

HONEYWAGON.com

A Subsidiary of SS Process Equipment



OPERATION AND MAINTENANCE MANUAL FOR HONEYWAGON MODELS:

HW125G / E, HW300G / E, HW525G / E

MANUFACTURED BY:



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ASSEMBLY

The unit comes fully assembled but the engine may not have fuel or oil in it. The pump gearbox may not have oil in it.

CAUTION

Starting the unit without preparing it as described in this manual will void warranty and cause damage.

PREPARATION FOR OPERATION

WARNING!! Before start-up, the unit must be level & stabilized by adjusting the jack and locking it in place. Failure to do this may result in injury.



Start preparations by checking that all fasteners and components are tight and secure without leaks.

Check the oil level on the engine. The type of oil, quantity and level are described in the engine section of this manual.

The pump has an attached gearbox. It requires oil. The oil type, quantity and level is described in the pump section of this manual. Check the oil level.

STARTING THE HONEYWAGON

The unit comes with 50 feet of coiled suction hose. At the end of the suction hose is a plug.



CAUTION

The plug must be removed before starting the honeywagon.

Failure to remove the plug will cause a potential collapse of the suction hose and damage to the pump.

After removing the plug, the hose can be submerged in water (flooded basement, pool, holding tanks) and the engine started. Water will be pumped into the honey wagon holding tank.

PUMP OUT of RV HOLDING TANKS

SS Process Equipment provides a special connection devise for use on RV's.



Check to make sure the RV holding tank valves are CLOSED for the black water and gray water. Securely tighten the device bayonet fitting to the RV holding tank outlet. Connect the suction hose to the special device. Do NOT open the gray water valve on the RV outlet. Fully open the black water valve on the RV and the ball valve on the suction device. Return to the honey wagon and start the engine.

CAUTION

Failure to open the RV holding tank valve or the special connection device valve before starting the engine will potentially damage the suction hose, pump and the RV holding tank valve.

Once the black water flow stops open the gray water valve, continue pumping until all flow stops. Stop the engine. Close all RV valves and the device valve. Remove the suction hose and replace plugs.

FLUSHING RV HOLDING TANKS

Occasionally, an RV owner may want to flush the holding tanks during the pump-out. This is an optional service that may require additional equipment and a source of water pressure. **It is not a standard procedure for the RV pump-out.**

Some RV's come equipped with a built-in holding tank flushing system. It may require a separate water hose. Follow the RV supplier instructions for the operation of the flushing system.

Some RV's could require an optional fitting, and a flushing hose with a back-flow preventer,



all available from SS Process Equipment. The flushing fitting is connected between the RV holding tank outlet and the suction hose. The flushing hose is connected to a source of water pressure but must include a back-flow preventer to stop any gray water from entering the water system.

The fittings must be in place before starting the RV pump-out.

After the black water has been pumped-out and before opening the gray water valve, the honey wagon engine/pump continues to operate while the flush valve is opened.

Water will start to pump into the black water tank dislodging and flushing all residue. While the honeywagon is removing all the dislodged residue it is important to monitor the black water tank level. Any indication of the tank reaching capacity requires the flush water to be stopped.

After the black water discharge remains clear and fully flushed, the flushing water can be turned off and the gray water valve opened. Close the black water valve after opening the gray water valve.

After the gray water stops flowing repeat the flushing process described for the black tank flushing. Finally, turn off the flushing water and turn off the engine, close all valves, remove all fittings and replace plugs.

DUMPING THE TANKS

SS Process Equipment includes a pre-assembled dumping line that extends to 15 feet allowing spill free dumping.



The discharge line is permanently installed with a shut off valve at the holding tank as well as the end of the drain hose. Remove the head of the discharge line extending it to reach the dump entry pipe then insert it into the dump pipe.

CAUTION

Do **not** open the valve on the discharge head at this time. Return to the honey wagon drain and open the drain valve. The force of the draining fluids may cause the discharge head to come free from the dump drain. Return the discharge head to the dump pipe and slowly open the discharge head valve.

If desired the honey wagon can be flushed with water draining through the open discharge line before closing all valves. Return the discharge hose to its mounting stand.



Limited Warranty

All SS Process Equipment, LLC (“COMPANY”) systems are tested at the factory prior to shipment.

The Company warrants to the purchaser of this product for a period of one year from the date of shipment. The Company warrants that its pumping products will be free from defects in total, and so far as of its own manufacture, will be free from defects in materials and workmanship as follows:

1. SSPE will replace, at no charge, any part that fails due to a defect in material and/or workmanship during the warranty period, FOB our factory, Rochester, NY. To obtain warranty service, you must forward the defective parts to the factory for examination, freight prepaid.
2. This warranty period does not cover any product or product part, which has been subject to accident, misuse, abuse or negligence. The Company shall only be liable under this warranty if the product is used in the manner intended by the manufacturer as specified in the written instructions furnished with this product.

The Company will deliver repaired or replacement products Ex Works its factory or Factory Authorized Service center. Products not of the Company’s manufacture are warranted only to the extent provided by the original manufacturer.

Under no circumstances shall the Company be liable for any incidental, consequential, or special damages, losses or expenses arising from this contract, its performance, or in connection with the use of the Company’s product.

The liability of the Company in respect of all damages, losses, costs, or expenses, whether suffered or incurred by the purchaser or any third party arising in any manner or incident related to this contract of the performance hereunder, shall be limited in the aggregate to the actual price paid by the purchaser to the Company.

Important Notice Return Authorization

1. All equipment returned to SSPE requires proper Return Authorization Number and completed Return Material Report.
2. All equipment returned to the factory for repair or service must first be thoroughly flushed and have all chemical contact areas neutralized.
3. All equipment, which has been in contact with chemicals, must be accompanied by a copy of the Chemical Product material Safety Data Sheet (MSDS).
4. Failure to comply with the above instructions will result in equipment being returned to the sender, freight collect, without service.



Owner's Manual

336G Pump



Please read and save this Repair Parts Manual. Read this manual and the General Operating Instructions carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. The Safety Instructions are contained in the General Operating Instructions. Failure to comply with the safety instructions accompanying this product could result in personal injury and/or property damage! Retain instructions for future reference. AMT reserves the right to discontinue any model or change specifications at any time without incurring any obligation.

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Periodic maintenance and inspection is required on all pumps to ensure proper operation. Unit must be clear of debris and sediment. Inspect for leaks and loose bolts. Failure to do so voids warranty.



Diaphragm Pumps

DESCRIPTION

These diaphragm pumps are high capacity, self-priming (to 25 ft. lift), portable units shipped completely assembled (except for handle). The pumps are used for operation with fluids mixed with abrasive solids such as sand, silt, mud, sludge and waste. Not for use with pumping cement or mortar. Handles liquids from 40° to 180° F (4° to 82 ° C). Pump is capable of handling solids up to 1-5/8" diameter. For use with water and other non-flammable fluids compatible with pump component materials.

Model	Driver Type	Material	Diaphragm	Check Valve	Gear Box	Bearings	NPT
336Z-96	Hatz 1B20 Diesel	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	2"
336G-96	Honda GX120	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	2"
336E-96	1.5 HP 115 VAC @60 Hz	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	2"
335A-96	B&S 525 Series	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	3"
335G-96	Honda GX120	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	3"
335E-96	1.5 HP 115 VAC @60 Hz	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	3"
335B-96	B&S CP550	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	3"
335H-96	Honda GX160	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	3"
335Z-96	Hatz 1B20 Diesel	Aluminum	Thermoplastic/TPE	Neoprene	Oil Bath	Needle	3"

NOTE: Driver is subject to change without notice, see labels and manual with driver for operation, specifications, maintenance and warranty.

UNPACKING

After unpacking the unit, inspect carefully for any damage that may have occurred during transit. Check for loose, missing or damaged parts.

Specific Safety Information for Gasoline Engine Driven Pumps

- Carefully read the instruction manuals supplied by the engine manufacturer before attempting to assemble, disassemble or operate the engine or any other part. The "Warning" and "Caution" statements in this manual signal potentially hazardous conditions to the operator or equipment. Know when these conditions can exist. Take necessary steps to protect personnel, as well as equipment.

⚠ WARNING

Gasoline is a highly combustible fuel. Use it with care! The improper use, handling and/or storage of gasoline can be dangerous. Help prevent accidents by following these safety rules:

- Use gasoline only as a fuel, never as a cleaning fluid.
- Always use an approved container to hold or store gasoline. Never store gasoline in familiar containers such as milk gallons or soda pop bottles.
- Never store gasoline near a heater or an open flame.
- When storing or using gasoline, make sure container is out of the reach of children.
- Never add gasoline to a running or hot engine. Spilled gasoline on a hot engine may cause a fire or an explosion. Fill gasoline tank outdoors and wipe up any spills.
- Have a fire extinguisher nearby. Be sure extinguisher is in operating condition – check the pressure gauge or indicator. Be familiar with its proper use. Consult the local fire

department for the correct type of extinguisher for your application. Extinguishers rated ABC by the National Fire Protection Association are appropriate for all applications.

- On permanent installations, be sure all fuel supplies have a positive shutoff valve. Fuel lines must be of steel piping, adequately secured and free from leaks. Do not use copper piping on flexible lines as copper becomes hardened and brittle and will break. Use black pipe on natural gas or gaseous fuels, but not on gasoline or diesel fuels. Piping at the engine should be a suitable flexible line that is compatible with the fluid.

Positively no smoking!

- Check engine oil, fuel levels and gear box oil levels before initial startup each day. Stay away from moving parts due to the danger of becoming caught in moving parts. Avoid loose jackets, shirts, sleeves and ties. Make sure all nuts and bolts are secure. Keep power shields and guards in place. If adjustment MUST be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.
- Do not work with this equipment when mentally or physically fatigued.
- Be careful not to touch the exterior of the engine, especially the muffler and the area around it. It is hot enough to be painful or cause injury.
- To prevent accidental starting, always remove the spark plug or disconnect and ground the spark plug wire before working on the engine or the equipment driven by the engine.
- DO NOT RUN THE ENGINE IN AN ENCLOSED AREA!!** Exhaust gases contain carbon monoxide, which is an odorless and deadly gas that will cause death if breathed too long. If equipment is located in an enclosed area with an

Diaphragm Pumps

- exhaust line to the outside, regularly check the exhaust system for leaks. Be sure the area is well ventilated.
- If the gas engine is equipped with a spark arrester screen in the muffler, it should be inspected for wear periodically and replaced when necessary.

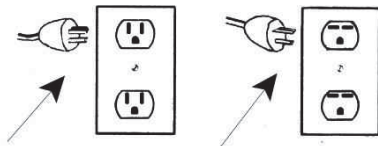
Specific Safety Information for Electric Motor Driven Pump

- This unit is not waterproof and is not intended to be used in potentially wet locations. The motor is designed to be used in a clean dry location with access to an adequate supply of cooling air. Ambient temperature around the motor should not exceed 104° F (40° C). For outdoor installations, motor must be protected by a cover that does not block air flow to and around the motor. This unit is not weatherproof nor is it able to be submersed in water.
- When wiring an electrically driven pump, follow all electrical and safety codes, as well as the most recent United States National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

▲ WARNING

Risk of electrical shock! Never connect the green (or green and yellow) wire to a live terminal.

- To reduce the risk of electric shock, the motor must be securely and adequately grounded!. This can be accomplished by either: (1) inserting plug (portable) directly into a properly installed and grounded 3-prong grounding-type receptacle (as shown in Figure 2); (2) permanently wiring the unit with a grounded metal raceway system; (3) using a separate ground wire connected to the bare metal of the motor frame; or (4) other suitable means. The green (or green and yellow) conductor in the cord is the grounding wire. The motor must be securely and adequately grounded for your protection against shock hazards! Where a 2-prong wall receptacle is encountered, it must be replaced with a properly grounded 3-prong receptacle with a grounded 3-prong receptacle installed in accordance with the National Electrical Code and local codes and ordinances. To ensure a proper ground, the grounding means must be tested by a qualified electrician. Use only 3-wire extension cords that have 3-prong, grounding-type plugs and 3-pole receptacles that accept the equipment plug.
- All wiring should be performed by a qualified electrician.



Grounding blade

Figure 2 Grounding Methods

▲ WARNING

An incorrect connection may cause an electric short, produce an electrical shock or burn out the pump motor, resulting in property damage and/or personal injury.

- Protect electrical cord from sharp objects, hot surfaces, oil and chemicals. Avoid kinking the cord. Replace or repair damaged or worn cords immediately.
- Provide safety shields on all moving and electrical parts to prevent personal injury.
- Keep fingers and foreign objects away from ventilation and other openings. Do not insert any objects into the motor.
- Use wire of adequate size to minimize voltage drop at the

- motor.
- Disconnect power before servicing a motor or its load. If the power disconnect is out of sight, lock it in the open position and tag it to prevent unexpected application of power.
- Do not touch an operating motor. Modern motors are designed to operate at high temperatures.

General Safety Information (All Units)

- Know the pump application, limitations and potential hazards.

▲ WARNING

Do not use to pump flammable or explosive fluids such as gasoline, fuel oil, or kerosene, etc. Do not use in flammable and/or explosive atmospheres. Pump should only be used with liquids compatible with pump component materials. Failure to follow this warning can result in personal injury and/or property damage.

- Make certain that the power source conforms to the requirements of your equipment.
- Provide adequate protection and guarding around moving parts.
- Disconnect power before servicing.
- Release all pressure within the system before servicing any component.
- Drain all liquids from the system before servicing.
- Secure the discharge line before starting the pump. An unsecured discharge line will whip, possibly causing personal injury and/or property damage.
- Check hoses for weak or worn condition before each use, making certain that all connections are secure.
- Periodically inspect pump and system components. Perform routine maintenance as required (see Maintenance Section).
- Provide a means of pressure relief for pumps whose discharge line can be shut off or obstructed.
- Personal Safety:**
 - Wear safety glasses at all times when working with pumps.
 - Wear a face shield and proper apparel when pumping hazardous chemicals.
 - Keep work area clean, uncluttered and properly lighted - replace all unused tools and equipment.
 - Keep visitors at a safe distance from the work area.
 - Make workshop childproof – with padlocks, master switches and by removing starter keys.
- For air drive units follow Safety Information in instruction sheet supplied with air motor.

ASSEMBLY

- HANDLE ON 2" PUMP** (Refer to Figure A)
 - Remove two hex cap screws (Ref. No. A6) and washers (Ref. No. A7) from gearbox (Ref. No. A1).
 - Place handle (Ref. No. A35) on gearbox flange and align holes.
 - Reinstall two hex cap screws and washer assemblies, then tighten.
- HANDLE ON 3" PUMP** (Refer to Figure A)
 - Remove two hex nuts (Ref. No. A14) from pump well (Ref. No. A3).
 - Place handle (Ref. No. A35) under pump well.
 - Reinstall two hex nut and washer assemblies, then tighten.
- ROTATING SUCTION/DISCHARGE PORTS (OPTIONAL)** (Refer to Figure A,W,P)

Diaphragm Pumps

In some applications, it may be preferable to have suction/discharge ports rotated 90 degrees to be in line with driver. If so, proceed as follows:

- a. Remove four hex cap screws (Ref. No. A9), hex nuts (Ref. No. A13 & A14) and washers (Ref. Nos. A11 & A12) from pump assembly to separate pump well (Ref. No. A3) from pump base (Ref. No. A8).
- b. Rotate pump well 90 degrees clockwise so that driver is positioned over top of discharge plate (Ref. No. W7).
- c. Be sure that pump well base and diaphragm (Ref. No. P17) are aligned properly with one another. Then, reinstall four hex cap screws, hex nuts and washer assemblies and tighten.

GEAR BOX OIL (Refer to Figure A,G)

3. Place pump on a level surface. Fill pump gear box (Ref. No. A1) with gear box oil before the pump is operated. Gear oil must meet requirements of API GL-5 and military specification MIL-L-2105B. Remove gear box housing fill plug (Ref. No. G6). Remove level plug (Ref. No. G5). Pour gear oil into gear box slowly until oil comes out of level plug.

Warranty on this unit is void unless the gear box is lubricated with appropriate gear oil listed above. DO NOT OVER FILL!

INSTALLATION

NOTE: In any installation where property damage can occur by pumps not operating due to power outages, discharge line freezing or any other reason, a backup system(s) and/or warning system(s) should be used.

1. Place the pump on a level, solid foundation, locating it as close to the liquid as possible, making the suction line as short and direct as possible.
2. Install pipe nipples (Ref. No. A36) so the smoother side of pipe end faces the suction and discharge hose.

▲ CAUTION

Maximum discharge head is 25 feet or 10.9 psi. Operation over this head or pressure will cause pump to stall and/or gearbox damage. Use only rigid hoses.

3. Attach suction piping to the suction inlet (Ref. No. W2) and discharge piping to the discharge outlet (Ref. No. W7). The suction line should be positioned such that there is a continual upward slope from the fluid source to the pump. Avoid using loops or sections of pipe or fittings, which might permit air to become trapped.

NOTE: If hose is used, be sure to use reinforced hose on both the suction and discharge. **DO NOT USE** canvas or similar collapsible materials. **NEVER USE PIPE REDUCER; PIPE SIZE MUST BE EQUAL TO OR LARGER THAN PUMP PORT SIZE.** Suction line must be airtight so that air cannot leak in and destroy priming vacuum. On a permanent installation where piping is used, always connect a piece of flexible hose between pump and piping so pump is free to move slightly.

4. It is advisable to use a strainer (Ref. No. W16) on the inlet end of the suction hose or pipe. A properly sized strainer is supplied with this unit and should be used at all times to prevent damage. Keep the strainer clean. If possible, suspend it to keep it from becoming clogged with muck, roots, debris or leaves. It is best to keep hose free of kinks as they will restrict flow and add excess loading to pump and gearing.

5. **GASOLINE ENGINE UNITS:** Follow all instructions in the engine manual before starting the engine. Fill engine with oil, gasoline, etc.

AIR MOTOR UNITS: Follow all instructions in the air motor manual before starting unit.

ELECTRIC MOTOR UNITS: It is strongly recommended that this unit is plugged into a G.F.I. (Ground Fault Interrupter) circuit. Consult your local electrician for installation and availability.

6. Input RPM (to pump) – Input RPM must be between 1750 and 2750 RPM. Final pump speed will be 40 strokes/min. with a 1750 RPM input and 60 strokes/min. with a 2750 RPM input.

Do not exceed 60 strokes per minute with the diaphragm pump.

OPERATION

Operate the diaphragm pump in an upright position only.

1. This diaphragm pump is capable of priming "dry" up to fifteen feet; it will prime much faster when it is filled with clean water through priming cap (Ref. No. W6). Primed, it can lift to 25 feet.
2. Activate unit following engine or air motor manual or turning unit on if electrical.

▲ CAUTION

Do not control discharge capacity with a valve or similar device.

CLEARING JAM-UP

If large solids or an accumulation of sand or other sediment becomes lodged in the pump well (Ref. No. A3) preventing the plunger arm (Ref. No. A2) from making a full stroke, the pump should be thoroughly cleaned as described in "If Pump Stalls" shown below. Refer to parts list and illustration for parts identification.

▲ CAUTION

If pump has stopped or stalled for any unknown reason, clean out pump cavity thoroughly. Failure to comply with the "caution" could result in damage to crank (Ref. No. P5/P9), plunger arm (Ref. No. P1) or other parts of assembly.

1. IF PUMP STALLS:
 - a. Remove handle (Ref. No. A35).
 - b. Remove four bolts (Ref. No. A9 & A10).
 - c. Clean obstruction and all debris from pump well (Ref. No. A3).
 - d. Reassemble pump in reverse order of disassembly and return to service.
2. IF PLUNGER ARM (Ref. No. P1) SEIZES AND GEAR BOX OUTPUT SHAFT (Ref. No. G8) TURNS IN CRANK (Ref. No. P5):
 - a. Remove sheet metal guard (Ref. No. A4) by loosening hand knob screws (Ref. No. A5).
 - b. Disassemble pump and clean as described in steps (a) through (d) listed for stalled engine jam up.
 - c. Torque the crank lock screw (Ref. No. P6) to 70 foot pounds with an appropriate torque wrench (see Figure 3).

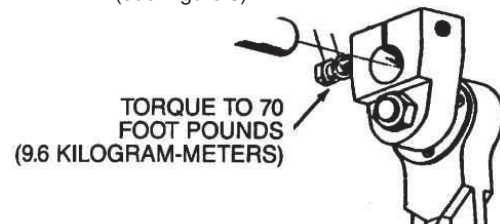


Figure 3

- d. Reassemble the pump in reverse order of disassembly and return to service.

Diaphragm Pumps

▲ WARNING

Pump jamming with an over-torqued lock screw may cause internal damage. Under torquing may allow the output shaft to spin and wear parts necessitating replacement.

MAINTENANCE

▲ WARNING

Make certain that unit is disconnected from power source before attempting to service or remove any component.

1. Check gear box oil level every 20 hours of operation or at least once a week; more often if any leakage is detected around the gear box. Change gearbox oil after the first 40 hours of operation. Fill to the oil level plug. Change gearbox oil every 350 hours of operation.
2. The plunger bearing (Ref. No. P3) must be greased (any automotive grease) after every 8 hours of use. This is done by rotating plunger bearing to the 12 o'clock position. At this point, grease fitting will be visible through hole in guard (Ref. No. A4). Bearing may be cleaned and kept well lubricated by pumping grease slowly into fitting until new grease oozes out between bearing and journal.
3. During freezing weather, be sure to drain the pump when it is not running. Remove discharge hose and tip unit towards discharge side.
4. Keep pump clean. After use with liquids containing foreign materials, flush with clean water.

REPLACEMENT OF FLAPPER VALVE

(Ref. No. W15)

1. Remove two bolts (Ref. No. W3) and remove suction priming chamber (Ref. No. W2). Replace flapper (Ref. No. W15) on flapper pin to locate on priming chamber.
2. Remove two bolts (Ref. No. W8) and remove discharge plate (Ref. No. W7). Replace flapper valve on flapper pin to locate valve on pump well (Ref. No. W1).

REPLACEMENT OF DIAPHRAGM

(Ref. No. P17)

1. Remove sheet metal guard (Ref. No. A4) by loosening hand knob screws (Ref. No. A5).
2. Rotate pump until plunger arm (Ref. No. A2) is in the down position.
3. Remove handle (Ref. No. A35).
4. Remove pump well (Ref. No. A3) by removing screws, (Ref. No. A9/A10).
5. Remove diaphragm by removing three nuts (Ref. No. P12) from bolts (Ref. No. P11).
6. Replace diaphragm and reverse steps 1 through 5 for reassembly.

GEAR BOX OVERHAULING

A completely assembled gear box is available as a replacement part (Ref. No. G28).

DISASSEMBLY

1. Remove diaphragm (Ref. No. P13) as described in "Replacement of Diaphragm".
2. Remove crank (Ref. No. P5) by removing machine screw (Ref. No. P6). Use screwdriver in slot of crank to release clamp on output shaft (Ref. No. G8).
3. Drain oil from gear box by removing drain plug (Ref. No. G4).
4. Remove driver (Ref. Nos. A28/A32) from adapter (Ref. No. G26) by removing four bolts (Ref. No. A27) plus 4 additional bolts (Ref. No. A29) from engine mount bracket (Ref. No. A16) for gas driver models. Slide driver back from adapter until driver shaft disengages pinion (Ref. No. G20).

5. Remove adapter by removing four bolts (Ref. No. G27).
6. Remove gear box from pump base (Ref. No. A8) by removing four bolts (Ref. No. A9 & A10).
7. Remove pinion/bearing assembly (Ref. Nos. G15, G24, G20, G16) by pulling straight out. Use a slide hammer puller gripping in pinion groove
8. Remove twelve bolts (Ref. No. G3) holding gear box halves (Ref. Nos. G1 & G2) together.
9. Carefully separate gearbox halves.
10. Remove gasket (Ref. No. G22).
11. Remove output shaft/bearing assembly (Ref. Nos. G8, G9, G12, G11, G12, G13) and idler pinion/bearing assembly (Ref. Nos. G13, G14, G17, G18, G19).
12. Remove output shaft oil seal (Ref. No. G23)
13. Remove bearings (Ref. Nos. G15 & G16) from ends of input pinion shaft (Ref. No. G20).
14. Remove bearings (Ref. Nos. G13 & G14) from ends of idler pinion shaft (Ref. No. G17).
15. Remove internal spur gear (Ref. No. G19) and key (Ref. No. G18) from idler pinion shaft.
16. Remove retaining ring (Ref. No. G10) and bearings (Ref. Nos. G12 & G13) from ends of output shaft (Ref. No. G8).
17. Remove output gear (Ref. No. G11) and key (Ref. No. G9) from output shaft.

REASSEMBLY

1. Assemble input pinion/bearing assembly, idler pinion/bearing assembly and output shaft/bearing assembly.
2. Install output shaft oil seal into gearbox output half. Lubricate lip seal.
3. Slide output shaft through lip seal. Start output bearing in bore in gear box output half. Position idler pinion bearing assembly in its bore in output half. Simultaneously press both assemblies into output half.
4. Install gasket on output half.
5. Position gear box input half; align shaft bearings with bearing bores. Press gear box halves together, align pins in output half with pin bore in input half.
6. Secure halves together with twelve bolts.
7. Slide input pinion/bearing assembly into bore in gear box input half. Rotate pinion during installation to make sure gear teeth align with internal spur gear teeth.
8. Install O-ring (Ref. No. G25) on outside of pinion bearing.
9. Reassemble gear box to pump base with four bolts.
10. Reassemble adapter to gear box with four bolts.
11. Align driver shaft key (Ref. No. A26) with keyway in pinion. Slide driver into pinion, secure to adapter with four bolts (Ref. No. A27).
 - a. **(Gas engine only)** Attach engine to engine mount with four additional screw assemblies (Ref. No. A29).
12. Reassemble crank to output shaft as described under "Operation" section.
13. Replace diaphragm as described under "Replacement of Diaphragm" section.
14. Fill gear box with oil as described under "Assembly" section.
15. Pump should be checked daily, weekly, monthly for proper operation.

NOTE: Only qualified service personnel should attempt to repair this unit. Improper repair and/or assembly can cause pump damage, driver damage and/or an electrical shock hazard depending on model.

