ELECTRICAL

STARTING, LIGHTING AND IGNITION

While the starting, lighting and ignition units will operate 10000 or 20000 miles and even more without giving trouble, their original high efficiency gradually drops during this long period without attention; and repairs, when necessary, are more costly. If on the other hand, inspections with minor adjustments are made of the various electrical units at regular intervals, their original high efficiency is maintained much longer and costly repairs are avoided because the natural, gradual wear of the various parts will be noted before serious damage has been done. It is recommended that tune-up inspections be made each 3000 to 5000 miles of operation and a complete check made each 10000 to 12000 miles.

GENERATORS

Tune-Up Inspection

The tune-up inspection should include an inspection of the condition of the commutator and brushes, a check of the bearings for wear, lubrication of the bearings, a check of all connections in the charging circuit to be sure they are tight and making a good electrical contact, a check of the generator output and finally a check of the generator and line voltage.

Commutators which are dirty or discolored should be polished with 00 sandpaper. If the commutator is rough or worn so that the mica and copper bars are nearly even or if the brushes are badly worn the unit should be removed for bench repairs.

The commutator end bearings are absorbent bronze plain bearings while the driven end has a ball bearing. The commutator end bearing can be checked for wear by lifting on the armature to see if there is any noticeable play.

Generators are provided with hinged top oilers over the bearing at either end. Lubrication should include a few drops of light engine oil in each oiler (A), (Figure 2).

Check fan belt adjustment. The sag should be 1" as shown at (E) in Figure 2.

Checking Output

An accurate reading volt-ammeter having voltage

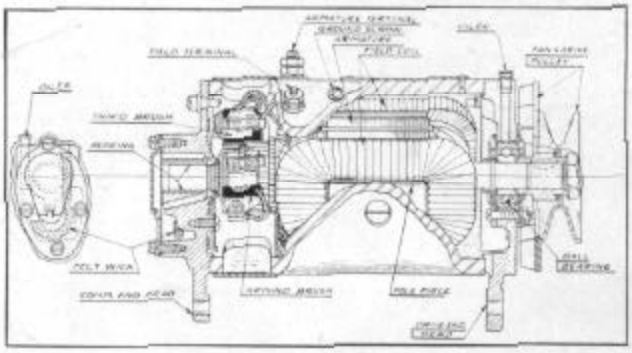

Figure 1—Generator

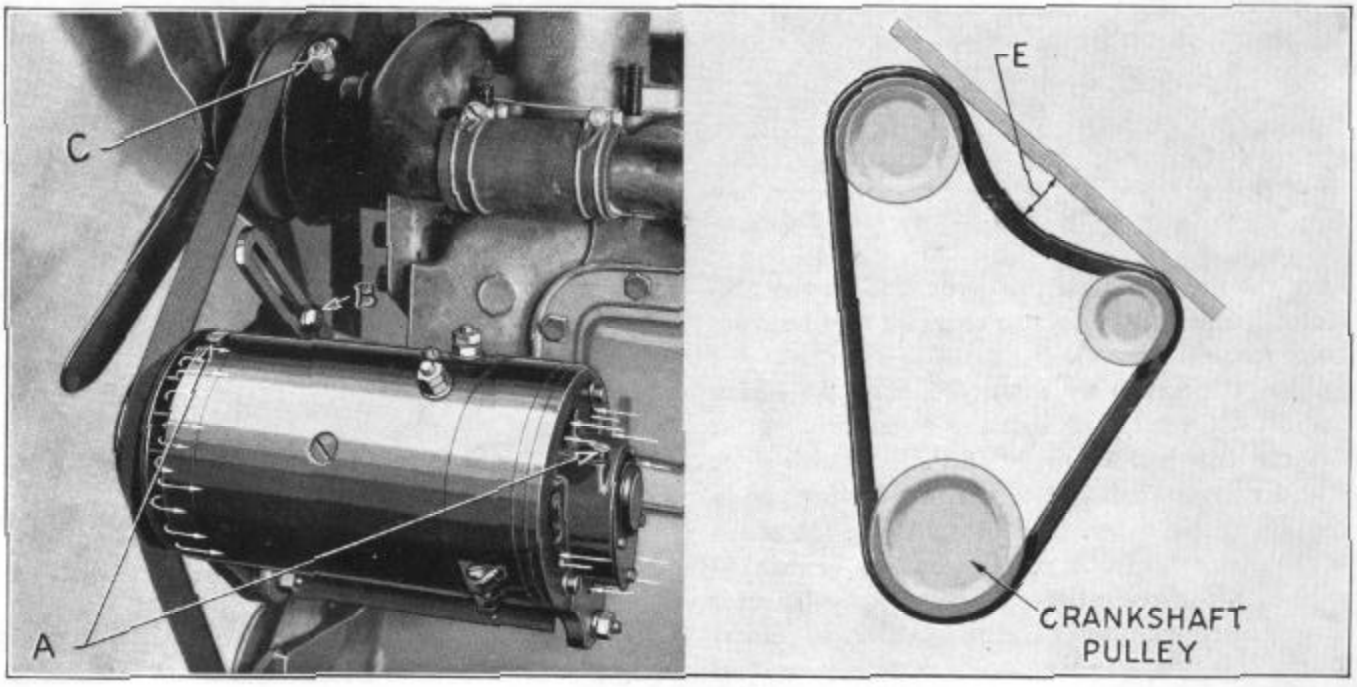

Figure 2—Generator Hub and Fan Belt Adjustment

graduations to read 1/5th volt and amperage graduations to read ½ ampere is absolutely essential to make electrical tests. The leads to the ammeter should be of at least No. 12 stranded wire and as short as possible. A variable rheostat for inserting a resistance in a circuit is also very useful. Connections to the test meters must be clean and tight if accurate readings are to be had (Figure 3).

