

(2) Use a seal driver and seal sleeve to install the seals (Fig. 6–24).

(3) Install the front seal to 1/2" (12,7 mm) from the outer edge of the bearing plate (Fig. 6–25).

(4) Install the rear seal to 1/8" (3,175 mm) from the outer edge of the bearing plate (Fig. 6–26).

6–10.9 Installation of The Oil Pan

(1) Place the cylinder block on its top.

(2) Install a new gasket.

(3) Use the alignment studs and install the oil pan.

(4) Install the four bolts. Tighten the bolts to 25 ft.-lbs. (33,7 Nm) torque.

6–10.10 Installation of The Valves

Use a machine to grind the valves and valve seats. Use a hand grinder to get a smooth finish on the valve seat. After you have ground the valves. Keep the valve seat from 1/32" (0,793 mm) to 1/16" (1,587 mm) wide, thoroughly clean the valves, valve seats and valve ports.

To install the valve:

(1) Check the clearance between the valves and tappets before the valves are installed (Fig. 6–27). Refer to page 8–4 for correct clearance.

(2) When you get the correct clearance, remove the valves and apply lubricant. Install the valve springs, valve rotators, valve spring retainers and valve retainers.

6–10.11 Installation of The Cylinder Head

(1) Check the cylinder head to make sure the gasket surface is flat.

(2) Always install a new gasket when the cylinder head has been removed.

(3) Apply lubricant to the retainer bolts for the cylinder head. Install the cylinder head and gasket. Install the retainer bolts. Tighten the bolts as in figure 6–28. (Refer to page 7–1 for torque).

(4) Install a new spark plug. Use a resistor spark plug. Set the spark plug gap at .020 to .025 tighten the spark plug to correct torque.

6–10.12 Engine Breather

This engine has a "reed" type system to cause a vacuum in the engine. Clean all the parts and check that they are in good condition. Use new gaskets, reed and filter when you overhaul the engine. Figure 1–10 on page 1–5 shows the correct procedure for assembly of the breather.

