

INSTALLATION INSTRUCTIONS

Original Issue Date: 4/12

Model: **6-60 kW Residential and Light Commercial**

Market: **Residential/Commercial**

Subject: **RDC2, DC2, and VSC Controller Replacement Kits and Relay Kits
GM84962, GM84963, GM84964, GM92089, GM92090, GM92091,
GM95104, and GM92804**

Introduction

These instructions explain how to replace and set up the RDC2, DC2, and VSC controllers shown in Figure 1 through Figure 3.

New controller versions have been released as Kohler has introduced product improvements and updates. Operation and setup procedures for the revised controllers are the same as the original.

The original controller can be identified as follows:

- The USB port and mini circuit breaker are located behind a cover with a thumbscrew.
- The circuit board, visible on the back of the controller, is green.

Note: Do not install a green-board controller on a generator set that was originally equipped with a red- or blue-board controller.

Revised RDC2, DC2, and VSC controllers were introduced in 2014 and 2015. Revised controllers can be identified as follows:

- The USB port is located behind a small rubber cover.
- The mini circuit breaker is located near, but not on, the controller.
- The circuit board, visible on the back of the controller, is red (RDC2 and DC2) or blue (VSC).

The RDC2.4, DC2.4, and VSC.4 blue-board controllers were introduced in October of 2016. The RDC2.4, DC2.4, and VSC.4 controllers can be identified as follows:

- The circuit board, visible on the back of the controller, is blue.
- The USB port cover is gray.

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

Controller setup is required after installation.

- The RDC2 and VSC controllers can be set up using the controller keypad to navigate through the menus and change settings. The RDC2 and VSC controllers can also be set up using Kohler® SiteTech™ software and a personal (laptop) computer.
- Kohler® SiteTech™ software and a personal (laptop) computer are *required* for setting up the DC2 controller.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

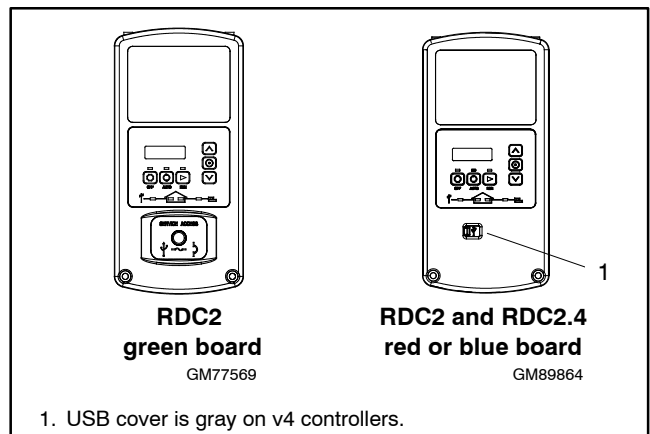


Figure 1 RDC2 Controllers

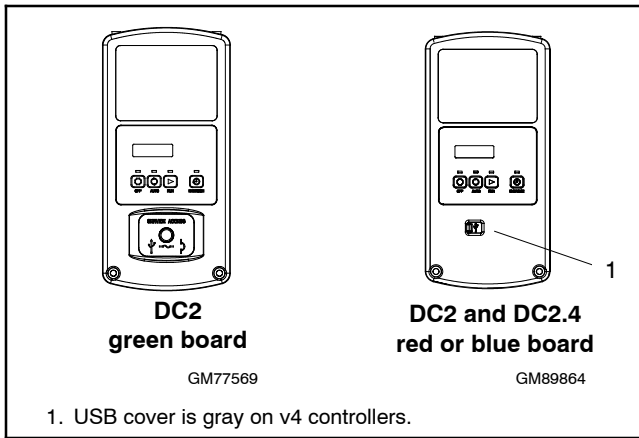


Figure 2 DC2 Controllers

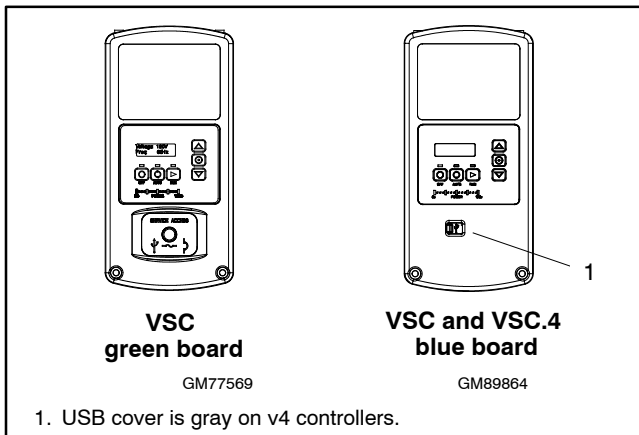
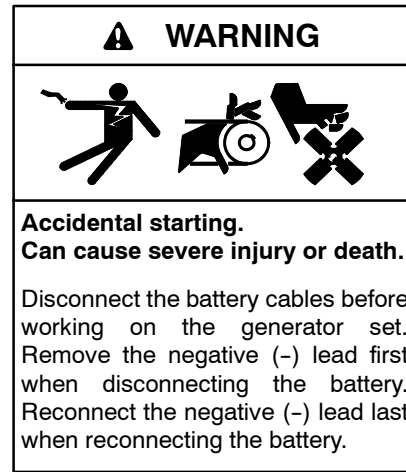
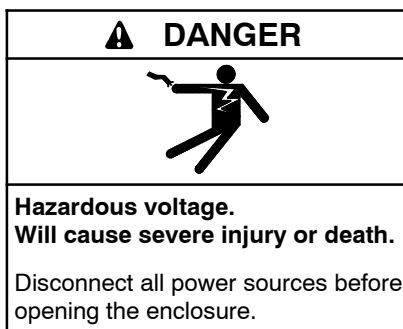


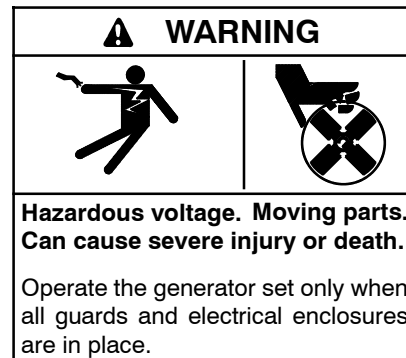
Figure 3 VSC Controllers

1 Safety Precautions

Observe the following safety precautions while installing the kit.



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.



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)

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 all jewelry before servicing the equipment.

2 Service Kits

Before replacing a green-board controller, read the following information about controller service kits and harnesses that may be required.

Note: The following information is summarized in Figure 7 and Figure 8.

If a green board controller is being replaced with a later version (red or blue board) controller on model **14/20RESA/L, 20RESB, or 6VSG** generators, **an additional kit is required.**

- For the 14/20RESA, 14/20RESAL, or 20RESB, order the controller kit **AND** GM95104, relay and mini-circuit breaker kit.
- For the 6VSG, order the controller kit **AND** relay kit number GM92804.

Note: The relay and harness in kit GM95104 can be used on the 6VSG, if necessary. Discard the mini-circuit breaker included in kit GM95104.

- The relay kit is **NOT** required for RCL models.

Refer to the replacement procedures later in this document for relay kit installation instructions.

Replacing V1 (green board) controllers *with bar code dates before 9/15/14:*

If a green-board controller is being replaced, check for the presence of diode harness GM95149 connected to P1 on the controller. The diode harness is shown in Figure 4 and Figure 20.

- If you are installing a green-board controller with a bar code date **BEFORE 9/15/14**, keep the diode harness and connect it to the replacement controller. See Figure 5 and Figure 6 to find and interpret the bar code label.
- If you are installing a green board controller with a barcode date **AFTER 9/15/14**, or you are installing a red or blue board controller, remove the diode harness.

See TT-1647, Battery Charging Diode kit, for more information about the diode harness, if necessary.

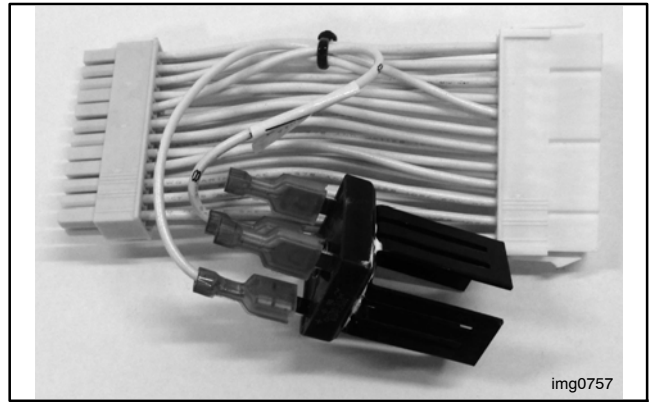
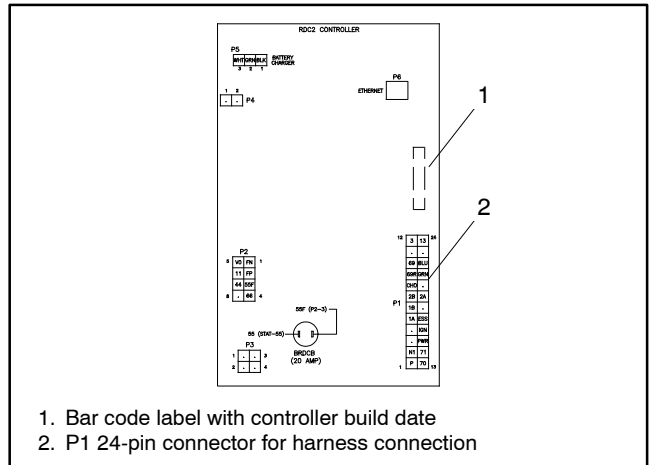


Figure 4 Diode Harness GM95149



1. Bar code label with controller build date
2. P1 24-pin connector for harness connection

Figure 5 Back of Controller

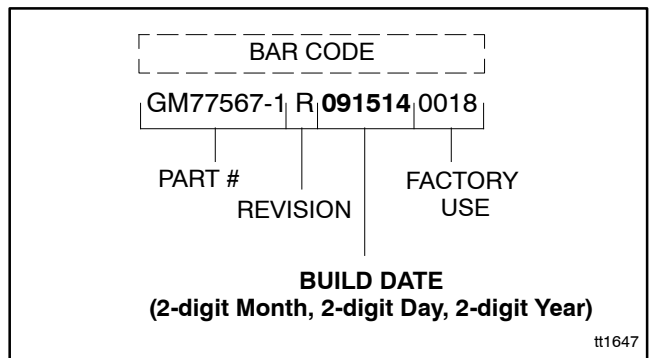


Figure 6 Controller Bar Code Label

Controller Version	Green Board			Red or Blue Board		
Controller Model	RDC2	DC2	VSC	RDC2	DC2	VSC
Kit number	GM84962	GM84963	GM84964	GM92089	GM92090	GM92091
Board color	Green	Green	Green	Red or Blue	Red or Blue	Blue
Relay kit required *	No	No	No	GM95104 *	GM95104 *	GM92804 *
Diode harness required †	GM95149 †	GM95149 †	GM95149 †	No	No	No

* Relay kit is **required** when replacing original green-board controllers with revised red- or blue-board controllers on these models.
† Use the diode harness on green-board controllers **manufactured before 9/15/14 only**. See Figure 6. Remove the diode harness when replacing the original green-board controller with any other controller.

Figure 7 Replacement Controller Summary (see Figure 8 for kit numbers by generator set model)

Generator Set Models	Controller	Controller Service Kit Number(s)			
		Original Controller (green board)	Diode Harness † (for green boards built before 9/15/14 only)	Revised Controller (red or blue boards)	Relay Kit * (for red or blue boards only)
6VSG *	VSC	GM84964	GM95149 †	GM92091	GM92804 *
8RESV 10RESV 12RESV	RDC2	—	—	GM92089	No
8RESVL 10RESVL 12RESVL	DC2	—	—	GM92090	No
14RESA * 20RESA *	RDC2	GM84962	GM95149 †	GM92089	GM95104 *
14RESAL * 20RESAL *	DC2	GM84963	GM95149 †	GM92090	GM95104 *
20RESB *	RDC2	GM84962	GM95149 †	GM92089	GM95104 *
20RESC 20RESD	RDC2	—	—	GM92089	No
20RESCL	DC2	—	—	GM92090	No
24RCL 30RCL 38RCLB	RDC2	—	—	GM92089	No
38RCL 48RCL 48RCLA 60RCL	RDC2	GM84962	GM95149 †	GM92089	No

* Relay kit is **required** when replacing original green-board controllers with revised red- or blue-board controllers on these models.
† Use the diode harness on green-board controllers **manufactured before 9/15/14 only**. See Figure 6.

Figure 8 Replacement Controller Service Kits by Generator Set Model

3 Installation Procedures

3.1 Controller Replacement Procedure, Models 8/10/12RESV

1. Read and follow the safety precautions in Section 1.
2. Using the enclosure locking tool provided with the generator set, open the enclosure roof. See Figure 11.
3. Press the OFF button on the controller.

Note: Utility power is connected to the generator's terminal block. This power must be turned off before the controller is removed.

4. Disconnect utility power to the generator set by opening the circuit breaker in the building's distribution panel. Use a voltmeter to verify that utility power has been disconnected. See Figure 9 and Figure 10 for the utility power connection location.
5. Disconnect the generator set engine starting battery, negative (-) lead first.
6. Remove the two (2) screws securing the controller to the junction box and *carefully* lift the bottom edge of the controller. See Figure 11.

