



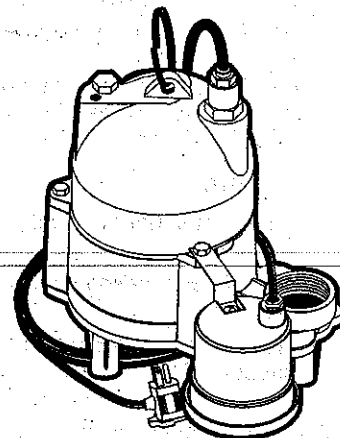
Pentair Water

740 East 9th Street, Ashland, OH 44805

**X-40**

# Submersible Solids Handling Pumps

## INSTALLATION, OPERATION, & PARTS MANUAL



### SAFETY INFORMATION

Carefully read and follow all safety instructions in this manual or on pump.

**▲ This is the safety alert symbol.** When you see this symbol on your pump or in this manual, look for one of the following signal words and be alert to the potential for personal injury!

**▲ DANGER** warns about hazards that will cause serious personal injury, death or major property damage if ignored.

**▲ WARNING** warns about hazards that can cause serious personal injury, death or major property damage if ignored.

**▲ CAUTION** warns about hazards that will or can cause minor personal injury or property damage if ignored.

The word **NOTICE** indicates special instructions which are important but not related to hazards.

1. Read these rules and instructions carefully. Failure to follow them could cause serious bodily injury and/or property damage.
2. Check your local codes before installing. You must comply with their rules.
3. Vent sewage or septic tank according to local codes.
4. Do not install pump in any location classified as hazardous by National Electrical Code, ANSI/NFPA 80-1984 or the Canadian Electrical Code.

**▲ WARNING** Hazardous voltage. Can shock, burn, or kill. During operation the pump is in water. To avoid fatal shocks, proceed as follows if pump needs servicing:

- 5A. Disconnect power to outlet box before unplugging pump.
- 5B. Take extreme care when changing fuses. Do not stand in water or put your finger in the fuse socket.
- 5C. Do not modify the cord and plug. When using the cord and plug, plug into a grounded outlet only. When wiring to a system control, connect the pump ground lead to the system ground.

6. Do not run the pump dry. Dry running can overheat the pump, (causing burns to anyone handling it) and will void the warranty.
7. The pump can run hot. To avoid burns when servicing pump, allow it to cool for 20 minutes after shut-down before handling it.
8. The pump is permanently lubricated. No oiling or greasing is required in normal operation. For overhaul, see instructions under "Service".

### DESCRIPTION

Submersible sewage pump is designed for sewage, effluent and high capacity sump drainage. Unit has built in thermal overload protection with automatic reset. The mechanical seal and ball bearings on the motor shaft are permanently lubricated. Stainless steel hardware and a heavy duty lift-out ring allow for easy disassembly after extended use.

**NOTICE:** This unit is not designed for applications involving salt water or brine! Use with salt water or brine will void warranty.

### SPECIFICATIONS

Power supply required ..... 115V/15A/60 Hz  
 Maximum Liquid Temperature ..... 130° F (55° C)  
 Discharge Adapter ..... 2" NPT

### PERFORMANCE

Model	GPM AT TOTAL FEET			No flow at height shown below
	5	10	15	
CAPACITY GALLONS/MINUTE				
X-40	90	66	25	18

### MOTOR, SWITCH, & CORD SPECIFICATIONS

Model Number	Motor HP	Voltage	Motor Full Load Amps	Individual Branch Circuit Required (Amps)	Cord Length in ft. (m)	Switch Setting in inches (mm)		Discharge Adapter Size
						On	Off	
X-40	4/10	115/1	12.5	15	10 (3.0)	15-1/2 (394)	5-1/2 (140)	2"

## INSTALLATION

**▲ WARNING** Hazardous voltage. Can shock, burn or kill. Do not lift pump by the power cord. See "Cord Lift Warning," below.

