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7,841,322B2. 7,100,582. & Pat Pend.

Diesel Magnum Tech II

Model ICU-G5

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DEVELOPED BY

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CREDITS

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REVISION INFORMATION

The last revisions to this guide were made
1 January 2014 (V-8-LPG)

Section 1: Important Information

Limitation of liability

By purchasing, Model ICU-G5 (Kit # ADSDM57), the purchasing company, agent, distributer, dealer, installer or any individual customer ("*Purchaser*") agrees that:

1. American Diesel Systems, its officers, directors, employees, partners, holding company or investors ("*ADS*") do not have or are not subject to any liability whatsoever, for any damage resulting or caused directly or indirectly from the installation of Model ICU-G5 (Kit # ADSDM57), including but not limited to, damages to an engine or consequential damages.
2. It is not possible for *ADS*, to ensure that the *Purchaser* is and remains compliant with all directives concerning the installation, operation, use and maintenance of Model ICU-G5 (Kit # ADSDM57), fuel tanks, or other components.
3. *ADS* is not, cannot and will not be held responsible or liable for any damage, incidental, consequential or otherwise or costs incurred as a result of the use or misuse of Model ICU-G5 (Kit # ADSDM57) or ancillary componentry.
4. *ADS* is in no way obligated to indemnify or defray these costs. *ADS* liability, if any, is explicitly restricted to the price of the Model ICU-G5 (Kit # ADSDM57).
5. *ADS* cannot possibly verify nor guard the fulfillment of the directions regarding the installation, the local or national ordinances or laws pertaining to this type of equipment, or the safety and operation of Model ICU-G5 (Kit # ADSDM57)
6. When the Model ICU-G5 (Kit # ADSDM57) or any related componentry purchased from A*DS*, is put into use, this takes place under the sole and total responsibility of the *Purchaser* and / or installer.

Express Limited Warranty Statement General Provisions

1. American Diesel Systems, its officers, directors, employees, partners, holding company or investors ("*ADS*"), warrants to the original end use purchaser ("*Purchaser*") that part number ADSDM57 shall be covered for defects in material and/or workmanship.

2. *ADS* reserves the exclusive right to determine the proper course of action, regarding repair and / or replacement of the Model ICU-G5 (Kit # ADSDM57)

3. There will be no cash refund for product installed or used in any way. Any refund or compensation for unused product is at the sole discretion of *ADS*.

4. In the event of a warranty claim, it is the responsibility of the *Purchaser* to contact *ADS*, for any warranty claims a *Purchaser* may have.

5. Any *ADS* warranty claim form must be completed by the purchaser and faxed or emailed to *ADS*, prior to the shipping of any unit for repair or replacement. *Purchaser* is responsible for shipping costs. Any COD shipment will not be accepted.

6. Repaired or replaced product will be returned freight collect. Accepted warranty units, which have been replaced, become the sole property of *ADS*.

7. In the event of a Warranty repair or replacement, product warranty period continues from the original date of the original purchase of the product.

8. Warranty is not extended or renewed on repaired or replaced products, as it dates from purchase date of original item.

ADS is relieved from any responsibility or liability under this Warranty on any product for which invoices carry an open balance; i.e.: all bills must be paid in full before ADS will even consider a warranty replacement or repair. ADS may amend this warranty from time to time, at its discretion, to keep up with changing business conditions and technology.

In the Event of a Failure

Part number ADSDM53 carries a 3-year parts only warranty. There are several exceptions, so refer to this warranty's specific terms and conditions. All labor, shipping or any other charges associated with the product and the product's failure are not covered under warranty. Labor and/or shipping charges will not be refunded under any circumstance. In the event of a failure, the purchasing company, agent, distributer, dealer, installer or any individual customer ("*Purchaser*") must complete and fax, or Email the warranty form to American Diesel Systems, ("*ADS*"). Only then can the defective product be returned to *ADS* for inspection, before a replacement is sent. After *ADS*, inspects the product and completes the failure analysis, the inspection officer at *ADS*, will provide written documentation stating the condition of the product and determine, to the best of his or her ability, what caused the malfunction or complaint. Based on the findings of the inspection report, *ADS* will decide whether there is a valid warranty claim.

Should a *Purchaser* require immediate service and chooses not to wait for its product to be returned to *ADS* for inspection, service, and potential repair or replacement, the *Purchaser* can use existing inventory as a replacement or purchase replacement product from *ADS*. When the defective product arrives, *ADS* will inspect it. During inspection, *ADS* will assess the product for warrantable damage. If the original product has indeed failed under the terms of the original warranty, *ADS* will replace any inventory used or refund the full purchase price for the replacement product only. If the product has failed due to any issue not covered under the original warranty, *ADS* will assess charges to the *Purchaser* based on any parts necessary to return the product to nominal ADS standards. *ADS* will deduct the total cost of required parts from the replacement product's purchase price, and the purchaser will be refunded the difference (if any) between the purchase price paid for the replacement product and the cost of parts.

If the *Purchaser* can wait for their product to be returned to *ADS* for inspection, service, and potential repair or replacement, the purchaser pays shipping to and from *ADS*'s shop. When the defective product arrives in Illinois, *ADS* will inspect the product. *ADS* will then assess the product for warrantable damage. If the product has failed under the terms of the original warranty contract, *ADS* will repair or replace the product – at *ADS*'s discretion. If the product has failed due to any issue not covered under the original warranty, *ADS* will assess charges to the purchaser based on any parts necessary to return the product to nominal *ADS* standards.

