

Specifications	
Heat Output: Full	31,000btu
Input Rating Based On Fuel Consumption: (Diesel) Full	.28 GPH
Rated Voltage:	12v or 24v
Electrical Power Consumption @ 12v: Full	7 amps
Start-up (first 30 secs.)	14 amps
Dimensions (L x W x H)	12½" x 5 1/4" x 8 21/32" 420mm x 152mm x 184mm
Weight	10.6 lbs.



**Thermo 90S**

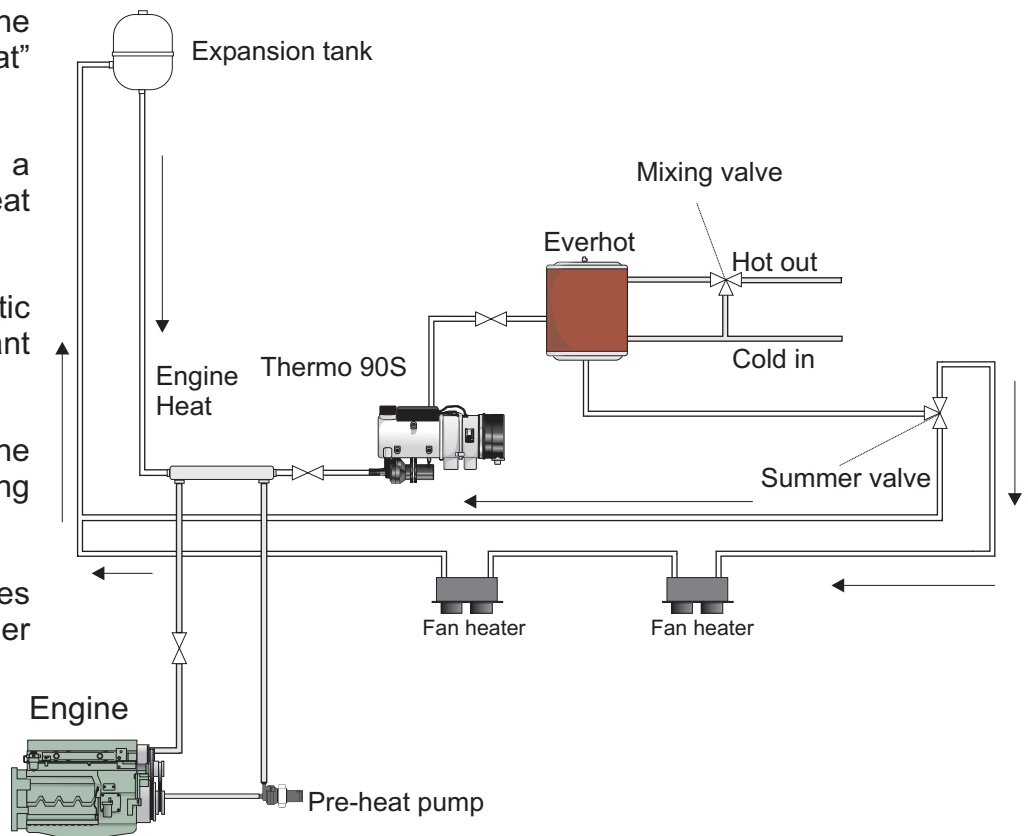
Domestic hot water is provided from both the heating system and the engine providing "free engine heat" for the heater loop.

Domestic hot water is provided by a tankless (on demand) hot water heat exchanger.

Bypass valves adjust the domestic hot water heat exchanger coolant flow.

A summer valve lets you use the heater for hot water purposes during the warmer summer months.

The engine preheat pump circulates coolant through the heat exchanger for cold engine pre-heat.





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## **Webasto Hot Water Heating System for Boat Applications from 34 to 42 ft. in length. Thermo 90S**

The Thermo 90S is designed for larger boats ranging from 34 to 42 foot (depending on make and model). This unit is a diesel-fired boiler that is available in 12 and 24 volt and is rated at 30,000 BTU. The Thermo 90S is not designed for a live aboard application. If you wish to heat your boat for this purpose, please contact Sure Marine Service for advice.

The Thermo 90S is a water heater designed to heat a coolant loop ran throughout the boat with a system of fan heaters that will blow hot air over coils flooded with coolant. In larger boat applications, water heat is almost a necessity due to the fact that air heaters will not have the airflow to heat the entirety of the boat at an even level. A coolant heater heats the coolant evenly, thus heating the entire boat at an even rate. Other benefits of water heaters are added applications such as domestic water heat and engine heat. The Thermo 90S can be plumbed through existing domestic hot water systems replacing the engine as a heat source. The engine can be then used to heat the entire heating system by way of a water-to-water heat exchanger.

