

# WILLYS-KNIGHT

## MODEL 70-A (1927)

### AUTO-LITE GENERATING, STARTING AND LIGHTING SYSTEM AUTO-LITE IGNITION

**BATTERY:**—U.S.L. Type 3-HVX-7X. 6 volt. Starting capacity is 158.5 amperes for 20 minutes. Lighting capacity is 5 amperes for 28.4 hours. The negative (—) terminal is grounded. Battery is mounted on frame under front floor board on left hand side.

**IGNITION:**—Coil Model IG-4065. Distributor Model IGA-4021. Breaker contacts separate .020-.024 inch. They are made of tungsten. Resurface contacts with a fine flat contact file or on a medium hard oilstone. Distributor is semi-automatic. Manual advance is 20° (engine). Automatic advance begins at 800 R.P.M. (engine). Maximum automatic advance is 20° (engine) reached at 2400 R.P.M. Breaker arm spring tension is 20 ounces. Ignition current is 1-3 amperes with engine running and 4-5 amperes with engine stopped.

**Mounting:**—Distributor is mounted on the right of the engine near the forward end. To remove distributor, disconnect primary lead and manual advance rod and remove head with cables attached. Then remove two mounting screws and lift distributor from place.

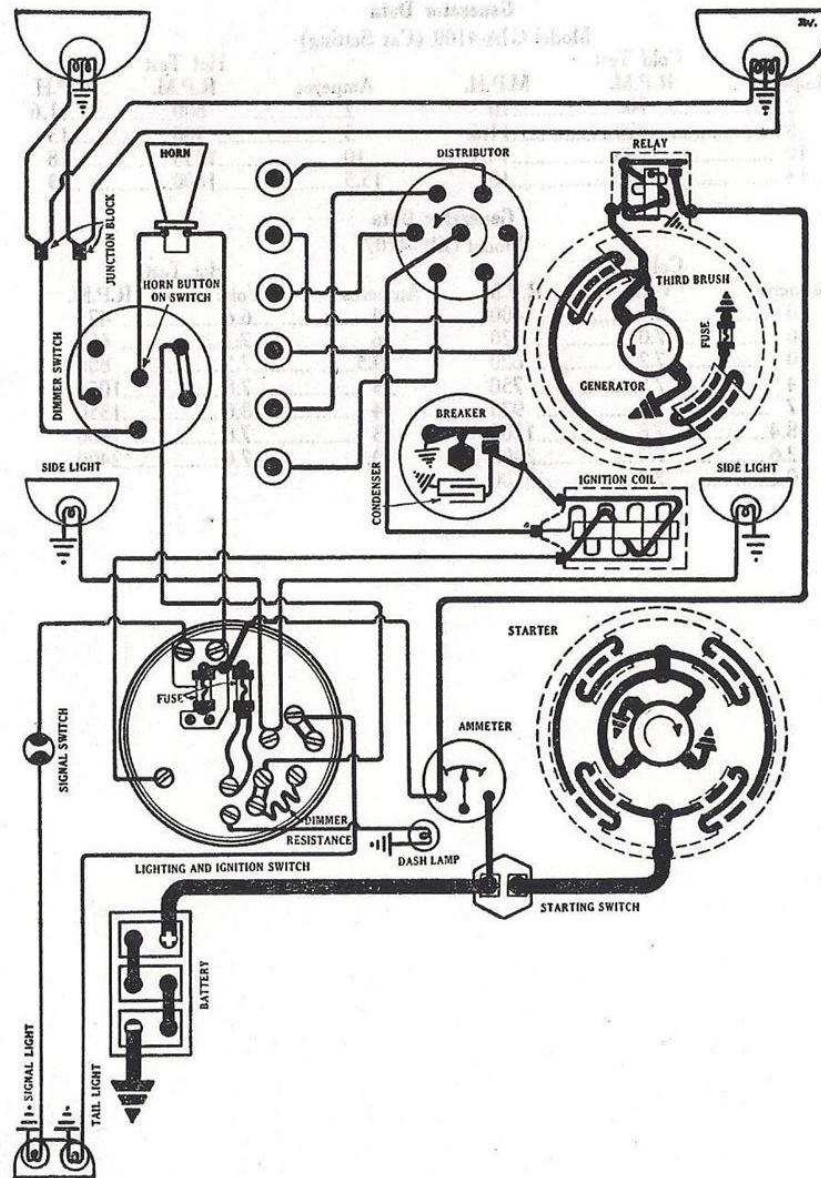
**Oiling:**—Fill the grease cup on the side of the distributor shaft with pure vaseline and turn down one turn each week or each 250 miles. Every 5000 miles remove the rotor button and saturate the wick oiler in the center of the shaft with light engine oil. Put a small bit of vaseline on the face of the breaker cam under the fiber bumper of the contact arm.