To test the generator on cars having a circuit breaker only (Figure 5), connect the ammeter in series between the generator terminal and the wire removed from that terminal; connect the voltmeter across the generator terminal and a clean, unpainted ground on the engine or frame. Cars which are equipped with a regulator, either two-charge (Figure 6) or vibrating voltage type (Figure 7) should

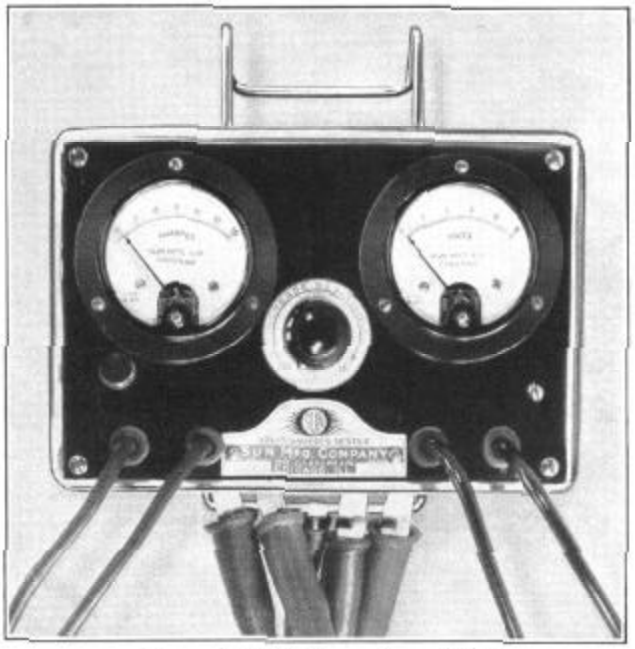

Figure 3—Volt Ammeter—J-795

have the field terminal post grounded to the generator frame while generator charging rate tests are being made (Figure 4).

After the meters are connected, start the engine and set the throttle so that the engine will run at a speed equal to 25 or 30 M.P.H. in high gear. Run for several minutes or until no further rise in the voltage is noted. Then by varying the speed of the engine, generator performance can be checked against the specifications for the particular unit under test and any adjustments needed made. *In checking generator output the voltage reading must be noted as the amperage output varies with the voltage.*

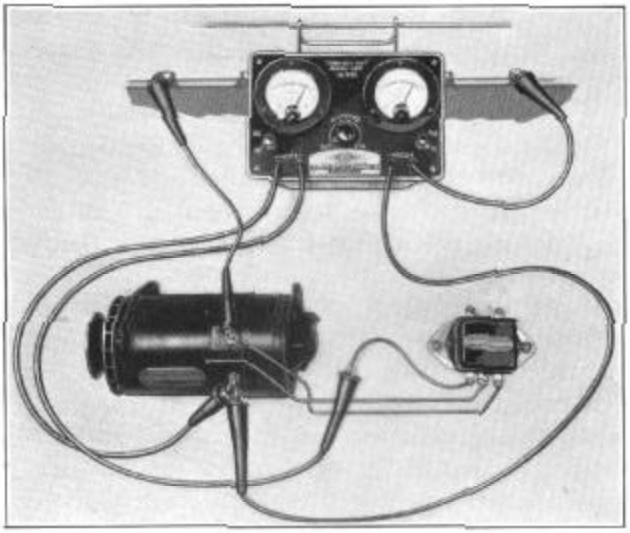

Figure 4—Checking Charging Rate

Complete Inspection

When a complete inspection of the generator is to be made, the unit should be removed from the car and the work done on the bench. Dismantle, thoroughly clean and inspect all parts, replacing any that show excessive wear. At this time the commutator will probably need turning and undercutting. When undercutting be sure to undercut the mica square, the full width of the slot and $\frac{1}{32}$ of an inch deep.

The commutator end bearing should be checked for wear according to the specifications for the generator being worked on. The drive end bearing, after thorough cleaning, should be packed not over one-half full with a heat resisting grease before being assembled in the drive end head.

When new brushes are installed, they should be carefully sanded in so as to have at least a 75% bearing on the commutator and then run in long enough to have a perfect fit before any attempt is made to set the generator output.

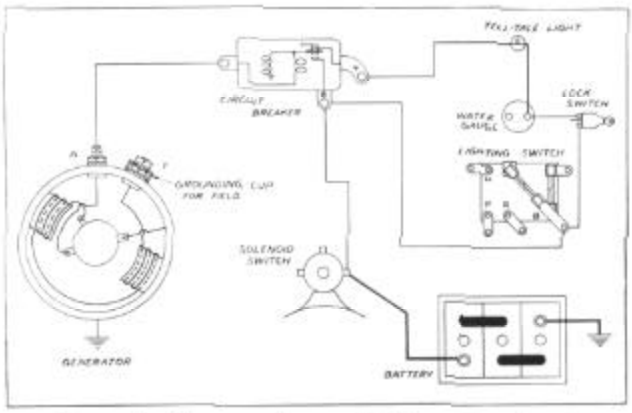

Figure 5—Charging Circuit (without Regulator)

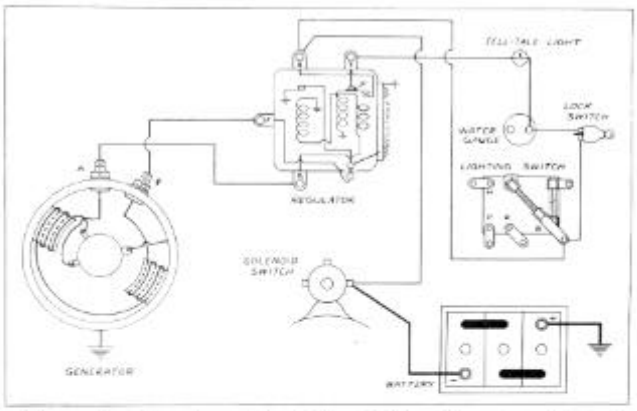

Figure 6—Charging Circuit (with Two Step Regulator)

After assembling, the generator should be given a complete bench test before being installed on the car. While testing, set the third brush for the correct maximum output. (See specifications on pages 8,9 and 10 for the generator that is being tested.)

DISTRIBUTORS

Tune-Up Inspection

The tune-up inspection of the distributor should include the removal and cleaning of the inside of the distributor cap, removal of the rotor, inspection of the breaker points with refacing and respacing if necessary, a check of the automatic governor to see that it is working free, a test of the condenser, lubrication and finally a check and resetting if necessary of the timing of the distributor to the engine. At the same time where proper equipment is available the ignition coil performance should be checked.

