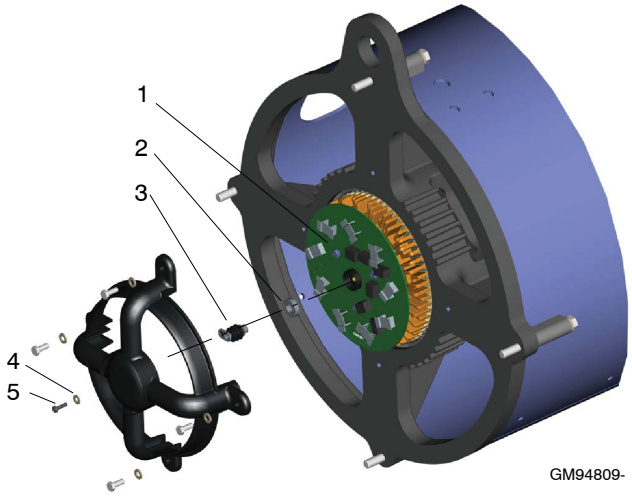
INSTALLATION INSTRUCTIONS

Original Issue Date: **12/16**
Model: **20–200 kW with Fast-Response® X Alternator**
Market: **Industrial, Residential/Commercial, and Marine**
Subject: **FRX LED Optic Board Dust Seal Kit GM101820-KP1-QS**

Introduction

Kohler Co. has released a new option for the FRX series alternator. The GM101820-KP1-QS dust seal kit is designed to reduce maintenance of the LED/photo transistor boards when generator sets are used in dusty conditions. The kit provides a flexible tube to seal the space between the LED board and photo transistor board reducing the formation of dirt and/or dust on the optical devices thereby increasing maintenance intervals. See Figure 1.

Refer to the Fast-Response® X Service Manual TP-6783 as needed for additional disassembly information.



1. FRX activator board
2. Ball bearing
3. Diode cover
4. Washer, plain
5. Screw, pan head

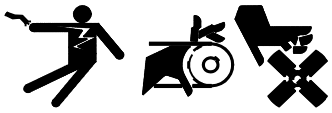
Figure 1 FRX Diode Circuit Board Dust Seal Kit

Special Tools Needed

- Drill, 1/4 in. chuck
- 11/64 in. drill bit
- Torque wrench capable of 1.3–6.2 Nm (12 in. lbs. to 4.6 ft. lbs.)
- Torque wrench capable of 194 Nm (143 ft. lbs.)

Safety Precautions

⚠ 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 equipment connected to the set, 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.

(Decision-Maker® 3+ and 550 Controllers)

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows: (1) Press the generator set off/reset button to shut down the generator set. (2) Disconnect the power to the battery charger, if equipped. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

(Decision-Maker® 3000, 3500, and 6000 Controllers)

Installation Procedure

Note: Read all safety precautions at the beginning of this publication before performing any work on the generator set.

1. Remove the generator set from service.

1.1 Press the generator set master control OFF/RESET button or move the generator set master switch to 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. Access the alternator end of the generator set.

2.1 Open the enclosure panels as needed.

2.2 Remove the junction box rear cover.

2.3 Remove the alternator (rodent) guard, if used.

3. Remove the existing components.

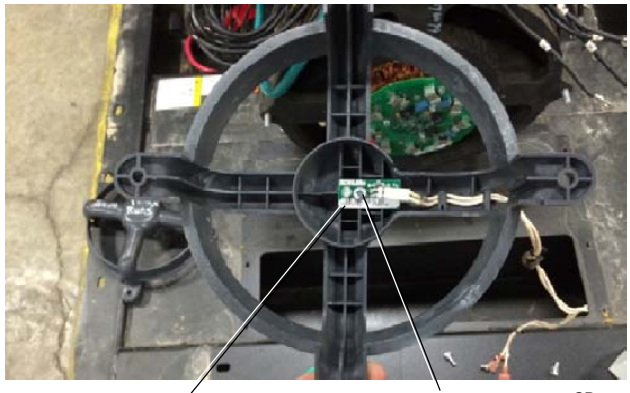
3.1 Remove the 4 screws and the LED optic board holder. See Figure 2.

3.2 Remove the screw and LED optic board from the LED optic board holder. See Figure 3.

3.3 Place the LED optic board holder in a vise or on a stable surface and drill an 11/64 in. hole through the mounting boss shown in Figure 4 and Figure 5.

