



**FORD PERFORMANCE**

## **Instruction Sheet**

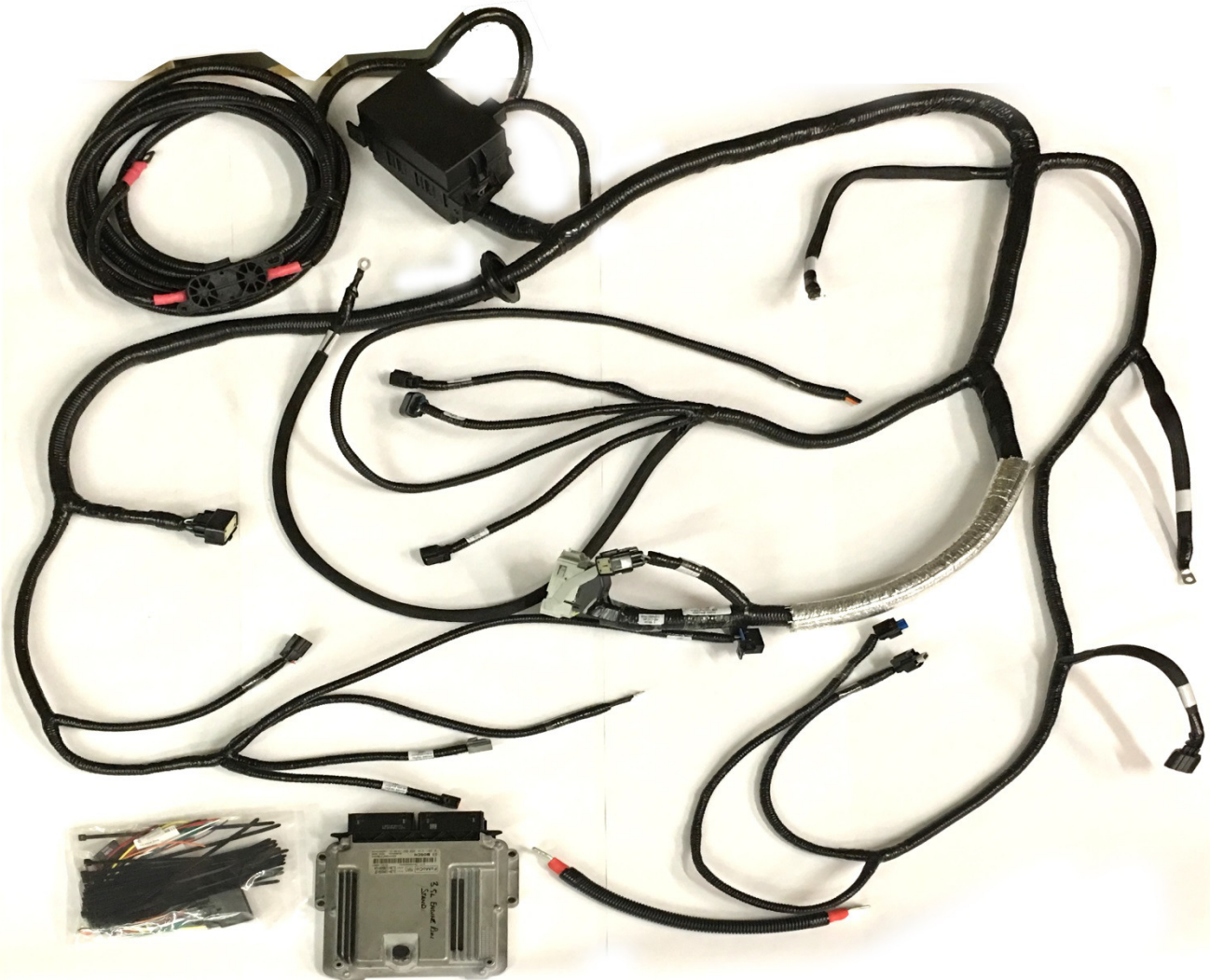
### **M-6017-35CNTRL 2013-2015 3.5L EcoBoost Controls Pack**

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Please visit [www.fordracingparts.com](http://www.fordracingparts.com) for the most current instruction and warranty information.

**PLEASE READ ALL OF THE FOLLOWING INSTRUCTIONS CAREFULLY PRIOR TO INSTALLATION. AT ANY TIME YOU DO NOT UNDERSTAND THE INSTRUCTIONS, PLEASE CALL THE FORD PERFORMANCE TECHLINE AT 1-800-367-3788**

## ***3.5L EcoBoost Controls Pack Installation Manual***



Factory Ford shop manuals are available from Helm Publications, 1-800-782-4356



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## **1.0 Introduction**

This kit was developed by Ford Performance in order to allow performance enthusiasts the ability to install the 3.5L EcoBoost Crate Engine (Ford Performance P/N: M-6007-35T) into the application of their choice. The system supports use of a manual transmission only.

Note: Cruise control is not available with this system.

## **2.0 Overview**

This booklet provides a step by step guide for the preparation and installation of the controls pack. Please read the instructions thoroughly before starting the installation. If you have any questions, contact Ford Performance Technical Support at (800) 367-3788.

## **3.0 Included Components**

### **3.1 Powertrain Control Module (PCM) – CMDL3Z-12A650-ZF**

- The PCM is the central processing unit for engine operation. Input data/engine operation feedback is provided from each of the engine’s sensors connected to the PCM via wiring leads. This input data is used to perform calculations that in turn adjust fuel quantity, turbo pressure, and spark timing according to varying driver demand (ie – accelerator pedal input).

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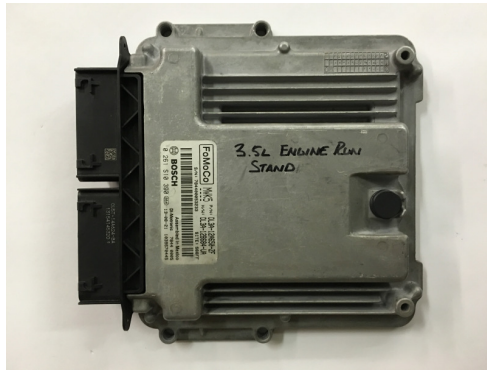
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- The wiring that plugs into the PCM is integral to the wiring harness that was included with your 3.5L crate engine, the length of these wiring leads dictate that mounting location be in close proximity to the engine itself.
- The PCM in this Controls Pack has a custom software and calibration dataset which were specifically modified/developed by Ford Performance engineers to provide peak performance and reliability with the 3.5L EcoBoost Crate Engine (Ford Performance P/N: M-6007-35T)



#### PCM Calibration Application Notes:

- The calibration provided in this PCM will NOT work with the 'Returnless' fuel system as used on factory vehicles. Use of a return style fuel system is required. Refer to Section 7 of this manual for more information on fuel system requirements for this PCM.
- The Air Filter Assembly with Integral Mass Air Flow Sensor included with this kit must be used to achieve acceptable engine performance. If air filter assembly provided is not used, calibration may be required. Refer to Section 3.7 for more information about Air Inlet System requirements.
- **Premium Fuel Only (91 Octane or higher).**

**NOTE: Due to the fuel system requirement described above, installation of this PCM in ANY Production vehicle will result in a no-start condition!**

#### 3.2 Accelerator Pedal Position Sensor (APPS) – DL3Z-9F836-A

- The accelerator pedal assembly includes a pair of integrated pedal position sensors (APPS1/APPS2). This pedal has electrical properties designed specifically for correct interface with PCM: **CMDL3Z-12A650-ZF** and is required for proper engine operation.