Breaker points that show a grayish color and possibly are only slightly rough with no pit or crater showing and which have within .002" proper maximum gap need not be touched for refacing or

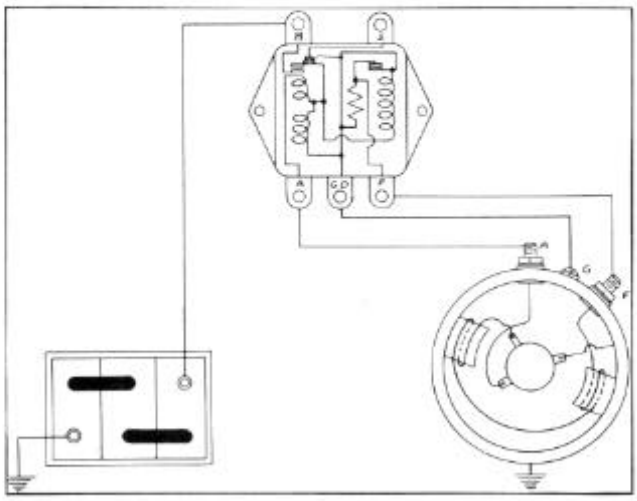

Figure 7—Ch arging Circuit (with Vibrator Regulator)

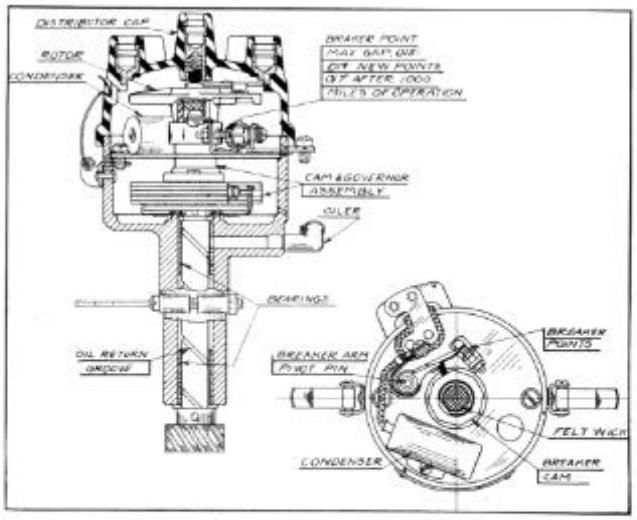

Figure 8—Distributor (8 Cyl.)

adjustment. However, if the breaker points must be readjusted they should always first be refaced so as to have a smooth, flat contact with each other Also be sure they are properly aligned so as to have full face contact.

The governor can be checked for working free by turning the breaker cam in the direction of rotation as far as it will go and releasing. When released it should immediately return to its original position with no drag or hesitancy.

A test of the condenser should include both capacity and leakage. This can only be done with proper test equipment.

Lubrication (Figure 10) should include the adding of several drops of light engine oil in the oiler on the outside of the housing, a film of light grease on the breaker cam, one drop only of light engine oil on the breaker arm pivot pin and the saturating of the felt in the top of the breaker can shaft with light oil on the IGP distributors or the placing of a few drops of light oil in the hole in the top of the breaker cam shaft on the IGB and IGW distributors.

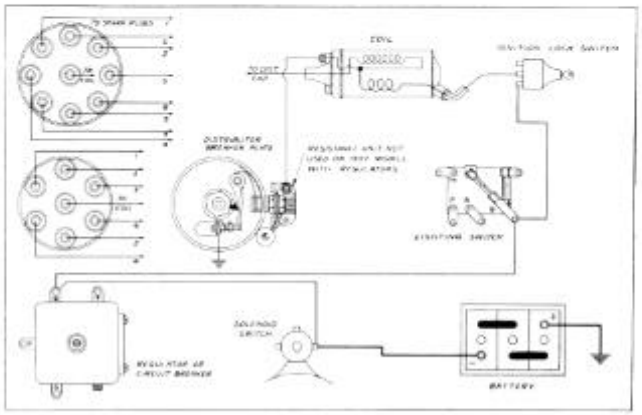

Figure 9—Ignition Wiring Circuit

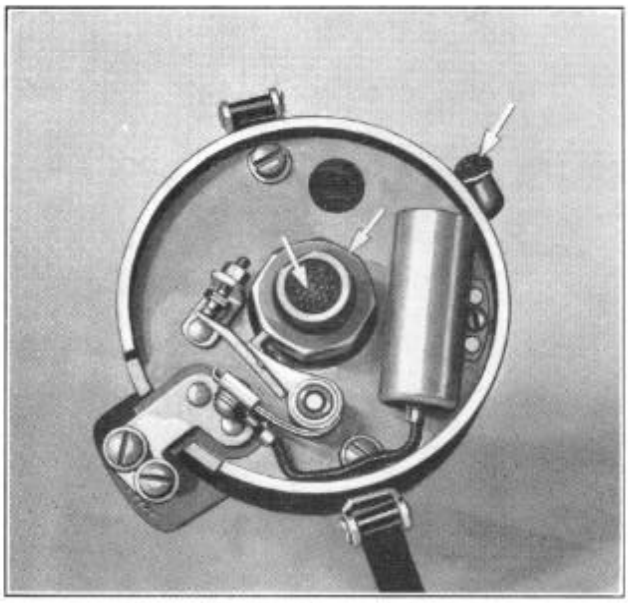

Figure 10—Distributor Lubrication

When the complete inspection is made the bearings in the distributor housing should be thoroughly cleaned, then lubricated before assembling the drive shaft in the housing.

Complete Inspection

The complete inspection should include removal of the distributor from the engine, complete dismantling and cleaning, an inspection of the bearings and breaker cam for possible wear, a check of all points mentioned in the tune-up inspection, reassembling and finally re-installation and complete resetting of the timing to the engine.

No attempt to check or adjust the automatic governor should be made except with an oscillograph so that the occurrence of the spark in degrees can be checked against the speed in R.P.M.

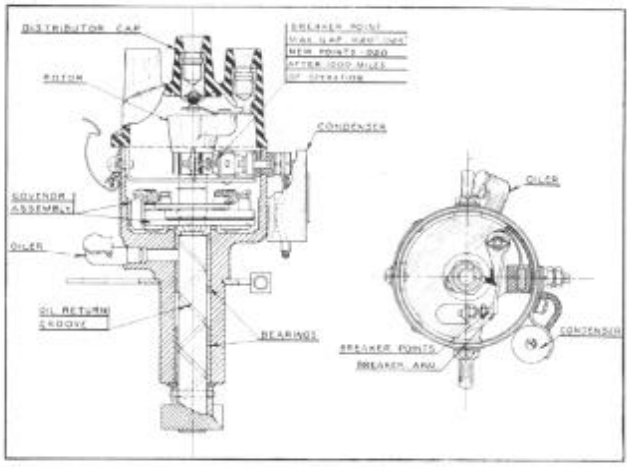

Figure 11—Distributor (6 Cyl.)

The distributor advance curve can be retarded by bending the spring lubs outward and advanced by bending the lugs inward.

Some of the distributors have what is known as a dog leg curve whereby a quick advance is obtained during the lower speeds and a more gradual advance at the higher speeds. Also some of the distributors having this type of an advance have governor weight springs of different tension with a flat auxiliary spring outside of one of the lugs holding the outer end of one of the governor weight springs.

