

# STARTIX SYSTEM (Type D)

## WILLYS 6-90, 6-90A, 8-88, 8-88A

### (custom models only)

**DESCRIPTION:**—Startix is an automatic magnetically operated switch. It will be found installed on a number of 1932 car models as original equipment. It is used in conjunction with starters equipped with Bendix drives and is designed to crank the engine automatically whenever the ignition switch is turned on. It will also crank the engine whenever the engine stalls with the ignition switch on.

**OPERATION:**—Startix consists essentially of the main switch contacts, a movable contactor and two solenoids, a main switch solenoid, and a relay solenoid. The starting switch contactor is mounted on a plunger in the main switch solenoid. The main switch solenoid is connected between the 'IGN' terminal on the startix case and ground through a set of contacts controlled by a vibrating arm operated by the relay solenoid plunger. The 'IGN' terminal is connected to the coil side of the ignition switch so that the main switch solenoid is energized whenever the ignition switch is turned on (the contacts are normally closed with the ignition switch off and the engine stopped). This causes the main switch solenoid plunger to move in closing the circuit between the main switch contacts, completing the starter circuit and cranking the engine. There is a large one half turn series coil wound around the relay solenoid plunger which is connected in series with the starting switch contacts so that the entire starting motor current flows through this coil. When the engine begins to fire, disengaging the Bendix drive, the current drawn by the starter will decrease sufficiently so that the effect of this series coil (which tends to hold the relay solenoid plunger out and the vibrating arm contacts closed) will be overcome by the outer starting motor circuit winding on the relay solenoid drawing the plunger into the relay solenoid and causing the operating lever to deflect the vibrating arm and open the contacts. This opens the main switch solenoid circuit and the starting motor circuit is opened by a spring on the solenoid plunger. There is also a second winding on the relay solenoid connected between the 'GEN' terminal and ground. The 'GEN' terminal is connected to the generator side of the relay and a small current will begin to flow through this coil as soon as the generator begins to operate. This assists in holding the relay solenoid plunger in as long as the engine is operating. Whenever the engine stalls, the relay solenoid moves out, closing the contacts and completing the main switch solenoid circuit.