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

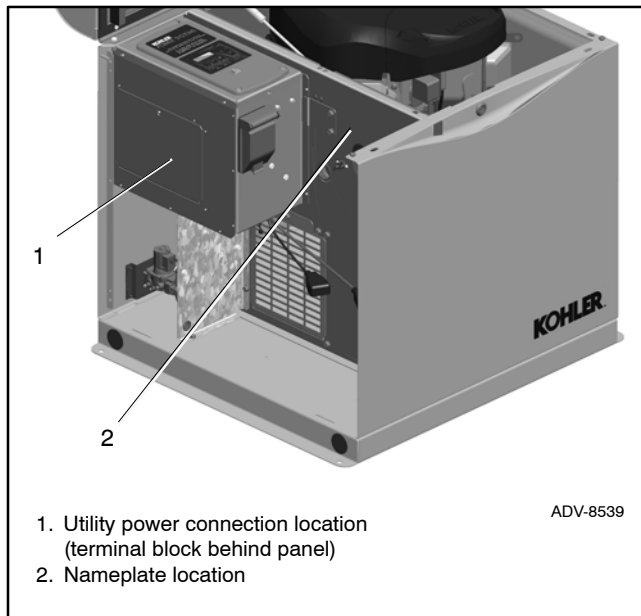


Figure 9 Utility Power Connection and Nameplate Locations

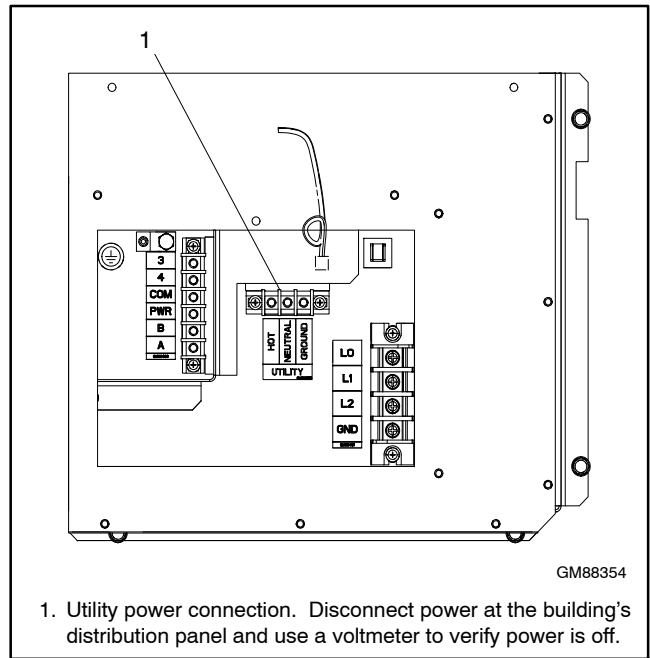


Figure 10 Utility Power Connection Detail

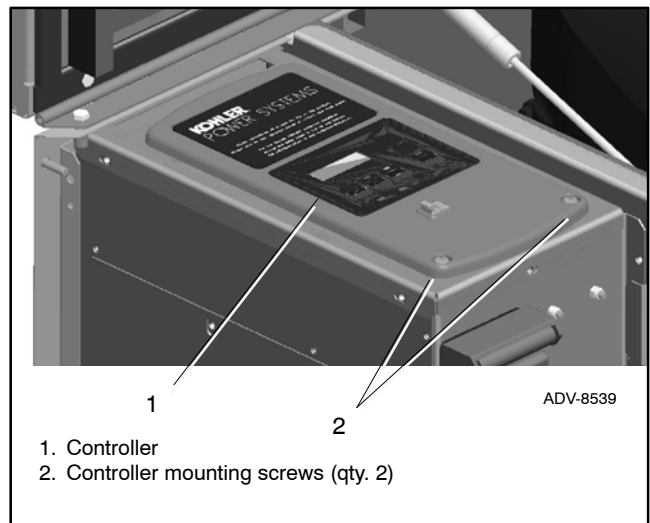


Figure 11 Controller Location

7. Note the connections on the back of the controller, and then disconnect all harnesses and leads from the controller. See Figure 12 or the wiring diagram in the generator installation manual.
8. Remove the old controller.
9. Reconnect all harnesses to the new controller assembly.
10. Install the controller onto the junction box using the two (2) screws removed in step 6.
11. Reconnect the engine starting battery, negative (-) lead last.

12. Reconnect the utility power to the generator set by closing the circuit breaker in the building's distribution panel.
 13. The controller will prompt you to set the date and time, and then to set the exerciser. See the generator set Operation Manual for instructions, if necessary.
 14. Check the firmware version on the controller. See Section 4. Use SiteTech or the USB utility with the computer connected to the controller's USB port to update the firmware to the latest released version. See the SiteTech Software Operation Manual or the USB Utility instruction sheet for instructions.
- Note:** SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.
15. Set up the controller as instructed in Section 5, Controller Setup.
 16. Calibrate the voltage. See Section 6, Voltage Calibration.
 17. Replace covers and panels. Close and lock the roof.
 18. If OnCue® Plus is used to monitor this generator set, reset the OnCue password on the controller and note the new password. See Section 7, Setting the OnCue Password. Then connect with OnCue Plus and enter the new password.
 19. Verify that OnCue® Plus can communicate with the generator set over the Internet before leaving the job site.

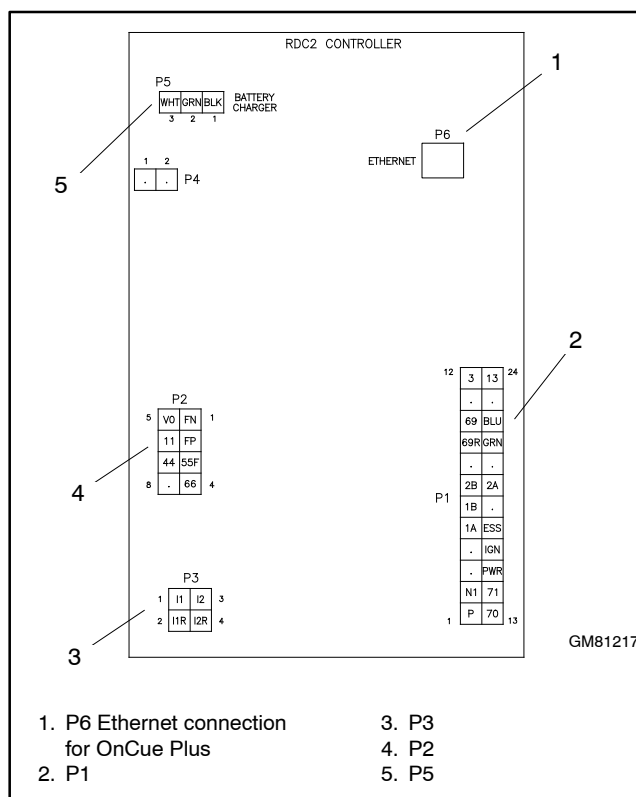


Figure 12 Controller Connections

3.2 Controller Replacement Procedure, Models 14RESA and 20RESA/B/C/D*

* Includes RESA, RESAL, RESB, RESC, RESCL, and RESD models.

Note: If an RDC2.4 blue-board controller is installed on a generator set used with an Automatic Paralleling Module (APM), the other generator set in the paralleled system must also use an RDC2.4 blue-board controller.

1. Review the service kit information in Section 2 and make sure that you have the correct service kits.
2. Read and follow the safety precautions in Section 1.
3. Using the enclosure locking tool provided with the generator set, open the enclosure roof.
4. Press the OFF button on the controller.

Note: Utility power is connected to the generator's terminal block. This power must be turned off before the controller is removed.

5. Disconnect utility power to the generator set by opening the circuit breaker in the building's distribution panel. Use a voltmeter to verify that utility power has been disconnected. See Figure 13 (14/20RESA/L) or Figure 14 (20RESB) for the utility power connection location. See Figure 15 for the power connection detail on the generator set terminal block.
6. Disconnect the generator set engine starting battery, negative (-) lead first.

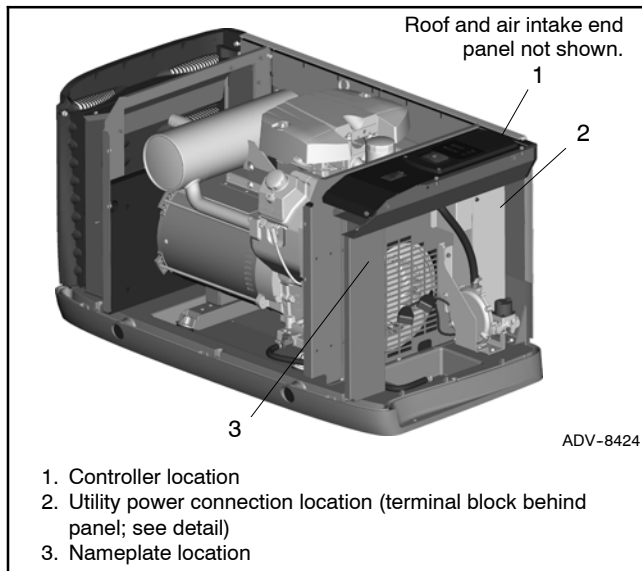


Figure 13 Component Locations, 14/20RESA/C

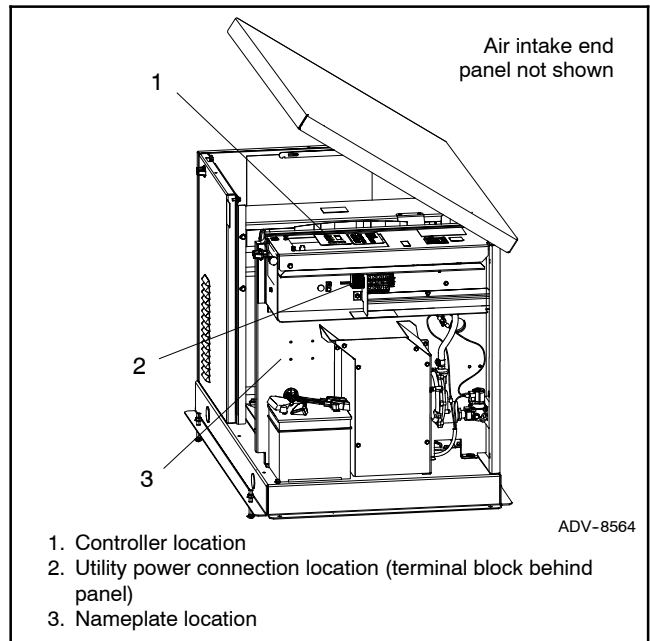


Figure 14 Component Locations, 20RESB/D

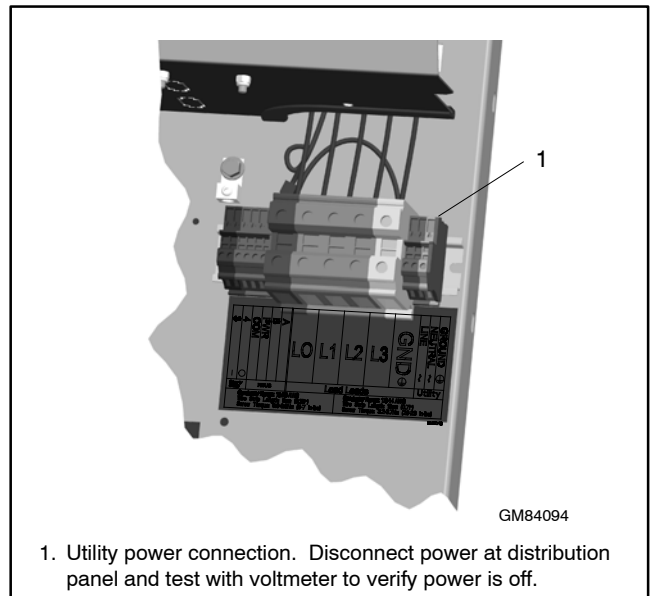


Figure 15 Power Connection Detail (RESA shown)

7. Remove the two (2) screws securing the controller to the junction box and *carefully* lift the bottom edge of the controller. See Figure 16.

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

8. Note the connections on the back of the controller, and then disconnect all harnesses and leads from the controller. See Figure 17 or the wiring diagram in the generator installation manual.
9. Remove the old controller.

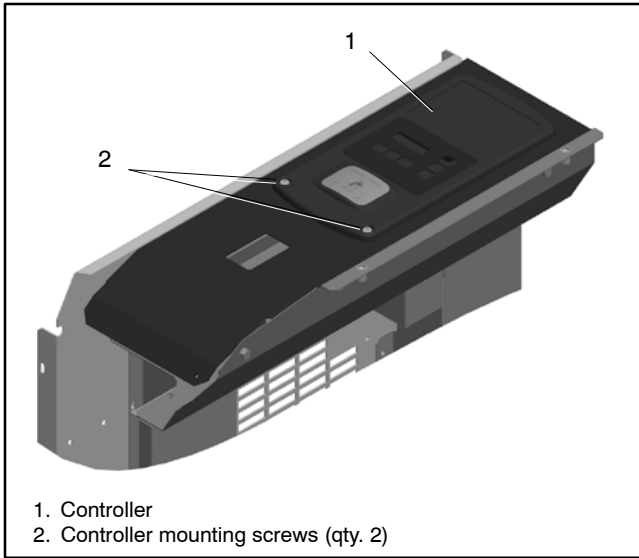


Figure 16 Controller Mounting (14/20RESA shown)

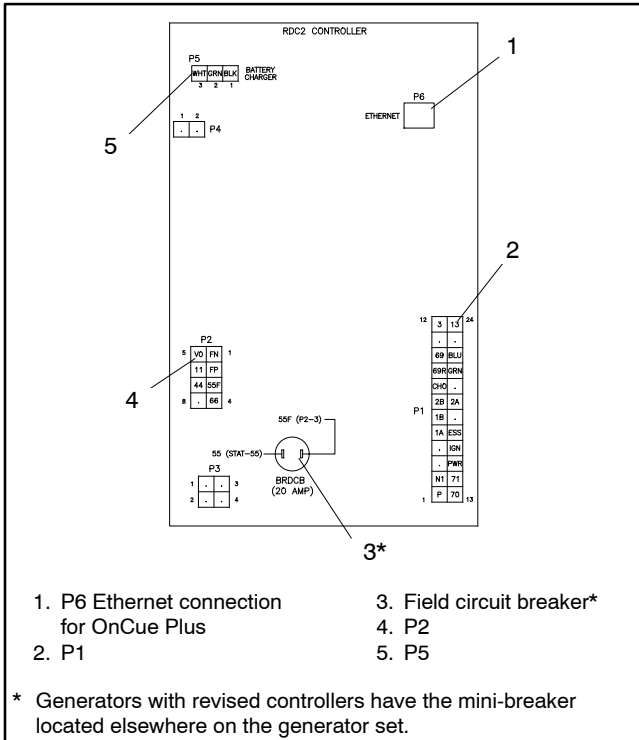


Figure 17 Controller Connections

10. If an original green-board controller is being replaced, check for the presence of diode harness GM95149 connected to P1 on the controller. The diode harness is shown in Figure 20.

- If the new controller has a green board with a bar code date BEFORE 9/15/14, keep the diode harness and connect it to the replacement controller. See Figure 18 and Figure 19 to find and interpret the bar code label.
- If the new controller has a green board with a barcode date AFTER 9/15/14, or if the new controller has a red or blue circuit board, remove and discard the diode harness.

