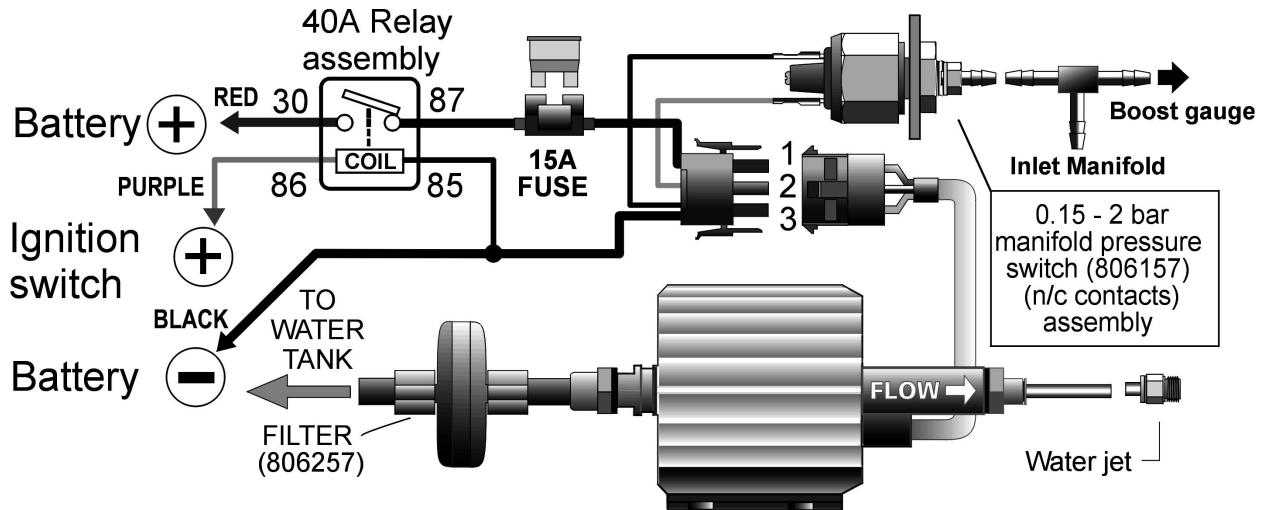


Aquamist System1s Fitting Tips



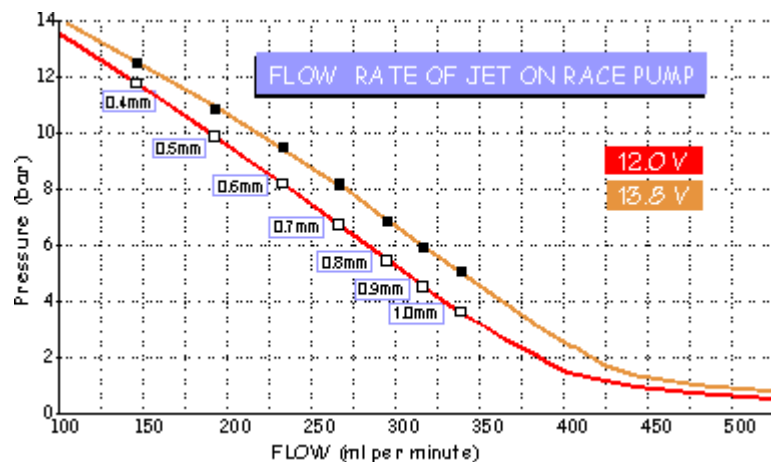
Water tank matters...

1. Water tank size ?

Generally about 5% to 10% capacity of the fuel tank, it will last approximately between every fuel filling.

2. What is regarded as the average water consumption?

This will vary with jet sizes and greatly with the pressure of you right foot, the first three months after the water injection installation consumes most water, consumption will drop as the novelty wears off and the system will become transparent and will be left alone and perform its duty peacefully.



3. Do I have to make a special tank for the water injection?

Most existing installations use the original windscreen washer tank. Some car makers even provide a low level warning lamp, which illuminates when water levels are getting low.

4. Would screenwash additive damage the aquamist pump?

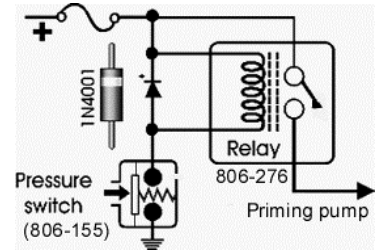
Our water pump is safe with most forms of alcohol. The screen additive normally contains a mixture of 5% detergent, 5% glycol and up to 50% of alcohol (methanol, or iso-propanol), the rest is water. **Ethanol based alcohol is not recommended.**

5. If I want to use a custom-made tank, can I put it at the back of the car?

Yes, with the exception of Porsche, Beetle etc. The lowest water level inside the tank should be higher than the water pump especially if the horizontal distance is under 3.5 metres (11.5 feet).

