

Vessel alarms: Your safety patrol

Almost daily in major fishing ports, the fracturing wail of a vessel alarm breaks through the din of normal activity. Somewhere among the vessels a small electronic warning device has identified a potential threat. At sea, nothing will rouse a sleepy crew faster than an alarm bell. The crew lurches from the bunks, all senses keyed to locate the threat to the vessel.

Too frequently, however, the main engine slows or stops, or the vessel slowly settles into a list—the result of alarm failures, or the lack of an alarm in some strategic location.

This bulletin discusses the necessity of alarms of various types on vessels, including strengths and weaknesses, and precautions you should observe when you install and maintain alarms. It points out, too, that in an era of escalating insurance costs, many insurance firms require alarm systems on vessels before they will insure them.

The reasons why

There are four reasons for having an alarm system:

1. *Peace of mind.* You can sleep a lot better knowing your vessel is being watched.
2. *Safety.* You can correct a problem before it becomes dangerous.
3. *Money.* It's cheaper for you to take care of a problem early, before major damage occurs.
4. *Insurance company requirements.* Now there's a new reason! Maybe it doesn't seem as pressing as the first three, but it's just as valid.



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Four main types

There are four types of alarm systems commonly in use today.

No alarm at all. This "system," sometimes called the "wetfoot," unfortunately has widespread use. Considering the investment most fishermen have in their vessels, this seems rather foolish.

The doorbell system. All switches are strung on one circuit and hooked to one bell. Advantages? Least expensive, easiest to install. Disadvantages? Troubleshooting is difficult; you will lose time trying to decide which alarm has gone off.

Passive system. All the switches are normally open and have to close the contacts to trigger an alarm. This type of alarm uses a small panel equipped with a light, a switch to silence the indicator (siren or bell), a name tag (identifying the alarm), and possibly a test button. Several manufacturers build

panels of this type. Each alarm feeds an individual circuit so that trouble can be readily identified.

Electronic or active system. This system uses normally closed contacts; the contacts have to open to indicate trouble. It is self-checking: a broken wire, loose connection, or other circuit problems will trip the alarm. It also provides maximum flexibility, minimum extra cost for more alarms, and ease in adding additional alarms. The main disadvantage is the cost—between \$3000 and \$4000, or more. The electronic system is usually installed only on larger boats (100-foot, or 30.5-meter, or longer).

Now that we've explored the reasons for alarms and their types, let's talk about specifics: what is common for a medium-sized (30- to 80-foot; 9- to 24-meter) combination boat?

Engine (main)

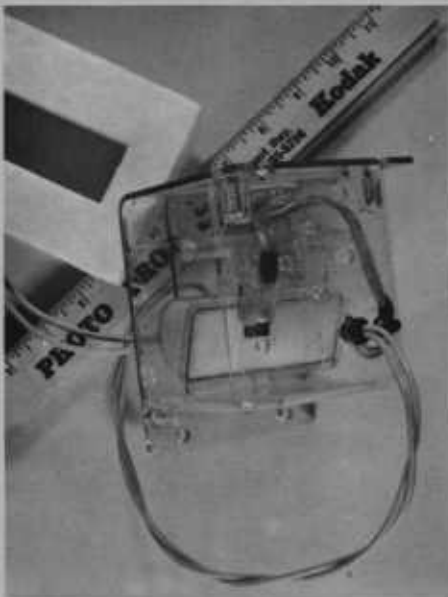
Low oil pressure. Use a low-pressure cutoff switch; set it for minimum pressure according to the engine manufacturer's instructions. The part number indicates operating pressure.

Overtemp, usually a brass half-inch (1.27-cm) pipe plug with two terminals screwed into a thermostat housing. A bimetallic contact closes at 212°F (100°C). *This switch will not work if you have lost the water out of the engine.* Losing water will overheat the engine but will not turn on the alarm. This alarm is intended to notify you that you have a bad water pump, a broken belt, or seawater not flowing in a heat exchanger engine. In other words, it tells you that water is still in the engine but is not circulating.

Water level indicator. This switch indicates low water in the engine; in most cases, this is more important than the overtemp alarm. Mounted near the bottom of the expansion tank, it also serves as a sight gauge. If the water



The overtemp alarm is usually a brass 1/2-inch pipe plug with two terminals screwed into a thermostat housing. The bimetallic contact closes at 212° F (100° C). When it sounds, it tells the operator that the water in the engine is not circulating.



Properly installed, strategically located, and carefully maintained bilge alarms are a must on any vessel. The alarm shown above contains a plastic float that rises with the water and trips a mercury switch, which triggers the alarm.



Heat-activated fire alarms are the cheapest alarm you can install on your vessel. Install them over the galley stove and in the engine room.

level falls, a float in the gauge falls and transfers a switch that turns on the alarm.

You can add other engine alarms according to your needs. Alarms for fuel pressure, oil temperature, oil contamination, and reduction-gear temperature are a few of the possibilities. All you have to do is decide what you need monitored; then pick the alarm that will do that job for you.

