ELECTRO-MAGIC

GRIME FIGHTER

MODEL 3000-5 GED

HOT HIGH
PRESSURE
WASHER

SPECIFICATIONS

OPERATING PRESSURE	3000 PSI
DISCHARGE CAPACITY	270 GPH
TEMPERATURE	Up to 200°F
WATER RESERVOIR CAPACITY	6 Gal. Constant Feed, Float Controlled
COIL SIZE	7/8" OD x 221' Helical, Wound Steel Tubing
WATER PUMP	Triplex Oil Bath
PUMP MOTOR	18 HP, Electric Start, Gas Engine
PUMP DRIVE	Belt
HOSE	1/2" ID x 50' Hi-Pressure
GUN	Trigger
HIGH-PRESSURE ORIFICE SIZE	.0005 .1505 .2505
BURNER	Oil Fired, Automatic 10,000 volt Ignition, Fuel Filter Standard
BURNER NOZZLE SIZE	2.50 - 90° Angle
FUEL	Kerosene, No. 1 or 2 Fuel Oil or No. 1 or 2 Diesel
FUEL CAPACITY	13.75 Gal.
FUEL CONSUMPTION	2.75 GPH
BURNER INPUT	385,000 BTU/H
BURNER MOTOR	1/5 HP, 110V, 60 Hz, 3450 RPM
CONTROLS	Pump and Burner Switches, Thermostat, Relief Valve, Unloader Valve, Flow Switch, Chemical Metering Valve
DIMENSION	Length 58", Width 38", Height 33"
CARBON MONOXIDE ALLOWED	Trace
COMBUSTION SMOKE BACHARACH SCALE	#1
WHEELS	Skid Mounted
ENGINE FUEL CAPACITY	5.5 Gals
ENGINE FUEL CONSUMPTION	1.25 GPH

Electro-Magic has a policy to incorporate the latest technological improvements in its products on a continuing basis without prior notification and reserves the right to make these changes without obligation to install any such improvements on previously manufactured machines.

SERIAL NUMBER _____

Fill in your serial number now for future reference.

THANK YOU for selecting one of our products.

PLEASE protect your investment - read this booklet.

Uncrate carefully, checking for hidden damage, or missing components. Immediately contact your distributor or the delivering carrier concerning discrepancies.

...re to prevent direct spray from the gun to ... ring

PARTS SHIPPED UNATTACHED

1. Hose
2. Wash Wand
3. Parts Packet,
4. Soap Hose Assembly

When missing parts and freight damage occur, make notations on the freight bill and file a freight claim immediately with the delivering carrier.

RULES FOR SAFE OPERATION

1. Read the Manual and Rules for Safe Operation carefully. Failure to follow the Rules for Safe Operation and the instruction could cause a malfunction of the cleaner and result in death, serious bodily injury and/or property damage.
2. All installations must comply with local codes. Contact your electrician, plumber, utility company or the selling distributor for specific details.
3. Always turn the cleaner off before refueling. Do not fill with gasoline. Fire and/or explosion may occur if these rules are not followed.
4. Be sure that there is sufficient combustion air. Combustion with inadequate oxygen produces dangerous carbon monoxide.
5. The cleaner must be electrically grounded to protect the operator from electrical shock.
6. Do not start the cleaner unless the wand is firmly gripped by the operator. Failure to observe this could result in injury from a whipping wash wand.
7. WARNING: Do not use near combustible materials as open flame may start fire.
8. When in use do not leave the unit unattached.
9. Never put hands or fingers in front of the wash wand or point the gun at your body or at anyone else as this can result in serious injury.
10. Do not start the burner unless a full flow of water is emitting from the wand.
11. Do not operate the system if there are any leaks in the system because high pressure leaks can cause serious body harm.
12. When applying chemicals follow the safety rules on the chemical labels. Safety glasses and gloves should be worn.
13. Use only kerosene, No. 1 or No. 2 heating oil or No. 1 or No. 2 grade diesel. The use of gasoline or alcohol may result in fire and/or explosion.

PREPARATION

Proper initial installation of equipment will assure you of more satisfactory performance, longer life, and less maintenance costs.

The cleaner should be installed on a level surface where it is not readily influenced by outside sources such as strong winds, freezing temperatures, rain, etc. The unit should be located considering the accessibility for chemicals, fuel connections and maintenance.

It is recommended that a partition be made between the wash area and the machine to prevent direct spray from the gun to come in contact with the machine. Excess moisture reaching the power unit or electrical controls will reduce the unit life and may cause problems by causing electrical shorts.

The water connection should be of 5/8" ID oil resistant synthetic rubber hose or metal pipe with standard 5/8" hose fittings. This is the minimum size of the incoming water line required with water pressure of 40 psi or more. Any water pressure less than 40 psi will require a larger ID water piping supply line.

This unit should be wired through a fused or breaker protected, electrically grounded circuit or outlet. WARNING! Make certain that the power supplies the correct voltage, cycle and phase as specified on the pump motor nameplate.

During installation of the cleaner beware of poorly ventilated locations or of areas where exhaust fans may cause an insufficient supply of oxygen. Sufficient combustion can only be obtained when there is a sufficient supply of oxygen available for the amount of fuel being burned. If it is necessary to install a unit in a poorly ventilated area, outside fresh air may have to be piped to the burner and a fan installed bringing the air into the unit.

PRIOR TO OPERATION

CHECK:

1. The water supply is on and sufficient to provide over the specified gallons per minute.
2. The power connections are secure. Incoming voltage has identical characteristics as that on the motor name plate. The switches are in the "off" position.
3. The float valve operates freely, opening and closing, controlling the water flow.
4. The fuel supply is adequate.
5. Chemical connections are tight and the chemical supply is adequate.
6. Attach the hi-pressure hose securely to the coil outlet.
7. Connect the insulated grip gun.
8. Flush the unit thoroughly before installing the wash nozzles.

FLUSHING THE UNIT

First, remove the nozzle from the wash wand. Turn on the pump switch and flush the water system by pumping cold water through the unit for several minutes. The water should be clear and no foreign material should be coming from the gun with the water flow before this operation is complete. Turn the pump switch off and replace the nozzle. The unit is now ready for operation.

OPERATION

TO START –

Turn on pump switch and open prime valve until primed (normally required first time used or if system has been drained).

After water runs steady from the gun, and cold water pressure is reached, turn on the burner switch. The unit will reach operating pressure in 3 to 5 minutes.

TO CLEAN WITH –

CHEMICAL SOLUTION – Use factory recommended chemicals for the best cleaning action and for extended unit life. Mix the chemical as recommended on the label.

CLEAN – Turn the prime valve handle to the chemical position. The valve handle will be positioned at a 90 degree angle from the machine to draw chemical. A one time adjustment of the metering system can be made by opening the valve to the maximum position. When chemical is coming from the gun, back the selector handle toward the off position until the desired chemical solution is reached. Adjust the stop to this setting and you will automatically be able to turn to this position every time chemical is desired. To clean, start on the lower portion and work up using long, even, overlapping strokes.

RINSE – Turn the metering valve to the off position. Turn the prime valve to the rinse position. The prime valve is in the rinse position when the valve handle is horizontal with the machine. To rinse, wait for the chemical to clear, start on the top working down with the same action as for soaping.

TO STOP –

Turn off the burner switch.

Close chemical valve.

Turn the unit on rinse making certain cool, clean, clear water is coming from the gun. Turn the pump switch off.

If this unit is to be left for an extended period of time or is subject to freezing, follow these procedures –

- Disconnect the incoming water line.
- Remove the plugs, draining the water reservoir tank.
- Disconnect the hose and gun from the machine.
- Close the shut-off valve on the suction line.
- Attach an air chuck to the air valve stem and blow out the water line with compressed air.
- When air only is coming from the coil outlet start the burner, using the burner over-ride switch, and allow it to run for 30 seconds, allowing the air to continue to flow through the lines. This will heat any moisture droplets in the coil, turn them to vapor and completely dry out the coil.
- Open the shut-off valve on the suction line allowing it to be cleared of water.
- Open the rinse valve clearing this line of water.

MAINTENANCE AND SERVICE

PUMP LUBRICATION –

Periodically check the oil level in the crankcase. Change the oil after the initial 50 hours of operation and every 500 hours of operation or every 6 months, whichever comes first. Use SAE 20-30 oil.
Clean fuel filter every 40 hours or every 5 days, whichever is sooner.

MOTORS - Oil per directions on name plate.

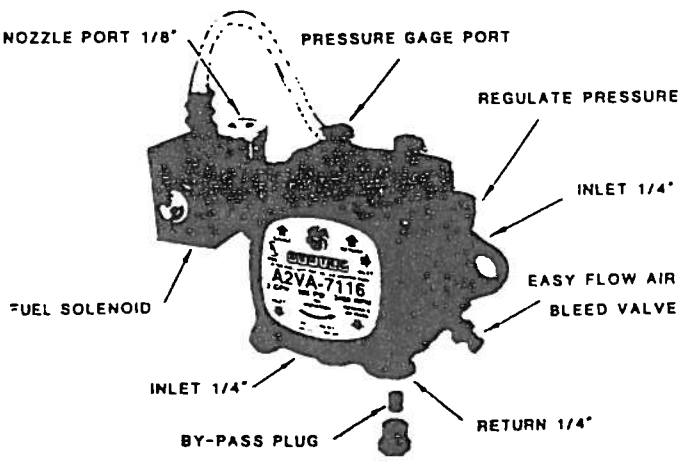
PRIMARY IGNITION CIRCUIT –

Periodically inspect the wires, the transformer contacts and the electrodes for shorts, loose connections and improper spacing. To check the transformer for the proper spark, (CAUTION – 10,000 volts - use a defect-free insulated, handled screwdriver and keep fingers off the blade), lay the blade across the first contact. The transformer is working properly if the arc will span 1/2" between the end of the blade and the other contact.

