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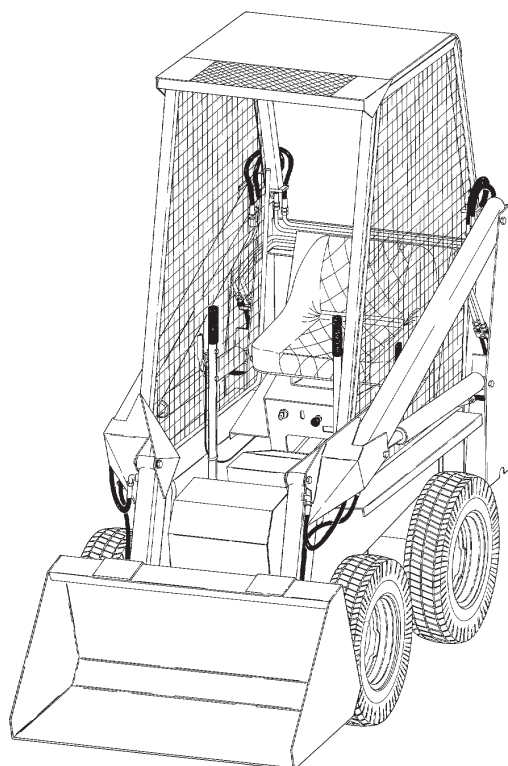
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Service Manual

(Gasoline & L.P. Gas)



**MELROE
INGERSOLL-RAND**

6545574 (2-84)

Printed in U.S.A.



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MAINTENANCE SAFETY



WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0903



Safety Alert Symbol: This symbol with a warning statement, means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

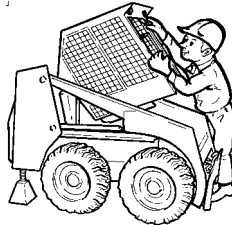
CORRECT



B-10731a

- Never service the Bobcat Skid-Steer Loader without instructions.

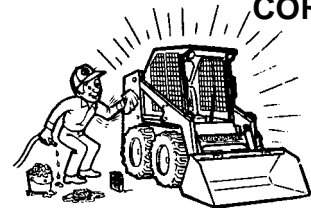
CORRECT



B-12365

- Use the correct procedure to lift or lower operator cab.

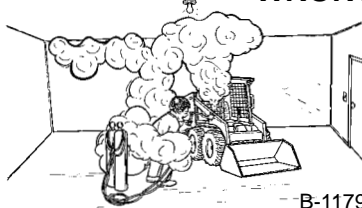
CORRECT



B-7469

- Cleaning and maintenance are required daily.

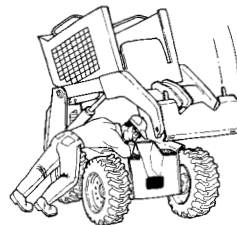
WRONG



B-11799

- Have good ventilation when welding or grinding painted parts.
- Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.
- Avoid exhaust fume leaks which can kill without warning. Exhaust system must be tightly sealed.

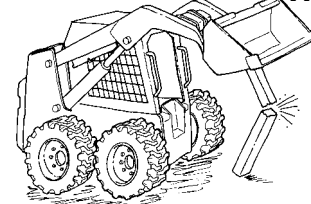
WRONG



B-15231

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause lift arms to drop. Do not go under lift arms when raised unless supported by an approved lift arm support device. Replace it if damaged.

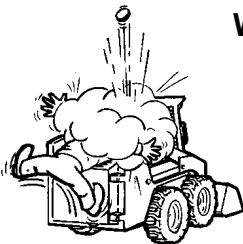
WRONG



B-15280

- Never work on loader with lift arms up unless lift arms are held by an approved lift arm support device. Replace if damaged.
- Never modify equipment or add attachments not approved by Bobcat Company.