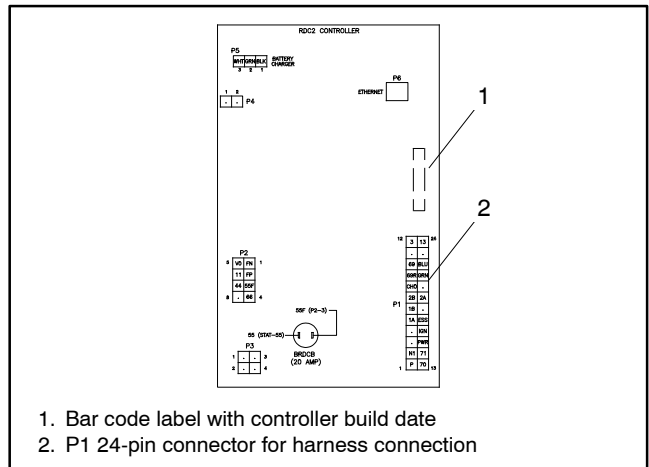


Figure 18 Back of Controller

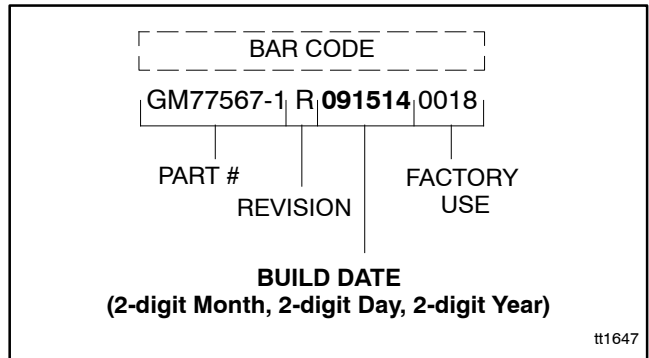


Figure 19 Controller Bar Code Label

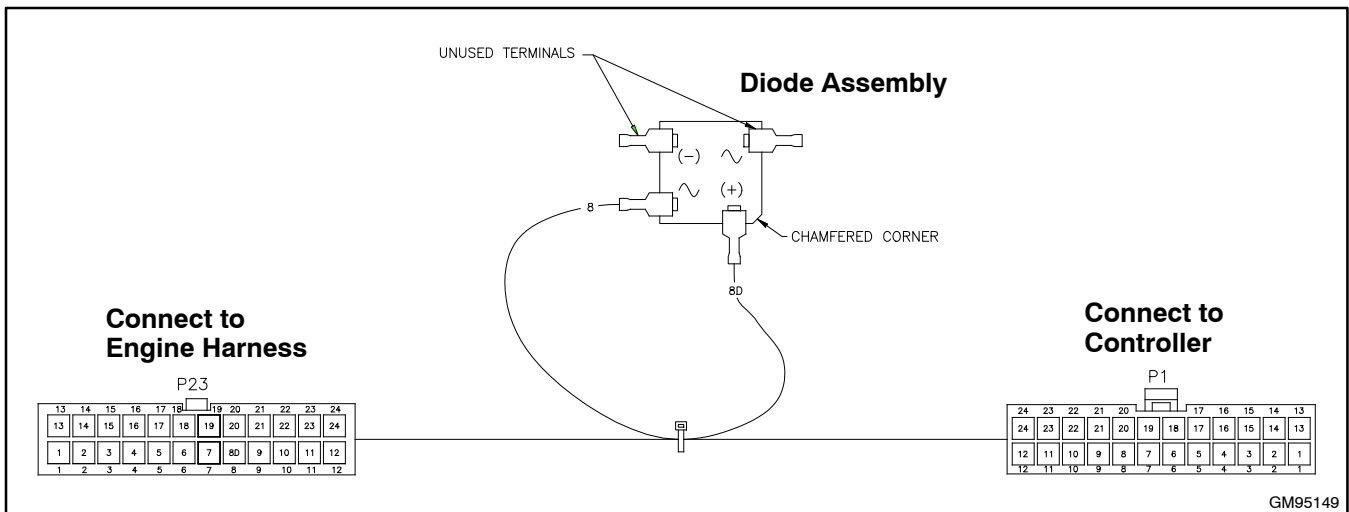


Figure 20 Diode Harness GM95149 (for original controllers manufactured before 9/15/14)

11. If an original (green board) controller is being replaced with an original controller, OR if a revised (red board) controller is being replaced with a revised controller, go to step 13.
12. If an original controller is being replaced with a revised controller, install the new relay (with fuse) and mini circuit breaker provided in kit GM95104.
 - a. Use the hardware provided in the relay kit to install the new run relay in the trough under the controller, near the existing relay. See Figure 21.
 - b. Install fuse P22, which connects to the relay adapter harness, near the new relay. Make sure that the fuse is located close enough to the relay for the lead lengths in the harness.
 - c. Connect the relay adapter harness to P1 on the controller. Connect the other end to the 24-pin connector on the engine harness. Connect the adapter harness to the relay and the fuse.
 - d. Leads 55 and 55F were disconnected from the mini circuit breaker on the old controller. Connect leads 55 and 55F to the new mini circuit breaker assembly.
 - e. Use a cable tie to secure the mini circuit breaker to the harness as shown in Figure 22.
 - f. Proceed to step 13.
13. Reconnect all harnesses to the new controller assembly.
14. Install the controller onto the junction box using the two (2) screws removed in step 6.
15. Reconnect the engine starting battery, negative (-) lead last.
16. Reconnect the utility power to the generator set by closing the circuit breaker in the distribution panel.
17. The controller will prompt you to set the date and time, and then to set the exerciser. See the generator set Operation Manual for instructions, if necessary.

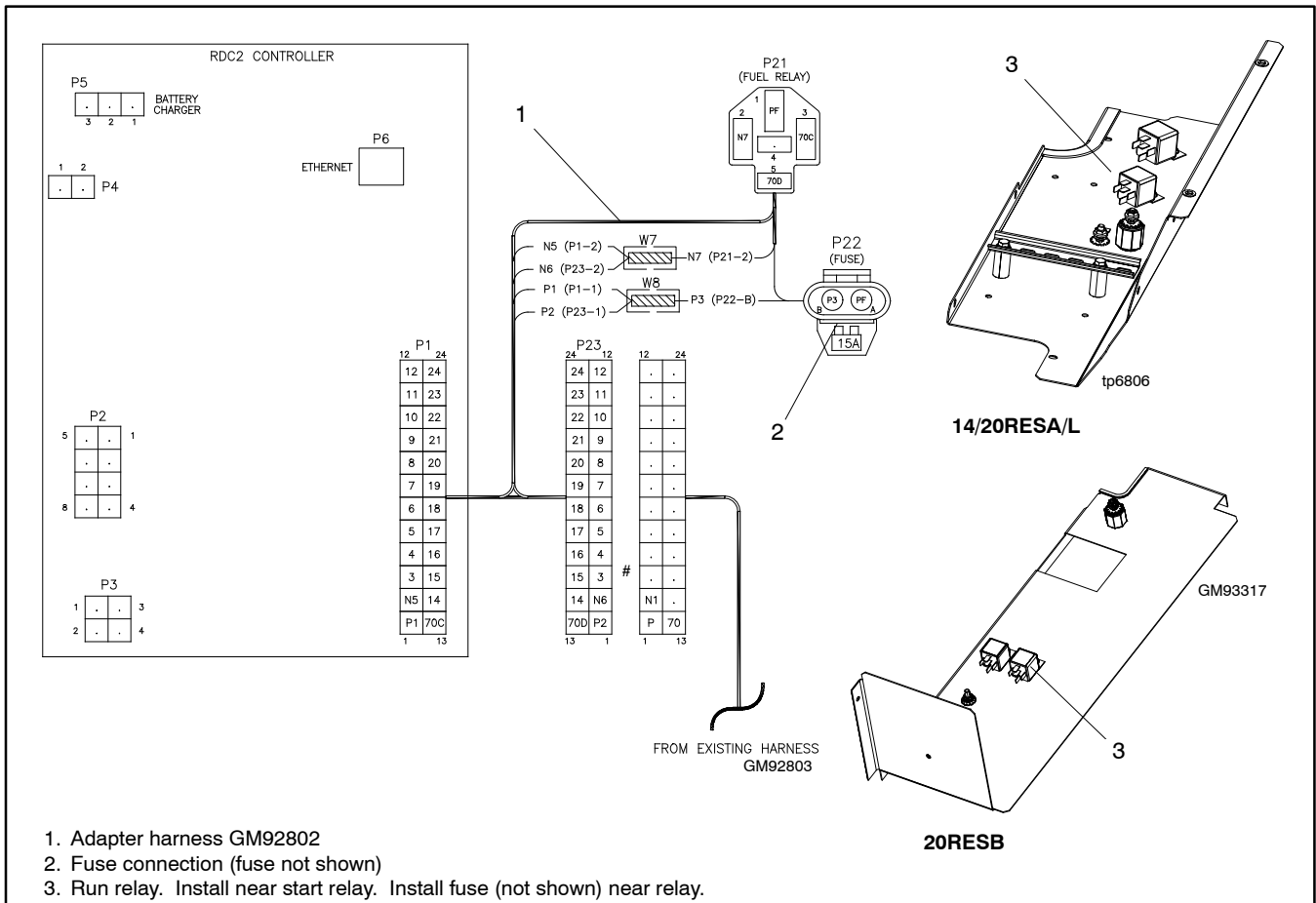


Figure 21 Relay and Adapter Harness (for replacing original controller with revised controller only)

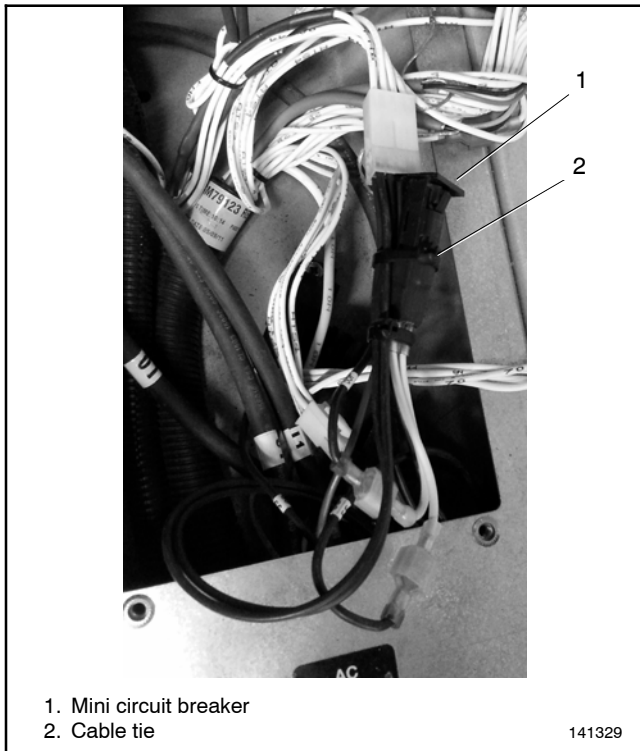


Figure 22 Mini Circuit Breaker

18. Check the firmware version on the controller. See Section 4. Use SiteTech or the USB utility with the computer connected to the controller's USB port to update the firmware to the latest released version. See the SiteTech Software Operation Manual or the USB Utility instruction sheet for instructions.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

19. Set up the controller as instructed in Section 5, Controller Setup.

20. Calibrate the voltage. See Section 6, Voltage Calibration.

21. Replace covers and panels. Close and lock the roof.

22. If OnCue® Plus is used to monitor this generator set, reset the OnCue password on the controller and note the new password. See Section 7, Setting the OnCue Password. Then connect with OnCue Plus and enter the new password.

23. Verify that OnCue® Plus can communicate with the generator set over the Internet before leaving the job site.

3.3 Controller Replacement, Model RCL†

† Includes RCL, RCLA, and RCLB models

1. Read and follow the safety precautions in Section 1.
2. Using the enclosure locking tool provided with the generator set, open and remove the enclosure door on the service side of the generator set. See Figure 23 or Figure 24.
3. Press the OFF button on the controller.

Note: Utility power is connected to the generator's terminal block. This power must be turned off before the controller is removed.

4. Disconnect utility power to the generator set by opening the circuit breaker in the building's distribution panel.
5. Disconnect the generator set engine starting battery, negative (-) lead first.
6. Remove the customer connection access panel and use a voltmeter to confirm that utility power has been disconnected. See Figure 25 and Figure 26.
7. Remove the two (2) screws securing the controller to the junction box and *carefully* lift the bottom edge of the controller. See Figure 25.

