SERVICE INSTRUCTIONS

GENERAL

Service instructions in this section are limited to parts and components other than the engine and hydraulic pump. Other major components should be serviced by representatives of the respective manufacturers as follows:

ENGINE -
Briggs and Stratton Vanguard OHV
Model 350447-0084-01

The engine should be serviced only by *Briggs & Stratton Industrial and Construction Equipment Dealers*. *Lawn and Garden Dealers* may not be able to offer warranty work for this application. It is recommended to contact a *Central Sales & Service Distributor* for the nearest authorized Briggs and Stratton representative or contact Briggs and Stratton at 1-800-233-3723.

HYDRAULIC PUMP -
John S. Barnes (Vickers) 65-5-5-A13R9-23-R
or
Commercial Intertech
P5B193BECASPL97CACSPL1

DASH PANEL & CONTROL BLOCK ASSEMBLY

If it is necessary to remove the valve assembly, the fuel tank must first be removed in order to gain access to the hose fittings and wiring located on the back of the panel. Otherwise, many components of the panel and valve can be serviced by removing the grille (13, fig. 2).

NOTE: Disconnect the battery terminals before servicing the control block assembly or any dash panel components.

VALVE SPOOL
(See figure 5)

1. To service the valve spool first remove the control rod (8).

2. Remove the grille (18).

3. Remove the elbow swivels (1).

4. Remove the retaining ring (6) and the spool washer (5).

5. Remove the capscrews which hold the panel (3) in place and then lift the panel forward away from the control block.

6. The valve spool is removed from the control block by removing the retaining ring (23) and pulling the spool out of the valve block.

5. Inspect the finish of the valve spool and bore of the control block. If scored or scratched, replace the part(s).

6. Reverse the above procedure to reinstall the above components.

RELIEF VALVE **(See figure 5).**

DESCRIPTION: The relief valve allows oil to by-pass to the reservoir when the system pressure reaches a pre-set setting. The relief valve is set to by-pass at a "cracking" pressure of 2100-2300 psi/145-158 bar.

While adjustments can be made to the relief setting (see TESTING and TROUBLESHOOTING), the parts of the relief valve are not serviceable.

To adjust or remove the relief valve, follow steps 1 through 5 under VALVE SPOOL found earlier in this section. Then follow the steps under TESTING and TROUBLE SHOOTING (found later in this manual) to adjust the relief valve.

ENGINE & RELATED COMPONENTS

ENGINE **(See figure 1 and 2).**

Most engine servicing can be performed without removing the engine. Consult with your Briggs and Stratton Dealer regarding engine repairs.

1. Remove both battery connections and the battery strap (42, fig. 2) and remove the battery.

2. To remove the engine, the fuel tank and wheels must first be removed. See instructions in this section for removing the fuel tank.

3. Remove the five screws (14, fig. 1) holding the cooler mount (18, fig. 1) to the blower housing.

4. Remove the throttle cable connection (50, fig. 2) at the engine.

5. Remove the choke cable (15, fig. 1) connection at the engine.

6. Detach wires from the engine and move them away from the engine.

7. Detach the fuel line from the fuel filter.

8. Remove the four capscrews (30, fig. 1 & 45, fig. 2) holding the engine to the frame and then push the engine forward.

9. Remove the coupling sleeve (31, fig. 2).

10. Slide the engine, with exhaust and blower housing attached, out the fuel tank side of the frame.

11. Reverse the procedure to reinstall the above components.

12. After installing the engine, adjust the coupling so the sleeve has 1/32-1/16 inch end play.

13. Adjust the actuator cylinder by loosening the cylinder clamps and sliding the cylinder forward or back.

IMPORTANT

Switch connections must not be changed. The Magtronic Ignition system will be damaged if wires are not connected correctly. Refer to the wiring diagrams for the appropriate model.

EXHAUST SYSTEM (See figure 1).

The muffler (9) cannot be removed without first removing the air duct weldment (25). Removal of the air duct weldment requires engine removal.

ELECTRICAL

Refer to the wiring diagram for the correct connections, wire sizes and colors.

BLOWER HUB & SHAFT EXTENSION, BLOWER WHEEL, INLET RING, & BLOWER HOUSING (See figure 1).

