ROUSH Supercharger Kit

Service and Diagnostic Manual

ROUSH© Performance

2018-2020 Ford F-150 5.0L and 2018-2021 Ford Mustang 5.0L ROUSH© Supercharger Kit

Revision History		
-AA	NEW	06/2021
-AB	ADDED MAP AND SIP PID INFORMATION	09/2021

SERVICE AND DIAGNOSTICS MANUAL 10XX-01B001-AB

Table of Contents

FOREWARD

This manual is intended to provide technicians with the procedures required to maintain and service the unique components for the ROUSH© Supercharger Kit for 2018-2021MY Ford Mustangs and Ford F-150s.

For assistance with other components of the ROUSH© Mustang or F-150, or any non-ROUSH© Performance components, please see the appropriate Ford service or diagnostic manual.

COMMONLY USED ACRONYMS

Acronym or Abbreviation	Description
ACT	Air Charge Temperature (also known as IAT2 or MCT)
EECPV	Evaporative Emissions Canister Purge Valve or Vapor Management Valve
ETC	Electronic Throttle Control
IAT2	Intake Air Temperature Sensor (also known as ACT or MCT)
IMRC	Intake Manifold Runner Control
KOEO	Key On Engine Off
KOER	Key On Engine Running
LTR	Intercooler Low Temperature Radiator
MAFS	Mass Air Flow Sensor
MAP	Manifold Absolute Sensor
MCT	Manifold Charge Temperature (also known as ACT or IAT2)
MIL	Malfunction Indicator Lamp
PCM	Powertrain Control Module (aka ECM, ECU, PCU, EEC)
PCV	Positive Crankcase Ventilation
RDT	ROUSH© Diagnostic Tool
SENT Module	Module that converts analog signals to digital for the PCM to interpret
SIP	Supercharger Inlet Pressure
TPS	Throttle Position Sensor
VECI	Vehicle Emissions Control Information
VID	Vehicle Identification Block
VMV	Vapor Management Valve or Evaporative Emissions Canister Purge Valve

LIMIT OF LIABILITY STATEMENT

All procedures, images, specifications, or descriptions have been verified and known to be accurate at time of publishing. However, due to continual updates to our products, procedures, and diagnostics, changes to this manual may occur periodically. Updated manuals can be found at www.ROUSHPerformance.com by clicking on the Help button at the top of the page and the searching for the manual. Each new revision will contain a "rev number" in the box before the table of contents (ex. 1318-B0100-**AA**).

IMPORTANT NOTE

Before removing any ROUSH© Supercharger Kit components, please read this manual and verify that all items and tools are present. If you are missing hardware or have any questions, please contact ROUSH© Performance at 1-(800) 59-ROUSH©.

ALERT MESSAGES

The following alert messages appear from time to time in the appropriate places in this manual. Ensure that all personnel in the immediate area are aware of these reminders

STOP

CAREFULLY READ THE IMPORTANT SAFETY PRECAUTIONS and WARNINGS BEFORE PROCEEDING WITH THE REPAIRS!

Appropriate disassembly, assembly methods and procedures are essential to ensure the personal safety of the individual performing the kit installation. Improper installation due to the failure to correctly follow these instructions could cause personal injury or death. Read each step of the installation manual carefully before starting the installation.

- Always wear safety glasses for eye protection.
- Place the ignition switch in the OFF position.
- Always apply the parking brake when working on the vehicle.
- Block the front and rear tire surfaces to prevent unexpected vehicle movement.
- Operate the engine only in well-ventilated areas to avoid exposure to carbon monoxide.
- Do not smoke or use flammable items near or around the fuel system.
- Use chemicals and cleaners only in well-ventilated areas.
- Batteries can produce explosive hydrogen gas which can cause personal injury. Do not allow flames, sparks or flammable sources to come near the battery.
- Keep hands and any other objects away from the radiator fan blades.
- Keep yourself and your clothing away from moving parts when the engine is running.
- Do not wear loose clothing or jewelry that can be caught in rotating or moving parts.
- Premium fuel (91 octane or higher) is required to prevent “spark-knock” or detonation under certain operating conditions.
- The use of fuel additives (i.e. octane boosters) is not recommended. There is a possibility that these chemicals can damage your engine and cause drivability issues with your vehicle and void your warranty.
- Operating your engine without the ROUSH© PCM recalibration will result in engine damage or failure and will void your warranty.
- 5W50 oil is required.

WARNING

Fuel in the fuel system remains under high pressure even when the engine is not running. Before working on or disconnecting any of the fuel lines or fuel system components, the fuel system pressure must be relieved. Failure to do so can result in personal injury.

WARNING

Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related components. Highly flammable mixtures are always present and can be ignited, resulting in personal injury.

ROUSH© POWERTRAIN COMPONENTS

The ROUSH© Supercharged Powertrain in this vehicle is equipped with:

Supercharger
The latest technology on the market, the TVS 2650 takes superchargers to the next level. Improved air flow, isentropic efficiency, and lower discharge temps all help with tremendous power potential of this head unit.

Intake Manifold
Custom made for the 5.0L DIPI Ti-VCT engine, this cast aluminum intake packages all of the requirements for an integrated charge air cooler and manifold in one.

Intercooler System
The stand alone water to air intercooler system helps with maintaining consistent air charge temperatures and delivering peek performance on demand.

Fuel System Upgrades
The ROUSH© Kit utilizes higher-flow injectors that meet performance demands and retain everyday driveability.

Engine / Transmission Calibration
The PCM/TCM (automatic transmission equipped vehicles) have unique calibrations developed specifically for the ROUSHcharged© engine packages. Countless hours of engine dynamometer testing, durability testing, cold & hot weather trips and varying altitude trips go into the end product you drive.

THE SUPERCHARGER BYPASS OPERATION

The supercharger is a positive-displacement pump; that is, so long as it is rotating, it is always pumping air. During low demand or high vacuum operation (i.e. idle, deceleration, and light throttle cruise), the pumping action is undesirable as it creates unwanted heat and noise. The bypass circuit, when open, prevents any pressure buildup across the supercharger and allows air to circulate through the rotors, allowing the supercharger to “idle” freely during these conditions. This results in reduced noise, and by reducing heat buildup in the intake, significantly improves street and strip performance. As throttle demand increases, the bypass circuit is closed, resulting in full performance from the supercharger. The bypass circuit is never used to limit or control boost during full-throttle operation and defeating or altering the bypass function will not result in improved performance in any condition, and will result in poor drivability.

MODIFICATIONS TO THE 5.0L ENGINE

To install the ROUSH© Supercharger and Cold Air Intake kits, some of the lines, hoses, and electrical connectors in the vehicle have been modified from the original build from Ford. Due to these modifications some pinpoint tests in the Ford Workshop Manual or Ford Powertrain/Emissions Diagnosis Service Manual will no longer be applicable to this vehicle.

Below is a short list and description of some of the modifications to the engine bay and components.

Brake Booster Vacuum Hose
The brake booster vacuum hose has been modified to work with the ROUSH© Supercharger Kit.

Coil Cover (optional)
ROUSH© Performance offers optional ROUSH© coil covers to replace the OEM coil covers.

Evaporative Canister Purge Line
The OEM purge line will be discarded and replaced with a longer line connecting the purge valve and intake manifold. The OEM purge valve is retained.

Electric Fan Shroud
The OEM electric fan shield shroud is modified to allow for the installation of a ROUSH©-specific degas bottle.

Front Engine Cover
One of the bosses on the front engine cover is modified to allow to allow for ROUSH©-specific FEAD components. The boss is grinded down and the mounting hole re-tapped during initial installation.