Specific Limited Warranty Statement

American Diesel Systems, its officers, directors, employees, partners, holding company or investors ("*ADS*") warrants the original purchaser ("*Purchaser*") that any parts purchased shall be free from defects in material and workmanship. *ADS* is the warrantor of this product, direct and or through its authorized distribution network. *Purchaser* must contact its respective supplier first for any warranty concerns, unless product was purchased direct from manufacturer. A defect is defined as a condition that would render the product inoperable. This warranty does not cover deteriorating of plating, paint or any other coating. *ADS* liability is limited to the repair or replacement, at *ADS*'s option, of any component of part # ADSDM53 returned prepaid with a prior sent warranty form via fax or Email. Repaired or replaced, product will be returned to the authorized supplier, freight collect. Accepted warranty units, which have been replaced, become the sole property of *ADS*. A Return Product Authorization number, obtained in advance, from an *ADS* service representative, must accompany the completed warranty form, prior to shipping products for warranty determination. *ADS* will be the final authority on all warranty decisions. This warranty shall not apply to any unit which has not been installed by a certified and or trained installer, has been improperly stored or installed, was subjected to misapplication, improper operating conditions, accidents, or neglect; or which has been improperly repaired, altered or otherwise mistreated. This warranty shall terminate at the end of 36 months in service with the original purchaser. Labor cost incurred by the removal and replacement of the unit or components thereof, while performing warranty work, will be the responsibility of the *Purchaser*; in no case does the obligation of *ADS* exceed the original purchase price of the product as indicated on the original bill of sale. Except as set forth in this warranty, *ADS* disclaims any implied warranty, including implied warranties of merchantability and fitness for a particular purpose. *ADS* also disclaims any liability for incidental or consequential damages including, but not limited to, repair labor, rental vehicles, hotel costs or any other inconvenience costs. This warranty is in lieu of all warranties or guarantees, either expressed or implied.

The Following is NOT Covered under Warranty

ADS is not liable for any towing charges, travel/lodging expenses, lost wages, business losses, replacement vehicle charges, or any other resulting charges due to the failure of the component in question. Labor and/or shipping charges are not covered under any circumstance. Except as set forth in this Express Written Warranty, ADS disclaims any implied warranty, including implied warranties of merchantability and fitness for a particular purpose. ADS also disclaims any liability for incidental or consequential damages including, but not limited to, repair labor, rental vehicles, hotel costs or any other inconvenience costs. The Express Written Warranty is in lieu of all warranties or guarantees, either expressed or implied, and shall not extend to any person, other than the original end use purchaser.

Section 2: Installation Preparation

Contents of ADSDM57 Kit

Qty	Description	Connection or Installation location	Page	Part #
1	DM Control Unit /LPG	Control Box-Mounts in Cab or in Dry Protected Area	12	ADSDM53
1	Harness-Main-DM	Connects to Control Box and all Electrical Componentry	12	ADS528
1	Harness Injector X 2 (1-15 Liters)	Plugs into Main Harness & Alt Fuel Injectors	18	ADS529
1	*Harness Injector X 4 (16-30 Liters only)*	Plugs into Main Harness & Alt Fuel Injectors	18	ADS530
1	Switch-Control W/ MIL & Fuel Indicator	Mounts in Dash of Vehicle or Control Panel of Gen Set	13	ADS531
1	Filter Assembly W/ Pressure & Temp Sensor	Connects " in -line " Between Regulator & Injectors	13	ADS532
1	Nozzle Induction Alt Fuel	Mounts in Fresh Air Intake of Engine (Pre Turbo)	14	ADS534
1	Nut-Jam-Induction Nozzle	Secures Induction Nozzle in Fresh Air Duct	14	ADS535
1	Thermocouple-EGT Sensor	Mounts in Exhaust as close to Turbo Outlet as Possible	13	ADS536
4	Feet of 3/ 8" ID Alt Fuel Vapor Hose	Regulator to Filter & Filter to Injectors (Must be 4')		ADS537
1	2 Injector Assembly (1-15 Liters)	Connects to Inj-Sub-Harness & Induct Nozzle/Alt Fuel Filter	14	ADS567
1	*4 Injector Assembly (16-30 Liters only)*	Connects to Inj-Sub-Harness & Induct Nozzle/Alt Fuel Filter	18	ADS567-4
1	Alt Fuel Regulator (LPG)	Connects to Alt Fuel Lock Off & Filter Assembly	13	ADS557
1	Alt Fuel Lock Off	Connects to Line from Motor Fuel Tank & Regulator	13	ADS556
1	Alt Fuel Vapor Hose	To Connect Injectors to the Induction Nozzle		ADS537
1	Kit-Literature			
1	Installation Guide			ADS570
1	Owner's Manual	Keep with Vehicle or Equipment		ADS573
1	Warranty Card	Fill Out & Send to ADS		
1	Warranty Certificate	Keep in Vehicle or With Equipment		
1	Decal " Diesel Magnum"	Place as Desired on Vehicle or Equipment		ADS571
1	Fault Code " Key Chain"	Keep with Vehicle or Equipment		ADS572

Accessories Needed

1	Motor Fuel Tank (LPG)	Mnts on Vehicle or Near Equipment-Connects to Lock Off
1	Miscellaneous Hardware & Fittings	To Mount & Connect Componentry

Tools Recommended

Basic Tools	Basic Socket & Wrench Set	Safety Tools	Safety Goggles
	Adjustable Wrench		Recommended Alt Fuel Gloves etc.…
	Good Quality Hose Cutter		
	A Clean Work Bench	Special Tools	Soldering Gun or Torch
	A Parts Tray		1/8 NPT Pipe Tap
	Rags or Shop Towels		20mm Drill or "Step Drill"
			OEM Shop Manual (Available From OEM)

Section 3: Pre-Installation Check List

Before installing Model ICU-G5 (Kit # ADSDM57), complete the following checklist.

