

# New products for 2005

## System 2e

System 2e is an advanced version of the system 2d, allowing the user to alter the water flow from the dashboard without going into the engine bay. Below is a production version of the control electronics, built inside a machined aluminium casing which is the same size as a standard automotive gauge. (2-1/6 inches or 52mm) Light indicator dots represent the opening percentage time of the fuel injector in real time and the modified opening time of the water injector. A diagnostics bar shows a dot moving between the two extremes, a blocked jet and a water leak due or cut pipe.

Two user adjustable spindles allow the user to set two variables; the left spindle sets the five programming modes- external spray, internal spray, WI threshold, WI gain and Brightness. The second spindle sets the multiplying factor in relationship to the first spindle. There is also a dedicated LED for the power, pressure switch status, Manual spray status and finally water tank level sensor status (if fitted). We have made provisions for those with the 2d, 2c and 1s system to upgrade to the 2e system at a latter date.

The 2e sets a new standard on the modern water injection system where users are demanding more facilities and controls. The system is available for sale in March 2005. Please place order early from our listed agents on our website: [www.aquamist.co.uk](http://www.aquamist.co.uk). We are expecting demand will exceed initial production.

Standard Kit contains the following main parts:

1. 52mm backlit gauge
2. Interfacing box
3. Aquamist magnetic piston race pump
4. Purge/priming valve
5. Water level sensor
6. Boost cut relay.

Optional upgrade parts are available separately on the standard version. The System2e+ is supplied with a pre-assembled cluster on a bracket with surge arrestor etc.



## DDS3 Gauge

Since the launched of the DDS2 the flow sensor system in 2003, we have received many request for a "Gauge" version for the system. So here we are, the DDS3 is now planned will be available as, either an upgrade to the DDS2 or as a completely kit of parts.

The most radical change to the system is the incorporation of a "Boost" button. Upon pressing the button, a wastegate valve is activated and allows the boost pressure of a turbocharged engine to spool up to a preset higher value and allow instant power increase (DDS3T version). This of course is subject to detection of correct amount of water flow and enough water in the tank. A water level sensors is supplied with the kit.

The heart of the system is the 8-bar led display, covering the flow range of up to 450ml/minute. "S" denotes the presence of the flow sensor and "B" shows the system is on high-boost mode.

Two more leds shows the "high boost" mode is activated and the other warns the water level in the tank is low.

Three adjustable potentiometers allows the user to set the sensitivity of the flow sensor and the other two sets the flowrate window that allows extra boost be activated.



The Gauge is available separately as a upgrade to DDS2.

The system is available for sale by the end of March 2005. Again order your system earlier. Part number and versions will be published on our website.

All new products as from 2005 has in-build priming pump driver for remote water tank and for flow capacity extension.

New dealer Enquiries welcome, please contact us:

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2005

# Aquamist

water injection systems

**Does your car feel faster on a cold, damp morning? With Aquamist water injection your car could feel like that everyday.**

The concept of water injection isn't new, it's been around since the early 1900's and in that time has been used successfully on many applications, including Formula 1 cars in the 1980's (when they were turbo-charged) and modern day WRC cars.

The main function of water injection is to suppress detonation caused by high temperature and pressure developed within the combustion chamber when the effective compression ratio has been taken beyond the auto-ignition point of the fuel, by either a turbo or supercharger.

Today people want to get more power from their standard production engine. With force induction this is fairly easy to achieve by raising the boost pressure and adding a pre-programmed chip, but the hidden drawback is that you are dumping fuel to regulate the exhaust gas and piston crown temperatures, which means the pistons are no longer being properly lubricated due to bore-wash and the fuel mixture is too rich to produce big power gains.

Water is six times more powerful than petrol at absorbing unwanted heat in the combustion chamber, so with Aquamist you can replace fuel-dumping with water and prolong your engine's life, as well as enjoying the power gains from running with a leaner air/fuel ratio. In addition to this, water injection can also reduce induction charge air temperatures and the production of oxides of nitrogen in the exhaust gases.