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

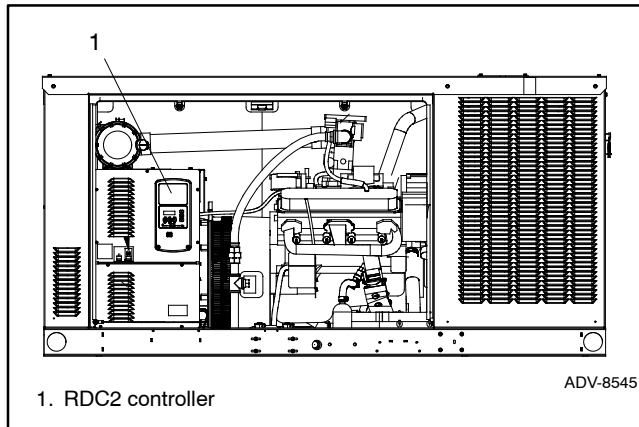


Figure 23 Controller Location, 38/48/60RCL and 48RCLA

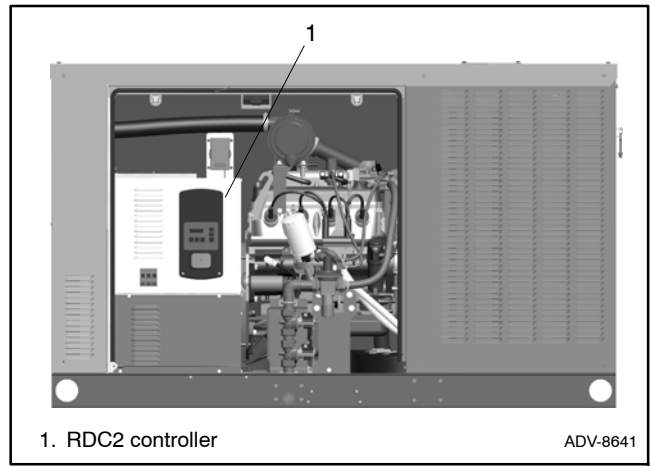


Figure 24 Controller Location, 24/30RCL and 38RCLB

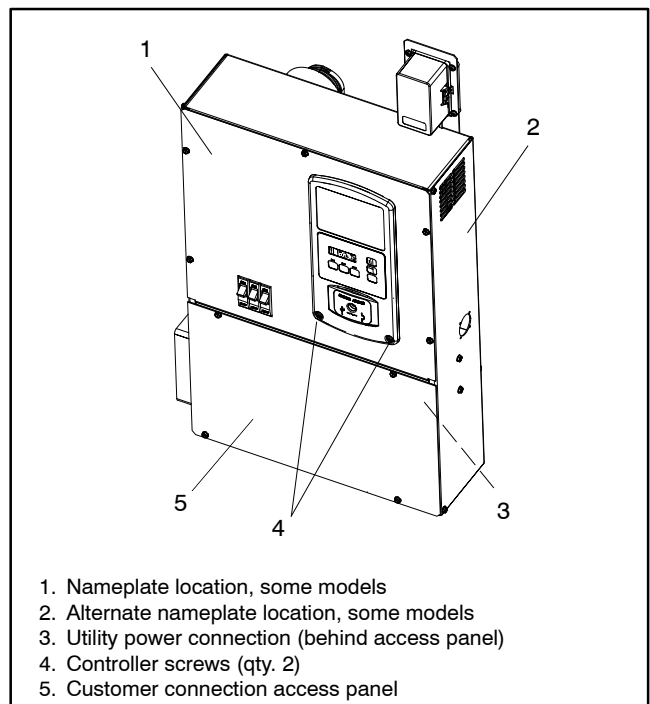


Figure 25 Controller and Access Panel, Typical RCL

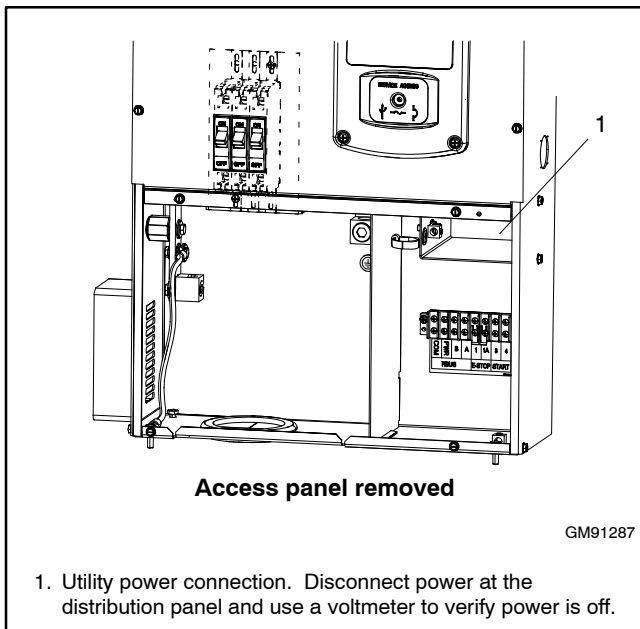
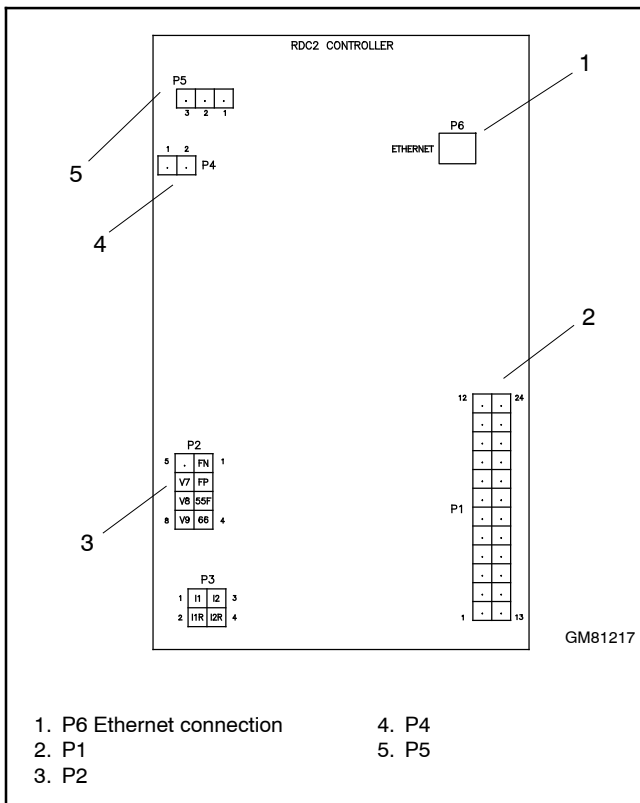


Figure 26 Utility Power Connection, Typical RCL

8. Note the connections on the back of the controller, and then disconnect P1, P2, P4, P5, and P6. See Figure 27 or the wiring diagram in the generator installation manual.

Note: The auxiliary winding mini-breaker on the original RDC2 controller is not connected on Model RCL generator sets.



- 1. P6 Ethernet connection
- 2. P1
- 3. P2
- 4. P4
- 5. P5

Figure 27 Controller Connections, RCL

9. Remove the old controller.
10. Reconnect all harnesses to the new controller assembly. See Figure 17 or the wiring diagram in the generator installation manual.
11. Install the controller onto the junction box using the two (2) screws removed in step 7.
12. Replace the access panel and secure with the screws.
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 distribution panel.
15. Update the controller firmware to the latest released version. See Section 4, Firmware Update, for instructions.
16. The controller will prompt you to set the date and time, and then to set the exerciser. See the generator set Operation Manual for instructions, if necessary.
17. Check the firmware version on the controller. See Section 4. Use SiteTech or the USB utility with the computer connected to the controller's USB port to update the firmware to the latest released version. See the SiteTech Software Operation Manual or the USB Utility instruction sheet for instructions.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

18. Set up the controller as instructed in Section 5, Controller Setup.
19. Calibrate the voltage. See Section 6, Voltage Calibration.
20. Replace covers and panels. Close and lock the enclosure door(s).
21. If OnCue® Plus is used to monitor this generator set, reset the OnCue password on the controller and note the new password. See Section 7, Setting the OnCue Password. Then connect with OnCue and enter the new password.
22. Verify that OnCue® Plus can communicate with the generator set over the Internet before leaving the job site.

3.4 VSC Controller Replacement, 6VSG

1. Review the service kit information in Section 2 and make sure that you have the correct service kits.
2. Read and follow the safety precautions in Section 1.
3. Using the enclosure locking tool provided with the generator set, open the enclosure roof.
4. Press the OFF button on the controller.

Note: Utility power is connected to the generator's terminal block. This power must be turned off before the controller is removed.

5. Disconnect utility power to the generator set by opening the circuit breaker in the building's distribution panel. Use a voltmeter to verify that utility power has been disconnected. See Figure 28 and Figure 29 for the utility power connection location.
6. Disconnect the generator set engine starting battery, negative (-) lead first.
7. Remove the two (2) screws securing the controller to the junction box and *carefully* lift the bottom edge of the controller. See Figure 30.

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

8. Note the connections on the back of the controller, and then disconnect all harnesses and leads from the controller. See Figure 31 or the wiring diagram in the generator installation manual.

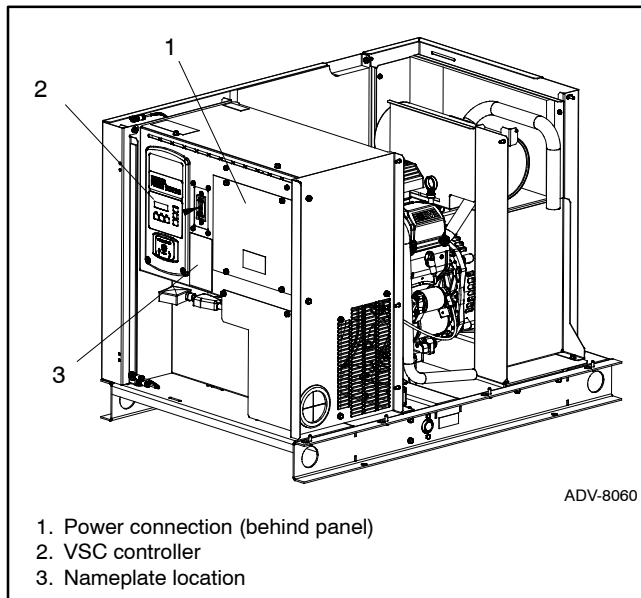


Figure 28 6VSG

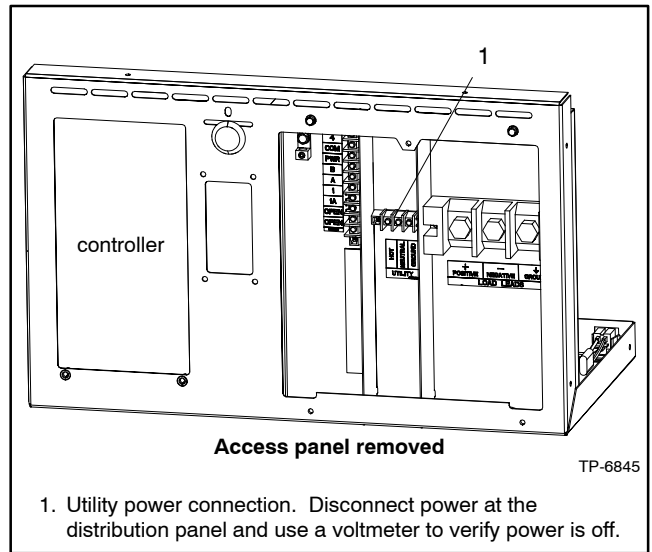


Figure 29 Power Connection Detail

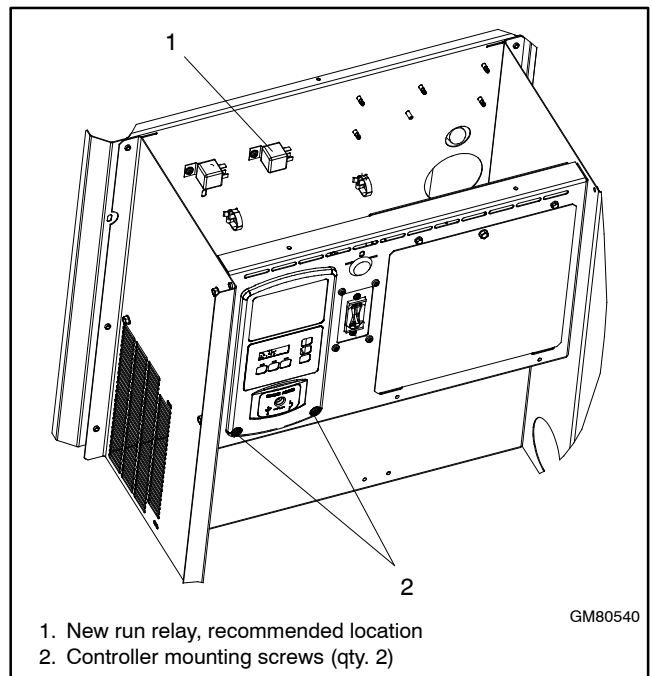


Figure 30 VSC Controller Mounting and Relay Location

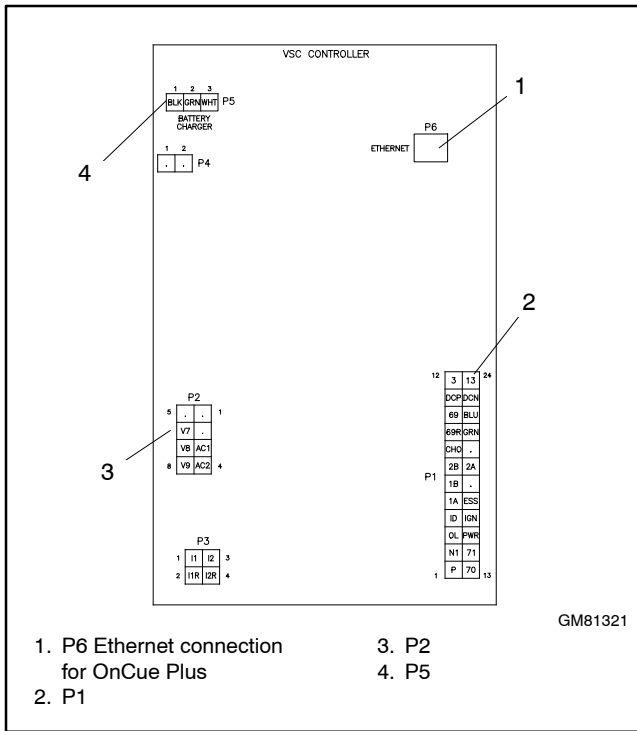


Figure 31 Controller Connections

9. Remove the old controller.
10. If an original (green board) controller is being replaced with an original controller, OR if a revised (red board) controller is being replaced with a revised controller, go to step 13.
11. If an original controller is being replaced with a revised controller, install the new relay provided in kit GM92804.

Note: Relay/breaker kit GM95104 can be used with the 6VSG. Discard the mini circuit breaker that is included in the kit.

- a. Use the hardware provided in the relay kit to install the new run relay in the junction box, near the existing relay. See Figure 30.
- b. Install fuse P22, which connects to the relay adapter harness, near the new relay. Make sure that the fuse is located close enough to the relay for the lead lengths in the harness.
- c. Connect the relay adapter harness to P1 on the controller. Connect the other end to the 24-pin

connector on the engine harness. Connect the adapter harness to the relay and the fuse. See Figure 32.

- d. Proceed to step 13.

12. Reconnect all harnesses to the new controller assembly.
13. Install the controller onto the junction box using the two (2) screws removed in step 6.
14. Reconnect the engine starting battery, negative (-) lead last.
15. Reconnect the utility power to the generator set by closing the circuit breaker in the distribution panel.
16. The controller will prompt you to set the date and time, and then to set the exerciser. See the generator set Operation Manual for instructions, if necessary.
17. Check the firmware version on the controller. See Section 4. Use SiteTech or the USB utility with the computer connected to the controller's USB port to update the firmware to the latest released version. See the SiteTech Software Operation Manual or the USB Utility instruction sheet for instructions.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

18. Set up the controller as instructed in Section 5, Controller Setup.
19. Calibrate the voltage. See Section 6, Voltage Calibration.
20. Replace panels and covers. Close and lock the enclosure roof.
21. If OnCue® Plus is used to monitor this generator set, reset the OnCue password on the controller and note the new password. See Section 7, Setting the OnCue Password. Then connect with OnCue Plus and enter the new password.
22. Verify that OnCue® Plus can communicate with the generator set over the Internet before leaving the job site.