**NOTICE:** Install the pump on a hard, level surface (cement, asphalt, etc.). Never place the pump directly on earth, clay or gravel surfaces.

### Piping

Piping must not be smaller than pump discharge.

When installed in a **sewage** system, the pipe must be capable of handling semi-solids of at least 2" (51mm) in diameter.

When installed in an **effluent** system, the pipe must be capable of handling semi-solids of at least 3/4" (19mm) in diameter.

The rate of flow in the discharge pipe must keep any solids present in suspension in the fluid. To meet minimum flow requirements (2 feet per second in the discharge line), size the pipe as follows:

A Pipe Size Of:	Will Handle a Flow Rate Of:
1-1/2" (38mm)	12 GPM
2" (51mm)	21 GPM
2-1/2" (64mm)	30 GPM
3" (76mm)	48 GPM

Use a 2" (51mm) check valve in pump discharge to prevent backflow of liquid into sump basin. The check valve should be a free flow valve that will easily pass solids. Be sure check valve installation complies with local codes.

**NOTICE:** For best performance of check valve when handling solids, do not install it with the discharge more than 45° above the horizontal. Do not install the check valve in a vertical position as solids may settle in the valve and prevent it from opening on startup.

Drill a 3/16" (5mm) hole in the discharge pipe about 1-2" (25-51mm) above the pump discharge connection (but below check valve) to prevent airlocking the pump.

## Electrical

**▲ WARNING** Hazardous voltage. Can shock, burn, or kill. When installing, operating, or servicing this pump, follow the safety instructions listed below.

1. **DO NOT** splice the electrical power cord.
2. **DO NOT** allow the plug on the end of the electrical cord to be submerged.
3. **DO NOT** use extension cords. They are a fire hazard and can reduce voltage sufficiently to prevent pumping and/or damage motor.
4. **DO NOT** handle or service the pump while it is connected to the power supply.
5. **DO NOT** remove the grounding prong from the plug or modify the plug. To protect against electrical shock, the power cord is a three-wire conductor and includes a 3-prong grounded plug. Plug the pump into a 3-wire, grounded, grounding-type receptacle. Connect the pump according to the NEC or CEC and local codes.

For automatic operation, plug the pump into the piggy-back switch plug. Plug the diaphragm switch into the outlet. For continuous running, plug the pump directly into the outlet (that is, bypass the piggyback switch plug).

Connect pump to its own individual branch circuit with no other outlets or equipment in the circuit. Size fuses or circuit breakers according to the "Motor, Switch and Cord Specifications" chart, Page 1.

**▲ WARNING** Risk of electrical shock and fire. Can burn, kill or cause property damage. Be sure that power supply information (Voltage/ Hertz/Phase) on pump motor nameplate matches incoming power supply exactly. Install pump according to all electrical codes that apply.

## OPERATION

**▲ WARNING** Risk of fire or explosion. Can cause severe personal injury, property damage or death. Do not use in explosive atmospheres. Pump water only with this pump.


**NOTICE:** Do not allow the pump to run in a dry sump. It will void the warranty and may damage the pump.

An automatic overload protector in the motor will protect the motor from burning out due to overheating/overloading. When the motor cools down, the overload protector will automatically reset and start the motor.

If the overload trips frequently, check for the cause. It could be a stuck impeller, wrong/low voltage, or an electrical failure in the motor. If an electrical failure in the motor is suspected, have it serviced by a competent repairman.

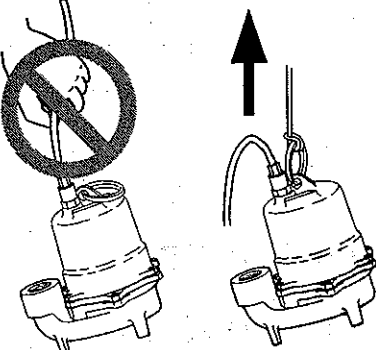
The pump is permanently lubricated. No oiling or greasing is required.

