self-locking cap screw in tappet body of Models S-10D, S-12D and S-14D. Setting for these models, engine cold, is 0.007 inch (0.178 mm) for intake valves and 0.016 inch (0.406 mm) for exhaust valves.

Tappet clearance for all other engine models is adjusted by careful grinding of valve stems. Cold clearance is 0.006 inch (0.152 mm) for intake valves and 0.012 inch (0.305 mm) for exhaust valves except for exhaust valve of Model TRA-12D which calls for a clearance of 0.015 inch (0.381 mm).

Manufacturer specifies that all reground valves be lapped in for proper seating.

Valve spring compartments have reed-type breather valves of types shown in Figs. W36 and W37. Action of these valves during engine operation maintains a partial vacuum in engine crankcase to prevent internal pressure build-up which could cause oil leaks at seals and gaskets. If oil fouling occurs in ignition breaker box, condition of breather valve should be checked as a highly possible cause. These reed valve assemblies should be kept clean and renewed whenever found to be inoperable.

WISCONSIN

SERVICING WISCONSIN ACCESSORIES

12-VOLT STARTER-GENERATOR

The combination 12-volt starter-generator manufactured by Delco-Remy is used on some Wisconsin engines. The starter-generator functions as a cranking motor when starting switch is closed. When engine is operating and with starting switch open, unit operates as a generator. Generator output and circuit voltage for battery and various operating requirements are controlled by a current-voltage regulator.

To determine cause of abnormal operation, starter-generator should be given a "no-load" test or a "generator output" test. Generator output test can be performed with starter-generator on or off the engine. The no-load test must be made with starter-generator removed from engine. Refer to Fig. W38 for exploded view of starter-generator assembly. Parts are available from Wisconsin as well as authorized Delco-Remy service stations.

Starter-generator and regulator service test specifications are as follows:

Starter-Generator 1101696

Brush spring tension	22-26 oz. (624-737 g)
Field draw:	
Amperes	1.43-1.54
Volts	12
Cold output:	
Amperes	10
Volts	14
Rpm	5750
No-load test:	
Volts	11
Amperes, max	17
Rpm, min	2350
Rpm, max	2850

Starter-Generator 1101870

Brush spring tension	22-26 oz. (624-737 g)
Field draw:	
Amperes	1.52-1.62
Volts	12
Cold output:	
Amperes	12
Volts	14
Rpm	4950
No-load test:	
Volts	11
Amperes, max	18
Rpm, min	2500
Rpm, max	2900

Starter-Generators 1101871 & 1101972

Brush spring tension	24-32 oz. (624-737 g)
Field draw:	
Amperes	1.43-1.54
Volts	12
Cold output:	
Amperes	10
Volts	14
Rpm	5450
No load test:	
Volts	11
Amperes, max	17
Rpm, min	2500
Rpm, max	3000

Regulators 1118791 & 1118985

Ground polarity	Positive
Cut-out relay:	
Air gap	0.020 in. (0.5 mm)
Point gap	0.020 in. (0.5 mm)
Closing voltage, range	11.8-14.0
Adjust to	12.8
Voltage regulator:	
Air gap	0.075 in. (1.9 mm)
Setting voltage, range	13.6-14.5
Adjust to	14.0

Regulators 1118983 & 1118984

Ground polarity	Negative
Cut-out relay:	
Air gap	0.020 in. (0.5 mm)
Point gap	0.020 in. (0.5 mm)
Closing voltage, range	11.8-14.0
Adjust to	12.8
Voltage regulator:	
Air gap	0.075 (1.9 mm)
Setting voltage, range	13.6-14.5
Adjust to	14.0