The Thermo 90S can be plumbed in such a way that when it is operational, the unit will heat domestic hot water. This can be done by plumbing one of the heater loops through an existing hot water heater, or by installing an on-demand system. An on-demand domestic water heater that will provide hot water as long as the heater is up to temperature.

The engine can be used as well to heat the entire system as if the Thermo 90S were running. This can be accomplished by installing a water-to-water heat exchanger in the system, and a switch to run the system pump but not the heater. In this configuration, the engine heats its loop through the heat exchanger and the heat exchanger heats the system. The heating system will perform in the same parameters as if the heater were running. A separate switch can be installed with a separate pump to pre-heat the engine. The pump will move the water in the engine loop back through the engine block when the heater system is up to temperature. This will preheat the block before starting the engine and will provide an easy start every time without the need for chemicals.

The Thermo 90S system can be wired in such a way that it can be controlled by internal temperature of the boat. It has the ability to be zoned into an unlimited amount of zones based on your needs. In this application, multiple thermostats are installed in each "zone" of the boat controlling the operation of the heater. A zone can be staterooms, heads, saloons, etc. If any zone is calling for heat, the thermostat will have the heater and the nearby fan heater run until the cabin is up to temperature. Once all zones are up to temperature, the heater and fan heaters will be turned off. When heat is needed again in any zone, the fan heaters and eventually the heater itself will be turned on.

As with everything in the boating world, placement is very important. A clean, dry location should be chosen for the mounting of the Thermo 90S. Once a spot is chosen, it must then be checked against the parameters of the heater. The installation manual will provide specifics, but major limitations such as the exhaust should be considered. The exhaust should be vented as high and as far aft as possible with the aft transom being the ideal place for going through the hull. The Thermo 90S has a maximum run of 10' and may only have 270° or less in bends. The unit should also have adequate room for maintenance of the heater and related components that must be located near the unit. Also take into consideration the limitations of the fuel, electrical and coolant systems.



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Contact Sure Marine or consult the installation manual for further specifications on mounting.

As mentioned before, placement of the exhaust thru-hull is very important to heater installation. The Thermo 90S uses a 1 ½" exhaust pipe and thru-hull. The thru-hull must be installed in a place where it is free of seawater and where there is a limited possibility of contact with any limbs of passengers on your boat. The aft transom is the ideal position for the thru-hull, but it is not always possible to reach. In this case, a spot as high and as far aft as possible should be chosen.

Once limitations for the heater have been considered, locations to mount the other parts of the heating system should be chosen. Aside from hose and fan heaters, most other system components (such as the system pump, manifolds, domestic water heater and so on) can be mounted near the heater out of the way. One component is in most cases very tricky to mount: the expansion tank. The expansion tank in the water system must be above everything else in the system. If you wish to put a fly bridge heater on your fly bridge, the expansion tank must be above the heater. This is to provide head pressure for the water pump and to prevent air locks in the system. This is an inconvenient specification, but if your heater is to perform properly, it must be followed.

Once space for all of the system components has been chosen, fan units for your cabins must be sized and have space provided for them. Each cabin has different needs for heat depending on use, layout, amount of windows, and so on. To figure BTU for each cabin, take the cubic footage (length x width x height) and multiply it by 15. This will give you an approximate rating for that space, favoring the high side. If the space is well insulated and has no windows, perhaps a factor of 12 can be used.

Once BTU requirements have been figured, different models of fan heaters can be chosen by shape, capacity or use. See the attached information on fan heaters to choose the right fan heaters for your spaces. Each fan heater is normally rated to 7,000 BTU or 14,000 BTU depending on model. In some cases a space may not need 7,000 BTU, but to have heat it must have a fan heater. There are fan heaters that can be split between two spaces and divide the heat. Another method is to merely have the fan controlled by thermostat. Once the smaller space is up to temperature, the unit will shut off.

Once all models have been chosen for each space, subtract their rating from the 30,000 BTU of the Thermo 90S. More fan heaters than the rated BTU of the heater can be installed but for the unit to operate properly only 30,000 BTU of fan heaters should be in operation.

With this basic information, the choice of heater for your boat should be a bit easier (or perhaps harder if you cannot meet specifications). If you have any further questions on installation, please contact Sure Marine to purchase an installation manual or ask any other questions you may have.