TROUBLE-SHOOTING SECTION

Symptom	Possible Cause	Cure
Reduced Flow	Plugged strainer	Clean outside of strainer and clean debris from around impeller.
	Discharge line plugged with trash	Clean out hose by back-flushing.
	Polarity reversed	Turn pump ON. Remove pump from strainer base and make certain that impeller rotation matches arrow direction.
	Low battery voltage	Check battery condition and charge if necessary.
	Kinked discharge hose	If hose is kinked because of sharp bend, convert to Rule #88 hose which will not kink at bends—or put in copper plumbing fitting to take the bend.
	Airbound	Trying to pump the bilge too low may cause the pump to gulp air. This can be cured by mounting the automatic switch at a higher level. (¼" to ½" higher than the pump base should be sufficient).
No water pumped	Wire connections	Make sure wire connections are not corroded. Visual check is not enough —a slight pull on each wire will tell if the wires are still joined. Check to be sure no wire joints are hanging down into the water.
	Blown fuse	Check fuse to see that it is the correct size according to the chart in step 9. If fuse size is correct and fuse still blows, check impeller through inlet opening to be sure it is not jammed or stuck with debris.

Symptom	Possible Cause	Cure
No water pumped (cont'd)	Float switch failure	Lift end of float switch up —if pump runs, switch is OK. If pump does not turn Manual Switch to . position—if pump runs, automatic switch has failed.
Pump won't shut off	Something under float	Clean under the float to make sure debris is not holding the float up.
	Stuck float	Check to see that the float is loose and free of gummy bilge oil. If float action appears sluggish and/or the float does not move freely, intermittent or sporadic operation of the pump may occur. This condition is usually the result of oil and/or dirt accumulating in and around the movable parts of the switch. To correct, try soaking the entire switch in Sudbury® Automatic Bilge Cleaner for 10 minutes, agitating several times and checking for smooth and free operation of the float. Repeat if necessary.
	Switch mounted too low	If the pump is sucking air and the automatic switch has not reached the OFF position, then the switch may be mounted too low for the pump and should be reinstalled ¼" to ½" higher than the pump ' .
Wires over-heated. Melted insulation	Combination of jammed impeller and wrong size fuse.	Be sure impeller is clean of debris and is free to rotate. Reduce fuse to proper size shown in chart in step 9. Replace damaged wiring and/or switch.
Repeated blown fuse	Fuse size Jammed impeller	Be sure fuse has amp rating shown in chart in step 9. Check impeller to see that is not bound up by fish line, etc.

IMPORTANT

CONGRATULATIONS!

You have just purchased one of the finest quality bilge pumps available in the industry. It was developed after years of experience, research and testing by our research staff. The motor and shaft seals were specially designed and manufactured by Rule Industries to give years of reliable trouble-free performance.

Most early pump failures are due to improper installation and wiring. Please read and follow the instructions carefully and your pump will provide you with the maximum of output and life for which it was designed.

These pumps are BIA certified and are rated "Ignition Protected."

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PRODUCED AT GOVERNMENT EXPENSE

STEP 2 Determine the desired location for the pump. If only one pump is used it is usually located where the water is deepest in the bilge while the boat is at rest.

STEP 3 Position the strainer so that the pump nozzle is in the proper position to connect to the discharge hose.

STEP 4 Mounting the Strainer

A. If attaching the strainer to wood, fasten with the stainless steel screws provided.
B. If attaching the strainer to metal or fiberglass, first mount a wooden block using fiberglass or screws and then fasten the strainer to the wooden block.

STEP 5 Mount the pump on the strainer so that both 1½" lock-tabs "snap" into place. (The pump may be reversed on these tabs if so desired.)

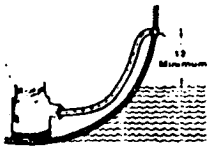
STEP 6 Attach 1½" I.D. hose to the discharge nozzle and fasten with a stainless steel clamp. Rule flexible hose (Model #88) is recommended because it will not kink when making sharp bends.

If you wish to adapt the discharge outlet to accept 1 1/8" I.D. hose, rule® Hose Adaptor (Model #67) is available.