TO ADJUST THE FUEL PRESSURE –

If proper combustion cannot be set with air shutter at best trial setting, use a gauge to adjust the fuel pressure within the 95-115 psi range. The pressure adjusting screw is located on the upper right hand side of the pump. Turn the adjusting screw clockwise to increase the fuel pressure; counterclockwise to decrease the fuel pressure.

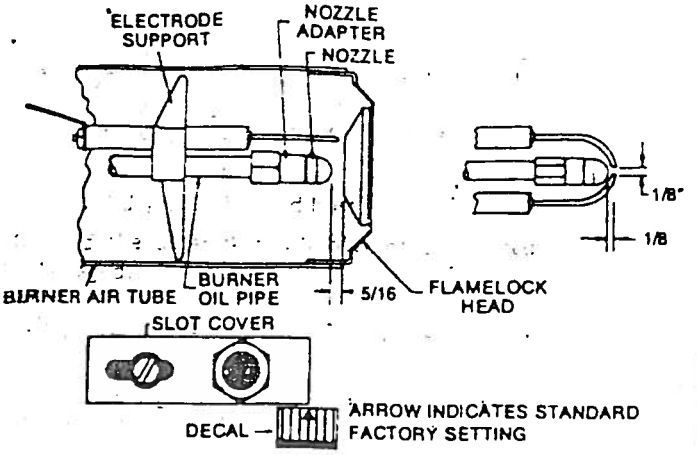
NOTE: When changing fuel pump a bypass plug must be installed in the return line port or pump will not prime.



NOZZLE –

Keep tip free of surface deposits by wiping with clean, solvent-saturated cloth, being careful not to plug or enlarge orifice. For maximum efficiency, replace nozzle every year. To service, swing transformer back, disconnect fuel line, loosen electrode assembly and remove.

CAUTION – Do not damage electrodes.



FUEL TANK —

Prior to storage, drain and flush with clean fuel. Do not use gasoline or water. To prevent rusting from condensation, refill with proper fuel and operate unit approximately 3 minutes.

AIR ADJUSTMENTS —

Units are preset and performance tested at the factory elevation, 1,160 feet. A one-time initial correction for your location will pay off in economy, performance, and extended service life.

If a smokey or eyeburning exhaust is being emitted from the stack, two things should be checked. First check the fuel and be certain that the proper fuel is being used. Next check the air adjustment on the burner. An oily smokey fire indicates a lack of air and the air band should be moved to allow more air to flow through the burner. Sharp eyeburning fumes indicate too much air flowing through the combustion chamber and the air band should be readjusted to allow less air to flow through the burner.

WATER SOFTENERS —

The use of water softeners is recommended in areas where troublesome conditions are common with comparable equipment such as water heaters. With 30 or more grains of hardness, coil could be expected to require deliming after approximately 100 hours of operation.

CLEANING OF COILS —

It is recommended that a qualified Electro-Magic service station be contacted about cleaning the coils. The best preventative is to use only factory trademarked chemicals formulated with inhibitors and water conditioners. The periodic use of our coil cleaner removes lime and other deposits before troublesome stoppage occurs. Contact your local distributor for the coil cleaner and instructions on how to use it. CAUTION — when using the coil cleaner do not run the burner for over 30 seconds every 20 minutes. The temperature of the solution must be kept well below the steam point. When the deliming process has been completed the system should be drained thoroughly and flushed with cold water for 15 minutes.

Dry steam, is superheated steam containing very little moisture. Usually dry steam is caused by an insufficient amount of water flowing through the coils. This insufficient flow can be caused by any number of things. If a unit is allowed to run with a lack of water flow for any length of time the following may occur.

1. The steam hose will dry out, char and bust.
2. Coils, baffles and the outer skin will become overheated and may be damaged.

Use the following procedures if the unit is going into dry steam.

To trouble shoot a cleaner going into dry steam first check the cold water discharge at the gun. The specified gallons of water per minute should be flowing through the unit. This check should be made with the pump only running. The burner should not be on when the gallonage check is being performed. If you are not getting the specified gallons per minute at the gun, disconnect the coil inlet line and check the water flow at this point. If you are not getting the correct gallonage at the gun but you are getting it at the coil inlet, the problem is on the discharge side of the pump. If you are not getting the specified gallons per minute at the pump outlet, the problem is in the suction side of the pump.

If you are getting the correct gallonage requirements at the gun, check the burner. Be certain that the correct fuel is being used. Next check the nozzle making certain no one has put in a larger fuel jet or that the nozzle is not defective and delivering too much fuel to the fire chamber. Also, set the fuel pressure between 100 and 110 psi.

If the problem is on the discharge side of the pump, first inspect the check valves on the pump. Inspect for dirt, partial stoppage or an imperfect seat that would allow water pumped into the coil on the discharge stroke to pass back through the valve on the suction stroke, causing cavitation. Next check the nozzle at the wand. Make certain it is the correct size. Also make certain that it is not partially plugged with scale or lime residue. Next check the gun and hose for any foreign obstruction. A blistered or charred hose could be restricting flow. Now check the coils for lime or mineral deposits which would decrease the inside diameter of the pipes and thereby restrict water flow. Lime deposits can be removed by the use of coil cleaner. If the coil is completely plugged and cannot be cleaned or if the deposits on the coil walls are of mineral and cannot be removed the coil will have to be replaced.

If the problem is on the suction side of the pump, check the incoming water supply making certain it is sufficient to provide enough water for pumping to the coils at all times. Next check the chemical and water tank screen for partial clogging which would prevent a full flow of water from going to the pump. Next inspect the pump packing. Possibly the packing is worn. If the packing is badly worn it should be replaced. Also check all of the lines and fittings on the suction side of the pumps. They must be tight and not damaged as any slight defect may allow the pump to draw air into the system. Last check the pump motor making certain that it is delivering the full 1725 revolutions per minute.

TROUBLE SHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Burner will not light.	1. Check the fuel supply.	1. If contaminated fuel, clean the tank and refill. If tank is empty, refill.
	2. Check for fuel at the nozzle.	2. Nozzle, filter, or lines may be loose or plugged. Clean and replace as needed. Fuel solenoid may not be functioning. Clean or replace.
	3. Check for improper electrode setting.	3. Clean and reset.
	4. Check transformer.	4. See primary ignition circuit in maintenance section of manual.
	5. Check the flow switch.	5. See section on flow switch.
	6. Check the wiring.	6. All wire contacts should be clean and tight. No breaks in wire.
	7. Check the motor thermal protector for lockout.	7. If tripped, check voltage, connections, and extensions for cause. Check the fuel pump. The shaft may be tight causing the motor to overheat.
	8. Check the burner coupling for slippage.	8. Replace if needed.
	9. Check the fuel pump pressure.	9. Pressure should read a minimum of 90 psi.
	10. Check the stacking on permanent installations.	10. A downdraft will cause delayed ignition.
	11. Check for sooting.	11. Soot deposits on the coil and burner can interrupt air flow, and cause shorting of the electrodes. Clean as required.
	12. Check the thermostat.	12. Replace as required.

TROUBLE SHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Delayed Ignition (rumbling, noisy starts)	1. Dirty or damaged electrodes.	1. Clean or replace.
	2. Air adjustment open too far.	2. Adjust.
	3. Poor fuel spray pattern.	3. Replace nozzle. Adjust fuel pressure.
	4. Check electrode setting.	4. Adjust.
Dry Steam	1. Check starting procedure.	1. A full flow of water must be coming from the gun before the burner switch is turned on.
	2. Check for a sticking check valve.	2. Clean or replace.
	3. Check the water pump.	3. Packings may need replacing.
	4. Check the soap screen for foreign material.	4. Clean or replace.
	5. Check the fittings on the suction side of the pump for air leaks.	5. Tighten or replace as needed.
	6. Check the discharge side of the pump for partial clogging.	6. Clean the nozzle. The coil may need deliming.
	7. Check the nozzle and fuel pressure.	7. Excessive fuel nozzle size or fuel pressure indicates replacement of fuel nozzle and pump.
	8. Check motor and pump drive.	8. Insufficient RPM's can be caused by a slippery flexible drive coupling, insufficient voltage or a defective motor.

– SEE SPECIAL SECTION ON DRY STEAM –

TROUBLE SHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Relief Valve Trips	1. Check the orifice, hose, and gun for blockage.	1. Clean or replace.
	2. Check nozzle size.	2. Nozzles sized too small. This will cause excess pressure.
Low Operating Pressure	1. Check pump packing.	1. Replace as needed.
	2. Check the valves in pump.	2. They may be sticking. Clean or replace as required.
	3. Check the chemical valve.	3. The valve may be drawing air causing low pressure or dry steam.
	4. Check the nozzle.	4. It may be enlarged or missing.
	5. Check for air leaks.	5. Tighten all fittings on the suction side of the pump.
	6. Check the coil.	6. Descale as required.
Unit Smokes	1. Check for improper fuel.	1. Clean tank and replace any contaminated fuel.
	2. Check air adjustments.	2. See maintenance section of manual.
	3. Check fuel system for air leaks.	3. Tighten or replace as needed.
	4. Check for faulty nozzle spray pattern.	4. Replace nozzle.
Unit Fumes	1. Check for too much combustion air.	1. See maintenance section of manual.
	2. Check the fuel pressure.	2. Too low a fuel pressure causes poor atomization of the fuel and fumes.

