
**INSTALLATION, OPERATION,
AND MAINTENANCE MANUAL**
WITH PARTS LIST



60 SERIES PUMP

MODELS
61 1/2A1-22 61 1/2A1-22 S/G

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA Printed In U.S.A.

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The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

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INTRODUCTION

This Installation, Operation, and Maintenance manual is designed to help you achieve the best performance and longest life from your Gorman-Rupp pump.

This pump is a 60 Series, centrifugal model with an enclosed impeller. The pump is designed for high pressure distribution of clear water in irrigation or fire fighting service. It is closed coupled to a single cyl-

inder, air cooled gasoline Briggs and Stratton 221432 pull start engine or a 221437 starter generator engine mounted on a common hand-carry base. Standard equipment includes an exhaust primer system, spark arresting muffler, suction strainer, discharge check valve, discharge pressure gauge and fire hose thread adaptors. The basic material of pump construction is aluminum with cast iron wear ring and a self-lubricated mechanical seal.

If there are any questions regarding the pump or its application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or write:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901-1217

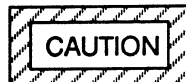
or

Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7

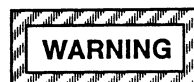
The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.



INSTRUCTIONS WHICH MUST BE FOLLOWED TO AVOID CAUSING DAMAGE TO THE PRODUCT OR OTHER EQUIPMENT INCIDENTAL TO THE INSTALLATION. THESE INSTRUCTIONS DESCRIBE THE REQUIREMENTS AND THE POSSIBLE DAMAGE WHICH COULD RESULT FROM FAILURE TO FOLLOW THE PROCEDURES.



THESE INSTRUCTIONS MUST BE FOLLOWED TO AVOID CAUSING INJURY OR DEATH TO PERSONNEL, AND DESCRIBE THE PROCEDURE REQUIRED AND THE INJURY WHICH COULD RESULT FROM FAILURE TO FOLLOW THE PROCEDURE.

WARNINGS - SECTION A

THESE WARNINGS APPLY TO 60 SERIES ENGINE DRIVEN PUMPS. REFER TO THE MANUAL ACCOMPANYING THE ENGINE BEFORE ATTEMPTING TO BEGIN OPERATION.



BEFORE ATTEMPTING TO OPEN OR SERVICE THE PUMP:

1. FAMILIARIZE YOURSELF WITH THIS MANUAL.
2. DISCONNECT THE SPARK PLUG WIRE TO ENSURE THAT THE PUMP WILL REMAIN INOPERATIVE.
3. ALLOW THE PUMP TO COOL IF OVERHEATED.
4. CHECK THE TEMPERATURE BEFORE OPENING ANY COVERS, PLATES, OR PLUGS.
5. CLOSE THE SUCTION AND DISCHARGE VALVES.
6. VENT THE PUMP SLOWLY AND CAUTIOUSLY.
7. DRAIN THE PUMP.



THIS PUMP IS DESIGNED TO HANDLE CLEAR WATER FOR HIGH PRESSURE DISTRIBUTION. DO NOT ATTEMPT TO PUMP VOLATILE, CORROSIVE, OR FLAMMABLE LIQUIDS WHICH MAY DAMAGE THE PUMP OR ENDANGER PERSONNEL AS A RESULT OF PUMP FAILURE.

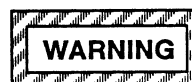


DO NOT OPERATE THE PUMP AGAINST A CLOSED DISCHARGE VALVE FOR LONG PERIODS OF TIME. IF OPERATED AGAINST A CLOSED DISCHARGE VALVE, PUMP COMPONENTS WILL DETERIORATE, AND THE LIQUID COULD COME TO A BOIL, BUILD PRESSURE,

AND CAUSE THE PUMP CASING TO RUPTURE OR EXPLODE.



AFTER THE PUMP HAS BEEN INSTALLED, MAKE CERTAIN THAT THE PUMP AND HOSE CONNECTIONS ARE TIGHT, PROPERLY SUPPORTED AND SECURE BEFORE OPERATION.

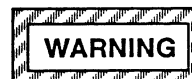


OVERHEATED PUMPS CAN CAUSE SEVERE BURNS AND INJURIES. IF OVERHEATING OF THE PUMP OCCURS:

1. STOP THE PUMP IMMEDIATELY.
2. VENTILATE THE AREA.
3. ALLOW THE PUMP TO COOL.
4. CHECK THE TEMPERATURE BEFORE OPENING ANY COVERS, PLATES, GAUGES, OR PLUGS.
5. VENT THE PUMP SLOWLY AND CAUTIOUSLY.
6. REFER TO INSTRUCTIONS IN THIS MANUAL BEFORE RESTARTING THE PUMP.



DO NOT REMOVE PLATES, COVERS, GAUGES, PIPE PLUGS, OR FITTINGS FROM AN OVERHEATED PUMP. VAPOR PRESSURE WITHIN THE PUMP CAN CAUSE PARTS BEING DISENGAGED TO BE EJECTED WITH GREAT FORCE. ALLOW THE PUMP TO COOL BEFORE SERVICING.



DO NOT OPERATE AN INTERNAL COMBUSTION ENGINE IN AN EXPLOSIVE ATMOSPHERE. WHEN OPERATING INTERNAL COMBUSTION ENGINES IN AN ENCLOSED AREA, MAKE CERTAIN THAT EXHAUST FUMES ARE PIPED TO

THE OUTSIDE. THESE FUMES CONTAIN CARBON MONOXIDE, A DEADLY GAS THAT IS COLORLESS, TASTELESS, AND ODORLESS.



FUEL USED BY INTERNAL COMBUSTION ENGINES PRESENTS AN EXTREME EXPLOSION AND FIRE HAZARD. MAKE CERTAIN THAT ALL FUEL LINES ARE SECURELY CONNECTED AND FREE OF LEAKS. NEVER REFUEL A HOT OR RUNNING ENGINE. AVOID OVERFILLING THE

FUEL TANK. ALWAYS USE THE CORRECT TYPE OF FUEL.



NEVER TAMPER WITH THE GOVERNOR TO GAIN MORE POWER. THE GOVERNOR ESTABLISHES SAFE OPERATING LIMITS THAT SHOULD NOT BE EXCEEDED. CONTINUOUS DUTY PERFORMANCE IS LIMITED TO 3600 RPM; HOWEVER THE ENGINE MAY BE RUN AT 3800 RPM DURING INTERMITTENT FIRE FIGHTING SERVICE.

INSTALLATION - SECTION B

Review all WARNINGS in Section A.