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#### 3.3 Clutch Pedal Position Switches: Bottom Travel (CBT) - 6G9Z-11A152-A (Gray Plunger) Top Travel (CTT) - 4M5Z-11A152-A (Black Plunger)



(CBT)



(CTT)

- The switches translate the clutch pedal position to the PCM. The bottom travel switch also acts as a starter safety interlock. The starter motor will not energize until the clutch has been fully depressed.
- CBT switch is Normally Open (IE – Clutch Pedal NOT fully depressed); Closed with Clutch Pedal fully depressed
- CTT switch is Normally Open (IE – With Foot off Clutch Pedal); Closed Otherwise
- Clutch pedal assembly P/N: DV6Z-7519-A is available through an Authorized Ford Parts dealer. Includes a clutch pedal and mounting bracket with provisions to hold both the Top and Bottom of Travel switches in the appropriate locations.

**WARNING: DO NOT BYPASS THE STARTER INTERLOCK. DOING SO CREATES A HAZARD TO THOSE IN AND AROUND THE VEHICLE AS THE STARTER CAN OPERATE WITH THE TRANSMISSION IN GEAR AND THE CLUTCH PEDAL ENGAGED.**

#### 3.4 Universal Exhaust Gas Oxygen Sensor (UEGO) – 8F9Z-9F472-H

- Two UEGO sensors provide wide range feedback to the PCM for closed loop air fuel ratio control by measuring the quantity of oxygen present in exhaust leaving the combustion chamber.
- Each UEGO is supplied with a light coating of anti-seize lubricant on its threads. Please use caution when installing as this lubricant will damage the sensor element, so make sure no lubricant comes in contact with the sensor element (tip).
- Tighten to 48 Nm (35 lb-ft).
- **NOTE:** Do not splice, lengthen or otherwise modify the UEGO wiring. Doing so will adversely affect the sensor performance & reliability of the signal.



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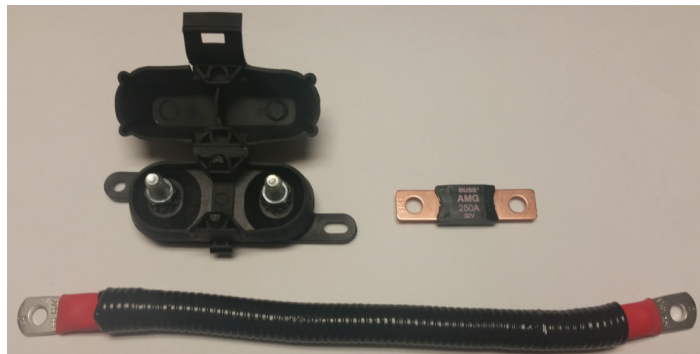
Moving the UEGO sensors to alternate locations can result in the need to recalibrate the PCM. Do not install sensors with harness on a downward angle.

It is required to locate the sensor so it is sampling from all 3 cylinders and at a distance of 2 to 6 inches beyond the turbocharger outlet flange.

**NOTE:** Modification of the UEGO harness can affect function of UEGO sensor and should not be attempted.

#### **3.5 B + to FPPDB Cable Assembly**

- Provides B+ from Battery "+" Post to in-line fuse and then to the Ford Performance Power Distribution Box (FPPDB)
- It is extremely important that the ground eyelet connection (discussed later) is attached to a solid grounding location



#### **3.6 Plastic Bag of Assorted Items**

- Zip-ties
- 4 AWG Jumper Cable
- Buss 250A In-line Fuse and Fuse Holder
- Malfunction Indicator Light
- Small diameter heat shrink (red)
- Large diameter heat shrink (black)
- Large diameter eyelet terminal
- Small diameter eyelet terminal
- Two battery terminal lugs

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#### **3.7 Air Cleaner Assembly– DL3Z-9V456-A, CL3Z-9661-A DL3Z-9C623-A, DL3Z 9R530-A**



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**IMPORTANT NOTE:** The calibration of the PCM you have received requires use of this air box system exactly as received. Any changes to the air inlet system will result in changes to how the air entering the engine is measured and will require modification to the PCM's calibration.

Ford Performance recognizes that it may not be practical to package this Air Box sensor system in some vehicle applications. The recommendations listed below are intended to serve as guidelines for designing an air inlet system that will provide good control system performance once the control system calibration has been modified to work with the new Air Inlet System:

1. **MAP sensor contamination:** Install sensor in upper half of cross sectional area to minimize possibility of condensation coming in contact with the MAP sensor element. In other words, if a clock is superimposed on a cross section of the zip tube, the sensor should be installed somewhere equal to or above the 9:00 and 3:00 positions. Most OEM applications have the sensor located at the 9:00 or 3:00 location,
2. **MAP sensor locations:** MAP sensors will have to be mounted in two separate locations. One will be located between the air filter and the turbo charger inlet. If you're using a y-pipe the sensor should be located in the pipe prior to the split. The second sensor should be 8 to 10 inches from the throttle body to prevent flow pulsations .

#### **3.8 Controls Pack Wiring Assembly – CM-14A006-35LA**

- Connects to vehicle battery and inline connector on engine harness
- Contains Ford Performance Power Distribution Box (FPPDB) and High Power 250A inline fuse
- Electrical connections to Accelerator Pedal (APPS) and Clutch Switches (CBT/CTT)
- Wire leads for Ignition Switch & Starter,
- Data Link Connector for reading Diagnostic Trouble Codes (DTCs)
- Check Engine/Malfunction Indicator Lamp (MIL) for visual indication of engine control system fault code presence
- MIL will stay illuminated when the ignition is ON and the engine is NOT running; therefore this condition does not indicate a system fault; Not all DTCs will cause the MIL to illuminate
- MIL on stock instrument panel will not work—only the MIL included in this kit will illuminate if a fault exists.

## **4.0 Pre-Installation of Harness and Parts**

### **4.1 Planning**

The following is a list of key factors to consider before any installation takes place:

- PCM mounting location is limited by the lengths of the (2) corresponding leads into which the PCM is connected. These leads are an integral part of the CRATE ENGINE HARNESS (not included with Controls Pack)
- Inline Fuse Holder must be mounted within 12” of the vehicle battery “+” post when using the supplied 4AWG Jumper Cable  
Ford Performance Power Distribution Box must be mounted within 60” of the engine powertrain controls module (carefully layout complete system prior to attaching any components).
- Lay out the harness and components first in order to ensure that the wiring leads will reach everywhere you intend them to. This is a good reality check before you drill any holes or mount any components!

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#### 4.2 Connector ID

Item	Connector #	Description	Item	Connector #	Description
A	C1551B	PCM	O	C2040	APPS
B	C146	Electronic Compressor Bypass Valve	P	C277	Clutch Top
C	-	Blunt Cut Fan	Q	C257	Clutch Bottom
D	C100	AC Comp	R	GD-100	Ground
E	C1588	TCBP	S	C251	Data Link/OBD2
F	C1260	AC Trans			
G	-	Starter Eyelet			
H	GD200	Ground			
I	GD300	Ground			
J	C102A	Alternator			
K	C1622	ECBV			
L	C1667	TCIPT			
M	-	FPPDB			
N	C160A	I/P Inline			