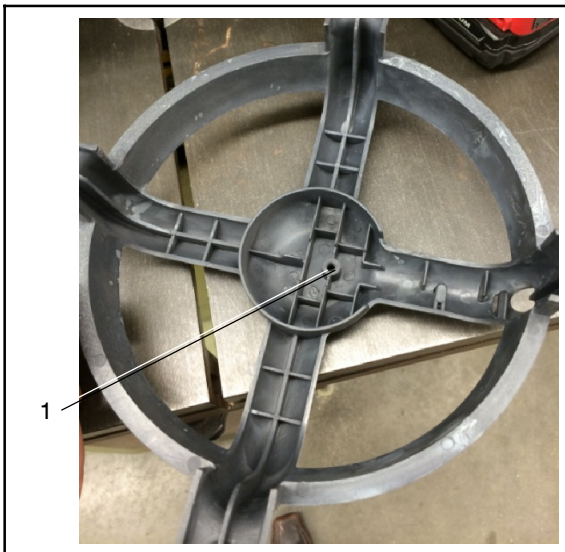
1. LED optic board holder
2. Screws (qty. 4)

Figure 2 Removing LED Optic Board Holder



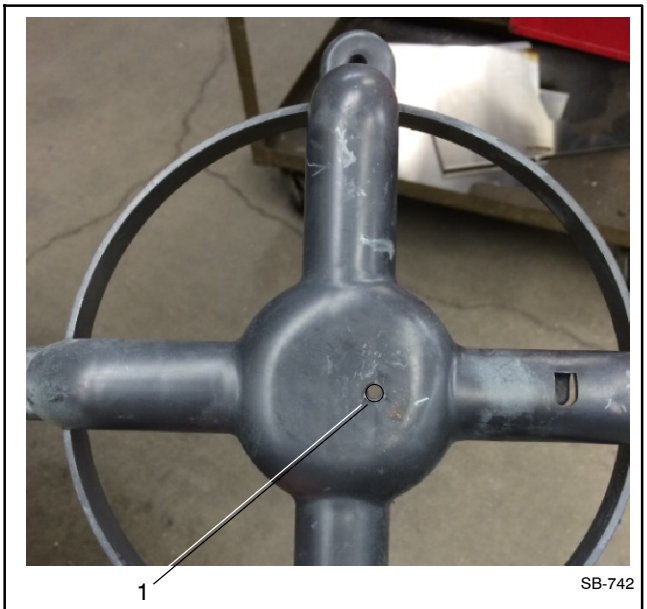
1. LED optic board
2. Screw

Figure 3 LED Optic Board and Holder



1. Mounting boss (drill through using 11/64 in. drill bit)

Figure 4 Drill Hole Through Mounting Boss

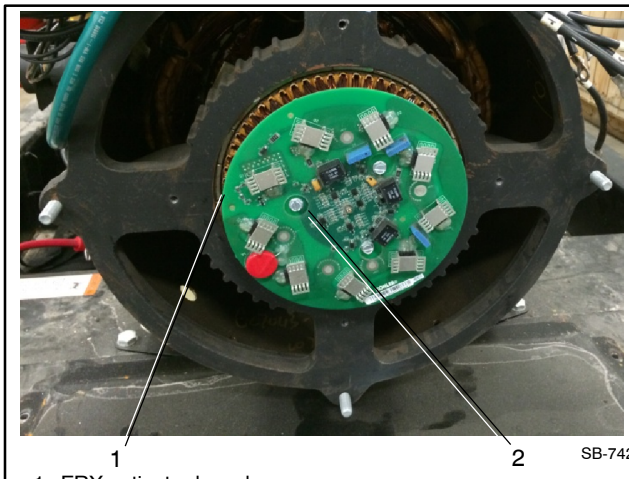


1. Hole in FRX activator board holder (highlighted for clarity)

Figure 5 Hole in FRX Activator Board Holder

3.4 **For Units Before Alternator Serial Number 96779:** Remove the 3 screws and the existing FRX activator board from the exciter armature. See Figure 6. The existing FRX activator board and 3 screws will not be reused.

