Please visit www.performanceparts.ford.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

2024+ 5.0L GEN 4 Controls Pack Installation Manual

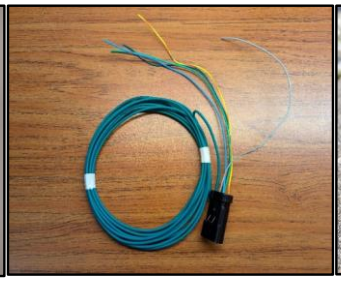


TABLE OF CONTENTS

1.0 Introduction

This kit was developed by Ford Performance to allow performance enthusiasts the ability to install our 5.0L Gen 4 Automatic control packs in addition to the Generation 4 Coyote crate Engine into their application of choice.

Note: NOT FOR USE WITH GEN 4X ENGINE

Note: Cruise control is not available with this system. GPS or drive shaft sensors are suggested for vehicle speed.

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/Possibly required Components

- **Powertrain Control Module (PCM)- PR3Z-12A650-H**
- 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 and spark timing according to varying driver demand (ie – accelerator pedal input).
- The wiring that plugs into the PCM is integral to the wiring harness that was included with your 5.0L GEN 4 engine, the length of these wiring leads dictates 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 5.0L 2024 + Gen 4 Engine. (Ford Performance P/N: M-6007-M50DAUTO)

PCM Calibration Application Notes:

- The calibration provided in this PCM will NOT work with the 'return-less' fuel system as used on factory Mustang vehicles. Use of a return-style fuel system is required. Refer to Section 8 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 as delivered to achieve acceptable engine performance. Refer to Section 3.6 for more information about Air Inlet System requirements. PCM is not tunable.
- Premium Fuel Only (91 Octane or higher).

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

3.2 Accelerator Pedal Position Sensor (APPS) – GR3Z-9F836-C

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 and is required for proper engine operation.

WARNING: DO NOT BYPASS THE STARTER INTERLOCK.

3.3 O2 Sensors, Upstream

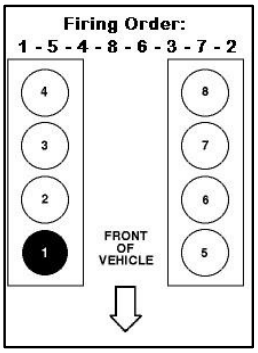
- Two O2 sensors provide wide range feedback to the PCM for closed loop air fuel ratio control by measuring the quantity of oxygen present in exhaust leaving the combustion chamber.
- Each sensor is supplied with a light coating of anti-seize lubricant on its threads. Please use caution when installing 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 sensor wiring. Doing so will adversely affect the sensor performance & reliability of the signal. You may lengthen the connector leads from the harness side if necessary, by splicing, soldering and shrink wrapping the splices.

The engine harness and controls package M-6017-M50D is designed to operate with the O2 sensors in the 2024 COYOTE Mustang stock locations.

Here are some tips if sensors have to be relocated:

- The best option is to locate the sensor so it is sampling from all 4 cylinders and at a distance that does not require modification of the UEGO harness.
- If your header design will not allow you to sample all 4 cylinders without harness modifications, a better alternative is locating the UEGO sensor to sample from a single cylinder. The cylinders that have (on average) the closest A/F ratio to the bank average are cylinder #4 (on bank 1) and cylinder #7 (on bank 2). If that's not possible due to packaging constraints, the next best choices are cylinder #3 (on bank 1) and cylinder #8 (on bank 2).



3.4 Plastic Bag of Assorted Items

- Inline Fuse
- Fuse Holder
- 6-way IP Pigtail

3.5 Air Cleaner Assemblies with Integral Mass Air Flow Sensor

IMPORTANT NOTE: It is recommended to use the air box/MAF sensor assemblies exactly as received.

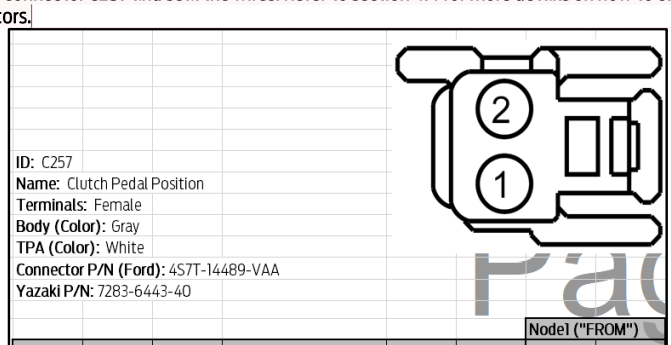
Ford Performance recognizes that it may not be practical to package this Air Box/MAF sensor system in some vehicle applications. The recommendations listed below are intended to serve as guidelines for designing an air inlet system that will provide good control system performance once the control system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

1. Flow Profile: the MAF sensor should be located on a straight section of zip tube where the flow profile is generally uniform. If the sensor cannot be located on a straight section put the sensor on the outside radius of the inlet so the sensor is located in the higher flow velocity area.
2. Flow Area: Keep the cross-sectional area of the MAF sensor tube as close as possible to the cross-sectional area of the original induction system.
3. Flow quality: minimize flow direction changes and maintain smooth tubing to minimize air flow disturbances and turbulence.
4. Flow pulsation: install sensor at least 6 to 8 inches upstream of the throttle body.
5. Transient performance: installing the sensor too far upstream of the throttle body (>24 inches) will result in transient lean/rich spikes due to the additional amount of time required for the measured air flow to travel from the MAF sensor to the intake manifold.
6. MAF sensor contamination: A) install sensor in upper half of cross-sectional area to minimize possibility of condensation coming in contact with the MAF 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. B) Sensor must be installed downstream of air filter and upstream of crank case ventilation inlet. Ideally, sensor should be located 3 diameters upstream of the crank case ventilation inlet.
7. Be sure your intake system is symmetrical and uses the same dimensions for each throttle body.

3.6 Controls Pack Wiring Assembly –CM-14A006-50D, AUTO Transmission Harness- CM-6017-M50ATD

- Connects to vehicle battery and inline connector on engine harness
- Contains Ford Performance Power Distribution Box (FPPDB) and High Power inline fuse

- Electrical connections to Accelerator Pedal (APPS) and Clutch Switch (CBT)
- Note: Clutch switch is intended for manual transmission use ONLY. For automatic transmission use please cut off the CPP connector C257 and seal the wires. Refer to section 4.4 for more details on how to cap off unused connectors.



ID: C257
Name: Clutch Pedal Position
Terminals: Female
Body (Color): Gray
TPA (Color): White
Connector P/N (Ford): 4S7T-14489-VAA
Yazaki P/N: 7283-6443-40

Node1 ("FROM")

Circuit ID	AWG	Color	Function	Length	Twisted	Connector1 ID	Cavity1
CET42B	20	GN-VT	CPP			C257	1
GD100A	20	BK	Ground Eyelet - Interior			C257	2

- Wire leads for Ignition Switch & Starter.
- Gateway Module and connector – necessary for transmitting CAN data and reading DTC's
- 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.

Commented [SD1]: Maybe this is where we mention the CPP wiring?

Commented [DS(2]: We need to call out the lead and identifying decal - i.e. "Item R CPP-BT", maybe move CPP mention somewhere else(?)

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 corresponding leads into which the PCM is connected. These leads are an integral part of the CRATE ENGINE HARNESS (not included with Controls Pack)
- Ford Performance Power Distribution Box must be mounted within 60" of the vehicle battery as dictated by the Battery+/Ground Lead Lengths of the controls pack wiring harness.
- 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.

4.2 Connector ID chart

Item	Connector #	Description		Item	Connector #	Description
A	C175B	PCM vehicle connector		O	C251	Data Link Connector & MIL
B	C1B	Inline to Trans Harness		P	C9	Gateway Module
C	C146	Inline to Engine		Q	C8	Pats Module
D	C102A	Alternator		R	C257	CPP-BT
E	C1217	Intercooler Coolant Pump		S	C90	PCM Trans connector
F	C132	Ambient Air Temperature Sensor		T	C1571	O2 sensor Upstream-RH
G	B-330-14HD	Starter Lead Eyelet		U	C1572	O2 sensor Upstream-LH
H	-	Blunt cut Key ON 12V		V	C1A	Inline to Controls Pack Harness
I	-	Blunt cut cooling fan		W	-	Blunt cut HS CAN
J	PDB	FPPDB		X	C168A	Automatic Transmission Bulkhead Connector
K	-	Blunt Ground cut		-	(C128)	(Mass Air Flow (MAF) sensor 1)
L	-	Battery positive blunt lead eyelet		-	(C1454)	(Mass Air Flow (MAF) sensor 2)
M	C160A	Inline to IP Pigtail		-	-	-
N	C2040	APPS		-	-	-

