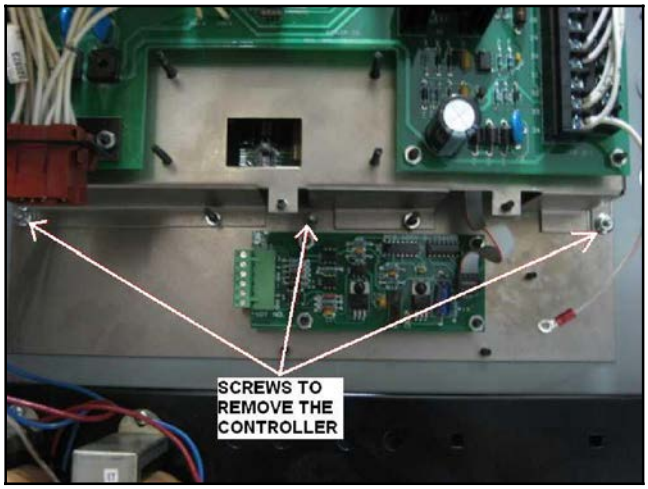


Figure 22 Remove Controller Screws

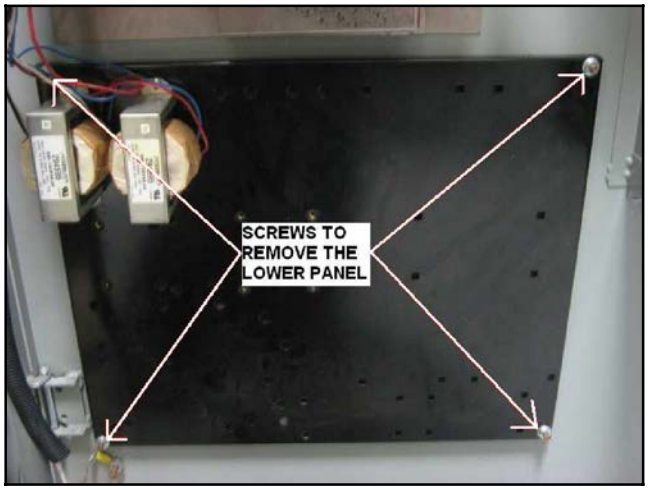


Figure 23 Remove Lower Panel Screws

Figure 24 Controller and Lower Panel Removed

Note: Refer to the notes in Figure 29 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 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 25 and Figure 29. 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). See Figure 26.

19. Install panel retainer (GM70051). See Figure 26.

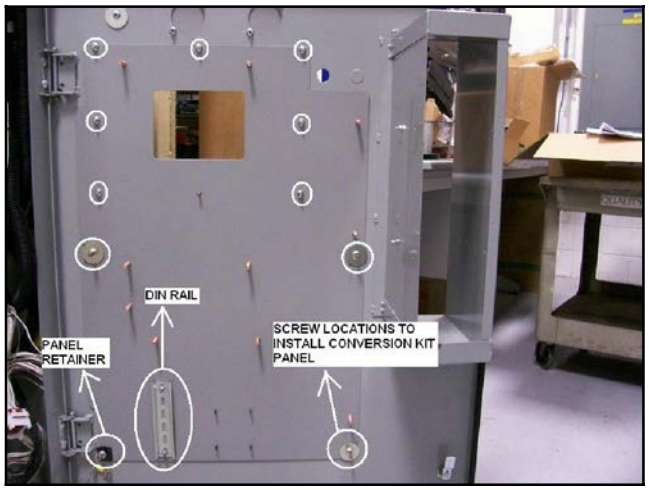


Figure 25 Mounting Plate Installation

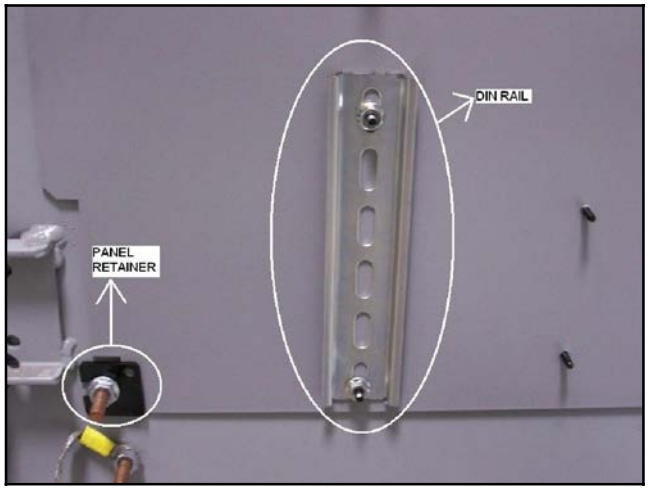


Figure 26 DIN Rail and Panel Retainer

20. 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 27 and Figure 29.

    The installed plate is shown in Figure 28.

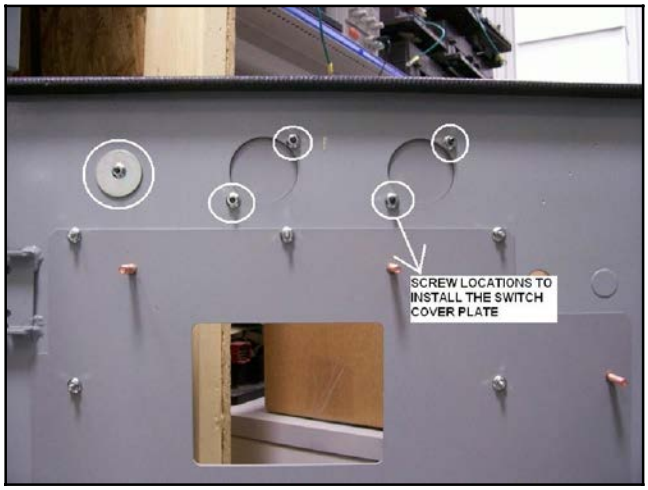


Figure 27 Switch Cover Plate GM69929

Figure 28 Door with Mounting Plate and Switch Cover Plate

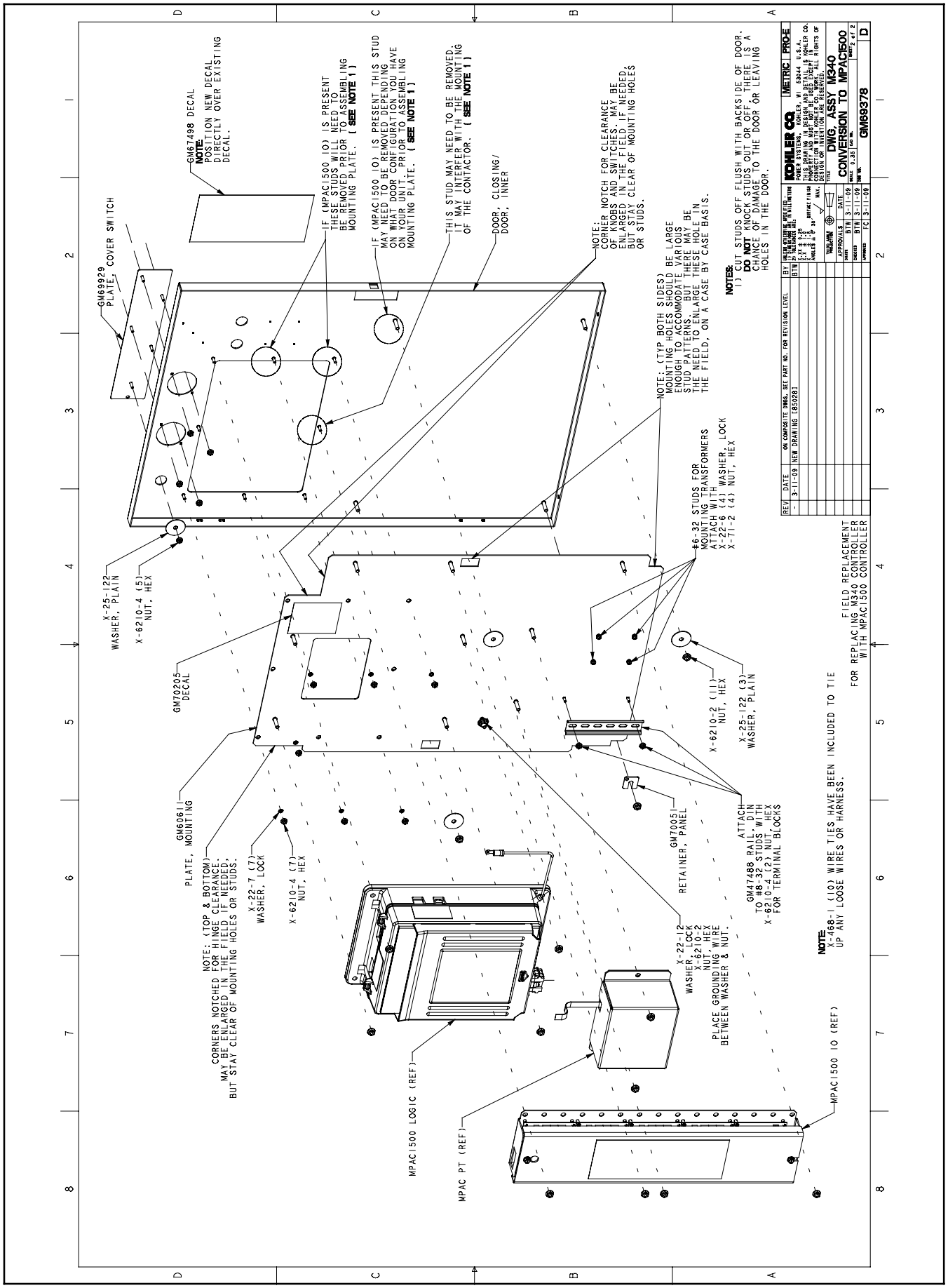


Figure 29 Conversion Kit Assembly

21. Install the MPAC 1500 controller assembly (GM46733-1) onto the conversion kit mounting plate using four nuts X-6210-2. See Figure 30.

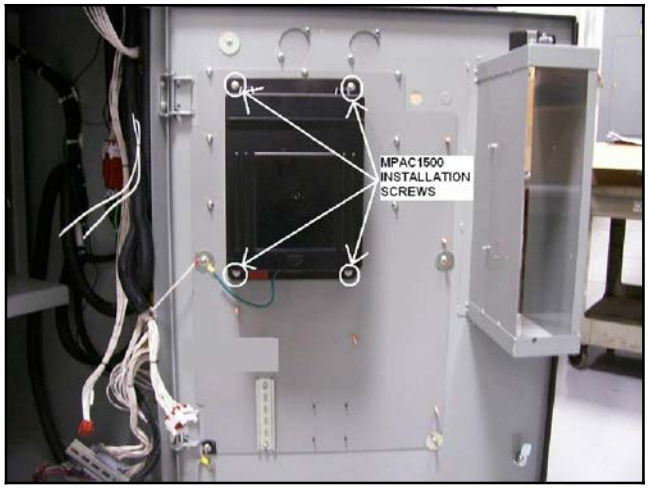


Figure 30 Controller Assembly Installation

22. See Figure 31 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.

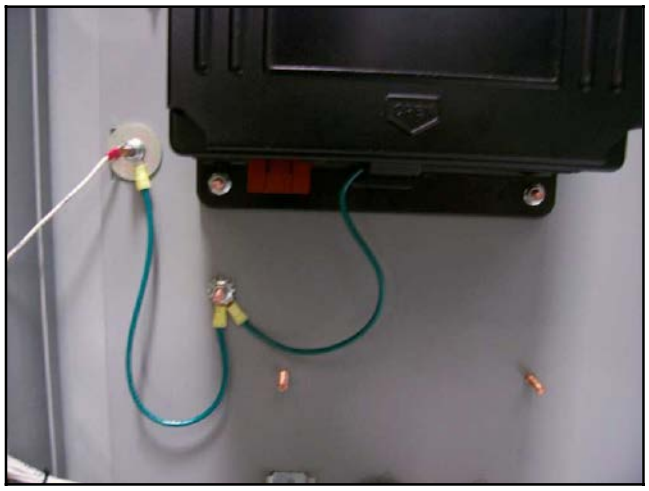


Figure 31 Ground Lead Connections

23. Reinstall the transformers and terminal block that were removed in step 14. See Figure 32 and Figure 33.

    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.

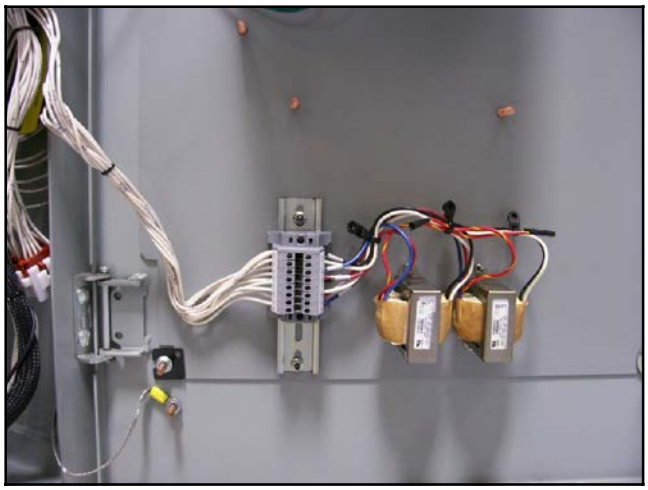


Figure 32 Transformer and Terminal Block Installation

Figure 33 Transformers and Terminal Block Installed

24. Remove the existing switch decal, if necessary, and affix conversion kit decal GM67498 over the old decal on the outside of the bottom door. See Figure 34 and Figure 35.

Figure 34 Before Decal Installation

Figure 35 After Decal Installation

25. Re-install the (AUTO/INHIBIT) disconnect switch through the conversion kit mounting plate. See Figure 36 and Figure 37.

Figure 36 Disconnect Switch Re-Installed

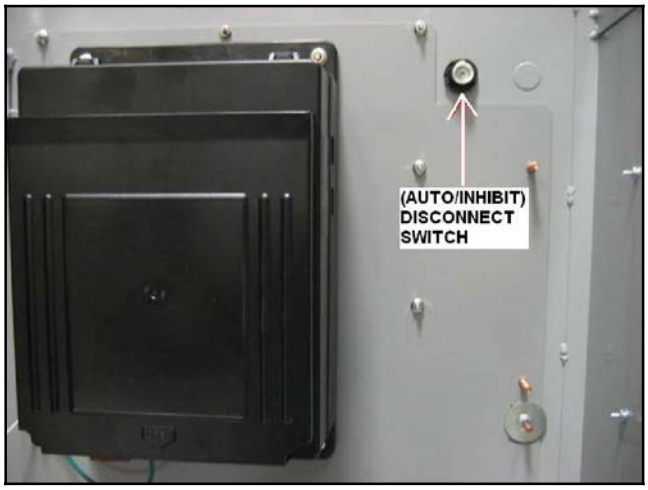


Figure 37 Disconnect Switch (inside door)

26. Connect the AUTO/INHIBIT disconnect switch, plug P24, and plug P1 of the conversion kit wire harness (GM69403) to the ATS. Route the conversion kit wire harness appropriately using the cable ties provided. See Figure 38 and Figure 39.

    See Figure 42 for the conversion kit wire harness GM69403.