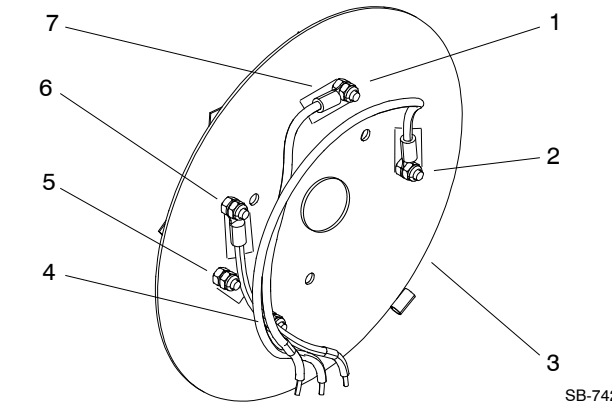
For Units After Alternator Serial Number 96779: Remove the 5 nuts, the thread-forming screw, and the FRX activator board from the exciter armature. The existing FRX activator board, 5 nuts, and thread-forming screw will not be reused. Proceed to Step 4.5.



1. FRX activator board
2. Screws (qty. 3)

Figure 6 Removing the FRX Activator Board

3.5 **For Units Before Alternator Serial Number 96779:** Access the back of the FRX activator board and disconnect the exciter armature leads (AC1, AC2, and AC3) and rotor assembly leads (F1 and F2) by removing the 5 elastic stop nuts. Note the lead terminals and their positioning on the FRX activator board silkscreen. See Figure 7 and Figure 8.

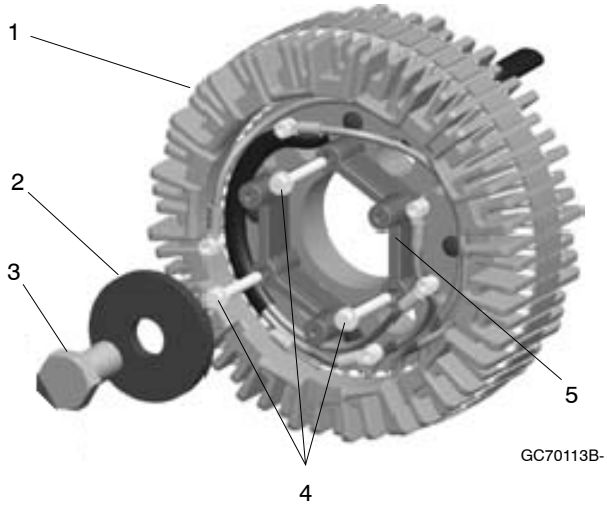


1. Exciter armature lead AC2
2. Exciter armature lead AC1
3. FRX activator board
4. Rotor assembly lead FP
5. Rotor assembly lead FN
6. Exciter armature lead AC3
7. Silkscreen positioning box

Figure 7 FRX Activator Board

Figure 8 Removing Leads from the FRX Activator Board

3.6 **For Units Before Alternator Serial Number 96779:** Remove the spacer by removing the 3 screws. See Figure 9. The existing spacer and 3 screws will not be reused. Remove the bow washer and bolt only when changing the armature.



NOTE: Remove items 2 and 3 only when changing the armature.

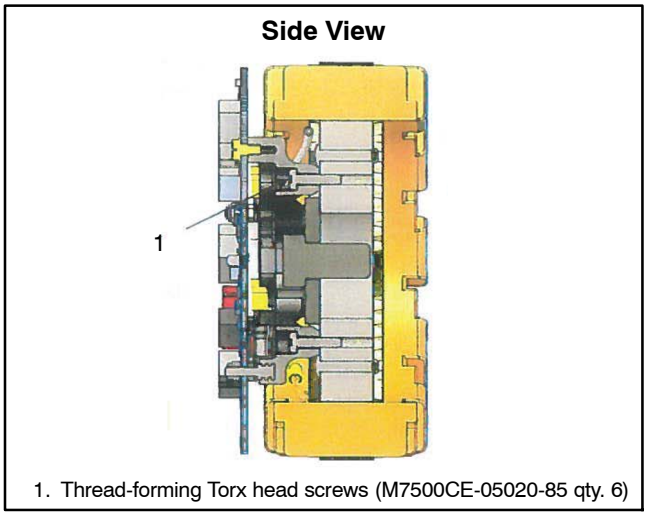
1. Exciter armature
2. Bow washer (position washer with convex side outward)
3. Bolt
4. Three screws
5. Spacer

Figure 9 Spacer Removal

4. Install the kit components.

4.1 **For Units Before Alternator Serial Number 96779:** Mount the new spacer (GM98936) to the exciter armature using 6 thread-forming Torx head screws (M7500CE-05020-85). See Figure 10 and Figure 13.

