
INSTALLATION INSTRUCTIONS

Original Issue Date: 2/04

Model: 400-2000 kW

Market: Industrial Generator Sets with 16-Light Microprocessor Controller

Subject: Ten-Relay Dry Contact Kits GM28618-KP7/-KP7S

Introduction

The ten-relay dry contact kit provides normally open and normally closed contacts in a form C configuration to activate warning devices and other user-provided accessories allowing remote monitoring of the generator set. Connect up to ten controller fault outputs to the ten-relay dry contact kit. Typically, lamps, audible alarms, or other devices signal the fault conditions. See Figure 1 for an illustration of the ten-relay dry contact kit.

Note: A maximum of three inputs may be connected to a single relay driver output. Inputs include dry contacts, remote annunciator, common failure alarm, A/V alarm, and shunt trip line circuit breaker.

Check the electrical requirements of the user-provided accessories prior to installation of the dry contact kit. User-provided accessories require their own electrical source and must not exceed the relay contact ratings that follow.

Do not use terminals 42A or N on the controller connection kit terminal strip TB8 to supply voltage to user-provided accessories. User-provided DC accessories require separate leads connected directly to the battery for the voltage supply. Attach user-supplied 12/24-volt DC accessories to the battery positive (+) connection at the starter solenoid and to the battery negative (-) connection at the engine ground. The 120 VAC accessories require a user-supplied voltage source.

Relay Contact Rating

Maximum Switching 10 amps @ 120 volts AC
10 amps @ 28 volts DC

Minimum Switching . . . 10 milliamps @ 120 volts AC
10 milliamps @ 28 volts DC

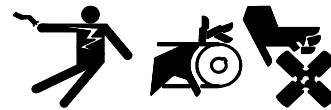
Read the entire installation procedure and compare the kit parts with the parts list in this publication before beginning installation. Perform the steps in the order shown.

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

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 Remove the junction box upper rear panel and hardware. See Figure 1.
- 2.2 Remove the inner panel access door screws and swing open the access door.
- 2.3 Attach controller connection assembly (GM28631-1) to junction box bracket using two screws (X-49-6) and whiz nuts (X-6210-3). The controller connection assembly includes terminal strip (328913), strip marker (328914), and wiring harness (GM10177). See Figure 1 for mounting location.
- 2.4 Remove the controller cover and hardware.
- 2.5 Route the other end of the wiring connection harness through the junction box port to the controller main circuit board.

- 2.6 Connect the leads from the controller connection assembly to terminal strip TB1 on the controller main circuit board. See Figure 2. If access to interconnection circuit board is difficult, remove two controller panel top screws and center bottom screw and then loosen bottom screws to swing rear controller panel down.
- 2.7 Swing the rear controller panel up and replace the screws, if previously removed. Replace the controller cover and hardware. Tighten all controller screws.

3. Mount the ten-relay dry contact assembly.

- 3.1 Mount the ten-relay dry contact circuit board (D-294303) on the junction box bracket studs using six spacers (X-712-9) and nuts (X-70-12). Place the spacers between the ten-relay dry contact circuit board and the mounting bracket. See Figure 1 for the mounting location.