**Timing:**—Breaker contacts begin to separate when the piston entering power stroke reaches a position .026 inch before top dead center with the manual advance lever in the fully advanced position. To check timing, crank engine until piston No. 1 enters compression stroke. This may be checked by removing spark plugs in the other cylinders and cranking engine until compression is felt. Then fully advance manual spark lever and continue to crank engine until ignition mark on the flywheel is opposite the indicator in the clutch inspection hole. This mark is 8° or 51/64 inch before top dead center. At this point the piston will be .026 inch before top dead center and the contacts should separate. To set timing, loosen the clamp screw under the distributor cup and rotate the distributor until contacts begin to separate. Tighten the clamp screw. A variation of 1° or 1/8 inch is allowable in setting the ignition.

**Firing Order:**—The firing order is 1-5-3-6-2-4.

**Spark Plugs:**—Spark plug diameters are 7/8 inch. Gaps are .025 inch.

**Valve Timing:**—The Willys-Knight engine is of the sleeve valve type. To time sleeve valves with eccentric shaft sprocket removed, remove pipe plug in exhaust manifold opposite No. 6 cylinder and scrape carbon from edges of sleeve ports so that closing of ports can be checked. Then remove clutch inspection plate and crank engine until flywheel mark "EC" is opposite the pointer on the flywheel case. Place electric lamp over spark plug port in cylinder No. 6 and rotate eccentric shaft in clockwise direction until the upper edge of the port in the outside port passes the lower edge of the port in the cylinder block on the downward stroke. At this point the ray of light from the lamp will be cut off. Then assemble chain on crankshaft, idler and generator sprockets. Insert the eccentric shaft sprocket in chain and change mesh of sprocket in chain one tooth at a time until the five cap screws can be inserted without changing the position of the eccentric shaft or crankshaft. Then tighten the five cap screws holding the sprocket rigidly on the shaft. To set tension of timing chain, turn idler eccentric bushing spring until all slackness is removed from chain. Then give spring one complete turn and insert end in slot of idler stud.



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AUTO-LITE IGNITION

**STARTER:**—Model MAB-4002. Starter is connected to the engine through a Bendix drive. The direction of rotation is counter-clockwise, looking at the commutator end. Starter cranks the engine at 120 R.P.M. drawing 250 amperes at 5 volts. Starter switch is Model SW-4001. Brush spring tension is 1 $\frac{3}{4}$  -2 $\frac{1}{4}$  pounds each.

Starter Data			
Torque	R.P.M.	Volts	Amperes
.6 lb. ft.	1900	—	100
3.5 "	1100	—	200
6.6 "	700	—	300
10.2 "	410	—	400
24 "	Lock	4	725

**Mounting:**—Starter is barrel mounted at the right of the transmission case on the rear of the flywheel housing. To remove, disconnect cable and remove pilot mounting screw directly above starter sleeve. Then slide starter to rear and lift from place.

**Oiling:**—Put 7 or 8 drops of light engine oil in the oiler on the drive end of the starter every two weeks or each 1000 miles.

**GENERATOR:**—Model GYA-4202A. The direction of rotation is counter-clockwise, looking at the commutator end. Generator current regulation is by third brush shunt field. To adjust generator output, remove commutator cover band and shift third brush by tapping on the mounting stud with a screwdriver. Shift the third brush in a counter-clockwise direction to increase the charging rate and in the opposite direction to decrease the charging rate. The third brush mounting bracket is held in any desired position by friction between the mounting stud and the end plate. Charging rate with maximum setting of third brush is 19 amperes at 8 volts.

## Generator Data

Cold Test			Hot Test	
Amperes	Volts	R.P.M.	Amperes	R.P.M.
2	6.6	620	2	700
5	7	700	5	840
10	7.3	860	10	1100
14	7.7	1050	14	1600
16	7.9	1200		

Motoring generator draws 5 amperes at 6 volts. Shunt field current is 3.8 amperes at 6.2 volts. Brush spring tension is 1 $\frac{1}{4}$ -2 pounds.

**Mounting:**—Generator is cradle mounted on the right side of the engine. To remove generator, disconnect lead and loosen two nuts on mounting strap. Then disengage coupling and lift generator from place.

**Oiling:**—Put 7 or 8 drops of light engine oil in each of the generator oilers every week or each 250 miles.

**RELAY:**—Model CB-4007. Relay is mounted on the generator. Relay contacts close at approximately 620 R.P.M. when the generator voltage reaches 7-7.5 volts and open with a discharge current of .5-2.5 amperes. Charging current at closing of contacts must not exceed 2 amperes. Relay contacts separate .025-.035 inch. Air gap between relay armature and coil core is .010-.030 inch, contacts closed.

**LIGHTING:**—Briggs & Stratton 70-A. Head lamps are 6-8 volt, 21 cp. double filament using second 21 cp. filament instead of dimming. Stop lamp is 6-8 volt, 21 cp. S.C. Dash, tail and side lamps are each 6-8 volt, 3 cp. S.C.

**FUSES:**—Generator field fuse is 5 amperes. Lighting fuses are 20 amperes.