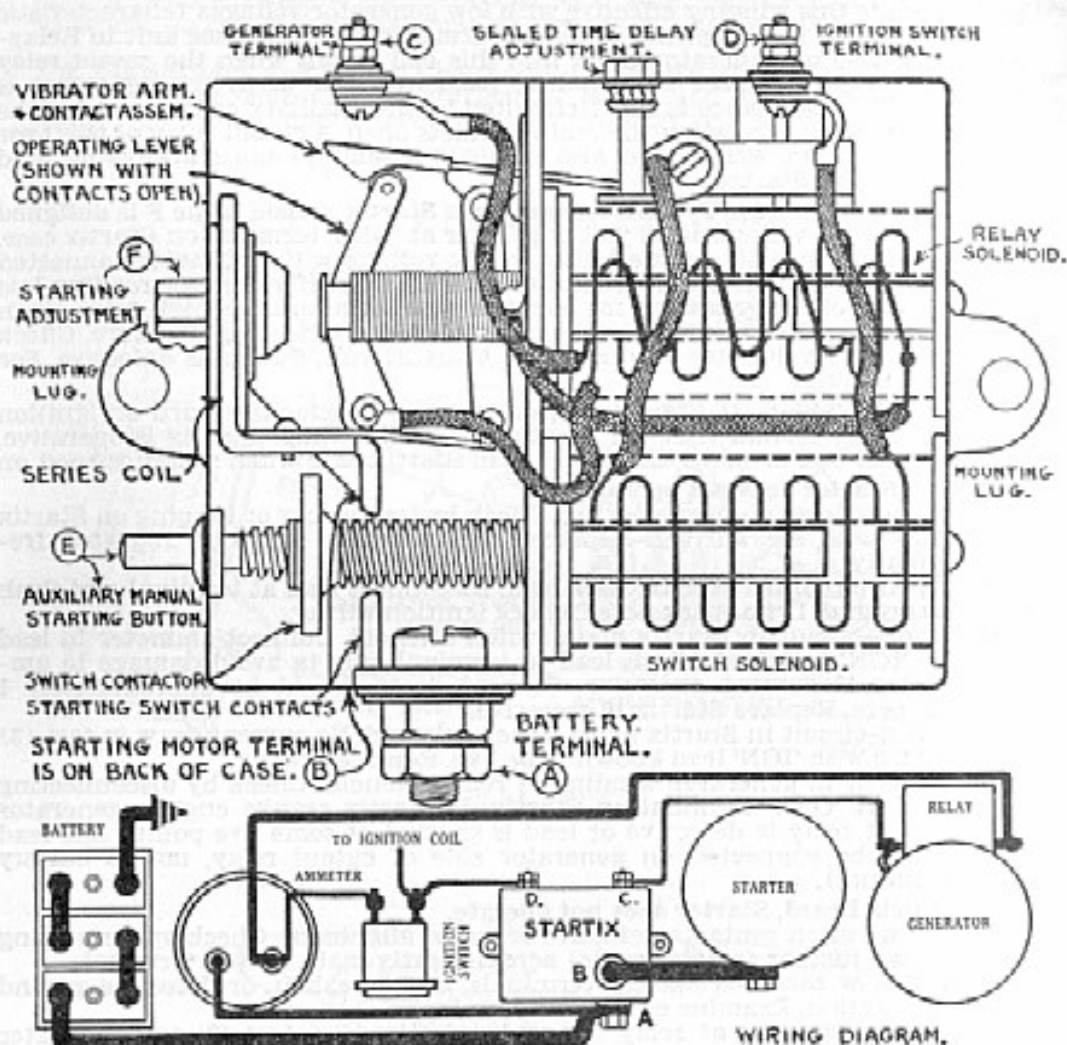
**Manual Operation.** An auxiliary starter button is located on the end of the Startix case for use whenever it is desired to operate the starting switch manually. The button should be pressed firmly and released quickly.

**Ignition Settings:**—A number of the ignition switches used on car models in conjunction with Startix provide two switch positions. The first 'On' position connects the Startix in the circuit, providing automatic cranking. The second 'On' position completes the ignition circuit but does not complete the Startix circuit. This switch position should be used in setting the ignition (with the ignition turned on) when the automatic cranking feature is not desired. On cars not equipped with this type switch it will be necessary to disconnect the wire on the 'IGN' terminal of the Startix case to prevent Startix operation.

**INSTALLATION:**—Startix is usually mounted on the engine block near the starter, or on the dash. The case is grounded and a separate ground wire must be run from the case to the car frame or engine block whenever the Startix is mounted on a wooden dash or other insulated mounting. Connections should be made as indicated on the diagram. In making connections to the main terminals care should be taken not to twist the main terminal posts as this may interfere with correct operation of the starting switch by affecting the alignment of the switch contacts.

**ADJUSTMENT:**—A starting adjustment is provided on the end of the Startix

case directly in front of the relay solenoid plunger. This adjustment consists of a slotted screw held in position by a locknut. It is designed to correct interrupted cranking (repeated attempts to crank the engine) or spinning of the starter after the engine has begun to fire and the Bendix drive has been disengaged. The extreme outward (counter-clockwise or left) position of the adjustment screw will cause interrupted cranking while the extreme inner (clockwise or right hand) position of the adjustment screw



WIRING DIAGRAM.

