

SERVICE AND PARTS CATALOG

U. S. Air Force Contract Number
AF 04(606)15112 dated 17 Sept. 1965
GENERATOR SET, DIESEL ENGINE

15 KW, Onan Model 15DEC-99R/5033B
30 KW, Onan Model 30DEF-99R/5033B
Continuous Duty,
60-Cycle, 0.8 Power Factor
120/208-Volt or 240/416-Volt
(44940)976-1001 Manual Ay. Incl. Ford's

Options peculiar to this model include:

Special 10-lead generator ... originally connected for 120/208-Volt, 3-Phase,
4-Wire; reconnectible for 240/416-Volt, 3-Phase, 4-Wire.

Special control panel and vernier governor control for manual paralleling.
Fungus treated.

Mounted fuel tank with 3-way valves on fuel return and fuel supply lines.

Special muffler mounts on housing.

Exterior is painted Air Force Strata Blue.

ONAN DIVISION OF STUDEBAKER CORPORATION
2515 UNIVERSITY AVE. S. E. • MINNEAPOLIS, MINNESOTA 55414

IN CANADA: ONAN GENERATORS CANADA LTD., P.O. BOX 652, GUELPH, ONTARIO

p/o 976-1001

Printed in U.S.A.

We mean it.....

.....and this certificate with the Onan electric plant you purchased proves we mean it! When this plant left our factory in Minneapolis it took with it our sincere assurance that it will produce exactly as stated on its nameplate.

The name of ONAN is synonymous with satisfactory performance, certified performance.

PERFORMANCE CERTIFIED

We certify that when properly installed and operated this Onan electric plant will deliver the full power and the voltage and frequency regulation promised by its nameplate and published specifications. This plant has undergone several hours of running-in and testing under realistic load conditions, in accordance with procedures certified by an independent testing laboratory.

ONAN Division of Studebaker Corporation
Minneapolis 14, Minnesota

This instruction book contains information for the proper installation, operation, and maintenance of your equipment. We suggest that this book be kept handy so that it can be referred to when necessary.

This equipment is the result of proven engineering design, highest quality materials, and expert workmanship. Thorough inspection and testing assures you that this equipment will perform as expected.

If you wish to contact your dealer or the factory regarding this equipment, be sure to supply the complete MODEL and SPEC. NO., and the full serial number of the equipment as shown on the nameplate. This information is necessary to identify the equipment among the many basic and special optional types manufactured.

MANUFACTURER'S WARRANTY

The Manufacturer warrants, to the original user, that each product of its manufacture is free from defects in material and factory workmanship if properly installed, serviced and operated under normal conditions according to the Manufacturer's instructions.

Manufacturer's obligation under this warranty is limited to correcting without charge at its factory any part or parts thereof which shall be returned to its factory or one of its Authorized Service Stations, transportation charges prepaid, within one year after being put into service by the original user, and which upon examination shall disclose to the Manufacturer's satisfaction to have been originally defective. Correction of such defects by repair to, or supplying of replacements for defective parts, shall constitute fulfillment of all obligations to original user.

This warranty shall not apply to any of the Manufacturer's products which must be replaced because of normal wear, which have been subject to misuse, negligence or accident or which shall have been repaired or altered outside of the Manufacturer's factory unless authorized by the Manufacturer.

Manufacturer shall not be liable for loss, damage or expense directly or indirectly from the use of its product or from any other cause.

The above warranty supersedes and is in lieu of all other warranties, expressed or implied, and of all other liabilities or obligations on part of Manufacturer. No person, agent or dealer is authorized to give any warranties on behalf of the Manufacturer nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an officer of the Manufacturer.

DATED August 1, 1963

IMPORTANT

RETURN WARRANTY CARD ATTACHED TO UNIT

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The Onan generating plant is a complete unit consisting of a diesel engine, a self excited alternating current generator, and such controls and accessories as are specified by the purchaser.

The electrical characteristics of the plant vary according to the particular model, and are noted on the Onan nameplate attached to the unit. The rated power is based on an .8 power factor load. For standby type service, optional controls for automatic starting, load transfer, and stopping may be connected.

If it ever becomes necessary to contact a dealer or the factory regarding the plant, be sure to mention the complete Model and Spec. No., and the Serial No. as given on the Onan nameplate. This nameplate information is necessary to properly identify the plant among the many types manufactured. Refer to the engine nameplate when requesting information from its manufacturer.

The generating plant is given a complete running test under various load conditions and is thoroughly checked before leaving the factory. Inspect the plant closely for any damage that might have occurred in shipment. Any such damage must be repaired before putting the plant in operation.

15DEC ENGINE

The engine is a Ford Model ..PX-6005-.. and is fully described in the Ford manual. It basically is a four-cylinder, water cooled, diesel (compression ignition) type. The cylinder bore is 3.937 inches, piston stroke is 4.524 inches, and displacement is 220-cubic inches. The engine is rated 53.0 horsepower (standby) at 1800 rpm. Compression ratio is 16 to 1. The standard oil capacity is 8.1 U.S. quarts. 12-volt battery current is used for starting and control circuits. The specific engine used may have variations due to optional features of the generating plant (type cooling etc.) specified by the plant purchaser.

30DEF ENGINE

The engine is a Ford Model C3PY6005A(SO-30) and is described in the Ford manual. It basically is a six-cylinder, water cooled, diesel (compression ignition) type. The cylinder bore is 3.938 inches, piston stroke is 4.528 inches, and displacement is 330-cubic inches. The engine is rated 87.0 horsepower (standby) at 1800 rpm. Compression ratio is 16 to 1. The standard oil capacity is 10 U.S. quarts. 12-volt battery current is used for starting and control circuits. The specific engine used may have variations due to optional features of the generating plant (type cooling etc.) specified by the plant purchaser.

GENERATOR

The generator consists of a 4-pole revolving field type alternator and "static" type exciter with magnetic amplifier regulation. The alternating current output is generated in the alternator stator winding attached directly to the rear end of the en-

DESCRIPTION

gine. The rotating field of the alternator is attached to the engine flywheel, and so turns at engine speed. The speed at which the rotor turns determines the current frequency - thus the 60-cycle plant must operate at approximately 1800 rpm, and the 50-cycle plant at approximately 1500 rpm. The outer end of the rotor turns in a large sealed ball bearing fitted into the end bell.

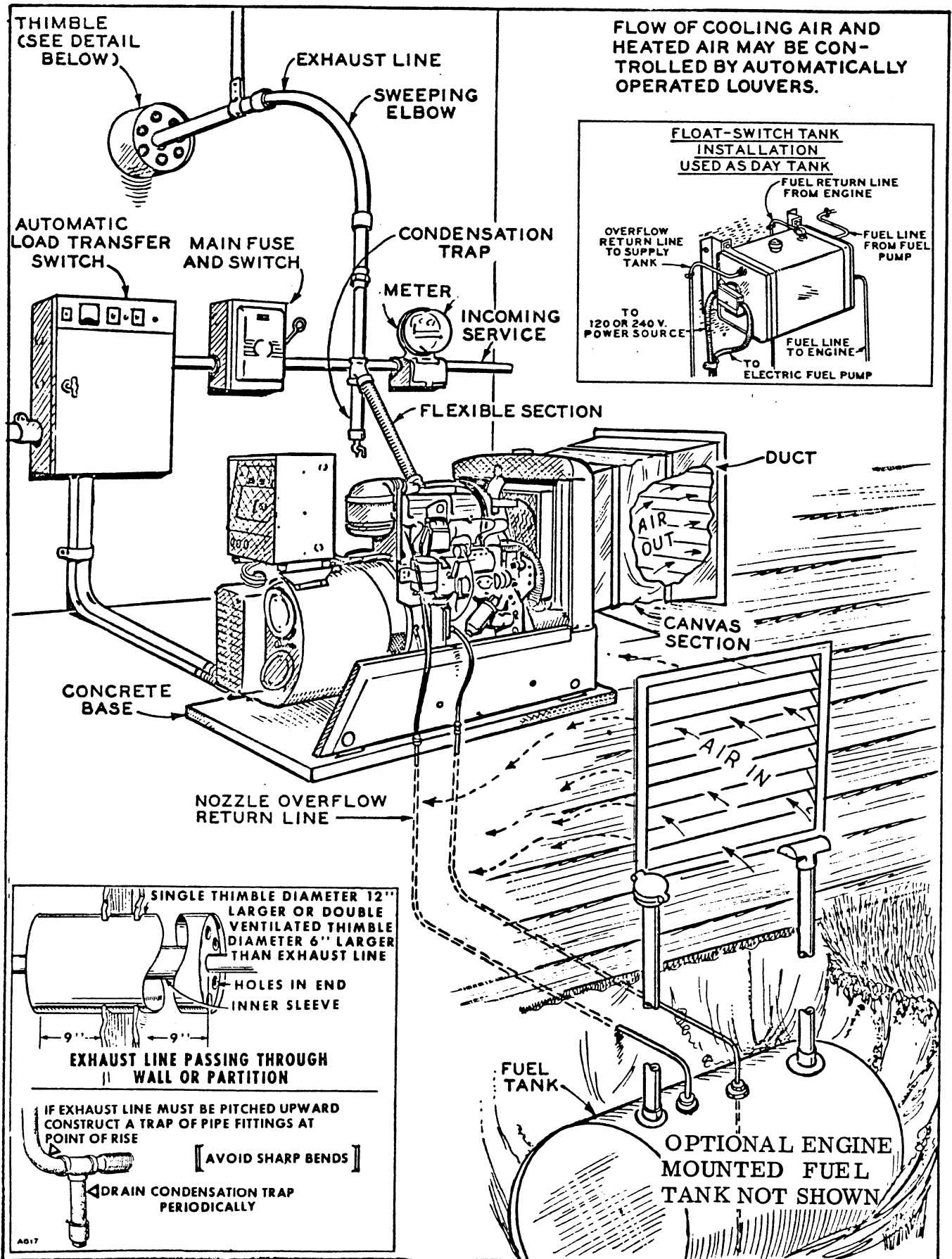
The stationary exciter is mounted on a metal frame attached to the alternator end bell, and protected by a sheet metal enclosure. The exciter and regulator provides voltage regulation of plus or minus 2%, from no load to continuous load. Stable generator output is established within 5 seconds after a change in load. The exciter has no moving parts, and needs no external voltage regulator.

CONTROLS

The engine controls for a standard plant include 12-volt automotive type starting and battery charging circuits with necessary relays, and a charge rate ammeter. Water temperature and oil pressure gauges provide for checking engine performance. A water temperature safety shut-off switch protects against engine damage if engine coolant temperature should rise dangerously high. Terminals may be provided for connection of optional warning devices, etc.

The generating plant is adaptable to the use of automatic load transfer control equipment (for emergency standby installations) if the ambient temperature will be above 50°F.

The electrical instrument panel equipment varies according to the model and purchaser options. Instruments may include voltmeter, ammeter, circuit breaker, running time meter, etc. Output terminals are provided for load wire connections.



INSTALLATION

Installation of the generating plant involves its location, connection to a fuel source, exhaust system, starting battery installation, etc. Each installation must be considered individually - use these instructions as a general guide. A typical installation is shown, and by following the principles outlined and referring to the installation outline drawing supplied a proper installation can be made. Local regulations (building code, fire ordinance, etc.) may affect some details, and any such regulations should be fully observed.

LOCATION. - Usually, the location has been pre-selected. For the average installation, a warm indoor site is recommended. Local regulations sometimes require that for emergency standby service the ambient temperature must not fall below a specified minimum. The selected site should be dry, well ventilated, and reasonably dust free. Provide for sufficient clearance (at least 24 inches recommended) on all sides for convenience in servicing the plant.

MOUNTING. - The plant is mounted to a rigid base that provides proper support and adequate vibration damping. However, for convenience in draining crankcase oil, general servicing, etc., the plant can be mounted on raised pedestals or rails at least 6 inches high. Extra vibration dampers are available and may be installed under the plant base. If mounting in a trailer, or for other mobile application, bolt securely in place. For a stationary installation bolting down is optional.

VENTILATION. - The engine generates a considerable amount of heat that must be dissipated. For a radiator cooled unit, proper ventilation is of vital importance. Under average operating conditions, a cooling air volume of approximately 4,000-cubic feet of air per minute will provide sufficient cooling for the DEC plant and 5,200-cubic feet of air per minute will provide sufficient cooling for the DEF plant. If the installation is made in a small room, this may require installation of an auxiliary fan of sufficient size to assure proper volume of air. The fan can be connected to operate only when the plant is running.

The pusher type fan used on radiator cooled units forces the cooling air out through the front of the radiator. For room or compartment installations the usual method of exhausting the heated air is to construct a duct from the front of the radiator to an opening in an outside wall. The duct and wall opening area should be at least as large as the plant radiator outlet area. An air inlet opening of at least equal area must also be provided.