Intercooler Pump Harness
The intercooler pump harness is added to the vehicle to power the intercooler pump. The harness is routed around the engine, with the ground eyelet installed below the ground wire bolt on the battery and the harness connected to where to the IMRC solenoid used to connect to.

Knock Sensors
Located on the underside of the intake manifold, the knock sensors will be re-oriented and harness re-wrapped to accommodate the new fuel charging assembly.

OEM Spark Plugs
The eight (8) OEM spark plugs were replaced upon installation of the supercharger kit. Please see the end of the manual for spark plug specifications.

ENGINE PREPARATION

Releasing Fuel System Pressure and Disconnecting the Battery

1. Cover the fenders with fender covers to protect the finish.
2. Release the fuel system pressure.
   a. Locate the underhood fuse panel.
   b. Remove the fuse for the fuel pump (fuse 49).
   c. Start the engine and allow the engine to idle until it stalls.
   d. After the end stalls, crank the engine for approximately ten (10) seconds to make sure the fuel injector supply manifold has been released.
3. Turn the ignition to OFF.
4. Remove the battery cover panel.
5. Disconnect the negative and positive terminals on the battery.

Removing the Coil Covers

Any work requiring access to the supercharger, intake manifold, or fuel charging system will require the removal of the six (6) bolts and the Coil Covers, the Clean Air Tube, and potentially de-tensioning the belt on the Idler Pulleys.

Removing the Coil Covers

1. Remove the six (6) bolts that attach the coil covers to the coil cover bracket on the supercharger.
2. Remove the coil covers and place them somewhere safe.

Installation of the Coil Covers

1. Position the coil covers over the coil cover bracket on the supercharger with the six (6) holes on the bracket line up with the six (6) holes on the coil covers.
2. Hand tighten the six (6) bolts. Torque to 7 Nm (5.2 ft-lb).

De-Tensioning the Supercharger Belt

1. Using a 17mm socket, rotate the FEAD tensioner counter-clockwise release the belt tension and slide the belt off of the upper idler puller.

Re-tensioning the Supercharger Belt

1. Slide the belt back over the FEAD tensioner. Using a 17mm socket, rotate the tensioner clockwise to install the belt. Inspect each pulley to ensure that the belt is properly seated.

SERVICING THE ROUSH SUPERCHARGER KIT

Airbox Assembly

The below instructions are for the complete removal of the airbox assembly.

Removal

1. Cover the fender with fender covers to protect the finish.
2. Disconnect the negative battery cable.
3. Remove the strut tower brace, if equipped.
4. It is recommended, but not required, to remove the driver side engine cover.
5. Disconnect the MAF sensor from the filter tube.
6. Remove the two hoses from the clean air tube assembly.
7. Remove the clean air tube assembly from the throttle body and filter tube. Both are attached via a wormgear clamp.
8. Remove the airbox assembly by removing the one (1) screw.

Installation

1. Place the airbox assembly in the vehicle where it was previously located. Using a 10mm socket, torque the one (1) screw to 8 Nm (6 ft-lb.).
2. Place the clean air tube/air box to the intake. Install the clamp over where the air tube meets the intake and tighten the 3 Nm (26 in-lb.).
3. Connect the PCV and brake aspirator sensors.
4. Connect the quick connect fittings on the two (2) hoses to the air tube.
5. Attach the engine cover. Torque the three (3) bolts to 7 Nm (5.2 ft-lb).
6. If equipped, attach the four (4) bolts that attach the tower strut brace. Torque to 55 Nm (40.6 ft-lb.).
7. Reconnect the positive and negative terminals.

Airbox Filter Removal and Maintenance

The below instructions are for the removal and maintenance of the airbox filter.

1. Remove the airbox cover by removing the six (6) screws that attach it to the airbox assembly.
2. Remove the filter by removing the two (2) screws attaching it to the airbox tube.

While previous air filters required a commercial recharge kit, this kit can be cleaned with soap and water. For dirtier filters with staining, a mild degreaser can be used, but it needs to be used in conjunction with soap and water.

Allow the filter to ***completely dry*** before reinstalling it in the vehicle.

1. Attach the filter to the airbox tube and hand tighten the two (2) screws that attach it to the airbox tube. Rotate the filter so that the arrow on the end of the filter is pointing down, or 90 degrees to the MAF sensor. Using a 10mm socket, torque to 3 Nm (26 in-lb.)
2. Install the lid onto the airbox assembly and tighten the six (6) self-tapping screws.

Supercharger

Removal

Inspect and retain all bolts, clips, and clamps for re-installation. Replace where necessary.

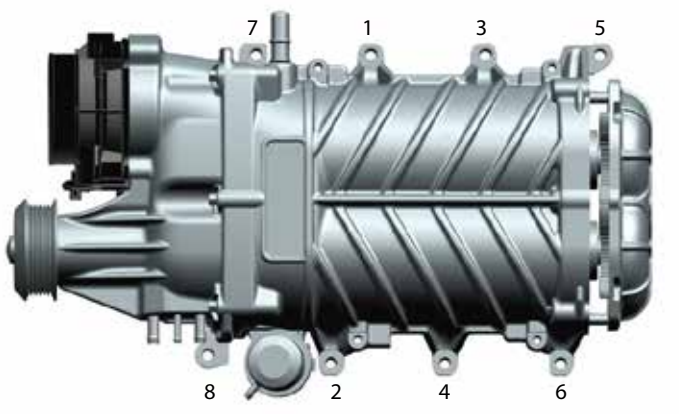
1. Cover the fender with fender covers to protect the finish.
2. Remove the strut tower brace, if equipped.
3. Release the fuel pressure and disconnect the negative battery terminal. Refer to the Engine Preparation section of this manual for more information.
4. Disconnect the airbox from the supercharger.
5. Remove the coil covers.
6. Remove the following lines and connections from the supercharger and set off to the side:
   - The PCV purge hose and line from the supercharger,
   - The two (2) coil cover brackets - Torque 7 Nm (5.2 ft-lb.),
   - Heater cover bracket - Torque 10 Nm (7.4 ft-lb.),
   - Vapor Management Valve (VMV)/Evaporative Emissions Canister Purge Valve (EECPV),
   - Throttle body,
   - Heater inlet line and outlet hose,
   - Booster hose.
7. Remove the supercharger by uninstalling the eight (8) fasteners that secure it to the intake manifold.
8. Cover the opening to the intake manifold until the supercharger is reinstalled.

Installation

Installation is the reverse of removal.

Note: To install and secure the supercharger, use the following pattern and torque specification.

- Hand tighten the eight (8) fasteners to install the supercharger to the intake manifold. See below for the torque pattern. Torque to 25 Nm (18.4 ft-lb.).



Fuel Rails

Removal

Inspect and retain all bolts, O-rings, clips, and clamps for re-installation. Replace where necessary.

1. Cover the fender with fender covers to protect the finish.
2. Remove the strut tower brace, if equipped.
3. Release the fuel pressure and disconnect the negative battery terminal. Refer to the Engine Preparation section of this manual for more information.
4. Remove the following lines and connections from the fuel rails and set off to the side:
   - ACT sensor to the ACT harness,
   - Fuel rail pressure sensor,
   - Fuel inlet tube (LH rail),
   - Fuel supply line (RH rail),
   - Electrical connectors from the eight (8) injectors,
5. Remove the fuel rail mounting bolts.
6. Pull out the fuel rails.

