INSTALLATION INSTRUCTIONS

Original Issue Date: **2/11**
Model: **14/20RES and 14/20RESL Generator Sets**
Market: **Residential/Commercial**
Subject: **RDC and DC Controller Replacement Kits GM79884 and GM79885**

Introduction

These instructions explain how to replace and set up the controllers on the generator set models shown in Figure 1. The controllers are shown in Figure 2.

Generator Set Model	Controller	Kit Number
14RES	RDC	GM79884
20RES	RDC	GM79884
14RESL	DC	GM79885
20RESL	DC	GM79885

Figure 1 Generator Set Models and Controllers

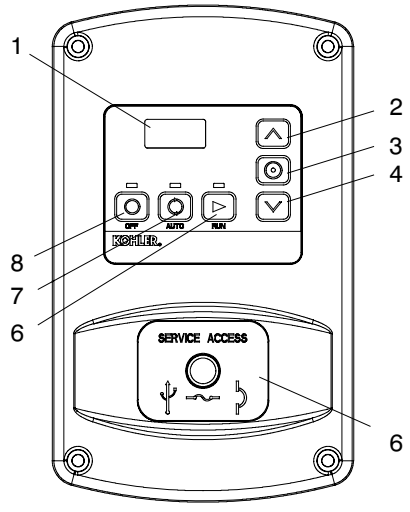
Read the entire installation procedure and compare the kit parts with the parts list on the last page of this document before beginning installation. Perform the steps in the order shown.

A Note about Controller Setup

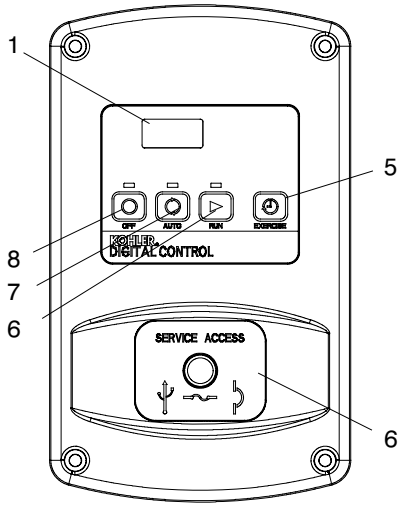
A new controller will display noEc, indicating that the controller parameters are not set. After replacing the controller, the installer must set the controller parameters. On the RDC controller, the installer can use the the controller keypad to set the Uu and Ec parameters, or use a personal computer running Kohler® SiteTech™ software. For the DC controller, use SiteTech software to configure the controller. Distributors can obtain SiteTech software from the TechTools site on Kohlernet.

If SiteTech™ is used and the old controller is functional, you may be able to save the current controller settings to a file before the controller is removed. (Or the controller settings may have been saved to a file during the installation process.) Then use SiteTech™ to load the settings onto the new controller after it is installed. See TP-6701, SiteTech™ Software Operation Manual, for instructions to export and import settings.

Note: Some generator set problems can be caused by incorrect controller settings. Verify that the settings are correct by comparing to Figure 6 or Figure 9.



Residential Digital Controller (RDC)



Digital Controller (DC)

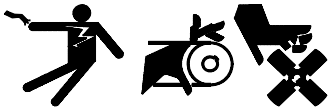
1. LED display
2. Up button (RDC only)
3. Select button (RDC only)
4. Down/Exercise button (RDC)
5. Exercise button (DC)
6. Service access (fuses and USB connection to PC)
7. RUN button and LED
8. AUTO button and LED
9. OFF button and LED

Figure 2 RDC and DC Controllers

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.