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

Most of the information pertains to a standard **static lift** application where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction** application where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the spe-

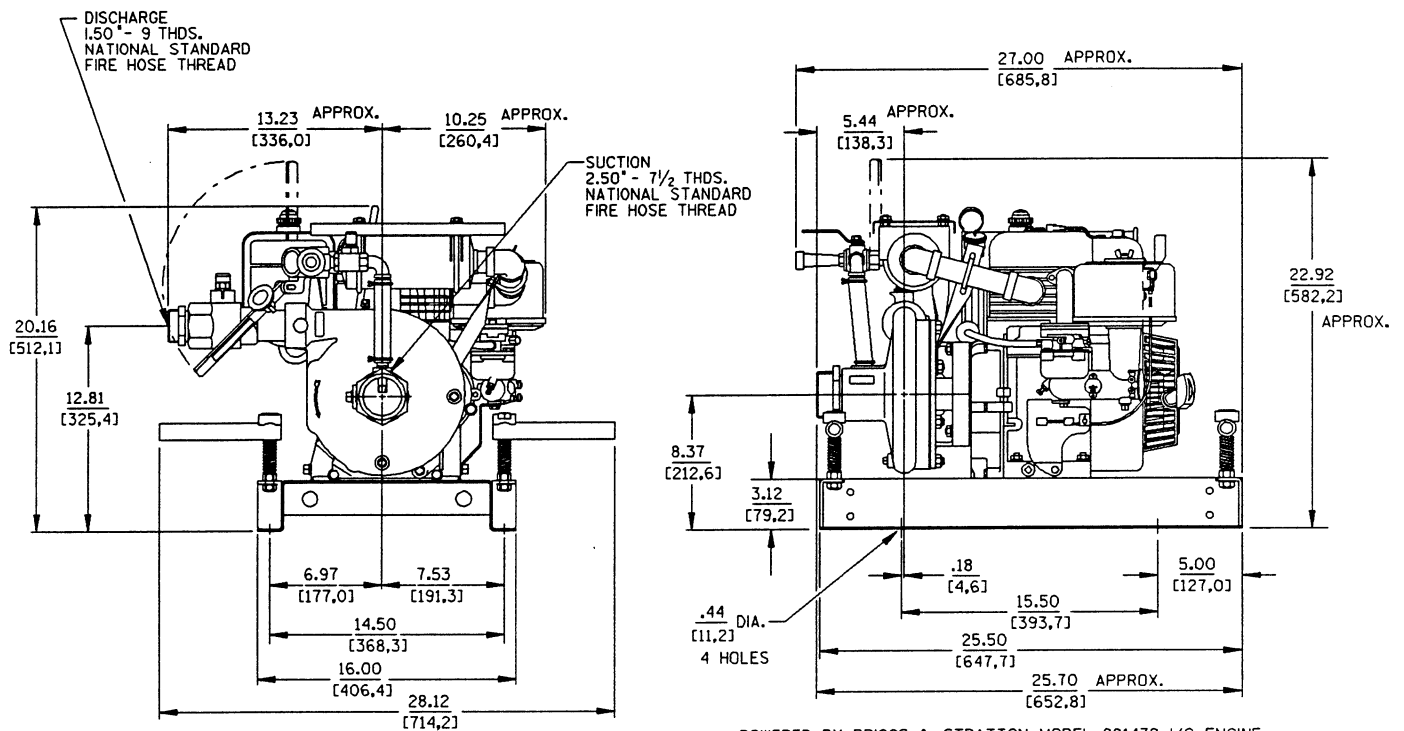
cific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to 50% of the maximum permissible operating pressure as shown on the pump performance curve. (See Section E, Page 1.)

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Pump Dimensions

See Figures 1 and 2 for the approximate physical dimensions of this pump.

OUTLINE DRAWING



DIMENSIONS:
INCHES
[MILLIMETERS]

POWERED BY BRIGGS & STRATTON MODEL 221432 I/C ENGINE.

Figure 1. Pump Model 61 1/2A1-22

OUTLINE DRAWING

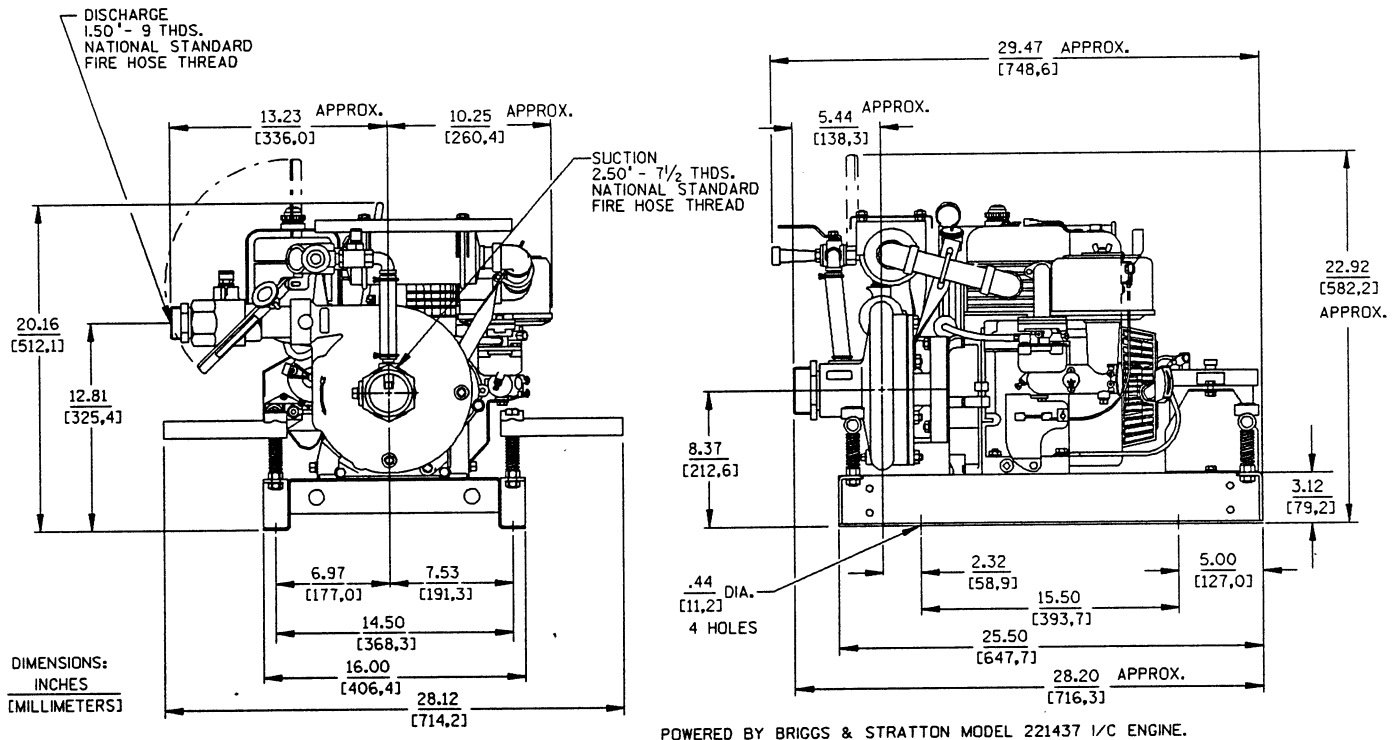


Figure 2. Pump Model 61 1/2A1-22 S/G

PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before shipment from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

- a. Inspect the pump and engine for cracks, dents, damaged threads, and other obvious damage.
- b. Check for and tighten loose attaching hardware. Since gaskets tend to shrink after drying, check for loose hardware at mating surfaces.
- c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated.
- d. Check levels and lubricate as necessary. Refer to **LUBRICATION** in the **MAINTENANCE AND REPAIR** section of this manual and perform duties as instructed.
- e. If the pump and engine have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.
- f. Check to ensure the following standard equipment items are included with the pump assembly:
 - Exhaust primer assembly.
 - Brass fire hose adaptors for the pump suction and discharge ports.
 - Discharge pressure gauge.
 - Suction strainer assembly.