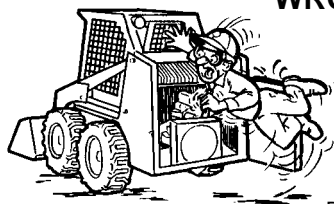
WRONG



B-6590

- Stop, cool and clean engine of flammable materials before checking fluids.
- Never service or adjust loader with the engine running unless instructed to do so in the manual.
- Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.
- Never fill fuel tank with engine running, while smoking or when near open flame.

WRONG



B-6580

- Keep body, jewelry and clothing away from moving parts, electrical contact, hot parts and exhaust.
- Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engines are running or tools are used. Use eye protection approved for type of welding.
- Keep rear door closed except for service. Close and latch door before operating the loader.

WRONG



B-6589

- Lead-acid batteries produce flammable and explosive gases.
- Keep arcs, sparks, flames and lighted tobacco away from batteries.
- Batteries contain acid which burns eyes or skin on contact. Wear protective clothing. If acid contacts body, flush well with water. For eye contact flush well and get immediate medical attention.

Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are **not** in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED BOBCAT SERVICE PERSONNEL**. Always use genuine Bobcat replacement parts. The Service Safety Training Course is available from your Bobcat dealer.



Bobcat®

FOREWORD

This manual is written in two parts: To provide instruction for proper routine servicing and adjustments of the Bobcat such as the 50 hour check and regularly scheduled periodic inspections established by the Service Schedule, and to provide detailed overhaul instructions of the power train, loader hydraulic system and general machine main frame components.

Refer to the Owners Manual for general operating instructions (Starting Procedure, Daily Checks, Bucket Operation, Minor Maintenance, etc).

INSPECTION:

A general inspection of the following items should be made whenever the machine has been serviced or repaired:

1. Check hydraulic fluid level, engine oil level and fuel supply.
2. Check for any sign of fuel, oil or hydraulic fluid leaks.
3. Lubricate the machine.
4. Check battery condition, electrolyte level and cables.
5. Check air cleaner for damage or leaks. Check element and replace if necessary.
6. Check transmission drive belt and hydraulic drive belt for wear and tension.
7. Check tires for wear and pressure.
8. Check Bob-Tach wedges for condition.
9. Check safety items for condition. (Operator Protective Guard, Seat Belt, Safety Treads on steps, Boom Stop).
10. Make a visual inspection for loose or broken parts or connections.

Advise the owner if any of the above items require service or repair.

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ROUTINE SERVICING

MAJOR OVERHAUL

TO LOCATE DESIRED SECTION PLACE THUMB ON RESPECTIVE TAB AND FLIP PAGES UNTIL CORRESPONDING SECTION TAB IS REACHED.

**ROUTINE
SERVICING**

**MAJOR
OVERHAUL**

ROUTINE SERVICING

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ROUTINE SERVICING

ENGINE

GENERAL MAIN

HYDR SYSTEM

DRIVE SYSTEM

GENERAL MAINTENANCE

Lubrication Points 1

Service Schedule 2

Tire Service 1

**GENERAL
MAIN**



TIRE INFLATION

Inflate the 5:70–16 x 12 tires to 50 PSI maximum. Do not allow the pressure to go lower than 40 PSI or the machine will be hard to turn and tire wear will be much greater.

Inflate 23:00–8.50 x 12 flotation tires to 20–25 PSI. These tires may be inflated to 50 PSI for road travel, or to provide easier steering and more efficient operation on hard surfaces.

TIRE ROTATION

If both rear or front tires wear excessively, rotate them to the opposite end of the machine as shown in Fig. 1. Excessive wear can be caused by improper tire inflation or by operating the machine with the front wheels held off the ground by the bucket.

TIRE REPLACEMENT

If you need to replace a damaged or worn tire, it is important that the replacement be the same size as the tires still on the Bobcat. Two different size tires on the same side of the machine will cause undue drive chain and tire wear, and loss of power. To replace two worn tires, install the new ones on the same side of the machine. Put the two used tires on the opposite side.

If tires slip on the rim while loading bucket, increase inflation pressure slightly and be sure to keep all four wheels on the ground while loading.