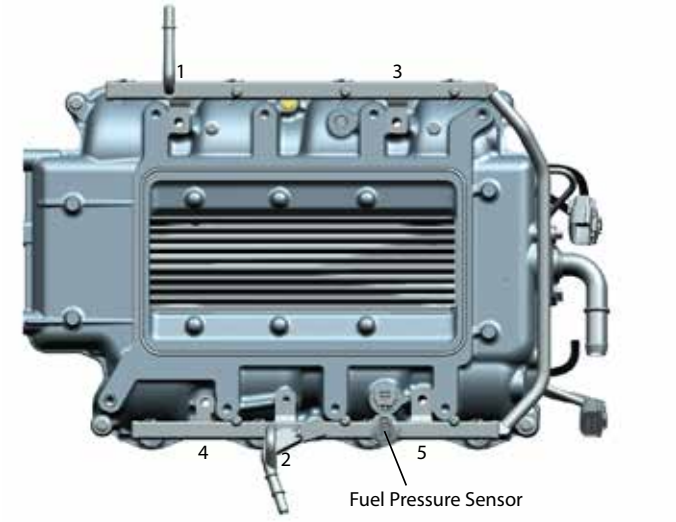
Installation

Installation is the reverse of removal.

Note: To install and secure the fuel rails, use the following pattern and torque specification.

- Install three (3) of the fuel rail mounting bolts into spots 1, 3, and 5 in the figure below.
- Install the shorter bolt in hole 2 and the longer bolt into hole 4 (see below). Mounting hole 4 is slightly recessed.
  a. Torque the bolts to 10 Nm (7.4 ft-lb.).
  b. Tighten the bolts an additional 45 degrees.

Note: Lubricate the lower fuel injector O-rings with engine oil and install them into the intake manifold. Verify that the injectors are fully seated before moving forward.



Injectors

Removal

Inspect and retain all bolts, clips, and clamps for re-installation. Replace where necessary. **Discard any used O-rings and replace.**

1. Cover the fender with fender covers to protect the finish.
2. Remove the strut tower brace, if equipped.
3. Release the fuel pressure and disconnect the negative battery terminal. Refer to the Engine Preparation section of this manual for more information.
4. Perform the Supercharger and Fuel Rail Removal procedures.
5. Remove the fuel injector clips and discard the injector(s).

Installation

Installation is the reverse of removal.

Notes:

- **Fuel injector clips can be reused if they are not damaged in the removal process. Inspect before reusing.**
- **When installing injectors, make sure to lubricate the bottom of the injector with clean motor oil, while keeping the top of the injector clean.**
- **If the fuel rail and temperature sensor is removed from the left rail, it must be replaced.**

Intake Manifold

Removal

Inspect and retain all bolts, clips, and clamps for re-installation. Replace where necessary.

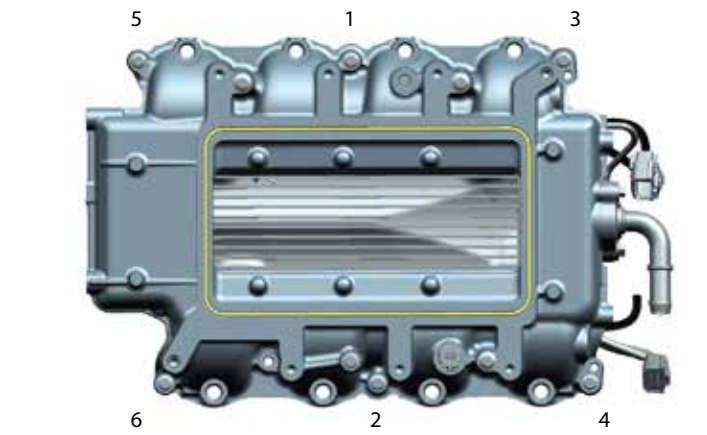
1. Cover the fender with fender covers to protect the finish.
2. Remove the strut tower brace, if equipped.
3. Complete the Supercharger and Fuel Rail Removal procedures.
4. Discharge the coolant from the coolant system. See the Ford Coolant Discharge procedure for your Mustang for more information.
5. Remove the following lines and connections from the intake manifold:
   - Intercooler hard line assembly to the coolant hoses on the back of the intercooler,
   - MAP sensor,
   - Upper FEAD.
6. Remove the intake manifold by uninstalling the six (6) fasteners that secure it to the engine.
7. Place tape over any opening that are revealed by removing the intake manifold.

Installation

Installation is the reverse of removal.

Note: To install and secure the intake manifold, use the following pattern and torque specification.

- Torque the bolts to 10 Nm (7.4 ft-lb.).
- Tighten the bolts an additional 45 degrees.



TORQUE CHART

Qty.	Component	Socket Size	Torque
	Airbox Assembly		
6	Self Tapping M6x25 mm	--	--
2	MAF Tube-to-Airbox Tray (M8 x 1.25 x 25)	10 mm	10 Nm (7.4 ft-lb.)
1	Airbox Tray Clamp	--	3 Nm (26 in-lb.)
1	Airbox to MAF Tube Clamp	--	3 Nm (26 in-lb.)
	Battery Terminal		
1	Intercooler Pump Wiring Harness Eyelet	10 mm	10 Nm (7.4 ft-lb.)
	FEAD		
1	Tensioner	17 mm	25 Nm (18.4 ft-lb.)
3	Water Pump Pulley	10 mm	25 Nm (18.4 ft-lb.)
1	77 mm Grooved Idler Pulley (M8x1.25x28) + Washer	10 mm	25 Nm (18.4 ft-lb.)
	70 mm Smooth Idler Pulley (M8x1.25x28) + Washer	10 mm	25 Nm (18.4 ft-lb.)
4	Upper Bracket-to-Engine - (M8x1.25x60)	10mm	25 Nm (18.4 ft-lb.)
2	Lower Bracket-to-Engine - (M8x1.25x120	10 mm and 13mm	25 Nm (18.4 ft-lb.)
	Fuel Rails		
1	Pressure Sensor	27mm for sensor, 19 mm wrench for nut	6 Nm (53 in-lb.) + 25°
3	Fuel Rail to Intake Manifold (Bolts 1, 3, & 5)	10 mm	10 Nm (7.4 ft-lb.) + 45° (see sequence)
1	Fuel Rail to Intake Manifold (M6x1.0x20) - (Bolt 2)	10 mm	10 Nm (7.4 ft-lb.)
1	Fuel Rail to Intake Manifold (M6x1.0x45) - (Bolt 4)	10 mm	10 Nm (7.4 ft-lb.)
	Intake Manifold		
6	Intake-to-Cylinder Head (M6x1.0x40)	10 mm	10 Nm (7.4 ft-lb.) + 45°
	Throttle Body		
4	M6x1.0x45	10 mm	10 Nm (7.4 ft-lb.)
	Misc		
4	Knock Sensor bolts	5 mm (with Loctite 242)	20-30 Nm (14.8 - 22.1 ft-lb.)
8	Spark Plugs	5/8" spark plug socket with 6" extension (universal swivel for RH plug)	14 Nm (10.3 ft-lb.)
7	Coil-on Plug Bolts	5/8" spark plug socket with 6" extension	14 Nm (10.3 ft-lb.)
	Supercharger		
8	M8	13 mm	25 Nm (18.4 ft-lb.) (see sequence)

ROUSH© SUPERCHARGER DIAGNOSTIC TROUBLE CODES

All diagnostic trouble codes (DTCs) specific to the ROUSH© Supercharger in 2018-2020 Mustangs and F-150 applications are covered in this manual. For all other DTCs, refer to the Ford Powertrain Control/Emissions Diagnosis Service Manual.