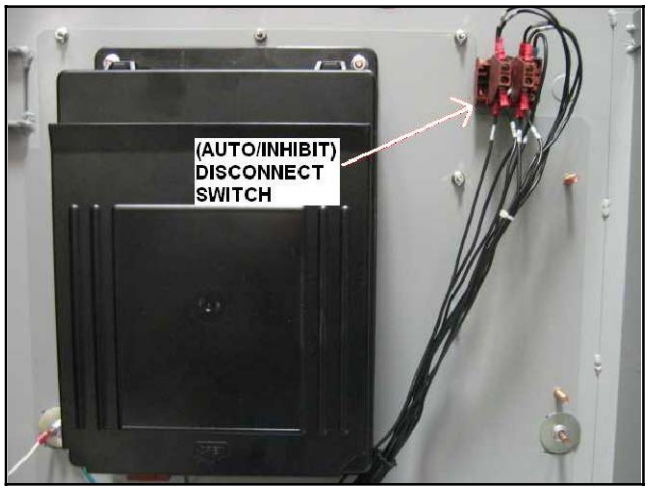


Figure 38 AUTO/INHIBIT Switch Connection

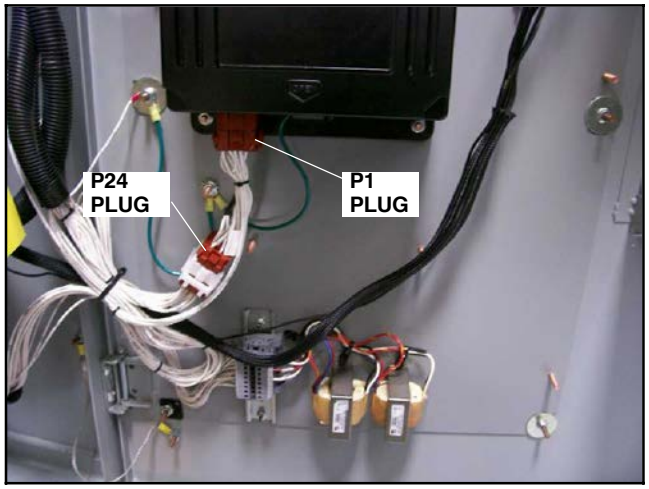


Figure 39 Conversion Kit Harness Connection to Controller Assembly

27. Remove the plastic panel covering the components on the upper door. See Figure 40 and Figure 41.

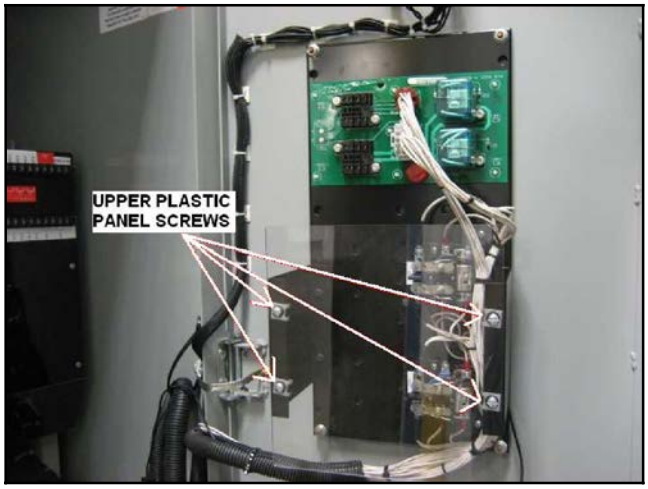


Figure 40 Plastic Panel on Upper Assembly

Figure 41 Upper Assembly with Plastic Panel Removed

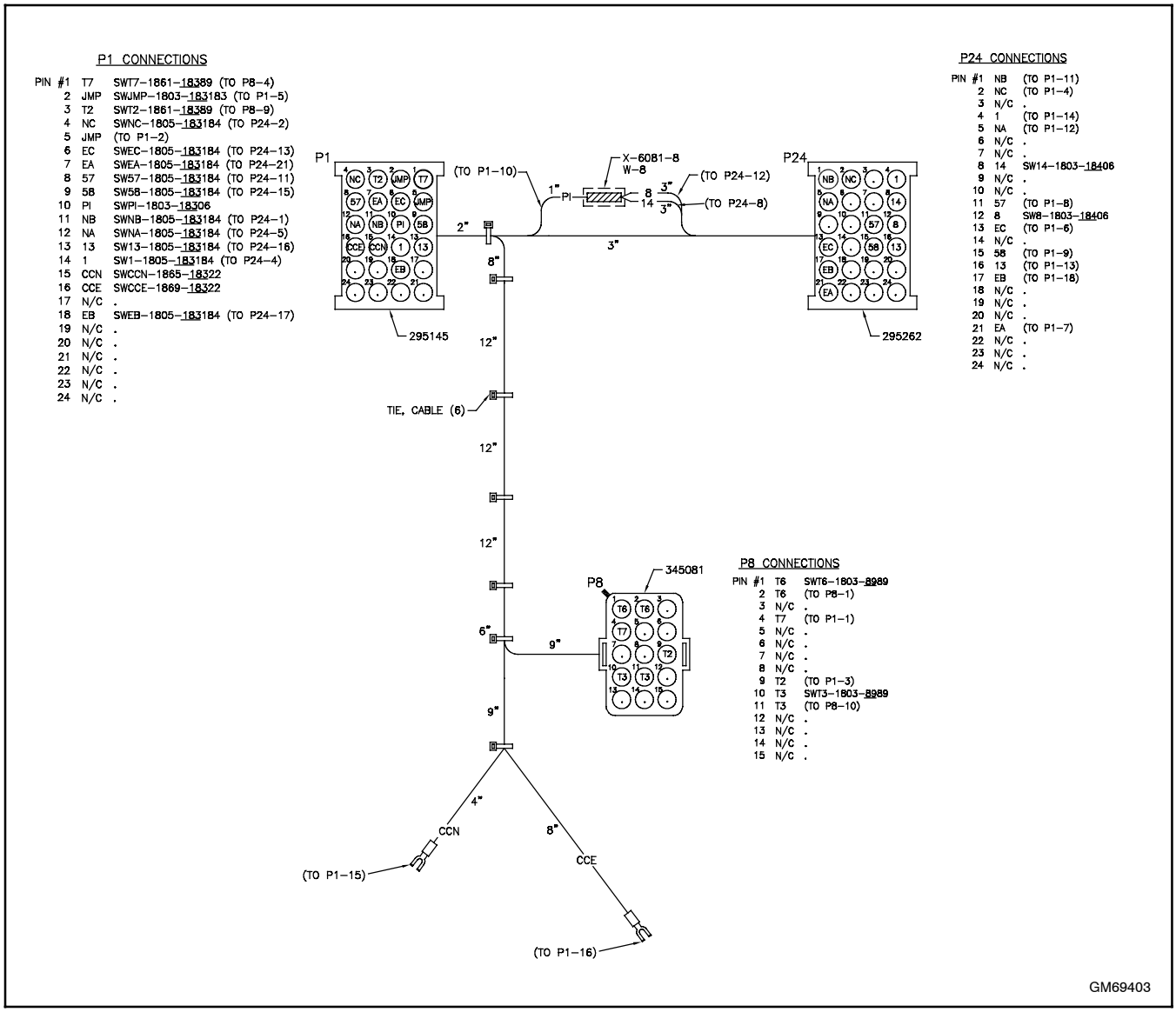


Figure 42 Conversion Kit Harness GM69403

28. Disconnect leads labelled 20 from terminals CCN-1 and CCE-1. See Figure 43.

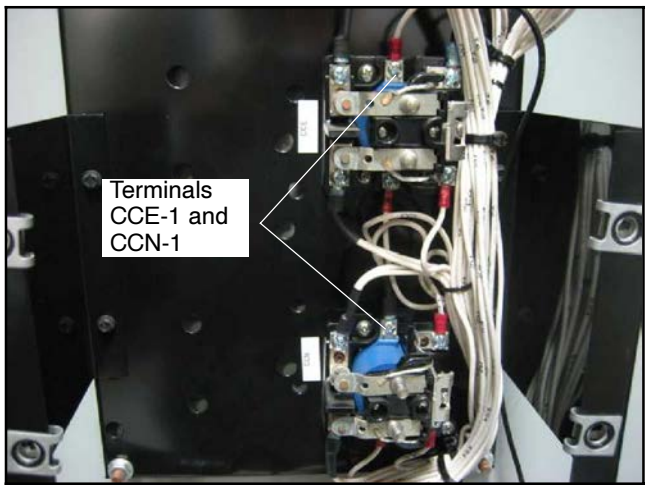
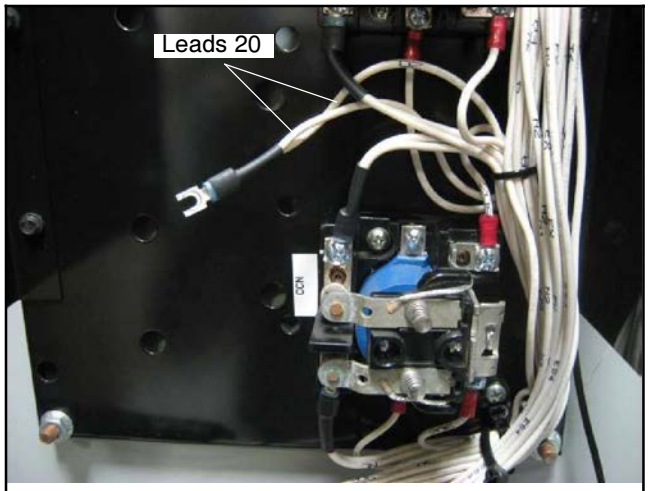


Figure 43 Disconnect Lead 20 from CCN-1 and CCE-1

29. Cut the terminal off the pair of leads marked 20 and separate the leads. See Figure 44. Discard the short jumper lead (20) that was connected from CCE-1 to CCN-1. See Figure 45.



1. Lead 20

Figure 44 Cut Connector from Pair of Leads Labelled 20

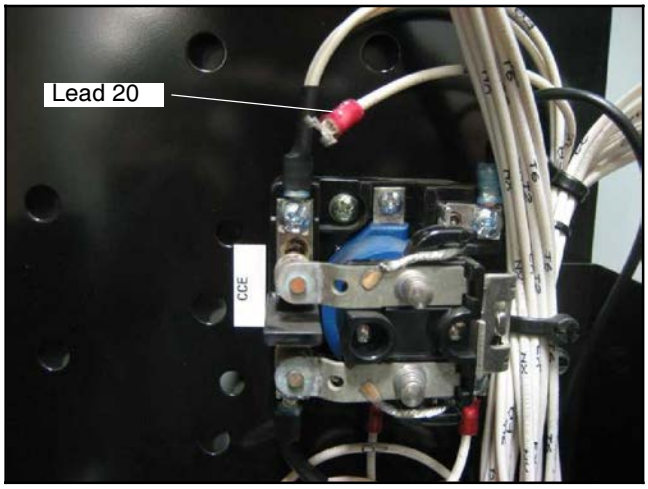


Figure 45 Single Jumper Lead 20 (separate and discard)

30. Disconnect plug P8 from the upper board. See Figure 46. Cut lead 33 (pin location: 15 on plug P8). See Figure 47.

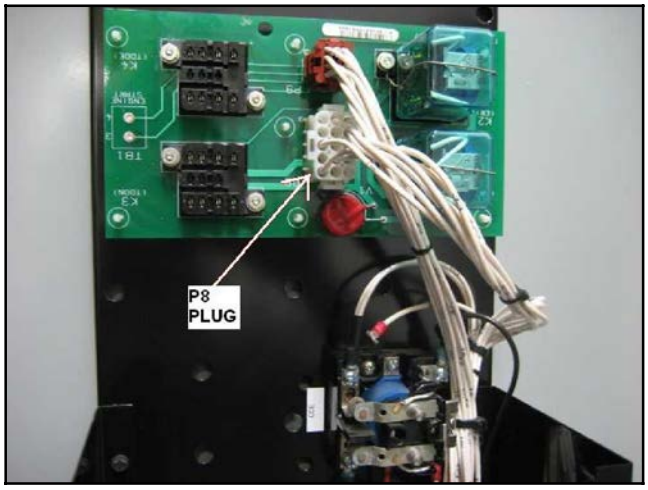


Figure 46 Disconnect Plug P8

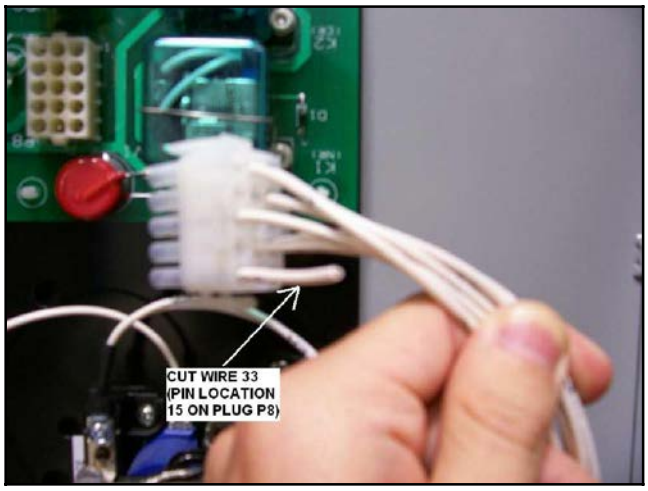


Figure 47 Cut Lead 33 at Pin 15 on Plug P8

31. Connect the conversion kit wire harness GM69403 to plug P8, which was disconnected from the upper board in the previous step. See Figure 48.

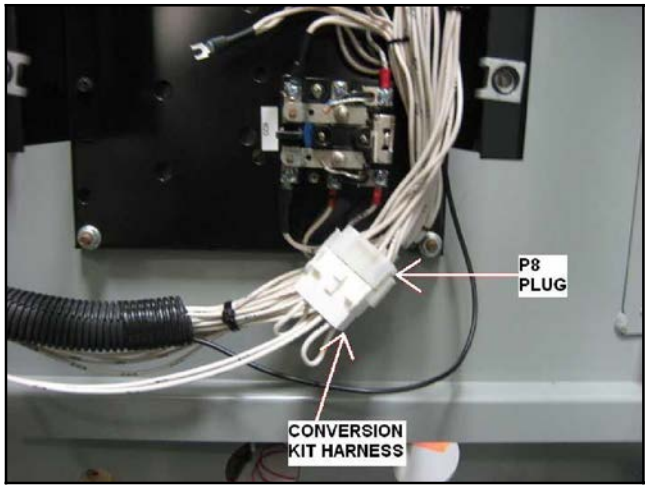


Figure 48 Connect Conversion Kit Wire Harness GM69403 to Plug P8

32. Disconnect plug P9 from the upper board. See Figure 49. 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 49 Disconnect P9

33. Cut the cable ties to release leads 33 and 20. See Figure 50.

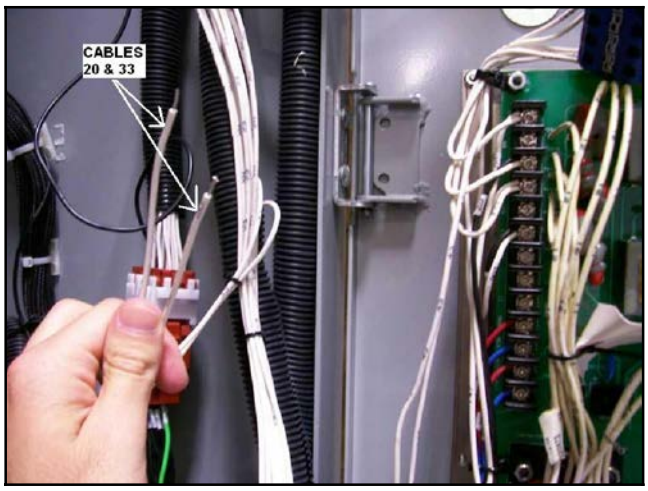


Figure 50 Leads 20 and 33

34. Re-route leads 33 and 20 and connect them to the MPAC1500 Programmable Input 1. Connect lead 33 to MPAC1500 TB1-1. Connect lead 20 to MPAC1500 TB1-2. See Figure 51.

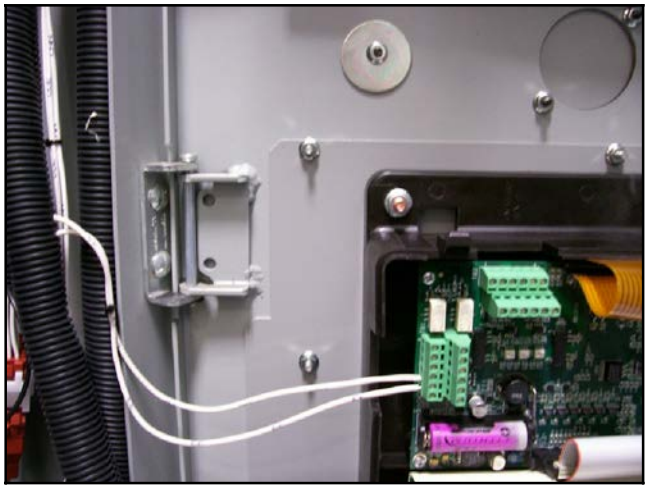


Figure 51 Connect Leads 20 and 33 to Programmable Input 1 on Controller

35. Connect to the CCN and CCE relays as follows. See Figure 52 through Figure 55.

    a. Connect lead CCN from the conversion kit wire harness GM69403 to CCN-1 on the CCN relay.

    b. Connect lead CCE from the conversion kit wire harness GM69403 to CCE-1 on the CCE relay.

    c. Route the conversion kit wire harness appropriately using the cable ties provided.

Figure 52 CCN and CCE Relay Location

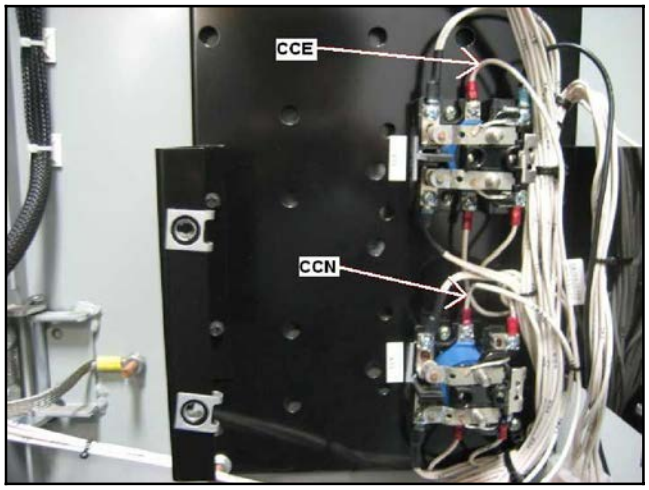


Figure 53 Connections to CCN and CCE Relays

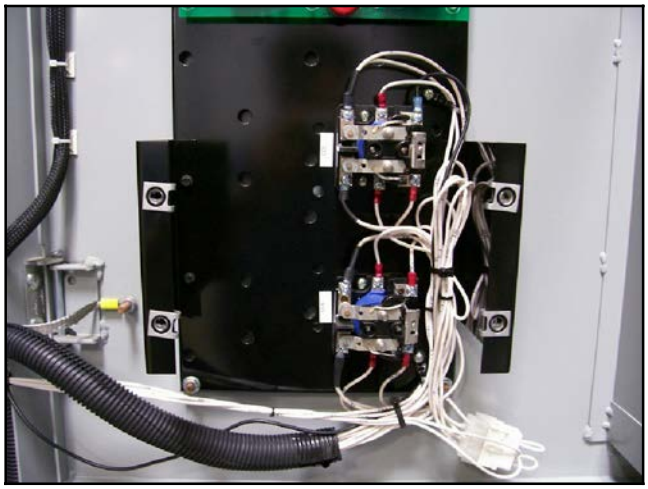


Figure 54 Harness Routing

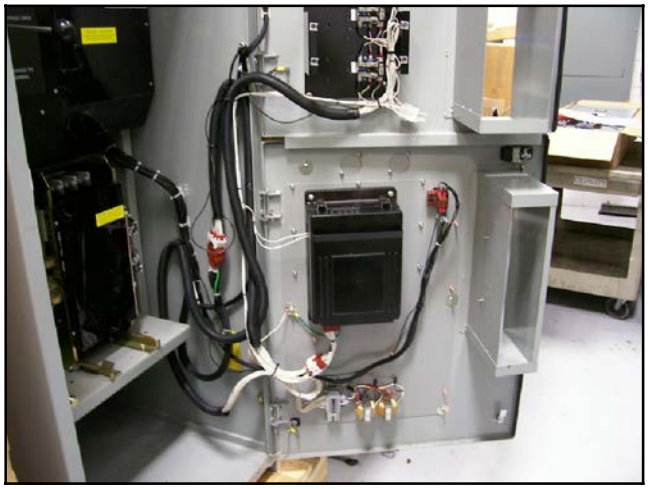


Figure 55 Harness Routing

36. Remove the circuit board from the upper panel. See Figure 56 and Figure 57.

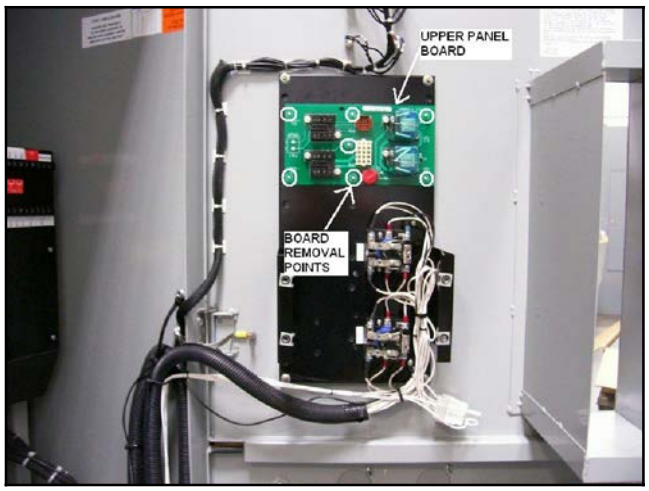


Figure 56 Remove the Upper Panel Circuit Board

Figure 57 Upper Circuit Board Removed

37. Re-install the upper plastic panel, and finish routing the conversion kit wire harness neatly using the cable ties provided. See Figure 58.

Figure 58 Re-Install Plastic Panel

38. For current sensing, obtain the appropriately rated current sensing kit with 10 foot harness, and install according to Figure 61. Connect the current transformers as shown in Figure 62. See the Parts List at the end of this document for current sensing kit numbers.

39. Place decal GM70205 (see Figure 59) on the mounting plate as shown in Figure 60 and record the required information on the decal.

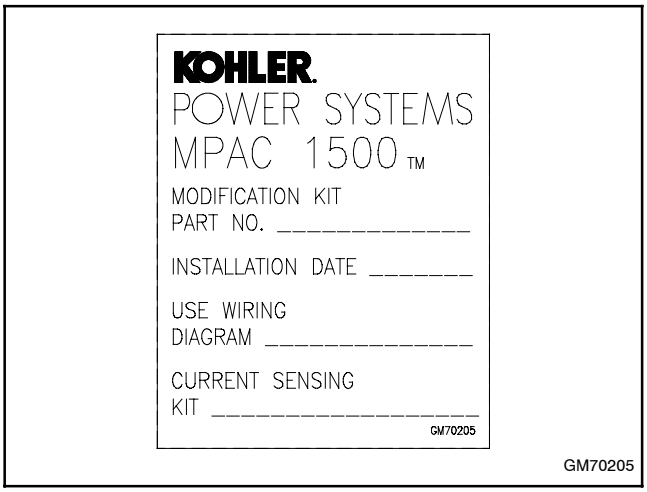


Figure 59 Decal GM70205

Figure 60 Decal GM70205 Location

40. The controller installation is now complete. For installation of optional accessories (such as input/output [I/O] or alarm modules), refer to the instructions provided with the accessory kit or to the MPAC™ 1500 Operation/Installation manual, TP-6714.

41. Reconnect power to the transfer switch.

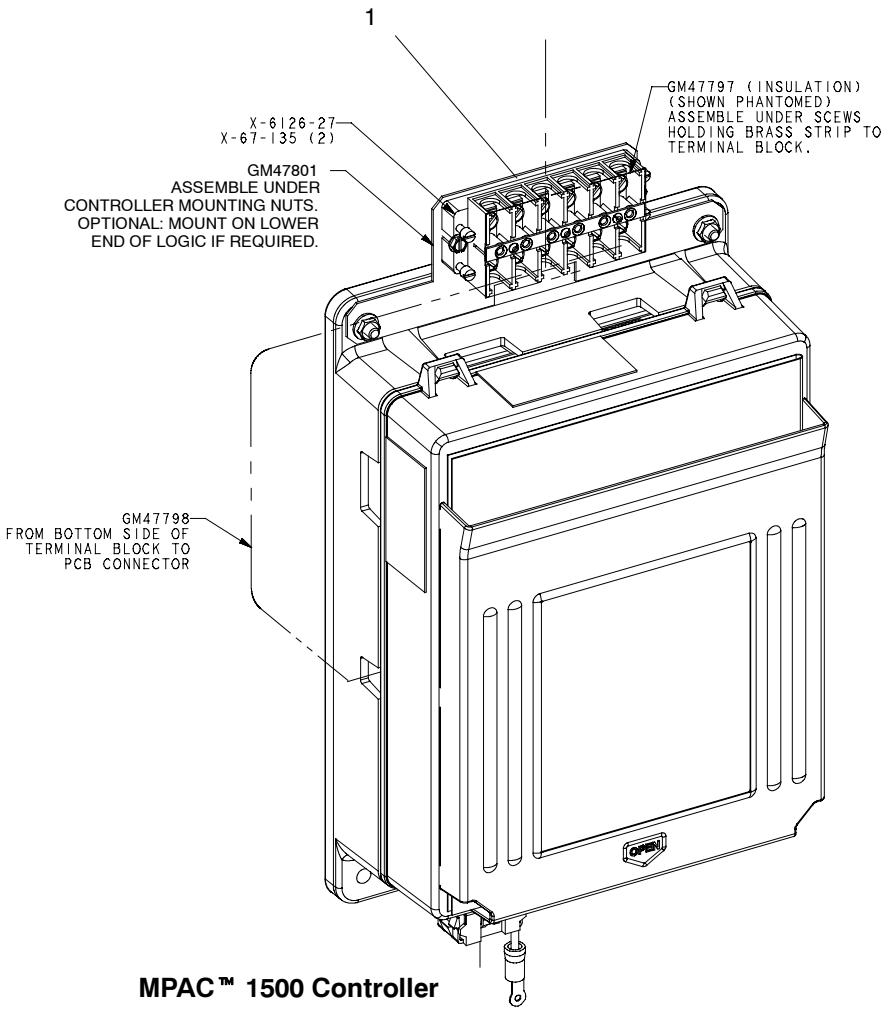
42. Check that the generator set master switch is in the OFF position.