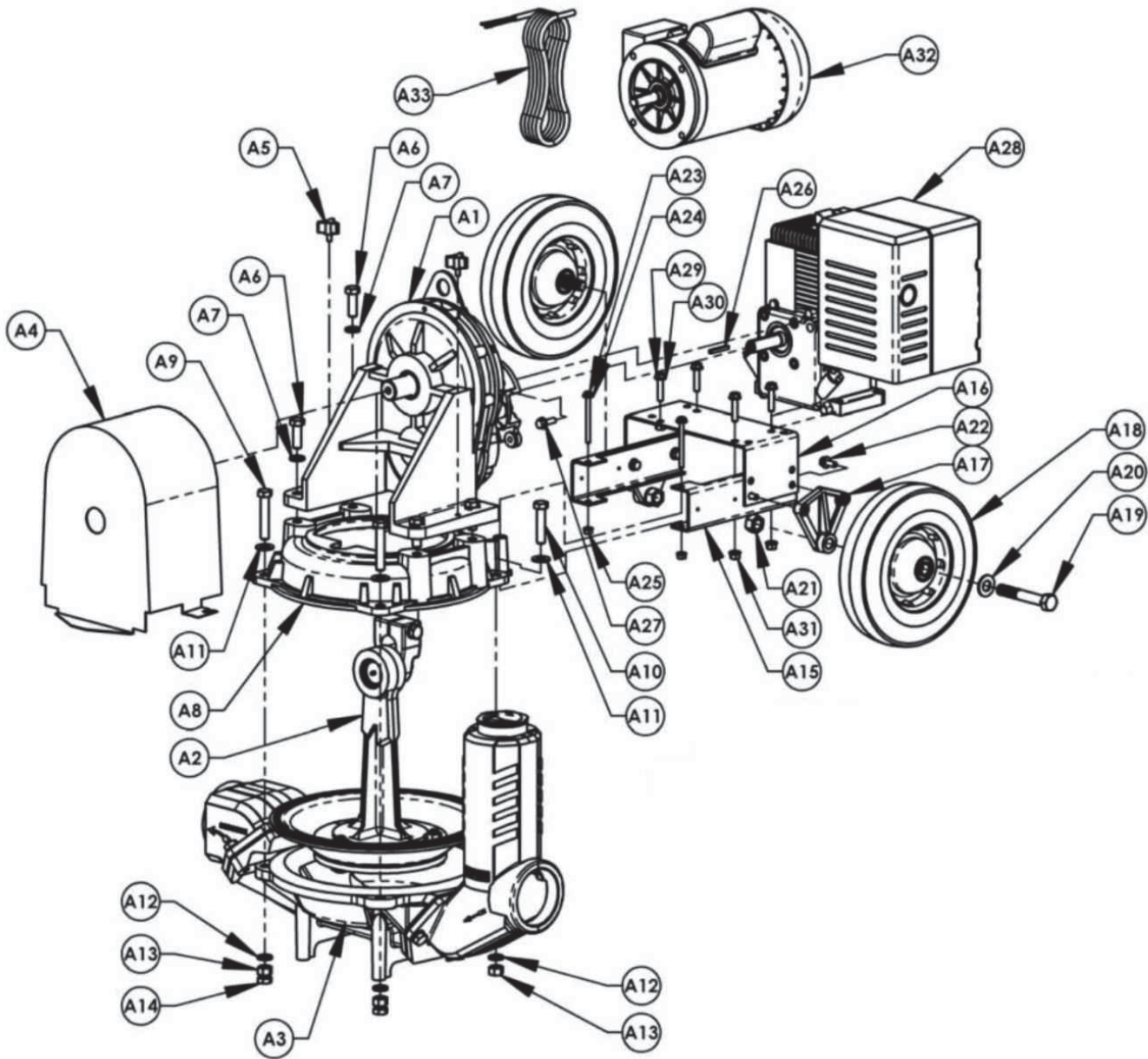
Diaphragm Pumps

Symptom	Possible Cause(s)	Corrective Action
Pump will not prime or retain prime after operating	<ol style="list-style-type: none"> 1. Air leak in suction line 2. Defective flapper valves 3. Clogged foot valve or strainer 4. No liquid in suction line 5. Material jammed in pump well 	<ol style="list-style-type: none"> 1. Repair or replace 2. Replace 3. Clean or replace 4. Fill suction line & pump with liquid 5. Clean (See Maintenance)
Flow rate is slow	<ol style="list-style-type: none"> 1. Incorrect driver speed 2. Piping is fouled or damaged 3. Clogged pump 4. Discharge line restricted or undersized 5. Collapsible discharge hose 6. Too many bends 7. Lines are too long 	<ol style="list-style-type: none"> 1. Increase speed (see Specifications) 2. Clean or replace 3. Clean 4. Flush out piping or replace 5. Replace with rigid or non-collapsible hose 6. Straighten hose 7. Shorten lines
Pump runs but no fluid	<ol style="list-style-type: none"> 1. Faulty suction piping 2. Pump located too far from fluid source 3. Gate valve closed 4. Clogged strainer 5. Discharge height too great 	<ol style="list-style-type: none"> 1. Replace 2. Place pump closer to source 3. Open gate valve 4. Clean or replace 5. Lower discharge height
Pump starts and stops pumping	<ol style="list-style-type: none"> 1. Leak in suction line 2. Leak in foot valve 3. Diaphragm has a crack or hole 4. Defective or clogged flapper valves 	<ol style="list-style-type: none"> 1. Repair 2. Repair or replace 3. Replace 4. Clean or replace
Excessive noise while pump in operation	<ol style="list-style-type: none"> 1. Pump not secured to firm foundation 2. Restricted suction line 	<ol style="list-style-type: none"> 1. Secure properly 2. Clean or correct
Pump stalls repeatedly or stops for no apparent reason	<ol style="list-style-type: none"> 1. Discharge height over 25 feet of head 2. Material jammed in pump well 	<ol style="list-style-type: none"> 1. Lower height (see Specifications) 2. Clean out pump well (See Operation & Maintenance section)

For Repair Parts contact dealer where pump was purchased.

Please provide following information:

- Model Number
- Serial Number (if any)
- Part description and number as shown in parts list



Assembled Pump – Figure A

Repair Parts List - Assembled Pump (Reference Figure A)

Ref. No.	Description	3" Engine Driven Pump Part Number	3" Motor Driven Pump Part Number	2" Engine Driven Pump Part Number	2" Motor Driven Pump Part Number	Qty.
A1	Gearbox Assembly	Ref. Page 8	Ref. Page 8	Ref. Page 8	Ref. Page 8	1
A2	Plunger/Diaphragm Assembly	Ref. Page 10	Ref. Page 10	Ref. Page 10	Ref. Page 10	1
A3	Well Assembly	Ref. Page 11	Ref. Page 11	Ref. Page 11	Ref. Page 11	1
A4	Plunger Guard	3354-103-00	3354-103-00	3354-103-00	3354-103-00	1
A5	¼-20X1/2 Plastic Knob	1716-010-00	1716-010-00	1716-010-00	1716-010-00	2
A6	½-13x1-1/2 Hex Head Cap Screw	1766-013-00	1766-013-00	1766-013-00	1766-013-00	2 (3" Version) 4 (2" Version)
A6	½-13x2-1/4 Hex Head Cap Screw	1766-016-00	1766-016-00	N/A	N/A	2
A7	½ Lock Washer	1798-001-00	1798-001-00	1798-001-00	1798-001-00	4
A8	Base	3354-001-01	3354-001-01	3360-020-01	3360-020-01	1
A9	½-13x2-1/4 Hex Head Bolt Grade-5	1766-016-00	1766-016-00	1766-016-00	1766-016-00	2
A10	½-13x2-1/4 Hex Head Bolt Grade-5	1766-016-00	1766-016-00	1766-016-00	1766-016-00	2
A11	½ Flat Washer	1798-002-00	1798-002-00	1798-002-00	1798-002-00	4
A12	½ Lock Washer	1798-001-00	1798-001-00	1798-001-00	1798-001-00	4
A13	½-13 Hex Nut	1782-002-00	1782-002-00	1782-002-00	1782-002-00	4
A14	½-13 Hex Jam Nut	1782-001-00	1782-001-00	N/A	N/A	2
A15	Mount Brace	3354-107-00	3354-107-00	3354-107-00	3354-107-00	2
A16	Engine Mount	3354-108-00	3354-108-00	3354-108-00	3354-108-00	1
A16	Engine Mount Kit for Hatz	335Z-101-90	N/A	335Z-101-90	N/A	1
A17	Wheel Bracket	3354-109-00	3354-109-00	3354-109-00	3354-109-00	2
A18	Wheel	1663-000-00	1663-000-00	1663-000-00	1663-000-00	2
A19	5/8-11x4 Hex Head Bolt	1769-000-00	1769-000-00	1769-000-00	1769-000-00	2
A20	5/8 Flat Washer	1799-000-00	1799-000-00	1799-000-00	1799-000-00	2
A21	5/8-11 Hex Nut	1782-020-00	1782-020-00	1782-020-00	1782-020-00	2
A22	5/16-18x3/4 Hex Flange Screw	1745-002-00	1745-002-00	1745-002-00	1745-002-00	4
A23	¼-20x3 Hex Head Bolt	1734-013-00	1734-013-00	1734-013-00	1734-013-00	2
A24	¼ Flat Washer	1789-000-00	1789-000-00	1789-000-00	1789-000-00	2
A25	¼-20 Hex Nut	1776-000-00	1776-000-00	1776-000-00	1776-000-00	2
A26	3/16 Square Key	1517-001-00	1517-001-00	1517-001-00	1517-001-00	1
A27	5/16-24x1 Hex Flange Screw	1753-000-00	N/A	1753-000-00	N/A	4
A27	3/8-16X1-1/4 Hex Head Cap Screw	N/A	1757-003-00	N/A	1757-003-00	4
A28	Engine ¾ Keyed PTO	See Chart	N/A	See Chart	N/A	1
A29	5/16-18x1-1/2 Hex Head Bolt	1748-000-00	N/A	1748-000-00	N/A	4
A29	5/16-18 x ¾ Hex Bolt (Hatz)	1745-002-00	N/A	1745-002-00	N/A	4
A30	5/16 Flat Washer	1790-000-00	N/A	1790-000-00	N/A	4
A31	5/16-18 Hex Nut	1785-000-00	N/A	1785-000-00	N/A	4
A32	Motor	N/A	1626-095-00	N/A	1626-095-00	1
A33	Cord Assembly	N/A	335E-352-90	N/A	335E-352-90	1
A34	Switch Assembly (not shown)	N/A	335E-350-90	N/A	335E-350-90	1
A35	Handle Kit (not shown)	3354-116-90	3354-116-90	3354-116-90	3354-116-90	1
A36	Nipple Pack (2 NPT nipples)	3270-170-00	3270-170-00	3160-170-00	3160-170-00	1

Repair Parts List - Engine Chart

Ref. No.	Description	3" Pump Model Number	2" Pump Model Number	Part Number	Qty.
A28	Honda GX120UT1QX2	335G-96	336G-98	1630-007-00	1
A28	Honda GX160UT1QX2	335H-96	N/A	1639-017-00	1
A28	Hatz 1B20	335Z-96	336Z-96	1630-021-90	1

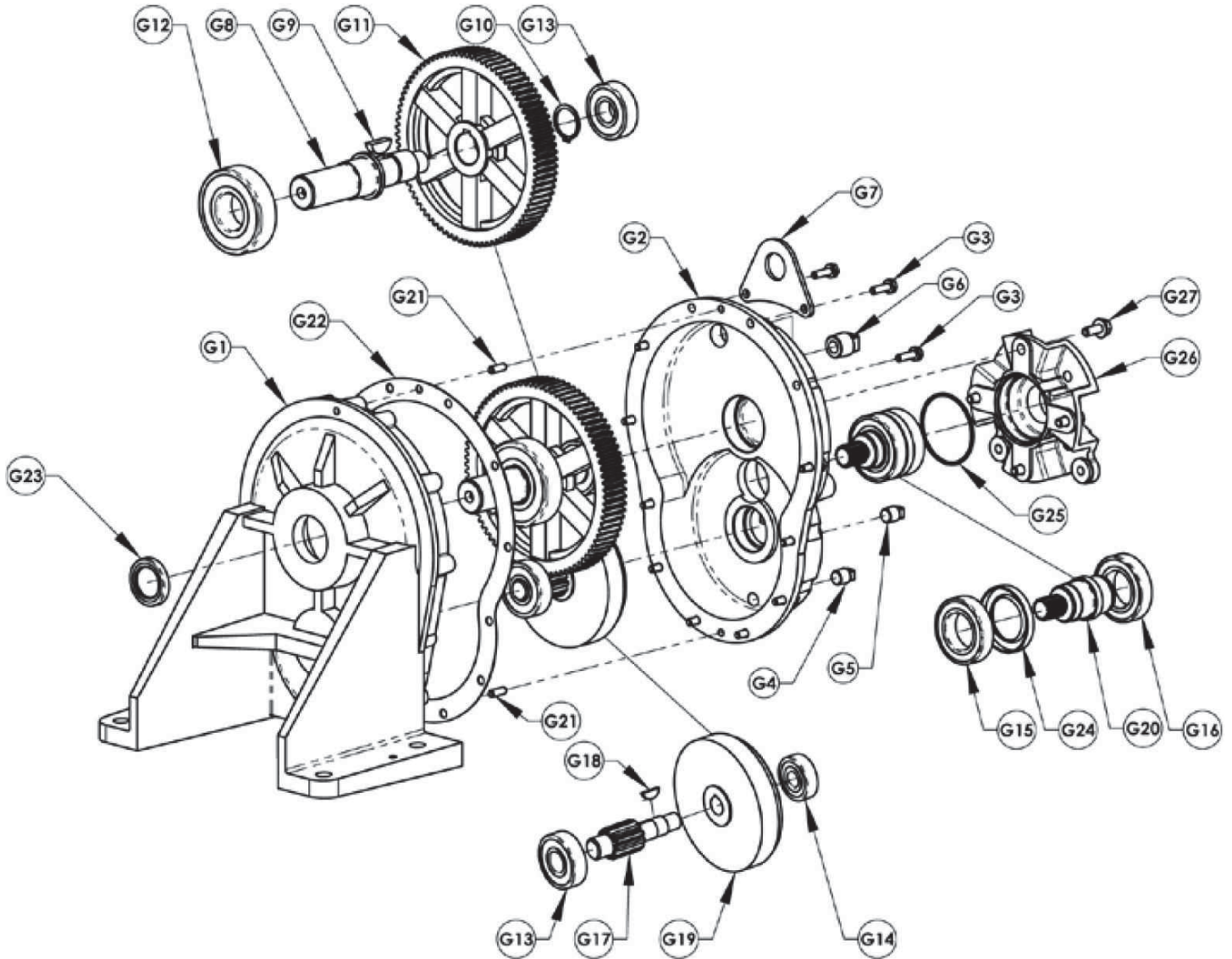
For Repair Parts contact dealer where pump was purchased.

Please provide following information:

-Model Number

-Serial Number (if any)

Part description and number as shown in parts list



Gearbox – Figure G

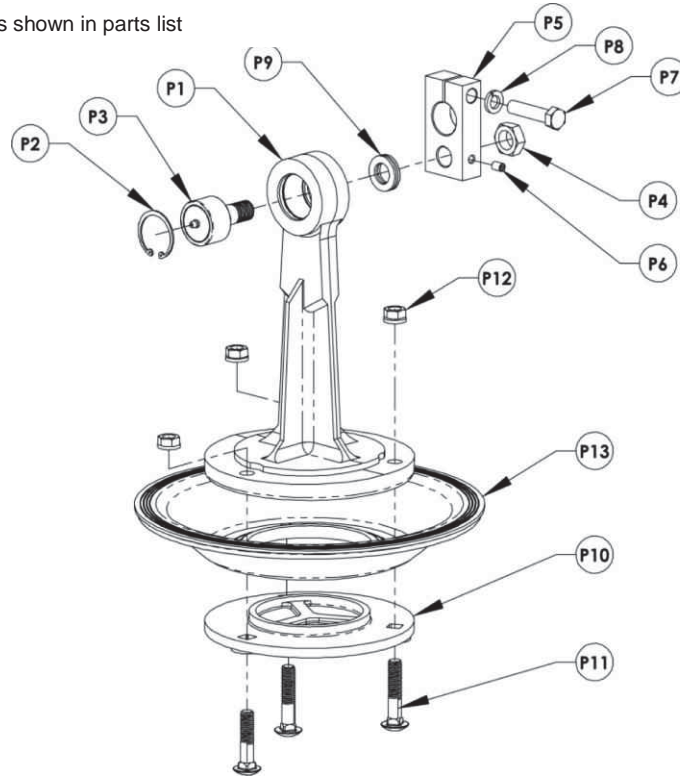
Repair Parts List - Gearbox (Reference Figure G)

Ref. No.	Description	3" Pumps		2" Pumps	
		Part Number	Qty.	Part Number	Qty.
G1	Gearbox Output Half	3354-090-01	1	3354-090-01	1
G2	Gearbox Input Half	3354-091-01	1	3354-091-01	1
G3	¼-20x7/8" Screws and Washer Kit (12 each)	3354-420-90	1	3354-420-90	1
G4	¼ NPT Plug (drain) (kit includes 1)	1767-002-00	1	1767-002-00	1
G5	¼ NPT Plug (oil level) (kit includes 1)	1767-002-00	1	1767-002-00	1
G6	½ NPT Vented Plug (fill) (kit includes 1)	1767-001-00	1	1767-002-00	1
G7	Lift Bracket	3354-106-00	1	3354-106-00	1
G8	Output Shaft	3354-140-00	1	3354-140-01	1
G9	Woodruff Key #1008	2141-000-00	1	2141-000-00	1
G10	External Retaining Ring SH-112	1806-064-00	1	1806-064-00	1
G11	Output Gear	3354-120-00	1	3354-120-00	1
G12	Bearing –Open- 35x80x21 #6307 JEM	3354-190-00	1	3354-190-00	1
G13	Bearing –Open- 20x52x15 #6304 JEM	3354-191-00	2	3354-191-00	2
G14	Bearing –Open- 15x42x13 #6302 JEM	3354-192-00	1	3354-192-00	1
G15	Bearing –Open- 35x62x14 #6007 JEM	3354-194-00	1	3354-194-00	1
G16	Bearing –Sealed- 35x62x14 #6007 2RSJEM	3354-193-00	1	3354-193-00	1
G17	Idler Pinion Shaft	3354-121-00	1	3354-121-00	1
G18	Woodruff Key #406	2157-000-00	1	2157-000-00	1
G19	Internal Spur Gear	2149-000-00	1	2149-000-00	1
G20	Input Pinion (3/4 keyed engine)	3354-122-00	1	3354-122-00	1
G20	Input Pinion (5/8 keyed 56C motor)	3354-123-00	1	3354-123-00	1
G21	1/4x1 Dowel Pin	1717-002-00	1	1717-002-00	1
G22	Gasket	3354-300-00	1	3354-300-00	1
G23	Oil Lip Seal 1.25x1.75x0.25	2148-000-00	1	2148-000-00	1
G24	Oil Lip Seal 40x62x8	2148-001-00	1	2148-001-00	1
G25	O-Ring- Buna #143	2181-005-00	1	2181-005-00	1
G26	Adapter (engine)	3354-093-01	1	3354-093-01	1
G26	Adapter (56C motor)	3354-092-01	1	3354-092-01	1
G27	5/16-18x3/4 Hex Flange Screw	1745-002-00	4	1745-002-00	1
G28	Assembled Gearbox for Gas Engine Models (includes Ref. Nos. G1 thru G24)	3354-402-90	1	3360-402-90	1
G28	Assembled Gearbox for Electric Models (includes Ref. Nos. G1 thru G24)	3354-403-90	1	3360-403-90	1

For Repair Parts contact dealer where pump was purchased.

Please provide following information:

- Model Number
- Serial Number (if any)
- Part description and number as shown in parts list



Plunger Assembly – Figure P

Repair Parts List - Plunger Assembly (Reference Figure P)

Ref. No.	Description	3" Pumps		2" Pumps	
		Part Number	Qty.	Part Number	Qty.
P1	Plunger	2134-000-01	1	3360-090-01	1
P2	Retaining Ring	3350-190-00	1	3360-191-00	1
P3	Plunger Bearing (includes Ref. No. P4)	2138-000-90	1	3360-190-90	1
P4	Bearing Lock Nut	Incl. w/P3	1	Incl. w/P3	1
P5	Crank Assembly Kit (includes Ref. Nos. P6, P7, P8, P9)	2140-000-90	1	3360-094-90	1
P6	5/16-18x1/2 Socket Set Screw	Incl. w/P5	1	Incl. w/P5	1
P7	½-13 Hex Head Cap Screw Grade-5	Incl. w/P5	1	Incl. w/P5	1
P8	½ Lock Washer	Incl. w/P5	1	Incl. w/P5	1
P9	Bearing Shim	Incl. w/P5	2	Incl. w/P5	1
P10	Diaphragm Retaining Plate	2133-000-00	1	3360-092-00	1
P11	Carriage Bolt Kit	3350-011-90	1	3360-011-90	1
P12	½-13 Hex Nut	1782-001-00	3	N/A	-
P12	3/8-16 Hex Nut	N/A	-	1780-000-00	3
P13	Diaphragm (Santoprene)	2132-000-00	1	3360-300-00	1

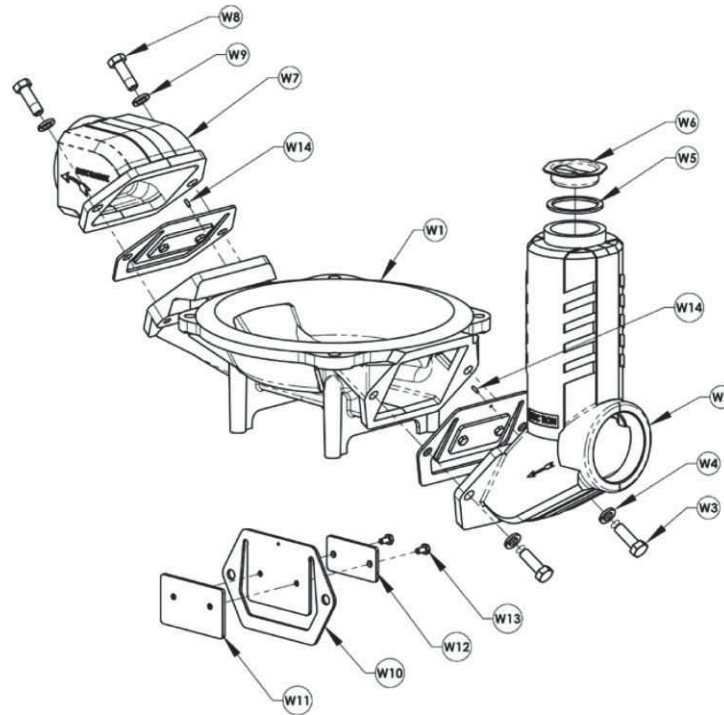
For Repair Parts contact dealer where pump was purchased.

Please provide following information:

-Model Number

-Serial Number (if any)

Part description and number as shown in parts list



Well Assembly – Figure W

Repair Parts List - Well Assembly (Reference Figure W)

Ref. No.	Description	3" Pumps		2" Pumps	
		Part Number	Qty.	Part Number	Qty.
W1	Well	2120-001-00	1	3360-001-01	1
W2	Suction Plate	2123-000-01	1	3360-050-01	1
W3	½-13x1-1/2 Hex Head Cap Screw Grade-5	1766-013-00	2	N/A	-
W3	3/8-16x1-1/2 Hex Head Cap Screw Grade-5	N/A	-	1759-001-00	2
W4	½ Lock Washer	1798-001-00	2	N/A	-
W4	3/8 Lock Washer	N/A	-	1793-001-00	2
W5	Gasket	2125-000-00	1	2125-000-00	1
W6	Cap	2124-000-00	1	2124-000-00	1
W7	Discharge Plate	2131-000-01	1	3360-052-01	1
W8	½-13x1-1/2 Hex Head Cap Screw Grade-5	1766-013-00	2	N/A	-
W8	3/8-16x1-1/2 Hex Head Cap Screw Grade-5	N/A	-	1759-001-00	2
W9	½ Lock Washer	1798-001-00	2	N/A	-
W9	3/8 Lock Washer	N/A	-	1793-001-00	2
W10	Check Valve (neoprene)	Incl. w/W15	2	Incl. w/W15	2
W11	Check Valve Weight Top	Incl. w/W15	2	Incl. w/W15	2
W12	Check Valve Weight Bottom	Incl. w/W15	2	Incl. w/W15	2
W13	¼-20x1/2 Hex Head Cap Screw	Incl. w/W15	4	Incl. w/W15	4
W14	1/8 diameter x 3/8 Pin	2121-000-00	2	2121-000-00	2
W15	Flapper Valve Assembly Kit (includes Ref. Nos. W10, W11, W12, W13)	3354-071-90	2	3360-070-90	2
W16	Suction Strainer (not shown)	1680-000-00	1	C230-170-00	1



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Royersford, PA 19468
Phone: (610) 948-3800
Fax: (610) 948-5300
www.amtpump.com



General Information

SALES POLICY: AMT products are sold through our established Distributors. We do not sell direct to the consumer or organization not entitled to trade recognition. Therefore, possession of our catalogs and/or price list(s) does not infer an offer to sell.

MINIMUM ORDER: We appreciate your order, however, all orders are subject to a minimum \$35.00 net invoice charge (excluding freight). This applies to all pump and parts purchase orders.

PRICES: Prices are subject to change without notice. All orders accepted are subject to prices in effect at time of shipment.

PAYMENT TERMS: Terms, upon establishment of credit, are Net 30 days. Past due accounts may be subject to a service charge of 1.5% per month. Domestic or assignable letter of credit is required for all export trade.

PAST DUE ACCOUNTS: AMT reserves the right to withhold open account shipments on any past due account. Invoices are considered past due after thirty (30) days. In the interest of sound business, all orders are subject to approval of the Credit Department.

SHIPPING INSTRUCTIONS: All shipments will be made F.O.B. the factory. Where instructions for shipment do not appear on the order, the shipment will be made according to our best judgment. Full risk of loss (including transportation delays and losses) shall pass to the customer upon delivery of the products to the carrier at the F.O.B. point. When loss or delay occurs, primary responsibility for tracing rests with the customer. When there is LOSS or APPARENT VISIBLE DAMAGE to a shipment, when tendered for delivery, **DO NOT** give the carrier a clear receipt. Note such damage on the carrier's delivery receipt and **HAVE THE DRIVER SIGN THE RECEIPT.**

PRODUCT REVISIONS: AMT reserves the right to discontinue, change or improve its products or any portions thereof without being obligated to provide such a change or improvement for units sold and/or shipped prior to such a change or improvement.

LEAD TIME: Products designated "Quick Ship Product", also referred to as "QSP" will normally be shipped within 24 hours of receipt of a non-cancellable purchase order. Only limited quantities of "QSP" pumps are available.

STANDARD LEAD TIME: Lead time is two weeks for all non "QSP" product. AMT reserves the right to revise lead times as required due to availability of materials and all other causes beyond our control.

