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Bilge Pumps



The Publisher's Statements on [page i](#) of this Owner's Manual apply to this chapter. Please read before proceeding.

Bilge pumps are essential to your safety at sea, and protection of your investment when the vessel is left unattended. This section covers design of the bilge system, and its effective use.

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Overview

The bilge pump system comprises 7 submersible automatic electric bilge pumps and one emergency manual bilge pump with pick-ups in three major compartments.

The electric bilge pumps are nominally rated at 1587 gph (7215 L/h), for a total nominal capacity of over 11000 gallons/hour. They meet relevant ISO and CE Standards.

Pumps are triggered (and shut off) automatically by their attached float switches, F_1 or F_2 .

Pumps are compact, made of corrosion-free materials and operate with a low amp draw to conserve batteries. They provide high flow rate and long service life. Pumps are fully submersible and tolerant of running dry (though that is not recommended). They are centrifugal type pumps and thus they *push* water; they do not *pull* water. That's why they are located at low points of the hull.

The emergency manual bilge pump, located in the starboard cockpit service locker, is a diaphragm-type pump, thus it *does* pull water from low bilges. For this reason, it can clear bilges to a lower level than the electric pumps. Because of its structure and large bore, the manual pump is particularly resistant to clogging.

To test a pump

With a non-enclosed float switch F_1 simply lift it up about 2 inches: the pump should run; after 30 secs the high bilge siren should sound. With a Rule-A-matic switch F_2 turn the knurled knob on the side to lift the internal float: the pump should run; after 30 secs the alarm should sound.

Environmental concerns

The captain must be concerned about the quality of the bilge water discharged for two main reasons:

- If your bilge discharge is contaminated by fuel oil or other toxic substances you face hefty fines for water pollution. Environmental laws are rigorously enforced.
- If your bilges are cluttered by carelessly stowed gear, or by debris left by workmen, your pumps, however clog resistant, may not work at full efficiency when you need them most.

Thus bilges should be kept scrupulously clean. Disposable absorbing mats placed under the engines will trap any small leaks of fuel, oil, or coolant. Normally, there should be none but stuff happens, and service technicians have been known to spill things. As an aid to good housekeeping, use an environmentally-safe bilge cleaner product such as Sudbury Bilge Cleaner.

Some captains keep a "clean-up kit" on board with rags, paper towels, cleaners, sponges, and a pail with a sealable lid for safely storing clean-up debris until the next port.

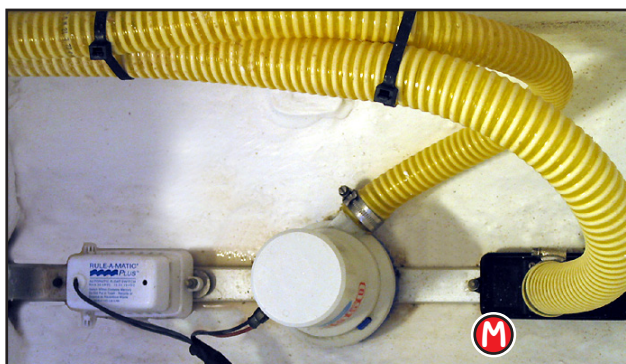


Typical bilge pump installations

There may be some variety in bilge pumps installed but all meet high safety and performance standards. Older boats have an open float switch (left); newer models are likely to have the Rule-a-Matic float switch at right. They are much the same except for the enclosure, which prevents jamming.

Rule-a-Matic switch

The double row of inlet holes helps prevent clogging. Wires are abrasion- and water-resistant. To test operations turn the knurled knob to lift the float inside.



Manual pump, E & typical manual pick-up, M

There are 3 manual pickups - this is engine room, fwd.

Power supply, **B**

The bilge pumps draw from the House batteries via the constant supply 24V bus so that they are always ready to run in response to high water. HOWEVER – secondary breakers 1-7 **B** must be on for this to happen.

These breakers must always be on when the boat is in the water.

Each of the bilge pump breakers is rated at 6A. To reset a tripped breaker put it fully off, then on again – but first determine why it tripped and correct the problem.

