Under Floor Water Leak Detection
Port Side Heating
Water and CH Drainage
12V Car Socket
Operation & Troubleshooting

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Under floor water leak detection circuit

Under the floor in the rear loo there is a sensor to detect water. If water is detected a siren will sound and a small red light will flash. Presence of water under the floor in the rear loo is not normal and indicates either that the pump or pipe work for the Port Side Heating (located under the floor) has failed or some other part of the boat's plumbing has failed or more worryingly that ***OLYMPIC HAS A LEAK!***

To turn off the siren and flashing light simply turn the Port Side Heating off, move the switch on the bottom left hand side of the black control box (with the flashing red light) to the up position.

Turn off the water pump in the kitchen if a leak is detected and open the cold water tap. The most likely reason for water under the floor is some kind of plumbing failure and the flow can be inhibited by turning the water off and opening a tap in the kitchen to take the pressure off.

If a plumbing problem cannot be identified quickly then it might be best to assume some kind of under floor leak. The lino by the back door is the easiest to lift and this gives immediate access to a panel which, when lifted, allows you to see what is going on under the floor.

There is no reset of the leak detection circuit once the leak has been resolved. When the sensor dries out it will reset automatically and you can turn on the power again. To manually dry the sensor you will need to lift the floor in the rear loo – a simple but time consuming task. Use of the electric screwdriver will speed up the process, note some screws are longer than others and the holes are marked S & L appropriately (I seem to recall that the short screws are for the edge nearest the front and the longest for the edge nearest the back).

Port Side Heating

Background

In the 2009 start of season refit a new white plastic pipe (15mm) was run from the back loo to the kitchen and a pump and control box installed in the back loo. When the system is operating the water in the hot tank is pushed through the white pipe to the kitchen and returns using a copper pipe at floor level.

The idea is that this circulating hot water will heat up the port side of the boat which has a tendency to get damp in the autumn and winter. The probable side effects of this system are:

- the boiler will run more often to keep the water in the hot tank hot;
- hot water to the kitchen and shower will be more responsive since it will be hot in the pipe, not just hot in the tank at the back of the boat.

There may of course be other unintended consequences, see the troubleshooting section if you feel the need to disable the system.

Note that this system is entirely independent of the water in the Central Heating system of large pipes and radiators on the starboard side.

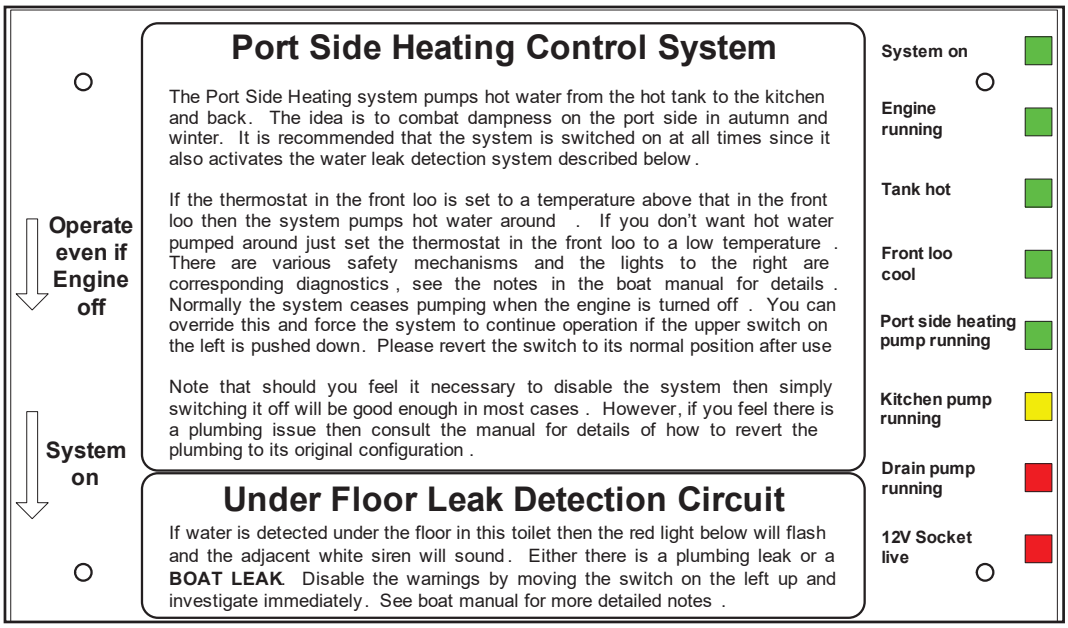
A late addition to this system was the under floor leak detection circuit described in the previous section. Functionally this is independent of the Port Side Heating System but operationally is housed in the same black control box and uses the same fuses and power line. So if the Port Side Heating is off, so is the under floor leak detection circuit.

