FIDC tracking water injection system

HFS-5 idc

User manual v10w

GETTING TO KNOW THE AQUAMIST HFS-5

Over the last few years, the demand for great engine power output has increased. The cubic inches option is no longer the norm. Squeezing out 200-300hp per litre is within the reach of the ordinary folks on the street. The tuning industry has grown to embrace new tuning techniques as well as readily affordable components to produce powerful and reliable engines.

We at Aquamist have also come to terms with the inevitable, meeting the demands of the market and offering new systems capable of supporting engine powers output up to 1000+ BHP.

The HFS-5 reads the duty cycle of a fuel injector and delivers water proportional to fuel flow. Water quantity is metered by a high speed inline valve and flow is monitored by a turbine flow sensor for clogged jet and severed hose detection. A number of options are available for the user to limit engine power in the absence of water flow.

We believe the HFS-5 meets all the requirements of a high-end water injection system for achieving fast engine transients and responds with absolute precision. Tracking the fuel delivery is the most reliable method to deliver your fluid flow under the whole engine operating cycle. Anything short of this means having to tailor your fuel map to compensate for the irregular fluid quantity ingested by the engine.

Contents:

Checking the contents of the box carefully

This is a "must do" immediately after unpacking ....

Water pump

Unpack the corrugated sheet carefully. The pump should be labelled with the original custom Shurflo/ Aquamist logo.

The white box

- 6M of 6mm OD nylon hose (806-261)
- 2M of 4mm OD nylon hose (806-266)
- 15A Fused water pump harness with 40A relay
- 75mm stainless hose clip and support bracket
- HSV with 6/4 mm hose connector and clips and 2-way sealed plug and socket set (806-244)
- 0.8 mm water jet (806-323) in plastic bag
- 0.9 mm water jet (806-324) in plastic bag
- 1.0 mm water jet (806-325) in plastic bag
- 1x 4mm Y-piece (806-362) in plastic bag
- 2x M8 x 1/8 NPT jet adapter with plug (806-357
- 1x water tank adapter 1/8 BSP (806-270) + 6mm qck-fit elbow (806-376)
- 100 micron inline water filter (806-257)
- 4x M5x 40mm, nuts, washers and fasteners for pump
- 1x M6 grounding stud with washed and nuts and 6mm eyelet for pump ground
- 5-port brass manifold with 3/8BSP adapter. 3x blanking plugs, 1x 3/8 BSP-M to 1/8BSP-F adaptor 2x 6mm 1/8BSP-M elbow.
- 1x 22cc surge arrestor/accumulator (806-409)
- 1x Pump label

DDS3v10 fluid monitoring system box

- Assortment of 22 AWG coloured hook-up wires
- 1x DDS3 Dash Gauge with 1.5 M x 8-way cable
- 1x Version 10 Junction box
- 1x water level switch with connector (806-280c)
- 1x Digital flow sensor (806-428)
- A set of wires for inter-connection
- 3A fuse link with 1.25 inch quick blow fuse

Note: Please contact your supplier immediately should you discover any missing parts.

Getting started on installation

Before installation guidelines

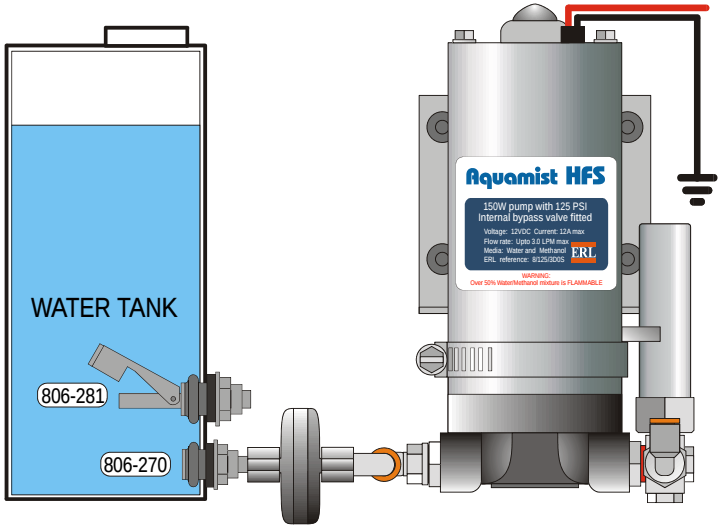
- The pump and water tank are designed to be fitted in the trunk. Install the water pump and inline filter below the water tank.
- Ensure all fittings are tightened and leak proof before filling up with methanol, test it with water first. If high concentration of methanol is used, please vent the tank's breather hole externally. Methanol is poisonous at high concentrations.

Assembling the pump in steps

- Gently assemble the two 3/8 BSP adapters into the pump without crossing the threads. The female one goes into the inlet of the pump. Flow direction is moulded onto the plastic pump head. Ensure o-ring is properly seated.
- Ensure the accumulator lies horizontally after final tightening.
- Assemble the accumulator supporting bracket with the metal band supplied.
- Assemble the rest of the 1/8 BSP elbow fittings and blanking plugs. Ensure all o-ring type fittings are not overly tightened.
- Mark (dye is smeared on to the bottom of the pump's rubber feet) and drill four holes for the pump.

Water tank components

- Ensure the outlet is facing the rear or the side of the tank. Drill/bore a burr-free 7/8" hole. Clear up all the burred edges and wash the tank thoroughly. No debris or plastic shaving should remain in the delivery system. 1-2 inch from the bottom of the tank is ideal. Don't over tighten.
- Same size hole for the water level sensor. Do not place the sensor near the washer pump, it will not operate properly. The float should swing upwards. The tank venting hole must be re-directed externally if high alcohol concentration is used.
- A tall and slim water tank is ideal for this type of application. This minimises delivery surge problems at low water level.



Installation for long-term reliability

This is the most important section of the DDS3 chapter. Please do not skip reading this part.

The 52mm Dash Gauge:
Location is not too critical as long as it is in view of the driver. There isn't too many pitfall on this.

The Junction box:
This is the heart of the system and must be installed in a dry location, preferably sited close to the glove compartment. Do not install it in the engine compartment, (It has been done !)
Assuming all cables from various locations are routed to the junction box neatly. Please label the flow sensor cable to prevent it from wrongly identified with the 4-core cable from the truck area, Once marked, the cables and wires can be cable tided.

