

INSTALLATION INSTRUCTIONS

Original Issue Date: 12/09

Model: GLS-5, K-5, and KB-5 Automatic Transfer Switches

Market: ATS

Subject: M340 to MPAC™ 1500 Controller Conversion Kit GM69378-S3

Introduction

Use conversion kit GM69378-S3 to replace the M340 controller with an MPAC™ 1500 controller on the standard-transition automatic transfer switch models listed above.

Note: Do not use this conversion kit on programmed-transition models, which use -6 in the model designation to indicate programmed transition.

See Figure 7 to interpret the transfer switch model designation.

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

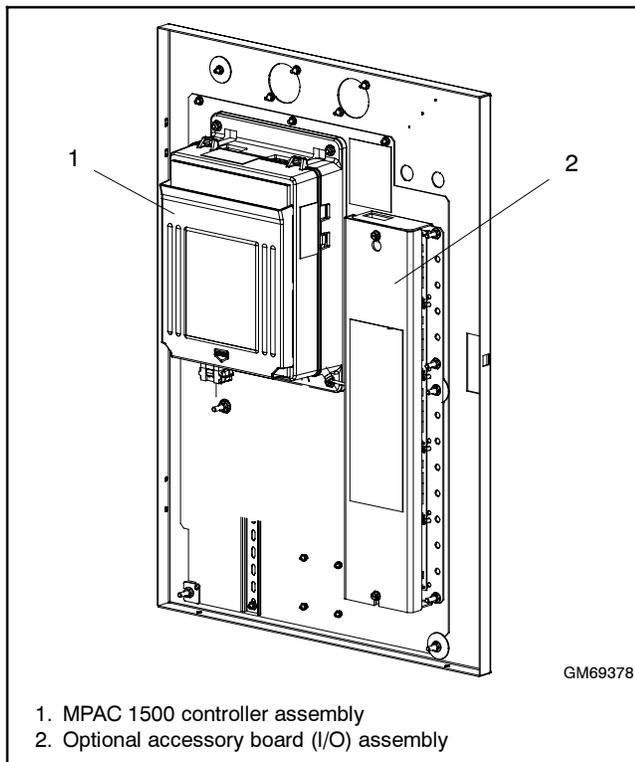


Figure 1 MPAC™ 1500 Controller Conversion Kit, Installed

Tools 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.

Note: Do not discard these instructions after kit installation. Keep this document with the transfer switch documentation for future reference.

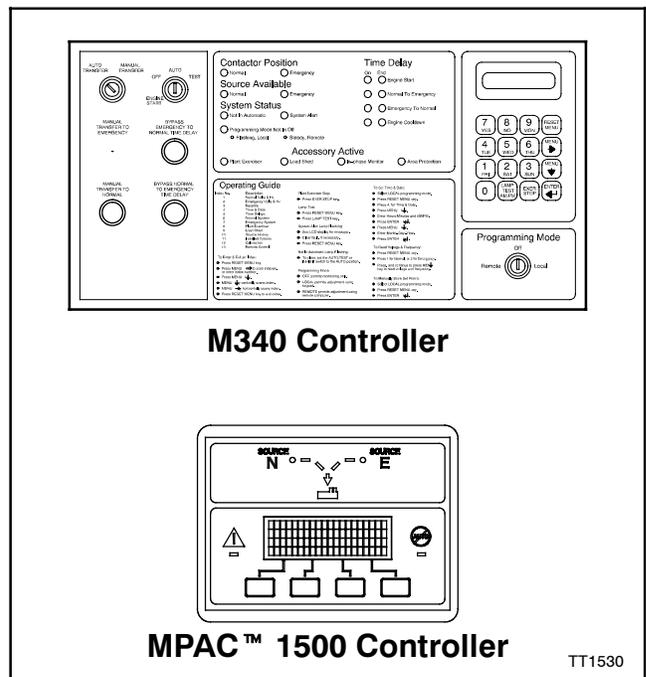


Figure 2 Controller Identification

Controller Accessories

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

M340	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.

Module Accessories	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 Module Accessories for MPAC™ 1500

Other Accessories

Other 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
Remote Annunciator	GM52650-KP1

† 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 before starting the controller kit installation procedure. If the transfer switch is equipped with current transformers (CTs), they will need to be replaced with the new current transformers for use with the MPAC 1500 controller. See Figure 6 for available 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.

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 6 Current Sensing Kits

Model Designation

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

model GLS, K and KB switches are combined in the model designation chart. Some codes do not apply to all three models.