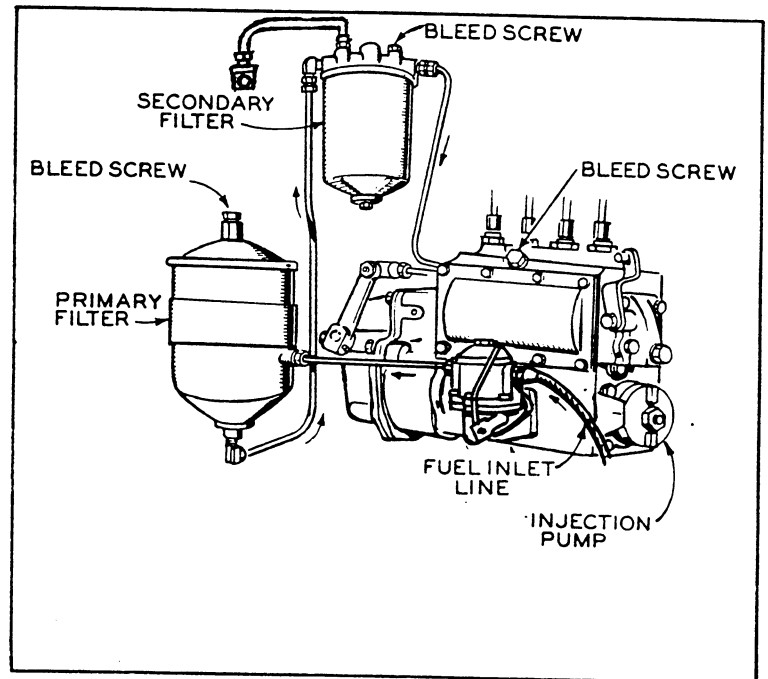
Air inlet and outlet openings should be provided with suitable shutters to prevent back flow of cold outside air during shut down periods. Proper consideration must be given to any other draft creating equipment installed in the same room. If unattended, automatic starting (as for emergency standby with automatic load transfer switch) is planned, the shutters should be automatically controlled.

EXHAUST. - Pipe the exhaust gases outside any enclosure. Use pipe at least as large as the 2-inch pipe size outlet of the engine. Increase the pipe diameter one pipe size for each additional 12-feet in length. Use a flexible connection at the engine exhaust manifold. Provide adequate support for the piping. Pipe fittings cause a resistance to the flow of exhaust gases and can result in a loss of engine power. Use sweeping type elbows in preference to standard pipe elbows, and keep the number of necessary turns to the minimum. If the exhaust line runs upward at any point, install a vapor trap at the low point, with provision for periodic draining. Shield or insulate the line if there is danger of personnel contact. If the line passes close to a combustible wall or partition, allow at least 4" clearance. Install a suitable muffler.

FUEL SUPPLY VALVES. - Three-way valves are supplied with engine mounted fuel tanks. These valves enable the operator to select between the mounted fuel supply or an auxiliary fuel supply. These valves must be set to operate off of the same fuel supply. **EXAMPLE:** Auxiliary fuel supply - - Auxiliary fuel return.

NOTE

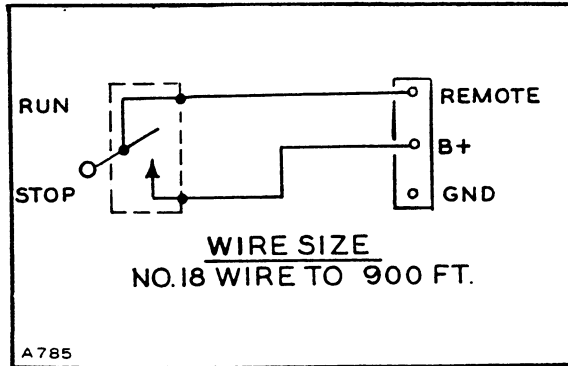
In any diesel engine installation, fuel system cleanliness is of utmost importance. Make every effort to prevent entrance of any moisture or contaminating matter of any kind. Do not use lines or fittings of galvanized material.



BATTERY. - Two 6-volt batteries are recommended. Note that each battery cable terminal clamp is stamped "P" (positive) or "N" (negative) for connection to the proper battery terminal post. Connect positive to the large terminal of the start solenoid on the starter. Connect negative to a convenient ground point on the engine. Service the batteries as necessary.

Infrequent use of the plant (as in emergency standby service) may allow the battery to self discharge to the point where the battery can not start the plant. A separate trickle charger should be connected if installing a load transfer switch that has no built-in charge circuit. Onan load transfer controls include such a battery charging circuit.

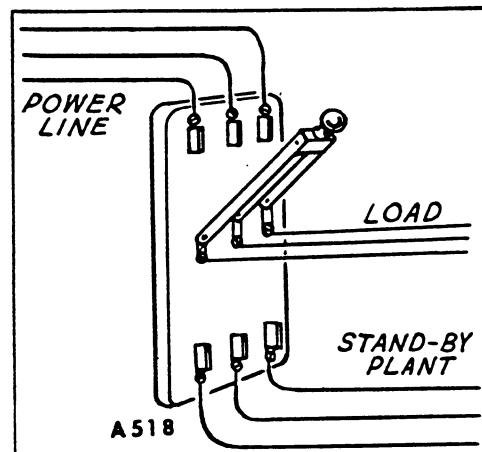
REMOTE CONTROL CONNECTIONS. - Starting and stopping is through a 2-wire electrical system. To extend this control to one or several remote locations, a 3-place terminal block is provided in the plant control box. The terminal block is marked REMOTE, B+, and GND. If a load transfer or an automatic control is used, follow the instructions supplied with the control. If a SPST manual switch is used, connect the wires and mount the switch so the engine will run when the switch handle is up, the same as an ordinary light switch. The size wire to use is determined by the plant-to-control distance. Use #18 wire up to 900-ft. The GND terminal is for a customer-supplied alarm at a remote location to warn of low oil pressure, high water temperature and overspeed.



CONNECTING LOAD WIRES. - The plant AC output terminals are large studs located inside the control box, at the generator end of the plant. Knock out openings are provided for convenience in bringing the load wires into the control box.

Most local regulations require that wiring connections be made by a licensed electrician, and that the installation be inspected and approved before operation. All connections, wire size, etc., must conform to requirements of electrical codes in effect at the installation site.

If the installation is for standby service, a double throw transfer switch must always be used. This switch (either manual or automatic type) must be connected so that it is impossible for the generator current to be fed into the normal power source lines, nor for the normal source and generator current to be connected at the same time. Instructions for connecting an automatic load transfer control are included with such equipment. It is assumed that personnel connecting the generator, and any such auxiliary equipment, are fully qualified and understand the problems of balancing the circuits, grounding the plant, etc. Refer to the output control wiring diagram furnished. Each generator lead is marked according to the wiring diagram.



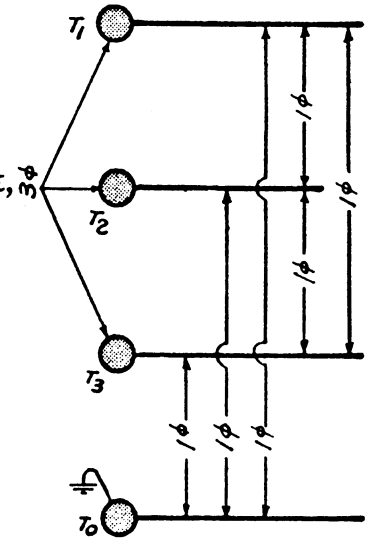
120/208-VOLT, 3-PHASE, 4-WIRE, WYE CONNECTED PLANT

The 3-phase 4-wire plant produces single phase current of one voltage and three phase current of a different voltage. The single phase voltage is the lower voltage as noted on the plant nameplate, and the three phase voltage is the higher nameplate voltage.

The terminal marked T0 is grounded. For single phase current, connect the neutral (white) load wire to the T0 terminal. Connect the "hot" (black) load wire to any one of the other three terminals - T1, T2, or T3. Three separate single phase circuits are available, with not more than 1/3 the rated capacity of the plant from any one circuit.

For 3-phase current, connect separate load wires to each of the plant terminals T1, T2, and T3. If phase sequence is important, as with 3-phase motors, final connections may be postponed until a trial run is made. When the plant is installed for standby service, phase sequence of the normal line service and the generator output must be the same for proper load operation.

If single phase and 3-phase current is to be used at the same time, use care to properly balance the single phase load.



FOR WIRING CONNECTIONS
REFER TO WIRING DIAGRAMS
CONTAINED IN THIS MANUAL

PREPARATION

CRANKCASE OIL. - Refer to the LUBRICATION section of the Ford engine manual for recommendations as to the SAE number oil to use. Fill the crankcase with a good quality, heavy duty oil designated for "type DS" service. The DEC crankcase holds 8 quarts and the DEF crankcase holds 10 quarts (U.S. measure).

Approximately 1-pint of oil drains from the oil filter into the crankcase during shut down, so a level reading is most accurate if taken immediately upon stopping.

GOVERNOR OIL. - Refer to the LUBRICATION AND MAINTENANCE section of the Ford engine manual. Fill the governor with engine oil until the oil starts to overflow from the oil level plug hole on the back of the governor. Do not overfill.

INJECTOR PUMP OIL. - Remove the injector side plate and check that the injector pump lubricating oil level is correct. The oil level must reach the covered opening on the outside of the injector pump. Add fresh engine crankcase oil as required.

AIR CLEANER. - Service the air cleaner with oil, filling to the level marked on the cleaner. Use the same SAE number oil as used in the crankcase. However, it is not necessary to use expensive heavy duty oil in the air cleaner. A straight non-detergent mineral oil is satisfactory.

RADIATOR. - Fill the radiator with clean soft water. Use a good rust and scale inhibitor. If there is any danger of exposure to freezing temperatures, use a standard antifreeze in the recommended proportion. The approximate capacity of the cooling system is 17 U.S. quarts for the DEC plant or 18 U.S. quarts for the DEF plant. On the initial run, check the level several times and add liquid as necessary to compensate for any air pockets which may have formed when filling.

FUEL. - Refer to the Ford manual for fuel oil specifications. Check with the fuel supplier for assurance that the fuel meets the specifications.

Before the initial start, the fuel system must be properly primed and all air bled from the fuel system.

1. Loosen the bleeder screws at the top of both filters and the injection pump.
2. Operate the electric fuel pump until fuel flows from the primary filter bleeder. Tighten the primary filter bleed screw. When fuel flows from the inlet bleeder screw on the secondary filter, tighten the inlet bleeder screw. Tighten the secondary filter outlet bleeder screw when fuel flows from the outlet bleeder.
3. Tighten the bleed screw on the injection pump when air bubbles no longer appear at the bleeder port. Failure to bleed the entire fuel of air may result in an air lock condition and cause engine stoppage and erratic running.
4. Check the entire fuel system for leaks after starting the engine.

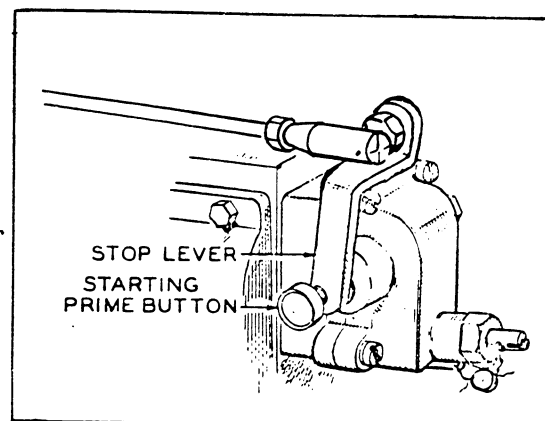
STARTING. - Always be sure the fuel system is air free, as directed under PREPARATION. If fuel lines have been disconnected, or if fuel has been exhausted bleed the entire fuel system. For normal starts, no further priming is necessary.

To start, press the START-STOP switch to its START position, holding in contact to crank the engine. The engine should start with a few seconds of cranking. Investigate any failure to start - do not crank for more than 30 seconds at one time. If engine fails to crank, check that the cranking limiter switch is closed. For a cold engine start, push in the Starting Prime Button on the injector pump and crank the engine. The Starting Prime Button will automatically release when the engine is running.

For starting in temperatures below $+10^{\circ}\text{F.}$, be sure the fuel has a pour point well below the prevailing temperature. The fuel supplier is responsible for providing a fuel suitable for the temperature conditions - free of wax, etc. Drain, preheat, and refill the engine coolant and crankcase oil. If practical, keep the battery in a warm location during shut down and reconnect just before starting.

CAUTION

Before initial start, after installation or injector pump repair, check lubricant level of injector pump. Add lubricating oil if necessary. Improper lubrication will quickly result in serious damage to the pump.



CHECKING OPERATION. - As soon as the engine starts, always check the oil pressure. Normal oil pressure is 30 to 45 lbs. at operating temperature, but will be considerable higher until the engine warms up.

The water temperature gauge indicates the coolant temperature during operation. Normal operating temperature is approximately 190°F.