For any other DTCs, please verify that the vehicle has been flashed with an up-to-date calibration as these DTCs may come from a factory calibration.

P0096 — Intake Air Temperature Sensor 2 Circuit Range/Performance (Bank 1)	
Vehicle	Mustang and F-150
Description	This DTC sets when the intake air temperature 2 (IAT2) sensor signal is less than the self-test minimum. The IAT2 sensor minimum is 0.2 volt.
Possible Causes	• IAT2 circuit short to ground • Incorrect harness connection • Damaged IAT2 sensor
Symptom	—
Diagnostic Aid	Monitor the IAT2 sensor PID value. A typical IAT2 sensor temperature should be greater than the IAT sensor temperature.
Action	If other fault codes are present, diagnose those first. Refer to the Ford Powertrain Control/ Emissions Diagnosis Service Manual for P0097 diagnostics.

P0097 — Intake Air Temperature Sensor 2 Circuit Low (Bank 1)	
Vehicle	Mustang and F-150
Description	This DTC sets when the intake air temperature 2 (IAT2) sensor signal is less than the self-test minimum. The IAT2 sensor minimum is 0.2 volt.
Possible Causes	• IAT2 circuit short to ground • Incorrect harness connection • Damaged IAT2 sensor
Symptom	—
Diagnostic Aid	Monitor the IAT2 sensor PID value. A typical IAT2 sensor temperature should be greater than the IAT sensor temperature.
Action	If other fault codes are present, diagnose those first. Refer to the Ford Powertrain Control/ Emissions Diagnosis Service Manual for P0097 diagnostics.

P0098 — Intake Air Temperature Sensor 2 Circuit High (Bank 1)	
Vehicle	Mustang and F-150
Description	Bleed solenoid stuck open. While the engine is running, the PCM seals the EVAP system and checks for a rise in pressure. If pressure in the EVAP system exceeds the threshold, a fault is set.
Possible Causes	• Short to the GND (ground) • Armature stuck in post • Solenoid seal compromised
Symptom	—
Diagnostic Aid	—
Action	If other fault codes are present, diagnose those first. Refer to the Ford Powertrain Control/ Emissions Diagnosis Service Manual for P0098 diagnostics.

P00CE — Intake Air Temperature Measurement System - Multiple Sensor Correlation (Bank 1)	
Vehicle	Mustang and F-150
Description	The DTC sets when the PCM detects that each sensor is out of the calibrated range at engine start up after a soak period of at least 6 hours when a block heater is not used.
Possible Causes	• Damaged IAT, CACT or IAT2 sensors • Contaminated or blocked IAT, CACT or IAT2 sensors • Slow responding IAT, CACT or IAT2 sensors
Symptom	—
Diagnostic Aid	Compare all sensor readings to the ambient temperature to determine which sensor is reading correctly.
Action	If other fault codes are present, diagnose those first. Refer to the Ford Powertrain Control/ Emissions Diagnosis Service Manual for P00CE diagnostics.

P012B — Turbocharger/Supercharger Inlet Pressure Sensor Circuit Range/Performance	
Vehicle	Mustang and F-150
Description	This DTC sets when the manifold absolute pressure (MAP) sensor input is not within the calibrated value.
Possible Causes	• Slow responding MAP sensor • Damaged MAP sensor
Symptom	• Runs rough • Lack of power • Hard starting
Diagnostic Aid	Check wiring to SIP sensor.
Action	Perform MAP/SIP pinpoint test for diagnostics for the SIP sensor.

P012C — Turbocharger/Supercharger Inlet Pressure Sensor Circuit Low	
Vehicle	Mustang and F-150
Description	This DTC sets when the manifold absolute pressure (MAP) sensor operating voltage is below the minimum calibrated parameter of 0.25 volt.
Possible Causes	• MAP circuit open • MAP circuit short to ground • VREF circuit open • VREF circuit short to ground • Damaged MAP sensor
Symptom	• Runs rough • Lack of power • Hard starting
Diagnostic Aid	Check wiring to SIP sensor.
Action	Perform MAP/SIP pinpoint test for diagnostics for the SIP sensor.

P012D — Turbocharger/Supercharger Inlet Pressure Sensor Circuit High	
Vehicle	Mustang and F-150
Description	This DTC sets when the manifold absolute pressure (MAP) sensor operating voltage is above the maximum calibrated parameter of 5 volts.
Possible Causes	• MAP circuit open • MAP circuit short to voltage • VREF circuit short to voltage
Symptom	• Runs rough • Lack of power • Hard starting
Diagnostic Aid	Check wiring to SIP sensor.
Action	Perform MAP/SIP pinpoint test for diagnostics for the SIP sensor.

P026A — Charge Air Cooler Efficiency Below Threshold	
Vehicle	F-150 only
Description	This DTC sets when the temperature differential between the intake air temperature 2 (IAT2) sensor value and the charge air cooler temperature (CACT) sensor value is less than a calibrated value.
Possible Causes	• Low coolant level in the supercharger intercooler system • Cooling system concern • Biased IAT2 sensor • Biased CAC sensor • Damaged charge air cooler (CAC) • Air bubbles • Air blocked from reaching LTR by license plate bracket or lights
Symptom	• Lack of power • Hot intake air
Diagnostic Aid	Check for any cooling system concerns. Verify that the CAC pump turns on during KOER by checking the smaller Degas bottle for coolant movement.
Action	If pump is inoperable, go to the CAC Pinpoint Test.

P03xx — Misfire	
Vehicle	Mustang and F-150
Description	This DTC sets when the misfire detection monitor detects an engine misfire in multiple cylinders or the PCM cannot identify which cylinder is misfiring.
Possible Causes	• Damaged camshaft position (CMP) sensor • Low fuel (less than 1/8 tank) • Stuck open exhaust gas recirculation (EGR) valve • Blocked EGR passages • Misfire monitor neutral profile correction has not been relearned since the last mechanical repair
Symptom	—
Diagnostic Aid	One or more EGR passages may be blocked or partially blocked.
Action	If any other DTCs are present, diagnose other trouble codes first. Proceed with Stumble Stall Diagnostic procedure. **Note: Do not run any direct injection only tests in Ford IDS. When all diag is completed, perform a Profile Relearn on the PCM.**

P1227 — Wastegate Failed Closed (Over pressure)	
Vehicle	Mustang and F-150
Description	This DTC sets when the boost pressure is continuously higher than desired.
Possible Causes	• Exhaust gas recirculation (EGR) valve • Faulty MAP sensor • Faulty SIP sensor • Supercharger bypass actuator stuck closed
Symptom	• Stall at idle or coming to a stop • Sluggish acceleration
Diagnostic Aid	This DTC is informational only and may be accompanied by other DTCs. Diagnose other DTCs first.
Action	• Check for holes, cracks, bends or kinks in the vacuum lines going to the supercharger bypass actuator. Check for any disconnected hoses at the supercharger bypass actuator. Repair or install vacuum lines as necessary. • Verify that the bypass valve actuator is functioning. Refer to the Ford Powertrain Control/ Emissions Diagnosis Service Manual for bypass valve actuator/P1227 diagnostics.