LUBRICATION

Fig. 2 shows the grease fitting locations. Use a good lithium base grease on all fittings.

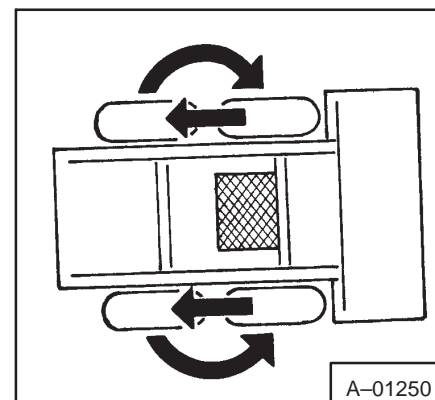


Fig. 1 Tire Rotation

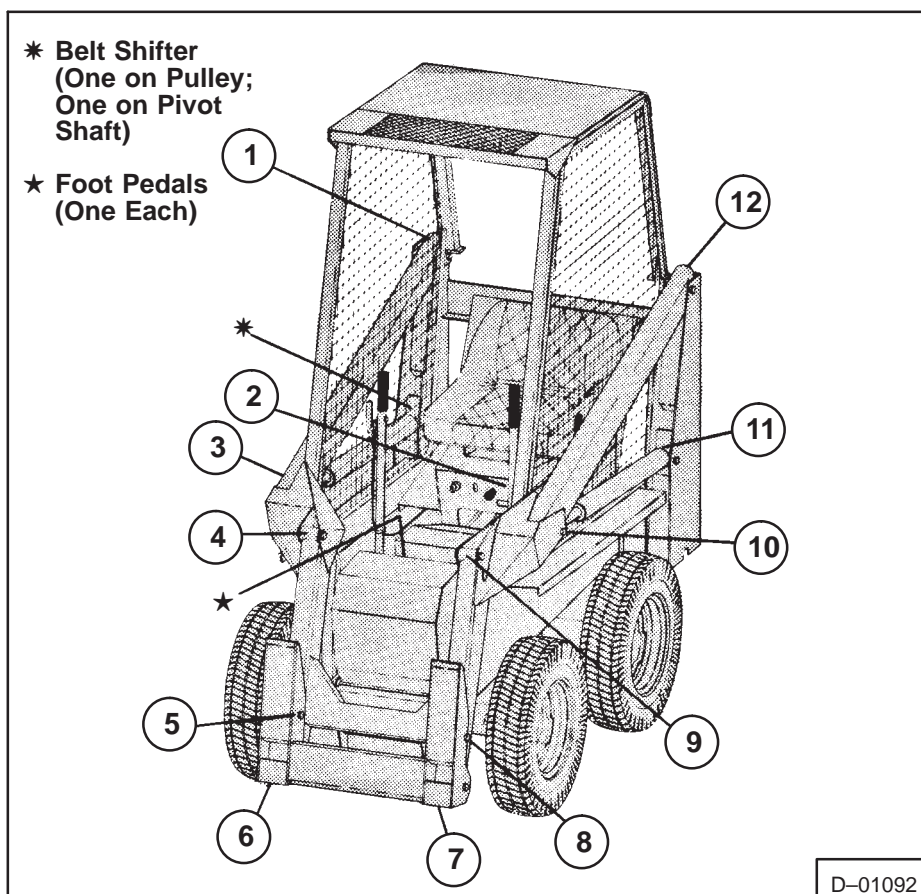


Fig. 2 Lubrication Points

GENERAL MAINTENANCE

Maintenance work must be done regularly. Failure to do so will result in damage to the machine or its engine. The service schedule has been prepared as a guide to proper maintenance of the Bobcat loader. Do not depart from this schedule unless it is to shorten the intervals due to extremely hot, cold, dusty or corrosive operating conditions.