**▲ WARNING**



Risk of electrical shock.  
Can burn or kill.  
Do not lift pump by power cord.

**CORD LIFT WARNING**



1. Attempting to lift or support pump by power cord can damage cord and cord connections.
2. Cord may pull apart, exposing bare wires with possibility of fire or electrical shock.
3. Lifting or supporting pump by power cord will void warranty.
4. Use lifting ring or handle on top of pump for all lifting/lowering of pump. Disconnect power to pump before doing any work on pump or attempting to remove pump from sump.

# SERVICE

## General

**⚠ WARNING** Hazardous voltage and risk of cord damage. Can shock, burn, or kill. Before removing the pump from the basin for service, always disconnect electrical power to the pump and the control switch. Do not lift the pump by the power cord. See the "Cord Lift Warning", Page 2.

After removing the basin cover and the necessary discharge piping, lift the pump out of the basin.

Place the pump in an area where it can be cleaned thoroughly. Remove all scale and deposits on the pump.

Submerge the complete pump in a disinfectant solution (chlorox or chlorine bleach) for at least one hour before disassembling the pump.

The pump motor housing contains a special lubricating oil which should be kept clean and free of water at all times.

**NOTICE:** Whenever the motor housing is being removed for service, remove oil and replace it with new oil at reassembly. Use only oil listed in parts list in this manual. When filling with new oil, DO NOT overfill. Allow about 7/8" (22mm) air space from top of boss in housing for expansion of oil when the pump is operating.

## Pump Disassembly

### Impeller and Seal Replacement

#### A. Impeller removal (See the pump disassembly drawing):

1. Remove the oil fill plug and turn the pump upside down to drain oil.
2. Remove the capscrews holding the lower motor housing to the volute; lift off the lower motor housing.
3. Remove the capscrews holding the upper motor housing to the lower motor housing.

**NOTICE:** the motor lead wires are permanently connected to the power cord. Be sure that they do not pull loose when you remove the upper motor housing. Power cord is not removable or replaceable.

4. Hold the rotor shaft assembly and unscrew the impeller by turning it counter-clockwise. Remove impeller and clean it.

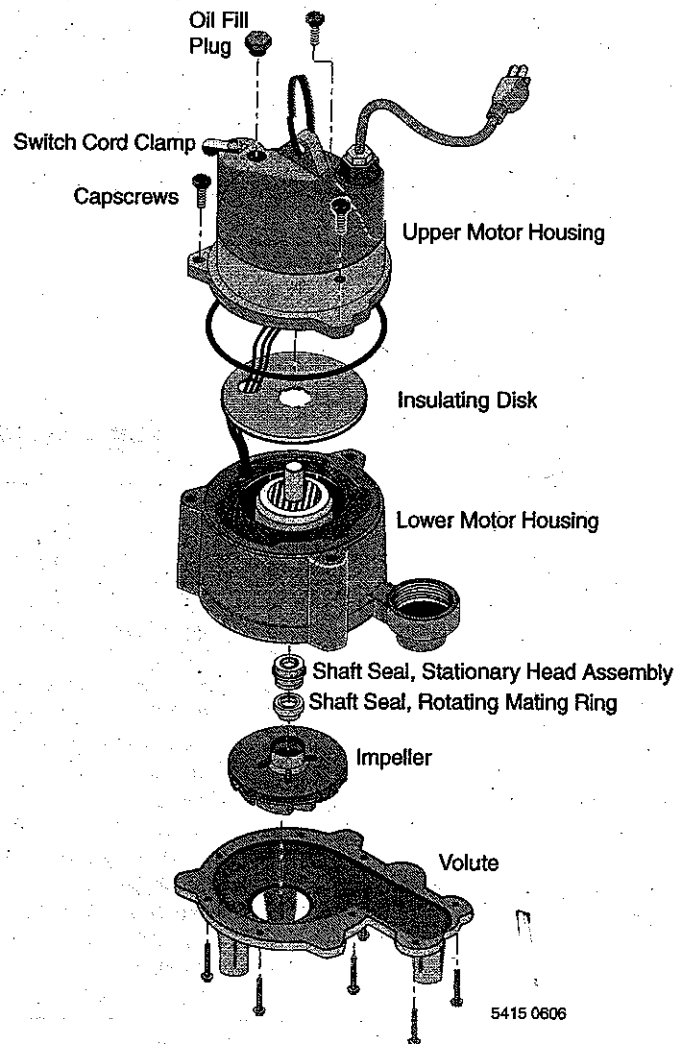
If no more service is needed, reverse instructions above to reassemble the pump. Fill with clean dielectric oil (Part No. U197-8A), check the oil level and replace fill plug. Oil should cover the motor windings.

