DESCRIPTION

A generator's engine must run at a constant speed to enable the generator to produce the stable AC power (hertz) required.

The Electronic Governor consists of three components, the CONTROLLER, a PCB board installed in the control panel. A MAGNETIC PICK-UP (MPU) installed in the bellhousing over the engine flywheel and the linear ACTUATOR mounted on the engine and attached by linkage to the injection pump throttle control.

The Electronic Governor regulates the engine speed by sensing the engine's RPM with the magnetic pick-up at the flywheel. The governor's controller continuously monitors the engine speed and if there is any discrepancy, the controller signals the actuator and the actuator adjusts the engine to the desired speed electronically.

CONTROLLER ADJUSTMENT

The controller has two adjustments: the SPEED adjustment is used to increase or decrease the engine's speed to the desired hertz. The GAIN adjustment affects the reaction time of the actuator to the generator load changes.

NOTE: A high gain adjustment can induce an oscillating of the actuator producing a hunting mode. In such cases, lessen the gain adjustment.

CALIBRATION

1. With no power to the governor (engine not running), adjust the GAIN potentiometer to 9:00 o'clock.
2. Start the engine and adjust the speed by turning the speed pod clockwise to desired speed.

NOTE: Controllers are factory adjusted to minimum RPM. However, for safety, one should be capable of disabling the engine if an overspeed should exist.
3. At no load, turn the GAIN potentiometer clockwise until the engine begins to hunt. If the engine does not hunt, physically upset the actuator linkage.
4. Turn the GAIN potentiometer counterclockwise until engine runs stable.

NOTE: Controllers are available in 12 and 24 VDC models. The operating voltage range is + or - 20%. If the voltage varies above or below this range, the controller will not operate and the engine will run in the idle mode until proper DC voltage is supplied to the controller.

ELECTRONIC GOVERNOR ADJUSTMENTS

The controller has two adjustment pods. You need a mini screw driver to adjust these. One is speed and one is gain. These are noted on the drawing of the controller.
MAGNETIC PICK-UP [MPU] INSTALLATION
The MPU is installed in the threaded opening on the side of the flywheel bellhousing. This positions the MPU over the teeth of the flywheel ring gear. Viewing through this opening, manually rotate the engine crankshaft so as to position the flat of one of the ring gear’s teeth directly under the opening. Thread the MPU into the opening until it gently contacts the flat of this tooth (Thread is 3/8” x 24). Back the MPU out of the opening one turn and then lock it in this position with the jam nut. This will position the end of the MPU approximately 0.030 inches away from the flats of the ring gear teeth.

To ensure the MPU is positioned correctly, slowly rotate the crankshaft by 360° by hand to assure there is no physical contact between the MPU and the ring gear teeth. If contact is felt between the MPU and the flywheel teeth, the MPU may be damaged. Remove the MPU and inspect it. Replace if necessary and repeat the above installation procedure.

NOTE: When replacing the Magnetic Pick-Up (MPU) it MUST be replaced without cutting and splicing into the existing wiring cable. Doing so will cause a erratic AC signal to the controller.

GOVERNOR CIRCUIT VOLTAGES
Below are the voltages normally found in the governor circuit when the system is functioning normally. These voltages are an approximate and should be of help in troubleshooting a system that is not functioning correctly.

DC Voltage into Controller
Bat + to Bat - (battery charging voltage 13.5 - 14.5 VDC) (Terminal block #1 and #2)

DC Voltage to Actuator
ACT to ACT (5.5 - 6.5 VDC) (Terminal block #5 and #6)

AC Voltage from MPU into Controller
MPU to MPU (2.5 - 7.0 VAC) (Terminal block #3 and #4)

This voltage spread is the result of the distance the MPU is positioned from the flat of the flywheel ring gear tooth. The closer to the tooth, the higher the AC signal. The further away, the lower the AC signal.