Table 1 – Summary of ControlsPack Connectors

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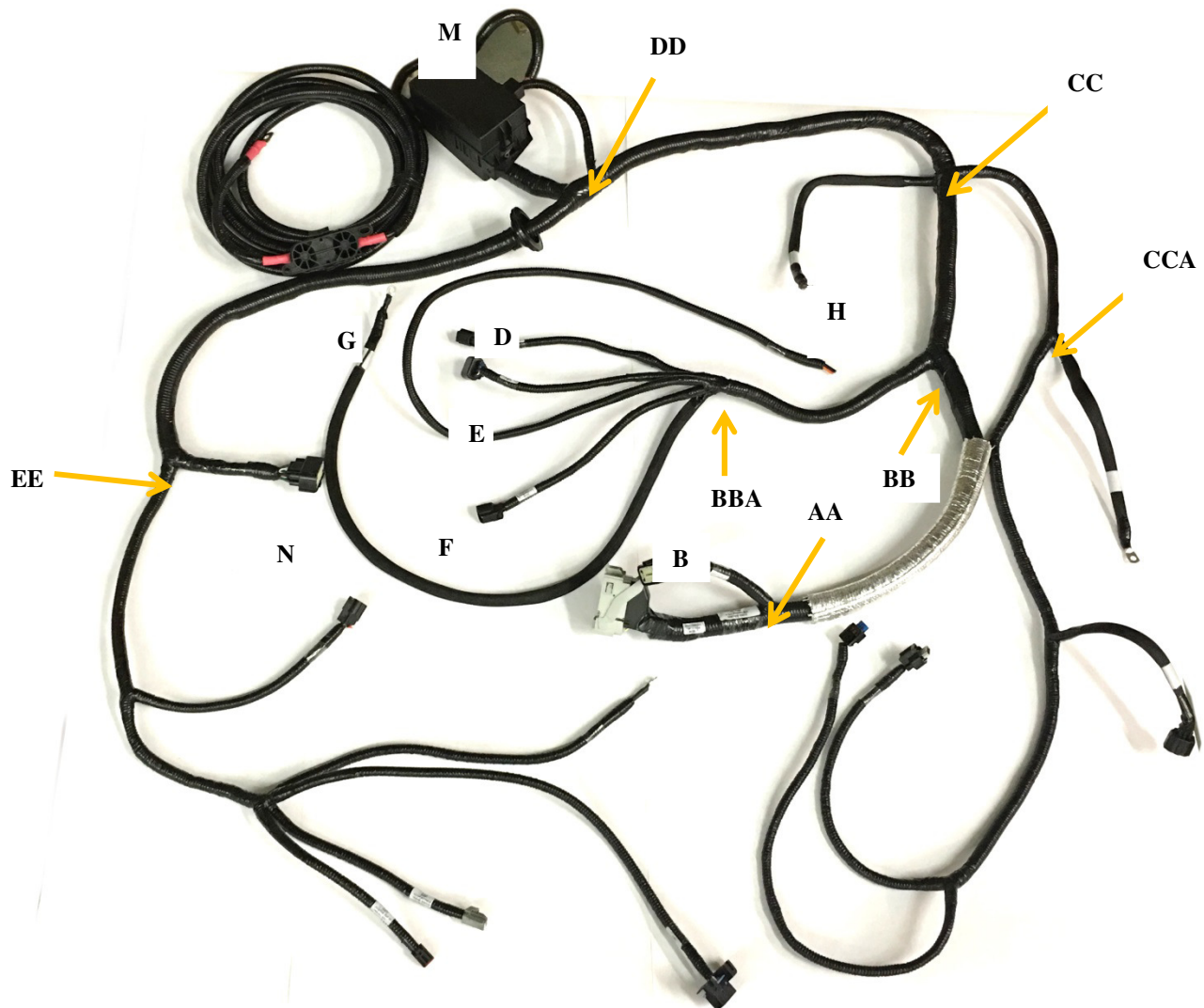


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**Figure 1 - Controls Pack Wiring Harness Components**

#### 4.3 Tools Required

- Wire Cutter/Stripping Tool
- Crimper
- Digital Volt/Ohm Meter
- Solder Gun / Solder
- Center Punch
- Cordless Drill / Drill bits / Hole saw / Screwdriver bits

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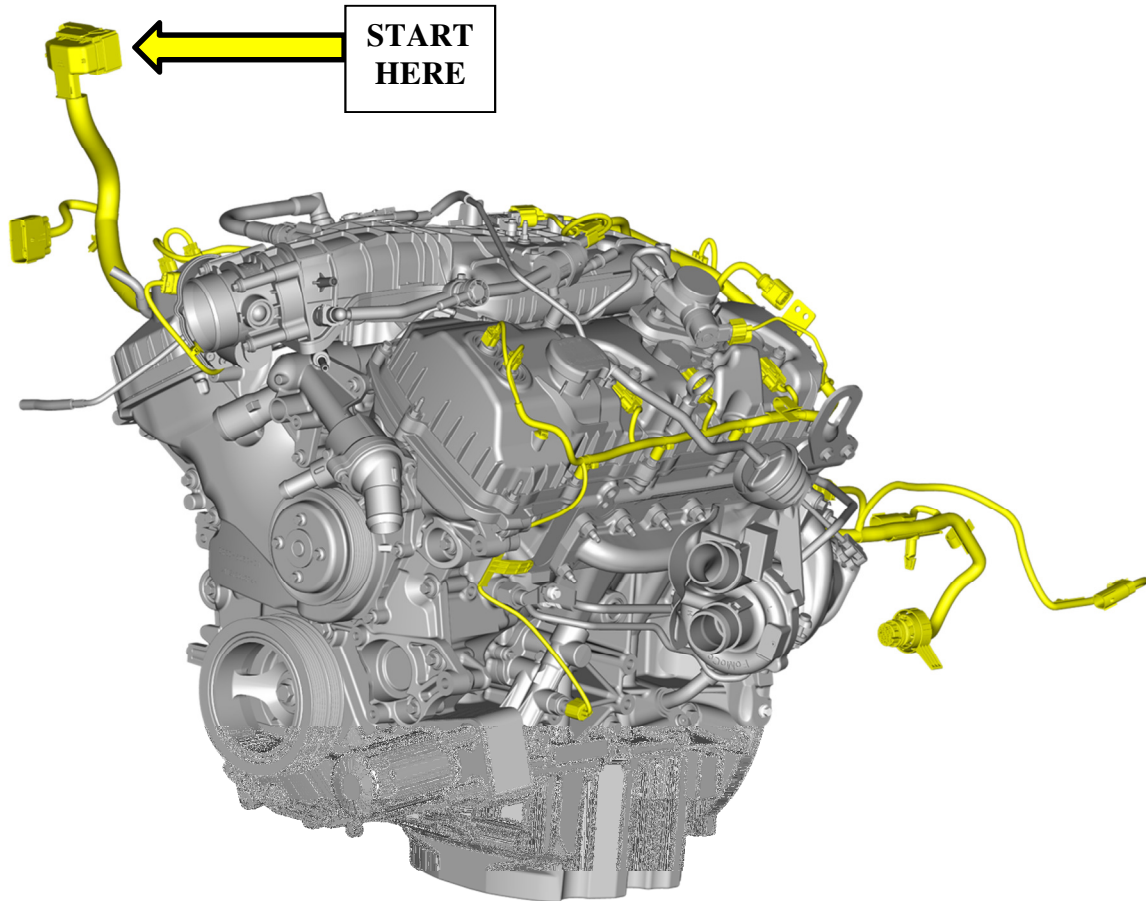
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#### **4.4 Engine Harness Routing**

**Front View of Engine:**



**Figure 2 – Front View of Engine.**

**Note: the wire harness shown in yellow above is the ENGINE harness that comes standard with the 3.5L Crate Engine (Ford Performance P/N: M-6017-35CNTRL ); THIS IS NOT THE CONTROLS PACK WIRING HARNESS.**

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Rear View of Engine:

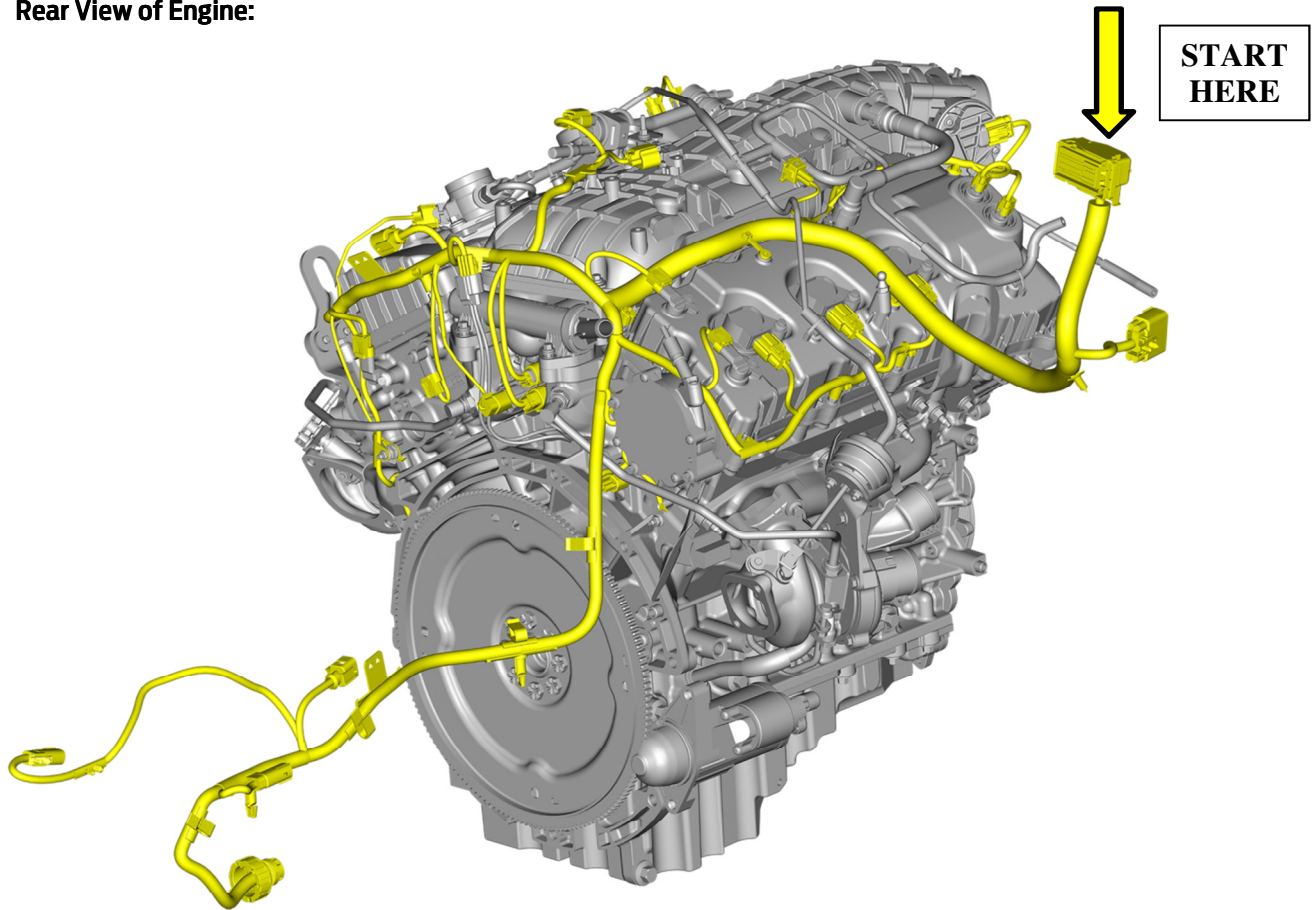


Figure 3 – Rear View of Engine.

Note: the wire harness shown in yellow above is the ENGINE harness that comes standard with the 3.5L Crate Engine (Ford Performance P/N: M-6017-35CNTRL ); THIS IS NOT THE CONTROLS PACK WIRING HARNESS.

## 5.0 3.5L Controls Pack Harness Installation Instructions

**NOTE:** To avoid electrical shock and/or damage to sensitive electrical control system components, before beginning any work, remove the vehicle's Negative Battery Terminal and place a rag or towel between it and the Battery Negative Post. The Negative Battery Terminal is not to be reinstalled until the last step of installation.

1. Locate harness that comes on engine then locate a large black PCM connector that hangs off the engine.
2. From the PCM connector traveling towards the engine you come to the first takeout AA, then traveling further down the harness you come to takeout BB, which is between the intake and the valve cover.
3. Locate PCM connector on control pack harness which is C1551 referring to figure1.
4. Traveling up the harness you come to takeout AA continuing up the harness comes takeout BB, locate C1260, C100, C1588, BLUNT CUT FAN CIRCUITS and starter solenoid eyelet and make sure they are routed towards the front of the motor.

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5. Place takeout BB on top of takeout BB of the engine harness and zip tie together.
6. In the fig 4 you can see the red wire routing correctly under the vacuum lines, please note the red wired in this figure doesn't come with the engine, it is only use as a visual example for correct routing. Please carefully route C1260, C100, C1588, BLUNT CUT FAN takeout and starter solenoid eyelet under vacuum lines located in the top of engine. Please zip tie controls pack harness along the same routing as the engine harnesses.



Figure 4 – Correct Routing under vacuum lines

7. Route C1260, C100, blunt cut fan and solenoid eyelet down front of cylinder head.
8. Locate takeout C1588 and connect to sensor in front of throttle body on air intake tube.
9. Connect eyelet to starter solenoid, takeout must be routed away from the exhaust.
10. Locate C1260 and C100 if using OEM air conditioning compressor plug C100 into compressor and C1260 into A/C pressure transducer. If you do not intent to use A/C on your engine set up you can cut these takeouts off the harness but take extreme care to use shrink tube to seal all circuits separately and then tape all those circuits together so the wires are not visible.
11. Please notice then a blunt cut FAN takeout is provided with for your own custom cooling FAN set up. The orange wire is positive and the black wire negative.
12. Locate takeout BB again moving towards the back of the motor following engine harness routing with controls pack harness will come to takeout CC, carefully apply zip ties along on both harnesses to tied them together.
13. Locate ground eyelet GD200 and place on ground stud, carefully route behind engine harness.
14. At takeout CC continue routing control pack harness along engine harness and zip tie together, then you'll come to takeout CCA which is the FAN ground eyelet, place eyelet on ground stud on the back side of the left head of the engine.
15. Locate C1667, C1622 and C102A and carefully round under vacuum lines and rubber hose on engine. Please notice as in step 6 the red wire shows the properly routing, carefully apply zip ties along on both harnesses to tie them together until you come to takeout CCB, the takeout C102A will routes down to the alternator and plug to the alternator.
16. Route C1667 to sensor on top of air cleaner
17. Route C1622 to sensor on inner cooler near bottom left of radiator, please take care so harness will not come in contact with cooling fan movement.
18. Return to takeout CC on the back of the motor traveling down the harness you come to takeout DD and the PDB shown in fig xx.

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19. Choose a mounting location for the PDB and route the rest of the harness inside of the vehicle. Please remove the small cover of the PDB, you will find an eyelet loosely attached to the PDB, it is CRITAL that this eyelet must remain at the same location after the installation is completed.
20. Locate long battery cable, place both eyelet of the battery cable and the eyelet from takout DD on the PDB stud as shown in fig 5 and then replace the small PDB eyelet on top of the large eyelet, then re-install nut and washer onto PDB stud and torque down and re-place small cover. At this point of the installation is up to the owner of this kit to route the rest of the battery cable provided to the desired location of the battery. Please note that the battery cable can be shortened to desire location (an extra eyelet and shrink tube is provided in this kit).