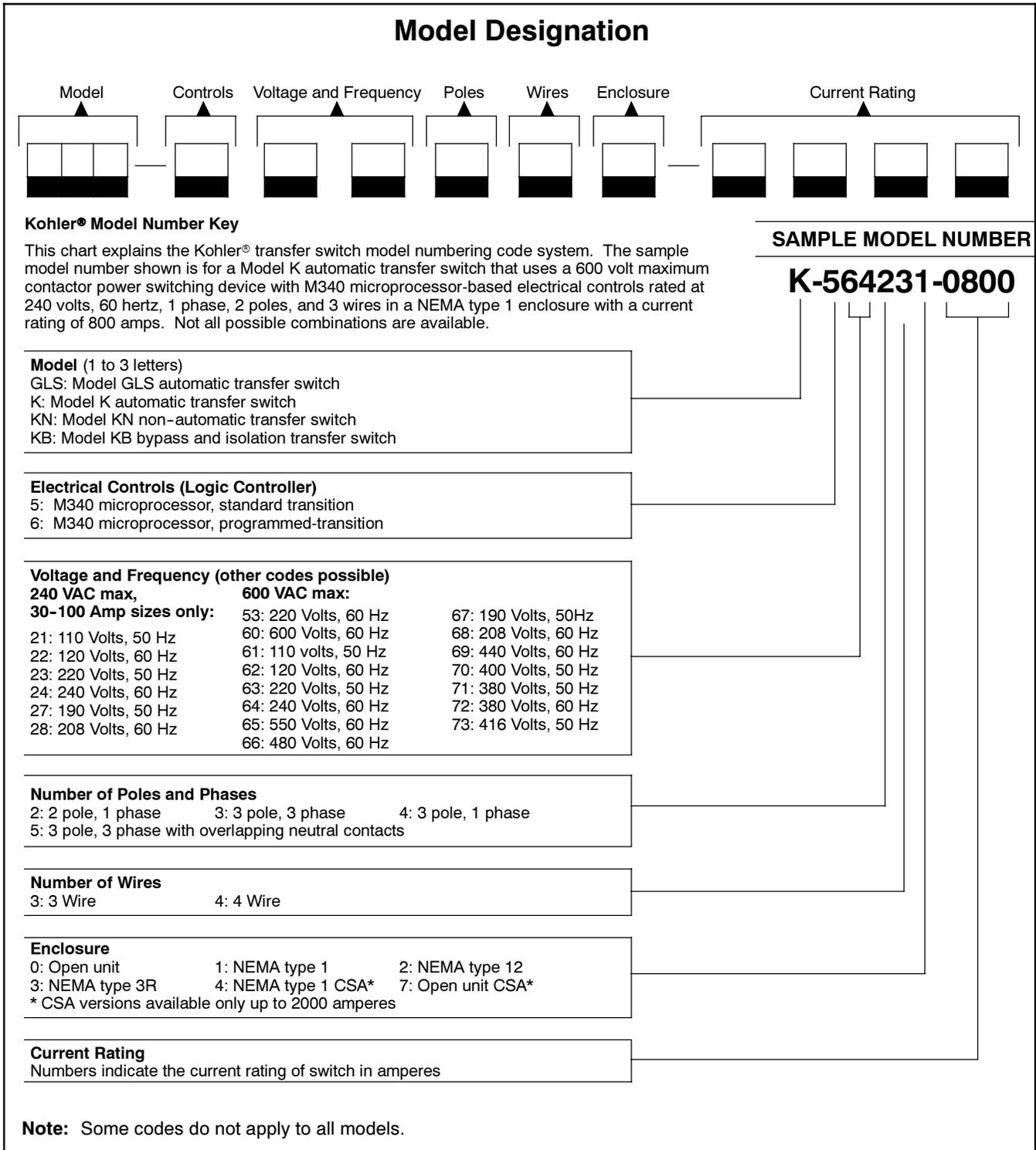


Figure 7 Model Designation Key

Safety Precautions

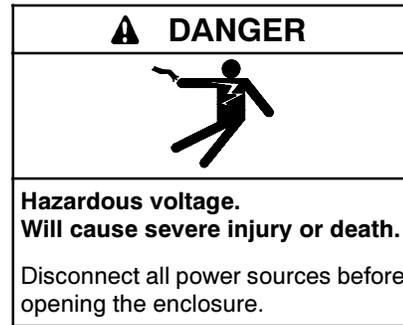
Observe the following safety precautions while installing the kit.



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.



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

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. Place the generator set master switch in the OFF position.
2. Disconnect the power to the battery charger, if equipped.
3. Disconnect the generator set engine starting battery(ies), negative (-) lead first.
4. Disconnect power from the transfer switch on both sources, Normal and Emergency.
5. If the transfer switch is equipped with current transformers (CTs), remove all CTs from the power lines of the ATS.

6. Disconnect and remove the TEST pushbutton. See Figure 8.
7. Disconnect and remove any other optional switches. See Figure 9.
8. If the transfer switch is equipped with meters, disconnect and remove all meters and the selector switch. See Figure 9.

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.