Note: Restricting the flow from a Rule pump by using a smaller hose does not damage the pump. However, it will reduce the flow.

STEP 7 Thru-hull Fittings

A. For sailboat installations, place the thru-hull fitting high enough in the stern so that continued submergence of the fitting will not occur.



B. For power boat installations, install a full size 1½" I.D. thru-hull fitting (Rule Model #59) to handle the high quantity flow of the Rule pump. Locate the thru-hull fitting at least 12" above the water line to prevent water from flowing back into the hull when the pump is off. In some installations, it may be easier to discharge into the drain hose below the galley sink.

Note: The safety standards of the American Boat and Yacht Council state that "no check valves shall be used in the discharge line."

STEP 8 Wiring

In order to prevent electrolysis and corroded wire connections, it is essential that all wire ends and terminals be sealed with rule® Heavy Duty Marine Sealant and located above the highest possible water level by fastening with insulated staples or plastic straps.

When installing your pump, 14 gauge wire should be used. However, if your installation is over 20' from the battery source, the wire size should be increased to 12 gauge. Using a wire which is too small causes undesirable heat in the wires and results in a voltage drop and lower performance of the pump.

STEP 9 Fusing

To protect your electrical wiring and automatic switch from possible overload install a fuse in the positive (+) lead from the battery. The fuse should be sized according to the following chart.

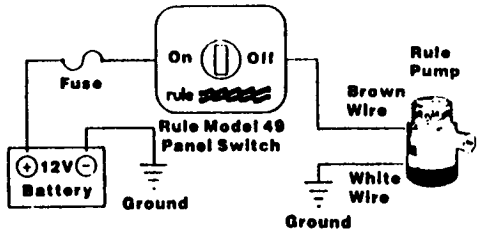
PUMP	3500-12 volt	3500-24 volt	3500-32 volt
FUSE	20 amp	10 amp	10 amp

If using a panel switch with a fuse holder, check to see that the proper fuse is being used. You may wish to install a rule® Panel Switch with a built-in fuse holder (Models #41 or 42.)

STEP 10 Follow one of the two wiring diagrams:

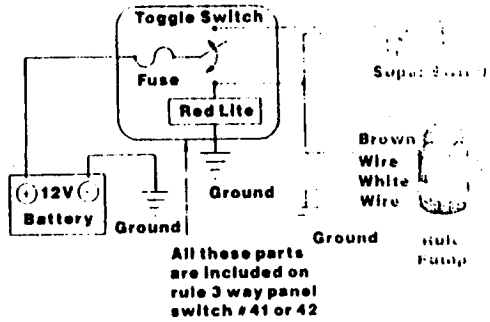
Wiring for Manual Operation

The **manual system** is the simplest system but it only provides ON-OFF control of the pump. Consequently, pumps are often left ON longer than necessary.



Wiring for Automatic Operation

The **automatic system** assures that the vessel is always pumped out, even when unattended. In addition, it extends the life of the pump and your battery by automatically turning the pump off when the water has been pumped out. The automatic system can also provide for manual control of the pump by installing a rule® Panel Switch (Models [illegible] 45). These switches have a "fail-safe" feature which automatically returns the switch to the "off" position, preventing the pump from being inadvertently left on.



STEP 11 Polarity is important. If it is not correct, the pump will rotate **backwards.** Water will still come out of the discharge nozzle but the flow will be **very much reduced.** On the rule® 3500 pump, the correct polarity will be [illegible] when the **BROWN** wire of the pump is connected to the POS or + side of the battery. The way to verify the correct direction of rotation (and thus the polarity) is correct is to look into the inlet hole on the bottom of the pump after the pump is running and see if the impeller rotates in the direction of the arrow molded into the bottom.

Caution: Strainer **must always** be properly attached to the pump before running the unit.

Storage

The pump may be left in the bilge all winter without [illegible]. Even if pump is frozen no damage will occur. Do not try to turn pump ON if pump is embedded in ice.

WARNING: REMOVAL OF THE 6 SCREWS ON TOP OF THE PUMP WILL VOID WARRANTY