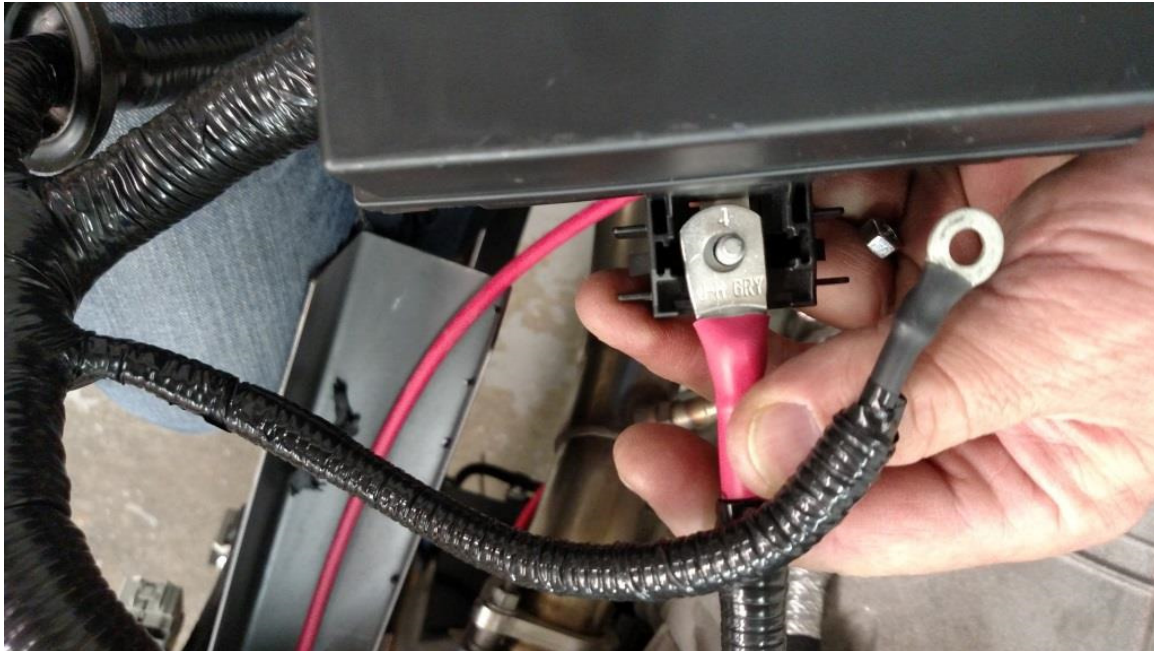


Figure 5 – PDB power and battery cable routing

21. Locate short battery cable jumper and assemble into the mega fuse.
22. Attached long battery cable onto the other side of the mega fuse and do not install battery eyelet to battery until installation is complete
23. Please note negative cable is not provided in the controls pack installation kit. Cable must run from battery negative to engine block for best results.
24. Continuing down the main line away from Takeout DD, you should come across a loose/floating grommet. This grommet needs to be properly installed in the firewall of your vehicle so as to protect the controls pack harness routing that passes through to the passenger compartment. All takeouts and connections previously mentioned are located under hood; all takeouts and connections mentioned from this point on are located in the passenger compartment.
25. Identify the most appropriate location, based on your application, for the controls pack wiring harness to pass through the engine compartment/passenger compartment bulkhead. Use a center punch to mark the location of the center of the hole, this will keep the drill bit from 'walking' while you are cutting through the bulkhead. Next use a hole saw to create a hole large enough (~2") for the remaining portion of the controls pack harness to pass through. It is strongly recommended to file/smooth the sharp metal edges created by the hole saw and install a rubber grommet in the hole so as to prevent the metal edges from perforating the harness and causing damage to it. Feed the controls pack harness through the opening and route to the appropriate locations.

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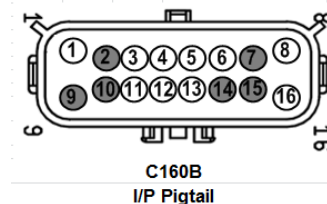
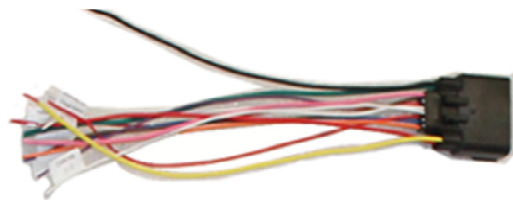
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26. Identify proper mounting location for the Accelerator pedal, Clutch pedal (purchased separately) and Ignition Switch (purchased separately). Lay each component on its own piece of cardboard and use a pencil to create a template of the footprint. Use the templates to drill holes in the proper location/orientation within the vehicle passenger compartment. Attach components to vehicle.
27. Identify mounting location for the Bracket with OBDII connector. Be sure to complete Step 26 before you do this as you will be limited by the harness lead length. Use a piece of paper or cardboard and a pencil to create a template of the bracket footprint. Use the template to drill holes in the proper location/orientation within the vehicle passenger compartment. Attach the bracket to the vehicle.
28. Moving down the main line of the controls pack harness from the loose grommet is "Takeout EE," which consists of one routing off of the mainline:
  - a. Instrument Panel Pigtail connector (C160A)
29. Route C160A to approximately the base of the steering wheel to be connected as explained in a later step (Step 34).
30. Connect the ground eyelet to a reliable ground point on the chassis or engine block, away from dirt and water.
31. Located approximately 1 foot down the main line of the controls pack harness from Takeout EE is "Takeout FF" and "Takeout GG", which consist of five routing off of the mainline:
  - a. Accelerator Pedal Position Sensor (APPS) (C2040)
  - b. Ground Eyelet (GD100)
  - c. Clutch Bottom of Travel (C257)
  - d. Clutch Top of Travel (C277)
  - e. Data Link Connector (C251)
32. Connect C2040 to the base of the accelerator pedal module.
33. Connect each of the connectors in to their respective locations.
34. Locate the 16-way I/P Pigtail connector with blunt leads and continue to Section 6.

#### \* Removal Procedures for Unused Connectors:

If 100% sure connector is not currently needed and will not be needed in the future, cut routing leading-up to unused connector and individually heat shrink each wire herein. To ensure that the wires are completely isolated from one another and the outside environment, you may also want to wrap the heat-shrunked wire in electrical tape to provide an additional layer of protection from moisture and dirt.

## 6.0 16-way I/P Pigtail Connection Details



The 16-way pigtail is to be connected according to the chart below. See also the diagrams on the following pages for illustrations of wire connection points, based on the ignition/starter switches that you intend to use. Setup A uses separate toggle switches for ignition and starter inputs, while Setup B uses an ignition cylinder with a key.

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Cavity	Lead Label	Wire Color	Description
1	Fuel Pump Relay Out	GN	Provides constant +12V to the fuel pump
2	Clean Tach Out Signal (CTO)	OR	Provides tach signal if needed
3	Starter Request (SMR)	RD-LB	Apply +12V to send a request to the PCM to energize the starter solenoid
4	A/C Request	VT	Apply +12V to send a request to the PCM to energize the A/C clutch solenoid
5	Ignition Relay Trigger (Toggle Switch)	RD-LG	Apply +12V to energize the ignition relay/wake-up the system
6	Malfunction Indicator Lamp (MIL)	BU	Provides +12V to MIL when error state is present
7	AUX1	GN	Optional use: provides constant +12V
8	HAAT B	RD	Provides constant +12V
9	Ground - Power	BK-GY	Provides ground for AUX 1-3, if needed
10	-	-	-
11	-	-	-
12	CAN HS (-)	WH	Provides access to High Speed CAN Bus (-) if needed
13	CAN HS (+)	WH-BU	Provides access to High Speed CAN Bus (+) if needed
14	AUX2	GN	Optional use: provides constant +12V
15	AUX3	GN	Optional use: provides constant +12V
16	Key On 12V/10A	YE	Provides +12V when ignition is ON

6.1 Locate each of the Blunt Leads. This is where you will need to make all of the soldered connections for the harness. Before soldering any wires, however, you must first decided which set-up you will pursue by referencing Set-up A and Set-up B on pages 19 and 20. Once you've decided on your set-up, continue to Step 6.2.