		HOURS						
		8-10	25	40-50	80-100	200	300	500
<input type="checkbox"/> Engine Air Cleaner	Clean the element (if required).							
All Loader Pivots	Grease fittings until excess shows.							
Control Pedals & Levers	Grease fittings until excess shows.							
Engine Oil	Check and add as needed.							
<input type="checkbox"/> Engine Air Inlet Screen	Check and clean.							
Cooling Fins & Shroud	Backflush with air as required.							
Engine Oil	Change.							
Tires	Check inflation.							
Hydraulic/Transmission Fluid	Check level.							
ΔHydraulic Fluid Filter	Replace element after first 50 hours of operation & every 250 hrs. thereafter.							
Drive Chains	Adjust to 1/4" freeplay.							
Battery	Check electrolyte level.							
*Boom, Cylinder, Bob-Tach Pivots	Tighten the pivot bolts to 160 ft.-lbs. Torque. (1st 50 hours only)							
Belt Pulleys	Check to be sure the pulley mounting screws or nuts are tight.							
Crankcase Breather	Inspect. Service as required.							
Steering Clutches	Adjust when lever exceeds 3" from neutral in either direction.							
Carb Sed. Bowl	Remove and clean.							
Spark Plug	Remove, clean and regap. Retorque.							
Breaker Points	Remove cover. Check contacts. Replace if pitted.							
Engine Air Cleaner	Replace element (if required).							
Engine Cylinder	Clean carbon from cylinder head.							
Engine Shroud	Remove to clean cooling fins.							
Spark Plug	Replace.							
Ignition Timing	Check and retune as necessary.							
Engine Valve Tappets	Check clearance. Adjust if required.							
Hydraulic/Transmission Fluid	Replace fluid.							
Drive Belts	Check for Wear.							

*Check every 200 hours thereafter.

☐ On extremely dusty operations, clean more often as needed.

ΔChange after first 50 hours. Thereafter, change every 500 hours.

ENGINE SERVICE

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ENGINE



CHANGING ENGINE OIL



WARNING

On new engines, run-in (break-in) has been completed at the factory. Do not use break-in or non-detergent type oils in a new engine.

On a new or rebuilt engine, change after the first 5 hours of operation. Thereafter, change every 25 hours under normal conditions. Under dusty, dirty conditions, change oil more often.

Drain the oil when the engine is hot. To drain oil, remove the 3/4" plug on the elbow at the rear of the machine, below the grill. After oil is drained, replace the plug and fill with 2 quarts of a good quality detergent oil of correct viscosity (see chart below). Check the oil level. Do not overfill.

OIL SPECIFICATIONS

Use a good quality detergent motor oil that meets API service classification SC. Use the proper SAE viscosity for expected temperature conditions at the time of starting, not for the highest temperature expected during the work day (see chart below).

AIR TEMPERATURE	OIL VISCOSITY	OIL TYPE
ABOVE 30° F.	SAE 30	API SERVICE SC
30° F. TO 0° F.	SAE 10W – 30	API SERVICE SC
BELOW 0° F.	SAE 5W – 20	API SERVICE SC

ENGINE AIR CLEANER (Fig. 3)

Remove the element and tap it lightly on a flat surface to remove loose surface dirt. Replace the element if dirt does not drop off easily. Do not wash the dry element in any kind of liquid or attempt to blow dirt off with air hose as this will damage the filter element.

Handle the element carefully, and check the following when installing:

1. Back plate must be securely tightened to the carburetor. Replace back plate if it is bent or cracked.
2. Gasket surfaces of element must be flat against back plate and cover to seal effectively.
3. A vinyl washer is bonded to the wing nut. Make certain that it is intact or water or dirt may enter. Tighten the wing nut finger tight.
4. Service the pre-cleaner by washing it in soap and water, rinse and squeeze out excess water, let it dry before re-installing. Do not oil this type of pre-cleaner.

CRANKCASE BREATHER (Fig. 4)

A crankcase reed type breather is used to maintain a slight vacuum in the crankcase. All parts must be clean and in good condition. A faulty breather valve may cause high engine temperatures and oil leaks at engine seals.

