INSTALLATION INSTRUCTIONS

Original Issue Date: **5/15**
Model: **20-2250 kW**
Market: **Industrial**
Subject: **Decision-Maker® 3 to Decision-Maker® 3+ Conversion Kit, GM94331**

Introduction

This conversion kit provides the components for replacing the main logic board on the Decision-Maker 3 with the main logic board on the Decision-Maker 3+. The Decision-Maker 3+ main logic board has two main differences from the older board:

- A different ribbon cable for connecting to the status indicator board
- 8 DIP switches for selecting controller functionality

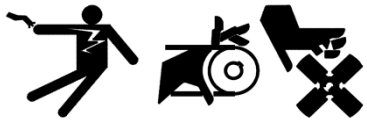
The adapter board, included with this kit, allows the new main logic board to connect to the existing status indicator board. Spacers and a new 24-pin ribbon cable are also included for the adapter board installation.

Note: Before completing the installation, the dip switches must be set for such functions as overspeed selection, temperature cooldown, crank mode selection, engine communication, and Modbus® address. To set the dip switches, see the detailed instructions in this sheet.

Safety Precautions

Observe the following safety precautions while installing the kit.

⚠ WARNING

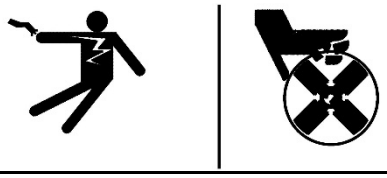


Accidental starts can cause severe injury or death.

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.

⚠ WARNING



Hazardous voltage. Moving rotor. Can cause severe injury or death.

Operate the generator set only when all guards and electrical enclosures are in place.

Grounding electrical equipment. Hazardous voltage can cause severe injury or death. Electrocution is possible whenever electricity is present. Ensure you comply with all applicable codes and standards. Electrically ground the generator set and related equipment and electrical circuits. Turn off the main circuit breakers of all power sources before servicing the equipment. Never contact electrical leads or appliances when standing in water or on wet ground because these conditions increase the risk of electrocution.

Connecting the battery and the battery charger. Hazardous voltage can cause severe injury or death. Reconnect the battery correctly, positive to positive and negative to negative, to avoid electrical shock and damage to the battery charger and battery(ies). Have a qualified electrician install the battery(ies).

Short circuits. Hazardous voltage/current can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

NOTICE

Electrostatic discharge damage. Electrostatic discharge (ESD) damages electronic circuit boards. Prevent electrostatic discharge damage by wearing an approved grounding wrist strap when handling electronic circuit boards or integrated circuits. An approved grounding wrist strap provides a high resistance (about 1 megohm), *not a direct short*, to ground.

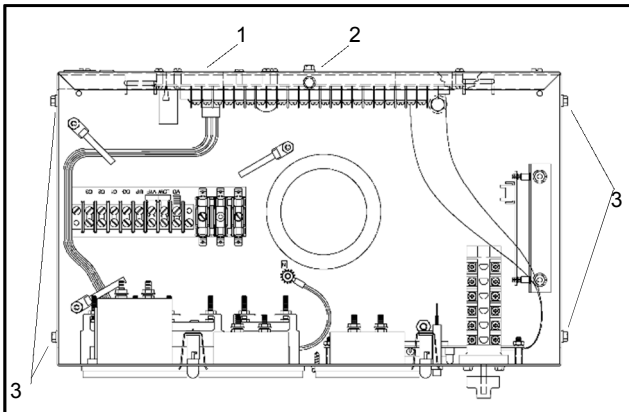
Installation Procedure

1.1 Remove the generator set from service

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.

1.2 Open the controller

1. Remove the controller cover and hardware.
2. To lay the back controller panel flat for accessibility, remove the controller back panel mounting screw.