<table>
<thead>
<tr>
<th>VOLT</th>
<th>PN#</th>
<th>OHM VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>PN#044990</td>
<td>3.0 – 3.1 OHM</td>
</tr>
<tr>
<td></td>
<td>PN#303007</td>
<td>2.0 – 2.1 OHM</td>
</tr>
<tr>
<td>24</td>
<td>PN#044991</td>
<td>10.7 – 10.8 OHM</td>
</tr>
<tr>
<td></td>
<td>PN#039746</td>
<td>7.5 – 7.6 OHM</td>
</tr>
</tbody>
</table>

MPU (MAGNETIC PICKUP “OHM VALUE”)
PN#039172 0.950 – 1.0 K OHM
ELECTRONIC GOVERNOR TROUBLESHOOTING

**Problem**

<table>
<thead>
<tr>
<th>Test/Check</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>System appears dead. (No actuator movement)</td>
<td>1. Check the battery voltage at the controller terminal block with the Preheat/On switch depressed.</td>
</tr>
<tr>
<td>Engine runs, but at idle speed</td>
<td>1. Inspect the DC circuit back to the starting battery.</td>
</tr>
</tbody>
</table>

**Actuator lever goes to full extension when the preheat switch is depressed and stays extended.**

<table>
<thead>
<tr>
<th>Test/Check</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator lever goes to full extension.</td>
<td>1. Check the controller by removing the two, purple leads one at a time that come from the actuator off the controller terminal block. Lift one actuator lead and depress the preheat/switch. Reconnect and do the same with the second.</td>
</tr>
<tr>
<td></td>
<td>1. Check for a shorted actuator lead. Replace the controller because it should not cause the actuator lever to go to full fuel when the engine is not running.</td>
</tr>
<tr>
<td></td>
<td>1) Broken actuator lead, repair.</td>
</tr>
<tr>
<td></td>
<td>2) Broken actuator lead, repair or replace actuator.</td>
</tr>
<tr>
<td></td>
<td>3) Check actuator winding for open. Replace actuator.</td>
</tr>
</tbody>
</table>

**Actuator hunts during operation.**

<table>
<thead>
<tr>
<th>Test/Check</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator hunts during operation.</td>
<td>1. Lubricate or replace.</td>
</tr>
<tr>
<td></td>
<td>2. Re-adjust the calibration.</td>
</tr>
<tr>
<td></td>
<td>3. If actuator doesn’t fully extend (diesel) or retract (gasoline) then check the actuator leads.</td>
</tr>
<tr>
<td></td>
<td>If the voltage is less than specified, check for loose or poor connections in the DC circuit back to the battery, check the K2 relay and its connections.</td>
</tr>
</tbody>
</table>

If problems continue to persist, contact your WESTERBEKE dealer for additional assistance.
THE ELECTRONIC GOVERNOR

DESCRIPTION
A generator's engine must run at a constant speed to enable the generator to produce the stable AC power (hertz) required.

The Electronic Governor consists of three components, the CONTROLLER, a pc board installed in the control panel. A MAGNETIC PICK-UP (MPU) installed in the bellhousing over the engine flywheel and the linear ACTUATOR mounted on the engine and attached by linkage to the injection pump throttle control.

The Electronic Governor regulates the engine speed by sensing the engine's RPM with the magnetic pick-up at the flywheel. The governor's controller continuously monitors the engines speed and if there is any discrepancy, the controller signals the actuator and the actuator adjusts the engine to the desired speed electronically.

CONTROLLER ADJUSTMENT
The controller has two adjustments: the SPEED adjustment is used to increase or decrease the the engine's speed to the desired hertz. The GAIN adjustment affects the reaction time of the actuator to the generator load changes.

NOTE: A high gain adjustment can induce an oscillating of the actuator producing a hunting mode. In such cases, lessen the gain adjustment.

CALIBRATION
1. With no power to the governor (engine not running), adjust the GAIN potentiometer to 9:00 o'clock.
2. Start the engine. The green LED will indicate the governor is energized. Adjust the controller for the desired speed by pressing the decrease or increase buttons.