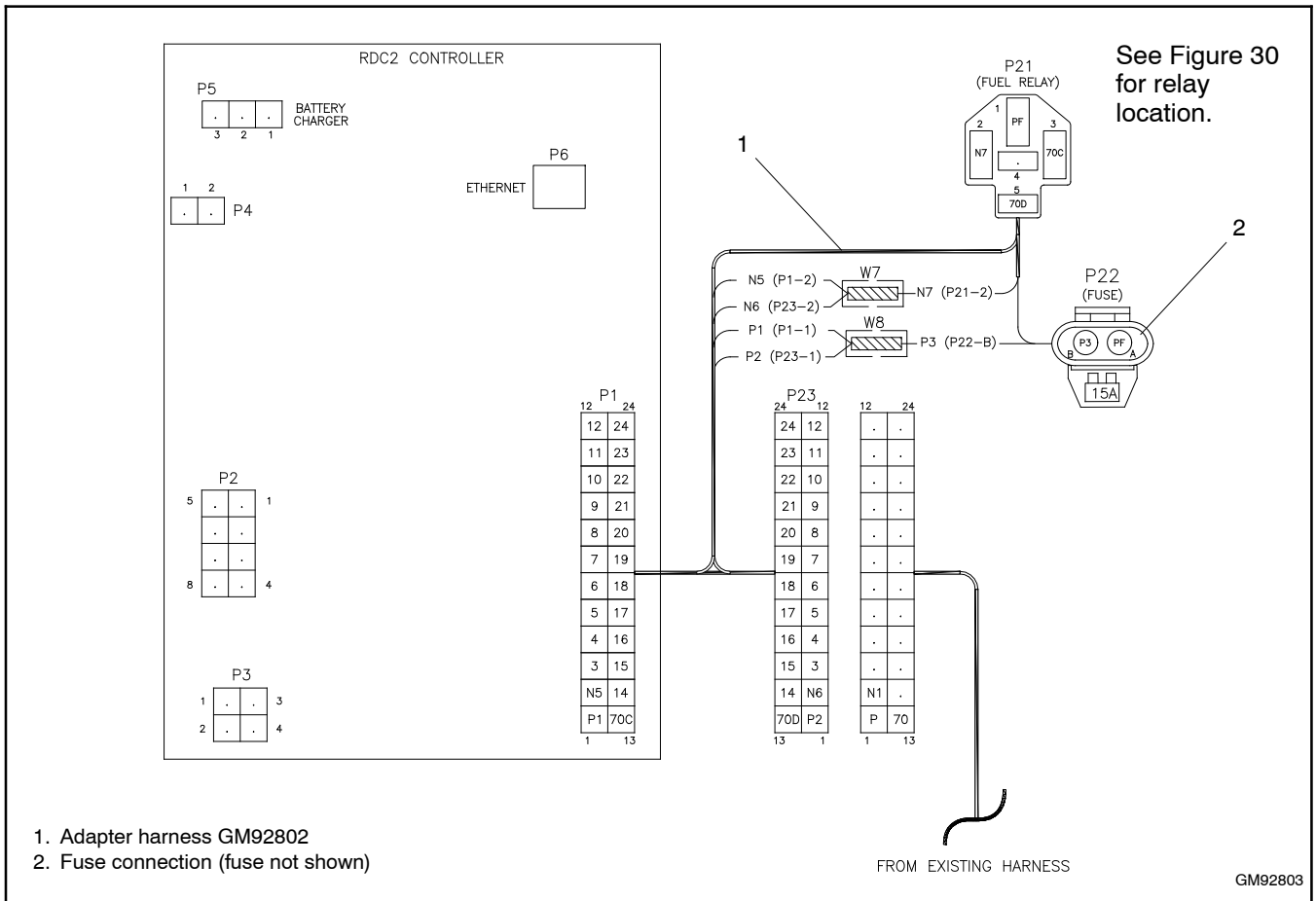


Figure 32 Relay and Adapter Harness (for replacing original controller with revised controller only)

4 Firmware Update

Update the firmware on the replacement controller to the latest version. Firmware files are posted on Kohler TechTools and on:

<http://www.KohlerGenerators.com/usb>.

Firmware filenames contain the controller name and the version number. For example, Rdc2_6_11_2.bin indicates RDC2 controller firmware version 6.11.2. Also see Figure 33 for firmware filename and version information.

Note: Controller firmware for use with the automatic paralleling module (APM) is labelled Automatic Paralleling Module or Paralleling Only and has a version number 101 or higher; for example, version number 105.6.0.

Note: The RDC2.4 blue-board controller uses different firmware than the red- and green-board controllers. Do not load RDC2.4 firmware onto a red- or green-board controller.

Controller	Firmware Filename
RDC2 green or red board	RDC2_#_#_#.bin Version 6 or higher is required for red board
DC2 green or red board	
RDC2 green or red board with paralleling	RDC2_#_#_#.bin Version 105.6 or higher is required for red board
RDC2.4 blue board	RDC2v4_#_#_#.bin Version 1 or higher
DC2.4 blue board	
RDC2.4 blue board with paralleling	RDC2v4_#_#_#.bin Version 101 or higher
VSC green or V3 blue board	VSC_#_#_#.bin Version 1.3.0 or higher is required for V3 blue board
VSC.4 blue board with gray USB port cover	Rdc2V4_Vsc_#_#_#.bin Version 1.0.2 or higher is required for V4 blue board

Figure 33 Firmware Filenames

Use a personal computer connected to the controller with a USB cable and Kohler® SiteTech™ software or the USB Utility to update the controller firmware. See TT-1636 for instructions to use the USB Utility to update firmware.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

Procedure to Update Software Using SiteTech

1. Download the latest RDC2/DC2 or VSC firmware file from the the Kohler Power Resource Center website or the Kohler dealer portal. Save the new firmware file on your PC. Be sure to note the file

location. Firmware files are typically downloaded as .zip files and will need to be extracted.

If the 14RESA or 20RESA/B/C/D single-phase generator set is paralleled with another unit using the PowerSync™ APM, be sure to load the controller firmware file for paralleled generators:

- Rdc2_#_#_#.bin version 105.5 or higher for original green-board RDC2 controllers.
- Rdc2_#_#_#.bin version 105.6 or higher for revised red-board RDC2 controllers.
- Rdc2v4_#_#_#.bin version 101.0 or higher for blue-board RDC2.4 controllers.

2. Use a USB cable to connect the controller to a USB port on your PC. See Figure 36 for the connection.
3. Start SiteTech. The program will recognize the connected device.
4. Click on Update Firmware near the top of the screen. See Figure 34.
5. A window will open asking you to browse for the firmware file. Click the Browse button and navigate to the directory where you stored the firmware file. Firmware files have the extension .bin (for example: RDC2_6_11_2.bin). Select the file and click Open.
6. The Update Device Firmware screen displays the current version number, new version number, and file name of the selected firmware file. See Figure 35. If all of the information is correct, click Update Firmware.
7. When the update is complete, the screen will display the version numbers and the message Firmware Updated Successfully. Click Close.

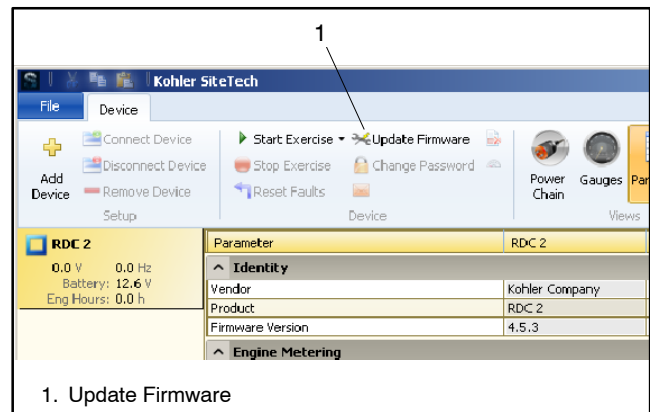


Figure 34 SiteTech Update Firmware Command

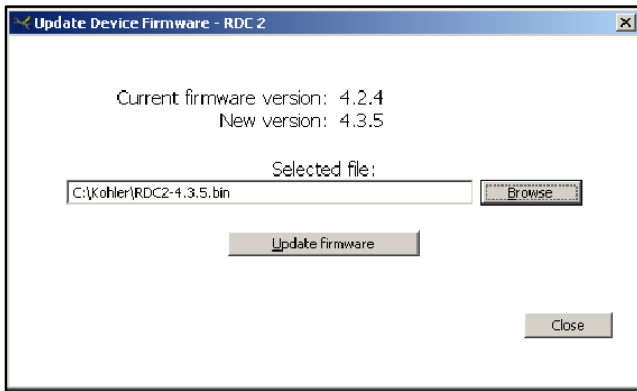


Figure 35 SiteTech Update Device Firmware Screen

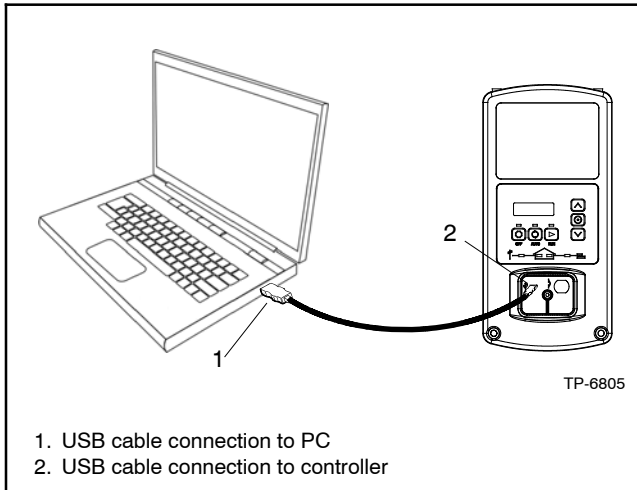


Figure 36 Controller Connection to a Laptop Computer through the USB Port (for setup using Kohler® SiteTech™ software; original controller shown)

5 Controller Setup

Controller setup is required after installation. Follow the instructions in this section to set the necessary parameters.

Controller Setup Notes:

- Some of the required information can be found on the generator set nameplate.
- The Fuel Type parameter is available through SiteTech with controller firmware versions 4.5 or higher. The fuel type setting affects the generator set power rating, which is used to determine setpoints for the load control or load shed devices. Setting the Fuel Type is recommended if the generator set is connected to an LCM, load shed kit, or RXT transfer switch with a combined interface/load management board.
- See Figure 38 or Figure 39 for additional information.

Controller Setup Procedure

1. Use one of the methods listed below to set the parameters shown in Figure 38 or Figure 39.
 - a. The RDC2 or VSC controller can be set up using the buttons on the controller to navigate through the controller menus and change the settings. See the required controller menus in Figure 40 through Figure 43. See the generator set operation manual for additional instructions, if necessary.
 - b. Kohler® SiteTech™ software and a personal (laptop) computer are required for setting up the DC2 controller. The RDC2 and VSC controllers can also be set up using SiteTech. The computer connects directly to the controller through the USB port. See Figure 36. Refer to TP-6701, SiteTech Software Operation Manual, for instructions if necessary.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

2. Check the voltage calibration and adjust, if necessary. See Section 6, Voltage Calibration.

Exporting Settings from a File

If a personal computer (laptop) and Kohler® SiteTech™ software were used to create a controller settings file at the time of generator set installation (or another time when the controller was known to be operating correctly), then SiteTech software can be used to load the saved settings onto the new controller. See TP-6701, SiteTech Software Operation Manual, for instructions to export and import controller settings.

Note: Load the old controller settings onto the new controller only if you are certain that the settings are correct. Many generator set operation problems can be caused by incorrect settings.

Do not load settings from an original green-board controller onto a revised red-board controller (or vice-versa). Do not attempt to load settings from an RDC2 controller onto an RDC2.4 controller (or vice-versa).

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

System Voltage	Frequency, Hz	Phases	Phase Connection
120	60	1	Single
220	50	1	Single
230	50	1	Single
240	50	1	Single
100/200	50	1	Single
100/200	50	3	Delta
110/220	60	1	Single
110/220	60	3	Delta
115/230	50	1	Single
120/208	60	3	Wye
120/240	60	1	Single
120/240	60	3	Delta
127/220	50	3	Wye
220/380	50	3	Wye
230/400	50	3	Wye
240/416	50	3	Wye
277/480	60	3	Wye

Figure 37 Voltage and Phase Connections

Parameter	Controller Menu	SiteTech Group	Settings				
			8/10/12RESV/ RESVL	14RESA/ RESAL	20RESA/ RESAL 20RESC/ RESCL	20RESB 20RESD	RCL RCLA RCLB
Genset Model Number	Genset Information	Genset Info	8RESV*, 10RESV*, or 12RESV*	14kW	20kW	20kW	From genset nameplate
Genset Serial Number			From nameplate				
Fuel Type †	Genset System	Genset System Configuration	Natural Gas or Liquid Propane (LP)				
Phase Connection			Single Phase	See the nameplate and Figure 37		Single Phase	See the nameplate and Figure 37
Genset System Voltage			From nameplate				
Genset System Frequency			60 Hz	50 or 60 Hz			
* For 8RESVL, select 8RESV. For 10RESVL, select 10RESV, For 12RESVL, select 12RESV.							
† Fuel Type is available with controller firmware versions 4.5 or higher.							

Figure 38 Controller Setup, RDC2 and DC2 Controllers

Controller Parameter	SiteTech Parameter	Settings		
		24V	36V	48V
Genset Model Number	Genset Model Number	6VSG-24V	6VSG-36V	6VSG-36V
Genset Serial Number	Genset Serial Number	From nameplate		
System Voltage	Genset System Voltage	27 ‡	47.5 ‡	54 ‡
Auto Start Volt	Auto Start Minimum Voltage	25 ‡	37.5 ‡	50 ‡
Auto Stop Load (%)	Auto Stop Minimum Percent Load	40 ‡		
Pct. Load Limit (%)	Genset Maximum Percent Capacity	100 ‡		
Fuel Type	Genset Fuel Type	Natural Gas or LPG		
—	Voltage Regulator Gain §	128		
—	Personality Installed Options § (in Genset Personality Profile Group)	None for standard 6VSG; 6VSG Telecom if communications kit is installed.		

‡ Setting the model number automatically sets these parameters to the default settings shown.
§ SiteTech is required to set these parameters.