VIP SHIPMENT: Select AMT and IPT branded pumps are available for next day shipment for non-QSP (Quick Ship Products) items and subjected to a specific model surcharge per unit noted in the respective price book. Requires calling for availability, confirmation and a non-cancellable purchase order or credit card payment prior to shipment. The expedited shipping charges are an additional cost added separately from the VIP charges per item. AMT reserves the right to revise lead times as required due to availability of materials and all other causes beyond our control. QSP quantities are limited as determined by AMT.

ALL purchase orders must be submitted via hard copy sent to AMT customer service department by fax, EDI or e-mail.

RETURN GOODS POLICY: Goods shall not be returned without a return goods authorization number (RGA) issued by AMT customer service. The RGA number must be listed on the packing list. Only current model and part numbers with a valid date code may be returned (within one year from date of purchase). **A 20% restocking and packaging charge will apply to all returns. All shipping charges must be pre-paid. No exceptions.**

ORDER CHANGES BY CUSTOMER: Orders in process may not be changed except with written consent and may be subject to special charges.

12 Month Limited Warranty

EXTENT AND DURATION OF LIMITED WARRANTY

Coverage: AMT Pump Company (herein "AMT") or IPT Pumps by Gorman-Rupp (herein "IPT") or Gorman-Rupp Industries Division of the The Gorman-Rupp Company, Patterson, or the Gorman-Rupp Company (herein referred to as "G-R Unit) each individually warrants that its products and parts shall be free from defects in material and workmanship for twelve (12) months from the date of purchase by the original end user when installation is made and maintenance is performed in accordance with G-R Unit's recommendations. Wear and tear resulting from use and items normally consumed in use are not covered.

EXCEPTIONS

(A) This Limited Warranty shall not apply to mechanical seals in AMT or IPT pumps and the following products and parts: engines, motors, trade accessories and all other products, components, parts and materials not manufactured by the G-R Units. These items may, however, be covered by the warranties of their respective manufacturers. (B) This warranty does not extend to or apply to any unit which has been repaired or altered at any place other than by a G-R Unit, or by persons not expressly approved by a G-R Unit to make repairs or alterations, nor to any unit the serial number, model number or identification of which has been removed, defaced or altered. (C) This warranty does not extend to any product manufactured by a G-R Unit, which has been subjected to mis-use, neglect, accident, improper installation, or use in violation of instructions furnished by a G-R Unit. (D) Pump Kits: This warranty does not extend to any product sold by a G-R Unit unassembled as a Pump Kit. Pump Kits are warranted against defects in material and workmanship for 60 days from the date of shipment from a G-R Unit. Any Pump Kit parts deemed defective by a G-R Unit will be replaced free of charge within 60 days of shipment. Pump Kits are not returnable for credit.

LIMITATIONS

THE G-R UNITS' SOLE AND EXCLUSIVE WARRANTY WITH RESPECT TO THEIR PRODUCTS AND PARTS IS THIS LIMITED WARRANTY. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER EXPRESS AND/OR IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.

EXCLUSIVE REMEDY AND DAMAGES

The sole and exclusive remedy for breach of this Warranty by a G-R Unit and the entire extent of its liability for such breach or for damages arising from the use of the products and parts covered under this Limited Warranty, shall be as follows:

- Repair or Replacement:** If inspection shows that any G-R Unit product or part covered under this Limited Warranty is defective in materials or workmanship, the G-R Unit shall repair or replace the defective or non-conforming product or part without charge, whichever the G-R Unit chooses. You must have properly maintained and used the product or part claimed to be defective in accordance with the maintenance schedule or manual, which comes with the product. No allowance will be made for labor, installation, removal, transportation or other charges incurred by you in connection with such repair or replacement.
- To obtain the above remedy:
 - Immediately notify the G-R Unit upon discovery of the claimed defect in materials or workmanship and provide the serial number or date code of the product and/or part(s) or provide the G-R Unit with the invoice or bill of sale referencing the product by no later than the expiration date of the warranty period.
 - The G-R Unit will advise whether inspection will be necessary and how whether repair or replacement will be made. If inspection by the G-R Unit is necessary, the pump or defective part must be sent freight pre-paid to the G-R Unit. Return shipment will be F.O.B. the G-R Unit's plant.
 - Return Goods Authorization Requirement:** No product will be accepted for return or replacement without the prior written authorization of the G-R Unit. Upon such authorization, and in accordance with instructions from the G-R Unit, the product will be returned to the G-R Unit, shipping charges prepaid by the Buyer.
- Damages:** The G-R Unit's liability for damages for breach of this Limited Warranty shall not exceed the amount of the purchase price of the product or part(s) in respect to which Such damages are claimed. **IN NO EVENT SHALL THE G-R UNITS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES FOR BREACH OF THIS LIMITED WARRANTY.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

Proper Method of Dumping RV Holding Tanks

Brought to you by



Using this method will insure your tanks are emptied in an environmentally friendly manner, as well as much more sanitary for the operator. Please tell all your RVing friends, or better yet, give them a copy of this procedure. Together we can get rid of all the mess at RV park sites across the country.

Follow us on **Facebook** to add your comments on this and other RV related issues.
www.facebook.com/Drainmasterproducts

To see the Waste Master Cam Loc system, the ultimate waste evacuation system, go to www.drainmaster.com & click on RV's then Sewer Hose Systems in the middle of the page.

Using the System

1. Remove the system from its storage container near the park sewer inlet. (This is probably opposite to your current method.) REMEMBER THE "FIRST IN" "LAST OUT" RULE APPLIES HERE.
2. Insert the nozzle in the sewer inlet securely.
3. Open the grey lever on the side of the nozzle. (If you have a sewer inlet fitting without an on-off valve, use a cap to cover the outlet fitting)
4. With the other end of the hose assembly, walk back to the RV where the sewer outlet is located.
5. Remove the cap on the coach, then the storage cap in the male Cam Loc fitting. (Or bayonet fitting)
6. Connect the male Cam Loc fitting into the female Cam Loc fitting on the coach and rotate the grey cams to their locked position. (You know how to attach the bayonet fitting)

Dumping the Tanks

1. Check your installation to be sure the nozzle is open and secure in the park sewer inlet.
2. Open the black dump valve and allow the tank to fully drain. (See Flushing section)
3. Close the black valve fully and open the grey valve (if your RV is equipped with 2 grey valves, open the galley first). When the tank is fully drained, close the valve.

Flushing the Holding Tanks

1. Most RVs have a flusher in the black tank and some have them in the grey tanks. You should have them in both or all 3 tanks if so equipped.
2. Connect a hose to the coach connection on the side of the RV. Do not use the fresh water hose used for supplying water to the RV.
3. Turn on the water and fill the black tank about 2/3 full before opening the dump valve. Repeat this process until the sight glass in your Polychute system runs clear.
4. Repeat step 2 and 3 with your grey tank(s).
5. Now is the time to restore the assembly as outlined next.

Restoring the system for travel

1. Make sure all tank dump valves are closed.
2. Remove male Cam Loc fitting connected to the coach and install the protective cap both in the coach fitting and the male Hose fitting. (Or your bayonet fitting)
3. Walk the hose assembly back to the sewer inlet, letting the hose collapse as you get close to the park sewer inlet.
4. Close the grey lever on the nozzle. (Or lift the sewer fitting out of the sewer and put the cap on the outlet)
5. Insert the nozzle in the storage container and feed the hose and male Cam Loc fitting back as well. Return system to its RV storage location.

If you have any questions or need clarification regarding this procedure please let us know by email admin@drainmaster.com

Please read and save this Repair Parts Manual. Read this manual and the General Operating Instructions carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. The Safety Instructions are contained in the General Operating Instructions. Failure to comply with the safety instructions accompanying this product could result in personal injury and/or property damage! Retain instructions for future reference. AMT reserves the right to discontinue any model or change specifications at any time without incurring any obligation.

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Periodic maintenance and inspection is required on all pumps to insure proper operation. Unit must be clear of debris and sediment. Inspect for leaks and loose bolts. Failure to do so voids warranty.

Diaphragm Pumps



DESCRIPTION

These diaphragm pumps are high capacity, self-priming (to 25 ft. lift), portable units shipped completely assembled (except for handle). The pumps are used for operation with fluids mixed with abrasive solids such as sand, silt, mud, sludge and waste. Not for use with pumping cement or mortar. Handles liquids from 40° to 180° F (4° to 82° C). Pump is capable of handling solids up to 1-5/8" diameter. For use with water and other non-flammable fluids compatible with pump component materials.

Model	Driver Type	Material	Diaphragm	Check Valve	Gear Box	Plunger Bearing	NPT
338Z-96	Hatz 1B30 Diesel	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	2"
338G-96	Honda GX120	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	2"
338E-96	1.5 HP 115VAC @ 60 HZ	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	2"
338T-96	1.5 HP, 3PH 208-230/460VAC @ 60HZ	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	2"
337G-96	Honda GX120	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	3"
337H-96	Honda GX160	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	3"
337Z-96	Hatz 1B30 Diesel	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	3"
337E-96	1.5 HP 115 VAC @ 60 HZ	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	3"
337T-96	1.5 HP, 3PH 208-230/460VAC @ 60HZ	Aluminum	Thermoplastice/TPE	Neoprene	Oil Bath	Needle	3"

NOTE: Driver is subject to change without notice, see labels and manual with driver for operation, specifications, maintenance and warranty.

UNPACKING

After unpacking the unit, inspect carefully for any damage that may have occurred during transit. Check for loose, missing or damaged parts.

Specific Safety Information for Gasoline Engine Driven Pumps

- Carefully read the instruction manuals supplied by the engine manufacturer before attempting to assemble, disassemble or operate the engine or any other part. The "Warning" and "Caution" statements in this manual signal potentially hazardous conditions to the operator or equipment. Know when these conditions can exist. Take necessary steps to protect personnel, as well as equipment.

▲ WARNING

Gasoline is a highly combustible fuel. Use it with care! The improper use, handling and/or storage of gasoline can be dangerous. Help prevent accidents by following these safety rules:

- Use gasoline only as a fuel, never as a cleaning fluid.
- Always use an approved container to hold or store gasoline. Never store gasoline in familiar containers such as milk gallons or soda pop bottles
- Never store gasoline near a heater or an open flame.
- When storing or using gasoline, make sure container is out of the reach of children.
- Never add gasoline to a running or hot engine. Spilled gasoline on a hot engine may cause a fire or an explosion. Fill gasoline tank outdoors and wipe up any spills.
- Have a fire extinguisher nearby. Be sure extinguisher is in operating

condition – check the pressure gauge or indicator. Be familiar with its proper use. Consult the local fire department for the correct type of extinguisher for your application. Extinguishers rated ABC by the National Fire Protection Association are appropriate for all applications.

- On permanent installations, be sure all fuel supplies have a positive shutoff valve. Fuel lines must be of steel piping, adequately secured and free from leaks. Do not use copper piping on flexible lines as copper becomes hardened and brittle and will break. Use black pipe on natural gas or gaseous fuels, but not on gasoline or diesel fuels. Piping at the engine should be a suitable flexible line that is compatible with the fluid.

Positively no smoking!

- Check engine oil, fuel levels and gear box oil levels before initial startup each day. Stay away from moving parts due to the danger of becoming caught in moving parts. Avoid loose jackets, shirts, sleeves and ties. Make sure all nuts and bolts are secure. Keep power shields and guards in place. If adjustment MUST be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.
- Do not work with this equipment when mentally or physically fatigued.
- Be careful not to touch the exterior of the engine, especially the muffler and the area around it. It is hot enough to be painful or cause injury.
- To prevent accidental starting, always remove the spark plug or disconnect and ground the spark plug wire before working on the engine or the equipment driven by the engine.

Diaphragm Pumps

6. DO NOT RUN THE ENGINE IN AN ENCLOSED AREA!! Exhaust gases contain carbon monoxide, which is an odorless and deadly gas that will cause death if breathed too long. If equipment is located in an enclosed area with an exhaust line to the outside, regularly check the exhaust system for leaks. Be sure the area is well ventilated.
7. If the gas engine is equipped with a spark arrester screen in the muffler, it should be inspected for wear periodically and replaced when necessary.
7. Keep fingers and foreign objects away from ventilation and other openings. Do not insert any objects into the motor.
8. Use wire of adequate size to minimize voltage drop at the motor.
9. Disconnect power before servicing a motor or its load. If the power disconnect is out of sight, lock it in the open position and tag it to prevent unexpected application of power.
10. Do not touch an operating motor. Modern motors are designed to operate at high temperatures.

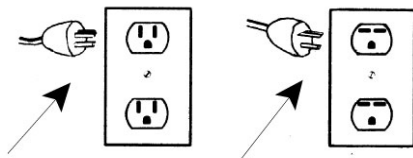
Specific Safety Information for Electric Motor Driven Pump

1. This unit is not waterproof and is not intended to be used in potentially wet locations. The motor is designed to be used in a clean dry location with access to an adequate supply of cooling air. Ambient temperature around the motor should not exceed 104° F (40° C). For outdoor installations, motor must be protected by a cover that does not block air flow to and around the motor. This unit is not weatherproof nor is it able to be submersed in water.
2. When wiring an electrically driven pump, follow all electrical and safety codes, as well as the most recent United States National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

▲ WARNING

Risk of electrical shock! Never connect the green (or green and yellow) wire to a live terminal.

3. To reduce the risk of electric shock, the motor must be securely and adequately grounded!. This can be accomplished by either: (1) inserting plug (portable) directly into a properly installed and grounded 3-prong grounding-type receptacle (as shown in Figure 2); (2) permanently wiring the unit with a grounded metal raceway system; (3) using a separate ground wire connected to the bare metal of the motor frame; or (4) other suitable means. The green (or green and yellow) conductor in the cord is the grounding wire. The motor must be securely and adequately grounded for your protection against shock hazards! Where a 2-prong wall receptacle is encountered, it must be replaced with a properly grounded 3-prong receptacle with a grounded 3-prong receptacle installed in accordance with the National Electrical Code and local codes and ordinances. To ensure a proper ground, the grounding means must be tested by a qualified electrician. Use only 3-wire extension cords that have 3-prong, grounding-type plugs and 3-pole receptacles that accept the equipment plug.
4. All wiring should be performed by a qualified electrician.



Grounding blade

Figure 2 Grounding Methods

▲ WARNING

An incorrect connection may cause an electric short, produce an electrical shock or burn out the pump motor, resulting in property damage and/or personal injury.

5. Protect electrical cord from sharp objects, hot surfaces, oil and chemicals. Avoid kinking the cord. Replace or repair damaged or worn cords immediately.
6. Provide safety shields on all moving and electrical parts to prevent personal injury.

General Safety Information (All Units)

1. Know the pump application, limitations and potential hazards.

▲ WARNING

Do not use to pump flammable or explosive fluids such as gasoline, fuel oil, or kerosene, etc. Do not use in flammable and/or explosive atmospheres. Pump should only be used with liquids compatible with pump component materials. Failure to follow this warning can result in personal injury and/or property damage.

2. Make certain that the power source conforms to the requirements of your equipment.
3. Provide adequate protection and guarding around moving parts.
4. Disconnect power before servicing.
5. Release all pressure within the system before servicing any component.
6. Drain all liquids from the system before servicing.
7. Secure the discharge line before starting the pump. An unsecured discharge line will whip, possibly causing personal injury and/or property damage.
8. Check hoses for weak or worn condition before each use, making certain that all connections are secure.
9. Periodically inspect pump and system components. Perform routine maintenance as required (see Maintenance Section).
10. Provide a means of pressure relief for pumps whose discharge line can be shut off or obstructed.
11. Personal Safety:
 - Wear safety glasses at all times when working with pumps.
 - Wear a face shield and proper apparel when pumping hazardous chemicals.
 - Keep work area clean, uncluttered and properly lighted - replace all unused tools and equipment.
 - Keep visitors at a safe distance from the work area.
 - Make workshop childproof – with padlocks, master switches and by removing starter keys.
12. For air drive units follow Safety Information in instruction sheet supplied with air motor.

ASSEMBLY

1. HANDLE (Refer to Figure A)
 - Place handle (Ref. No. A11) on gearbox foot flange and align holes.
 - Install two hex screws (Ref. No. A12) flat washers (Ref. No. A13) and hex nuts (Ref. No. A14), tighten screws.
2. ROTATING SUCTION/DISCHARGE PORTS (OPTIONAL) (Refer to Figure A,W,P)

In some applications, it may be preferable to have suction/discharge ports rotated 90 degrees to be in line with driver. If so, proceed as follows:

- Remove four hex cap screws (Ref. No. A8) and hex nut (Ref. No. A9) from pump assembly to separate pump well (Ref. No. A3) from pump base (Ref. No. A7).
- Rotate pump well 90 degrees clockwise so that driver is positioned over top of discharge plate (Ref. No. W6).

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- Be sure that pump well, base and diaphragm (Ref. No. P13) are aligned properly with one another. Then, reinstall four hex cap screws and hex nuts and tighten.

GEAR BOX OIL (Refer to Figure A,G)

3. Place pump on a level surface. Fill pump gear box (Ref. No. A1) with gear box oil before the pump is operated. Gear oil must meet requirements of API GL-5 and military specification MIL-L-2105B. Remove level plug (Ref. No. G5). Pour gear oil into gear box slowly until oil comes out of fill port.

Warranty on this unit is void unless the gear box is lubricated with appropriate gear oil listed above. DO NOT OVER FILL!

INSTALLATION

NOTE: In any installation where property damage can occur by pumps not operating due to power outages, discharge line freezing or any other reason, a backup system(s) and/or warning system(s) should be used.

1. Place the pump on a level, solid foundation, locating it as close to the liquid as possible, making the suction line as short and direct as possible.
2. Install pipe nipples (Ref. No. A35) so the smoother side of pipe end faces the suction and discharge hose.

⚠ CAUTION

Maximum discharge head is 25 feet or 10.9 psi. Operation over this head or pressure will cause pump to stall and/or gearbox damage. Use only rigid hoses.

3. Attach suction piping to the suction inlet (Ref. No. W2) and discharge piping to the discharge outlet (Ref. No. W6). The suction line should be positioned such that there is a continual upward slope from the fluid source to the pump. Avoid using loops or sections of pipe or fittings, which might permit air to become trapped.

NOTE: If hose is used, be sure to use reinforced hose on both the suction and discharge. DO NOT USE canvas or similar collapsible materials. NEVER USE PIPE REDUCER; PIPE SIZE MUST BE EQUAL TO OR LARGER THAN PUMP PORT SIZE. Suction line must be airtight so that air cannot leak in and destroy priming vacuum. On a permanent installation where piping is used, always connect a piece of flexible hose between pump and piping so pump is free to move slightly.

4. It is advisable to use a strainer (Ref. No. A36) on the inlet end of the suction hose or pipe. A properly sized strainer is supplied with this unit and should be used at all times to prevent damage. Keep the strainer clean. If possible, suspend it to keep it from becoming clogged with muck, roots, debris or leaves. It is best to keep hose free of kinks as they will restrict flow and add excess loading to pump and gearing.

5. **GASOLINE ENGINE UNITS:** Follow all instructions in the engine manual before starting the engine. Fill engine with oil, gasoline, etc.

ELECTRIC MOTOR UNITS: It is strongly recommended that this unit is plugged into a G.F.I. (Ground Fault Interrupter) circuit. Consult your local electrician for installation and availability.

6. Input RPM (to pump) – Input RPM must be between 1750 and 2750 RPM. Final pump speed will be 40 strokes/min. with a 1750 RPM input and 60 strokes/min. with a 2750 RPM input.

Do not exceed 60 strokes per minute with the diaphragm pump.

OPERATION

Operate the diaphragm pump in an upright position only.

1. This diaphragm pump is capable of priming “dry” up to fifteen feet; it will prime much faster when it is filled with clean water through priming cap (Ref. No. W5). Primed, it can lift to 25 feet.
2. Activate unit following engine or air motor manual or turning unit on if electrical.

⚠ CAUTION

Do not control discharge capacity with a valve or similar device.

CLEARING JAM-UP

If large solids or an accumulation of sand or other sediment becomes lodged in the pump well (Ref. No. A3) preventing the plunger arm (Ref. No. A2) from making a full stroke, the pump should be thoroughly cleaned as described in “If Pump Stalls” shown below. Refer to parts list and illustration for parts identification.

⚠ CAUTION

If pump has stopped or stalled for any unknown reason, clean out pump cavity thoroughly. Failure to comply with the “caution” could result in damage to crank (Ref. No. P5/P9), plunger arm (Ref. No. P1) or other parts of assembly.

1. IF PUMP STALLS:
 - Remove four bolts (Ref. No. A8). Separate pump well from pump body.
 - Clean obstruction and all debris from pump well assembly (Ref. No. A3).
 - Reassemble pump in reverse order of disassembly and return to service.
2. IF PLUNGER ARM (Ref. No. P1) SEIZES AND GEAR BOX OUTPUT SHAFT (Ref. No. G8) TURNS IN CRANK (Ref. No. P5):
 - Remove guard (Ref. No. A4) by loosening screws (Ref. No. A5).
 - Disassemble pump and clean as described in steps above stalled engine jam up.
 - Torque the crank lock screw (Ref. No. P7) to 70 foot pounds with an appropriate torque wrench (see Figure 3).

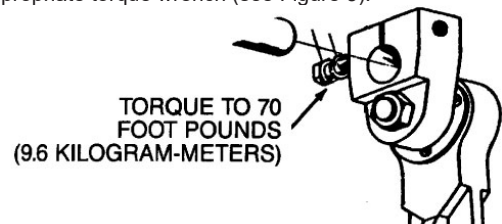


Figure 3

- Reassemble the pump in reverse order of disassembly and return to service.

⚠ WARNING

Pump jamming with an over-torqued lock screw may cause internal damage. Under torqueing may allow the output shaft to spin and wear parts necessitating replacement.

MAINTENANCE

Diaphragm Pumps

▲ WARNING

Make certain that unit is disconnected from power source before attempting to service or remove any component.

1. Check gear box oil level every 20 hours of operation or at least once a week; more often if any leakage is detected around the gear box. Change gearbox oil after the first 40 hours of operation. Fill to the oil level plug. Change gearbox oil every 350 hours of operation.
2. The plunger bearing (Ref. No. P3) must be greased (any automotive grease) after every 8 hours of use. Remove guard (Ref. No. A4) by loosening two screws (Ref. No. A5). Grease fitting on end of bearing; will be visible after removing guard. Bearing may be cleaned and kept well lubricated by pumping grease slowly into fitting until new grease oozes out between bearing and journal.
3. During freezing weather, be sure to drain the pump when it is not running. Remove discharge hose and tip unit towards discharge side.
4. Keep pump clean. After use with liquids containing foreign materials, flush with clean water.

REPLACEMENT OF FLAPPER VALVE

(Ref. No. W9)

1. Remove two bolts (Ref. No. W3) and remove suction priming plate (Ref. No. W2). Replace flapper (Ref. No. W9) on pin (Ref. No. W8) to locate on suction plate.
2. Remove two bolts (Ref. No. W7) and remove discharge plate (Ref. No. W6). Replace flapper valve on pin (Ref. No. W8) to locate valve on pump well (Ref. No. W1).

REPLACEMENT OF DIAPHRAGM

(Ref. No. P13)

1. Remove guard (Ref. No. A4) by loosening screws (Ref. No. A5).
2. Rotate pump until plunger arm (Ref. No. A2) is in the down position.
3. Remove pump well (Ref. No. A3) by removing screws (Ref. No. A8).
4. Remove diaphragm by removing four nuts (Ref. No. P12) from studs (Ref. No. P11).
5. Replace diaphragm and reverse steps 1 through 4 for reassembly.

GEAR BOX OVERHAULING

A completely assembled gear box is available as a replacement part (Ref. No. G28).

DISASSEMBLY

1. Remove diaphragm (Ref. No. P13) as described in "Replacement of Diaphragm".
2. Remove crank (Ref. No. P5) by loosening hex head screw (Ref. No. P7). Use screwdriver in slot of crank to release clamp on output shaft (Ref. No. G8).
3. Drain oil from gear box by removing drain plug (Ref. No. G4).
4. Remove driver (Ref. Nos. A28/A32) from adapter (Ref. No. G26) by removing four bolts (Ref. No. A27) plus 4 additional bolts (Ref. No. A29) from engine mount bracket (Ref. No. A16) for gas driver models. Slide driver back from adapter until driver shaft disengages pinion (Ref. No. G20).
5. Remove adapter by removing four bolts (Ref. No. G27).
6. Remove gear box from pump base (Ref. No. A7) by removing four bolts (Ref. No. A6).
7. Remove pinion/bearing assembly (Ref. Nos. G15, G20, G24) by pulling straight out. Use a slide hammer puller gripping in pinion groove
8. Remove twelve screws (Ref. No. G3) holding gear box halves (Ref. Nos.

G1 & G2) together.

9. Carefully separate gearbox halves; input (Ref. No. G2) and output (Ref. No. G1).
10. Remove gasket (Ref. No. G22).
11. Remove output shaft/bearing assembly (Ref. Nos. G8, G9, G10, G11, G12, G13) and idler pinion/bearing assembly (Ref. Nos. G13, G14, G17, G18, G19).
12. Remove output shaft oil seal (Ref. No. G23) from output housing.
13. Remove needle bearing (Re. No. G16) from inut housing.
14. Remove bearing (Ref. No. G15) from end of input pinion shaft (Ref. No. G20).
15. Remove bearings (Ref. Nos. G13 & G14) from ends of idler pinion shaft (Ref. No. G17).
16. Remove internal spur gear (Ref. No. G19) and key (Ref. No. G18) from idler pinion shaft.
17. Remove retaining ring (Ref. No. G10) and bearings (Ref. Nos. G12 & G13) from ends of output shaft (Ref. No. G8).
18. Remove output gear (Ref. No. G11) and key (Ref. No. G9) from output shaft.

REASSEMBLY

1. Assemble input pinion/bearing assembly, idler pinion/bearing assembly and output shaft/bearing assembly.
2. Install output shaft oil seal into gearbox output half. Lubricate lip seal. Install needle bearing in gear box input half.
3. Slide output shaft through lip seal. Start output bearing in bore in gear box output half. Position idler pinion bearing assembly in its bore in output half. Simultaneously press both assemblies into output half.
4. Install gasket on output half.
5. Position gear box input half; align shaft bearings with bearing bores. Press gear box halves together, align pins in output half with pin bore in input half.
6. Secure halves together with twelve screws.
7. Slide input pinion/bearing assembly into bore in gear box input half. Rotate pinion during installation to make sure gear teeth align with internal spur gear teeth.
8. Reassemble gear box to pump base with four bolts.
9. Reassemble adapter to gear box with four bolts.
10. Align driver shaft key (Ref. No. A26) with keyway in pinion. Slide driver into pinion, secure to adapter with four bolts (Ref. No. A27).
 - (Gas engine only) Attach engine to engine mount with four additional screw assemblies (Ref. No. A29).
11. Reassemble crank to output shaft as described under "Operation" section.
12. Replace diaphragm as described under "Replacement of Diaphragm" section.
13. Fill gear box with oil as described under "Assembly" section.
14. Pump should be checked daily, weekly, monthly for proper operation.