P1228 — Wastegate Failed Open (Under Pressure)	
Vehicle	Mustang only
Description	This DTC sets when boost pressure is continuously lower than desired.
Possible Causes	• Exhaust gas recirculation (EGR) valve • Faulty MAP sensor • Faulty SIP sensor • Supercharger bypass actuator stuck closed
Symptom	Lack of acceleration
Diagnostic Aid	This DTC is informational only and may be accompanied by other DTCs. Diagnose other DTCs first.
Action	• Check for holes, cracks, bends or kinks in the vacuum lines going to the supercharger bypass actuator. Check for any disconnected hoses at the supercharger bypass actuator. Repair or install vacuum lines as necessary. • Verify that the bypass valve actuator is functioning. Refer to the Ford Powertrain Control/ Emissions Diagnosis Service Manual for bypass valve actuator/P1228 diagnostics.

ROUSH SUPERCHARGER PINPOINT TESTS

Pinpoint Test A: Stumble Stall/Lack of Power

Note: Prior to performing any pinpoint tests, make sure that the calibration id for the vehicle is correct. For more information on how to check the calibration id, please see the Verifying Calibration ID Procedure.

Step	Procedure	Action
1	Inspect the vehicle to verify the following: a. Confirm that vehicle has only been run on 91-93 octane fuel. b. Perform an underhood inspection to look for non-ROUSH after-market parts (i.e. pulley, new headers, etc.) c. Verify that the air filter is clean. Did the vehicle pass all of these tests?	Yes — Continue to the next step. No — Correct the issue(s) and restart vehicle. If problem persists, move on to Step 2. If non-ROUSH after-market parts are on the vehicle, contact ROUSH Performance Customer Success at (800) 59-ROUSH (597-6874).
2	Verifying that the vehicle has the most current calibration. Using RDT, is the calibration current?	Yes — If the calibration is correct, continue to the next step. No — If the calibration is not current, contact ROUSH Performance Customer Success at (800) 59-ROUSH (597-6874) to get new calibration information.
3	Verify if the vehicle has a SENT module. If P0120 or P0124 codes are present, verify that the vehicle has a SENT module. Does the vehicle have either a P0120 or P0124 code AND a SENT module?	Yes — If it has those codes and a SENT module, contact ROUSH Performance Customer Success at (800) 59-ROUSH (597-6874) to replace SENT module and throttle body with 87mm SENT throttle body. No — If the vehicle does not have a SENT module and a P0120 or P0124 code, continue to the next step.
4	Inspect heat exchanger coolant level. With the key on, engine running (KOER), check the coolant level. Is the coolant level for the heat exchanger low?	Yes — Test for leaks, refill coolant level, and recheck. Then continue to the next step. No — Perform the CAC Pinpoint Test.
5	Check for low temperature water pump operation. With the vehicle idling, open the smaller Degas bottle. The coolant will ripple and bubble, signifying that the coolant is circulating. Does the water pump appear operational?	Yes — Continue to the next step. No — Perform the CAC Pinpoint Test.
6	Verify tire size. Verify that the tire size in the VID block matches current installed tire size on the vehicle. Is the tire size in the VID block correct?	Yes — Continue to the next step. No — Refer to the VID Block Updating procedure to update the tire size and the retest the vehicle.

7	Verifying MAP and SIP installation. Note: See the Removing the Coil Covers and Air Tube and De-Tensioning the Supercharger Belt section of this manual to gain access to the MAP and SIP sensors. a. Perform a visual inspection. • Verify that the MAP and SIP sensors are routed correctly • Verify that the color of wires matches across the connector. • Weather that the seal at the connection is intact (no failure or corrosion present). Are any of these conditions present?	Yes — If no concerns are present, move to 6b. No — Correct concern and retest.
	b. Pull MAP and SIM PIDs. With key on, engine off (KOEO), use RDT to access the MAP and SIM PIDs (TMAP and SIP RAW). Both values should be rational (approximately 14.7 psi at sea level) at ambient temperature. Are the MAP and SIP values rational?	Yes — If both values are rational, move to 6c. No — Complete the MAP and SIP Pinpoint test.
	c. Monitor MAP and SIP PIDs With the engine idling, use RDT to monitor the MAP and SIM PIDs (TMAP and SIP RAW). Both values should be rational (approximately 5 psi at sea level) at ambient temperature. Are the MAP and SIP values rational?	Yes — If both values are rational, complete the MCT/IAT2 Pinpoint Test. No — Complete the MAP and SIP Pinpoint test.

Pinpoint Test B: Crank/No Start

Note: Prior to performing any pinpoint tests, make sure that the calibration id for the vehicle is correct. For more information on how to check the calibration ID, please see the Verifying Calibration ID Procedure.

Step	Procedure	Action
1	Verify supercharger installation date. Was the supercharger recently installed?	Yes — Continue to the next step. No — Go to Step 4.
2	Perform a visual inspection of the battery to verify the following: a. Verify that the battery terminals are correctly connected. b. Verify that the fuel pump module is correctly connected. Does the vehicle pass both visual checks?	Yes — Continue to the next step. No — If either are not installed correctly, correct the issue(s) and attempt to restart vehicle. If problem persists, move on to Step 3. If problem is gone, diagnostics are complete.
3	Perform a visual inspection of the MAP and SIP sensors. Note: See the Removing the Coil Covers and Air Tube and De-Tensioning the Supercharger Belt section of this manual to gain access to the MAP and SIP sensors. 1. Verify that the MAP and SIP sensors routed correctly. 2. Verify color of wires match across the connector. 3. Check connection for weather seal failure or corrosion. Are the MAP and SIP installed correctly?	Yes — Continue to the next step. No — Perform the MAP and SIP pinpoint test.
4	b. Pull MAP and SIM PIDs. With key on, engine off (KOEO), use RDT to access the MAP and SIM PIDs (TMAP and SIP RAW). Both values should be rational (approximately 14.7 psi at sea level) at ambient temperature. Are the MAP and SIP values rational?	Yes — Continue to the next step. No — Perform the MAP and SIP pinpoint test.
	c. Monitor MAP and SIP PIDs With the engine idling, use RDT to monitor the MAP and SIM PIDs (TMAP and SIP RAW). Both values should be rational (approximately 5 psi at sea level) at ambient temperature. Are the MAP and SIP values rational?	Yes — The ROUSH components have been verified to be working correctly. Refer to the Ford Powertrain Control / Emissions (PC/ED) Service Manual for more information on potential issues with Ford components. No — Perform the MAP and SIP pinpoint test.