AIR COOLING SYSTEM

Air is drawn into the cooling shroud by fins provided on the flywheel. The air screen and cooling fins must be kept clean and unobstructed at all times. Never operate the engine with the blower housing or cooling shrouds removed. Removal results in improper air circulation.

To clean cylinder head fins, first remove the rotating screen, then remove the blower housing (attaching parts must also be removed from the blower housing before it can be removed).

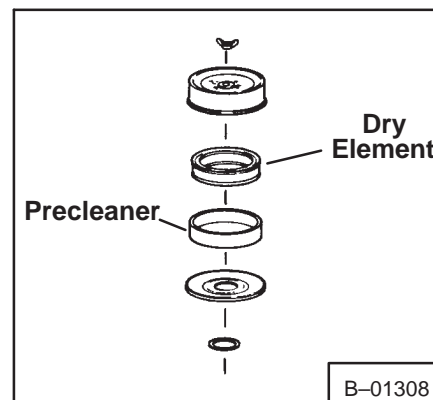


Fig. 3 Engine Air Cleaner

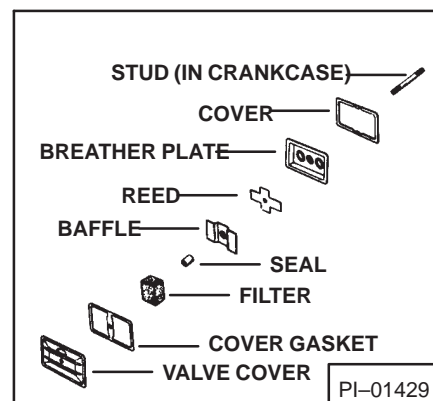


Fig. 4 Crankcase Breather

CARBURETOR

Improper carburetor setting can cause fouled spark plugs, overheating, excessive valve wear or other problems.

If black exhaust smoke is noted, check the air cleaner first, since an over rich mixture is usually caused by poorly serviced, clogged air cleaner element, not an improperly adjusted carburetor.

PROBLEM	CAUSE	CORRECTION
Black sooty exhaust smoke. Engine sluggish.	Mixture too rich.	Readjust main fuel needle.
Engine misfires and backfires at high speed.	Mixture too lean.	Readjust main fuel needle.
Engine starts, sputters and dies under cold weather starting.	Mixture too lean.	Turn main fuel adjustment 1/4 turn counterclockwise.
Engine runs rough or stalls at idle speed.	Improper idle adjustment.	Readjust idle fuel needle.

If any of the above problems exist, follow these procedures:

1. Stop the engine. Carefully turn the MAIN FUEL and IDLE FUEL NEEDLE adjusting screws all the way in (clockwise) until they bottom (Fig. 5). DO NOT FORCE SCREWS as this will damage needle valves
2. For initial adjustment, turn the MAIN FUEL screw 2 TURNS counterclockwise. Turn the IDLE FUEL screw 1-1/4 TURNS counterclockwise (out)
3. Start the engine and operate at normal speed until its normal operating temperature is reached.
4. MAIN FUEL ADJUSTMENT – With the engine running a full throttle and full load, turn the MAIN FUEL screw in (clockwise) until the engine slows down (lean). Note the position of the screw. Turn the needle out (counterclockwise) until the engine regains speed and then again slows down (over rich). Turn the needle back in until it is positioned halfway between the lean and over rich settings. If adjusted properly, the engine should accelerate smoothly with a steady governor action.
5. IDLE FUEL ADJUSTMENT – Operate the engine at idle speed of about 1000 RPM. Adjust the IDLE SPEED screw until you attain this speed. Check with a tachometer. Turn the IDLE FUEL screw in (clockwise) until engine slows down and idles rough. Then turn the screw out until the engine speeds up and idles smoothly at the desired engine speed.
6. Since the MAIN FUEL and IDLE FUEL adjustments have some effect on each other, recheck the engine and make final adjustments as necessary to achieve smoothest operation.