Table 1 – Summary of Controls Pack Connectors

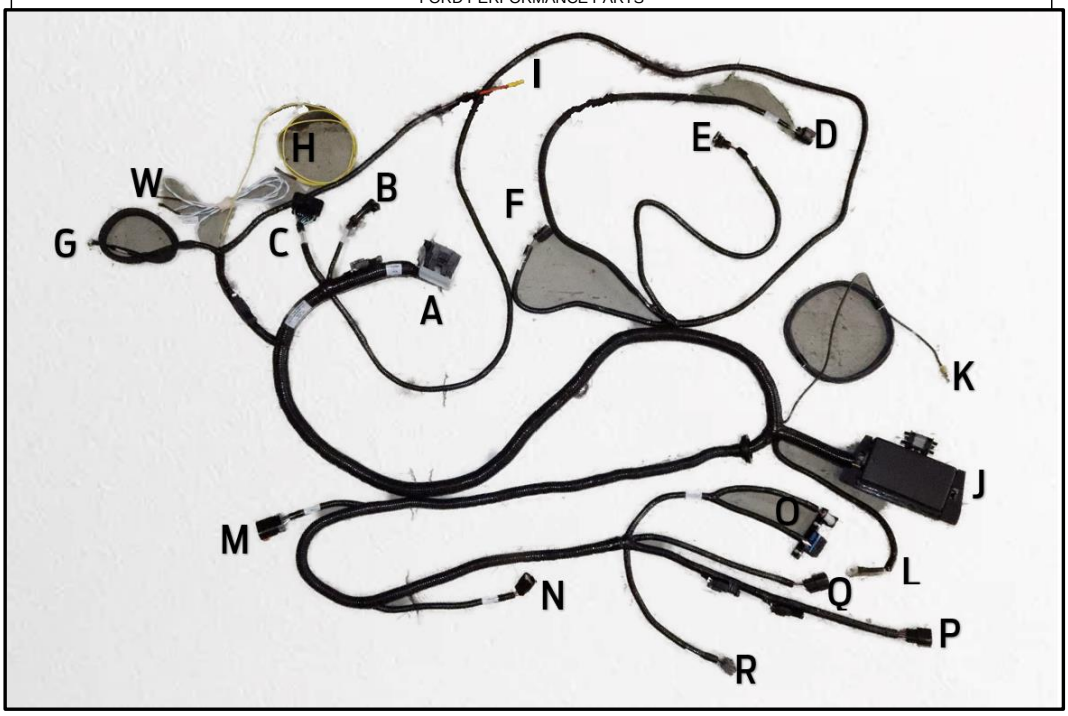


Figure 1a - Controls Pack Wiring Harness Components

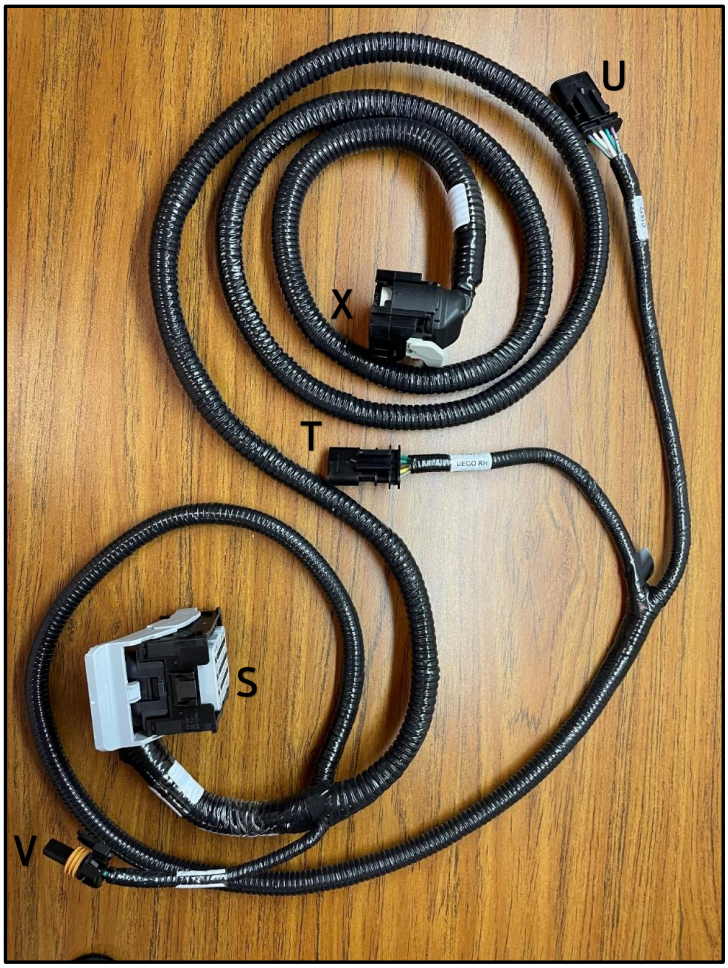


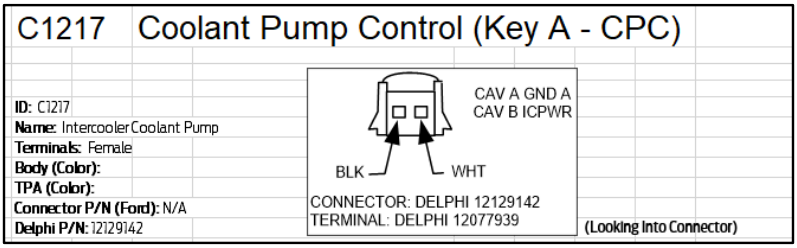
Figure 1b – Automatic Transmission Wiring Harness Components

NOTE: If your harness is equipped with downstream O2 sensors, it does NOT need to be plugged in for this kit.

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

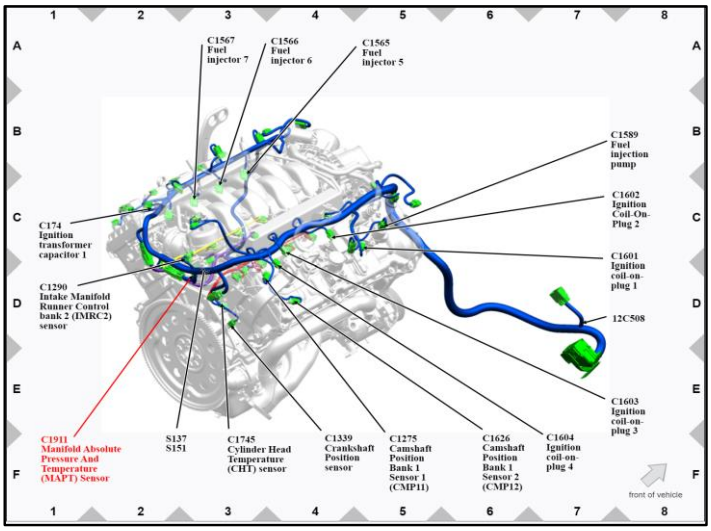
4.4 Cap off the Unused Supercharger Intercooler Connector if Applicable



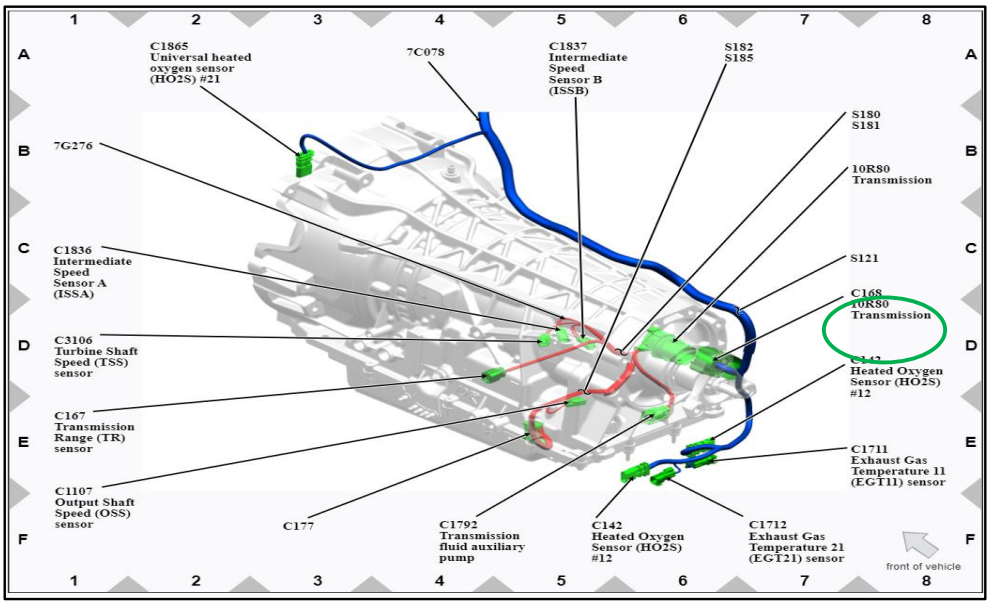
If your vehicle is not supercharged, locate the 2-way ICP (Item P, Connector C1217, Controls Pack Wiring Harness) and cut the wires leading to the connector and tape each wire, or place shrink tube over it, INDIVIDUALLY. This is very important to ensure that you do not inadvertently short a hot and ground lead together, causing damage to your PCM and/or other sensitive electronics.