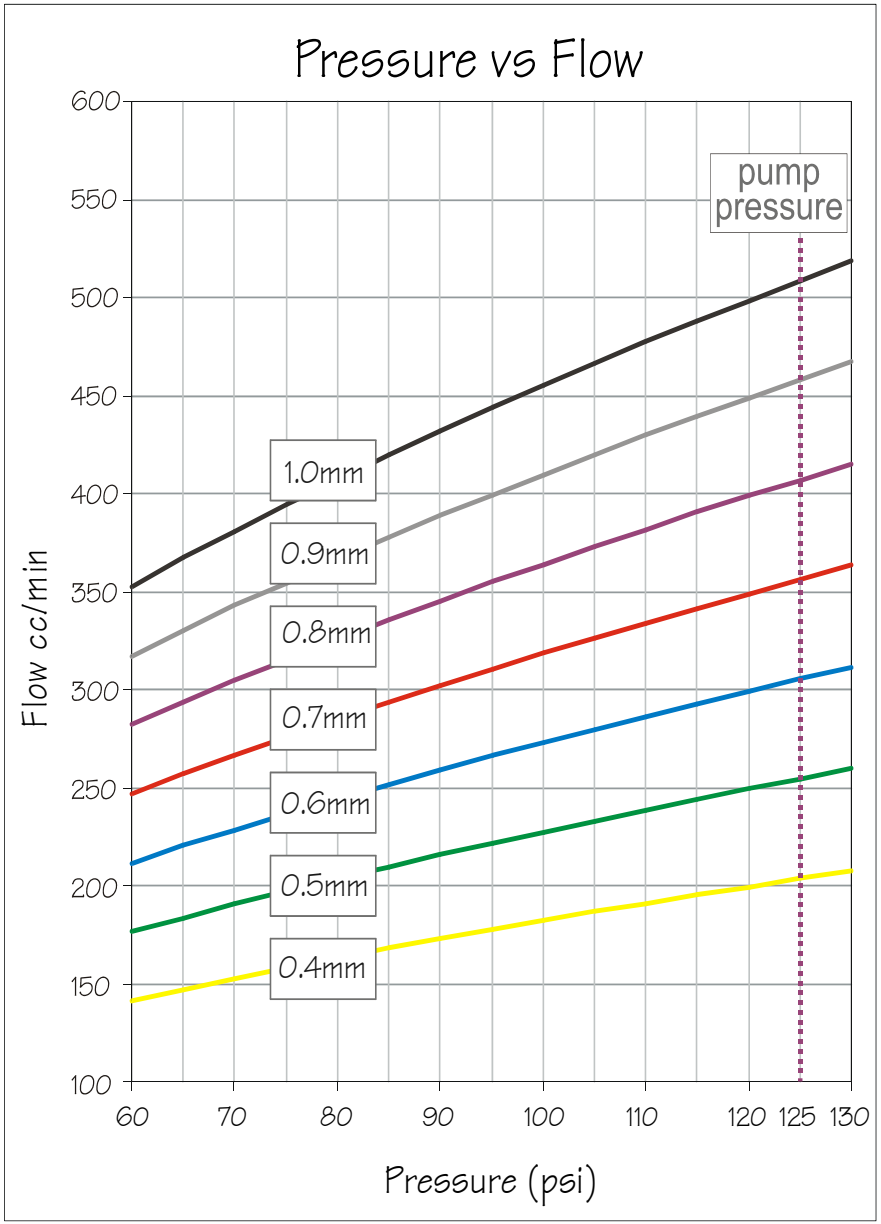
The most common mistake at this point is cutting the bundled cables very short to improve tidiness. Please don't. Allow a minimum of 2 feet so that the junction box is accessible when a problem occurs, Longer cable length will not degrade the system performance at all.

The Flow sensor:
The location of this sensor is most critical to overall system reliability. It is normally located it in the engine compartment. But there is no reason why it can't be spliced into any where between the pump outlet and jets/nozzles.

The sensor must be installed in a cool area, well away from the a heat source. Bulkhead/fire wall is not a good location as most heat is flowing towards it during motoring. Avoid location near any electromagnetic components such as the ignition coil, solenoid valves and electronic motors.

It is very important that the hose is cut cleanly with a razor blade to retain the "roundness". Side cutter produces a semi-round hose end, major leak will result sooner or later. The hose exiting the fitting must be straight so that the hose is not distorted and will be badly affected in a hot environment. Again, in time it will develop a leak.

The Tank level sensor:
Avoid locating the sensor tip close to a washer motor. The motor magnet will affect the sensor to read properly. The sensor can be installed 3/4 way down the tank, Preferably at the rear facing wall of the tank. A 23mm burr-free hole must be used to ensure good seal. Never over tighten or the seal will split, just tight enough to prevent leakage, no more.



Choosing jet size

This is a general guide only:

- 100% water: run 10-15% water/fuel ratio.
- 50:50 methanol/water, run 15-20% to fuel.
- 100% methanol, run 20-25% to fuel

Choosing the jet by calculation:

First work out the total fuel flow by adding up the capacity of the fuel injectors. Multiply the result by the preferred % recommended above.

Pick the nearest jet/jets size to match the flow. Don't forget to subtract the boost pressure from the line pressure of 125psi. For example, if you are boosting 25psi, you should select the jet flow at 100 psi.

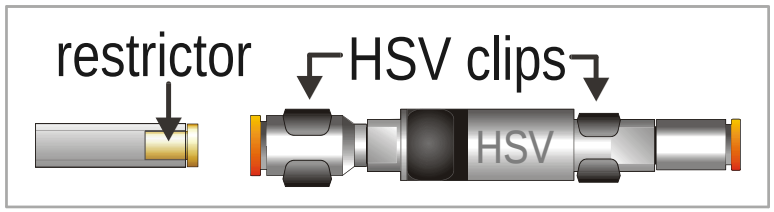
Once the jet/jets and flow are determined, insert the nearest HSV restrictor to regulate the fluid flow so the delivery will be linear to the duty cycle.

JET	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	PSI
0.3	46	48	50	52	54	55	57	58	60	61	63	64	66	67	68	
0.4	141	147	152	158	163	168	173	177	182	186	191	195	199	203	208	
0.5	176	183	190	197	203	210	216	222	228	233	239	244	249	254	259	
0.6	211	220	228	236	244	252	259	266	273	280	286	293	299	305	311	
0.7	247	257	266	276	285	294	302	310	319	326	334	342	349	355	365	
0.8	282	283	305	315	326	336	345	355	354	373	382	390	399	407	415	
0.9	317	330	343	355	366	378	388	399	410	420	429	439	449	458	467	
1.0	352	367	381	394	407	419	432	443	455	466	477	488	498	509	519	

CC per minute

Advanced delivery management

The HFS-5 is supplied with a set of high-flow water jets, sized at 0.8, 0.9 and 1.0mm (see chart for flow rate). A Y-piece is supplied with the kit for twin jet applications. There are two nickel plated brass jet adapters. Three pre-HSV in-hose restrictors are supplied for duty cycle/flow matching, should good linearity be required.



Please note the HSV should not be installed in areas where there heat and vibration is present. At any point of priming sequence, especially if no fluid is flowing pass it. Do not allow the HSV to be energised for 30 second at a time.