6.2 Connect the following REQUIRED blunt leads as follows:

6.2.1 **Blunt Lead 1 – Fuel Pump Relay Out (Dark Green):** Connect to Fuel Pump positive. Separate ground for fuel pump must be provided. The fuel pump will be running any time key is on.

6.2.2 **Blunt Lead 3 – Starter Motor Request (Red-Light Blue):**

Set-up A:

Connect to input node of starter momentary switch so that 12 volts is provided when engine starting is requested.\*

Set-up B:

Connect to 'Start' output node of ignition cylinder so that 12 volts is provided when engine starting is requested.\*

6.2.3 **Blunt Lead 5 – Ignition Relay Trigger (Red-Light Green):**

Set-up A:

Connect this wire to the output side of the ignition toggle switch so that 12 volts is provided when the key is in the 'Start' (cranking) and 'Run' positions. It is imperative that this circuit be reliable, the PCM will interpret an intermittent voltage on this signal as a request to shut down the engine! (Hint, if your engine shuts down after a hard launch check here first).

Set-up B:

Connect to the 'Start/Run' output node of ignition cylinder so that 12 volts is provided when engine starting is requested. It is imperative that this circuit be reliable, the PCM will interpret an

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intermittent voltage on this signal as a request to shut down the engine! (Hint, if your engine shuts down after a hard launch check here first).

- 6.2.1 **Blunt Lead 6 – Malfunction Indicator Light (Blue):** Connect this blunt lead to the negative (black) lead on the MIL (provided in the kit bag). You will need to provide 12V for the positive (red) lead of the MIL.
- 6.2.2 **Blunt Lead 8 – Hot At All Times (Red):**
  - Set-up A:  
Connect this lead to three different locations as needed: 1) the input node of the A/C toggle switch, 2) the input node of the Starter momentary switch, and 3) the input node of the Ignition toggle switch.
  - Set-up B:  
Connect this lead to two different locations as needed: 1) the input node of the A/C toggle switch, 2) the input node of the ignition cylinder.
- 6.2.3 **Blunt Lead 9 – Chassis Ground (Black-Grey):** Connect this blunt lead to the negative (black) lead on the MIL (provided in the kit bag).
- 6.2.4 **Blunt Lead 16 – Key On 12V/10A (Yellow):**
  - Set-up A:  
This lead is not needed and may be wrapped in heat shrink and electrical tape as described at the end of Section 5.
  - Set-up B:  
Connect to the 'Accessory' output node of ignition cylinder so that 12 volts is provided when key is in 'Accessory/Run' mode with engine off.
- 6.3 Connect the following OPTIONAL blunt leads as follows:
  - 6.3.1 **Blunt Lead 2 – CTO (Orange):** Optional tachometer output signal if desired.
  - 6.3.2 **Blunt Lead 4 – A/C Request (Violet):** Connect to the output of an A/C toggle switch (if desired). Sends a request to the PCM to energize the A/C Clutch Solenoid when 12 volts is applied.
  - 6.3.3 **Blunt Lead 7 – AUX 1 (Green):** Optional 12 volt power supply for additional aftermarket items. Please note that if use is desired, you must add an additional fuse to the FPPDB.
  - 6.3.4 **Blunt Lead 12 – HS CAN (-) (White):** Optional CAN line for additional aftermarket items.
  - 6.3.5 **Blunt Lead 13 – HS CAN (+) (White-Blue):** Optional CAN line for additional aftermarket items.
  - 6.3.6 **Blunt Lead 14 – AUX 2 (Green):** Optional 12 volt power supply for additional aftermarket items. Please note that if use is desired, you must add an additional fuse to the FPPDB.
  - 6.3.7 **Blunt Lead 15 – AUX 3 (Green):** Optional 12 volt power supply for additional aftermarket items. Please note that if use is desired, you must add an additional fuse to the FPPDB.
- 6.4 Once all of the blunt lead connections have been soldered onto their appropriate location, insert the 16-way I/P Pigtail connector into C160A.

#### \* **Important Note on the Starting System**

This kit includes connections and installation instructions for PCM controlled engine starting; however, it is not required that the customer utilize this option. Customers may choose to use their existing non-PCM controlled starting system if desired. If non-PCM controlled starting is used, Step 6.2.2 may be omitted, and any unused blunt leads should be cut to ~2" length and sealed using heat shrink.

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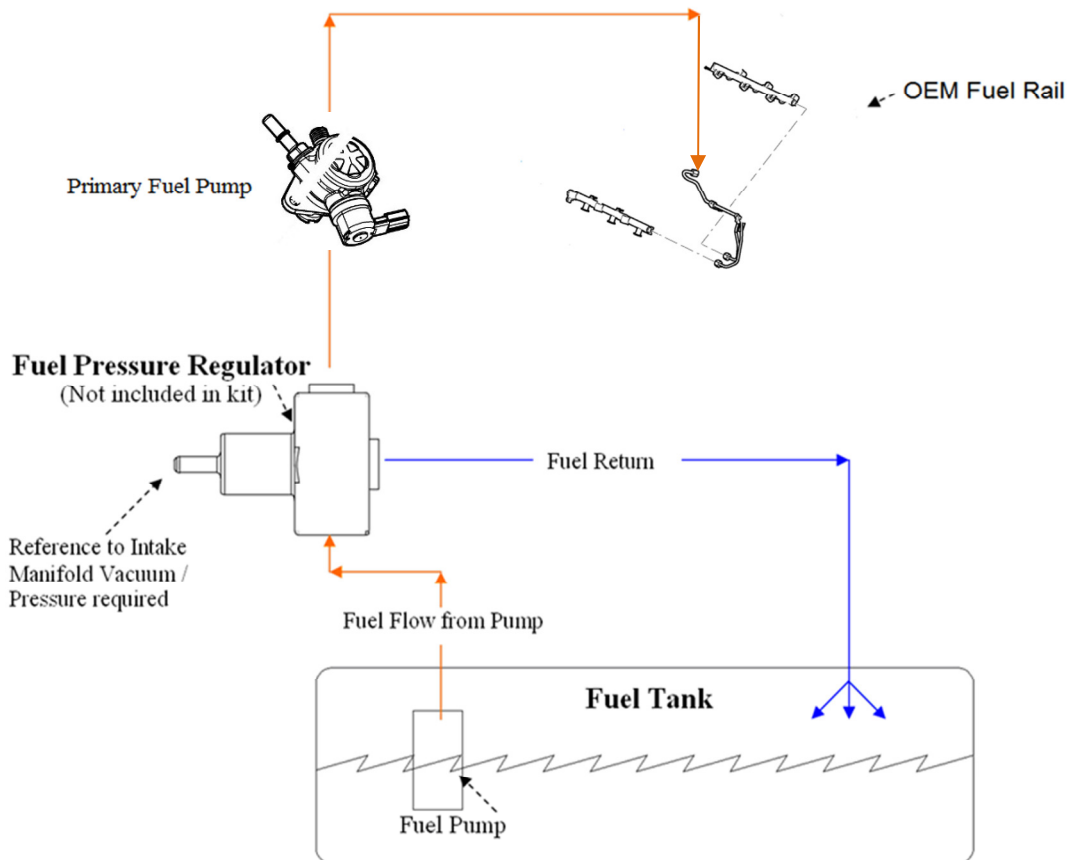
## Instruction Sheet

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## 7.0 Fuel System

The PCM is calibrated for a return style fuel system as shown below.



- Set regulator to maintain 50-55 psi delta fuel pressure across injector (50-55 psi at fuel rail with engine off):
- Use only AN type fuel fitting to interface with OEM fuel rail.
- Fuel pressure regulator must have reference to manifold vacuum.