If the maximum shelf life has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

Battery Specifications And Installation

Unless otherwise specified on the pump order, the engine battery was **not** included with the starter/generator unit. Refer to the following specifications when selecting a battery.

Table 1. Battery Specifications

Voltage	Cold Crank Amps @ 0° F	Reserve Capacity @ 80° F (Minutes)	Amp/ Hr. Rating	Approx. Overall Dims. (Inches)
12 Volts	220-255	41	33	7.75L x 5.13W x 7.38H

Refer to the information accompanying the battery and/or electrolyte solution for activation and charging instructions.

Before installing the battery, clean the positive and negative cable connectors, and the battery terminals. Secure the battery by tightening the holddown brackets. The terminals and clamps may be coated with petroleum jelly to retard corrosion. Connect and tighten the positive cable first, then the negative cable.

POSITIONING PUMP

Lifting

This pump is designed to be hand carried using the 2-man carry handles. The total pump weight for the pull start unit is approximately **148 pounds (67,1 kg)** and approximately **160 pounds (72,6 kg)** for the starter/generator unit, not including accessories or suction strainer. Customer installed equipment such as suction and discharge piping **must** be removed before attempting to lift.

Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation.

The pump may have to be supported or shimmed to provide for level operation or to eliminate vibration.

To ensure sufficient lubrication and fuel supply to the engine, **do not** position the pump and engine more than 15° off horizontal for continuous operation. The pump and engine may be positioned up to 30° off horizontal for **intermittent operation only**; however, the engine manufacturer should be consulted for continuous operation at angles greater than 15°.

SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve and recommendations on Page E-1 to be sure your overall application allows pump to operate within the safe operation range.

Materials

Either pipe or hose maybe used for suction and discharge lines; however, the materials must be compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines not less than 18 inches (457,20 mm) from the suction and discharge ports and install the gauges. Installation closer to the pump may result in erratic readings.

SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

Strainers

If a strainer is furnished with the pump, be certain to use it; any spherical solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

This pump is designed to handle up to 7/32-inch (5,6 mm) diameter spherical solids.

Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to 1-1/2 times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance 1-1/2 times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least 3 times the diameter of the suction pipe.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 3 shows recommended minimum submergence vs. velocity.

NOTE

The pipe submergence required may be reduced by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).

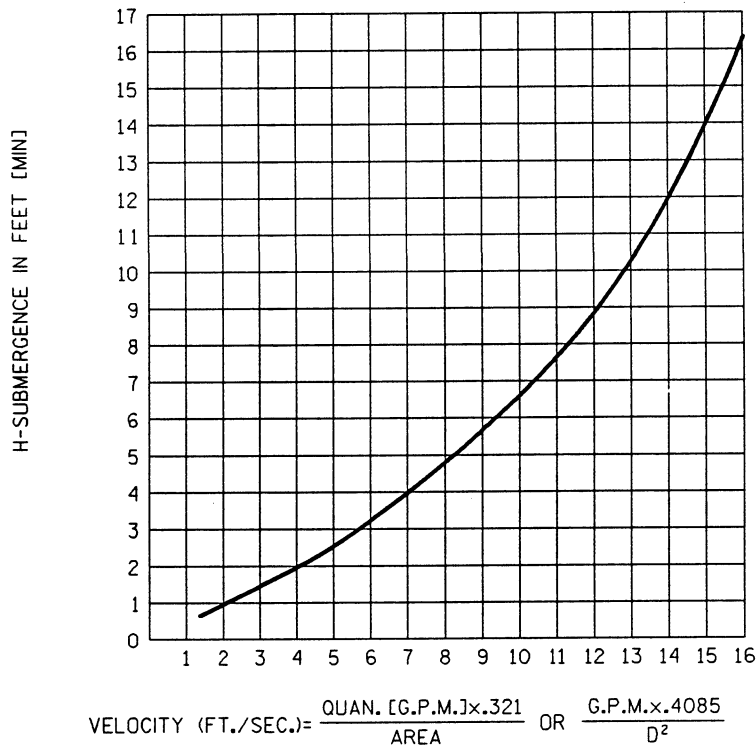


Figure 3. Recommended Minimum Suction Line Submergence vs. Velocity

DISCHARGE LINES

Siphoning

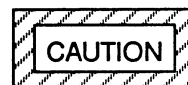
Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

Valves

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe to minimize

friction losses. Never install a throttling valve in a suction line.

With high discharge heads, it is recommended that a throttling valve and a system check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

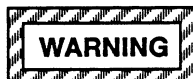


IF THE APPLICATION INVOLVES A HIGH DISCHARGE HEAD, GRADUALLY CLOSE THE DISCHARGE THROTTLING VALVE BEFORE STOPPING THE PUMP.

OPERATION – SECTION C

Review all warnings in Section A.

Follow the instructions on all tags, labels and decals attached to the pump.



THIS PUMP IS DESIGNED TO HANDLE CLEAR WATER FOR HIGH PRESSURE DISTRIBUTION. DO NOT ATTEMPT TO PUMP VOLATILE, CORROSIVE, OR FLAMMABLE LIQUIDS WHICH MAY DAMAGE THE PUMP OR ENDANGER PERSONNEL AS A RESULT OF PUMP FAILURE.



NEVER TAMPER WITH THE GOVERNOR TO GAIN MORE POWER. THE GOVERNOR ESTABLISHES SAFE OPERATING LIMITS THAT SHOULD NOT BE EXCEEDED. CONTINUOUS DUTY PERFORMANCE IS LIMITED TO 3600 RPM; HOWEVER THE ENGINE MAY BE RUN AT 3800 RPM DURING INTERMITTENT FIRE FIGHTING SERVICE.

PRIMING

Install the pump and piping as described in **INSTALLATION**. Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see **LUBRICATION** in **MAINTENANCE AND REPAIR**).

Exhaust Primer

Since this pump is not self-priming, it is equipped with an exhaust primer assembly (see Figure 1).