#### B. Shaft seal replacement:

1. Follow the instructions to remove the impeller, above.
2. Remove the stator capscrews and the spacers (if applicable). Lift off the stator.

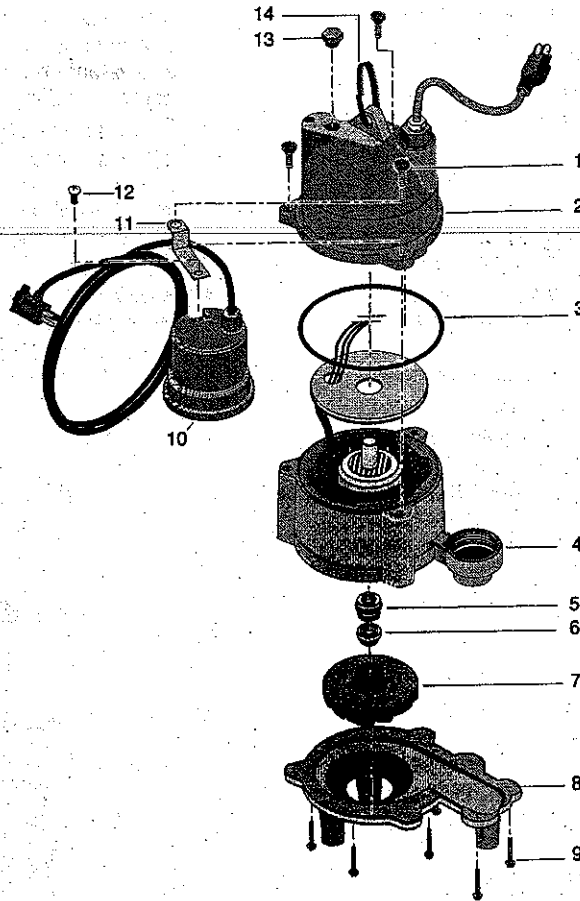
3. Remove the seal's ceramic seat from the rotor shaft and the body of the seal out of the lower motor housing.
4. Clean the seal cavity thoroughly before installing the new seal. **NOTICE:** Make sure that the seal cavity is clean; do not scratch or damage the new seal during seal replacement. Apply Permatex #2 or an equivalent sparingly to the outside edge of seal body before installing the seal in the lower motor housing.
5. Press the new seal body into position in the lower housing cavity.
6. Press the ceramic seat onto the motor shaft. The impeller will pull it into position.
7. Reassemble the stator and tighten the stator capscrews.
8. Reassemble the impeller and the pump (reverse instructions 1 through 4 in section A).
9. Fill with clean dielectric oil (Part No. U197-8A), check the oil level and replace the oil fill plug.