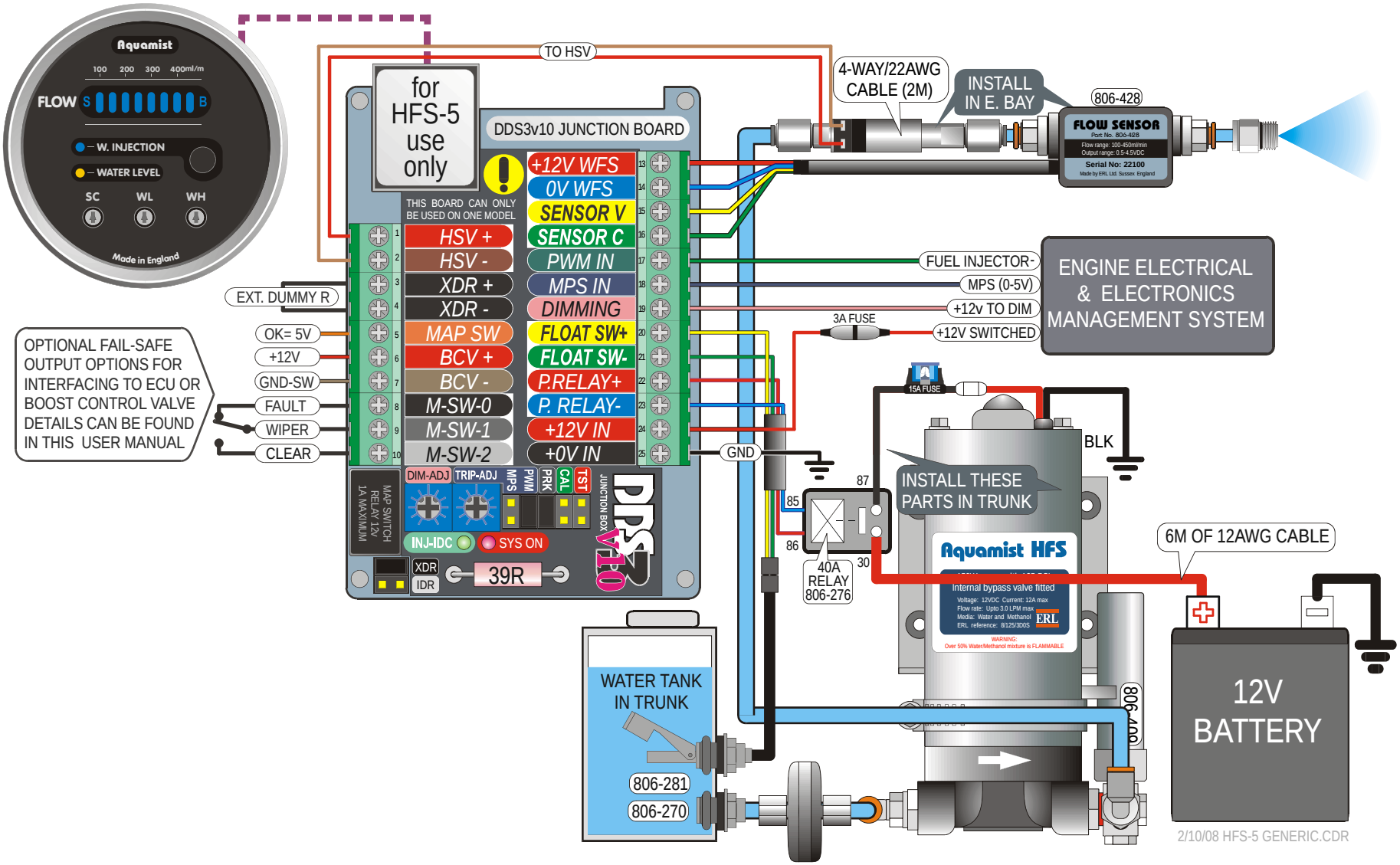
The HSV's wetted parts are designed to work with "99.9% pure" methanol or ethanol only. Avoid using alcohol with unknown denaturant. Always buy alcohol in seal containers or risk cross-contamination during dispensing.

Applications involving methanol mix beyond 50%:

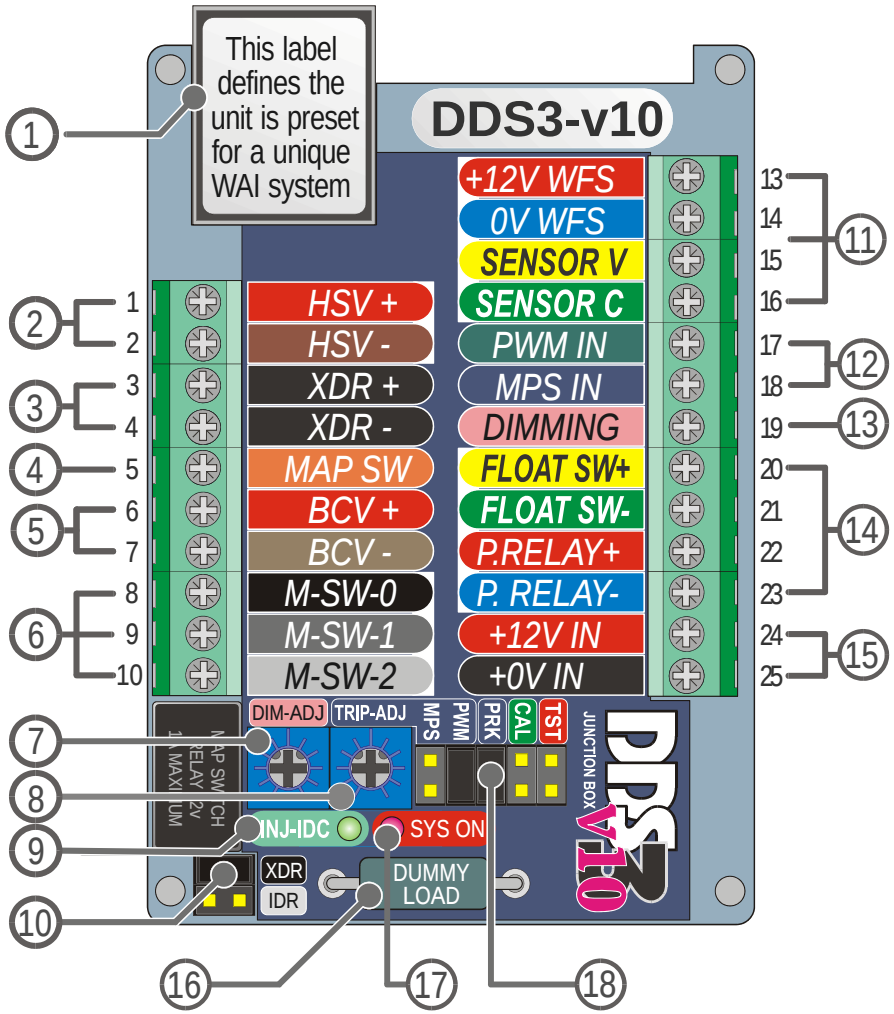
Great care and attention must be taken to ensure the fluid tank is capable of handling methanol and is designed for this type of application. These tanks are normally termed as a Fuel cell and are available from most reputable racing parts suppliers. Anti-surge foam should be used for circuit racing. Follow the maker's guidelines carefully.
The breather hole must be vented externally with a suitable hose. All fluid delivery hoses and fittings must be free of all leaks. Ensure the area is well ventilated and isolated from the driver's compartment. Take whatever measures to avoid any methanol fumes building up in trunk area.