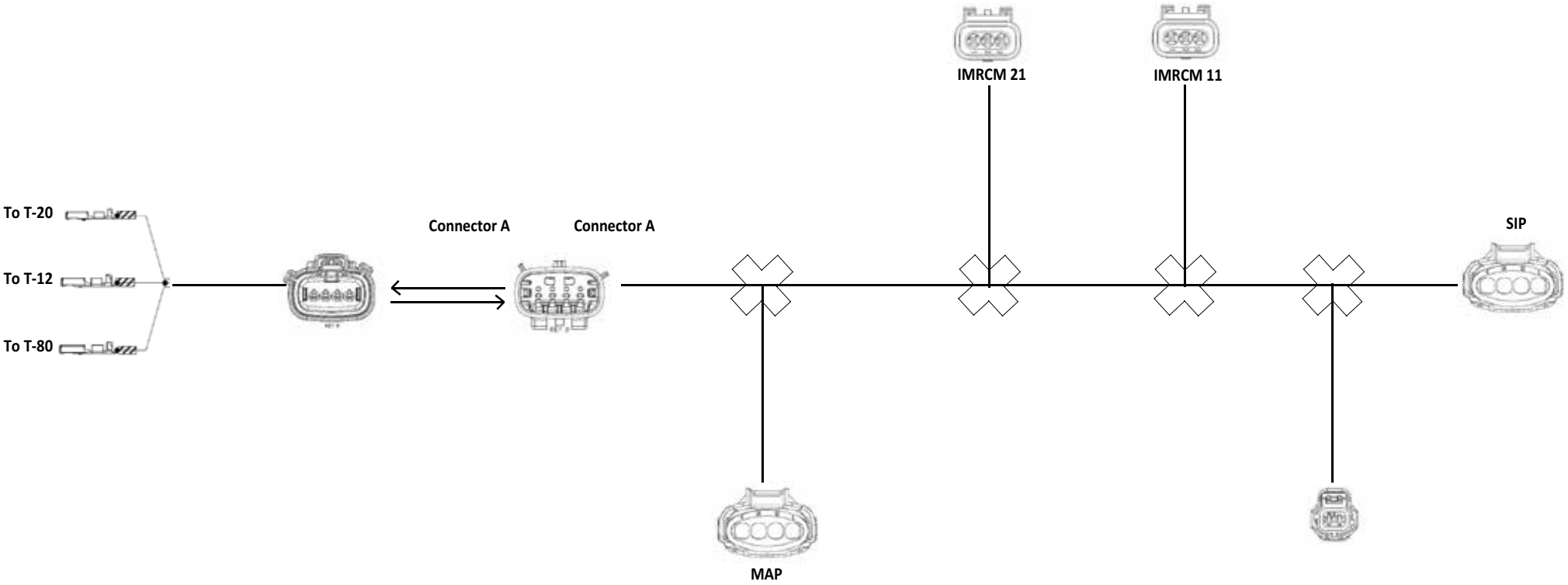
Pinpoint Test C: MAP/SIP Pinpoint Test

Note: Prior to performing any pinpoint tests, make sure that the calibration id for the vehicle is correct. For more information on how to check the calibration ID, please see the Verifying Calibration ID Procedure.

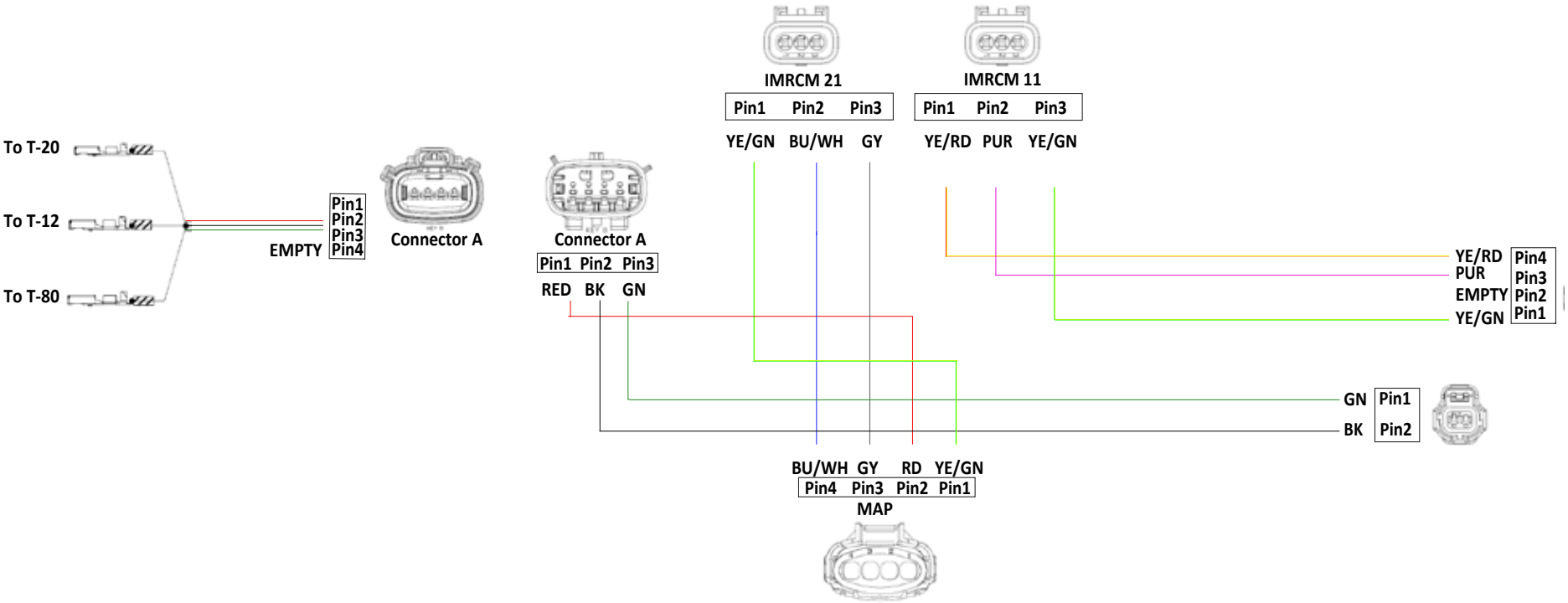
Step	Procedure	Action
1	Perform a visual inspection of the MAP and SIP sensors. Note: See the Removing the Coil Covers and Air Tube and De-Tensioning the Supercharger Belt section of this manual to gain access to the MAP and SIP sensors. 1. Verify that the MAP and SIP sensors are routed correctly. 2. Verify that the color of wires match across the connector. 3. Check connection for weather seal failure or corrosion. Are the MAP and SIP installed correctly?	Yes — Continue to the next step. No — Correct the issue(s) and retest. If problem persists, move on to Step 2.
2	b. Pull MAP and SIM PIDs. With key on, engine off (KOEO), use RDT to access the MAP and SIM PIDs (TMAP and SIP RAW). Both values should be rational (approximately 14.7 psi at sea level) at ambient temperature. Are the MAP and SIP values rational?	Yes — If yes to both, there is no concern with MAP or SIP sensor. Diagnostics complete. No — If MAP sensor is irrational on either test, go to step 3. If SIP sensor is irrational on either test, go to step 4.
	c. Monitor MAP and SIP PIDs With the engine idling, use RDT to monitor the MAP and SIM PIDs (TMAP and SIP RAW). Both values should be rational (approximately 5 psi at sea level) at ambient temperature. Are the MAP and SIP values rational?	
3.	Diagnostics for MAP sensor.	
	a. At key on, engine off (KOEO), perform wiggle test connector and look for value to change. Did the value change?	Yes — If the value changed, repair the wiring connector. No — If the value is constant, go to the next step.
	b. Disconnect sensor and read voltage across Pin-A and Pin-C. Is 5v present?	Yes — If 5v is present, go to the next step. No — If 5v isn't present, measure resistance between PCM pin and MAP sensor pin.
	c. Test for continuity on IMRC connector. Is continuity present?	Yes — If continuity is present, go to the next step. No — If continuity is not present, repair wiring concern.
	d. Test for continuity on the ground wire of the MAP sensor. Is continuity present?	Yes — If continuity is present, go to the next step. No — If continuity is not present, repair wiring concern.
	e. With KOEO, plug in sensor and read from signal wire on the MAP to ground. Is the value between .05v and 4.95v?	Yes — If value is between .5v and 4.95v, replace the sensor. No — If value is not between .5v and 4.95v, go to the next step.
	f. With KO, measure continuity from signal wire to the PCM. Is there continuity and 5 ohm resistance?	Yes — If continuity is present, replace MAP sensor. No — If continuity is not present, repair wiring concern.