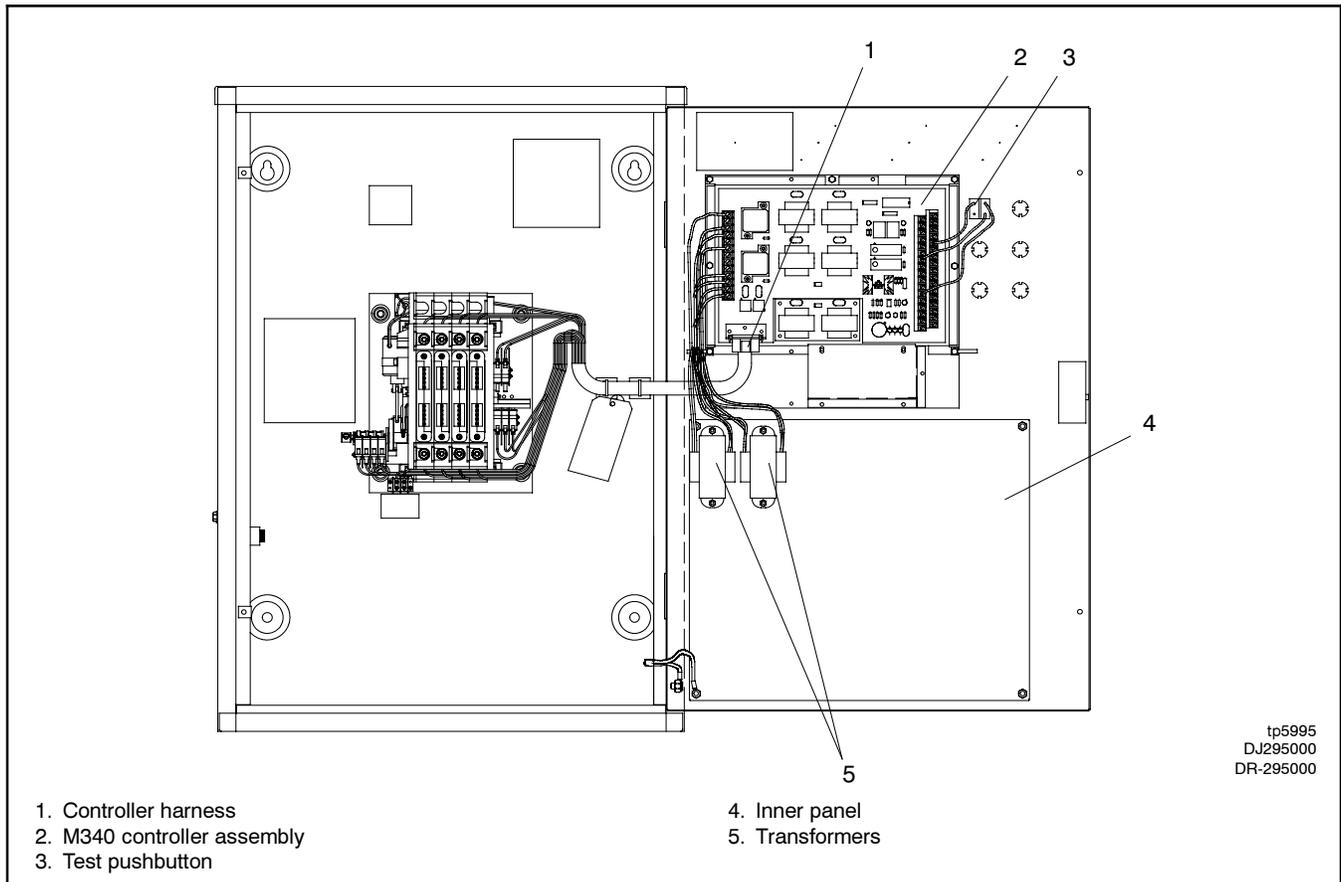


Figure 8 Model GLS-5 ATS with M340 Controls

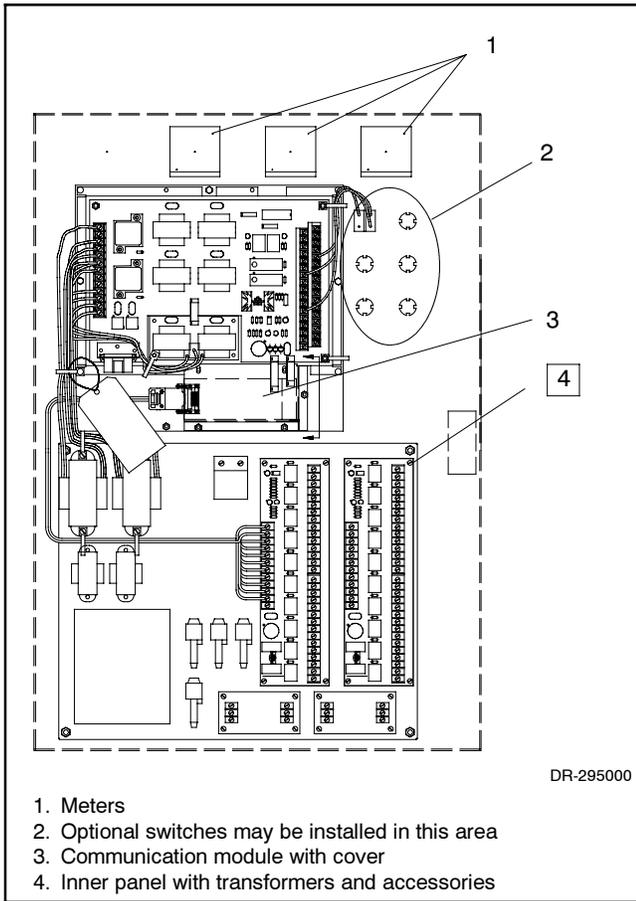


Figure 9 M340 Controller with Optional Accessories

9. Disconnect any other accessories mounted on the inner panel.

Note: 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.

10. Disconnect the contactor harness from the M340 controller at plug P1. See Figure 10.

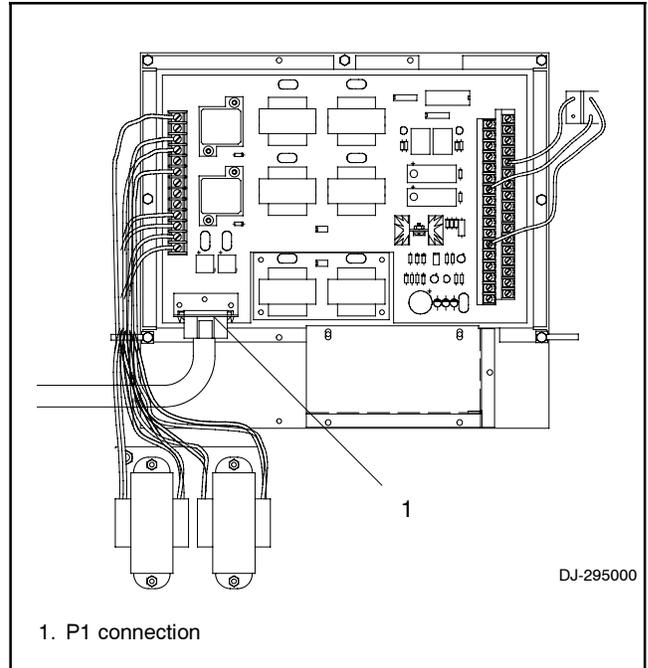


Figure 10 Disconnect P1

11. Remove the metal cover over the optional communication module, if present. See Figure 11.

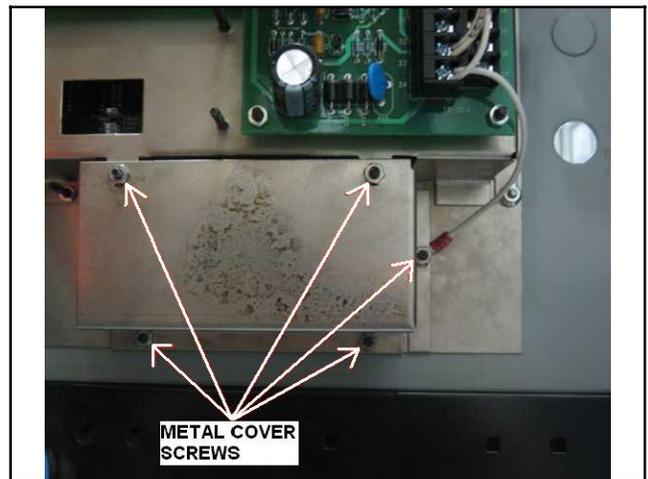


Figure 11 Remove Cover Screws

- Remove the mounting screws to remove the controller and the inner panel from the enclosure door.



Figure 12 Controller, Switches, Meters, and Inner Panel Removed

Note: Refer to the notes in Figure 16 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.

- 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 13 and Figure 16. Install three flat washers (X-25-122) with three nuts (X-6210-2) as shown.

- Install panel retainer (GM70051). See Figure 13.

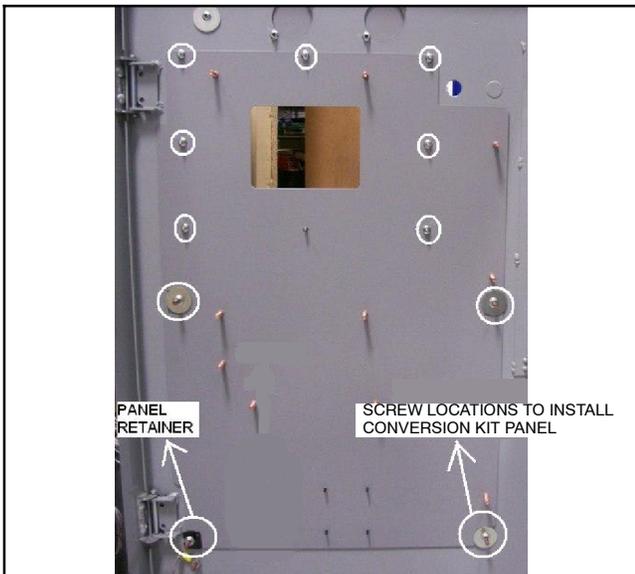


Figure 13 Mounting Plate Installation

- 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 14 and Figure 16. The installed plate is shown in Figure 15.



Figure 14 Switch Cover Plate GM69929



Figure 15 Door with Mounting Plate and Switch Cover Plate

16. Install the MPAC 1500 controller assembly (GM46733-1) onto the conversion kit mounting plate using four nuts X-6210-2. See Figure 17.

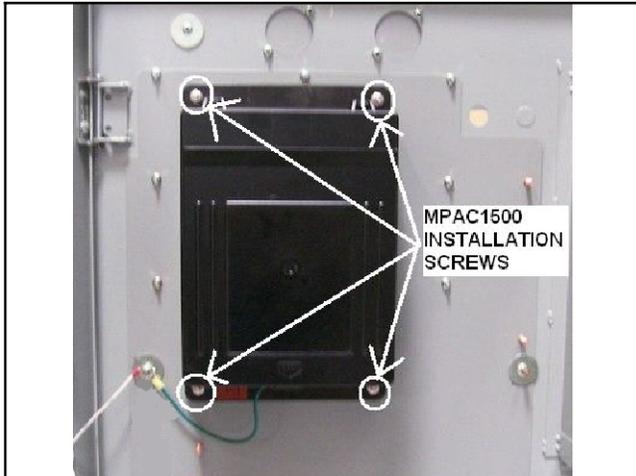


Figure 17 Controller Assembly Installation

17. See Figure 18 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 18 Ground Lead Connections

18. Affix conversion kit decal GM70355 over the old decal on the outside of the enclosure door. See Figure 19 and Figure 20.