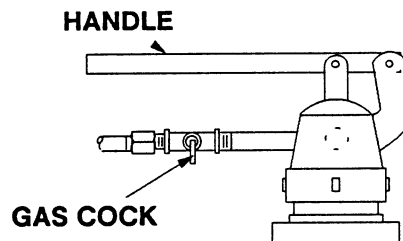


Figure 1. Exhaust Primer Assembly

The exhaust primer utilizes engine exhaust gases, directed through a venturi, to create a vacuum and draw air out of the suction line and pump casing. The exhaust primer is capable of priming a pump with a maximum priming lift of 25 feet within 1 minute; less time will be required for priming at a lesser lift. If the pump does not prime in a reasonable length of time, check the suction line for leaks. To prime the pump, close the throttling valve in the discharge line. Close the exhaust primer handle (see Figure 1), and open the cock in the priming line. Consult the starting instructions in this manual as well as the engine operating manual, and start the engine. Operate the engine at maximum governed speed and allow the pump to prime until liquid flows continuously from the exhaust primer nozzle. When the pump is fully primed, open the exhaust primer handle, and close the cock in the priming line. Once fully primed, reduce engine speed and partially open the discharge throttling valve. The discharge line should be filled slowly to prevent damage to the piping, gaskets, and other devices, resulting from the initial shock of liquid filling the lines. When the discharge line is completely filled, adjust the discharge throttling valve to the desired flow rate.

STARTING

Consult the operations manual furnished with the engine.

OPERATION

Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 160° F (71,1 °C). Do not apply it at a higher operating temperature.

Overheating can occur if operated with the valves in the suction or discharge lines closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.



DO NOT REMOVE PLATES, COVERS, GAUGES, PIPE PLUGS, OR FITTINGS FROM AN OVERHEATED PUMP. VAPOR PRESSURE WITHIN THE PUMP CAN CAUSE PARTS BEING DISENGAGED TO BE EJECTED WITH GREAT FORCE. ALLOW THE PUMP TO COOL BEFORE SERVICING.

Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop. If a vacuum suction gauge has been installed, monitor and record the readings regularly to detect strainer blockage.

Never introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, **liquid pressure** must be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve. (See Section E, Page 1.)

Pump Vacuum Check

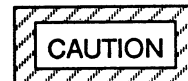
With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches (508,0 mm) or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operation speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

STOPPING

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly.

On engine driven pumps, reduce the throttle speed slowly and allow the engine to idle briefly before stopping.



IF THE APPLICATION INVOLVES A HIGH DISCHARGE HEAD, GRADUALLY CLOSE THE DISCHARGE THROTTLING VALVE BEFORE STOPPING THE PUMP.

After stopping the pump, disconnect the spark plug wire to ensure that the pump will remain inoperative.

Cold Weather Preservation

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts. If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump

from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

TROUBLESHOOTING – SECTION D

Review all WARNINGS in Section A.



BEFORE ATTEMPTING TO OPEN OR SERVICE THE PUMP:

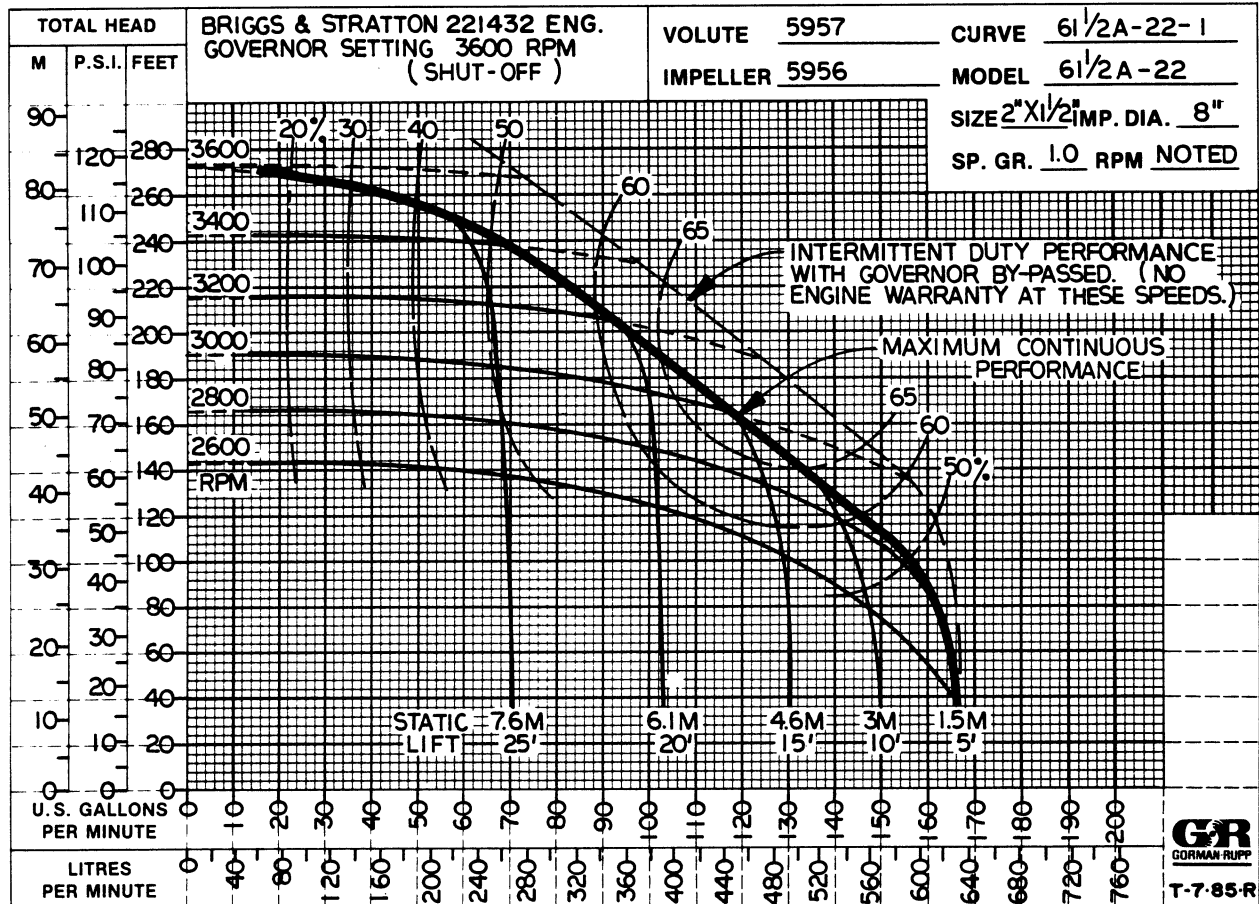
1. FAMILIARIZE YOURSELF WITH THIS MANUAL.
2. DISCONNECT THE SPARK PLUG WIRE TO ENSURE THAT THE PUMP WILL REMAIN INOPERATIVE.
3. ALLOW THE PUMP TO COOL IF OVERHEATED.
4. CHECK THE TEMPERATURE BEFORE OPENING ANY COVERS, PLATES, OR PLUGS.
5. CLOSE THE SUCTION AND DISCHARGE VALVES.
6. VENT THE PUMP SLOWLY AND CAUTIOUSLY.
7. DRAIN THE PUMP.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	<p>Not enough liquid in casing.</p> <p>Air leak in suction line.</p> <p>Lining of suction hose collapsed.</p> <p>Leaking or worn seal or pump gasket.</p> <p>Suction lift or discharge head too high.</p> <p>Strainer clogged.</p> <p>Auxiliary priming device faulty or improperly installed.</p> <p>Integral discharge check valve clogged or binding.</p>	<p>Add liquid to casing. See PRIMING.</p> <p>Correct leak.</p> <p>Replace suction hose.</p> <p>Check pump vacuum. Replace leaking or worn seal or gasket.</p> <p>Check piping installation and install bypass line if needed. See INSTALLATION.</p> <p>Check strainer and clean if necessary.</p> <p>Repair priming device or check installation.</p> <p>Clean valve.</p>
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	<p>Air leak in suction line.</p> <p>Suction intake not submerged at proper level or sump too small.</p> <p>Lining of suction hose collapsed.</p> <p>Impeller or other wearing parts worn or damaged.</p>	<p>Correct leak.</p> <p>Check installation and correct submergence as needed.</p> <p>Replace suction hose.</p> <p>Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.</p>