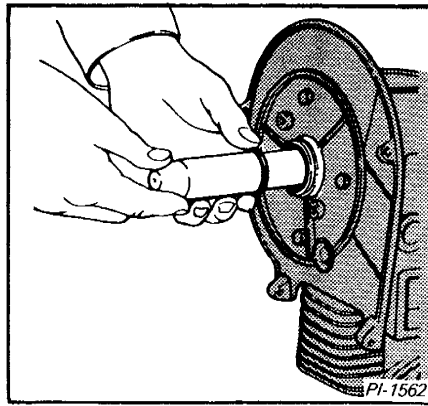


Fig. 6–24 Installation of Seals With Sleeve

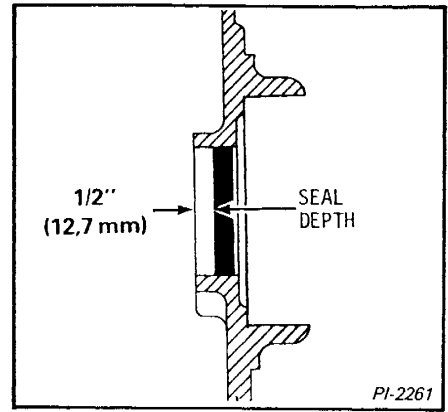


Fig. 6–25 Front Seal

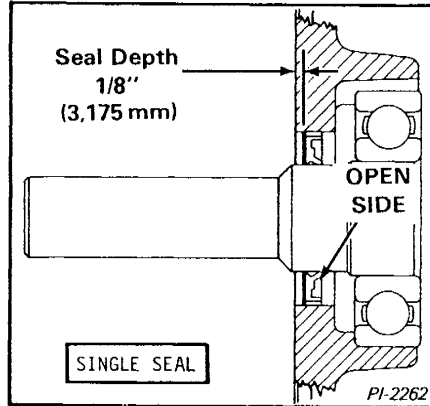


Fig. 6–26 Rear Seal

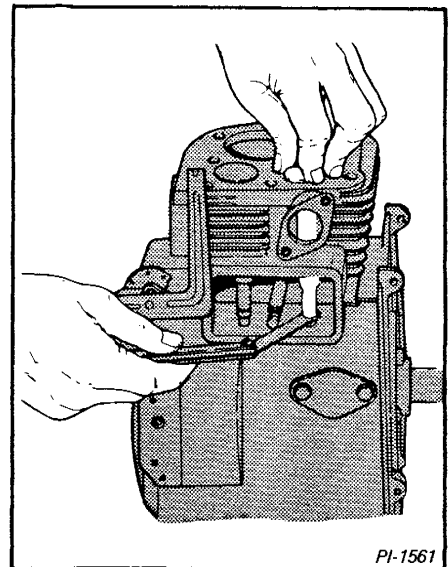


Fig. 6–27 Check Valve Tappet Clearance

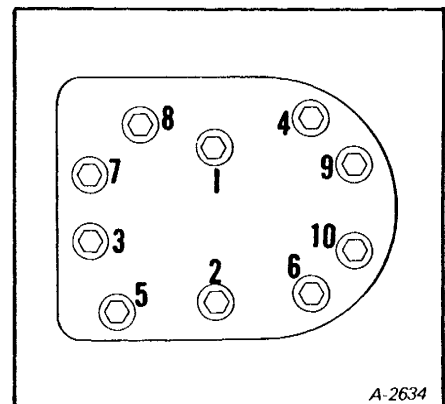


Fig. 6–28 Cylinder Head Tightening Sequence

6—10.13 Installation of The Flywheel

To install the flywheel:

- (1) Put the special washer on the crankshaft. Put the square key in the groove on the crankshaft. Install the flywheel.
- (2) Install the lock washer and nut. Put a bar between the flywheel fins to hold the flywheel (Fig. 6—29). Tighten the nut to correct torque (See page 8—3).
- (3) Install the screen to the flywheel with the four bolts.

6—10.14 Installation of The Breaker Points

- (1) Install the push rod.
- (2) Install the breaker points with the two screws.
- (3) Adjust the breaker point gap to .020. Refer to page 1—12 for service of the ignition system.
- (4) Install the grommet and cover for the breaker points.

6—10.15 Installation of The Carburetor

- (1) Use a new gasket. Install the gasket and carburetor.
- (2) Adjust the carburetor. Refer to page 6—4 for the procedure.

6—10.16 Installation of Governor Linkage

- (1) Connect the carburetor linkage to the throttle arm.
- (2) Connect the governor arm to the carburetor linkage.
- (3) Slide the governor arm onto the governor shaft.
- (4) Turn the shaft all the way counterclockwise. Pull the carburetor linkage away from the carburetor. Tighten the nut on the governor arm. Check to see that the linkage will operate freely.

6—10.17 Installation of The Blower Cover

Install the blower cover to the engine. Use the short bolts on the lower part of the blower cover. Install the blower cover in this order:

- (1) Install the cover for the cylinder head.
- (2) Install the cover for the cylinder block.
- (3) Install the cover for the blower.

6—11 TO START A RECONDITIONED ENGINE

Follow the instruction in section one for final adjustment of the engine. After the engine has been reconditioned, use non-detergent oil. Operate the engine under load for about five hours to seat the piston rings. Remove the non-detergent oil. Fill the engine with the correct type of detergent oil (See page 1—4).

6—12 CARBURETOR

Problems with the fuel system are often caused by a carburetor that is dirty or needs adjustment. If adjustment of the carburetor will not correct the problems, disassemble and clean the carburetor.

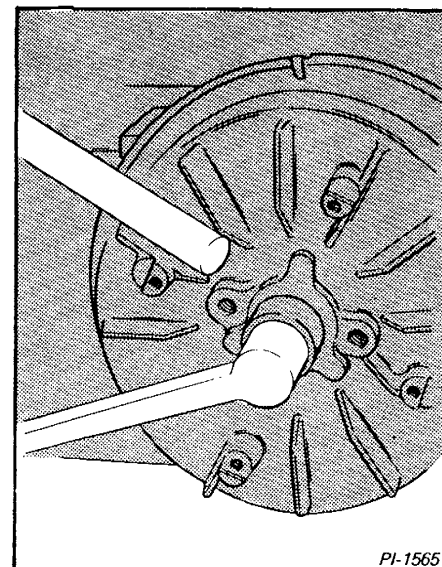


Fig. 6—29 Installation of Flywheel

6—12.1 Disassembly of The Carburetor (Fig. 6—30)

- (1) Remove the carburetor from the engine.
- (2) Remove the nut, fuel bowl and gasket. Remove the gasket from the bowl.
- (3) Remove the float pin, float needle and needle seat. Check the float for dents or leaks and for wear on the float pin or needle areas.
- (4) Remove the main and idle fuel adjustment screws and springs.
- (5) Do not remove the choke or throttle plates and shafts. Replace the carburetor when these parts have damage.

Clean all of the parts in a solvent. Use alcohol or acetone to remove gum. Be sure all deposits are removed from the bore where the throttle plates seat. Use compressed air to clean all the passages. Install a repair kit to replace any part that have wear or damage.

