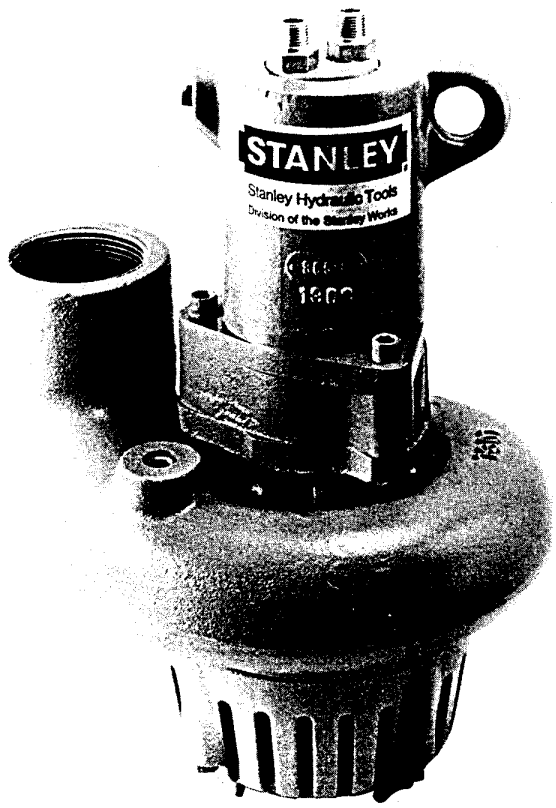
SM22
HYDRAULIC SUMP PUMP



Safety, Operation and Maintenance Manual

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05451 12/93R

SAFETY PRECAUTIONS

Tool operators and maintenance personnel must always comply with the safety precautions given in this manual and on the stickers and tags attached to the tool and hose.

These safety precautions are given for your safety. Review them carefully before operating the tool and before performing maintenance or repairs.

Supervising personnel should develop additional precautions relating to the specific work area and local safety regulations. If so, place the added precautions in the space provided on page 3.

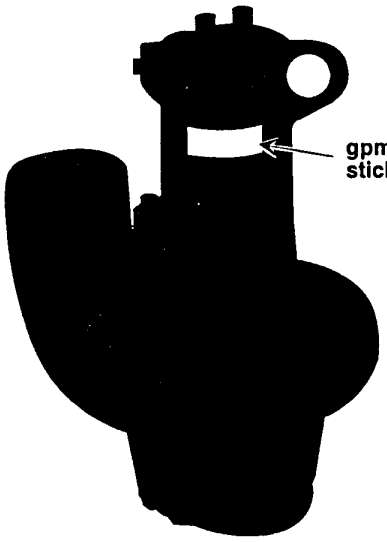
GENERAL SAFETY PRECAUTIONS

The SM22 Sump Pump provides safe and dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any stickers and tags attached to the tool and hose before operation. Failure to do so can result in personal injury or equipment damage.

- Operators must start in a work area without bystanders. The operator must be familiar with all prohibited work areas such as excessive slopes and dangerous terrain conditions.
- Always wear safety equipment such as goggles, ear and head protection, and safety shoes at all times when operating the tool.
- Do not overreach. Maintain proper footing and balance at all times.
- Do not inspect or clean the tool while the hydraulic power source is connected. Accidental engagement of the tool can cause serious injury.
- Always connect hoses to the tool hose couplers before energizing the hydraulic power source. Make sure all hose connections are tight.
- Establish a training program for all operators to ensure safe operation.
- Do not operate the tool unless thoroughly trained or under the supervision of an instructor.
- Never wear loose clothing that can get entangled in the working parts of the tool.
- Never use tools near energized transmission lines. Know the location of buried or covered services before starting your work.
- Do not lift the pump by pulling on the hydraulic hoses. Use a suitable line fastened through the eye in the motor housing.
- Do not put hand under volute while the pump is running.
- To avoid personal injury or equipment damage, all tool repair, maintenance and service must only be performed by authorized and properly trained personnel.

TOOL STICKERS AND TAGS

A flow and pressure sticker is attached to the pump at the location shown. Never exceed the flow and pressure levels specified on this sticker.



CAUTION

5-10 GPM/20-38 LPM
DO NOT EXCEED 2000 PSI/ 140 BAR

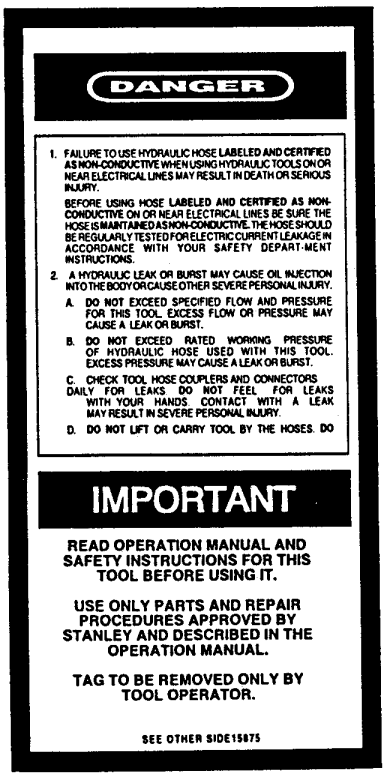
■ DO NOT EXCEED SPECIFIED FLOW OR PRESSURE. ■ USE CLOSED-CENTER TOOL ON CLOSED-CENTER SYSTEM. ■ USE OPEN-CENTER TOOL ON OPEN-CENTER SYSTEM. ■ CORRECTLY CONNECT HOSE TO TOOL "IN" AND "OUT" PORTS. IMPROPER HANDLING, USE OR MAINTENANCE OF TOOL COULD RESULT IN A LEAK, BURST OR OTHER TOOL FAILURE. ■ CONTACT AT A LEAK OR BURST CAN CAUSE OIL INJECTIONS INTO THE BODY. ■ FAILURE TO OBSERVE THESE PRECAUTIONS CAN RESULT IN SERIOUS PERSONAL INJURY.

GPM/PRESSURE DANGER STICKER

The information listed on stickers and tags must be legible at all times. Always replace stickers that have become worn or damaged. Replacements are available from your local Stanley distributor.

SAFETY TAG

The safety tag at right is attached to the pump when shipped from the factory. Read and understand the safety instructions listed on this tag before removal. We suggest you retain this tag and attach it to the pump when not in use.



DANGER

1. FAILURE TO USE HYDRAULIC HOSE LABELED AND CERTIFIED AS NON-CONDUCTIVE WHEN USING HYDRAULIC TOOLS ON OR NEAR ELECTRICAL LINES MAY RESULT IN DEATH OR SERIOUS INJURY.

   BEFORE USING HOSE LABELED AND CERTIFIED AS NON-CONDUCTIVE ON OR NEAR ELECTRICAL LINES BE SURE THE HOSE IS MAINTAINED AS NON-CONDUCTIVE. THE HOSE SHOULD BE REGULARLY TESTED FOR ELECTRIC CURRENT LEAKAGE IN ACCORDANCE WITH YOUR SAFETY DEPARTMENT INSTRUCTIONS.