Methanol is highly flammable. The main delivery hose to the engine bay should be routed underneath the car. Ensure it is securely clipped and fastened. Avoid kinks, close proximity of moving parts and heat producing components. Please treat this recommendation seriously. If in doubt, ask advice from a professional person familiar with this kind of application. DO NOT take any undue risks. It is recommended that a suitable fire extinguisher is placed within easy reach of the driver. All electrical connections must be properly tightened to avoid spark production.

GENERIC WIRING DIAGRAM FOR HFS-5 with DDS3v10



DDS3v10 pinout function directory



1. RJ-45 socket for dash gauge (p.11)
2. Inline flow control valve (p.11)
3. External Anti-CEL dummy load resistor (p.11)
4. MAP switching signal output (p.11)
5. Boost Control valve output (p.11)
6. Voltage free relay outputs (p.11)
7. Led brightness for night driving (p.12)
8. System trigger point adjustment (p.12)
9. LED (green) to monitor IDC (p.12)
10. Selecting external dummy resistor (p.12)
11. 4-core cable to turbine flow sensor (p.13)
12. System trigger signal input (p.13)
13. +12V input to enable led dimming (p.13)
14. Tank level/pump control output (p.13)
15. Main power input (fused), IGN.SW#2 (p.13)
16. Internal Anti-CEL dummy resistor (p.13)
17. LED (red) to show system activation (p.14)
18. User selectable system configuration (p.14)

DDS3 junction board pinout descriptions

1. RJ-45 socket for dash gauge:
The DDS3v10 uses a RJ45 connector to link up with the Dash gauge,

2. Inline flow control valve:
This output can be used to switch an inline solenoid valve to control flow. Output current is limited to 1 Amp. It is activated by the signal applied to the PWM (pin17) or MAP (pin18) input.
User can set the triggering point by using the "Trip-adj" potentiometer near the bottom of the junction board.

3. External Anti-CEL dummy load resistor:
A more powerful anti-CEL dummy resistor can be connected to this output when excessive heat is produced by the on-board dummy resistor. This option only applies if pin 9-10 is used for cutting the PWM signal to a boost control solenoid valve in the event of failsafe or prolonged "gauge-off period".

4. MAP switching signal output:
Fail-safe output for map switching usage. This output is about 5V and switch to 0v upon fail-safe activation. The signal is short circuit proof with a current limit of 5mA. If an alternative or an inverted output signal is required. this output pin can be reprogrammed via a set of soldering pad on the underside of the circuit board.
Please go to page 15, section C/D for a more detailed description of how this can be done.

5. Fail-safe window output (SW GND)
When flow signal falls inside the fail-safe window, pin7 will switch to ground immediately. This output can be used to activate a solenoid valve to increase boost pressure. This output can also be used to switch MAP (GND active) on an ECU.

6. Voltage free relay outputs
There are three terminals representing a set of voltage-free "change-over" contacts from a relay if anti-CEL -dummy resistor jumper link is un-used. (p10.6). M-SW1 is the "wiper" or "common" pin.

M-SW1 and M-SW-0 contacts are opened normally until fail-safe is triggered or gauge is switched off

M-SW1 and M-SW-3 contacts are closed normally until fail-safe is triggered or gauge is switched off.

DDS3 junction board pinout descriptions cont.

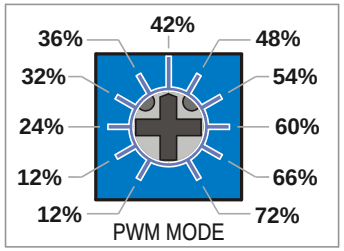
7. Led brightness for night driving (p.9)

When pin 19 is linked to the headlamp switch, this potentiometer enables user to adjust the brightness level of the gauge leds.

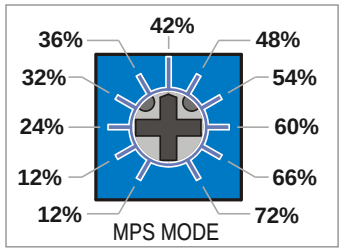
8. System trigger point adjustment (p.9)

This potentiometer sets the triggering point of the injection system.

In PWM mode, the figure on the left indicates the IDC trip point in 6% steps.
Most common onset point is 42%, (12 o'clock).



In MPS mode, the figure on the left will help to identify the trip point of a 12 to 72% Manifold Pressure Sensor. To translate the signal % to PSI, please see the table below:



Trip-adj	12	18	24	30	36	42	48	54	60	66	72	%
2-bar	-11	-9.3	-7.6	-5.8	-4.1	-2.3	-0.6	1.2	2.9	4.6	5.6	PSI
3-bar	-9.3	-6.7	-4.1	-1.5	1.7	3.8	6.4	9.0	11.6	14.2	16.8	PSI

MAP sensor conversion table: from % to PSI (shaded = vacuum)

9. LED (green) to monitor IDC

This led will active when a PWM signal is successfully detected on pin17. It should pulse in unison with the frequency and grows brighter as the duty cyle % increases. This led should not be lit before cranking. After the engine has started, it should pulse in time with engine speed,

If the DDS3 is used as a fail-safe to a third party WAI system, this led will only pulse when the PWM pump is activated under normal injection events.

10. Selecting external dummy resistor

Selecting ext/int dummy resistor. The on-board Anti-CEL resistor is rated for intermittent usage during fail-safe activation. In the event of prolong activation, it will get very warm. To avoid excessive heat build up, it is recommended to use an external dummy resistor for this purpose,

The external resistor is not supplied with the kit but it is widely available in electronics store. The resistor should be 39 ohms, 10W-25W in metal body.

NOTE: If anti-cel is not necessary, please leave it on the XDR position or remove the link completely.

DDS3 junction board pinout descriptions cont.

11. 4-core cable to turbine flow sensor

Please ensure the stripped wires are twisted without any loose strands before insertion into the terminal block connector.

12. System trigger signal input

Choice of two system triggering signal inputs. Selectable by jumper links (page14.18)

PWM IN (pin17): It reads and translates any negative going pulses such as fuel injector or PWM based pump speed controller in to a reference signal to trigger the system and fail-safe circuitry.

The system is factory set to detect negative PWM signals. Some pump speed controller uses a positive PWM switching driver, you need to re-configure the DDS3 circuit board manually, (p15.F).

MPS-IN (pin18): 0-5V input signal for triggering the system instead of PWM. This type of signal is normally associated with MAP, MAF and TPS sensors.
The trigger point of the above is set by the Trip-adj potentiometer (#8).

13. +12V input to enable led dimming

A 12V signal at this input enables the uses to set the brightness of gauge (p12.7). It is normally wired to the head lamp switch so the gauge will automatically dim during night driving.

14. Tank level/pump control output

These four connections control the delivery pump and detects water tank fluid level. Control signals are transmitted via a ~5M of 4-core cable to the trunk area.

15. Main power input (fused), IGN.SW#2

It is important the 12V power is only active at ignition switch position #2. Ideally, it should be wired to the same +12V supply to the fuel injectors.

16. Internal Anti-CEL Dummy resistor

If the stock ECU-controlled boost valve is disconnected by the DDS3 during a fail-safe activation, a CEL (check engine light) is often illuminated.
To prevent this from happening, A dummy resistor is used to create an artificial load of a boost control valve.