!! CAUTION !!

Failure to complete the Pre-Installation Checklist may result in severe engine damage after installation is complete.

1. Verify Condition of Engine: Before installing any Alternative Fuel Components, ensure the engine runs smoothly and that the factory malfunction indicator light ("MIL") is off. The MIL indicates a problem with one or more OEM systems. If the MIL is on, this condition MUST be corrected before proceeding.

!! CAUTION !!

Alternative Fuel products are intended for use only on stock, unmodified, well-maintained engines. Installation on a worn-out engine is NOT recommended. Installation on a modified engine is NOT recommended without first investigating, how the modification may be affected, by the addition of an alternative fuel, in the combustion process.

2. Verify Condition of Diesel Fuel and Fuel System: Ensure fuel used in the engine is of good quality (Clean Diesel Fuel) and it is not contaminated (water, dirt…). Inspect all filters and water separators to ensure that maintenance has been kept and system is up to OEM specs.

3. Verify Engine and Under Hood Area are Clean. Never remove fresh air intake duct work or components, unless they are clean and debris free. Opening these components, in a dirty state, could contaminate the internal area and prove fatal to the Turbo Charger and / or Engine.

4. Assess Cleanliness of Installation Area: Make sure your work area is free from debris. The Diesel Engine is an expensive piece of equipment and care must be taken not to contaminate systems or parts.

5. Verify Turbo Charger Condition: After removal of the fresh air intake duct work it is wise to inspect the Turbo Charger for excessive ware and contamination from oil or debris.

6. Identify All Components: Before beginning installation, identify all the components purchased and ensure all items are present and undamaged.

7. Read through the DM Installation Guide (in its entirety) prior to the actual commencement of any installation procedures. Familiarize yourself with the components purchased and the tools and equipment you will use. Read and understand all the recommended procedures before you start for faster and easier installation.

Before you begin any procedures, make sure you have completed all of the Pre-Installation Checklist.

- ✓ 1) Verified the Condition of the Engine
- ✓ 2) Verified Condition of Diesel Fuel & Fuel System
- ✓ 3) Verify Engine and Under Hood Area are Clean.
- ✓ 4) Assessed the Cleanliness of the Installation Area
- ✓ 5) Verify Turbo Charger Condition
- ✓ 6) Identify All Components
- ✓ 7) Read DM Installation Guide

NOTICE:

Installation of American Diesel Systems products signifies that you have read this document and have agreed to the terms stated within.

It is the purchaser's responsibility to follow all installation instruction recommended guidelines and suggested safety procedures supplied with the product, as it's received by the purchaser to determine the compatibility of the product, with the vehicle or the device the purchaser intends to install the product on.

American Diesel Systems (ADS), its officers, directors, employees, partners, holding company or investors assume no responsibility for damages occurring from accident, misuse, abuse, improper installation, improper operation, lack of reasonable care or all previously stated reasons resulting from incompatibility with other manufacturer's products.

There are no warranties expressed or implied for engine failure or damage to the vehicle in any way, loss of use or inconvenience or labor reimbursement. This includes merchantability and fitness.

Be sure you have read and understand the Important Information Section, the Installation Preparation Section and have completed the Pre-Installation Checklist, then proceed to the Illustrated Installation Guide.

Section 4: Illustrated Installation Guide

A. Preparation Before Component Installation

- Before you begin, ADS recommends that you clean the engine and engine compartment. Failure to do so could result in grease or debris build up to become dislodged and fall into the air intake or other componentry and cause damage.
- Make sure the engine has cooled down before you begin. Exhaust components can remain dangerously hot for long periods of time.
- To help you with reassembly, we suggest taking digital pictures of wiring connections to sensors, hose connections or position of components before removing them. If a camera is not available you could mark things with masking tape to ensure they are reconnected at the end of the job.
- It is always a good practice to keep all nuts, bolts and other fasteners with the components they belong to. Plastic bags or masking tape can help with this.
- The Model ICU-G5 (Kit # ADSDM57) is designed to be non-intrusive. Do NOT change any OEM factory settings.