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Motor Won't Start Or Trips Out	1. Check for overload.	1. Too small an orifice may create too high a pressure. Replace.
	2. Check for insufficient voltage.	2. The circuit may be underpowered. Replace. The biggest source of low voltage is a long, light electrical extension cord.
	3. Check the fuel viscosity.	3. In freezing weather the fuel may become so viscous as to create a drag on the fuel pump.
	4. Check the fuel pump.	4. Pump may be binding. Replace.

TROUBLE SHOOTING THE WATER PUMP

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Fluctuating Pressure	1. Valves worn.	1. Check and replace if necessary.
	2. Blockage in valve.	2. Check and clean out if necessary.
	3. Pump sucking air.	3. Check water supply and air ingress at joints in suction line.
	4. Worn piston packing.	4. Check and replace if necessary.
Pressure Low After Period Of Normal Use	1. Nozzle worn.	1. Check and replace if necessary.
	2. Suction or delivery valves worn.	2. Check and replace if necessary.
	3. Suction or delivery valves blocked.	3. Check and clean if necessary.
	4. Worn piston packing.	4. Check and replace if necessary.
Pump Noisy	1. Air in suction.	1. Check water supply and corrections on suction line.
	2. Broken or weak suction or delivery valve spring.	2. Check and replace if necessary.
	3. Foreign matter in valves.	3. Check and clean if necessary.
	4. Worn bearings.	4. Check and replace if necessary.
	5. Excessive temperature of liquid.	5. Reduce to below 75°C.
Presence Of Water In Oil	1. Oil seal worn.	1. Check and replace if necessary.
	2. High humidity in air.	2. Check and change oil twice as often.
	3. Piston packing worn.	3. Check and replace if necessary.
Water Dripping From Under Pump	1. Piston packing worn.	1. Check and replace if necessary.
	2. O. R. plunger retainer worn.	2. Check and replace if necessary.
Oil Dripping	1. Oil seal worn.	1. Check and replace if necessary.

SERVICING THE PUMPING SECTION

Models T-521 thru T-1031

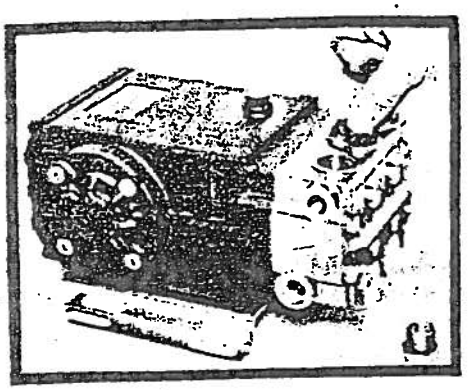
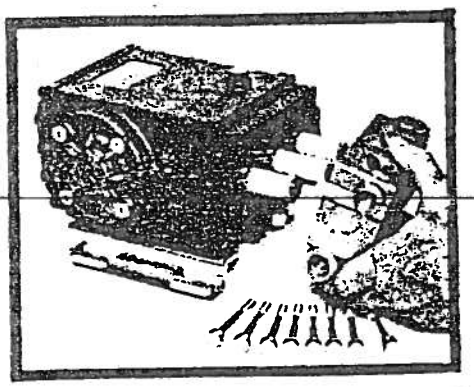


Photo 1
The Valve Assemblies

1) All inlet and discharge valves can be serviced without disrupting the inlet or discharge piping. The inlet and discharge valves are the identical in these models.
2) To service any valve, remove the hex plug using a 24 or 32 millimeter socket.
3) Examine o-ring gaskets and replace if there is any evidence of cuts, abrasions or distortion.
4) Remove valve assembly (retainer, spring, valve, valve seat) from valve cavity.
5) Remove o-ring from valve cavity.
6) Only one valve kit is necessary to repair all the valves in the pump. The kit includes new o-rings, valve seat, poppet, spring and retainer, all pre-assembled.
7) Install new o-ring in valve cavity.
8) Insert assembly into valve cavity.
9) Replace valve cap and torque to 75 to 80 foot pounds.



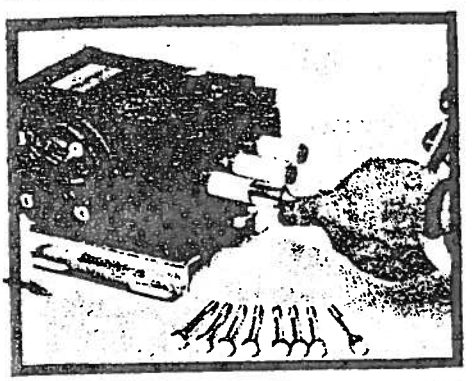
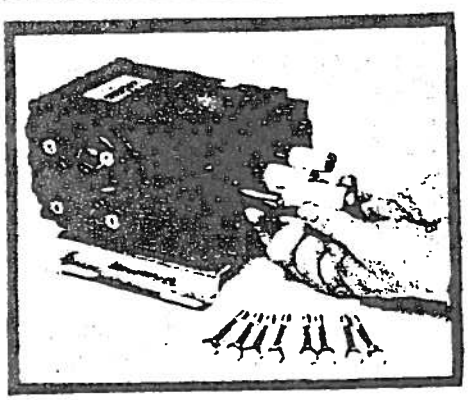


Photo 2
Removing Manifold Head

1) Remove the eight cap bolts from the head using an 8, 10, or 12 millimeter wrench.
2) Separate head from crankcase. NOTE: It may be necessary to tap head lightly with rawhide mallet to loosen. CAUTION: When sliding head from crankcase use caution not to damage plungers.
3) The V-packing assemblies may come off with the head. At this point, examine plungers. Plunger surfaces should be smooth and free from scoring or pitting; if not, replace.
4) Reinstall manifold head and torque per sequence described below.



TORQUE SEQUENCE FOR TIGHTENING HEAD

Install all eight cap bolts fingertight. Torque all cap bolts to 10 foot pounds in sequence as shown, then torque to 20 foot pounds, again in sequence show. Follow this procedure when reinstalling head.

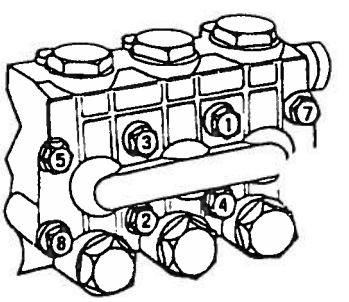
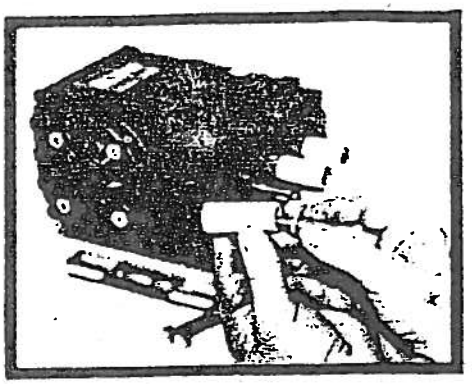


Photo 3, 4, and 5
Replacing Plungers



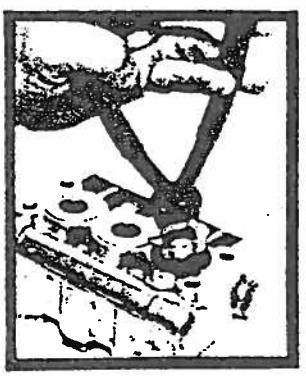
1) Using appropriate 6, 17, or 27 millimeter socket, remove stainless steel plunger retainer and plunger from piston rod.
2) If barrier slinger comes off with plunger, be certain this is replaced before new plunger is installed.
3) Separate plunger retainer from plunger.
4) Install new o-ring and teflon backup-ring on plunger retainer.

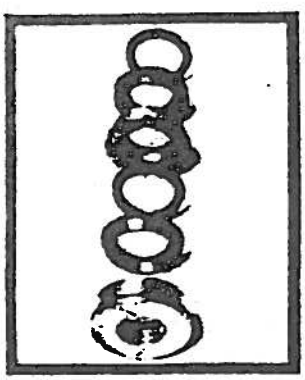
   NOTE: A small dab of grease on the outside of the o-rings insures a better installation.

5) Carefully press plunger retainer into new plunger.
6) Slide new plunger over the piston rod and torque to 30 to 35 foot pounds.