The small DC ammeter indicates the battery charging current. An automatic regulator controls the charging rate, which will vary according to the charge condition of the battery. Normal charge rate is 5 to 10 amperes when the plant first starts. The rate should fall to almost zero as the battery becomes fully charged.

STOPPING. - If conditions permit, disconnect electrical load and allow the plant to run a few minutes at no load. This will allow the plant to cool off slightly and may prevent an excessive temperature rise when the plant stops and ventilation ceases. Press the START-STOP switch to its STOP position to stop the plant.

LOW OIL PRESSURE SWITCH. - In case of low engine oil pressure, the oil pressure switch acts through the emergency stop relay to stop the plant. After correcting the cause of the low oil pressure, press the reset button before attempting to restart the engine.

HIGH WATER TEMPERATURE. - If the engine coolant temperature rises to a dangerously high point, a thermostatic switch actuates the stop circuit and stops the plant. Correct the condition that caused the high temperature. The coolant temperature must drop approximately 10°F. before the plant can be started again. The high water temperature switch acts through the EMERGENCY STOP RELAY, and the PUSH TO RESET button must be pressed to restore normal operation.

VOLTAGE REGULATOR RHEOSTAT. - On plants equipped with the voltage regulator rheostat, the rheostat provides for approximately 5% plus or minus adjustment of the output voltage. Turn clockwise to increase the voltage, counterclockwise to decrease the voltage.

BATTERY, HOT LOCATION. - Batteries will self discharge very quickly when the ambient temperature is consistently above 90°F., such as in a boiler room. To lengthen battery life, dilute the electrolyte from its normal 1.275 specific gravity reading a full charge to a 1.225 reading. The cranking power of the battery will be reduced slightly when the electrolyte is so reduced, but if the temperature is above 90°F. this should not be noticed, and the lengthened battery life will be a distinct advantage.

CRANKING LIMITER. - The cranking limiter is a safety device which prevents excessive engine cranking. The electrically operated thermal relay will automatically open the engine cranking circuit after approximately one-minute cranking time. The limiter must be manually reset after opening. Allow at least one minute before attempting to reset the limiter. Investigate any failure in starting.

EXERCISE PERIOD. - If the plant is used infrequently, such as in standby service, start and operate for 15 to 30 minutes at least once a week. This exercise period keeps oil distributed on engine parts, fuel system full, etc., and promotes easier starting.

NO LOAD OPERATION. - Period of no load operation should be held to a minimum. After about 4 hours of continuous no load operation, the injection nozzles may become fouled enough to require servicing. If it is necessary to keep the engine running for long periods of time when no electrical output is required, best engine performance will be obtained by connecting a "dummy" electrical load. Such a load could consist of heater elements, etc.

SPECIAL EQUIPMENT

Some plant models are equipped with electrical indicating meters, running time meter, circuit breakers, etc. Such equipment varies according to purchaser options or plant model.

AC AMMETER. - The ac ammeter indicates the amount of load connected to the generator circuit. On three phase models, the current shown will be for one phase only, according to the position of the selector switch.

AC VOLTMETER. - The ac voltmeter indicates the voltage of the ac output. On three phase models, the voltage shown will be for the same phase as the amperage shown, according to the position of the selector switch. On a single phase (no selector switch) or four wire, three phase model, the voltage shown will be the higher nameplate voltage.

METER SELECTOR SWITCH. - The meter selector switch is provided on three phase models. The position of its handle indicates the phase of the generator output that is indicated on the ac ammeter and voltmeter.

RUNNING TIME METER. - The running time meter registers the total number of hours, to 1/10th, that the plant has run. Use it to keep a record of periodic servicing.

CIRCUIT BREAKER. - The circuit breaker is a safety device to protect the generator against damage from an overload. If an overload should occur, the circuit breaker will automatically trip, disconnecting the generator output from the load terminals. After correcting the overload condition, it is necessary to manually reset the breaker to the ON position.

EMERGENCY STOP RELAY. - If a plant safety device operates to stop the plant, the emergency stop relay PUSH TO RESET button must be pressed in before the plant can be started again. Always be sure to correct the condition that caused the emergency stop.

VERNIER GOVERNOR CONTROL. - The vernier governor control enables the operator to change the governed speed of the engine by using the knob located at the bottom of the control panel. Speed is increased by turning the knob clockwise and decreased by turning the knob counterclockwise. This control is intended primarily for fine adjustment when paralleling generating plants.

MANUAL PARALLELING CONTROL. - Procedures for paralleling generating plants are given in the enclosed Onan Technical Bulletin, No. T-016, in paragraph D on page 13. It is recommended that for complete orientation to the equipment the operator read the complete Technical Bulletin.

GENERAL. - Follow a definite schedule of inspection and servicing, based on operating hours. Keep an accurate record of operating time. Use the running time meter (optional equipment) to keep a record of operation and servicing. Service periods outlined below are for normal service and operating conditions. For continuous duty, extreme temperature, etc., service more frequently. For infrequent use, light duty, etc., service periods can be lengthened accordingly. Refer to the Ford engine manual for details of engine service operations.

DAILY SERVICE, NORMAL 8 HOURS OF OPERATION.

1. FUEL OIL. - Check, replenish as necessary.
2. CRANKCASE OIL. - Check level, add as necessary.

NOTE

Check the oil level immediately after stopping, before oil in the filter drains back into the crankcase. Drain sediment off.

3. RADIATOR. - Check level, add as necessary.
4. CLEAN AND INSPECT. - Wipe clean of dust, spilled oil, etc. Inspect for loose parts, leaks, etc.

WEEKLY SERVICE, NORMAL 50-HOURS OF OPERATION.

1. GOVERNOR. - Check oil level, add oil as necessary.
2. AIR CLEANER. - Check, clean, replenish oil as frequently as necessary.

SEMI-MONTHLY SERVICE, NORMAL 100-HOURS OF OPERATION.

1. CRANKCASE BREATHER. - Clean and inspect.
2. FAN BELT. - Inspect and adjust to 1/2-inch depression between pulleys.
3. FUEL FILTER. - Drain sediment. Reprime.
4. COOLING SYSTEM. - Check for rust or scale formation.

MONTHLY SERVICE, NORMAL 200-250 HOURS OF OPERATION.

1. CHARGE GENERATOR. - Oil bearings sparingly, check brushes.
2. STARTER. - Oil front bearing sparingly, check brushes.
3. INJECTION NOZZLE. - Check for proper spray pattern, etc. Refer to the Ford manual.
4. AC GENERATOR. - Check brushes, replace if worn to 1/2-inch or if damaged. DO NOT LUBRICATE.
5. FUEL FILTER - Replace elements, clean, and reprime.
6. CRANKCASE OIL. - Drain and refill unless experience indicates otherwise. Refer to LUBRICATION in the Ford manual.
7. OIL FILTER. - Replace the element at time of oil change.

ENGINE

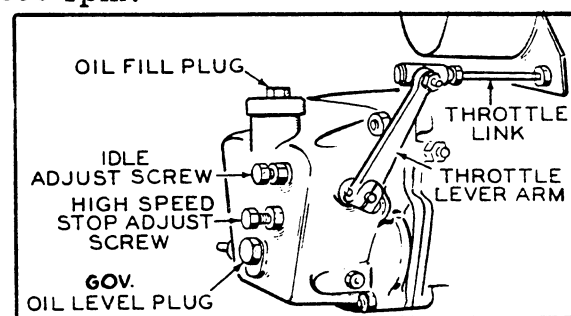
GENERAL. - Basic engine maintenance procedures are covered in the Ford engine manual. Proper attention to correct operating and periodic service procedures will lessen the necessity for future maintenance repairs.

ENGINE SPEED. - The frequency of the generator output current is in direct ratio to the engine speed. The engine speed is controlled by the built-in governor of the fuel injection pump. The original factory setting of the governor should not be disturbed. However, in case of pump repair, the governor is easily reset.

1. See that the injection pump is properly timed to the engine. Refer to the manual.
2. Check that the governor oil level is even with the bottom of the oil level plug. When adding oil to the governor, the oil should just start to flow out of the oil level plug hole. Do not over fill.
3. Adjust the length of the throttle link to give an engine speed of approximately 1800 rpm for a 60-cycle plant (1500 rpm for a 50-cycle plant). Loosen the adjusting nuts which secure the throttle link to the injector pump and lengthen the link to decrease the rpm or shorten the link to increase the rpm. Use an accurate tachometer to determine engine speed, or a frequency meter connected to the AC generator output. Multiply frequency by 30 to obtain engine speed.

EXAMPLE: 30 x 61 (cycles) equals 1830 rpm.

Check the generator voltage. It may be necessary to make a slight readjustment of the speed setting to obtain the preferred voltage at average load. A range of 1830 to 1890 rpm (61 to 63 cycles) might give the desired voltage.



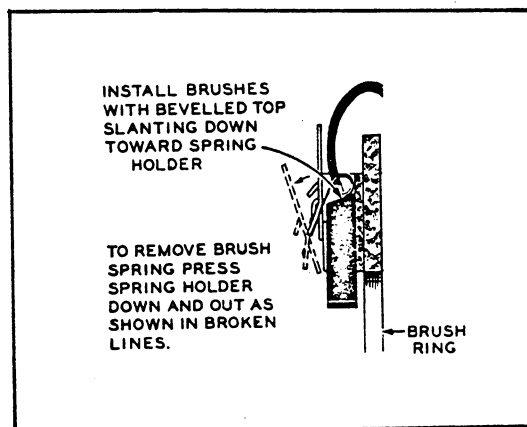
MAINTENANCE

GENERATOR

The ac generator normally requires very little servicing. Periodic inspection, to coincide with engine oil changes, will assure continued good performance.

BRUSHES. - To examine the brushes, brush springs, and slip rings, remove the inspection and ventilating covers from the end bell openings. Keep the end bell, brush rig, etc. free of dust and dirt.

Brushes should be replaced when worn to approximately 1/2-inch long, or so that the lead end of the brush is below a point midway between the outer and inner end of its guide. Do not attempt to remove the brush without first removing its spring and bracket as shown. Never bend a spring back over its bracket - doing so will put a kink in it and require its replacement. Do not use a substitute brush that may look identical but may have entirely different electrical characteristics. Be sure the brush is installed so that the short side of its taper is toward the spring and its bracket.



GENERATOR BEARING. - The generator bearing is prelubricated for its life and sealed. It requires no servicing.

EXCITER. - The exciter contains no moving parts. Occasionally blow out any dust, etc. Check thoroughly to assure that all components are mechanically secure, and that all electrical connections are tight.

Generator tests. - If the generator does not function properly, a few simple tests with the plant off may isolate the cause.

1. Temporarily disconnect the leads from exciter terminals E1, E2, AF1 and AF2. Check the exciter wiring diagram for input voltage to the exciter, and temporarily connect an alternate source (such as commercial line) of AC power with the same voltage rating to exciter terminals E1 and E2.

Check the voltage across terminals AF1 (+) and AF2 (-). If there is no dc voltage, the exciter is not functioning.

2. If dc voltage at terminals AF1 and AF2 is 25 volts or higher, check the alternator for a grounded or open circuit, etc.
3. No terminal of the exciter should show a grounded circuit.

4. CHECKING STATIC EXCITER. - Troubles are listed in advancing order, from no output voltage to a rated but fluctuating output voltage. The relationship between trouble and cause is not always consistent from model to model, so the following information must be used as a guide, not an absolute rule. The column entitled "step" indicates the step for testing a standard component. When the word "None" appears in that column, all the information needed to complete the check is given in the column headed "Corrective Action". Use a multimeter to check continuity, voltage, and resistance as indicated in the tests.

Note: It is imperative that the testing procedures are completely understood by the serviceman before attempting to perform corrective maintenance. Use caution when working on an operating plant.