When replacing these springs care must be taken to install the lighter weight spring on the lug having

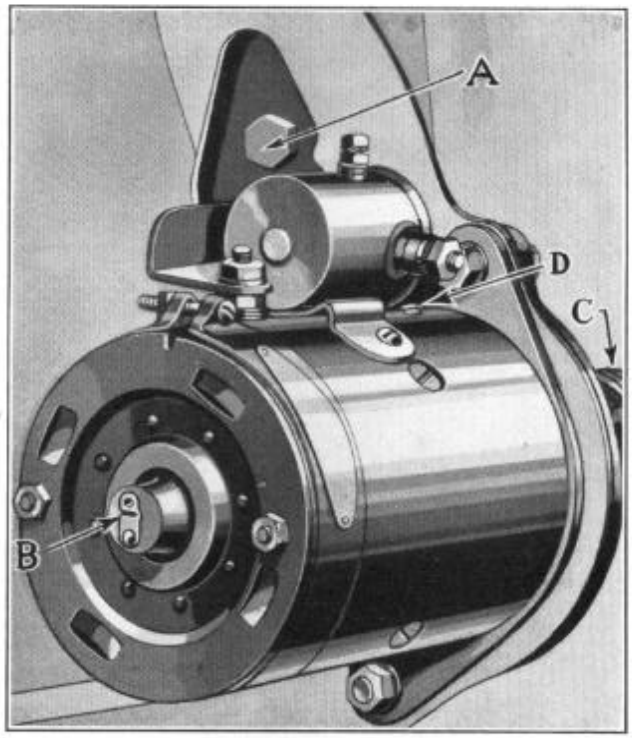

Figure 12—Starting Motor Lubrication

the auxiliary spring back of it. If this is not done, proper advance can not be obtained. As a further precaution to obtain proper governor action it is recommended that governor weight springs always be purchased in sets and both springs replaced.

STARTING MOTORS

Tune-Up Inspection

This inspection should include a check of the brushes and commutator, cleaning of the commutator if needed, a check of the bearings for wear and lubrication of the bearings. The starting switch should be given a voltage drop test for possible burnt contacts.

At the same time the starting circuit should also be given a voltage test to be sure there is no loss of

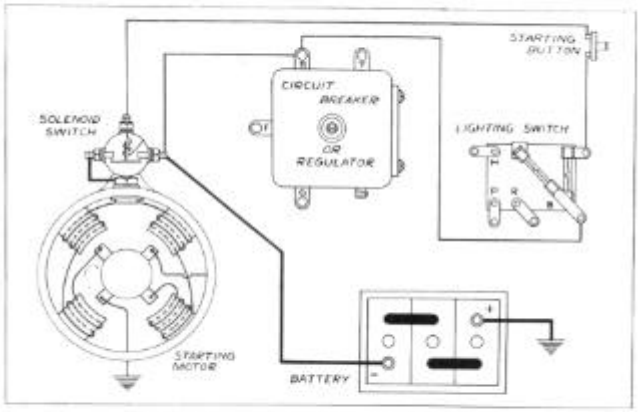

Figure 13—Starting Motor Circuit

starting motor efficiency due to poor or corroded connections or improperly soldered terminals. In making this check, particular attention should be given the ground connection to the frame. (See Engine Tune-up, Section 3.)

All starting motor commutator end bearings are provided with an oil hole accessible by swinging the oil hole cover to one side. This oil hole is located on the end of the bearing housing. Some of the starting motors are also provided with a hinged top oiler located in the frame near the drive end for lubrication of the drive end bearing. Add a few drops of light engine oil in each oiler or oil hole. (B and D, Figure 12.)

Complete Inspection

The complete inspection should include the removal of the starting motor, complete dismantling, truing up of the commutator, installing of new brushes if needed, a check of the bearings with replacement of those that are worn and an inspection of the Bendix drive for worn parts or a distorted spring. The starting switch and starting circuit should also be checked as outlined in the tune-up inspection.

To replace the starting motor grounded brushes it will be necessary to cut the rivets holding the brush holders and brush ground strip to the commutator end plate assembly. When re-riveting be sure the rivets fit the holes snug and that they are riveted tight so as not only to hold the brush holder firmly in place but to secure a positive ground connection for the brushes.

To replace the insulated brushes, unsolder the brush pigtail from the field coil and remove the old brushes. When inserting the pigtail of the new brushes it will probably be necessary to open up the loop slightly in the field coil. Be sure the pigtail is inserted the full depth of the loop after which it should be clinched to hold the pigtail securely before resoldering. A good soldering job must be done to assure full efficiency of the starting motor.

BENDIX STARTER DRIVE

Failure of the Bendix drive to engage the flywheel gear in cold weather indicates the presence of gummy dirt on the screw threads of the Bendix Drive, which must be cleaned off in the following manner:

Press the starter button and release quickly. Repeat until the Bendix pinion is fully meshed with the flywheel gear. With a paint brush dipped in kerosene, brush the screw threads back of the pinion, rotating same slightly. *Very little kerosene should be used. Never use gasoline* because it removes all lubrication.

Start the engine several times in order to work the kerosene into the gum on the screw threads of the Bendix Drive. It is desirable to remove excessive kerosene, after cleaning, by brushing with a dry brush or wiping with a clean cloth.

While the Bendix Drive can be cleaned without removing the starter, it is recommended that the starter be removed before cold weather each year and the screw threads cleaned according to the above instructions.

Never wash the whole Bendix Drive in kerosene or gasoline. Clean only the screw threads. In case the lubrication is cleaned off of the armature shaft under the pinion, it should be relubricated.

The Eclipse Machine Company, of Elmira, New York, who manufacture the device, recommend Gredag No. 31¼ for relubrication. If this lubricant is not available use a few drops of S.A.E. 10 Engine Oil. Do not apply lubricant to the screw threads.

HELPFUL POINTERS

For those that are not entirely familiar with electrical work and the approved methods for handling certain operations the following suggestions may be of help.