B. Map out Parts & Harness

1. ADS recommends that the installing technician, position the componentry, where it may be installed and lay out the main harness and sub harness (fig 1). This is a good way to determine if all branches of the harness, will reach their intended components.
2. Check the fresh air intake for the air compressor (if equipped) to see if it is plumbed to the intake manifold, post Turbo Charger. This is a common place for late model trucks to draw clean air for the air compressor. However, introducing an alternative fuel pre Turbo Charger with this arrangement poses a problem of the Alternative Fuel entering the Air Compressor (fig2). This is solved easily with re-routing this hose to an area in the fresh air duct work after the air filter and BEFORE the location of the DM Induction Nozzle (fig3)

ADS offers A kit for this

C. Installation of Purchased Components

1. Find a suitable location for the DM control unit. This area should be assessable for technicians to access for information downloads. Make sure the unit is in a dry safe place free from excessive heat or debris (fig4).
2. Mount the control unit utilizing the 4 mounting holes in the flanged lid. Make sure there is clearance for the 40 pin main connector on the harness.
3. Route the Main harness including all branches under hood and in cab being careful to avoid sharp edges and sources of RFI or Magnetic interference, i.e.: Alternators, Blower Motors, Antenna Wires… Always use Rubber Grommets when routing through fire walls and the like. Make sure that the harness is secured every 12 inches in a professional manner.
4. Connect the main harness via the 40 pin connector to the control unit. This is accomplished with a 4mm or 5/32" hex wrench (fig5). Take care not to over tighten the screw in the connector. Use the screw to draw the connector into to its mate on the control unit and lightly snug the screw.
5. Connect the main harness to the vehicles data link wires utilizing J1939 or J1708 (fig6).The DM harness has two twisted pairs of wires to connect with. These communication wires must be twisted. Green and yellow are for J1939 & Blue & white are for J1708 (fig7). It is important to note that with some engines both protocols are required to access all the data for auto learn. ADS always recommends, connecting to both, if the two are available. Please see PG 22 "SAE J1708 / J1939 Wiring Reference"" for a detailed schematic of vehicle data link connectors and further instructions for this VERY IMPORTANT step.

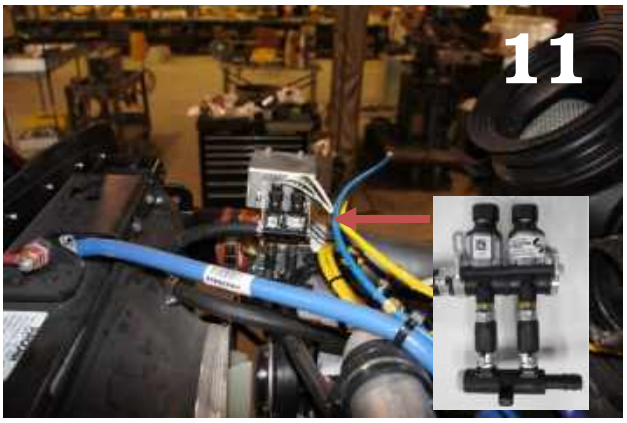
6. Find a suitable location for the on/off switch w/ integrated MIL (malfunction indicator lamp) and fuel level gage (Part # ADS531). Keep in mind that there MUST be at least 60mm of depth clearance for the switch and harness plug. Take into consideration that the operator should be able to safely view this unit as they would any other vehicle instrumentation (fig8). Once the location is determined, drill the "20mm" mounting hole (a step drill works well for this operation). Using care, gently install the switch into the mounting hole.
7. Find a location for thermocouple EGT (exhaust gas temperature) sensor (Part # ADS536) downstream of the Turbo charger outlet, yet as close as possible to the Turbo Charger inlet. The location must be metal capable of being "drilled and tapped", cast iron is NOT suitable for this. Utilizing a 5/16" drill bit make the mounting hole. Tap the hole with a 1/8" NPT tap. Install the adapter and then the thermocouple (fig9). Do NOT over tighten the adapter of the thermocouple. Now connect the two wires from the harness to the thermocouple pig tail, utilizing the supplied machine screws and nuts, via the ring terminals, making sure the color coding is correct or the sensor will not function (red to red / yellow to yellow). Seal the electrical connections with heat shrink or similar product. Route the thermocouple harness away from any excessive heat or components capable of transmitting RFI interference
8. When selecting the location for the LPG Fuel Regulator/Lock Off/Filter and Injector Assembly, make sure they are protected from road debris, excessive heat and especially moving parts. These components come pre-assembled and should NOT be altered or modified. (fig10).

   Please Note: Do NOT cut or change the length of any hoses attached to this assembly. This will cause the system to go into a series of "faults".