During this period, the resistor will warm up. If heat is a concern, use an external resistor, (see page11.3)

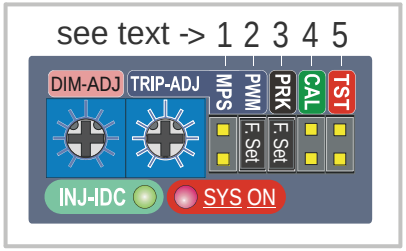
DDS3 junction board pinout descriptions

17. LED (red) to show system activation

This "SYS ON" red led actives when the PWM/MPS input signal reaches the "trip adj" setting. The system will commence injection.

18. User selectable system configuration

Figure on the right shows a set of default user selectable jumper links for setting up the triggering mode and manual system test. Read on for further details



1. MPS (Manifold Pressure Sensor) MODE link:
Selecting this link instead of the default "PWM" link changes the system's triggering mode. Now the system will be looking at the MPS signal (0-5V) at pin 18 to turn the system on.

2. PWM (Pulse Width Modulation) MODE link:
PWM MODE (Factory set). The system looks for "switch to ground" PWM signal from the pin17 to turn the fail-safe circuitry and W/A injection on. For "positive edge trigger" see "Advance setting" (Page21.F). Upon successful detection of PWM pulses, the Green led will pulse in time with the incoming PWM signal.

3. PRK (Parking unused jumper link)
This link space is for parking an un-used jumper link socket. No other usage.

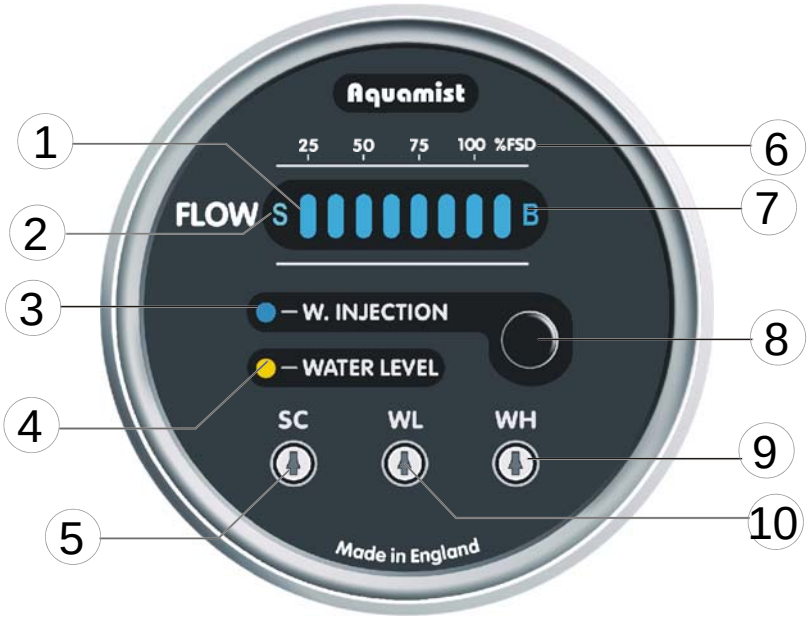
4. CAL (Calibration Simulation. Default = unlinked)
Linking this pin turns the "SC" potentiometer into a flow sensor simulator. Fully clockwise for minimum water flow. Useful to check the fail-safe window width. "B" led will activate when the simulated flow is inside the window

5. TST (Manually test. Default= unlinked)
This link is useful for testing the system without driving the car at full boost and RPM. When this link is shorted, it simulates a 100% IDC signal appearing at the PWM input terminal (pin17).

Warning!!! Linking this pin will start the pump and energise the Inline valve, resulting in 100% maximum fluid delivery to the water jet/jets.
Do not activate this link for more than 5-10 seconds at a time for risk of burning up a solenoid valve designed for pulsing purpose use only.

Remove this link as soon as the manual system test is completed.

DDS3v10 Dash Gauge Functions



1. 8-element Bargraph Display (80-1800ml/min)
Each segment is equivalent to a percentage of the total flow of the sensor scaled by the SC potentiometer.

2. "S" indicates the presence of sensor.
The letter "S" (sensor) must be lit after power up and stay on to show the sensor is functioning correctly.

3. Water injection system ON led
This led comes on the when the system is switched on and in readiness to inject. .

4. Water Level led (yellow)
(This LED has three functions)

a. During "power on delay" period:
This LED will activate for approximate for 10 seconds during the system-on delay (v10) before the main system turns on.

b. During normal operation period:
- This LED is on during the safe-fail activation
- Water level low (intermittent flashes)

c. Led lit after the gauge is switched off:
- If the water level sensor is activated for over 20 seconds.
- Fail-safe output is in the active state (10.6).

5. SC (Sensor Calibration)
20-stepped potentiometer allow user to scale the flow sensor to give an ideal visual indication of a given flow rate. Ideally set the led to display 5-6 bars at full flow.

6. Backlit flow legend
Legend displays % of full scale of 8-bars

7. "B" Boost Enabled led
When the flow falls inside the fail-safe window after system trigger, this "B" led will activated. Useful indicator of the WL and WH setting.

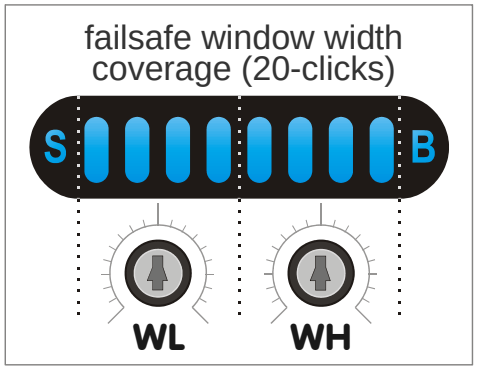
DDS3v10 Dash Gauge Functions cont.

8. Water injection enable button
Due to extra power level achieved under WI, user may want to reduce the power to the wheels in less than ideal driving conditions. Disabling the WI will reduce boost to wastegate bleed valve setting (if fitted) as well as switching to a less aggressive MAP on custom engine management.

9. Over-range setting potentiometer (WH)
It is just as important to monitor over-range conditions as well as under-range flow conditions. If a leak develops close to the water jet and starves the engine of the water, the user must know this condition. A 20-stepped potentiometer allows accurate and repeatable adjustment range.

10. Under-range setting potentiometer (WL)
This setting can indicate partial blockage and trapped air inside a delivery hose. Again 20-stepped potentiometer is employed. Each click represents a fixed portion of the window width of 8-bars.

WL covers the lower 4 bars and the WH covers the upper 4 bars. Figure on the right illustrates the span of the coverage. Setting is very simple once SC is calibrated.



NOTE:
In order to make the fail-safe adjustment easier, it is recommended to set the bargraph to display 5-6 bars at maximum flow. This way, the fail-safe window can span from the centre outwards.

If the WL and WH is set at 12 O'clock, the fail-safe window is approximately spanned between 2-7bars. A good starting point.

Minor trimming for the WL is necessary if the water injection trigger point is set to commence earlier.

The v10 gauge will display the activation of the "fail-safe" with two leds:

Further useful hints:
"B" led (right of the bargraph) will active if the flow is inside the fail-safe window during injection period.