NOTE: Only qualified service personnel should attempt to repair this unit. Improper repair and/or assembly can cause pump damage, driver damage and/or an electrical shock hazard depending on model.

Diaphragm Pumps

Symptom	Possible Cause(s)	Corrective Action
Pump will not prime or retain prime after operating	<ol style="list-style-type: none"> 1. Air leak in suction line 2. Defective flapper valves 3. Clogged foot valve or strainer 4. No liquid in suction line 5. Material jammed in pump well 	<ol style="list-style-type: none"> 1. Repair or replace 2. Replace 3. Clean or replace 4. Fill suction line & pump with liquid 5. Clean (See Maintenance)
Flow rate is slow	<ol style="list-style-type: none"> 1. Incorrect driver speed 2. Piping is fouled or damaged 3. Clogged pump 4. Discharge line restricted or undersized 5. Collapsible discharge hose 6. Too many bends 7. Lines are too long 	<ol style="list-style-type: none"> 1. Increase speed (see Specifications) 2. Clean or replace 3. Clean 4. Flush out piping or replace 5. Replace with rigid or non-collapsible hose 6. Straighten hose 7. Shorten lines
Pump runs but no fluid	<ol style="list-style-type: none"> 1. Faulty suction piping 2. Pump located too far from fluid source 3. Gate valve closed 4. Clogged strainer 5. Discharge height too great 	<ol style="list-style-type: none"> 1. Replace 2. Place pump closer to source 3. Open gate valve 4. Clean or replace 5. Lower discharge height
Pump starts and stops pumping	<ol style="list-style-type: none"> 1. Leak in suction line 2. Leak in foot valve 3. Diaphragm has a crack or hole 4. Defective or clogged flapper valves 	<ol style="list-style-type: none"> 1. Repair 2. Repair or replace 3. Replace 4. Clean or replace
Excessive noise while pump in operation	<ol style="list-style-type: none"> 1. Pump not secured to firm foundation 2. Restricted suction line 	<ol style="list-style-type: none"> 1. Secure properly 2. Clean or correct
Pump stalls repeatedly or stops for no apparent reason	<ol style="list-style-type: none"> 1. Discharge height over 25 feet of head 2. Material jammed in pump well 	<ol style="list-style-type: none"> 1. Lower height (see Specifications) 2. Clean out pump well (See Operation & Maintenance section)

Diaphragm Pumps

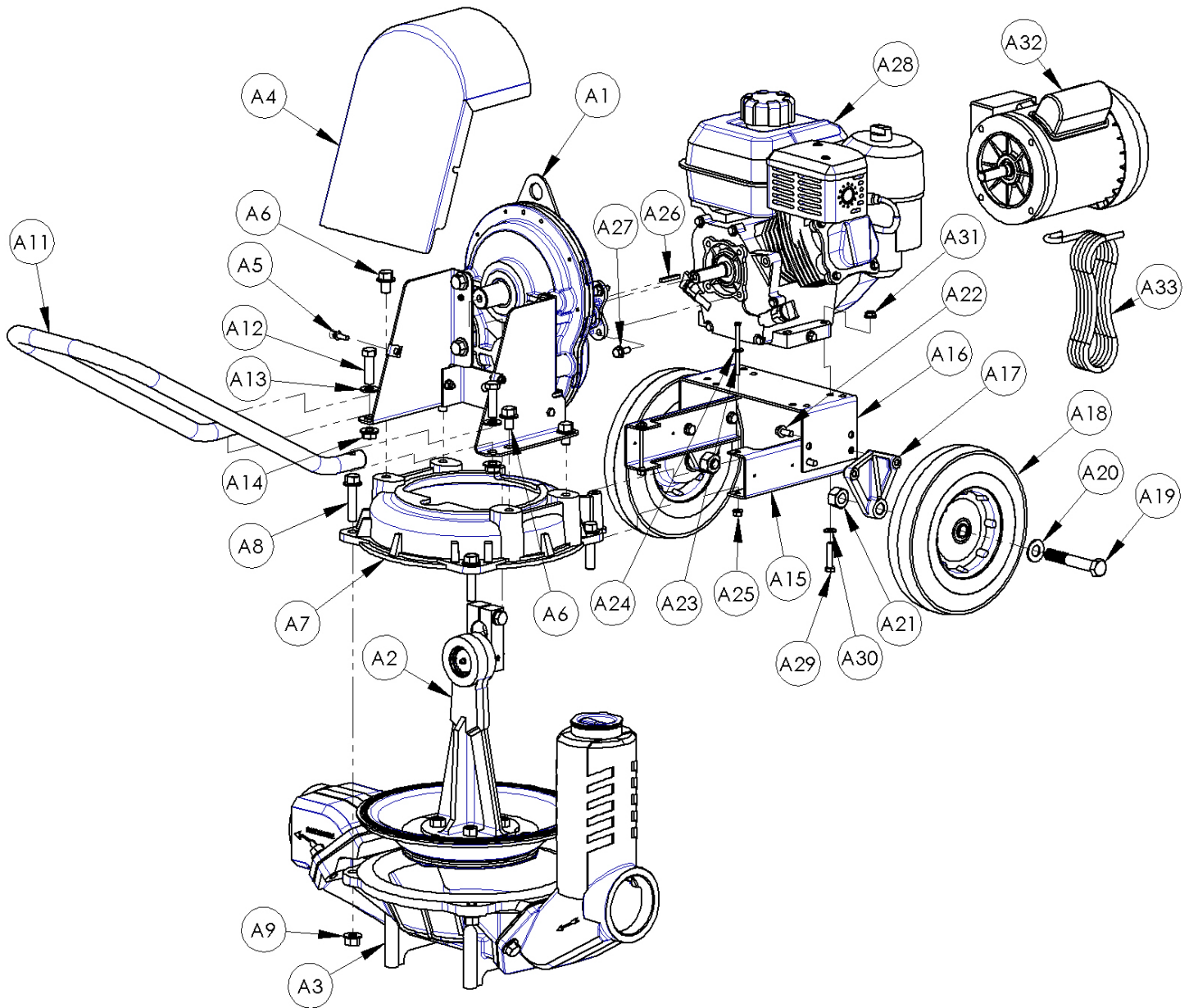
For Repair Parts contact dealer where pump was purchased.

Please provide following information:

-Model Number

-Serial Number (if any)

Part description and number as shown in parts list



Assembled Pump - Figure A

Repair Parts List - Assembled Pump (Reference Figure A)

Ref No.	Description	Part Number for Models				Qty
		3" Engine Driven Pump	3" Motor Driven Pump	2" Engine Driven Pump	2" Motor Driven Pump	
A1	Gearbox/Gearbox Feet Assembly	Ref. Page 8 to 11	Ref. Page 8 to 11	Ref. Page 8 to 11	Ref. Page 8 to 11	1
A2	Plunger Diaphragm Assembly	Ref. Page 12 & 13	Ref. Page 12 & 13	Ref. Page 12 & 13	Ref. Page 12 & 13	1
A3	Well Assembly	Ref. Page 14 & 15	Ref. Page 14 & 15	Ref. Page 14 & 15	Ref. Page 14 & 15	1
A4	Plunger Guard / Kit	3370-102-92	3370-102-92	3370-102-92	3370-102-92	1
A5	1/4-20x3/4 Screw	Incl. w/Ref. A4	Incl. w/Ref. A4	Incl. w/Ref. A4	Incl. w/Ref. A4	2
A6	1/2-13x3/4 Hex Flange Screw	1766-065-00	1766-065-00	1766-065-00	1766-065-00	4
A7	Base	3354-001-00	3354-001-00	3360-020-01	3360-020-01	1
A8	1/2-13x2-1/4 Hex Head Bolt Grade-5	1766-066-00	1766-066-00	1766-066-00	1766-066-00	4
A9	1/2-13 Hex Nut	1782-004-00	1782-004-00	1782-004-00	1782-004-00	4
A10	Not Used	N/A	N/A	N/A	N/A	-
A11	Handle / Kit	3370-116-90	3370-116-90	3370-116-90	3370-116-90	1
A12	1/2-13x1-3/4 Hex Head Bolt	incl w/A11	incl w/A11	incl w/A11	incl w/A11	2
A13	1/2 Flat Washer	incl w/A11	incl w/A11	incl w/A11	incl w/A11	2
A14	1/2-13 Hex Nut	incl w/A11	incl w/A11	incl w/A11	incl w/A11	2
A15	Mount Brace	3354-107-00	3354-107-00	3354-107-00	3354-107-00	2
A16	Engine Mount	3354-108-00	3354-108-00	3354-108-00	3354-108-00	1
A16	Engine Mount Kit for Hatz Diesel	335Z-101-90	N/A	335Z-101-90	N/A	1
A17	Wheel Bracket	3354-109-00	3354-109-00	3354-109-00	3354-109-00	2
A18	Wheel	1663-000-00	1663-000-00	1663-000-00	1663-000-00	2
A19	5/8-11x4 Hex Head Bolt	1769-000-00	1769-000-00	1769-000-00	1769-000-00	2
A20	5/8 Flat Washer	1799-000-00	1799-000-00	1799-000-00	1799-000-00	2
A21	5/8-11 Hex Nut	1782-022-00	1782-022-00	1782-022-00	1782-022-00	2
A22	5/16-18x3/4 Hex Flange Screw	1745-002-00	1745-002-00	1745-002-00	1745-002-00	4
A23	1/4-20x3 Hex Bolt	1734-013-00	1734-013-00	1734-013-00	1734-013-00	2
A24	1/4 Flat Washer	1789-000-00	1789-000-00	1789-000-00	1789-000-00	2
A25	1/4-20 Hex Nut	1776-000-00	1776-000-00	1776-000-00	1776-000-00	2
A26	3/16x1-1/2 Square Key	1517-001-00	1517-001-00	1517-001-00	1517-001-00	1
A27	5/16-24x1 Hex Flange Screw	1753-000-00	N/A	1753-000-00	N/A	4
A27	3/8-16x1 Hex Flange Screw	N/A	1755-002-00	N/A	1755-002-00	4
A28	Engine 3/4 Keyed PTO	See Chart	N/A	See Chart	N/A	1
A29	5/16-18x1-1/2 Hex Bolt	1748-000-00	N/A	1748-000-00	N/A	4
A30	5/16 Flat Washer	1790-000-00	N/A	1790-000-00	N/A	4
A31	5/16-18 Hex Nut	1785-000-00	N/A	1785-000-00	N/A	4
A32	Motor - 1 Phase	N/A	1626-095-00	N/A	1626-095-00	1
A32	Motor - 3 Phase	N/A	1627-039-00	N/A	1627-039-00	1
A33	Cord Assembly	N/A	335E-352-90	N/A	335E-352-90	1
A34	Switch Assembly (not shown)	N/A	335E-350-90	N/A	335E-350-90	1
A35	Nipple Pack (2 NPT nipples) (not shown)	3270-173-90	3270-173-90	C366-999-90	C366-999-90	1
A35	NPT x BSPT Nipple pack (2 nipples)	C370-999-90	C370-999-90	C369-999-90	C369-999-90	opt
A36	Suction Strainer (not shown)	1680-000-00	1680-000-00	C230-170-00	C230-170-00	1

Repair Parts List - Engine Chart

Ref No.	Description	3" Engine Driven Pump	2" Engine Driven Pump	Part Number	Qty
A28	Honda GX120UT1QX2	337G-96	338G-96	1630-007-00	1
A28	Honda GX160UT1QX2	337H-96	N/A	1639-017-00	1
A28	Hatz 1B30	337Z-96	338Z-96	1630-037-90	1
A28	Honda GX160 Spark Arrestor Kit (not shown)	337H-96	N/A	1639-001-90	1

Diaphragm Pumps

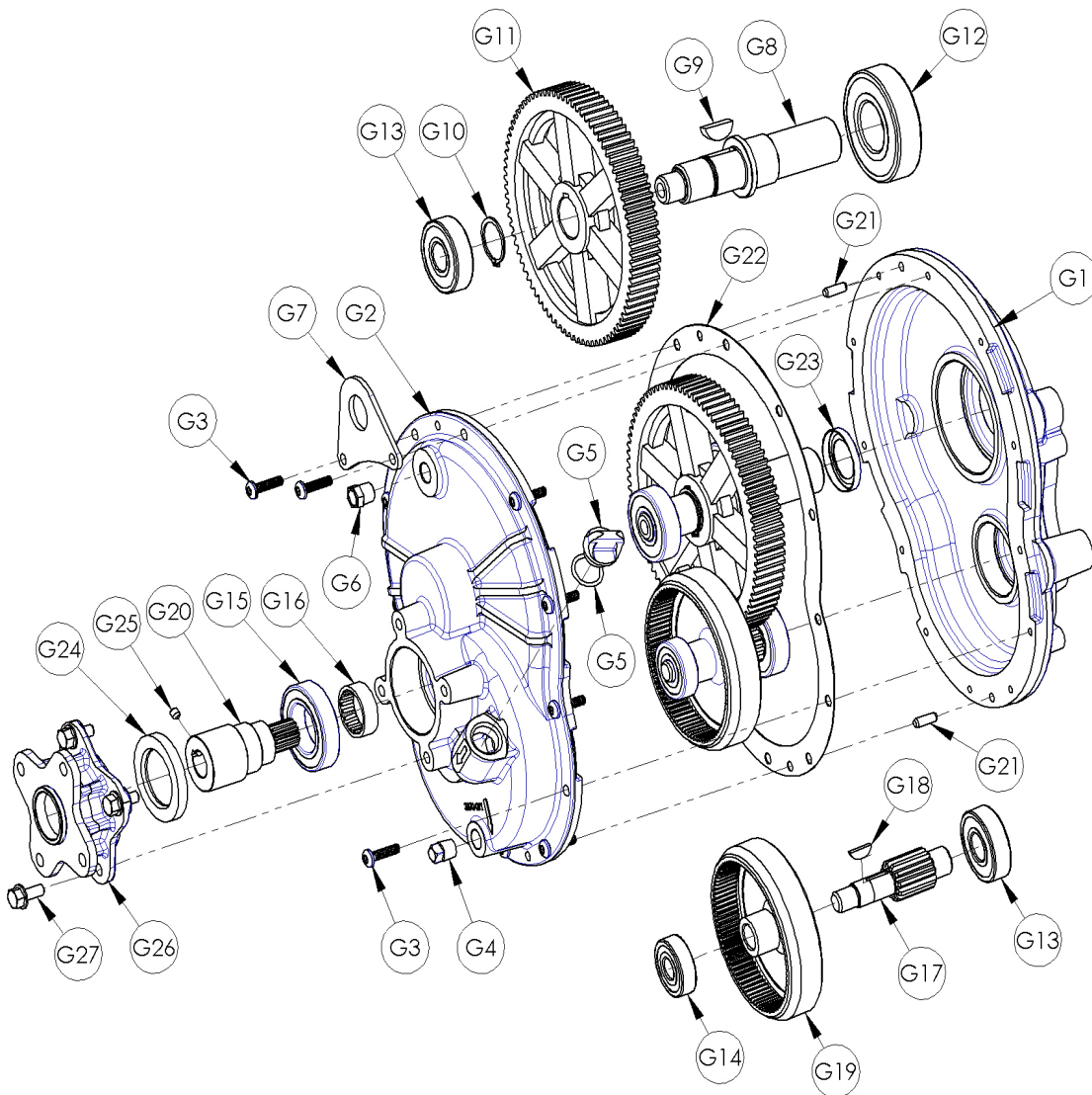
For Repair Parts contact dealer where pump was purchased.

Please provide following information:

-Model Number

-Serial Number (if any)

Part description and number as shown in parts list



Gearbox - Figure G

Repair Parts List - Gearbox (Reference Figure G)

Ref		3" Pumps	2" Pump	
No.	Description	Part Number	Part Number	Qty
G1	Gearbox Output Half	3370-090-01	3370-090-01	1
G2	Gearbox Input Half	3370-091-01	3370-091-01	1
G3	1/4-20x1 Screw	1718-007-00	1718-007-00	12
G4	1/4 NPT Plug (drain)	1767-002-00	1767-002-00	1
G5	1/2 NPT Plug and Oring (fill / oil level)	3SXB-170-90	3SXB-170-90	1
G6	1/4 NPT Vented Plug	1767-009-00	1767-009-00	1
G7	Lift Bracket	3354-106-00	3354-106-00	1
G8	Output Shaft	3354-140-00	3354-141-00	1
G9	Woodruff Key #1008	2141-000-00	2141-000-00	1
G10	External Retaining Ring SH-112	1806-064-00	1806-064-00	1
G11	Output Gear	3354-120-00	3354-120-00	1
G12	Bearing-Open 35x80x21 #6307 JEM	3354-190-00	3354-190-00	1
G13	Bearing-Open 20x52x15 #6304 JEM	3354-191-00	3354-191-00	2
G14	Bearing-Open 15x42x13 #6302 JEM	3354-192-00	3354-192-00	1
G15	Bearing-Open 35x62x14 #6007 JEM	3354-194-00	3354-194-00	1
G16	Bearing-Open 30x37x12 Needle	3370-094-00	3370-094-00	1
G17	Idler Pinion Shaft	3354-121-00	3354-121-00	1
G18	Woodruff Key #406	2157-000-00	2157-000-00	1
G19	Internal Spur Gear	2149-000-00	2149-000-00	1
G20	Input Pinion (3/4 keyed engine)	3370-122-00	3370-122-00	1
G20	Input Pinion (5/8 keyed 56C motor)	3370-123-00	3370-123-00	1
G21	1/4x1 Dowel Pin	1717-002-00	1717-002-00	2
G22	Gasket	3354-300-00	3354-300-00	1
G23	Oil Lip Seal 1-1/4x1-3/4x1/4	2148-000-00	2148-000-00	1
G24	Oil Lip Seal 40x62x8	2148-001-00	2148-001-00	1
G25	1/4-20x1/4 Set Screw	1711-001-00	1711-001-00	1
G26	Adapter (engine)	3370-093-01	3370-093-01	1
G26	Adapter (56C motor)	3370-092-00	3370-092-00	1
G27	5/16-18x3/4 Hex Flange Screw	1745-002-00	1745-002-00	4
G28	Assembled Gearbox for Gas Engine Models (includes Ref. Nos. G1 thru G25)	3370-090-96	3380-090-96	1
G28	Assembled Gearbox for Electric Models (includes Ref. Nos. G1 thru G25)	3370-090-96	3380-090-96	1

Diaphragm Pumps

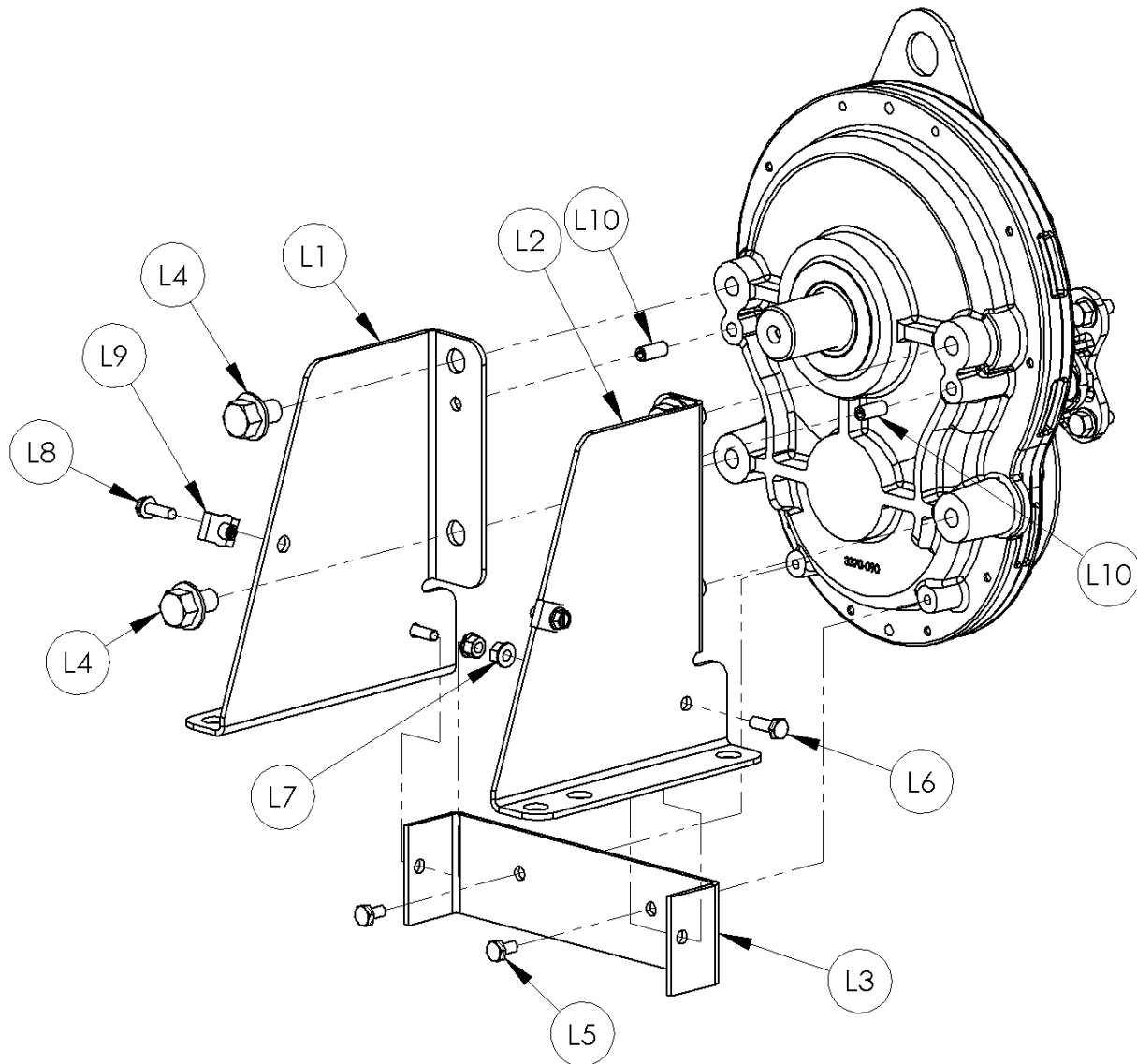
For Repair Parts contact dealer where pump was purchased.

Please provide following information:

-Model Number

-Serial Number (if any)

Part description and number as shown in parts list



Gearbox Feet - Figure L

Repair Parts List - Gearbox Feet (Reference Figure L)

Ref		3" Pumps	2" Pump	
No.	Description	Part Number	Part Number	Qty
L1	Steel leg - Left	3370-101-00	3370-101-00	1
L2	Steel leg - Right	3370-100-00	3370-100-00	1
L3	Guard Bracket	3370-102-00	3370-102-00	1
L4	1/2-13x3/4 Hex flange screw	1766-065-00	1766-065-00	4
L5	1/4-20X1/2 Screw	1715-001-00	1715-001-00	2
L6	1/4-20x3/4 Screw	1719-000-00	1719-000-00	2
L7	1/4-20 Flange nut	1776-000-00	1776-000-00	2
L8	1/4-20x3/4 Hex flange screw	1722-000-00	1722-000-00	2
L9	1/4-20 Clip nut	1769-011-00	1769-011-00	2
L10	5/16x3/4 Spring pin	1769-010-00	1769-010-00	2

Diaphragm Pumps

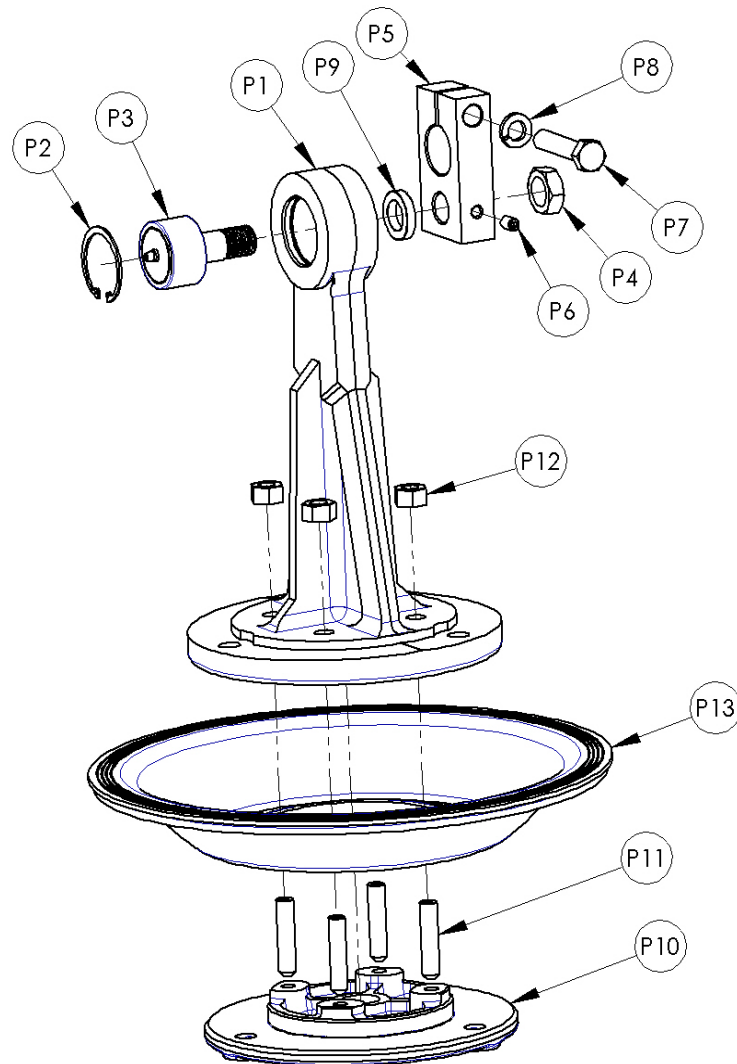
For Repair Parts contact dealer where pump was purchased.