2. A HYDRAULIC LEAK OR BURST MAY CAUSE OIL INJECTION INTO THE BODY OR CAUSE OTHER SEVERE PERSONAL INJURY.
   A. DO NOT EXCEED SPECIFIED FLOW AND PRESSURE FOR THIS TOOL. EXCESS FLOW OR PRESSURE MAY CAUSE A LEAK OR BURST.
   B. DO NOT EXCEED RATED WORKING PRESSURE OF HYDRAULIC HOSE USED WITH THIS TOOL. EXCESS PRESSURE MAY CAUSE A LEAK OR BURST.
   C. CHECK TOOL HOSE COUPLERS AND CONNECTORS DAILY FOR LEAKS. DO NOT FEEL FOR LEAKS WITH YOUR HANDS. CONTACT WITH A LEAK MAY RESULT IN SEVERE PERSONAL INJURY.
   D. DO NOT LIFT OR CARRY TOOL BY THE HOSES. DO

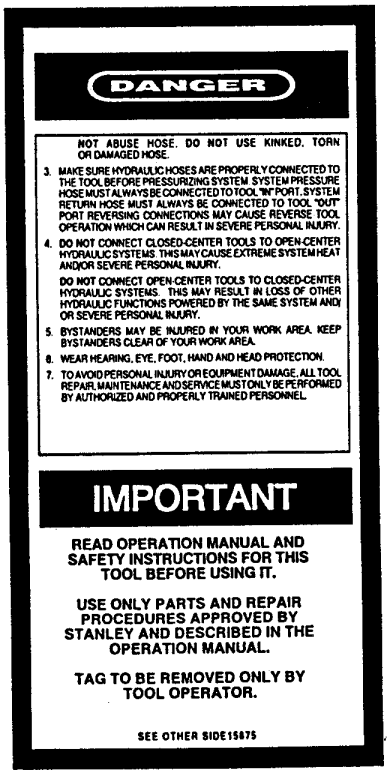
IMPORTANT

READ OPERATION MANUAL AND SAFETY INSTRUCTIONS FOR THIS TOOL BEFORE USING IT.

USE ONLY PARTS AND REPAIR PROCEDURES APPROVED BY STANLEY AND DESCRIBED IN THE OPERATION MANUAL.

TAG TO BE REMOVED ONLY BY TOOL OPERATOR.

SEE OTHER SIDE15875



DANGER

NOT ABUSE HOSE. DO NOT USE KINKED, TORN OR DAMAGED HOSE.

3. MAKE SURE HYDRAULIC HOSES ARE PROPERLY CONNECTED TO THE TOOL BEFORE PRESSURIZING SYSTEM. SYSTEM PRESSURE HOSE MUST ALWAYS BE CONNECTED TO TOOL "IN" PORT. SYSTEM RETURN HOSE MUST ALWAYS BE CONNECTED TO TOOL "OUT" PORT. REVERSING CONNECTIONS MAY CAUSE REVERSE TOOL OPERATION WHICH CAN RESULT IN SEVERE PERSONAL INJURY.
4. DO NOT CONNECT CLOSED-CENTER TOOLS TO OPEN-CENTER HYDRAULIC SYSTEMS. THIS MAY CAUSE EXTREME SYSTEM HEAT AND/OR SEVERE PERSONAL INJURY.

   DO NOT CONNECT OPEN-CENTER TOOLS TO CLOSED-CENTER HYDRAULIC SYSTEMS. THIS MAY RESULT IN LOSS OF OTHER HYDRAULIC FUNCTIONS POWERED BY THE SAME SYSTEM AND/ OR SEVERE PERSONAL INJURY.
5. BYSTANDERS MAY BE INJURED IN YOUR WORK AREA. KEEP BYSTANDERS CLEAR OF YOUR WORK AREA.
6. WEAR HEARING, EYE, FOOT, HAND AND HEAD PROTECTION.
7. TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE, ALL TOOL REPAIR, MAINTENANCE AND SERVICE MUST ONLY BE PERFORMED BY AUTHORIZED AND PROPERLY TRAINED PERSONNEL.

IMPORTANT

READ OPERATION MANUAL AND SAFETY INSTRUCTIONS FOR THIS TOOL BEFORE USING IT.

USE ONLY PARTS AND REPAIR PROCEDURES APPROVED BY STANLEY AND DESCRIBED IN THE OPERATION MANUAL.

TAG TO BE REMOVED ONLY BY TOOL OPERATOR.

SEE OTHER SIDE15875

SAFETY SYMBOLS

Safety symbols are used to emphasize all operator, maintenance and repair actions which, if not strictly followed, could result in a life-threatening situation, bodily injury or damage to equipment.

DANGER

This safety symbol may appear on the tool. It is used to alert the operator of an action that could place him/her or others in a life threatening situation.

⚠ WARNING

This safety symbol appears in these instructions to identify an action that could cause bodily injury to the operator or other personnel.

IMPORTANT

This safety symbol appears in these instructions to identify an action or condition that could result in damage to the tool or other equipment.

Always observe safety symbols. They are included for your safety and for the protection of the tool.

LOCAL SAFETY REGULATIONS

Enter any local safety regulations here. Keep these instructions in an area accessible to the operator and maintenance personnel.

EQUIPMENT PROTECTION AND CARE

IMPORTANT

In addition to the Safety Precautions on pages 1 thru 3 of this manual, observe the following for equipment protection and care.

- Always store the tool in a clean, dry space, safe from damage or pilferage.
- Always keep critical tool markings, such as labels and stickers, legible.
- Always replace hoses, couplings, and other parts with replacement parts recommended by Stanley Hydraulic Tools. Supply hoses must have a minimum working pressure rating of 2500 psi/172 bar.
- Always use hoses that have a fluid resistant inner surface and an abrasive resistant outer surface. Whenever near electrical conductors, use clean hose labeled and certified non-conductive.
- Make sure all couplers are wiped clean before connection.
- The hydraulic circuit control valve must be in the "OFF" position when coupling or uncoupling hydraulic tools. Failure to do so can result in damage to the quick couplers and cause overheating of the hydraulic system.
- Do not lift the pump by the hydraulic hoses. Use a suitable line fastened through the eye in the motor housing.

HYDRAULIC HOSE REQUIREMENTS

HOSE TYPES

Hydraulic hose types authorized for use with Stanley Hydraulic Tools are as follows:

❶ Labeled and certified non-conductive

❷ Wire braided (conductive)

❸ Fabric braided (not certified or labeled non-conductive)

Hose ❶ listed above is the only hose authorized for use near electrical conductors.

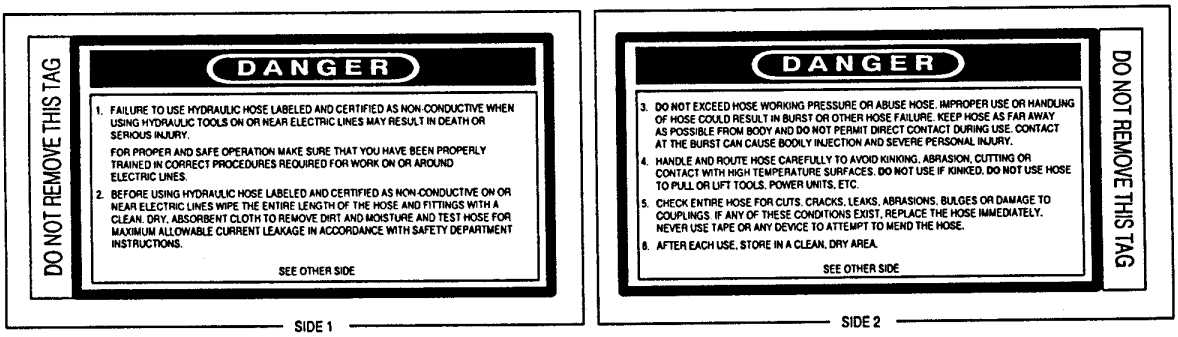
Hoses ❷ and ❸ listed above are **conductive** and **must never** be used near electrical conductors.