NATURE OF TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION	STEP
Generator will not build up voltage.	Circuit breaker in "off" or "tripped" position	Reset and close breaker	None
	Open in circuit breaker	Stop plant and check breaker continuity	None
	No AC power to Magneciter	Check AC voltage at E1-E2 with the plant operating. Voltage should be five per cent of the rated voltage. If not, check continuity from E1-E2 back to the generator	None
	Partial loss of residual in Rotor	With plant operating jumper from E2 to heat sink of field rectifier No. 1 until voltage begins to build-up. Then remove.	None
	Pair of Field Rectifiers (either 1 & 4 or 2 & 3) open	Test rectifiers and replace if defective	5
	Both Field Rectifiers 2 and 3 shorted	Test rectifiers and replace if defective	5

NATURE OF TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION	STEP
Output voltage slow to build up. Circuit breaker opens in about five seconds	Either Field Rectifier 2 or 3 shorted	Test rectifiers and replace if defective	5
Output voltage slow to build up and five per cent below rated voltage after build up. Voltage regulation poor.	Either Field Rectifier 1 or 4 shorted	Test Rectifier and replace if defective	5
Output voltage slow to build up and higher than rated voltage after build up	Open circuit in one or more Control Rectifier	Test rectifier and replace if defective. Check soldered connections to rectifiers	5
Output voltage slow to build up and ten to twenty percent above rated voltage after build up	Open in one Field Rectifier	Test rectifiers and replace if defective	5
	Open circuit in Gate winding G1-G2 of Reactor A or B	If Field Rectifiers 1 and 2 check okay, check continuities of Gate windings G1-G2	6
Output voltage builds up normally but less than rated voltage after build up	Shorted winding in Control Reactor	Test Control Reactor and replace if defective	7
Output voltage builds up normally with slightly less than rated voltage at no load and low voltage at full load	Compound winding S1-S2 installed backward or has open circuit.	Check wiring diagram for polarity of Compound windings through Reactors A and B and test for continuity	None
Output voltage builds up normally but 20-percent above rated voltage after build up. Voltage regulation poor.	Compound winding S1-S2 installed backward through one Reactor (A or B)	Check wiring diagram for polarity of Compound winding through Reactor A or B	None
Output voltage builds up normally but is twenty five percent above rated voltage after build up	Open circuit in Control Rectifier bridge	Check continuity from the junction of Control Rectifiers 1 and 2 to the junction of Control Rectifiers 3 and 4	None

NATURE OF TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION	STEP
Output voltage builds up normally but 125 to 150-percent above rated voltage after build up	Shorted turn in gate winding G1-G2 of Reactor A or B	Test Reactors A and B for shorted turns and replace if defective	6
Output voltage builds up normally but 150 to 200-percent above rated voltage after build up. No regulation possible	Control winding C1-C2 of Reactor A or B polarized incorrectly	Check circuit connections of both Reactors A and B	None
	Shorted turn in Control winding C1-C2 of Reactor A or B	Test Reactors A and B for shorted turn and replace if defective	6
	Open in Control Circuit	Check continuity from E1 to E2 through Control Circuit	None
Generator Voltage fluctuating while engine running at constant speed	Incorrect setting on the Stabilizing Resistor	Check resistance and reset.	8

5. Checking Rectifiers. Disconnect one lead from, or remove, each rectifier for its individual test.

CAUTION

Note carefully the DIRECTION OF MOUNTING of any rectifier removed. It must be remounted in its original direction.

- Connect the ohmmeter across the rectifier contacts and observe the meter reading.
- Reverse the connections and compare the new reading with the first reading.
- If one reading is considerably higher than the other reading, the rectifier can be considered satisfactory. However, if both readings are low, or if both indicate an "open" circuit, replace the rectifier with a new identical part.

MAINTENANCE

6. Checking Reactors "A" and "B".

- a. Set the resistance range selector on the meter to the resistance range.
- b. Isolate one Gate winding by disconnecting either end of Gate winding G1-G2 from its point of connection; for example, disconnect G1 at E2. Measure the resistance in the Gate winding across G1-G2. Should be 0.75.
- c. Isolate one Control winding by disconnecting either lead C1 or C2 from the terminal block. Measure the resistance in the Control winding across C1-C2. Should be 9.0.
- d. Connect one meter lead to the disconnected Gate winding lead and the other meter lead to the disconnected Control winding lead and check for continuity.

Results:

1. REACTOR IS SERVICEABLE if resistance is within 20-percent either way of the value listed and there is no continuity between the Control and Gate windings.
2. REACTOR IS DEFECTIVE if there is an open circuit in either the Gate or the Control windings. Continuity between the Gate and the Control windings is also an indication of a defective Reactor. In either case, the Reactor should be replaced.

7. Checking Control Reactor.

- a. Isolate the Control Reactor by disconnecting common lead "C" from its point of connection and carefully measure the resistance from this lead to the numbered lead on the Control Reactor. Should be 18.0.

Results:

1. CONTROL REACTOR IS SERVICEABLE if resistance is within 10 percent of the value specified.
2. CONTROL REACTOR IS DEFECTIVE if no continuity is indicated between the common lead "C" and the numbered lead, indicating the presence of an open circuit.

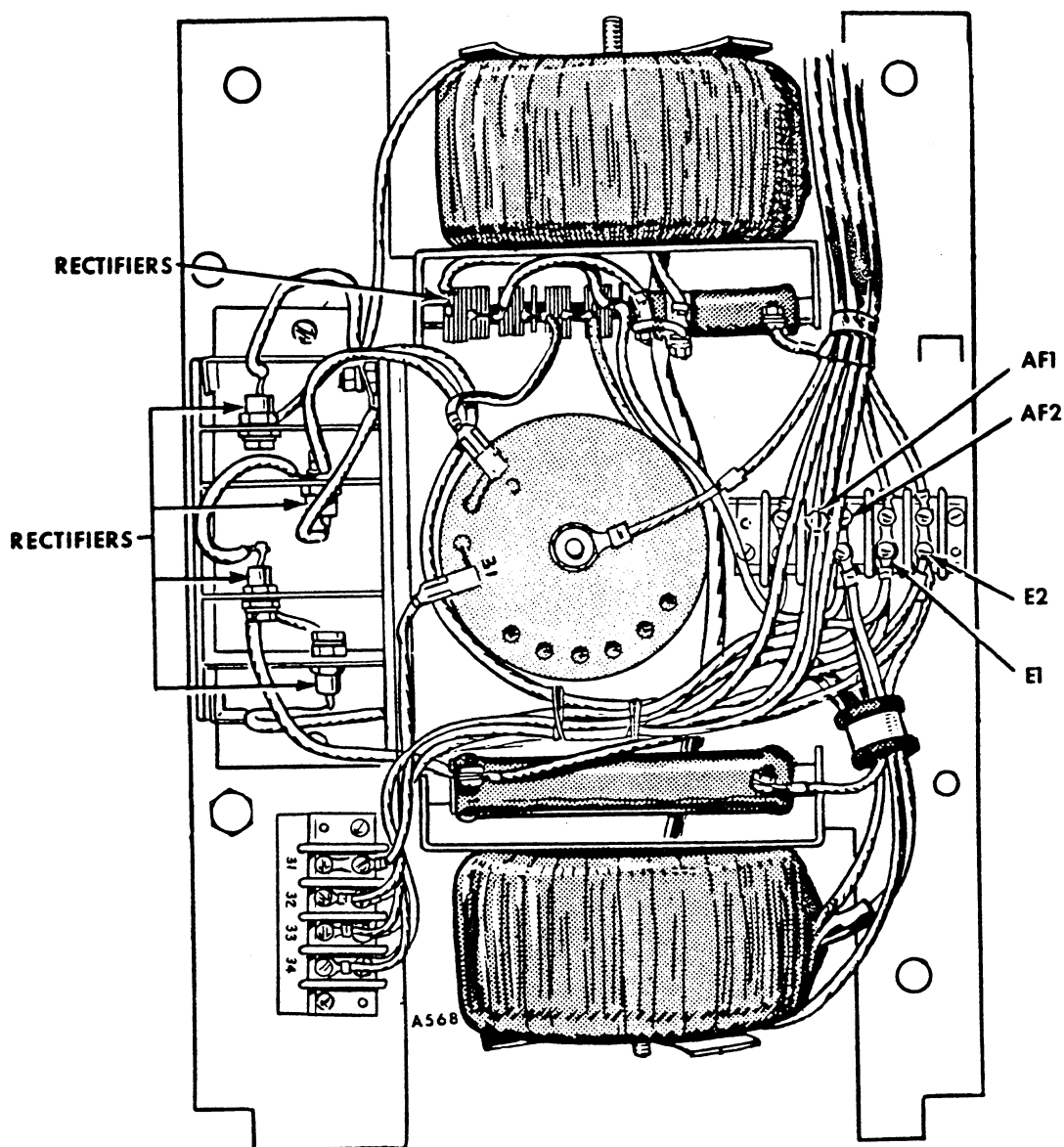
8. Checking Resistors:

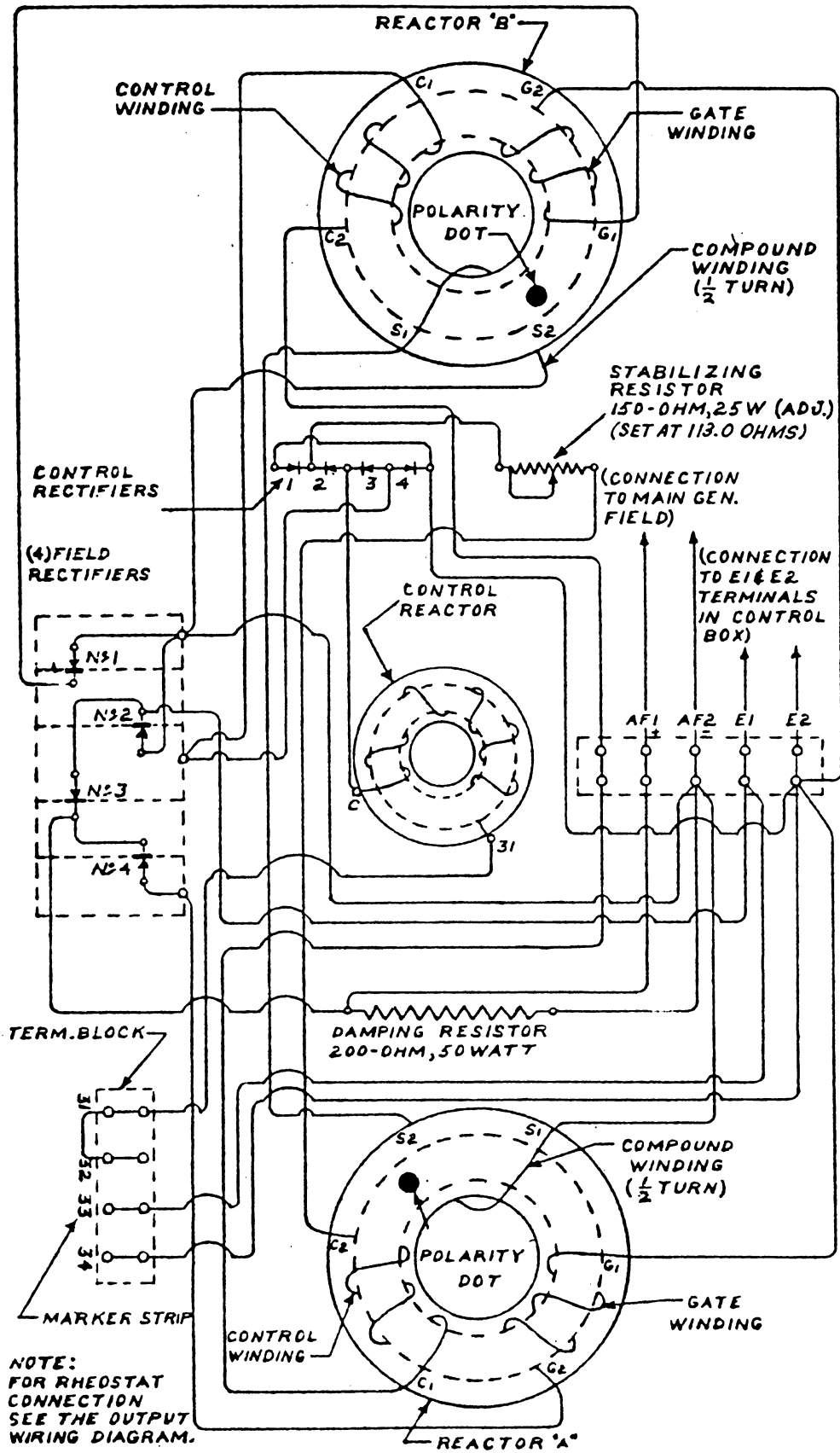
The resistors must be checked with a multimeter adjusted to the appropriate range of resistances. See wiring diagram for correct values.