4.5 Engine Harness Routing

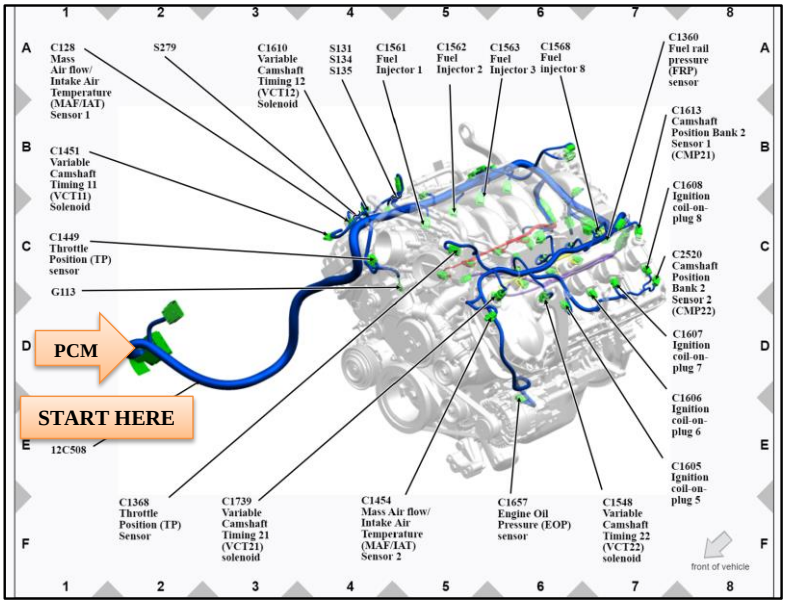
RIGHT VIEW OF ENGINE



Note: The wire harness shown in blue above is the ENGINE harness that comes standard with the 5.0L 2024 Coyote Crate Engine (Ford Performance P/N: M-6007-M50D); THIS IS NOT THE CONTROLS PACK WIRING HARNESS. The automatic transmission control pack harness comes with a connector(C168) which can be plugged into 2024+ Mustang automatic transmission.



FRONT VIEW OF ENGINE:



Note: The wire harness shown in blue above is the ENGINE harness that comes standard with the 5.0L Coyote Gen4 Mustang Crate Engine (Ford Performance P/N: M-6007-M50D); THIS IS NOT THE CONTROLS PACK WIRING HARNESS.

5.0 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.

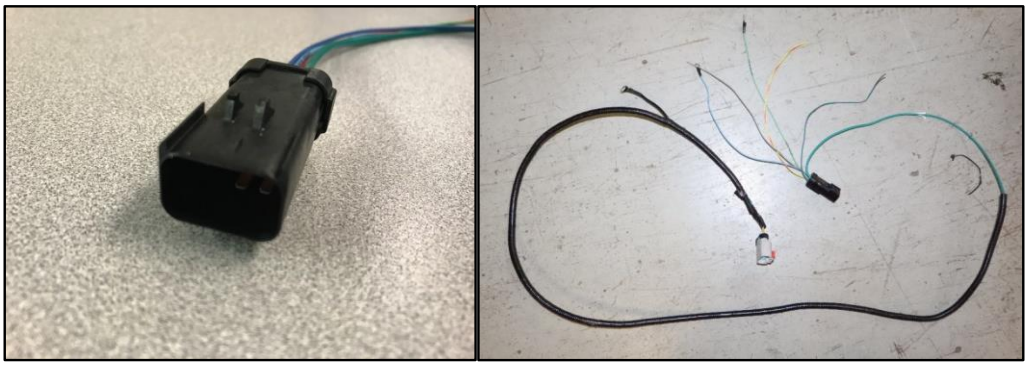
1. Identify proper mounting location for the PCM, Power Distribution Box (Item J) & Inline Fuse Holder. Locate the PCM connector (C175E) on the engine harness as indicated in Front view of engine by the "START HERE" arrow.
2. If a stock PCM is present (crate engines do NOT include a stock PCM, only the controls pack PCM), unplug it and store it in a cool, dry place in case it is needed in the future.
3. Plug C175E (from the engine harness), C175B (Item A from the controls pack harness) and C90 (Item S from transmission harness) into the controls pack PCM; once plugged-in, use a zip-tie to tie the bundle of wires exiting each connector back together. Route the transmission harness so that all upstream O2 sensor connectors (C1571, C1572) are able to reach their corresponding sensors. Again, if you have downstream O2 sensor connectors on the harness they are NOT needed for this kit. Connect the O2 sensors and 1-way inline connectors (C1A, C1B). In the steps that follow, we will be repeating this process of using zip-ties to piggy-back/tie the harness to the existing engine harness approximately every 200 mm or so along the engine harness.
4. Connect the in-line connector (C146) from the controls pack harness to the mating connector on the engine harness.
5. Connect Alternator Connector (C102A), Mass Air Flow (MAF) Sensor 1 Connector (C128), Mass Air Flow (MAF) Sensor 2 Connector (C1454), Ambient Air Temperature Sensor Connector (C132), and Intercooler coolant pump (C1217) to their respective locations being sure to avoid any pinch-points or exhaust hot-spots.
6. Connect Blunt-cut orange 10AWG cooling fan lead (will not work with PWM fan) and Starter Lead Eyelet to their respective locations.
7. The 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 connections previously mentioned are located under hood; all connections mentioned from this point on are located in the passenger compartment.
8. Identify proper mounting location for the Accelerator pedal and Ignition Switch (purchased separately).
9. Identify mounting location for the Bracket with OBDII connector and Malfunctioning Light.
10. Connect the ground eyelet (Item B) to a reliable ground point on the chassis or engine block, away from dirt and water.
11. Route C160A to approximately the base of the steering wheel to be connected later.
12. Connect each of the connectors to their respective locations mentioned above (C2040, C257).
13. Locate the 6-way I/P Pigtail connector with blunt leads (C160B) 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-shrink wire in electrical tape to provide an additional layer of protection from moisture and dirt.

6.0 6-way I/P Pigtail Connection Details



The 6-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.

Cavity	Lead Label	Wire Color	Description
1	Fuel Pump Relay Out	GN	Provides +12V to the fuel pump
2	Shift Up	GY	Assign to Shift Up paddle if desired
3	Starter Motor Request (SMR)	Light Blue	Apply +12V to send a request to the PCM to energize the starter solenoid
4	Shift Down	GN/VT	Assign to Shift Down paddle if desired
5	Ignition Relay Trigger	Light Green	Apply +12V to energize the ignition relay/wake-up the system
6	Signal Return	YE/OG	-

6.1 Locate each of the Blunt Leads. This is where you will need to make all the soldered connections for the harness. Before soldering any wires, however, you must first decide which set-up you will pursue by referencing Set-up A and Set-up B on pages 23 and 24. 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 start running any time key is on, then if you don't start the engine the computer will turn it off after a couple of seconds.

6.2.2 **Blunt Lead 3 – Starter Motor Request (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.*

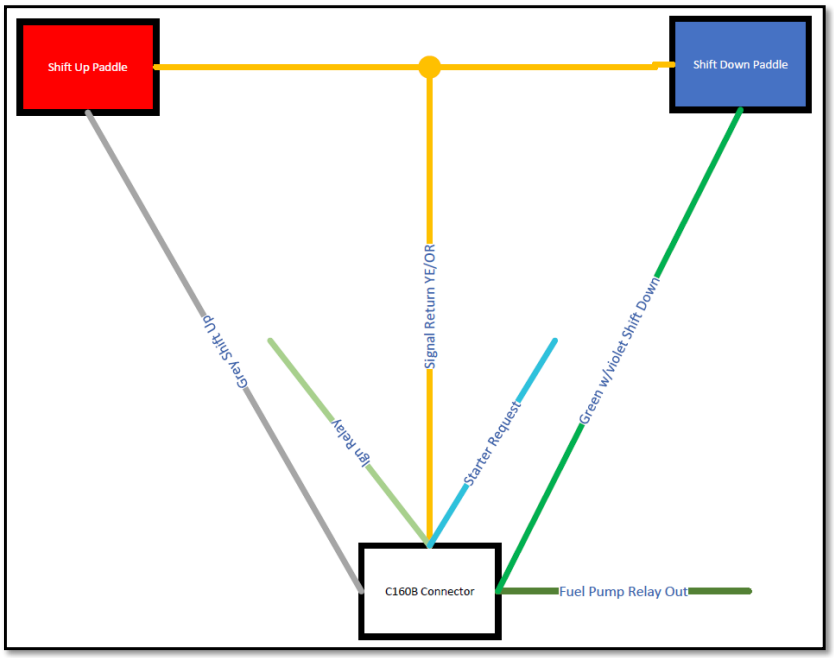
6.2.3 **Blunt Lead 4 – Malfunction Indicator Light (Blue):** Connect this blunt lead to the negative (black) lead on the MIL (provided in the kit bag).