Note: Orient the non-electrical connection mounting hole to the mounting hole above the keyway. See Figure 12.



1. Thread-forming Torx head screws (M7500CE-05020-85 qty. 6)

Figure 10 Spacer (GM98936) Installation

4.2 **For Units Before Alternator Serial Number 96779:** Route the exciter armature and rotor leads (AC1, AC2, AC3, F1, and F2) around the outer diameter of the spacer to the inside to eliminate slack. See Figure 11 and Figure 12.

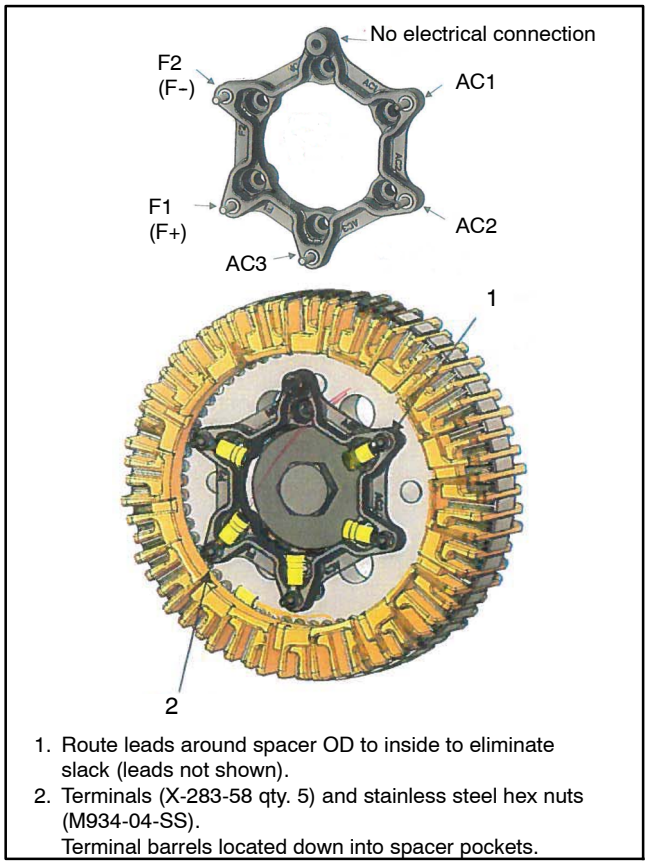
Note: Lead connection locations are identified on the spacer and in Figure 12.

Note: Secure excess lead length before attaching terminals.

4.3 **For Units Before Alternator Serial Number 96779:** Use 5 terminals (X-283-58) and **5 stainless steel hex nuts (M934-04-SS)** to connect leads AC1, AC2, AC3, F1, and F2 to the spacer studs. Torque to 1.3 Nm (12 in. lbs.). Locate the terminal barrels down inside the spacer pockets. See Figure 12 and Figure 13.

4.4 **For Units Before Alternator Serial Number 96779:** If the armature was changed, secure the new exciter armature by reusing the existing bolt and bow washer. See Figure 9. Torque to 194 Nm (143 ft. lbs.).