Brushes

Whenever new generator brushes are installed they must be carefully fitted to the commutator by

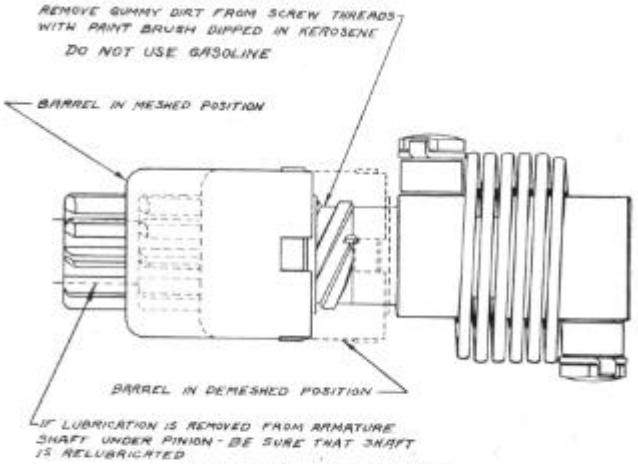

Figure 14—Bendix Drive

sanding to assure at least a 75% bearing on the commutator and then run in for a sufficient length of time to obtain a perfect fit before any attempt is made to set the generator output. To sand in brushes cut a strip of 00 sandpaper the width of the commutator and long enough to wrap about two and a half times around the commutator.

After the generator is assembled slide the sandpaper around the commutator with the sand side toward the brushes. Lap the end under so that it is drawn tight when the armature is rotated in the direction in which it is driven. Be sure the sandpaper is tight on the commutator. Rotate the armature slowly until the brushes show a contact over their entire surface. Due to its smaller size the third brush will seat sooner than the main brushes and as soon as this brush is seated lift it off the sandpaper while finishing the main brushes. This will save excessive wear on the third brush. Also do not sand the brushes any longer than is necessary to obtain a seat as to do so only shortens their useful life. After fitting the brushes remove the sandpaper carefully so as not to cut the edge of a brush and carefully blow out all sand and carbon dust.

Wiring Tests

The electrical system of a car should be considered as a number of separate circuits each working independent of the others although they may have certain wires or parts in common. Thus there is the charging circuit, the starting circuit, the ignition circuit, the lighting circuit, etc. When checking or shooting trouble take each circuit separate and make the necessary tests to prove it O. K. before going on to another circuit.

Possibly 75% of the electrical troubles on an automobile can be traced to excessive voltage. Excessive voltage may be the result of a too high generator charging rate resulting in an overcharged battery, burnt distributor breaker points, short light bulb life, etc. The check of the battery condition and generator charging rate will easily tell if the charging rate is too high.

High voltage is also often caused by poor electrical connections. These can be located by an accurate voltage test.

To check the wiring for high resistance in any circuit first inspect and tighten all connections. Then with an accurate reading voltmeter take a voltage reading at each connection in the circuit starting at the source of current supply and follow the circuit thru to its end. The circuit must be under a load or the current "on" when these tests are made. The source of current supply in the charging circuit is the generator while for all other circuits the source of current supply is the battery.

When making these tests one side of the voltmeter should be connected to a clean, unpainted ground and the other side of the voltmeter to the point where a reading is desired. A variation of not more than .5 volts maximum drop is allowable in a circuit. A greater drop indicates trouble between the last point of normal reading and the first point of low reading.

Whenever any tests are to be made to the generator or charging circuit the generator should be run at a set speed long enough for the voltage to build up to a steady reading before the tests are started.

Meters

An ammeter is always connected in series in the circuit to be tested while a voltmeter is always connected in shunt across the circuit to be tested. To use the ammeter it is necessary to remove a wire from its terminal and connect one side of the meter to the wire just removed and the other side of the meter to the terminal from which the wire was removed. As the ammeter leads must carry the full volume of current flowing thru the circuit the leads should be of ample size so as to cause no resistance to the flow of the current, the connections clean and securely made and the leads as short as possible. As the voltmeter has only a very small

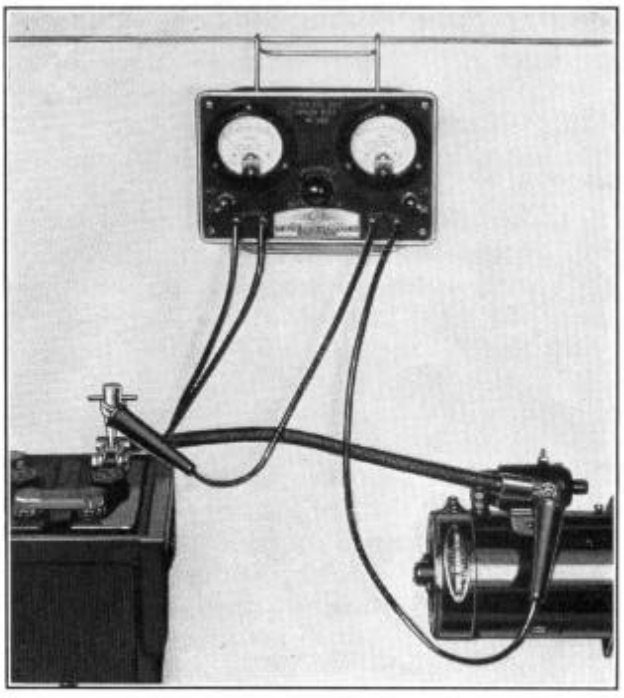

Figure 15—Test Each Circuit Separately—Testing Battery Cable

amount of current flowing thru it these leads need not be as heavy as the ammeter leads. However, connections must be clean and securely made or else a false reading will be obtained. As all circuits use the metal parts of the car such as the frame or engine for one side of the circuit the voltmeter should have one lead connected to a clean, unpainted part of the frame or engine and the other lead to the terminal or wire where the reading is wanted.

SPECIAL INSTRUCTIONS FOR CHECKING TWO-CHARGE REGULATORS

The two-charge regulators which are standard equipment on certain models (See Equipment Chart Page 10) of both Hudson and Terraplane cars can be checked with an accurate reading volt-ammeter having a rheostat to control the charging circuit voltage.

Before making any checks as to the two-charge regulator performance the battery should be inspected for electrolyte at proper level, for terminal connections free from all corrosion, clean and tight and the charging circuit wiring given a voltage test to be sure there are no high resistance connections.

Having checked the charging circuit (Figure 6) to be sure it is in perfect condition, remove the wire from the battery or "B" terminal of the regulator and connect the test ammeter; one side to the regulator terminal and the other side to the wire just removed. Connect the test voltmeter; one side to the regular battery terminal and the other side to a clean, unpainted ground on the engine or frame. The regulator cover must be in place while all tests are being made. Start the engine and set speed for maximum generator charge.

If after running for several minutes the line voltage does not rise sufficiently to cause the two charge regulator to operate, increase the voltage by adjusting the rheostat. When the regulator operates the charging rate will drop approximately one half. If the air temperature surrounding the regulator is 70° or higher the voltage when the regulator cuts the charging rate from high to low should read between 7.8 and 8.1 volts. On the other hand if the air temperature is below 70° the voltage when the regulator cuts from high to low should be between 8.1 and 8.7.

