

SECTION 8 • DVR®2000E VOLTAGE REGULATOR SET-UP FROM THE COMPUTER FOR SINGLE UNIT OPERATION



PROCEDURE

The regulator must be powered from an external source into terminals 3 and 4. This power can be from the generator PMG with the engine running or a 120 Vac wall outlet.

CAUTION

Before terminals 3 and 4 on the voltage regulator are connected to the PMG, the engine must be set for 1800 RPM for 60 Hz operation or 1500 RPM for 50 Hz operation. If the engine speed goes high the PMG voltage will also go high, which can damage the voltage regulator.

1. Connect the computer to the voltage regulator with a straight serial cable (no null modem).
2. Ground the regulator with the ground terminal. No other wires should be connected to the regulator at this time. When power is applied to the regulator, **LED 2, Loss of Sensing**, should be blinking.
3. Start the DVR®2000E computer program on the computer. Click on '**Communications**' in the top tool bar. Select '**Open Comm Port**' from the drop down menu, then move over and click on '**RS-232 Port**'. In the Password window, type '**dvr**' and press '**Enter**'. The default settings on the '**Comm Port**' window are normally acceptable. Press '**Enter**' to proceed with the default settings. If everything is working properly, a series of small windows will open to show that information is being uploaded from the voltage regulator. Every time a screen is changed on the computer, new data will be read from the voltage regulator to insure that the screen is up to date.
4. Click on '**File**' in the top tool bar and then click on '**Save**' in the drop down menu. Click '**Yes**' to save the data. In the window that opens, type the name of the file that is appropriate for the installation. Click on '**Save**'. By saving the data before any changes are made allows the user to refer back to the default settings if necessary. To print the settings for future reference, click on '**File**' in the top tool bar and then click '**Print**'. Click on the '**Print**' button and fill in the requested data to add to the print out to identify the specific unit. Then click '**OK**'.

Note: For the following steps below for any window on the computer screen that requires data entry (fields with white or green colored background), double clicking on the window will provide a list of the acceptable values. After a number is changed in a window, press '**Enter**' to send data to the regulator.

5. The first screen to appear is the '**System Settings**' screen. In the upper left area of the screen under the '**Sensing Voltage**' section, identify whether the generator will be three phase or single phase by clicking on the circle next to '**Three Phase**' or '**Single Phase**'. In the top center under '**Regulator Sensing Voltage (V)**' enter the nominal value that the regulator will see on its sensing terminals. If it is connected to the output leads of the generator it will sense the rated generator voltage. If it is connected to the midpoint of the generator leads it will sense one-half of the rated generator voltage. If it is connected to the secondary of a sensing transformer it will sense the secondary voltage of the transformer. If a sensing transformer is used, enter the ratio of the sensing transformer (480:120 has a ratio of 4) in the '**Generator PT Ratio**' window. If a CT is used it must have a secondary rating of 5 amps. Enter the CT ratio (500:5 has a ratio of 100) in the '**Generator CT Ratio**' window.

Note: If an ammeter is installed, it is recommended that the B phase CT be connected in series through the regulator CT1 and CT2 terminals. This will provide additional information on the '**Metering**' screen that can be very useful for any troubleshooting.

6. Click the '**Settings**' button in the upper tool bar. On the '**Setpoint**' tab, under '**Automatic Voltage Regulator (AVR)**' enter the voltage in '**AVR Setpoint (V)**' that the regulator will see when the generator is operating properly. This is the fine voltage adjustment and will either be the generator terminal voltage or the voltage from the secondary of a transformer. If the unit is to operate at 50 Hz, change the '**Corner Frequency (Hz)**' to '**49**' in the '**Underfrequency Setting**' section.
7. Click the '**Gain**' button in the upper tool bar. On the '**Control Gain**' screen identified in the upper left, enter the required value in the '**Stability Range**' area based on the identified frame size from the following table:

FRAME SIZE	STABILITY RANGE
360	1
430	2
570	3
740	4
1000	5

8. Click the **'Metering'** button in the upper tool bar. In the **'Control Mode'** section located in the lower right of the screen, set the regulator to the **'FCR'** mode for startup by clicking on the rectangular button to the right of **'FCR'**. On the top right, under **'Setpoint'**, the **'Current (A)'** window should be green. Enter **'0.1'** in this window.
9. Click the **'EEPROM'** button in the upper tool bar to save the new settings to permanent memory in the regulator.
10. Click **'File'** in the top tool bar and pick **'Save'**. Click **'Yes'** to save the new settings to a file for future reference.
11. Click **'Communications'** in the top tool bar and choose **'Close Comm Port'**.
12. Remove power from the voltage regulator. Connect the regulator to the generator.
13. Start the engine and bring up to speed. Initiate computer communications with the voltage regulator by following step 3 above.
14. Click the **'Metering'** button in the upper tool bar. On the **'Operation'** screen, ensure that the voltages are balanced on phases **'Vab'**, **'Vcb'** and **'Vca'**. Increase the field current in the **'Setpoint'** section in the top right by entering **'.2'** amps in the **'Current (A)'** field. Increase the current value in incremental steps of **'.2'** amps until reaching rated voltage (approximated) identified in the **'Voltage (V)'** field to the left of the **'Current (A)'** field. (Note: Do not exceed 1 amp.) Insure that all voltages are reading properly and that the voltage window at the top right of the **'Metering'** screen has the desired operating voltage entered.
15. Click on the **'Control Mode'** button to change to **'AVR'** mode (rectangular box to the right of **'FCR'**). The generator should be operating at the desired voltage. Note the field voltage in **'Voltage (V)'** and field current in **'Current (A)'** values for future reference.
16. The **'Field Current (A)'** and **'Field Voltage (V)'** values will be relatively stable, but moving up and down in small steps. To adjust the gain, click the **'Gain'** button in the top tool bar. On the lower left of the screen under **'AVR < = Loop Gain KG...'** increase this value from **'1'** to **'1.5'** (value on the left). Return to the **'Metering'** screen and observe the **'Field Current (A)'** value. If it is changing significantly more than previously, then stop at this point. If the value is not changing significantly more than previously, then continue increasing the **'AVR < = Loop Gain KG...'** (value on left) in steps of **'.5'** until the **'Field Current (A)'** value in the **'Metering'** screen is oscillating by a significant amount. At this point, begin reducing the **'AVR < = Loop Gain KG...'** in **'.1'** steps until the **'Field Current (A)'** value in the **'Metering'** screen returns to the same state of stability. Click the **'EEPROM'** button in the upper tool bar to save the new settings to permanent memory in the regulator.
17. Click **'File'** in the top tool bar and identify a new file name for the new settings obtained. Click **'Save'** and then **'Yes'** to save the new settings for future reference.
18. Click **'Communications'** in the top tool bar and choose **'Close Comm Port'**.
19. Disconnect the computer from the regulator.

The generator is now ready for operation.

Equipment Needed:

IBM compatible PC (Windows '95, '98, 2000 or XP), a 120 volt, two prong power cord with flag terminals crimped on the ends and a RS-232 serial port cable with 9-pin DB-9 type female and male connectors.