Normal Running

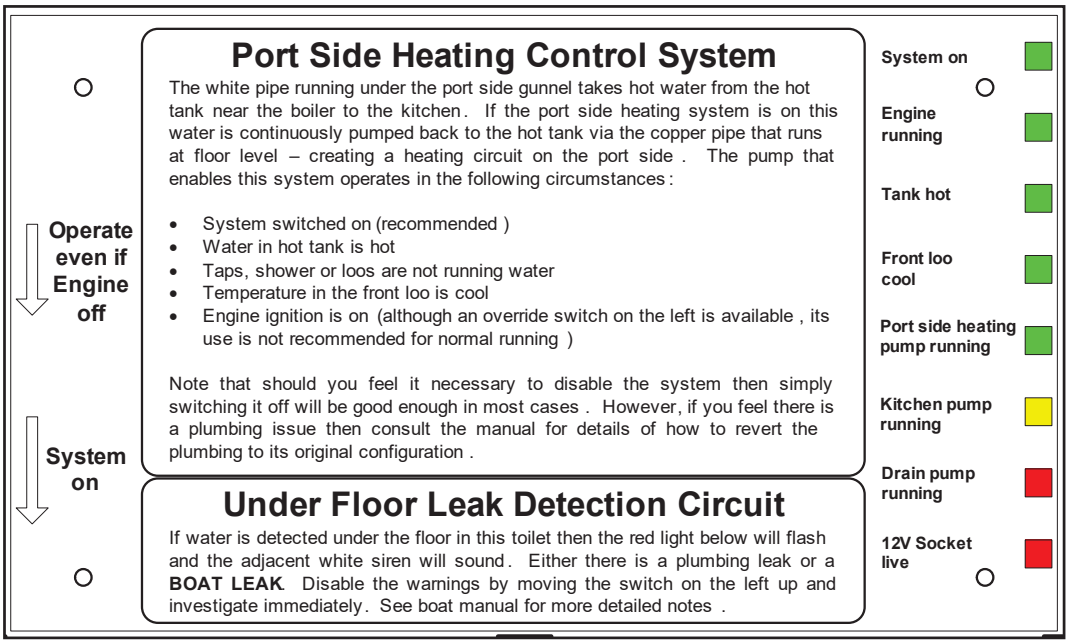
Switch the system on using the black control box in the rear loo. The box is mounted on the wall above the toilet. Below are the instructions for normal operation. Note that the only other control you might wish to operate yourself is the thermostat in the front loo. If the temperature in the front loo is above the thermostat setting then no hot water is pumped around the pipes. However, if the temperature in the front loo is lower than the thermostat setting, i.e. cool, then hot water is pumped around the pipes.

In normal running the system only operates with the engine on. This is to conserve electrical power when the engine is off. You can override this as noted in the diagram below but remember to reset the switch. Power consumption of the pump is equivalent to about a third of one of the kitchen lights.

Standard running instructions



Advanced running instructions



Troubleshooting

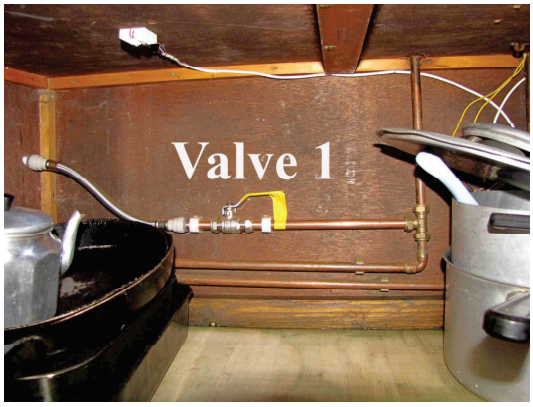
1. To switch the system off simply move the system switch into the up position. Note that the Water Leak Detection Circuit is also switched off.

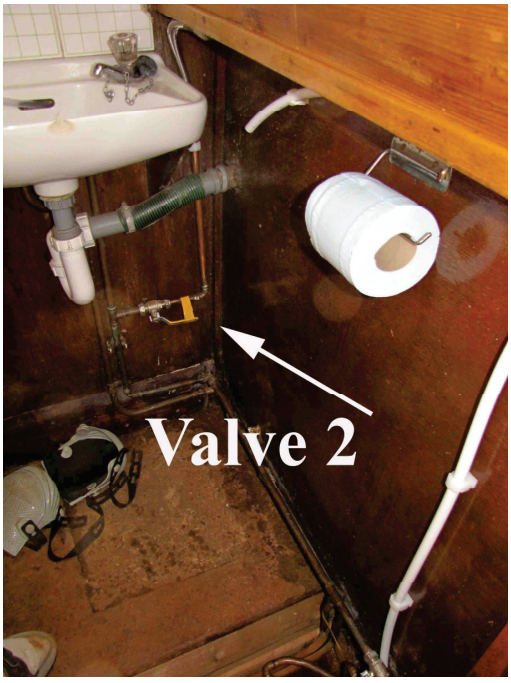
2. To completely disconnect the system from the boat electrics remove the fuse in the fuse box (last fuse on the right). Note that the Water Leak Detection Circuit is also disconnected.