43. Reconnect the generator set engine starting battery, negative (-) lead last.

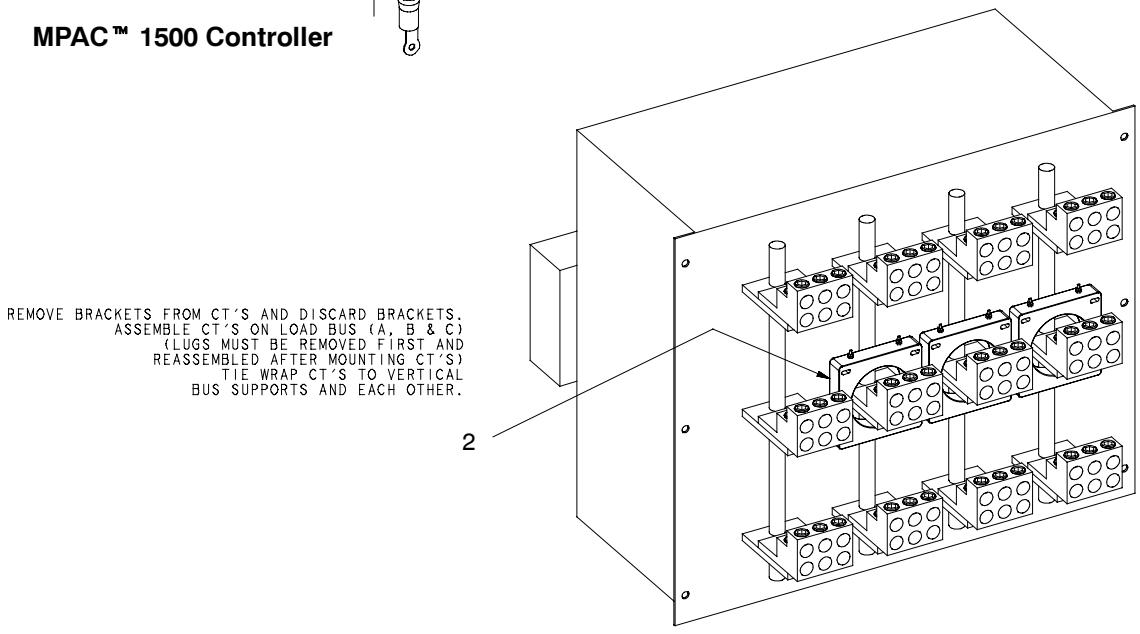
44. Reconnect power to the battery charger, if equipped.

45. Program the MPAC1500 controller voltages, time delays, and system phases. **Assign programmable input 1 to Bypass Contactor Disable.** See TP-6714, Operation Manual, for instructions.

46. Run the operation tests outlined in Operation Manual TP-6714 to verify system operation.



MPAC™ 1500 Controller



NOTES:

HI SIDE OF CT'S MUST ALWAYS FACE TOWARD THE CONTACTOR.
Route CT harness neatly to controller with controller/contactor harness. Use cable ties as necessary.
See wiring diagram GM47803 (Figure 62).

1. Connect harness GM40562 (10 ft. harness). See Figure 62 for electrical connections.
2. Current transformers. See Parts List for part numbers.

Figure 61 Current Sensing Kit Installation

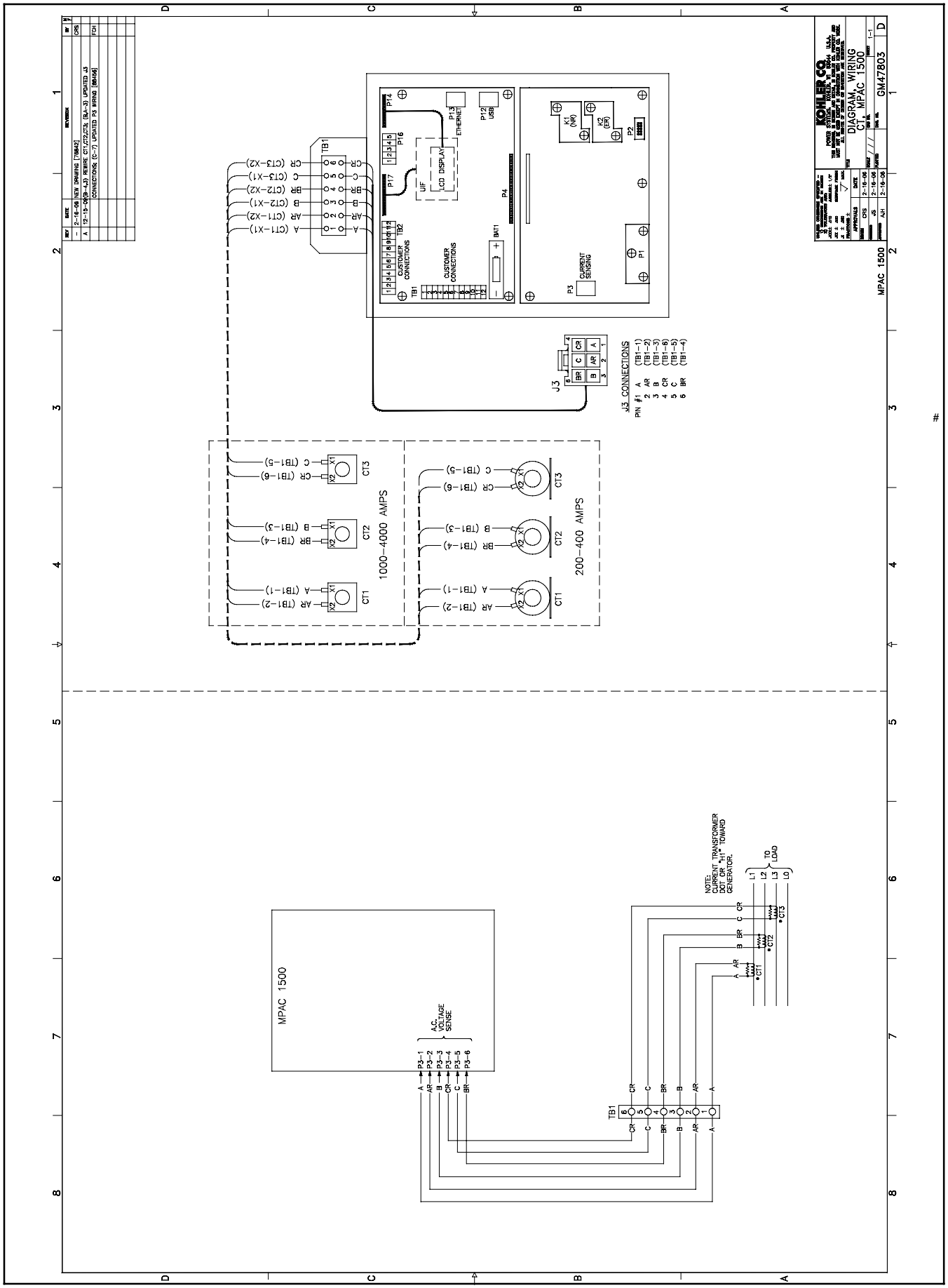


Figure 62 Current Sensing Kit Wiring Diagram, GM47803

Parts Lists

ZCM-5 and ZCB-5 MPAC™ 1500 Conversion Kit

Kit: GM69378-S1		
Qty.	**Description**	**Part Number**
1	Plate, mounting	GM60611
1	Plate, cover switch	GM69929
1	Decal	GM70205
1	Decal	GM67498
1	Logic, MPAC1500 Assembly	GM46733-1
1	Harness - ZCS/ZCM/ZCB - 5 MPAC1500	GM69403
10	Tie, cable	X-468-1
2	Tie, cable	X-468-3
5	Washer, plain	X-25-122
1	Retainer, panel	GM70051
10	Nut, hex (expense)	X-6210-2
5	Nut, hex	X-71-2
5	Washer, lock	X-22-6
1	Rail, din	GM47488
1	Washer, lock	X-22-12
1	Cable, ground	LK-1212-1515
15	Nut, hex (expense)	X-6210-4
8	Washer, lock	X-22-7
1	Operation Manual - MPAC1500	TP-6714
1	Operation/Installation Man - ZCM/ZCB-5 MPAC1500	TP-6718
1	Conversion Installation Inst ZCM/ZCB-5 MPAC1500	TT-1522
1	Dwg, Assy M340 Conversion to MPAC 1500	GM69378

Current Sensing Kits

		Part Quantity									
		Kit number GM47965:									
		-S19	**-S20**	**-S21**	**-S22**	**-S23**	**-S24**	**-S25**	**-S26**	**-S27**	**-S28**
Description	**Part Number**	1000 A 3 ph	1200 A 3 ph	2000 A 3 ph	3000 A 3 ph	1000 A 1 ph	1200 A 1 ph	200 A 3 ph	200 A 1 ph	400 A 3 ph	400 A 1 ph
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				2					
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
Harness, CT	GM47798	1	1	1	1	1	1	1	1	1	1
Bracket, Terminal Block Mounting	GM47801	1	1	1	1	1	1	1	1	1	1
Diagram, Wiring CT MPAC 1500	GM47803	1	1	1	1	1	1	1	1	1	1
Drawing, Assembly Current Sensing	GM47965	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
Screw, Hex, Washer, Thread-forming	X-67-135	2	2	2	2	2	2	2	2	2	2

Notes

ATS Wiring Diagrams and Schematics

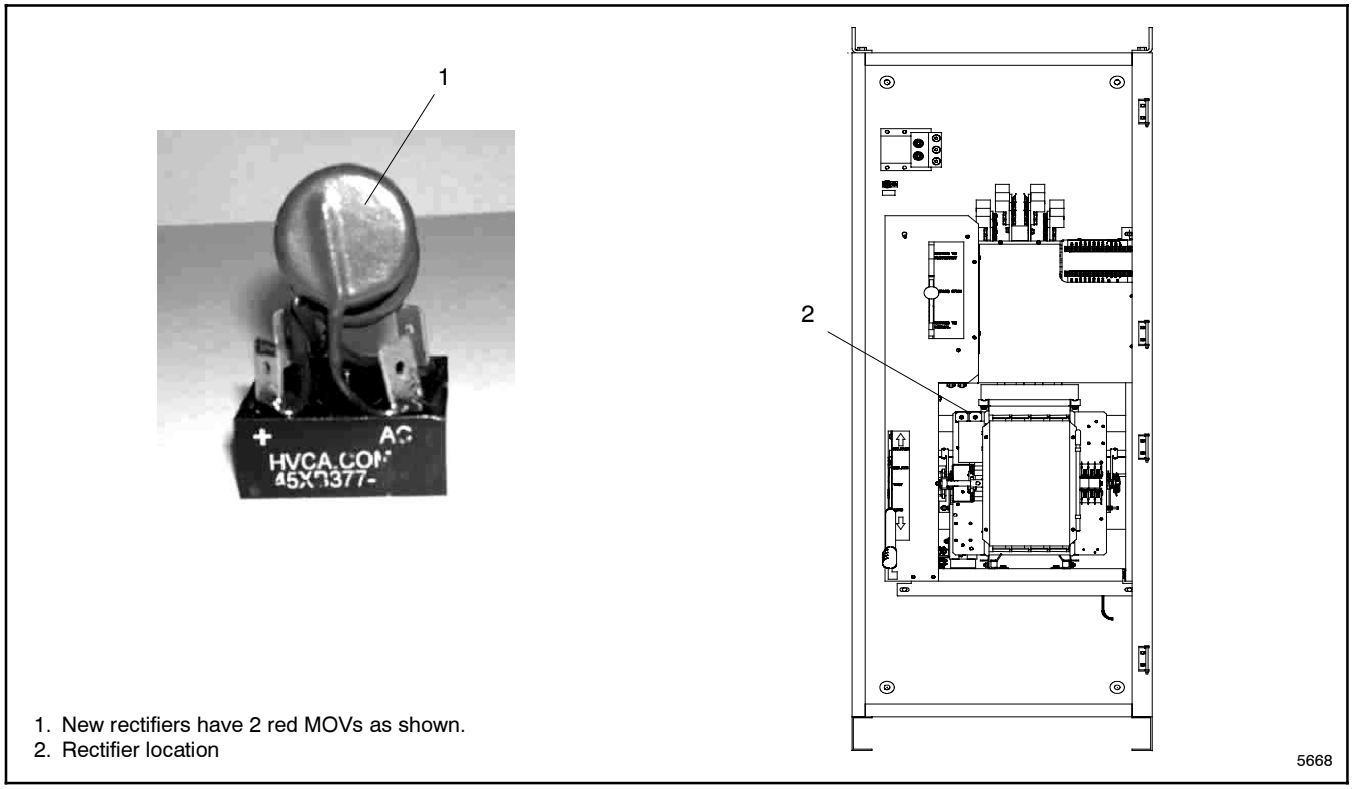
Use the table below to identify the drawing numbers for your ZCB-5 or ZCM-5 bypass/isolation switch. The drawings are arranged in numerical order on the following pages.

ATS Model	Poles	Amps	Bypass Schematic	Schematic with MPAC 1500 Conversion	Wiring Diagram with MPAC 1500 Conversion
ZCB-5xx231-0150	2	150	321444	GM71337	GM71338
ZCB-5xx231-0225		225			
ZCB-5xx231-0260		260			
ZCB-5xx231-0400		400			
ZCM-5xx231-0150	2	150	GM29622 * GM55095 †	GM71335 * GM69402 †	GM71336 * GM69404 †
ZCM-5xx231-0225		225			
ZCM-5xx231-0260		260			
ZCM-5xx231-0400		400			
ZCB-5xx231-0600	2	600	321484	GM70375	GM70376
ZCB-5xx231-0800		800			
ZCB-5xx341-0150	3	150	321444	GM71337	GM71338
ZCB-5xx341-0225		225			
ZCB-5xx341-0260		260			
ZCB-5xx341-0400		400			
ZCM-5xx341-0150	3	150	GM29622 * GM55095 †	GM71335 * GM69402 †	GM71336 * GM69404 †
ZCM-5xx341-0225		225			
ZCM-5xx341-0260		260			
ZCM-5xx341-0400		400			
ZCB-5xx341-0600	3	600	321484	GM70375	GM70376
ZCB-5xx341-0800		800			
ZCB-5xx341-1000		1000			
ZCB-5xx341-1200		1200			
ZCB-5xx341-1600	3	1600	321454	GM71190	GM71191
ZCB-5xx341-2000		2000			
ZCB-5xx341-2500		2500			
ZCB-5xx341-3000		3000			
ZCB-5xx341-4000		4000			
ZCB-5xx641-0150	4	150	321444	GM71337	GM71338
ZCB-5xx641-0225		225			
ZCB-5xx641-0260		260			
ZCB-5xx641-0400		400			
ZCM-5xx641-0150	4	150	GM29622 * GM55095 †	GM71335 * GM69402 †	GM71336 * GM69404 †
ZCM-5xx641-0225		225			
ZCM-5xx641-0260		260			
ZCM-5xx641-0400		400			
ZCB-5xx641-0600	4	600	321484	GM70375	GM70376
ZCB-5xx641-0800		800			
ZCB-5xx641-1000		1000			
ZCB-5xx641-1200		1200			
ZCB-5xx641-1600	4	1600	321454	GM71190	GM71191
ZCB-5xx641-2000		2000			
ZCB-5xx641-2500		2500			
ZCB-5xx641-3000		3000			
ZCB-5xx641-4000		4000			
xx =See Figure 64, Voltage Codes			* Before rectifier change. † With new rectifiers. See Figure 65.		

Figure 63 Drawing Numbers

Code (xx)	Voltage and Frequency
53	220 V, 60 Hz
60	600 V, 60 Hz
63	220 V, 50 Hz
64	240 V, 60 Hz
66	480 V, 60 Hz
68	208 V, 60 Hz
71	380 V, 50 Hz
72	380 V, 60 Hz
73	416 V, 50 Hz

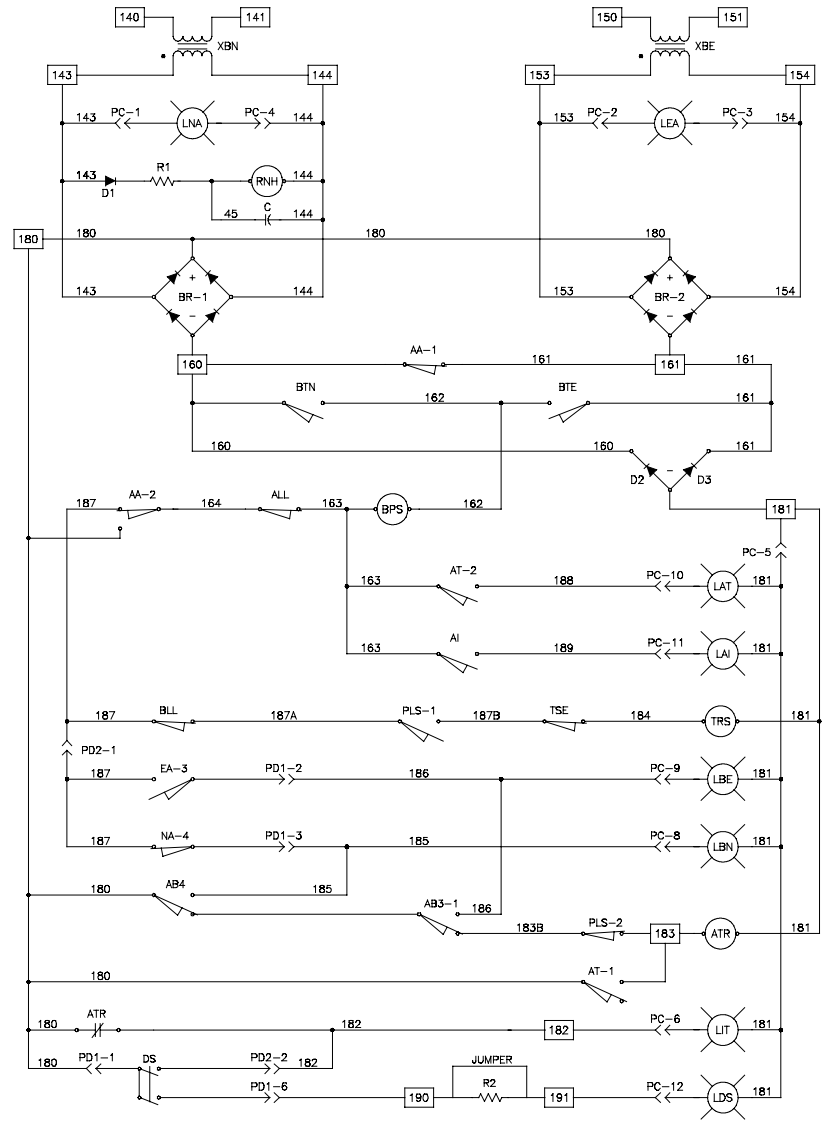
Figure 64 Voltage Codes



1. New rectifiers have 2 red MOVs as shown.
2. Rectifier location

Figure 65 New Rectifiers with MOVs (150–400 Amp Model ZCM)

REV	DATE	REVISION	BY	M E
A	3-28-94	WIRE NUMBERS REVISED	AH	
B	8-25-09	(C-3,2) D2 AND D3 WAS BR-3, (B-3) ADDED JUMPER [85028]	FCH	

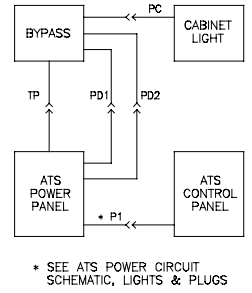


LIMIT SWITCH CHART

X = ACTUATED	ATS LOCATION				ATS MODE		BYPASS MODE		
	AUTO	TEST	ISO	REMOVE	NORM.	EMERG.	NORM.	EMERG.	OPEN
AA	X								
AT		X							
AI			X	X					
ALL	X	X	X	X					
TSE	X	X	X						
AE			X	X					
NA					X				
EA						X			
AB4							X		
AB3								X	
BLL							X	X	X
PLS	ACTIVATED WHEN ALH IS OPERATED								

LEGEND

AA-1,2	LIMIT SWITCH, ATS AUTO LOCATION
AB3-1	LIMIT SWITCH, BYPASS EMERGENCY
AB4	LIMIT SWITCH, BYPASS NORMAL
AI	LIMIT SWITCH, ATS IN ISOLATE
ALH	ATS LOCATION HANDLE
ALL	LIMIT SWITCH, ATS LOCK LOCATION
AT-1,2	LIMIT SWITCH, ATS TEST LOCATION
ATR	AUTO/TEST RELAY
BLL	LIMIT SWITCH, BYPASS LOCK LOCATION
BPS	BYPASS SOLENOID
BTE	LIMIT SWITCH, BYPASS TRANSFER EMERGENCY (MBH MOVEMENT TO NORMAL)
BTN	LIMIT SWITCH, BYPASS TRANSFER NORMAL (MBH MOVEMENT TO EMERGENCY)
BR	BRIDGE RECTIFIER
DS	ATS DISCONNECT SWITCH
EA-3	LIMIT SWITCH, ATS IN EMERGENCY
LBE	BYPASS EMERGENCY LIGHT
LBN	BYPASS NORMAL LIGHT
LAI	ATS ISOLATE LIGHT
LAT	ATS TEST LOCATION
LDS	DISCONNECT SWITCH INHIBIT POSITION
LEA	EMERGENCY AVAILABLE LIGHT
LIT	ATS INHIBIT LIGHT
LNA	NORMAL AVAILABLE LIGHT
NA-4	LIMIT SWITCH, ATS IN NORMAL
PLS-1,2	PERMISSIVE LIMIT SWITCH
RNH	NORMAL VOLTAGE RELAY
TRS	SOLENOID, TRANSFER RELEASE
TSE	LIMIT SWITCH, TRANSFER SWITCH ENGAGED
[81]	TERMINAL ON BYPASS SUBPANEL