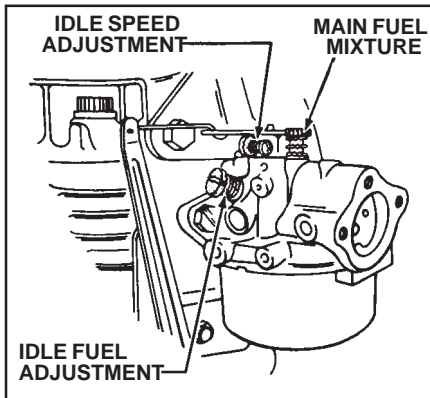


Fig. 5 Carburetor Adjustment

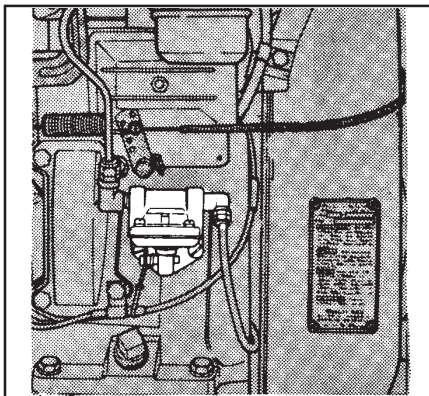


Fig. 5A Fuel Pump

NOTE: If these adjustments do not remedy carburetor problems, carburetor reconditioning may be necessary.



WARNING

Do not use force on adjustment needle screws.

FUEL PUMP (Fig. 5A)

The fuel pump operates off a cam on the camshaft. The external lever is for hand priming. A fuel pump which will not deliver fuel is usually due to a ruptured diaphragm within a pump. Replace the faulty pump by removing fuel lines and mounting screws. Use a new mounting gasket when installing a new pump.

LP GAS FUEL SYSTEM

On LP gas engines a sealed fuel system includes a carburetor, primary regulator and a secondary regulator. LPG is stored under pressure up to approximately 200 PSI, depending on the ambient temperature. Fuel is withdrawn under pressure from the tank as vapor and the primary regulator reduces the pressure to 4 to 8 ounces per square inch.

An electrically operated "Filter Lock" is installed on the fuel line to the primary regulator (Fig. 6). This lock opens when the ignition switch is turned on and closes when the switch is turned off.

The secondary regulator (Fig. 7) withholds gas until a vacuum, created by turning the engine over at a continuous rate, opens the regulator valve allowing fuel to enter the carburetor.

The carburetor is adjusted at the factory and under normal operating conditions will require no readjustment. If adjustment is necessary because of gas valves or air conditions, use the following procedure:

1. Open the fuel supply valve on the fuel tank.
2. Depress the primer button on the secondary regulator for an instant so that enough fuel will enter the carburetor for starting (Fig. 7).
3. Open the throttle fully and start the engine.
4. After the engine has been allowed to warm up, return the throttle to idle position and adjust the idle setting. The idle adjustment is made on the carburetor (Fig. 8).
5. Set the engine at full throttle and put under a full load. Adjust the load adjustment screw for maximum engine RPM (Fig. 8). If possible, a tachometer should be used for final power adjustment.

Refer to the Engine Overhaul Section of this manual for repair of the carburetor or regulators.

IGNITION SYSTEM

Hard starting, roughness, low power and erratic operation are often attributed to faulty ignition. All components must be in top condition. The ignition spark must be properly timed.

OPERATIONAL TEST

Remove the high tension lead at the spark plug. Hold the end terminal about 1/16" to 1/8" away from the cylinder. Crank the engine, if a sharp, snappy spark occurs, the trouble is apparently not in the ignition coil, condenser or breaker points. It could be caused by a faulty spark plug. If no spark or a very weak spark occurs, ignition trouble is indicated.

SPARK PLUG

Always clean the area around a spark plug before removing to prevent dirt falling into the engine. Remove the plug and note its condition. Plugs fail for various reasons. Often the porcelain insulator cracks or becomes coated with dirt. This causes the ignition impulse to travel from the center electrode to ground without jumping the spark gap. As an engine operates, the electrodes are gradually burned or worn away. In time, the gap becomes so wide that the spark cannot jump the gap and the engine misses.

