CHAPTER 4 GOVERNORS AND LINKAGE

GENERAL INFORMATION

Tecumseh 4 cycle engines are equipped with mechanical type governors. The governor’s function is to maintain a R.P.M. setting when engine loads are added or taken away. Mechanical type governors are driven off the engine’s camshaft gear. The governor follower arm rests on the center of the governor spool on center force governors, and off to one side on other governor systems. Changes in engine R.P.M. cause the governor lever to move the solid link that is connected from the governor lever to the throttle in the carburetor. The throttle is opened when the engine R.P.M. drops and is closed as an engine load is removed.

This chapter includes governor assembly linkage illustrations to aid in governor or speed control assembly.

OPERATION

As the speed of an engine increases, the governor weights on the governor gear move outward by centrifugal force. The shape of the governor weights force the governor spool to lift. The governor rod maintains contact with the governor spool due to the governor spring tension. The governor rod rotates causing the attached outer governor lever to push the solid link and close the throttle opening. When the engine speed decreases, the lower centrifugal force allows the governor weights to be pulled in by the governor spring. The governor rod rotates and the solid link moves the throttle to a more open position (diag. 1).

TROUBLESHOOTING

Engine operation problems where the governor is suspected to be the cause may actually be the result of other engine system failures. Hunting (engine R.P.M. surging up and down) indicates that the engine is incapable of maintaining a constant R.P.M. with or without an engine load. Engine overspeeding must be corrected immediately before serious engine damage occurs. Use the applicable following procedure to diagnose a suspected governor failure.

ENGINE OVERSPEEDING

1. If the engine runs wide open (faster than normal), shut the engine off or slow it down immediately.
2. Check the condition of the external governor shaft, linkage, governor spring, and speed control assembly for breakage or binding. Correct or replace binding or damaged parts.
3. Follow the governor adjustment procedure and reset the governor - see "Service" in this chapter.
4. Run the engine. Be ready to shut the engine off if an overspeed problem still exists. If the problem persists, the engine will require disassembly to inspect the governor gear assembly for damage, binding, or wear.
5. See Chapter 9 under "Disassembly Procedure" to disassemble the engine.
6. Remove the governor gear assembly. Repair or replace as necessary.

ENGINE SURGING

1. Try to stabilize the engine R.P.M. by holding in one position the solid link between the governor arm and the carburetor throttle, using a pliers or fingers.
2. If the engine R.P.M. stabilizes, the governor or governor adjustment should be checked. See "Service" governor adjustment procedure in this chapter. If the engine R.P.M. does not stabilize, the engine will require additional checks see Chapter 9 under "Troubleshooting".
3. If the problem persists after the governor adjustment, check the engine R.P.M. found on microfiche card # 30. The R.P.M. settings are critical. If the R.P.M. setting for high and low speed are within specification and a slight surge is experienced, increasing the engine idle R.P.M. setting slightly may eliminate this condition.
4. Check the governor shaft or linkages for binding, wear, or improper hookup. Check the governor spring for adequate tension or damaged condition. Repair or replace as necessary.
SERVICE

GOVERNOR ADJUSTMENT

With the engine stopped, loosen the screw holding the governor lever to the governor shaft clamp. Push the governor lever to move the carburetor throttle plate to the wide open position. Rotate the governor clamp counterclockwise on all overhead valve engines covered in this manual. Hold the lever and clamp in this position while tightening the screw (diag. 2).

GOVERNOR GEAR AND SHAFT SERVICE

After the cylinder cover is removed from the engine, the governor spool, gear, or governor shaft can be removed. On some governor assemblies, the retaining ring must be removed to allow the spool or gear to slide off the shaft. Other governor shafts use an upset to hold the governor spool on. If the gear requires replacement, the governor shaft will have to be removed.

Governor Gear or Shaft Replacement, Upset Style Governor Shaft

1. Grip the original spool in a vise and use a twisting and pulling motion on the flange until the spool is free.
2. Clamp the shaft in a vise and pound gently on the flange with a wooden or plastic mallet to remove the shaft (diag. 4).

NOTE: DO NOT TWIST THE SHAFT WHEN REMOVING. THE SHAFT BOSS MAY BECOME ENLARGED AND THE PRESS FIT WILL NOT SECURE THE NEW GOVERNOR SHAFT.

