

# SCOT

# ENGINEPUMP™

5/8" and 1" THREADED ENGINE SHAFTS  
SELF PRIMING

● INSTALLATION ● OPERATION ● MAINTENANCE  
INCLUDES MECHANICAL SEAL REPLACEMENT

Check pump for shortage and damage immediately upon arrival. Note damage or shortage on freight bill (bill of lading); immediately file claim with carrier.

**EXTERIOR** — Pay particular attention to conduit box, external hardware and accessories. Touch up abrasions or scratches with approved paint.

**INTERNAL** — If extensive or serious external damage is noted, if impeller is damaged (look in ports), or if shaft binds or sticks, disassemble as required to permit internal inspection.

## HANDLING

Handle with care. Dropping or jarring can seriously damage engine or break pump parts. Rig a double sling under engine frame and pump casing. Do not use a sling through pump engine or around suction and discharge flanges.

Engine manufacturers do not recommend transporting engine with fuel in tank or with fuel shut-off valve open. (Refer to engine manufacturers manual.)

## INSTALLATION

**Location** — Pump location should provide the following:

1. Install as close to suction supply as possible.
2. Shortest and most direct suction pipe practical. Suction lift must not exceed limit for pump. NPSH available must equal or exceed pump requirement.
3. Room for inspection and maintenance.
4. Adequate ventilation - exhaust gases contain carbon monoxide - an odorless and deadly poisonous gas.
6. If outdoors, protection from the elements, freezing and water damage due to flooding.

**Piping** — Suction and discharge gauges are useful to check pump operation and are excellent trouble indicators. Install gauges in the lines if pump ports do not have gauge taps. Observe these precautions when installing piping:

1. Support close to, but independently of pump.
2. Use the next larger pump size for suction and discharge.
3. Keep as straight as possible. Avoid bends and fittings.
4. Remove burrs, sharp edges, ream pipe cuts, and make joints air-tight.
5. Don't spring pipe to make connections. Strain must not be transmitted to pump.
6. Allow for pipe expansion with hot fluids; expansion joints are not recommended.

**Suction** — Size and install suction piping to keep pressure loss at minimum and to provide correct NPSH by observing the following:

1. The suction pipe should be equal in size or preferably one size larger than the suction connection of the pump. If pipe is larger than the pump suction, an eccentric pipe reducer should be used at the pump.
2. For hose applications, use reinforced type that will not collapse under suction. Use thread sealer to make sure all suction connections are airtight.
3. Attach a suction strainer (if required) to the end of the suction hose. Be sure to keep the suction hose submerged.

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## **INSTALLATION, CONT.**

4. A valve in the suction is necessary only on positive suction head installation and must not be used to throttle the pump. The suction valve should be installed for maintenance purposes only.

**Discharge** — Ensure there is adequate clearance with selected position between wall or tank, motor conduit box, and grease fittings. Casing may extend beyond base or feet.

1. Short discharge lines may be the same size as the discharge port. Long runs require a pipe larger than the discharge port.
2. Long horizontal runs require a grade as even as possible. Avoid high spots and loops. Trapped air will throttle flow and may result in erratic pumping.

## **OPERATION**

**Pre-Start** — Before initial start of the pump, check as follows:

1. Fill engine with oil as specified in the engine manual.
2. Fill gasoline tank,

**Priming** — Priming time depends on the height of the suction lift. Maximum practical suction lift is 25 feet vertically from the surface of the liquid. The lower the suction lift, the quicker the pump will prime.

1. Prime pumps installed with a flooded suction by opening the suction valve and allowing liquid to enter the casing, at the same time venting air out the top of the casing.
2. Open prime plug in pump case. Fill case with liquid. Reinstall prime plug in case.

**CAUTION** - DO NOT RUN PUMP DRY. Serious damage may result if started dry.

**Starting** — Proceed as follows to start pump:

1. Close drain valves and valve in discharge line.
2. Open fully all valves in the suction line.
3. Prime the pump. If pump does not prime properly, or loses prime during start-up, shut down and correct condition before repeating procedure.
4. Start the engine in accordance with engine manufacturer's manual.

**Running** — Periodically inspect pump while running, but especially after first start and following repair.

1. Check pump and piping for leaks. Repair immediately.
2. Record pressure gauge readings for future reference.
3. Adjust pump capacity with discharge valve. DO NOT throttle suction line.
4. DO NOT fill gasoline tank while engine is running. Allow engine to cool for a few minutes before refueling. Refuel outdoors or in a well ventilated area.