Forced run rocker switches, **R**

Three rocker switches **R** on the salon helm console force individual bilge pumps to run (in case you don't want to wait for the float switches to trigger). The numbers on the switch icons refer to three main vessel compartments (1: fwd, 2: engine room, 3: lazarette). They activate the main pumps in those compartments – those that also have a manual pump pickup.

Like the bilge pumps, the rockers connect to constant supply from the House batteries and so can be used at any time (assuming secondary breakers 1-7 **B** are on).

The built-in white LED lights **L** glow to show when a pump is running – whether or not you have pressed the rocker switch. In this way you can see if pumps are coming on more frequently than usual. If they are, find out why.

High bilge alarm, **H**

If any bilge pump runs for more than 30 seconds a 100 decibel alarm siren on the flybridge will sound and the large red bilge warning icon **H** in the center of the console will light up. At the salon helm the white LED strips **L** on the rocker switches will show which pump is running.

It would be very unusual if more than one pump is running under high bilge alarm. If so, you have a major intrusion of water – investigate immediately.

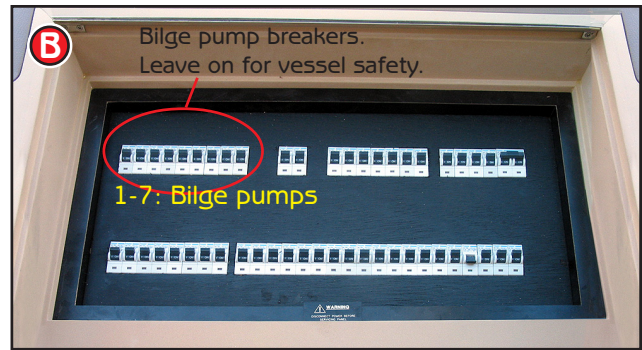
Possible sources of significant water in the bilges are:

- a broken thru-hull fitting or loose hose clamp
- a burst pipe or hose
- a hole caused by hitting an object
- heavy rain or seas entering an unsecured opening
- failure of the shaft seals (a spare is provided)

All such events require immediate correction.

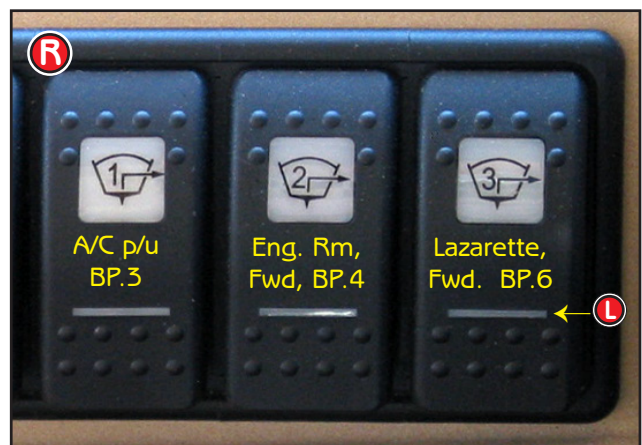
The hull is divided into separate bilge compartments, with no interconnection between them.

Water from rain and from the anchor chain can enter the chain locker, so the chain locker is a separate bilge compartment and is drained directly overboard.



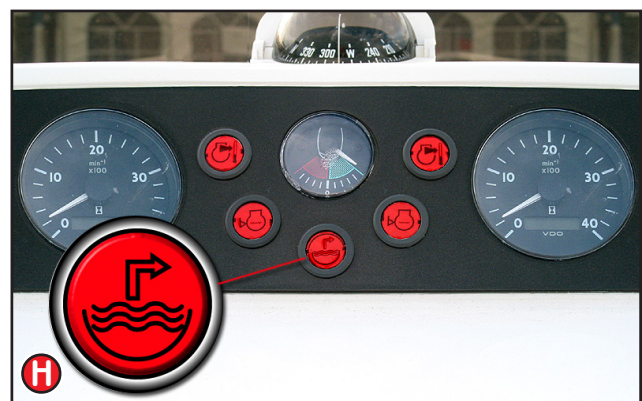
Secondary circuit breaker panel

These breakers are on top of the salon steering console. Breakers 1-4 for bilge pumps must always be on.