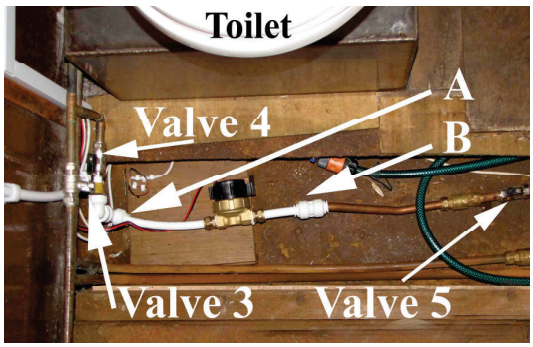
3. To revert the plumbing to its original configuration, first disconnect the system from the boat electrics as noted above. Next switch three yellow lever valves to their other position and at least one black ball valve lever. The plumbing diagram at the back shows what you are doing. The pictures show the valves in situ.

    - Valve 1 under the sink in the kitchen on the horizontal pipe connected to the white pipe (not the twist valve but the yellow handled lever valve). Move this valve to the closed position, i.e. across the pipe.
    - Valve 2 under the basin in the rear loo on the horizontal pipe connected to the white pipe. Move this valve to the closed position, i.e. across the pipe.
    - Valve 3 (yellow handle) to the left of the toilet in the rear loo, near the floor (not the red handled lever valve connected to the flexible pipe that connects to the toilet). Move this valve to the open position, i.e. in-line with the pipe.
    - Valve 4 is just above the floor and under valve 3. It has a black plastic lever. Move this valve to the closed position, i.e. across the pipe.
    - Valve 5 is under the floor and isolates the pump. It can be left as it is and the plumbing will be more or less as it was. A non-return valve in effect makes the valve redundant when valve 4 is closed. So you don't necessarily have to lift the floor to get at this valve. If you decide to operate this valve then move it to the closed position, i.e. across the pipe.

4. If all this fails then you are on your own. Feel free to give me a call, 0788 060 1409.





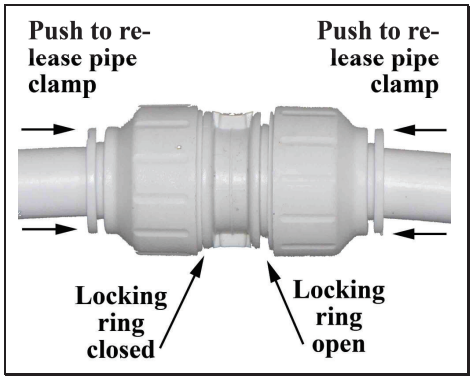


Winterizing

The water pump in the kitchen is winterized by removing it from the pipe work and typically from the boat. The same could be done relatively easily for the Port Side Heating pump as follows:

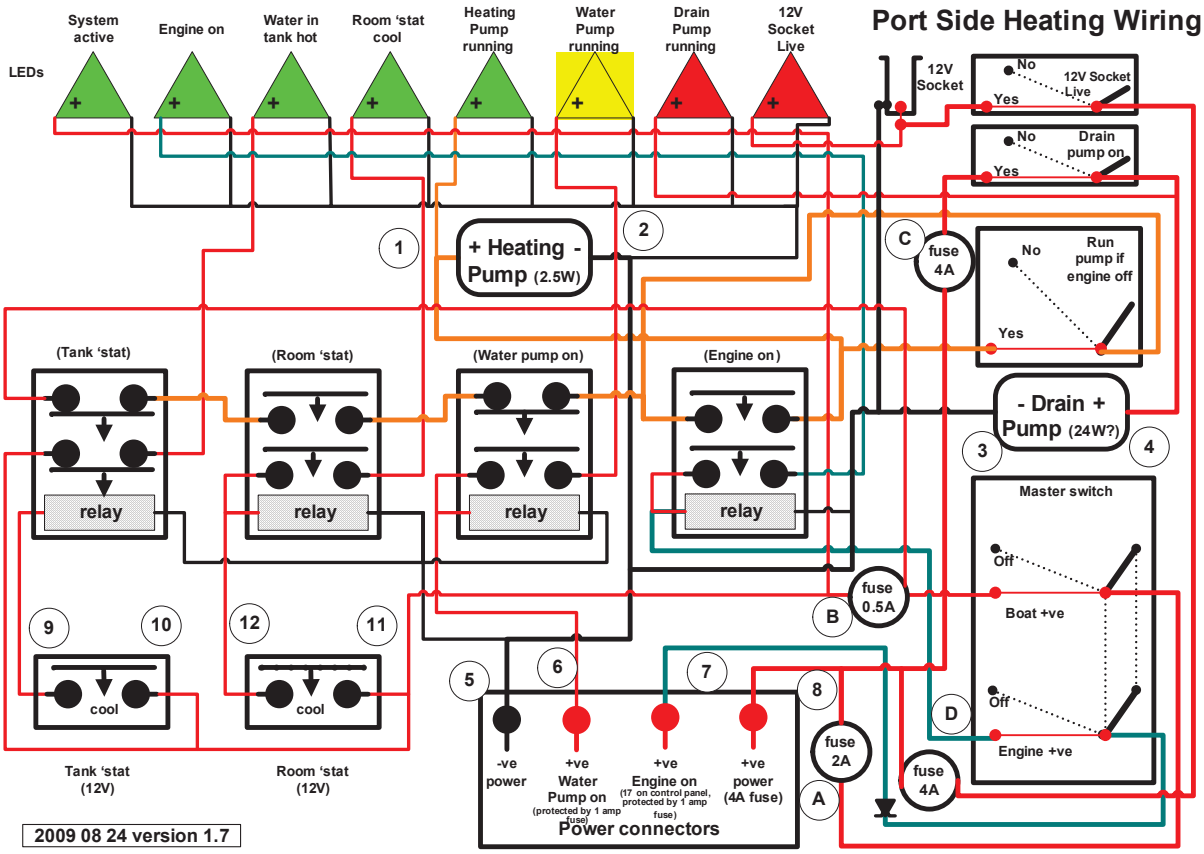
- Lift the floor in the rear loo.
- Turn valves 4 and 5 to the off position, i.e. across the pipe, to isolate the pump.
- Disconnect the plastic pipe work at positions A and B, see picture above. Disconnection instructions follow, see picture below for context.

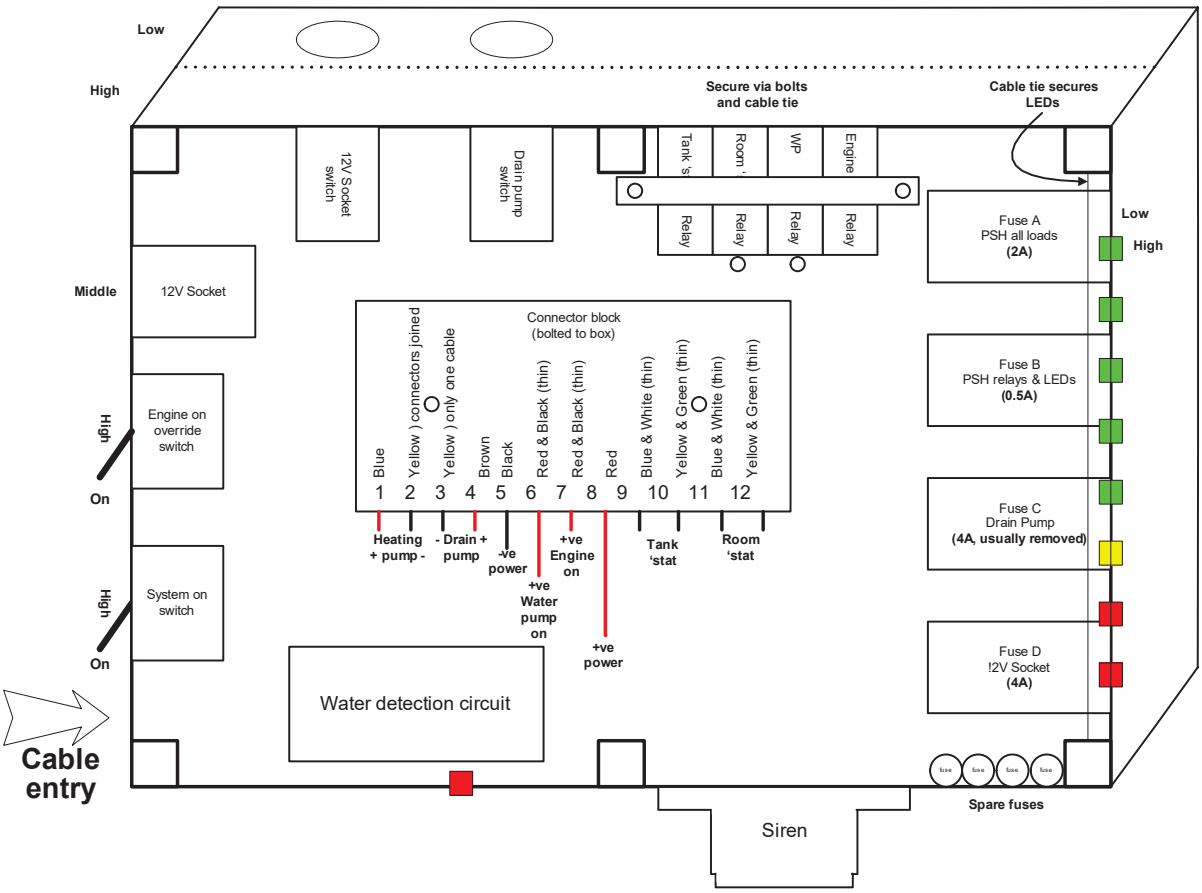
  First open the locking ring by a half turn anti clockwise, then push the indicated ring to release the pipe clamp and pull out the pipe. Note that in my experience the internal pipe spacer tends to remain in the fitting and is not on the pipe – this is not a problem but you need to take care on re-assembly.
- Unclip the two covers from the top of the plastic conduit by the side of the rear toilet. Within the conduit the cable to the pump can be unplugged and the water sensor cable may also be unpluggable by the time you read this (if not then cut the cable at a suitable point in the conduit and I will fit plugs on re-installation).
- It should now be possible to lift the board containing the pump and sensor from the floor.



The drainage pump could also be removed at this time, or left with no water inside it. It can also be electrically unplugged like the Port Side Heating pump (described above) and its plumbing connections are simple garden hose click fittings which can just be unclicked.

Pictures


Port Side Heating Wiring
LEDs
System active
Engine on
Water in tank hot
Room 'stat cool
Heating Pump running
Water Pump running
Drain Pump running
12V Socket Live
12V Socket
No
Yes
12V Socket Live
Drain pump on
+ Heating - Pump (2.5W)
fuse 4A
Run pump if engine off
(Tank 'stat)
(Room 'stat)
(Water pump on)
(Engine on)
relay
- Drain + Pump (24W?)
Master switch
Off
Boat +ve
Engine +ve
fuse 0.5A
fuse 2A
fuse 4A
cool
Tank 'stat (12V)
Room 'stat (12V)
-ve power
+ve Water Pump on
(protected by 1 amp fuse)
+ve Engine on
(17 on control panel, protected by 1 amp fuse)
+ve power (4A fuse)
Power connectors
2009 08 24 version 1.7


Low
High
Secure via bolts and cable tie
Cable tie secures LEDs
12V Socket switch
Drain pump switch
Tank 's
Room '
WP
Engine
Relay
Fuse A PSH all loads (2A)
Middle
12V Socket
Connector block (bolted to box)
Blue
Yellow) connectors joined
Yellow) only one cable
Brown
Black
Red & Black (thin)
Red & Black (thin)
Red
Blue & White (thin)
Yellow & Green (thin)
Blue & White (thin)
Yellow & Green (thin)
Heating + pump -
- Drain + pump
-ve power
+ve Engine on
+ve Water pump on
+ve power
Tank 'stat
Room 'stat
Fuse B PSH relays & LEDs (0.5A)
Engine on override switch
System on switch
Fuse C Drain Pump (4A, usually removed)
Fuse D !2V Socket (4A)
Water detection circuit
Cable entry
Spare fuses
Siren

Wiring Colours into Control Box

Black – Negative power from fuse box

Red – Positive power form fuse box

Fat white cable from heating pump under rear loo floor
- Blue – Heating pump positive
- Brown – Drain pump positive
- Yellow – Heating and drain pump negatives

Thin white cable from port side, 'stat in front loo and kitchen water pump on

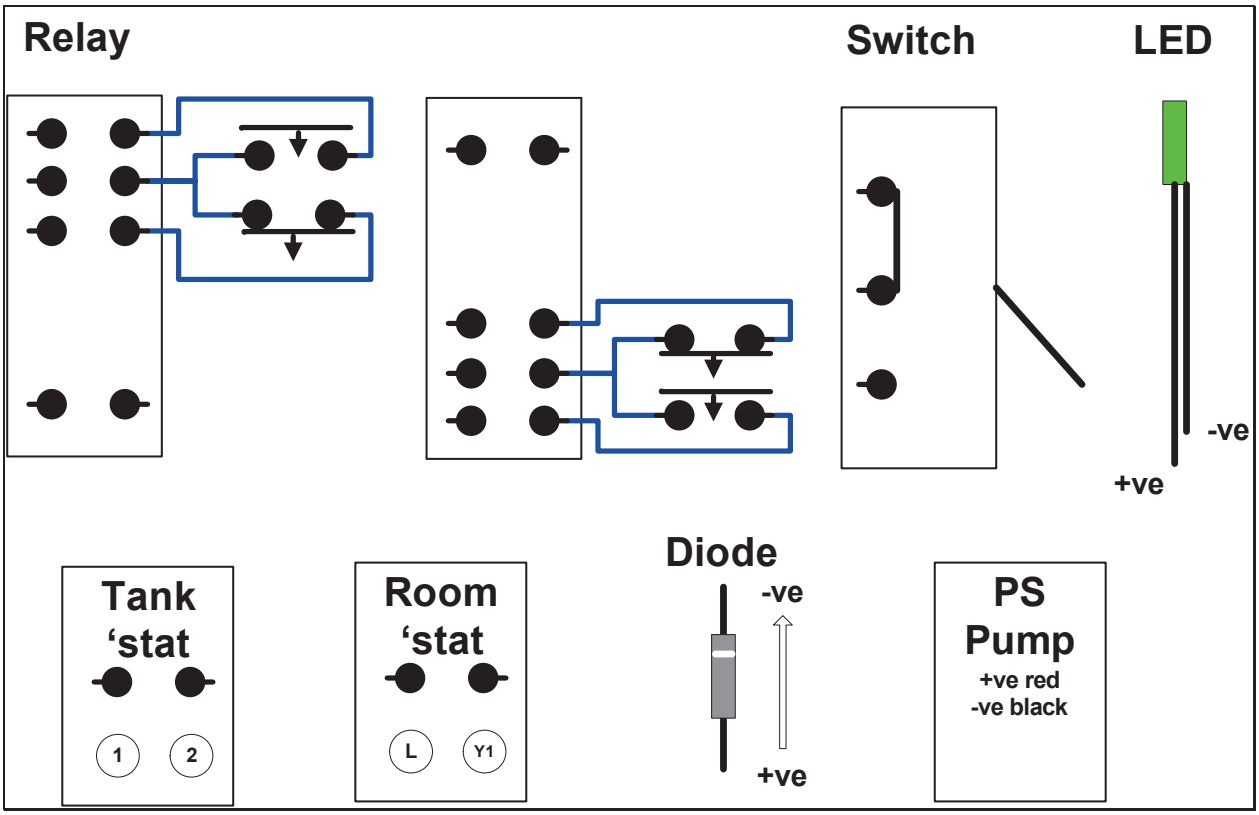
Blue & white	one 'stat connection
Yellow & green	other 'stat connection
Red & black	water pump +ve

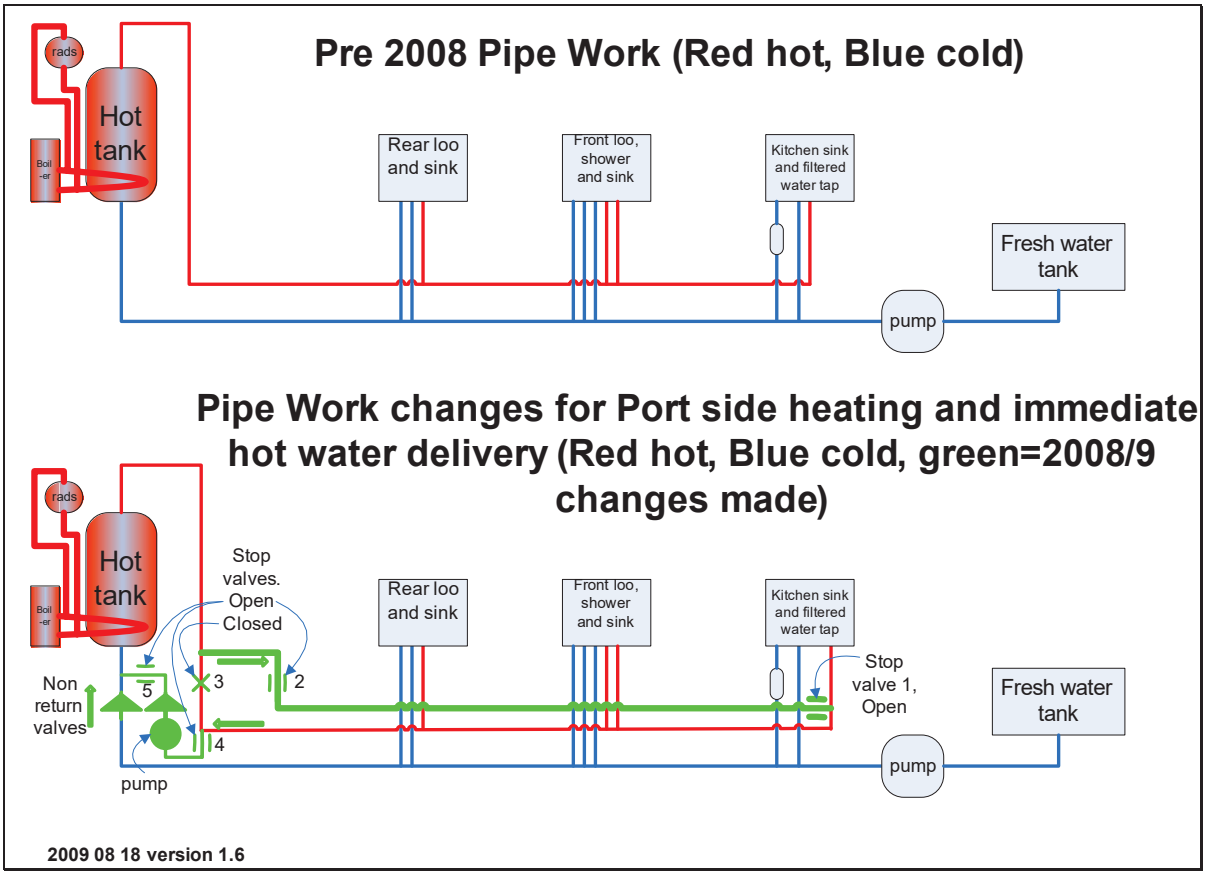
Thin white cable from starboard side, hot tank 'stat and engine on