* SEE ATS POWER CIRCUIT SCHEMATIC, LIGHTS & PLUGS

MODEL ZCB-1, 5
100-400 AMP
3 & 4 POLE
FOR INTERCONNECTION DIAGRAM SEE DWG. 321558

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

APPROVALS		DATE
DRAWN	WJB	1-11-94
CHECKED	AH	2-14-94
APPROVED	AH	2-14-94

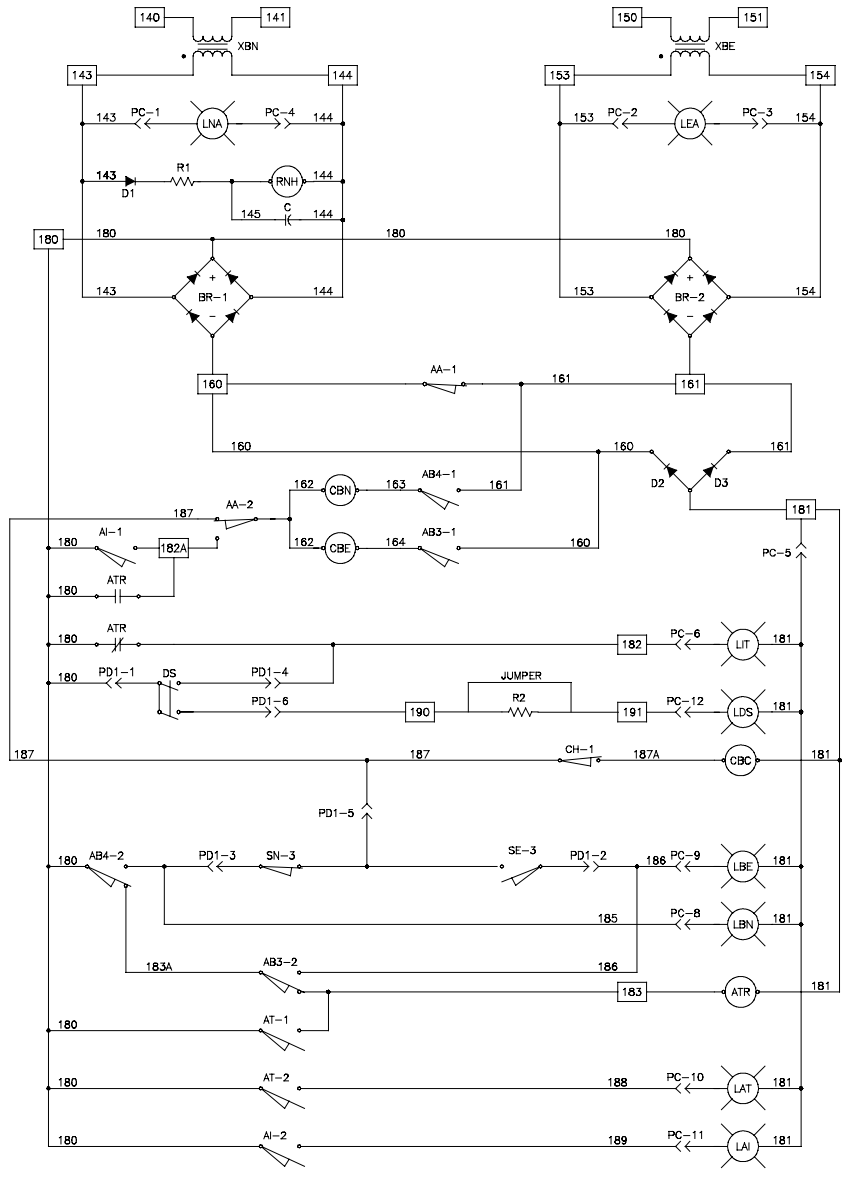
KOHLER CO.
GENERATOR DIVISION, KOHLER, WI 53044 U.S.A.

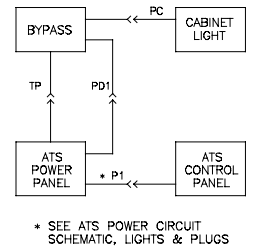
TITLE: SCHEMATIC DIAGRAM

SCALE	CAD NO.	SHEET
NONE	321444.DWG	1-1
PLOTTED	DWG. NO.	
	321444	E

Bypass Schematic, Model ZCB-5, 150-400 Amps, 3 and 4 Poles, 321444

REV	DATE	REVISION	BY	M E
A	3-25-94	WIRE NUMBERS REVISED	AH	
B	12-13-05	(A-2) 321496 DIAGRAM REMOVED [76835]	SAM	
C	8-11-09	(C-3,2) D2/D3 WAS BR-3, (B-3) ADDED JUMPER [85028]	FCH	





* SEE ATS POWER CIRCUIT SCHEMATIC, LIGHTS & PLUGS

LIMIT SWITCH CHART

X = ACTUATED	ATS LOCATION				ATS MODE		BYPASS MODE	
	AUTO	TEST	ISO	REMOVE	NORM	EMERG.	NORM	EMERG.	OPEN
AA	X								
AT		X							
AI			X	X					
AE			X	X					
SN					X				
SE						X			
AB4							X		
AB3								X	

LEGEND

AA-1,2,3	LIMIT SWITCH, ATS AUTO LOCATION
AB3-1,2	LIMIT SWITCH, BYPASS EMERGENCY
AB4-1,2	LIMIT SWITCH, BYPASS NORMAL
AI-1,2,3	LIMIT SWITCH, ATS IN ISOLATE
AT-1,2	LIMIT SWITCH, ATS TEST LOCATION
ACD	LIMIT SWITCH, CRANK HANDLE ENGAGED
ACU	LIMIT SWITCH, CRANK HANDLE ENGAGED
ATR	AUTO/TEST RELAY
BR	BRIDGE RECTIFIER
CBC	CRANK SOLENOID
CBE	EMERGENCY TRANSFER OPERATOR
CBN	NORMAL TRANSFER OPERATOR
DS	ATS DISCONNECT SWITCH
LBE	BYPASS EMERGENCY
LBN	BYPASS NORMAL LIGHT
LAI	ATS ISOLATE LIGHT
LAT	ATS TEST LOCATION
LDS	DISCONNECT SWITCH
LEA	EMERGENCY AVAILABLE LIGHT
LIT	ATS INHIBIT LIGHT
LNA	NORMAL AVAILABLE LIGHT
RNH	NORMAL VOLTAGE RELAY
[81]	TERMINAL ON BYPASS SUBPANEL

MODEL ZCB-1, 5
1600-3000 AMP
3 & 4 POLE

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

APPROVALS		DATE
DRAWN	WJB	1-11-94
CHECKED	AH	2-14-94
APPROVED	AH	2-14-94

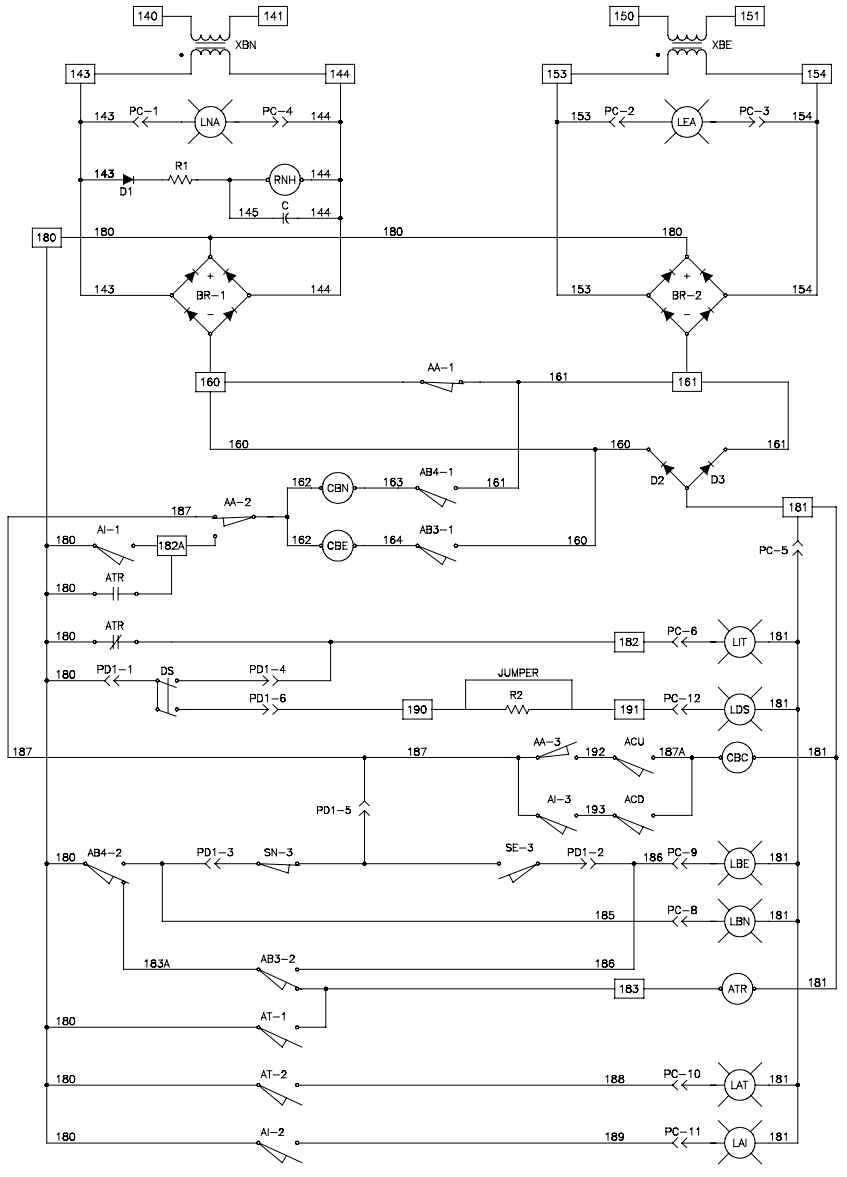
KOHLER CO.
POWER SYSTEMS, KOHLER, WI 53044 U.S.A.

TITLE: SCHEMATIC DIAGRAM

SCALE	CAD NO.	SHEET
NONE	321454.DWG	1-1
PLOTTED	DWG. NO.	321454 E

Bypass Schematic, Model ZCB-5 , 1600-3000 Amps, 3 and 4 Poles, 321454

REV	DATE	REVISION	BY	M F
A	3-25-94	WIRE NUMBERS REVISED	AH	
B	8-11-09	(C-3,2) D2/D3 WAS BR-3, (C-3) ADDED JUMPER [85028]	FCH	

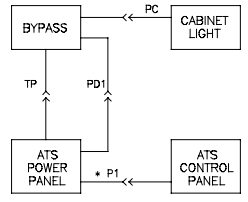


LIMIT SWITCH CHART

X = ACTUATED	ATS LOCATION			ATS MODE		BYPASS MODE	
	AUTO	TEST	ISO	NORM.	EMERG.	NORM.	EMERG.
AA	X						
AT		X					
AI			X	X			
AE			X	X			
SN				X			
SE					X		
AB4						X	
AB3							X

LEGEND

AA-1,2,3	LIMIT SWITCH, ATS AUTO LOCATION
AB3-1,2	LIMIT SWITCH, BYPASS EMERGENCY
AB4-1,2	LIMIT SWITCH, BYPASS NORMAL
AI-1,2,3	LIMIT SWITCH, ATS IN ISOLATE
AT-1,2	LIMIT SWITCH, ATS TEST LOCATION
ACD	LIMIT SWITCH, CRANK HANDLE ENGAGED
ACU	LIMIT SWITCH, CRANK HANDLE ENGAGED
ATR	AUTO/TEST RELAY
BR	BRIDGE RECTIFIER
CBC	CRANK SOLENOID
CBE	EMERGENCY TRANSFER OPERATOR
CBN	NORMAL TRANSFER OPERATOR
DS	ATS DISCONNECT SWITCH
LBE	BYPASS EMERGENCY
LBN	BYPASS NORMAL LIGHT
LAI	ATS ISOLATE LIGHT
LAT	ATS TEST LOCATION
LDS	DISCONNECT SWITCH
LEA	EMERGENCY AVAILABLE LIGHT
LIT	ATS INHIBIT LIGHT
LNA	NORMAL AVAILABLE LIGHT
RNH	NORMAL VOLTAGE RELAY
81	TERMINAL ON BYPASS SUBPANEL



* SEE ATS POWER CIRCUIT SCHEMATIC, LIGHTS & PLUGS

MODEL ZCB-1, 5
600-1200 AMP
3 & 4 POLE
FOR INTERCONNECTION DIAGRAM SEE DWG. 321560

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

APPROVALS		DATE
DRAWN	WJB	1-11-94
CHECKED	AH	2-14-94
APPROVED	AH	2-14-94

KOHLER CO.
GENERATOR DIVISION, KOHLER, WI 53044 U.S.A.

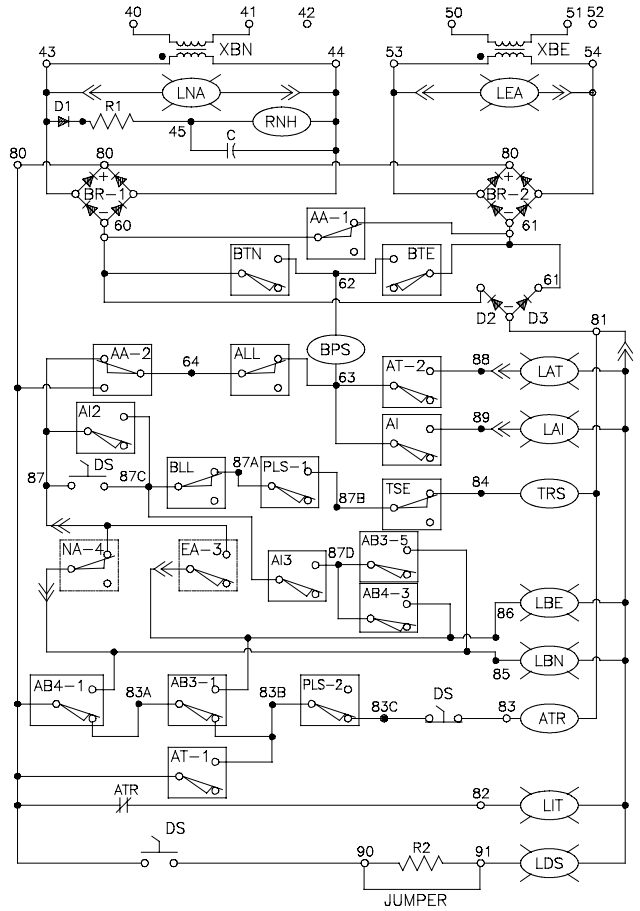
TITLE: SCHEMATIC DIAGRAM

SCALE	NONE	CAD NO.	321484.DWG	SHEET	1-1
PLOTTED		DWG. NO.	321484		E G

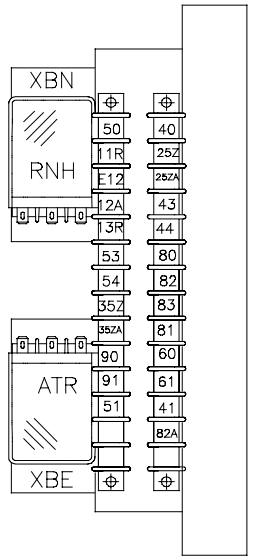
-S-

Bypass Schematic, Model ZCB-5 , 800-1200 Amps, 3 and 4 Poles, 321484

REV	DATE	REVISION	BY	M E
–	9–12–03	NEW DRAWING [69361]	AJH	
A	8–20–09	(D–4,3) D2/D3 WAS BR–3, (B,C–4) ADDED R2 [85028]	FCH	



BYPASS SUBPANEL



BYPASS/ISOLATION SCHEMATIC

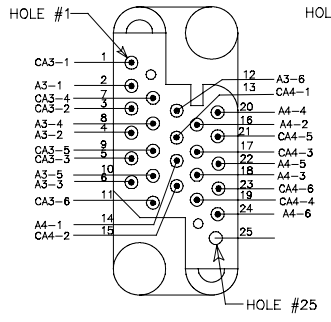
AA–1	–	LIMIT SWITCH, ATS AUTO LOCATION
BTN	–	LIMIT SWITCH, BYPASS TRANSFER NORMAL (MBH MOVEMENT TO NORMAL)
BTE	–	LIMIT SWITCH, BYPASS TRANSFER EMERG. (MBH MOVEMENT TO EMERGENCY)
BPS	–	BYPASS SOLENOID
AA–2	–	LIMIT SWITCH, ATS AUTO LOCATION
ALL	–	LIMIT SWITCH, ATS LOCK LOCATION
AT–2	–	LIMIT SWITCH, ATS TEST LOCATION
LAT	–	LIGHT, ATS TEST LOCATION
AI	–	LIMIT SWITCH, ATS ISOLATE LOCATION
LAI	–	LIGHT, ATS ISOLATE LOCATION
BLL	–	LIMIT SWITCH, BYPASS LOCK LOCATION
PLS–1	–	PERMISSIVE LIMIT SWITCH
TSE	–	LIMIT SWITCH, TRANSFER SWITCH ENGAGED
TRS	–	SOLENOID, TRANSFER RELEASE
NA–4	–	LIMIT SWITCH, ATS IN NORMAL
EA–3	–	LIMIT SWITCH, ATS IN EMERGENCY
LBE	–	LIGHT, BYPASS EMERGENCY
LBN	–	LIGHT, BYPASS NORMAL
AB4–1	–	LIMIT SWITCH, BYPASS NORMAL
AB3–1	–	LIMIT SWITCH, BYPASS EMERGENCY
PLS–2	–	PERMISSIVE LIMIT SWITCH
ATR	–	AUTO/TEST RELAY
AT–1	–	LIMIT SWITCH, ATS TEST LOCATION
LIT	–	LIGHT, ATS INHIBIT
DS	–	ATS DISCONNECT SWITCH
LDS	–	LIGHT, DISCONNECT SWITCH INHIBIT POSITION
ALH	–	ATS LOCATION HANDLE
MBH	–	MANUAL BYPASS HANDLE

XBN	–	BYPASS NORMAL CONTROL TRANSFORMER
XBE	–	BYPASS EMERGENCY CONTROL TRANSFORMER
LNA	–	NORMAL AVAILABLE LIGHT
LEA	–	EMERGENCY AVAILABLE LIGHT
RNH	–	NORMALLY HELD RELAY
D1	–	DIODE
R1	–	RESISTOR, RNH
C	–	CAPACITOR, RNH
BR–1,2,3	–	BRIDGE RECTIFIER

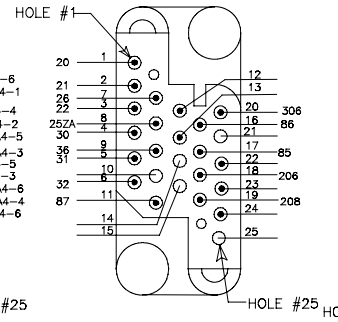
ATS TEST PLUGS (TP)

LOOKING AT PINS

TP1 ON ATS

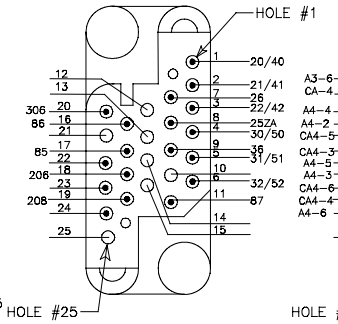


TP2 ON ATS

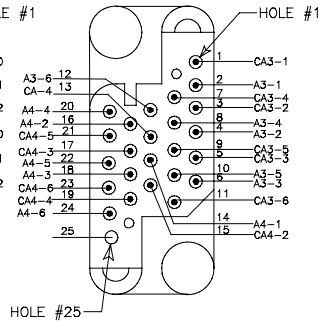


LOOKING AT SOCKETS

TP2 ON BY–PASS



TP1 ON BY–PASS



LIMIT SWITCH CHART

X = ACTUATED	ATS LOCATION				ATS MODE		BYPASS MODE		
	AUTO	TEST	ISO	REMOVE	NORM.	EMERG.	NORM	EMERG.	OPEN
AA	X								
AT		X							
AI			X	X					
ALL	X	X	X	X					
TSE	X	X	X						
AE			X	X					
NA					X				
EA						X			
AB4							X		
AB3								X	
BLL							X	X	X
PLS	ACTIVATED WHEN ALH IS OPERATED								

MODEL ZCM–5
150–400A
2, 3 & 4 POLE

FOR SCHEMATIC DIAGRAM SEE GM29621
FOR INTERCONNECTION DIAGRAM SEE GM29623

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

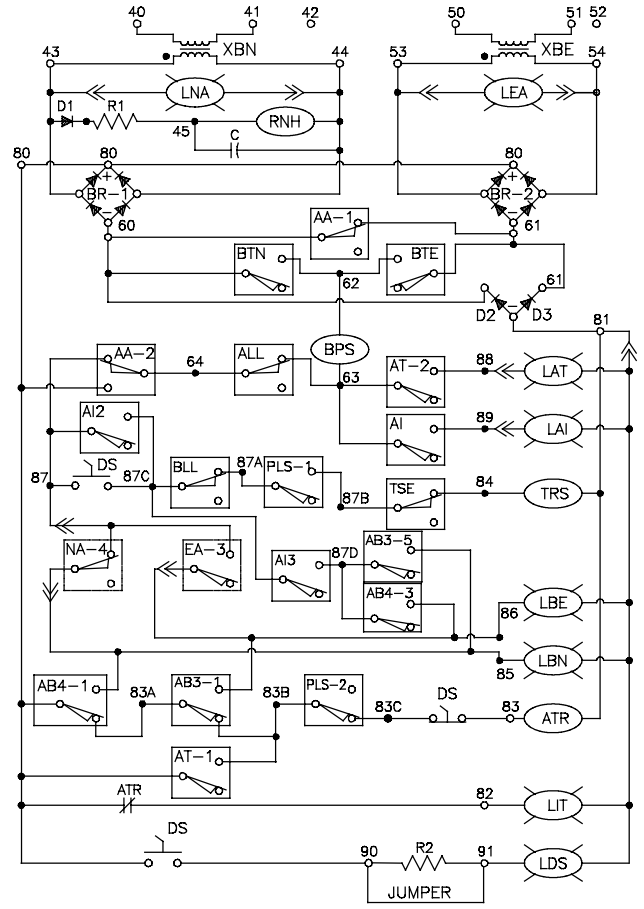
APPROVALS	DATE
DRAWN AJH	9–12–03
CHECKED WSD	10–20–03
APPROVED AJH	10–20–03

KOHLER CO.
GENERATOR DIVISION, KOHLER, WI 53044 U.S.A.