⚠ WARNING

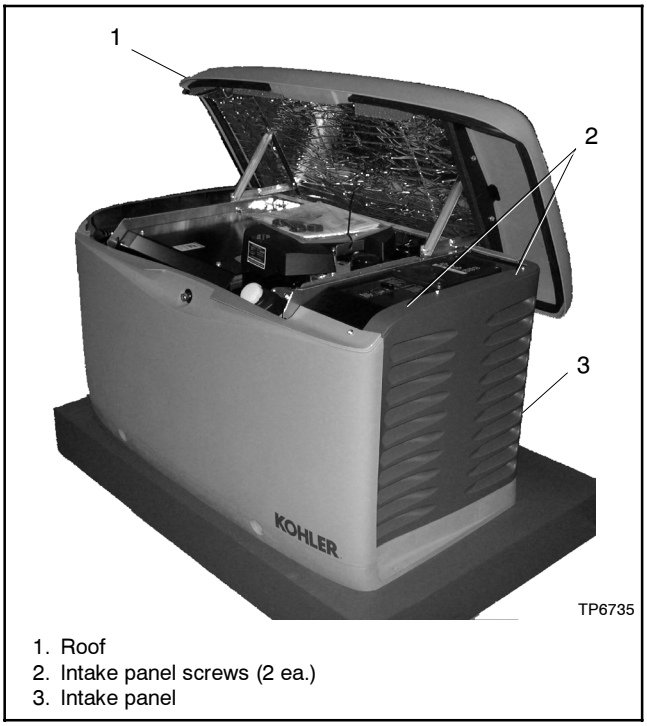
Hazardous voltage. Moving parts.
Can cause severe injury or death.

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

Testing live electrical circuits. Hazardous voltage or current can cause severe injury or death. Have trained and qualified personnel take diagnostic measurements of live circuits. Use adequately rated test equipment with electrically insulated probes and follow the instructions of the test equipment manufacturer when performing voltage tests. Observe the following precautions when performing voltage tests: (1) Remove all jewelry. (2) Stand on a dry, approved electrically insulated mat. (3) Do not touch the enclosure or components inside the enclosure. (4) Be prepared for the system to operate automatically.
(600 volts and under)

Installation Procedure

1. Open the enclosure roof.
2. If desired, connect a laptop computer to the RDC controller and use SiteTech software to save the controller settings. See A Note about Controller Setup on page 1.
3. Press the OFF button on the RDC controller. Verify that the OFF LED is flashing.
4. Disconnect the utility power coming into the generator set by opening the circuit breaker in the essential loads panel. Verify that the power to the generator set is disconnected before proceeding.
5. Remove two (2) screws on the intake panel and remove the panel. See Figure 3.
6. Unplug the battery charger's power cord.
7. Disconnect the generator set engine starting battery(ies), negative (-) lead first.



1. Roof
2. Intake panel screws (2 ea.)
3. Intake panel

Figure 3 Enclosure Roof and Air Intake Panel

Replace the Controller

8. Remove the four (4) screws securing the controller and *carefully* lift the controller. See Figure 4.

   Note: Be careful of the leads and harness connected to the controller.

9. Note the connections on the back of the controller, and then disconnect P1, P2, P3, and leads 55 and 55F at the miniature circuit breaker. See Figure 5 or the wiring diagram.

10. Remove the old controller.

11. Reconnect P1, P2 and P3 to the new controller assembly GM62863-2 or GM62863-3. Connect leads 55 and 55F to the mini-breaker.

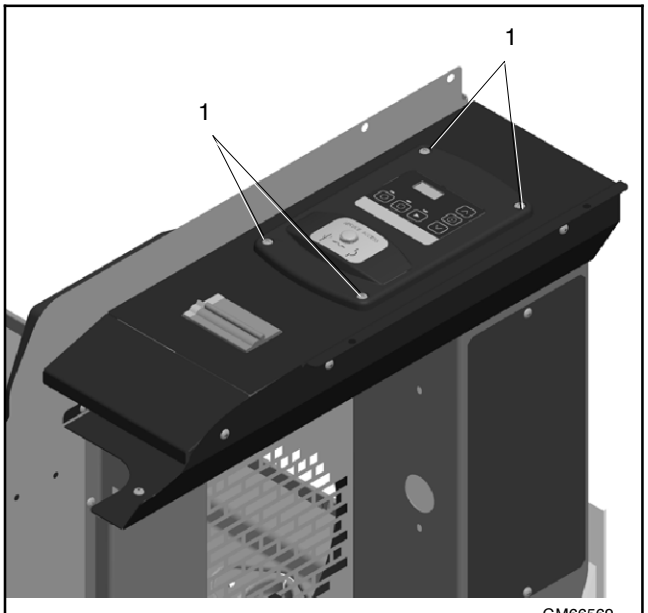
12. Mount the new controller assembly onto the junction box using the four (4) screws removed in step 8.