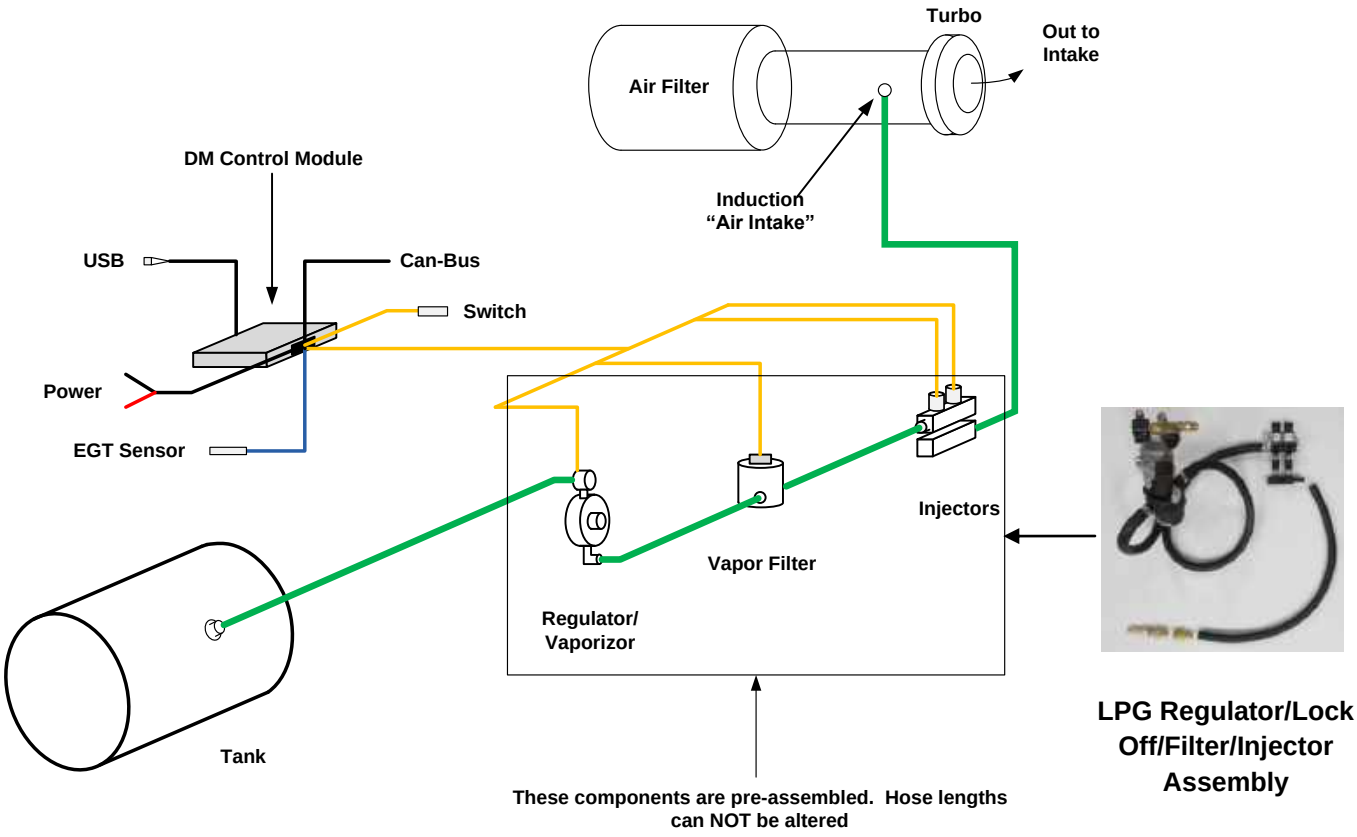
Fig 10

LPG Fuel Regulator/Lock Off/Filter Assembly

9. Find a suitable location for the injectors. Mount the injectors preferably as close as possible to the induction nozzle location. An example of mounted injectors is in (fig11). Connect the injector sub harness to the injectors. Please see section 5 entitled Electrical Connections for more information on this operation.
10. Install the Induction Nozzle Part# ADS534 in a suitable location, pre Turbo Charger in the fresh air inlet duct work, as close as possible to the turbo inlet, keeping safe clearance from the turbine (fig12). Utilize the supplied Jam Nut to secure the Nozzle in place. It is a recommended practice to "score" the threads on the Induction Nozzle when possible after it is mounted securely with the Jam Nut, thus ensuring the "Jam Nut" will not back off.



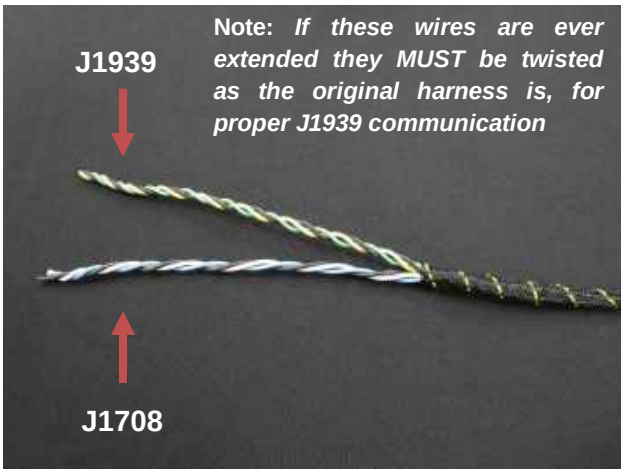
Please refer to diagram below for DM System overview



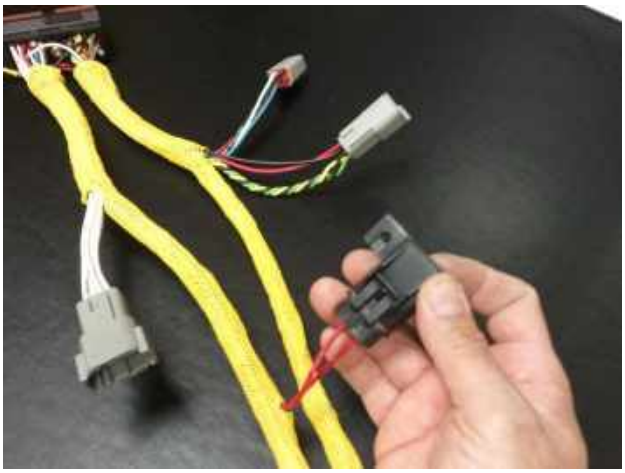
LPG Regulator/Lock Off/Filter/Injector Assembly

Section 5: Electrical Connections

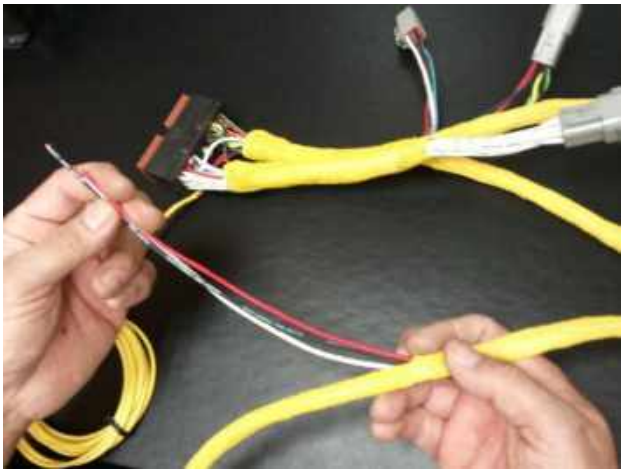
Gently install main harness 40 pin plug into controller. Use the mounting center screw to draw in the plug. Do not over tighten!