Without changing the rheostat setting gradually reduce the engine speed until the regulator cuts out allowing the generator to charge at its high rate. The voltage reading when the regulator cuts out should be between 1.2 and 1.4 volts below the voltage at which the regulator cut in.

Regulators which are found to operate at voltages outside of the above limits we recommend be referred to an official Auto-Lite Service Station for adjustment or replacement. Regulators can be properly adjusted only where the necessary special equipment is available for complete control of the voltage and the temperature is known and fairly constant.

SPECIAL INSTRUCTIONS FOR TESTING VRD VOLTAGE REGULATORS

To test the VRD vibrating type voltage regulator as used on the 1937 Hudson models and Terraplane model 72, an accurate reading ammeter with heavy, short leads should be connected between the regulator "B" terminal and the lead removed from this terminal, while an accurate reading voltmeter should be connected across the regulator "B" and "GD" terminals.

If the battery is not fully charged (specific gravity at least 1250) the regulator will not become operative and can not be checked unless a resistance is inserted in the charging circuit. If an ammeter with a resistance in series is not available it is necessary to replace the battery with one that is fully charged in order to generate sufficient voltage to test the regulator.

Start the engine and set for a speed equivalent to approximately 30 M.P.H. in high gear. Run the engine for several minutes or until the voltage remains constant before taking any readings. Turn in the resistance until the ammeter reads 10 Amps. The voltmeter reading should now be from 7.4 to 7.9 volts.

If the battery is fully charged, the ammeter should show a reading below the maximum to which it was set and the voltmeter should show a reading between 7.4 and 7.9 volts.

It will be found that the voltage readings will be near the 7.9 limit under cold operating conditions and near the 7.4 limit under hot operating conditions.

Regulators which operate within the above figures are functioning according to the manufacturers' specifications. If a reg uator is found which is not operating correctly it should be removed and exchanged for another through an official Auto-Lite Service Station. Be sure not to break the seal of the regulator as a broken seal voids the exchange privilege.

Ignition System Testing

Complete information on testing the ignition system is included in the Engine Tune-up (section 3).

Hudson and Terraplane—Auto-Lite Equipment

Name and Model	Serial No. Start of Production	Engine No.	Generator	Relay or Regulator	Starting Motor	Starting Switch	Serial No. Start of Production	Distributor	Serial No. Start of Production	Ignition Coil
HUDSON 1934										
LL	S-252000	E-30000	GBK-4602	CBA-4002 & TC-4102A	MAB-4061	SS-4001	.....	IGP-4001A	.....	CE-4304
LT, LTS	S-950000									
HUDSON 1935										
GH Big 6	S-53101	E-70000	GBK-4602-1	TC-4304A	MAB-4060	SS-4001	.....	IGB-4301A	.....	IG-4616
					MAB-4074	SS-4001	S-536449 & E-76665	IGB-4301B	E-73791	.....
HUDSON 1935										
HT Special 8	S-54101									
HU De Luxe 8	S-55101									
HHU Custom 8	S-56101	E-55000	GBK-4602-1	TC-4304A	MAB-4061	SS-4001	.....	IGP-4001A	.....	CE-4606
HTL 124" Special 8	S-57101				MAB-4075	SS-4001	E-63836	IGP-4001B	E-65247	.....
HUL 124" De Luxe 8	S-58101									
HUDSON 6, 1936										
63	S-63101	E-79000	GAR-4701-6	TC-4304A	MAB-4075	SS-4001	.....	IGB-4301B	.....	IG-4633
HUDSON 8, 1936										
64	S-64101									
65	S-65101	E-1000	GAR-4701-6	TC-4304A	MAB-4075	SS-4001	.....	IGP-4001B	.....	CE-4617
66	S-66101									
67	S-67101									
HUDSON 6, 1937										
73	S-73101	90000	GCJ-4803A	VRD-4003A	MAB-4075	SS-4001	.....	IGW-4013A	.....	IG-4644
HUDSON 8, 1937										
74	S-74101									
75	S-75101	18000	GCJ-4803A	VRD-4003A	MAB-4075	SS-4001	.....	IGP-4008A	.....	CE-4625
76	S-76101									
77	S-77101									
TERRAPLANE 1934										
K	S-373000	E-48000	GBK-4602	CBA-4002 & TC-4102A	MAB-4060	SS-4001	.....	IGB-4301A	.....	IG-4311
KU	S-21500									
KS	S-373000	E-48000	GAM-4503	CBA-4002	MAB-4060	SS-4001	.....	IGB-4301A	.....	IG-4311
TERRAPLANE 1935										
G Special	S-51101	E-103000	GBK-4601-2	CBA-4002	MAB-4060	SS-4001	.....	IGB-4301A	.....	IG-4616
				CBA-4003	MAB-4074	SS-4001	E-143134	IGB-4301B	E-128077	.....
G Commercial	S-51101	E-103000	GAM-4503	CBA-4002	MAB-4060	SS-4001	.....	IGB-4301A	.....	IG-4311
TERRAPLANE 1935										
GU De Luxe 6	S-52101	E-103000	GBK-4602-1	TC-4304A	MAB-4060	SS-4001	.....	IGB-4301A	.....	IG-4616
					MAB-4074	SS-4001	S-5210966 & E-143134	IGB-4301B	E-128077	.....
TERRAPLANE 1936										
61 De Luxe	S-61101	E-157000	GAR-4702	CBA-4003	MAB-4075	SS-4001	.....	IGB-4301B	.....	IG-4633
TERRAPLANE 1936										
62 Custom	S-62101	E-157000	GAR-4701-6	TC-4304A	MAB-4075	SS-4001	.....	IGB-4301B	.....	IG-4633
TERRAPLANE 1937										
71	S-71101	E-250000	GCJ-4804A-1	CBA-4003	MAB-4075	SS-4001	.....	IGW-4012A	.....	IG-4644
TERRAPLANE 1937										
72	S-72101	E-250000	GCJ-4803A	VRD-4003A	MAB-4075	SS-4001	.....	IGW-4013A	.....	IG-4644
TERRAPLANE 1937										
70 (Commercial)	S-70101	E-250000	GCJ-4804A-1	CBA-4003	MAB-4075	SS-4001	.....	IGW-4012A	.....	IG-4644

NOTE: "S-" preceding a serial number indicates car serial; "E-" preceding a serial number indicates engine serial.
Where no serial number is given, unit is used from beginning of production serial and engine numbers—columns two and three.