6.2.4 **Blunt Lead 5 – Ignition Relay Trigger (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 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).

6.2.5 **Blunt Lead 6 – MIL Power B+ (RED):** Connect this blunt lead to the positive (red) lead of the MIL.

6.2.6 **Blunt Lead 8 – Hot At All Times (Red):**
Set-up A:
Connect this lead to two different locations as needed: 1) the input node of the Starter momentary switch, and 2) the input node of the Ignition toggle switch.
Set-up B:
Connect this lead to locations as needed: 1) the input node of the ignition cylinder.

6.3 If paddle shifters are desired, you will need to buy them separately.
6.3.1 Paddle shifters need to be wired like in the schematic below. The signal return (yellow w/orange wire) needs to be connected to both shift up and shift down paddles.



6.4 Once all of the blunt lead connections have been soldered onto their appropriate location, connect C160A pigtail connector.

* 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.

7.0 Ford Performance Power Distribution Box Installation

NOTE: DO NOT MAKE ANY ELECTRICAL CONNECTIONS TO THE BATTERY TERMINALS UNTIL INSTRUCTED.

1. Before you start, you will need three battery cables for battery positive and ground connections. Two will be used for battery positive and one for battery ground (negative) (purchased separately. 4 AWG recommended). One battery positive lead will be from battery to 250A fuse holder and the other from fuse holder to FPPDB (Item A). One battery positive and the battery ground cable will need a battery clamp at one end and an eyelet at the other. The second battery positive cable will need an eyelet at both ends (battery clamps and eyelets are purchased separately).
2. Carefully remove the nut and washers on both terminals of the in-line fuse holder and set aside.
3. Using the battery positive cable with an eyelet at both ends, place one end onto the in-line fuse holder terminal. Place one washer and nut over the eyelet and tighten down.
4. Locate the power terminal on the FPPDB. NOTE: **Make sure that battery positive blunt lead eyelet (Item L) is attached to PDB stud.**. Attach the second eyelet from the battery positive cable in Step 3 to the power terminal on FPPDB. Install on the FPPDB terminal in the following order: washer, battery positive cable eyelet, blunt lead eyelet, washer, and nut.
5. Place the Buss 250A fuse onto the fuse holder terminals.
6. Using the eyelet end of the second battery positive cable, place the eyelet on the opposite in-line fuse holder terminal. Place the remaining washer and nut over the eyelet and tighten down.
7. Close the cover of the in-line fuse holder.
8. Being careful not to inadvertently complete the circuit, connect the battery clamp end of the second battery positive cable to the positive terminal of the vehicle battery.

   NOTE: This lead MUST be hot at all times (HAAT). If this lead is connected through a switch, the Keep Alive Memory (KAM) of the PCM will be cleared whenever the switch is opened. This will result in loss of diagnostic trouble codes, adaptive fuel parameters, and other information stored in KAM by the PCM.

9. Verify that you have a good (clean & dry) ground path from the battery negative post to chassis ground. Attach the eyelet end of the battery ground cable to chassis ground. Attach the battery clamp end of the ground cable to the negative terminal of the vehicle battery. NOTE: In general, the resistance from the battery ground post through to the chassis should be less than 0.1 ohm.

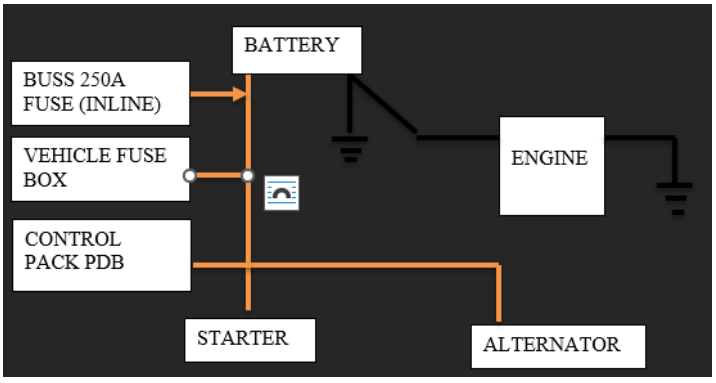
NOTE: While routing battery cables avoid any sharp edges and use zip-ties to secure the cable approximately every 200 mm.

7.1 Suggested Battery Cable Diagram

Connect the Battery positive to the starter and alternator.

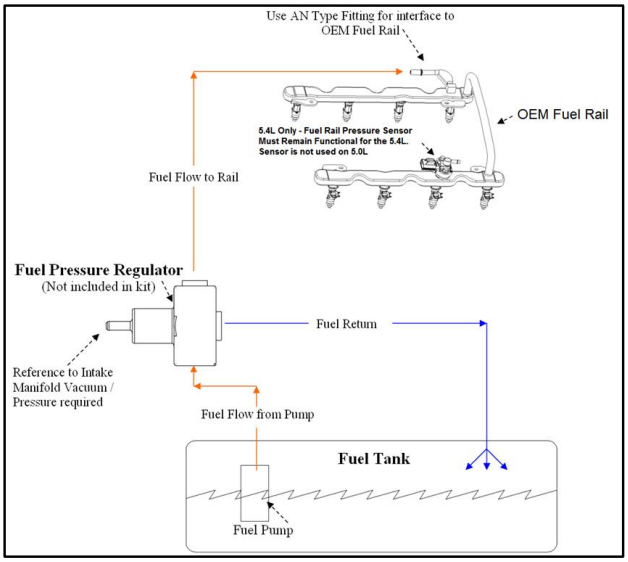
Ground the engine to the chassis.

NOTE: Pay close attention to the vehicle grounds. Many times, electrical Issues can be traced back to insufficient ground circuits. Ensuring your vehicle is well grounded now, will save you time and frustration later.



8.0 Fuel System

The PCM is calibrated for a return style fuel system as shown below.
- Set regulator to maintain 65 psi delta fuel pressure across injector:
- Use only AN type fuel fitting to interface with OEM fuel rail.
- Fuel pressure regulator must have reference to manifold vacuum.



Fuel pump
requirements: 165L/Hr minimum at 65psi

Fuel pump location
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.

9.0 Gateway Module

This module is new to Generation 4 Coyote Control Packs. Previous generations have not needed a device like this. It translates CAN data into readable messages that generic gauges, generic scan tools, and other off-the-shelf devices need to interface with the application you are using this control pack for. This small black box will need to be plugged into connector C9 "GWM". It is an 8-pin connector that is located near the OBD2 connector leg.

- Mount this device on the interior of your vehicle away from wet places.
- Make sure it does not rub or crash into components during operation.
- There are 4 resistors on this harness that're required for the gateway module to function properly. These are mounted externally and are strategically placed. If any parts of the harness need to be lengthened, keep in mind that you need to keep the positions of each resistor close to the following connectors (no more than 20in away) C9, C175B, and the CAN Blunt leads. If the resistors need to be rerouted or moved, please contact the Techline for further scenario-specific instructions.
- The gateway module allows for high-speed CAN data to be read at the OBD2 port and the CAN blunt leads.
- Do not add additional legs to this harness for additional accessories. CAN communications can become compromised if this happens.

10.0 Initial Start-Up

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

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

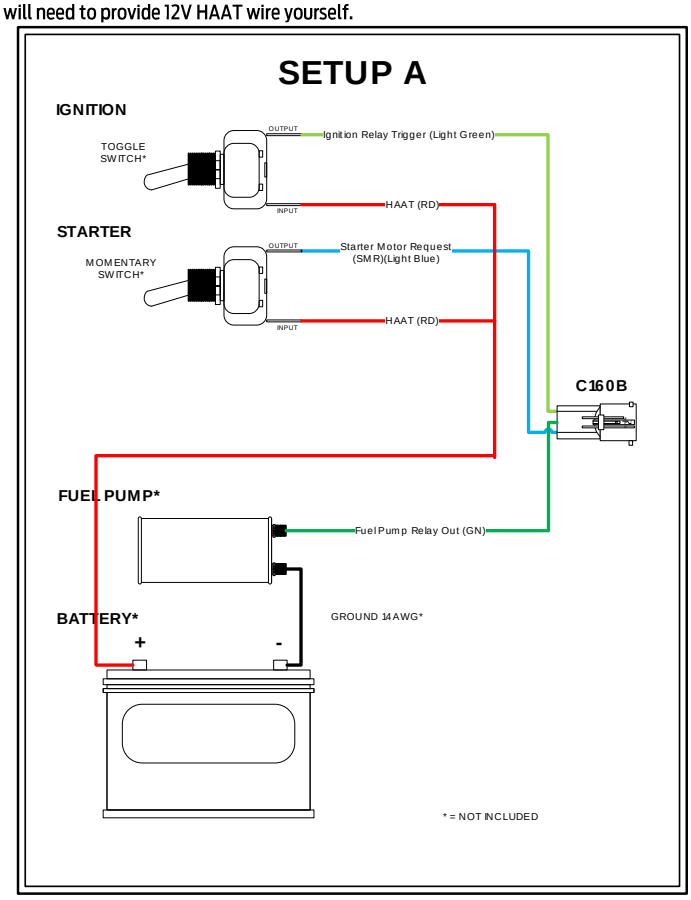
!!! NOTE: If any leaks are found, do not proceed further until these have been corrected!!!