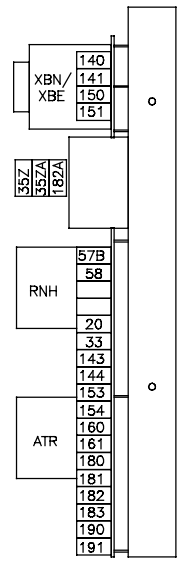
TITLE: SCHEMATIC DIAGRAM

SCALE: NONE | CAD NO.: GM29622.DWG | SHEET: 1–1
PLOTTED | DWG. NO.: GM29622 | E G

Bypass Schematic, Model ZCM-5 (before rectifier change), 150-400 Amps, 2, 3, and 4 poles, GM29622



BYPASS SUBPANEL



REV	DATE	REVISION	BY	W F
–	5-11-07	NEW DRAWING [81626]	CRS	
A	8-11-09	(D-4,3) D2/D3 WAS BR-3, (B-4) ADDED R2 [85028]	FCH	

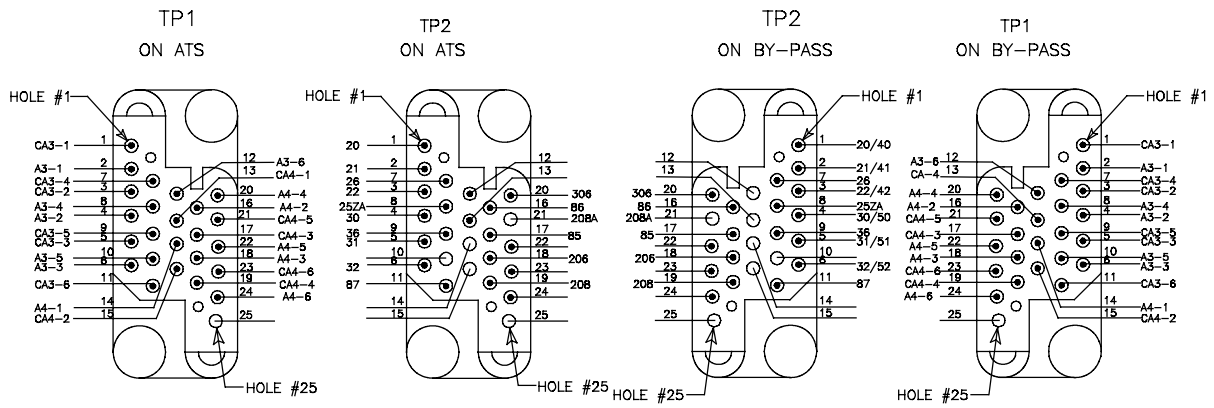
BYPASS/ISOLATION SCHEMATIC

AA-1 – LIMIT SWITCH, ATS AUTO LOCATION
BTN – LIMIT SWITCH, BYPASS TRANSFER NORMAL (MBH MOVEMENT TO NORMAL)
BTE – LIMIT SWITCH, BYPASS TRANSFER EMERG. (MBH MOVEMENT TO EMERGENCY)
BPS – BYPASS SOLENOID
AA-2 – LIMIT SWITCH, ATS AUTO LOCATION
ALL – LIMIT SWITCH, ATS LOCK LOCATION
AT-2 – LIMIT SWITCH, ATS TEST LOCATION
LAT – LIGHT, ATS TEST LOCATION
AI – LIMIT SWITCH, ATS ISOLATE LOCATION
LAI – LIGHT, ATS ISOLATE LOCATION
BLL – LIMIT SWITCH, BYPASS LOCK LOCATION
PLS-1 – PERMISSIVE LIMIT SWITCH
TSE – LIMIT SWITCH, TRANSFER SWITCH ENGAGED
TRS – SOLENOID, TRANSFER RELEASE
NA-4 – LIMIT SWITCH, ATS IN NORMAL
EA-3 – LIMIT SWITCH, ATS IN EMERGENCY
LBE – LIGHT, BYPASS EMERGENCY
LBN – LIGHT, BYPASS NORMAL
AB4-1 – LIMIT SWITCH, BYPASS NORMAL
AB3-1 – LIMIT SWITCH, BYPASS EMERGENCY
PLS-2 – PERMISSIVE LIMIT SWITCH
ATR – AUTO/TEST RELAY
AT-1 – LIMIT SWITCH, ATS TEST LOCATION

LIT – LIGHT, ATS INHIBIT
DS – ATS DISCONNECT SWITCH
LDS – LIGHT, DISCONNECT SWITCH INHIBIT POSITION
ALH – ATS LOCATION HANDLE
MBH – MANUAL BYPASS HANDLE

XBN – BYPASS NORMAL CONTROL TRANSFORMER
XBE – BYPASS EMERGENCY CONTROL TRANSFORMER
LNA – NORMAL AVAILABLE LIGHT
LEA – EMERGENCY AVAILABLE LIGHT
RNH – NORMALLY HELD RELAY
D1 – DIODE
R1 – RESISTOR, RNH
C – CAPACITOR, RNH
BR-1,2,3 – BRIDGE RECTIFIER

ATS TEST PLUGS (TP)



LIMIT SWITCH CHART

X = ACTUATED	ATS LOCATION AUTO	ATS LOCATION TEST	ATS LOCATION ISO	ATS LOCATION REMOVE	ATS MODE NORM	ATS MODE EMERG.	BYPASS MODE NORM	BYPASS MODE EMERG.	BYPASS MODE OPEN
AA	X								
AT		X							
AI			X	X					
ALL	X	X	X	X					
TSE	X	X	X						
AE			X	X					
NA					X				
EA						X			
AB4							X		
AB3								X	
BLL							X	X	X
PLS	ACTIVATED WHEN ALH IS OPERATED								

MODEL ZCM-5
150-400A
2, 3 & 4 POLE

FOR SCHEMATIC DIAGRAM SEE GM55094
FOR INTERCONNECTION DIAGRAM SEE GM55096

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

APPROVALS	DATE
DRAWN CRS	5-11-07
CHECKED AJH	5-11-07
APPROVED AJH	5-11-07

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GENERATOR DIVISION, KOHLER, WI 53044 U.S.A.

TITLE: SCHEMATIC DIAGRAM

SCALE NONE | CAD NO. GM55095.DWG | SHEET 1-1
PLOTTED | DWG. NO. GM55095 | E G

Bypass Schematic, Model ZCM-5 (with new rectifiers), 150-400 Amps, 2, 3, and 4 Poles, GM55095

REV	DATE	REVISION	BY	M F
–	8–19–09	NEW DRAWING [85028]	FCH	

AUXILIARY CONTACTS
15A, 240VAC

A4–1 NO A4–1 · A3–2 NO A3–2
A3–1 NO A3–1 · A4–3 NO A4–3
A4–2 NO A4–2 · A3–3 NO A3–3

P1–12 · AE–1 · 57A · 3
TP · 57B · RNH · AB3–2 · ENGINE START TERMINALS
P1–11 · 58 · 4

MLB
P13 ETHERNET
P12 USB
P17
LCD
UIF
P14
P10
P4

PSB
P1–19 ATR
P1–20
TB1
1 PROGRAMMABLE INPUT 1
2
3 N/C
4
5 PROGRAMMABLE OUTPUT 1
6
7 PROGRAMMABLE INPUT 2
8
9 N/C
10
11 PROGRAMMABLE OUTPUT 2
12

TB2
1
2 MODBUS_RS485_B1(+)
3 MODBUS_RS485_A1(–)
4
5 MODBUS_RS485_B2(+)
6 MODBUS_RS485_A2(–)
7
8 MODBUS_RS485_B1(+)
9 MODBUS_RS485_A1(–)
10
11 MODBUS_RS485_B2(+)
12 MODBUS_RS485_A2(–)

SW1
1 PASSWORD
2 MAINTENANCE
3 SPARE
4 SPARE

P1–8 P24–11 57 P1–12
P1–9 P24–15 58 P1–11 SEE REMOTE ENGINE START CIRCUIT
P1–10
P1–13 P24–16 P1–32
P1–14 P24–4 P1–29 1 SN 8 NC · 13 SE · 14 NC
P1–30 P1–31
P24–12 P24–8
P24–5
P1–12
P24–1
P1–11
P24–2
P1–4
P1–22

K1 P1–3 P8–9 TB3 NCPT TB1 TB2
K1 P1–15 CCN P8–11 P8–10 TB4
K1 K2 P1–1 P8–4 TB8 ECPT TB5 TB6
K1 K2 P1–16 CCE P8–2 P8–1 TB7

P1–7 P24–21
P1–18 P24–17
P1–6 P24–13
P1–23
P1–5
P1–2

FROM NORMAL SOURCE
NN NC NB NA
2 NTS
TO LOAD
LN LC LB LA
2 ETS
3
NN EC EB EA
EN EC EB EA
FROM EMERGENCY SOURCE

GD AT MECHANISM
P1–34
GD AT INNER PANEL

P1–22 P1–23 P1–24
P1–8 P1–9 P1–10

CCN 6 4 206 P1–17 · CN 206R
CCN 5 3 209 P1–5 DS 208 AC RN AC – 209R

P1–3 307 CCE 3 5
CE 306R
307 DS 208A AC + RE – AC 306
P1–2 306 CCE 4 6
307R

		NORMAL	EMERG.
SN	C NO		X
	C NC	X	
SE	C NO	X	
	C NC		X

NOTES:
1. ATS SHOWN IN NORMAL POSITION WITH NORMAL POWER PRESENT
2. NEUTRAL CONTACTS NTS & ETS PRESENT ON 4 POLE UNITS ONLY.
3. OPTIONAL NEUTRAL BUS

LEGEND

AB3–2	LIMIT SWITCH, BYPASS EMERGENCY
AE–1	LIMIT SWITCH, ENGINE START TRANSFER
ATR	AUTO/TEST RELAY
CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
RE	EMERGENCY OPERATOR BRIDGE RECTIFIER
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
RN	NORMAL OPERATOR BRIDGE RECTIFIER
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
RNH	NORMALLY HELD RELAY
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH, NORMAL
°	COMPONENT CONNECTION TERMINAL
###	LEAD
#	
P#–#	PLUG/SOCKET CONNECTOR
•	CONNECTION NODE
A4–1	TERMINAL BLOCK ON TRANSFER SWITCH PANEL
4	TERMINAL BLOCK ON LOGIC BOARD

FOR WIRING DIAGRAM SEE DWR. GM69404
FOR BYPASS SCHEMATIC SEE DWR. GM55095

MODEL ZCM–5
150–400 AMP
3 & 4 POLE
LOGIC – MPAC 1500

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

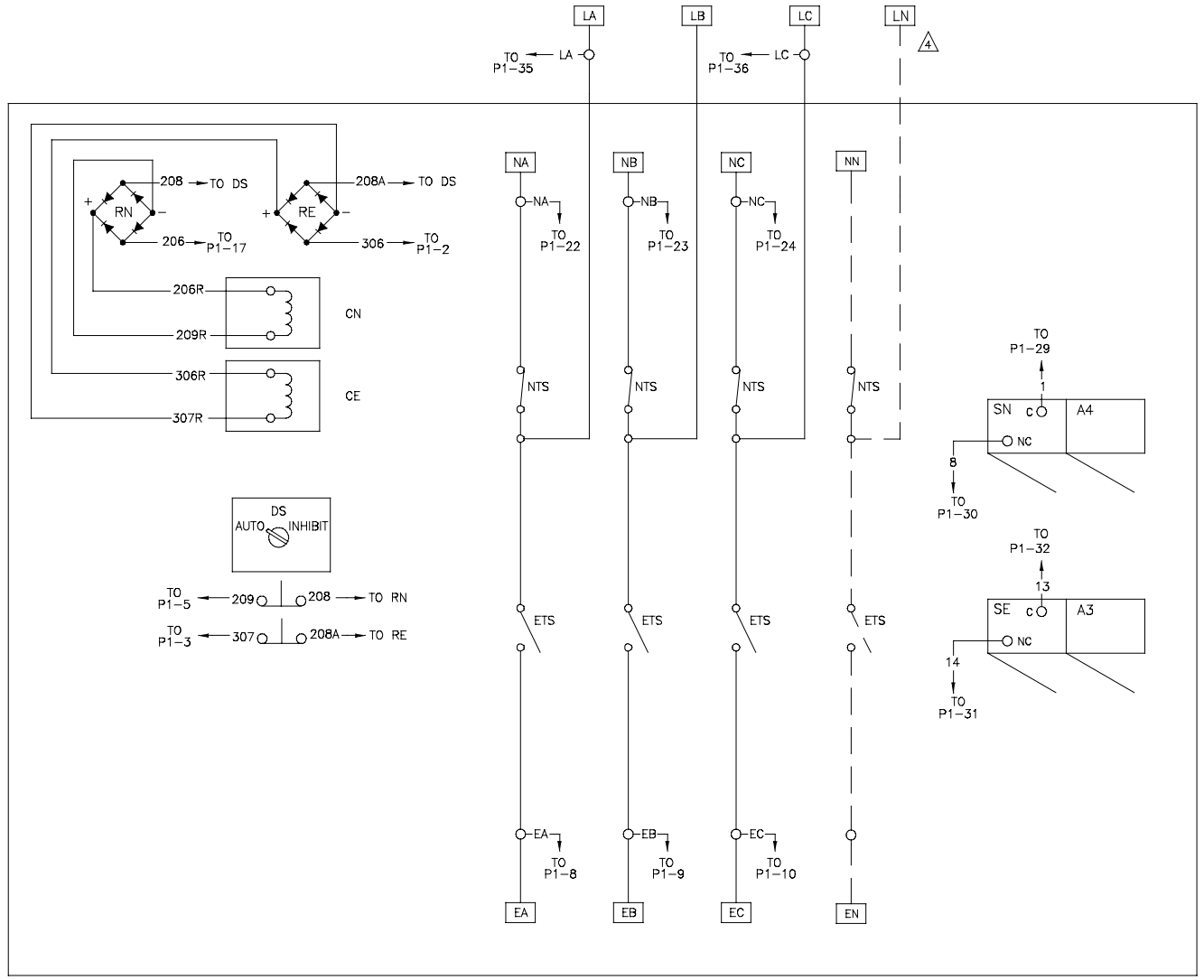
APPROVALS		DATE
DRAWN	FCH	8–19–09
CHECKED	AJH	8–21–09
APPROVED	AJH	8–21–09

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

TITLE: DIAGRAM SCHEMATIC
SCALE: / / / · CAD NO. · SHEET 1–1
PLOTTED · DWG. NO. GM69402 · D

Schematic Diagram, ZCM-5 with MPAC™ 1500 Controls, 150-400 Amps, GM69402 (with new rectifiers)

REV	DATE	REVISION	BY	M F
–	8-19-09	NEW DRAWING [85028]	FCH	

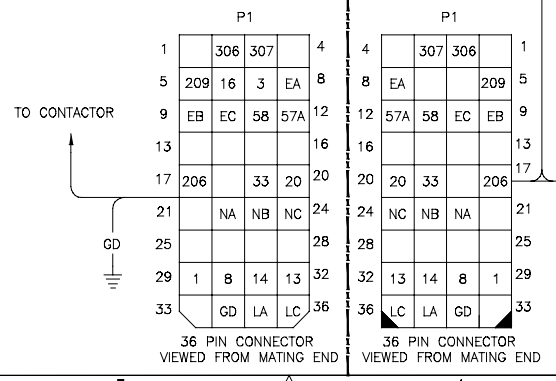


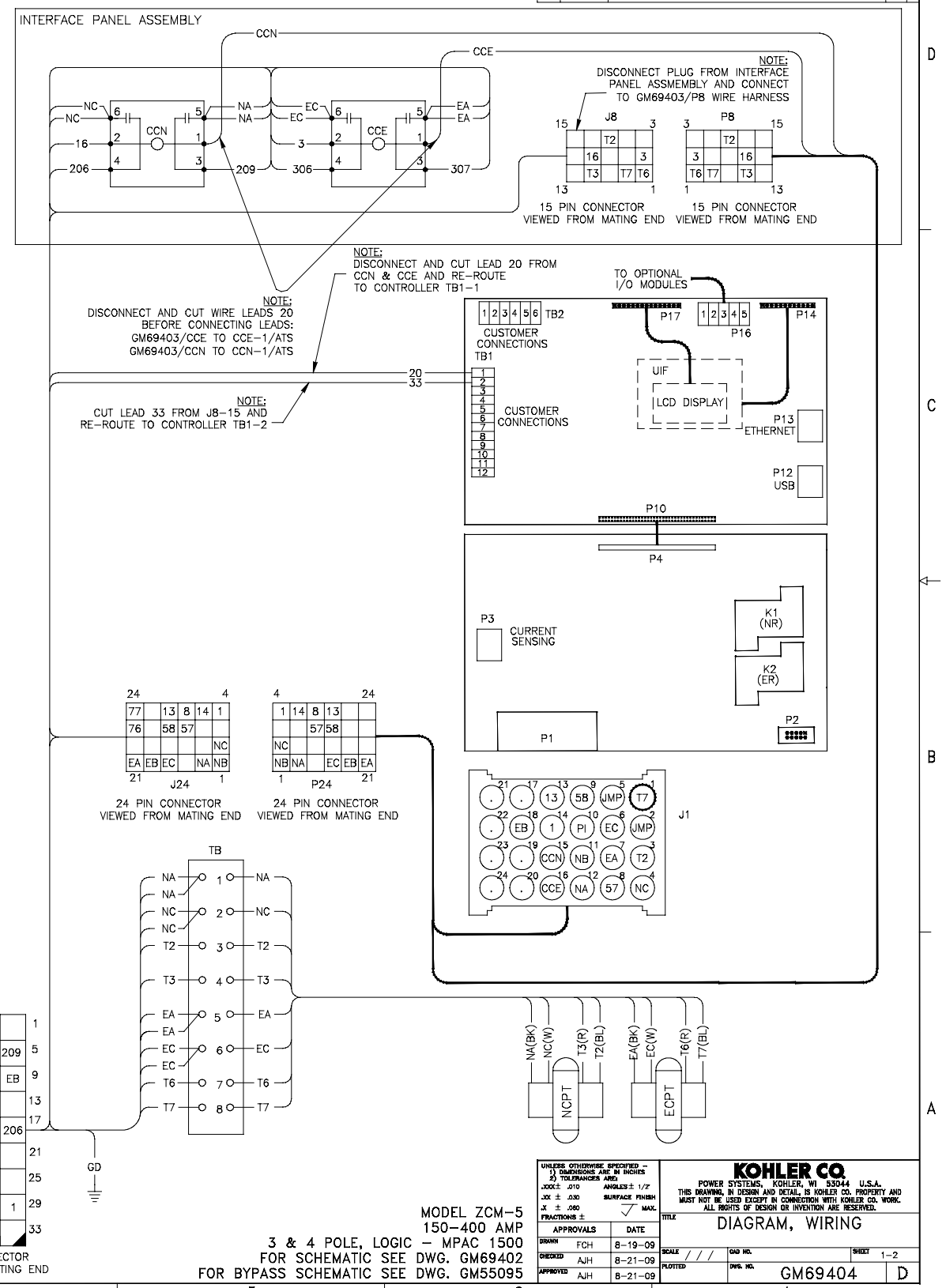
NOTES

1. SWITCH SHOWN DE-ENERGIZED CONNECTED TO NORMAL SOURCE.
2. OPERATORS MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
3. ALL PLUGS & SOCKETS VIEWED FROM MATING SIDE.
4. NEUTRAL NOT USED ON 3 WIRE SYSTEMS.

LEGEND

CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
RE	EMERGENCY OPERATOR BRIDGE RECTIFIER
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
RN	NORMAL OPERATOR BRIDGE RECTIFIER
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
BE	BYPASS EMERGENCY
BN	BYPASS NORMAL
ATR	AUTO/TEST RELAY
RNH	NORMALLY HELD RELAY
UIF	CONTROLLER USER INTERFACE
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH – NORMAL
TB	TERMINAL BLOCK
P	PLUG





UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX ± .010 ANGLES ± 1/2° .XX ± .030 .X ± .060 FRACTIONS ± SURFACE FINISH 125 MAX.