Figure 39 Controller Setup, VSC Controller

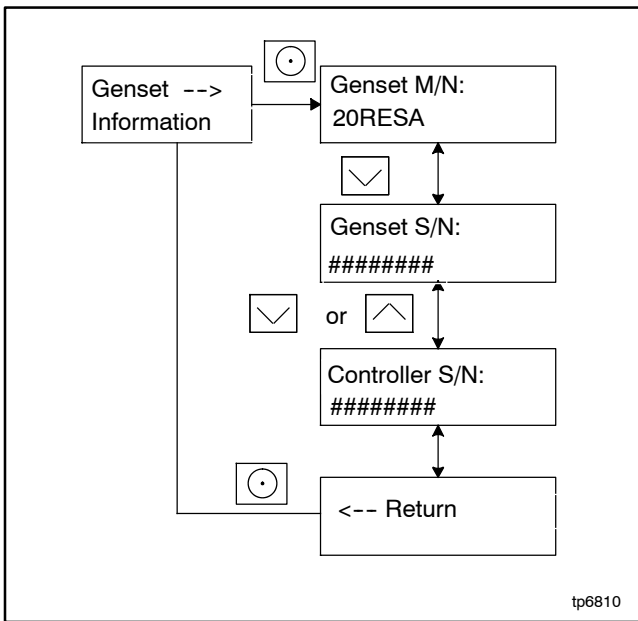


Figure 40 Genset Information Menu, RDC2

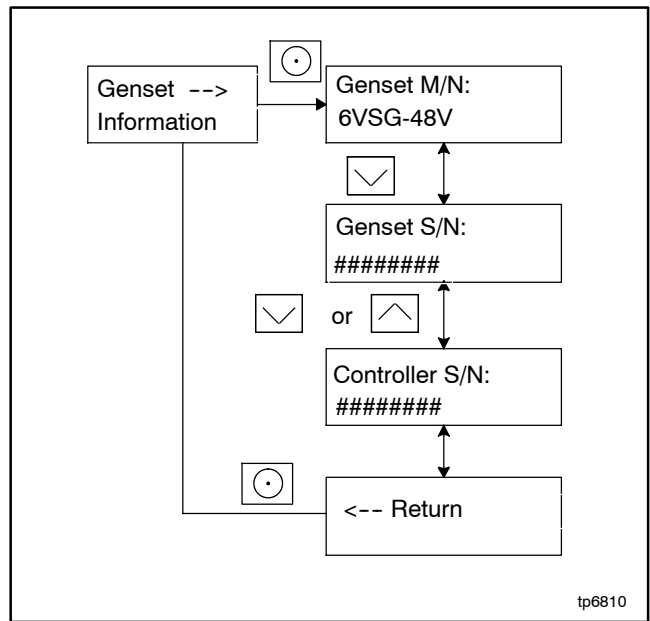


Figure 41 Genset Information Menu, VSC Controller

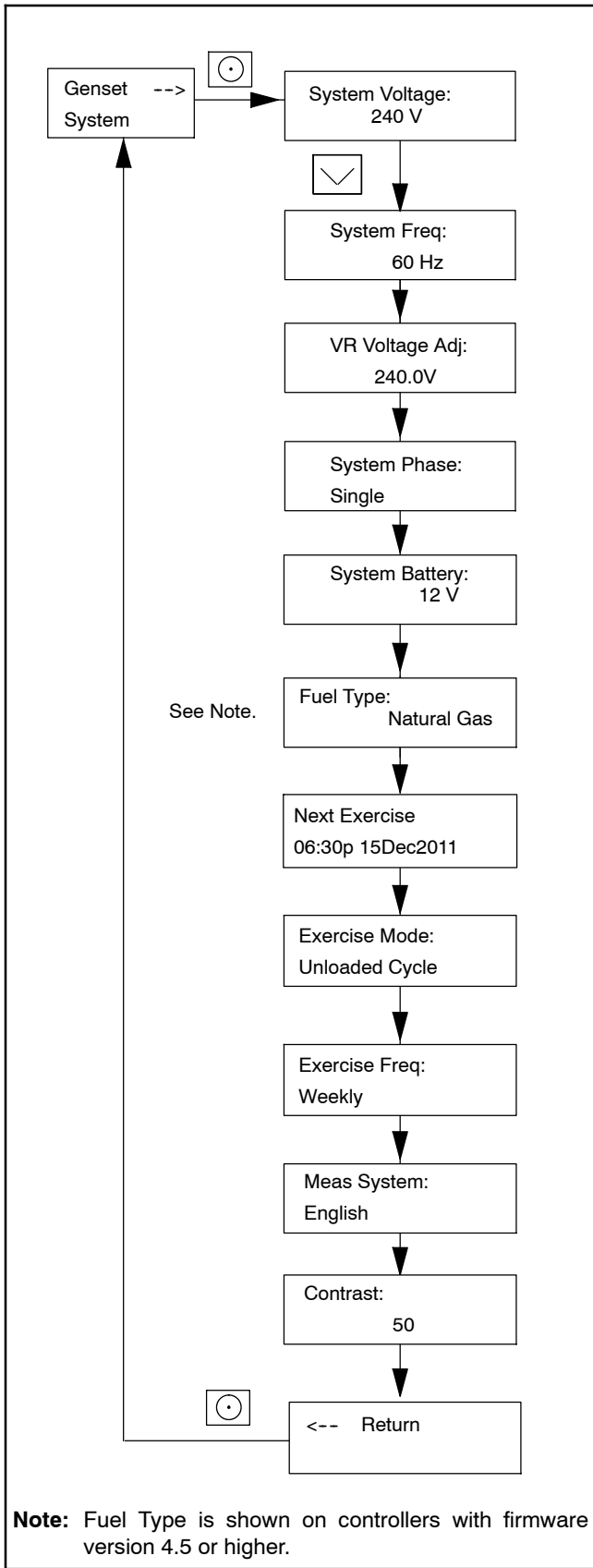


Figure 42 Genset System Menu, RDC2

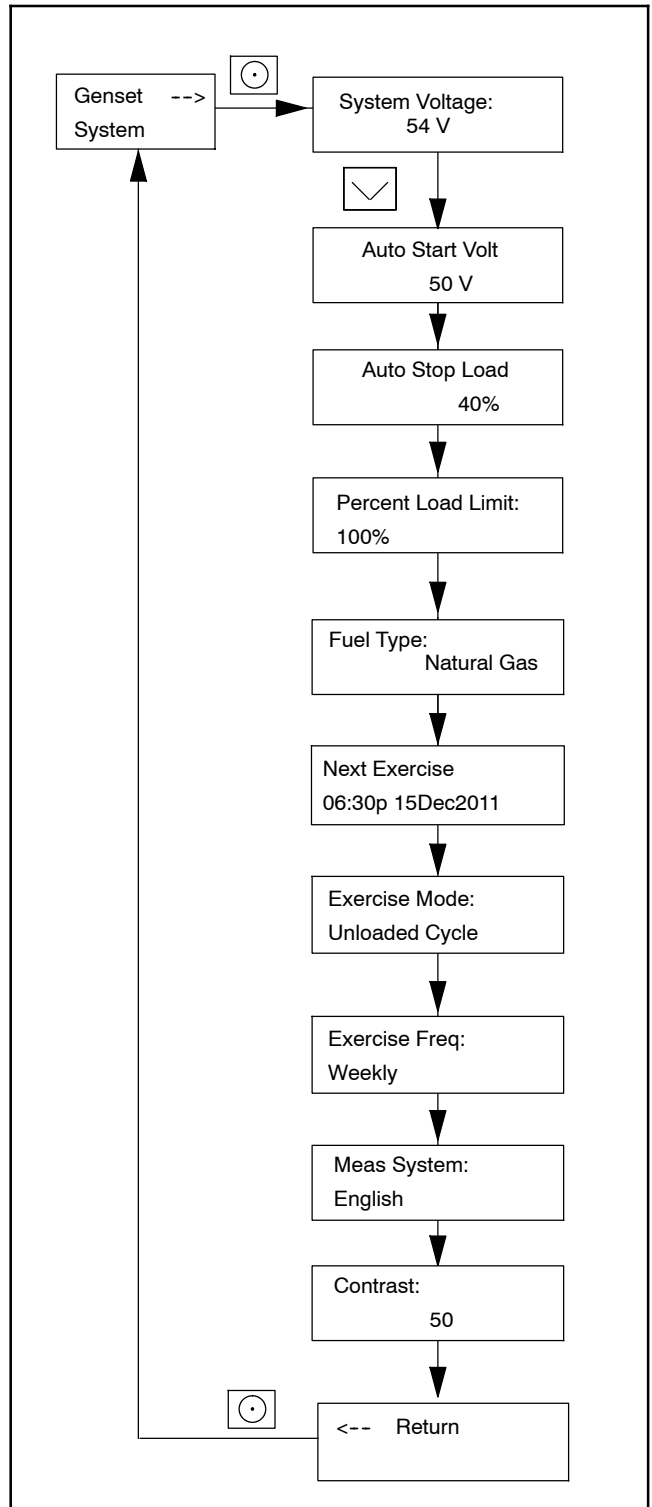


Figure 43 Genset System Menu, VSC

RDC 2
0.0 V 0.0 Hz
Battery: 12.6 V
Eng Hours: 0.0 h

Parameter	RDC 2
^ Genset Info	
Genset Model Number Select	Model 20 RE SA
Genset Serial Number	
Alternator Part Number	
Genset Controller Serial Number	-1
Engine Part Number	
Engine Model Number	CH-1000
Engine Serial Number	
Genset State	Off
^ Genset Run Time	
^ Genset Personality Profile	
^ Genset System Configuration	
Genset System Voltage	240.0 V
Genset System Frequency	60.0 Hz
Genset Voltage Phase Connection	Single Phase
Genset Power Rating	18.0 kW
Genset Rated Current	75.0 A
Genset System Battery Voltage	12 V
Prime Power Application	Standby
Current Transformer Ratio	400
Local Start Mode	Off
Measurement System	English
ECM Power	False
Alarm Silence Always Allowed	Always
Display Contrast	0
Using Voltage Selector Switch	False
Genset System Language	English
Genset Maximum Percent Capacity	70.0 %
Generator Overloaded Percent	85.0 %
Genset Fuel Type	Natural Gas
Automatic Start Minimum Voltage	51.0 V

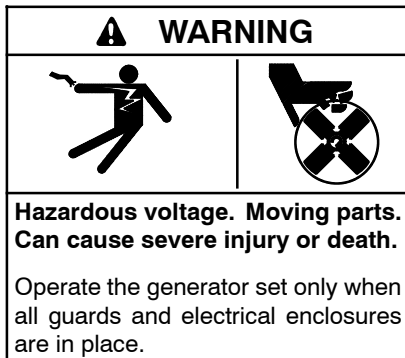
Event History
1 Device 1 Connected - 1002 Events 2 Active Alerts

1. Genset model and serial numbers
2. System settings
3. Fuel type (controller firmware version 4.5 or higher)

tt1589

Figure 44 Controller Setup Using SiteTech™

6 Voltage Calibration



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)

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 all jewelry before servicing the equipment.

The RDC2 and VSC controllers can be calibrated using the controller keypad and menus, or using a personal computer with Kohler® SiteTech™ software. SiteTech is required for calibration of the DC2 controller.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

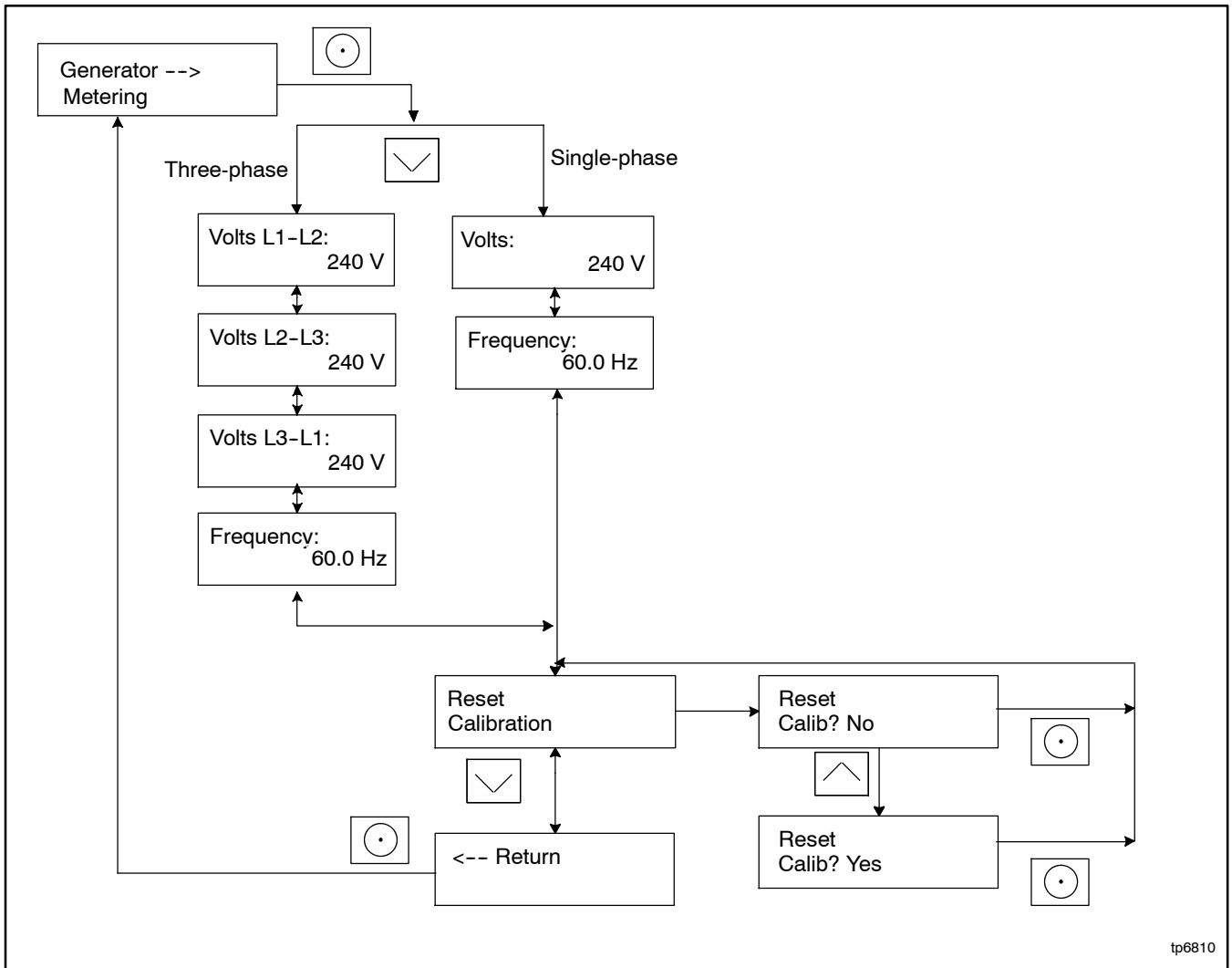
6.1 Voltage Calibration Using the Controller Keypad

6.1.1 RDC2 Voltage Calibration Using the Controller Keypad

The controller's voltage calibration can be adjusted using the controller keypad. See Figure 45 and follow the procedure below.