Salon helm – forced run rockers

*These switches force individual bilge pumps to run so you can reduce water level in the bilges at any time. The LED strips **L** light up when a pump is running.*



High bilge alarm light

The red pilot light in the center of the bridge helm console will glow, and a siren will sound, if any bilge pump runs for more than 30 seconds.

Bilge Pumps Installed

The hull is divided into separate bilge compartments, with no interconnection between them.

Water from rain and from the anchor chain enters the chain locker (also a separate bilge compartment) and drains by gravity directly overboard.

The vessel has 7 submersible electric bilge pumps. They are centrifugal impeller type. They are independently powered by a constant source of 24 volts from the House battery, each having its own circuit breaker. A float switch on each pump triggers it when water in the bilge accumulates to a certain level (about 2 inches). The pump then discharges the water overboard.

Bilge warning system. If any pump runs more than 30 seconds an alarm timer module triggers a 100 decibel warning at both steering consoles. Continual water in the bilges must be investigated. Where it is coming from? Has the vessel has been out in heavy seas?

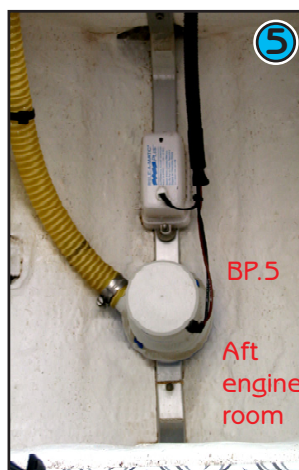
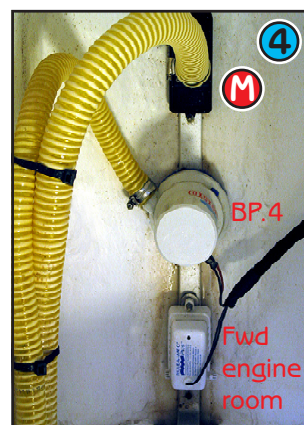
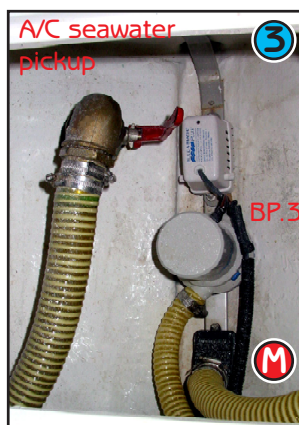
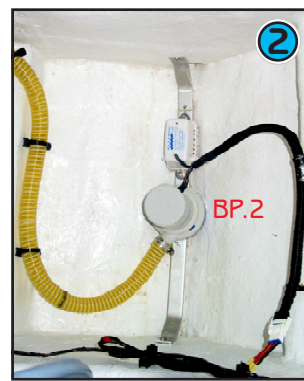
To test the bilge alarm system: turn knurled knob **K** to lift each float until the pump starts. Hold in raised position with pump running for more than 30 seconds – this should sound the alarm. Test each pump monthly.

Rocker switches on the Salon helm console permit forced running of individual bilge pumps. Forced operation is handy for clearing a bilge without waiting for a 2-inch accumulation. Forced operation conveniently confirms pump operation but it does nothing to test float switch or alarm integrity – these must be tested physically, as described.