Figure 19 Before Decal Installation



Figure 20 After Decal Installation

19. Connect P24 of the conversion kit harness GM71472 to the contactor harness, which was disconnected from the M340 controller in step 10. See Figure 22.
20. Connect P1 of the conversion kit harness to P1 of the MPAC™ 1500 controller. See Figure 21.

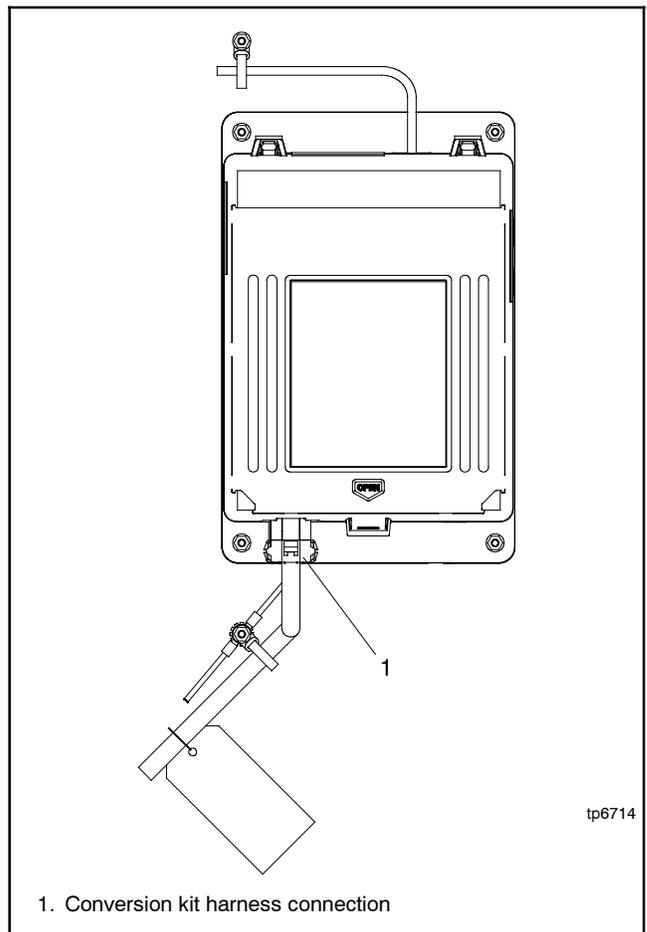


Figure 21 Connection to MPAC™ 1500 Controller

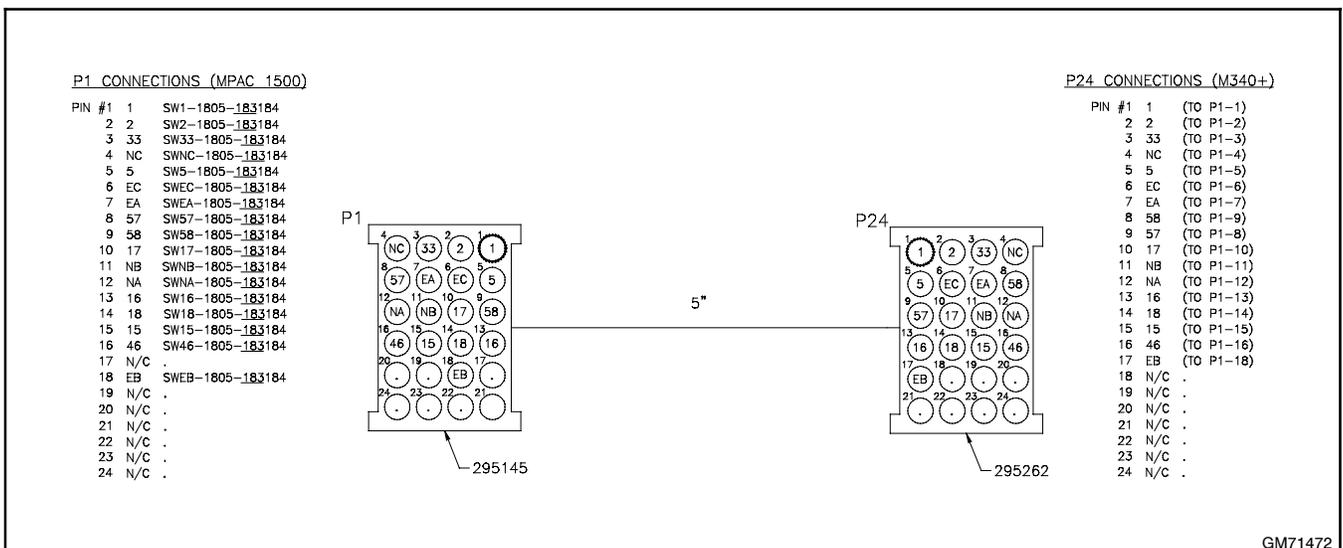


Figure 22 Conversion Kit Harness

21. For current sensing, obtain the appropriately rated current sensing kit and install according to Figure 25. Connect the current transformers as shown in Figure 26. See the Parts List for current sensing kit numbers.
22. Record the required information on decal GM70205. See Figure 23. See Figure 6 for current sensing kits and Figure 27 for wiring diagram numbers.
23. Place decal GM70205 on the mounting plate as shown in Figure 24.
24. If optional accessory modules are used, attach the accessory mounting kit to the conversion kit mounting plate. See Figure 16 and Figure 24. Then refer to instruction sheet TT-1449, provided with the accessory mounting kit, to install and connect the modules.
25. For installation of other optional accessories, refer to the instructions provided with the accessory kit or to the MPAC™ 1500 Operation/Installation manual, TP-6714.
26. Reconnect power to the transfer switch.