Please provide following information:

-Model Number

-Serial Number (if any)

Part description and number as shown in parts list



Plunger Assembly - Figure P

Repair Parts List - Plunger Assembly (Reference Figure P)

Ref No.	Description	3" Pumps Part Number	2" Pump Part Number	Qty
P1	Plunger	2134-000-02	3360-090-02	1
P2	Retaining Ring	3350-190-00	3360-191-00	1
P3	Plunger Bearing (includes Ref. No. P4)	2138-000-90	3360-190-90	1
P4	Bearing Lock Nut	Incl. w/Ref. P3	Incl. w/Ref. P3	1
P5	Crank / Crank Assembly Kit (includes Ref. Nos. P6, P7, P8, & P9)	2140-000-90	3360-094-90	1
P6	5/16-18x1/2 Socket Set Screw	Incl. w/ Ref.P5	Incl. w/ Ref.P5	1
P7	1/2-13 Hex Head Cap Screw Grade-5	Incl. w/Ref. P5	Incl. w/Ref. P5	1
P8	1/2 Lock Washer	Incl. w/Ref. P5	Incl. w/Ref. P5	1
P9	Bearing Shim	Incl. w/Ref. P5	Incl. w/Ref. P5	1
P10	Diaphragm Retaining Plate	3370-020-00	3380-092-00	1
P11	7/16-14x2 Stud	1766-007-00	N/A	4
P11	3/8-16x2 Stud	N/A	1760-012-00	4
P12	7/16 Heavy Hex Nut	1766-036-00	N/A	4
P12	3/8-16 Hex Nut	N/A	1780-000-00	4
P13	Diaphragm	3370-300-00	3380-300-00	1

Diaphragm Pumps

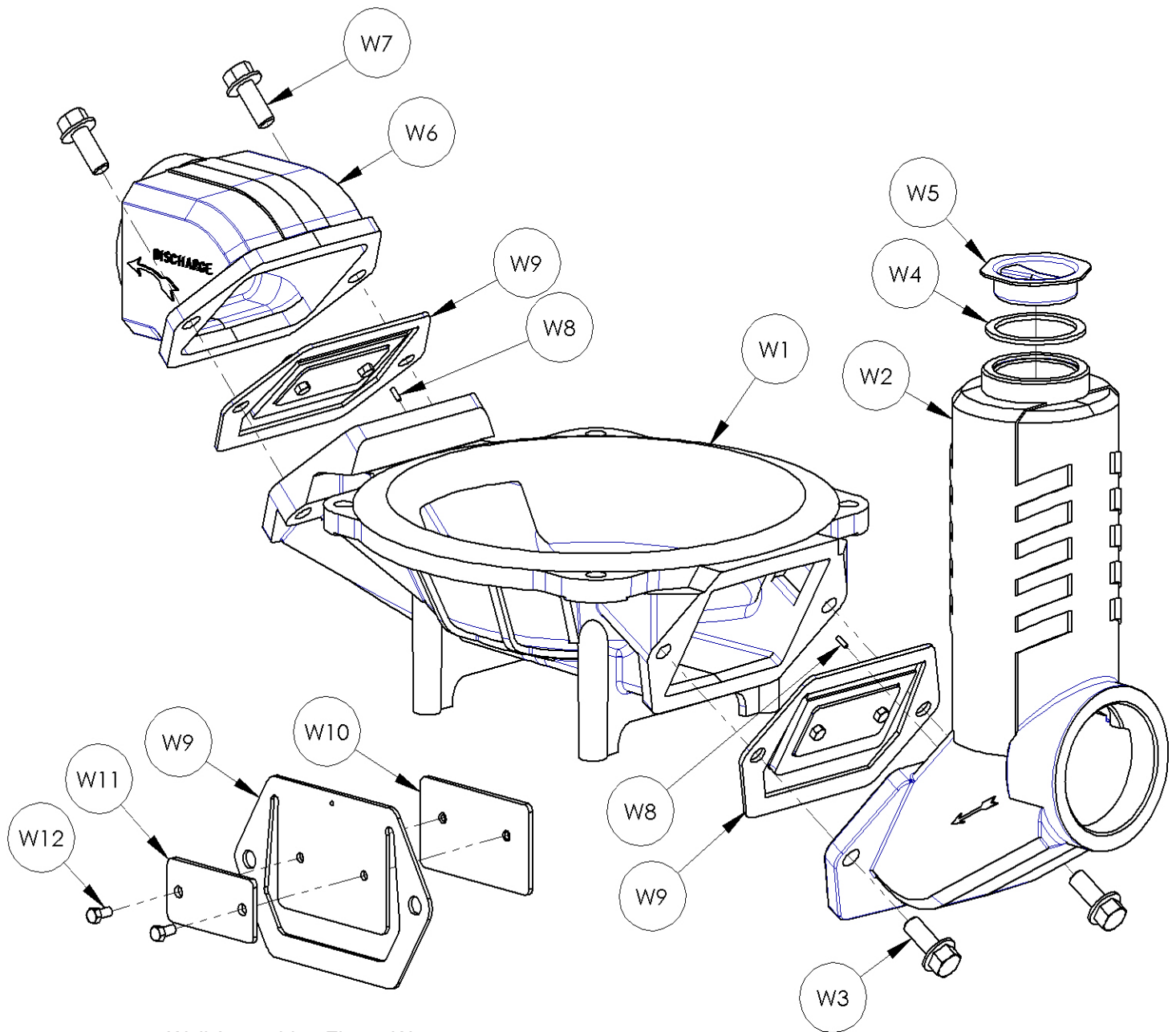
For Repair Parts contact dealer where pump was purchased.

Please provide following information:

-Model Number

-Serial Number (if any)

Part description and number as shown in parts list



Well Assembly - Figure W

Repair Parts List - Well Assembly (Reference Figure W)

Ref		3" Pumps	2" Pump	
No.	Description	Part Number	Part Number	Qty
W1	Well	2120-001-00	3360-001-00	1
W2	Suction Plate	2123-000-00	3360-050-00	1
W3	1/2-13x1-1/4 Hex Flange Screw Grade-5	1766-010-00	N/A	2
W3	3/8-16x1-1/4 Hex Flange Screw Grade-5	N/A	1757-007-00	2
W4	Gasket	Incl. w/Ref. W5	Incl. w/Ref. W5	1
W5	Fill Cap (includes Ref. Nos. W5, & W6)	2124-000-00	2124-000-00	1
W6	Discharge Plate	2131-000-00	3360-052-01	1
W7	1/2-13x1-1/4 Hex Flange Screw Grade-5	1766-010-00	N/A	2
W7	3/8-16x1-1/4 Hex Flange Screw Grade-5	N/A	1757-007-00	2
W8	1/8 Diameter x 3/8 Pin	2121-000-00	2121-000-00	2
W9	Check Valve (neoprene) / Assembly Kit (includes Ref. Nos. W9, W10, W11, & W12)	3354-070-90	3360-070-90	2
W10	Check Valve Weight Top	Incl. w/Ref. W9	Incl. w/Ref. W9	1
W11	Check Valve Weight Bottom	Incl. w/Ref. W9	Incl. w/Ref. W9	1
W12	1/4-20x1/2 Hex Head Cap Screw	Incl. w/Ref. W9	Incl. w/Ref. W9	2



AMT Pump Company
(herein "AMT")
400 Spring Street
Royersford, PA 19468
Phone: (610) 948-3800
Fax: (610) 948-5300
www.amtpump.com



General Information

SALES POLICY: AMT products are sold through our established Distributors. We do not sell direct to the consumer or organization not entitled to trade recognition. Therefore, possession of our catalogs and/or price list(s) does not infer an offer to sell.

MINIMUM ORDER: We appreciate your order, however, all orders are subject to a minimum \$35.00 net invoice charge (excluding freight). This applies to all pump and parts purchase orders.

PRICES: Prices are subject to change without notice. All orders accepted are subject to prices in effect at time of shipment.

PAYMENT TERMS: Terms, upon establishment of credit, are Net 30 days. Past due accounts may be subject to a service charge of 1.5% per month. Domestic or assignable letter of credit is required for all export trade.

PAST DUE ACCOUNTS: AMT reserves the right to withhold open account shipments on any past due account. Invoices are considered past due after thirty (30) days. In the interest of sound business, all orders are subject to approval of the Credit Department.

SHIPPING INSTRUCTIONS: All shipments will be made F.O.B. the factory. Where instructions for shipment do not appear on the order, the shipment will be made according to our best judgment. Full risk of loss (including transportation delays and losses) shall pass to the customer upon delivery of the products to the carrier at the F.O.B. point. When loss or delay occurs, primary responsibility for tracing rests with the customer. When there is LOSS or APPARENT VISIBLE DAMAGE to a shipment, when tendered for delivery, *DO NOT* give the carrier a clear receipt. Note such damage on the carrier's delivery receipt and *HAVE THE DRIVER SIGN THE RECEIPT*.

PRODUCT REVISIONS: AMT reserves the right to discontinue, change or improve its products or any portions thereof without being obligated to provide such a change or improvement for units sold and/or shipped prior to such a change or improvement.

LEAD TIME: Products designated "Quick Ship Product", also referred to as "QSP" will normally be shipped within 24 hours of receipt of a non-cancellable purchase order. Only limited quantities of "QSP" pumps are available.

STANDARD LEAD TIME: Lead time is two weeks for all non "QSP" product. AMT reserves the right to revise lead times as required due to availability of materials and all other causes beyond our control.

VIP SHIPMENT: Select AMT and IPT branded pumps are available for next day shipment for non-QSP (Quick Ship Products) items and subjected to a specific model surcharge per unit noted in the respective price book. Requires calling for availability, confirmation and a non-cancellable purchase order or credit card payment prior to shipment. The expedited shipping charges are an additional cost added separately from the VIP charges per item. AMT reserves the right to revise lead times as required due to availability of materials and all other causes beyond our control. QSP quantities are limited as determined by AMT.

ALL purchase orders must be submitted via hard copy sent to AMT customer service department by fax, EDI or e-mail.

RETURN GOODS POLICY: Goods shall not be returned without a return goods authorization number (RGA) issued by AMT customer service. The RGA number must be listed on the packing list. Only current model and part numbers with a valid date code may be returned (within one year from date of purchase). **A 20% restocking and packaging charge will apply to all returns. All shipping charges must be pre-paid. No exceptions.**

ORDER CHANGES BY CUSTOMER: Orders in process may not be changed except with written consent and may be subject to special charges.

12 Month Limited Warranty

EXTENT AND DURATION OF LIMITED WARRANTY

Coverage: AMT Pump Company (herein "AMT") or IPT Pumps by Gorman-Rupp (herein "IPT") or Gorman-Rupp Industries Division of The Gorman-Rupp Company, Patterson, or the Gorman-Rupp Company (herein referred to as "G-R Unit") each individually warrants that its products and parts shall be free from defects in material and workmanship for twelve (12) months from the date of purchase by the original end user when installation is made and maintenance is performed in accordance with G-R Unit's recommendations. Wear and tear resulting from use and items normally consumed in use are not covered.

EXCEPTIONS

(A) This Limited Warranty shall not apply to mechanical seals in AMT or IPT pumps and the following products and parts: engines, motors, trade accessories and all other products, components, parts and materials not manufactured by the G-R Units. These items may, however, be covered by the warranties of their respective manufacturers. (B) This warranty does not extend to or apply to any unit which has been repaired or altered at any place other than by a G-R Unit, or by persons not expressly approved by a G-R Unit to make repairs or alterations, nor to any unit the serial number, model number or identification of which has been removed, defaced or altered. (C) This warranty does not extend to any product manufactured by a G-R Unit, which has been subjected to mis-use, neglect, accident, improper installation, or use in violation of instructions furnished by a G-R Unit. (D) Pump Kits: This warranty does not extend to any product sold by a G-R Unit unassembled as a Pump Kit. Pump Kits are warranted against defects in material and workmanship for 60 days from the date of shipment from a G-R Unit. Any Pump Kit parts deemed defective by a G-R Unit will be replaced free of charge within 60 days of shipment. Pump Kits are not returnable for credit.

LIMITATIONS

THE G-R UNITS' SOLE AND EXCLUSIVE WARRANTY WITH RESPECT TO THEIR PRODUCTS AND PARTS IS THIS LIMITED WARRANTY. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER EXPRESS AND/OR IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.

EXCLUSIVE REMEDY AND DAMAGES

The sole and exclusive remedy for breach of this Warranty by a G-R Unit and the entire extent of its liability for such breach or for damages arising from the use of the products and parts covered under this Limited Warranty, shall be as follows:

1. **Repair or Replacement:** If inspection shows that any G-R Unit product or part covered under this Limited Warranty is defective in materials or workmanship, the G-R Unit shall repair or replace the defective or non-conforming product or part without charge, whichever the G-R Unit chooses. You must have properly maintained and used the product or part claimed to be defective in accordance with the maintenance schedule or manual, which comes with the product. No allowance will be made for labor, installation, removal, transportation or other charges incurred by you in connection with such repair or replacement.
2. To obtain the above remedy:
 - A. Immediately notify the G-R Unit upon discovery of the claimed defect in materials or workmanship and provide the serial number or date code of the product and/or part(s) or provide the G-R Unit with the invoice or bill of sale referencing the product by no later than the expiration date of the warranty period.
 - B. The G-R Unit will advise whether inspection will be necessary and how whether repair or replacement will be made. If inspection by the G-R Unit is necessary, the pump or defective part must be sent freight pre-paid to the G-R Unit. Return shipment will be F.O.B. the G-R Unit's plant.
 - C. **Return Goods Authorization Requirement:** No product will be accepted for return or replacement without the prior written authorization of the G-R Unit. Upon such authorization, and in accordance with instructions from the G-R Unit, the product will be returned to the G-R Unit, shipping charges prepaid by the Buyer.
3. **Damages:** The G-R Unit's liability for damages for breach of this Limited Warranty shall not exceed the amount of the purchase price of the product or part(s) in respect to which Such damages are claimed. **IN NO EVENT SHALL THE G-R UNITS BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES FOR BREACH OF THIS LIMITED WARRANTY.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

Owner's Manual

GX120



Thank you for purchasing a Honda engine.

This manual covers the operation and maintenance of GX120 and GX160 engines and is based on GX160 engine. The QXE type is equipped for both electric and manual starting; other types are equipped for manual starting only. All information in this publication is based on the latest product information available at the time of printing.





Honda Motor Co., Ltd. reserves the right to make changes at any time without notice and without incurring any obligation.

No part of this publication may be reproduced without written permission.

This manual should be considered a permanent part of the engine and should remain with the engine if it is resold.

It is illegal in some areas to operate an engine without a U.S.D.A. qualified spark arrester; check local laws and regulations. An optional spark arrester for this engine is available from any dealership displaying the Honda Power Equipment Engines sign.

READ THIS OWNER'S MANUAL CAREFULLY. Pay special attention to these symbols and any instructions that follow:

- | | |
|--|---|
|  DANGER | —Indicates serious injury or death WILL result if instructions are not followed. |
|  WARNING | —Indicates a strong possibility that serious injury or death could result if instructions are not followed. |
|  CAUTION | —Indicates a possibility that minor injury can result if instructions are not followed. |
|  NOTICE | —Indicates that equipment or property damage can result if instructions are not followed. |

NOTE: Gives helpful information.

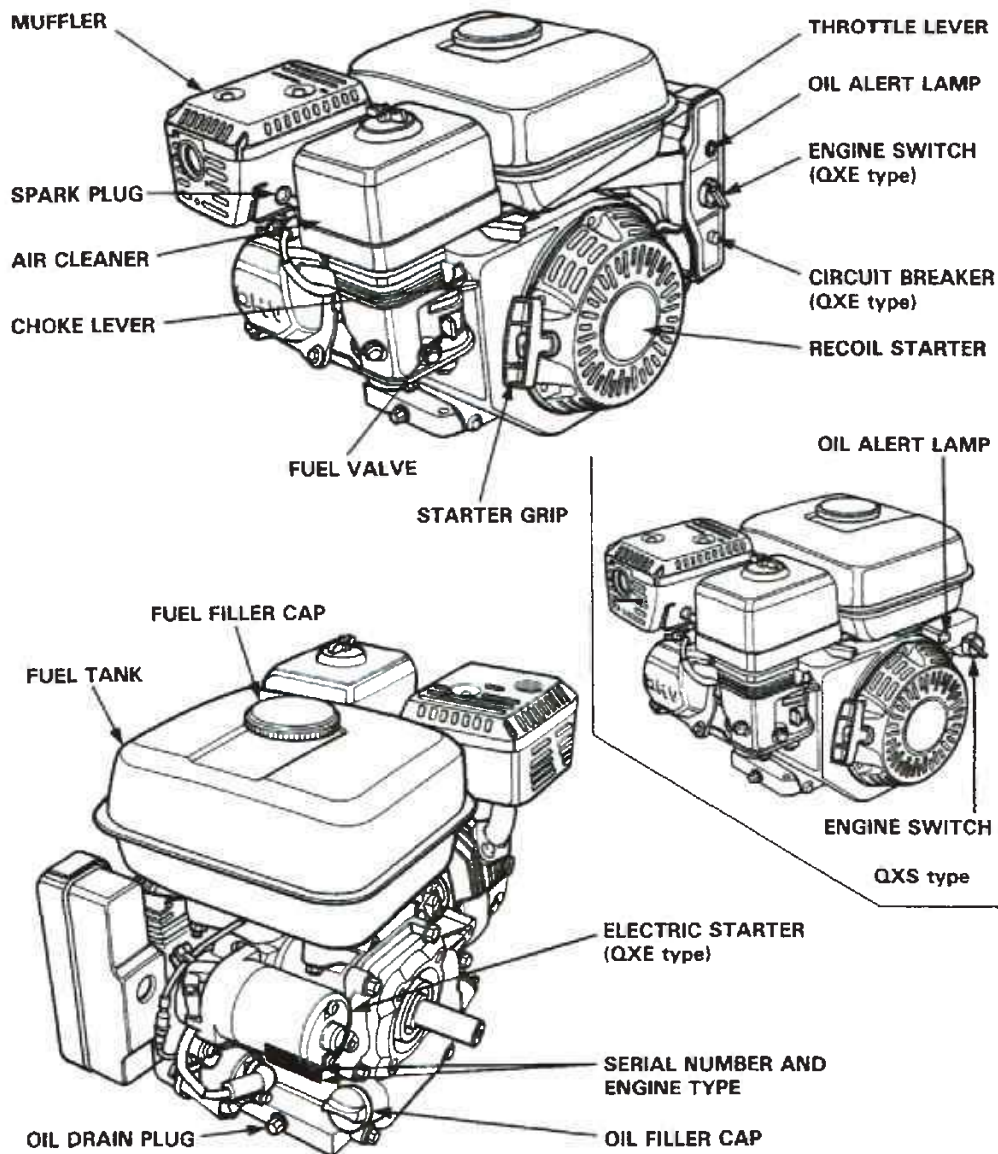
If a problem should arise, or if you have any questions about your engine, consult your Honda engine dealer.

1. ENGINE SAFETY

▲ WARNING

- Honda engines are designed to give safe and dependable service if operated according to instructions. Read and understand this Owner's Manual before operating the engine. Failure to do so could result in personal injury or equipment damage.
- To prevent fire hazards and to provide adequate ventilation, keep the engine at least 1 meter (3 feet) away from buildings and other equipment during operation. Do not place flammable objects close to the engine.
- Children and pets must be kept away from the area of operation due to a possibility of burns from hot engine components or injury from any equipment the engine may be used to operate.
- Know how to stop the engine quickly, and understand the operation of all controls. Never permit anyone to operate the engine without proper instructions.
- Gasoline is extremely flammable and is explosive under certain conditions.
- Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the refueling area or where gasoline is stored.
- Do not overfill the fuel tank. After refueling, make sure the tank cap is closed properly and securely.
- Be careful not to spill fuel when refueling. Fuel vapor or spilled fuel may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.
- Never run the engine in an enclosed or confined area. Exhaust contains poisonous carbon monoxide gas; exposure may cause loss of consciousness and may lead to death.
- The muffler becomes very hot during operation and remains hot for a while after stopping the engine. Be careful not to touch the muffler while it is hot. To avoid severe burns or fire hazards, let the engine cool before transporting it or storing it indoors.

2. COMPONENT IDENTIFICATION



Record the engine model, type and serial number information for your reference. Refer to this information when ordering parts, and when making technical or warranty inquiries (see page 36).

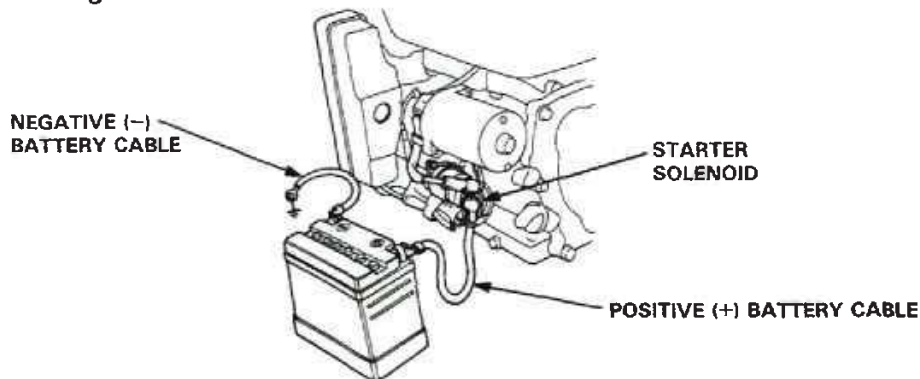
Engine model type and serial number: _____

3. BATTERY CONNECTIONS (for electric starter)

Use a 12 volt battery with an ampere-hour rating of at least 18 AH. Connect the battery positive (+) cable to the starter solenoid terminal, as shown.

Connect the battery negative (-) cable to an engine mounting bolt, frame bolt, or other good engine ground connection.

Check the battery cable connections to be sure the cables are secured and free of corrosion. Remove any corrosion and coat the terminals and cable ends with grease.



▲WARNING

- The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using batteries in an enclosed space.
- The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.
 - If electrolyte gets on your skin, flush with water.
 - If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.
- Electrolyte is poisonous.
 - If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician.
- **KEEP OUT OF REACH OF CHILDREN.**

NOTICE

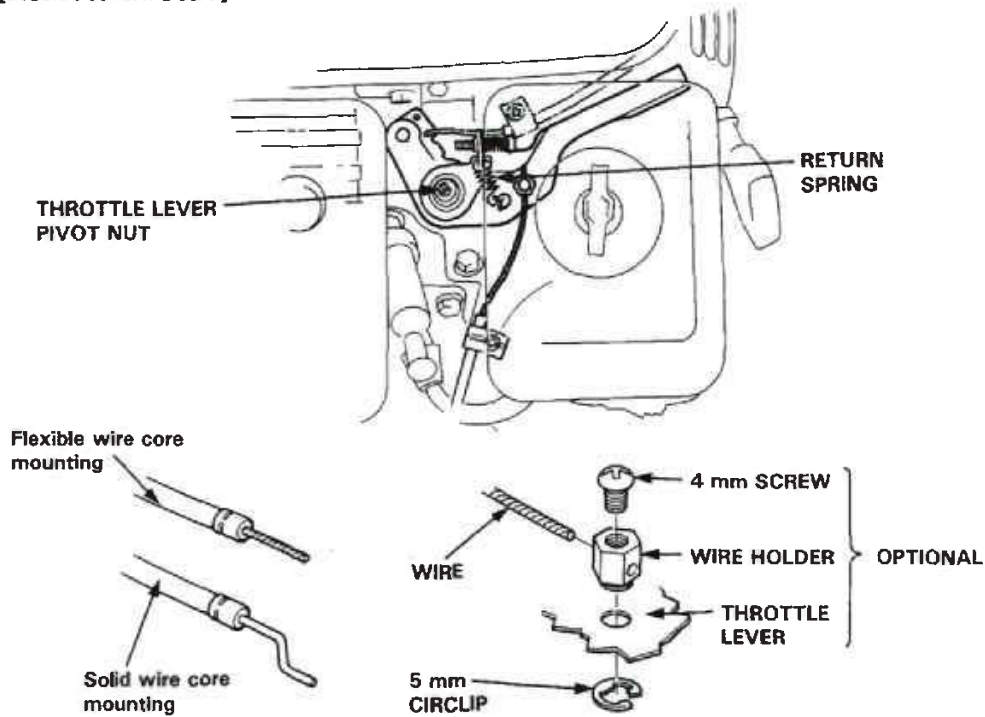
- Use only distilled water in the battery. Tap water will shorten the service life of the battery.
- Filling the battery above the UPPER LEVEL line may cause the electrolyte to overflow, resulting in corrosion to engine or nearby parts. Immediately wash off any spilled electrolyte.
- Be careful not to connect the battery in reverse polarity, as this will short circuit the battery charging system.

4. REMOTE CONTROL LINKAGE (for throttle and choke cables)

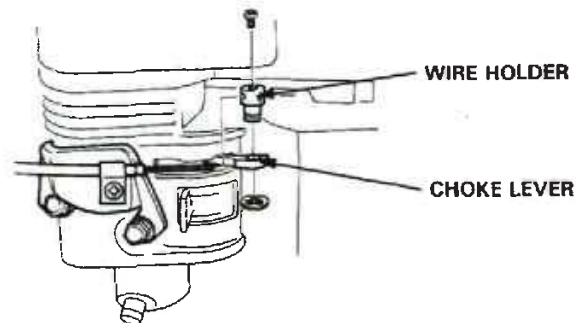
The throttle and choke control levers are provided with holes for optional cable attachment. The following illustrations show installation examples for a solid wire cable and for a braided wire cable. If using a braided wire cable, add a return spring as shown.

It is necessary to loosen the throttle lever friction nut when operating the throttle with a remote cable.

[Remote throttle]



[Remote choke]



5. PRE-OPERATION CHECK

1. ENGINE OIL

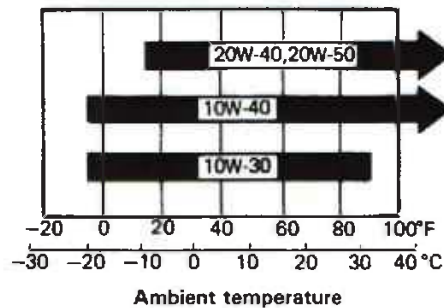
NOTICE

- Engine oil is a major factor affecting engine performance and service life. Non-detergent oils and vegetable oils are not recommended.
- Be sure to check the engine on a level surface with the engine stopped.

Use Honda 4-stroke oil or an equivalent high-detergent, premium quality motor oil certified to meet or exceed U.S. automobile manufacturer's requirements for Service Classification SG.SF/CC.CD. Motor oils classified SG.SF/CC.CD. will show this designation on the container.

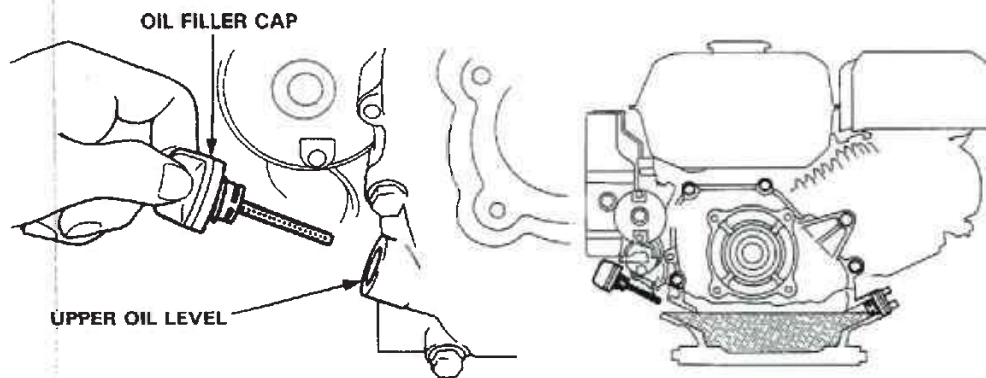
SAE 10W-30 is recommended for general, all-temperature use.