# ERL

**Discover the  
power of water injection**

# Current products

## System 2d

System 2d is for those who would like a 3-D water injection MAP but do not want to spend time mapping. The clever bit of the system is the newly developed FiA2 controller, which reads the PWM signal from the engine's fuel injectors (including Peak and Hold type) and converts it to drive the High Speed Valve to regulate water flow. It draws less than 10ma from the pulsed line. This enables the water injection to follow a fixed water/fuel ratio. A 3-30psi Adjustable Pressure Switch (normally closed) sets the cut-in point relative to manifold pressure. The system provides a pre-pressurised water line up to 10 bars and the flow rate is metered by our High Speed Valve.



In addition to mirroring the fuel injector pulses, the FiA2 unit monitors the fuel's duty cycle and converts it to 0-5voltage for the purpose of data logging or to let you know if your stock injectors have maxed out. Two LEDs are mounted on the top side of the box. The green LED indicates successful detection of fuel injector pulses and the red LED lights when water is being injected. (Pre-set manifold pressure is reached)

The FiA2 also reads the PWM signal from the centre pin of the Aquamist pump and compares it to the water injection pulses. It can flag an error signal to another 1.5A output drive to trigger a relay or boost limiting solenoid valve to bring the boost pressure to a safe level should a blocked jet be detected.

## System 1s



System 1s is triggered by boost only, the trigger point is determined by an adjustable pressure switch installed in the manifold (3-30psi). Three jets of 0.5, 0.6 and 0.7mm are supplied with the kit. (jet size is the only way of controlling water flow) This system can be upgraded to any of the other

systems with minimal waste of components.

## DDS2



The DDS2 allows the user to see in real time the quantity of water being injected. The heart of the system is the all-new digital flow sensor, which is the result of an intense development effort by our design team. Pulses from the magnetised turbine are digitally translated by an internal micro-controller, giving a linearized output signal of 0-5v proportional to water flow. A small 10-segment LED bar-graph displays the flow rate in ml/min. The bar-graph module incorporates a user definable window (WA) for shifting the lower and upper limits allowing a boost extension valve (optional) to be switched when the correct water flow is detected. The system can also be wired in such a way that when a water flow fault is detected, the boost will be reduced to the standard wastegate setting.

## System 2c

This system is designed solely for users equipped with their own ECU so they can program their own water injection map. This system is being used by two of the top WRC teams and many rally teams. The system provides a pre-pressurised water line up to 10 bars and the flow rate is metered by our latest High speed Valve (HSV). This in-line valve is made of high grade Stainless steel, capable of achieving a cycling rate of over 250Hz and is directly driven by the third party ECU, where customer water maps can be programmed. As there is not a built in fault detection circuit in the system, a circuit diagram shows how you can use the signal from the pump to determine the status of the system in real-time, the output signal is directly proportional to the flow of the system. We have also shown this signal can be configured to either digital or analogue, by the use of a simple resistor and capacitor network. ERL will assist any user regarding how this system can best be utilised for their particular application.



## System 2s

System 2s is a mappable system similar to fuel injection systems, the water line is pressurised during start-up and water flow is regulated by an inline solenoid valve. The quantity of water injected is mapped and controlled by an electronic control unit (MF2) supplied with the kit. The system is triggered by boost pressure and water flow is mapped by a series of potentiometers between 2000-9000 RPM. 3-D mapping is also possible if a MAP sensor is used instead of a manifold pressure switch (most turbo cars comes with a map sensor) making the water map progressive with boost. During start-up and during injection, the MF2 checks for any possible fault; blocked jet or broken pipes, an onboard LED warns the user of any fault that may have developed and can also send the fault signal to a third party boost controller to lower the boost pressure.



## MF2

MF2 is a mappable multi-injector driver designed to control extra fuel injectors once the standard fuel injection system can no longer provide enough fuel for your boost upgrades. The unit can drive up to four high impedance or two low impedance injectors (not supplied) and has a programming range from 2000 to 9000 RPM with a variable cylinder number selection (2-12). The system is triggered by an adjustable manifold pressure switch and fuel flow is mapped



by a series of potentiometers. 3-D mapping is possible when used in conjunction with a MAP sensor instead of the pressure switch.

PLEASE NOTE THIS IS A PIGGY-BACK SYSTEM TO BE USED ALONGSIDE THE ORIGINAL FUEL INJECTION SYSTEM.