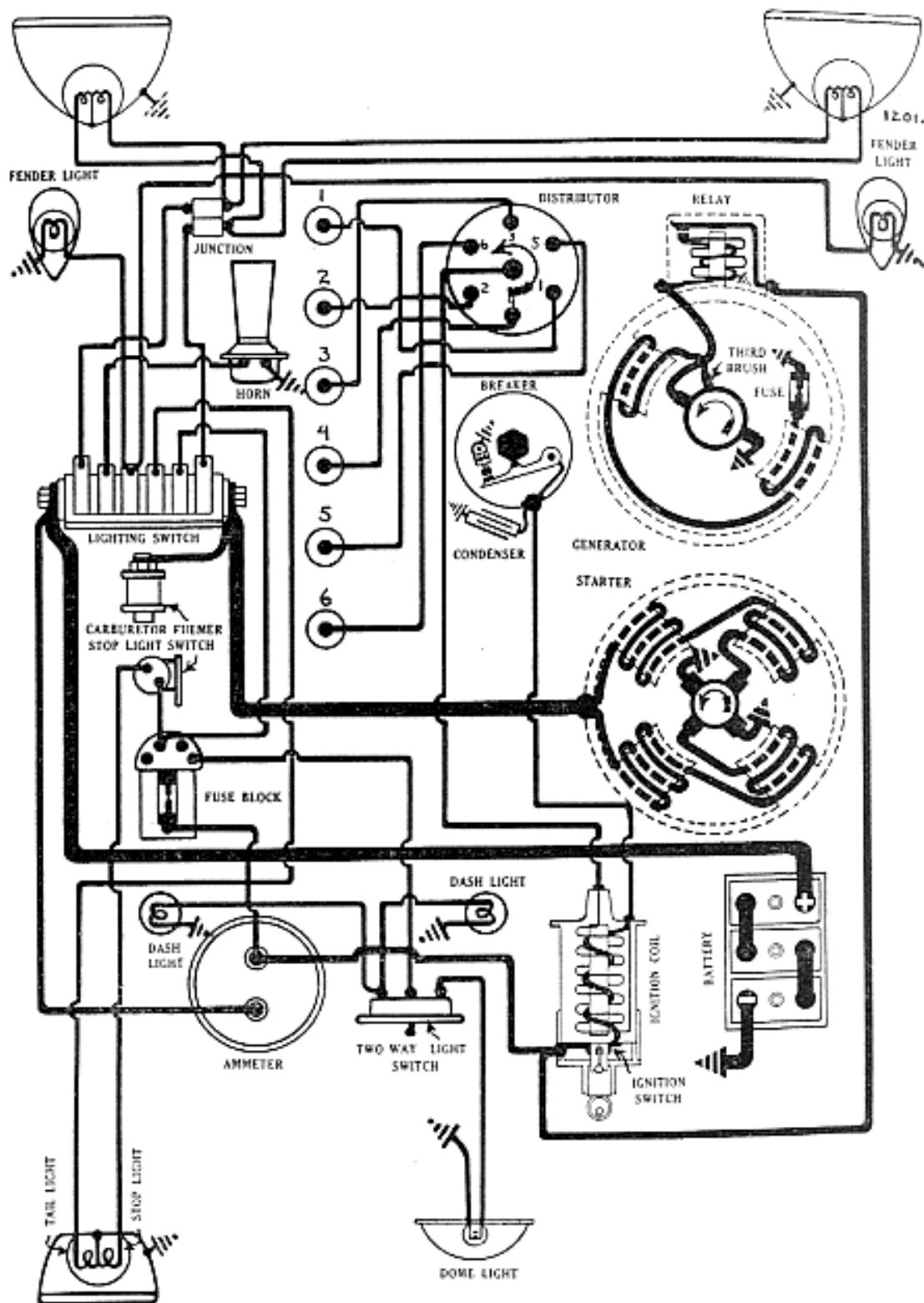


WILLYSKNIGHT

MODEL 95 (1931-32), SERIAL NUMBERS 1001 UP
 PRODUCTION STARTED JUNE 6, 1931
 AUTO-LITE SYSTEM



CAR SERIAL NUMBER:—Stamped on plate on right frame member in front of right front spring rear hanger and on body sill under driver's seat cushion.

ENGINE NUMBER:—Stamped on plate on right side of crankcase.

BATTERY:—U.S.L., Type 3-HVX-6X-6A, 6 volt, 117 ampere hour capacity (5 ampere rate). Starting capacity, 127 amperes for 20 minutes. Negative (—) terminal grounded. Battery mounted on right frame member under front compartment floor boards. Battery size, 7 7/16 inches wide, 10 7/16 inches long, 9 3/4 inches high.