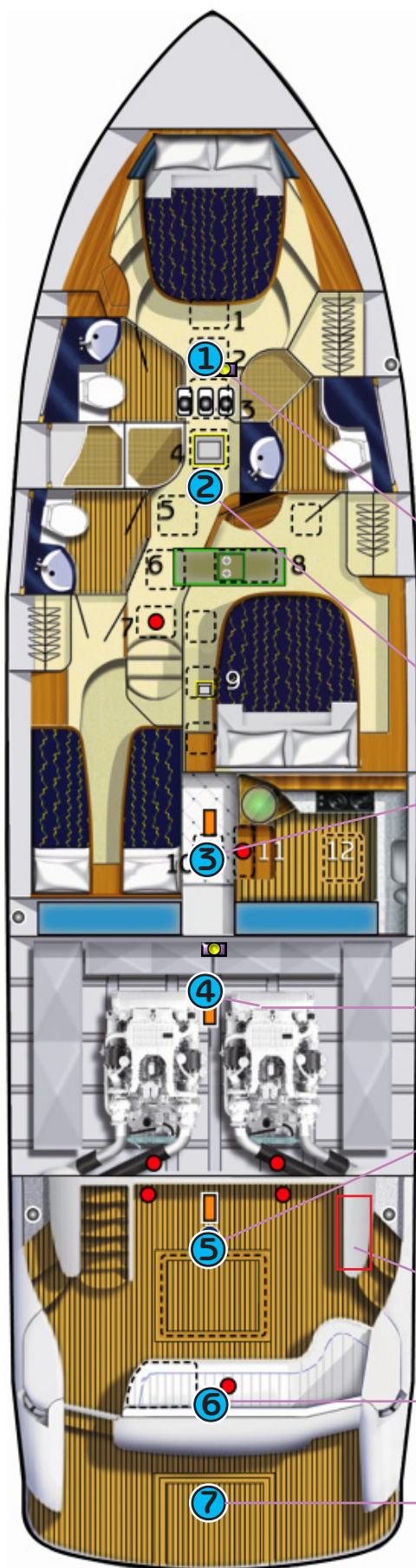
Manual backup bilge pump. Three bilge pump locations (3, 4, 6) also have a manual pickup **M** for bilge water. Hoses from the pickups run to the starboard deck service locker **C**. Use the red rotary valve to select a bilge space. Place the clip-on pump handle in the receptacle and stroke up and down. Water is sucked from the selected bilge into a strum box then discharged overboard through hull-side fittings.

Though its main purpose is emergency backup for the electric pumps, the manual pump is handy for housekeeping. Electric pumps never clear the last inch of water; the manual pump does much better. Use it to keep bilges clean and dry.

Clean bilges. If you see oil or coolant in any bilge, find out the reason and correct it. You can be charged for pumping oily bilge overboard. Bilges should be cleaned with Sudbury bilge cleaner, a safe product to use.



It is illegal to discharge oil or contaminants into the water.



BP.1 Bilge Pump 1 - under Hatch 2 in fwd cabin. The bow thruster is here also.

BP.2 Bilge Pump 2 - Access via Hatch 5 in corridor.

BP.3 Bilge Pump 3 - Galley, Hatch 11, in front of washer/dryer, next to AVC seawater pickup.

MP.3 Manual Pump pickup is just fwd of BP.3.

BP.4 Bilge Pump 4 - Fwd Engine Room. Manual Pump pickup just to aft.

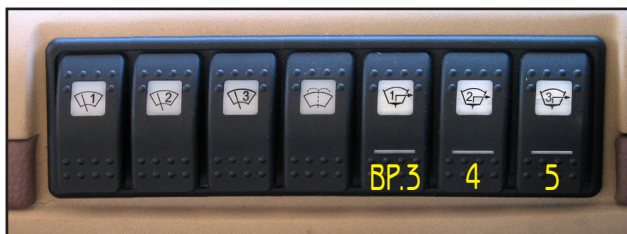
BP.5 Bilge Pump 5 - Aft Engine Room. Manual Pump pickup just fwd.

MP Manual Bilge Pump Locker (on wall of cockpit).

BP.6 Bilge Pump 6 - Lazarette, near ladder.

BP.7 Bilge Pump 7 - Lazarette, near rudder table.

Bilge Pump Locations



Bilge pump helm switches

The helm rocker switches force individual bilge pumps to run. These switches are normally off unless there is a specific need to clear a chosen bilge.

Dirty Bilges = Trouble!

Keep bilges clean, because dirty or oily bilges can seriously affect the reliability of the float switches and bilge pumps.

Sudbury brand Bilge Cleaner is excellent. It's from the same company who make the Rule pumps.