6—12.2 Assembly of The Carburetor

- (1) Install the needle seat and needle, float and float pin.
- (2) Check the float height. To check the float height, set the carburetor on its' top. The clearance between the machines surface in the carburetor and the float on the side opposite the float pin should be $11/64''$ (4,365 mm) plug or minus $1/32''$ (0,793 mm).
- (3) Bend the float to adjust the float height.
- (4) Install new gaskets on the bowl and bowl nut. Install the bowl and bowl nut.
- (5) Install the main fuel adjustment screw. Turn the screw in until it contacts the seat. Turn the screw out two turns.
- (6) Install the idle fuel adjustment needle. Turn the screw until it contacts the seat. Turn the screw out 1-1/4 turns.

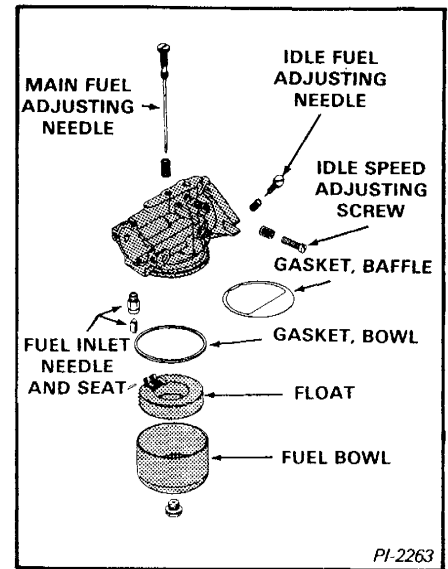


Fig. 6—30 Carburetor Breakdown

SMOKE DIAGNOSIS CHART		
PROBLEM	CAUSE	CORRECTION
Black exhaust smoke. Loss of power.	Rich mixture.*	Make adjustment to main fuel valve.
Engine does not run correctly and has much noise at high speed.	Lean mixture.**	Make adjustment to main fuel valve.
In cold weather, engine starts but has noise and stops.	Lean mixture.**	Turn main fuel valve 1/4 turn, counter-clockwise.
Engine does not run smooth or stops at idle speed.	Wrong idle valve adjustment.	Make adjustment to idle fuel valve.

* Rich Mixture — A high concentration of fuel in fuel/air mixture that goes into the cylinder.

** Lean Mixture — A low amount of fuel in fuel/air mixture that goes into the cylinder.

ENGINE

	Paragraph Number	Page Number
ENGINE, RECONDITIONING OF.....	7-4	7-7
ENGINE, SHOCK SUPPORT.....	7-3	7-7
FUEL SYSTEM.....	7-1	7-3
LUBRICATION SYSTEM.....	7-2	7-7

**ENGINE
(313)**



TROUBLESHOOTING THE 313 ENGINE

PROBLEM	CAUSE	CORRECTION
Engine will not turn over with the starter.	Battery has lost its charge.	Charge battery. Check the function of charging system.
	Loose battery connections.	Clean battery connections and cables. Tighten the clamps.
	Loose starter connections.	Tighten the connections.
	Defect in starter switch.	Make replacement of switch.
	Broken or disconnected wiring harness.	Connect or make replacement of wiring harness.
	Defective starter or solenoid.	Repair as needed.
Engine fails to start or is difficult to start.	Wrong starting procedure.	Refer to "Starting Procedure" in the Bobcat Owner's Manual.
	No fuel in the tank.	Add fuel. Remove air from fuel system.
	The fuel filter is plugged.	Replace fuel filter element.
	Air cleaner is dirty.	Service the air cleaner.
	Air in the fuel system.	Remove air from fuel system.
	Fuel tank vent in cap has restriction.	Remove the cap and clean vent.
	Fuel line has air leak or dirt or water.	Correct as required.
	Damaged electric fuel pump.	Make replacement of pump if needed.
	Defect in fuel injection system.	Check and make repairs as needed.
	Crankcase oil is thick.	Use engine oil of correct viscosity (See Section 1-3 for "Oil Specification" Chart).
	Auxiliary control is in detent position.	Take control out of detent.
Engine misses, runs irregularly or stops.	Fuel injection set wrong.	Check timing.
	Dirty fuel mixture or restriction in fuel filter or vent.	Clean as needed.
	Poor compression.	Check for loose cylinder head bolts.
	Water in the fuel.	Make replacement of fuel.
Engine overheats.	Engine is overloaded.	Operate in low range. Operate at rated RPM.
	Auxiliary control in "detent" position.	Take out of "detent".

PROBLEM	CAUSE	CORRECTION
Engine overheats (Cont'd).	Radiator grill is clogged.	Remove debris from radiator grill.
	Dirty engine oil.	Change engine oil.
	Using wrong grade of engine oil.	Change to proper grade of oil for ambient temperature.
	The crankcase is over-filled.	Drain to proper level.
	The crankcase oil level is low.	Replenish immediately.
	Restricted exhaust.	Correct as necessary.
	Injection timing wrong.	Check timing.
	Clogged crankcase breather.	Clean the breather.