Every 100 hours remove the plug, check its condition and reset the gap. Good operating conditions are indicated if a plug has a light coating of gray or tan deposit. A dead white, blistered coating could indicate overheating. A black (carbon) coating may indicate an "over rich" fuel mixture caused by a clogged air cleaner or improper carburetor adjustment. DO NOT sandblast, wire brush or scrape a plug which is in poor condition, use a new plug. Set the spark gap at .025 in. Tighten the plug to 27 ft.-lbs. torque. The standard spark plug is an H-10, 14 mm size. Replace the spark plug after 300 hours of operation.

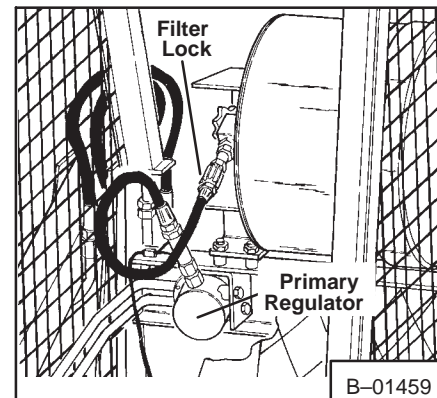


Fig. 6 Filter Lock & Primary Regulator

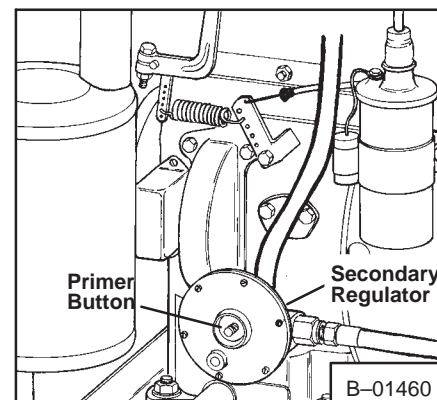


Fig. 7 Secondary Regulator & Primer Button

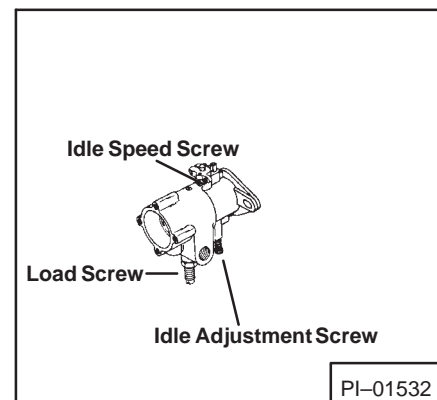


Fig. 8 LP System Carburetor

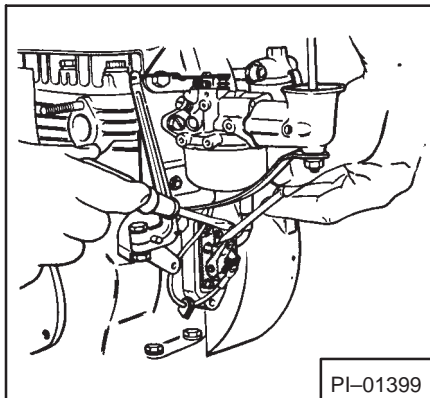


Fig. 9 Setting Breaker Points

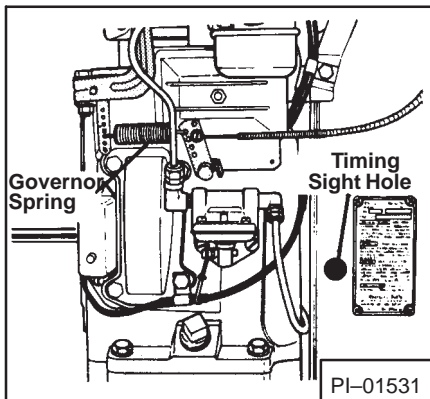


Fig. 10 Timing Sight Hole

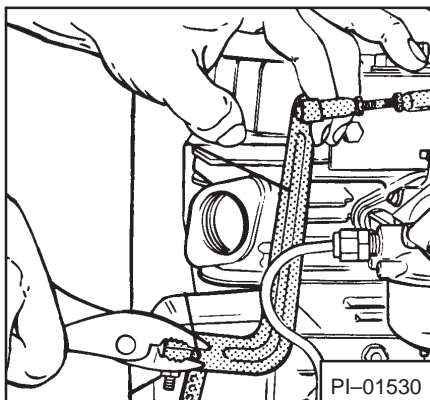


Fig. 11 Adjusting Governor

BREAKER POINTS

If points are burned or badly oxidized, little or no current will pass. As a result, the engine may not operate at all. If it does run it is likely to miss, particularly at full throttle.

Always replace badly burned or pitted breaker points. A certain amount of build-up or metal transfer occurs under normal operating conditions; however, if this occurs too frequently and becomes excessive, the condenser may be a fault. Slightly pitted points can be dressed down with a point file (Fig. 9). This should be done only as a temporary field fix. Replace points at the first opportunity after filing. If the points are oxidized, rub a piece of coarse cloth between the surfaces. Clean dirty or oily points with a cloth, but be sure not to leave lint between the surfaces. Set clearance at .020 in.

CONDENSER

If the condenser shorts out, the coil will be unable to produce output voltage. On the other hand, if it opens or decreases in capacitance, the output voltage will be greatly reduced and the ignition points will burn excessively. If badly burned breaker points occur too frequently, the condition of the condenser should be suspected. If the condenser has too small capacitance, metal will transfer from the stationary contact to the movable contact. If its capacitance is too large, the metal will build up on the stationary contact.

IGNITION TIMING PROCEDURE