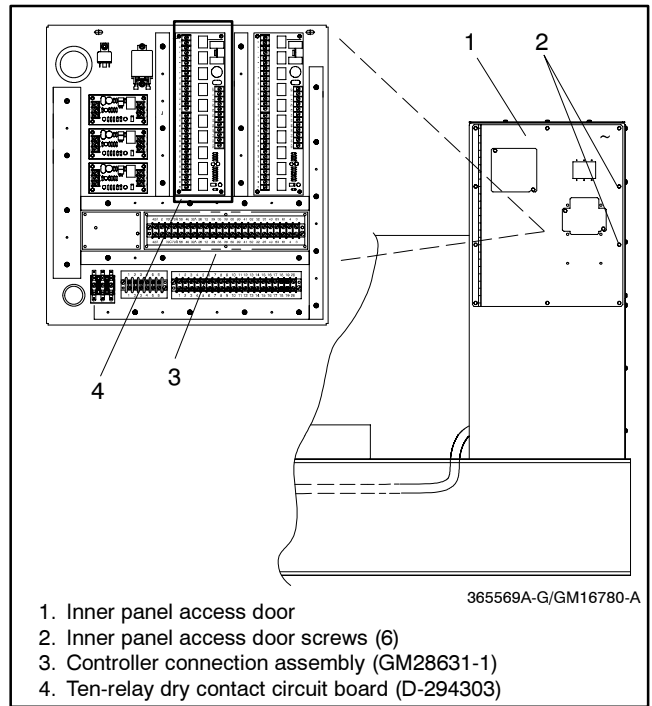


Figure 1 Junction Box Terminal Block Bracket Mounting

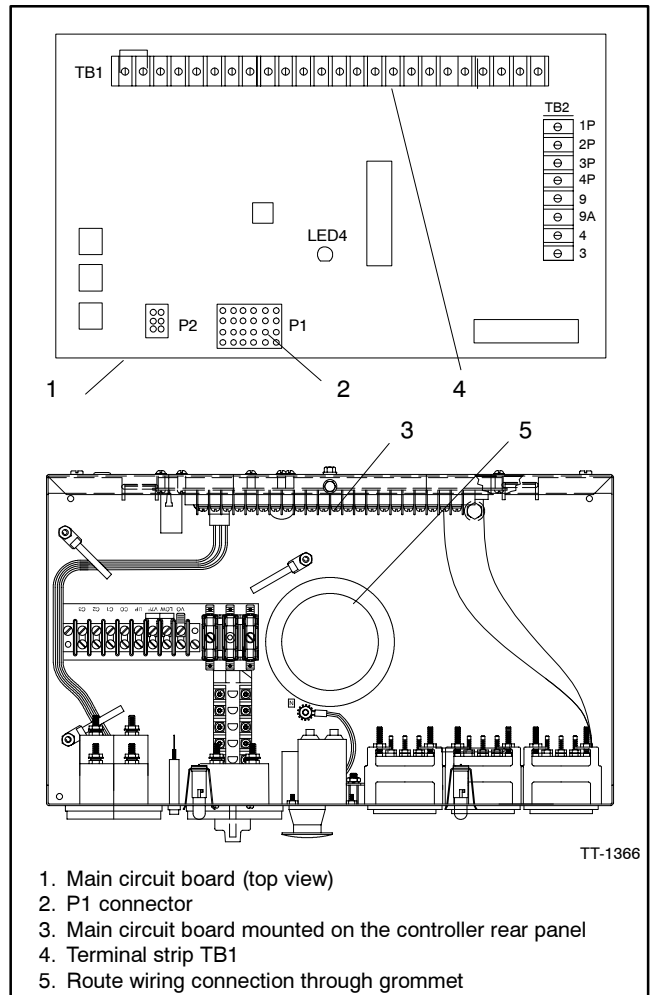


Figure 2 Controller Circuit Board Connections

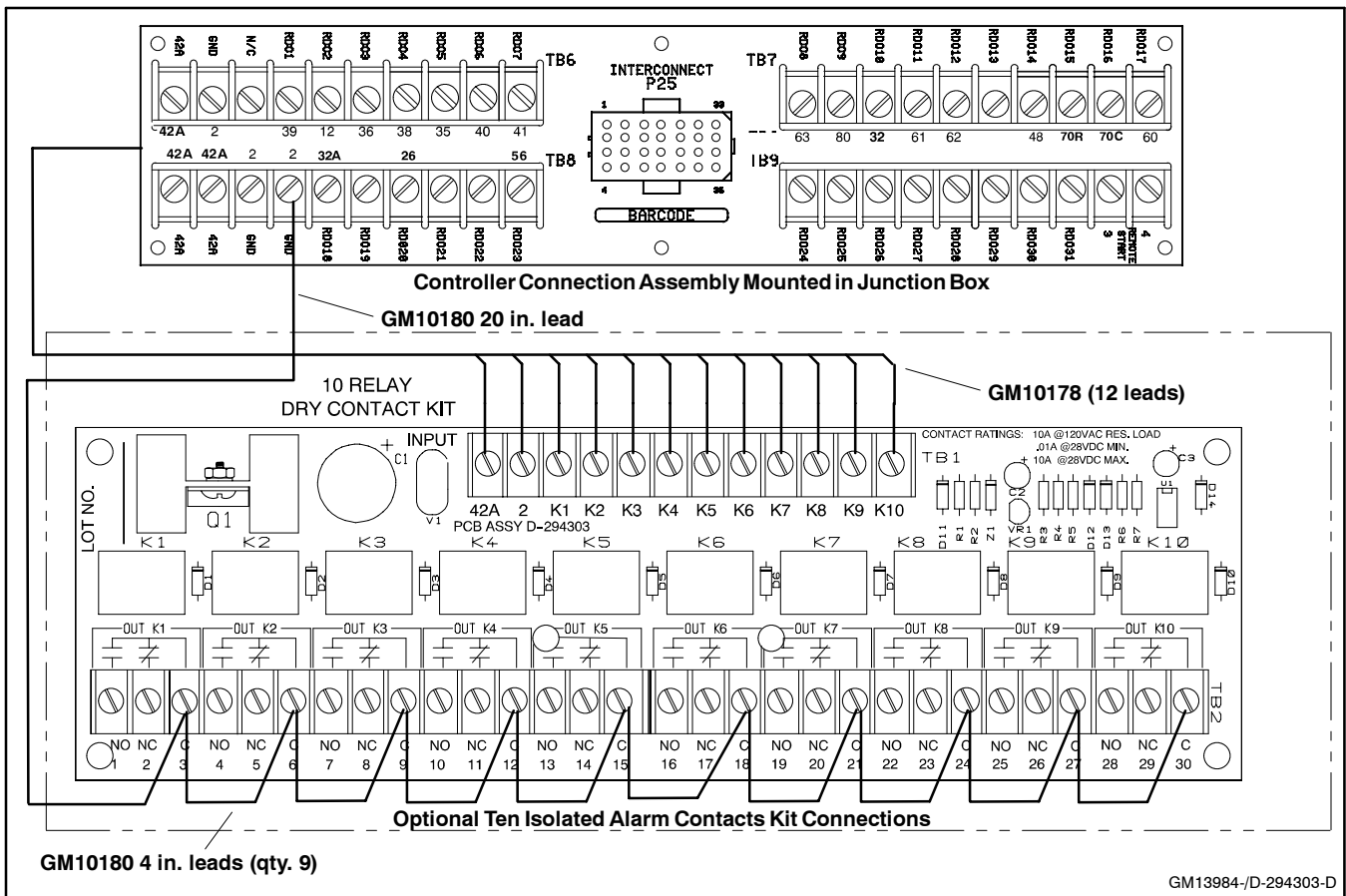


Figure 3 Wiring Harness GM10180 Connections for DC Power Supply

4. Connect the ten-relay dry contact kit to the controller connection kit.

Use the appropriate accessory wiring diagram found in the Wiring Diagram Manual supplied with the generator set to select the fault connection.

When a generator fault condition occurs, the contact kit relay energizes. Select either normally open or normally closed contacts from the relay depending upon application requirements. The relay contact closure corresponds to the controller light being activated.

Connect the 12-lead dry contact relay wiring harness (GM10178) from the controller connection assembly to the ten-relay dry contact kit relay input terminals. See Figure 3 for connection information. Terminals 2 (ground) and 42A (battery voltage) provide an electrical source to operate the K1-K10 relays.

5. Connect the dry contact kit relays to the user-supplied device(s).

Select the normally open (NO) and/or normally closed (NC) form C dry contact, depending upon the application. Use a two-wire harness for either NO or NC connections. Use a three-wire harness for both NO and NC connections.

- 5.1 The user must supply stranded wire long enough to connect the user-supplied device to the dry contact relay terminals and power supply. Use color-coded wire for easy identification. Make leads long enough to allow for walls, ductwork, and other obstructions. Use separate conduit for the dry contact kit wiring.

5.2 **12/24-Volt DC Devices.** Attach the user-supplied 12/24-volt DC accessories to the starting battery positive (+) connection at the starter solenoid and to the battery negative (-) connection at the engine ground. Otherwise, use a separate 12/24-volt DC supply. Do not use terminals 42A and 2 on the controller connection kit terminal strip to supply the voltage to the relay contacts. Supply separate leads directly to the battery for the supply voltage. The circuit must include fuse or circuit breaker protection.

Install the 10-lead dry contact wiring harness (GM10180) to electrically connect the relay common (C) terminals together when using a DC power supply. See Figure 3. Remove the 10-lead dry contact wiring harness (GM10180) when applying an AC power supply.