## **MAINTENANCE**

**ENGINE** -

1. CHECK OIL LEVEL regularly after five hours of operation. OIL LEVEL MUST BE MAINTAINED.
2. CHANGE OIL after first five hours of operation. Thereafter, change engine oil after every 50 hours of operation under normal operating conditions. Change engine oil every 25 hours of operation if the engine is operated under heavy load, or in high ambient temperature.
3. CLEAN AIR CLEANER CARTRIDGE at three month intervals or every 25 hours, whichever occurs first.
4. COOLING SYSTEM - Grass, chaff or dirt may clog the rotating screen and the air cooling system after prolonged service. Yearly, or every 100 hours, whichever occurs first, remove the blower housing and clean to avoid overspeeding, overheating, and engine damage. Clean more often if necessary.

**NOTE** - THE MAINTENANCE PROCEDURES LISTED ARE GUIDELINES ONLY. ALWAYS REFER TO ENGINE MANUFACTURER'S MANUAL BEFORE PERFORMING ENGINE MAINTENANCE.

**PUMP** - Pumps should require no maintenance other than protection from the environment.

Remove oil, dust, lint, water, and chemicals from exterior of engine and pump.

**FREEZING PROTECTION** - Protect pump shut down during freezing conditions by one of the following methods.

1. Drain pump; remove all liquid from the casing.
2. Keep fluid moving through the pump to prevent freezing (do not let the temperature exceed 150°F.), or maintain ambient condition above freezing.
3. Fill pump with antifreeze solution.

## TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
<b>LOSS OF SUCTION</b>	<ol style="list-style-type: none"> <li>1. Air leak in suction line</li> <li>2. Suction head too high</li> <li>3. Leaking flapper valve*</li> </ol>	Repair or replace suction line Lower suction head Replace flapper valves
<b>PUMP LEAKS</b>	Worn mechanical seal	Replace seal
<b>LITTLE OR NO DISCHARGE</b>	<ol style="list-style-type: none"> <li>1. Casing not filled with water</li> <li>2. Total head too high</li> <li>3. Impeller plugged</li> <li>4. Hole or leak in suction line</li> <li>5. Impeller worn or damaged</li> <li>6. Strainer or suction line not submerged deep enough in water</li> <li>7. Discharge hose kinked</li> <li>8. Suction hose collapsed</li> <li>9. Suction or discharge line valves closed</li> </ol>	Fill case with water Shorten suction lift and/or discharge head Disassemble pump and clean impeller Repair or replace suction line Replace impeller Submerge lower in water  Straighten out to exhaust air Replace with reinforced suction hose Open

\*The flapper valve (Supplied on 1½" models only) may only need adjusting. Use the following procedure for adjustment:

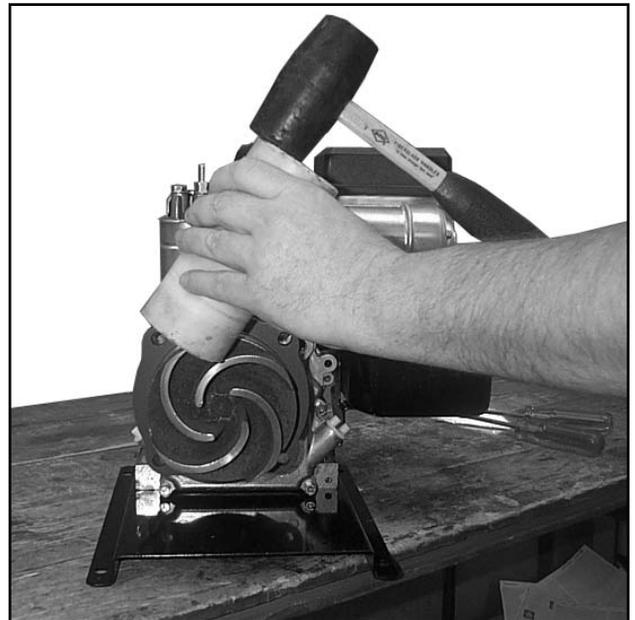
- 1.) Remove three (3) ¼-20 machine screws that hold suction flange of casing.
- 2.) Remove suction flange and flapper valve.
- 3.) Inspect flapper valve. If it is bowed, distorted or worn out it should be replaced.
- 4.) Inspect suction flange. Surface on which flapper valve seals should be clean and smooth.
- 5.) Reassemble flapper and suction flange to the pump casing making sure weighted end of flapper is toward the casing. Replace the three (3) ¼-20 machine screws and lockwashers. Tighten the machine screws until the lockwashers are flat and then tighten the screws an additional ¼ turn.

NOTE: Overtightening of the machine screws will cause the flapper to distort and seal improperly, thereby causing leakage.

### MECHANICAL SEAL REPLACEMENT

A.) Disassembly: It is not necessary to remove the pump case from the piping system to perform maintenance.

