Holley Breakerless Ignition

International Harvester Co.

DESCRIPTION & OPERATION

Holley electronic breakerless ignition system consists of 3 major components; distributor, coil and electronic control unit. Distributor is of the conventional type with the exception that a sensor and trigger wheel replace the usual contact points, condenser and breaker cam. The ignition coil is of standard type. The electronic control unit is a solid state permanently sealed unit. As distributor shaft rotates, the distributor generates signals causing module to make and break the primary current and induce secondary voltage in coil. Dwell angle is determined by angle between adjacent teeth of trigger wheel and air gap between ends of wheel teeth and the sensor.

ADJUSTMENT

AIR GAP

With one tooth of trigger wheel aligned with centerline of sensor, measure air gap between sensor and end of tooth. Move sensor as necessary to obtain .008" air gap. *See Fig. 1.* Tighten sensor mounting screw and recheck air gap. If dwell is not within specifications, sensor may require readjustment. Move sensor away from trigger wheel to increase dwell and towards wheel to decrease dwell. A .001" movement of sensor will change dwell approximately ½ degree.

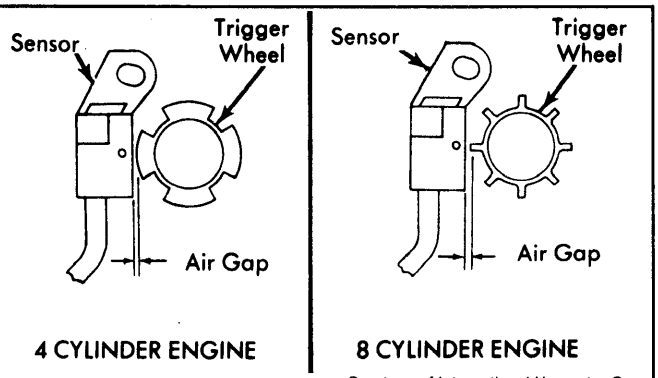

Fig. 1: Checking Air Gap

CENTRIFUGAL ADVANCE

Centrifugal advance is adjusted by bending advance spring posts through distributor plate access hole. *See Fig. 2.* Bend posts toward mainshaft to increase advance and away from mainshaft to decrease advance.

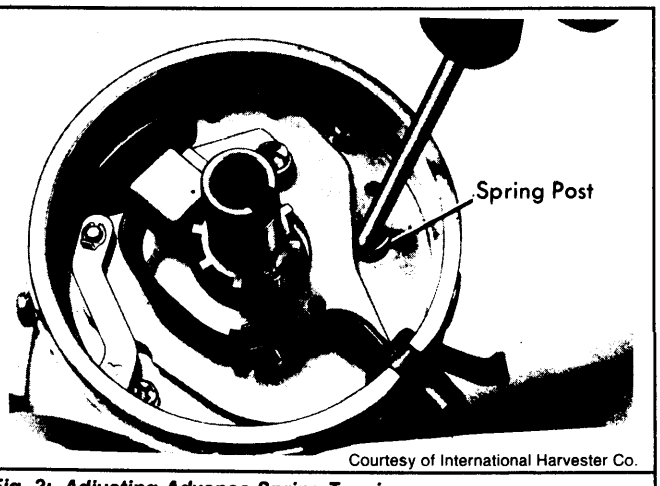

Fig. 2: Adjusting Advance Spring Tension

VACUUM ADVANCE

Diaphragm assembly is preset and no adjustment is provided. If not within specifications, replace vacuum unit.

TESTING

NOTE: Before starting tests, ensure battery is fully charged. Check all wiring and connectors for damage or loose connections. Replace any high tension cables which show signs of cracks or deterioration.

1) Connect voltmeter between coil positive terminal and ground. Turn ignition on. Voltmeter should read battery voltage. If voltage is significantly lower than battery voltage, check for high resistance between ignition switch and coil. Correct as necessary.