3. Start Engine.
4. Check for leaks and/or noises that may indicate a problem.

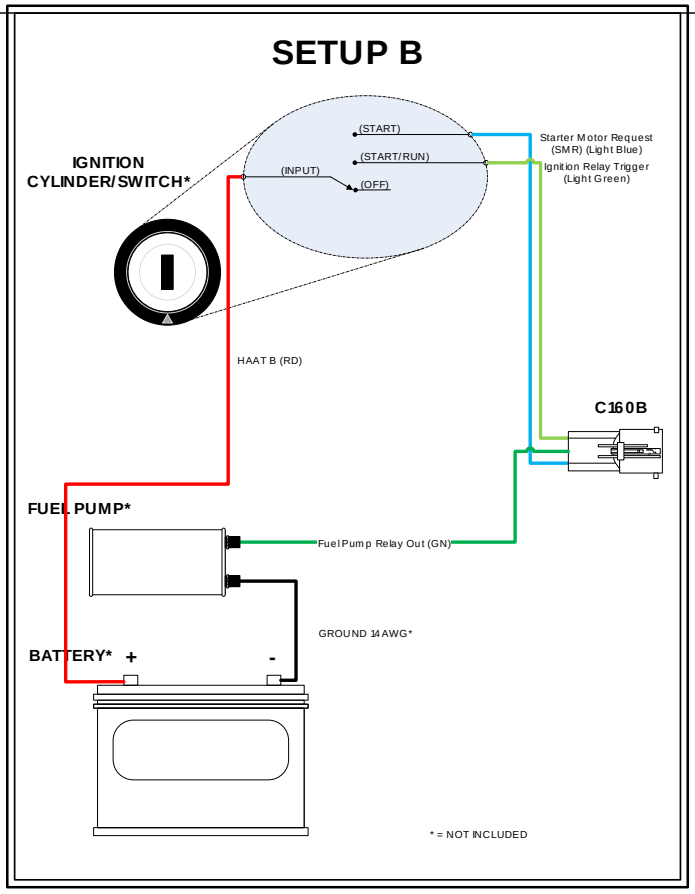
CAUTION: Be certain to run the vehicle in a well-ventilated area.

11.0 Ignition Switch Wire Schematics

The following two pages detail the two most common wiring configurations—please choose one to complete installation of your controls pack kit. You will need to provide 12V HAAT wire yourself.



SETUP B

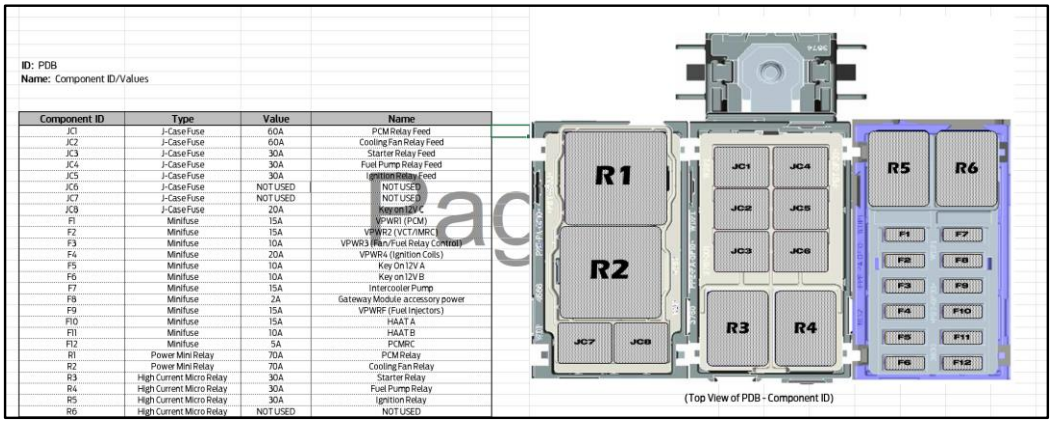


12.0 Fuses & Relays

- 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.

ID: PDB
Name: Component ID/Values

Component ID	Type	Value	Name
JC1	J-Case Fuse	60A	PCM Relay Feed
JC2	J-Case Fuse	60A	Cooling Fan Relay Feed
JC3	J-Case Fuse	30A	Starter Relay Feed
JC4	J-Case Fuse	30A	Fuel Pump Relay Feed
JC5	J-Case Fuse	30A	Ignition Relay Feed
JC6	J-Case Fuse	NOT USED	NOT USED
JC7	J-Case Fuse	NOT USED	NOT USED
JC8	J-Case Fuse	20A	Key on 12V C
F1	Minifuse	15A	VPWR1 (PCM)
F2	Minifuse	15A	VPWR2 (VCT/IMRC)
F3	Minifuse	10A	VPWR3 (Fan/Fuel Relay Control)
F4	Minifuse	20A	VPWR4 (Ignition Coils)
F5	Minifuse	10A	Key On 12V A
F6	Minifuse	10A	Key on 12V B
F7	Minifuse	15A	Intercooler Pump
F8	Minifuse	2A	Gateway Module accessory power
F9	Minifuse	15A	VPWRF (Fuel Injectors)
F10	Minifuse	15A	HAAT A
F11	Minifuse	10A	HAAT B
F12	Minifuse	5A	PCMRC
R1	Power Mini Relay	70A	PCM Relay
R2	Power Mini Relay	70A	Cooling Fan Relay
R3	High Current Micro Relay	30A	Starter Relay
R4	High Current Micro Relay	30A	Fuel Pump Relay
R5	High Current Micro Relay	30A	Ignition Relay
R6	High Current Micro Relay	NOT USED	NOT USED



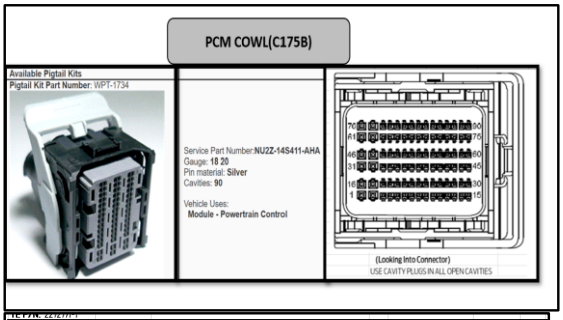
(Top View of PDB - Component ID)

13.0 Troubleshooting tips:

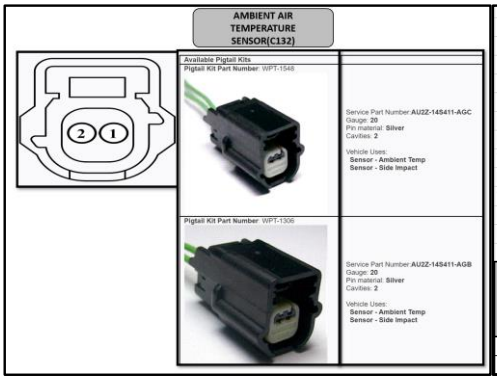
The following troubleshooting tips are intended to run a few quick tests to diagnose a concern or determine what the issues are before contacting the Ford Performance Techline:

- Double check all ground connections. The wiring included in this kit is extremely sensitive to ground issues. Secure all the connections (chassis grounds & vehicle battery negative post). Do a continuity test with reliable DVOM (Digital Volt Ohm Meter) between all your ground terminals and battery negative post.
- Check all reference voltages. Use a DVOM to measure the voltage at each sensor. It should read 5V.
- If none of the sensors or components have power, check the ignition switch, ignition relay R6, and PCM relay R1 wiring. It should have 12V at both relay outputs with the ignition on. This is fused via F5 and F1 separately. Use a DVOM to measure the voltage at F5 and F1, to confirm that 12V is present. Use the small holes on the mini fuses to probe and measure voltage.
- If the sensor and relay measured voltages are correct, but the engine does not crank, check the starter switch and starter relay R3 wiring. 12V should be present at the relay output when the ignition is in the crank position. Measure the voltage at the starter solenoid eyelet to confirm 12V is present during cranking.
- If your engine only cranks, but does not start, a fuel system malfunction could be the cause. First check that 12V is present at fuel pump +, and all injectors when the key is in the on position. Measure the fuel pressure at the fuel rail, it should increase when the key is cycled to on.