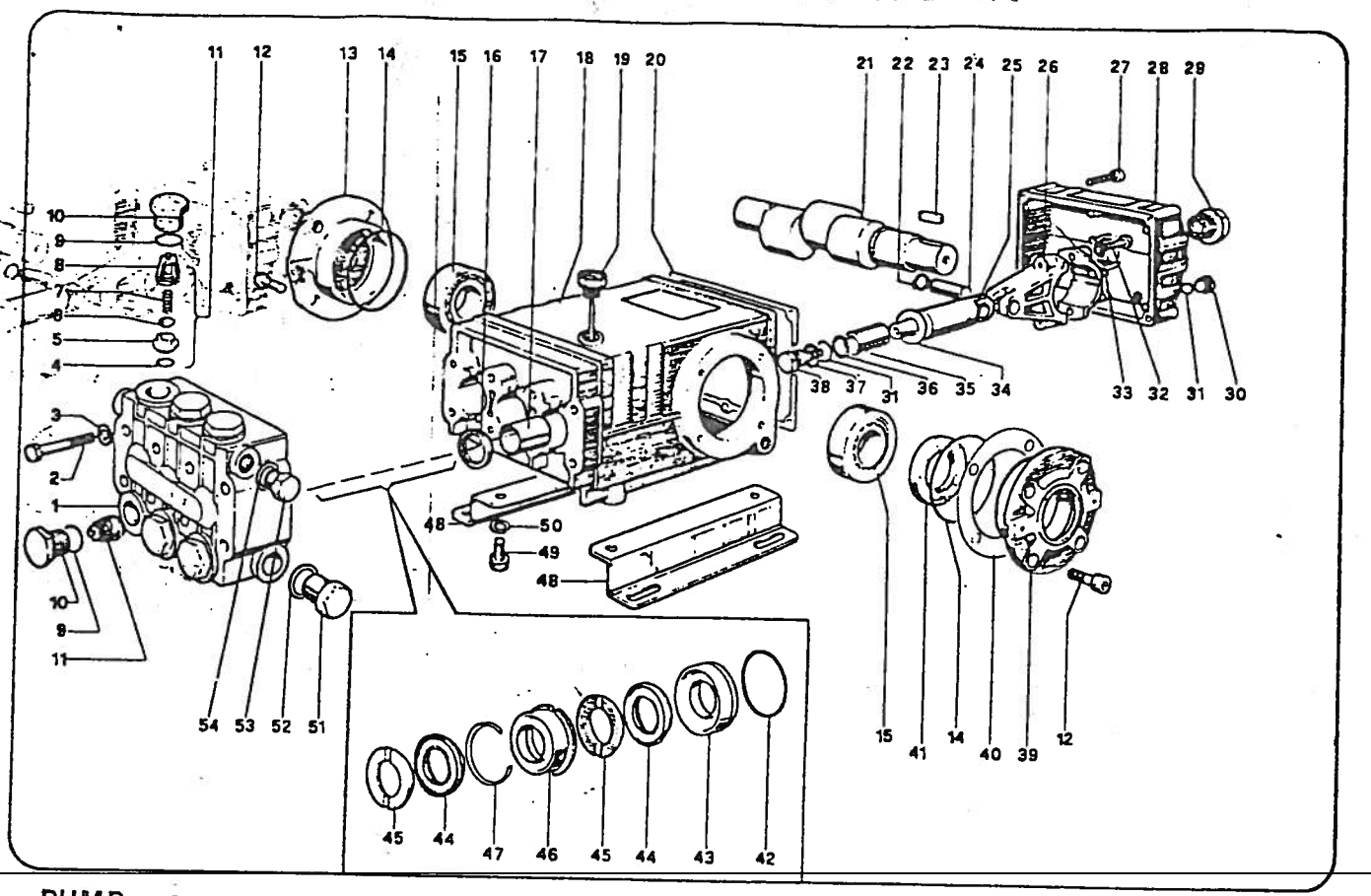
Photo 6, 7, and 8
Replacing V-Packings

1) From crankcase side of manifold head, remove main seal retainer and rear v-packing. This is best done with a hook-shaped tool. Gently hook the edge of the v-packing or adapter and lift out.
2) Using same tool, lift out male adapter and intermediate retainer.
3) Front male adapter and v-packing should be removed next.
4) Examine adapters and v-packings for wear and replace as needed.
5) Install new parts: First front male adapter.
6) Coat front v-packing with thin film of grease and insert into cavity.
7) Firmly press intermediate seal retainer into v-packing.
8) Next press rear male adapter and rear v-packing into cavity.
9) Replace main seal retainer.
10) Coat each plunger with a thin film of grease and carefully slide manifold head into crankcase.
(11) Reinstall manifold head and eight cap bolts and torque to 10 foot pounds. Then torque to 20 foot pounds as described in torque sequence drawing.





ELECTRO-MAGIC PART NO. 08-20200



PUMP: GENERAL PUMP MODEL TS 2021 PART #08-20200

KITS:

PART #	ITEMS INCLUDED	# PIECES
08-19100 K01	4. 5. 6. 7. 8 (11)	6
08-13200 K02	16	3
08-13200 K03	41	2
08-20200 K05	9. 10	6
08-19100 K06	31. 36. 37. 38	3
08-20200 K07	45	6
08-20200 K08	44	6
08-20200 K09	46. 47	3
08-20200 K10	42. 43	3
08-20200 K28	42. 43. 44. 45. 46. 47	1

INDIVIDUAL PARTS:

ITEM	PART #	DESCRIPTION
1	08-20200-01	PUMP HEAD
2	08-13200-02	DIAPHRAM SCREW
3	08-13200-52	WASHER
12	08-13200-11	SCREW
14	08-13200-13	O-RING
15	08-20200-15	ROLLER BEARING
17	08-13200-38	BUSHING
18	08-20200-18	CRANKCASE
19	08-13200-17	OIL DIPSTICK
20	08-13200-18	COVER GASKET
21	08-13200-19A	CRANKSHAFT
22	08-13200-20	SNAP RING
23	08-19100-32	KEY
24	08-13200-22	PISTON PIN
25	08-20200-25	PISTON GUIDE
26	08-13200-24	CONNECTING ROD
27	08-13200-26	SCREW

ITEM #	PART #	DESCRIPTION
28	08-20200-28	CRANKCASE COVER
29	08-19100-28	OIL LEVEL INDICATOR
30	08-19100-29	CAP
32	08-13200-25	SCREW
33	08-13200-29	WASHER
34	08-19100-38	WASHER
35	08:20200-35	PISTON
39	08-20200-39	CRANKCASE COVER
40	08-13200-36	SHIM
48	08-13200-39	PUMP FEET
49	08-13200-42	SCREW
50	08-13200-43	WASHER
51	08-19100-56	CAP
52	08-19100-57	WASHER
53	08-19100-55	CAP
54	08-19100-58	WASHER
13	08-20200-13	CRANKCASE COVER