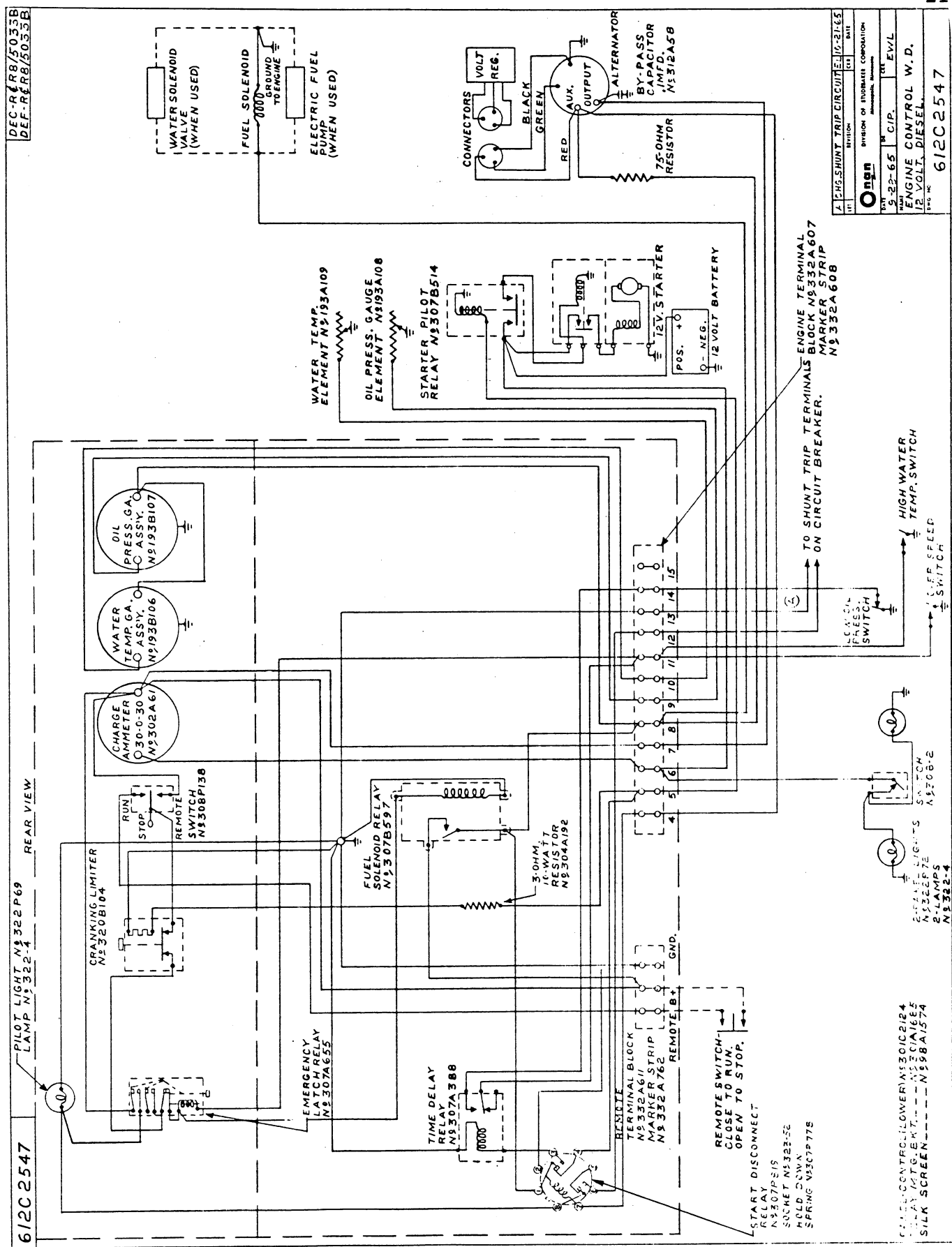
- a. Isolate the Resistor by disconnecting one end from its point of connection and carefully measure the resistance.

Results:

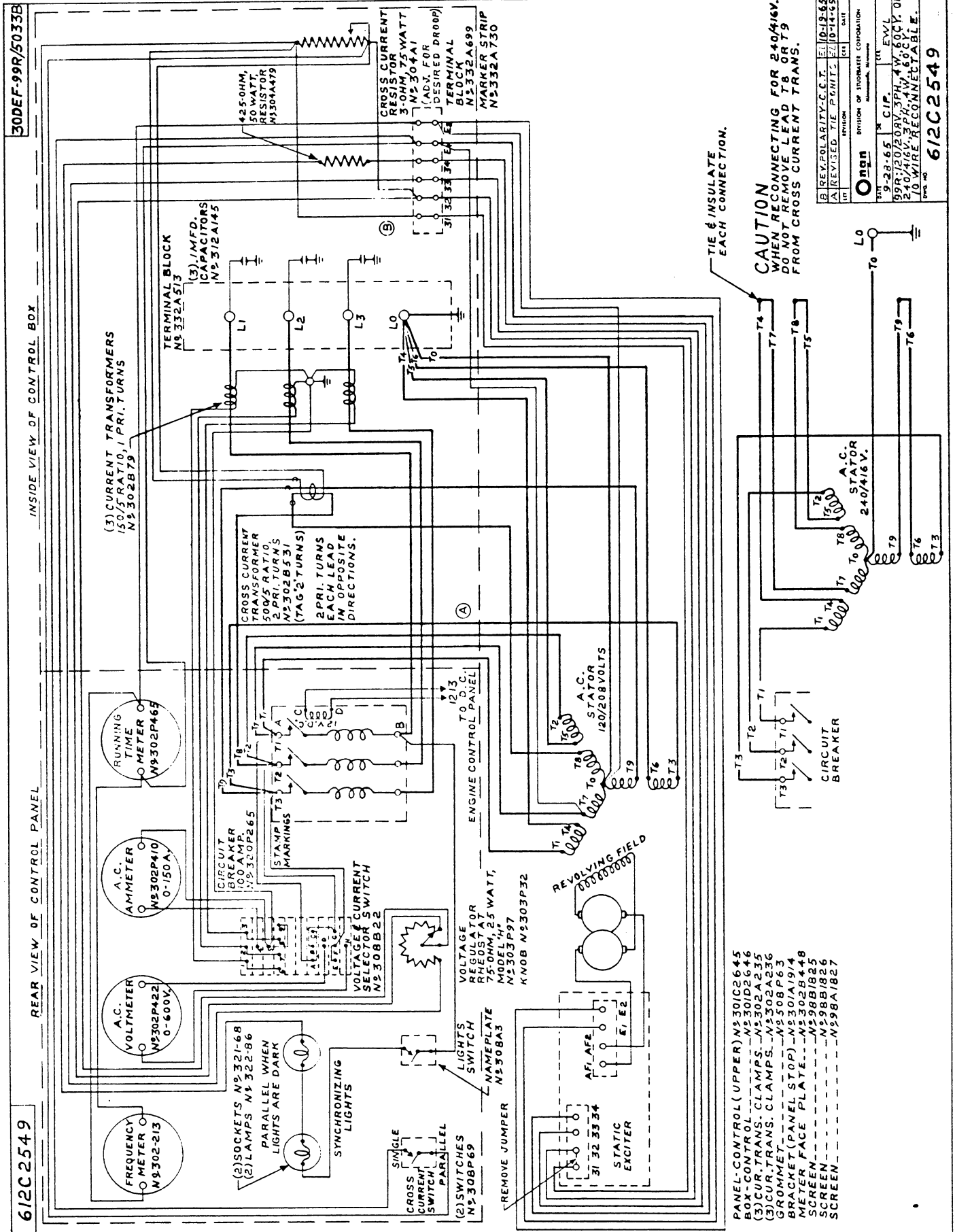
1. RESISTOR IS SERVICEABLE if the measured resistance falls within 20-percent of the value specified in the wiring diagram.
2. RESISTOR IS DEFECTIVE if there is no indication of continuity through the resistor. If the measured resistance exceeds the percent limits either way, the Stabilizing Resistor can be adjusted to bring the resistance within the required limits.







2145 SHUNT TRIP CIRCUIT 10-21-63			
REV.	BY	DATE	DESCRIPTION
1	22-65	W. C. P.	EVIL
Ongn			
DIVISION OF EVOLUTIVE CORPORATION			
ENGINE CONTROL W.D.			
12 VOLT DIESEL			
612C2547			



PARTS CATALOG

This parts catalog applies to 15DEC-99R/5033B and 30DEF-99R/5033B electric generating plants. The 15DEC-99R/5033B is powered by a Ford C3PX6005A and 30DEF-99R/5033B by a C3PY6005A Engine, which is more completely described in the Ford manual. Parts must be selected from the appropriate Ford parts list, and parts must be secured from the Ford Motor Company.

Engine parts that are modified or added by ONAN will be found in this list. They all have ONAN part numbers and must be used in place of similar parts which may be listed by Ford in their parts list. Parts are illustrated in groups with reference numbers that correspond to like numbers in the list for that group. Illustrations are typical and do not necessarily portray a particular part number. Unless mentioned in parts description, parts are interchangeable between both models.

"Right" and "Left" sides of the Generator, Control, and Housing are determined by FACING the Radiator (Front) end.

Using your ONAN plant nameplate MODEL and SPEC. order parts from this catalog that apply to your plant.