14.0 Connector Faces

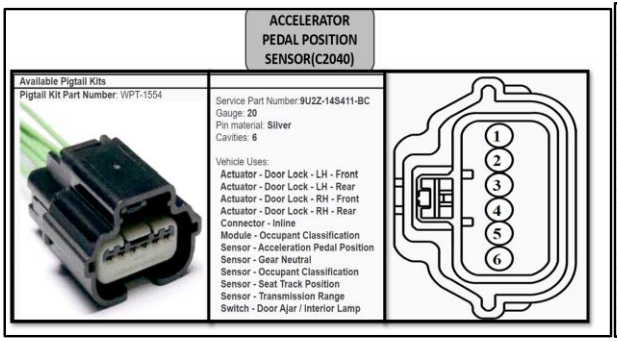


						Model (*FROM*)	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector ID	Cavity
DCF018	18	BU	VPWR1			C175B	2
RE230	20	BU	MAFRTN1	-	-	C175B	4
BE807	20	GN/WH	MAF_IAT1	-	-	C175B	5
CDC54	20	WH-GN	Starter Motor Control Sense (SMCS)			C175B	11
DCF01C	18	BU	VPWR1			C175B	16
DCF01D	18	BU	VPWR1			C175B	17
RE419	20	YE/OG	SIGRTN			C175B	19
BE808	20	YE/VT	MAF_IAT21	-	-	C175B	20
DCF058	20	VT	ISP_R			C175B	25
MIL01	18	BK	Malfunction Indicator Lamp (MIL)			C175B	29
VDB05A	20	GREEN	FD CAN (-)		VDB04A/VDB05A	C175B	33
VH750	20	BU-GN	AAT			C175B	36
VE702	20	BU/WH	APP2			C175B	39
RE406	20	BK	SIGRTN			C175B	40
CET42A	20	GN-VT	CPP - Shift Down			C175B	42
CKP54	18	LIGHT BLUE	Starter Request (SMR)			C175B	43
GDPCMA	18	BK	Ground Eyelet - Chassy			C175B	46
GDPCMB	18	BK	Ground Eyelet - Chassy			C175B	47
VDB04A	20	YELLOW	FD CAN (+)		VDB04A/VDB05A	C175B	48
VE181	20	WH/GN	Alternator LIN			C175B	49
VE701	20	YE/OG	APP1			C175B	50
CET43	20	GY	Shift UP			C175B	57
CDC12	20	YE	Starter Moter Control (SMC)			C175B	60
GDPCMC	18	BK	Ground Eyelet - Chassy			C175B	61
GDPCMD	18	BK	Ground Eyelet - Chassy			C175B	62
RE136	20	VT/GN	APP1RTN		LE136/RE136	C175B	66
LE136	20	GN/OG	APP1VREF		LE136/RE136	C175B	67
RE325	20	VT/BN	MAFRTN21	-	-	C175B	68
RE137	20	YE/GN	APP2RTN		LE137/RE137	C175B	69
LE137	20	BU/GY	APP2VREF		LE137/RE137	C175B	70
DCF05C	20	VT	PCM_WAKE			C175B	73
CE302	20	YE-BU	PCMRC			C175B	74
VE203	20	VT-GY	Fan Relay Control			C175B	75
GDPCME	18	BK	Ground Eyelet - Chassy			C175B	76
GDPCMF	18	BK	Ground Eyelet - Chassy			C175B	77
LE420	20	BU/WH	VREF	-	-	C175B	85
RE226	20	WH-YE	Fuel Pump Relay Control			C175B	90



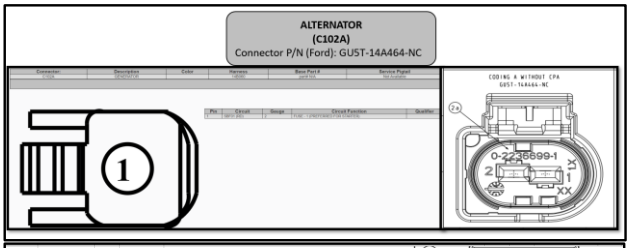
ID: C132
Name: Ambient Air Temperature Sensor
Terminals: Female
Body (Color): Black
TPA (Color): White
Connector P/N (Ford): BL3T-14A464-KC
Molex P/N: 34975-2500

Circuit ID	AWG	Color	Function	Length	Twisted	Node1 ("FROM") Connector1 ID	Node1 ("FROM") Cavity1
VH750	20	BU-GN	AAT			C132	1
RE406	20	BK	SIGRTN			C132	2

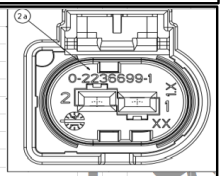


ID: C2040
Name: Accelerator Pedal Position Sensors (APPS)
Terminals: Female
Body (Color): Black
TPA (Color): Neutral
Connector P/N (Ford): 8U5T-14A464-JAB
Molex P/N: 31402-6110

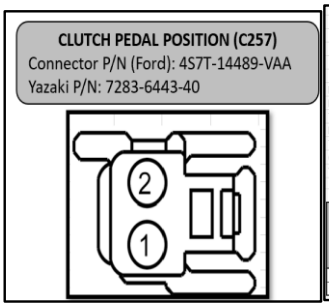
Circuit ID	AWG	Color	Function	Length	Twisted	Node1 ("FROM") Connector1 ID	Node1 ("FROM") Cavity1
LE136	20	GN/OG	APP1VREF		LE136/RE136	C2040	1
VE701	20	YE/OG	APP1			C2040	2
RE136	20	VT/GN	APP1RTN		LE136/RE136	C2040	3
RE137	20	YE/GN	APP2RTN		LE137/RE137	C2040	4
VE702	20	BU/WH	APP2			C2040	5
LE137	20	BU/GY	APP2VREF		LE137/RE137	C2040	6



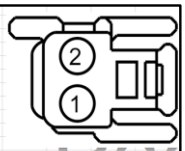
ID: C102A
Name: Alternator
Terminals: Female
Body (Color): BLACK
TPA (Color): RED
Connector P/N (Ford): GU5T-14A464-NC
TE P/N: 2-2236706-3



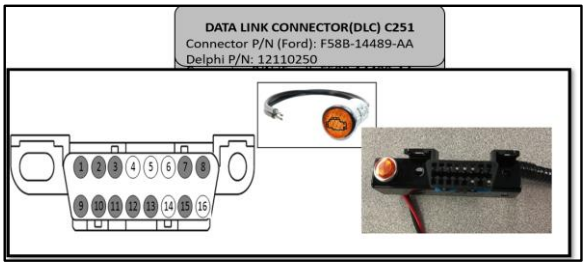
						Node1 ("FROM")	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector 1 ID	Cavity1
VE181	20	WH/GN	Alternator LIN			C102A	1

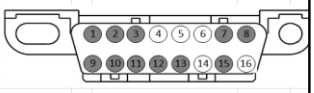


ID: C257
Name: Clutch Pedal Position
Terminals: Female
Body (Color): Gray
TPA (Color): White
Connector P/N (Ford): 4S7T-14489-VAA
Yazaki P/N: 7283-6443-40



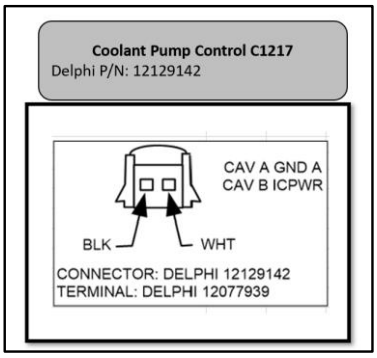
						Node1 ("FROM")	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector1 ID	Cavity1
CET42B	20	GN-VT	CPP			C257	1
GD100A	20	BK	Ground Eyelet - Interior			C257	2





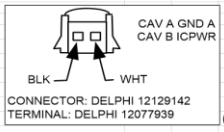
D: C251
Name: Data Link Connector (DLC) Bracket
Terminals: Female
Body (Color): Black
TPA (Color): Blue
Connector P/N (Ford): F58B-14489-AA
Delphi P/N: 12110250
Terminal Lock P/N (Ford): F58B-14A468-AA
Delphi Terminal Lock P/N: 12160437

						Nodel ("FROM"	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector ID	Cavity
-	-	-	-	-	-		1
-	-	-	-	-	-		2
-	-	-	-	-	-		3
GD100C	20	BK	Ground Eyelet - Interior			C251	4
GD100D	20	BK	Ground Eyelet - Interior			C251	5
VDB04CBL5	20	WH-BU	HS CAN (+)		VDB04CBL5/VDB05CBL5	C251	6
-	-	-	-	-	-	-	7
-	-	-	-	-	-	-	8
-	-	-	-	-	-	-	9
-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	11
-	-	-	-	-	-	-	12
-	-	-	-	-	-	-	13
VDB05CBL5	20	WH	HS CAN (-)		VDB04CBL5/VDB05CBL5	C251	14
-	-	-	-	-	-	-	15
DCF10B	18	RD	HAAT A			C251	16
MIL01	18	BK	Malfunction Indicator Lamp (MIL)			MIL	1
DCF11	18	RD	MIL Power B+	-	-	MIL	2



C1217 Coolant Pump Control (Key A - CPC)

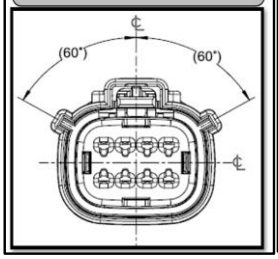
ID: C1217
Name: Intercooler Coolant Pump
Terminals: Female
Body (Color):
TPA (Color):
Connector P/N (Ford): N/A
Delphi P/N: 12129142