Note: A digital voltmeter is required for these adjustments.

1. With the generator set off, connect a digital multimeter to measure output voltage across L1 and L2. Set the meter to measure AC volts.
2. Start the generator set by pressing the RUN button on the RDC2 controller.
3. Navigate to the Generator Metering menu and press the Select button. Volts L1-L2 will be displayed.
4. Press the Select button. The voltage number will flash.
5. Press the up or down arrow buttons to change the voltage reading to match the reading on the voltmeter.
6. When the correct voltage is displayed, press the Select button.
7. Use the arrow buttons to step down to the Return screen.
8. Pressing select when Reset Calibration is displayed will discard the changes and reset the calibration to the original readings.
9. Press OFF to stop the generator set.



tp6810

Figure 45 Voltage Calibration Using RDC2 Menus

6.1.2 VSC Voltage Calibration Using the Controller Keypad

The controller's voltage calibration can be adjusted using the controller keypad. See Figure 45 and follow the procedure below.

Note: A digital voltmeter is required for these adjustments.

1. With the generator set off, connect a digital multimeter to measure output voltage across TB3 + and – terminals. Set the meter to measure DC volts.
2. Start the generator set by pressing the RUN button on the VSC controller.
3. Navigate to the Generator Metering menu and press the Select button. Volts will be displayed.

4. Press the Select button. The voltage number will flash.
5. Press the up or down arrow buttons to change the voltage reading to match the reading on the voltmeter.
6. When the correct voltage is displayed, press the Select button.
7. Use the arrow buttons to step down to the Return screen.
8. Pressing select when Reset Calibration is displayed will discard the changes and reset the calibration to the original readings.
9. Press OFF to stop the generator set.

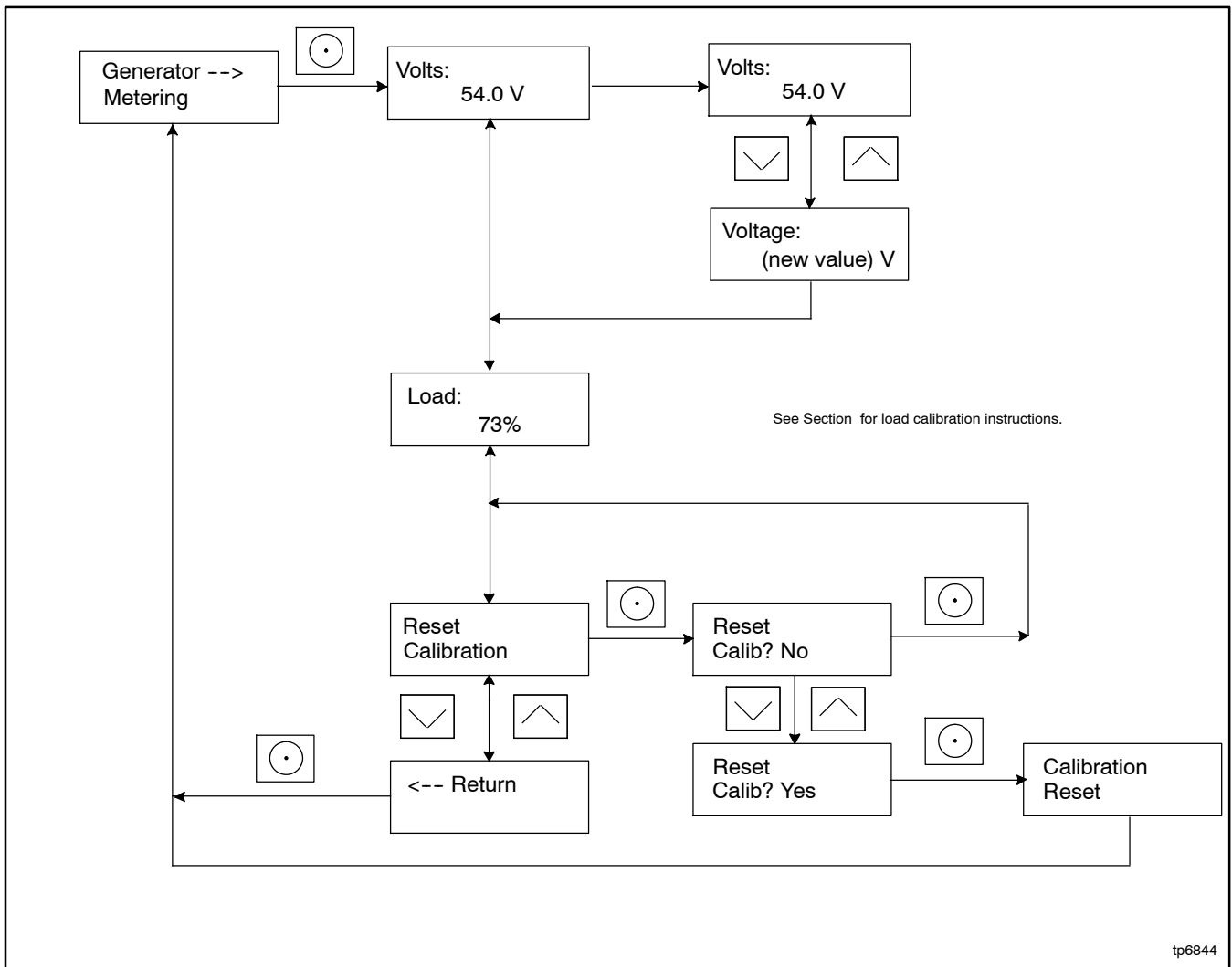


Figure 46 Voltage Calibration from the Controller Keypad, VSC

6.2 Calibration Using SiteTech

6.2.1 RDC2 Voltage Calibration Using SiteTech

Voltage calibration factors can be adjusted using SiteTech software to calibrate the RDC2 or DC2 controller. Connect a personal computer (laptop) to the controller using a USB cable and follow this procedure to use Kohler® SiteTech™ software to calibrate the controller.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

The voltage calibration factors are located in the Genset Calibration group in SiteTech™. Find the parameter labelled Genset Calibration Factor Voltage, L1-L2. See Figure 48.

Note: A digital voltmeter is required for these adjustments.

1. With the generator set off, connect a digital multimeter to measure output voltage across L1 and L2. Set the meter to measure AC volts.
2. Start the generator set by pressing the RUN button on the RDC2 controller.
3. Compare the voltage reading on the digital voltmeter to the voltage displayed by the controller.

Note: On the DC2 controller, the voltage is shown in the scrolling status displays when the generator set is running. Generator Voltage L1-L2 is also displayed in SiteTech in the Generator Metering group.

4. If the voltage displayed on the controller does not match the measured voltage, use the equation in Figure 47 to calculate a new value for Genset Calibration Factor Voltage, L1-L2.
5. Type the new value for Genset Calibration Factor Voltage, L1-L2 into SiteTech and click on Apply Changes. See Figure 48.
6. Allow a few seconds for the controller to adjust to the new factor and then compare the voltmeter reading with the voltage displayed on the controller.
7. If the voltage readings do not match, check your calculations. Check the calibration factor and both voltage readings again. Repeat the procedure using the new values, if necessary.

Note: To simplify the calculation, set the calibration factor to 1.0000 and then repeat the calibration procedure from step 3.

8. Press OFF to stop the generator set.
9. Repeat the procedure for voltage across L2-L3 and L3-L1, if necessary. (Three-phase only.)

$$(V_{\text{meter}} \div V_{\text{control}}) \times F_{\text{old}} = F_{\text{new}}$$

V_{meter} = Voltmeter reading

V_{control} = Voltage displayed on controller

F_{old} = Genset Calibration Factor Voltage, L1-L2, from SiteTech before calibration

F_{new} = New value to enter for Genset Calibration Factor Voltage, L1-L2, in SiteTech

Example:

Voltmeter reading: 241.2

Controller display: 240

Old calibration factor (from SiteTech): 1.0063

New calibration factor:

$$(241.2 \div 240) \times 1.0063 = 1.0113$$

Figure 47 Voltage Calibration Factor

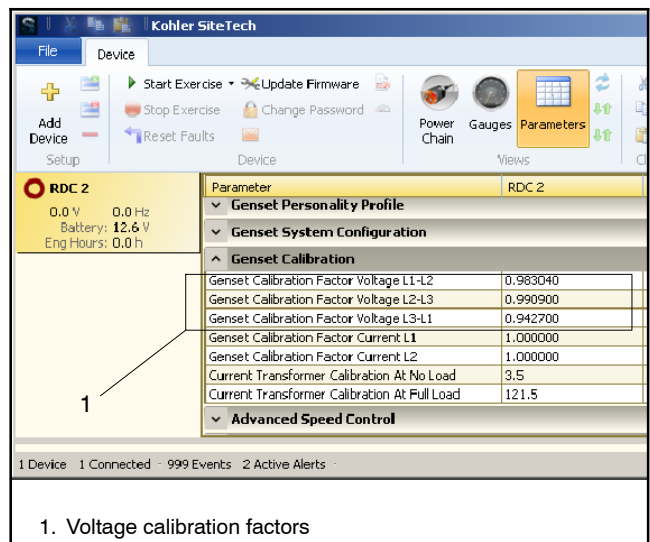


Figure 48 Voltage Calibration Factors in SiteTech™

6.2.2 VSC Voltage Calibration Using SiteTech

Connect a personal computer (laptop) to the controller using a USB cable and follow this procedure to use Kohler® SiteTech™ software to calibrate the controller.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

The voltage calibration factors are located in the Genset Calibration group in SiteTech™. Find the parameter labeled Genset Calibration Factor Voltage, L1-N. See Figure 51.

Note: Note: A digital voltmeter is required for these adjustments.

1. With the generator set off, connect a digital multimeter to measure output voltage across + and -. Set the meter to measure DC volts.
2. Start the generator set by pressing the RUN button on the VSC controller.
3. Compare the voltage reading on the digital voltmeter to the voltage displayed by the controller.
4. If the voltage displayed on the controller does not match the measured voltage, use the equation in Figure 49 to calculate a new value for Genset Calibration Factor Voltage, L1-N.
5. Type the new value for Genset Calibration Factor Voltage, L1-N into SiteTech and click on Apply Changes. See .
6. Allow a few seconds for the controller to adjust to the new factor and then compare the voltmeter reading with the voltage displayed on the controller.
7. If the voltage readings do not match, check your calculations. Check the calibration factor and both voltage readings again. Repeat the procedure using the new values, if necessary.

Note: To simplify the calculation, you can set the calibration factor to 1.0000 and then repeat the calibration procedure from step 3.

8. Press OFF to stop the generator set.

$$(V_{\text{meter}} \div V_{\text{control}}) \times F_{\text{old}} = F_{\text{new}}$$

V_{meter} = Voltmeter reading

V_{control} = Voltage displayed on controller

F_{old} = Genset Calibration Factor Voltage, L1-N, from SiteTech before calibration

F_{new} = New value to enter for Genset Calibration Factor Voltage, L1-N, in SiteTech

Example:

Voltmeter reading: 53.4

Controller display: 54.0

Old calibration factor (from SiteTech): 1.0063

New calibration factor:

$$(53.4 \div 54.0) \times 1.0063 = \mathbf{0.9951}$$

Figure 49 VSC Voltage Calibration Factor

6.3 VSC Load (Current) Calibration

The VSC controller can be calibrated using the controller keypad and menus, or using a personal computer with Kohler® SiteTech™ software.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

6.3.1 VSC Current Calibration Using the Controller Keypad

The controller's load calibration can be adjusted using the controller keypad. See Figure 50 and follow the procedure below.

Note: A digital ammeter is required for these adjustments.

1. With the generator set off, connect a digital multimeter to a DC current probe and configure it to measure current supplied by the generator (DC Amps).

Note: The 6VSG supplies current far in excess of what a digital multimeter can handle using the internal current measurement channel. A clamp-on DC current probe or DC current meter is required.

2. Start the generator set by pressing the RUN button on the VSC controller.
3. Adjust the system voltage to obtain rated current output if battery bank is attached. If no battery bank is attached, a load bank will be necessary to calibrate the generator load metering.

Note: If the generator current and voltage will not increase when the set point is raised, it is possible that the generator is in current-limit mode. The maximum percent load may need to be increased to reach rated output current on the generator for calibration. The maximum percent load may not be set above 105%. It is possible that several calibration attempts may be required to reach rated output current if the controller has been replaced.

Note: If the current does not reach rated current when the output voltage has reached a maximum safe voltage, the battery bank may require discharging before the calibration can be completed. This may require the use of a load bank.

Note: If the Percent Load of the generator is correct, there is no need to complete calibration. Percent Load is computed by the following:

$$\% \text{ Load} = (\text{Measured Current} * \text{Output Voltage}) / 60$$

4. Trip the output breaker on the generator.
5. Navigate to the Generator Metering menu and press the Select button. Gen Voltage will be displayed.
6. Press the Down button. The Generator Load will be displayed.
7. Press and hold the Select button. No-Load Calibration will be displayed.
8. Verify that the generator output breaker is open. Press Select, select Yes, and press Select again.
9. Close the circuit breaker for the generator output.
10. Verify that the generator is supplying rated output current. Press Select, select Yes, and press Select again.
11. Verify that the load on the generator is displayed correctly. Recalibrate if necessary.
12. Press OFF to stop the generator set.