1. Controller back panel
2. Back Panel mounting screw
3. Controller cover mounting screws

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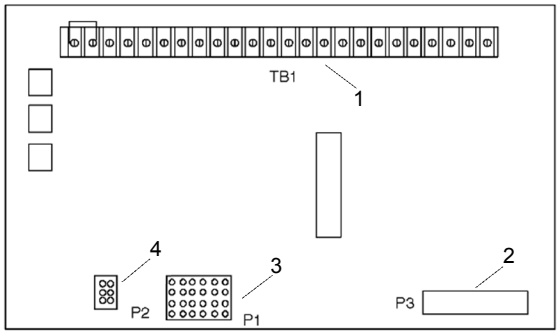
Figure 1 Controller Screw Locations

1.3 Decision-Maker 3 vs 3+ Circuit Board Identification

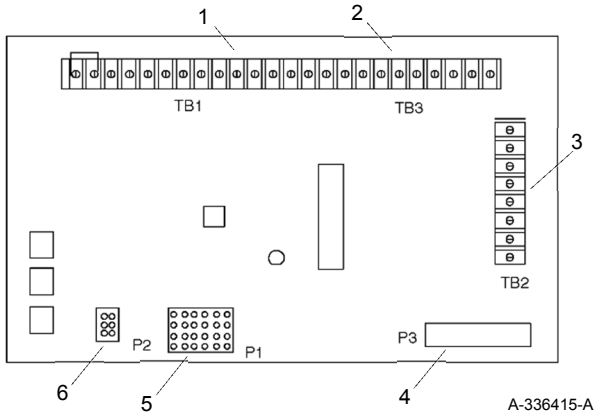
Note: If the controller is a Decision-Maker 3+, the kit can still be used to replace the main logic circuit board but the adapter board is not needed for the installation.

1. To identify the controller main logic circuit board, determine the number of terminal strips on the circuit board. The Decision-Maker 3 controller only has the TB1 terminal strip on the controller circuit board. The Decision-Maker 3+ controller has three terminal strips, TB1, TB2, and TB3, on the controller circuit board. See Figure 2 or Figure 3 for controller configurations and to verify that a Decision-Maker 3 controller circuit board is being replaced.



1. TB1 terminal strip
2. P3 (control panel harness) to P4 (LED indicator panel circuit board)
3. P1 connector (DC harness)
4. P2 connector (AC harness)

Figure 2 Decision-Maker 3 Main Logic Board



1. TB1 terminal strip
2. TB3 terminal strip
3. TB2 terminal strip
4. P3 (control panel harness) to P4 (LED status indicator panel circuit board)
5. P1 connector (DC harness)
6. P2 connector (AC harness)

Figure 3 Decision-Maker 3+ Main Logic Board

1.4 Remove the main logic board external electrical connections

Note: Clearly mark all disconnected leads from the controller with tape to simplify reconnection.

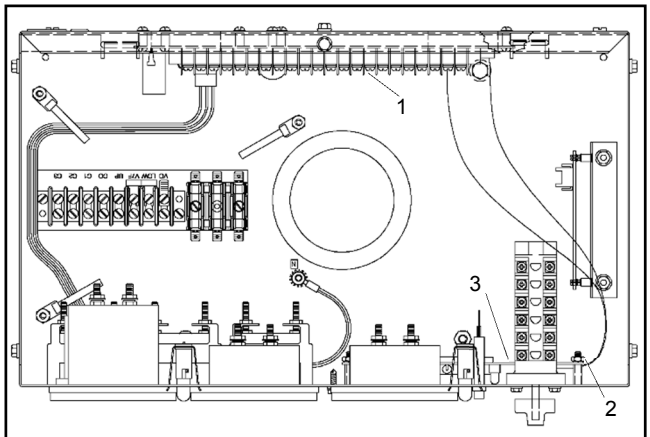
1. Disconnect and mark all leads on TB1 and all electrical connections on the main logic board.

   Note: If the engine cranking mode is set to continuous, a jumper will connect TB1-2 with TB1-9 on the controller terminal strip, TB1. If there is no jumper on TB1, the crank mode is set to cyclic.

   Note: Early versions of the Decision-Maker 3+ did not have dip switches. Cranking mode was set to continuous by adding a jumper between TB2-9 and TB2-9A.

2. Determine if the controller is set to continuous or cyclic crank mode and save this information for later use when setting the dip switches on the new board.

1.5 Remove/replace the main logic circuit board from the controller

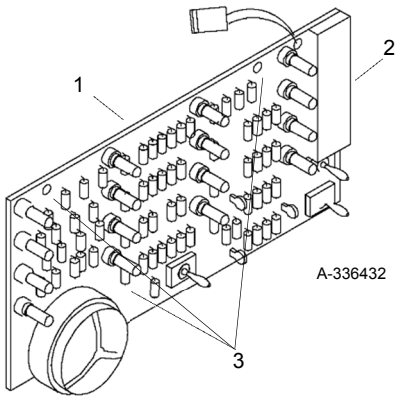


1. Main logic board
2. Mounting nuts, status indicator board
3. Status indicator board

Figure 4 Controller Circuit Board Locations

1. Observe proper circuit board grounding practices. See the NOTICE in the safety precautions section.
2. Remove the mounting hardware.
3. Remove the existing main logic board.
4. Install the new main logic board in the same position as that of the old main logic board.
5. Secure the new main logic board using the existing hardware.

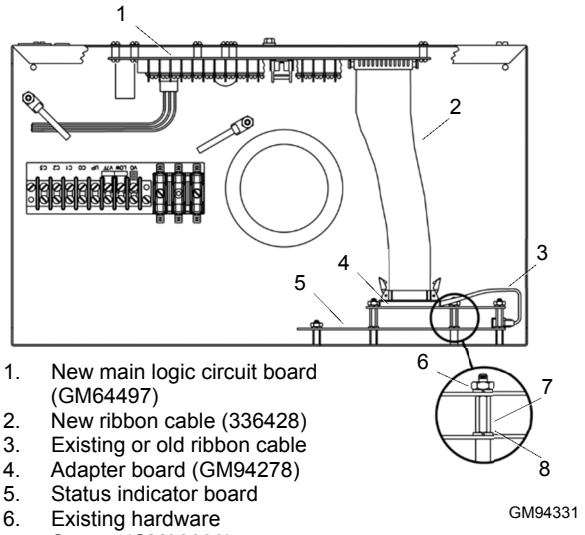
1.6 Attach the status indicator adapter board



1. Status indicator board
2. P4 Status indicator board harness connection
3. Threaded stud locations

Figure 5 Status Indicator Board (16-light shown)

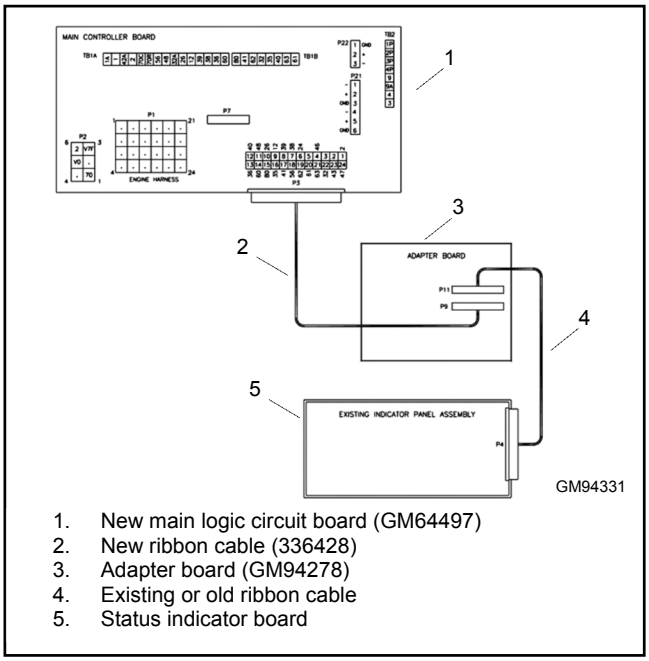
1. Remove the three nuts and lock washers from the threaded studs on status indicator board and replace with the three lock washers (X-22-7) and the three spacers (GM32633) provided. See Figure 6.



1. New main logic circuit board (GM64497)
2. New ribbon cable (336428)
3. Existing or old ribbon cable
4. Adapter board (GM94278)
5. Status indicator board
6. Existing hardware
7. Spacer (GM32633)
8. Lock washer (X-22-7)

Figure 6 Adapter Board Installation

2. Position the adapter board (GM94278) onto the spacers and secure the board with the existing hardware removed in the previous step.
3. Use the existing ribbon cable to connect P4 on the status indicator board to the adapter board. See Figure 7.
4. Use the new ribbon cable provided with the kit to connect P3 on the main logic board to the adapter board. See Figure 7.



1. New main logic circuit board (GM64497)
2. New ribbon cable (336428)
3. Adapter board (GM94278)
4. Existing or old ribbon cable
5. Status indicator board

Figure 7 Ribbon Cable Connections

5. Reconnect all leads and electrical connections on the main logic board.

1.7 Set the DIP switches

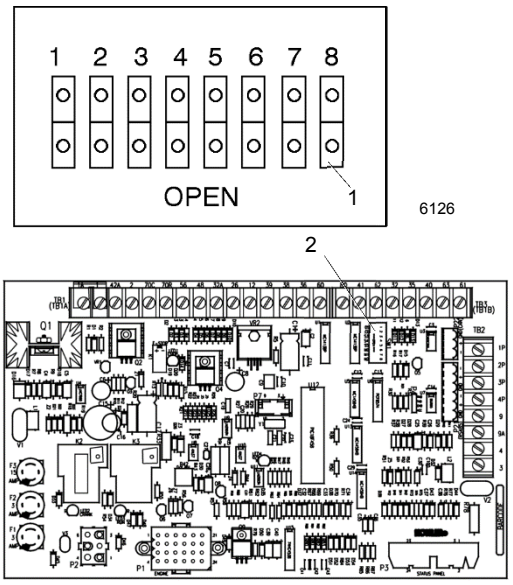
The controller main logic board contains eight DIP switches. See Figure 8.

DIP Switch	Description	Switch Position	
		Open	Closed
1	Overspeed Selection	60 Hz (50 Hz+10)	70 Hz (60 Hz+10)
2	Temperature Cooldown Enable	Cooldown Disabled	Cooldown Functional
3	Crank Mode Selection	Cyclic	Continuous
4	Engine Comm. Setting	Open, No ECM	
5	Engine Comm. Setting		
6	Modbus® Address Bit 0	Closed (typical factory default)	
7	Modbus® Address Bit 1		
8	Modbus® Address Bit 2		

Figure 8 DIP Switch Functions

Note: After setting DIP switches to the generator set application, be sure to power down and then power up the controller (disconnect the battery and then reconnect the battery of the generator set) or use the prime power switch, if equipped. The controller will NOT acknowledge the DIP switch change until after the generator set controller is powered up.

Push the DIP switch toward the OPEN label to open the switch, or push it away to close it. See Figure 9.



1. Push this side down to open the circuit.
2. DIP switch location

Figure 9 DIP Switch Open Position

Typically, the factory default settings have all the DIP switches in the closed position except the crank mode selection switch SW3 which is open for cyclic cranking. The overspeed selection switch SW1 is open on 50 Hz. units. Be sure to select the correct DIP switch configuration for the generator set application.

Overspeed Frequency (DIP Switch 1). The generator set overspeed frequency is set using DIP switch 1. Select 70 Hz for 60 Hz voltages and 60 Hz for 50 Hz voltages.

Temperature Cooldown (DIP Switch 2). The generator set will continue to run during a five-minute cooldown cycle or shut down immediately. The choice is made using DIP switch 2.

Note: Use the engine cranking settings on the old controller board when setting the DIP switch. If the crank mode is set to continuous on the old circuit board, a jumper will connect TB1-2 with TB1-9 on the controller terminal strip, TB1. If there is no jumper on TB1, the crank mode is set to cyclic.

Engine Cranking (DIP Switch 3). The controller is factory-set for cyclic cranking. To change to the continuous cranking mode, use DIP switch 3. Set the DIP switch to match the settings on the old controller circuit board.

Engine Configuration (DIP Switches 4 and 5). Set the engine communication DIP switches, 4 and 5, to open for no ECM.

Modbus® Address (DIP Switches 6, 7, and 8). Because Modbus® settings are not available on the Decision-Maker 3, set DIP switches 6, 7, and 8 to closed.

1.8 Restore power to the generator set

1. Check that the generator set master switch is in the OFF position.
2. Reconnect the generator set engine starting battery, negative (-) lead last.
3. Reconnect power to the battery charger, if equipped.

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Parts List

Kit: GM94331		
Qty.	**Description**	**Common Parts**
1	Ribbon Cable Assembly, 24-Position	336428
3	8-32 x .625 Male-Female Spacer	GM32633
3	Lock Washer, 0.172 in. ID x 0.333 in. OD	X-22-7
1	DEC3+ Main Logic Board	GM64497
1	DEC3 to 3+ Indicator Adapter	GM94278
1	O/M 20-2250kW, Industrial	TP-6161
1	Instruction, Installation	TT-1662

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