1. Remove the engine as described earlier in this section.

2. To remove the blower wheel, remove the five screws (38) around the housing inlet ring (39) and remove the ring.

3. Remove the blower wheel (35) with the blower hub and shaft extension (33) by loosening the two set screws (32).

4. Remove the four capscrews (19) holding the blower housing (21) to the engine. Remove the housing.

5. Reverse the procedure to reinstall the above components and observe the following added procedures.

• Install capscrews (19) which hold the blower housing to the engine using Loctite™ 242.

• Install capscrews (36) which hold the blower wheel to the blower hub and shaft extension using Loctite™ 680 and torque to 80-100 lb. in.

OIL COOLER (See figure 1, 2 and 7).

1. Remove the grille (11, fig. 2).

2. Remove the hoses (1 & 15, fig 7)

3. Remove the two capscrews (41, fig. 1) and lift the cooler out.

4. Reverse the procedure to reinstall the above components.

HYDRAULIC PUMP (See figure 2).

1. Remove the grille (18).

2. Disconnect the pressure and supply hoses at the pump and tie them in a position to minimize fluid loss.

3. Remove the 2 capscrews (24) and then remove the pump.

4. Reverse the above procedure to reinstall the pump and observe the following step.

• Insure the coupling sleeve has 1/32-1/16 inch end play.

FRAME ASSY & RELATED COMPONENTS

FUEL TANK (See Figure 2).

1. If the fuel tank contains fuel, take extreme precautions to remove the fuel into approved containers. Do not attempt to service the fuel tank in unventilated areas or in areas containing electric or natural gas appliances which may start-up unexpectantly or in shop areas where grinding or welding is present, all of which can ignite the fuel vapors.

1. Remove the grille (18) by removing the 4 capscrews (10).

2. Remove the fuel line from the tank by pulling it out.

3. The fuel tank can now be removed by removing the 3 capscrews (1) and the tank support tab (4).

4. Thoroughly clean the tank and replace the fuel filter.

5. Use the reverse procedure to reinstall the fuel tank.

HYDRAULIC TANK (See Figure 2, 6 & 7).

1. First remove the hydraulic fluid from the tank by either pumping it out with a portable drill pump or draining it into a container.

2. Remove the grille (18, fig. 2) by removing the 4 capscrews (10, fig. 2).

2. Remove the hoses 6, 8 & 12, fig. 7) by loosening the hose clamps.

4. The hydraulic tank can now be removed by removing the 3 capscrews (1, fig. 2) and the tank support tab (33, fig. 2).

HYDRAULIC FILTER (See figure 6).

5. The filter can be removed from the filter block (13) by removing 4 capscrews (2), lifting off the filter top (4), and then lifting out the oil filter (6).

6. The gasket (17) can be serviced by removing 4 capscrews (12) while holding the filter grip plate (18) in place and then lifting off the filter block (13). Lift out the filter grip plate and set aside.

7. Reinstall the grip plate, gasket, filter block, oil filter and filter top by reversing the removal procedure.

8. Reinstall the hydraulic tank by reversing the removal procedure.

CHOKE CABLE ASSY (See figure 1 & 3).

1. The choke cable assembly is removed by removing the sheet metal screws (14, fig. 1) and the choke cable anchor capscrew.

ACTUATOR ASSY (See figure 2 & 4).

!. Remove the screen (18, fig. 2).

2. Unscrew the hose fitting on the hose (11, fig. 4) at the valve.

3. Remove the throttle cable (50, fig. 2) at the carburator.

4. Remove the screen 11, fig. 2).

5. Remove the capscrew (8, fig. 2) and lift the actuator assembly out.

6. Inspect the piston and cylinder for scratches. If any are present, replace the parts. Replace all seals.

7. Reverse the above procedures to reinstall the actuator assembly.

8. Adjust the actuator cylinder by loosening the cylinder clamps and sliding the cylinder forward or back.

TESTING and TROUBLESHOOTING

GENERAL

Tests and adjustments should be performed periodically to ensure the power unit is operating at maximum efficiency. A hydraulic circuit tester is recommended for use in isolating problems in both the engine and hydraulic system prior to any power unit disassembly.

TESTING THE HYDRAULIC CIRCUIT.

The following tests can be performed to ensure that the hydraulic pump is supplying the correct flow and pressure and that the system relief valve is operating properly.