6. What if the horizontal distance of the tank is over 3.5 metres and below the water pump ?

You need a priming pump, any windscreen washer type will do it, needs to be activated under boost.



Inline filter positions

7. Where should I put the inline stainless water filter?

The filter should be below the water tank, preferably immediately below the water level. If the filter is positioned above the water level, you might experience interrupted water delivery due to trapped air within the filter. Make sure that you can access it easily.

8. Can the water filter be cleaned?

Yes, back flushing is best, make sure that the trapped debris does not re-enter the system.



9. Where is the best place for the water pump?

In a dry area of the engine bay, the pump should be away from heat and vibration and not more than 0.5 meter above the lowest water supply level. It is important that it is not more than a metre away from the battery. Noise is also important, avoid fitting it near the bulkhead and large flat panel.

10. What if the pump is over two metres away from the battery?

Increase the gauge of the wire (standard loom is 16 AWG). We can supply heavier gauge cable loom for that purpose, state the length.

11. Can I fit the pump in an enclosed area?

Not really, semi-enclosed area must have ducted airflow to assist cooling and bolt the pump body to the chassis properly to help transfer the heat produced by the pump.

12. Can the pump be fitted in any orientation?

Horizontal is best, but for road cars it can be fitted in any which way you like. To minimise the water gathering at the front of the pump housing and eventually ingress into the pump and cause permanent damage, bend the cable downwards so that water will not trickle toward the pump.

Water jet locations...

13. Where do I place the water jet?

Place it immediately after the intercooler unless the intercooler suffers from heat soaking. Cars with intercooler fitted above the engine is an exception (Subaru, GTI-R, Toyota Celica and etc), the water jet should then be fitted before the intercooler. Make sure that the tip of the water jet protrude or flush with the inner bore of the inlet tract.

14. Surely if the jet is placed before the intercooler it will have better cooling effects?

Not quite true. If the air entering the intercooler is pre-cooled, the cooling efficiency of the intercooler will drop due to the smaller temperature differentials between the ambient air and induction air within the intercooler core. Secondly, there is also a possibility that the hot air from the turbo may cause unnecessary vaporisation of the injected water thus taking up precious volume that was intended for the charge air.

15. Should the water jet be facing the direction of the in-coming air?

Two possible locations, if the jet is to be installed along an induction pipe, point it at 90 degrees to the direction of the airflow. Position the jet furthest away from the throttle body as this will enable better mixing and intercooling properties. If the jet is installed at the end-tank of the intercooler, point the jet in such a way that it has the greatest cavity to accommodate the 90-degree spray pattern.

16. How do I stop the water being siphoned into the inlet manifold during idle as I have to install the jet after the throttle body?

You need to install an inline checkvalve (806-249), it has a crack pressure of 1 bar, so the vacuum cannot overcome the valve.



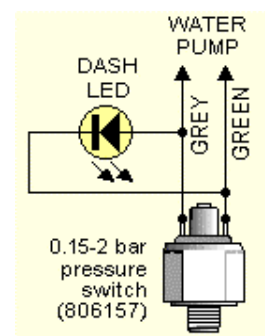
17. Is it possible for the water to siphon into the engine during the non-running period?

Under normal conditions, the inline pump act as a stop valve, only under pressures over 2 psi will the water pass through the pump. This condition is unlikely unless your water tank is 10 feet above the water jet.

Pressure switch

18. Can I use the pressure switch to switch on a dash led?

Yes, a dash board led can be connected in parallel to the switch to indicate the switch point, no inline resistor is necessary Please note that it doesn't mean that water is being injected



19. Where is the best position to fit a pressure switch?

Along the inlet tract or manifold, but well away from heat and vibration. The setting of the pressure switch can be affected by heat.

We have now included the remote mounting kit for systems purchased after March 2000.



Pump in trunk?

20. Is it possible for the water pump to be located in the trunk (opposite end of the car)?

Unless there is absolutely no alternative, the pump should always be by the engine bay.

21. What if there are no other alternatives?

You need to double the size of the electrical cable to the pump or lost of performance will result, this is due to voltage drop in the cable and the pump is not receiving maximum current from the battery. (this is true if the battery is at the opposite end of the car).

22. Is there another way other than increasing the size of the cable ?

Yes, fit a small rechargeable battery near to the water pump (6.5 AHr-lead acid) will do it. The battery will supply the peak current to the pump (28A for 1ms) and retains the peak performance of the pump.

Aquamist safeguards

23. What will happen to the pump if the water tank is empty?

You have got approximately three minutes before permanent damage occurs.

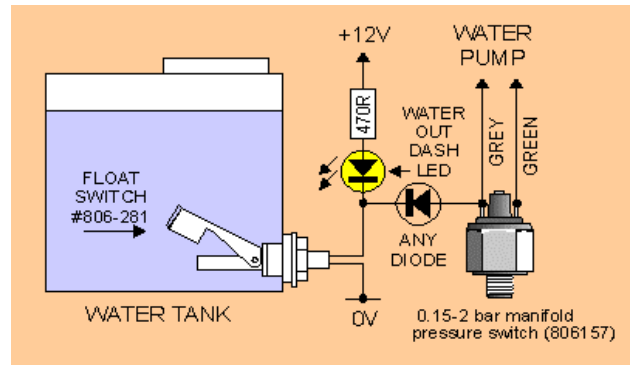
Please note that this rarely happens as three minute is an awfully long time to pin your foot down on a normal road. Track racers have to take great care not to allow this to happen. Water pumps manufactured from June 2002 has in-build thermo cut-out circuitry incorporated to safeguard against heat related damage.



24. How do I prevent this from happening?

Treat water injection as part of your standard OE equipment, check the water level regularly, fitting a water pressure gauge is the first step. Diagram on the left uses a water level sensor to stop the water pump from activating when the water level senses low water level. It will also light up a led to warn user of low water tank level.

Monitoring the water pressure has other advantages such as early warning of a blocked jet, if the water pressure progressively increased for no reasons it is a sign of the beginning of a blockage.



25. I would like to fit a better looking gauge rather than your 'purely' functional type, will oil gauge do it?

Yes, most 10-bar+ oil pressure gauges are constructed with brass fittings and are suitable for water applications. Please note that an inline restrictor must be used to prevent the gauge from damage by the high pressure pulses by the piston-action pump. We can supply most fittings to match the thread fitting of common oil gauges, contact us with the thread fitting details, do not guess.

26. I would like an early warning system rather than a gauge, any suggestion?

We supply an external-fit float switch, it is very easy to fit, available with LED warning lamp as an option.

27. Is that an active or automatic way of stopping the water pump running dry?

Yes, there are a number of ways you can do it:

- Wire-up the float switch to disable the pump when the water level is low. Don't forget to put a dash warning lamp as well
- A dash-board normally open switch can be used to manually switch off the pump when the tank is empty, works well with a water pressure gauge.

The switch should only disable the power relay coil rather interrupting the power fed to the pump (28A !).

- Teeing a 5-10 bar pressure switch onto the water delivery line, disable the pump in absence of water pressure during activation period. This method needs a bit of under standing of electronics. One drawback, it will not detect a blocked water jet.

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Engine safeguard

28. How do I protect the engine from the absence of water?

The modern engine protects itself by either retarding the ignition timing and injecting more fuel when detonation is detected by the onboard knock sensor and extreme in-take air temperatures.

The effect of the water injection is very similar to putting in a tank full of high octane fuel, engine management has in-build intelligence to adjust itself to achieve optimum operating perimeter to suit the fuel.

29. What if my engine management cannot perform such strategy in the absence of water ?

There are a number of ways to achieve the same aim as the car manufacturer. As from August 2002 we have made available two Dash display systems to perform visual and water flow check for the operating conditions of your water injection in real time.

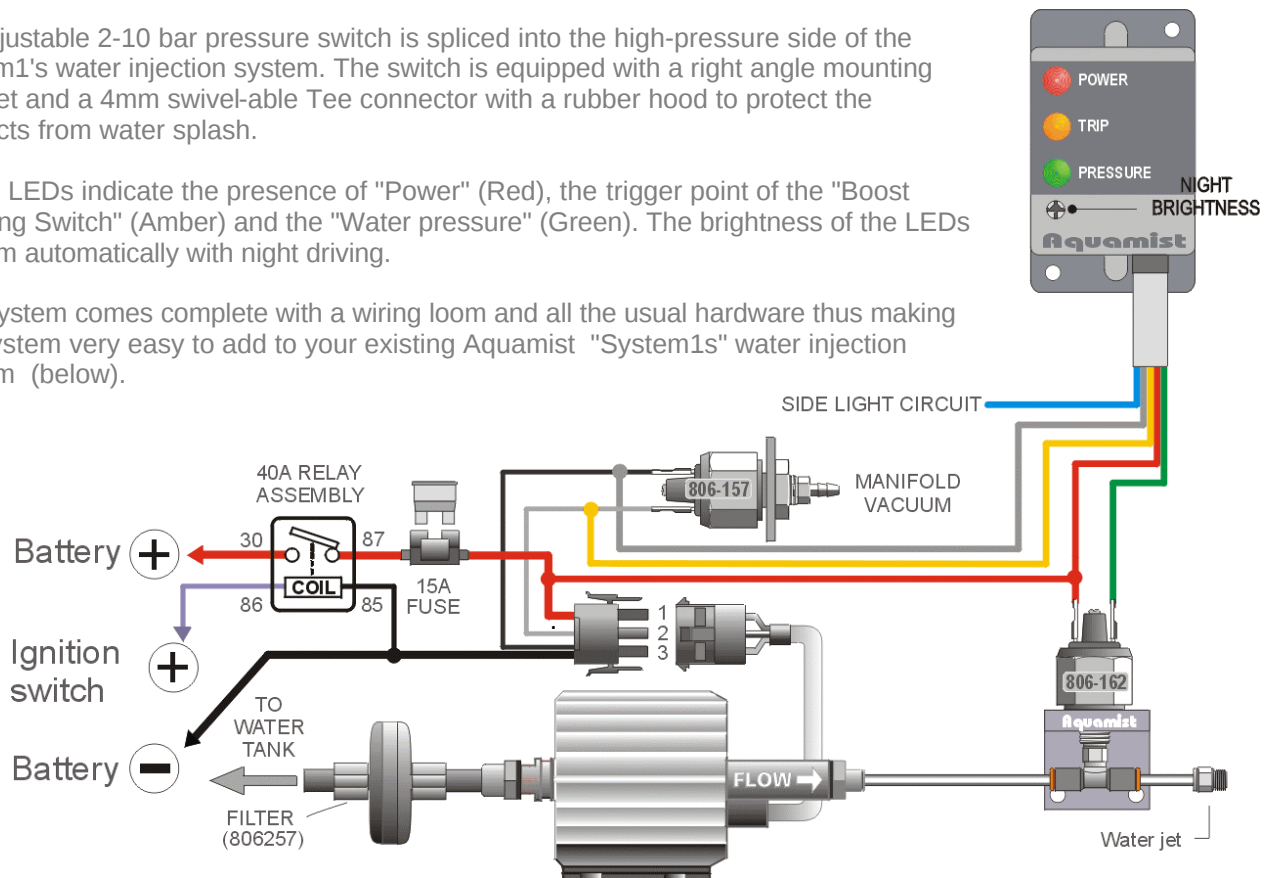
DDS1 (Dash Display System1 806-421) - advance data for reference only

Our first system monitors the presence of the water pressure.

An adjustable 2-10 bar pressure switch is spliced into the high-pressure side of the system1's water injection system. The switch is equipped with a right angle mounting bracket and a 4mm swivel-able Tee connector with a rubber hood to protect the contacts from water splash.

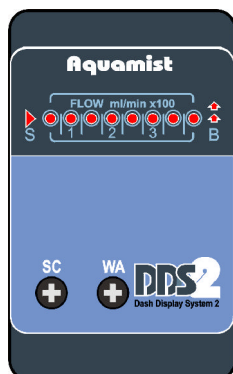
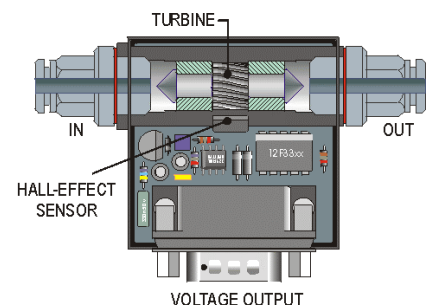
Three LEDs indicate the presence of "Power" (Red), the trigger point of the "Boost Sensing Switch" (Amber) and the "Water pressure" (Green). The brightness of the LEDs will dim automatically with night driving.

The system comes complete with a wiring loom and all the usual hardware thus making the system very easy to add to your existing Aquamist "System1s" water injection system (below).



DDS2 (Dash Display System2 806-425)

The newly developed sensor detects the flow of water through a small plastic tube with a magnetized turbine wheel in its path. The rotational speed of the turbine is proportional to the amount of water that passes it. Each revolution of the turbine is sensed by a "Hall effect Device" embedded within the outer perimeter of the tube. A Micro-controller analyses the readings and send out a voltage proportional to water flow.



Rather providing a simple bar-graph display for the above flow sensor, we have opted for a more comprehensive system. The display is able to detect between 50-450ml/minute and advances a moving bar every 50ml increment (2nd to 9th bar) of water flow.

The first bar is for monitoring the presence of the sensor and the last bar for indicating an external boost controller valve (see the next item)

Here comes the good part - user can set a window within the moving bars, if it falls outside the window, the boost valve is automatically disabled. The output to the boost valve can be replaced by a relay to increase fuel flow (alter the resistance of the engine coolant sensor or the air temperature sensor).

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