

**BELL SYSTEM PRACTICES**  
**Outside Plant Construction**  
**and Maintenance**

**SECTION G96.310.1**  
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# **PORTABLE GASOLINE ENGINE**

## **ELECTRIC GENERATOR**

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### **1. GENERAL**

1.01 The Portable Gasoline Engine Electric Generator Unit, Specification No. 285B50, is used primarily for operating lighting, heating and ventilating equipment at manholes. The weight of this unit is about 85 pounds and the unit has a capacity of 7.5 amperes of direct current at 110 to 125 volts.

1.02 The engine is equipped with a special muffler to provide comparatively quiet operation.

### **2. SAFETY PRECAUTIONS**

2.01 Do not operate this unit in an enclosure unless there is full ventilation, and never operate it or store it in a manhole. When operating the unit in the vicinity of a manhole, locate it so the fumes will not blow into the manhole.

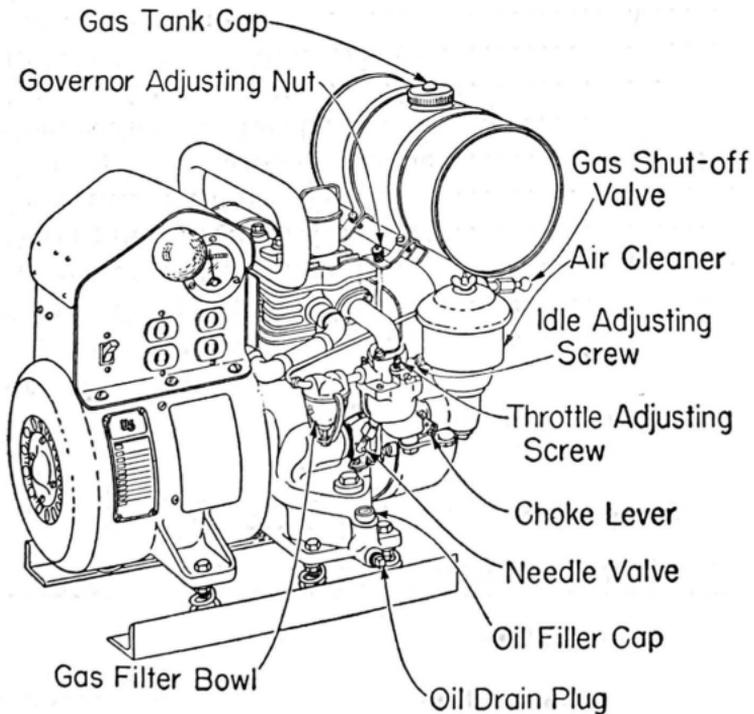
2.02 Observe the usual precautions for handling gasoline when filling the gas tank, operating the unit or storing the unit. Do not remove the gas tank cap or the oil filler cap,

while the engine is running. Do not fill the gas tank while the engine is hot. When filling the gas tank, be careful not to spill gasoline on the engine. If gasoline is accidentally spilled, wipe engine dry and move the unit from proximity of spilled gasoline before starting the engine.

- 2.03 Locate the generator so that it will not be subject to damage, obstruct traffic or be hazardous to pedestrians.
- 2.04 Display proper warning signs at all times.
- 2.05 Do not leave generator on an unattended job unless it is properly protected from theft or tampering.

### 3. NAMES OF PARTS

3.01 The following is a front view of the Portable Gasoline Engine Electric Generator and indicates only the parts referred to in this practice. Detailed parts information, if required, may be obtained from the manufacturer's catalog supplied with the unit



## 4. DESCRIPTION

4.01 The Portable Gasoline Engine Electric Generator consists principally of a 4-cycle, one-cylinder, air cooled gasoline engine, direct coupled to a compound field, direct current generator with an illuminated load connection panel.

4.02 The gasoline engine is equipped with a pull rope starter, hand choke, adjustable needle valve and an adjustable governor which automatically controls the engine throttle to meet varying loads.

4.03 The direct current electric generator has both a shunt field and a series field which provides good voltage regulation for any load up to 7.5 amperes.

4.04 The load connection panel is equipped with a 15-watt lamp to illuminate the panel, a circuit breaker which operates on 7.5 to 8.6 amperes with a 10 to 15-second delay, a voltmeter which indicates the output voltage, and four "twist-tite" receptacles for connecting the load to the generator.