During these tests, make sure the engine is warm and operating smoothly. If test results are not as specified, refer to the troubleshooting table given in this section for possible causes. Also, refer to the section on service instructions for repair or replacement of defective parts.

TESTING H.T.M.A. (Hydraulic Tool Manufacturers Association) TYPE I CIRCUITS

An **H.T.M.A. Type I Circuit** is a circuit that produces 5 gpm/19 lpm at 2000 psi/140 bar. When the throttle actuator is set in the "**5**" position, the power unit produces 5 gpm/19 lpm at 2000 psi/140 bar.

1. Set the circuit control lever to the OFF position.

2. Connect the circuit tester across the tool hose ends.

3. Fully open the tester restrictor valve.

4. Start the engine and allow it to run until warm.

5. Set the engine Throttle Control to the "**5**" position.

6. Place the circuit control lever to the ON position. With the engine at medium speed, the test flow gauge should read 5-6 gpm/19-23 lpm.

7. Slowly close the restrictor valve while watching the pressure gauge. The flow rate should begin at 5 gpm/19 lpm and will drop slightly as the pressure gauge rises. At a pressure of 1900 psi/133 bar the flow rate should read 5 gpm/19 lpm. If it does not, the throttle governor may require adjustment. If a pressure of 1900 psi/133 bar cannot be obtained, the relief valve may require adjustment.

Since the engine is not operating at full rpm, testing or adjusting the relief valve setting is not recommended. Test the relief valve according to the instructions located later in this manual.

TESTING H.T.M.A. (Hydraulic Tool Manufacturers Association) TYPE II CIRCUITS

An **H.T.M.A. Type II Circuit** is a circuit that produces 8 gpm/30 lpm at 2500 psi/172 bar. When the throttle actuator is set in the "**8**" position, the power unit produces 8 gpm/30 lpm at 2500 psi/172 bar. If the throttle actuator is set in the "**AUTO**" position, 8 gpm/30 lpm at 2500 psi/172 bar can also be obtained.

1. Set the circuit control lever to the OFF position.

2. Connect the circuit tester across the tool hose ends.

3. Fully open the tester restrictor valve.

4. Start the engine and allow it to run until warm.

5. Set the engine Throttle Control to the "**8**" position.

6. Place the circuit control lever to the ON position. With the engine at high speed, the test flow gauge should read 8-9 gpm/30-34 lpm.

7. Slowly close the restrictor valve while watching the pressure gauge. The flow rate should begin at 8 gpm/30 lpm and will drop slightly as the pressure gauge rises. At a pressure of 1900 psi/133 bar the flow rate should read 8 gpm/30 lpm. If it does not, the throttle governor may require adjustment. If a pressure of 1900 psi/133 bar cannot be obtained, the relief valve may require adjustment.

Test the relief valve according to the instructions located later in this manual.

TESTING THE THROTTLE ACTUATOR

1. Set the circuit control lever to the OFF position.

2. Connect the circuit tester across the tool hose ends.

3. Set the engine Throttle Control to the "AUTO" position.

4. Fully open the tester restrictor valve.

5. Start the engine and allow it to run until warm.

6. Place the circuit control lever to the ON position.

7. Slowly close the restrictor valve while watching the pressure gauge. As the gauge reaches 600 psi/42 bar, the engine should start to SPEED up.

8. Open the tester restrictor valve while watching the pressure gauge. The engine speed should start to SLOW as the pressure drops below 150 psi/11 bar.

If the engine speed does not react as indicated above, the throttle control or linkage may require adjustment. Check for free movement. Make sure the lever movement near the actuator cylinder is sliding correctly. Movement of the actuator lever can be tested by manually pushing the actuator lever. Notice if the linkage feels sticky or the engine fails to speed up. If neither problem is evident, the actuator cylinder or pressure line from the control valve to the cylinder must be faulty. Repair as required.

ADJUSTING SPEED ACTUATOR CONTROL

1. Without changing the engine rpm, loosen the hose clamp on the actuator cylinder and slide the cylinder back or forward until the AUTO hole in the cylinder lever aligns with the corresponding hole in the actuator control weldment. Remove the faspin and set the actuator control weldment to AUTO.

2. While the engine is idling, use a long phillips screwdriver to turn the engine governor adjustment screw about one-quarter turn clockwise to increase engine rpm or counter-clockwise to decrease engine rpm.