2) Disconnect high tension cable from one spark plug. Using an insulated pair of pliers, hold cable ½" from engine. Crank engine and watch for spark to jump gap. If spark does not jump gap, replace plug cable and continue testing. Disconnect center distributor cap cable at cap. Crank engine to see if a spark will jump a gap of ¼-½" to engine ground. If spark occurs, check for faulty distributor cap, rotor, or defective spark plug cables. If no spark occurs, proceed with testing.

3) Disconnect distributor primary wiring connector nearest to distributor and install Tester Switch (SE-2503) into wiring harness. *See Fig. 3.* Turn ignition switch on. Press tab on tester switch and watch for spark between jumper wire clip and ignition cable terminal. If spark occurs, distributor sensor unit is faulty and requires replacement. If no spark occurs, proceed with testing.

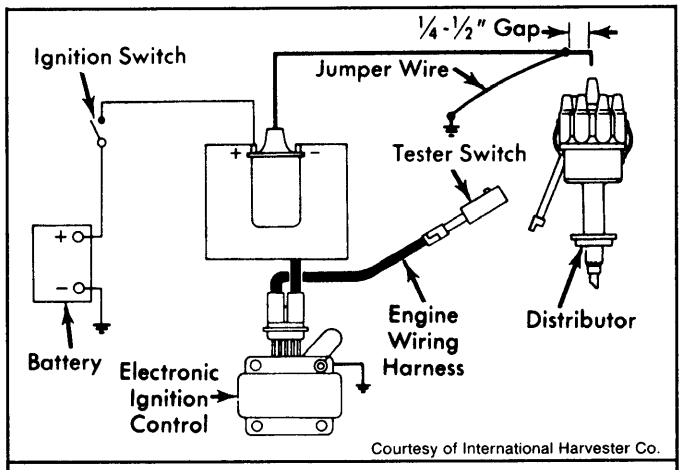

Fig. 3: Testing Ignition Circuit

4) Disconnect distributor primary wiring connector from electronic control and insert tester switch into control unit. *See Fig. 3.* Turn ignition switch on, press tab on tester switch and check for spark between jumper wire clip and ignition cable terminal. If spark is observed, primary wiring between ignition control and distributor is faulty and requires repair or replacement. If no spark occurs, disconnect tester switch from system. Reconnect distributor primary wiring connection and proceed with testing.

5) Connect voltmeter between coil negative terminal and ground. With ignition switch on, voltage should read 5-8 volts. A reading which is not within specifications indicates a defective coil. If voltage is within limits, insert tester switch into primary wiring harness connection nearest to distributor. Press tester button and observe voltmeter.

6) Voltage should increase to battery voltage and drop to 5-8 volts when button is released. If voltage does not switch up and down, electronic ignition control is defective and requires replacement. If voltage switches up and down but no spark occurs between jumper wire and ignition cable terminal, coil is defective and requires replacement. Disconnect all test equipment and make sure all ignition system wiring connections are clean and tight when reinstalled.

OVERHAUL

DISTRIBUTOR

Disassembly - 1) Remove distributor cap, rotor and dust cover. Remove vacuum advance diaphragm rod retaining ring, retaining screws and diaphragm assembly from distributor housing. Carefully pull sensor wire seal/retainer from slot in distributor housing. Remove sensor plate mounting screws and lift sensor plate assembly from housing. Remove retaining spring from bottom side of lower plate. Separate plates and remove 3 thrust buttons from upper plate.

2) Remove lubrication wick, trigger wheel assembly retainer and trigger wheel assembly from distributor. Remove slider blocks from trigger wheel assembly. Remove primary and secondary advance weight springs, advance weights, bushings and thrust washers. Measure and record distributor shaft end play. If end play exceeds .035-.040", replace thrust washer (if equipped) or distributor shaft and gear.