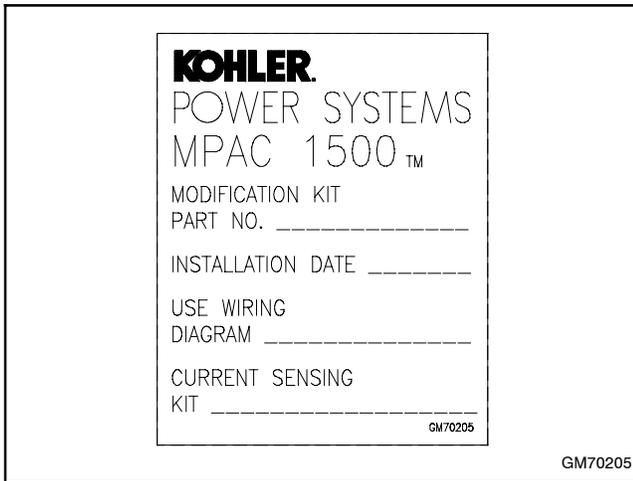


Figure 23 Decal GM70205

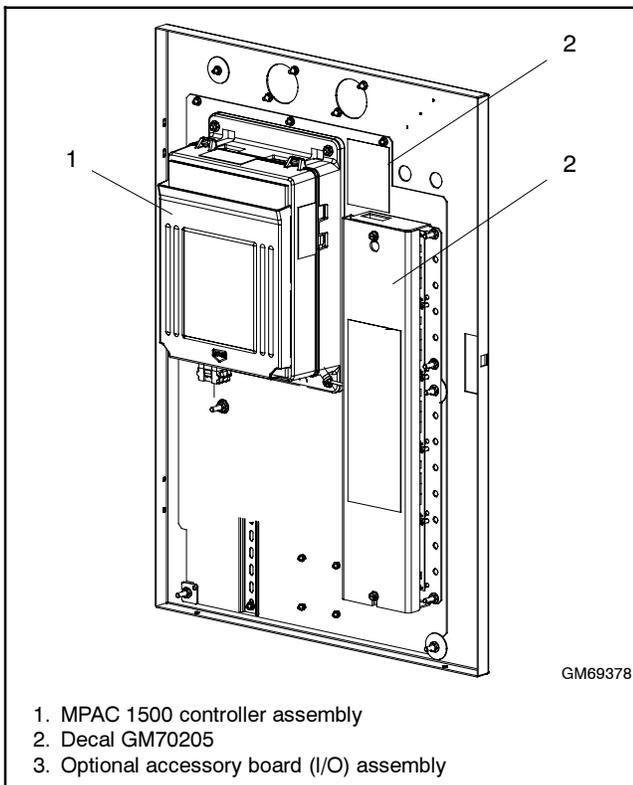


Figure 24 Decal GM70205 Location

27. Check that the generator set master switch is in the OFF position.
28. Reconnect the generator set engine starting battery, negative (-) lead last.
29. Reconnect power to the battery charger, if equipped.
30. Program the MPAC™ 1500 controller voltages, time delays, and system phases. See TP-6714, Operation Manual, for instructions.
31. Run the operation tests outlined in Operation Manual TP-6714 to verify system operation.

Note: Keep this document, which includes installation instructions and wiring diagrams, with the transfer switch documentation.

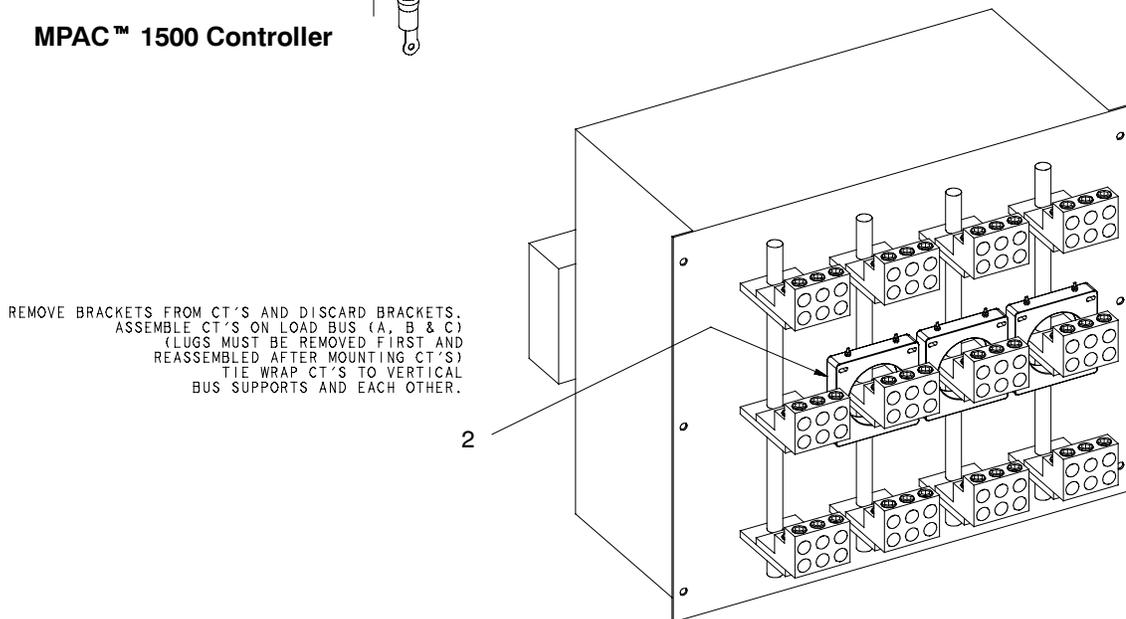
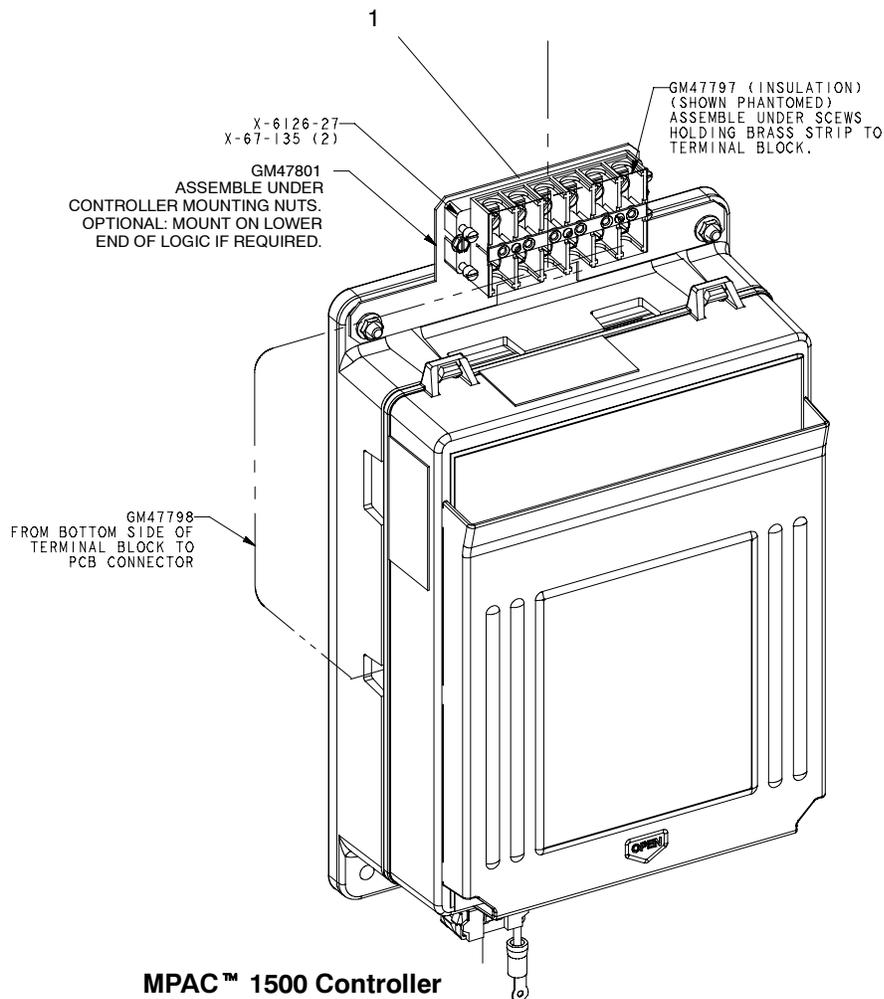
Parts Lists