5.3 **120-Volt AC Devices.** Connect the user-supplied accessories to a separate 120-volt AC power supply. The circuit must include fuse or circuit breaker protection.

5.4 Connect the user-supplied device per the installations and/or schematic supplied with the device to a power source and to the dry contact relay terminals. Cut the user-supplied leads to the desired length, strip lead ends, crimp on spade terminals (not supplied), and connect the leads to the relay contact screw terminals. Keep the dry contact wiring away from the generator set output leads.

5.5 Repeat step 5 for the remaining dry contact relays.

5.6 Swing the access door closed and install the screws.

5.7 Replace the junction box panel and hardware.

6. Restore the generator set to service.

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

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

6.3 Reconnect power to the battery charger, if equipped.

6.4 Move the generator set master switch to AUTO for startup by remote transfer switch or remote start/stop switch.

Parts List

Ten-Relay Dry Contact Kit

Kits: GM28618-KP7/-KP7S		
Qty.	Description	Part Number
1	Dry contact, ten-relay	D-294303
1	Harness, dry contact (12 lead)	GM10178
1	Harness, dry contact relay wiring (10 lead)	GM10180
4	Nut, 8-32 hex	X-70-12
4	Spacer, 0.25 in OD x 0.5 in.	X-712-9
1	Connection device and hardware includes:	GM28631-1
2	Screw, 6-32 x 3/4	X-49-6
2	Nut, 6-32 whiz	X-6210-3
1	Harness, controller connection wiring (23 lead)	GM10177
1	Strip, terminal	328913
1	Marker, strip	328914

Test the Dry Contact Relay

Verify that the dry contact relay functions by using the following procedure when troubleshooting.

Test Procedure

1. De-energize the power supply to the user-supplied device.
2. Remove the user-supplied device and power supply wiring from the dry contact relay terminals.
3. Test the relay operation by connecting an ohmmeter across the NO and C terminals on the relay terminal strip.
4. Use a jumper wire to ground the selected fault terminal on the controller connection terminal strip. The relay contacts should close and the ohmmeter should display a low resistance reading (continuity).
5. Install the user-supplied device and power supply wiring on the dry contact relay terminals.
6. Energize the power supply to the user-supplied device.