APPROVALS	DATE
DRAWN FCH	8-19-09
CHECKED AJH	8-21-09
APPROVED AJH	8-21-09

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

TITLE: DIAGRAM, WIRING

SCALE: /// | CAD NO. | SHEET 1–2

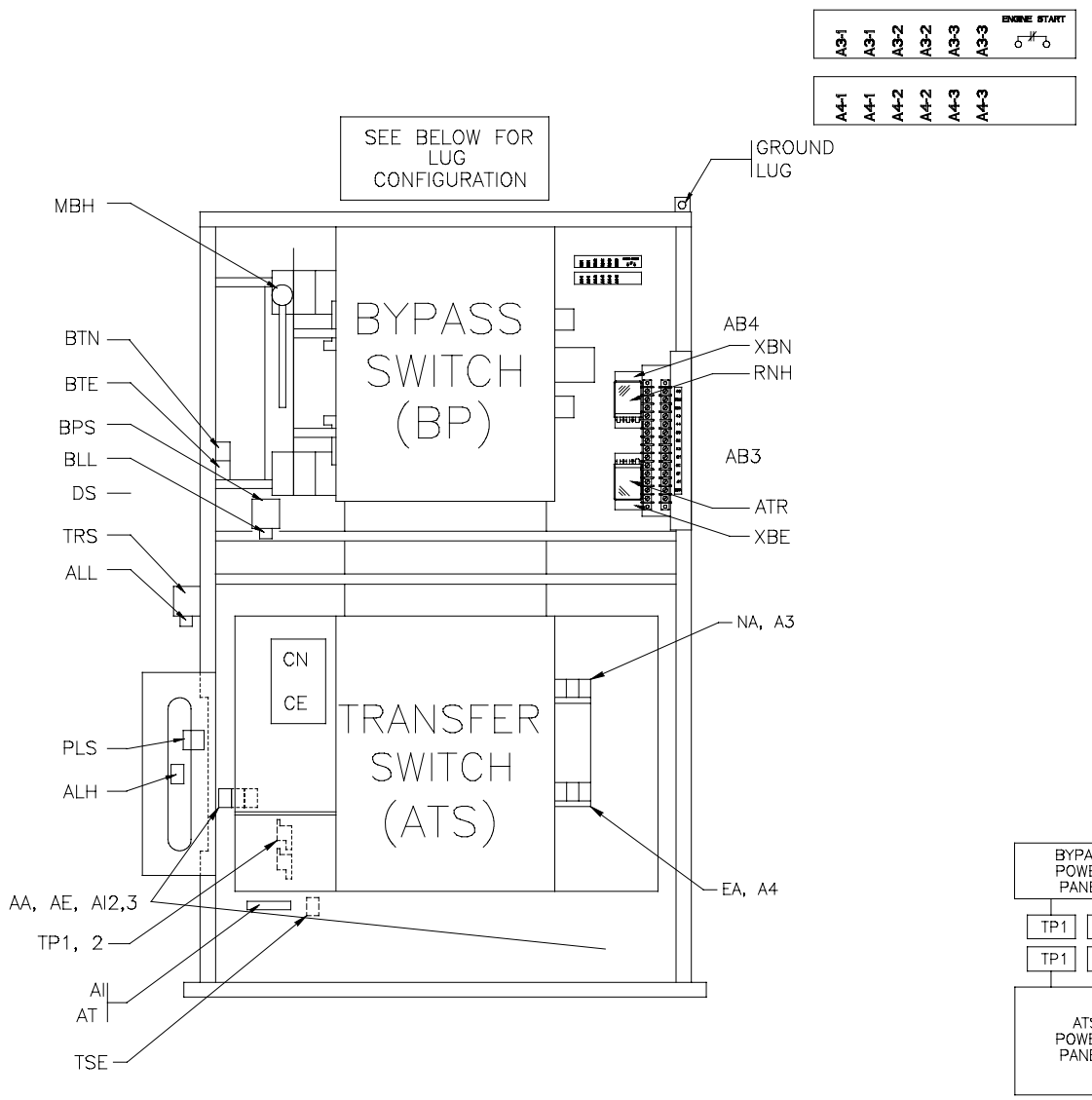
PLOTTED | DWG. NO. GM69404 | D

MODEL ZCM-5
150-400 AMP
3 & 4 POLE, LOGIC – MPAC 1500
FOR SCHEMATIC SEE DWG. GM69402
FOR BYPASS SCHEMATIC SEE DWG. GM55095

Wiring Diagram, ZCM-5 with MPAC™ 1500 Controls, 150-400 Amps, GM69404 Sheet 1 (with new rectifiers)

REV	DATE	REVISION	BY	M F
–	8–19–09	NEW DRAWING [85025]	FCH	

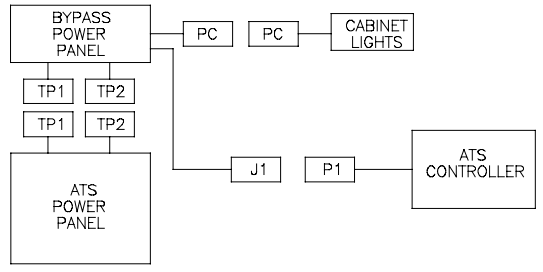
BYPASS/ISOLATION TRANSFER SWITCH



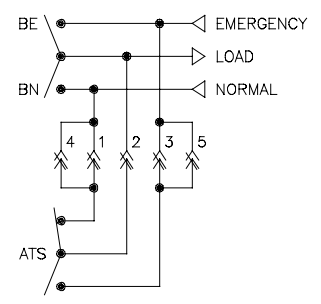
WIRE NUMBERING CHART

LIMIT SWITCHES	C	NC	NO
AA–1	60		61
AA–2	64	80	87
AB3–1	83A	83B	86
AB3–2	E12		E11
AB3–3	E12A	12A	
AB3–4	ABE		ABE
AB3–5	87D		85
AB4–1	80	83A	85
AB4–2	ABN		ABN
AB4–3	87D		86
AE–1	E11	11	11R
AE–2	E13	13	13R
AI	63		89
AI2	87		87C
AI3	87C		87D
ALL	64		63
AT–1	80		83B
AT–2	63		88
BLL	87C		87A
BTE	61		62
BTN	60		62
EA–3	86		87
NA–4	85		87
PLS–1	87A		87B
PLS–2	83B	83C	
TSE	87B		84

INTERCONNECTION PLUG DIAGRAM

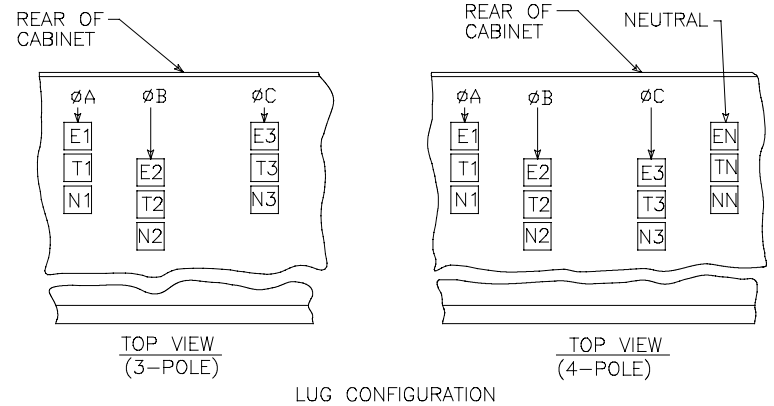


BYPASS/ISOLATION DIAGRAM



ATS LOCATION	LOAD CARRYING CONTACTS			ATS TEST PLUG (TP)	
	1	2	3	4	5
AUTO	X	X	X	X	X
TEST	O	O	O	X	X
ISOLATE	O	O	O	O	O

X = CLOSED
O = OPEN



LUG CONFIGURATION

NOTE:
ATS SHOWN IN NORMAL POSITION WITH NO POWER AVAILABLE.

MODEL ZCM–5
150–400 AMP
3 & 4 POLE, LOGIC – MPAC 1500
FOR SCHEMATIC SEE DWG. GM69402
FOR BYPASS SCHEMATIC SEE DWG. GM55095

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

APPROVALS	DATE
DRAWN FCH	8–19–09
CHECKED AJH	8–21–09
APPROVED AJH	8–21–09

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

TITLE: DIAGRAM, WIRING

SCALE / / / | CAD NO. | SHEET 2–2

PLOTTED | DWG. NO. GM69404 | D

Wiring Diagram, ZCM-5 with MPAC™ 1500 Controls, 150-400 Amps, GM69404 Sheet 2 (with new rectifiers)

REV	DATE	REVISION	BY	M F
–	8-19-09	NEW DRAWING [85028]	FCH	

AUXILIARY CONTACTS
15A, 240VAC

A4-1 NO A4-1 — A4-2 NO A4-2

A3-1 NO A3-1 — A3-2 NO A3-2

P1-12 — TP — P1-11

AE-1 — 57A — 3

57B — RNH — AB3-3 — 58 — 4

ENGINE START TERMINALS

FROM NORMAL SOURCE: NN, NC, NB, NA

2 NTS — NTS — NTS — NTS

TO LOAD: LN, LC, LB, LA

2 ETS — ETS — ETS — ETS

3

FROM EMERGENCY SOURCE: EN, EC, EB, EA

GD — AT MECHANISM — P1-34 — GD — AT INNER PANEL

MLB
P13 ETHERNET
P12 USB
P17
LCD
UIF
P14
P10
P4

PSB

P1-8 P24-11 57 P1-12
P1-9 P24-15 58 P1-11
SEE REMOTE ENGINE START CIRCUIT
P1-10
P1-13 P24-16 P1-32
P1-14 P24-4 P1-29 1
SN-2 13 SE-2 8 NO 14 NO
P1-30 P1-31
P24-12 P24-8
P24-5
P1-12
P24-1
P1-11
P24-2
P1-4
P1-22

P1-19 ATR P1-20
TB1
1 PROGRAMMABLE INPUT 1
2
3 N/C
4
5 PROGRAMMABLE OUTPUT 1
6
7 PROGRAMMABLE INPUT 2
8
9 N/C
10
11 PROGRAMMABLE OUTPUT 2
12

TB2
1
2 MODBUS_RS485_B1(+)
3 MODBUS_RS485_A1(–)
4
5 MODBUS_RS485_B2(+)
6 MODBUS_RS485_A2(–)
7
8 MODBUS_RS485_B1(+)
9 MODBUS_RS485_A1(–)
10
11 MODBUS_RS485_B2(+)
12 MODBUS_RS485_A2(–)

SW1
1 PASSWORD
2 MAINTENANCE
3 SPARE
4 SPARE

K1 P1-3 P8-9 TB3 NCPT TB1 TB2
K1 P1-15 CCN P8-11 P8-10 TB4
K1 K2 P1-1 P8-4 TB8 ECPT TB5
K1 K2 P1-16 CCE P8-2 P8-1 TB7 TB6

P24-21 P1-7
P24-17 P1-18
P24-13 P1-6
P1-23
P1-5
P1-2

P1-23 P1-24 — NC — CCN 5 3 — P1-3 CE — DS — EA
NA — DS — CN — P1-18 — P1-22
CCE 3 5 — EC
P1-9 P1-10
P1-8

		NORMAL	EMERG.
SN-1	C — NO	X	
	NC		X
SN-2	C — NO	X	
	NC		X
SE-1	C — NO		X
	NC	X	
SE-2	C — NO		X
	NC	X	

NOTES:

1. ATS SHOWN IN NORMAL POSITION WITH NORMAL POWER PRESENT

2 NEUTRAL CONTACTS NTS & ETS PRESENT ON 4 POLE UNITS ONLY.

3 OPTIONAL NEUTRAL BUS

LEGEND

AB3-3	LIMIT SWITCH, BYPASS EMERGENCY
AE-1	LIMIT SWITCH, ENGINE START TRANSFER
ATR	AUTO/TEST RELAY
CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CE1	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CN1	COIL CONTROL RELAY (TRANSFER TO NORMAL)
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
RNH	NORMALLY HELD RELAY
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH, NORMAL
° ###	COMPONENT CONNECTION TERMINAL
#	LEAD
P#-#	PLUG/SOCKET CONNECTOR
•	CONNECTION NODE
A4-1	TERMINAL BLOCK ON TRANSFER SWITCH PANEL
4	TERMINAL BLOCK ON LOGIC BOARD

FOR WIRING DIAGRAM SEE DWG. GM70376
FOR BYPASS SCHEMATIC SEE DWG. 321484

MODEL ZCB-5
600–1200 AMP
3 & 4 POLE
LOGIC – MPAC 1500

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

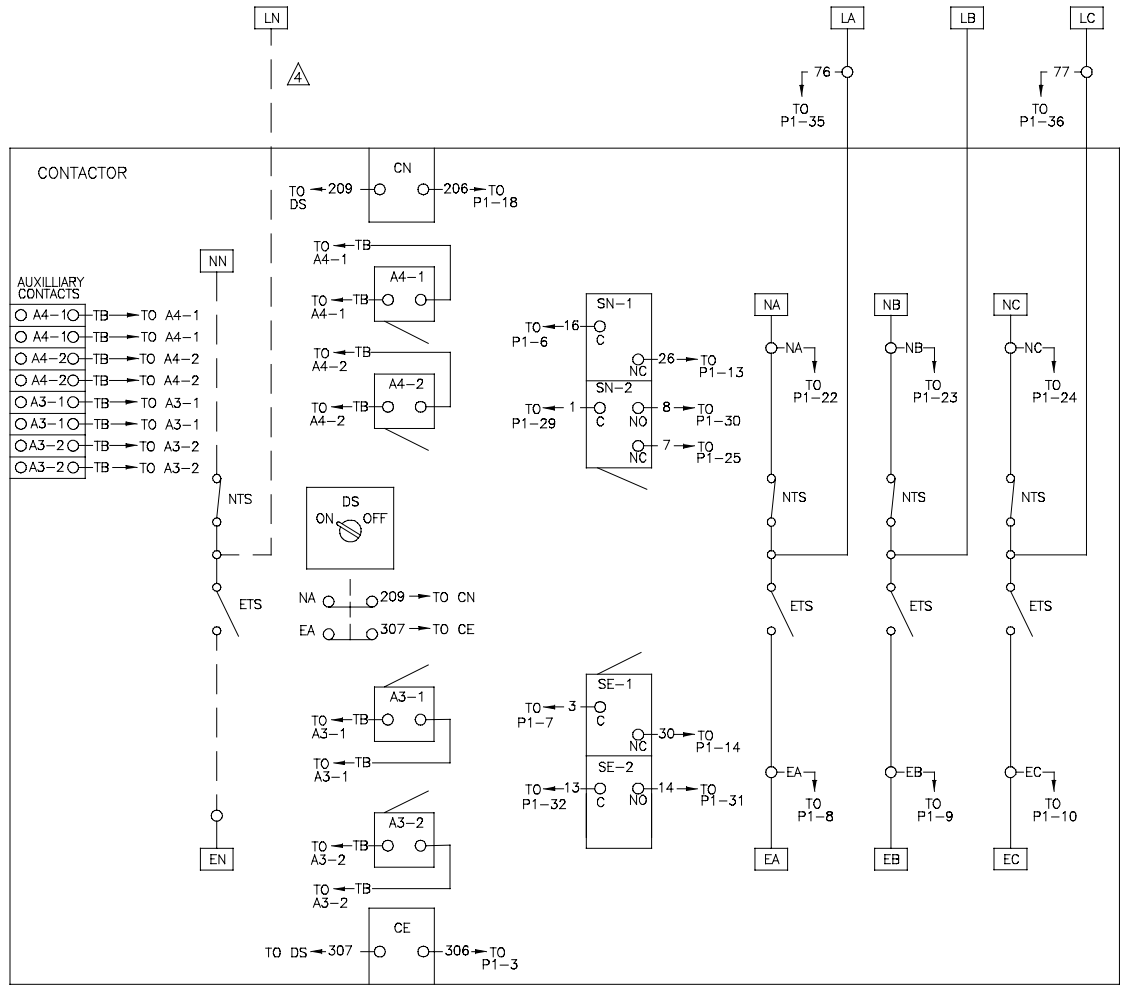
APPROVALS		DATE
DRAWN	FCH	8-19-09
CHECKED	AJH	8-21-09
APPROVED	AJH	8-21-09

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

TITLE: DIAGRAM SCHEMATIC
SCALE: / / / CAD NO. SHEET 1-1
PLOTTED DWG. NO. GM70375 D

Schematic Diagram, ZCB-5 with MPAC™ 1500 Controls, 600-1200 Amps, 3 and 4 Poles, GM70375

REV	DATE	REVISION	BY	M F
–	8-19-09	NEW DRAWING [85028]	FCH	



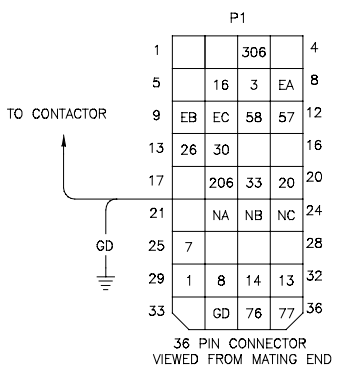
NOTES

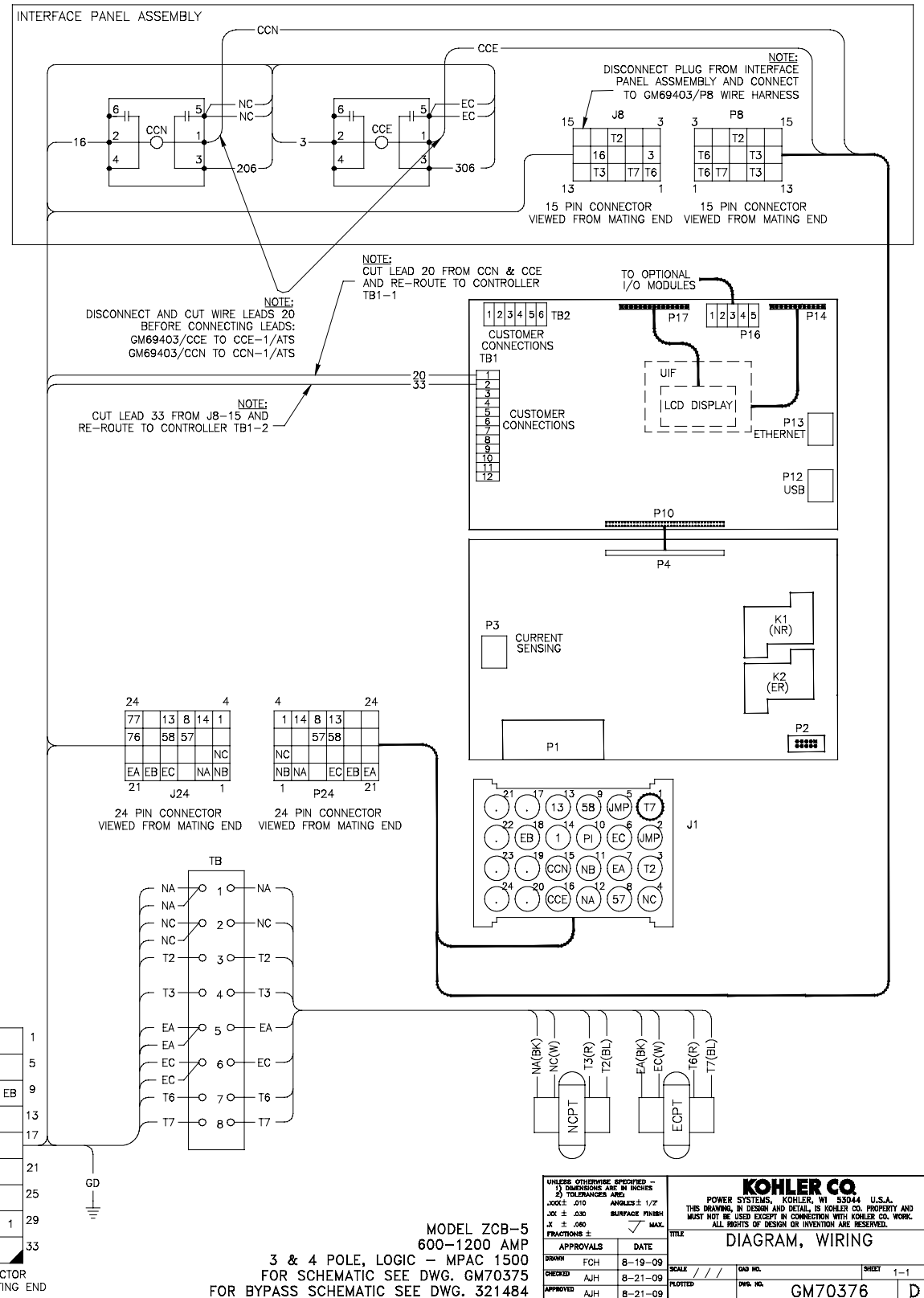
1. SWITCH SHOWN DE-ENERGIZED CONNECTED TO NORMAL SOURCE.
2. OPERATORS MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
3. ALL PLUGS & SOCKETS VIEWED FROM MATING SIDE.

