INSTALLATION INSTRUCTIONS

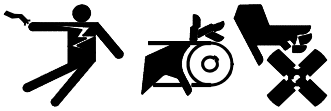
Original Issue Date: **9/90**
Model: **2.25–24 kW**
Market: **Commercial/Residential, Marine, Mobile, and Portable**
Subject: **Voltage Regulator Kits 228602, 228603, 228604, and 228605**

Kohler generator sets use several different types of voltage regulators. Use one of the following instructions to connect the voltage regulator. To determine which instruction to use, identify the part number of the voltage regulator and use Figure 1 below. The X, listed under the voltage regulator part number, signifies any prefix letter.

Voltage Regulator Part Number	Voltage Regulator Kit Number	Voltage Regulator Type
X-278598	228605	PowerBoost™ IIIE
X-239753	228604	PowerBoost™ III
X-239311	228602	PowerBoost™ (120 volt)
X-239509	228603	PowerBoost™ (110 volt)

Figure 1. Voltage Regulator Types

⚠ WARNING



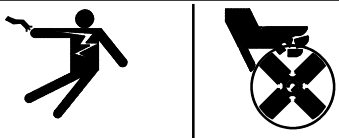
Accidental starting.
Can cause severe injury or death.

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.

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) Disconnect the power to the battery charger, if equipped. (2) 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.

⚠ 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.

Testing the voltage regulator. Hazardous voltage can cause severe injury or death. High voltage is present at the voltage regulator heat sink. To prevent electrical shock do not touch the voltage regulator heat sink when testing the voltage regulator. *(PowerBoost™, PowerBoost™ III, and PowerBoost™ V voltage regulator models only)*

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 wristwatch, rings, and jewelry before servicing the equipment.

PowerBoost™ IIIE Voltage Regulator Connection

The PowerBoost™ IIIE voltage regulator uses a 6-pin, inline connector. This configuration is the easiest to reconnect because there are no individual leads to connect. See Figure 2. After the connection is made, make final adjustments. See Voltage Regulator Adjustment following.

NOTE

Fine voltage adjustment. Connect an optional, customer-provided rheostat across regulator leads/terminals 33 and 66 to adjust the generator output voltage from a location remote from the generator set. The rheostat (10 kOhms, 1/2 watt minimum) provides a 5-volt adjustment range.

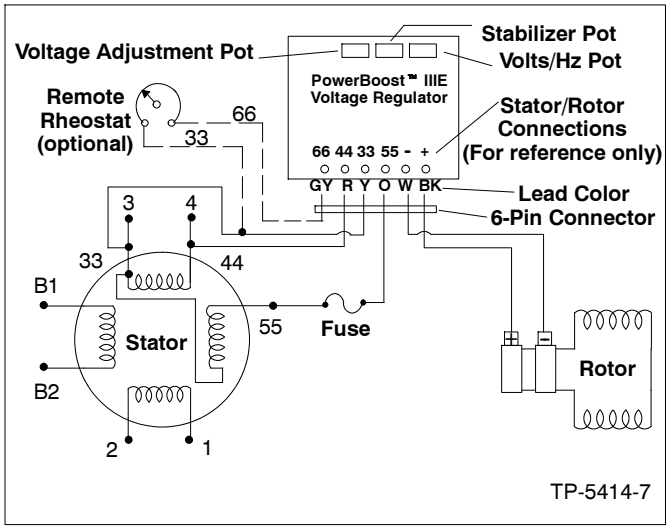


Figure 2. The PowerBoost™ IIIE Voltage Regulator

PowerBoost™ III Voltage Regulator Connection

The PowerBoost™ III voltage regulator requires connecting individual leads from the rotor and stator. See Figure 3. After the connection is made, make final adjustments. See Voltage Regulator Adjustment following.

NOTE

Fine voltage adjustment. Connect an optional, customer-provided rheostat across regulator leads/terminals 33 and 66 to adjust the generator output voltage from a location remote from the generator set. The rheostat (10 kOhms, 1/2 watt minimum) provides a 5-volt adjustment range.