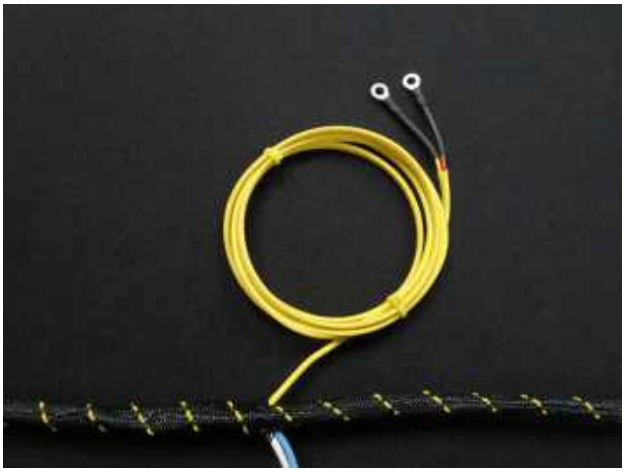
The "twisted pair" of communication wires for J1939 are yellow, green and black. Yellow is Negative - and Green is Positive +
The "twisted pair" of communication wires is for J1708 are blue, white and black. Blue is Negative - and White is Positive +.



This is the main 10 amp fuse for the controller and related parts.

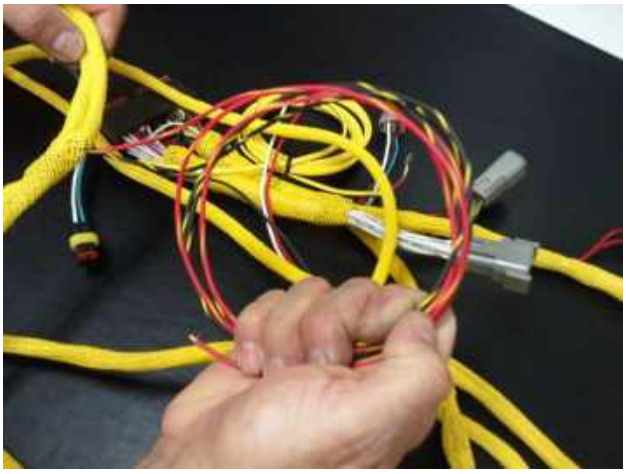


Main Power, Black is ground, Red is positive. You may connect the Red positive to any voltage from 9v to 48v! White wire is for a 90ohm fuel tank sender, needed for the fuel gauge in the switch to function. If not connected Gauge flashes Red as if tank was empty.



This is the EGT Sensor cable. Note the Color Code and be sure it is matched properly with the sensor pig tail. Connect the wires with the supplied Machine Screws and lock Nuts.

This is the Alternative Fuel Lock Off Connector



These wires connect to the TPS signal wire in MANUAL MODE installations only! Secure & Cap in computer controlled engine installations. (*Manual Mode is only used in European Country installations*)

Pressure & Temperature Sensor Connection, located in the Assembly, in module.. Replacement Cartridges are available from ADS

Main Control Switch with integrated MIL & Fuel Gauge Connection.
Care should be taken when Installing and Connecting Harness to Switch.

Injector "Sub Harness" connection for 16 liter to 30 liter engines. 4 Injectors. Either Sub Harness plugs into this connecter and the system is intelligent enough to detect whether 4 or 2 Injectors are connected.

Injector "Sub Harness" connection for 1 liter to 15 liter engines. 2 Injectors. Either Sub Harness plugs into this connecter and the system is intelligent enough to detect whether 2 or 4 Injectors are connected.

Section 6: Fluid Connections

Typical Propane Motor Fuel Tank. The tanks come in a variety of shapes & sizes. It will usually have 2 outlets (vapor & liquid), a pressure relief valve, a fill valve and a service valve mechanical or electric. Propane is stored as a liquid.

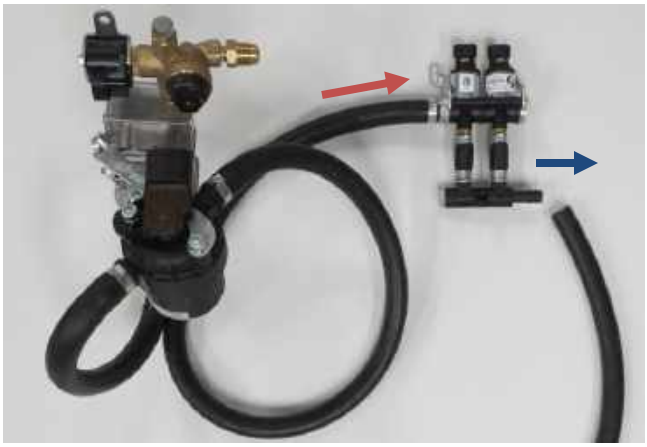
Propane "service valve". Liquid Propane exits the tank through this valve. It has an excess flow valve incorporated to shut off in the event of a leak. From here, liquid propane travels to the fuel lock via line and possibly a filter.