Other viscosities shown in the chart may be used when the average temperature in your area is within the indicated range.



1. Remove the oil filler cap and wipe the dipstick clean.
2. Insert the dipstick into the oil filler neck but do not screw it in.
3. If the level is low, fill to the top of the oil filler neck with the recommended oil.

NOTICE Running the engine with insufficient oil can cause serious engine damage.

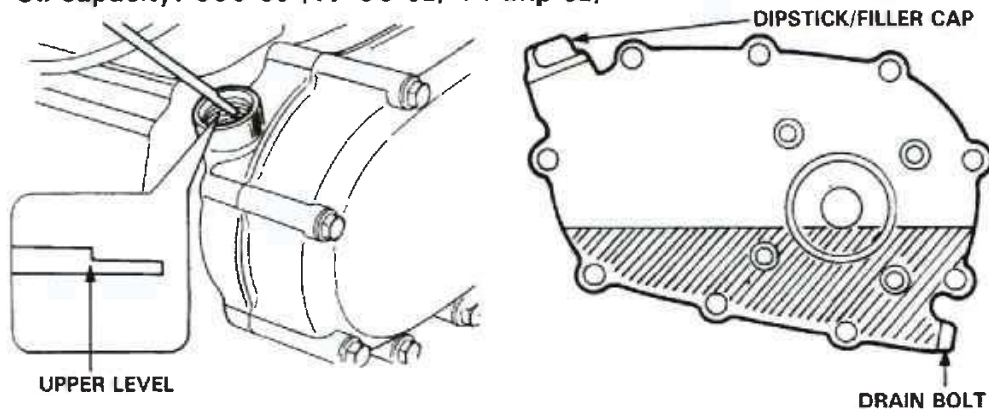


2. REDUCTION GEAR OIL (Only on equipped model)

<1/2 reduction with automatic centrifugal clutch>

1. Remove the oil filler cap and wipe the dipstick clean.
2. Insert the dipstick into the filler neck but do not screw it in.
3. If the level is low, fill to the upper level mark with the same oil recommended for the engine (see engine oil recommendations on page 7).

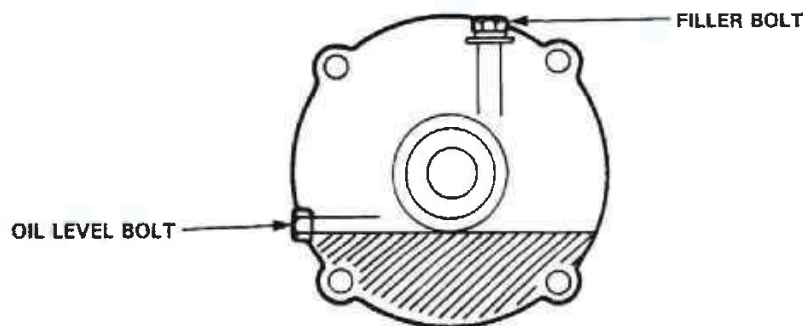
Oil capacity: 500 cc (17 US oz, 14 Imp oz)



<1/6 reduction>

1. Remove the oil level bolt.
2. Check the oil level; it should reach the edge of the oil level bolt hole. If the oil level is low, remove the filler bolt, and add oil until it starts to flow out the oil level bolt hole. Use the same oil recommended for the engine (see engine oil recommendations on page 7).
3. Install the oil level bolt and filler bolt. Tighten them securely.

Oil capacity: 150 cc (5.1 US oz, 4.2 Imp oz)

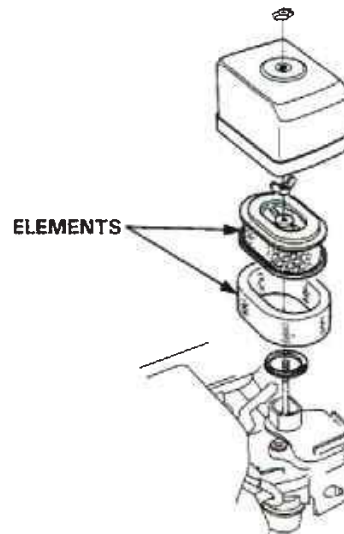


3. AIR CLEANER

NOTICE Never run the engine without the air cleaner. Rapid engine wear will result from contaminants, such as dust and dirt, being drawn through the carburetor and into the engine.

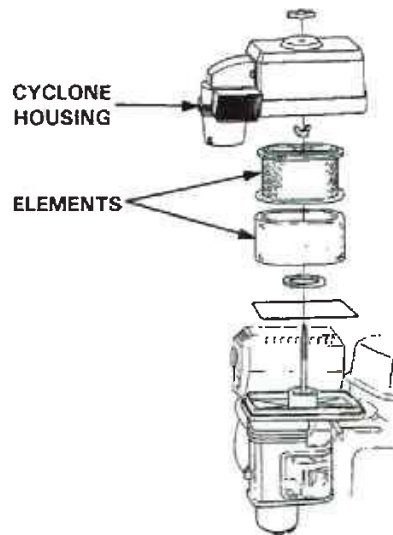
<Dual element type>

Check the air cleaner elements to be sure they are clean and in good condition. Clean or replace the elements if necessary (p.22).



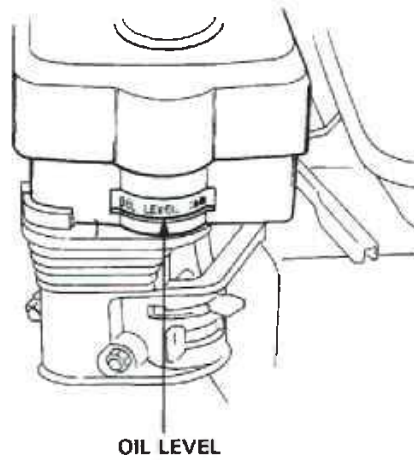
<Cyclone type>

1. Check the air cleaner element to be sure they are clean and in good condition. Clean or replace the elements if necessary (p.23).
2. Check the cyclone housing, and clean it if it is clogged or excessively dirty (p.23).



<Oil bath type>

1. Check the air cleaner element to be sure it is clean and in good condition. Clean or replace the element if necessary (page 24).
2. Check oil level and condition.



4. FUEL

Your engine is designed to use any gasoline that has a pump octane number $\left(\frac{R + M}{2}\right)$ of 86 or higher, or that has a research octane number of 91 or higher. Gasoline pumps at service station normally display the pump octane number.

We recommend that you use unleaded fuel because it produces fewer engine and spark plug deposits and extends the life of exhaust system components.

Never use stale or contaminated gasoline or an oil/gasoline mixture. Avoid getting dirt, dust or water in the fuel tank. Use of a lower octane gasoline can cause persistent "pinging" or heavy "spark knock" (a metallic rapping noise) which, if severe, can lead to engine damage.

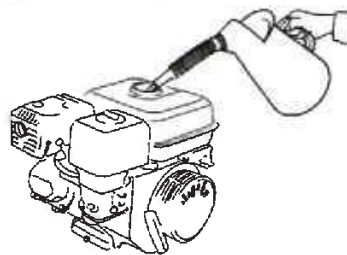
NOTICE If "spark knock" or "pinging" occurs at a steady engine speed under normal load, change brands of gasoline. If spark knock or pinging persists, consult your authorized Honda dealer. Failure to do so is considered misuse, and damage caused by misuse is not covered by Honda's Limited Warranty.

Occasionally you may experience light spark knock while operating under heavy loads. This is no cause for concern, it simply means your engine is operating efficiently.

▲ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions.
- Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area where the engine is refueled or where gasoline is stored.
- Do not overfill the fuel tank (there should be no fuel in the filler neck). After refueling, make sure the tank cap is closed properly and securely.
- Be careful not to spill fuel when refueling. Spilled fuel or fuel vapor may ignite. If any fuel is spilled, make sure the area is dry before starting the engine.
- Avoid repeated or prolonged contact with skin or breathing of vapor.
KEEP OUT OF REACH OF CHILDREN.

Fuel tank capacity: GX120 : 2.5 ℓ (0.66 US Gal, 0.55 Imp Gal.)
GX160 : 3.6 ℓ (0.95 US Gal, 0.79 Imp Gal.)



GASOLINES CONTAINING ALCOHOL

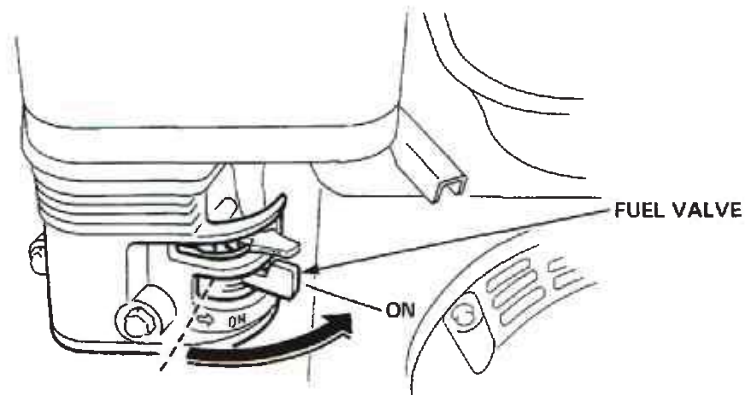
If you decide to use a gasoline containing alcohol (gasohol), be sure its octane rating is at least as high as that recommended by Honda. There are two types of "gasohol": one containing ethanol, and the other containing methanol. Do not use gasohol that contains more than 10% ethanol. Do not use gasoline containing methanol (methyl or wood alcohol) that does not also contain cosolvents and corrosion inhibitors for methanol. Never use gasoline containing more than 5% methanol, even if it has cosolvents and corrosion inhibitors.

NOTE:

- Fuel system damage or engine performance problems resulting from the use of fuels that contain alcohol is not covered under the warranty. Honda cannot endorse the use of fuels containing methanol since evidence of their suitability is as yet incomplete.
- Before buying fuel from an unfamiliar station, try to find out if the fuel contains alcohol, if it does, confirm the type and percentage of alcohol used. If you notice any undesirable operating symptoms while using a gasoline that contains alcohol, or one that you think contains alcohol, switch to a gasoline that you know does not contain alcohol.

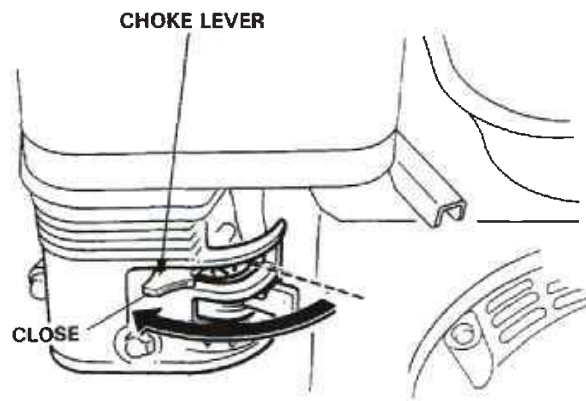
6. STARTING THE ENGINE

1. Turn the fuel valve to the ON position.

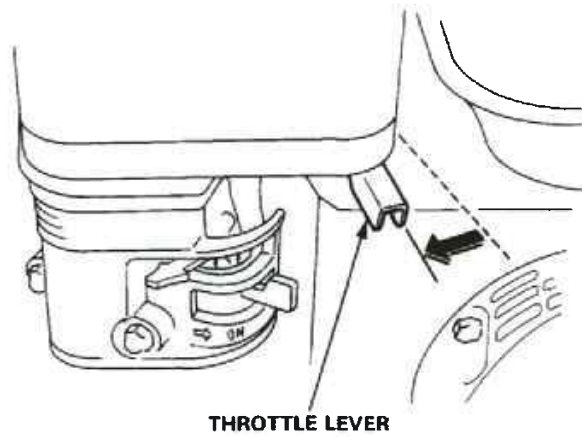


2. Move the choke lever to the CLOSE position.

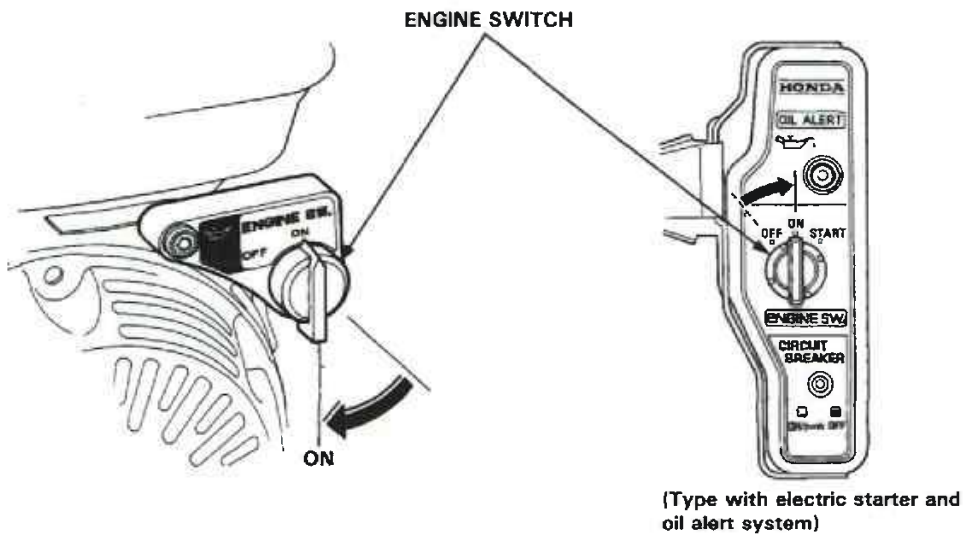
NOTE: The choke may not be needed if the engine is warm or the air temperature is high.



3. Move the throttle lever slightly to the left.

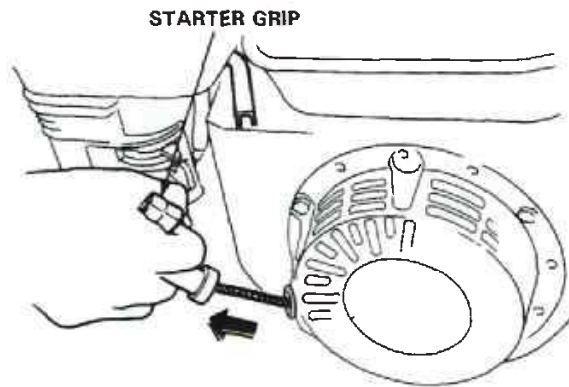


4. Start the engine.
- With recoil starter:
Turn the engine switch to the ON position.



Pull the starter grip lightly until resistance is felt, then pull briskly.

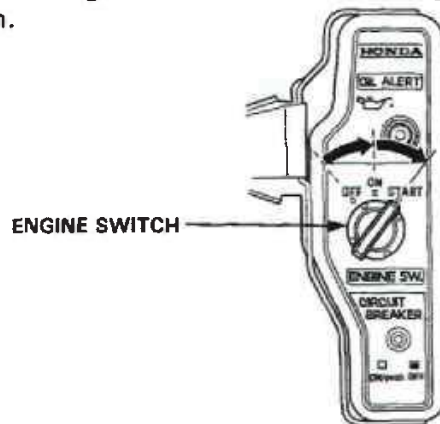
NOTICE Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.



- With electric starter:
Turn the engine switch to the START position and hold it there until the engine starts.

NOTICE Do not use the electric starter for more than 5 seconds or starter motor damage may occur. If the engine falls to start, release the switch and wait 10 seconds before operating the starter again.

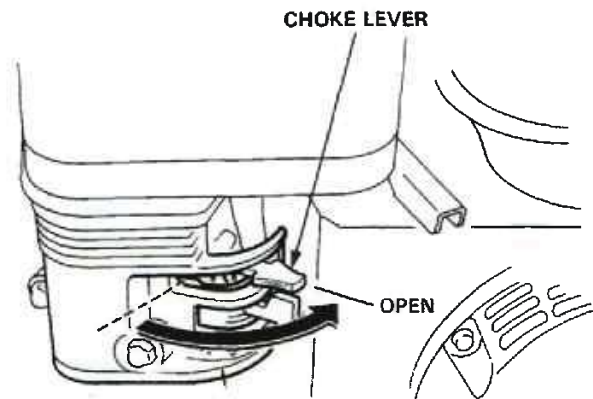
When the engine starts, allow the engine switch to return to the ON position.



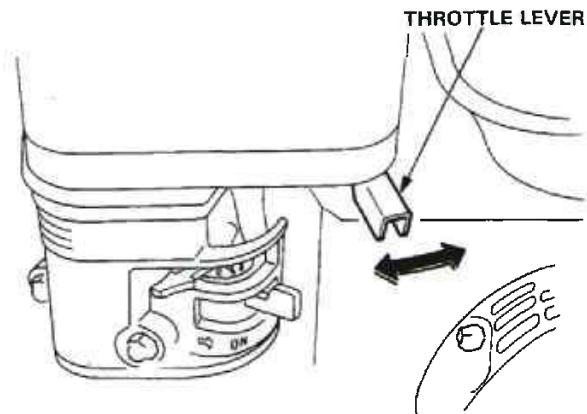
(Type with electric starter and oil alert system)

7. OPERATION

1. As the engine warms up, gradually move the choke lever to the OPEN position.



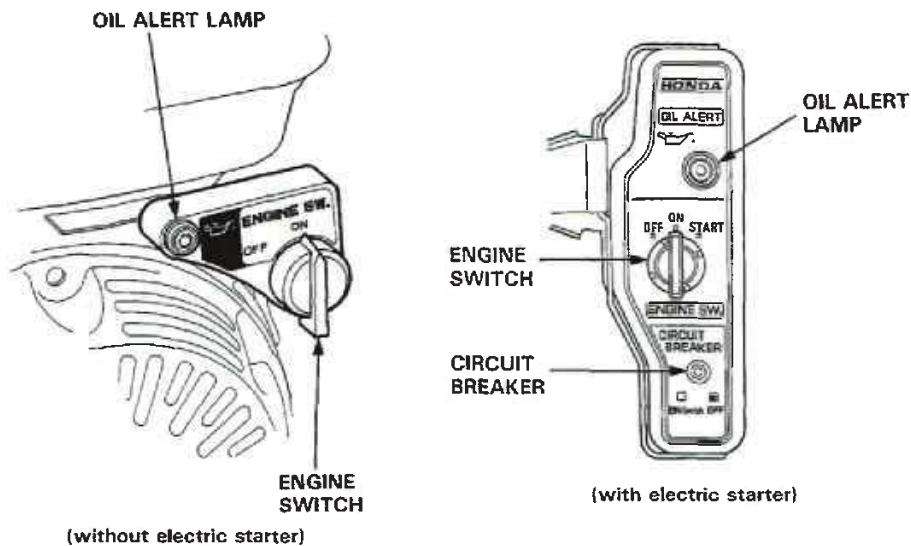
2. Position the throttle lever for the desired engine speed.



Oil Alert System

The Oil Alert system is designed to prevent engine damage caused by an insufficient amount of oil in the crankcase. Before the oil level in the crankcase can fall below a safe limit, the Oil Alert system will automatically shut down the engine (the engine switch will remain in the ON position).

If the Oil Alert system shuts down the engine, the Oil Alert lamp will flash when you operate the starter, and the engine will not run. If this occurs, add engine oil (page 7).



Circuit Breaker (for electric starter)

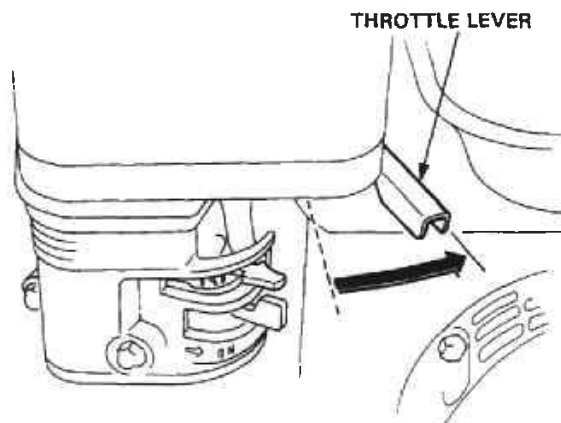
The circuit breaker protects the battery charging circuit. A short circuit or a battery connected in reverse polarity will trip the circuit breaker. The green indicator inside the circuit breaker will pop out to show that the circuit breaker has switched off. If this occurs, determine the cause of the problem and correct it before resetting the circuit breaker.

Push the circuit breaker button to reset.

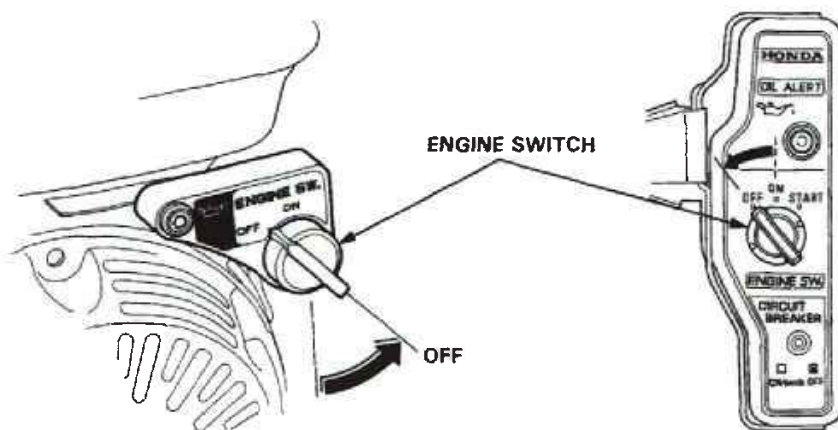
8. STOPPING THE ENGINE

To stop the engine in an emergency, turn the engine switch to the OFF position. Under normal conditions, use the following procedure:

1. Move the throttle lever fully to the right.

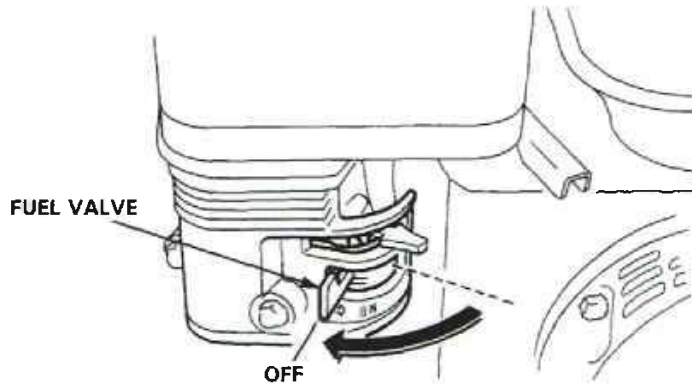


2. Turn the engine switch to the OFF position.



(Type with electric starter and oil alert system)

3. Turn the fuel valve to the OFF position.



• **High altitude operation**

At high altitude, the standard carburetor air-fuel mixture will be excessively rich. Performance will decrease, and fuel consumption will increase.

High altitude performance can be improved by installing a smaller diameter main fuel jet in the carburetor and readjusting the pilot screw. If you always operate the engine at altitudes higher than 6,000 feet above sea level, have your authorized Honda Engine dealer perform these carburetor modifications.

Even with suitable carburetor jetting, engine horsepower will decrease approximately 3.5% for each 1,000 foot increase in altitude. The effect of altitude on horsepower will be greater than this if no carburetor modification is made.

NOTICE Operation of the engine at an altitude lower than the carburetor is jetted for may result in reduced performance, overheating, and serious engine damage caused by an excessively lean air/fuel mixture.

9. MAINTENANCE

The purpose of the maintenance and adjustment schedule is to keep the engine in good operating condition. Inspect or service as scheduled in the table below.

▲ WARNING Shut off the engine before performing any maintenance. If the engine must be run, make sure the area is well ventilated. The exhaust contains poisonous carbon monoxide gas.

NOTICE Use only genuine HONDA parts or their equivalent. The use of replacement parts which are not of equivalent quality may damage the engine.

Maintenance Schedule

REGULAR SERVICE PERIOD		Each use	First month or 20 Hrs.	Every 3 months or 50 Hrs.	Every 6 months or 100 Hrs.	Every year or 300 Hrs.
ITEM	Performed at every indicated month or operating hour interval, whichever comes first.					
Engine oil	Check level	○				
	Change		○		○	
Reduction gear oil (applicable models only)	Check level	○				
	Change		○			○
Air cleaner	Check	○				
	Clean			○(1)		
Sediment cup	Clean				○	
Spark plug	Check clean				○	
Spark arrester (optional part)	Clean				○	
Valve clearance	Check-Adjust					○(2)
Fuel tank and strainer	Clean					○(2)
Fuel line	Check (Replace if necessary)		Every 2 years (2)			

NOTE: (1) Service more frequently when used in dusty areas.

(2) These items should be serviced by an authorized Honda dealer, unless the owner has the proper tools and is mechanically proficient. See the Honda Shop Manual.

1. Oil change

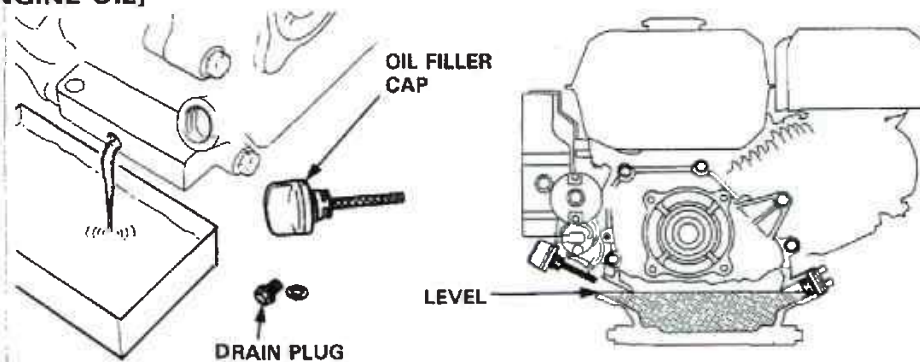
Drain the oil while the engine is still warm to assure rapid and complete draining.

1. Remove the oil filler cap and drain plug to drain the oil.
2. Install the drain plug and tighten it securely.
3. Refill with the recommended oil (see page 7) and check the oil level.
4. Install the oil filler cap.