4 NEUTRAL NOT USED ON 3 WIRE SYSTEMS.

LEGEND

CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CE1	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CN1	COIL CONTROL RELAY (TRANSFER TO NORMAL)
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
UIF	CONTROLLER USER INTERFACE
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH – NORMAL
TB	TERMINAL BLOCK
P	PLUG





MODEL ZCB-5
600-1200 AMP
3 & 4 POLE, LOGIC – MPAC 1500
FOR SCHEMATIC SEE DWG. GM70375
FOR BYPASS SCHEMATIC SEE DWG. 321484

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

APPROVALS		DATE
DRAWN	FCH	8-19-09
CHECKED	AJH	8-21-09
APPROVED	AJH	8-21-09

TITLE: DIAGRAM, WIRING
SCALE: / / / SHEET 1–1
DWG NO. GM70376 D
PLOTTED

Wiring Diagram, ZCB-5 with MPAC™ 1500 Controls, 600-1200 Amps, 3 and 4 Poles, GM70376

REV	DATE	REVISION	BY	M F
–	8–19–09	NEW DRAWING [85028]	FCH	

AUXILIARY CONTACTS
15A, 240VAC

A4–1 NO A4–1
A3–1 NO A3–1
A4–2 NO A4–2
A3–2 NO A3–2

P1–12 TP P1–11 AE–1 57B RNH AB3–3 57A 3 58 4

ENGINE START TERMINALS

FROM NORMAL SOURCE: NN NC NB NA
2 NTS
TO LOAD: LN LC LB LA
2 ETS
3
FROM EMERGENCY SOURCE: EN EC EB EA

GD AT MECHANISM
P1–34
GD AT INNER PANEL

MLB: P13 ETHERNET, P12 USB, P17, P14, LCD, UIF; P10, P4
PSB

P1–8 P24–11 57 P1–12
P1–9 P24–15 58 P1–11
SEE REMOTE ENGINE START CIRCUIT
P1–10
P1–13 P24–16 P1–32
P1–14 P24–4 P1–29 SN–2 SE–2 13 14 8 1 NO
P1–30 P1–31
P24–12 P24–8

P1–19 ATR P1–20
TB1
1 PROGRAMMABLE INPUT 1
2
3 N/C
4 PROGRAMMABLE OUTPUT 1
5
6
7 PROGRAMMABLE INPUT 2
8
9 N/C
10 PROGRAMMABLE OUTPUT 2
11
12

TB2
1
2 MODBUS_RS485_B1(+)
3 MODBUS_RS485_A1(–)
4
5 MODBUS_RS485_B2(+)
6 MODBUS_RS485_A2(–)
7
8 MODBUS_RS485_B1(+)
9 MODBUS_RS485_A1(–)
10
11 MODBUS_RS485_B2(+)
12 MODBUS_RS485_A2(–)

SW1
1 PASSWORD
2 MAINTENANCE
3 SPARE
4 SPARE

P1–12 P24–5
P1–11 P24–1
P1–4 P24–2
P1–22

P1–23 P1–24
CCN 6 4 P1–18
DS 209R AC RN AC 206R CN 206
P1–22

P1–8
307R DS 307 AC RE AC 306R CE P1–3 306 CCE 4 6

K1 P1–3 P8–9 TB3 NCPT TB1
K1 P1–15 CCN P8–11 P8–10 TB4 TB2
K1 K2 P1–1 P8–4 TB8 ECPT TB5
K1 K2 P1–16 CCE P8–2 P8–1 TB7 TB6

P1–7 P24–21
P1–18 P24–17
P1–6 P24–13
P1–23

P1–5
P1–2

		NORMAL	EMERG.
SN–2	C NO	X	
	NC		X
SE–2	C NO		X
	NC	X	

NOTES:
1. ATS SHOWN IN NORMAL POSITION WITH NORMAL POWER PRESENT
2. NEUTRAL CONTACTS NTS & ETS PRESENT ON 4 POLE UNITS ONLY.
3. OPTIONAL NEUTRAL BUS

LEGEND

AB3–3	LIMIT SWITCH, BYPASS EMERGENCY
AE–1	LIMIT SWITCH, ENGINE START TRANSFER
ATR	AUTO/TEST RELAY
CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
RE	EMERGENCY OPERATOR BRIDGE RECTIFIER
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
RN	NORMAL OPERATOR BRIDGE RECTIFIER
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
RNH	NORMALLY HELD RELAY
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH, NORMAL
°	COMPONENT CONNECTION TERMINAL
###	
#	LEAD
P#–#	PLUG/SOCKET CONNECTOR
●	CONNECTION NODE
A4–1	TERMINAL BLOCK ON TRANSFER SWITCH PANEL
4	TERMINAL BLOCK ON LOGIC BOARD

FOR WIRING DIAGRAM SEE DWG. GM71191
FOR BYPASS SCHEMATIC SEE DWG. 321454

MODEL ZCB–5
1600–3000 AMP
3 & 4 POLE
LOGIC – MPAC 1500

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

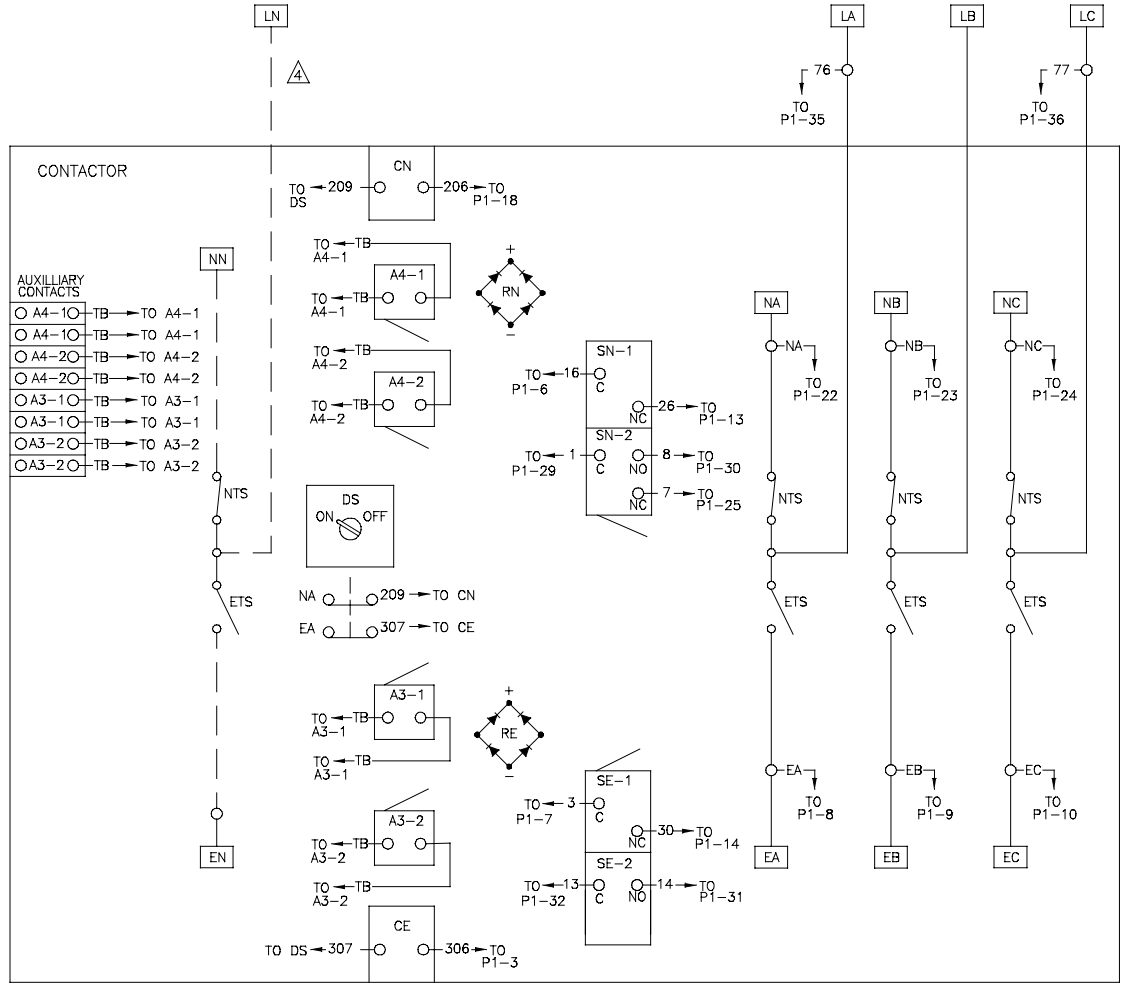
APPROVALS	DATE
DRAWN FCH	8–19–09
CHECKED AJH	8–21–09
APPROVED AJH	8–21–09

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

TITLE: DIAGRAM SCHEMATIC
SCALE / / / CAD NO. SHEET 1–1
PLOTTED DWG. NO. GM71190 D

Schematic Diagram, ZCB-5 with MPAC™ 1500 Controls, 1600-3000 Amps, 3 and 4 Poles, GM71190

REV	DATE	REVISION	BY	M F
–	8-19-09	NEW DRAWING [85028]	FCH	



NOTES

1. SWITCH SHOWN DE-ENERGIZED CONNECTED TO NORMAL SOURCE.
2. OPERATORS MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
3. ALL PLUGS & SOCKETS VIEWED FROM MATING SIDE.
4. NEUTRAL NOT USED ON 3 WIRE SYSTEMS.

LEGEND

CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
RE	EMERGENCY OPERATOR BRIDGE RECTIFIER
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
RN	NORMAL OPERATOR BRIDGE RECTIFIER
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
BE	BYPASS EMERGENCY
BN	BYPASS NORMAL
ATR	AUTO/TEST RELAY
RNH	NORMALLY HELD RELAY
UIF	CONTROLLER USER INTERFACE
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH – NORMAL
TB	TERMINAL BLOCK
P	PLUG

ENCLOSURE

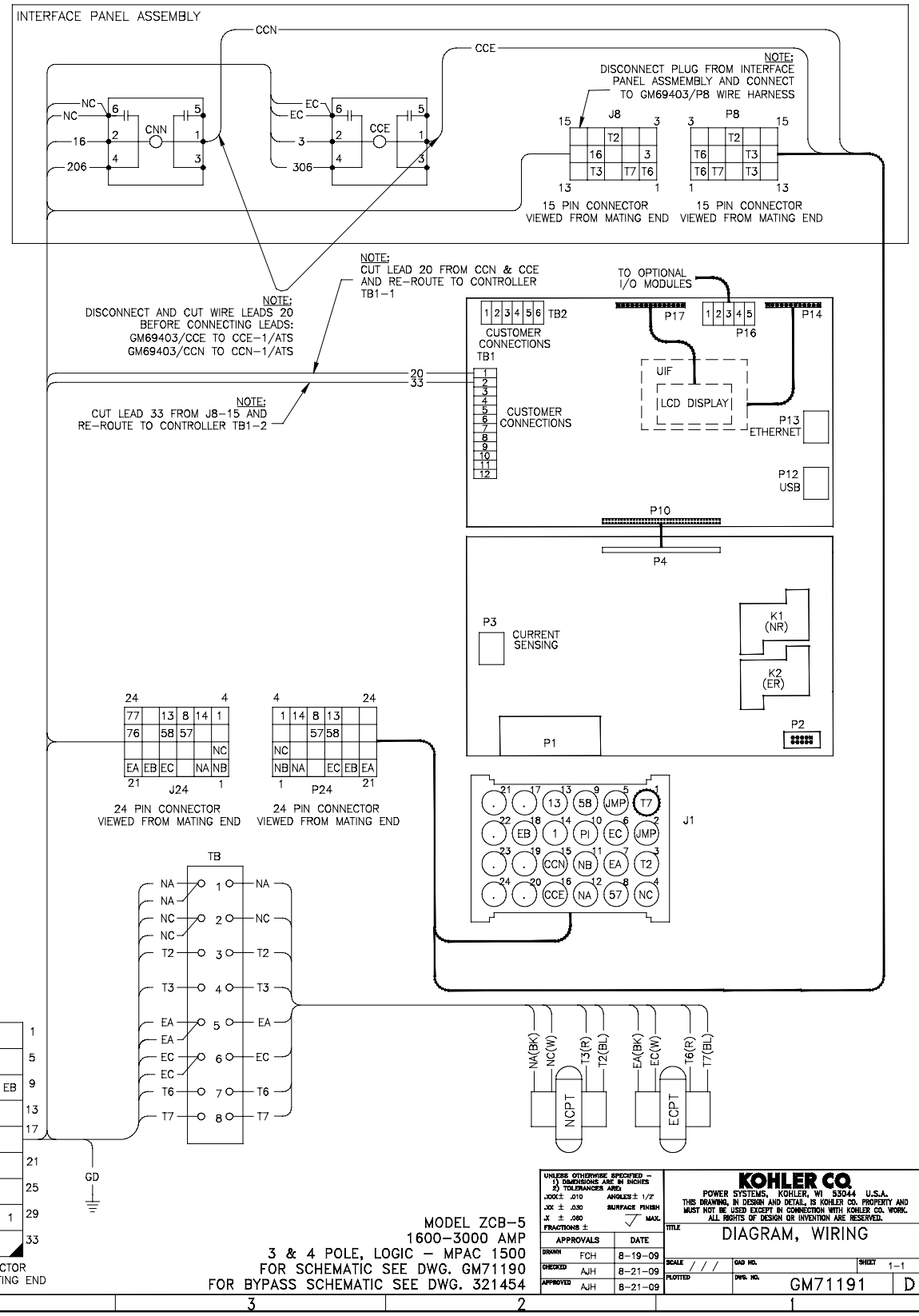
TO CONTACTOR

P1

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

GD

36 PIN CONNECTOR VIEWED FROM MATING END



MODEL ZCB-5
1600-3000 AMP
3 & 4 POLE, LOGIC – MPAC 1500
FOR SCHEMATIC SEE DWG. GM71190
FOR BYPASS SCHEMATIC SEE DWG. 321454

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

APPROVALS	DATE
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TITLE: DIAGRAM, WIRING

SCALE /// | GAD NO. | SHEET 1-1

PLOTTED | DWG. NO. GM71191 | D

Wiring Diagram, ZCB-5 with MPAC™ 1500 Controls, 1600-3000 Amps, 3 and 4 Poles, GM71191

REV	DATE	REVISION	BY	M F
–	8–19–09	NEW DRAWING [85028]	FCH	

AUXILIARY CONTACTS
15A, 240VAC

A4–1 NO A4–1 · A3–2 NO A3–2
A3–1 NO A3–1 · A4–3 NO A4–3
A4–2 NO A4–2 · A3–3 NO A3–3

P1–12 · AE–1 · 57A · 3
TP · 57B · RNH · AB3–2 · ENGINE START TERMINALS
P1–11 · 58 · 4

FROM NORMAL SOURCE: NN, NC, NB, NA
2 NTS
TO LOAD: LN, LC, LB, LA
2 ETS
3
FROM EMERGENCY SOURCE: EN, EC, EB, EA

GD
AT MECHANISM
P1–34
GD
AT INNER PANEL

P1–8 · P1–9 · P1–10

P1–22 · P1–23 · P1–24

CCE 209 3 5
CCN 6 4 206 P1–17
CCN 5 3 209 P1–5 DS 208
CN 206R
RN (AC, AC, +, –) 209R
CE 306R
RE (AC, AC, +, –) 307R
P1–2 306 CCE 4 6

MLB
P13 ETHERNET
P12 USB
P17
LCD
UIF
P14
P10
P4

PSB
P1–8 P24–11 57 P1–12
P1–9 P24–15 58 P1–11
SEE REMOTE ENGINE START CIRCUIT
P1–10
P1–13 P24–16 P1–32
P1–14 P24–4 P1–29 1
SN–2 13 SE–2 8 NC 14 NO
P1–30 P1–31
P24–12 P24–8
P24–5
P1–12
P24–1
P1–11
P24–2
P1–4
P1–22

P1–19 TB1 P1–20
ATR
1 2 PROGRAMMABLE INPUT 1
3 N/C
4 5 6 PROGRAMMABLE OUTPUT 1
7 8 PROGRAMMABLE INPUT 2
9 N/C
10 11 12 PROGRAMMABLE OUTPUT 2

TB2
1
2 MODBUS_RS485_B1(+)
3 MODBUS_RS485_A1(–)
4
5 MODBUS_RS485_B2(+)
6 MODBUS_RS485_A2(–)
7
8 MODBUS_RS485_B1(+)
9 MODBUS_RS485_A1(–)
10
11 MODBUS_RS485_B2(+)
12 MODBUS_RS485_A2(–)

SW1
1 PASSWORD
2 MAINTENANCE
3 SPARE
4 SPARE

K1 P1–3 P8–9 TB3 NCPT TB1
K1 P1–15 CCN P8–11 P8–10 TB4 TB2
K1 K2 P1–1 P8–4 TB8 ECPT TB5
K1 K2 P1–16 CCE P8–2 P8–1 TB7 TB6

P24–21 P1–7
P24–17 P1–18
P24–13 P1–6
P1–23
P1–5
P1–2

		NORMAL	EMERG.
SN–2	C NO		X
	C NC	X	
SE–2	C NO		X
	C NC	X	

NOTES:
1. ATS SHOWN IN NORMAL POSITION WITH NORMAL POWER PRESENT
2 NEUTRAL CONTACTS NTS & ETS PRESENT ON 4 POLE UNITS ONLY.
3 OPTIONAL NEUTRAL BUS

LEGEND

AB3–2	LIMIT SWITCH, BYPASS EMERGENCY
AE–1	LIMIT SWITCH, ENGINE START TRANSFER
ATR	AUTO/TEST RELAY
CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
RE	EMERGENCY OPERATOR BRIDGE RECTIFIER
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
RN	NORMAL OPERATOR BRIDGE RECTIFIER
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
RNH	NORMALLY HELD RELAY
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH, NORMAL
∘	COMPONENT CONNECTION TERMINAL
###	LEAD
#	
P#–#	PLUG/SOCKET CONNECTOR
•	CONNECTION NODE
A4–1	TERMINAL BLOCK ON TRANSFER SWITCH PANEL
4	TERMINAL BLOCK ON LOGIC BOARD

FOR WIRING DIAGRAM SEE DWR. GM71336
FOR BYPASS SCHEMATIC SEE DWR. GM29622

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

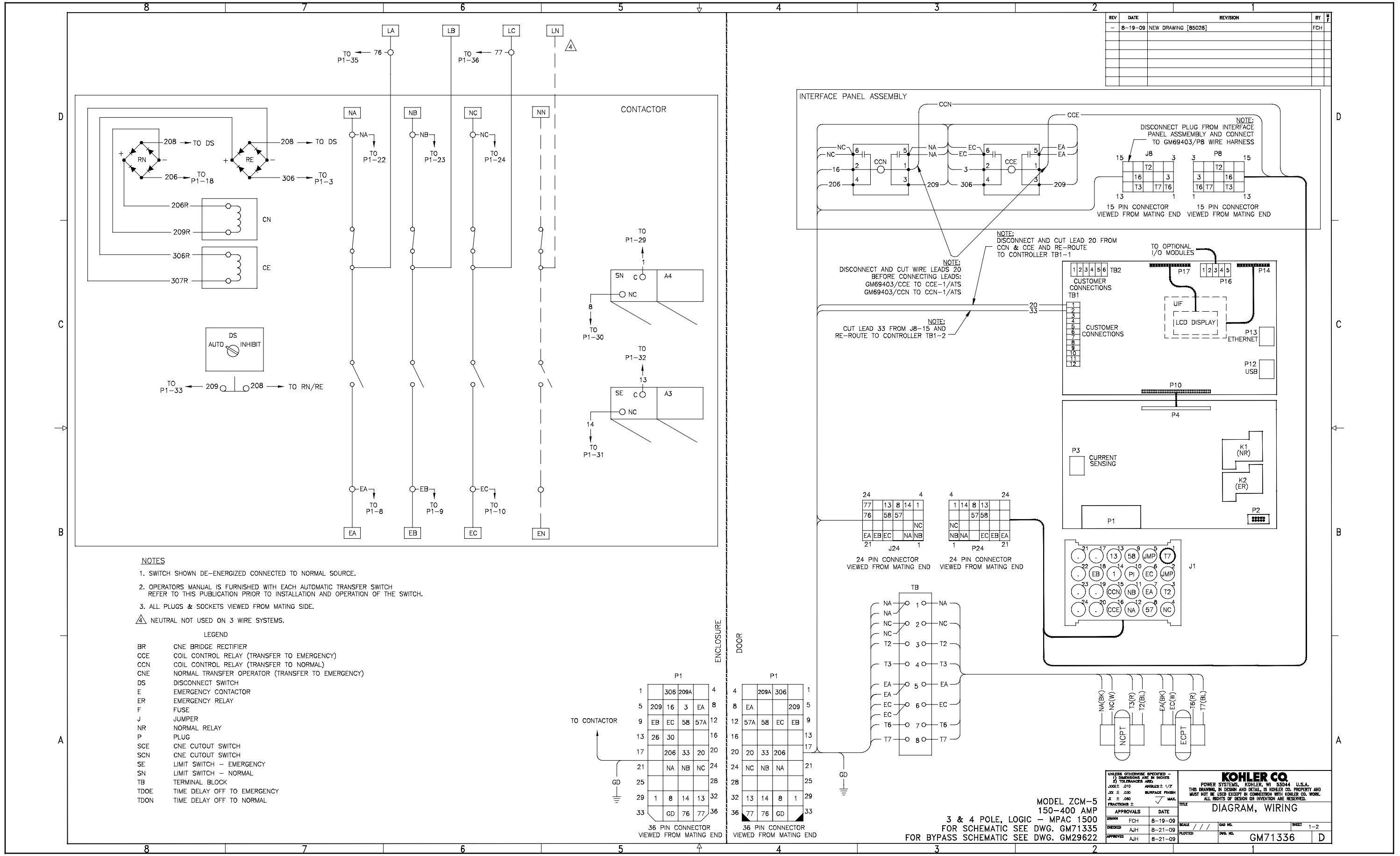
APPROVALS	DATE
DRAWN FCH	8–19–09
CHECKED AJH	8–21–09
APPROVED AJH	8–21–09

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

TITLE: DIAGRAM SCHEMATIC
SCALE: / / / · CAD NO. · SHEET 1–1
PLOTTED · DWG. NO. GM71335 D

MODEL ZCM–5
150–400 AMP
3 & 4 POLE
LOGIC – MPAC 1500

Schematic Diagram, ZCB-5 with MPAC™ 1500 Controls, 150-400 Amps, 2, 3, and 4 Poles, GM71335 (before rectifier change)



NOTES

1. SWITCH SHOWN DE-ENERGIZED CONNECTED TO NORMAL SOURCE.
2. OPERATORS MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
3. ALL PLUGS & SOCKETS VIEWED FROM MATING SIDE.