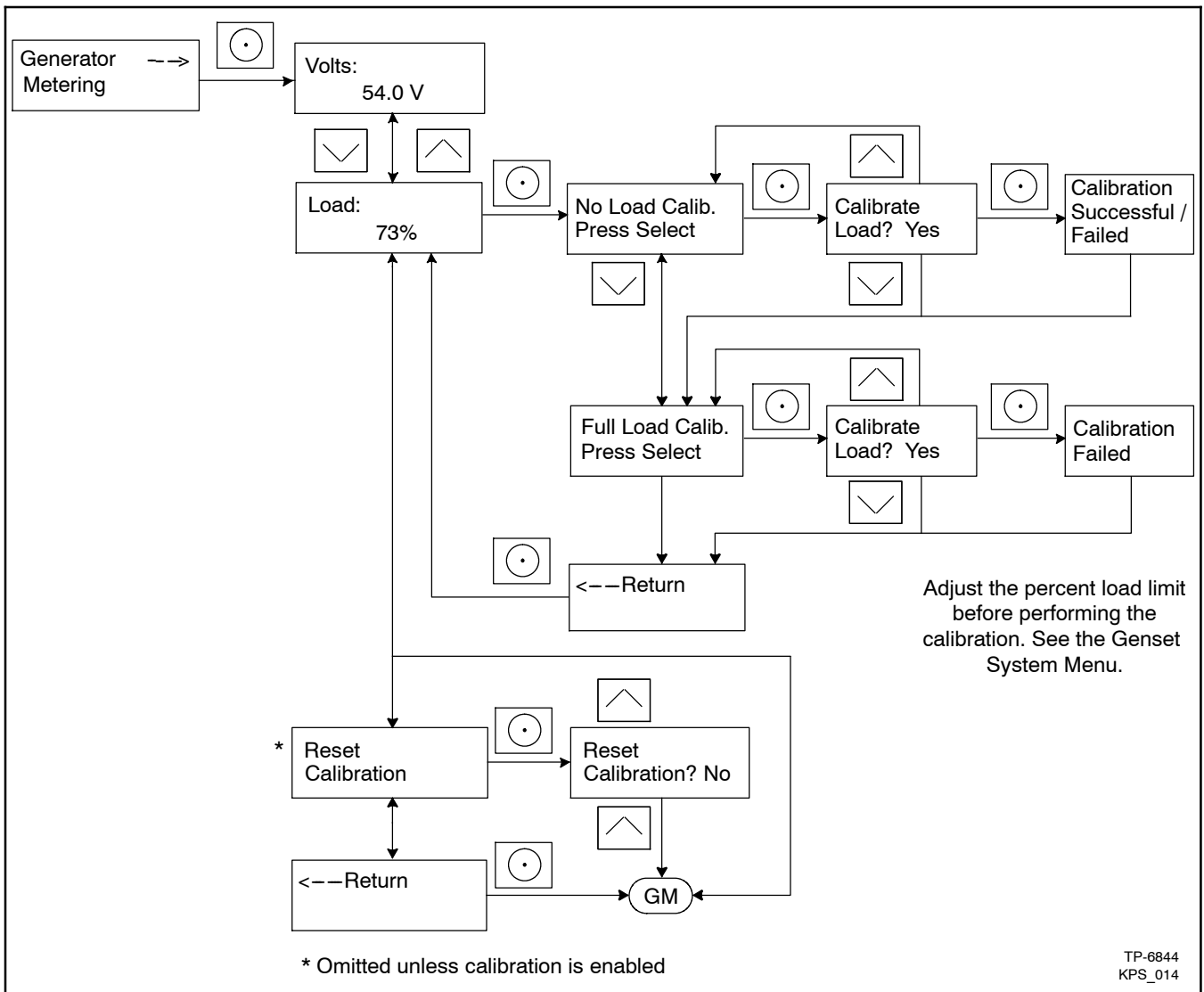


Figure 50 VSC Load (Current) Calibration

6.3.2 VSC Current Calibration Using SiteTech

Current calibration factors can be adjusted using SiteTech™ software. Connect a personal computer (laptop) to the controller using a USB cable and follow this procedure to use Kohler® SiteTech™ software to calibrate the VSC controller.

Note: SiteTech version 4.5 or later is required for use with RDC2.4, DC2.4, and VSC.4 controllers.

The current calibration factors are located in the Genset Calibration group in SiteTech. Find the parameters labeled Current Transformer Calibration At No Load and Current Transformer Calibration At Full Load. See Figure 51.

Note: A digital ammeter is required for these adjustments.

1. With the generator set off, connect a digital multimeter to a DC current probe and configure it to measure current supplied by the generator (DC Amps).

Note: The 6VSG supplies current far in excess of what a digital multimeter can handle using the internal current measurement channel. A clamp-on DC current probe or DC current meter is required.

2. Start the generator set by pressing the RUN button on the VSC controller.
3. Adjust the Voltage Regulator Average Voltage Adjustment to obtain rated current output if battery bank is attached. If no battery bank is attached, a load bank will be necessary to calibrate the generator load metering.

Note: If the generator current and voltage will not increase when the set point is raised, it is possible that the generator is in current-limit mode. Increasing the Current Transformer Calibration At Full Load setting will permit additional load to be placed on the generator set.

Note: If the current does not reach rated current when the output voltage has reached a maximum safe voltage, the battery bank may require discharging before the calibration can be completed. This may require the use of a load bank.

Note: If the Percent Load of the generator is correct, there is no need to complete calibration. Percent Load is computed by the following:

$$\% \text{ Load} = (\text{Measured Current} * \text{Output Voltage}) / 60$$

4. Set the Current Transformer Calibration At Full Load to the value displayed under the Generator Current Average while the generator is at 100% load.
5. Open the generator output breaker.
6. Set the Current Transformer Calibration At No Load to the value displayed under the Generator Current Average while the generator is at no load (breaker tripped).
7. Close the circuit breaker for the generator output.
8. Verify that the load on the generator is displayed correctly. Recalibrate if necessary.
9. Press OFF to stop the generator set.

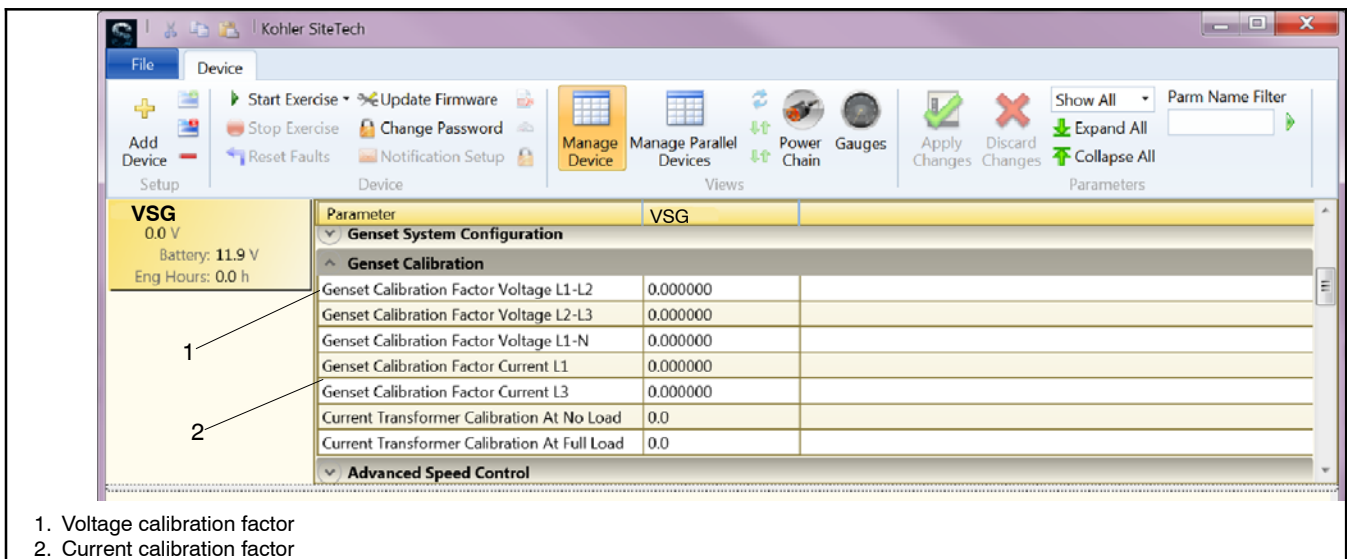


Figure 51 VSC Controller Voltage and Current Calibration Factors in SiteTech

7 Setting the OnCue Password

If the Kohler® OnCue® Plus Generator Management System is used to monitor the generator set, reset the OnCue password as described in Section 7.1 for the RDC2 or VSC controller. See Section 7.2 for the DC2 controller.

7.1 RDC2 and VSC Controllers

Refer to Figure 52 during this procedure.

1. Press Select and then press the down arrow button to navigate to the networking Information menu.
2. Press Select. Networking Status is displayed.
3. Press the Down arrow button. Networking Configuration is displayed.
4. Press Select. Reset OnCue Password is displayed.
5. Press and HOLD the Select button until Reset OnCue Password? No appears. The word No will flash.

6. Press the Up arrow button to change the word No to Yes.

7. Press Select to reset the password. The generator set serial number and new password are displayed for 10 seconds. Be sure to write down the new password for entry into OnCue Plus.

7.2 DC2 Controller

1. Press the OFF button and verify that the generator set is not running.
2. Press and HOLD the EXERCISE button until *Press Again to Reset OnCue PW* is displayed.
3. Release the EXERCISE button and press it again within 5 seconds.

Note: If the EXERCISE button is not pressed within 5 seconds, the controller exits the password reset mode.

4. The generator set serial number and new password will be displayed for 10 seconds. Be sure to write down the new password for entry into OnCue Plus.

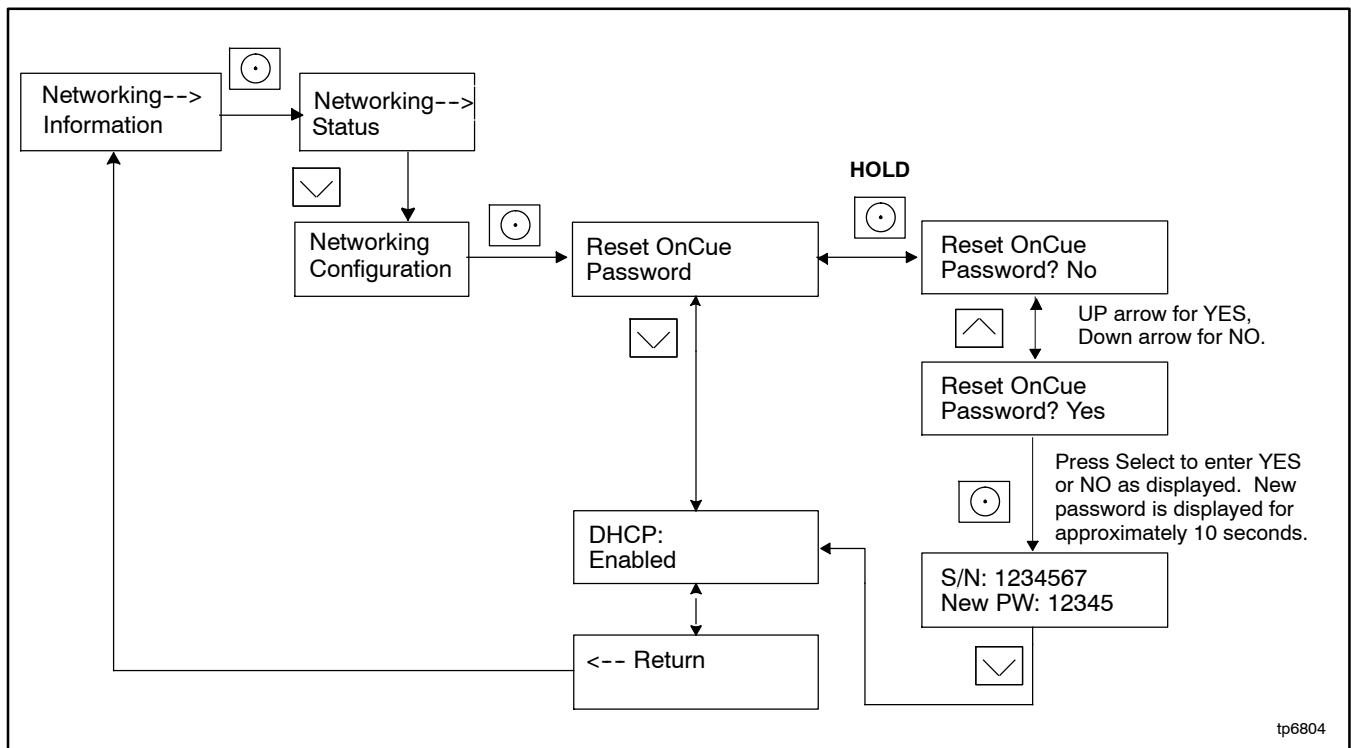


Figure 52 Setting the OnCue Password, RDC2 and VSC

Notes

Parts Lists

Original RDC2 Service Controller

Kit: GM84962		
Qty.	Description	Part Number
1	Controller, RDC2 - Distributor	GM85969-1
1	Installation Instructions	TT-1589

Original DC2 Service Controller

Kit: GM84963		
Qty.	Description	Part Number
1	Controller Assembly, DC2 - Retail	GM85969-2
1	Installation Instructions	TT-1589

VSC Variable Speed Service Controller

Kit: GM84964		
Qty.	Description	Part Number
1	Controller Assembly, VSC	GM85969-3
1	Installation Instructions	TT-1589

Revised RDC2 Service Controller

Kit: GM92089		
Qty.	Description	Part Number
1	Controller, RDC2 - Distributor	GM92088-1
1	Installation Instructions	TT-1589

Revised DC2 Service Controller

Kit: GM92090		
Qty.	Description	Part Number
1	Controller, DC2 - Retail	GM92088-2
1	Installation Instructions	TT-1589

Revised VSC Variable Speed Service Controller

Kit: GM92091		
Qty.	Description	Part Number
1	Controller, DC2 - Retail	GM92088-3
1	Installation Instructions	TT-1589

Relay Service Kit for 6VSG

Kit: GM92804		
Qty.	Description	Part Number
1	Relay, 12 VDC	GM49746
1	Harness, RESA relay kit	GM92802
2	Screw, pan head mach.	M7985A-05012-20
2	Nut, hex elastic stop, 5mm	M982-05-60
1	Installation Instructions	TT-1589

Relay/Breaker Service Kit

Kit: GM95104		
Qty.	Description	Part Number
1	Relay, 12 VDC	GM49746
1	Harness, RESA relay kit	GM92802
1	Harness, RDC2 breaker	GM95103
2	Screw, pan head mach.	M7985A-05012-20
2	Nut, hex elastic stop, 5mm	M982-05-60
1	Installation Instructions	TT-1589

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator set distributor for availability.