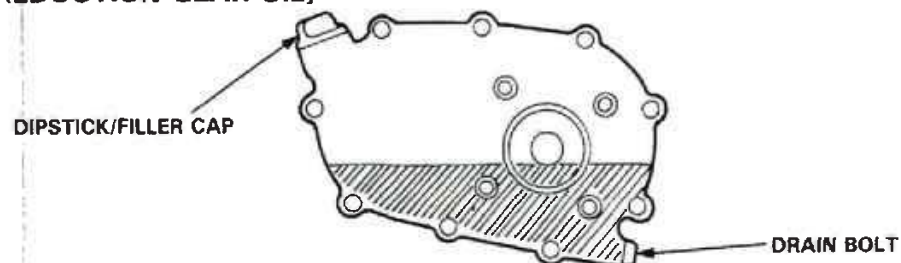
ENGINE OIL CAPACITY: 0.6 l (0.63 US qt, 0.53 Imp qt)

1/2 REDUCTION GEAR OIL CAPACITY: 500 cc (17 US oz, 14 Imp oz)

[ENGINE OIL]



[REDUCTION GEAR OIL]



⚠ CAUTION Used motor oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

NOTE: Please dispose of used motor oil in a manner that is compatible with the environment. Do not throw it in the trash or pour it on the ground.

2. Air cleaner service

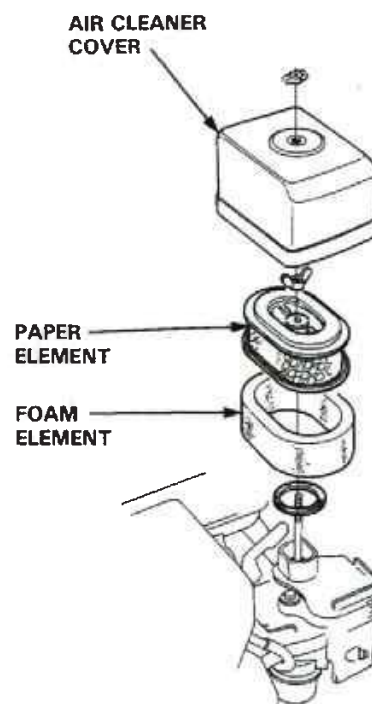
A dirty air cleaner will restrict air flow to the carburetor. To prevent carburetor malfunction, service the air cleaner regularly. Service more frequently when operating the engine in extremely dusty areas.

⚠ WARNING Never use gasoline or low flash point solvents for cleaning the air cleaner element. A fire or explosion could result.

NOTICE Never run the engine without the air cleaner. Rapid engine wear will result.

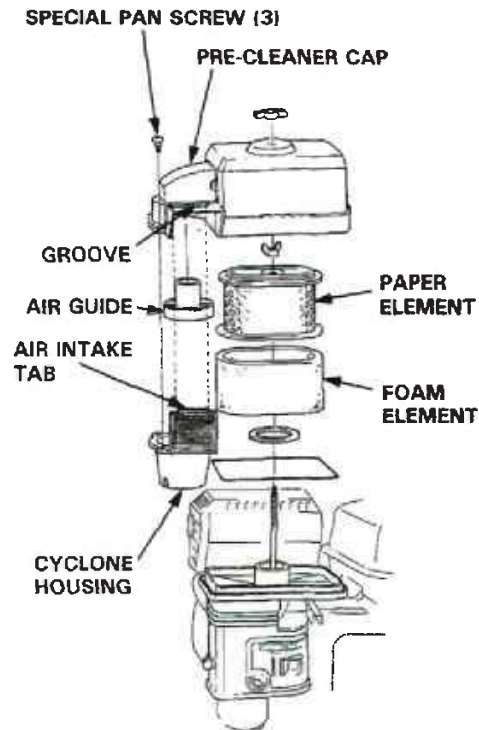
<Dual element type>

1. Remove the wing nut and the air cleaner cover. Remove the elements and separate them. Carefully check both elements for holes or tears and replace if damaged.
2. Foam element: Wash the element in a solution of household detergent and warm water, then rinse thoroughly, or wash in nonflammable or high flash point solvent. Allow the element to dry thoroughly. Soak the element in clean engine oil and squeeze out the excess oil. The engine will smoke during initial start-up if too much oil is left in the foam.
3. Paper element: Tap the element lightly several times on a hard surface to remove excess dirt, or blow compressed air through the filter from the inside out. Never try to brush the dirt off; brushing will force dirt into the fibers. Replace the paper element if it is excessively dirty.



<Cyclone type>

1. Remove the wing nut and the air cleaner cover. Remove the elements and separate them. Carefully check both elements for holes or tears and replace if damaged.
2. Foam element: Wash the element in a solution of household detergent and warm water, then rinse thoroughly, or wash in nonflammable or high flash point solvent. Allow the element to dry thoroughly.
Soak the element in clean engine oil and squeeze out the excess oil. The engine will smoke during initial start-up if too much oil is left in the foam.
3. Paper element: Tap the element lightly several times on a hard surface to remove excess dirt, or blow compressed air through the filter from the inside out. Never try to brush the dirt off; brushing will force dirt into the fibers. Replace the paper element if it is excessively dirty.
4. Cyclone Housing: Remove the three special pan head screws, remove the housing, and wash the components with water. Dry the components thoroughly, and carefully reassemble them.



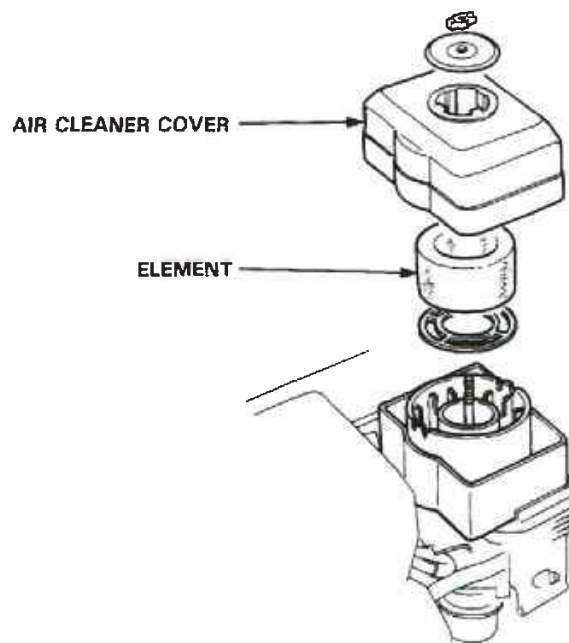
NOTICE

- When reinstalling the cyclone housing, be sure that the air intake tab fits properly into the groove in the pre-cleaner cap.
- Be careful to install the air guide as shown.

<Oil bath type>

1. Unscrew the wing nut, remove the air cleaner cover and remove the element.
2. Wash the element in a solution of household detergent and warm water, then rinse thoroughly, or wash in nonflammable or high flash point solvent. Allow the element to dry thoroughly.
3. Soak the element in clean engine oil and squeeze out the excess oil. The engine will smoke during initial start-up if too much oil is left in the element.
4. Empty the oil from the air cleaner case and wash out any accumulated dirt with nonflammable or high flash point solvent. Dry the case.
5. Fill the air cleaner case to the level mark with the same oil that is recommended for the engine (see engine oil recommendations on page 7).
6. Reinstall the element and the cover.

OIL CAPACITY: 60 cc (2.0 US oz, 1.69 Imp oz)

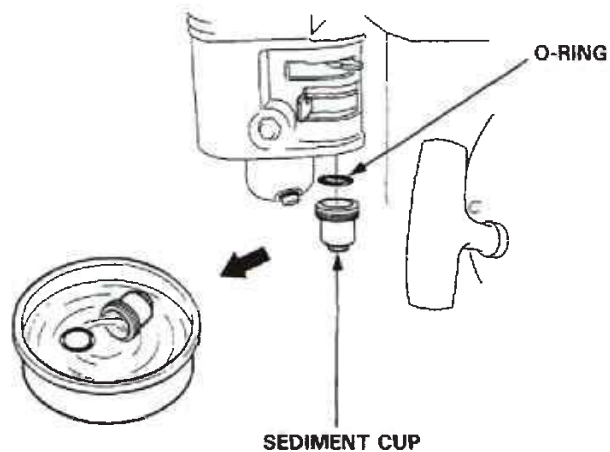


3. Sediment cup cleaning

⚠ WARNING Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in the area.

Turn the fuel valve to OFF. Remove the sediment cup and O-ring and wash them in nonflammable or high flash point solvent. Dry them thoroughly and reinstall securely. Turn the fuel valve ON and check for leaks.

⚠ WARNING If any fuel is spilled, make sure the area is dry before testing the spark plug or starting the engine. Fuel vapor or spilled fuel may ignite.



4. Spark plug service

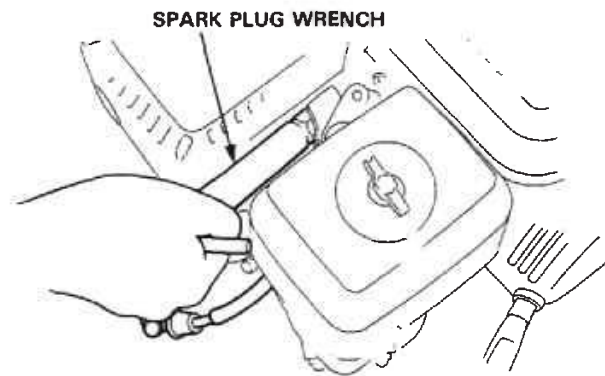
Recommended spark plug: BPR6ES (NGK)
W20EPR-U (ND)

NOTICE Never use a spark plug of incorrect heat range.

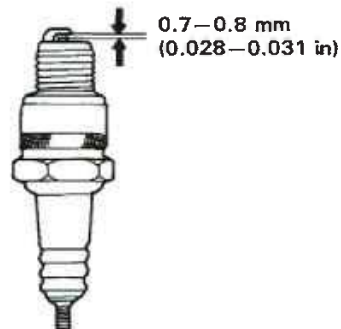
To ensure proper engine operation, the spark plug must be properly gapped and free of deposits.

1. Remove the spark plug cap and use a spark plug wrench to remove the plug.

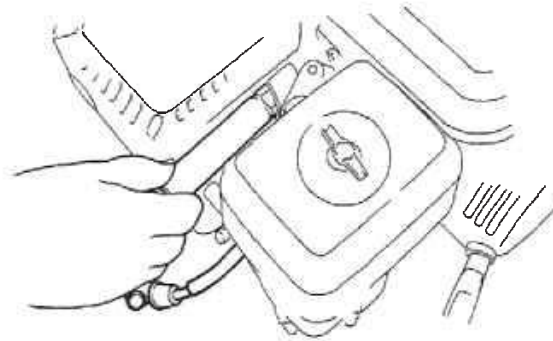
WARNING If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.



2. Visually inspect the spark plug. Discard it if the insulator is cracked or chipped. Clean the spark plug with a wire brush if it is to be reused.
3. Measure the plug gap with a feeler gauge. The gap should be 0.7–0.8 mm (0.028–0.031 in). Correct as necessary by bending the side electrode.



-
4. Check that the spark plug washer is in good condition and thread the spark plug in by hand to prevent cross-threading.
 5. After the spark plug is seated, tighten with a spark plug wrench to compress the washer.



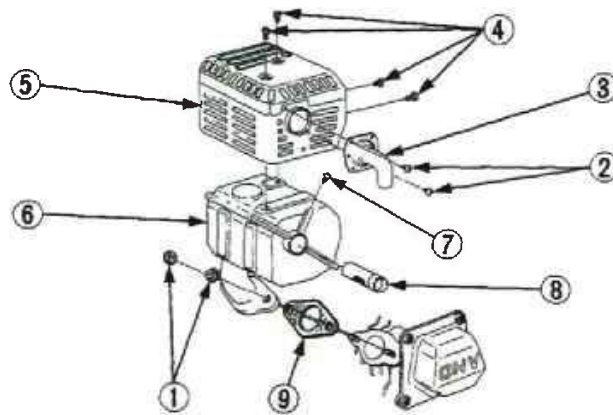
NOTE: When installing a new spark plug, tighten $1/2$ turn after the spark plug seats to compress the washer. When reinstalling a used spark plug, tighten $1/8 - 1/4$ turn after the spark plug seats to compress the washer.

NOTICE The spark plug must be securely tightened. An improperly tightened spark plug can become very hot and may damage the engine.

5. Spark arrester maintenance (optional part)

⚠ WARNING If the engine has been running, the muffler will be very hot. Allow it to cool before proceeding.

1. Remove the two 8 mm nuts ① and the muffler assembly.
2. Remove the three 4 mm screws ② and remove the exhaust deflector ③.
3. Remove the eight 5 mm screws ④ and remove the muffler protector ⑤ from the muffler ⑥.
4. Remove the 4 mm screw ⑦ and remove the spark arrester ⑧ from the muffler.



5. Use a brush to remove carbon deposits from the spark arrester screen.

NOTICE Be careful not to damage the spark arrester screen.



NOTE: The spark arrester must be free of breaks and holes. Replace, if necessary.

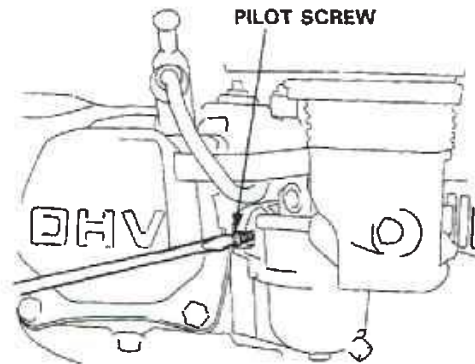
6. Install a new muffler gasket ⑨. Install the spark arrester and the muffler in the reverse order of disassembly.

6. Carburetor adjustment

1. Start the engine and allow it to warm up to normal operating temperature.
2. With the engine idling, turn the pilot screw in or out to the setting that produces the highest idle rpm. Usually the correct setting will be found to be:

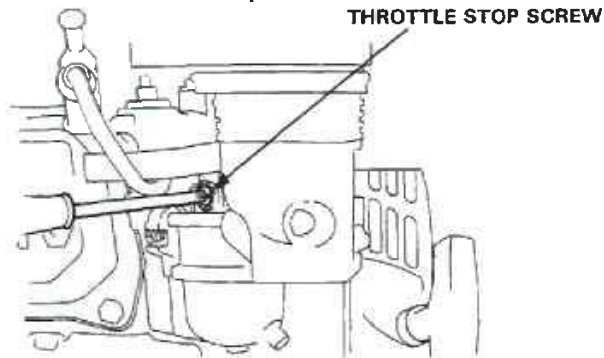
	GX120	GX160
Dual element type	2.0 turns	3.0 turns
Oil bath type		
Cyclone type	2 3/8 turns	2 1/8 turns

NOTICE Do not tighten the pilot screw against its seat; this will damage the pilot screw or seat.



3. After the pilot screw is correctly adjusted, turn the throttle stop screw to obtain the standard idle speed.

Standard idle speed: 1,400 ± 100 rpm.



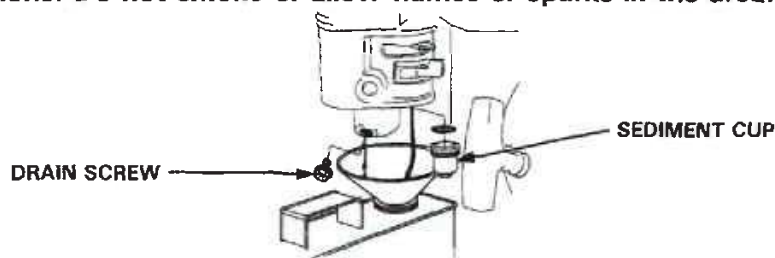
10. TRANSPORTING/STORAGE

▲ WARNING When transporting the engine, turn the fuel valve to the OFF position and keep the engine level to prevent fuel spillage. Fuel vapor or spilled fuel may ignite.

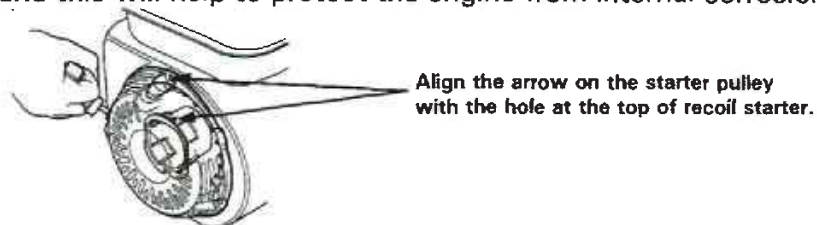
Before storing the unit for an extended period;

1. Be sure the storage area is free of excessive humidity and dust.
2. Drain the fuel...
 - a. With the fuel valve in the OFF position, remove and empty the sediment cup.
 - b. Turn the fuel valve to the ON position and drain the gasoline from the fuel tank into a suitable container.
 - c. Replace the sediment cup and tighten securely.
 - d. Drain the carburetor by loosening the drain screw. Drain the gasoline into a suitable container.

▲ WARNING Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in the area.



3. Change the engine oil (page 21).
4. Remove the spark plug and pour about a tablespoon of clean engine oil into the cylinder. Crank the engine several revolutions to distribute the oil, then reinstall the spark plug.
5. Pull the starter rope slowly until resistance is felt. Continue pulling until the notch on the starter pulley aligns with the hole on the recoil starter (see illustration below). At this point, the intake and exhaust valves are closed, and this will help to protect the engine from internal corrosion.



6. Electric starter type: Remove the battery and store it in a cool, dry place. Recharge it once a month.
7. Cover the engine to keep out dust.

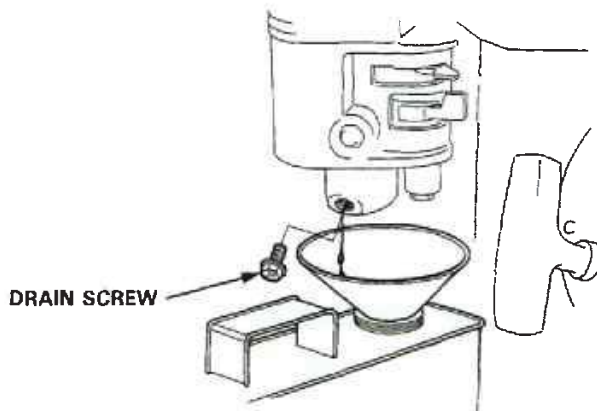
11. TROUBLESHOOTING

Engine will not start using recoil starter:

1. Is the engine switch in the ON position? (See page 14.)
2. If equipped with oil alert, does the oil alert lamp flash when the starter is operated? (See page 7.)
3. Is the fuel valve ON? (See page 13.)
4. Is there fuel in the fuel tank? (See page 4.)
5. Is gasoline reaching the carburetor?

To check, loosen the drain screw with the fuel valve on.

⚠ WARNING If any fuel is spilled, make sure the area is dry before testing the spark plug or starting the engine. Fuel vapor or spilled fuel may ignite.



6. Is there a spark at the spark plug?
 - a. Remove the spark plug cap. Clean any dirt from around the spark plug base, then remove the spark plug. (See pages 26, 27.)
 - b. Install the spark plug in the plug cap.
 - c. Turn the engine switch on.
 - d. Ground the side electrode to any engine ground, and pull the recoil starter to see if sparks jump across the gap.
 - e. If there is no spark, replace the plug.
If OK, reinstall the spark plug and try to start the engine again according to the instructions.
7. If the engine still does not start, take the engine to an authorized Honda dealer.

Engine will not start using electric starter:

1. Are the battery cables securely connected and free of corrosion?
2. Is the battery fully charged?

NOTE: If the engine does not charge the battery, check the circuit breaker.

3. If the starter motor operates but the engine will not start, follow the troubleshooting procedures described under "engine will not start using the recoil starter". (See page 31.)

12. SPECIFICATIONS

GX120

DIMENSIONS AND WEIGHT	GX120
Description code	GC01
Length x Width x Height	300 x 345 x 320 mm (11.8 x 13.6 x 12.6 in)
Dry weight	12.0 kg (26.5 lb)
Engine type	4-stroke, overhead valve, single cylinder
Displacement [Bore x Stroke]	118 cc (7.3 cu in) [60 x 42 mm (2.4 in x 1.7 in)]
Max. output	4.0 HP/3,600 rpm
Max. torque	0.75 kg (5.4 ft-lb)/2,500 rpm
Fuel consumption	230 g/PS h
Cooling system	Forced air
Ignition system	Transistorized magneto
PTO shaft rotation	Counterclockwise

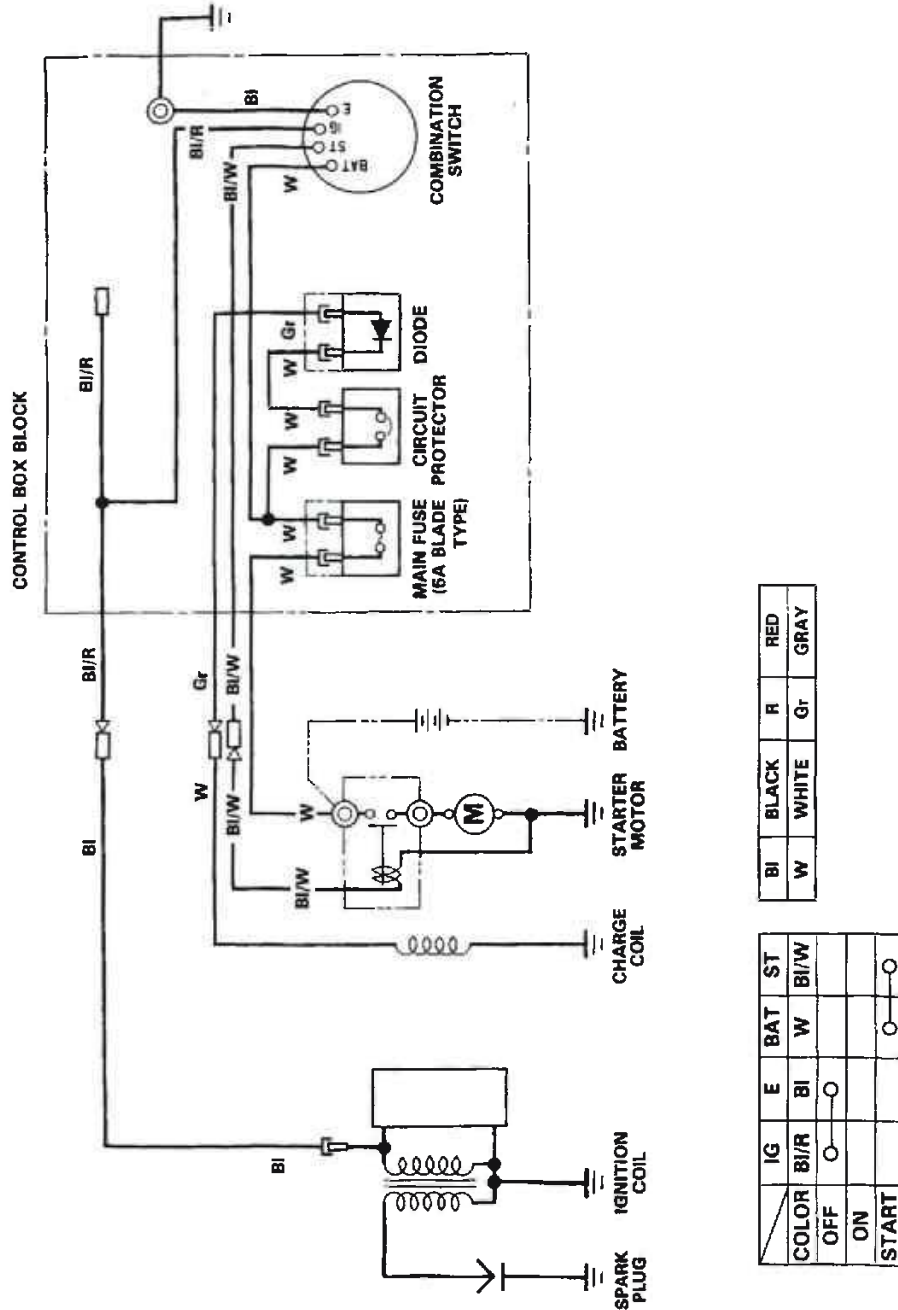
GX160

DIMENSIONS AND WEIGHT	GX160
Description code	GC02
Length x Width x Height	305 x 365 x 335 mm (12.0 x 14.4 x 13.2 in)
Dry weight	14.0 kg (30.9 lb)
Engine type	4-stroke, overhead valve, single cylinder
Displacement [Bore x Stroke]	163 cc (9.9 cu in) [68 x 45 mm (2.7 in x 1.8 in)]
Max. output	5.5 HP/3,600 rpm
Max. torque	1.1 kg (8.0 ft-lb)/2,500 rpm
Fuel consumption	230 g/PS h
Cooling system	Forced air
Ignition system	Transistorized magneto
PTO shaft rotation	Counterclockwise

NOTE: Specifications may vary according to the types, and are subject to change without notice.

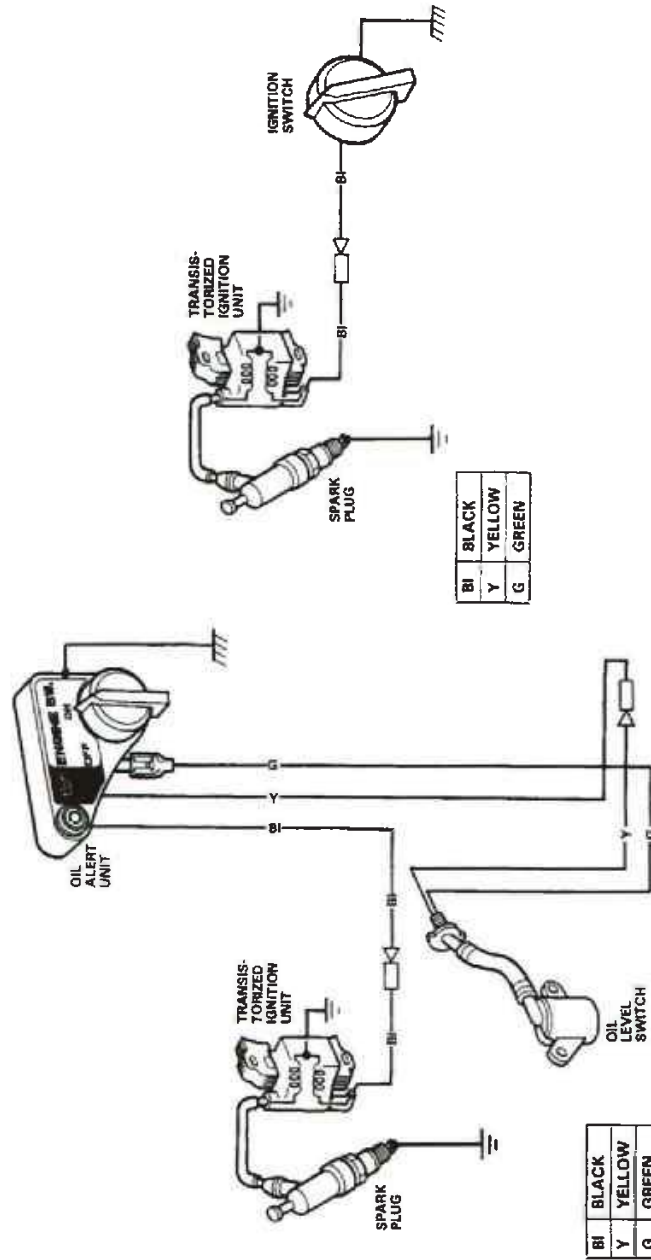
13. WIRING DIAGRAM

<Type with electric starter and oil alert system>



NOTE: Wiring diagrams may vary according to the types.

