

# WILLYS KNIGHT

MODEL 70-A (1928)

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

**BATTERY:**—U.S.L. Type 3-HVX-7X, 6 volt. Starting capacity is 148.5 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. Coil is mounted on right side of engine block. Ignition current is 1-3 amperes at 6 volts with engine running and 3.4-5 amperes at 6 volts with engine stopped.

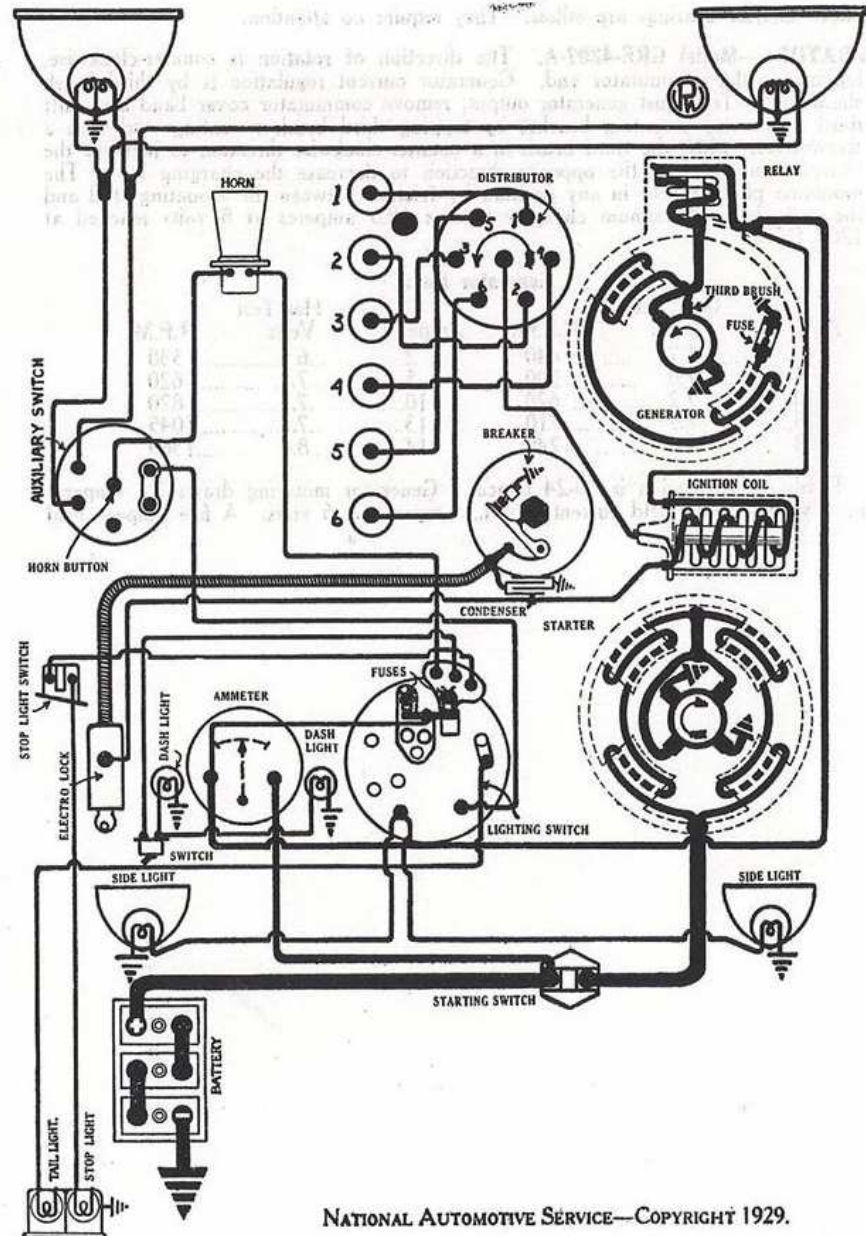
**Distributor Model IGA-4042.** Breaker contacts separate .020-.025 inch. Set contact gap by loosening lock nut on stationary contact stud and turning up stud until proper gap is secured with breaker arm on lobe of cam. Resurface contacts with a fine flat contact file or on a medium hard oilstone. Breaker arm spring tension is 16-20 ounces. Distributor is semi-automatic. Maximum manual advance is 20 degrees (engine). Automatic advance begins at 800 R.P.M. of engine. Maximum automatic advance is 20 degrees reached at 2400 R.P.M.

**Mounting:**—Distributor is mounted on the right of the engine. To remove distributor, disconnect manual advance rod and remove Electrolock from instrument board. Then remove distributor head with cables intact and remove two mounting cap screws in distributor base. Lift distributor from place and remove Electrolock and distributor as a unit.

**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  $8^{\circ}$  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  $1^{\circ}$  or  $1/8$  inch is allowable in setting the ignition.

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

**Spark Plugs:**—Spark plug diameters are  $\frac{7}{8}$  inch. Gaps are .025 inch.

**STARTER:**—Model MAB-4002. Starter is connected to the engine through a Bendix drive. The direction of rotation is clockwise, looking at the commutator end. Starter cranks the engine at 140 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.

### 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 500 miles.

**GENERATOR:**—Model GAL-4103. 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 the commutator cover band and shift the third brush and mounting plate by tapping on the third brush 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 mounting plate is held in any position by friction between the mounting stud and the end plate. The maximum charging rate is 17 amperes at 8 volts reached at 2075 R.P.M. or 23 miles per hour.

### Generator Data

Amperes	Volts	R.P.M.
2	6.4	675
6	6.9	835
10	7.3	1025
14	7.65	1275
17.2	8.0	2075
14	7.65	2925

Brush spring tension is 24-32 ounces. Generator motoring draws 4.7-5.7 amperes at 6 volts. Shunt field current is 4.2 amperes at 6 volts. A five ampere field fuse is mounted on the top of the generator.

**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-4104. Relay is mounted on the generator. Relay contacts close at 675 R.P.M. when the generator voltage reaches 7-7.5 volts and opens with a discharge current of 5-2.5 amperes. Charging current at closing of contacts is approximately 2 amperes. Relay contacts separate .025-.035 inch. Air gap is .010-.030 inch with contacts closed.

**LIGHTING:**—Briggs and Stratton Switch. Lighting switch is mounted on the instrument board. An auxiliary switch to control head lights is mounted on the side of the steering column. Head lights are 6-8 volt, 21-21 cp. (double filament-double contact base using second 21 cp. filament instead of dimming) Mazda No. 1110. Side lights are 6-8 volt, 3 cp. S.C. Mazda No. 63. Stop light is 6-8 volt, 15 cp. S.C. Mazda No. 87. Dash, tail and dome lights are each 6-8 volt, 3 cp. S.C. Mazda No. 63.

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