IGNITION:—Coil Model IGC-4303. Lock coil type with ignition switch in base. Coil mounted on back of instrument board with ignition switch at right of instrument panel. Ignition current 1-3 amperes at 6 volts (engine running), 3.4-5 amperes at 6 volts (engine stopped).

Distributor Model IGC-4045-A. Single breaker arm, 6-lobe cam type with semi-automatic advance. Manual spark controlled by button at lower right of instrument panel. Normal running position with spark advanced—button pushed in, pull out button to retard spark. Breaker contact gap set at .018 inch. Hold within limits of .018-.020 inch. To set gap, loosen lock nut on stationary contact stud, turn up stud. Breaker arm spring tension, 16-22 ounces (measured at tip of breaker arm with spring scale in line with center of contacts and at right angles to arm). Maximum manual advance, 20 degrees (engine).

Cam Angles—Closed 41°. Open 19° (distributor degrees).

Degrees	Distributor	Automatic Advance R.P.M.	Degrees	Engine	R.P.M.
Start	300	0	.....	600
2	520	4	.....	1040
4	750	8	.....	1500
6	970	12	.....	1940
7.5	1100	15	.....	2200

Mounting:—Mounted on accessory drive housing at right of engine. To remove, disconnect manual advance control, disconnect primary lead, take off distributor cap, take out hold-down screw in advance arm, lift unit out.

Oiling:—250 Miles. Fill oiler under distributor cup with light engine oil.
500 Miles. Take off distributor cap and rotor, oil wick oiler in center of shaft, put one drop of oil on breaker arm pivot pin.
5000 Miles. Take off distributor cap and rotor, apply thin film vaseline to face of breaker cam.

Timing:—Standard setting 12° (on flywheel) or .058" (piston travel) before top dead center with manual spark control fully advanced. To set timing, advance manual spark control (push button in toward dash), take off cover over inspection hole in left front of flywheel housing. With No. 1 piston on compression turn engine over until flywheel mark 'IGN/' (which is 12° before top dead center mark 'TC/EC') is directly opposite pointed indicator pin in inspection hole, loosen advance arm clamp screw, rotate distributor until contacts begin to open (use test lamp), tighten clamp screw, connect spark plugs as indicated on diagram (No. 1 terminal as designated).

NOTE:—Flywheel is stamped with two sets of marks for right hand drive cars and left hand drive cars. Inspection hole on right hand drive cars is at right of housing and no confusion should result in setting timing if care is taken that No. 1 piston is approaching top dead center on compression when flywheel mark is checked. To determine compression stroke, take out No. 1 spark plug, close opening by placing thumb in port and turn engine over until air compressed in cylinder is felt escaping.

Firing Order:—1-5-3-6-2-4. No. 1 cylinder nearest radiator.

Spark Plugs:—7/8-18 S.A.E. Champion Type C-1. Set gaps at .020 inch.

VALVE TIMING:—Sleeve valve type with double sleeves driven by eccentric shaft at left of engine. Eccentric shaft driven by chain from crankshaft. Chain adjustment by automatic idler sprocket.

Valve Timing

Inlet port opens— 10° or $1\ 9/64"$ on flywheel before top dead center.
 Inlet port closes— 35° or $3\ 31/32"$ on flywheel after lower dead center.
 Exhaust port opens— 45° or $5\ 7/64"$ on flywheel before lower dead center.
 Exhaust port closes—at top dead center with flywheel mark 'TC/EC' at indicator on flywheel housing.

To Check Valve Timing. Take off exhaust manifold, take off cover plate on inspection hole in left front of flywheel housing. Scrape carbon from edges of exhaust port cylinder No. 1, turn engine over until port just closes when upper edge of port in outer sleeve passes lower edge of port in cylinder block (use .0015" feeler inserted in port or take out No. 1 spark plug and insert test light in spark plug port to check closing—closing of port will be indicated by sleeve gripping feeler or ray of light from test light being cut off). Flywheel mark 'TC/EC' should be directly opposite pointed indicator screw on housing. Retime sleeves when flywheel mark is more than $3/8"$ from indicator when port closes.

To Set Valve Timing—with chain and automatic idler sprocket dismantled. Turn crankshaft until No. 1 piston is on top dead center with flywheel mark 'TC/EC' at indicator on housing. Turn eccentric shaft clockwise until No. 6 exhaust port just closes (see paragraph above). Assemble chain on crankshaft sprocket, eccentric shaft sprocket, accessory sprocket. Mesh idler sprocket, take up all slack by turning eccentric bushing spring, turn spring $1\ 1/4$ additional turn, insert end in nearest slot of idler sprocket stud. Rotor in distributor should be opposite No. 1 terminal in distributor cap.