M340 to MPAC™ 1500 Conversion Kit

Kit: GM69378-S3		
Qty.	Description	Part Number
1	Plate, Mounting	GM60611
1	Plate, Cover Switch	GM69929
1	Decal	GM70205
1	Decal	GM70355
1	Logic, MPAC 1500 Assembly	GM46733-1
1	Harness - GLS - 5 MPAC 1500	GM71472
10	Tie, Cable	X-468-1
2	Tie, Cable	X-468-3
5	Washer, Plain	X-25-122
1	Retainer, Panel	GM70051
14	Nut, Hex	X-6210-2
1	Washer, Lock	X-22-12
1	Cable, Ground	LK-1212-1515
15	Nut, Hex	X-6210-4
8	Washer, Lock	X-22-7
1	Operation Manual - MPAC1500	TP-6714
1	Installation Instructions	TT-1530

Current Sensing Kit Parts

Description	Part Number	Part Quantity									
		Kit number GM47965:									
		-S19	-S20	-S21	-S22	-S23	-S24	-S25	-S26	-S27	-S28
		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:

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 26).

1. Connect harness GM40562 (10 ft. harness). See Figure 26 for electrical connections.
2. Current transformers. See Parts List for part numbers.

Figure 25 Current Sensing Kit Installation

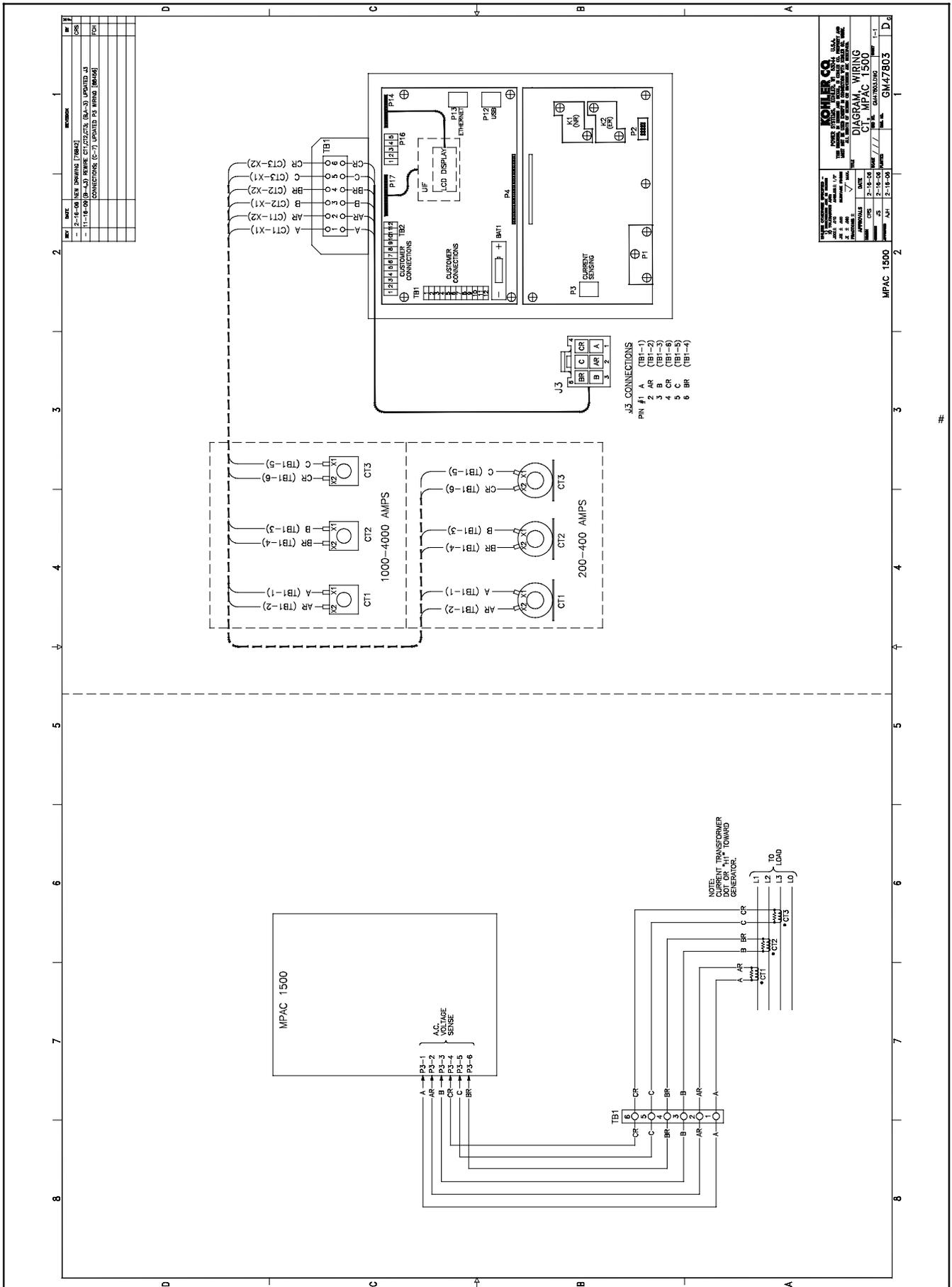


Figure 26 Current Sensing Kit Wiring Diagram, GM47803

Transfer Switch Wiring Diagrams

The schematic diagrams and wiring diagrams for the transfer switches with MPAC™ 1500 controls are arranged in numerical order on the following pages. Find your model and the corresponding drawing numbers in Figure 27.

The schematic and wiring diagram drawing numbers for the transfer switch with M340 controls are shown in Figure 27 for reference only. Those drawings are not

included in this document. Refer to the original documentation provided with the transfer switch for M340 drawings, if necessary.