Figure 11 Routing of Leads

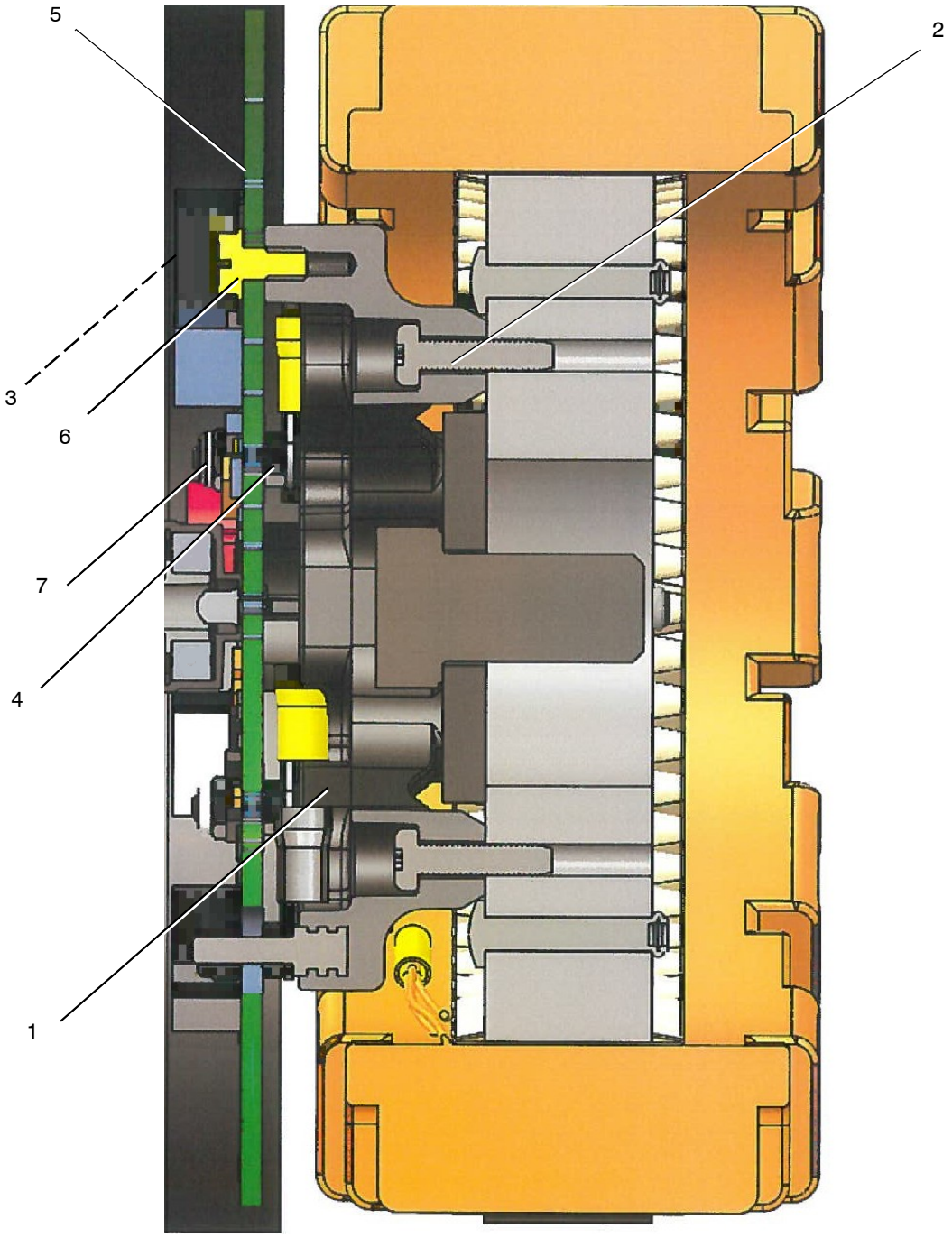


1. Route leads around spacer OD to inside to eliminate slack (leads not shown).
2. Terminals (X-283-58 qty. 5) and stainless steel hex nuts (M934-04-SS).
   Terminal barrels located down into spacer pockets.

Figure 12 Spacer (GM98936) Connections

4.5 Secure the activator board (GM98939-2) to the studs on the spacer by using 5 stainless steel elastic stop hex nuts (M985-04-SS) and a thread-forming screw (X-6071-8). Torque to 1.3 Nm (12 in. lbs.). See Figure 13 and Figure 14.

Side View

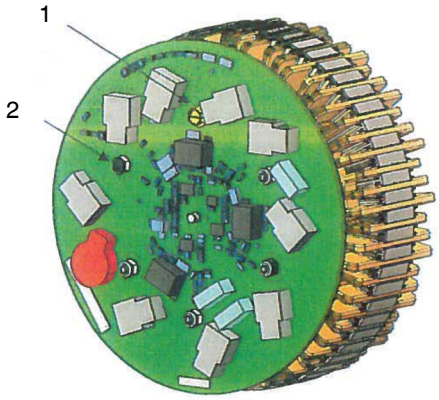


GC79429-43

Listed in order of assembly:

1. Spacer (GM98936)
2. Thread-forming Torx head screw (M7500CE-05020-85 qty. 6)
3. Terminal (X-283-58 qty. 5), not shown
4. Stainless steel hex nut (M934-04-SS qty. 5)
5. Activator board (GM98939-1)
6. Thread-forming screw (X-6071-8)
7. Stainless steel nylock nut (M985-04-SS qty. 5)

Figure 13 Components Shown in Order of Assembly



1. Thread-forming screw (X-6071-8)
2. Stainless steel nuts (M985-04-SS qty. 5)

Figure 14 Activator Board

4.6 Install the ball bearing (X-758-19) to the center retainer cup of the FRX activator board and secure using the spiral retaining spring (GM98940). See Figure 15.