13. Reconnect the engine starting battery, negative (-) lead last.

14. Reconnect the utility power to the generator set by closing the circuit breaker in the essential loads panel.

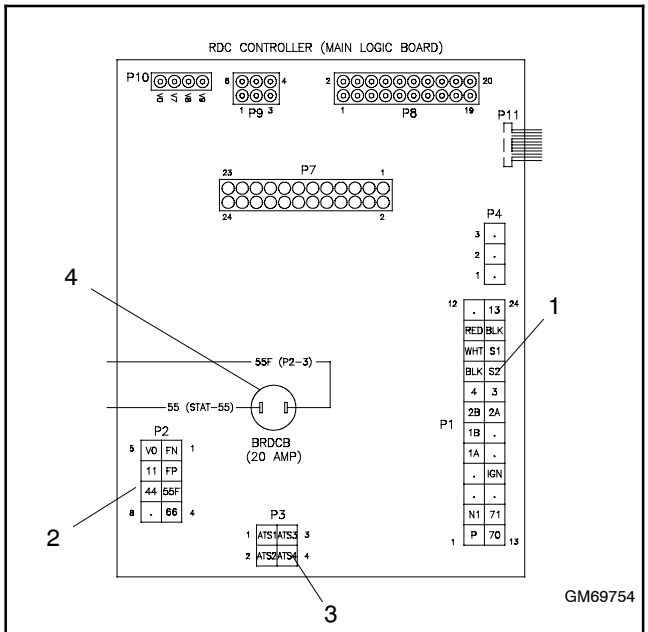
15. Plug the battery charger cord into the receptacle on the generator set.

16. Replace the air intake end panel and secure with two screws.



1. Controller screws (qty. 4)

Figure 4 Controller Mounting Screws



1. P1
2. P2
3. P3
4. Mini-breaker connections

Figure 5 Controller Connections

Configure the Controller

17. Configure the controller. Choose one of the options below:

    a. Use the RDC controller keypad to set the new controller's voltage/frequency setting (Uu) and engine configuration setting (Ec). Refer to the Controller Setup section on page 5.

    b. For the DC controller, use a personal computer with SiteTech software to set the following parameters. See Figure 9 and the instructions on page 7:

    - Genset Model Number (14RESL or 20RESL)
    - Engine Model Number (enter CH-740 for the 14RESL or CH-1000 for the 20RESL)
    - Voltage (240)
    - Frequency (60 Hz)
    - Number of phases (Single phase)

    c. If a settings file for the controller is available, use a personal computer with Kohler® SiteTech™ software to load the settings onto the new controller. See TP-6701, SiteTech Software Operation manual, for instructions.

18. Optional, except for use with OnCue™ software as noted below: Use Kohler® SiteTech™ software to enter the following generator set information into the new controller. See Figure 9 and the instructions on page 7.

    - Genset Serial Number (from generator set nameplate; required for OnCue™ operation)
    - Engine Serial Number (from engine nameplate)

Check the Output Voltage and Frequency

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(600 volts and under)

19. Press the RUN button on the controller to start the generator set. Use a voltmeter to check the output voltage and frequency. If voltage or frequency adjustments are required, refer to the Generator Output Adjustments section on page 8 for instructions.

20. Press the AUTO button to stop the generator set through normal timing sequences and place the controller in automatic mode.

Set the Exerciser

21. Set the exerciser. The generator set will exercise weekly on the same day and time that the exerciser is started. See generator set Operation Manual TP-6734 for more information about unloaded and loaded exercise runs.

    a. Press the AUTO button. Check that the AUTO LED is illuminated.

    b. Press the down arrow (RDC) or EXERCISE (DC) button once to start an unloaded variable-speed exercise. After the engine starts, EnLd appears on the controller display.

    c. For a loaded exercise, press the down arrow or EXERCISE button again. The engine speed increases and E Ld appears on the controller display.

    d. The exercise runs for 20 minutes. Loaded exercises may run for up to 5 additional minutes during the engine cooldown cycle.

22. Close the roof and lock the enclosure.

Controller Setup

Adjust the controller configuration with the generator set OFF.

To adjust the RDC controller configuration using the RDC controller keypad, use the select and arrow buttons to change settings as described in the following sections.

To adjust the DC controller configuration, use Kohler® SiteTech™ software and a personal computer. Refer to the instructions and Figure 9 on page 7. Also see TP-6701, SiteTech Software Operation Manual.