<Type without electric starter>



NOTE: Wiring diagrams may vary according to the types.

14. WARRANTY SERVICE

Owner Satisfaction

Your satisfaction and goodwill are important to your dealer and to us. All Honda warranty details are explained in the Distributor's Limited Warranty. Warranty service is available at any dealership displaying the Honda Power Equipment Engines sign. To locate dealers in your area, look in the yellow pages of your telephone directory under Gasoline Engines, Garden & Lawn Equipment & Supplies, Lawn Mowers, etc.



Normally, any problem concerning the engine will be handled by the dealer's service department. If you have a warranty problem that has not been handled to your satisfaction, we suggest you take the following action:

- Discuss your problem with a member of dealership management. Often complaints can be quickly resolved at that level. If the problem has already been reviewed with the Service Manager, contact the owner of the dealership or the General Manager.
- If your problem still has not been resolved to your satisfaction, contact:

American Honda Motor Co., Inc.
P.O. Box 100021
Duluth, Georgia 30136-9421
Telephone: (404) 497-6400

We will need the following information in order to assist you:

- Your name, address, and telephone number
- Engine model and serial number
- Date of purchase
- Dealer name and address
- Product or equipment in which the engine is installed.
- Nature of the problem

After reviewing all the facts involved, you will be advised of what action can be taken. Please bear in mind that your problem will likely be resolved at the dealership, using the dealer's facilities, equipment, and personnel, so it is very important that your initial contact be with the dealer.

Your purchase of a Honda engine is greatly appreciated by both your dealer and American Honda Motor Co., Inc. We want to assist you in every way possible to assure your complete satisfaction with your purchase.

Current customer service contact information:

Servicing dealership personnel are trained professionals. They should be able to answer any question you may have. If you encounter a problem that your dealer does not solve to your satisfaction, please discuss it with the dealership's management. The Service Manager, General Manager, or Owner can help. Almost all problems are solved in this way.

United States, Puerto Rico, and U.S. Virgin Islands:

If you are dissatisfied with the decision made by the dealership's management, contact the Honda Regional Engine Distributor for your area (www.honda-engines.com/dea.htm).

If you are still dissatisfied after speaking with the Regional Engine Distributor, you may contact the Honda Office as shown.

American Honda Motor Co., Inc.
Power Equipment Division
Customer Relations Office
4900 Marconi Drive
Alpharetta, GA 30005-8847

Or telephone: (770) 497-6400 M-F, 8:30 am - 7:00 pm EST

When you write or call, please provide the following information:

- Equipment manufacturer's name and model number that the engine is mounted on
- Engine model, serial number, and type
- Name of the dealer who sold the engine to you
- Name, address, and contact person of the dealer who services your engine
- Date of purchase
- Your name, address, and telephone number
- A detailed description of the problem



Distributor's Limited Warranty

Honda General Purpose Engines

This warranty is limited to Honda general purpose engines distributed by American Honda Motor Co., Inc., Power Equipment Division, 4900 Marconi Drive, Alpharetta, Georgia 30005. The following warranty applies to engines purchased at retail or placed into rental service on or after January 1, 2009.

PRODUCTS COVERED BY THIS WARRANTY:	LENGTH OF WARRANTY: (FROM DATE OF ORIGINAL PURCHASE)	
	PRIVATE RESIDENTIAL ⁽³⁾	COMMERCIAL/RENTAL/INSTITUTIONAL
GX & GXV Series Engines (except models listed below)	36 months	36 months ⁽¹⁾
GXV140, GXV160	24 months	24 months
GX22, GX25, GX31, GX35, GXH50, GXV50, GXV57, GS & GSV Series Engines	24 months	12 months ⁽²⁾
GC & GCV Series	24 months	3 months ⁽²⁾

- Honda GX and GXV general purpose engines installed in concession-type vehicles are covered by this warranty for a period of 12 months from the date of original retail purchase.
- Honda GC/GS and GCV/GSV general purpose engines are not covered by this warranty when installed on concession type vehicles.
- Private Residential: Used in maintaining owner's primary and/or secondary residence. Any other use, including but not limited to informal "for hire" use, is considered commercial/rental/institutional use.

To Qualify for this Warranty:

The Honda general purpose engine must be purchased from a Honda general purpose engine dealer authorized to sell that product in the United States, Puerto Rico, or the U.S. Virgin Islands. This limited warranty applies to the first retail purchaser and each subsequent owner during the applicable warranty time period.

What American Honda Will Repair or Replace Under Warranty:

American Honda will repair or replace, at its option, any part that is proven to be defective in material or workmanship under normal use during the applicable warranty time period. Warranty repairs and replacements will be made without charge for parts or labor. Anything replaced under warranty becomes the property of American Honda Motor Company, Inc. All parts replaced under warranty will be considered as part of the original product and any warranty on those parts will expire coincident with the original product warranty.

To Obtain Warranty Service:

You must take your Honda general purpose engine, or the equipment in which it is installed, together with proof of original retail purchase date, at your expense, to a Honda engine dealer authorized to sell that product in the United States, Puerto Rico, or the U.S. Virgin Islands, during their normal business hours. To locate a dealer near you, visit our web site at <http://engines.honda.com> and click on FIND A DEALER.

If you are unable to obtain warranty service, or are dissatisfied with the warranty service you receive, take the following steps: First, contact the owner of the dealership involved; normally this should resolve the problem. However, if you should require further assistance, write or call the Power Equipment Customer Relations Department of American Honda Motor Co., Inc.

American Honda Motor Co., Inc.
Power Equipment Customer Relations Department
4900 Marconi Drive
Alpharetta, Georgia 30005-8847
Telephone: (770) 497-6400

Exclusions:

This engine warranty does not include the following:

- Any damage or deterioration resulting from the following:
 - Neglect of the periodic maintenance as specified in the engine owner's manual
 - Improper repair or maintenance
 - Operating methods other than those indicated in the engine owner's manual
 - Damage caused by the product on which the engine is installed
 - Damage caused by conversion to, or use of, fuel other than the fuel(s) that the engine was originally manufactured to use, as set forth in the engine owner's manual and/or warranty booklet
 - The use of non-genuine Honda parts and accessories, other than those approved by Honda (other than recommended lubricants and fluids) (does not apply to the emissions warranty unless non-genuine part used is not comparable to Honda part and was cause of the failure)
 - Exposure of the product to soot and smoke, chemical agents, bird droppings, sea water, salt, or other corrosive environments
 - Collision, fuel contamination or deterioration, neglect, unauthorized alteration, or misuse
 - Natural wear and tear (natural fading of painted or plated surfaces, sheet peeling and other natural deterioration)
- Consumable parts: Honda does not warrant parts deterioration due to normal wear and tear. The parts listed below are not covered by warranty (unless they are needed as a part of another warranty repair):
 - Spark plug, fuel filter, air cleaner element, clutch disc, recoil starter rope
 - Lubricant: oil and grease
- Cleaning, adjustment, and normal periodic maintenance work (carburetor cleaning and engine oil draining).
- Use of the Honda general purpose engine for racing or competition.
- Any engine that is part of a product that has ever been declared a total loss or sold for salvage by a financial institution or insurer.

Disclaimer of Consequential Damage and Limitation of Implied Warranties:

American Honda disclaims any responsibility for loss of time or use of the engine, or the equipment in which the engine is installed, transportation, commercial loss, or any other incidental or consequential damage. Any implied warranties are limited to the duration of this written limited warranty. Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.



Distributor's Limited Warranty

Accessories, Replacement Parts, and Apparel

This warranty is limited to Honda Power Equipment parts, accessories, and apparel when distributed by American Honda Motor Co., Inc., 4900 Marconi Drive, Alpharetta, Georgia 30005-8847.

PRODUCTS COVERED BY WARRANTY:	LENGTH OF WARRANTY: (FROM DATE OF ORIGINAL RETAIL PURCHASE)	
	PRIVATE RESIDENTIAL	COMMERCIAL/RENTAL/INSTITUTIONAL
Accessories	12 months	3 months
Replacement Parts	6 months	3 months
Apparel	6 months	3 months

To Qualify for this Warranty:

- The accessories, replacement parts, or apparel must be purchased from American Honda or a dealer authorized by American Honda to sell those products in the United States, Puerto Rico, and the U.S. Virgin Islands. Parts and Accessories must be purchased for installation on original Honda equipment or engines to be eligible for warranty coverage. Installing Parts and Accessories on non-Honda products or engines voids this warranty.
- You must be the first retail purchaser. This warranty is not transferable to subsequent owners.

What American Honda Will Repair or Replace Under Warranty:

American Honda will repair or replace, at its option, any Honda General Purpose Engine accessories, replacement parts, or apparel that are proven to be defective in material or workmanship under normal use during the applicable warranty time period. Anything replaced under warranty becomes the property of American Honda Motor Company, Inc. All parts replaced under warranty will be considered as part of the original product, and any warranty on those parts will expire coincident with the original product warranty.

Accessories and replacement parts installed by a dealer who is authorized by American Honda to sell them will be repaired or replaced under warranty without charge for parts or labor. If installed by anyone else, accessories and replacement parts will be repaired or replaced under warranty without charge for parts, but any labor charges will be the responsibility of the purchaser.

Apparel will be repaired or replaced under warranty without any charge.

To Obtain Warranty Service:

You must take the Honda General Purpose Engine accessory, replacement part, apparel, or the Honda general purpose engine on which the accessory or replacement part is installed, and proof of purchase, at your expense, to any Honda General Purpose Engine dealer in the United States, Puerto Rico, or the U.S. Virgin Islands who is authorized to sell that product, during the dealer's normal business hours. If you are unable to obtain warranty service, or are dissatisfied with the warranty service you receive, take the following steps: first, contact the owner of the dealership involved; normally this will resolve the problem. However, if you should require further assistance, write or call the Power Equipment Customer Relations Department of American Honda Motor Co., Inc.

American Honda Motor Co., Inc.
Power Equipment Customer Relations Department
4900 Marconi Drive
Alpharetta, Georgia 30005-8847
Telephone: (770) 497-6400

Exclusions:

This warranty does not extend to accessories, parts, or apparel affected or damaged by collision, normal wear, use in an application for which the product was not designed, or any other misuse, neglect, incorporation or use of unsuitable attachments or parts, unauthorized alteration, improper installation, or any causes other than defects in material or workmanship of the product. Installing Parts and Accessories on non-Honda products or engines voids this warranty.

Disclaimer of Consequential Damage and Limitation of Implied Warranties:

American Honda disclaims any responsibility for loss of time or use of the product, or the power equipment on which the product is installed, transportation, commercial loss, or any other incidental or consequential damage. Any implied warranties are limited to the duration of this written warranty. Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.



Kuriyama Industrial Hoses



King Bee™

**Liquid Suction and
Wastewater Hose**

*Highly Flexible – great
for portable toilets*

Crush Resistant

Wear Resistant



KBEE™ Series

**NEW
PRODUCTS!**



Kuriyama of America, Inc.





King Bee™

KBEE™ Series

Polyethylene Liquid Suction and Wastewater Hose



General Applications:

- Pumps, rental and construction dewatering
- Pumps, trash
- Septic and wastewater handling
- Water suction – standard duty

Construction: flexible polyethylene (LDPE) tube with polyethylene (LDPE) ribs and cuffed ends

Service Temperature: -40°F (-40°C) to 150°F (+65°C)*

Features and Advantages:

- **Superior Flexibility!** – Corrugated tube and ribs provides high flexibility, perfect for maneuvering in tight areas such as portable toilets.
- **“Cold-Flex” Materials** – Hose remains flexible in sub-zero temperatures.
- **Crush Resistant** – Will spring back to original shape after being crushed, will not kink!
- **Easy Slide Helix** – Exposed ribs protect hose tube from cover wear, and allow hose to slide easily over rough surfaces. Easy-to-handle.
- **Leak Proof Cuffs** – Overmolded cuffs eliminate leaking and will not separate from the hose. Each cuff and unit is 100% factory tested.
- **Additional 2" Cuffs** – Additional 2" cuffs are available for making hose repairs and custom lengths; order part no. CUFF2



Nominal Specifications

Series	ID (in.)	ID (mm)	OD (in.)	OD (mm)	Working Pressure (psi @ 68°F)	Vacuum Rating (in. Hg @ 68°F)	Min. Bending Radius (in. @ 68°F)	Standard Length (ft.)	Weight (lbs./ft.)
KBEE200	2	50.8	2.76	70.1	15	29	3.5	60/50/40/30/25/20	0.85
KBEE300	3	76.2	4.06	103.1	7	29	6.5	30/20	1.60

NOTE: Service life may vary depending on operating conditions and type of material being conveyed.

*Actual service temperature range is application dependent.

Because we continually examine ways to improve our products, we reserve the right to alter specifications or discontinue products without prior notice.



King Bee™

KBEE™ Series

Polyethylene Hose Guard



General Applications:

- Protection of high pressure sewer jetting hoses

Construction: flexible polyethylene (LDPE) tube with polyethylene (LDPE) ribs and cuffed ends

Service Temperature: -40°F (-40°C) to 150°F (+65°C)*



Features and Advantages:

- **Easy Slide Interior** – low coefficient of friction polyethylene tube allows for sewer jetting hoses to slide through easily, protecting them from wear.
- **“Cold-Flex” Materials** – Remains flexible in sub-zero temperatures.
- **Crush Resistant** – Will spring back to original shape after being crushed, will not kink!
- **Easy Slide Helix** – Exposed ribs protect tube from cover wear, and allow hose to slide easily over rough surfaces. Easy-to-handle.
- **Leak Proof Cuffs** – Overmolded cuffs will not separate from the hose guard. Each cuff and unit is 100% factory tested.

Nominal Specifications

Part Number	ID (in.)	ID (mm)	OD (in.)	OD (mm)	Working Pressure (psi @ 68°F)	Vacuum Rating (in. Hg @ 68°F)	Min. Bending Radius (in. @ 68°F)	Standard Length (ft.)	Weight per Pkg. (lbs.)
KBEE3X3	3	76.2	4.06	103.1	7	29	6.5	3	4.80

NOTE: Service life may vary depending on operating conditions and type of material being conveyed.

*Actual service temperature range is application dependent.



"COLD-FLEX"
MATERIALS



EASY SLIDE



WATER



Tiger™ Yellow TY™ Series EPDM Suction Hose

General Applications:

- Agriculture liquid fertilizers
- Irrigation lines
- Liquid manure handling
- Marine bilge discharge
- Pumps, rental and construction dewatering
- Pumps, trash
- Septic and wastewater handling
- Used frack solution removal
- Water suction – standard duty

Construction: EPDM tube with polyethylene helix.

Service Temperature: -40°F (-40°C) to 160°F (+71°C)*

Features and Advantages:

- **Superior Rubber Compounds** – Tigerflex™ uses only the best available EPDM compounds, which provide the ideal combination of light-weight, flexibility, durability and chemical resistance.
- **Superior Flexibility** – Our tests show up to 22% more flexible than the competition, especially in sub-zero weather! Tiger™ Green comes off the trucks more flexible and easier to handle than other similar hoses.
- **Easy Slide Helix** – Rigid helix design protects hose tube from cover wear, and allows hose to slide easily over rough surfaces and around corners. Easy-to-handle.
- **Convuluted Outer Cover** – Provides increased hose flexibility.
- **"Cold-Flex" Materials** – Hose remains flexible in sub-zero temperatures.

Nominal Specifications

Series	ID (in.)	ID (mm)	OD (in.)	OD (mm)	Working Pressure (psi)		Vacuum Rating (in. Hg)		Approx. Bending Radius (@ 68°F)	Standard Length (ft.)	Weight (lbs./ft.)
					68°F	104°F	68°F	104°F			
TY100	1	25.4	1.40	35.5	65	45	FULL	28	2	100	0.28
TY125	1¼	31.8	1.63	41.4	60	40	FULL	28	3	100	0.33
TY150	1½	38.1	1.93	49.0	50	35	FULL	28	3	100	0.44
TY200	2	50.8	2.51	63.8	50	35	FULL	28	5	100	0.67
TY300	3	76.2	3.60	91.5	45	30	FULL	26	7	100	1.14
TY400	4	101.6	4.70	119.5	40	25	FULL	26	11.5	100	1.84

NOTE: Service life may vary depending on operating conditions and type of material being conveyed.

NOTE: For details of the following compliances, refer to footnotes listed on page 62.

*Actual service temperature range is application dependent.

RoHS(11)

Because we continually examine ways to improve our products, we reserve the right to alter specifications or discontinue products without prior notice.

KTFCA0116

Cautionary Statement

All Products sold and distributed by Kuriyama of America, Inc. are in the nature of commodities and they are sold by published specifications and not for particular purposes, uses or applications. Purchaser shall first determine their suitability for the intended purposes, uses or applications and shall either conduct its own engineering studies or tests, or retain qualified engineers, consultants or testing laboratories and consult with them before determining the proper use, suitability or propriety of the merchandise or Products for the intended purposes, uses or applications.

Kuriyama of America, Inc. ("Seller") does not recommend the Products for any particular purpose, use or application, and the Purchaser or user thereof shall assume full responsibility for the suitability, propriety, use and application of the Products. Purchaser shall follow all instructions contained in Seller's catalogs, brochures, technical bulletins and other documents regarding the Products. The Products, including but not limited to, hose, tubing or couplings, may fail due to the use or conveyance of substances at elevated or lowered temperatures or at excessive pressure, the conveyance of abrasive, injurious, flammable, explosive or damaging substances.

Hose or tubing used in bent configurations will be subjected to increased abrasion. Hose clamps or couplings may loosen after initial installation and all sections of hose and tubing including connections, couplings, clamps, conductivity and bonding should be inspected frequently, regularly and consistently, and should be replaced, adjusted or re-tightened for the avoidance of leakage, for the prevention of injuries or damages, and for general safety purposes. Except as indicated in its Limited Warranty, Seller shall not be liable or responsible for direct or indirect injuries or damages caused by or attributed to the failure or malfunction of any Products sold or distributed by it.

Purchasers or users of the Products should frequently and consistently undertake inspections and protective measures with respect to the use and application of Products, which should include the examination of tube and cover, conditions of the hose or tubing, and the identification, repair or replacement of sections showing cracking, blistering, separations, internal and external abrasions, leaking or slipped couplings or connections and make proper proof tests.

Limited Warranty

The Products sold or distributed by Seller are warranted to its customers to be free from defects in material and workmanship at the time of shipment by us, subject to the following provisions. ALL WARRANTY CLAIMS SHALL BE MADE WITHIN SIX (6) MONTHS AFTER SELLER SHIPPED THE PRODUCTS. SELLER'S LIABILITY HEREUNDER IS LIMITED AT SELLER'S EXCLUSIVE DISCRETION, TO 1) THE PURCHASE PRICE OF ANY PRODUCTS PROVING DEFECTIVE; 2) REPAIR OF ANY DEFECTIVE PRODUCT OR PART THEREOF; OR 3) REPLACEMENT OF ANY DEFECTIVE PRODUCT OR PART UPON ITS AUTHORIZED RETURN TO SELLER.

THIS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE CREATED UNDER APPLICABLE LAW INCLUDING, BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SELLER OR THE MANUFACTURER OF THE PRODUCT BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFITS, WHETHER OR NOT CAUSED BY OR RESULTING FROM THE NEGLIGENCE OF SELLER AND/OR THE MANUFACTURER OF THE PRODUCT, UNLESS SPECIFICALLY PROVIDED HEREIN. IN ADDITION, THIS WARRANTY SHALL NOT APPLY TO ANY PRODUCTS OR PORTIONS THEREOF WHICH HAVE BEEN SUBJECTED TO ABUSE, MISUSE, IMPROPER INSTALLATION, MAINTENANCE, OR OPERATION, ELECTRICAL FAILURE OR ABNORMAL CONDITIONS, AND TO PRODUCTS WHICH HAVE BEEN TAMPERED WITH, ALTERED, MODIFIED, REPAIRED, REWORKED BY ANYONE NOT APPROVED BY SELLER, OR USED IN ANY MANNER INCONSISTENT WITH THE PROVISIONS OF THE "CAUTIONARY STATEMENT" ABOVE OR ANY INSTRUCTIONS OR SPECIFICATIONS PROVIDED WITH OR FOR THE PRODUCT.

09/2005

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Proper Method of Dumping RV Holding Tanks

Brought to you by



Using this method will insure your tanks are emptied in an environmentally friendly manner, as well as much more sanitary for the operator. Please tell all your RVing friends, or better yet, give them a copy of this procedure. Together we can get rid of all the mess at RV park sites across the country.

Follow us on **Facebook** to add your comments on this and other RV related issues.
www.facebook.com/Drainmasterproducts

To see the Waste Master Cam Loc system, the ultimate waste evacuation system, go to www.drainmaster.com & click on RV's then Sewer Hose Systems in the middle of the page.

Using the System

1. Remove the system from its storage container near the park sewer inlet. (This is probably opposite to your current method.) REMEMBER THE "FIRST IN" "LAST OUT" RULE APPLIES HERE.
2. Insert the nozzle in the sewer inlet securely.
3. Open the grey lever on the side of the nozzle. (If you have a sewer inlet fitting without an on-off valve, use a cap to cover the outlet fitting)
4. With the other end of the hose assembly, walk back to the RV where the sewer outlet is located.
5. Remove the cap on the coach, then the storage cap in the male Cam Loc fitting. (Or bayonet fitting)
6. Connect the male Cam Loc fitting into the female Cam Loc fitting on the coach and rotate the grey cams to their locked position. (You know how to attach the bayonet fitting)

Dumping the Tanks

1. Check your installation to be sure the nozzle is open and secure in the park sewer inlet.
2. Open the black dump valve and allow the tank to fully drain. (See Flushing section)
3. Close the black valve fully and open the grey valve (if your RV is equipped with 2 grey valves, open the galley first). When the tank is fully drained, close the valve.

Flushing the Holding Tanks

1. Most RVs have a flusher in the black tank and some have them in the grey tanks. You should have them in both or all 3 tanks if so equipped.
2. Connect a hose to the coach connection on the side of the RV. Do not use the fresh water hose used for supplying water to the RV.
3. Turn on the water and fill the black tank about 2/3 full before opening the dump valve. Repeat this process until the sight glass in your Polychute system runs clear.
4. Repeat step 2 and 3 with your grey tank(s).
5. Now is the time to restore the assembly as outlined next.

Restoring the system for travel

1. Make sure all tank dump valves are closed.
2. Remove male Cam Loc fitting connected to the coach and install the protective cap both in the coach fitting and the male Hose fitting. (Or your bayonet fitting)
3. Walk the hose assembly back to the sewer inlet, letting the hose collapse as you get close to the park sewer inlet.
4. Close the grey lever on the nozzle. (Or lift the sewer fitting out of the sewer and put the cap on the outlet)
5. Insert the nozzle in the storage container and feed the hose and male Cam Loc fitting back as well. Return system to its RV storage location.

If you have any questions or need clarification regarding this procedure please let us know by email admin@drainmaster.com



Waste Master RV Sewer Hose System

This all-in-one system provides the best and safest method for handling RV waste between your RV and the RV ground sewer inlet. The waste water transfer process should be easy, clean, and simple, with the absolute minimum chance of offensive leakage. That's where the Waste Master systems help you conveniently and safely transfer your gray water and black water waste to the ground sewer inlet.

We designed the Sta-Put sewer hose material specifically for the RV industry. Existing hoses in the market are made of sub standard material and won't consistently do the job in an uneventful, simple and sanitary way, so we set out to fix that! With proper care and use, this industrial strength hose will perform flawlessly for years. It is designed that way, built that way and backed that way. If you ever have an issue with the material or workmanship of the hose material or fittings on one of our sewer hose systems, **just give us a call. (877) 787-8833** We will take care of it.



WARNING

READ CAREFULLY READ CAREFULLY

*Confined spaces must be considered hazardous. DO NOT enter tank without taking proper precautions.

*Fill tank with water and hold for at least 5 hours PRIOR to use to identify leakage through unsecure fittings, shipping damage or manufacturing defects. The manufacturer's warranty of this tank is void unless upon installation of the tank, the tank is water pre-tested as a final test of suitability. Manufacturer is not responsible for loss of materials. See manufacturer's limited warranty.

*DO NOT use for vacuum or pressure applications. Tank must be properly vented.

*Continuous operating temperatures above 140° F (60° C) are NOT RECOMMENDED. Consult factory for operating temperature above 100° F (38° C).

*Protect tanks from impact (especially sharp blows).

*Installation sites for tanks of 8,000 gallons or more must be on a reinforced concrete pad. Such installation is also preferred for smaller tanks. Soil sites for smaller tanks must be solid, stable and compacted. All sites must be level, flat, free of rocks or other objects, and above known flood plains.

*Excessive weight of strainers, valves, hose or pipe must not be carried by the tank outlets.

*Consult factory on fitting location and type for sizes larger than 2". Vertical tanks 1500 to 2999 gallons shall have a 6" minimum fitting centerline height for fittings. Vertical tanks 3000 gallons or larger shall have a 9" minimum centerline height for fittings. Minimum fitting centerline height is fitting size dependent.

*Horizontal tanks requiring support must be equipped with a full saddle or skid with cradle supporting at least one-third of the tank circumference over its entire length.

*Horizontal tanks must be secured with bands and/or hoops to prevent tank movement. CHECK BAND/HOOP TENSION AFTER FILLING TANK. Bands and/or hoops must be tightened to remove all gap between bands/hoops and tank before filling and after filling but not causing tank distortion.

*Tank used for transport must have full bottom support and be properly secured to the transport vehicle. DO NOT EXCEED YOUR VEHICLE'S GROSS WEIGHT LIMITS.

*Vertical tanks should be anchored using the molded-in tie-down lugs. Use moderate tension and care not to put undue stress on the lugs by over-tightening.

*Cone bottom tanks must be installed in SII stands at ground level.

*User is responsible for determining compatibility of chemicals with tank and fitting materials. TESTING IS RECOMMENDED. Tank should not be used for gasoline storage.

*Use expansion joints or other flexible connection methods at all tank fittings to prevent damage from differential expansion and contraction of piping and tank. The use of rigid piping or the failure to provide for the expansion of the tank will void all warranties.

*Observe all local, state and Federal codes.

*Rinse tanks well before and after each use and before filling with each different solution.



INDUSTRIES, INC.

Lincoln, Nebraska 68504

www.snydernet.com

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P/N: 99700176
10/2014