The engine is equipped with a timing sight hole in the blower housing. The timing marks can be seen thru this hole. Two marks are stamped on the flywheel. The "T" mark indicates Top Dead Center (TDC), while the "S" mark indicates the spark point, which is 20 degrees before TDC. You can rotate the flywheel until the "S" mark can be seen thru the sight hole and scratch a mark on the air screen and blower housing for easier use and a quick visual check of the timing.

When you install new points:

1. Set the points at .020 gap.
2. Rotate the engine. The "S" mark should be in the sight hole when you hear the spark as the points open.

When using a timing light to time the engine, the following procedure should be used:

1. Start the engine and run it at 1200 to 1800 RPM. Aim the timing light into the sight hole (Fig. 10). The light should flash just as the "S" mark is centered in the sight hole.
2. If the timing is off, remove the breaker point cover. Loosen the gap adjusting screw and shift the breaker plate until "S" mark is exactly centered. Retighten the adjusting screw and replace the cover.

GOVERNOR

Initial Adjustment

The governor was adjusted at the factory and no further adjustment should be necessary unless the arm or linkage works loose or becomes disconnected. If this happens, make the following initial adjustment with the engine shut off:

1. Loosen (do not remove) the nut which holds the governor arm to the cross shaft (Fig. 11).
2. Grasp the end of the cross shaft with pliers, turn it in a counterclockwise direction as far as it will go (the tab on the cross shaft will stop against the rod on the governor gear assembly, inside the crankcase. Be careful excessive pressure can break the tab off the cross shaft).
3. Pull the governor arm as far away from the carburetor as possible, while holding the cross shaft. Then tighten the nut holding the arm to the shaft.

After making the initial adjustment, start the engine and check the operating speed with a tachometer. Maximum allowable speed is 3100 RPM. **DO NOT EXCEED THIS SPEED!**

Speed Adjustment

Set the throttle at full RPM. Loosen the cap screw on the high speed stop and set the stop to limit the throttle cable travel at 3100 RPM. Tighten the cap screw.

Sensitivity Adjustment

If a large speed drop occurs when load is applied to the machine, the governor should be set for greater sensitivity. This may be done by placing the governor spring (Fig. 10) into holes further apart on the governor arm bracket and speed control bracket.

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