To help ensure your safety, the following DANGER tags are attached to all hoses purchased from Stanley Hydraulic Tools. DO NOT REMOVE THESE TAGS.

If the information on a tag is illegible because of wear or damage, replace the tag immediately. A new tag can be obtained at no charge from your Stanley distributor.

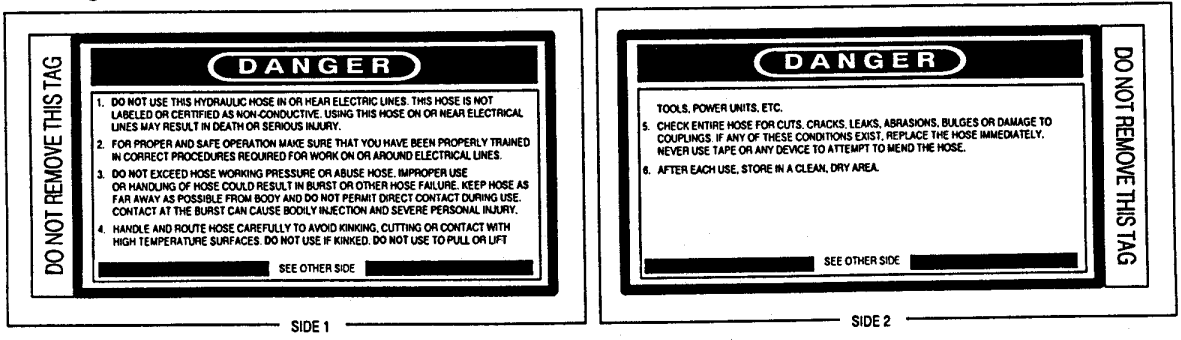
❶ CERTIFIED NON-CONDUCTIVE

This tag is attached to all certified and labeled **non-conductive** hose.



❷ AND ❸ WIRE- AND FABRIC-BRAIDED (NOT CERTIFIED OR LABELED NON-CONDUCTIVE)

This tag is attached to all **conductive** hose.



HOSE PRESSURE RATING

The rated working pressure of the hydraulic hose **must be equal to or higher than** the relief valve setting on the hydraulic system used to power the pump.

HYDRAULIC SYSTEM REQUIREMENTS

- The hydraulic system should provide a flow of 7-12 gpm/26-45 lpm at an operating pressure of 1000/2000 psi/105-140 bar. Recommended relief valve setting is 2100/2250 psi/145-155 bar.

- The hydraulic system should not have more than 250 psi/17 bar backpressure measured at the tool end of the operating hoses. The system conditions for measurement are at maximum fluid viscosity of 400 ssu/82 centistokes (minimum operating temperatures).

- The hydraulic system should have sufficient heat rejection capacity to limit the maximum fluid temperature to 140° F/60° C at the maximum expected ambient temperature. The recommended minimum cooling capacity is 5 hp/3.73 kW at a 40° F/22° C difference between ambient temperature and fluid temperature.

- The hydraulic system should have a minimum of 25 micron full-flow filtration. It is recommended that filter elements be sized for a flow of at least 20 to 30 gpm/75 to 113 lpm for cold temperature startup and maximum dirt holding capacity.

- The hydraulic fluid used should have a viscosity between 100 and 400 ssu/20 and 82 centistokes at the maximum and minimum expected operating temperatures. Hydraulic fluids of petroleum base with antiwear and non-conductive properties and viscosity indexes over 140 meet the recommended requirements over a wide range of operating temperatures.

- The recommended hose size is 0.500 inch/12 mm I.D. to 50 ft/15 m long and 0.625 inch/16 mm I.D. minimum up to 100 ft/30 m long.

OPERATION

PREOPERATION PROCEDURES

CHECK POWER SOURCE

1. Using a calibrated flowmeter and pressure gauge, check that the hydraulic power source develops a flow of 7-12 gpm/26-45 lpm at 1000/2000 psi/70-140 bar.

2. Make certain that the hydraulic power source is equipped with a relief valve set to "crack" open at 2250 psi/145 bar, maximum.

3. Check that the pump inlet screen is clean. Remove any obstruction before operating the pump. Refer to PUMP CLEANING PROCEDURES.

CONNECT HOSES

1. Wipe all hose couplers with a clean lint-free cloth before making connections.

2. Connect the hoses from the hydraulic power source to the couplers on the tool hoses. It is a good practice to connect the return hose first and disconnect it last to minimize or eliminate trapped pressure within the tool.

3. If hose couplers are used, observe the arrow on the coupler to ensure that the flow is in the proper direction. The female coupler on the tool hose is the inlet coupler. This coupler should be connected to the port closest to the water outlet.

PUMP OPERATION

Note: The SM22 is not designed for use with a suction pipe inlet. The diameter of the suction screen at the bottom of the pump provides maximum pump efficiency. Reducing the size of this inlet will greatly reduce pump performance.

1. Connect a hose fitted with a 2 1/2-inch male pipe end to the pump outlet fitting. Make sure the fitting is securely tightened.

2. Lower the pump into the liquid to be pumped. Locate the outlet end of the discharge hose to disperse the liquid as required.

⚠ WARNING

Never point the end of the hose at bystanders.

3. Energize the power source. Watch for solids in the liquid being pumped. If solids are excessive, the discharge flow may decrease. If this happens, stop the pump and check for the cause of the problem.

Under some conditions, the liquid being pumped may be slowed enough so that it can no longer push solids in the liquid. If this happens, solids can accumulate in the hose and cause further restriction. The impeller then acts as a "grinding wheel", which causes accelerated pump wear. Reduced liquid flow can be caused by the following:

- The pump sinks into solids at the bottom of the hole.

- The end of the outlet hose is too high, causing an excessive lift height for the column of liquid being pumped. This slows the flow of liquid to a level where it can no longer carry solids.

- The flow and pressure of hydraulic fluid to the pump is too low, which reduces impeller speed. A 20 percent decrease in hydraulic fluid flow can reduce pump performance by 50 percent. When operating at reduced hydraulic flow and pressure, the end of the outlet hose should not be more than 40 ft/12 m above the liquid.

4. When pumping is completed, set the hydraulic flow control valve at the power source to "OFF" then lift the pump from the hole or chamber.

COLD WEATHER OPERATION

If the pump is to be used during cold weather, preheat the hydraulic fluid at low engine speed. When using the normally recommended fluid should be at or above 50°F/10°C (400 ssu/82 centistokes) before use.

Damage to the hydraulic system or pump can result from use with fluid that is too viscous or thick.

SERVICE INSTRUCTIONS

CLEANING THE PUMPING CHAMBER

Note: For orientation of parts identified in the following procedures, refer to the parts location diagram.

Debris such as weeds, sand and other solids may become trapped in the pumping chamber. This can reduce pumping performance. It is important that the pumping chamber be kept clean at all times. To clean the pumping chamber:

1. Clean pump exterior.

2. Remove the four hex head capscrews securing the screen, impeller cover, and cover shims.

3. Remove all debris from the screen, impeller cover, and the pump volute. Do not remove the impeller unless necessary for repair, replacement or to remove trapped debris.