3. To install a new shaft, first assemble the gear and washer on the shaft. Start the shaft into the hole with a few taps from a soft faced hammer.
4. Place the flange in a press with a solid piece supporting the area below the shaft boss. Press the shaft in until a part # 670297 (.0125"/.3175 mm) shim just becomes snug (.010" - .020"/.254-.508 mm clearance) (diag. 5).
Governor Shaft Replacement, Retaining Ring Style

1. Remove the retaining ring, spool, gear assembly, and washer(s).

2. Clamp the shaft in a vise and pound gently on the flange with a wooden or plastic mallet to remove the shaft.

**NOTE:** DO NOT TWIST THE GOVERNOR SHAFT WHEN REMOVING. THE SHAFT BOSS MAY BECOME ENLARGED AND THE PRESS FIT WILL NOT SECURE THE NEW GOVERNOR SHAFT.

3. Start the new shaft into the shaft boss by tapping with a soft faced hammer.

4. Refer to the chart at right for the proper shaft exposed length from the mounting surface. Add a drop of red Loctite 271 and press the governor shaft to the proper depth using a press or a vise. Wipe the extra Loctite off after installation.

5. Reassemble the washer(s), governor gear, and spool followed by the retaining ring.

<table>
<thead>
<tr>
<th>ENGINE MODEL</th>
<th>EXPOSED SHAFT LENGTH</th>
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<tbody>
<tr>
<td>OHH/OHSK50-70</td>
<td>1.319&quot; - 1.334&quot;</td>
</tr>
<tr>
<td>OVRM</td>
<td>(33.502 - 33.883 mm)</td>
</tr>
<tr>
<td>OVM</td>
<td>1.085&quot; - 1.100&quot;</td>
</tr>
<tr>
<td>OHSK80-130</td>
<td>(27.559 - 27.940 mm)</td>
</tr>
<tr>
<td>OVM</td>
<td>1.350&quot; - 1.365&quot;</td>
</tr>
<tr>
<td>OVXL</td>
<td>(34.290-34.671 mm)</td>
</tr>
<tr>
<td>OHV</td>
<td>6</td>
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</tbody>
</table>

**NOTE:** SPACER MAY BE PART OF THE GEAR ASSEMBLY.
Speed Controls And Linkage

Many different types of speed controls and linkage are used for O.E.M. applications. Linkage attachment points are best recorded or marked prior to disassembly. This assures the correct placement during reassembly. The solid link is always connected from the outermost hole in the governor lever to the throttle in the carburetor. The governor spring is connected between the speed control lever and the governor lever. Vertical shaft engines may use an adjustable intake pipe mounted speed control bracket located above the carburetor, or a vertical or horizontal control mounted on the side of the engine. The ignition ground out terminal, idle R.P.M. and high speed R.P.M. adjustment screws may be located on the speed control bracket.

The adjustable speed control bracket which is mounted on the intake pipe must be aligned properly when installing. To align the control bracket, use the following steps.

1. Loosen the two screws on the top of the panel.
2. Move the control lever to full wide open throttle position and install a wire or aligning pin through the hole in the top of the panel, the hole in the choke actuating lever, and the hole in the choke (diag. 12).
3. With the components aligned, tighten the two screws on the control panel.

The following pages show common linkage hookup arrangements. Whenever the carburetor or the governor linkage is removed or replaced, the engine R.P.M.'s should also be checked. Use microfiche card #30 or contact a local Tecumseh dealer for the correct R.P.M. settings for the engine model and specification.

**NOTE:** RPM SETTINGS CAN ALSO BE FOUND ON THE COMPUTERIZED PARTS LOOK UP SYSTEMS.

**OHH REMOTE SPEED CONTROL**

The engine and equipment control must be adjusted to allow the engine control lever to touch the high speed stop when the equipment control is set in the "highspeed" or "fast" position. Loosen the bowden wire clamp, place the equipment control to the "fast" position, move the engine control lever to contact the high speed stop, and hold the lever in this position while tightening the bowden wire clamp.

**OHH GOVERNED IDLE SPEED CONTROL**

This control is adjusted by bending the tabs on the control bracket to achieve the correct idle speed and high speed. When the engine is running, the governor controls both the idle and the high engine speed. In order for the governor to respond properly to a crankshaft load at engine idle, the idle speed screw on the top of the carburetor must be set 600 RPM lower than the governed idle speed. Use the following procedure to set the engine speeds (diag. 14 & 16).