## 5. PREPARATION BEFORE USE

5.01 Open the oil filler cap on the crankcase. On some units the cap is threaded and is removed by turning counter-clockwise. On other units the cap is provided with a spring loaded catch which hooks on the side of the filler opening and holds the cap open. Fill the crankcase with oil of the grade and type specified on the operating instruction plate on the side of the engine. The crankcase holds one pint of oil and should be filled to the top of the filler cap opening when the unit is standing on a level surface. Close the oil filler opening. If the operating instruction plate is missing or unreadable, use a good grade oil of the following viscosity:

Temperature above 32°F — SAE 20

“ below 32°F — SAE 10W

5.02 Remove the wing nut on the top of the air cleaner and remove the top on the air cleaner. Fill the air cleaner to the oil level mark with the same oil used in the crankcase. Replace the top of the air cleaner and the wing nut.

5.03 Remove the fuel tank cap and fill the fuel tank with a regular grade, preferably non-leaded, clean motor vehicle gasoline and replace the fuel tank cap. In filling the fuel tank be careful not to spill gasoline on the engine; if necessary, use a funnel. **Do not mix oil with gasoline** as this is a 4-cycle engine similar in operation to the conventional automobile engine.

## 6. STARTING THE GASOLINE ENGINE

- 6.01 Set the unit on a firm level base as close as practical to the load giving due consideration to the safety precautions in Part 2.
- 6.02 Open the gasoline shut-off valve in the fuel line just below the fuel tank.
- 6.03 Turn the choke lever clockwise as far as it will go to completely close the choke.
- 6.04 Place the knot on the end of the pull rope in the notch on the starter pulley and wind the rope around the pulley. Pull the rope with a quick steady pull to spin the engine. Open the choke slightly (about 1/8 of its travel) and spin the engine again and it should start. If the engine fails to start after being spun 3 or 4 times, consult Part 11 of this practice.
- 6.05 As the engine warms up, gradually open the choke until the engine runs smoothly with the choke wide open.

## 7. CONNECTING THE LOAD

7.01 Before connecting any lights, heating lamps, soldering irons or electric blowers to the generator, check the output voltage which is indicated by the voltmeter on the load connection panel. If the voltage is not between 100 and 120 volts, either return the unit for adjustment in accordance with local instructions or make the adjustments set forth in Part 8 of this practice.

7.02 The load connection panel is equipped with 4 "twist-tite" receptacles for connecting the load. Any one or all four of these receptacles may be used as long as the total load connected thereto does not exceed 800 watts. If the load is too great, the circuit breaker will operate after about 10 or 15 seconds.

## 8. ENGINE ADJUSTMENTS

- 8.01 The engine has four basic adjustments which are:
- (a) The needle valve which controls the mixture of air and gasoline fed to the engine by the throttle.
  - (b) The idle adjusting screw which regulates the mixture of air and gasoline fed to the engine when the throttle is closed.
  - (c) The throttle adjusting screw which regulates the idling speed of the engine.
  - (d) The governor adjusting nut which regulates the speed of the engine under load by controlling the position of the throttle.

8.02 If the engine is not operating properly, and it appears that the carburetor is out of adjustment, proceed as follows:

- (a) Stop the engine, close the needle valve and the idle adjusting screw by turning them clockwise until they rest lightly against their valve seats. Do not force the screws too firmly against the seats or the valves may be damaged.
- (b) Open the needle valve 1 to 1-1/4 turns and the idle adjusting screw 1/2 to 3/4 of a turn by turning them counterclockwise.
- (c) Start the engine and allow it to warm up. If it is necessary to keep the choke partially closed for several minutes before the engine runs smoothly, the needle valve setting is too lean and it should be opened an additional 1/8 to 1/4 turn in the counterclockwise direction.
- (d) After the engine has warmed up, and is operating without load and the choke fully open, connect a voltmeter to the generator output by means of one of the receptacles on the load connection panel. If a good voltmeter is not available, the voltmeter on the load connection panel will serve the purpose and is already connected to the generator output; however, it is recommended that an independent voltmeter, which is known to be accurate, be used if available, as the voltmeter on the load connection panel is of comparatively cheap design and may be inaccurate.
- (e) Adjust the speed of the engine by means of the governor adjusting nut until the voltmeter reads 115 volts.
- (f) Connect a suitable load of about 800 watts to the output of the generator by means of the "twist-tite" receptacles on the load connection panel. Four 200-watt lamps are a convenient load for this purpose.
- (g) With the engine operating under full load (about 800 watts) and the choke fully open, adjust the speed of the engine by means of the governor adjusting nut until the voltmeter reads 110 volts.
- (h) If the engine surges, i.e., will not hold a steady speed, under the conditions in above Paragraph (g), readjust the needle valve. This is the final adjustment of the needle valve and can be most easily made by turning the needle valve clockwise until the engine surges (noting this position of the needle valve) then turning the needle valve counterclockwise until the engine surges (noting this position of the needle valve) and then turn the needle valve to a position about half way between these two points.