The yellow led (water level) will activate if the flow is outside the fail-safe window during injection.

As soon as the "fail-safe " is tripped, there will be a 4 second reset period before it resets. If the fail-safe drops boost, expect 4 seconds of low boost. The same will apply for fail-safe-induced map switch.

When gauge is off, expect low boost and safe map unless the board is re- configured. (page21.B).

Powering up the system.

Powering up the system for the first time

The system can be activated manually for priming and leak checks. An external water jet can be used temporarily check the spray and bargraph display. It is not necessary to set up the fail-safe at this point.

Please follow the steps below:

(assuming the system is in PWM mode)

a. Put the ignition switch to position #1 (ACC). No activity should be observed on the gauge or junction board. If not, check wiring.

b. Process to ignition switch position #2 (pre-cranking).

c. The yellow led on the gauge should light up immediately.

d. Within 10 seconds, the gauge will power up. No other activity should be observed.

e. Start the engine and let it idle.

f. Check the green led (INJ-IDC) on the Junction board is pulsing in time when throttle is applied.

g. Remove the spare jumper link (prk) on the 5-way programming link to the "TST" link. This will active the pump, the HSV and the red led (SYS ON). If all is well, unlink after a few seconds.

h. This is a good time to check the installation for leaks. Never over-tighten the fittings to cure leaks.

I. Set the gauge and junction board as follows (if necessary):
- SC (sendor calibration) is set to 12 o'clock. (gauge)
- WL (window low) is set to fully counter clockwise
- WH (window high) is set to fully clockwise.
- MPS, CAL & TST on the J. Board are unlinked
- Trip-adj is set to ~ 9 o'clock. (24% IDC)

J. The system is ready for a test drive. Ensure the water jet is clipped on the windscreen.

K. Upon a successful test run, spray pattern is uniform, splutter free and activation is predictable. As engine load increases, the spray should progressively become fuller. The bargraph on the gauge should change with load.

What next...

The system is now ready. The correct water jet can be connected to spray internally, reset the trip point to the preferred value. Allow time for the system to settle down before proceeding to the next stage of the setting up the

Setting up the Failsafe

This final stage should quick simple and effective, please read it before proceeding. It will save you time in the long run.

If fluid flow falls inside the fail-safe detection window after triggering, no action will be taken. So setting up the width of the window to accommodate the full fluid flow is vital.

Setting up the fail-safe should only be done after the car has been tuned or the jet/jets sizes are finalised.

Recommended steps to set up the fail-safe

1. Adjust the "SC" to display 5-6 bars at full power.
2. Make a mental note of the number of displayed bars during spool up. Made easier at higher gears.
3. Set the WL to match the number of spool-up bars. It is recommended to allow 2-3 clicks below that point to avoid false triggering. Full span of WL is 20 clicks, covering from 0 bar to 4 bars.
4. Same procedure to set up the WH, allowing 2-3 clicks above 6 bars. Full span of WH is 20 clicks covering 4-8 bars.

This completes the fail-safe setup ...

What steps to take after the failsafe trigger

The commonest way to minimise engine damage in the absence of injector is to reducing the boost pressure.

1. For engines with electronic boost control valve: Pin 9/10 is a set of relay contact that goes open circuit when the fail-safe is triggered. See page 10.6 for more details. Connect pin 9 to the ECU side.

2. For engines with MBC (manual boost controller): Pin 8/9 is a set of relay contact that goes close circuit during fail-safe activation. Use this output to power-up a solenoid valve to by-pass the MBC. Essentially allowing full turbo boost to the wastegate. See page 19 for more details.

3. For engine with map switching capabilities: Pin 5 (see page 10.4) is a dedicate output to perform such a task. This pin can be user configured match the signal requirement of the "third party" ECU to switch map. See page 20 for more details. This pin is factory configured to give a 5V for "OK" and "0v" is "flow fault"

Maximum current of this output is 5mA.

Fail-safe wiring for MBC

Upon detection of water flow fault, the HFS-1 can reduce the boost pressure of a MBC to wastegate setting with a 2-way Low Current Solenoid valve (not supplied) - A typical supplier is MAC valve (36A-AAA-JDBA-1BA - www.macvalves.com) or Clippard valve (ECO-3-12-L-M5- www.Cippard.com).

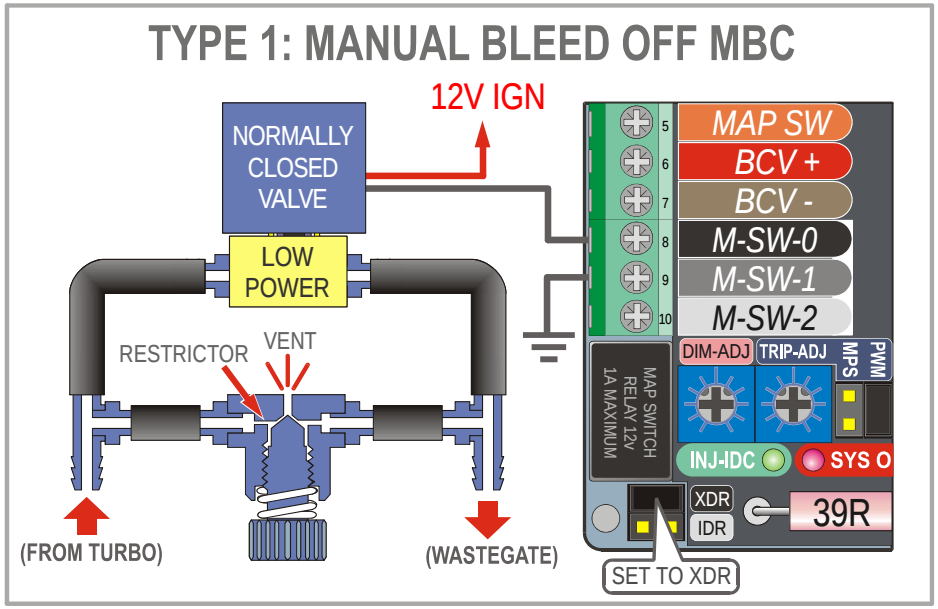
Figure below shows two common type of MBC (manual boost controller) used on most turbo cars.