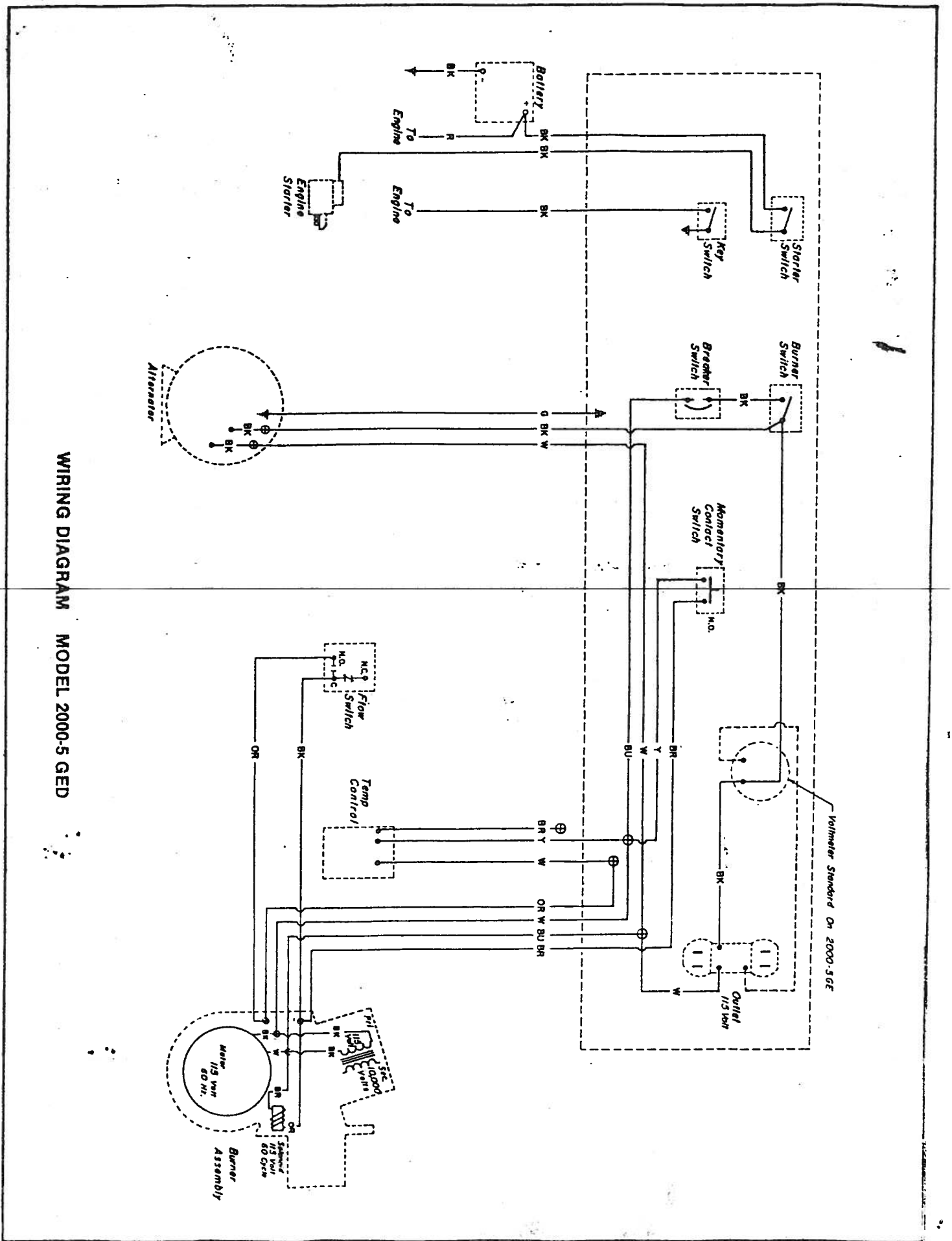
1 – 513 874-4484

PARTS LIST

Model 3000-5 GED

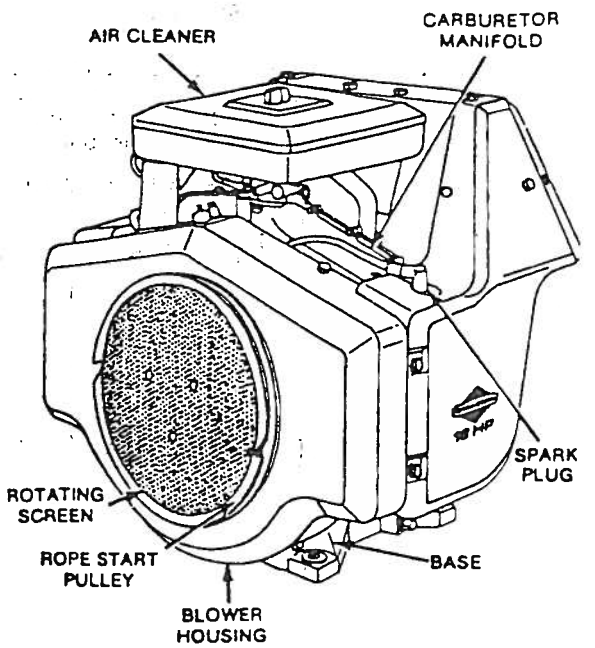
Item	Part No.	Description
1	01-12609	Hose Clamp, #4
2	01-12610	Hose Clamp, #8
3	05-21301	Hub, JA x 5/8"
4	01-17221	Elbow, 1/2" - 45°
5	02-11100	Self Tap Screw, 1/4-20 x 1/2"
6	02-11110	Hex Cap Screw, 1/4-20 x 1/2"
7	02-12143	Hex Cap Screw, 5/16"-18 x 1-1/4"
8	02-12154	Hex Cap Screw, 5/16"-18 x 1-3/4" Grade 5
9	02-13141	Hex Cap Screw, 3/8-16 x 1-1/4"
10	02-17250	Sheet Metal Screw, #8 x 3/8"
11		Included in Assembly
12	02-51140	Hex Locknut, 1/4-20
13	02-52112	Hex Flange Locknut, 5/16"-18
14	02-53113	Locknut, 3/8"-16
15	02-70115	Shim, 3/8" ID x 1" OD x .16 Thick
16	02-80320	Pop Rivets, 3/8"
17	04-69550	Tie Wrap, Large
18	04-70080	Wire Nut, 72-B
19	04-71110	Strain Relief Box Connector
20	04-83100	Generator, Winco
21	04-84250	Battery Case, w/Lid and Strap
22	05-24327	Rim, 3V162.65 (Gen.)
23	05-23304	Hub,
24		Included with Engine
25	05-41501	Belt,
26	05-41475	Belt,
27	09-00400	Water Hose, 1/2" ID x 14"
28	09-00400	Water Hose, 1/2" ID x 60"
29	09-30055	Hose, 3/8" ID x 50' 1/2 NPT x 3/8 NPT Swivel
30	09-55012	Surge Hose, 3/8" NPT x 1/2 NPT x 25" SOE
31	09-55021	Hose, 1/2" NPT x 1/2" NPT Swivel x 21-1/2"
32	14-10144	Trigger Gun
33	15-00161	Tubing, 1/4" ID x 60"
34	15-16660	Copper Tubing, 1/8" OD x 60"
35	15-18660	Copper Tubing, 3/8" OD x 60"
36	15-18655	Copper Tubing, 3/8" OD x 55"
37	19-28968-PB2	Shock Cushion Base, HRS 3/16" x 22-3/8 x 43-1/2
38	20-14170-PNB	Battery Mount, 16ga. x 10" x 17"
39	20-14383-PNB	End Panel, 16ga. x 11-3/4" x 36-1/4"
40	20-14593-PNB	Side Panel, 16ga. x 11-3/4" x 56-1/4"
41	29-S0405	Shock Mount
42	42-11881	Lid Assy.
43	42-11871	Tank Lid Assy.
44	04-00750	Battery Cable, 36" Lg.
45	04-70275	Battery Terminal Clamp
46	04-70276	Battery Terminal Clamp
47	11-60380	Engine, 18 HP Electric Start
48	09-00270	Hose, 1/4" x 4"
49	09-00270	Hose, 1/4" x 31"
50	29-F0204	Fuel Filter
51	01-12270	Hose Barb, 1/4" NPT x 1/4"
52	01-12310	Hose Barb, 1/2" NPT x 1/2"
53	01-19141	Tee, 1/2"
54	01-17214	St. Elbow, 1/2-90
55	01-21141	Close Nipple, 1/2" NPT
56	01-21131	Close Nipple, 3/8" NPT
57	01-13101	Hex Bushing, 1/4" NPT x 1/8" FNPT
58	01-11160	Comp. Elbow, 1/8" NPT x 1/8"
59	01-19181	Tee 3/8" FNPT
60	01-13101	Hex Bushing, 3/8" NPT x 1/4"
61	01-12612	Hose Clamp, #12
62	01-17119	St. Elbow, 3/8"-90°
63	05-23304	Rim,
64	06-18701	Filter Screen, 1/2" NPT
65	06-18406	Unloader Valve, K7.2
66	06-19349-4	Switch
67	06-18510	Air Valve w/Stem
68	06-18500	Air Cap
69	08-20100	Pump
70	09-00400	Water Hose, 3/4" ID x 8"
71	16-14101	Nipple, 3/8" NPT x 2"
72	05-23305	Hub,
73	01-14224	Coupling, 3/8" EHD
74	01-14314	Red. Coupling, 1/2" x 3/8" EHD
75	01-19142	Tee 1/2" EHD
76	01-14244	Coupling 1/2" EHD
77	06-11117	Thermal Switch 220°
78	01-12290	Hose Barb. 3/8" NPT x 1/2" Hose
79	01-12310	Hose Barb. 1/2" NPT x 1/2" Hose
80	01-17211	Elbow, 1/2"-90°
81	01-17328	Red. Elbow, 1/2" FNPT x 3/8" FNPT
82	01-21131	Close Nipple, 3/8" NPT
83	06-18205	Ball Valve, 3/8" FNPT
84	06-18428	Float Rod, 1/4-20 x 8"
85	06-18433	Float Ball 4 x 5 Plastic
86	06-18440	Float Valve, 1/2" FNPT
87	06-18710	Soap Screen, 1", FNPT (Ron Vic)
88	42-11611	Float Tank Assemby
89	01-12150	Swivel Nut, 11-1/2 TPI
90	01-12151	Swivel Bib, 1/2" NPT
91	01-12310	Hose Barb, 1/2" NPT x 1/2"
92	02-72100	Hose Washer, 9/16" I.D.
93	85-25355	Coupling Mount Weld
94	01-17215	St. Elbow, 1/2-90 EHD
95	01-19142	Tee, 1/2 FNPT EHD
96	01-13131	Hex Bushing, 1/2 NPT x 1/4 FNPT
97	01-17101	St. Elbow, 1/4-90 Galv.
98	01-17119	St. Elbow, 3/8-90
99	01-12290	Hose Barb, 3/8 NPT x 1/2"
100	01-12138	Quick Coupler, 1/2 NPT
101	06-18403	Relief Valve, Rego 1/4 NPT x 3/8 FNPT
102	16-16123	Nipple, 1/2 NPT x 1-1/2"
103	85-25356	Coupling Mount Weld
104	04-70288	Rubber Grommet, 3/8" I.D. x 5/8" Groove
105	04-73127	Outlet Cover
106	04-73184	Outlet, 15 Amp.
107	04-74109	Switch Boot
108	04-74118	Starter Switch, Push Button
109	04-74120	Toggle Switch
110		
111		
112		
113	07-10300	Volt Meter
114	20-16550-PNB	Front Panel, 18 Ga. x 12" x 38" (Brushed SS)
115	06-18196	Metering Valve, 1/4" FNPT
116	01-11160	Comp. Elbow, 1/8" NPT x 1/8"
117	01-14301	Red. Coupling, 1/4" FNPT x 1/8" FNPT
118	07-10175	Gauge, Panel Mount, 0-5000 PSI
119	42-11321	Box Assembly
120	04-00750	Cable, 65" Long
121	04-70276	Battery Clamp
122	04-70275	Battery Terminal Clamp 1-11841 GSI
123	04-70201	Terminal Lug (Blackburn L70) Copper 670
124	01-17101	St. Elbow, 1/4-90
125	01-11240	Compression Elbow, 1/4" NPT x 3/8"
126	01-11250	Comp. Adapter, 1/4" NPT x 3/8"
127	16-12160	Nipple, 1/4" NPT x 6"
128	29-F0230	Fuel Filter, 1/4 FNPT General 1A-25A
129	10-30291	Nozzle, 2.50-90°A
130	10-10309	Burner, 120 V.-50 Hz.
131	01-13109	Plug, 1/4 NPT
132	06-13192	Fuel Valve, 1/4 NPT x 3/8 Compression
133	29-C0121	Filler Cap, Chrome Plated
134	42-11711	Fuel Tank Assembly
135	06-18179	Fuel Valve, 1/8 NPT x 1/4" Hose
136	42-11811	Gas Tank Assembly
137	42-11781	Belt Guard Assembly
138	42-11861	Side Panel Assembly
139	85-11841	Coil Assembly
140	51-50250	Burner Head w/Insulation
141	47-32102	Coil Weld Assembly
142	42-11401	Frame Assembly
143	01-12137	Quick Coupler Plug, 1/2 FNPT Parker
144	01-14302	Reducing Coupling, 1/4 FNPT x 1/8 FNPT
145	14-30123	Nozzle, 1/8 NPT, 0005
146	14-30122	Nozzle, 1/8 NPT, 1505
147	14-30121	Nozzle, 1/8 NPT, 2505
148	06-18700	Strainer, 3/8"
149	15-00161	Vinyl Tubing, 1/4" ID x 3/8" OD x 90"
150	06-18246	Check Valve Assembly
151	05-25566	Rim,