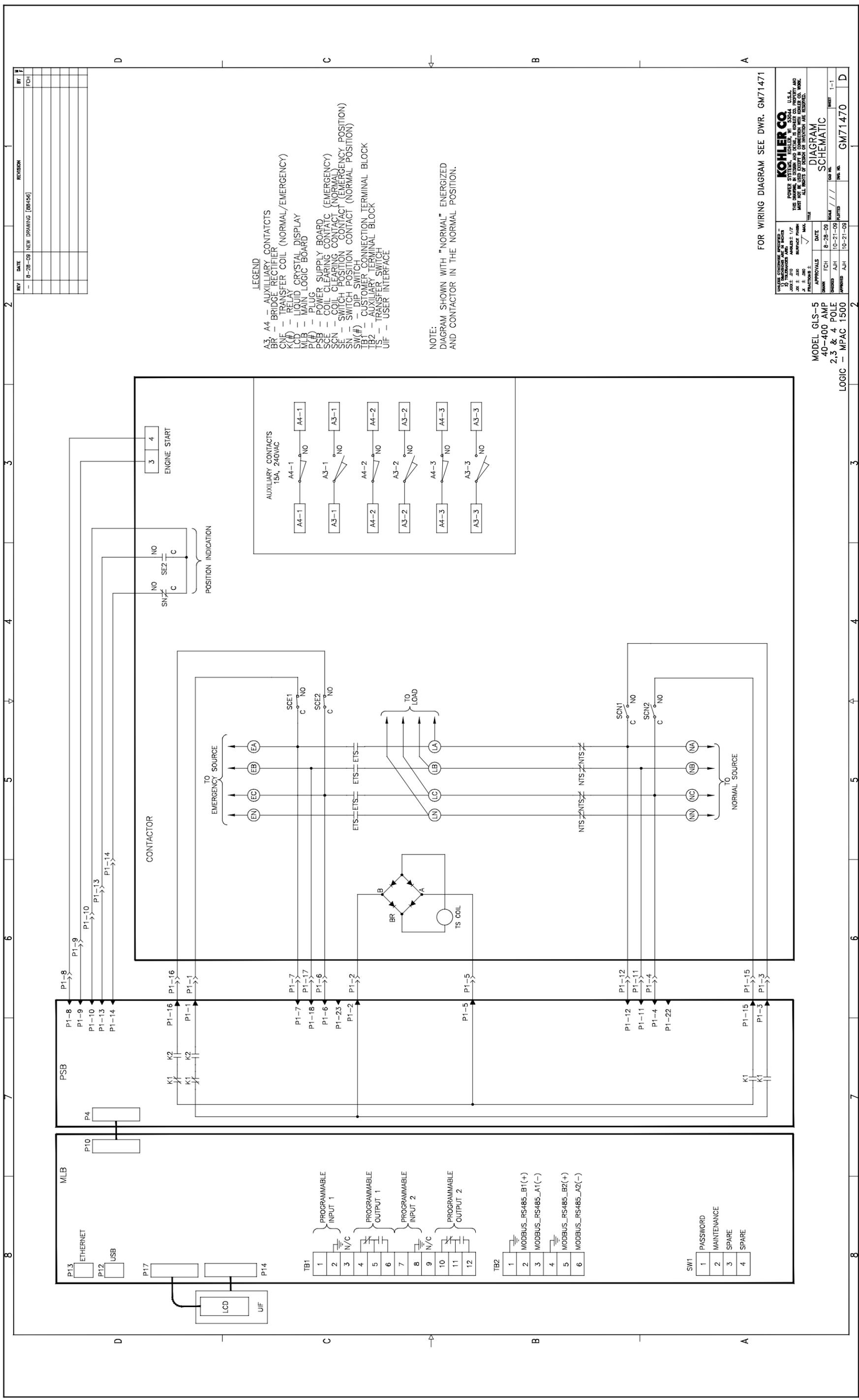
To interpret the transfer switch model designation, see the model designation chart in Figure 7. Codes for the model GLS, K and KB switches are combined in the model designation chart. Some codes do not apply to all three models.

ATS Model *	Poles*	Phases*	Amps	M340 Drawing Numbers (for reference only)		MPAC 1500 Conversion Drawings	
				Schematic	Wiring Diagram	Schematic	Wiring Diagram
GLS-5	2	1	40-400	362173	362171	GM71470	GM71471
	3	3					
	4	3					
K-5	2	1	30-4000	294859	294854	GM77173	GM77174
	3	3					
	3	1					
KB-5	2	1	150-400	294808	294815	GM69412	GM69414
	3	3					
	3	1					
	4†	3					
	2	1	600-800	294811	294817	GM77203	GM77204
	3	3	600-800	353347	294817	GM77202	GM77204
	3	1					
	4†	3					
	3	3					
	3	1	1000-1200	294812	294819	GM77192	GM77193
4†	3						

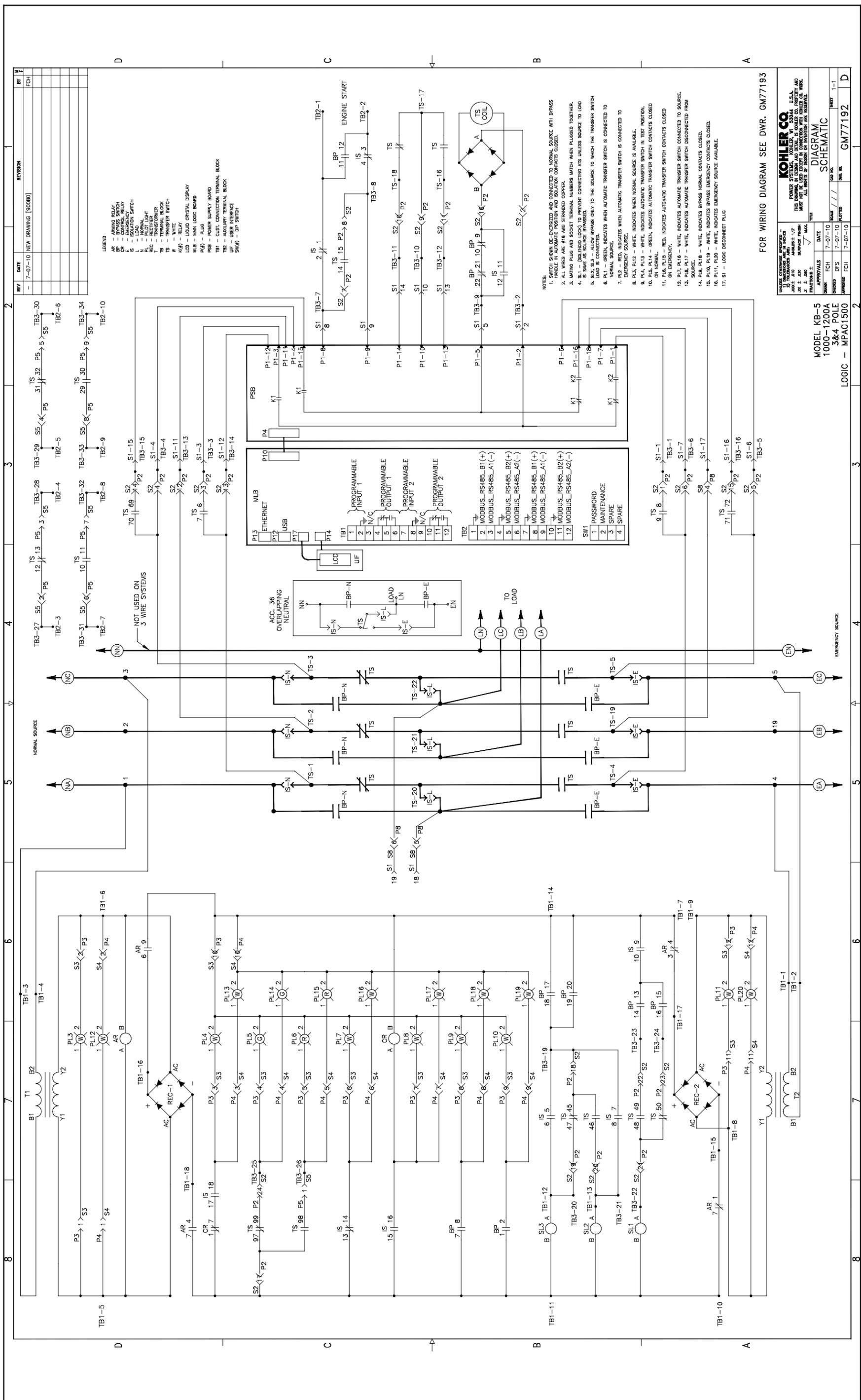
* See Figure 7 to interpret the model designation.
† 3 pole, 3 phase with overlapping neutral