This connection is the liquid propane line from the Fuel Tank to the Fuel Lock.. LPG flows through this device when energized.

Liquid propane flows from the fuel lock to the regulator where it is converted to a vapor & exits via hose and the filter assembly on to the injectors.

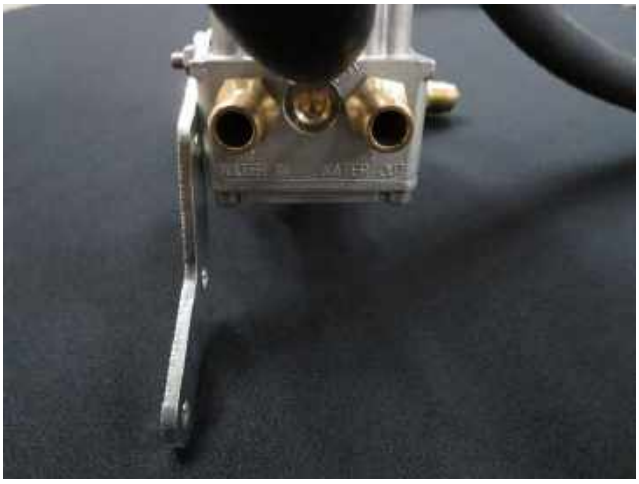
This is part # ADS532, filter, pressure & temperature sensor. Propane vapor flows from the regulator through this assembly and on to the injectors. Sensors feed the controller valuable information allowing constant compensation in injection

This is serviceable cartridge part # ADS533 inside the "spin off canister" that is easily replaced in regular maintenance.



Alternative fuel injector assembly. Low pressure propane enters at the red arrow and exits at the green arrow. From here the vapor travels to the Induction Nozzle to be introduced to the fresh air inlet of the engine

Induction Nozzle Assembly. Installed in the fresh air intake, pre-turbo.

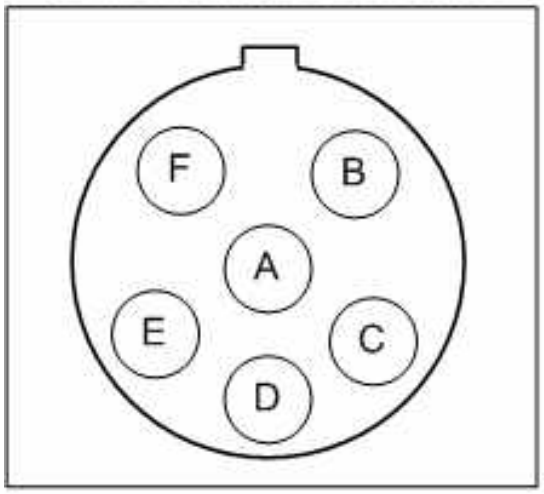


This shows the engine coolant ports of the LPG fuel regulator. You must have good coolant flow through the regulator at all times for proper vaporization of the LPG. It takes "quantity of heat" not temperature.

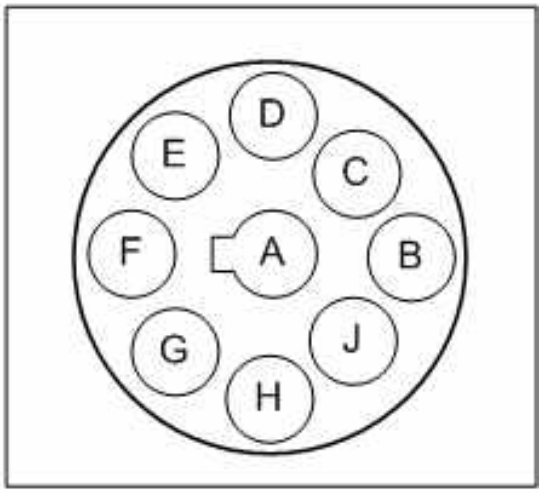
For Reference When Connecting Communication Wires

SAE J1708 / J1939 Wiring Reference

6-PIN Deutsch Connector



9-PIN Deutsch Connector



6-PIN Deutsch Description

A	J1708 (+)
B	J1708 (-)
C	Power (+)
D	N/A
E	Power (-)
F	N/A

9-PIN Deutsch Description

A	Power (-)
B	Power (+)
C	CAN J1939 HI (+)
D	CAN J1939 LO (-)
E	CAN J1939 Shield
F	J1708 (+)
G	J1708 (-)
H	
I	

