The crankshaft rotation is **clockwise** when viewed from the front of the engine.

The cylinders are numbered from the front gear cover end of the engine.

The engine firing order is 1-5-3-6-2-4.

---

The valves and injectors on the same cylinders are **not** adjusted at the same index mark on the accessory drive pulley on fixed time engines.

One pair of valves and one injector are adjusted at each pulley index mark before rotating the accessory drive to the next index mark.

Two crankshaft revolutions are required to adjust all the valves and injectors.

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**Warning:** Do not pull or pry on the fan to manually rotate the crankshaft. To do so can damage the fan blades. Damaged fan blades can cause premature fan failures which can result in serious personal injury or property damage.

The valve set marks are located on the accessory drive pulley. The marks align with a pointer on the gear cover. Use the accessory drive shaft to rotate the crankshaft.

---

The adjustment can begin on any valve set mark. In the following example the adjustment will begin on the ‘A’ valve set mark with cylinder number five valves closed and cylinder number three injector ready for adjustment.

Rotate the accessory drive shaft **clockwise** until the ‘A’ valve set mark on the accessory drive pulley is aligned with the pointer on the gear cover.
When the ‘A’ mark is aligned with the pointer, the intake and exhaust valves for cylinder number five must be closed. If these conditions are not correct, cylinder number four injector and cylinder number two valves must be ready to set.

Both valves are closed when both rocker levers are loose and can be moved from side to side.

Loosen the injector adjusting screw locknut on cylinder number three. Tighten the adjusting screw until all the clearance is removed from the injector train.

Tighten the adjusting screw one additional turn to correctly seat the link.

Loosen the injector adjusting screw until the injector spring retainer washer touches the top stop screw.

Caution: An overtightened setting on the injector adjusting screw will produce increased stress on the injector train and the camshaft injector lobe which can result in engine damage.

Use torque wrench, Part No. 3376592, to tighten the adjusting screw.

Torque Value: 0.6 to 0.7 N•m [5 to 6 in-lb]
Valves and Injectors - Adjustment

Section 6 - Maintenance Procedures at 1500 Hours or 1 Year

Hold the adjusting screw in this position. The adjusting screw must not turn when the locknut is tightened.

Torque Value:
- **Without** Torque Wrench Adapter:
  61 N·m [45 ft-lb]
- **With** Torque Wrench Adapter (1), Part No. ST-669
  47 N·m [35 ft-lb]

Injector and Valve Adjustment Sequence

<table>
<thead>
<tr>
<th>Bar Engine in Direction of Rotation</th>
<th>Pulley Position</th>
<th>Set Cylinder</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>A</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Advance to</td>
<td>B</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Advance to</td>
<td>C</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Advance to</td>
<td>A</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Advance to</td>
<td>B</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Advance to</td>
<td>C</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

Firing Order: 1-5-3-6-2-4

Adjust the valves on the appropriate cylinder according to the sequence chart before rotating the accessory drive to the next valve set mark.

Feeler Gauges

<table>
<thead>
<tr>
<th>0.36 mm [0.014 in.]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.69 mm [0.027 in.]</td>
</tr>
</tbody>
</table>

Select a feeler gauge for the correct valve lash specification.

<table>
<thead>
<tr>
<th>Valve Lash Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intake</strong></td>
</tr>
<tr>
<td>0.36 mm [0.014 in.]</td>
</tr>
<tr>
<td><strong>Exhaust</strong></td>
</tr>
<tr>
<td>0.69 mm [0.027 in.]</td>
</tr>
</tbody>
</table>

Insert the feeler gauge between the top of the crosshead and the rocker lever pad.

Two different methods for establishing valve lash clearance are described below. Either method can be used; however, the torque wrench method has proven to be the most consistent. It eliminates the need to feel the drag on the feeler gauge.

- **Torque Wrench Method** : Use the inch pound torque wrench, Part No. 3376592, (normally used to set preload on top stop injectors) and tighten the adjusting screw.
  
  **Torque Value** : 0.7 N·m [6 in-lb]

- **Touch Method** : Tighten the adjusting screw until a light drag is felt on the feeler gauge.
Hold the adjusting screw in this position. The adjusting screw must not turn when the locknut is tightened. Tighten the locknut.

**Torque Value:**
- **Without** Torque Wrench Adapter:
  61 N•m [45 ft-lb]
- **With** Torque Wrench Adapter (1), Part No. St-669
  47 N•m [35 ft-lb]

After tightening the locknut to the correct torque value, check to make sure the feeler gauge will slide backward and forward between the crosshead and the rocker lever with only a slight drag.

If using the touch method, attempt to insert a feeler gauge that is 0.03 mm [0.001 in] thicker between the crosshead and the rocker lever pad. The valve lash is not correct when a thicker feeler gauge will fit.

Adjust the Jacobs Engine Brake, if applicable, after adjusting the valves before rotating the accessory drive pulley to the next index mark. Refer to Jacobs Engine Brake - Adjustment following this procedure.

After adjusting the valves, rotate the accessory drive and align the next valve set mark on the accessory drive pulley with the pointer on the gear cover.