

Battery.—Battery is 6 volt, 120 ampere-hour. The negative (—) terminal is grounded at the starting motor.

Ignition.—Breaker contacts should separate .016 inch to .018 inch. They are made of tungsten. They will operate properly even though quite rough. Should they become badly worn, affecting the ignition, the inner breaker mechanism must be renewed as directed on Page 50. In an emergency, contacts may be resurfaced enough to give service for 300 or 400 miles by drawing a piece of fine emery cloth between them.

Timing.—Contacts should begin to separate when the mark "1-4 U-P" on the flywheel is $2\frac{1}{2}$ inches past the indicator, spark control lever and breaker assembly in the fully retarded position.

Firing Order.—The firing order is 1, 3, 4, 2.

Spark Plug Gaps.—Spark plug gaps should be about .023 inch.

Ignition Thermostat.—There is a thermostat in the switch case to open the ignition, preventing battery discharging through the ignition apparatus should ignition switch be left "On" with engine idle, contacts closed. This device is fully described on Page 41.

Oiling.—Refill the cup under the breaker head with pure vaseline and turn down every month. If car is driven more than 1000 miles in a month, this must be done every 1000 miles. Do not put grease or oil in the cup.

Starter.—Starter is connected to the engine through a Bendix drive. Cold engine, tight bearings, heavy oil or other obstructions will cause a high current flow and low speed during cranking operation. When running free, armature should revolve at about 4200 R. P. M., taking 50-55 amperes. Greater speed indicates grounded, short circuited or damp field windings. Greater current or vibrating of the ammeter needle indicates grounded or short circuited armature coils or commutator. Damp armature windings will cause high current or slow speed.

Oiling.—Clean and repack starter bearings with soft cup grease every six months. Put in one or two drops of oil every month to keep grease soft. Do not oil the Bendix drive. Should pinion stick, clean shaft with gasoline.

Generator.—Generator current regulation is by reverse series field. Relay should close at 7-10 M. P. H., or 230-265 R. P. M., of generator armature. Charging current should be .5 to 1.5 amperes at closing and discharge current 0 to 1 at opening.

Amperes	GENERATOR DATA, MODEL GF	R. P. M.
5	430- 490
10	730- 870
12.5	945-1180
15	1225-1660
16-19	2200-2800

A variation of 1.5 amperes from these amounts is allowable. Output may be varied slightly by adjusting brush pressure on commutator. The pressure should be 1 to $1\frac{1}{4}$ pounds. If operated freely as a motor, armature should revolve at 200 R. P. M., taking 1.8 amperes. Much higher speed indicates damp, grounded or short circuited field coils. Greater current or lower speed indicates tight bearings or damp, grounded or short circuited armature windings or commutator. Periodic swinging of ammeter needle indicates grounded or short circuited armature coils or commutator bars. Shunt field should take about 1 ampere.

Oiling.—Put 5 or 6 drops of light engine oil in each of the generator oilers every two weeks. If car is driven more than 500 miles in two weeks, the oiling must be done every 500 miles.

Lamps.—Head lamps are 6-7 volts, 16 cp. Dimmer lamps are 6-7 volts, 4 cp. Dash and tail lamps are in series. They are each 3-4 volts, 2 cp.

Fuses.—Fuses are 20 ampere.

Model Numbers.—Generator is Model GF 1176. Starter is Model MC 1019 on the first 2400 cars and MC 1126 on later cars. On early cars a Willard OLBA battery was used. On later cars a USL CD 315 D battery is used.

Willys-Knight

Model 88-4 (1916-17)
Auto-Lite Starting and Lighting System
Connecticut Ignition