6 – 02176 PRESSER Switch



WIRING DIAGRAM MODEL 2000-5 GED

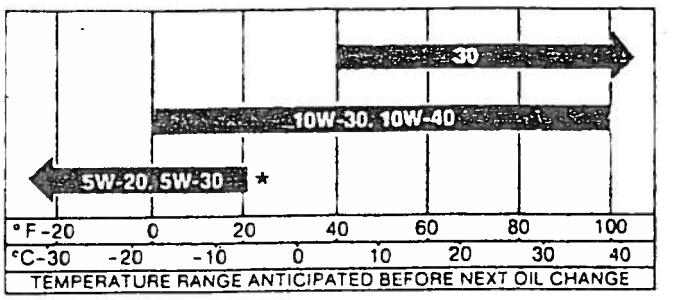
BEFORE STARTING



READ THE OPERATING INSTRUCTIONS OF THE EQUIPMENT THIS ENGINE POWERS

Use a high quality detergent oil classified "For Service SF, SE, SD or SC." Detergent oils keep the engine cleaner and retard the formation of gum and varnish deposits. Nothing should be added to the recommended oil.

RECOMMENDED SAE VISCOSITY GRADES

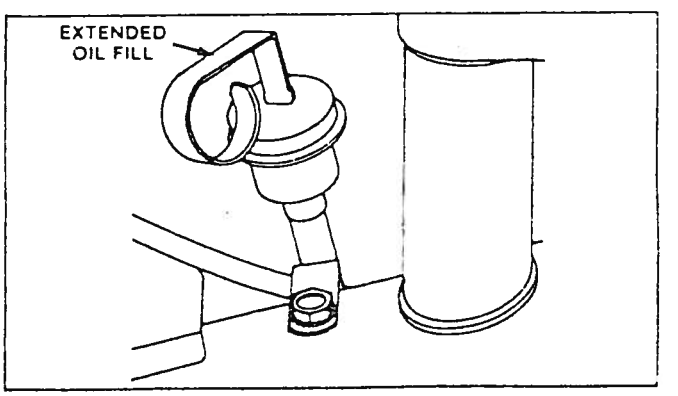


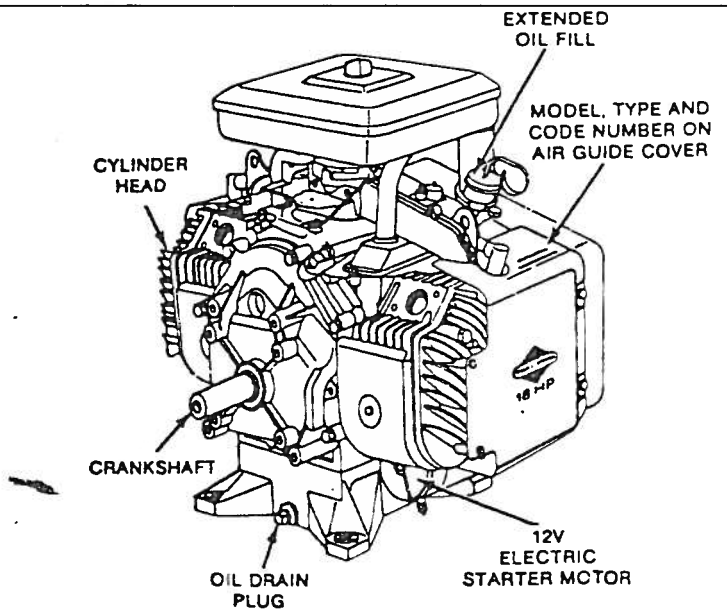
*If not available, a synthetic oil may be used having 5W-20, 5W-30 or 5W-40 viscosity.

FILL CRANKCASE WITH OIL

Place engine level. Clean area around oil fill before removing dipstick.

EXTENDED OIL FILL. Remove cap and dipstick. FILL TO FULL MARK on dipstick, POUR SLOWLY. Capacity approximately 3 pints (1.4 liters). When checking oil level, screw dipstick assembly firmly but slowly until cap bottoms on tube. DO NOT OVERFILL. Dipstick assembly must be securely assembled into tube at all times when engine is operating.





CHARGE BATTERY

Charge battery before use on engines equipped with 12 volt electric starter motor. See manufacturers' recommendations.

FUEL RECOMMENDATIONS

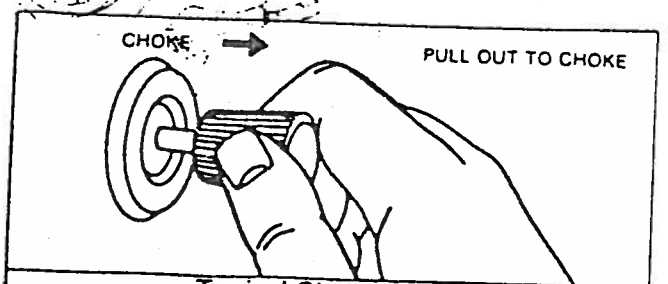
Our engines will operate satisfactorily on any gasoline intended for automotive use. DO NOT MIX OIL WITH GASOLINE.

We recommend the use of clean, fresh, lead-free gasoline. Leaded gasoline may be used if lead-free is not available. A minimum of 77 octane is recommended. The use of lead-free gasoline results in fewer combustion deposits and longer valve life.

STARTING

OPEN FUEL VALVE on engines so equipped.

CHOKE ENGINE: Move equipment control lever to "CHOKE" position.

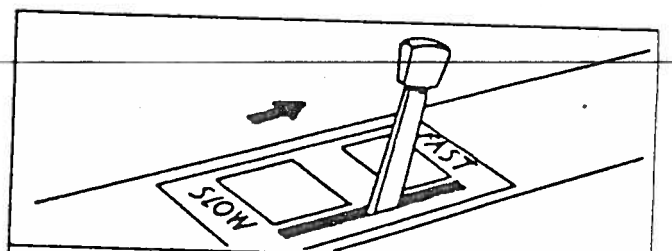


Typical Choke Control

NOTE: This should fully close choke on carburetor. If it does not, remote control must be re-adjusted. See ADJUSTMENT section.

NOTE: A warm engine requires less choking than a cold engine.

SPEED CONTROL LEVER: Move speed control lever to "RUN," "FAST" or "START" position if so equipped.

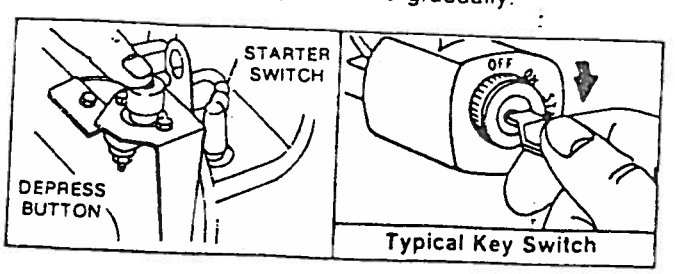


Typical Speed Control

TO START ENGINE

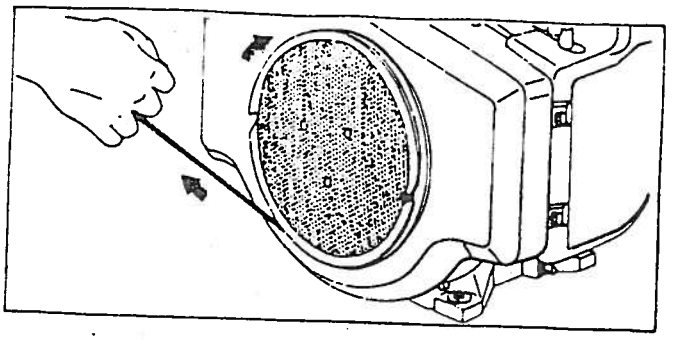
DANGER: ALWAYS KEEP HANDS AND FEET CLEAR OF MOWER BLADE OR OTHER ROTATING MACHINERY.

Electric Starter. Turn key to "START" position and/or press starter button on powered equipment. The best starter life is provided by using short starting cycles of several seconds. Prolonged cranking can damage the starter motor if cranked more than 15 seconds per minute. When engine starts, open choke gradually.



Typical Key Switch

Rope Starter. Wind the starter rope around the pulley in direction shown by arrow. Pull the rope with a quick full arm stroke to overcome compression and prevent kickback. Repeat if necessary with choke opened slightly. When engine starts open choke gradually.