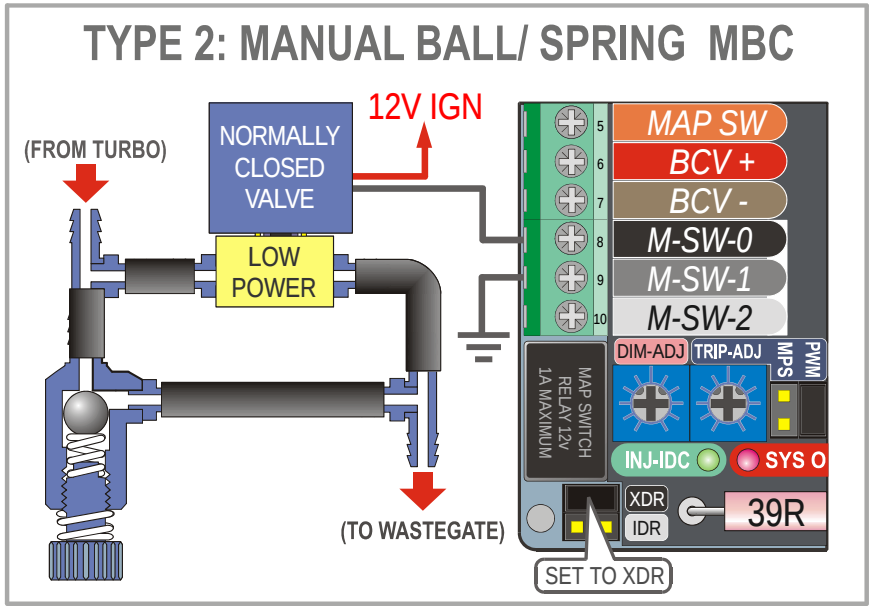
Type 1: pressure from the turbo to the wastegate is vented to the atmosphere via a restrictor and a vent. Boost increase is proportional to the amount vented.

Type 2: Boost increase is proportional to the spring pressure of the MBC.

When the solenoid valve is energised, pressure from the turbo is diverted to the wastegate directly. When MBC is by-passed, the boost pressure will drop down to wastegate setting.

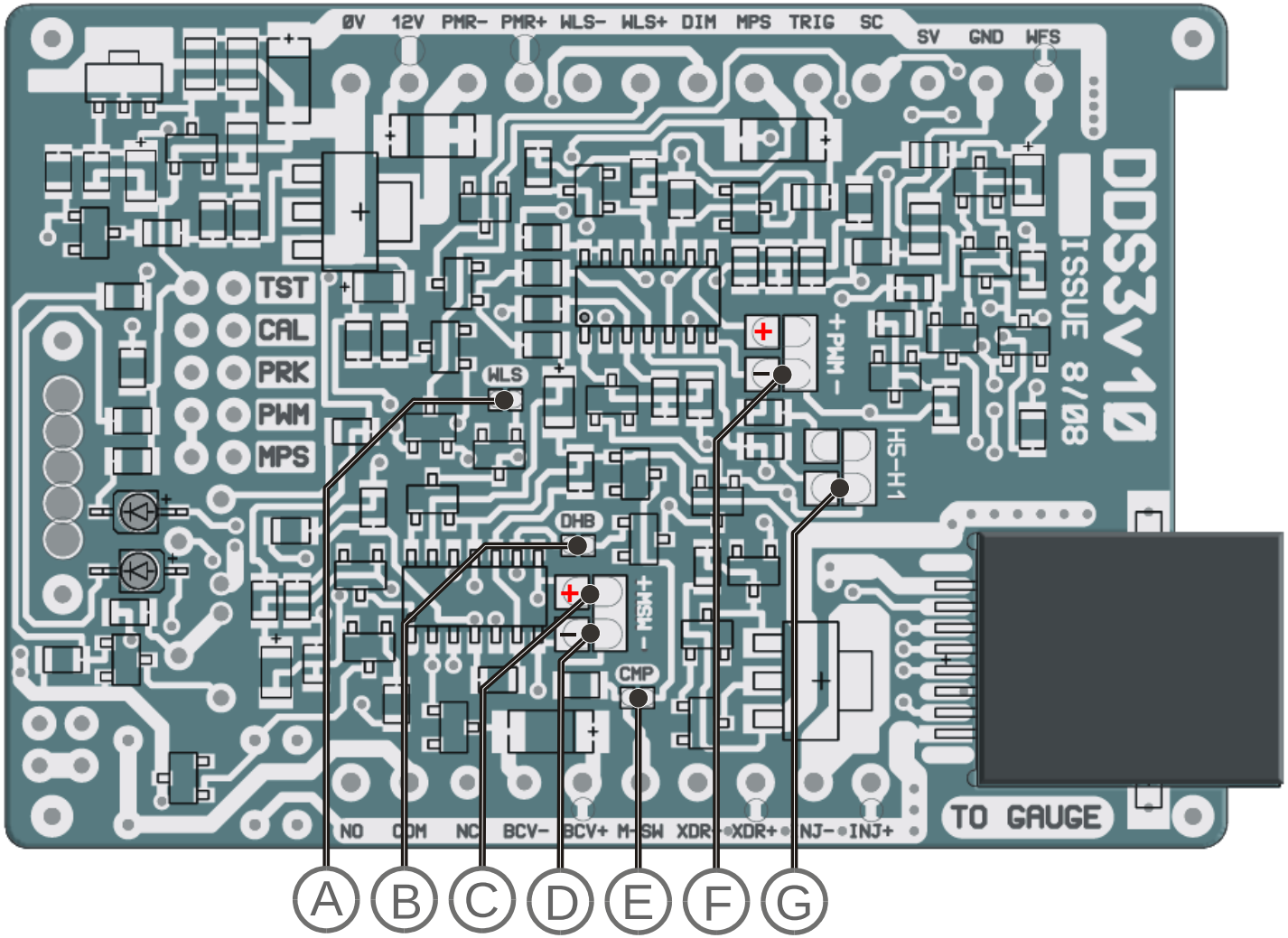
It is important to use a solenoid valve with a low power coil winding to avoid over heating during the by-pass mode. A typical coil power between 3- 6W is acceptable when installed in a cool place.





Advance system configuration (solder link)

(Links are factory preset - no need to alter the setting unless customising)



Advanced system configuration (solder link)

The DDS3v10 is pre-configured at the factory for a specific application. When in doubt, please check the round label on the lid of the box or the small label on the RJ45 socket at the top right of the junction board. (factory default: "for Universal fail-safe use")

If the user wishes to change the original setting, this is the section to explain it all. You will require a small tipped soldering iron and a small pointed tool.

As seen from the PCB figure on the left. All the user configurable links are marked with alphabetised circles.

Some pads are pre-linked from factory. If you need to change those, pick off the thin track (pointed tool) and solder link the alternative solder pads.

A: WLS - Water Level Sensor (default=linked)

Pick off the thin circuit track if you do not wish the tank level sensor to disable the system after 10-20 seconds of low level reading. (not recommended),

B: DHB - Disable High Boost (default=linked)

Pick off the thin circuit track if you want to retain high boost or "Aggressive MAP" after the system is switched off at the gauge, only if you are using pin 9/10 to reduce boost to wastegate setting after fail-safe activation,.

C/D: MSW - Map Switch polarity (default= D-linked)

The factory default output is preset to give a 0V output upon a fail-safe activation. Otherwise the output will stay at ~8V.

To invert this output to give out a +8v signal upon a fail-safe activation, un-solder the pad D(-) and solder link pad C(+) to the long soldering pad.