Engine (auxiliary)

These alarms are basically the same as those for the main engine, except all alarms are usually wired to an automatic shutdown. The one addition is an engine overspeed switch on the generator set to prevent engine runaway.

Bilge alarms

Direct submersible. There are several good alarms on the market. Look for these features: sealed wiring and contacts for waterproof circuits, protected float so debris cannot jam or clog (and so prevent the alarm from functioning), ease of testing, and durability.

Diaphragm switch style. This alarm uses a tube from a small cup up to a low pressure diaphragm switch that is activated by air pressure. Pressure is generated by rising water in the cup. Make sure the cup is resistant to plugging or clogging.

Float style. This is a small plastic float with a mercury switch. Make sure it is oil-resistant.

Locate a bilge alarm as close to the center line as possible to prevent false alarms caused by the boat's rolling and by water sloshing back and forth. Mount it high enough so that it does not turn on *all* the time, but low enough to give a warning in time for you to take

corrective action. You will usually find such a location at about the level of the bottom of the engine oil pan or the bottom of the tail shaft.

Install a bilge pump in each watertight compartment. *Definitely* install one in the lazarette. Drain lines can plug, and a lazarette half full of water can roll you over quicker than almost anything!

Fire alarm

This is the cheapest alarm to install (some for under \$5). Install one over the oil stove and another in your engine room. Be sure to get the 190°F (88°C) switch, not the 135°F (57°C) house variety. There are several other types, ranging all the way up to a full fire-control system, with price going up accordingly.



The long working hours and tedium of long cruises mandate the installation of a watch alarm on most vessels. If the crewman on watch dozes off, failing to reset the alarm at the required interval, the watch alarm activates a general alarm on the vessel.



Industrial electronic sirens are the best choice among alarm indicators. Their irritating sound and reliable functioning help to assure that the crew will be alerted to a problem, and that they will not sleep through the alarm or fail to hear it over normal operating noise.

Flow alarm

This is a low-pressure diaphragm or paddle switch that you install on the pressure side of a crab circulation pump. It indicates water has stopped flowing to the fish hold (crab tank). Water *must* be kept flowing to keep the hold full. An extremely dangerous situation exists when a fish hold is not completely full of water or is not completely empty. Flow alarms and check valves are usually required on vessels with flooded fish.

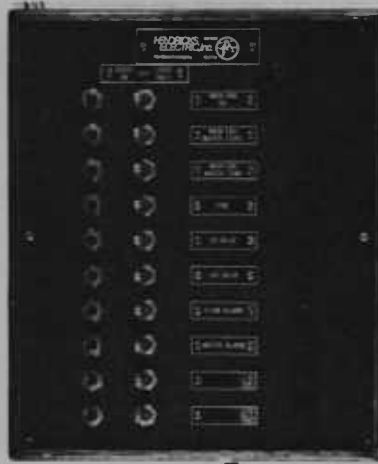
Watch alarms

A watch alarm is an automatic timer that cannot be shut off, except by the captain. The interval of warning is adjustable to meet the circumstances (usually between 5 minutes and several hours). Once started, the timer goes for the preset time, then a small signal sounds to let the watch know he has approximately 30 seconds to push a reset button. When he pushes the reset, the time sequence starts again. If he does not push the reset within the 30-second interval, the general alarm is triggered—and only an unhappy captain can reset it.

A new feature with watch alarms is an autopilot interlocking device. The autopilot is wired through a set of contacts in the watch alarm that prevent it from being engaged until the watch alarm is on. When the watch alarm is off, you must hand steer.

Indicators

Mechanical bells are not recommended; they are unreliable. First choice would be an industrial electronic siren for two reasons: high reliability and irritating or unusual sound. A *good alarm is one that you cannot ignore or sleep through*. It should be audible everywhere on the boat. You can add a flashing light in an extremely noisy engine room.



The more complex the alarm system on a vessel, the greater the need for a central panel, usually in the wheelhouse. A glance at the panel will tell which alarm is sounding, allowing the crew to respond to the specific problem—quickly.

Installation

Use an unusual or different wire to install your alarms so that you can instantly recognize it as *alarm* wire. Recommended types are 2S-J-16 (2 conductor, shielded) or DSGA-3 (2 conductor, armored waterproof) in

wet or hazardous areas. Mount all of these alarms where you can easily see and check them. They should all be of the ungrounded (2-terminal) type to prevent electrolysis.

Hook the alarm panel directly to the battery so the alarms are *always ON*, even at the dock with the engines shut off.

Cost

Alarm prices vary considerably. A basic "doorbell" system can be installed for as little as \$150, if the owner does the work. At the other extreme, the more elaborate (and reliable) system can run up to \$30,000 for a computer-controlled system. The recommended alarm system with a central panel would cost about \$1000, including the watch alarm, with some preliminary work done by the fisherman.

Each boat is different; prices vary from area to area. The main thing to remember is that you want an alarm system designed for *your* boat and *your* needs.

There are many other alarms available—refrigeration, hydraulics, radar watch, depth alarm, to name a few. Decide what you want monitored; an alarm can be designed to do the job for you. Talk to your local dealer or to your Extension marine agent.

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