**Fuel pump requirements: 155L/Hr minimum at 55psi**

**Fuel pump location**

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A common and often overlooked problem is the location of the fuel pump or pumps. Optimally, the fuel pump should be mounted IN THE TANK to reduce the possibility of pump cavitation. Cavitation is essentially localized boiling caused by a reduction in pressure,

generally occurring on the inlet side of a pump. This localized boiling results in fuel vapor bubbles which will reduce the volume of fuel the pump is capable of delivering to the engine. Any reduction in pressure or increase in temperature at the inlet side of the pump increases the chances that cavitation will occur. For this reason, it is always best to either have the pump inside the tank immersed in fuel or (in the case of an external pump) gravity fed, which will increase the pressure on the inlet side of the pump. If the fuel pump has to “pull” the fuel, this will result in a reduction in pressure at the fuel pump inlet potentially allowing cavitation and, thus, vapor bubbles to develop. These vapor bubbles are then drawn into the fuel pump and exit the high-pressure side of the fuel pump as compressed vapor.

They travel the entire length of the fuel system and are expelled through the fuel injector. This can cause issues ranging from stumbles and hesitations to engine damage due to insufficient fuel delivery and lean A/F ratios. Sometimes this problem can

characterize itself by only appearing when the weather gets warmer, which can confound the diagnosis of the issue. In certain cases, it may seem to only develop when driving on certain surfaces, because pavement reflects more heat than an off-road 4x4 trail. Remember, more heat and lower pressure on the inlet side of the pump means a greater chance of cavitation, which is to be avoided whenever possible.

If you are using an external mounted fuel pump, you should run a very coarse (typically around 100 micron) filter on the inlet side of the fuel pump, and a finer (typically around 10 micron) filter on the outlet side of the pump. A paper filter is NOT recommended on the inlet of the fuel pump because it can cause a restriction in fuel flow which, as mentioned previously, can lead to cavitation.

**Warning: It is highly recommended that an Inertia switch is incorporated into the fuel pump wiring to turn off the fuel pump in event of an accident.**

## 8.0 Initial Start-Up

Note: The following information assumes completion of each of the previous steps of this installation manual.

- 8.1. Check all fluid levels, electrical and fluid connections.
- 8.2. Pressurize the fuel system by turning the key on. Inspect the entire fuel system (from tank to engine) for leaks.

**!!! NOTE: If any leaks are found, do not proceed further until these have been corrected !!!**

- 8.3. Start Engine.
- 8.4. Check for leaks and/or noises that may indicate a problem.

**CAUTION: Be certain to run the vehicle in a well ventilated area.**

## 9.0 Wire Usage Schematics

The following two pages detail the two most common wiring configurations—please choose one to complete installation of your controls pack kit.

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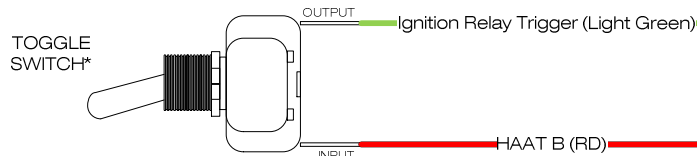
## Instruction Sheet

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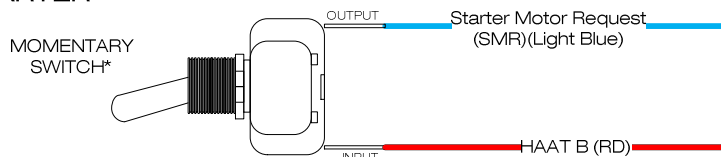
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## SETUP A

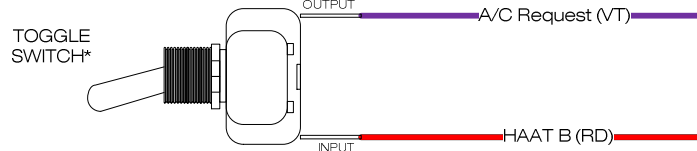
### IGNITION



### STARTER



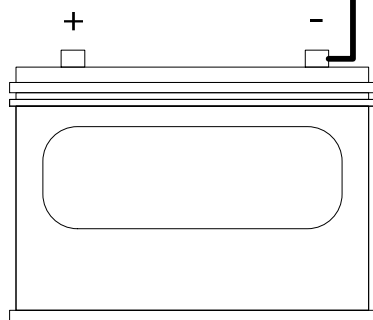
### A/C



### FUEL PUMP\*



### BATTERY\*



GROUND 14AWG\*

C160B

\* = NOT INCLUDED

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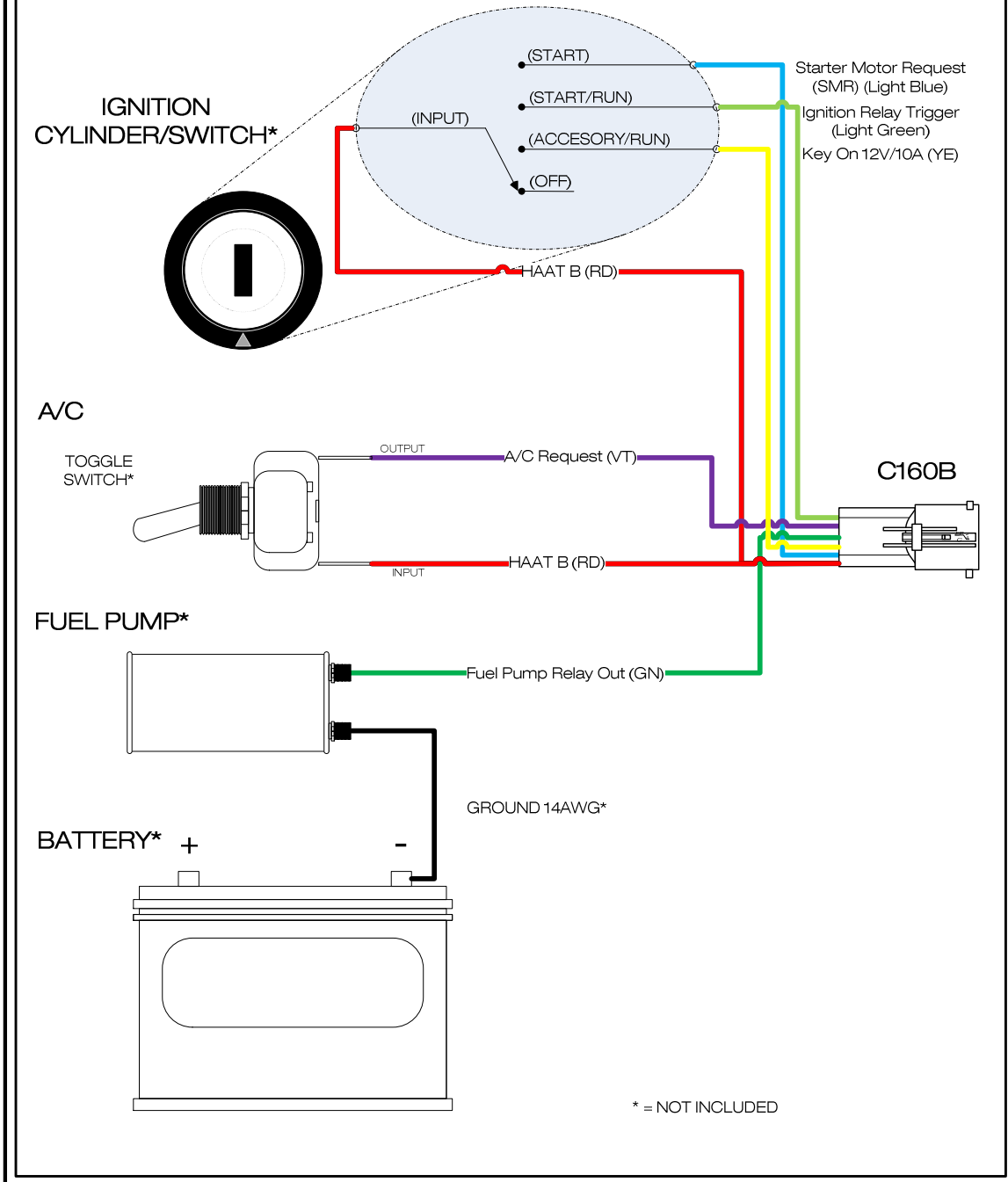
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### SETUP B