TESTING & SETTING THE RELIEF VALVE

The relief valve is set to "crack" open at approximately 2100-2300 psi/145-158 bar and should be fully open at 2500 psi/172 bar. These settings are tested as follows:

1. Set the circuit control lever to the OFF position.

2. Connect the circuit tester across the tool hose ends.

3. Set the engine Throttle Control to the "AUTO" position.

4. Fully open the tester restrictor valve.

5. Start the engine and allow it to run until warm.

6. Place the circuit control lever to the ON position.

7. Slowly close the restrictor valve while watching the pressure gauge. When the gauge reaches 2000 psi, continue to close the restrictor and watch closely for a small drop in pressure. This small drop in pressure should occur between 2100-2300 psi/145-158 bar and indicates the pressure at which the relief valve "cracks" open. Continue to close the restrictor. The pressure should not exceed 2500 psi/172 bar when the restrictor is fully closed. If the above settings are incorrect, the relief valve requires adjustment or replacement as follows:

a. Remove the top grille.

b. Remove the capscrews holding the dash panel in place and tilt the dash panel forward to gain access to the relief valve.

c. Remove the cap to the relief valve and note the screw slot. The relief valve is adjusted by turning the screw clockwise to increase pressure or counter-clockwise to decrease pressure. Adjust the relief valve until a cracking pressure of approximately 2100-2300 psi/145-158 bar is achieved and then repeat the test.

d. If "cracking" pressure between 2100-2300 psi/145-158 bar cannot be achieved, and/or if a maximum pressure of 2500 psi/172 bar cannot be achieved, replace the relief valve and repeat the test.

TROUBLESHOOTING

If symptoms of poor performance develop, use the chart on the following page to help isolate the problem.

TROUBLE SHOOTING CHART

PROBLEM	CAUSE	REMEDY
Engine will not run.	Ignition switch off.	Set the switch to "ON" before pushing control lever to the left.
	Battery not connected.	Attach battery cables, check wires.
	Weak battery.	Test battery, charge or replace.
	No fuel.	Add Fuel.
	Fuel filter plugged.	Replace fuel filter.
	Defective spark plugs.	Remove plugs, check gap, clean or replace.
Fluid blowing out of fluid reservoir vent.	Defective pump seal.	Replace pump seal.
	Hydraulic tank overfilled.	Correct the fluid level.
Hydraulic tool won't operate.	Control lever setting incorrect.	Set control lever to "TOOL ON".
	Incorrect hose connection to tool.	Make sure the tool hose circuit goes from right (pressure) fitting to tool and back to the left fitting (return). Fluid always flows from the male to female fittings.
	Quick disconnect fittings defective.	Detach from hose, connect set together and check for free flow.
	Hydraulic fluid level low.	Check for correct fluid level. Fill using the recommended fluid.
	Pump coupling defective.	Check power unit between pump and cooler. The coupler should slide only .150 inches between blower and pump.
	Relief valve stuck open.	Adjust or replace valve.
	Suction hose kinked.	Make sure suction hose from fluid reservoir to pump inlet has a smooth curve.
	Automatic throttle not working	If tool operates at low engine rpm, set throttle control manually, to 5 or 8 (per tool rating). Later, have the throttle control serviced.

SPECIFICATIONS

Engine: ..... 18 hp Vanguard IC V-twin (OHV)

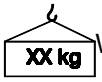
Engine Lube System: ..... Pressure Lube

Capacity ..... 8 gpm @ 2500 psi / 30 lpm @ 172 bar

Length: ..... 33 in. / 84 cm

Width: ..... 21 1/2 in: / 55 cm

Height: ..... 29 in. / 73.6 cm



Weight (Dry): ..... 216 lbs / 100 kg

Fuel Tank Capacity: ..... 4.2 gal. / 15 ltr

Estimated Gas Consumption Per Hour ..... 1.3 gal / 4 ltr

Hydraulic Reservor Capacity: ..... 2.7 gal. / 11 ltr

Relief Valve "crack" setting ..... 2100-2300 psi / 145-158 bar

Full relief setting ..... 2500 psi / 172 bar

EHTMA Category ..... "D" (30 lpm @ 138 bar)

Noise Level ..... Lwa 101

Vibration Level ..... N/A