RDC Controller Parameter Settings

Use the instructions in this section to check controller settings Uu and Ec after controller installation. Set the parameters to match the settings shown in Figure 6.

Do not use settings Uu07–Uu22. These settings may appear as choices during configuration but do not apply to the 14RES or 20RES generator sets.

Parameter	Setting	Definition		
		Phases	Hz	VAC
System voltage and frequency	Uu01	1	60	120/240
	Uu06	1	50	115/230
	Uu07–22	DO NOT USE		
Engine Configuration	Ec13	14RES/RESL		
	Ec14	20RES/RESL		

Figure 6 RDC Controller Configuration Parameters

Follow the instructions in Figure 8 to enter the configuration mode while the engine is not running and then step through the following parameters. Use the up (∧) and down (∨) arrow buttons to select the appropriate settings for the application. See Figure 7.

Note: Be sure to save your settings before exiting the configuration mode. The controller reverts to the last saved settings when the OFF button is pressed.

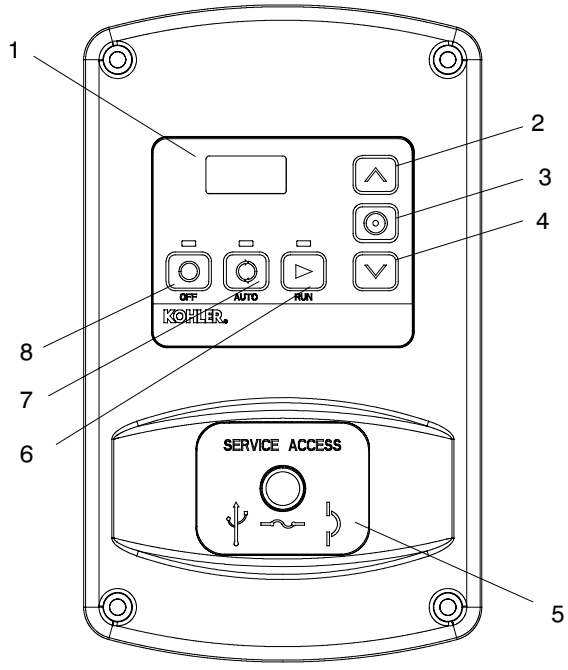
System voltage/frequency setting (Uu). Select the system voltage and frequency from the table in Figure 6.

Engine configuration (Ec). The engine configuration must match the generator set engine.

Note: Fault code noEc indicates controller parameters have been lost or reset due to controller replacement or momentary connection or disconnection of the battery. To prevent controller parameter reset when connecting or disconnecting the battery, remove controller fuse F3 before connecting or disconnecting battery cables.

Controller Timeout

If no buttons are pressed for one minute, the controller will automatically exit the configuration mode without saving any changes. Start the configuration procedure over again from the beginning if the controller exits the configuration mode before the settings have been saved.



1. LED display
2. Up button
3. Select button
4. Down/Exercise button
5. Service access (fuses and USB connection)
6. RUN button and LED
7. AUTO button and LED
8. OFF button and LED