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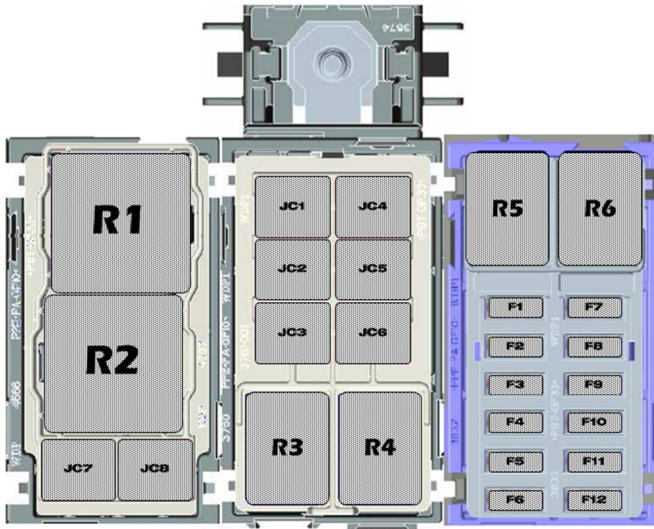
## Instruction Sheet

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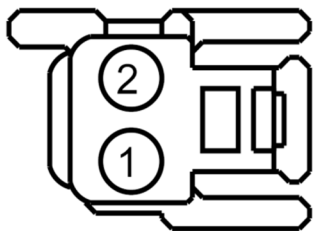
## 10.0 Fuses & Relays

- The following diagram outlines the array of fuses and relays included in the controls pack wiring harness, and the function of each.
- NOTE: Do NOT replace any of the fuses with a higher value than those specified below.

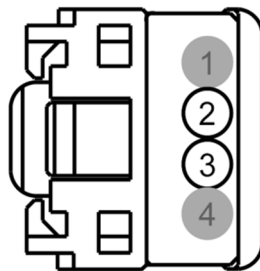


Component ID	Type	Value	Name
JC1	J-Case Fuse	50A	PCM Relay Feed
JC2	J-Case Fuse	50A	Cooling Fan Relay Feed
JC3	J-Case Fuse	30A	Starter Relay Feed
JC4	J-Case Fuse	40A	Fuel Pump Relay Feed
JC5	J-Case Fuse	40A	Ignition Relay Feed
JC6	J-Case Fuse	NOT USED	AUX
JC7	J-Case Fuse	NOT USED	-
JC8	J-Case Fuse	NOT USED	-
F1	Minifuse	25A	VPwR1
F2	Minifuse	20A	VPwR2
F3	Minifuse	10A	VPwR3
F4	Minifuse	15A	VPwR4
F5	Minifuse	10A	Ignition Switched A
F6	Minifuse	10A	Ignition Switched B
F7	Minifuse	NOT USED	-
F8	Minifuse	NOT USED	-
F9	Minifuse	10A	A/C Relay Feed
F10	Minifuse	10A	HAAT A
F11	Minifuse	10A	HAAT B
F12	Minifuse	NOT USED	-
R1	Power Mini Relay	70A	PCM Relay
R2	Power Mini Relay	70A	Cooling Fan Relay
R3	High Current Micro Relay	40A	Starter Relay
R4	High Current Micro Relay	40A	Fuel Pump Relay
R5	High Current Micro Relay	40A	A/C Relay
R6	High Current Micro Relay	40A	Ignition Relay

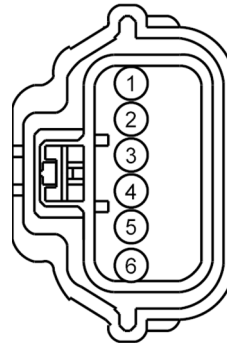
## 11.0 Connector Faces



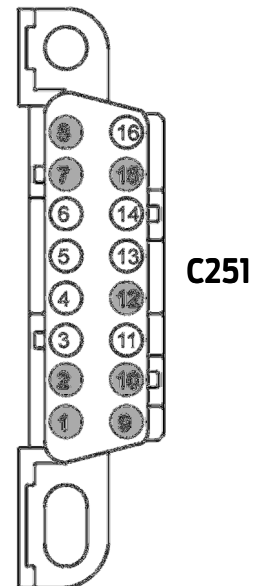
C257



C277



C2040



C251

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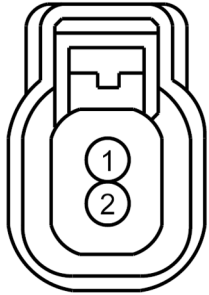


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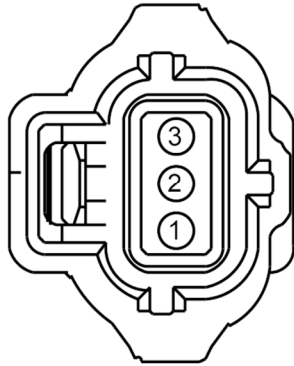
### Instruction Sheet

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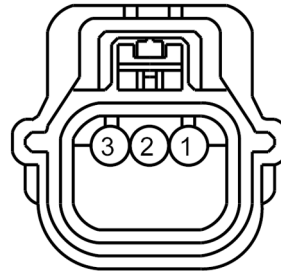
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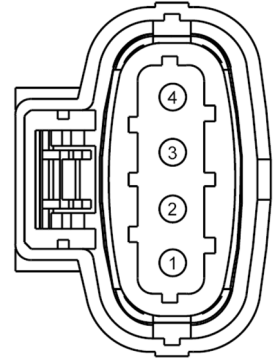
C100



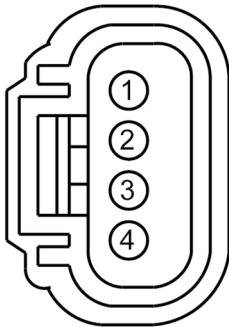
C102A



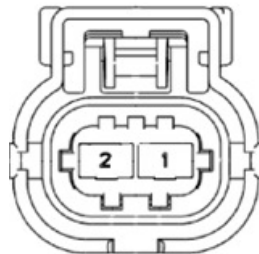
C1260



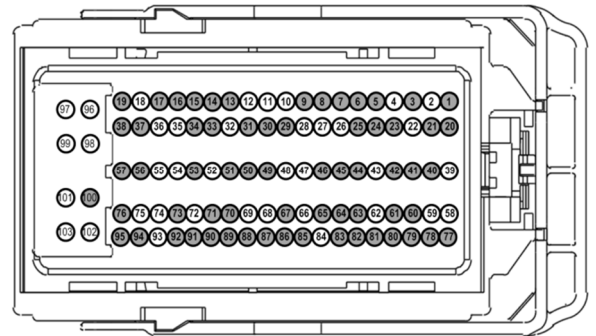
C1667



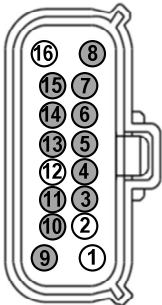
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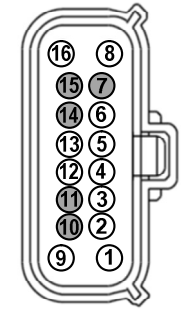
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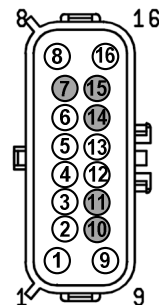
C1551B



C146



C160A



C160B

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