1. Check to find the correct engine speeds found on microfiche card # 30 or using the Computer Parts Look-up System.
2. Start and allow the engine to run (3-5 minutes) before beginning adjustments. Place the control knob in the lowest engine speed position. Use a Vibra-Tach or other tachometer to set the non-governed idle speed (600 RPM lower than the governed idle speed) by pushing the bottom of the governor lever away from the control bracket so the throttle lever contacts the idle speed screw and hold the lever in this position. Turn the idle speed screw clockwise to increase or counterclockwise to decrease engine idle speed.
3. Allow the governor to control the throttle. Use a Vibra-Tach or other tachometer and bend the tab as shown to achieve the specified governed idle speed.
4. Slide the control knob to the high speed position and bend the tab as shown to achieve the specified governed high engine speed.
NOTE: Early production OHH engines did not have governed idle, set only the idle crack screw and high speed governor stop.
CONVERSION TO REMOTE CONTROL

Remove the manual control knob by squeezing together with a pliers or prying with a screw driver. Remove the air cleaner cover and air cleaner element to gain easier access to the speed control lock nut that holds the control levers together.

Remove the 3/8" (9.525 mm) locknut, bushing, wave washer, control lever, and the detent bearing plate.

Reassembly of REMOTE control.

Discard the detent bearing plate and in its place install the washer with the smaller I.D. from the new parts bag.

Install the lever over the post making sure that the end of the lever is in the slot of the control.

Place the other washer with the large I.D. from the parts bag next to lever, then the bushing. The smaller side of the bushing goes towards the lever and fits inside of the lever and the washer.

Discard the wave washer.

Install the lock nut.

Check the alignment of the lever, bushing and washers to ensure that everything is aligned properly and torque the lock nut to 20 in. lbs. (2 Nm).

The control lever should move freely.

This engine speed control is set up with the "stop in the control". If a remote stop is desired remove and discard the short green wire that runs from the speed control grounding terminal (to the remote grommet stop blade). Reinstall the blade and screw. It will now be necessary to run a grounding wire to a remote grounding switch in order to stop the engine.

A remote grounding switch can be added to the engine at this terminal as well, thus allowing the engine to be stopped at either the stop in the control or the remote grounding switch.
OVM, OVXL, OHV VERTICAL SPEED CONTROL

This remote speed control may have governed idle, a choke override, and the option of an ignition remote stop terminal block.

The speed control is adjusted to the equipment throttle control by aligning the slot in the speed control lever with the alignment hole on the mounting bracket. Place a pin through the two holes, place the equipment throttle control to the wide open position, hook the bowden cable end in the control as shown, and tighten the cable housing clamp. In this position, the gap of .040” - .070” (1.02 - 1.778 mm) should exist at the gap location as illustrated. This will assure that the carburetor will go into full choke when the control is placed in the start position.

The idle speed is adjusted by turning the idle speed screw clockwise to increase engine R.P.M. and counterclockwise to decrease R.P.M. Use tool part # 670326 to adjust the high speed engine R.P.M. Place the slotted end of the tool onto the adjustment tab and bend the tab to the left (away from the control) to increase engine R.P.M.

Throttle plate alignment on all models with speed controls mounted on intake manifold. This adjusts choke in control as well (diag. 12 on page 25).

OHV 11-17 HORIZONTAL SPEED CONTROL

This speed control is adjusted to the equipment throttle control by aligning the slot in the speed control lever with the alignment hole on the mounting bracket. Place a pin through the two holes, place the equipment throttle control to the wide open position, hook the bowden cable end in the control as shown, and tighten the cable housing clamp. In this position, the gap of .040” - .070” (1.02 - 1.778 mm) should exist at the gap location as illustrated. This will assure that the carburetor will go into full choke when the control is placed in the start position.

NOTE: Assure that the throttle cable has full travel from wide open throttle to full choke. Hard starting could result if the cable is not properly adjusted to allow for full choke.

The idle speed is adjusted by turning the idle speed screw clockwise to increase engine R.P.M. and counterclockwise to decrease R.P.M. Use tool part # 670326 to adjust the high speed engine R.P.M. Place the slotted end of the tool onto the adjustment tab and bend the tab to the left (toward the spark plug end) to increase engine R.P.M.

OHV 11 -17 engines use nylon bushings on the throttle and choke linkage hook-up points to extend the life of the linkage and to enhance the stability of the governor system. Make sure they are in good condition and in place (diag. 27).