Section 7: Controller Initialization

1. Start the engine and turn on the control switch. A 3 second flash and 10 second pause of the yellow MIL, indicates normal operation with NO faults. If a fuel level indicator is connected on the white wire from the main harness, you will see the fuel level displayed on the switch assembly. If no sending unit is connected, or the fuel tank is close to empty, the gauge on the switch assembly will flash red.
2. Allow the engine to reach a temperature of at least 110 degrees Fahrenheit. At this point the controller will begin a series of tests, including leak checks, alternative fuel vapor pressure, alternative fuel vapor temperature and flow tests of each injector connected. It is normal to hear a change in the engine idle while these tests are being performed. This whole procedure after 110 degrees f is reached should take place within a few minutes. If all components pass their respective tests, the malfunction indicator lamp ("MIL ") will continue to flash on for 3 seconds and pause for 10 seconds. If a component failed a test, the MIL will flash a fault code, indicating the problem. Fault codes are listed in section 8, entitled Diagnostics & Troubleshooting.
3. You now need to initialize the controller for learning, by reaching a minimum of 1400 rpms and 90 percent engine load (to determine "max boost" from the Turbo Charger). This can be achieved by climbing a hill with a loaded vehicle or trailer, by safely "brake torqueing" the vehicle to simulate a load, or in the case of a generator or pump application, "loading it up by electrical or fluid demand. Once the minimum rpm and load is achieved, the controller will enter auto learn, indicated by a steady illuminated MIL.
4. The controller will now learn engine parameters, driving habits, rpm ranges and Diesel Fuel consumption throughout the entire power band. This process will take 1 hour of running time unless programmed differently from the manufacturer. During this learn process the MIL will remain on solid. The engine can be shut down and the controller powered off during this process. The controller will simply pick up where it left off when it repowers. Once the 1 hour run time has elapsed the controller will check the data for minimum requirements (if not achieved the controller will remain in "learn mode"), build the tables and automatically turn on the alternative fuel.
5. That is it, you are done. There is NO adjusting, no tuning and no "tweaking" as with other products.

It is important to note, that the controller will enter "Re-Learns" every 2500 hours. The MIL will stay on steady during these Re-Learn periods. Re-Learning the data ensures that the controller is always injecting the precise amount of alternative fuel throughout the engines life. Normal engine wear, aftermarket filters, engine tune ups, engine rebuilds all can affect fuel demand. Automatic re-learns do not require loading the engine as described above.

Section 8: Diagnostics

A. Diagnostic Fault Codes

The DM Tech II Controller will flash the "Fault Codes" on the Malfunction Indicator Lamp ("MIL") in the on/off Switch Assembly. For example, code "33" will flash three times, pause and flash again three times, over and over until the fault is erased. Fault codes are erased by curing the detected fault and re-powering the controller. The Fault Codes are listed below:

11 Injector 1 Electrical Fault (bad Injector Coil or bad Connection)

12 Injector 2 Electrical Fault (bad Injector Coil or bad Connection)

13 Injector 3 Electrical Fault (bad Injector Coil or bad Connection)

14 Injector 4 Electrical Fault (bad Injector Coil or bad Connection)

21 Injector 1 Flow Too Low in Flow Test (adjust or change Tip orifice)

22 Injector 2 Flow Too Low in Flow Test (adjust or change Tip orifice)

23 Injector 3 Flow Too Low in Flow Test (adjust or change Tip orifice)

24 Injector 4 Flow Too Low in Flow Test (adjust or change Tip orifice)

31 Injector 1 Flow Too High in Flow Test (adjust or change Tip orifice)

32 Injector 2 Flow Too High in Flow Test (adjust or change Tip orifice)

33 Injector 3 Flow Too High in Flow Test (adjust or change Tip orifice)

34 Injector 4 Flow Too High in Flow Test (adjust or change Tip orifice)

41 Rail Pressure Too Low (Problem with Regulator or Leak)

42 Rail Pressure Too High (Problem with Regulator)

51 Fuel Lock Off Electrical Fault (bad coil or bad connection)

52 Exhaust Gas Temperature Too High (Plugged OEM air filter or leaky Diesel Injector)

53 Engine Temperature Too High (Low engine coolant, T Stat, Cooling Fan inop…)

54 Bad Data Received From ECU (J1939 or J1708 connection wrong)

55 Injector Test PSI Not Stable (Fuel Rail Leak, Injector Seal bad, Regulator Problem)

56 Injector Test Abort. The controller was unable to reach the test psi and or maintain it.

57 Warm-up Failure. Regulator Temperature Insufficient.

58 Mechanical Fuel Lock Failure. Fuel Lock-off Not Closing Properly.

B: Recommended maintenance:

Component/Service	Actions	Comments
LPG Vapor Filter	Replace when you service your OEM filters	More frequently if LPG fuel quality is poor
LPG Liquid Filter	Replace when you service your OEM filters	More frequently if LPG fuel quality is poor
Injectors	Replace every 50,000 miles (or sooner) or follow manufactures re-conditioning	More frequently if LPG fuel quality is poor
LPG Fuel Regulator	Replace once a year or follow manufactures re-conditioning	More frequently if LPG fuel quality is poor
Fuel Lock Off	Replace once a year or follow manufactures re-conditioning	
Leak Checks	Every engine service	Use soapy water in a spray bottle

Section 10: Supplements

A. Inspection & Reporting on OEM systems

This is the fresh air inlet tube for the Turbocharger. This is on a brand new truck! The inside is corroding & flaking. It is important to note these types of problems so the owner is aware and can let the engine manufacturer know a potential problem exists!

Take a look in the Turbocharger inlet and check for oil. This could be a sign of a failed or failing seal. Also check for contamination and ware. Any problems need to be brought to the owner's attention prior to using the alternative fuel.

It is very important to check the engine and systems condition and functionality. Make sure that the purchaser has kept up with the maintenance of the engine. Our products are designed to protect engines not damage them. A failing turbocharger, unreported to the owner could have the failure blamed on you.

NOTES: