



Volvo Penta Quality Line Marine Water Heaters

Owners Manual



Mounting Instructions

Congratulations on your choice of a new QL Water Heater. A choice that will help you bring out the best in boating pleasure. To give you the best benefit of the product and to facilitate your installation, we kindly ask you to follow the recommendations and instructions below.

The QL Water Heaters are built with materials that withstand the rigors of the marine environment. Being an electrical appliance, the Water Heater should be installed in a ventilated location where it will not be subjected to humidity and external water spray. All QL Water Heaters are insulated with high efficiency, auto extinguishable cellular polyurethane.

The distance between the engine and the Water Heater should be as short as possible. Locate the Water Heater in an accessible position so that the water connections, pressure relief/non return valve and electrical heating element (30 cm long) remain accessible. Install the Water Heater in a ventilated location in order to prevent sweating which might be mistaken for water loss.

The Water Heater should be firmly secured with mounting brackets to a solid structure using bolts, nuts and lock washers. Bear in mind that the total weight of the Water Heater is its weight plus all the water it contains.

The Water Heater can be mounted either horizontally or vertically to bulkhead, deckhead or floor. The hot water outlet is placed in the far, top end of the bowl to ensure that the warmest possible water is used at every time even when vertically mounted.

Before mounting check the information on the sticker inside the plastic cap. This information is essential for the correct installation and maintenance of the Water Heater.

⚠ IMPORTANT! This product is covered by a limited warranty. It is restricted to the product itself and no liability will be assumed for damage occurred due to negligence of the contents in this manual.

If operations are performed incorrectly, this could result in personal injury, or damage to property or the Water Heater. Read the Mounting Instruction carefully before operating or servicing the Water Heater. If anything is unclear, please contact your Volvo Penta dealer for assistance.

⚠ This symbol is used in the book and on the Water Heater to make you aware of safety information. Always read these safety precautions very carefully.

In the Instruction Manual warning texts have the following priority:

⚠ WARNING! If these instructions are not followed, there is a danger of personal injury, extensive damage to the product or serious mechanical malfunction.

⚠ IMPORTANT! Used to draw your attention to something that can cause damage, product malfunction or damage to property.

NOTE! Used to draw your attention to important information that will facilitate work or operations.



This symbol is used in certain cases on our products and refers to important information in the Mounting Instruction. Ensure that warning and information symbols on the product are always visible and legible. Replace symbols that have been damaged or painted over.

The drawing of your Water Heater, found on page 6, will help you understand these instructions. To ensure that your Water Heater functions correctly, install it as follows:

Fit mounting brackets:

- 1. To bulkhead:** the Water Heater must be firmly secured to a bulkhead.
- 2. To deck:** the Water Heater must be firmly secured to the deck. Auxiliary bracing is advisable.

Ensure that Water Heater is mounted as follows:

1. Secure the mounting bracket's three anchorage points with through bolts.
2. Install the Water Heater in the required position (see drawing) taking particular care that the end marked 'TOP' is mounted accordingly.
3. Secure the brackets with the through bolts, bend the stainless steel straps around the Water Heater and use the screws and nuts (supplied with brackets) as screw-stays to clamp down the Water Heater.

Fresh water plumbing connection

For a better understanding of these instructions, please refer to the “plumbing connection diagram” found at the back of the booklet.

1. Connect water system to the pressure relief/non return valve and then to the cold water inlet marked with a blue rubber washer (see plumbing connection diagram, points 2 and 6).

NOTE! When Water Heater is mounted vertically with its tubes upwards, the entry pipes should be exchanged with the exit pipes and vice versa.

2. Ensure that pressure relief valve is mounted correctly (that the arrow points towards the blue rubber washer). A gate valve, that cuts off the Water Heater from the rest of the water circuit during maintenance operations (see plumbing connection diagram, point 8), is recommended. Install the valve between the accumulator tank and the pressure relief valve.
3. The hot water outlet marked with a red rubber washer (see plumbing connection diagram, point 1) should be connected to the hot water taps with tubes or hoses that can withstand the circuit's temperature and pressure (max. 120° –7 kg cm²).
4. An escape valve, useful for maintenance or drainage operations (see plumbing connection diagram, point 7) is recommended and should be mounted between the tube and pipe fitting connection.

⚠ WARNING! When the Water Heater has been mounted, open hot water taps and allow the water to run a few minutes (before electrical connection!) in order to expel all air from the Water Heater and lines thus ensuring that the heating element is totally submerged, otherwise it will burn out within a few minutes when power is turned on.

5. Ensure that all pipe fitting connections are watertight. Mount a small tube to the safety/non return valve and ensure that overflow runs into the bilge or other suitable space where hot water and steam will not cause any immediate risk to people on board or damage any other parts, particularly electrical ones.

NOTE! Ensure that the cold water inlet and hot water outlet pipework has been connected correctly (see plumbing connection diagram, points 1–2) and not the heat exchanger pipes marked with the engine symbol (see plumbing connection diagram, points 3–4).

Electrical connection

⚠ WARNING! Before removing the black plastic cap, be sure to turn off the electrical supply.

⚠ WARNING! Follow the norms and standards of the local authorities when carrying out electrical connections. Ensure that your AC voltage corresponds to that indicated on the electrical heating element.

Ensure that a high-sensitivity differential cut out switch and an insulating transformer is mounted into the electrical system.

Insert a bipolar switch (10AMP/220V or 15 AMP/110V) in an accessible location from where the electric supply of the Water Heater's electric heating element can be controlled.

Protect electric line with a 10 AMP/220V or 15AMP/110V fuse. Use only pliant and not rigid cable, since vibrations might damage the latter. The cable area should not be less than 2.5 mm². The electric cables and connections should be protected from sea spray and dripping. The cable must not run in the bilge. Support it securely at frequent intervals. Protect it from the possibility of accidental contact with mobile parts.

Strip the insulation from the three wires to bare about 1 cm of the stranded wire. The two wires conducting electricity (generally blue/brown) should be fastened to the thermometer's contact points marked by numbers 1 and 2. Connect the earth wire (yellow or green) to the screw nut contact on the Water Heater tank marked with the earth symbol.

Adjust the thermostat setting by turning the dial clockwise with a screwdriver blade until the arrow points to the desired temperature setting (production setting is to 60° C).

Our thermostats are equipped with a high temperature cut out safety switch, which is an electro-mechanical device that opens the current circuit and disconnects the electric heating element if the thermostat fails. When activated, the pin located near the temperature regulator dial is released. To check that the pin has not been released and is set correctly, check that the pin is lying a few millimeters below the structures edge.

After double-checking that the Water Heater is filled with water, the power can be turned on (see the plumbing connection above). Within a few minutes it should be evident that the Water Heater is beginning to heat the water.

Connection to boat's engine cooling system

Since all modern engines are cooled by a heat exchanger with a coolant, it is convenient to use the heated engine cooling water to feed the Water Heater's coil (heat exchanger).

⚠ IMPORTANT! Follow the engine manufacturer's instructions for the connection of the heat exchanger. The following instructions should only be used as a guideline.

For a better understanding of these instructions, please refer to the "plumbing connection diagram" at the back of this booklet. The Water Heater coil should be connected by a by-pass into the engine cooling circuit using flexible hose that can withstand the temperature of the engine's coolant.

1. A restrictor valve could be inserted into the circuit (see plumbing connection diagram, point 9) and set so that the total quantity of coolant in the engine always remains the same.
2. With engines cooled with sea water, water should be drawn at its hottest point after it has passed through the engine. After it has passed through the engine connect the coolant (or sea water) to the Water Heater coil's entry pipe fitting marked with a red rubber washer (see plumbing connection diagram, point 4). We would recommend fitting an escape valve, between the pipe and pipe fitting, for the Water Heater's heat exchanger system (see plumbing

connection diagram, point 5) which might be useful during maintenance and emptying operations.

3. Connect the Water Heater coil's exit pipe fitting, marked with a blue rubber washer (see plumbing connection diagram, point 3), to the coolant on its return to the engine or, if the engine is seawater cooled, before it is discharged overboard. Ensure that the entry and exit pipe fittings connected are those of the heat exchanger marked with the engine symbol illustrated below, and not those of the fresh water.

⚠ WARNING! The Water Heater must be placed with its highest point below the expansion tank to avoid air blocking of the circulation of the cooling water.

To ensure a good production of hot water, the temperature of the coolant circulating inside the Water Heater coil should be above 50°C. The volume of coolant contained inside Water Heater coil is approximately the following:

QL 20 l Water Heater	0.5 liters
QL 40/60 l Water Heater	0.8 liters

⚠ IMPORTANT! Make sure to add cooling water to make up for the added volume in the cooling system.

Problems and solutions

⚠ WARNING! Before removing black plastic cap, be sure to turn off the electrical supply.

When the engine does not heat the water:

- Check that there are no air locks inside the entry pipe to the water heater's coil. If any, unloosen escape valve (if mounted see plumbing connection diagram, point 5) or heat exchanger's pipe fitting (marked with red rubber washer see plumbing connection diagram, point 4) to release any air.
- Check that temperature of the coolant inside the water heater coil is over 50°C and that it circulates properly.
- Check that hot water taps are watertight.

When electric heating element does not heat water:

- Check the electric supply (that you are receiving power) and that the AC supply voltage corresponds to that indicated on the electric heating element.
- Check that the thermostat is working correctly (that it switches on/off).
- Check whether the thermostat's high temperature cut out safety device has been inserted (see electrical connection instructions above). If the pin of the cut out safety device has been released, restore contact by pushing the pin back to its original position, which is a few millimeters below the surface, with a pointed instrument. If the water heater overheats excessively and the cut out safety device is activated again within only a few hours of operation (temperature cut out = 120°C), check the thermostat and electric heating element and if faulty, substitute.
- With a tester check that the electric heating element is not damaged. Remove electric heating element, check whether there are any calcium deposits, and if any, remove.
- Check that hot water taps are watertight.

If hot water comes out of the cold water taps:

- Ensure that non-return valve is not obstructed and that it does not permit hot water to return to the accumulator tank.
- Control that water heater has been connected correctly.

- Should water boil despite the high temperature cut out safety device immediately cut out the power supply, carefully open hot water taps to let out any excess pressure and change the thermostat.

If there is any water loss:

- Ensure that the water heater is situated in a well ventilated location, otherwise any condensation that might occur could be mistaken for water loss.
- Control that the pipe fittings are water tight.
- Check that no water from the outside drips on to the water heater. Should water loss still persist, the water heater should be changed.

If coolant comes out of the fresh water taps and vice versa:

- Ensure that water heater coil does not leak. If perforated, the water heater must be replaced.

If the pressure relief valve releases water:

- Ensure that pressure relief/non-return valve tube or pipe fittings do not leak.
- If water loss is minimal (about a glassful every thermal cycle) and only occurs during the operation of the water heater, there should not be any problem. The pressure relief valve normally leaks when it compensates for any pressure increase inside the water heater. The installation of a suitable expansion tank will completely eliminate this inconvenience.
- If the water loss is larger and continual, check whether there is any foreign matter lodged in the valve seat of the pressure relief valve. If dripping continues, replace the valve.

If the current limit-switch or cut out differential switch has released during the electrical operation of the water heater:

- Check the electric line and thermostat connections.
- Check whether there are any current leakages to earth from the electric heating element. If there are, change the heating element as indicated under 'Maintenance'.

To check whether there are any current leakages to earth, disconnect electric wires and remove the thermostat as indicated under 'Maintenance'. With an ohmmeter check that the resistance, between earth (water heater tank) and the element head, is infinite (no contact between the two). If it is not infinite, replace electric heating element.

Maintenance

⚠ WARNING! Before removing black plastic cap, be sure to turn off the electrical supply.

Periodically check electric connections and check that all the pipe fittings are watertight. Replace any corroded or damaged nut/bolt and screw fastenings. For any ordinary maintenance follow the instructions manual, but the assistance of authorized service personnel is advisable for any special maintenance.

⚠ WARNING! Empty the water heater every time the temperature in its location goes below zero °C. The water heater might be irreparably damaged if water inside it freezes.

⚠ WARNING! All QL water heaters are heat insulated with auto-extinguishable cellular polyurethane; since this material produces small quantities of toxic gas at temperatures that exceed 500°C, any work that produces high temperatures (welding, scoring, drilling, etc.) must not be executed in closed confined areas.

To replace thermostat:

1. Remove plastic cap by unscrewing the two screws.
2. Disconnect cylindrical Fast-on contacts of mains indicator lamp and unscrew electric contact screws. Ensure that any exposed wires are protected.
3. Place a screw driver between thermostat and electric heating element to prize up the thermostat.
4. To remount the thermostat, follow the instructions the opposite way round, taking particular care that the thermostat contacts are correctly connected to the elements' Fast-On contacts.

To replace electric heating element:

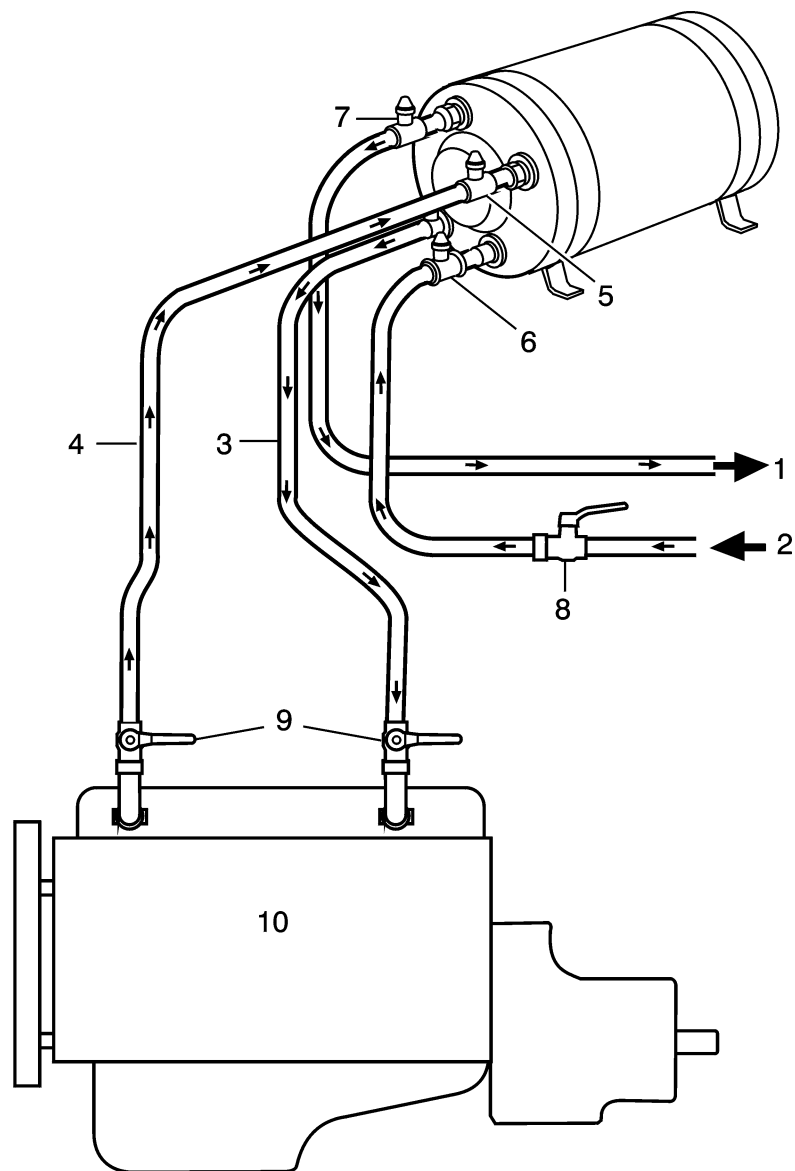
- Proceed as in points 1–3 above
- Unscrew electric heating element with a 56 mm socket spanner or similar tool. If difficult to unscrew, heat nipple between electric heating element and water heater.
- Before replacing element, seal threading with oakum or Teflon.

To empty the water heater:

⚠ WARNING! Ensure that the power supply is disconnected so that the water heater cannot be accidentally switched on when empty.

- Cut off the water supply to the water heater.
- Open the safety/non return valve by lifting the valve lever (ensure that water outlet is directed towards the bilge).
- Loosen the pressure relief valve, if mounted, or disconnect hot water pipe fitting (red rubber washer, see plumbing connection diagram point 1) until the water heater begins to empty.

Plumbing connection diagram



- 1 Hot fresh water outlet
- 2 Cold fresh water inlet
- 3 Heat exchanger (coil) liquid outlet
- 4 Heat exchanger (coil) liquid inlet
- 5 Escape valve (recommended)
- 6 Safety and non return valve
- 7 Escape valve (recommended)
- 8 Gate valve (recommended)
- 9 Gate restrictor valve (recommended)
- 10 Marine engine (with closed cooling system or direct discharge)

Please note that valves marked **recommended** is not included in the QL Water Heater kit.

Accessories and Spare parts

Accessories

41103503-3	50% Power reducer
41103504-1	1500W/220V Heating element
41103505-8	Thermostatic mixing valve kit
41103506-6	Magnetic scale remover

Spare parts

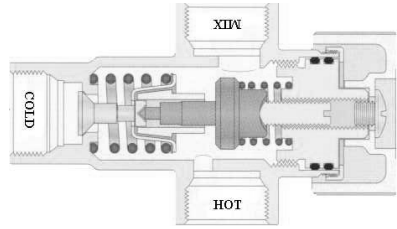
41103507-4	2 x 1/2" x 16 mm hose fitting kit
41103508-2	800W/220V Heating element
41103509-0	Thermostat
41103510-8	Safety valve

Adjustable thermostatic mixing valve

Thank you for having chosen our adjustable thermostatic mixing valve. This kit permits the mixing valve to be easily mounted onto all QL Water heaters.

The kit contains:

Thermostatic mixing valve with 1/2" feminine fittings
 Flexible stainless steel tube 1/2"
 Male-Female-length 400 mm (10")
 1/2" brass "T" fitting
 Double 1/2" brass nipple
 1/2" rubber gasket



Function:

The mixing valve functions automatically. All you have to do is turn the knob in the desired direction in order to obtain a temperature between 30°C (86 °F) and 48 °C (118 °F), with a tolerance of ± 5 °C (± 40 °F). The reliability of the device is assured due to its simple design and no need of auxiliary energy. A thermostatic bulb senses the temperature of the mixed water and maintains it by changing the amount of hot or cold water mixed.

NOTE! In order to obtain a correct mix, the pressure of the hot and cold water must be the more or less the same.

Characteristics:

Temperature range:
 30°–48 °C ± 5 °C (86°F–118°F ± 40 °F)
 Flow rate Dp 1 bar (14,5 Psi) (kv):
 1.300 l/h (347 US gals/h)
 Max. temperature: 110°C (232°F)
 Max. pressure: 10 bar (145 Psi)

Installation and adjustment:

⚠ IMPORTANT! You must assure the seals by using hemp, Teflon or Loctite 572.

1. Turn off the electrical connection to the water heater.
2. Close the cold water in-feed to the water heater.
3. Open the water heater's drain valve which is located on the safety non-return valve in order to relieve the pressure in the water heater (see point on the plumbing connection diagram in instructions manual of water heater).
4. Screw the fitting of the thermostatic mixing valve marked with the red dot onto the 1/2" male thread of the hot water outlet of the water heater (see point on the plumbing connection diagram in instructions manual of water heater).
5. Screw the flexible tube to the fitting of the thermostatic mixing valve marked with the blue dot.
6. Screw the 1/2" "T" fitting to the safety non return valve located on the water heater.
7. Screw the double 1/2" nipple onto the central boss of the 1/2" "T" fitting .
8. Connect the flexible stainless steel tube to the nipple in such a way that the tube does not impede the access to the electrical parts of the water heater. Use the rubber gasket to maintain the watertight seal.
9. Connect the fitting of the thermostatic mixing valve marked with "MIX" to the hot water outlet pipework.
10. Close the drain valve on the safety non return valve.
11. Open the cold water in-feed valve to the water heater.
12. Allow the water heater to heat the water.
13. Adjust the knob of the mixing valve in order to achieve the desired temperature.

Should you desire to exclude the function of the thermostatic mixing valve it is necessary to install a gate valve between 1/2" "T" fitting and the thermostatic mixing valve. When the gate valve is shut, thus not allowing the flow of cold water, the mixing valve does not mix the water.