Blue & white	one 'stat connection
Yellow & green	other 'stat connection
Red & black	engine on +ve

Thin white cable from water sensor under rear loo floor

Blue, black, brown and orange	one side of sensor
Yellow, white, red & green	other side of sensor





Water and CH drainage systems

At the same time that the Port Side Heating system was installed a pump to drain the hot and cold water systems and, optionally the CH system, was installed as a permanent feature.

To use these drainage systems it is necessary to lift the floor in the rear loo and by the back door. In the pictures you will see a small red pump and notice that it is connected to a green hosepipe that runs to the white drain pipe. The join to the drain pipe has a valve which is usually left closed (as in the picture).

To drain the water system:

- Turn off the kitchen water pump.
- Turn off water into the boat (red valve on water pump assembly under sink)
- Open all taps (including the one on the top of the hot water tank that feeds the CH header tank)
- Unclip the top of the drain pipe from the wall and move across until it is over the sink.
- Open the black PSH control box and remove the small plastic bag of fuses. Take a 4 Amp fuse and put in the third fuse holder down (push in and turn anti clockwise to remove fuse holder).
- Open the hot and cold water valves under the floor by the steps.
- Open the valve to the drain pipe.
- Turn on the drain pump, the second switch from the left on the top of the PSH Control Box

- DO NOT let the pump run dry. It tends to suck water out quicker than the pipes can drain so switch it off every few seconds to allow water to fill the pipes.
- When the system is empty you can turn off the valve connected to the drain pipe and disconnect over the spill catcher, you can also release the water in the drain pipe into the spill catcher. The idea is not to leave any water in the system which might freeze and burst the pump or drain pipe.

After draining the water system remember to:

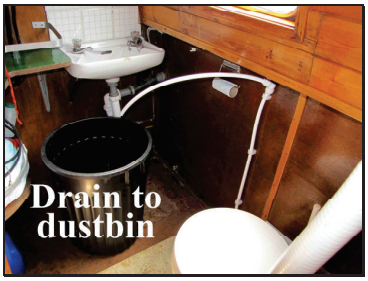
- Take out the fuse (stops someone turning the pump on in error and burning it out).
- Turn off the tap at the top of the hot water tank and all other taps!

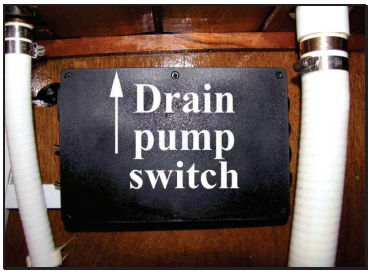
To drain the CH system:

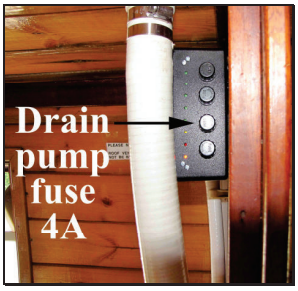
- Unclip the drain pump connector (use the spill catcher in case there are any spills) from its connection to the water system and transfer to the CH drain nipple.
- Open the black PSH control box and remove the small plastic bag of fuses. Take a 4 Amp fuse and put in the third fuse holder down (push in and turn anti clockwise to remove fuse holder).
- Open the CH drain nipple valve.
- Open all radiator valves and the air release valve at the front of boat.
- Unclip the top of the drain pipe from the wall and move across until it is over the dustbin. The idea is to keep the drained antifreeze for refilling the system.
- Turn on the drain pump, the second switch from the left on the top of the PSH Control Box
- DO NOT let the pump run dry. It tends to suck water out quicker than the pipes can drain so switch it off every few seconds to allow water to fill the pipes.
- When the system is empty you can turn off the valve connected to the drain pipe and disconnect over the spill catcher, you can also release the water in the drain pipe into the spill catcher. The idea is not to leave any water in the system which might freeze and burst the pump or drain pipe.