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont.)	Impeller clogged. Suction lift too high. Pump speed too slow. Leaking or worn seal or pump gasket.	Free impeller of debris. Measure lift w/vacuum gauge. Reduce lift and/or friction losses in suction line. Check engine output; consult engine operation manual. Check pump vacuum. Replace leaking or worn seal or gasket.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high. Liquid solution too thick. Exceeding operating limits.	Check engine output. Dilute if possible. See performance curves in PUMP MAINTENANCE AND REPAIR.
EXCESSIVE NOISE	Cavitation in pump. Pumping entrained air. Pump or drive not securely mounted. Impeller clogged or damaged.	Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory. Locate and eliminate source of air bubble. Secure mounting hardware. Clean out debris; replace damaged parts.

PUMP MAINTENANCE AND REPAIR - SECTION E

MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.



*** STANDARD PERFORMANCE FOR PUMP MODELS 61 1/2A1-22 AND 61 1/2A1-22 S/G**

NOTE: 221432 Pull Start Engine Used For Testing, 221437 Starter Generator Model Uses Same Curve.

* Based on 70° F (21 ° C) clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be difference due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify performance or part numbers.



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SECTION DRAWING

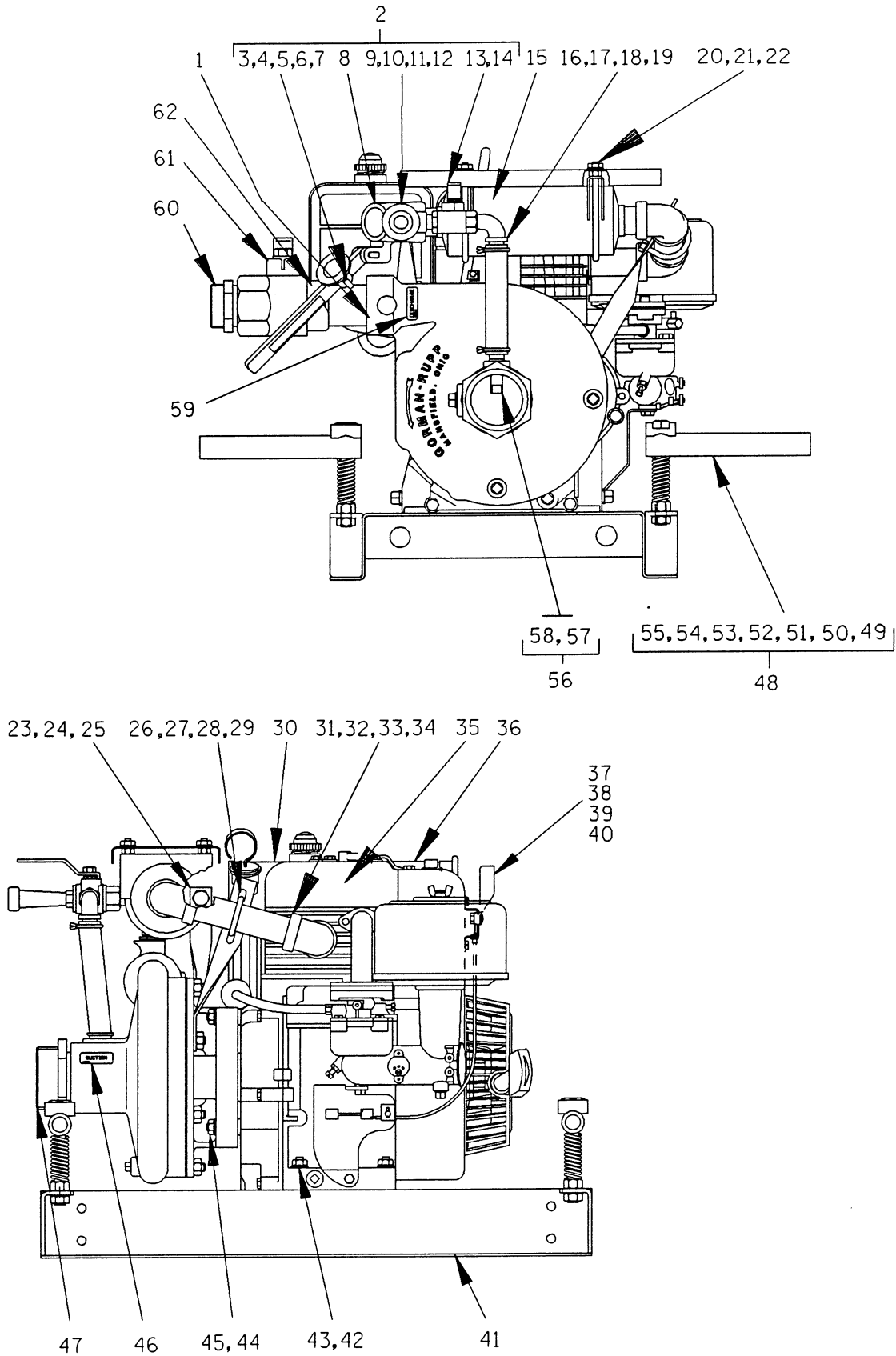


Figure 1. Pump Model 61 1/2A1-22

SECTION DRAWING

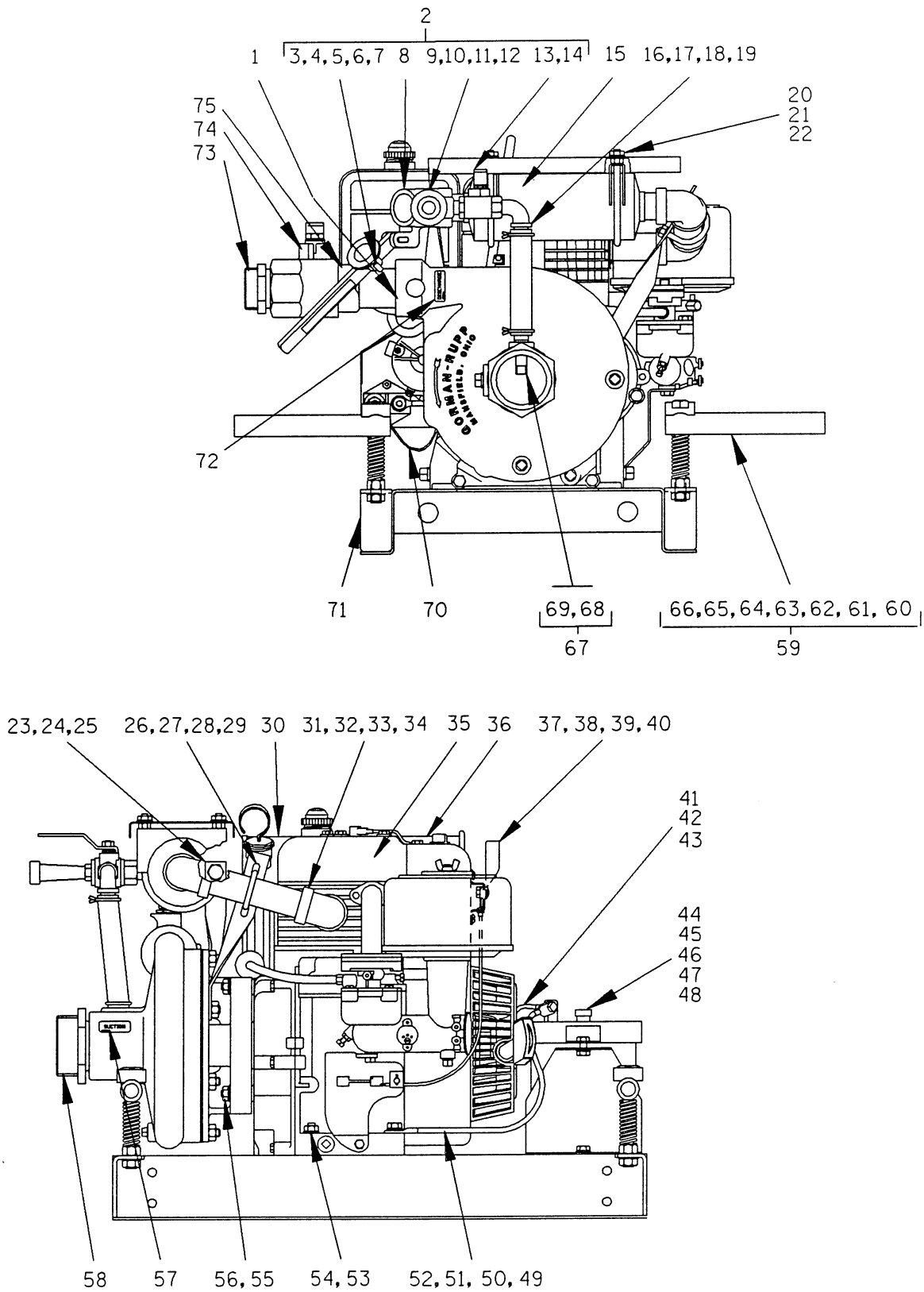


Figure 2. Pump Model 61 1/2A1-22 S/G

SECTION DRAWING

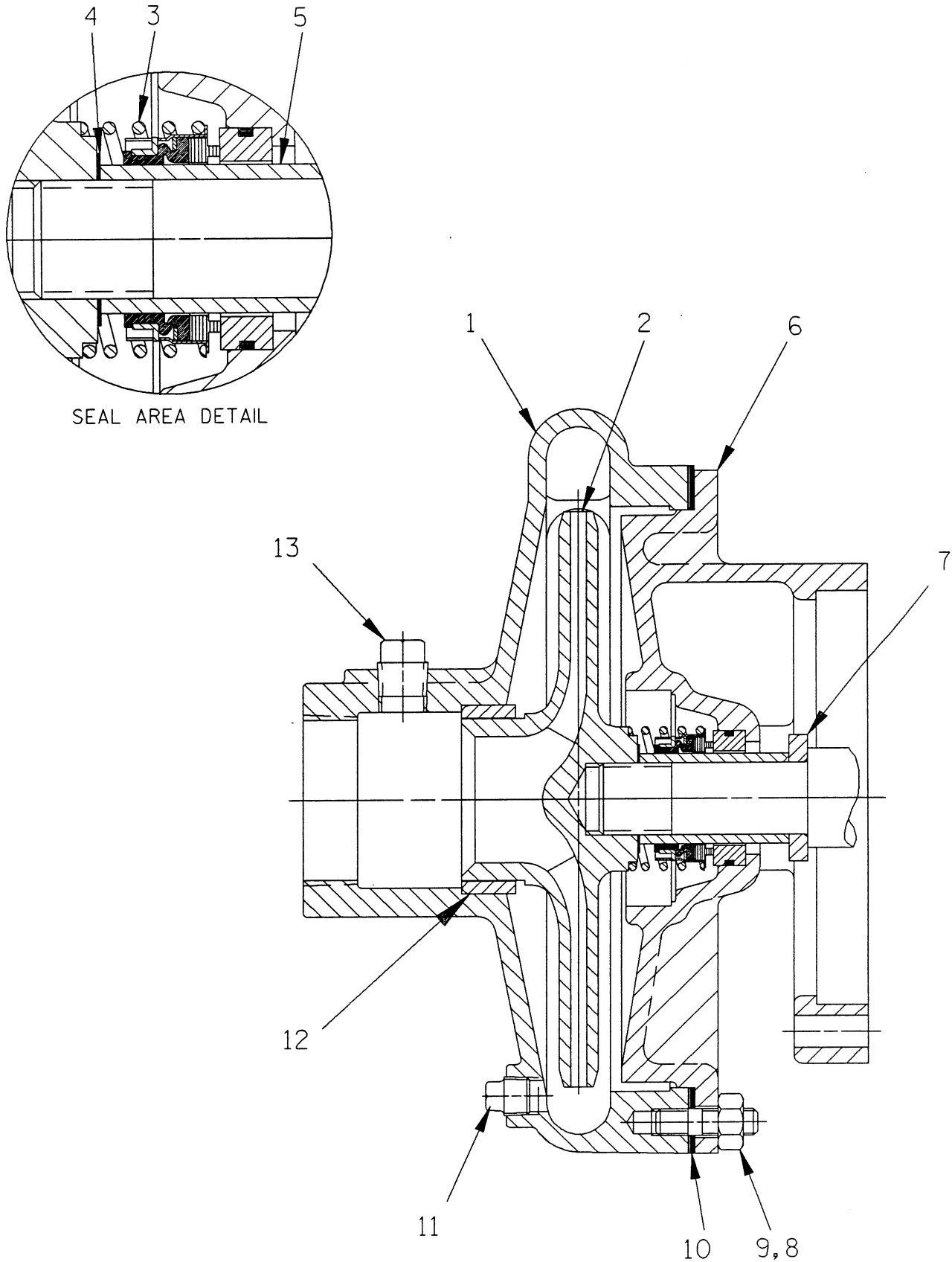


Figure 3. Pump End 61 1/2A1-(22)

PARTS LIST
Pump End 61 1/2A1-(22)

ITEM NO.	PART NAME	PART NUMBER	MAT'L CODE	QTY
1	PUMP CASING	5957	13040	1
2	* IMPELLER	5956	13040	1
3	* SEAL ASSEMBLY	25271-192	-----	1
4	* IMPELLER SHIM SET	2-X	17090	1
5	* SHAFT SLEEVE	2146	14000	1
6	INTERMEDIATE	6701	13040	1
7	SEAL RING	2-A	15020	1
8	STUD	C0605-1/2	15991	8
9	HEX NUT	D06	15991	8
10	* CASING GASKET SET	2958-G	18000	1
11	PIPE PLUG	P04	11990	3
12	* WEAR RING	5978	10090	1
13	ACCESSORY PLUG	P06	11990	1

* INDICATES PARTS RECOMMENDED FOR STOCK

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

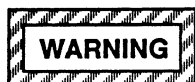
Review all warnings in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional views (see Figures 1, 2 and 3) and the accompanying parts lists.