NOTE: Controllers are factory adjusted to minimum RPM. However, for safety, one should be capable of disabling the engine if an overspeed should exist.
3. At no load, turn the GAIN potentiometer clockwise until the engine begins to hunt. If the engine does not hunt, physically upset the actuator linkage.
4. Turn the GAIN potentiometer counterclockwise until engine runs stable.

NOTE: The controller operates with either 12 or 24VDC. The minimum voltage the controller must have to operate is 9.0VDC. The maximum voltage the controller will operate with is 30VDC. If the DC voltage falls below the minimum or above the maximum, the controller will not operate until the voltage problem is corrected.

NOTE: High DC voltage will damage the controller.

ELECTRONIC GOVERNOR ADJUSTMENTS
When you press the preheat switch, the actuator linkage attached to the throttle arm of the injection pump should move outward towards the injection pump and return back into the actuator in a quick motion on diesel models and pull in and hold in on gasoline models.

WESTERBEKE
Engines & Generators
THE ELECTRONIC GOVERNOR

MAGNETIC PICK-UP (MPU) INSTALLATION

The MPU is installed in the threaded opening on the side of the flywheel bellhousing. This positions the MPU over the teeth of the flywheel ring gear.

Viewing through this opening, manually rotate the engine crankshaft so as to position the flat of one of the ring gear's teeth directly under the opening. Thread the MPU into the opening until it gently contacts the flat of this tooth (Thread is 3/8" x 24). Back the MPU out of the opening one turn and then lock it in this position with the jam nut. This will position the end of the MPU approximately 0.030 inches away from the flats of the ring gear teeth.

To ensure the MPU is positioned correctly, slowly rotate the crankshaft by 360° by hand to assure there is no physical contact between the MPU and the ring gear teeth. If contact is felt between the MPU and the flywheel teeth, the MPU may be damaged. Remove the MPU and inspect it. Replace if necessary and repeat the above installation procedure.

NOTE: When replacing the Magnetic Pick-Up (MPU) it MUST be replaced without cutting and splicing into the existing wiring cable. Doing so will cause an erratic AC signal to the controller.

GOVERNOR CIRCUIT VOLTAGES

Below are the voltages normally found in the governor circuit when the system is functioning normally. These voltages are an approximate and should be help in troubleshooting a system that is not functioning correctly.

DC Voltage into Controller
Bat + to Bat - (battery charging voltage 13.5 - 14.5 VDC)

DC Voltage to Actuator
ACT to ACT (5.5 - 6.5 VDC)

AC Voltage from MPU into Controller
MPU to MPU (2.5 - 7.0 VAC)

This voltage spread is the result of the distance the MPU is positioned from the flat of the flywheel ring gear tooth. The closer to the tooth, the higher the AC signal. The further away, the lower the AC signal.

ACTUATOR "OHM VALUE"