3) On distributors equipped with governor valve, remove governor air inlet filter, seal wire, and valve housing cover band with gasket. Using an Allen wrench, remove governor valve adjusting plug. Bend tabs on counterweight lock. Position a $^{7}/_{16}$" deep well socket over Governor Adjuster (SE-2072-1). Insert the slotted end onto adjuster screw and the socket over the hexagon counterweight. Loosen counterweight while holding adjuster stationary until adjusting screw becomes disengaged. Remove governor valve body and adjusting screw from distributor shaft.

4) On distributors equipped with tachometer drive, remove tachometer drive cover plate and attaching screws. Remove gear shaft plug and bushing. Remove tachometer driven gear and shaft. Use a drift punch to remove tachometer drive gear pin.

5) On all distributors, support driven gear on a vise and drive roll pin from gear or thrust collar using a drift punch. Position distributor housing and shaft assembly in a press. Press gear or thrust collar from distributor shaft. On distributors with tachometer drive, press shaft from tachometer drive gear. Remove distributor shaft from housing and tachometer drive (if equipped).

Cleaning & Inspection - Wash all components in solvent except distributor cap, rotor, sensor, sensor plate assembly and vacuum diaphragm assembly. Inspect all components for damage or excessive wear. Mount distributor mainshaft in "V" blocks and check shaft alignment using a dial indicator. If runout exceeds .002", distributor shaft requires replacement. Check that trigger wheel assembly fit on distributor shaft is free, but without roughness or excessive looseness. Inspect the governor valve components for wear or damage and replace as an assembly (if necessary). Rotor must fit tight on trigger wheel assembly. If tachometer gears show wear or damage, both gears must be replaced.

Bushing Replacement - 1) Using Remover (SE-1955-5), place distributor housing in press bed and insert knock-out bar ($^{7}/_{16}$ x11"). Press upper bushing from housing, then press out lower bushing. On models with tachometer drive, press our tachometer drive bushing using a knock-out bar ($^{7}/_{16}$ x4"). Remove vacuum seals, washers, spacer and retainer from tachometer drive housing.

2) On models with tachometer drive, slide lower oil seal, washer, spacer, washer and upper oil seal in bore of housing until they rest at bottom of counterbore. Position retainer on top of upper seal and use Installer (SE-1-8) to press retainer into housing. Distance from top of retainer to top edge of housing must be 3.615-3.617".

NOTE: Lower seal lip must face downward and upper seal lip must face up.

3) Lubricate outer diameter of upper bushing with a light coat of grease and install in distributor housing using Installer (SE-1955-8). Distance from top of housing to top of bushing must be 1 $^{51}/_{64}$". Lubricate outer diameter of lower bushing with a light coat of grease and install in distributor housing using Installer (SE-1955-8) until flush with bottom of housing. Use Burnisher (SE-1955-2) to size bushings.

CAUTION: DO NOT ream bushings as the olite type bearings are made of powdered metal.

4) On models with tachometer drive, lubricate outer diameter of bushing with a light coat of grease and install bushing using Installer (SE-1722) until bushing flange just seats against housing.

Reassembly - 1) Install new Teflon bushings in bores of advance weights, new Teflon thrust washers on advance weight pins and advance weights on pins. Install new advance springs and ensure weights pivot freely on pins. On models without tachometer drive, lubricate distributor shaft with engine oil and install shaft into distributor using care not to damage governor housing seals (if equipped).

2) On models with tachometer drive, place tachometer drive gear in housing with hub of gear facing downward and lubricate distributor shaft with engine oil. Install shaft into distributor using care not to damage governor housing seals (if equipped).

3) Start shaft into bore of tachometer drive and align roll pin hole in gear with hole in shaft (if original shaft and gear are being installed). Support housing and press shaft into tachometer gear until roll pin holes are aligned. If new shaft and gear are being installed, gear must be installed 4.58" from top of housing to top of gear with the shaft held to the bottom of housing.