CAUTION: When using rope starter to crank engine, use caution so knotted end of rope does not strike persons standing nearby.

When equipment is not in operation, provide protection from direct exposure to weather.

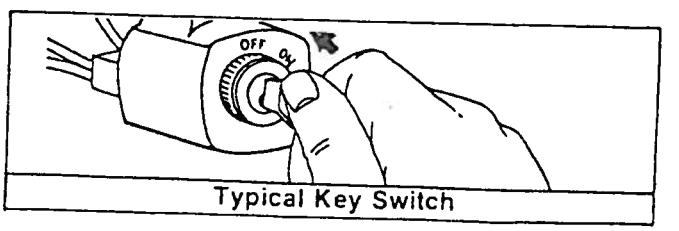
COLD WEATHER STARTING HINTS

1. Be sure to use the proper oil for the temperature expected.
2. Declutch all possible external loads.
3. Set speed control at part-throttle position.
4. A warm battery has much more starting capacity than a cold battery.
5. Use fresh winter grade fuel.

NOTE: Winter grade gasoline has higher volatility to improve starting. Do not use gasoline left over from summer.

TO STOP ENGINE

Turn key to "OFF" position. Do not choke carburetor to stop the engine.



Typical Key Switch

CAUTION: Always remove key from switch when leaving equipment unattended or when equipment is not in use.

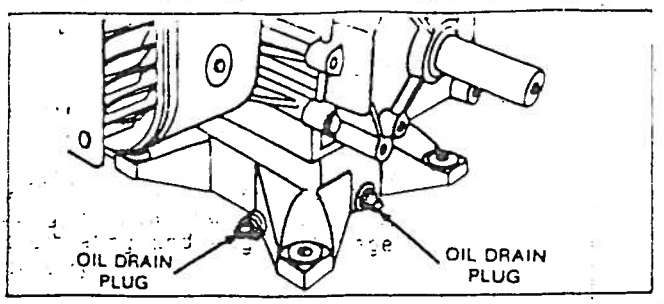
NOTE: Close fuel shut-off valve when engine is transported to prevent fuel leakage from carburetor.

MAINTENANCE

WARNING: TO PREVENT ACCIDENTAL STARTING when servicing the engine or equipment, always remove the spark plugs or wire from the spark plugs shown on page 2. Disconnect negative wire from battery terminal if equipped with a 12 volt starter system.

CHECK OIL LEVEL regularly — after each five hours of operation. BE SURE OIL LEVEL IS MAINTAINED.

CHANGE OIL after first five hours of operation. Thereafter change oil every 25 hours of operation. Remove oil drain plug and drain oil while engine is warm. Replace drain plug. Remove dipstick and refill with new oil of proper grade. Replace dipstick.

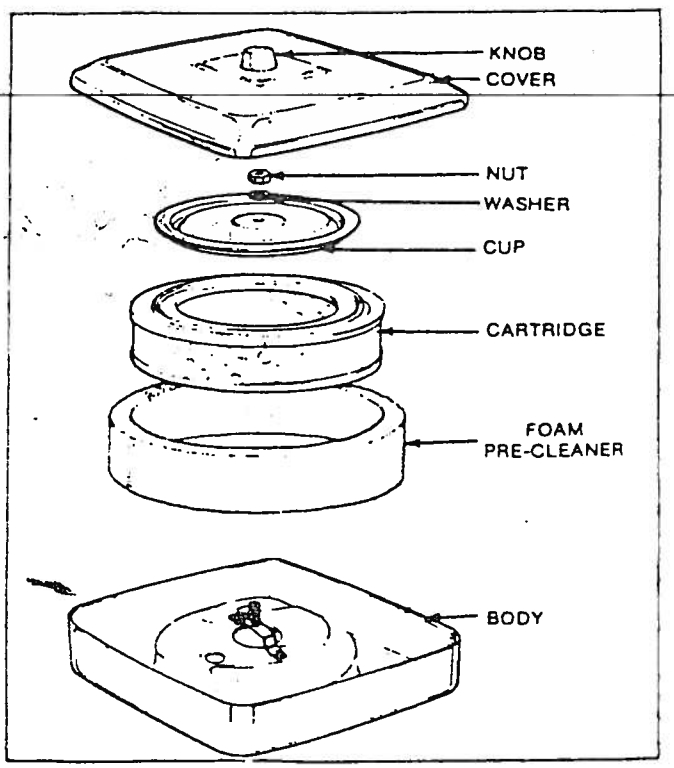


TO SERVICE DUAL ELEMENT AIR CLEANER

Clean and re-oil foam pre-cleaner at three month intervals or every 25 hours, whichever occurs first.

NOTE: Service air cleaner more often under dusty conditions.

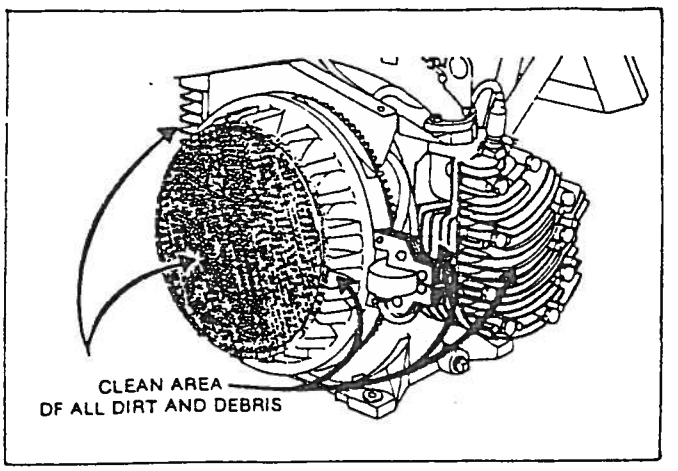
1. Remove knob and cover.
2. Remove foam pre-cleaner by sliding it off the paper cartridge.
3. a. Wash foam pre-cleaner in kerosene or liquid detergent and water.
   b. Wrap foam pre-cleaner in cloth and squeeze dry.
   c. Saturate foam pre-cleaner in engine oil. Squeeze to remove excess oil.
4. Install foam pre-cleaner over paper cartridge. Re-assemble cover and screw down tight.



Yearly or every 100 hours, whichever occurs first, remove paper cartridge. Clean by tapping gently on flat surface. If very dirty, replace cartridge, or wash in a low or non-sudsing detergent and warm water solution. Rinse thoroughly with flowing water from inside out, until water is clear. Cartridge must be allowed to stand and air dry thoroughly before using. Service more often if necessary.

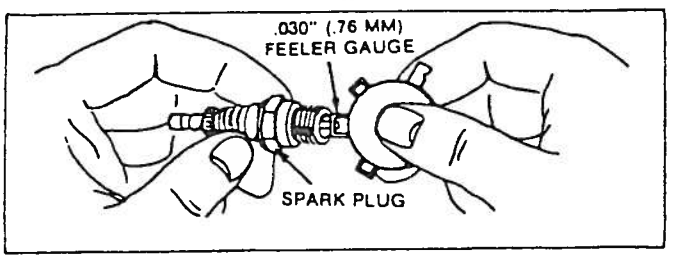
CAUTION: Petroleum solvents, such as kerosene, are not to be used to clean cartridge. They may cause deterioration of the cartridge. DO NOT OIL CARTRIDGE. DO NOT USE PRESSURIZED AIR TO CLEAN OR DRY CARTRIDGE.

CLEAN COOLING SYSTEM — Grass, chaff or dirt may clog the rotating screen and the air cooling system, especially after prolonged service in cutting tall dry grasses. Yearly or every 100 hours, whichever occurs first, remove the blower housing and clean the areas shown to avoid overspeeding, overheating and engine damage. Clean more often if necessary.



DANGER: Periodically clean muffler area to remove all grass, dirt and combustible debris.

SPARK PLUGS — Clean and reset gap at .030" every 100 hours of operation.



CAUTION: Do not blast clean spark plugs. Spark plugs should be cleaned by scraping or wire brushing and washing with a commercial solvent.

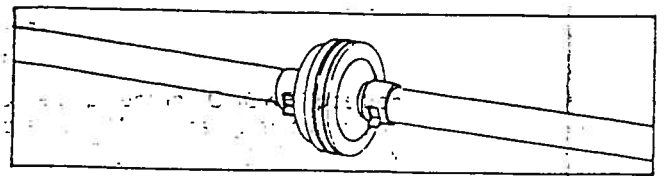
Sparking can occur if wire terminals do not fit firmly on spark plugs. Reform terminals if necessary.

REMOVE COMBUSTION DEPOSITS every 100-300 hours of operation. Remove cylinder heads and cylinder head shields. Scrape and wire brush the combustion deposits from cylinder, cylinder heads, top of pistons and around valves. Use a soft brush to remove deposits. Re-assemble gaskets, cylinder heads and cylinder head shields. Turn screws down finger tight, with the three longer screws around the exhaust valve, if so equipped. Torque cylinder head screws in a staggered sequence to 165 inch pounds (18.65 Nm).

SPARK ARRESTER EQUIPPED MUFFLER — If engine muffler is equipped with spark arrester screen assembly, remove every 50 hours for cleaning and inspection. Replace if damaged

CLEAN ENGINE — Remove dirt and debris with a cloth or brush. Cleaning with a forceful spray of water is not recommended as water could contaminate the fuel system.

FUEL FILTER — Replace IN-LINE filter every season.