4. Install cover shims as required to obtain a 0.010-inch/0.25 mm clearance between the impeller and the impeller cover. Install the screen and secure with four 3/8-16 x 3-inch/75 mm long hex head capscrews.

Note: Clean the capscrews and lubricate threads with waterproof grease before installation.

IMPELLER AND MOTOR SHAFT SEAL FUNCTIONAL CHECK

1. Perform steps 1 through 3 of CLEANING THE PUMPING CHAMBER.

2. Secure the pump so the interior of the pumping chamber is visible. Following the procedures in the OPERATION section of this manual, connect the pump to an hydraulic power source.

3. Slowly turn "ON" the hydraulic power source and listen to the pump operating in the air.

4. A "rough" sound accompanied with noticeable impeller shake and wobble normally signifies impeller shaft seal failure. Failure of this seal allows water to contaminate the hydraulic fluid and usually requires replacement of the bearing and seal. If the shaft or seal sleeve is worn at the bearing surfaces, it too must be replaced. After these repairs are completed, the hydraulic supply should be flushed out and the filter replaced.

5. A smooth running pump showing excessive fluid loss from behind the impeller normally indicates either the automatic oiler is out of adjustment or the motor shaft seal has failed.

PRIOR TO DISASSEMBLY

- Clean tool exterior.
- See notes on the parts location diagram. Obtain the proper seal kit so that all seals exposed during disassembly can be replaced. Note orientation of seals before removing them. Install new seals in the same way.

Note: For orientation of the parts identified in the following procedures, refer to the parts location at the end of this manual.

PUMP DISASSEMBLY

IMPELLER REMOVAL

1. Perform steps 1 through 3 of CLEANING THE PUMP CHAMBER.

2. Secure the impeller to prevent it from rotating. Remove the arbor nut (**left** handed thread) and washer holding the impeller to the impeller shaft.

3. Remove the impeller, hub bushing (if installed), shims, closure seal, seal sleeve, and key from the impeller shaft. Take care not to lose the key or shims.

VOLUTE REMOVAL

1. Perform impeller removal procedure.

2. Remove the two hydraulic adapters at the inlet and outlet ports of the motor.

3. Remove the three socket head capscrews securing the motor housing and adapter plate to the volute. Lift the motor housing from the adapter plate and remove the o-ring from the motor housing inlet/outlet bore.

4. Lift the motor and adapter plate assembly from the volute. Take care not to lose the key at the motor shaft end. Remove the o-ring from the adapter plate (volute side).

5. If the bearing and/or shaft is to be replaced, remove as a subassembly by lightly tapping on the small diameter end of the shaft while supporting the volute. Use Bearing Puller, part number 00933, to remove the bearing from the shaft.

6. Lubricate the small diameter end of the shaft. Support the bearing **inner** race and press the shaft through until the bearing seats.

7. Lubricate the volute bearing bore and press the bearing and shaft subassembly into the bore using a sleeve with a diameter slightly smaller than the diameter of the bearing. Apply pressure only on the bearing **outer** race.

MOTOR REMOVAL

1. Perform Impeller and Volute Removal procedures.

2. Remove two 5/16 NC x 2 1/4 capscrews from the adapter plate to free the motor and O-ring.

MOTOR DISASSEMBLY

The SM22 Sump Pump can have one of three motor assemblies: model 03001 (the original three-piece motor assembly), model 06858 (a two-piece motor assembly that replaced model 03001), and model 21451 (the current production two-piece motor assembly). Motor assemblies 03001 and 06858 are no longer available as complete units; however, service parts are available. If a complete motor assembly is required, only the 21451 model can be ordered.

The following procedures can be used to disassemble all three motor assemblies:

Note: For orientation of the parts identified, refer to the parts illustration diagrams located at the end of this manual.

1. Place the motor assembly in a vise (with soft jaws or V-blocks) around the front bearing housing/retainer. Make sure the motor shaft is facing down.

2. On model 03001 motor assemblies only, scribe assembly marks across the front and rear bearing retainers and the gear housing. Make sure the marks will be visible during assembly.

3. Remove the eight socket head capscrews securing the front bearing housing or the front and rear bearing retainers to the gear housing.

4. On model 03001 motor assemblies, gently pry the rear bearing retainer and gear housing away from the front bearing retainer. On model 06858 and 21451 motor assemblies, gently pry the gear housing away from the front bearing housing. Make sure you lift the rear bearing retainer (model 03001) and/or gear housing **straight off**. Use the inside groove provided at the split between the parts to prevent scratches on the surfaces.

5. Remove the two gears, motor shaft key (model 03001) or needle roller, and the idler shaft.

6. Remove the large face seal o-ring(s) being careful not to damage the o-ring grooves or surrounding surfaces.

7. To remove the motor shaft from the front bearing retainer or front bearing housing, remove the large retaining ring securing the ball bearings. Place the front bearing retainer or front bearing housing on a clean flat surface with clearance for bearing removal. Push on the small end of the motor shaft until the shaft and bearings slide free. Be careful not to bend the motor shaft.

8. The ball bearings should be removed only if they need replacing, since bearings are damaged during removal. To remove the bearings from the motor shaft, remove the retaining ring and then press on the threaded end of the motor shaft while supporting the outer race of the bearings. **Discard** the bearings.

9. Remove the retaining ring securing the shaft seal in the ball bearing bore to service the remaining parts.

10. To remove the seal liner and associated parts on 03001 motor assemblies, insert the small end of the motor shaft through the seal liner. Place a rag across the gear face of the front bearing retainer and blow air through the small diameter motor shaft bearing using a shop air nozzle to force the seal liner onto the motor shaft for removal.

11. To remove the seal from 06858 motor assemblies, use an appropriate o-ring service tool to pick it out of its bore. Make sure you do not damage the seal surfaces. Also note the seal orientation.

12. On 21451 motor assemblies, after the retaining ring is removed, the gland, quad ring, and o-ring will drop out of the front bearing housing.

13. To remove the early needle bearings or bushing sleeves on 03001 motor assemblies, use Collet, part number 05871, and Actuator Pin, part number 05872, along with Slide Hammer, part number 11931. These tools are available in Bearing Puller Kit, part number 05064.

To remove the larger bushings on 06858 and 21451 motor assemblies, use Collet, part number 11930, and Actuator Pin, part number 05067, along with Slide Hammer, part number 11931.

MOTOR INSPECTION AND CLEANING

Inspect and clean all parts as follows:

Small Diameter Bearings/Bushings

- On 03001 motors equipped with needle bearings, check to make sure all rollers are in place and not nicked or seized. If shaft wear is present, the bearing and shaft must be replaced. Replace with the high-load capacity DU bushings.

- On all motors equipped with bushings, the inside of the bushing should be gray, or slight bronze showing through. If a significant amount of yellow-bronze shows, bushing replacement is required. Inspect motor shaft for corresponding wear and replace as required.

Gear Chamber

- The chamber bores and end faces around the bearing bores should be polished but not rough or grooved. The flat surfaces around the chamber and bolt holes should be flat and free of nicks or burrs that could cause misalignment or leaks.