Figure 27 Drawing Numbers

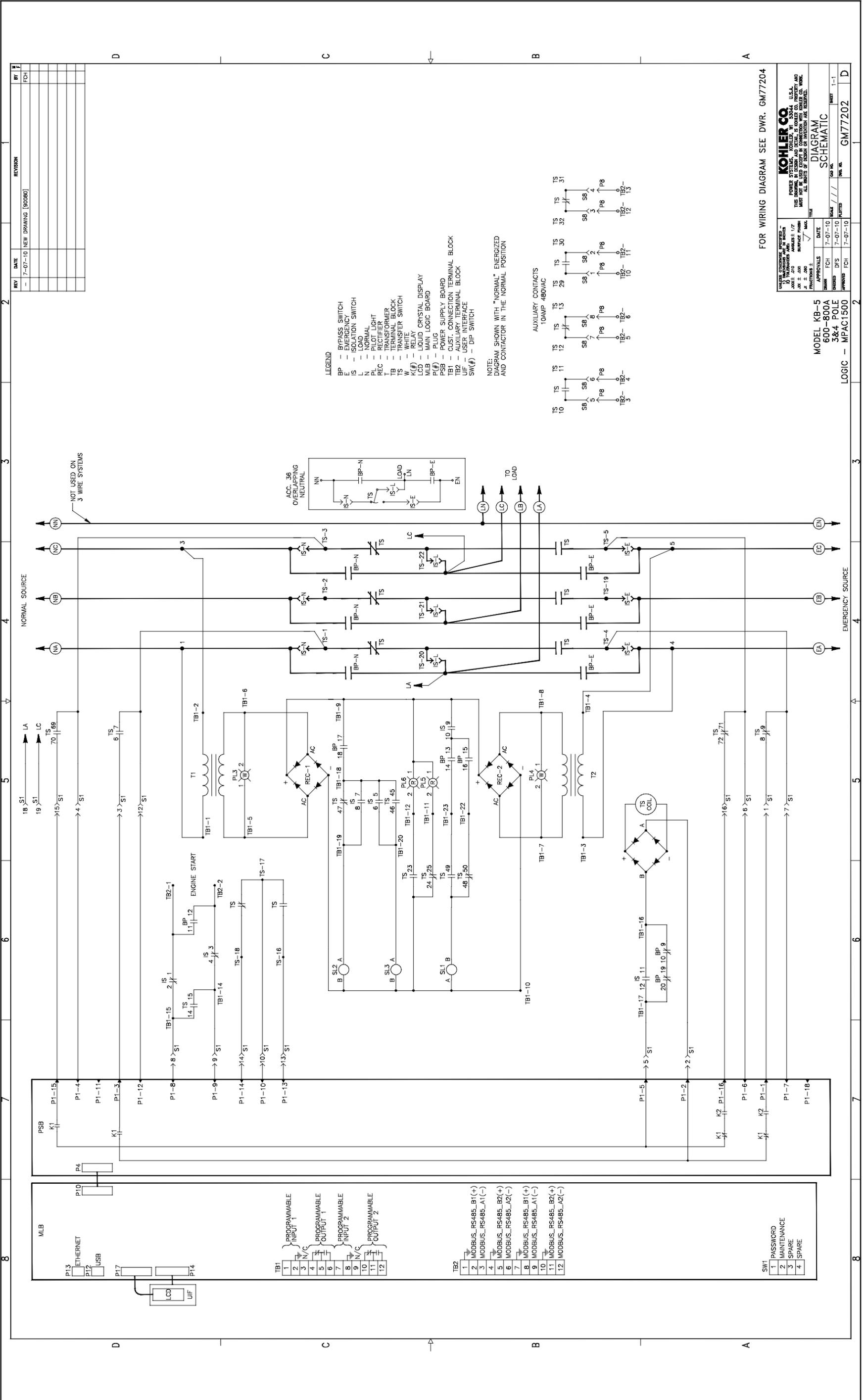
Notes



Schematic Diagram, Model GLS Standard Transition with MPAC 1500 Controls, GM71470



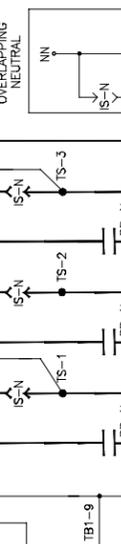
Schematic Diagram, 100-1200 Amp Model KB Standard Transition with MPAC 1500 Controls, GM77192



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NO.	DESCRIPTION	DATE	BY
1	PASSWORD		
2	MAINTENANCE		
3	SPARE		
4	SPARE		

NOT USED ON 3 WIRE SYSTEMS



LEGEND

- BP - BYPASS SWITCH
- E - EMERGENCY
- IS - ISOLATION SWITCH
- L - LOAD
- PL - PILOT LIGHT
- REC - RECTIFIER
- TB - TRANSFORMER
- TS - TRANSFER SWITCH
- W - RELAY
- K(#) - RELAY
- LOD - LIQUID CRYSTAL DISPLAY
- MLB - MAIN LOGIC BOARD
- PSB - POWER SUPPLY BOARD
- P(#) - PLUG
- TB1 - CUST. CONNECTION TERMINAL BLOCK
- TB2 - AUXILIARY TERMINAL BLOCK
- UIF - USER INTERFACE
- SW(#)- DIP SWITCH

NOTE:
DIAGRAM SHOWN WITH "NORMAL" ENERGIZED AND CONTACTOR IN THE NORMAL POSITION

AUXILIARY CONTACTS
10AMP 480VAC

NO.	DESCRIPTION
1	PROGRAMMABLE INPUT 1
2	N/C
3	PROGRAMMABLE OUTPUT 1
4	PROGRAMMABLE OUTPUT 2
5	N/C
6	PROGRAMMABLE INPUT 2
7	N/C
8	PROGRAMMABLE OUTPUT 1
9	N/C
10	PROGRAMMABLE OUTPUT 2
11	N/C
12	PROGRAMMABLE OUTPUT 1

NO.	DESCRIPTION
1	MODBUS_RS485_B1(+)
2	MODBUS_RS485_A1(-)
3	MODBUS_RS485_B2(+)
4	MODBUS_RS485_A2(-)
5	MODBUS_RS485_B1(+)
6	MODBUS_RS485_A1(-)
7	MODBUS_RS485_B2(+)
8	MODBUS_RS485_A2(-)
9	MODBUS_RS485_B1(+)
10	MODBUS_RS485_A1(-)
11	MODBUS_RS485_B2(+)
12	MODBUS_RS485_A2(-)

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1	PASSWORD		
2	MAINTENANCE		
3	SPARE		
4	SPARE		

NO.	DESCRIPTION	DATE	BY
1	PASSWORD		
2	MAINTENANCE		
3	SPARE		
4	SPARE		

NO.	DESCRIPTION	DATE	BY
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