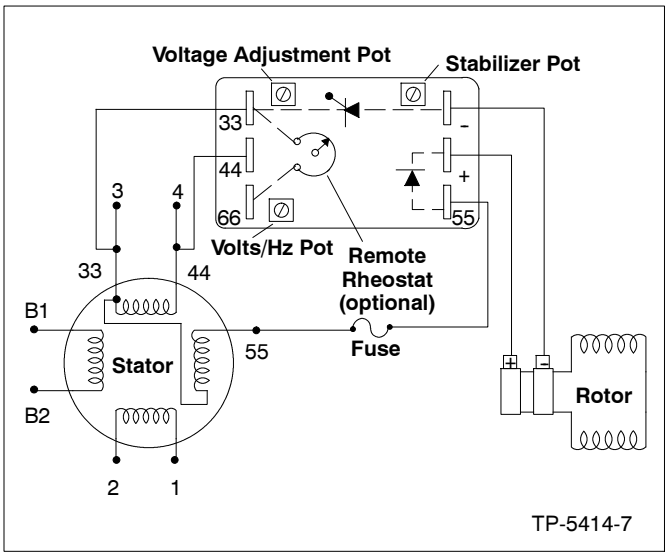


Figure 3. The PowerBoost™ III Voltage Regulator

Some early 7CKM RV units using the PowerBoost™ III voltage regulator may have a stator with a separate winding (55-66) where leads 66 and 33 are externally connected. See Figure 4 and the note following.

NOTE

Failure to connect stator leads 66 and 33 to the voltage regulator terminal 33 may result in generator damage.

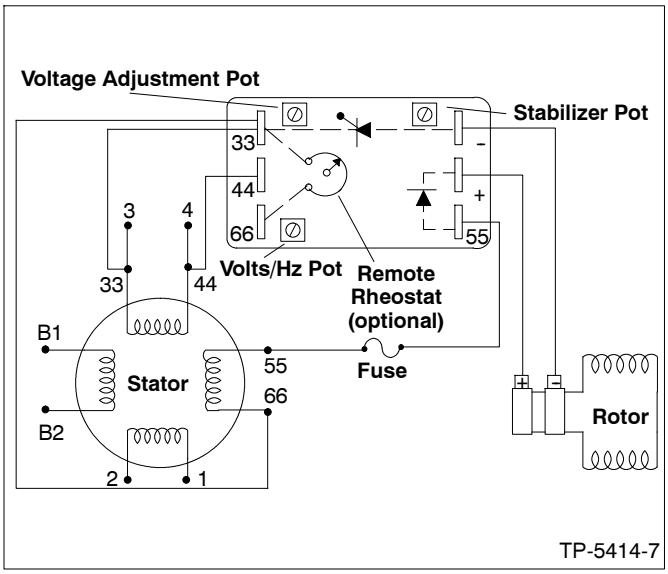


Figure 4. The PowerBoost™ III Voltage Regulator (early 7CKM RV models only)

PowerBoost™ 120-Volt and 110-Volt Voltage Regulator Connection

The PowerBoost™ 120-volt and 110-volt voltage regulators require connecting individual leads from the rotor and stator. The procedure for connection of the 120-volt and 110-volt voltage regulators is similar but the voltage regulators are not interchangeable. See Figure 5. After the connection is made, no adjustments are required.