Gears

- Both gears should have straight tips without nicks, square tooth ends and a smooth, even polish on the teeth and end faces. Check for cracks between the drive gear keyway and gear tooth root. Discard the gear if cracks are present.

Motor End Housing/Retainers

- The gear face running surface should show two interconnecting polished circles without a step and should not be rough or grooved.

- The gear face running surface should show two interconnecting polished circles without a step and should not be rough or grooved.

- The seal gland bore should be smooth and free from nicks or scratches.

Shafts

- The shaft diameter at the bearing and seal locations must be smooth. Grooves, roughness or a reduced diameter indicate fluid contamination or damage needle bearings. Grit particles may have imbedded in the seal or bushings, grinding into the hardened shaft. If abnormal shaft wear as above occurs (in excess of normal polishing) both the shaft and assocciated bearings/bushings must be replaced.

PRIOR TO ASSEMBLY

- Clean all parts with a degreasing solvent.
- Ensure that all seals that were exposed during disassembly are replaced with new parts.
- Apply clean grease or o-ring lubricant to all parts during assembly.

Note: For orientation of the parts identified in the following procedures, refer to the parts location at the end of this manual.

PUMP ASSEMBLY

MOTOR ASSEMBLY

1. On 03001 motors, assemble the seal liner assembly by installing the outside diameter o-ring, quad ring and seal washer as shown on the parts location diagram. Place idler shaft through the seal liner; then loosely position the assembly in the seal bore of the front bearing retainer (quad ring side down). Place the seal liner washer over the shaft; then carefully push the seal liner into place. Install the retaining ring. Remove the idler shaft.

Note: Make sure all seals are heavily greased.

2. On 06858 motors, carefully install the shaft seal with the lips facing the gear side. Replace the back-up washer and retaining ring.

Note: Make sure the shaft and keyway are free of burrs and scratches.

3. The shaft and keyway must be deburred. The quad ring is larger than the shaft and gland. It must be heavily greased and compressed into the gland without twisting. Install the greased O-ring on the gland, then install the gland into the front housing.

4. To install the ball bearings on the motor shaft; support the ball bearing inner race and press the motor shaft through the bearing inner race.

5. To install new DU bushing-sleeves on 03001 motor assemblies, use Bearing Pusher, part number 11916.

6. Place the front bearing retainer/front bearing housing assembly on a smooth clean arbor press surface (protected from damage) with the large bearing bore facing up. Position the piece so a clearance hole exists for the insertion of the motor shaft.

7. Apply grease to the motor shaft and keyway then insert it through the shaft seal. Using the bearing pusher or a sleeve/socket with a diameter slightly smaller than the outside diameter of the ball bearing, press the bearing assembly into place. press only on the outer race. Install the ball bearing retaining ring.

8. Install the motor shaft key (model 03001) or roller in the keyway. Use a small amount of grease to keep the motor shaft key or needle roller in place. Slide the drive gear over the key and shaft. Install the idler shaft and gear.

9. Apply grease to the face seal o-ring groove (s) then install the o-ring(s).

10. On 03001 motors, note the scribe marks made during disassembly; then carfully slide the gear chamber and rear bearing retainer into place.

Note: Make sure dowel pins and shafts are aligned during installation.

IMPORTANT

Do not force parts together.

On 06858 & 21451 motors, note the screw hole pattern on both housings. They will only assemble one way. With all parts aligned, carefully slide the gear housing assembly over the gears until it contacts the front bearing housing assembly.

IMPORTANT

Do not force parts together.

11. Turn the motor shaft manually to check for free rotation. Install the capscrews, then recheck rotation.

12. Install inlet and outlet fittings, connect to an hydraulic power source and check for smooth running. When replacement of the front bearing retainer, rear bearing retainer, or gear chamber has been made, motors will sometimes be tight and require "break-in" . This is accomplished by turning the shaft while hydraulic pressure is applied, first at low pressure, then gradually raising the pressure so as to **burnish** the gear bore, both with and against the hydraulic pressure, until the motor starts and runs freely.

13. Perform the AUTOMATIC OILER ADJUSTMENT procedure at the end of this section.

MOTOR REPLACEMENT

1. Lubricate and install the o-ring on the motor side of the adapter plate. Using the two 5/16-18 x 2 1/4-inch/57 mm long socket head capscrews, secure the adapter plate to the motor assembly.

2. Perform the Volute and then the Impeller Replacement procedures.

VOLUTE REPLACEMENT

1. Lubricate and install the o-ring on the volute (in the groove around the lip). Grease the motor shaft and install the key in the shaft.

2. Align the motor shaft (and key) with the impeller shaft and place the adapter plate on the volute.

3. Lubricate and install the o-ring on the lip (near the inlet/outlet bore) of the motor housing. Install the motor housing over the motor and align with the adapter plate and volute. Secure the motor housing and adapter plate to the volute using the three 3/8-16x2 1/4-inch/57 mm long socket head capscrews.

4. Install the two hydraulic adapters to the inlet and outlet ports of the motor.

5. Perform Impeller Replacement procedure.

IMPELLER REPLACEMENT AND CLEARANCE ADJUSTMENT

1. Grease the impeller shaft and install the seal sleeve and closure seal.

2. Place two impeller shims (0.025 in thickness) against the seal sleeve on the output shaft. Replace the key, impeller, washer and left-hand thread nut. Tighten while holding the impeller. Do not force the nut or impeller sideways while tightening.

3. Place four 0.010 cover shims on the cover and then press them against the volute face.Using a feeler gauge, check the clearance between the impeller. Clearance should be between 0.005 and 0.020. Add or subtract shims as required to attain the proper clearance.

4. Install the inlet screen then secure using four 3/8-16 x 3/76 mm capscrews.

5. Perform step 4 of CLEANING THE PUMPING CHAMBER procedure.

AUTOMATIC OILER ADJUSTMENT

1. Perform Impeller Removal procedure.

2. Perform steps 3 and 4 of the Volute Removal procedure.

3. Connect motor to an hydraulic power source. Stall the motor by placing a wrench on the motor shaft.

4. Oiler output is adjusted by turning the lube screw with a hex wrench. Do not not use a screwdriver. Turn clockwise to decrease or counterclockwise to increase fluid flow until it is flowing at about one drop every two seconds.

PUMP LUBRICATION

Long and reliable pump life is directly related to keeping the bearings, motor and impeller shafts lubricated and free of water or other contaminants. The grease fitting on the motor housing permits filling the area around the motor and bearing (down to the impeller shaft seal) with lubricant.

The impeller shaft seal will allow excess grease to leak out but will not let contaminants in. It is also important that assembly lubrication be done properly for startup and that the oiler adjustment be correct.

1. Pump waterproof grease into the grease fitting until grease begins to weep from above the impeller.

IMPORTANT

Secure the wench so that it will not rotate. A loose wrench may cause personal injury or pump damge when hydraulic power is applied in this procedure.

2. Connect the pump to a hydraulic power source as explained in the OPERATION section of this manual. Turn the pump "ON" and pump grease while the pump is in operation. You will hear a distinct change in motor sound when the bearing is adequately lubricated.

3. Turn "OFF" the hydraulic power source and restore the pump to normal service.

TROUBLESHOOTING

If symtoms of poor performance develop, the following chart can be used as a guide to correct the problem.

When diagnosing faults in operation of the pump, always check that the hydraulic power source is supplying the correct hydraulic flow and pressure to the pump as listed in the table. Use a flow meter known to be accurate. Check the flow with the hydraulic fluid temperature at least 80°F/27°C.