## Pump Disassembly



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## EXPLODED VIEW



## REPAIR PARTS LIST

Key No.	Part Description	Qty.	X-40 527420001 4/10 HP 115V
1	#10-32 x 3/4" Capscrew	3	U30-482SS
2	Upper Motor Housing	1	**
3	O-Ring	1	U9-339
4	Lower Motor Housing	1	**
5	Shaft Seal, Stationary Head Assembly	1	U9-379A
6	Shaft Seal, Rotating Mating Ring	1	U9-321A
7	Impeller	1	PW5-11P
8	Volute	1	PW1-13
9	#10-32 x 3-1/8" Capscrew	8	U30-966SS
10	Automatic Diaphragm Switch	1	149740005
11	Switch Bracket	1	055020111
12	Capscrew, 10-32x1/2" Panhead	1	003000211
13	1/4" NPT Plug	1	U78-941ZPV
14	Handle Ring	1	U97-128
*	Dielectric Oil (uses .61 qts.)	1	U197-8A

• Not Illustrated

\*\* If the motor fails replace the entire pump.

## TROUBLES-REMEDIES

**▲WARNING** Sudden Starts. If the power is on to the pump when thermal overload resets, the pump may start without warning. If you are working on the pump, you may get an electrical shock or the impeller may catch fingers or tools. Disconnect the power before servicing the pump.

<p><b>A. Pump fails to operate:</b></p>	<ol style="list-style-type: none"> <li>1. Check to be sure that power cord and switch cord are securely plugged in. Disconnect power to outlet before handling pump or motor.</li> <li>2. Check to be sure you have electrical power.</li> <li>3. Check that liquid fluid level is high enough to activate switch or controller.</li> <li>4. Check to be sure that 3/16" (5mm) vent hole in discharge pipe is not plugged.</li> <li>5. Check for blockage in pump inlet, impeller, check valve or discharge pipe.</li> <li>6. Disconnect the pump from the power source for a minimum of 30 minutes to allow the motor to cool and to protect yourself from sudden starts. See Warning above. Check for the cause of overheating. Pump may be running dry because something has blocked the switch. Inlet pipe may be plugged. Outlet pipe may be plugged.</li> </ol>
<p><b>B. Pump runs, but fails to empty sump:</b></p>	<ol style="list-style-type: none"> <li>1. Be sure all valves in discharge pipe are fully open.</li> <li>2. Clean out discharge pipe and check valve.</li> <li>3. Check for blockage in pump inlet or impeller.</li> <li>4. Pump not sized properly. A higher capacity pump may be required.</li> </ol>
<p><b>C. Pump will not shut off:</b></p>	<ol style="list-style-type: none"> <li>1. Check switch for proper operation and location. See installation instructions for switch.</li> <li>2. If pump is completely inoperative or continues to malfunction, consult your local serviceman.</li> </ol>

### LIMITED WARRANTY

FAIRBANKS MORSE warrants to the original consumer of the products listed below, that they will be free from defects in material and workmanship for the Warranty Period from the date of original installation or manufacture as noted.

Product	Warranty Period
Sump/Sewage/Effluent Products	1 year from date of original installation, or 18 months from date of manufacture

Our warranty will not apply to any product that has been subject to negligence, misapplication, improper installation or maintenance. In the event a three phase submersible motor is operated with single phase power through a phase converter, or if three-leg ambient compensated, extra-quick trip overload relays of recommended size are not used, our warranty is void.

Buyer's only remedy and FAIRBANKS MORSE's only duty is to repair or replace defective products (at FAIRBANKS MORSE's choice). Buyer agrees to pay all labor and shipping charges associated with this warranty and to request warranty service through the installing dealer as soon as a problem is discovered. If warranty service is requested more than 30 days after the Warranty Period has ended, it will not be honored.

FAIRBANKS MORSE SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, OR CONTINGENT DAMAGES WHATSOEVER.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE WARRANTY PERIOD PROVIDED HEREIN.

Certain states do not permit the exclusion or limitation of incidental or consequential damages or the placing of limitations on the duration of an implied warranty, therefore, the limitations or exclusions herein may not apply. This warranty sets forth specific legal rights and obligations, however, additional rights may exist, which may vary from state to state.

Supersedes all previous publications.

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