⚠4 NEUTRAL NOT USED ON 3 WIRE SYSTEMS.

LEGEND

BR	CNE BRIDGE RECTIFIER
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
CNE	NORMAL TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
DS	DISCONNECT SWITCH
E	EMERGENCY CONTACTOR
ER	EMERGENCY RELAY
F	FUSE
J	JUMPER
NR	NORMAL RELAY
P	PLUG
SCE	CNE CUTOUT SWITCH
SCN	CNE CUTOUT SWITCH
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH – NORMAL
TB	TERMINAL BLOCK
TDOE	TIME DELAY OFF TO EMERGENCY
TDON	TIME DELAY OFF TO NORMAL

REV	DATE	REVISION	BY	M F
–	8-19-09	NEW DRAWING [85028]	FCH	

MODEL ZCM-5
150-400 AMP
3 & 4 POLE, LOGIC – MPAC 1500
FOR SCHEMATIC SEE DWG. GM71335
FOR BYPASS SCHEMATIC SEE DWG. GM29622

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

APPROVALS	DATE
DRAWN FCH	8-19-09
CHECKED AJH	8-21-09
APPROVED AJH	8-21-09

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TITLE: DIAGRAM, WIRING

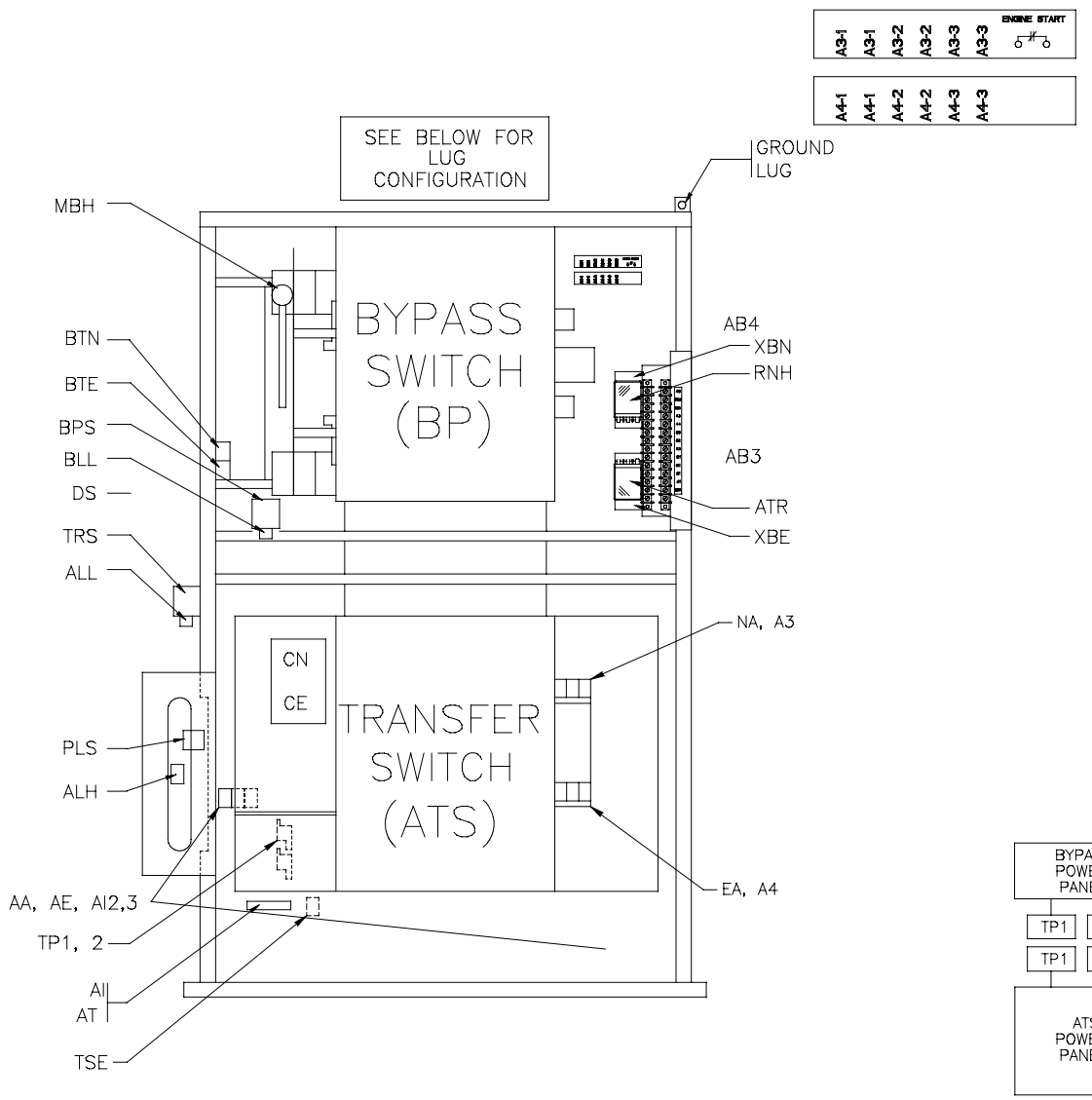
SCALE: /// DAD NO. SHEET 1–2

PLOTTED DWG. NO. GM71336 D

Wiring Diagram, ZCB-5 with MPAC™ 1500 Controls, 150-400 Amps, 2, 3, and 4 Poles, GM71336 Sheet 1 (before rectifier change)

REV	DATE	REVISION	BY	M F
–	8–19–09	NEW DRAWING [85025]	FCH	

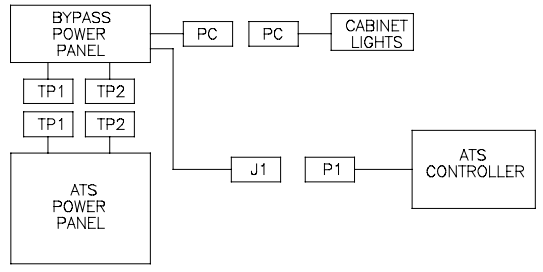
BYPASS/ISOLATION TRANSFER SWITCH



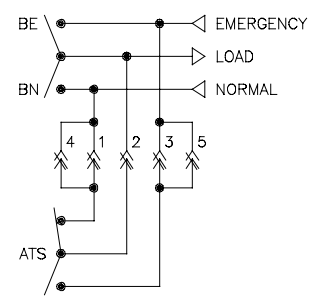
WIRE NUMBERING CHART

LIMIT SWITCHES	C	NC	NO
AA–1	60		61
AA–2	64	80	87
AB3–1	83A	83B	86
AB3–2	E12		E11
AB3–3	E12A	12A	
AB3–4	ABE		ABE
AB3–5	87D		85
AB4–1	80	83A	85
AB4–2	ABN		ABN
AB4–3	87D		86
AE–1	E11	11	11R
AE–2	E13	13	13R
AI	63		89
AI2	87		87C
AI3	87C		87D
ALL	64		63
AT–1	80		83B
AT–2	63		88
BLL	87C		87A
BTE	61		62
BTN	60		62
EA–3	86		87
NA–4	85		87
PLS–1	87A		87B
PLS–2	83B	83C	
TSE	87B		84

INTERCONNECTION PLUG DIAGRAM

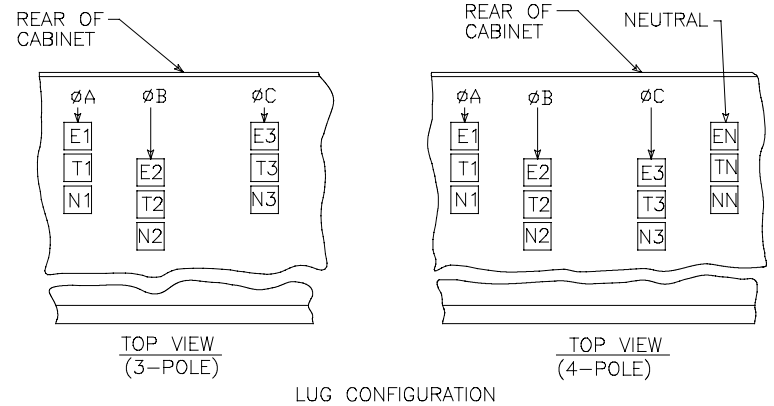


BYPASS/ISOLATION DIAGRAM



ATS LOCATION	LOAD CARRYING CONTACTS			ATS TEST PLUG (TP)	
	1	2	3	4	5
AUTO	X	X	X	X	X
TEST	O	O	O	X	X
ISOLATE	O	O	O	O	O

X = CLOSED
O = OPEN



LUG CONFIGURATION

NOTE:
ATS SHOWN IN NORMAL POSITION WITH NO POWER AVAILABLE.

MODEL ZCM–5
150–400 AMP
3 & 4 POLE, LOGIC – MPAC 1500
FOR SCHEMATIC SEE DWG. GM71335
FOR BYPASS SCHEMATIC SEE DWG. GM29622

UNLESS OTHERWISE SPECIFIED – 1) DIMENSIONS ARE IN INCHES 2) TOLERANCES ARE: .XXX± .010 ANGLES± 1/2° .XX ± .030 SURFACE FINISH .X ± .090 MAX. FRACTIONS ±

APPROVALS	DATE
DRAWN FCH	8–19–09
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APPROVED AJH	8–21–09

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

TITLE: DIAGRAM, WIRING

SCALE / / / | CAD NO. | SHEET 2–2

PLOTTED | DWG. NO. GM71336 | D

Wiring Diagram, ZCB-5 with MPAC™ 1500 Controls, 150-400 Amps, 2, 3, and 4 Poles, GM71336 Sheet 2 (before rectifier change)

REV	DATE	REVISION	BY	M F
–	8–19–09	NEW DRAWING [85028]	FCH	

AUXILIARY CONTACTS
15A, 240VAC

A4–1 A4–1 NO A4–1 A4–2 A4–2 NO A4–2
A3–1 A3–1 NO A3–1 A3–2 A3–2 NO A3–2

P1–12 AE–1 57A 3
TP 57B RNH AB3–2
ENGINE START TERMINALS
P1–11 58 4

MLB
P13 ETHERNET
P12 USB
P17
LCD
UIF
P14
P10
P4
PSB

P1–19 EATR P1–20
TB1
1 PROGRAMMABLE INPUT 1
2
3 N/C
4 PROGRAMMABLE OUTPUT 1
5
6 PROGRAMMABLE INPUT 2
7
8
9 N/C
10 PROGRAMMABLE OUTPUT 2
11
12

TB2
1
2 MODBUS_RS485_B1(+)
3 MODBUS_RS485_A1(–)
4
5 MODBUS_RS485_B2(+)
6 MODBUS_RS485_A2(–)
7
8 MODBUS_RS485_B1(+)
9 MODBUS_RS485_A1(–)
10
11 MODBUS_RS485_B2(+)
12 MODBUS_RS485_A2(–)

SW1
1 PASSWORD
2 MAINTENANCE
3 SPARE
4 SPARE

P1–8 P24–11 57 P1–12
P1–9 P24–15 58 P1–11
SEE REMOTE ENGINE START CIRCUIT
P1–10
P1–13 P24–16 P1–32
P1–14 P24–4 P1–29 1
13 SE–2
SN–2
8 NC 14 NO
P1–30 P1–31
P24–12 P24–8
P24–5
P1–12
P24–1
P1–11
P24–2
P1–4
P1–22

K1 P1–3 P8–9 TB3 NCPT TB1
K1 P1–15 CCN P8–11 P8–10 TB4 TB2
K1 K2 P1–1 P8–4 TB8 ECPT TB5
K1 K2 P1–16 CCE P8–2 P8–1 TB7 TB6

P24–21
P1–7
P24–17
P1–18
P24–13
P1–6
P1–23
P1–5
P1–2

FROM NORMAL SOURCE
NN NC NB NA
2 NTS
TO LOAD
LN LC LB LA
2 ETS
3
NN NC EC NB EB NA EA
FROM EMERGENCY SOURCE

GD
AT MECHANISM
P1–34
GD
AT INNER PANEL

P1–22 P1–23 P1–24
CCN 6 4 206 P1–18 SCN CNE 208R
CCN 5 3 209 P1–33 DS 208 AC BR AC 307 SCE P1–3 306 4 6 CCE
307R
209 CCE 3 5
P1–8 P1–9 P1–10

LEGEND

AB3–2	LIMIT SWITCH, BYPASS EMERGENCY
AE–1	LIMIT SWITCH, ENGINE START TRANSFER
ATR	AUTO/TEST RELAY
CE	EMERGENCY TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
RE	EMERGENCY OPERATOR BRIDGE RECTIFIER
CN	NORMAL TRANSFER OPERATOR (TRANSFER TO NORMAL)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
RN	NORMAL OPERATOR BRIDGE RECTIFIER
DS	DISCONNECT SWITCH
ECPT	EMERGENCY CONTROL POWER TRANSFORMER
ETS	EMERGENCY POWER TRANSFER SWITCH CONTACTS
NCPT	NORMAL CONTROL POWER TRANSFORMER
NTS	NORMAL POWER TRANSFER SWITCH CONTACTS
RNH	NORMALLY HELD RELAY
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH, NORMAL
° ###	COMPONENT CONNECTION TERMINAL
#	LEAD
P#–#	PLUG/SOCKET CONNECTOR
•	CONNECTION NODE
A4–1	TERMINAL BLOCK ON TRANSFER SWITCH PANEL
4	TERMINAL BLOCK ON LOGIC BOARD

		NORMAL	EMERG.
SN–2	C NO		X
	NC	X	
SE–2	C NO		X
	NC	X	

NOTES:
1. ATS SHOWN IN NORMAL POSITION WITH NORMAL POWER PRESENT
2. NEUTRAL CONTACTS NTS & ETS PRESENT ON 4 POLE UNITS ONLY.
3. OPTIONAL NEUTRAL BUS

FOR WIRING DIAGRAM SEE DWR. GM71338
FOR BYPASS SCHEMATIC SEE DWR. 321444

MODEL ZCB–5
150–400 AMP
3 & 4 POLE
LOGIC – MPAC 1500

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

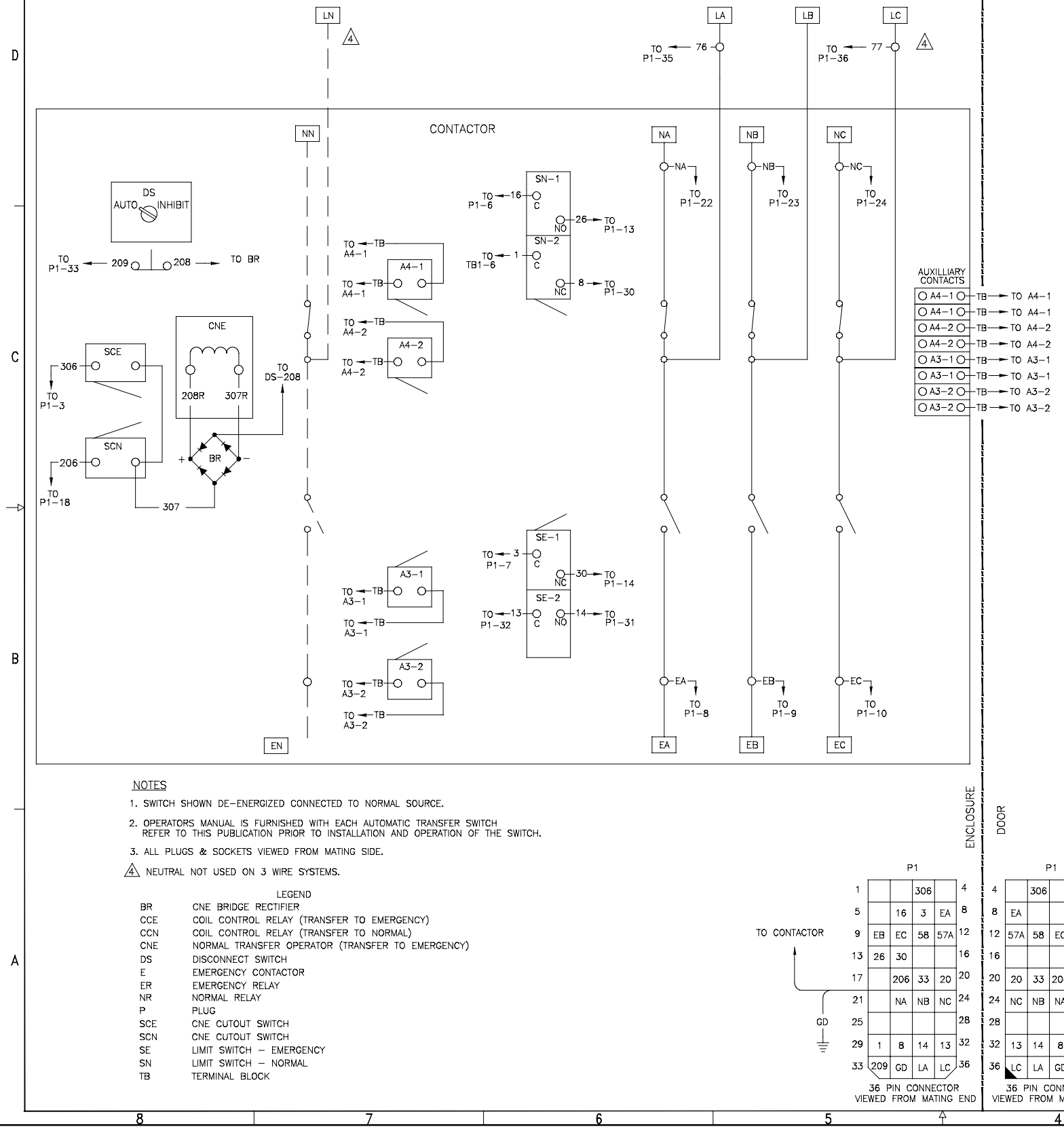
APPROVALS	DATE
DRAWN FCH	8–19–09
CHECKED AJH	8–21–09
APPROVED AJH	8–21–09

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

TITLE: DIAGRAM SCHEMATIC
SCALE: / / / CAD NO. SHEET 1–1
PLOTTED DWG. NO. GM71337 D

Schematic Diagram, ZCB-5 with MPAC™ 1500 Controls, 150-400 Amps, 2, 3, and 4 Poles, GM71337

REV	DATE	REVISION	BY	M F
–	8–19–09	NEW DRAWING [85028]	FCH	



NOTES

1. SWITCH SHOWN DE–ENERGIZED CONNECTED TO NORMAL SOURCE.
2. OPERATORS MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
3. ALL PLUGS & SOCKETS VIEWED FROM MATING SIDE.
4. NEUTRAL NOT USED ON 3 WIRE SYSTEMS.

LEGEND

BR	CNE BRIDGE RECTIFIER
CCE	COIL CONTROL RELAY (TRANSFER TO EMERGENCY)
CCN	COIL CONTROL RELAY (TRANSFER TO NORMAL)
CNE	NORMAL TRANSFER OPERATOR (TRANSFER TO EMERGENCY)
DS	DISCONNECT SWITCH
E	EMERGENCY CONTACTOR
ER	EMERGENCY RELAY
NR	NORMAL RELAY
P	PLUG
SCE	CNE CUTOUT SWITCH
SCN	CNE CUTOUT SWITCH
SE	LIMIT SWITCH – EMERGENCY
SN	LIMIT SWITCH – NORMAL
TB	TERMINAL BLOCK

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

APPROVALS		DATE
DRAWN	FCH	8–19–09
CHECKED	AJH	8–21–09
APPROVED	AJH	8–21–09

TITLE: DIAGRAM, WIRING

SCALE: / / / | CAD NO. | SHEET 1–1

PLOTTED | DWG. NO. GM71338 | D

Wiring Diagram, ZCB-5 with MPAC™ 1500 Controls, 150–400 Amps, 2, 3, and 4 Poles, GM71338

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