Figure 7 RDC Residential Digital Control

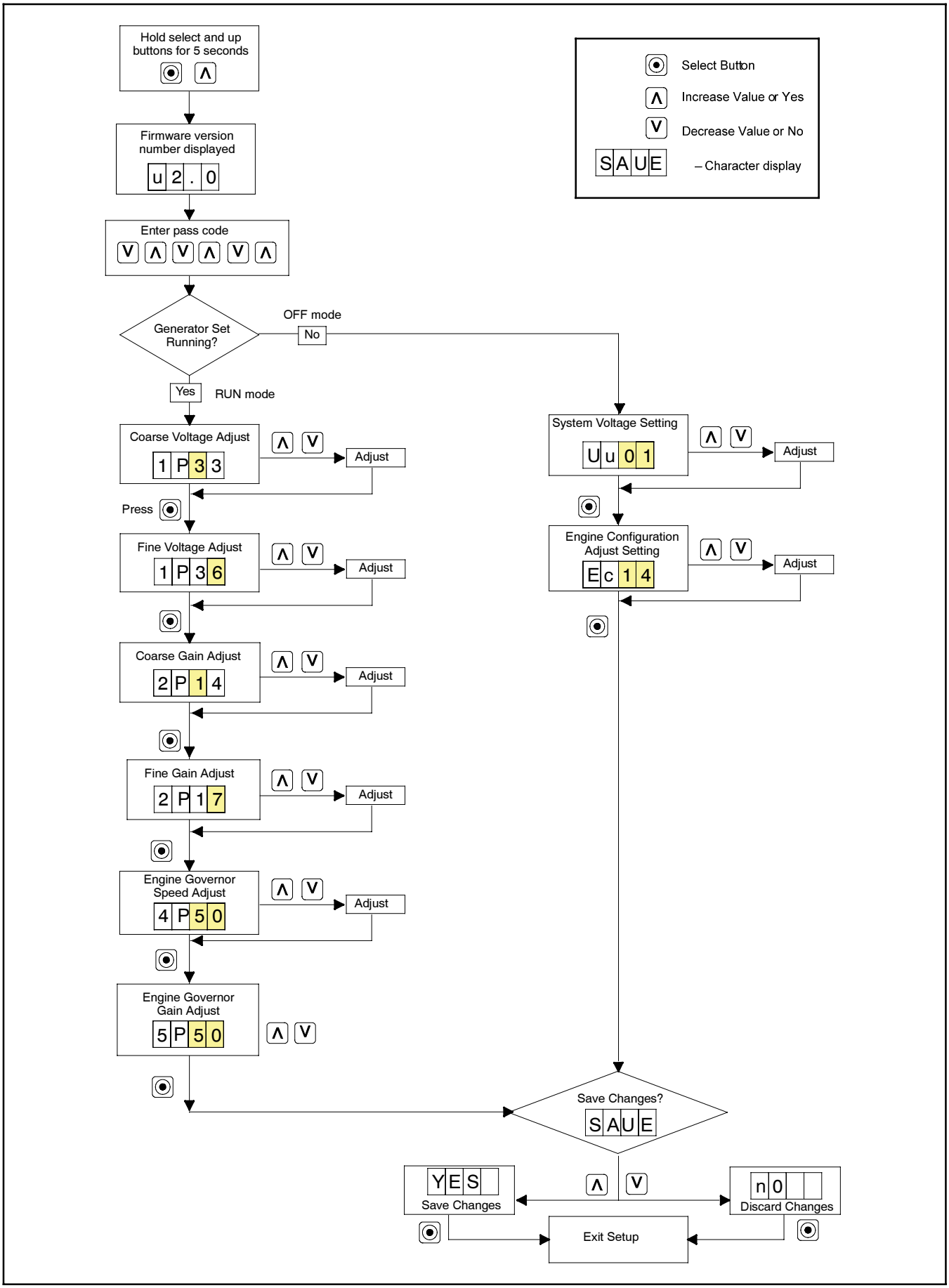


Figure 8 RDC Controller Configuration and Generator Output Adjustments

Controller Setup Using SiteTech Software

DC controllers on RESL models cannot be set up from the controller keypad. Use a personal computer and Kohler® SiteTech™ software to adjust the parameters on RESL models, if necessary.

SiteTech™ software can also be used to change the parameter settings on RDC controllers (RES models), if the installer prefers to use SiteTech.

See Figure 9 for the settings. Refer to TP-6701, SiteTech Software Operation Manual, for instructions.

SiteTech Group	Parameter	Value	Equivalent RDC Parameter Setting	How to Enter
Genset System Configuration	Genset System Voltage	240	Uu01	Type in
		230	Uu06	Type in
	Genset System Frequency	60	Uu01	Drop-down box
		50	Uu06	Drop-down box
	Genset Voltage Phase Connection	Single Phase	Uu01 or Uu06	Drop-down box
Genset Info	Engine Model Number	CH-740* (14RES or 14RESL)	Ec13	Type in* Drop-down box
		CH-1000* (20RES or 20RESL)	Ec14	Type in* Drop-down box
	Genset Model Number	14RES 14RESL 20RES 20RESL	none	Type in
	Genset Serial Number	See nameplate	none	Type in
	Engine Serial number	See nameplate	none	Type in
* With SiteTech versions prior to 2.3, type in CH-740 or CH-1000 with capital letters and dash exactly as shown.				