Before attempting to service the pump, remove the suction and discharge hoses and disconnect the spark plug wire to ensure that it will remain inoperative. Close all valves in the suction and discharge lines.

For engine disassembly and repair, consult the literature supplied with the engine, or contact your local Briggs and Stratton engine representative.



BEFORE ATTEMPTING TO OPEN OR SERVICE THE PUMP:

1. FAMILIARIZE YOURSELF WITH THIS MANUAL.
2. DISCONNECT THE SPARK PLUG WIRE TO ENSURE THAT THE PUMP WILL REMAIN INOPERATIVE.
3. ALLOW THE PUMP TO COOL IF OVERHEATED.
4. CHECK THE TEMPERATURE BEFORE OPENING ANY COVERS, PLATES, OR PLUGS.
5. CLOSE THE SUCTION AND DISCHARGE VALVES.
6. VENT THE PUMP SLOWLY AND CAUTIOUSLY.
7. DRAIN THE PUMP.

Exhaust Primer Disassembly

(Figure 1 or 2)

Loosen the hose clamps (18) and pull the rubber priming line (19) from the exhaust primer and pipe

nipple assembly (56, Figure 1 or 67, Figure 2). If necessary, remove the gas cock valve (13) and pipe nipple assembly (56, Figure 1 or 67, Figure 2).

To separate the exhaust primer assembly (2) from the muffler, unscrew the ejector body (11) at the pipe nipple (17) and unscrew the valve (8) from the muffler (15). To disassemble the exhaust primer, remove the valve handle (5) and unscrew the various primer components.

If no further pump disassembly is required, refer to **Exhaust Primer Reassembly**.

Pump Disassembly

(Figure 3)

After disconnecting the rubber priming line, remove the drain plug (11) to drain the pump. Clean and reinstall the plug.

Remove the hardware (9) and separate the pump casing (1) from the intermediate (6). Carefully remove the casing gasket set (10) and clean the contacting surfaces.

Inspect the wear ring (12) for severe erosion or damage. The wear ring is a press fit in the pump casing. To remove the ring, apply heat to the outside of the casing or split the ring. **Be careful** not to damage the pump casing.

To remove the impeller (2), insert a steel bar or drift pin between the vanes and turn it in a counterclockwise direction (when facing the impeller) while holding the engine crankshaft stationary. **Be careful** not to damage the impeller vanes. Use caution when unscrewing the impeller; tension on the seal spring will be released as the impeller is removed.

Seal Removal and Disassembly

(Figure 3)

Remove the impeller adjusting shims (4). Tie and tag the shims or measure and record their thickness for ease of reassembly.

Remove the seal spring and slide the shaft sleeve (5) and rotating portion of the seal off the engine shaft as a unit. Apply oil to the sleeve and work it up under the bellows. Slide the rotating portion of the seal off the sleeve.

Slide a stiff wire with a hooked end along the shaft and pull stationary seat and O-ring from the intermediate bore.

NOTE

An alternate method of removing the stationary seat is to remove the hardware (45, Figure 1 or 56, Figure 2) and separate the intermediate (6) from the engine. Use a dowel to press the stationary seat and O-ring from the intermediate.

If the seal ring (7) requires replacement, remove the intermediate as described above, and slide the seal ring off the shaft.

If no further disassembly is required, refer to **Seal Reassembly And Installation**.

Seal Reassembly and Installation

(Figures 3 and 4)

Clean the seal cavity and shaft with a cloth soaked in fresh cleaning solvent.



MOST CLEANING SOLVENTS ARE TOXIC AND FLAMMABLE. USE THEM ONLY IN A WELL-VENTILATED AREA FREE FROM EXCESSIVE

HEAT, SPARKS, AND FLAME. READ AND FOLLOW ALL PRECAUTIONS PRINTED ON SOLVENT CONTAINERS.

The seal is not normally reused because wear patterns on the finished faces cannot be realigned during reassembly. This could result in premature failure. If necessary to reuse an old seal in an emergency, **carefully** wash all metallic parts in fresh cleaning solvent and allow to dry thoroughly.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a non-oil based solvent and a clean, lint-free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Clean and polish the shaft sleeve, or replace it if there are nicks or cuts on either end. If any components are worn, replace the complete seal; **never mix old and new seal parts.**

If a replacement seal is being used, remove it from the container and inspect the precision finished faces to ensure that they are free of any foreign matter.

To ease installation of the seal, lubricate the O-rings and shaft sleeve with water or a very **small** amount of oil, and apply a drop of light lubricating oil on the finished faces. Assemble the seal as follows, (see Figure 4).