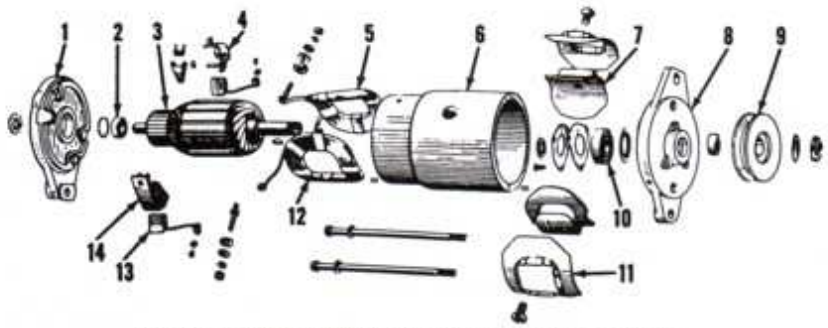

Fig. W38—Exploded view of typical Delco-Remy starter-generator.

1. Commutator end frame
2. Bearing
3. Armature
4. Ground brush holder
5. Field coil L.H.
6. Frame
7. Pole shoe
8. Drive end frame
9. Pulley
10. Bearing
11. Field coil insulator
12. Field coil R.H.
13. Brush
14. Insulated brush holder

Illustrations courtesy Teledyne Total Power.

12-VOLT GEAR DRIVE STARTER

Some einges may be equipped with a 12-volt gear drive starting motor manufactured by Prestolite. Test specifications are as follows:

Prestolite MGD4102A

Volts 12
Brush spring tension ..... 42-66 oz. (1190-1870g)
No-load test
Volts 10
Amperes 38
Rpm 10000

Refer to Fig. W39 for exploded view of starting motor and drive. Bendix drive (15) is available only as an assembly. Thrust washers (7, 8, 9, 12 and 13) are available in a service package.

To disassemble starting motor, remove the two through-bolts and commutator end cover (1). Remove brushes and springs from brush holder and remove holder assembly (3). Carefully withdraw frame and field coil assembly (6) from armature. Clamp steel core of armature in vise and remove Bendix drive retaining nut (16). Remove Bendix drive assembly (15), drive end plate (14) and thrust washers from armature (10).

Renew brush springs if heat damage is evident and renew brushes if excessively worn. Input brush (4) is integral with terminal stud and field brush (5) lead is soldered to field coil.

When reassembling, apply a light coat of oil to bushings. Do not lubricate Bendix drive assembly. Parts are available from Wisconsin as well as authorized Prestolite service stations.

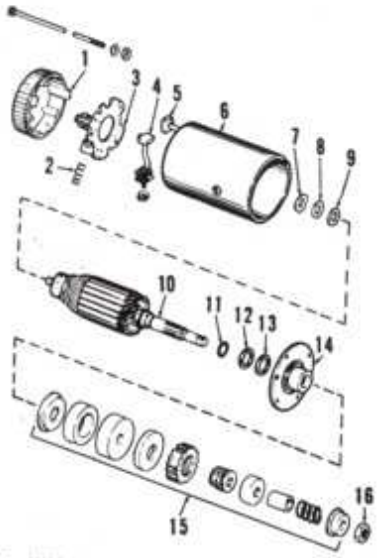

Fig. W39—Exploded view of typical Prestolite gear drive starting motor.

1. Commutator end cover
2. Brush spring (2 used)
3. Brush holder assy.
4. Input brush
5. Field brush
6. Frame & field coil assy.
7. Washer (0.031 in.)
8. Washer (0.23 in)
9. Washer (0.045 in.)
10. Armature
11. "O" ring
12. Washer (0.042 in.)
13. Washer (0.031 in.)
14. Drive end plate
15. Bendix drive assy.
16. Nut

Illustrations courtesy Teledyne Total Power.