- (i) Readjust the engine speed as in Paragraph (g).
- (j) Disconnect the load from the generator. The engine should speed up slightly and the output voltage should rise to about 113 volts. If the no load voltage rises too high (above 120 volts), readjust the governor adjusting nut.

## 9. LUBRICATION AND MAINTENANCE

9.01 After every 25 hours of operation, service the unit as follows:

(a) Remove oil drain plug and completely drain the crankcase. This should preferably be done while the engine is warm to make sure of getting the maximum amount of the old oil and sludge out of the engine. After the crankcase has drained completely, replace the oil drain plug, remove the oil filler cap and fill the crankcase with fresh oil of the grade and type specified in Par. 5.01. Close the oil filler opening making sure the cap is properly seated to avoid losing oil.

(b) Remove the wing nut and top on the air cleaner. Clean out the old oil in the air cleaner and refill with new oil to the oil level mark using the same type and grade oil as is used in the crankcase.

(c) Close the gas shut-off valve. Remove the gas line filter bowl, clean the screen on the top of the bowl, remove any residue which may have accumulated in the bowl and replace the bowl.

9.02 Keep the operating parts of the throttle linkage to the governor free of paint and rust and apply cup grease as required to keep them in a freely operating condition.

9.03 Tighten any bolts or screws which are found to be loose.

## 10. STORAGE INSTRUCTIONS

10.01 If it is anticipated that the unit will not be used for 30 days or more, the following procedure should be followed:

(a) After closing the gas shut-off valve remove the gas line filter bowl and clean it out thoroughly.

(b) Open the gas line shut-off valve and completely drain the fuel tank.

(c) Replace the filter bowl and operate the engine until it stops from exhaustion of fuel. This will drain the carburetor.

(d) Leave shut-off valve open.

(e) Remove spark plug and pour about one tablespoonful of clean motor oil into the cylinder. Crank engine slowly to spread the oil and replace the spark plug.

10.02 Store the unit in a dry location.

## 11. TROUBLE SHOOTING

11.01 The operating and maintenance manual for the gasoline engine, supplied with the unit, covers in detail most of the engine troubles that may be experienced.

11.02 The most common causes of failure of the engine to start are lack of fuel, improper choking or lack of spark.

11.03 If there is gasoline in the fuel tank and it appears that the carburetor is not getting fuel, remove the filter bowl and turn the gasoline shut-off valve on; gas should run out of the end of the fuel line where the filter bowl was attached. Make sure the air hole in the gas-tank cap is not clogged with dirt.

11.04 Improper choking—If the engine is cold and the weather is extremely cold, the engine may require considerable choking. Leave the choke fully closed until the engine spits or attempts to start when turned over. Then open the choke  $1/8$  to  $1/4$  of its travel and spin the engine again which should cause it to start. On the other hand, if the engine is warm it may not require any choking to start. If it appears the engine is flooded, leave the choke fully open and spin the engine several times.

11.05 If the engine does not fire at all or it appears there is not sufficient spark, remove the wire from the top of the spark plug and hold it about  $1/8$ " from the cylinder head (do not hold it near the carburetor) and spin the engine. A good spark should jump across this  $1/8$ " gap when the engine is turned over.

11.06 A common cause of loss of power in the engine is a clogged muffler. To check, remove muffler from engine and start the engine noting whether it develops more power with the muffler off. Another method of checking the muffler, is to remove it from the engine and pour water into the end which was attached to the engine. The water should run freely through the muffler. If the muffler is badly clogged, it should be replaced.

11.07 For additional detailed information on engine trouble, consult the operating and maintenance manual supplied with the unit.