

**INSTALLATION INSTRUCTIONS**

Original Issue Date: 4/01  
 Model: 20-400 kW  
 Market: Industrial Generator Sets with the 550 Controller  
 Subject: Controller Connection Kits:  
 GM17028-KP1 and GM17032-KP1

**Introduction**

The controller connection kit allows easy connection of selected controller accessories. The supplied wiring harness connects controller connector P23 and terminal strips TB1-3 and TB1-4 to the controller connection kit connector P25 and terminal strips TB6, TB7, TB8, and TB9. Connect accessory outputs (except the emergency stop kit) to the controller connection kit terminal strips. See Figure 1.

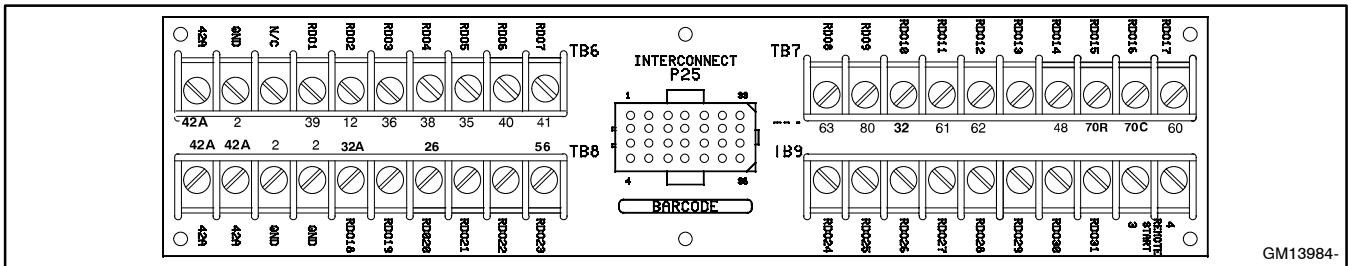
Use a single- or ten-relay dry contact kit between the controller connection kit and any external connections to isolate the controller circuit board from electrical interference. Connect controller accessories or customer-supplied warning devices (lights, horns, etc.) to the dry contact kit.

Attach customer-supplied 12-volt DC accessories to the battery positive (+) connection at the starter solenoid and to the battery negative (-) connection at the engine ground. Do not use terminals 42A and N on the controller connection kit terminal strip to supply voltage to relay contacts or customer-supplied devices. The user must attach separate leads directly to the battery for the voltage supply.

**Note:** Connect up to three audiovisual alarm kits, dry contact kits, and/or remote annunciator kits in any combination to the controller connection kit.

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

Observe applicable local and national electrical codes when installing the wiring system.

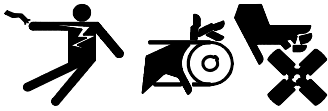


**Figure 1** Terminal Strips TB6, TB7, TB8, and TB9 on the Controller Connection Kit in the Junction Box

## 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.

## Installation Procedure

### 1. Remove the generator set from service.

- 1.1 Place the generator set master switch in the OFF position.
- 1.2 Disconnect the power to the battery charger, if equipped.
- 1.3 Disconnect the generator set engine starting battery(ies), negative (-) lead first.

### 2. Mount and connect the controller connection assembly.

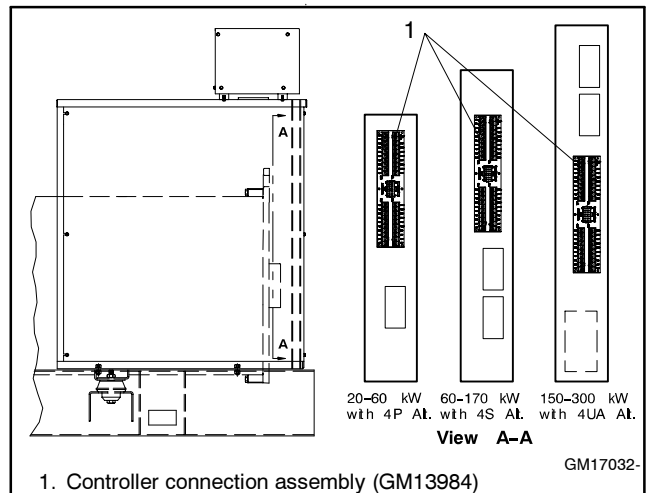
#### 2.1 GM17032-KP1 kit (20-300 kW)

- 2.1.1 Remove the junction box rear panel and hardware.