will result in the starter spinning. The correct adjustment will consist in finding a position between these two extremes which will result in satisfactory starter operation. To set Startix adjustment, first disconnect coil high tension lead at center terminal of distributor cap (to prevent engine firing). Loosen locknut on adjustment screw, turn ignition on and while starter is cranking engine determine interrupted cranking position of adjustment screw by turning screw slowly to left or counter-clockwise until interrupted cranking begins. Tighten locknut slightly and make a mark on the case in line with the screw slot. If adjustment is being made because of interrupted cranking, turn screw slowly to the right until starter cranks engine steadily and make the mark at this point. Then connect coil high tension lead so that engine will fire, disconnect wire on 'GEN' terminal of Startix case, turn on ignition and turn adjustment screw to right or clock-

wise until starter spinning occurs after engine begins to fire. Then turn adjustment screw to left or counter-clockwise until a click is heard indicating the opening of the starting switch contacts. Tighten the locknut and check this point by operating the Startix by turning ignition switch on. The starting motor should begin to slow down as soon as the engine begins to fire. Mark position of adjustment screw slot by a line on the case. The final setting of the adjustment screw should be midway between the two lines on the case (where the lines are less than  $180^\circ$  apart), or one quarter turn or  $90^\circ$  from the 'starter spinning' reference line (when the two lines are more than  $180^\circ$  apart). Lock the adjustment screw by securely tightening the locknut.

**Time Delay Adjustment.** There is a sealed 'Time Delay Adjustment' screw on the top of the Startix case. This adjustment is set and sealed at the factory and should not be disturbed. It is designed to provide a short interval of time between the stalling of the engine and the automatic cranking operation to prevent damage to the Bendix drive through engagement of the Bendix while the engine crankshaft is rocking.

**TROUBLE SHOOTING:**—Failure of the generator or a short-circuit in the line between the 'GEN' terminal on the Startix and the generator will be evidenced by a clicking sound caused by the meshing contact of the Bendix drive pinion and the flywheel. This may be corrected temporarily to enable the car to be driven to a service station by disconnecting the wire on the 'IGN' terminal on the Startix case rendering the Startix inoperative. Correct by checking line, checking generator connections, cleaning generator commutator, checking ground, and, in some cases, advancing engine idling speed slightly where engine idles at so low a speed that generator will not operate the relay solenoid.

**THERMOSTATIC SAFETY DEVICE:**—There is a thermostatic control incorporated in the Startix which will open and close the circuit (this will be evidenced by a clicking sound) whenever the Bendix pinion sticks or jams in the flywheel for as long as the ignition is left on. This clicking sound will indicate that the ignition should be turned off and the Bendix pinion freed. No adjustment will be necessary on the Startix.

## Startix Circuit Controller

**DESCRIPTION:**—This device is an automatic circuit breaker designed to open the Startix circuit and prevent automatic cranking momentarily whenever a backfire occurs. It is designed to be screwed in the intake manifold and is operated by the pressure built up in the manifold when the backfire occurs. The two terminals on the side of the Circuit Breaker case should be connected as follows: Terminal marked 'IGN' to Startix terminal on ignition switch (feed terminal), Terminal marked 'STARTIX' to 'IGN' terminal on Startix case. These connections must not be reversed as incorrect connections will interfere with the proper action of the Circuit Breaker.

**OPERATION:**—The pressure built up in the manifold by the backfire causes the plunger within the Circuit Breaker case to move upward, closing a set of contacts on a thermostatic arm and short-circuiting the current from the ignition switch through the thermostatic arm to ground. The thermostatic arm is heated and is flexed upward, opening the main contacts and break-

ing the circuit to the Startix switch, thus stopping the automatic cranking of the engine. As soon as the crankshaft stops moving backward and the pressure in the intake manifold drops, the plunger drops down, opening the thermostatic arm contacts, breaking the circuit through the thermostatic arm and permitting the arm to cool. After several seconds the arm flexes downward, closing the main contacts and the Startix switch will then resume the cranking operation. The entire action of the Circuit Breaker is automatic. It must be kept in mind that several seconds will intervene between a backfire and the resumed cranking.

**SERVICING:**—The Circuit Breaker requires no service operations. Connections should be kept tight and care must be taken that the unit is correctly hooked up ('IGN' terminal on unit should be connected to ignition switch and 'STARTIX' terminal connected to 'IGN' terminal on Startix case). If the Circuit Breaker does not operate satisfactorily it should be replaced by a new unit.