PROBLEM	CAUSE	REMEDY
Pump will not start.	No hydraulic flow or pressure..	Turn on power unit and check that 7-12 gpm/26-45 lpm at 1000-2000 psi/70-140 bar is available at the pump.
	Defective couplers.	Check the couplers by connecting them together with the hydraulic power supply operating and the control valve "ON", the power supply should operate without "loading" from the couplers.
	Impeller jammed with debris.	Clean the pumping chamber as described in the SERVICE INSTRUCTION section of this manual.
	Impeller rubbing against impeller cover.	Check and adjust the impeller clearance as described in the SERVICE INSTRUCTION section of this manual. Add cover shims as required.
	Defective hydraulic motor.	Repair or replace motor.
Pump plugs up with debris and shows rapid impeller wear. Also refer to **Poor Pump Performance**	Water velocity too slow to flush solids through the hose, therefore solids collect in hose and back into volute.	Lift pump off silt bottom.
		Increase circuit GPM.
		Reduce impeller to cover clearance. Replace worn parts.
		Lower the elevation of hose discharge.

PROBLEM	CAUSE	REMEDY
Poor pump performance.	Hydraulic flow reversed.	Check that hoses are correctly connected to the pump motor ports. The female coupler should be connected to the IN port. The return oil must never flow through a reversing valve.
	Improper hydraulic oil flow.	Check that 7-12 gpm/26-45 lpm at 1000-2000 psi/70-140 bar is available at the pump. Hydraulic flow of 11 gpm/41 lpm is required for rated performance.
		A 20 percent decrease in flow (below 11 gpm/41 lpm) can result in a 50 percent decrease in pump performance.
	Pump inlet restricted.	Remove the suction screen and clean thoroughly.
	Pump settled to the bottom.	Lift pump slightly off bottom.
	Discharge hose kinked or restricted.	Straighten the hose. If hose must bend at top of hole, use a piece of split rigid conuit (bent 90°) with a diameter large enough to accept the diameter of the expanded hose. This will keep the hose from kinking.
		Check for debris inside the hose. Clean as required.
	Water discharge hose too small	Use 2 1/2 inch/63.5 mm diameter fire hose.
	Water lift too high.	Lower the outlet end of the discharge hose.
	Hydraulic flow not sufficient (11 gpm/41 lpm) to spin impeller fast enough.	Match hydraulic flow to pump, or use pump suitable for lower hydraulic flow.
	Impeller worn or damaged.	Check for impeller damage and excessive wear. Replace the impeller if necessary. Check the cover to impeller clearance.
	Impeller cover worn or damaged.	Check for impeller cover damage or excessive wear. Replace if necessary. Add or remove cover shims as required.
	Hose used on suction side of pump.	Do not use any plumbing on the inlet to the pump. Use pump with suction screen as designed.

SPECIFICATIONS

Weight. ..... 29 lbs/13.1 kg
Pressure Range. ..... 1000-2000 psi/70-140 bar
Flow Range. ..... 7-12 gpm/26-45 lpm
Optimum Flow. ..... 11 gpm/41 lpm
Length. ..... 13 1/2 in./134.6 cm
Width. ..... 11 3/4 in/29.8 cm
System Type. ..... HTMA TYPE II, O.C. or C.C.
Port Size. ..... SAE 8 o-ring port in valve (3/4-16 THD)

NOTE

Weights, dimensions, and operating specifications listed are subject to change without notice. Where specifications are critical to your application, please consult the factory.

ACCESSORIES

PART NUMBER	DESCRIPTION
01304	Flat Bottom Suction Screen
02183	25 ft/8 m Length of 2 1/2 inch Fire Hose with Pin Lug Male x Female Coupler
02137	Fire Nozzle - 1 inch Output
05133	2 1/2 inch Thread Adapter for Fire Hose
05134	50 ft/15 m Length of 2 1/2 inch Fire Hose with Pin Lug Male x Female Coupler
05135	Spanner Wrench for Pin Lug Coupler

SERVICE TOOLS

PART NUMBER	DESCRIPTION
00933	Bearing Puller
05064	Bearing Puller Kit
05067	Actuator Pin
05871	Collet
05872	Actuator Pin
11916	Bearing Pusher
11918	Bearing Pusher
11930	Collet
11931	Slide Hammer

WARRANTY

Hand held tools and their parts are warranted against defects in materials and workmanship for a period of 12 months from the date of purchase, except for cutting parts, steels and other parts not manufactured by Stanley (such as impact mechanisms, alternators, regulators and hoses).

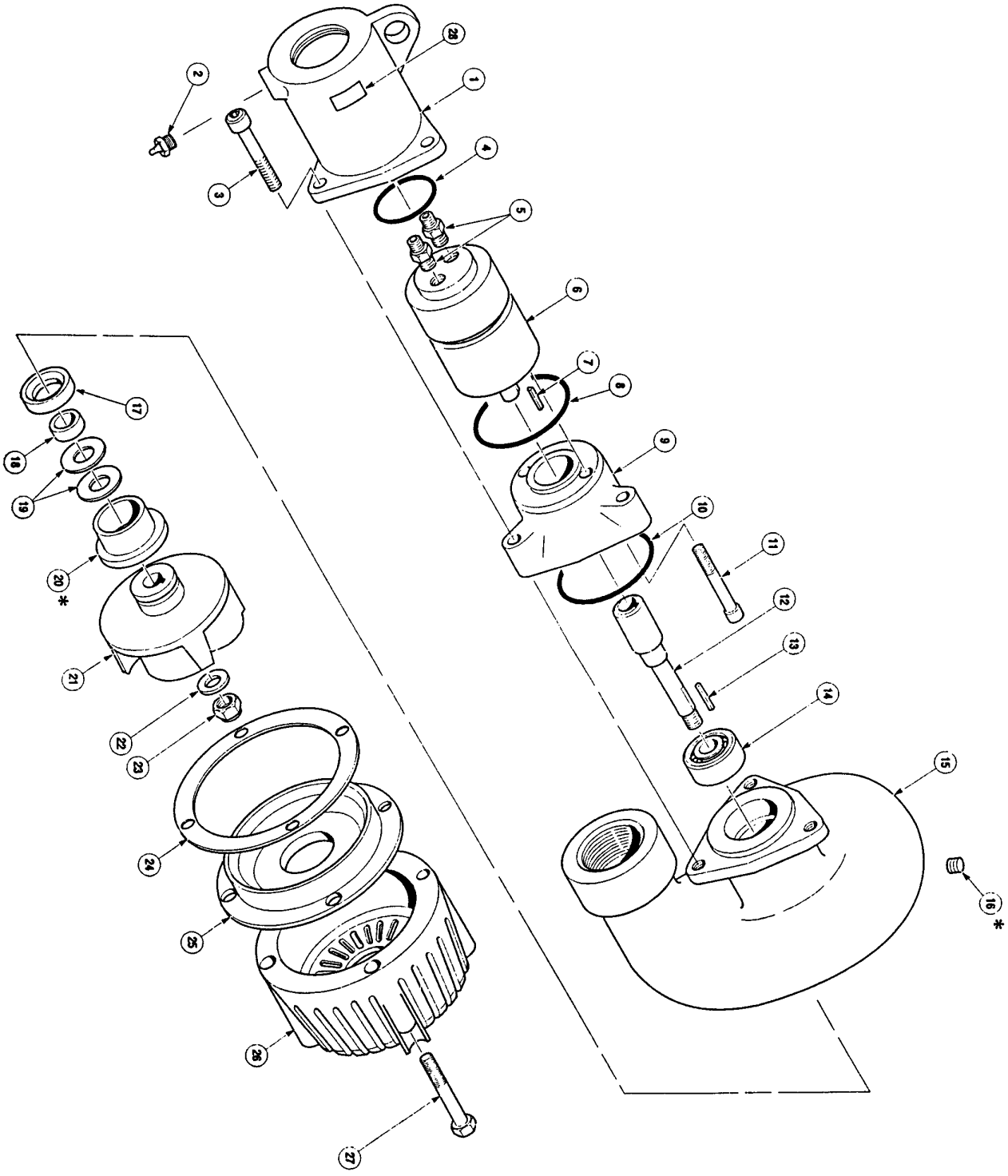
The Warranty Registration Card packed with the tool must be filled out and returned to Stanley upon receipt of the tool.