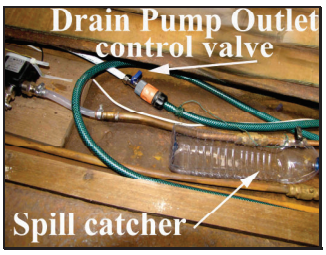
After draining the CH system remember to:

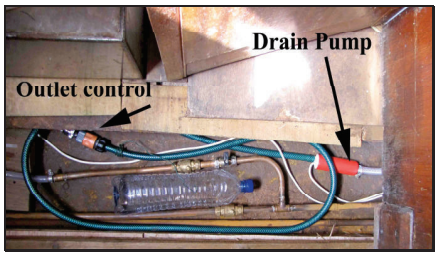
- Take out the drain fuse (stops someone turning the pump on in error and burning it out)
- Put the drain pump back to its original configuration.
- Close the CH drain nipple valve.
- Refill the CH system. This can be done from the drain nipple at the back or the corresponding drain nipple at the front of the boat. Use the small pump in one of the clear plastic boxes in the boiler cupboard. It can suck water from the dustbin and push it back into the CH system. Note that air locks are easy to induce so be sure that all radiator valves are open before you start.

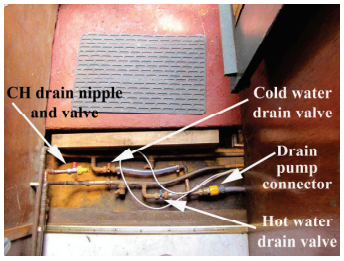










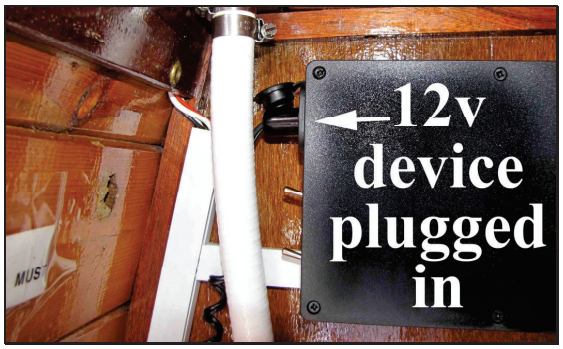


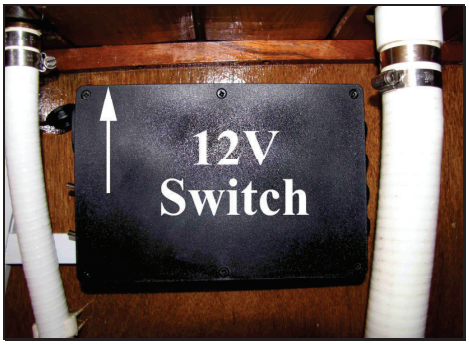
<--- under the floor in the rear loo --->

under the floor by the back door

12VSocket

At the same time that the Port Side Heating system was installed a pump a 12V socket was added to the PSH Control Box on the left hand side. It has a 4A fuse and is switched on using a switch on the top left of the control box. Note that the socket is normally covered and the cover needs to be lifted up to use the socket, as shown in the picture below





Water Alarm circuit diagram

Water Alarm

Assembly

Once all the components have been soldered and the battery box is in place, insert the two suction pads into the large holes in the circuit board.

Operation

Insert a 9V PP3 battery. An audible signal is produced when the bottom of the circuit comes into contact with water. The suction pads enable the circuit to be easily attached to the side of a tank or bath.

Part	Value	Device
PCB		JB07-27-1-0
Q1		BC548
Q2		BC548
R1	100R	Resistor, 0.25W, Carbon film
R2	1k	Resistor, 0.25W, Carbon film
SG1		Buzzer
	BH9VP	PP3 battery box (with pins)
		Suction pad
		Suction pad
		6.5mm self-taping screw
		6.5mm self-taping screw
		6.5mm self-taping screw

Instruction hints

SG1 - Note polarity (look for + symbol)

Battery box - Mount on the top side of PCB. Secure with screws.

Component markings

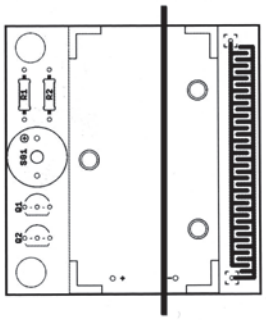
R1 brown, black, brown

R2 brown, black, red

Modifications

1. Sensor zigzag sawn off and made remote.
2.Relay put across siren.
3. More powerful siren and flashing LED activated by relay.

-ve from 5 on PSH circuit
+ve from B on PSH circuit



saw line

Supplied by: Middlesex University Teaching Resources, Unit 10, The IO Centre, Lea Road, Waltham Cross, Herts, EN9 1AS. Web: www.mutr.co.uk

MAP 417 PRI 417

PSH Control Box wiring picture