12 VOLT PN#044990 3.0 - 3.1 OHM
PN#303007 2.0 - 2.1 OHM

24 VOLT PN#044991 10.7 - 10.8 OHM
PN#039746 7.5 - 7.6 OHM

MPU (MAGNETIC PICKUP "OHM VALUE"
PN#039172 .950 - 1.0 K OHM
**ELECTRONIC GOVERNOR TROUBLESHOOTING**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Test/Check</th>
<th>Correct</th>
</tr>
</thead>
</table>
| System appears dead. (No actuator movement) | 1. Check the battery voltage at the controller terminal block with the Preheat/On switch depressed.  
2. Inspect the linkage for binding or sticking.  
3. If there is no signal or a weak signal from the MPU, measure the AC voltage between the white and black/white wire leads from the MPU on the controller terminal block. While cranking the engine or with the engine running at idle, voltage should be 2.5-3.0 VAC.  
NOTE: The AC input impedance of meter must be 5000 ohms/Volts or greater.  
NOTE: When making this test on diesel units, disable the preheat solenoid by disconnecting the "S" terminal connection so as not to damage the glow plugs.  
4. Check the actuator with the preheat/on switch depressed. This provides DC voltage to the controller. Measure the DC voltage between the actuator connections on the controller block and the black AC (+) power connection on the controller terminal block. Both connections should have battery voltage +0.00 or -0.75 VDC.  
a. Purple lead to Black DC (-).  
b. Purple lead/white lead to Black DC (+).  
NOTE: Continue this test (ONLY) if the battery voltage is not present.  
e. The following checks are performed between the connections at the actuator and the Black DC (-) connection on the controller terminal block. This is to determine if there is a break in the line between the controllers terminal block connection and the actuator connections or the actuator leads themselves.  
1) Low voltage (1.0-2.0 VDC) at either actuator connections.  
2) Battery voltage at both actuator connections.  
3) Battery voltage at one actuator connection but not the second. | 1. Inspect the DC circuit back to the starting battery.  
2. Free up the linkage and clean and lubricate the linkage.  
3. Check for damage to or improper adjustment of magnetic pick-up. Replace or re-adjust. |
| Engine runs, but at idle speed | 1. Check the controller by removing the two purple leads at the controller terminal block.  
2. Re-adjust the calibration.  
3. If actuator doesn’t fully extend (diesel) or retract (gasoline) then check the actuator leads.  
4. Low voltage (-1.0-2.0 VDC) at either actuator connections.  
5. If voltage is less than specified, check for loose or poor connections in the DC circuit back to the battery, check the K2 relay and its connections.  
a. Check for shorted actuator lead.  
b. Replace controller. |  |  
| Actuator lever goes to full extension when the preheat switch is depressed and stays extended. | 1. Check the controller by removing the two, purple leads one at a time that come from the actuator off the controller terminal block. Lift one actuator lead and depress the preheat/on switch. Reconnect and do the same with the second.  
a. Actuator goes to full extension (Diesel).  
does not retract (Gasoline).  
b. Actuator does not extend (Diesel). | 1. Check for shorted actuator lead. Replace the controller because it should not cause the actuator lever to go to full test when the engine is not running.  
a. Check for shorted actuator lead.  
b. Replace controller. |
| Actuator hunts during operation. | 1. Improper governor adjustment.  
2. Inadequate power supply voltage.  
a. Connect a DC voltmeter to Red (+) and Black (-) leads at the controller terminal block.  
b. Disconnect both leads coming from actuator from controller terminal block.  
c. Connect one lead from the actuator to the Red (+) on the terminal block and the other actuator lead to the Black (-) on the terminal block.  
d. Momentarily depress the preheat/on switch. The actuator should extend fully and stay extended (Gasoline) and retract (Diesel) as long as the switch is depressed. Measure the DC voltage across the Red (+) and Black (-) leads while performing this test.  
6.0 VDC minimum  
30.0 VDC maximum  
NOTE: Reconnect the actuator leads properly after completing this test.  
e. MPU positioned marginally too far away from flywheel teeth giving erratic AC input to controller. | 1. Lubricate or replace.  
2. Re-adjust the calibration.  
3. Check the position of the MPU. |

If problems continue to persist, contact your WESTERBEKE dealer for additional assistance.
ELECTRONIC GOVERNOR TERMINAL CONNECTIONS

VOLT METER 12 VDC

DC+ RED
DC- BLACK
BLACK + WIRE BLACK/WHITE
RED WHITE
PURPLE PURPLE

SENSOR

ACTUATOR "OHM VALUE"
12 VOLT PN#044990 3.0 - 3.1 OHM
PN#303007 2.0 - 2.1 OHM
24 VOLT PN#044991 10.7 - 10.8 OHM
PN#039746 7.5 - 7.6 OHM

MPU (MAGNETIC PICKUP "OHM VALUE"
PN#039172 .950 - 1.0 K OHM