Stanley reserves the right to replace or repair only those parts which under our examination prove to have been defective at the time of purchase.

Shipping charges are pre-paid by the customer unless otherwise authorized by Stanley.

The warranty is void if maximum flow and pressure ratings are exceeded.

There is no other warranty expressed or implied.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REPAIR AND SEAL KIT DATA

For Pumps With Motor, Part Number 06858 or 21451

Part No.	Qty.	Description
Repair Kit Part No. 07474		
01218	1	Bearing
01308	1	Key
01309	1	Sleeve
01316	1	Key
07475	1	Seal Kit

Part No.	Qty.	Description
Seal Kit Part No. 07475		
00178	1	O-Ring
00466	1	O-Ring
01205	1	O-Ring
01215	1	O-Ring
01216	1	Closure Seal
06315	1	Seal
00669	1	Quad Ring
00171	1	O-Ring
19884	1	Gland
07387	1	Service Instructions

For Pumps With Motor, Part Number 03001

Part No.	Qty.	Description
Repair Kit Part No. 01150		
00148	2	Bearing
00166	1	Retaining Ring
00169	1	Seal Liner Washer
00170	1	Retaining Ring
00708	1	Retaining Ring
01316	1	Key
01218	1	Bearing
01308	1	Key
01309	1	Sleeve
00609	1	Key
01149	1	Seal Kit

Part No.	Qty.	Description
Seal Kit Part No. 01149		
00172	1	Seal Liner
00173	1	Quad Ring
00178	2	O-Ring
00466	1	O-Ring
01203	1	Washer
01205	1	O-Ring
01215	1	O-Ring
01216	1	Closure Seal

PARTS LIST

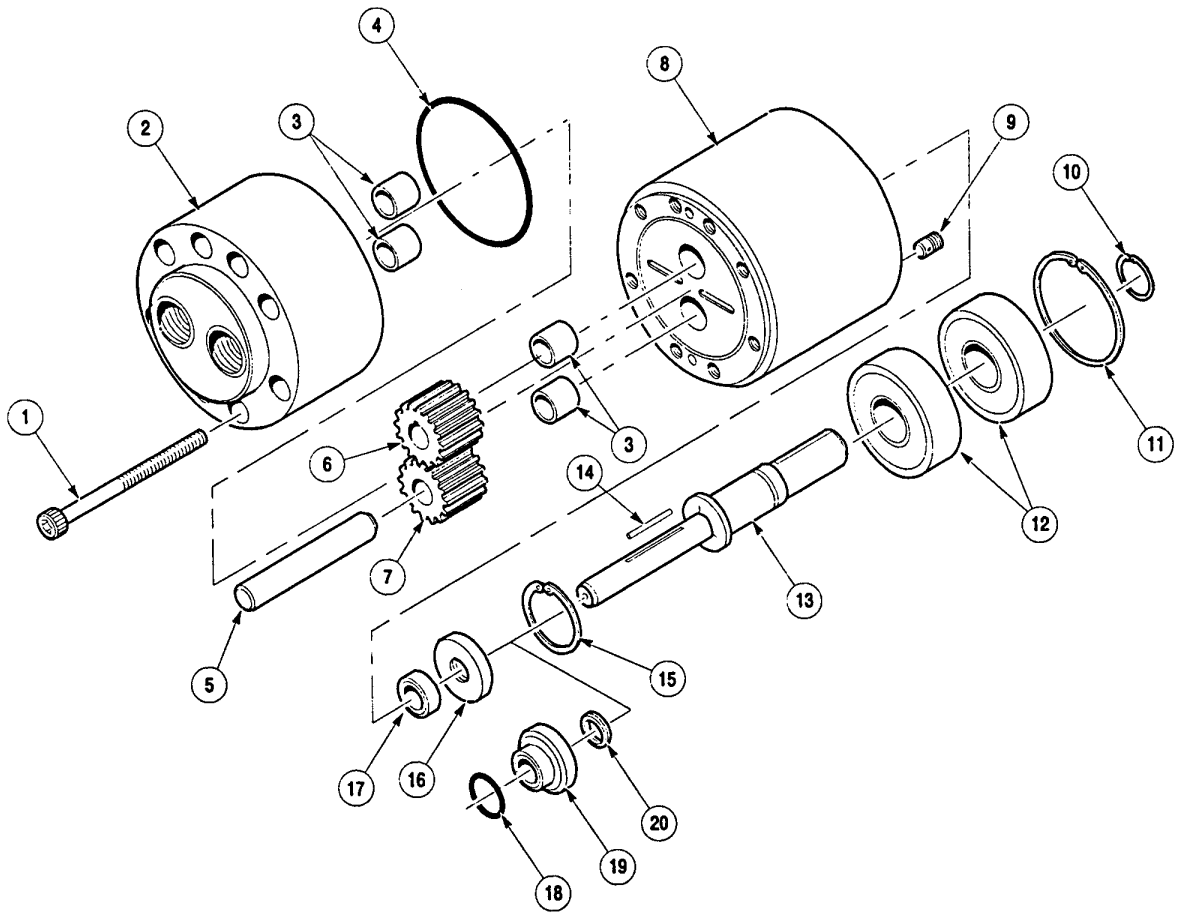
Item No.	Part No.	Qty.	Description
1	01303	1	Motor Housing
2	01220	1	Grease Fitting
3	01217	3	Capscrew, 3/8 - 16 x 2-1/4
4	01205	1	O-Ring, 2-1/4 x 2-3/4 x 1/16 ⊙
5	00936	2	Adapter
6	21451	1	Motor Assembly
	06858	1	Motor Assembly Replaced w/21451
	03001	1	Motor Assembly Replaced w/21451
7	01316	1	Key •
8	00466	1	O-Ring, 3-3/8 x 3-5/8 x 1/8 ⊙
9	01302	1	Adapter Plate
10	01215	1	O-Ring, 3-1/2 x 3-3/4 x 1/8 ⊙
11	00793	2	Capscrew, 5/16 - 18 x 2-1/4
12	01321	1	Impeller Shaft
13	01308	1	Impeller Key •
14	01218	1	Bearing •
15	01301	1	Volute
16	01219	1	Pipe Plug, 1/4 NPT ✱
17	01216	1	Closure Seal ⊙
18	01309	1	Seal Sleeve •
19	01320	2	Impeller Shim 0.025
20	01307	1	Hub Bushing ✱
21	01306	1	Impeller
22	01310	1	Washer
23	01311	1	Arbor Nut
24	01314	A/R	Cover Shim 0.010
25	02815	1	Impeller Cover
26	02784	1	Screen
27	01208	4	Capscrew, 3/8 - 16 x 3
28	09612	1	Sticker, GPM
	02731	1	Name Tag - Not Illustrated
	05152	1	Sticker, Stanley - Not Illustrated

• Denotes Part in Repair Kit.
⊙ Denotes Part in Seal Kit.
✱ Not Used in All Units.