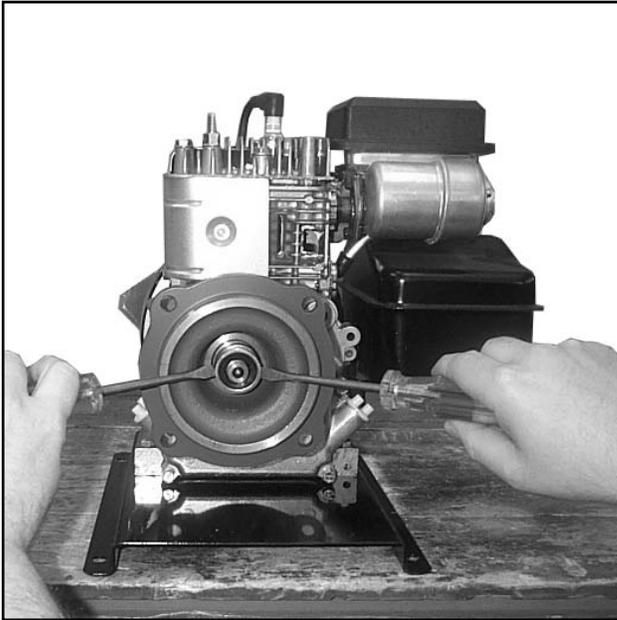
1. Turn off engine.
2. Close suction and discharge valves.
3. Drain pump.
4. Remove bolts holding base to foundation
5. Remove casing bolts.
6. Remove engine and impeller from the casing, leaving casing and piping undisturbed.
7. Remove impeller. Place a piece of wood against the outer edge of one of the impeller vanes. Hit the wood with a hammer to turn the impeller in the same direction as the rotation of the engine (counterclockwise) until the impeller is loosened and can be screwed off the engine crankshaft (as shown in FIGURE 1).



**FIGURE 1**

**MECHANICAL SEAL REPLACEMENT — CONTINUED**

8. Pry off rotating member of mechanical seal from shaft sleeve by using two (2) screwdrivers (as shown in FIGURE 2).



**FIGURE 2**

9. Remove bolts holding adapter to engine and take off adapter.
10. Place adapter on a flat surface with case rabbet facing down, and push out stationary part of mechanical seal.
11. Inspect shaft sleeve. If damaged or worn, remove from shaft and replace with a new one.

**B.) Reassembly:**

**CAUTION:** The mechanical seal is a precision product and should be handled accordingly. Use care when handling the lapped running surfaces of the mechanical seal to ensure they remain clean and free of chips or scratches.

1. Clean gasket and flange faces, seal seat cavity, shaft sleeve, and engine shaft.

2. Lubricate seal seat cavity of adapter and rubber cup or O-ring of stationary seat with the fluid that comes with the seal or repair kit. Press the stationary seat in seal seat cavity squarely and evenly using an arbor press (if possible), and the cardboard disc supplied with the seal. Be certain that the lapped face (shiny side) is facing you.
3. Remount the adapter on engine. Tighten the adapter bolts alternately and evenly. Use caution so the engine shaft does not dislocate or chip the stationary seat of the seal.
4. Apply the lubricating fluid that comes with the mechanical seal or repair kit to the shaft sleeve and the rubber bellows of the rotary seal. Slide the rotating member of mechanical seal over the sleeve, with the carbon ring facing the stationary seat. Be sure the rotating seal ring stays in the holding collar during installation. Take extra care not to chip or scratch the seal lapped faces.
5. Thread impeller on engine shaft by turning clockwise.
6. Slide engine and rotating element in casing. Be sure that any damaged O-ring or gasket is replaced.
7. Tighten casing bolts alternately and evenly.
8. Replace hold-down bolts.
9. Check for free rotation after assembly is completed.
10. Seal all drain openings using pipe sealant on threads.
11. Reprime before starting. Do not start until pump is completely filled with water.

The approved lubricating fluid for seal installation is included with the mechanical seal or repair kit. **DO NOT USE OTHER LUBRICATING LIQUIDS!**

**SCOT RECOMMENDS STOCKING A SPARE MECHANICAL SEAL OR REPAIR KIT TO ELIMINATE DOWN TIME.**

**PRESSURE AND TEMPERATURE LIMITATION  
STANDARD FITTED PUMPS**

PUMP NO.	PRESSURE		TEMPERATURE	
	STANDARD	OPTIONAL	STANDARD	OPTIONAL
68, 69	75 PSI	N/A	220°F	275°F
51, 61, 74	75 PSI	150 PSI	220°F	275°F
71, 72, 77, 78, 79, 82	75 PSI	N/A	220°F	275°F
11, 13, 60	75 PSI	150 PSI	220°F	275°F
62	165 PSI	165 PSI	220°F	275°F
ALL OTHERS	175 PSI	175 PSI	220°F	275°F
N/A-NOT AVAILABLE				

**CAUTION**

DO NOT ALLOW EITHER THE DISCHARGE PRESSURE OR THE TEMPERATURE OF THE LIQUID TO EXCEED THE LIMITATIONS LISTED ABOVE.