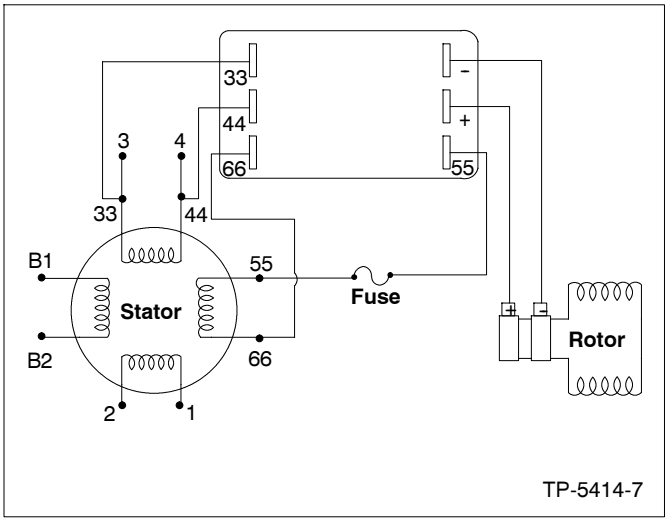


Figure 5. The PowerBoost™ 120-Volt and 110-Volt Voltage Regulator

Voltage Regulator Adjustment

The PowerBoost™ IIIE and PowerBoost™ III voltage regulators monitor the generator output to control the current flow to the generator field. The PowerBoost™ IIIE maintains the generator output at the specified voltage under load until the generator engine speed drops to a preset level of 56.3 Hz on 60 Hz models and 46.3 Hz on 50 Hz models. At this point the regulator allows the generator voltage and current to drop. The voltage/current drop enables the engine to pick up the load. When the generator speed returns to normal (60 Hz or 50 Hz) as load is accepted, the generator output also returns to normal.

The factory sets the voltage regulator for correct generator operation under a variety of load conditions. Usually, no further adjustment is necessary. However, if regulator adjustment is necessary to achieve 50 Hz voltage, or if the regulator has been replaced or tampered with, readjust according to the following procedure. The voltage regulator is located on the controller and is serviceable by removing the four controller cover screws. See the service manual for the specific location.

Voltage Adjustment Pot adjusts the generator output within the range of 100–130 volts.

NOTE

Connect a customer-provided rheostat across regulator leads/terminals 33 and 66 to adjust the generator output voltage from a location remote from the generator set. The rheostat (10K ohms, 1/2 watt minimum) provides a 5 volt adjustment range.

Stabilizer Pot fine-tunes regulator circuitry to reduce light flicker.

NOTE

The **volts**/**Hz** adjustment does not apply to the following models:

Model	Market
7/10CCO 7/10CCFO	Mobile
5/9CCOZ 4/8CCFOZ 5/8/9/10EOZ 4/6.5/8/9EFOZ	Marine

On these models, turn the volts/Hz adjustment pot full counterclockwise to stop and seal. No further volts/Hz adjustments are required.

Volts/**Hz Pot** adjustment determines the engine speed (Hz) at which the generator output voltage begins to drop.

⚠ WARNING

Hazardous voltage.
Backfeed to the utility system can cause property damage, severe injury, or death.

If the generator set is used for standby power, install an automatic transfer switch to prevent inadvertent interconnection of standby and normal sources of supply.

Testing the voltage regulator. Hazardous voltage can cause severe injury or death. High voltage is present at the voltage regulator heat sink. To prevent electrical shock do not touch the voltage regulator heat sink when testing the voltage regulator. *(PowerBoost™, PowerBoost™ III, and PowerBoost™ V voltage regulator models only)*

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 wristwatch, rings, and jewelry before servicing the equipment.

NOTE

For optimum results, apply full load when adjusting the voltage regulator.

1. With the generator set off, turn the remote rheostat, if equipped, to the midpoint. Turn the **voltage, volts**/**Hz**, and **stability pots** fully counterclockwise. Connect the voltmeter to the AC circuit or an electrical outlet.
2. Start the generator set. Rotate the **voltage adjustment pot** clockwise to increase the voltage or counterclockwise to decrease the voltage to achieve the desired output voltage.
3. Rotate the **stability pot** clockwise to obtain minimum light flicker.
4. Readjust the **voltage adjustment pot** if necessary.
5. Adjust the engine speed to 1690 RPM on 60 Hz units and 1390 RPM on 50 Hz units.
6. If applicable, rotate the **volts**/**Hz pot** clockwise until the voltage level begins to drop (as measured on the voltmeter. When set to these specifications, the generator will attempt to maintain normal output until the engine speed drops below the frequency set in step 5 as load is applied.
7. Readjust the engine speed to normal 1800 RPM on 60 Hz units and 1500 RPM on 50 Hz units.
8. Readjust the **voltage adjustment pot** if necessary.
9. Readjust the **stability pot** if necessary.
10. Use the remote rheostat, if equipped, to make final voltage adjustments.
11. Stop the generator set.