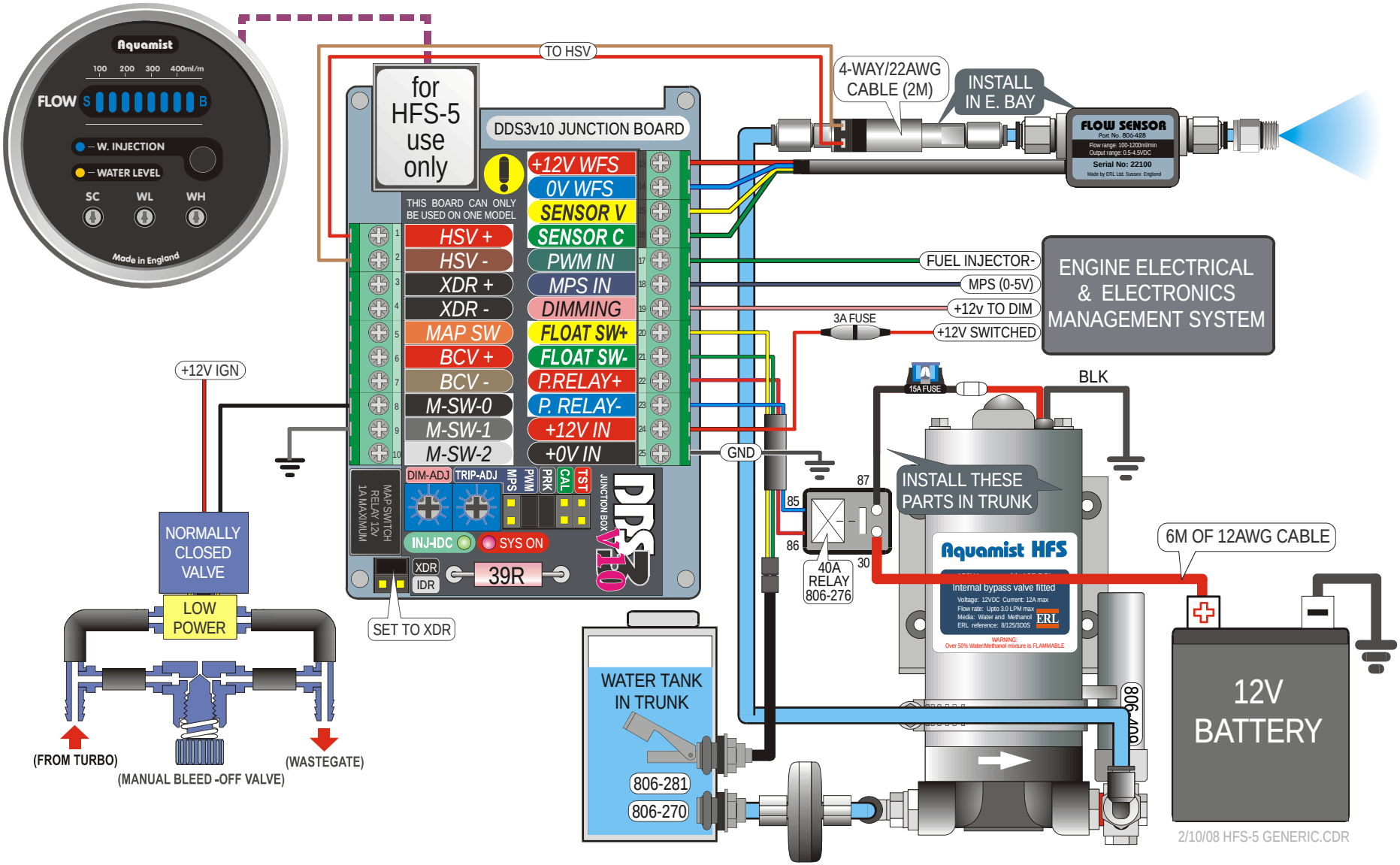
E: CMP Clamping MSW signal (default=clamped)

Solder linking this pin will clamp the above MSW signal down to 4.7V, suitable for most digital devices. It is factory linked to give 4.7V.

F: PWM MODE polarity (default=negative switched)

To change the PWM detection polarity to positive, pick off the thin track and solder-link the "+" pad to the long pad. This mode is rarely used except the DDS3 is used for monitoring WAI system using a positive PWM signal to control the water pump speed. (For example, Snow and Devilsown system)

GENERIC WIRING DIAGRAM FOR HFS-5v10 with MBC



Appendix

In Car Dash Gauge (8-core cable)

Pin	Colour	Size	Description	Electrical parameter
1	-	24awg	+12V power supply to gauge	250mAmax@12v
2	-	24awg	Flow Sensor output voltage	0-5 VDC @10mA
3	-	24awg	0V power supply to gauge	250mAmax@12v
4	-	24awg	Internal communication signal	-
5	-	24awg	Float Sensor from water tank	Ground active
6	-	24awg	Flow Sensor calibration output voltage	5-0 VDC @1mA
7	-	24awg	Night driving dimming connection	+12V active
8	-	24awg	Wastegate bleed valve option (SW-)	1A

@12V max.

Flow Sensor (4-core cable)

Pin	Colour	Size	Description	Electrical parameter
1	Red	24awg	+12V power supply of Flow Sensor	30mA @ 12v
2	Blue	24awg	0V power supply of Flow Sensor	0V Ground
3	Yellow	24awg	Flow Sensor output voltage	0-5VDC@10mA
4	Green	24awg	Flow Sensor calibration input voltage	5-0VDC@1mA

DDS3 Junction Box (25-ways - Pin 1= top left corner. Pin 25 bottom right corner)

Pin	Colour	Size	Description	Electrical parameter
RJ45	------	8-core	Same as Dash Gauge Above	------
1	Red	22awg	+12V power supply to Solenoid valve	+12V, 1A fused
2	Brown	22awg	Switching to ground for Solenoid Valve	1A maximum
3	D.Grey	22awg	Extending Dummy resistor (+12V side)	1A maximum
4	D,Grey	22awg	Extending Dummy resistor (EMS)	1A maximum
5	Orange	22awg	Programmable Map switch signal	5mA signal
6	Red	22awg	Boost control valve +12V supply	1A max
7	Brown	22awg	Boost control valve switch to ground	600mA max
8	Black	22awg	Normally closed relay contact (fail-safe)	1A max
9	Grey	22awg	Wiper/common relay contact	1A max
10	White	22awg	Normally opened relay contact	1A max
11-14	------	4-core	See 4-core cable description above	------
15	Green	22awg	FIDC detect or MAP sensor	Wave input
16	Blue	22awg	MAP sensor or 0-5v based sensor	0 to 5V input
17	Pink	22awg	Night driving dimming connection	+12V active
18	Yellow	22awg	To ground when tank is empty	0.25A maximum
19	Green	22awg	Common ground	0.25A maximum
20	Red	22awg	Priming pump +12V supply (0.5A FUSED)	0.5A maximum
21	Blue	22awg	Priming pump ground switch (active)	1A maximum
22	Red	20awg	+12V switched power supply for all	3A maximum
23	Black	20awg	0V ground supply for all	3A maximum

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Any claim against us must be made to us in writing within the period of 12 months after the sale by us , or our agents, or our distributors of goods in question (or such other period as may be indicated by us) and any goods to which the claim relates must be returned to us within that period suitably packaged and cleaned and, with any particular instructions which we may have notified to you at the time of supply. Original invoice, the nature of any claimed defect must accompany the goods in question prior to despatch to us.

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THE END

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