ADJUSTMENTS

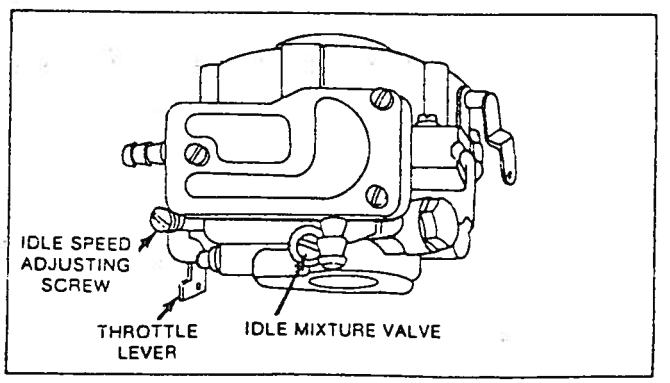
CARBURETOR ADJUSTMENTS

Minor carburetor adjustment may be required to compensate for differences in fuel, temperature, altitude or load.

NOTE: The air cleaner must be assembled to carburetor when running engine.

Gently turn the idle mixture valve clockwise until it just closes. Valve may be damaged by turning it in too far. Open idle valve 1-1/2 turns counterclockwise.

This initial adjustment will permit the engine to be started and warmed up prior to final adjustment.



Start engine and place equipment speed control lever in idle position. Hold carburetor throttle lever against idle stop, and adjust idle speed screw to obtain: 1200 to 1400 RPM. Turn idle mixture valve slowly clockwise (lean mixture) until speed just starts to slow. Then turn idle mixture valve 1/2 turn counterclockwise. Now adjust idle speed screw to obtain: 900 to 1200 RPM. Release throttle lever.

NOTE: Engines operated at altitudes of approximately 5000 feet, may require the installation of a high altitude carburetor main jet to achieve best engine performance. If erratic performance or lack of power is observed, select the fixed main jet part number 231333. It may be ordered through your nearest Briggs & Stratton Service Center.

CONTROL ADJUSTMENTS

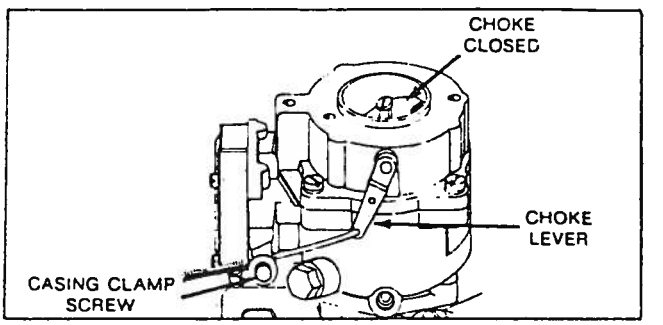
Proper choke and speed control operation is dependent upon correct adjustment of controls on the powered equipment.

TO CHECK OPERATION OF CHOKE CONTROLS

Move control lever to "CHOKE" position. The carburetor choke should be closed.

TO ADJUST CHOKE:

Place control lever on equipment in "CHOKE" position. Loosen casing clamp screw. Move casing and wire until choke is completely closed. Tighten casing clamp screw.

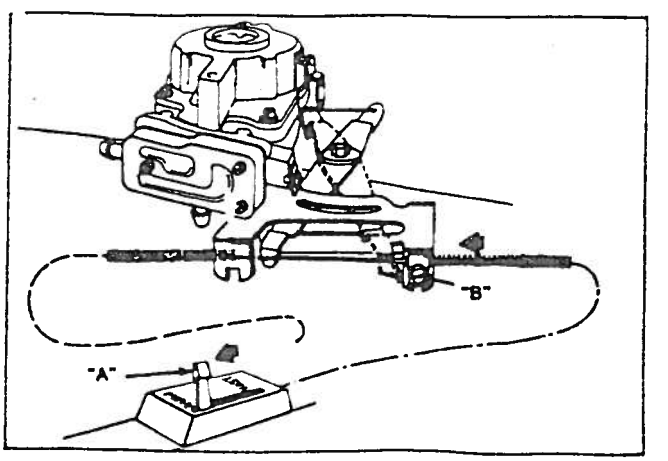


SPEED CONTROL ADJUSTMENT

The acceptable operating speed range is 1800 to 3600 RPM. Idle speed is 1400 RPM. The manufacturer of the equipment on which the engine is used, specifies the top governed no load speed at which the engine may be operated. DO NOT EXCEED this speed.

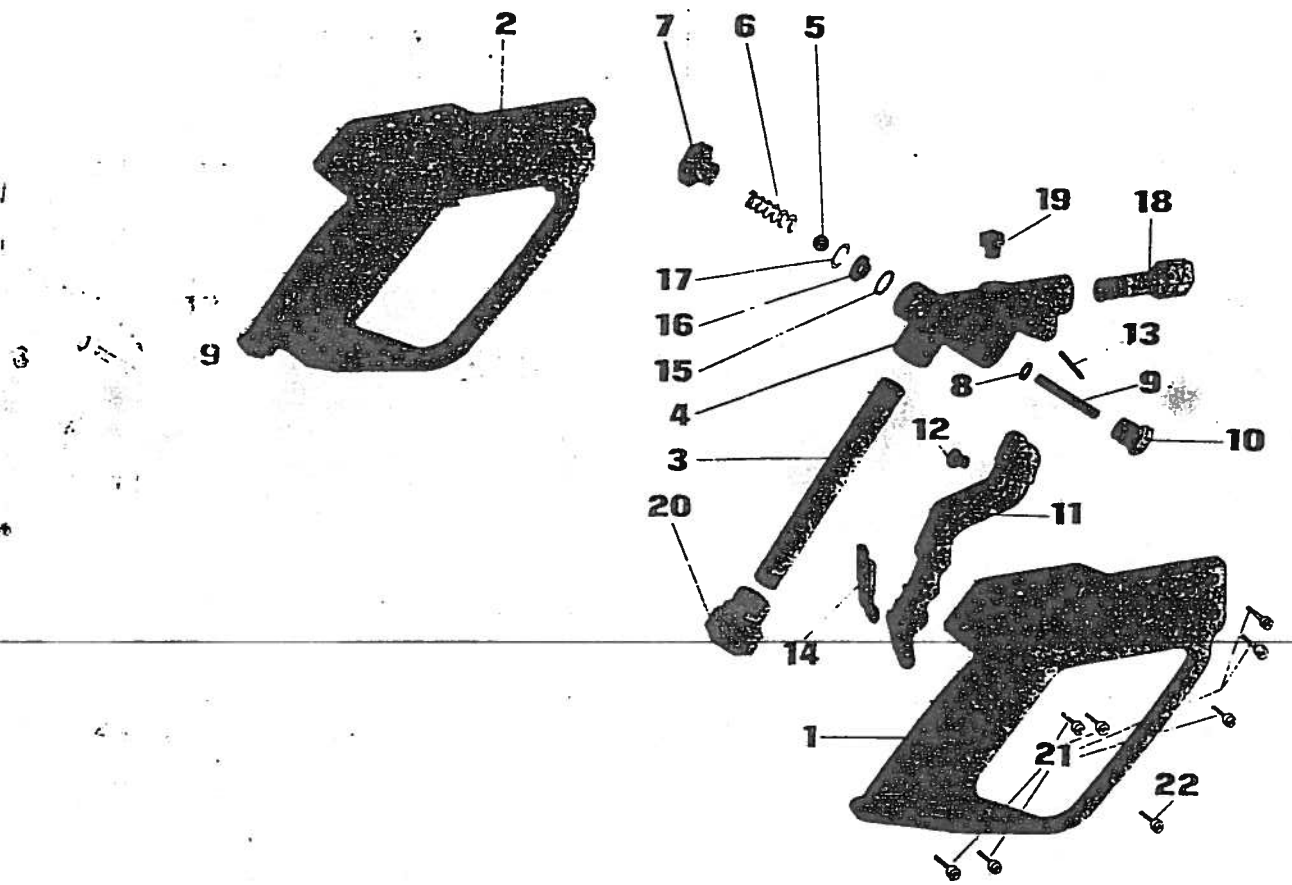
Engine speed is controlled by movement of the control lever. Move control lever on equipment, "A," to slowest engine speed possible. Throttle lever on carburetor should touch idle speed adjusting screw. To adjust, loosen control casing clamp screw "B." Move control casing and wire in direction shown by arrow until throttle lever touches idle speed adjusting screw on carburetor. Retighten casing clamp screw "B."

CAUTION: Throttle lever on carburetor MUST touch idle speed adjusting screw when equipment control lever is in slowest position.



TRIGGER GUN

14-10145



1	14-14027	Left Plastic Housing
2	14-14028	Right Plastic Housing
3	14-14003	Pressure Pipe
4	14-14029	Brass Housing
5	14-14005	Stainless Steel Pin Ball
6	14-14006	Stainless Steel Spring
7	14-14008	Brass End Screw
8	14-14010	O-Ring
9	14-14009	Control Bolt
10	14-14011	Pin Guide
11	14-14030	Trigger
12	14-14013	Brass Push Control
13	14-14014	Plastic Pin
15	14-14017	O-Ring
16	14-14018	Stainless Steel Seat
17	14-14019	Stainless Steel Safety Ring
18	14-14022	Brass Outlet
19	14-14020	Brass Stop
20	14-14031	Brass Inlet
21	14-14032	Screws
22	14-14033	Screws

MAXIMUM OPERATING CONDITIONS

3625 PSI, 300 Degrees F., 10 GPM