Figure 9 Controller Setup Using SiteTech Software

Generator Output Adjustments

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(600 volts and under)

The generator output voltage and frequency can be adjusted, if necessary. Adjust the output with the generator set running.

Note: A digital multimeter that measures voltage and frequency is required for these adjustments.

Use a digital multimeter to check the output voltage and frequency. If output voltage or frequency is not within specifications, use the RDC controller keypad to adjust the output voltage and engine speed (frequency) while the generator set is running. See Figure 7. The flowchart in Figure 8 outlines the adjustment procedures.

Note: Be sure to save your changes as instructed in Figure 8 before exiting configuration mode.

Changes in voltage and speed adjustments are lost if not saved before the generator set shuts down. The generator set continues to run with the new settings until it shuts down but then reverts to the previous settings at the next startup if the changes have not been saved.

A personal computer and SiteTech software can also be used to adjust the generator output. See additional instructions and Figure 12 on page 9.

Voltage Adjustment Procedure, RDC Controller

Note: Refer to the flowchart in Figure 8 during the following procedure.

1. With the generator set off, connect a digital multimeter to the output leads or an electrical outlet on the load side of the generator set. Set the meter to measure AC voltage.

2. Start the generator set by pressing the RUN button on the RDC controller.

3. Use the RDC controller to adjust the voltage (RDC parameter 1P) until the output voltage reaches the desired value. Refer to the flowchart in Figure 8 for instructions to adjust the output voltage. See Figure 10 for the approximate change in voltage per step.

Measured Voltage, VAC	ADC Display	Voltage Change per Step, VAC	
		Coarse	Fine
85–180	1P00–99	5	0.5
180–360	1P00–99	7	0.7

Figure 10 Voltage Adjustment (approximate)

4. Adjust the voltage stability (gain, RDC parameter 2P) to minimize light flicker.

5. Readjust the voltage, if necessary.

6. Save settings. See Figure 8.

7. Stop the generator set.

Note: Volts-per-hertz can be adjusted only by a Kohler® authorized distributor/dealer using a personal computer and Kohler® SiteTech™ software. See Figure 12.

Frequency Adjustment, RDC Controller

The engine speed determines the generator output frequency; 60 Hz units operate at 3600 rpm and 50 Hz units run at 3000 rpm. Adjust the engine governor speed and gain to set the output frequency and stability using the following procedure.

Note: Refer to the flowchart in Figure 8 during the following procedure.

1. Attach a frequency meter to the AC output leads or an electrical outlet on the load side of the generator set.

2. Start and run the generator set until it reaches normal operating temperature (at least 10 minutes).

3. Adjust engine governor speed (RDC parameter 4P) to obtain a frequency reading of 60 Hz (or 50 Hz if appropriate). See Figure 11.

4P Setting	60 Hz		50 Hz	
	RPM	Frequency	RPM	Frequency
00	3420	57	2850	47.5
50	3600	60	3000	50
99	3776	63	3150	52.5

Figure 11 Engine Speed Settings

4. Check stability with the generator set running and with no load applied. If the generator set speed is unstable, hunts, or surges, adjust the engine governor gain, RDC parameter 5P, until the generator set becomes stable with no hunting or surging. (Increasing the gain slows the governor response.)

5. Check the frequency reading. Repeat steps 3 and 4 if necessary to obtain the rated frequency and stable operation.

6. Save settings. See Figure 8.

Generator Output Adjustments Using SiteTech

The generator set output cannot be adjusted from the controller keypad on RESL models equipped with the DC controller. Use a personal computer and Kohler® SiteTech™ software to adjust the output on RESL models, if necessary. SiteTech can also be used to adjust output on RES models equipped with the RDC controller, if the installer prefers to use SiteTech.

Use the procedures above for voltage adjustment and frequency adjustment. When the procedure requires adjusting a voltage or speed parameter, use the SiteTech parameters shown in Figure 12 to adjust voltage and gain, or engine speed and gain as necessary.