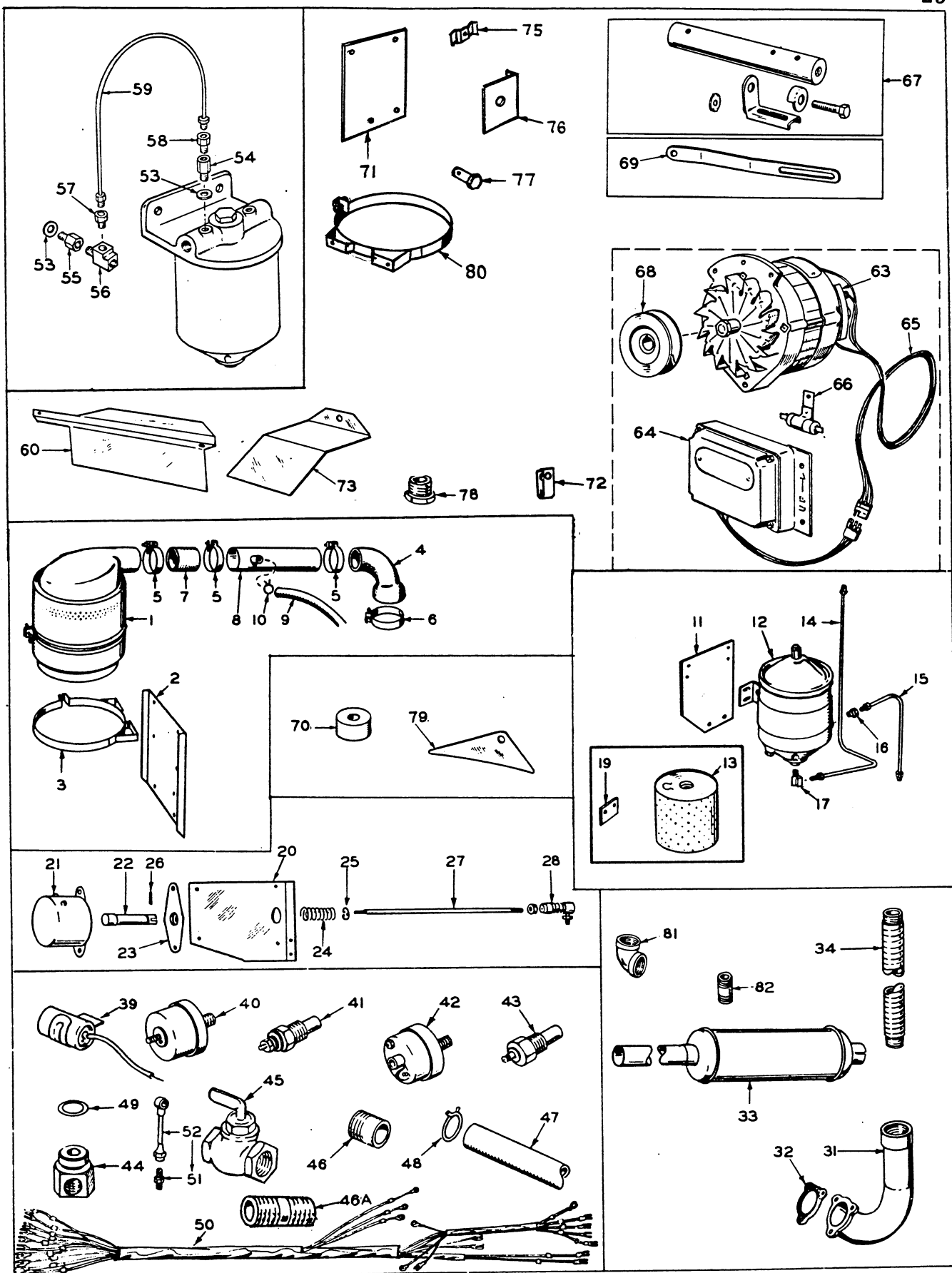


FIG.1-FUEL SYSTEM AND MISCELLANEOUS ENGINE PARTS GROUP

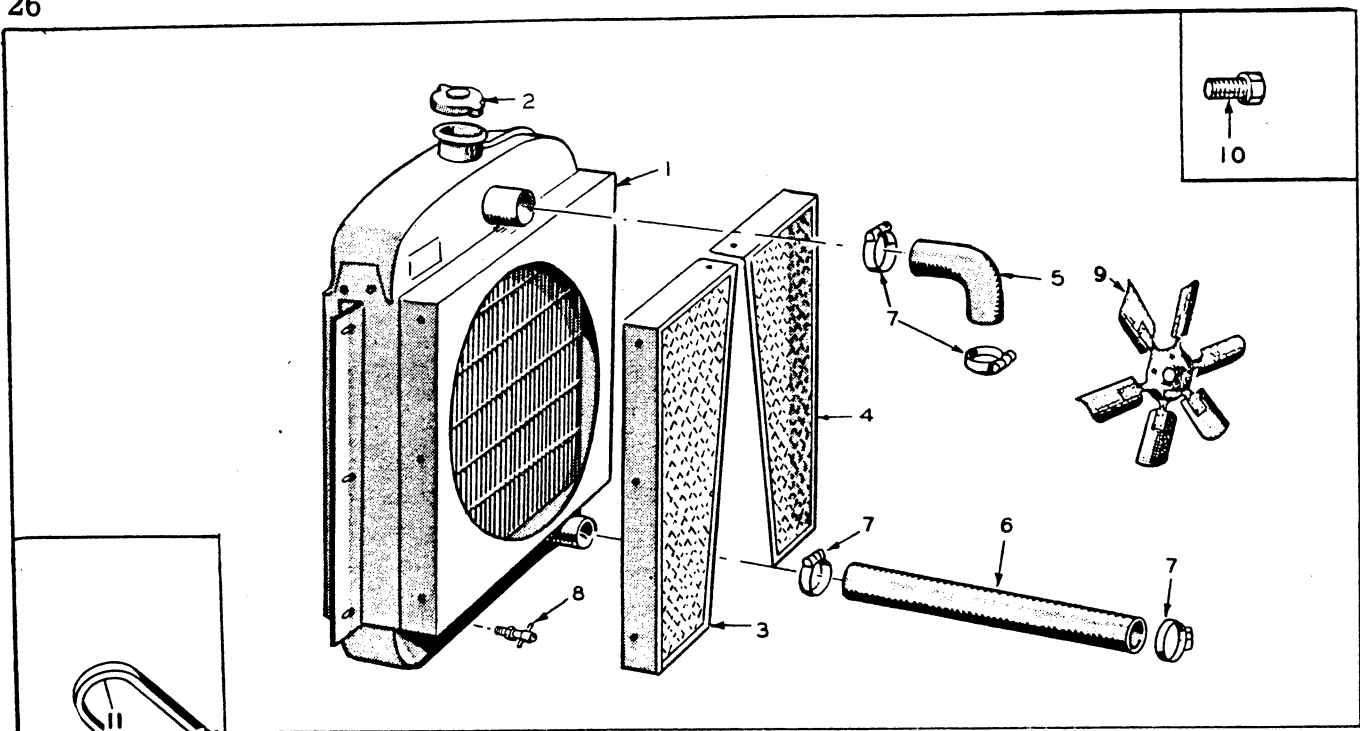


FIG. 2-COOLING SYSTEM GROUP

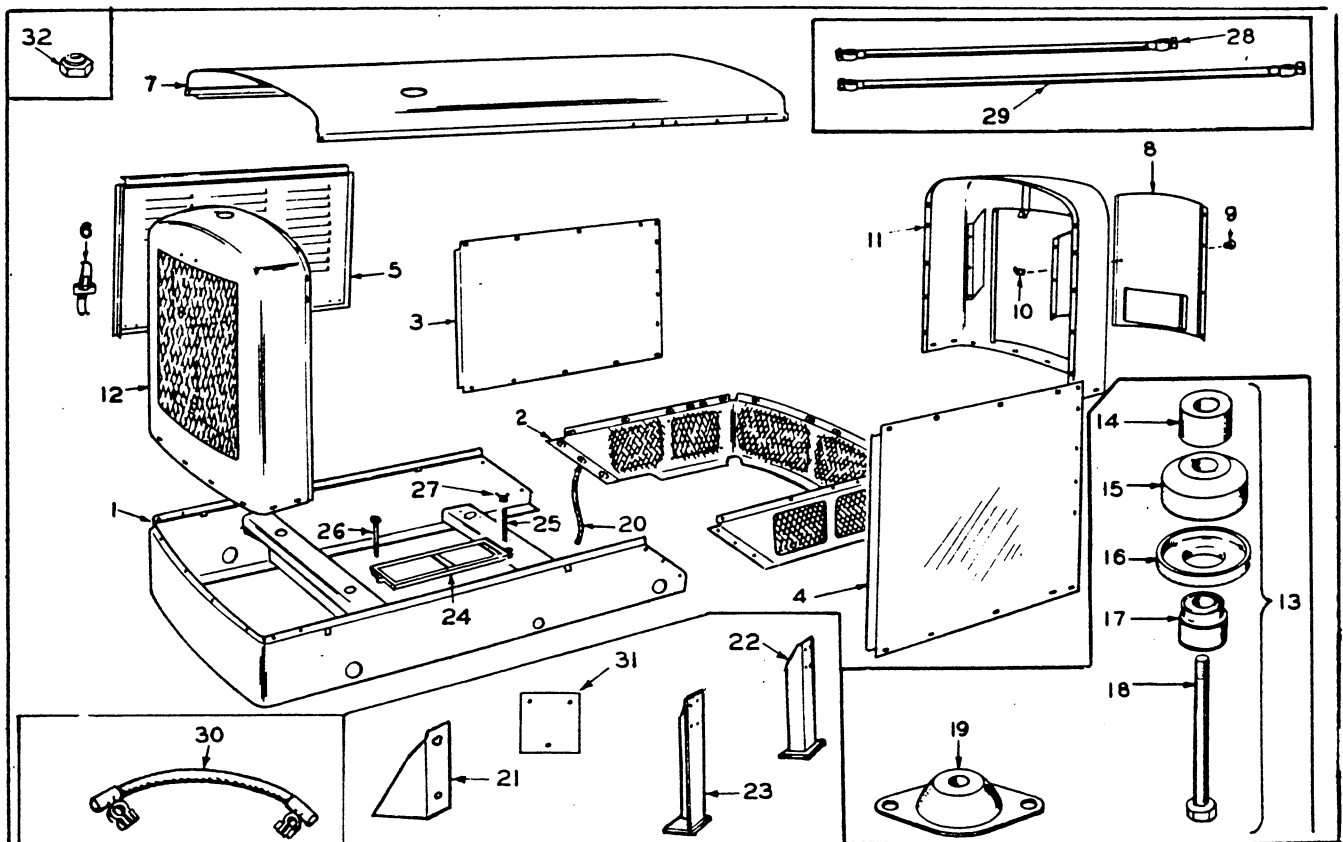


FIG. 3-HOUSING GROUP (HOUSED PLANTS ONLY)

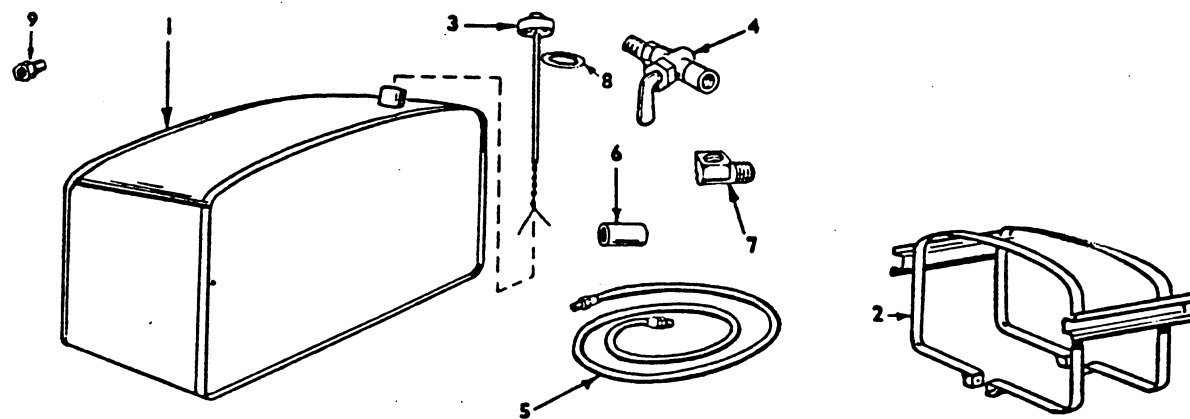
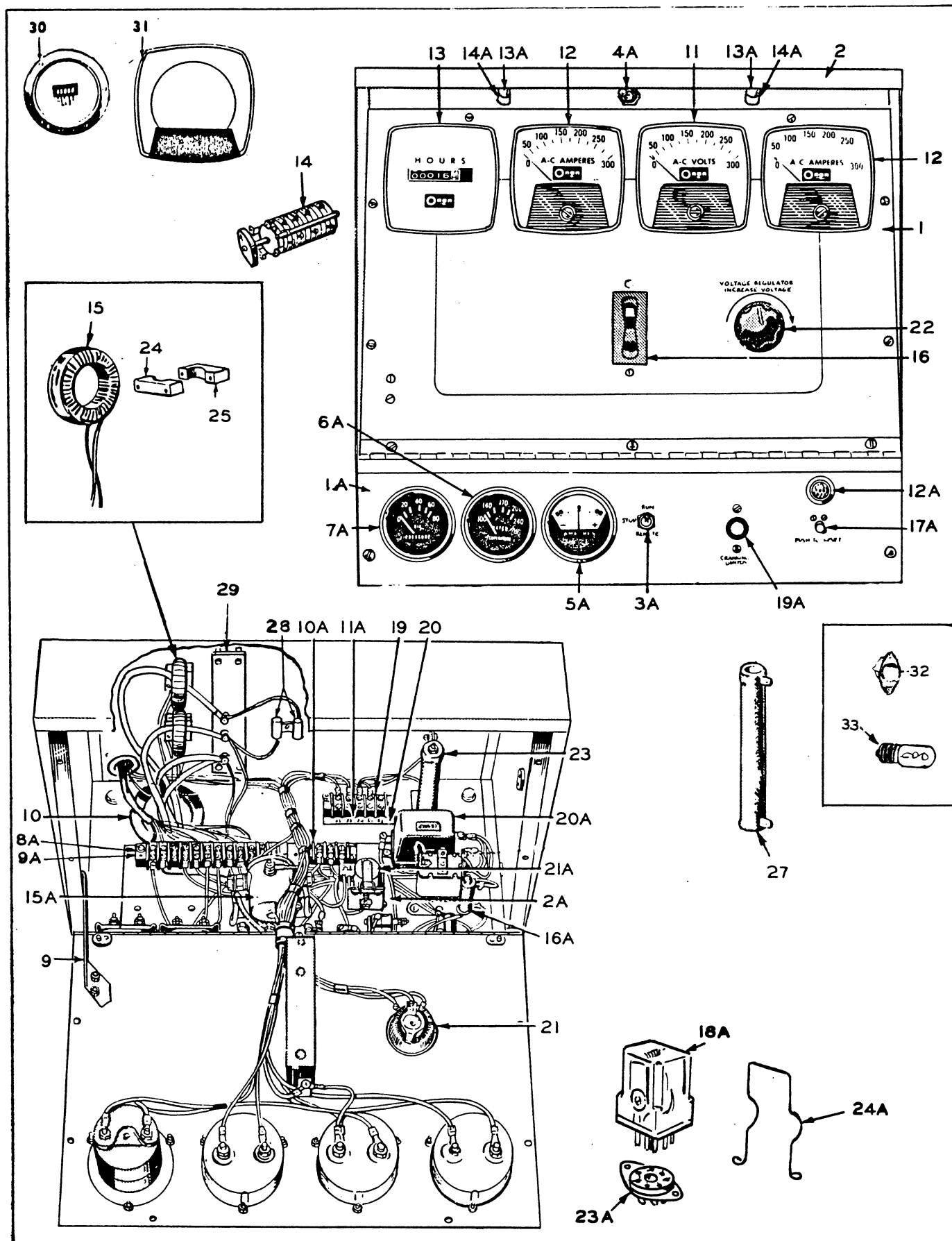


FIG. 8 - MOUNTED FUEL TANK GROUP (Optional Equipment)



NOTE: Parts appear in two separate groups in the Parts List.