STARTER:—Model MAD-4115. Starter drives through outboard Bendix drive. Rotation counter-clockwise at commutator end. Brush spring tension 44-56 ounces. Starter switch Pines 'Finger Tip Control' mounted at lower end of steering column (see Equipment Section).

Starter Data

Torque	R.P.M.	Volts	Amperes
0 lb. ft.	3750	5.5	58.2
.7 "	2355	5.5	100
3.0 "	1260	5.0	200
5.7 "	770	4.5	300
8.85 "	425	4.0	400
13.0 "	Lock	3.0	505
20.2 "	Lock	4.0	730

Mounting:—Starter flange mounted on front face of flywheel housing at right of engine. To remove, disconnect cable, take out 2 flange mounting bolts, pull starter straight forward to clear Bendix housing, lift out.

Oiling:—500 Miles. Put 4-5 drops light engine oil in oiler at each end of armature shaft. Outboard bearing (Bendix housing) is oilless.

GENERATOR:—Model GAL-4103 (cars without free wheeling). Third brush regulation. To adjust charging rate, take off commutator cover band, shift third brush (by prying on brush mounting stud) counter-clockwise to increase or clockwise to decrease charging rate. Brush held in position by friction. Maximum charging rate, 17-18 amperes (cold) at 8.0 volts reached at 1900 R.P.M.

Model GAL-4103—Generator Data

Cold Test			Hot Test		
Amperes	Volts	R.P.M.	Amperes	Volts	R.P.M.
0	6.3	600	0	6.4	700
4	6.7	740	4	6.9	900
8	7.1	900	8	7.4	1150
12	7.4	1120	10	7.7	1340
17	8.0	1900	12.4	8.0	2150
12	7.4	3200	9.5	7.7	3200

Brush spring tension, 22-25 ounces (main brushes), 31-34 ounces (third brush). Shunt field current is 4.08-4.52 amperes at 6.0 volts. Motoring, generator draws 4.27-4.73 amperes at 6.0 volts. Field fuse is 7½ ampere.

Model GAG-4134 (cars with free wheeling). Third brush regulation. Adjustment same as Model GAL-4103 (above). Maximum charging rate, 17 amperes (cold) at 8.0 volts reached at 1500 R.P.M.

Model GAG-4134—Generator Data

Cold Test			Hot Test		
Amperes	Volts	R.P.M.	Amperes	Volts	R.P.M.
0	6.4	550	0	6.4	640
4	6.7	660	4	6.9	800
8	7.0	760	8	7.3	980
12	7.4	900	10	7.6	1110
16	7.8	1120	12	7.8	1280
19	8.0	1540	14.2	8.0	1680
13	7.4	2400	11.5	7.7	2400

Brush spring tension is 22-27 ounces. Shunt field current is 4.08-4.52 amperes at 6.0 volts. Field fuse is 7½ ampere capacity. Motoring, generator draws 4.17-4.62 amperes at 6.0 volts.

Mounting:—Generator cradle mounted at right of engine. Driven through flexible coupling from accessory sprocket. To remove, disconnect lead, disconnect drive coupling, loosen mounting clamp band, lift generator out.

Oiling:—250 Miles. Put 4-6 drops light engine oil in oiler at each end.

RELAY:—Model CB-4014, 4021. Mounted on generator. Contacts close with generator voltage of 7-7.5 volts and open with discharge current of .5-2.5 amperes. Contact gap limits, .025-.035 inch. Air gap limits, .010-.030 inch (contacts closed).

LIGHTING:—Pines Switch, Model A-805. Lighting switch 'Finger Tip Control' type mounted at lower end of steering column controlled by button on steering wheel (see Equipment Section). Dimmer system 'depressed beam' double filament headlight bulbs controlled by lighting switch.

Lamp Sizes

Position	Voltage	Candlepower	Base	Mazda No.
Headlights	6-8	21-21	D.C.	1110
Fender Lights (parking)	6-8	3	S.C.	63
Instrument Lights	6-8	3	S.C.	63
Stop and Tail Light	6-8	21-2	D.C.	1158

NOTE:—Stop and tail light is a combination double filament bulb. Connect tail light lead to 2 cp. filament.

FUSES:—20 ampere capacity fuse mounted on fuse block left front of dash. Generator field fuse 7½ ampere capacity mounted on brush ring.

GASOLINE GAUGE:—K-S Telegauge hydrostatic type (see Carburetion Section).

FUEL PUMP:—A.C. Type 'B' mechanical fuel pump mounted at left of engine (see Carburetion Section).