4.	Diagnostics for SIP sensor.	
	a. At KOEO, perform wiggle test connector and look for value to change. Did the value change?	Yes — If the value changed, repair the wiring connector. No — If the value is constant, go to the next step.
	b. Disconnect sensor and read voltage across Pin-A and Pin-C. Is 5v present?	Yes — If 5v is present, go to the next step. No — If 5v isn't present, measure resistance between PCM pin and SIP sensor pin.
	c. Test for continuity on IMRC connector. Is continuity present?	Yes — If continuity is present, go to the next step. No — If continuity is not present, repair wiring concern.
	d. Test for continuity on the ground wire of the MAP sensor. Is continuity present?	Yes — If continuity is present, go to the next step. No — If continuity is not present, repair wiring concern.
	e. With KOEO, plug in sensor and read from signal wire on the MAP to ground. Is the value between .05v and 4.95v?	Yes — If value is between .5v and 4.95v, replace the sensor. No — If value is not between .5v and 4.95v, go to the next step.
	f. With KO, measure continuity from signal wire to the PCM. Is there continuity and 5 ohm resistance?	Yes — If continuity is present, replace the SIP sensor. No — If continuity is not present, repair the wiring concern and retest.

1318-12B579W, MAP to SIP Sensor Diagram, Overview



1318-12B579W, MAP to SIP Sensor, Wire Drawing



Pinpoint Test D: Manifold Charge Temperature (MCT)/IAT2 Sensor Pinpoint Test

Note: Prior to performing any pinpoint tests, make sure that the calibration id for the vehicle is correct. For more information on how to check the calibration ID, please see the Verifying Calibration ID Procedure.

Step	Procedure	Action
1	Check for DTCs: a. Verify that no DTCs are present. Are DTCs P0097, P0098, or P0127 present?	Yes — For P0098 or P1115, move to step 2. For P0127, move to step 3. No — Refer to the Ford Powertrain Control/Emissions (PC/ED) Service Manual.
2	Check for a signal to the PCM. a. Disconnect the MCT/IAT2 sensor connector b. With KOEO, place a 5a jumper between Pin-1 and Pin-2 on the harness side of the MCT/IAT2 sensor. Access the PCM and monitor the VOLT PID. Is the voltage less than .2v?	Yes — Remove and replace the IAT2 sensor, clear PCM DTCs, and retest. No — Continue to the next step.
3	Verify sensor signal to VREF. a. With the ignition off, measure the resistance between the PCM positive and negative connectors on the harness side. Is the resistance greater than 10k ohms?	Yes — Continue to the next step. No — Repair the circuit fault, clear any DTCs, and retest.
4	Simulate signal to PCM. a. With KOEO, disconnect MCT/IAT2 sensor. Access the PCM and monitor the IAT2 (VOLT) PID Is the voltage greater than 4.2v?	Yes — Remove and replace the MCT/IAT2 sensor, clear PCM DTCs, and retest. No — Continue to the next step.
5	Check for a sensor short. With the ignition off and the PCM disconnected, measure the resistance between: • Pin-1 and Pin-2 on the harness side of MCT/IAT2 sensor, harness side • Pin-1 of the MCT/IAT2 sensor, harness side, and the negative terminal of the 12v battery. Are the resistances on each greater than 10k ohms?	Yes — Continue to the next step. No — Repair the circuit fault, clear any DTCs, and retest.
6	Simulate High MCT/IAT2 signal to PCM. With KOEO, access the PCM and monitor IAT2 (VOLT) PID. Observe the PID while disconnecting the IAT2 sensor. Is the voltage greater than 4.2v?	Yes — Continue to the next step. No — Repair the circuit fault, clear any DTCs, and retest.
7	Simulate Low MCT/IAT2 signal to PCM. a. With engine off and the MCT/IAT2 sensor disconnected, connect a 5a jumper wire between Pin-1 and Pin-2 of the IAT2 sensor, harness side. b. With KOEO, access the PCM and monitor IAT2 (VOLT) PID. Is the voltage greater than .2v?	Yes — Reconnect the IAT2 sensor and monitor the PID values in different road test conditions. Compare results to the Reference Values in Section 6 of the Ford Powertrain Control / Emissions (PC/ED) Service Manual. If the sensor is out range, replace, clear all DTCs, and retest. No — Continue to the next step.
8	Check for correct PCM operation. a. Disconnect all PCM connectors and visually inspect for damage or corrosion to the pins. Then reconnect the PCM and all connections and verify that all connectors are seated properly. b. Carry out a PCM self-test. Is the concern still present?	Yes — Install a new PCM and flash new PCM. No — The system is operating correctly and concern may have been caused by a loose or corroded connector.

Pinpoint Test E: Charge Air Cooler (CAC)/Intercooler Pump Diagnostic Pinpoint Test

Note: Prior to performing any pinpoint tests, make sure that the calibration id for the vehicle is correct. For more information on how to check the calibration ID, please see the Verifying Calibration ID Procedure.