SiteTech Group	Parameter
Engine Speed Governor	Engine Speed Adjustment
	Engine Speed Gain Adjustment
Voltage Regulator	Average Voltage Adjustment
	Volts per Hertz Slope
	Volts per Hertz Cut-in Frequency
	Voltage Regulator Gain

Figure 12 Output Adjustments Using SiteTech Software

Parts Lists

RDC Replacement Controller

Kit: GM79884		
Qty.	**Description**	**Part Number**
1	Controller, RDC	GM62863-3
1	Instructions	TT-1568

DC Replacement Controller

Kit: GM79885		
Qty.	**Description**	**Part Number**
1	Controller, DC	GM62863-2
1	Instructions	TT-1568

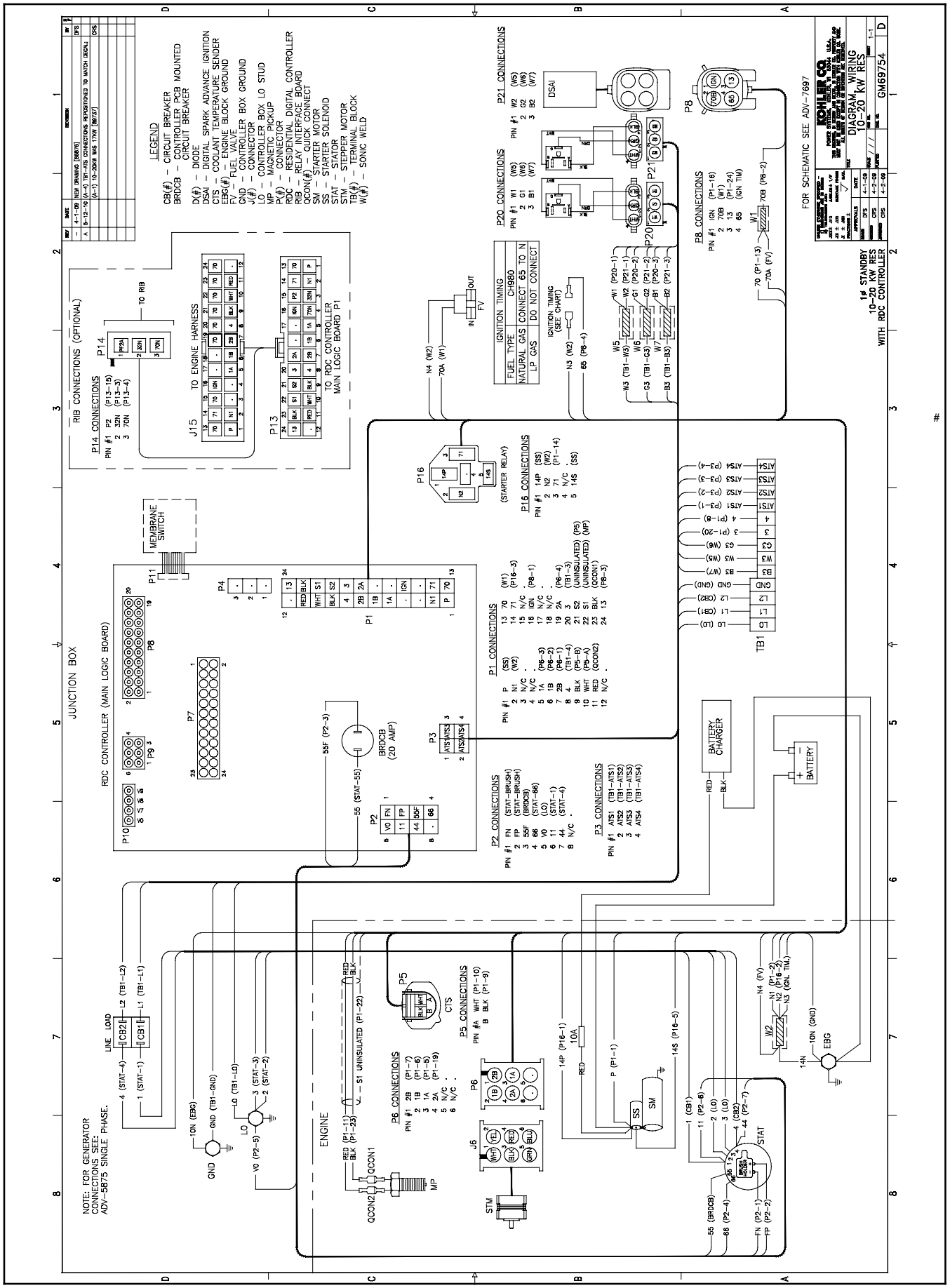

Figure 13 Wiring Diagram

Notes

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