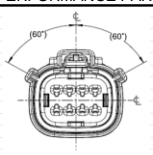


(Looking Into Conne

Circuit ID	AWG	Color	Function	Length	Twisted	Nodel ("FROM") Connector ID	Cavity)
GD200J	16	BK	Ground Eyelet - CHASSY			C1217	1
DCF07	16	RD	Intercooler Coolant Pump			C1217	2

PATS MODULE (C8)
Delphi P/N: 0334724806



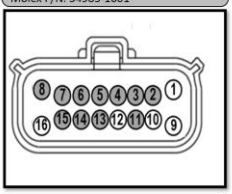


ID: C8
Name: PATS Module
Terminals: Female
Body (Color): Black
TPA (Color): NA
Connector P/N (Ford):
Delphi P/N: 0334724806

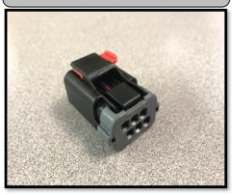
(Looking into Connector)

Circuit ID	AWG	Color	Function	Length	Twisted	Connector ID	Model ("FROM" P Cavity
-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	2
VDB04CBL4	20	WH-BU	HSCAN (+)		VDB04CBL4/VDB05CBL4	C8	3
VDB05CBL4	20	WH	HSCAN (-)		VDB04CBL4/VDB05CBL4	C8	4
GD100E	20	BK	GND			C8	5
DCF08B	20	GN	Key On 12 V C			C8	6
-	-	-	-	-	-	-	7
DCF10C	20	RD	HAAT A			C8	8

INLINE TO 12C508 (ENGINE HARNESS)(C146)
Molex P/N: 34985-1601

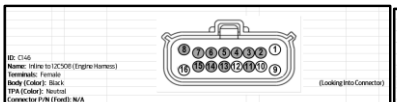


INLINE TO I/P PIGTAIL (C160A)
Delphi P/N: 54200608



I/P PIGTAIL (C160B)
Delphi P/N: 54200612

INLINE TO TRANSMISSION HARNESS(C1B)
Delphi P/N: 12065171



ID: C146
Name: Inline to I2C500 (Engine Harness)
Terminals: Female
Body (Color): Black
TPA (Color): Neutral
Connector P/N (Ford): N/A
Molex P/N: 34485-1601

(Looking Into Connector)

Circuit ID	AWG	Color	Function	Length	Twisted	Node1 ("FROM" Connector ID	Cavity
DCF04	16	VT-RD	VPWR4	-	-	C146	1
-	-	-	-	-	-	C146	2
-	-	-	-	-	-	C146	3
-	-	-	-	-	-	C146	4
RE230	20	BU	MAPRTNB	-	-	C146	5
BB807	20	GN/WH	MAF_IAT'B	-	-	C146	6
LE420	20	BU/WH	VREF	-	-	C146	7
-	-	-	-	-	-	-	8
DCF09	16	YE-GN	VPWRF	-	-	C146	9
KE325	20	VT-BN	MAFRTN22	-	-	C146	10
BE908	20	YE/VT	MAF_IAT22	-	-	C146	11
GG200E	16	BK	Ground Eyelet - CHASSY	-	-	C146	12
-	-	-	-	-	-	-	13
-	-	-	-	-	-	-	14
-	-	-	-	-	-	-	15
DCF02	16	GN	VPWR2	-	-	C146	16

ID: C160A
Name: Inline to I/P Pigtail
Terminals: Female
Body (Color): Black
TPA (Color): Neutral
Ford P/N: N/A
Delphi P/N: 54200608

(Looking Into Connector)

Circuit ID	AWG	Color	Function	Length	Twisted	Node1 ("FROM" Connector ID	Cavity
DCR04	12	GN	Fuel Pump Relay Out			C160A	1
CET43	20	GY	Shift UP			C160A	2
CKP34	18	LIGHT BLUE	Starter Request (SMR)			C160A	3
CET42C	20	GN-VT	Shift Down			C160A	4
RT060	18	LIGHT GREEN	Ignition Relay Trigger (Toggle Switch)			C160A	5
RE419	20	YE/OG	SIGRTN			C160A	6

ID: C160B
Name: I/P Pigtail
Terminals: Male
Body (Color): Black
TPA (Color): Neutral
Ford P/N: N/A
Delphi P/N: 54200612

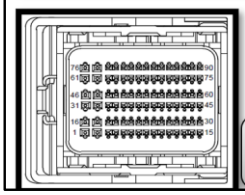
(Looking Into Connector)

Circuit ID	AWG	Color	Function	Length	Twisted	Node1 ("FROM" Connector ID	Cavity
DCR04BL	12	GN	Fuel Pump Relay Out			C160B	1
CET43BL	20	GY	Shift UP	-	-	C160B	2
CKP34BL	18	LIGHT BLUE	Starter Request (SMR)			C160B	3
CET42BL	20	GN-VT	Shift Down	-	-	C160B	4
RT060BL	18	LIGHT GREEN	Ignition Relay Trigger (Toggle Switch)			C160B	5
RE419BL	20	YE/OG	SIGRTN	-	-	C160B	6

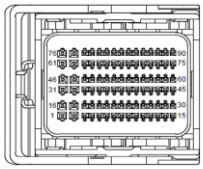
ID: C1B
Name: Inline to Transmission Harness
Terminals: MALE
Body (Color): BLACK
TPA (Color):
Ford P/N:
Delphi P/N: 12065171

(Looking Into Connector)

Circuit ID	AWG	Color	Function	Length	Twisted	Node1 ("FROM" Connector ID	Cavity
DCF08C	16	GN	Key On 12 V C			C1B	1



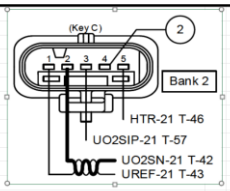
Connector P/N: JU5T-14A464-JB
Wire Dress Cover (90 degree): JU5T-14N003-FA



ID: C90
Name: PCM Transmission Connector
Terminals: Female
Body (Color): BLACK
TPA (Color): LT GRAY
Connector P/N: JU5T-14A464-JB
TE P/N: 2311078-1
Wire Dress Cover (90 degree): JU5T-14N003-FA
TE P/N: 2272771-1

(Looking Into Connector)

						Node1 ("FROM")	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector1 ID	Cavity1
VE827	18	WH-GN	UO2SN-21(LH)		LE449/VE827	C90	42
LE449	18	VT-GN	UREF-21(LH)		LE449/VE827	C90	43
LE448	18	GY-BU	UREF-11(RH)		LE448/VE826	C90	44
VE826	18	YE-GN	UO2SN-11(RH)		LE448/VE826	C90	45
CE236	18	GY-VT	HTR-21(LH)			C90	46
CE235	18	GN-BN	HTR-11(RH)			C90	47
LE450	18	WH	UO2IP-21(LH)			C90	57
LE451	18	BN-YE	UO2IP-11(RH)			C90	59



ID: C1572
Name: UEGO LH
Terminals: MALE
Body (Color): BLACK
TPA (Color): LT GRAY
Connector P/N: MU5T-14A624-JA
TE P/N: 2203781-3

						Node1 ("FRON	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector1 ID	Cavity1
LE449	18	VT-GN	UREF-21(LH)		LE449/VE827	C1572	1
VE827	18	WH-GN	UO2SN-21(LH)		LE449/VE827	C1572	2
LE450	18	WH	UO2IP-21(LH)			C1572	3
CBK02C	18	GN	VPWR			C1572	4
CE236	18	GY-VT	HTR-21(LH)			C1572	5

ID: C1A
Name: Inline to Control Pack Harness
Terminals: Female
Body (Color):
TPA (Color):
Connector P/N: N/A
Delphi P/N: 12065172

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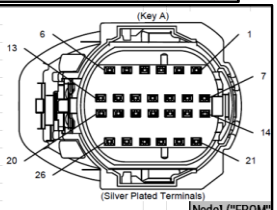
						Node1 ("FROM	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector1 ID	Cavity1
CBK02A	16	GN	VPWR			C1A	1