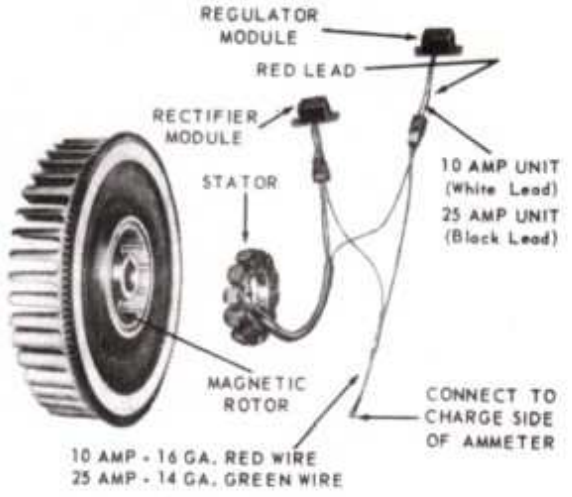

Fig. W40—View of 10 or 25 amp flywheel alternator charging system used on some engines.

FLYWHEEL ALTERNATOR

Some engines may be equipped with either a 10 amp or 25 amp flywheel alternator. See Fig. W40. To avoid possible damage to alternator system, the following precautions must be observed:

1. Negative post of battery must be connected to ground on engine.
2. Connect booster battery properly (positive to positive and negative to negative.)
3. Do not attempt to polarize alternator.
4. Do not ground any wires from stator or modules which terminate at connectors.
5. Do not operate engine with battery disconnected.
6. Disconnect battery cables when charging battery with a battery charger.

OPERATION. Alternating current (AC) produced by the alternator is changed to direct current (DC) in the rectifier module. See Fig. W41. Current regulation is provided by the regulator module which "senses" counter-voltage created by the battery to control or limit charging rate. No adjustments are possible on alternator charging system. Faulty components must be renewed. Refer to following troubleshooting paragraph to help pin point faulty component.

TROUBLESHOOTING. Trouble conditions and their possible causes are as follows:

1. Full charge – no regulation. Could be caused by:
   a. Faulty regulator module
   b. Defective battery

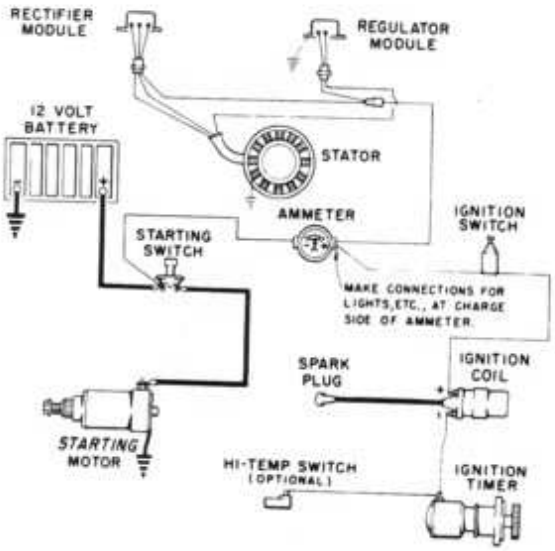

Fig. W41—Typical wiring diagram for ignition, starting and alternator charging systems used on some engines.

2. Low or no charge. Could be caused by:
   a. Faulty windings in stator
   b. Faulty rectifier module
   c. Regulator module not properly grounded or regulator module defective.

If "full-charge–no regulation" is the trouble, use a DC voltmeter and check battery voltage with engine operating at full rpm. If battery voltage is over 15.0 volts, regulator module is not functioning properly. If battery voltage is under 15.0 volts and over 14.0 volts, alternator, rectifier and regulator are satisfactory and battery is probably defective (unable to hold charge).

If "low" or "no charge" is the trouble, check battery voltage with engine operating at full rpm. If battery voltage is more than 14.0 volts, place a load on battery to reduce voltage to below 14.0 volts. If charge rate increases, alternator charging system is functioning properly and battery was fully charged. If charge rate does not increase, plug in a new rectifier module and retest. If charge increases, permanently install new rectifier module. If charge rate does not increase, stop engine and unplug all connectors between modules and stator. Start engine and operate at 2400 rpm. Using an AC voltmeter, check voltage between each of the black stator leads and ground. If either of the two voltage readings is zero or there is more than 10% difference between readings, the stator is faulty and should be renewed.

Illustrations courtesy Teledyne Total Power.