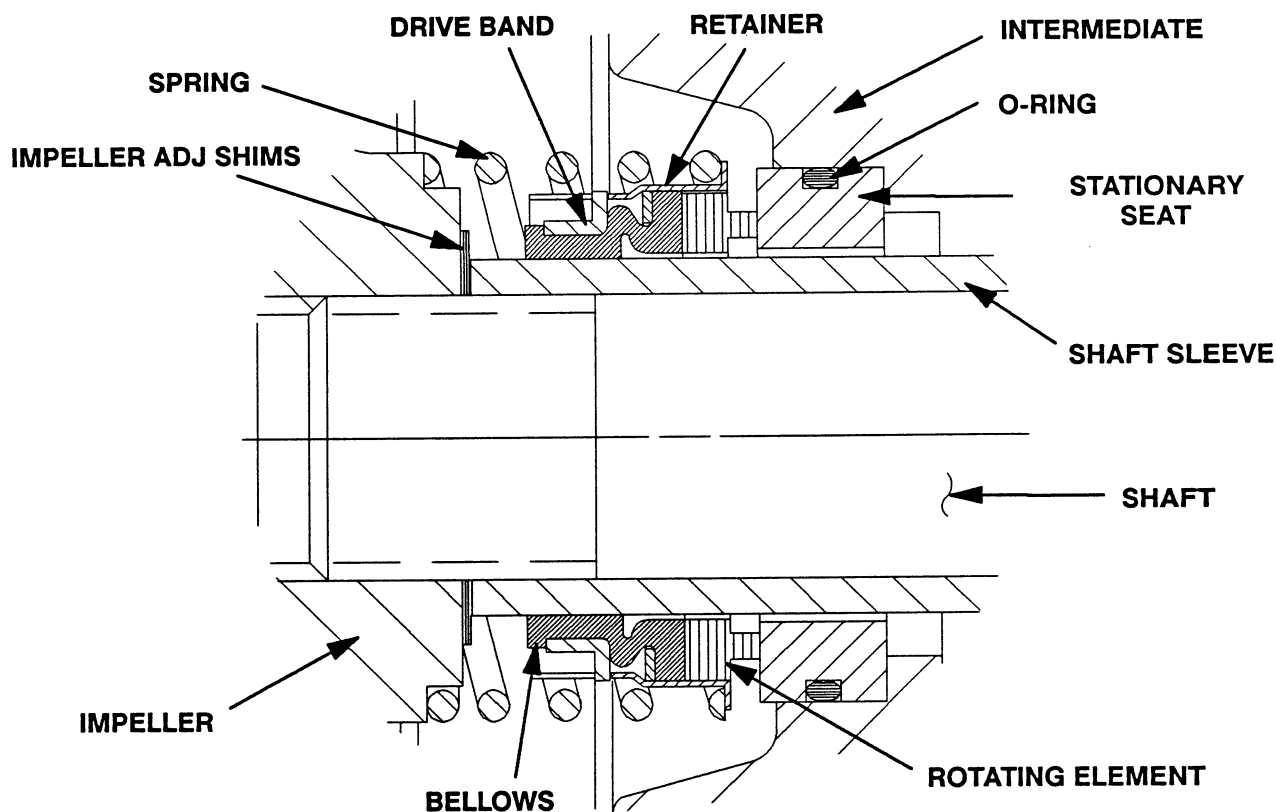


Figure 4. 25271-192 Seal Assembly



THIS SEAL IS NOT DESIGNED FOR OPERATION AT TEMPERATURES ABOVE 160° F (71,1°C). DO NOT USE AT HIGHER OPERATING TEMPERATURES.

If the intermediate was removed, lay it on a flat surface with the impeller side facing up. Subassemble the O-ring in the stationary seat and press it into the intermediate bore until it seats squarely against the shoulder. Install the seal ring (7) on the shaft and secure the intermediate to the engine with the hardware (45, Figure 1 or 56, Figure 2). **Be careful** not to damage the stationary seat on the shaft threads.

NOTE

If the intermediate was not removed, subassemble the O-ring in the stationary seat and use thumb pressure to press it into the intermediate bore until it seats squarely against the shoulder.

Subassemble the rotating element in the retainer and bellows, then slide this subassembly onto the shaft sleeve (5) until the face of the rotating element is **just flush** with the chamfered end of the sleeve. Slide the sleeve onto the shaft until the seal faces contact. Continue to push the sleeve through the seal until it seats against the seal ring (7).

Position the seal spring on the retainer and proceed with **Pump Reassembly**.

Pump Reassembly

(Figure 3)

If the wear ring (12) was removed, press the replacement ring into the casing bore until fully seated against the casing shoulder.

NOTE

*The wear ring **must** seat squarely in the casing bore or binding and/or excessive wear will result.*

Inspect the impeller and replace it if cracked or badly eroded. Install the same thickness of impeller

shims (4) as previously removed and screw the impeller onto the shaft until tight.

For maximum pump efficiency, the impeller should be centered within the volute scroll. Use the casing gaskets (10) and the impeller shims (4) to center the

impeller as described below.

To verify the impeller positioning, measure the pump casing and impeller as shown in Figure 5. Use these measurements to calculate the required impeller location (dimension E). Add or remove impeller adjusting shims until dimension E is obtained.

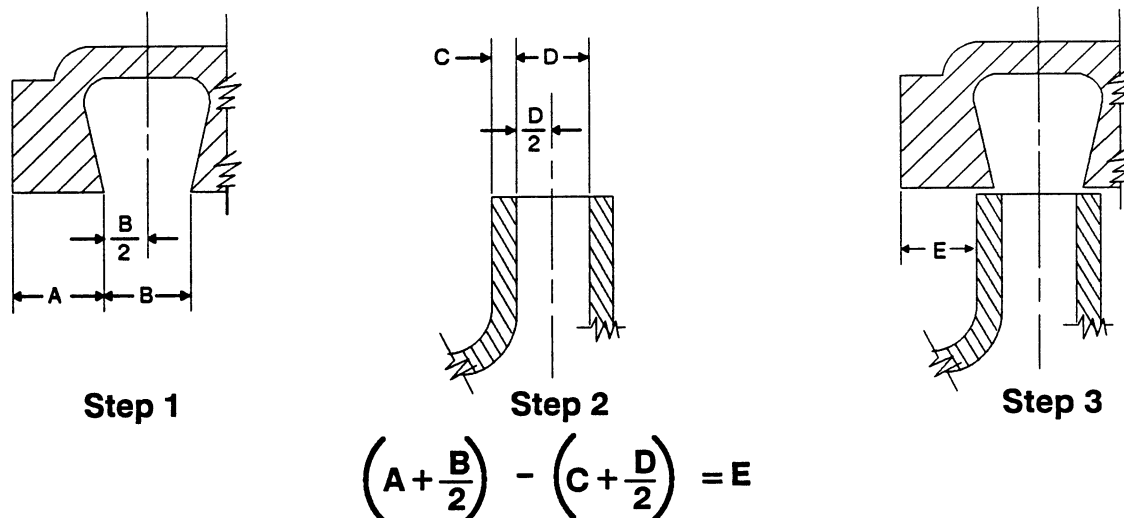


Figure 5. Centering Impeller Within Volute Scroll

NOTE

After the impeller has been properly positioned, check for free rotation. Correct any scraping binding before further reassembly.

Install the casing gasket set (10). Carefully guide the wear ring into the eye of the impeller and secure the casing to the intermediate with the hardware (9).

Exhaust Primer Reassembly

(Figure 1 or 2)

If the component parts for the exhaust primer assembly (2) were disassembled, clean or replace the parts as required and screw them together as shown in Figure 1 or 2. Install the valve handle (5). Screw the ejector body (11) into the pipe nipple (17). Secure the valve (8) to the muffler(15).

If removed, install the gas cock valve (13) and pipe nipple assembly (56, Figure 1 or 67, Figure 2). Install

the rubber priming line (19) between the exhaust primer and pipe nipple assembly and secure it with the hose clamps (18).

LUBRICATION

Seal Assembly

(Figure 3)

The shaft seal is lubricated by the liquid being pumped and no additional lubrication is required.

Engine

(Figure 1 or 2)

Consult the literature supplied with the engine, or contact your local Briggs and Stratton engine representative.

**For U.S. and International Warranty Information,
Please Visit www.grpumps.com/warranty
or call:
U.S.: 419-755-1280
International: +1-419-755-1352**

**For Canadian Warranty Information,
Please Visit www.grcanada.com/warranty
or call:
519-631-2870**