FIG. 7 - CONTROL GROUP (AC OUTPUT PORTION)

FIG. 7A - CONTROL GROUP (ENGINE INSTRUMENTS PORTION)

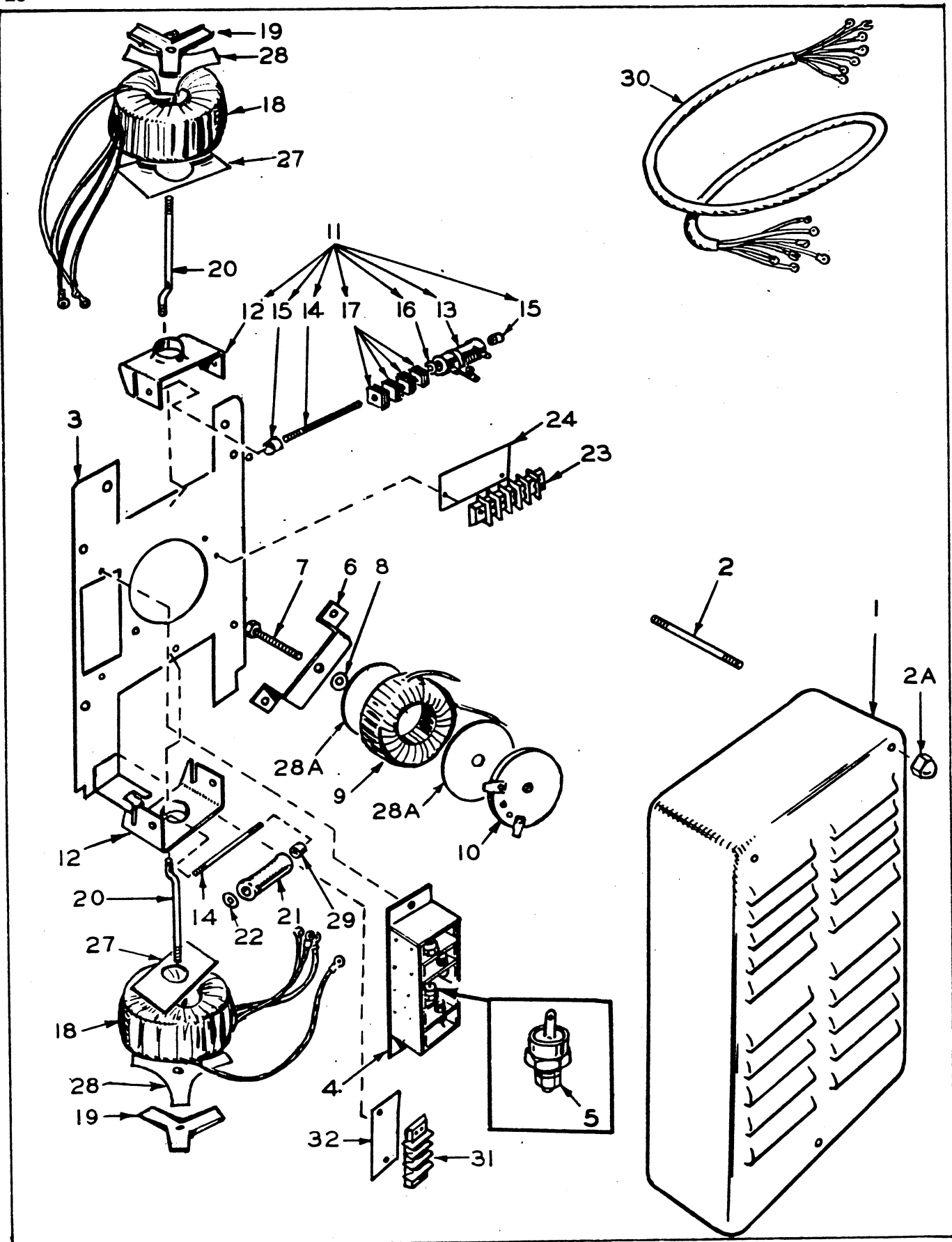


FIG.6- GENERATOR GROUP (EXCITER PORTION)

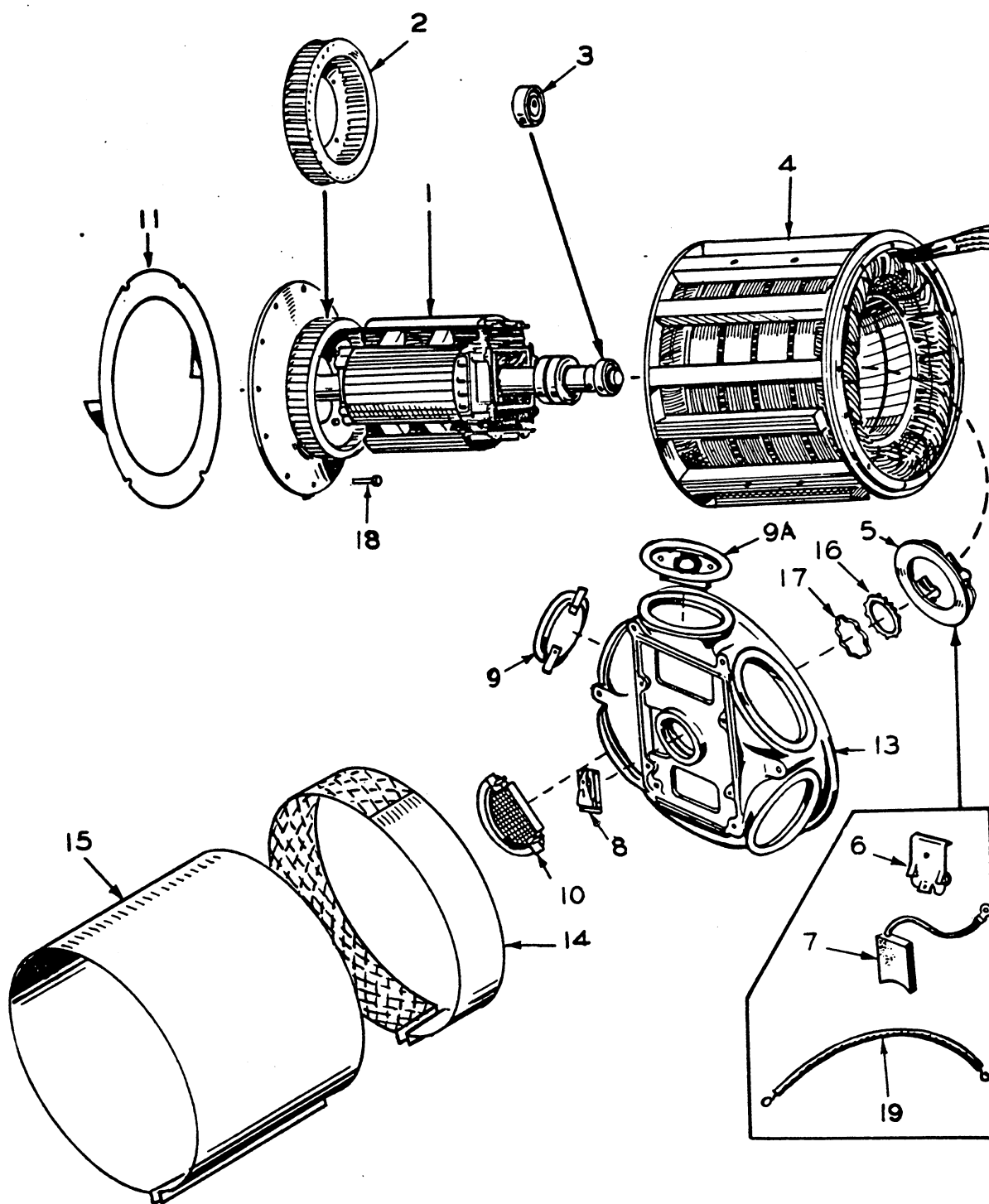


FIG.5-GENERATOR GROUP (ALTERNATOR PORTION)

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
REPLACEMENT ENGINE			
	100P565	1	For 15DEC-99R/5033B (Ford Model C3PX-6005A)
	100P564	1	For 30DEF-99R/5033B (Ford Model C3PY-6005A)
			General Description:
			Includes - Complete Cylinder Block; Oil Pan; Governor; Injection Pump; Oil Pump; Oil Filter; Water Pump; Secondary Fuel Filter; Flywheel; Starter Motor & Solenoid; Charge Generator Brackets; Fan Belt; Valve Rotators; Fuel Transfer Pump; and Oil Fill Tube.
			Excludes - Air Cleaner; Radiator and Hoses; Front Mounting Brackets; Charge Generator and Voltage Regulator.

FIG. 1 - FUEL SYSTEM AND MISCELLANEOUS ENGINE PARTS GROUP

1	140B62	1	Cleaner, Air
2			Bracket, Air Cleaner Mounting
	140B767	1	For 15DEC-99R/5033B
	140B764	1	For 30DEF-99R/5033B
3	140A80	2	Band, Air Cleaner Mounting
4			Hose, Air Cleaner Connector to Manifold
	503B455	1	For 15DEC-99R/5033B
	503B456	1	For 30DEF-99R/5033B
5	503-465	3	Clamp, Air Cleaner Hose
6	503-354	1	Clamp, Air Cleaner Hose
7	503-482	1	Hose, Air Cleaner to Connector
8	140A769	1	Connector, Air Cleaner to Manifold Hoses
9			Hose, Breather
	503-483	1	For 15DEC-99R/5033B
	503-217	1	For 30DEF-99R/5033B
10	503-197	2	Clamp, Breather Hose
11	149A985	1	Plate, Primary Fuel Filter Mounting
12	149C823	1	Filter, Fuel - Primary
13	149P846	1	Cartridge, Fuel Filter
14	149C988	1	Line, Fuel - Primary to Secondary Filter
15			Line, Fuel - Pump to Primary Filter
	149-1055	1	For 15DEC-99R/5033B
	149-1054	1	For 30DEF-99R/5033B
16	502-35	1	Connector, Primary Filter
17	502-42	1	Elbow, Inverted Male, Primary Fuel Filter

PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 1 - FUEL SYSTEM AND MISCELLANEOUS ENGINE PARTS GROUP (Cont.)			
20	306B197	1	Bracket, Solenoid Mounting
21	307B628	1	Solenoid, Stopping (12-Volt)
22	306A199	1	Plunger, Stop Solenoid
23	306A162	1	Retainer, Stop Solenoid Plunger
24	306A198	1	Spring, Stop Solenoid Plunger
25	518-203	1	Ring, Snap - Spring Retaining
26	516P103	1	Pin, Roll (1/8 x 1/2") - Spring Retaining
27			Rod, Stop Solenoid to Joint
	306A201	1	For 15DEC-99R/5033B
	306A200	1	For 30DEF-99R/5033B
28	150A638	1	Joint, Rod to Injector Pump
31			Elbow, Exhaust Outlet
	155A863	1	For 15DEC-99R/5033B
	155B936	1	For 30DEF-99R/5033B
32	185-112	1	Gasket, Exhaust Flange - For 15DEC-99R/5033B
33	155P516	1	Muffler, Exhaust
34	155A912	1	Tube, Exhaust
39	312A58	2	Condenser (1) Voltage Regulator (1) Charge Alternator
40	193A108	1	Sender, Oil Pressure
41	193A104	1	Sender, Water Temp.
42	309B10	1	Switch, Low Oil Pressure
43	309A179	1	Switch, Hi-Temperature Cut-off
44	102A553	1	Adapter, Oil Drain
45	504-30	1	Valve, Oil Drain
46	505A135	1	Nipple, Half - Pipe 3/8 x 1-1/2" Oil Drain
46A	505-224	1	Nipple, Pipe 3/8 x 4-1/2" - Oil Drain
47	503-484	1	Hose, Oil Drain
48	503-131	1	Clamp, Oil Drain Hose
49	102P532	1	Gasket, Oil Drain
50			Harness, Engine Control
	338C317	1	For 15DEC-99R/5033B
	338C316	1	For 30DEF-99R/5033B
53	526-65	2	Washer, Copper - Fuel Return Fittings
54	502A307	1	Adapter, Secondary Filter - Fuel Return
55	502A306	1	Adapter, Fuel Return
56	502-58	1	Tee, Fuel Return
57	502-30	1	Connector, Fuel Return
58	502-235	1	Connector, Restricted, Fuel Return
59	149A1049	1	Line, Fuel Return
60	151B292	1	Guard, Governor Control - For 30DEF-99R/5033B
63	191-543	1	Alternator, Charge
64	191-542	1	Regulator, Charge Alternator
65	191-544	1	Cable, Alternator to Regulator
66	191-545	1	Resistor, Charge Alternator
67	191-546	1	Bracket, Alternator Mounting

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
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FIG. 1 - FUEL SYSTEM AND MISCELLANEOUS ENGINE PARTS GROUP (Cont.)