GAR-4701-6 GENERATOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
CONTROL ..... 3rd Brush and Regulator.
FUSE ..... 5 Ampere in Regulator.
BRUSH SPRING TENSION ..... Minimum 18 to Maximum 22 ounces.
BEARINGS ..... C.E. Plain—Clearance .001" to .0025"
D.E. Ball.
LUBRICATION ..... See text.

		Amps. (Cold)	
FIELD CURRENT DRAW	Volts	Max.	Min.
	6.0	3.89	3.51
	7.2	4.73	4.27
	7.6	5.04	4.56
MOTORIZING DRAW	Volts	Max.	Min.
	6.0	5.88	5.32
	7.2	6.62	5.98
	7.6	6.83	6.17
MAXIMUM OUTPUT	Volts	Max.	Min.
	6.0	17.3	15.3
	7.0	19.8	17.8
	8.0	22.5	20.5

GAR-4702 GENERATOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
CONTROL ..... 3rd Brush and Regulator.*
FUSE ..... None or 5 ampere in regulator.
BRUSH SPRING TENSION ..... Minimum 18 to Maximum 22 ounces.
BEARINGS ..... C.E. Plain—Clearance .001" to .0025"
D.E. Ball.
LUBRICATION ..... See text.

		Amps. (Cold)	
FIELD CURRENT DRAW	Volts	Max.	Min.
	6.0	4.10	3.70
	7.2	4.94	4.46
	7.6	5.25	4.75
MOTORIZING DRAW	Volts	Max.	Min.
	6.0	5.04	4.56
	7.2	5.78	5.22
	7.6	6.04	5.46
MAXIMUM OUTPUT	Volts	Max.	Min.
	6.0	12.8	10.8
	7.4	15.7	13.7
	8.0	17.0	15.0

*This generator can be used either with or without a regulator. When a regulator is used it should be mounted on the dash and grounded.

GBK-4601-2 GENERATOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
CONTROL ..... 3rd Brush and Regulator.*
FUSE ..... None or 5 ampere in regulator.
BRUSH SPRING TENSION ..... Minimum 18 to Maximum 22 ounces.
BEARINGS ..... C.E. Plain—Clearance .001" to .0025"
D.E. Ball.
LUBRICATION ..... See text.

		Amps. (Cold)	
FIELD CURRENT DRAW	Volts	Max.	Min.
	6.0	4.52	4.08
	7.2	5.46	4.94
	7.6	5.78	5.22
MOTORIZING DRAW	Volts	Max.	Min.
	6.0	4.62	4.18
	7.2	5.25	4.75
	7.6	5.57	5.03
MAXIMUM OUTPUT	Volts	Max.	Min.
	6.0	12.3	10.3
	7.4	15.6	13.6
	8.0	17.5	15.5

GBK-4602 GENERATOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
CONTROL ..... 3rd Brush.
FUSE ..... 5 Ampere.
BRUSH SPRING TENSION ..... Minimum 18 to Maximum 22 ounces.
BEARINGS ..... C.E. Plain—Clearance .001" to .0025"
D.E. Ball.
LUBRICATION ..... See text.

		Amps. (Cold)	
FIELD CURRENT DRAW	Volts	Max.	Min.
	6.0	4.36	3.94
	7.2	5.20	4.70
	7.6	5.46	4.94
MOTORIZING DRAW	Volts	Max.	Min.
	6.0	5.04	4.56
	7.2	5.78	5.22
	7.6	6.09	5.51
MAXIMUM OUTPUT	Volts	Max.	Min.
	6.0	15.2	13.2
	7.4	18.9	16.9
	8.0	21.0	19.0

GBK-4602-1 GENERATOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
CONTROL ..... 3rd Brush.
FUSE ..... 5 Ampere.
BRUSH SPRING TENSION ..... Minimum 18 to Maximum 22 ounces.
BEARINGS ..... C.E. Plain—Clearance .001" to .0025"
D.E. Ball.
LUBRICATION ..... See text.

		Amps. (Cold)	
FIELD CURRENT DRAW	Volts	Max.	Min.
	6.0	4.36	3.94
	7.2	5.20	4.70
	7.6	5.46	4.94
MOTORIZING DRAW	Volts	Max.	Min.
	6.0	5.04	4.56
	7.2	5.78	5.22
	7.6	6.09	5.51
MAXIMUM OUTPUT	Volts	Max.	Min.
	6.0	16.6	14.6
	7.4	20.6	18.6
	8.0	23.0	21.0

GCJ-4803A GENERATOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
CONTROL ..... 3rd Brush and Voltage Regulator.
FUSE ..... None.
BRUSH SPRING TENSION ..... Minimum 27 to Maximum 53 ounces.
BEARINGS ..... C.E. Plain—Clearance .001" to .0025"
D.E. Ball.
LUBRICATION ..... See text.

		Amps. (Cold)	
FIELD CURRENT DRAW	Volts	Max.	Min.
	6.0	2.1	1.9
	7.2	2.45	2.25
	7.6	2.6	2.4
MOTORIZING DRAW	Volts	Max.	Min.
	6.0	4.4	4.0
	7.2	4.7	4.3
	7.6	4.8	4.4
MAXIMUM OUTPUT	Volts	Max.	Min.
	6.0	20.1	17.7
	7.0	23.1	20.9
	8.0	26.0	24.0

GCJ-4804A-1 GENERATOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
CONTROL ..... 3rd Brush.
FUSE ..... None.
BRUSH SPRING TENSION ..... Minimum 27 to Maximum 53 ounces.
BEARINGS ..... C.E. Plain—Clearance .001" to .0025"
D.E. Ball.
LUBRICATION ..... See text.

		Amps. (Cold)	
FIELD CURRENT DRAW	Volts	Max.	Min.
	6.0	2.1	1.9
	7.2	2.45	2.25
	7.6	2.6	2.4
MOTORIZING DRAW	Volts	Max.	Min.
	6.0	4.4	4.0
	7.2	4.7	4.3
	7.6	4.8	4.4
MAXIMUM OUTPUT	Volts	Max.	Min.
	6.0	12.5	11.4
	7.0	14.6	13.2
	8.0	17.0	15.0

MAB-4060—MAB-4061—MAB-4074—MAB-4075 STARTING MOTOR SPECIFICATIONS

ROTATION ..... C.W.D.E.
VOLTS ..... 6.
BRUSH SPRING TENSION ..... Minimum 42 to Maximum 53 ounces.
BEARINGS ..... 2 plain.
END PLAY ..... $\frac{1}{16}$" maximum.
LUBRICATION ..... See text.
TESTS ..... Without load and with Bendix.