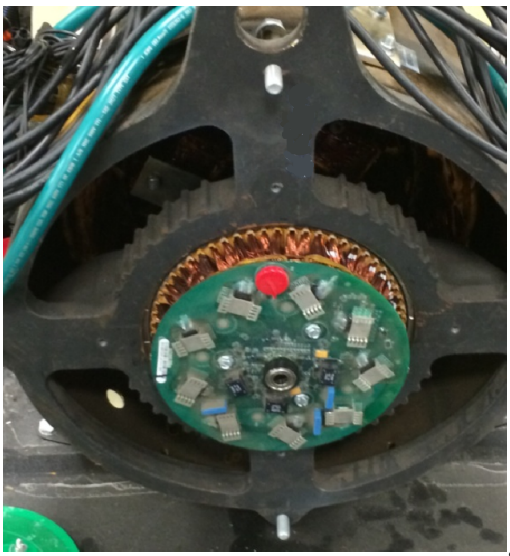


Figure 15 Mounting FRX Activator Board

4.7 Install FRX diode cover GC94111 in the inner race of the ball bearing. See Figure 16.

4.8 Reconnect the two-lead P6 connector at the LED optic board (if previously disconnected).

4.9 Mount the LED optic board to the LED optic board holder using one screw.

4.10 Attach the LED optic board holder to the end bracket using four screws. Do not tighten at this time.

4.11 Rotate the threaded tang of the FRX diode cover as necessary to align the threaded hole with the drilled hole in the FRX activator board bracket. Install the pan head screw M7985A-04020-20 and plain washer X-25-48 and torque to 1.3 Nm (12 in. lb.). See Figure 16 and Figure 17.

4.12 Final tighten the 4 screws attaching the LED optic board holder to the end bracket and torque to 6.2 Nm (4.6 ft. lb.).

4.13 Install the alternator (rodent) guard to the end bracket (if equipped).

4.14 Replace the junction box panels.

5. Restore the generator set to service.

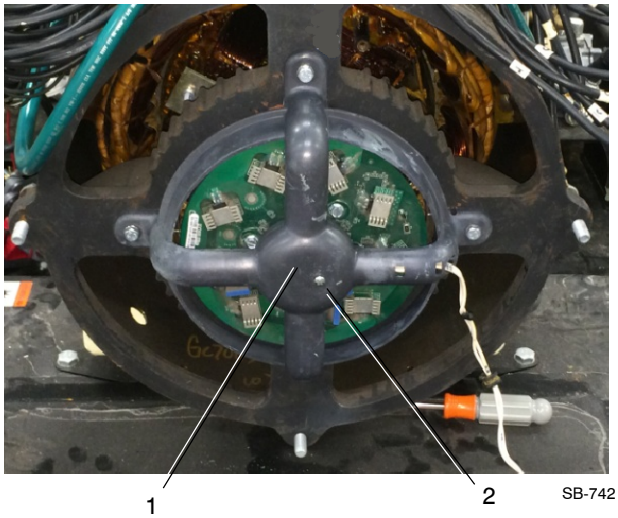
5.1 Check that the generator set OFF.

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

5.3 Reconnect power to the battery charger, if equipped.

1. FRX diode cover
2. Threaded tang

Figure 16 Installing the FRX Diode Cover



1. FRX activator board holder
2. Screw and washer attached to the FRX diode cover threaded tang

Figure 17 Installing the FRX Activator Board Holder

Parts List

FRX LED Optic Board Dust Seal Kit GM101820-KP1-QS

Kit: GM101820-KP1-QS		
Qty.	**Description**	**Part Number**
1	PCB activator board	GM98939-2
1	FRX diode cover	GC94111
1	Ball bearing	X-758-19
1	Screw, pan head	M7985A-04020-20
1	Washer, plain	X-25-48
1	Spiral retaining ring	GM98940
1	Spacer	GM98936
6	Screw, thread forming Torx head	M7500CE-05020-85
5	Terminal	X-283-58
5	Hex nuts, stainless steel	M934-04-SS
5	Nylock nuts, stainless steel	M985-04-SS
1	Screw, thread forming	X-6071-8

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
KOHLERPower.com

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

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