NOTES:

1. Use Part Number and Part Name when ordering.
2. Motors, part number 03001 and 06858, are **not available** as complete assemblies. If repacing the entire motor assembly, order Motor Assembly, part number 21451.
3. Motor, part number 03001, is identified by having two grooves around the main body. Motor, part number 06858 and 21451 have only one groove.
4. Be sure to order replacement parts from the correct parts list.
5. Motor, part number 21451, replaces motor part number 03001 and 06858. If ordering a complete motor, order motor, part number 21451.

HYDRAULIC MOTOR ASSEMBLIES 06858 and 21451



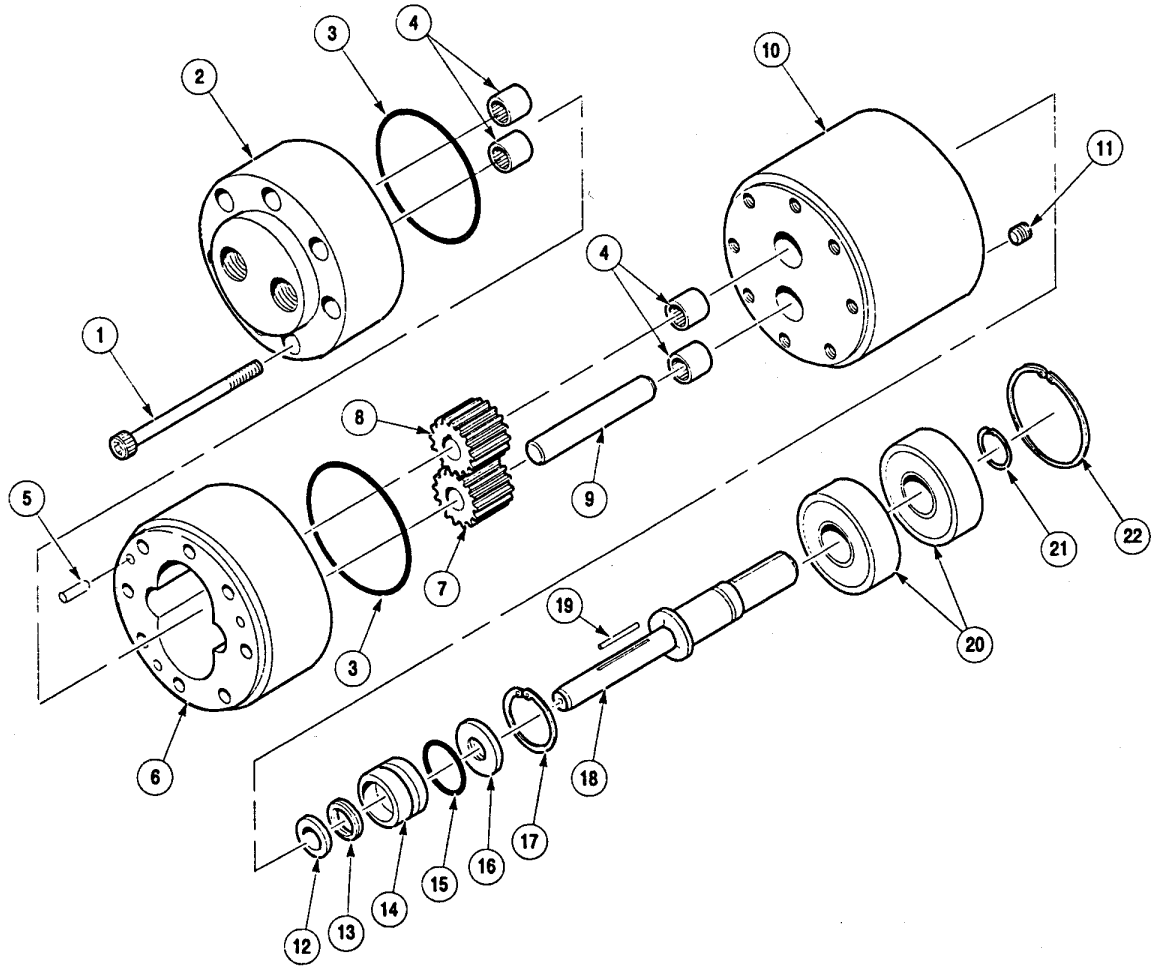
PARTS LIST

Item No.	Part No.	Qty.	Description
1	00612	8	Capscrew, 1/4 - 20 x 2-1/4 HSH STNLS
2	06857	1	**Gear Housing Assy** (Includes Item 3)
3	06316	4	Bushing
4	00178	1	O-Ring ⊙
5	06854	1	Idler Shaft
6	06853	1	Drive Gear
7	06855	1	Idler Gear
8	21435	1	**Front Bearing Housing Assy**
	06856	⊙	(Includes Items 3 and 9)
9	06821	1	Oiler Plug
10	00708	1	Retaining Ring

Item No.	Part No.	Qty.	Description
11	00166	1	Retaining Ring
12	00148	2	Bearing
13	06859	1	Motor Shaft
14	06881	1	Needle Roller
15	00170	1	Retaining Ring
16	06304	1	Seal Washer (Motor 06858 only)
17	06315	1	Seal (Motor 06858 only) ⊙
18	00171	1	O-Ring (Motor 21451 only) ⊙
19	19884	1	Gland (Motor 21451 only) ⊙
20	00669	1	Quad Ring (Motor 21451 only) ⊙

• Denotes Part in Repair Kit
⊙ Denotes Part in Seal Kit

HYDRAULIC MOTOR ASSEMBLY 03001



PARTS LIST

Item No.	Part No.	Qty.	Description
1	00612	8	Capscrew
2	03426	1	Rear Bearing Retainer (Includes Item 10)
3	00178	2	O-Ring ⊙
4	05459	4	DU Bushing and Sleeve
5	00611	3	Dowel Pin
6	00605	1	Gear Housing
7	00607	1	Gear
8	00608	1	Gear w/Keyway
9	00606	1	Idler Shaft
10	03424	1	**Front Bearing Retainer** (Includes Item 10)
11	00105	1	Oiler Plug

Item No.	Part No.	Qty.	Description
12	01203	1	Seal Washer ⊙
13	00173	1	Quad Ring ⊙
14	00172	1	Seal Liner ⊙
15	00171	1	O-Ring ⊙
16	00169	1	Seal Liner Washer •
17	00170	1	Retaining Ring •
18	00620	1	Motor Shaft
19	00609	1	Key •
20	00148	2	Bearing
21	00708	1	Retaining Ring •
22	00166	1	Retaining Ring •

Note: Motors, part number 03001 and 06858, are **not available** as complete assemblies. If replacing the entire motor assembly, order Motor Assembly, part number 21451.

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