4) Install new gear-to-housing thrust washer (if used) on shaft. Start gear or thrust collar on distributor shaft and align roll pin holes (if original components are being reinstalled). Support distributor housing in a press and press gear or thrust collar onto shaft until pin holes align (original components) or until specified end play is obtained (new components). Measure end play clearance between gear or thrust washer and lower end of distributor housing. If distributor has gear-to-housing thrust washer, check end play between gear or thrust collar and thrust washer.

5) On models reusing original shaft and gear, install driven gear or thrust collar roll pin. On models using new shaft and gear, support distributor in drill press and use roll pin hole in gear as guide to drill hole in distributor shaft. Install roll pin. If unit is equipped with tachometer drive, rotate shaft and check for interference.

6) If clearance is satisfactory at upper and lower limits of shaft, install tachometer drive gear roll pin on units using original components. On units using new components check clearance, support distributor in drill press, use roll pin hole in tachometer drive gear as guide, drill hole in distributor shaft and install roll pin.

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7) Ensure mechanical advance components are correctly installed on distributor shaft. Using distributor cam lubricant, lubricate trigger wheel assembly pilot surface of shaft. Grooves in pilot diameter must be filled and plate surface between grooves should have a thin film of lubricant. Reservoir in center should be filled to depth of plate surface.

8) Install new slider blocks on trigger wheel and position wheel assembly on pilot surface of distributor shaft. Align slider block flats with advance flyweight slots and push wheel into position. Install retainer and remove excess lubricant. Saturate felt wick using engine oil, squeeze excess from wick and install in top bore of wheel assembly. Mechanical advance should operate freely.

9) Use bearing lubricant on tachometer drive gear, driven gear and drive shaft bushings. Install driven gear and shaft into distributor housing and install driven gear shaft plug. Fill drive gear cavity in housing with lubricant. Install tachometer drive cover plate with a new gasket and tighten screws.

10) On models equipped with governor valve proceed as follows: Install $^{7}/_{16}$" deep well socket, governor counterweight and lock on Governor Adjuster (SE-2072-1). Engage counterweight in socket. Position slotted end of adjuster through horizontal hole in distributor shaft from the side nearest vertical hole of shaft.

11) Install valve body on slotted end of adjuster and engage tang of adjusting screw into slot in end of adjuster. Push body and counterweight together (toward center of shaft) and screw counterweight into valve body while holding adjuster stationary. Tighten counterweight and bend lock tabs.

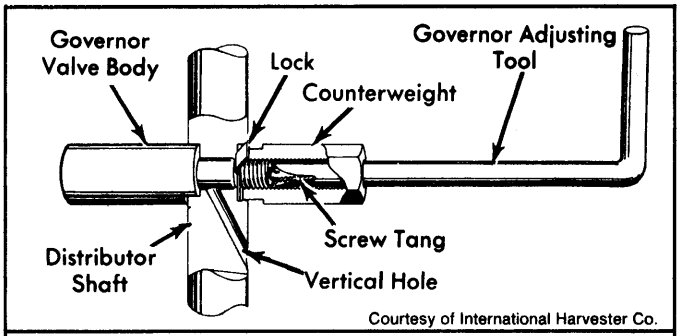

Fig. 4: Installing Governor Valve Assembly

12) Preset governor valve by turning adjuster clockwise until spring screw is bottomed. Back screw out approximately 3 ½ turns. Install valve adjusting plug and tighten using an Allen wrench. Install clamp and gasket assembly, seal wire, and governor air inlet filter.

13) Install 3 thrust buttons in upper sensor plate and lubricate buttons with distributor cam lubricant. Install upper plate to lower plate and install retaining spring. Position sensor to upper plate, install mounting screw loosely, and engage wiring clip into hole in plate. Install sensor plate assembly to distributor and install mounting screws. Tighten screws alternately and evenly.

14) Position sensor wiring seal/retainer into slot of distributor housing, position vacuum diaphragm assembly to housing and install mounting screws. Connect vacuum diaphragm rod to pin on sensor plate assembly and install retaining ring. Adjust trigger wheel-to-sensor air gap to .008" and tighten sensor mounting screw.