Amps.	Volts	R.P.M.
60	5.5	3700

With load.

Amps.	Volts	Load Foot Pounds	R.P.M.
100	5.5	0.6	1910
300	4.5	6.6	695
400	4.0	10.15	420

Stall torque without switch.

Amps.	Volts	Load Foot Pounds
582	3.	15.8
775	4.	22.5

Stall torque with switch.

Amps.	Volts	Load Foot Pounds
575	3.	15.2
750	4.	21.5

IGP-4001A-B DISTRIBUTOR SPECIFICATIONS

ROTATION.....R.H.
CYLINDERS.....8.
CONTROL.....Automatic.
TIMING.....Adjustable thru range of 360° by loosening hold down arm clamp screw.
END PLAY.....In the drive shaft after coupling is pinned .003" to .010".
SIDE PLAY.....In bearings .005". New bearings fitted .0005" minimum to .001" maximum.
CONDENSER.....Located on breaker plate.
BREAKER POINT GAP.....017"—Check with wire feeler gauge.
BREAKER POINT SPRING TENSION..18 to 20 ounces.
LUBRICATION.....See text.
ADVANCE.....IGP-4001A.

Distributor R.P.M.	Advance Max.	Advance Min.
400	2.0	0.0
535	5.0	1.0
672	8.0	4.0
810	11.0	7.0
945	14.0	10.0
1105	17.5	13.5
1265	21.0	17.0
1402	24.0	20.0
1540	27.0	23.0
1722	31.0	27.0
1860	34.0	30.0
2000	37.0	33.0

IGP-4001B.

Distributor R.P.M.	Advance Max.	Advance Min.
300	0.0	0.0
400	8.0	4.0
535	11.0	7.0
670	14.0	10.0
800	17.0	13.0
935	20.0	16.0
1070	23.0	19.0
1210	26.0	22.0
1345	29.0	25.0
1480	32.0	28.0
1615	35.0	31.0
1700	37.0	33.0
2000	37.0	33.0

IGP-4008A DISTRIBUTOR SPECIFICATIONS

ROTATION.....R.H.
CYLINDERS.....8.
CONTROL.....Automatic.
TIMING.....Adjustable thru range of 360° by loosening hold down arm clamp screw.
END PLAY.....In the drive shaft after coupling is pinned .003" to .010".
SIDE PLAY.....In bearings .005". New bearings fitted .0005" minimum to .001" maximum.
CONDENSER.....Located on breaker plate.
BREAKER POINT GAP.....017"—Check with wire feeler gauge.
BREAKER POINT SPRING TENSION..18 to 20 ounces.
LUBRICATION.....See text.
ADVANCE.....IGP-4008A.

Distributor R.P.M.	Advance Max.	Advance Min.
300	0.0	0.0
400	8.0	4.0
535	11.0	7.0
670	14.0	10.0
800	17.0	13.0
935	20.0	16.0
1070	23.0	19.0
1210	26.0	22.0
1345	29.0	25.0
1480	32.0	28.0
1615	35.0	31.0
1700	37.0	33.0
2000	37.0	33.0

IGB-4301A-B DISTRIBUTOR SPECIFICATIONS

ROTATION.....R.H.
CYLINDERS.....6.
CONTROL.....Automatic.
TIMING.....Adjustable thru range of 360° by loosening hold down arm clamp screw.
END PLAY.....In the drive shaft after coupling is pinned .003" to .010".
SIDE PLAY.....In bearings .005". New bearings fitted .0005" minimum to .001" maximum.
CONDENSER.....Located on outside of housing.

BREAKER POINT GAP..... .020"—Check with wire feeler gauge.
BREAKER POINT SPRING TENSION..16 to 20 ounces.
LUBRICATION.....See text.
ADVANCE.....IGB-4301A.

Distributor R.P.M.	Advance Max.	Advance Min.
400	2.0	0.0
560	5.0	1.0
720	8.0	4.0
880	11.0	7.0
1040	14.0	10.0
1200	17.0	13.0
1360	20.0	16.0
1520	23.0	19.0
1680	26.0	22.0
1840	29.0	25.0
2000	32.0	28.0

IGB-4301B.

Distributor R.P.M.	Advance Max.	Advance Min.
300	0.0	0.0
400	8.0	3.0
560	11.0	7.0
720	14.0	10.0
880	17.0	13.0
1040	20.0	16.0
1200	23.0	19.0
1360	26.0	22.0
1520	29.0	25.0
1630	31.0	27.0
2000	31.0	27.0

IGW-4012A DISTRIBUTOR SPECIFICATIONS

ROTATION.....R.H.
CYLINDERS.....6.
CONTROL.....Automatic.
TIMING.....Adjustable thru range of 360° by loosening hold down arm clamp screw.
END PLAY.....In the drive shaft after coupling is pinned .003" to .010".
SIDE PLAY.....In bearings .005". New bearings fitted .0005" minimum to .001" maximum.
CONDENSER.....Located on outside of housing.
BREAKER POINT GAP..... .020"—Check with wire feeler gauge.
BREAKER POINT SPRING TENSION..16 to 20 ounces.
LUBRICATION.....See text.
ADVANCE.....IGW-4012A.

Distributor R.P.M.	Advance Max.	Advance Min.
300	0.0	0.0
400	8.0	3.0
560	11.0	7.0
720	14.0	10.0
880	17.0	13.0
1040	20.0	16.0
1200	23.0	19.0
1360	26.0	22.0
1520	29.0	25.0
1630	31.0	27.0
2000	31.0	27.0

IGW-4013A DISTRIBUTOR SPECIFICATIONS

ROTATION.....R.H.
CYLINDERS.....6.
CONTROL.....Automatic.
TIMING.....Adjustable thru range of 360° by loosening hold down arm clamp screw.
END PLAY.....In the drive shaft after coupling is pinned .003" to .010".
SIDE PLAY.....In bearings .005". New bearings fitted .0005" minimum to .001" maximum.
CONDENSER.....Located on outside of housing.
BREAKER POINT GAP..... .020"—Check with wire feeler gauge.
BREAKER POINT SPRING TENSION..16 to 20 ounces.
LUBRICATION.....See text.
ADVANCE.....IGW-4013A.

Distributor R.P.M.	Advance Max.	Advance Min.
300	0.0	0.0
400	8.0	3.0
560	11.0	7.0
720	14.0	10.0
880	17.0	13.0
1040	20.0	16.0
1200	23.0	19.0
1360	26.0	22.0
1520	29.0	25.0
1630	31.0	27.0
2000	31.0	27.0