68	191-624	1	Pulley, Charge Alternator
69	191A101	1	Bracket, Alternator - Adjusting
70	403A315	2	Spacer, Air Cleaner Bracket Mounting
71	305A317	1	Plate, Alternator Mounting
72	505-7	2	Bushing, Reducer (1) Oil Sender (1) Low Oil Pressure Switch
73	191B619	1	Shield Heat - Alternator
75	152A36	1	Clamp, Governor Control Cable
76	151A230	1	Bracket, Governor Control Cable
77	152A158	1	Swivel, Governor Control
78	416-96	1	Clip, Harness
79	191-516	1	Cover, Starter Opening (Rear of Block)
80	140B649	2	Band, Muffler Mounting
81			Elbow, Exhaust
	505-44	1	2-1/2" x 90" - Muffler Outlet
	505-48	1	Reducer (2-1/2" to 2") Muffler Inlet
	505-175	1	2" x 90°
	505-638	1	Union Type, 2" x 90°
82			Nipple, Exhaust
	505-405	1	2 x 5" - For 15DEC-99R/5033B
	505-405	2	2 x 5" - For 30DEF-99R/5033B
	505-419	1	2 x 12" - For 15DEC-99R/5033B
	152P157	1	Cable, Governor Control (Not Illustrated)

FIG. 2 - COOLING SYSTEM GROUP

1			Radiator
	130D601	1	For 15DEC-99R/5033B
	130D604	1	For 30DEF-99R/5033B
2			Cap, Radiator
	130B449	1	For 15DEC-99R/5033B
	130P372	1	For 30DEF-99R/5033B
3	130C351	1	Guard, Fan - Left Hand Side
4	130C352	1	Guard, Fan - Right Hand Side
5	503A441	1	Hose, Radiator - Upper
6	503P439	1	Hose, Radiator - Lower
7	503P365	4	Clamp, Radiator Hose
8			Valve, Radiator Drain
	504-63	1	For 15DEC-99R/5033B
	504-28	1	For 30DEF-99R/5033B
9	130C605	1	Blade, Fan - For 30DEF-99R/5033B
10	801-24	4	Screw, Hex - Blade Mounting - For 30DEF-99R/5033B
11	511P79	1	Belt, Fan

PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 3 - HOUSING GROUP			
1			Chassis, Mounting
	403D696	1	For 15DEC-99R/5033B
	403D698	1	For 30DEF-99R/5033B
2	403D697	1	Chassis, Mounting - Rear Section
3			Panel, Housing - Left Side
	405B931	1	For 15DEC-99R/5033B
	405C1378	1	For 30DEF-99R/5033B
4			Panel, Housing - Right Side
	405B930	1	For 15DEC-99R/5033B
	405C1379	1	For 30DEF-99R/5033B
5			Panel, Door
	405C934	2	For 15DEC-99R/5033B
	405C1383	2	For 30DEF-99R/5033B
6	406A105	4	Clamp, Door
7			Panel, Top
	405D1377	1	For 15DEC-99R/5033B
	405D1380	1	For 30DEF-99R/5033B
8	405B932	1	Door, Rear Panel
9	406-2	1	Knob, Door
10	406-88	1	Catch, Panel Door
11			Panel, Rear End (Excludes Door)
	405D928	1	For 15DEC-99R/5033B
	405D1381	1	For 30DEF-99R/5033B
12			Panel, Front End
	405D1376	1	For 15DEC-99R/5033B
	405D1382	1	For 30DEF-99R/5033B
13	402A253	2	Mounting Assembly, Front Engine - Includes Parts Marked * Plus Washers and Nuts.
14	403A633	2	*Spacer, Front Engine Mounting
15	402A10	2	*Mount, Rubber - Upper
16	402A12	2	*Cup, Rubber Mount Retainer
17	402A11	2	*Mount, Rubber - Lower
18	801-81	2	*Screw, Cap - Engine Mounting
19	402P209	2	Mount, Vibration - Generator End
20	336A476	1	Cable, Ground - Generator to Chassis
21	403B695	2	Bracket, Support - Engine Front
22	403B694	1	Bracket, Support - Engine Rear - Left Hand
23	403B693	1	Bracket, Support - Engine Rear - Right Hand
24			Frame, Battery Hold-down
	416C523	1	For 15DEC-99R/5033B
	416C480	1	For 30DEF-99R/5033B
25			Stud, Battery Hold-down
	520A656	1	For 15DEC-99R/5033B
	520A231	1	For 30DEF-99R/5033B
26	800-31	1	Screw, Cap - Battery Hold-down

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
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FIG. 3 - HOUSING GROUP (Cont.)

27	865-7	1	Nut, Wing - Battery Hold-down
28	416A530	1	Cable, Battery - 16" Long
29	416A531	1	Cable, Battery - 24" Long
30	416A446	1	Cable, Battery - 9" Long
31	305A317	1	Plate, Voltage Regulator Mounting
32	870-68	2	*Nut, Huglock - Engine Mounting

* - Included in 405A253 Mounting Assembly (Front Engine).

FIG. 5 - GENERATOR GROUP (Alternator Portion)

1			Rotor Assembly, Wound - Includes Bearing, Blower and Drive Assembly
	201-1133	1	For 15DEC-99R/5033B
	201-1134	1	For 30DEF-99R/5033B
2	205B68	1	Blower
3	510P63	1	Bearing
4			Stator Assembly, Wound (Includes Bearings, Blower, and Drive Disc)
	220-922	1	For 15DEC-99R/5033B
	220-923	1	For 30DEF-99R/5033B
5	212C248	1	Rig Assembly, Brush - Includes Brushes and Springs
6	212B1105	4	Spring, Brush
7	214A56	4	Brush
8	150A717	1	Switch Assembly, Overspeed
9	232B1254	2	Cover, End Bell Openings (Includes Latch and Bracket) - Plain
9A	234B20	1	Cover, End Bell Openings (Includes Latch and Bracket) - With Lead Opening
10	232B1253	2	Cover, End Bell Openings (Includes Latch and Bracket) - Screened
11	234C175	1	Scroll, Air
13	211E131	1	Bell, End - Alternator to Exciter
14	234C174	1	Band, Generator - Front Portion - Narrow
15			Band, Generator - Rear Portion - Wide
	234C173	1	For 15DEC-99R/5033B
	234C176	1	For 30DEF-99R/5033B
16	232A1186	1	Holder, Bearing - Anti-Rotation
17	232A1187	1	Spring, Bearing Holder - Anti-Rotation

PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 5 - GENERATOR GROUP (Alternator Portion) Cont.			
18			Bolt, Shoulder - Drive Disc to Engine Flywheel
	232A1238	6	For 15DEC-99R/5033B
	232A1652	6	For 30DEF-99R/5033B
19	336A943	2	Jumper, Brush Rig
20	232B1820	1	Disc, Drive

FIG. 6 - GENERATOR GROUP (Exciter Portion) Model 07SX-1N1C

	207D11	1	Magneciter Assy., Complete
1	234D106	1	Cover, Exciter
2	520A575	3	Stud, Exciter Cover Mounting
2A	866-1	3	Nut, Acorn - Exciter Cover Mounting
3	234D105	1	Panel Only, Exciter
4	305B200	1	Rectifier Assembly, Power (Complete) Includes four #305P239 Plus Wire and Hardware
5	305P239	4	Rectifier Only, Power (Field) Included in #305B200 Assembly
6	150B733	1	Bracket Only, Overspeed Switch
7	150A772	1	Stud and Contact Point Assembly, Voltage Control Reactor Mounting
8			Washer, Fibre Insulating - Voltage Control Reactor Stud Mounting
	508-18	2	1/4" x 3/4" x 1/16"
	508-29	1	1/4" x 3/8" x 1/32"
9	315A73	1	Reactor, Voltage Control (Does Not Include Terminal Block) - 50-Cycle Plants
9	315A74	1	Reactor, Voltage Control (Does Not Include Terminal Block) - 60-Cycle Plants
10	332A687	1	Block, Terminal - Voltage Control Reactor
11	305B202	1	Rectifier Assembly, Resistor and (Includes Parts Marked * Plus Wire and Hardware)
12	234B60	2	*Bracket, Gate Reactor Mounting (Note: 1 Only Included in #305B202 Assembly)
13	304A5	1	*Resistor, Control - Adjustable (150-Ohm, 25-Watt - 9/16 x 2")
14	520A579	2	*Stud, Resistor & Rectifier Mounting (Note: 1 Only Included in #305B202 Assembly)
15	232A1473	2	*Spacer, Adjustable Resistor and Rectifier to Stud (3/8"O.D. x 3/16"I.D. x 7/32" Long)
16	304A14	2	*Washer, Centering - Adjustable Resistor Mounting
17	305P208	4	*Rectifier, Regulator Control
18	315A47	2	Reactor, Gate - 60-Cycle Plants

* - Included with Rectifier Assembly #305B202.

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 6 - GENERATOR GROUP (Exciter Portion) Model 07SX-1N1C (Cont.)			
19	234B62	2	Retainer, Gate Reactor
20	232A1361	2	Stud, Gate Reactor Mounting
21	304A21	1	Resistor, Fixed - Alternator Field (200-Ohm, 50-Watt - 3/4 x 4")
22	304A15	2	Washer, Centering - Fixed Resistor Mounting
23	332A604	1	Block, Terminal - 5-Place
24	332A678	1	Strip, Block Marker - 5-Place
			Insulation
27	232A1547	2	Gate Reactor to Mounting Bracket
28	232A1546	2	Gate Reactor to Retainer
28A	232A1548	2	Voltage Control Reactor Mounting
29	232A1474	2	Spacer, Fixed Resistor to Stud (3/8"O.D. x 3/16" I.D. x 11/32" Long)
30	338B237	1	Harness, Wiring - Exciter to Control
31	332A537	1	Block, Terminal - 4-Place
32	332A686	1	Strip, Block Marker (Marked 31, 32, 33, 34)
FIG. 7 - CONTROL GROUP (AC Output Portion)			
1	301C2645	1	Panel Only, Upper Control
2	301D2646	1	Box Only, Control
9	301A1914	1	Bracket, Panel Stop
10	508-63	1	Grommet, Rubber - For 2-3/4" Hole
11	302P422	1	Voltmeter (0-600)
12			Ammeter
	302P406	1	For 15DEC-99R/5033B (0-75 Scale)
	302P410	1	For 30DEF-99R/5033B (0-150 Scale)
13	302P465	1	Meter, Running Time
14	308B22		Switch Voltage and Current Selector
15			Transformer, Current
	302B76	3	For 15DEC-99R/5033B (Ratio 75/5)
	302B79	3	For 30DEF-99R/5033B (Ratio 150/5)
15	302B531	1	Transformer, Cross Current
16			Breaker, Circuit
	320P264	1	For 15DEC-99R/5033B (50-Amp)
	320P265	1	For 30DEF-99R/5033B (100-Amp)
19	332A699	1	Block, Terminal (6-Place)
20	332A730	1	Strip, Block Marker (31, 32, 33, 34, E1, E2)
21	303-97	1	Rheostat, Voltage Regulator
22	303-32	1	Knob, Rheostat
23	304A479	1	Resistor, Voltage Regulator

PARTS LIST

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
FIG. 7 - CONTROL GROUP (AC Output Portion) Cont.			
24	302A235	3	Clamp, Current Transformer Mounting - Inside Half
25	302A236	3	Clamp, Current Transformer Mounting - Outside Half
27	304A1	1	Resistor, Adj. (3-Ohm, 75-Watt)
28	312A145	3	Condenser, Output Terminal Suppression
29	332A513	1	Block, Terminal - Output
30	302-213	1	Meter Frequency - Optional Equipment
31	302B448	1	Plate, Meter Face
32	332 -68	2	Receptacle, Synchronizing Lights
33	322-86	2	Lamp, Synchronizing Lights

FIG. 7A - CONTROL GROUP (Engine Instruments Portion)

1A	301C2124	1	Panel Only, Lower Control
2A	301A1685	1	Bracket, Time Delay Relay Mounting
3A	308P138	1	Switch, Run-Stop-Remote
4A	308-2	1	Switch, Panel Light
5A	302A61	1	Ammeter, Charge (30-0-30)
6A	193B106	1	Gage, Water Temperature (Panel Unit Only)
7A	193B107	1	Gage, Oil Pressure (Panel Unit Only)
8A	332A607	1	Block, Terminal - 12-Place
9A	332A608	1	Strip, Block Marker (Marked 4 through 15)
10A	332A611	1	Block, Terminal - 3-Place
11A	332A762	1	Strip, Marker (Marked - Remote, B+, Ground)
12A	322P69	1	Receptacle Assembly, Pilot Light
13A	322P72	2	Receptacle, Panel Light
14A	322-4	3	Bulb, (2) Panel Lights (1) Pilot Light
15A	307B514	1	Relay, Starter Pilot
16A	304A192	1	Resistor, Fixed - 3-Ohm, 10-Watt
17A	307A655	1	Relay, Emergency Latch
18A	307P819	1	Relay, Start-Disconnect
19A	320A104	1	Limiter, Cranking
20A	307B597	1	Relay, Fuel Solenoid
21A	307A388	1	Relay, Time Delay - Low Oil Pressure Switch Circuit
23A	323-52	1	Socket, Start-Disconnect Relay
24A	307P778	1	Spring, Start-Disconnect Relay Hold-down

REF. NO.	PART NO.	QUANT. USED	DESCRIPTION
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FIG. 8 - MOUNTED FUEL TANK GROUP (Optional Equipment)

1	159D490	1	Tank, Fuel
2	159D489	1	Strap Assy., Fuel Tank Mounting
3	159D512	1	Cap and Indicator, Fuel Tank
4			Valve, Shut-Off
	504A75	1	Fuel Supply (with Screen) - Three-way
	504-4	1	Fuel Return - Three-way
5			Line, Fuel
	501A89	1	Fuel Supply - 39"
	501A88	1	Fuel Return - 28"
6	505-26	1	Coupling, Pipe 1/8"
7	502-20	1	Elbow, Street
8	159P751	1	Gasket, Gas Tank Filler Neck
9	502-3	1	Connector, Inverted Male

10B65

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