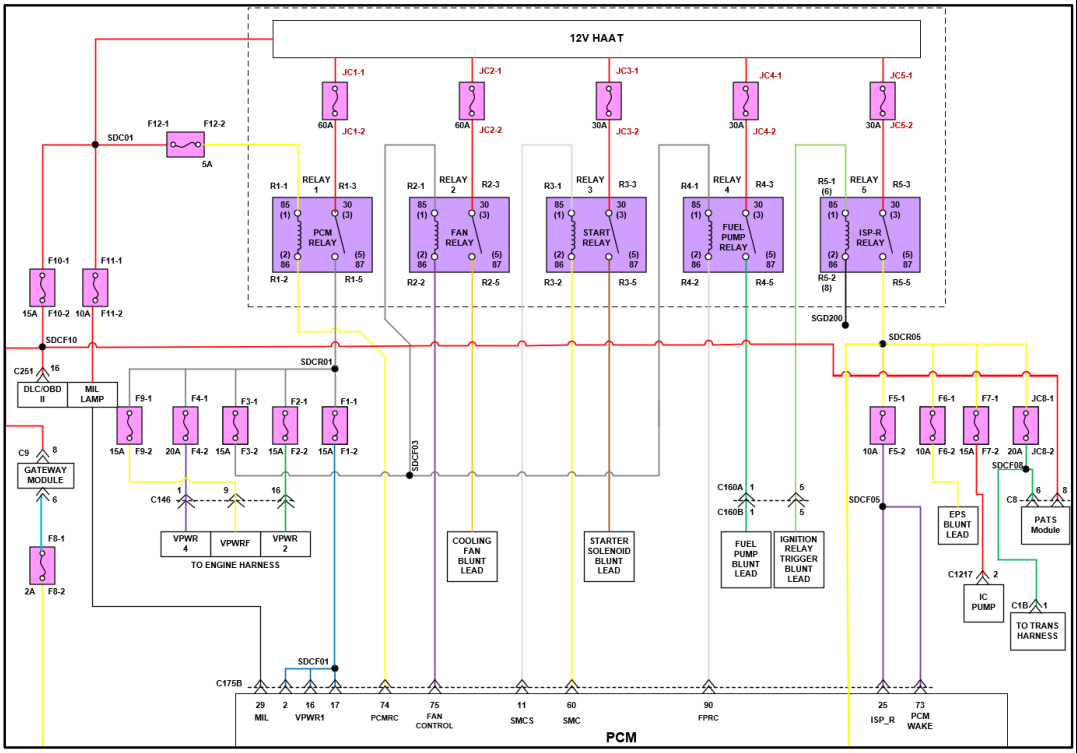
ID: C168A
Terminals: Female
Body (Color):
TPA (Color):
Connector P/N: EU5T-14A4646-MAA
TE P/N: 2203973-1
Wire Dress Cover: LU5T-14N003-AFC
TE P/N: 2203980-1



						Node1 ("FROM"	
Circuit ID	AWG	Color	Function	Length	Twisted	Connector1 ID	Cavity1
VET33	20	BU-OG	TSS			C168A	1
VETB0	20	BU-WH	ISS_A			C168A	2
VETB1	20	YE-GY	ISS_B			C168A	3
VET26	20	WH-BN	OSS			C168A	4
VET28	20	VT-OG	TR_P1			C168A	5
VET29	20	GY-YE	TR_P2			C168A	6
LET05	20	WH-GN	VREF_A			C168A	7
LET06	20	BU-BN	VREF_B			C168A	8
CET25	20	BU-GN	TSPC_1			C168A	9
CET49	20	BN	TSPC_2			C168A	11
CET91	20	YE-OG	TASV			C168A	12
VET27	20	BN-YE	TFT			C168A	13
VET01	20	YE-VT	PC (11)			C168A	14
VET02	20	VT-WH	PC (21)			C168A	15
VET03	20	GY-OG	PC (31)			C168A	16
CET85	20	OG	ATFPC			C168A	18
VET86	20	GY	AFTPM			C168A	19
RET24	20	BN-BU	TRGND			C168A	20
VET04	20	YE	PC (41)			C168A	21
VET05	20	WH-BU	PC (51)			C168A	22
VET06	20	YE-GN	PC (61)			C168A	23
VET07	20	GN-BN	PC (72) (LPC)			C168A	24
VET08	20	BN	PC (82) (CPC)			C168A	25

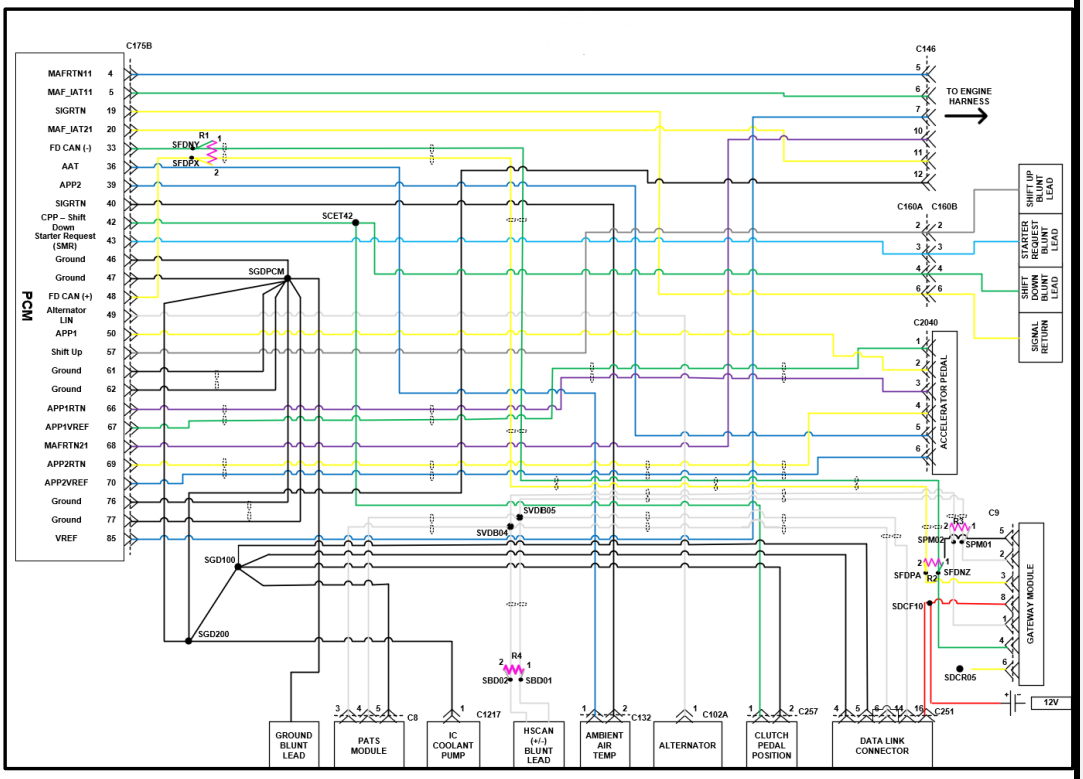
15.0 Schematics

15.1 Schematics-PDB



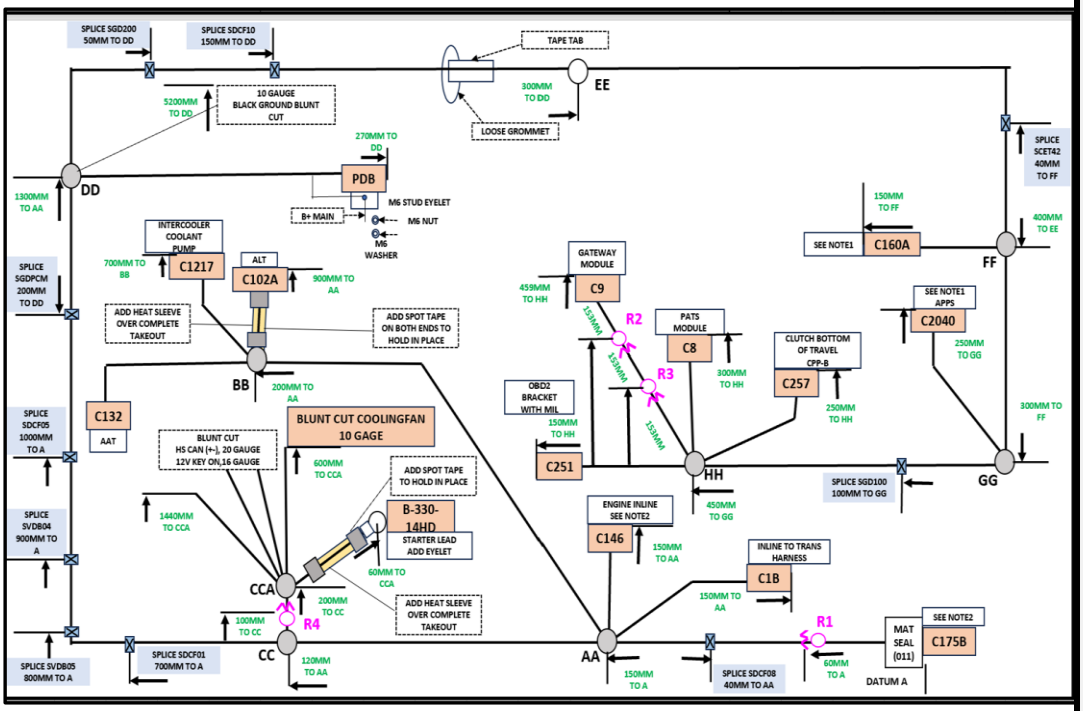
15.0 Schematics

15.2 Schematics-PCM & GROUND SCHEMATICS



16.0 Layout: -

16.1 Layout of Control Pack Harness: -



16.0 Layout: -

16.2 Layout of Auto Trans Harness: -