- 2.1.2 Attach the controller connection assembly (GM13984) to the junction box using six screws (X-51-3), spacers (X-712-9), and nuts (X-6210-4). Place the spacers between the controller connection assembly and the junction box bracket. See Figure 2 for the mounting location.

- 2.1.3 Plug the wiring connection harness (GM17033) into the controller connection assembly's P25 connector.

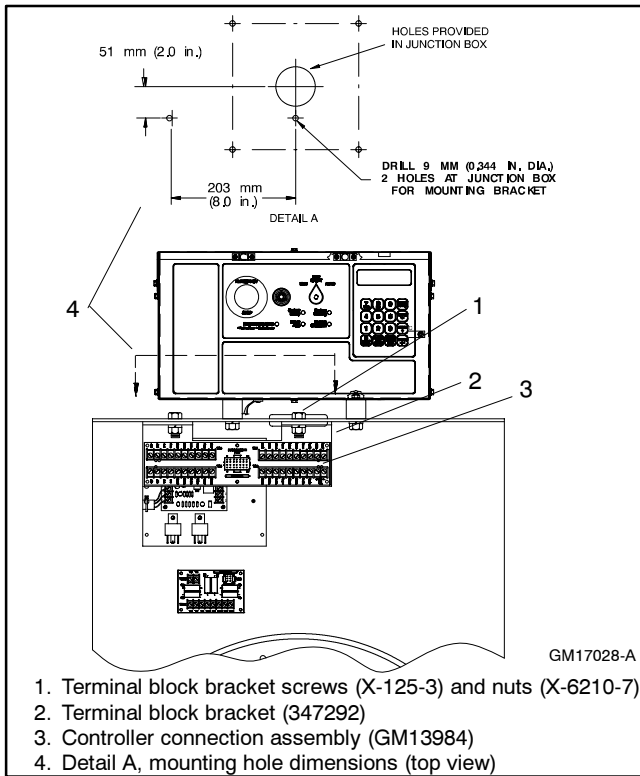
- 2.1.4 Proceed to step 2.3.



**Figure 2** Controller Connection Assembly Mounting Locations in Junction Box (20-300 kW)

#### 2.2 GM17028-KP1 kit (350/400 kW)

- 2.2.1 Remove the junction box rear panel and hardware.
- 2.2.2 Remove the four screws attaching the controller to the junction box. See Figure 3.
- 2.2.3 Mark the drill hole locations where the terminal block bracket (347292) mounts to the junction box top panel using the dimensions given in Figure 3.
- 2.2.4 Move the controller away from the rear of the junction box in order to provide enough clearance to drill two 9 mm (0.344 in.) dia. holes in the top of the junction box.
- 2.2.5 Remove burrs from the drilled holes and cleanup all metal chips in the junction box.



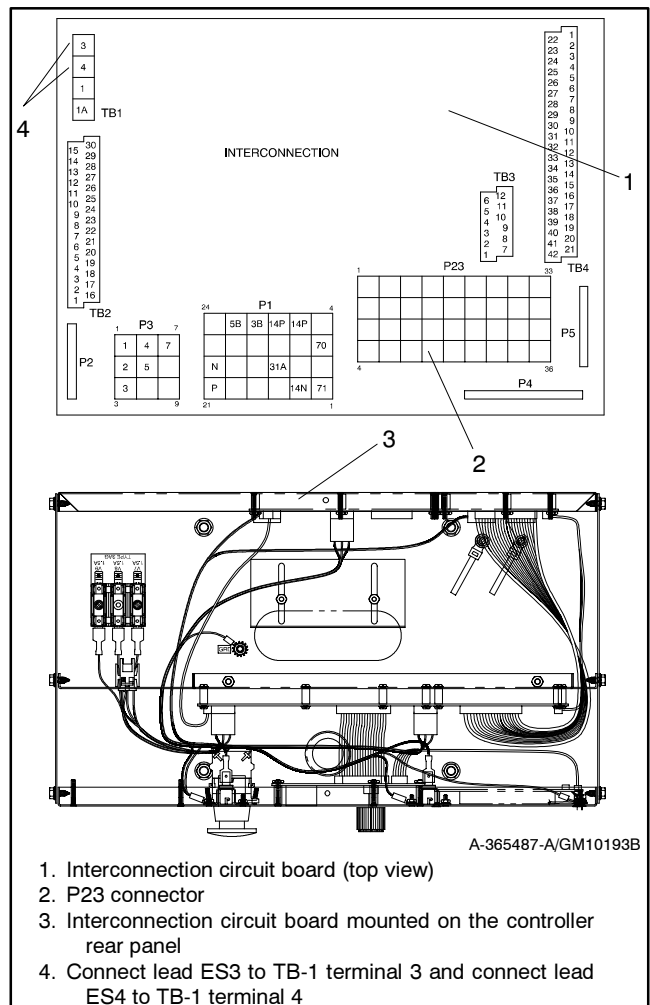
**Figure 3** Terminal Block Bracket and Controller Connection Assembly Mounting (350/400 kW)

1. Terminal block bracket screws (X-125-3) and nuts (X-6210-7)
2. Terminal block bracket (347292)
3. Controller connection assembly (GM13984)
4. Detail A, mounting hole dimensions (top view)

- 2.2.6 Place the terminal block bracket (347292) on the underside of the junction box top panel with the bracket mounting holes visible from the rear of the junction box and mount using two screws (X-125-3) and nuts (X-6210-7). See Figure 3.
- 2.2.7 Reposition the controller over the junction box holes and install the four screws.
- 2.2.8 Attach the controller connection assembly (GM13984) to the terminal block bracket using six screws (X-51-3), spacers (X-712-9), and nuts (X-70-12). Place the spacers between the controller connection assembly and the mounting bracket.
- 2.2.9 Plug the wiring connection harness (GM17029) into the controller connection assembly's P25 connector.
- 2.2.10 Proceed to step 2.3.

2.3 Remove the controller cover and hardware.

- 2.4 Route the other end of the wiring connection harness (GM17029 or GM17033) through the junction box port to the controller interconnection circuit board.
- 2.5 Plug the wiring harness connector into the interconnection circuit board's P23 connector. Connect lead ES3 to TB-1 terminal 3 and connect lead ES4 to TB-1 terminal 4. See Figure 4. If access to the interconnection circuit board is difficult, remove the two rear controller panel top screws and loosen the bottom screws to swing the rear controller panel down.
- 2.6 Swing the rear controller panel up and replace the screws, if previously removed. Replace the controller cover and hardware. Tighten all controller screws.



**Figure 4** Attaching Wiring Connection Harness to Controller Circuit Board

1. Interconnection circuit board (top view)
2. P23 connector
3. Interconnection circuit board mounted on the controller rear panel
4. Connect lead ES3 to TB-1 terminal 3 and connect lead ES4 to TB-1 terminal 4

**3. Connect the controller connection kit to the customer-supplied device.**

- 3.1 Supply lengths of stranded long enough to connect the customer-supplied device to the controller connection kit. Use color-coded for easy identification. Make leads long enough to allow for walls, ductwork, and other obstructions. Use separate conduit for the customer-supplied device wiring.
- 3.2 Connect the leads to the customer-supplied device per the installations and/or schematic supplied with the device.
- 3.3 Route the leads to the controller connection assembly in the generator set junction box. Cut leads to length, strip lead ends, crimp on spade terminals (not supplied), and connect the leads to the screw terminals shown in Figure 5 and Figure 6. Keep the customer-supplied device wiring away from the generator set output leads.
- 3.4 Replace the junction box panel and hardware.

**4. Restore the generator set to service.**

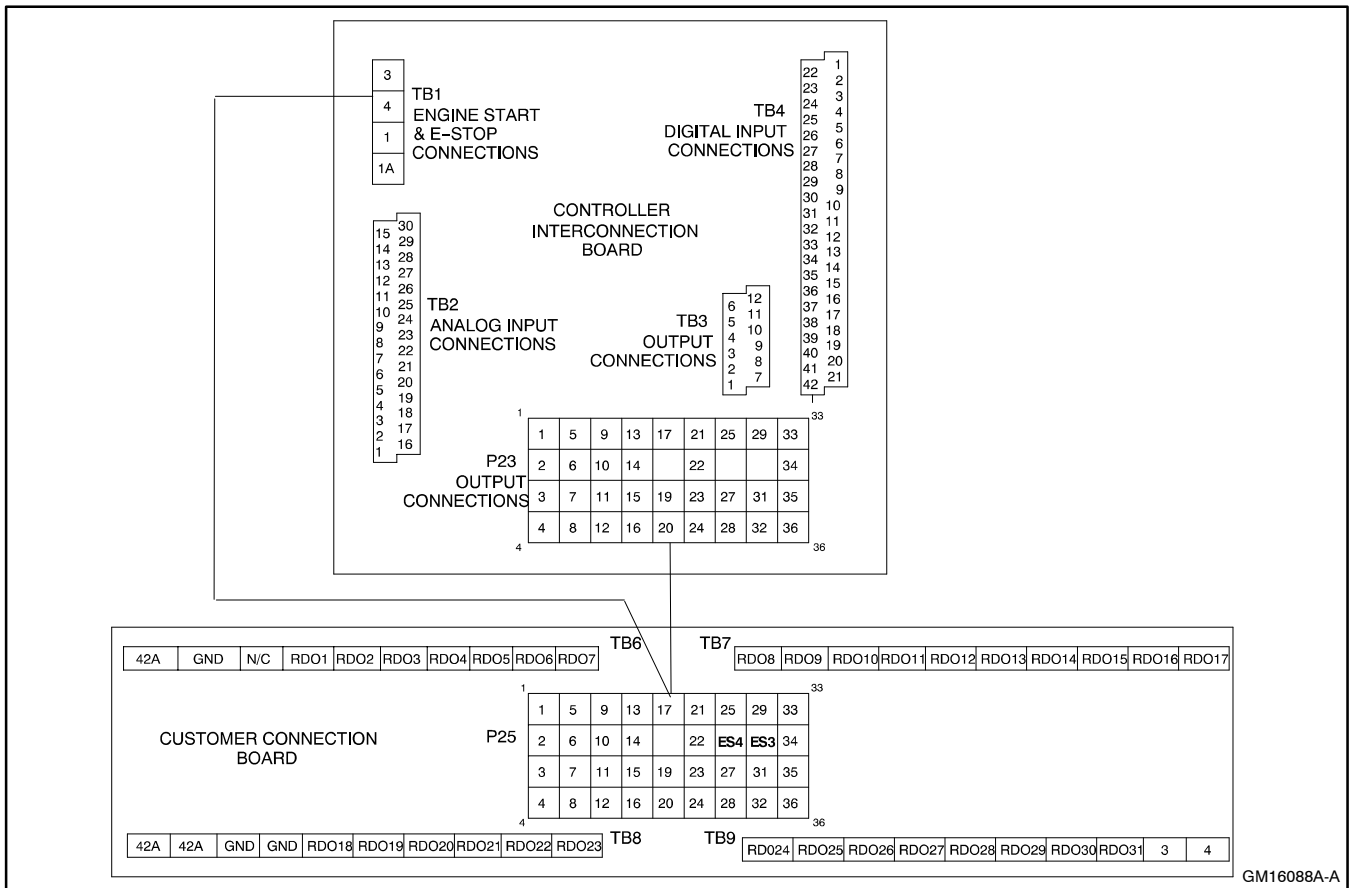
- 4.1 Check that the generator set master switch is in the OFF position.
- 4.2 Reconnect the generator set engine starting battery, negative (-) lead last.
- 4.3 Reconnect power to the battery charger, if equipped.
- 4.4 Move the generator master switch to AUTO for startup by remote transfer switch or remote start/stop switch.

**Parts List**

**Controller Connection Kits**

<b>Kit: GM17032-KP1 (20-300 kW)</b>		
<b>Qty.</b>	<b>Description</b>	<b>Part Number</b>
1	Connection assembly, controller	GM13984
1	Harness, controller connection wiring	GM17033
6	Screw, mounting	X-51-3
6	Spacer, 0.25 in. OD x 0.5 in.	X-712-9
6	Nut, 8-32 whiz	X-6210-4

<b>Kit: GM17028-KP1 (350/400 kW)</b>		
<b>Qty.</b>	<b>Description</b>	<b>Part Number</b>
1	Bracket, terminal block	347292
1	Harness, controller connection wiring	GM17029
1	Connection assembly, controller	GM13984
6	Screw, mounting	X-51-3
6	Nut, 8-32 hex	X-70-12
6	Spacer, 0.25 in. OD x 0.5 in.	X-712-9



GM16088A-A

**Figure 5** Controller Connection Kit

<b>TB6 Terminal Strip—RDOs 1-7</b>		<b>TB9 Terminal Strip—RDOs 24-31</b>	
Term.	Description	Term.	Description
42A	Battery (+)	RDO24	Speed sensor fault
GND	Battery (-)	RDO25	Loss of AC sensing
N/C		RDO26	ECM loss of communication
RDO1	Overspeed (39)	RDO27	Undervoltage
RDO2	Overcrank (12)	RDO28	Overfrequency
RDO3	High coolant temperature shutdown (36)	RDO29	Underfrequency
RDO4	Low oil pressure shutdown (38)	RDO30	Load shed kW overload
RDO5	Low coolant temperature (35)	RDO31	Load shed underfrequency
RDO6	High coolant temperature warning (40)	3	Remote start
RDO7	Low oil pressure warning (41)	4	Remote start
<b>TB7 Terminal Strip—RDOs 8-17</b>		<b>NOTE:</b> RDO-1 though RDO-31 are customer definable with the following factory defaults: emergency stop, high coolant temperature, low oil pressure, overcrank, and overspeed	
Term.	Description	<b>*NFWA-110 common alarm faults include:</b>	
RDO8	Low fuel (63)	Air damper indicator	
RDO9	Master switch not in auto (80)	Battery charger fault	
RDO10	NFWA 110 common alarm (32)*	EPS supplying load	
RDO11	Battery charger fault (61)	High battery voltage	
RDO12	Low battery voltage (62)	High coolant temperature warning	
RDO13	High battery voltage	High coolant temperature shutdown	
RDO14	Emergency stop (48)	Low battery voltage	
RDO15	Generator running (70R)	Low coolant level	
RDO16	Time delay engine cooldown (TDEC) (70C)	Low coolant temperature warning	
RDO17	System ready (60)	Low fuel (level or pressure)	
<b>TB8 Terminal Strip—RDOs 18-23</b>		Low oil pressure warning	
Term.	Description	Low oil pressure shutdown	
42A	Battery (+)	Master switch not in auto	
42A	Battery (+)	Overcrank	
2	Battery (-)	Overspeed	
2	Battery (-)		
RDO18	Defined common fault (32A)		
RDO19	Low coolant level		
RDO20	Overvoltage (26)		
RDO21	Idle mode		
RDO22	EPS supplying load		
RDO23	Air damper indicator (56)		

**Figure 6** Controller Connection Kit Terminal Strip Identification with Relay Driver Outputs (RDOs)