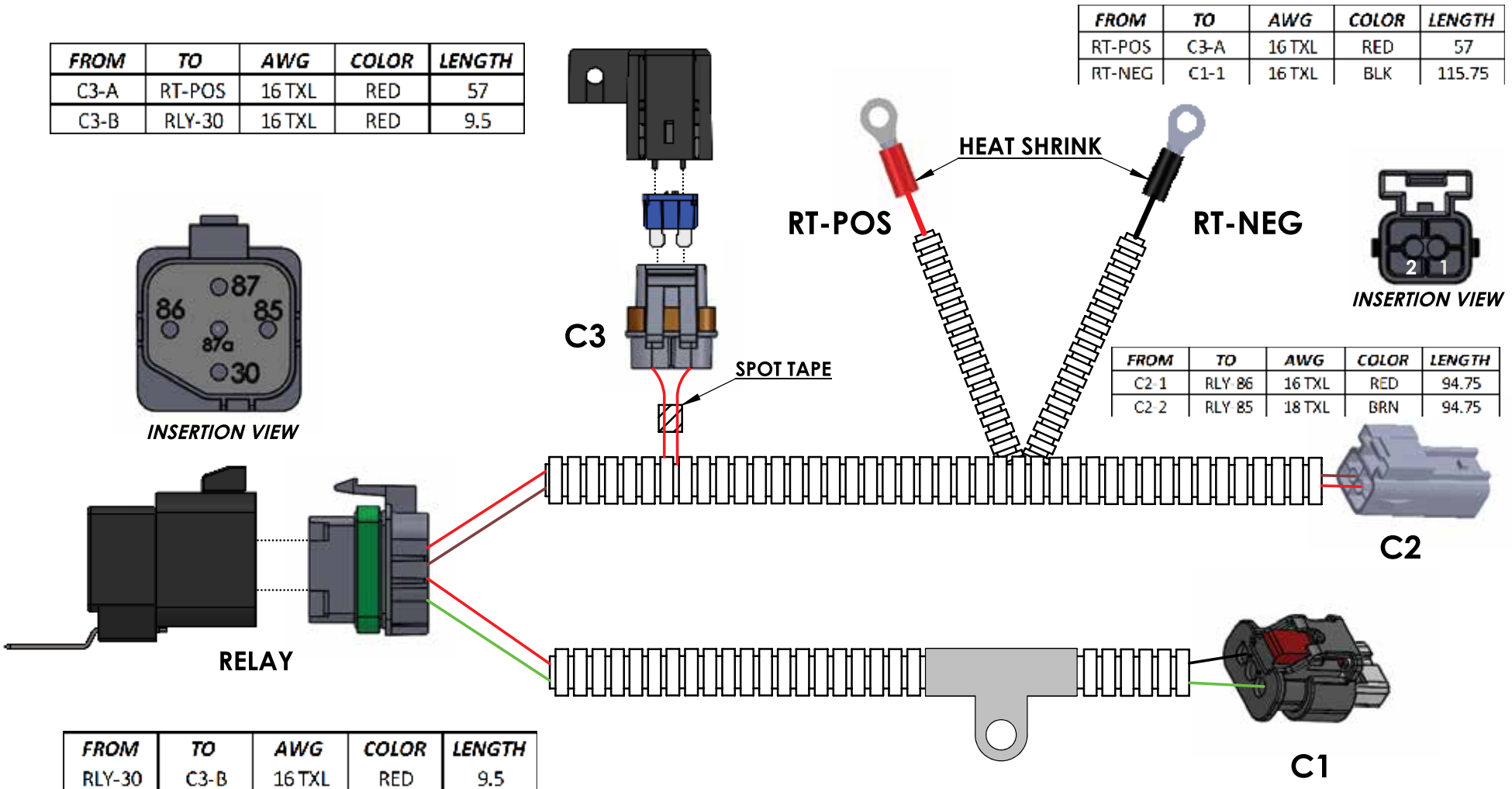
Step	Procedure	Action
1	Confirm that the calibration is up-to-date. Using RDT, note the calibration id and contact ROUSH Performance at 800-59-ROUSH© to verify that the calibration is up-to-date. Is the calibration up-to-date?	Yes — Continue to the next step. No — Install the correct calibration and retest the vehicle.
2	Check for power at the pump. With vehicle on a lift. With KOEO, check for power at C1 Pin-3. Are 12V present?	Yes — Go to step 13 to investigate the pump. No — Continue to the next step.
3	Check for voltage at the IMRC connector. Check vehicle-side connector C2-1 for 12V on green wire with accessory power on. Is there 12V?	Yes — Continue to the next step. No — Repair wiring as needed and retest.
4	Check for continuity at the IMRC connector. Check continuity on harness between red wire (green wire on vehicle-side) at connector C2-1 Pin-1 to Pin-86 on the relay. Is there continuity present?	Yes — Continue to the next step. No — Investigate wiring between C2 and relay Pin-86 and repair as needed. Then retest.
5	Check for continuity at the IMRC connector. Check continuity on harness between brown wire (yellow wire vehicle-side) connector C2-2 Pin-2 to Pin-85 on the relay. Is there continuity present?	Yes — Continue to the next step. No — Investigate wiring between C2 and relay Pin-85 and repair as needed. Then retest.
6	Check for power at the battery connector. Check for 12V at RT POS. Is there power at the battery connector?	Yes — Continue to the next step. No — Investigate body side power source and repair as needed. Then retest.
7	Check the fuse for continuity. Check for continuity between the fuse and battery connector. Is there good continuity in the circuits?	Yes — Continue to the next step. No — Investigate fuse holder connections and repair as needed. Then retest.
8	Check the fuse holder for continuity. Check for continuity between fuse holder Pin-B (C3-B) and relay Pin-30. Is there good continuity in the circuits?	Yes — Continue to the next step. No — Investigate relay connection and repair as needed. Then retest.
9	Check for power at the relay. With KOEO, check for voltage at the relay Pin-30. Is 12V present?	Yes — Continue to the next step. No — Investigate relay connection and repair as needed. Then retest.
10	Check the relay for continuity. Apply power to relay Pin-85 and relay Pin-86. Check for continuity between Pin-30 and Pin-87 Is there good continuity in the circuits?	Yes — Continue to the next step. No — Replace the relay and retest.
11	Check the relay for continuity. Check continuity on harness between relay Pin-87 and C1 Pin-3. Is there good continuity in the circuits?	Yes — Continue to the next step. No — Investigate pins between C1 and relay Pin-87. Repair as needed. Then retest.

12	Check the battery connection for continuity Check continuity between RT NEG on the battery and C1 Pin-1. Is there good continuity in the circuits?	Yes — Continue to the next step. No — Investigate wiring between C1 and RT NEG. Repair as needed. Then retest.
13	Check the CAC pump for proper operation Test the pump operation with outside power and water sources. Remove the CAC pump, inlet, and outlet hoses from the vehicle. Place the inlet hose in a bucket of water. Provide power to the pump via a 12V power source and verify that the pump is pulling water into and out of the pump. Is the pump operating?	Yes — No problem found, most likely air in the system that requires purging. Please contact ROUSH Performance Customer Success at (800) 59-ROUSH (597-6874) for more diagnostics. No — Replace the CAC pump. Test the vehicle to ensure that the concern has been remedied.

1320-8W501-A, Intercooler Pump Harness

FROM	TO	AWG	COLOR	LENGTH
C3-A	RT-POS	16 TXL	RED	57
C3-B	RLY-30	16 TXL	RED	9.5

FROM	TO	AWG	COLOR	LENGTH
RT-POS	C3-A	16 TXL	RED	57
RT-NEG	C1-1	16 TXL	BLK	115.75



FROM	TO	AWG	COLOR	LENGTH
C2-1	RLY-86	16 TXL	RED	94.75
C2-2	RLY-85	18 TXL	BRN	94.75

FROM	TO	AWG	COLOR	LENGTH
RLY-30	C3-B	16 TXL	RED	9.5
RLY-85	C2-2	18 TXL	BRN	94.75
RLY-87	C1-3	16 TXL	WHT/GRN	53
RLY-86	C2-1	16 TXL	RED	94.75

FROM	TO	AWG	COLOR	LENGTH
C1-1	RT-NEG	16 TXL	BLK	115.75
C1-2	PLUG	PLUG	PLUG	PLUG
C1-3	RLY-87	16 TXL	WHT/GRN	53

ROUSH© DIAGNOSTIC TOOL OVERVIEW

The Roush Diagnostic Tool (RDT) is a free desktop application available from ROUSH© for PCM calibration, performing advanced driveability diagnostics, DTC reading and clearing, and KOEO/KOER diagnostic tests.

Required Equipment

Performing electronic diagnostics on a ROUSH© Vehicle using the ROUSH Diagnostic Tool (RDT) requires the use of a capable J2534 Pass-Thru OBD-II device, which is required to communicate between the vehicle and the technicians laptop.

A list of laptop system requirements can be found at http://rdt.roush.com/RoushRdt/.

Downloading and Installing the ROUSH Diagnostic Tool

A laptop with a working USB port and a constant and uninterrupted wifi signal are required to run RDT. RDT is licensed per machine, so the software can only be used on the machine that it has been downloaded to.

Prior to installing RDT, install all drivers required for the chosen J2534 Pass-Thru device. Consult the installation instructions for the chosen Pass-Thru device to ensure drivers are properly downloaded.

To Download:

1. Access the ROUSH Diagnostic Tool page on the ROUSH Diagnostic Tool website to start the download process. The Google Chrome browser works best for downloading RDT.
2. Complete all of the required fields and click "Submit".
3. Click on "ROUSH Performance Client" to download RDT for your vehicle. The ROUSH CleanTech Client will not work with a ROUSH© Vehicle.

To Install:

1. Locate the file that was downloaded and then run the file.
2. Run the downloaded file to begin installation of the software. Review and agree to the licensing terms and begin the install, which may take several minutes.
3. Locate the Roush Diagnostic Tool icon on the desktop and open the program. Read and Accept the warning.
4. Enter email address that was registered and software activation code from above.
5. After installation, select Pass-Though device and close and re-open RDT before first use.

Using RDT

1. Connect J2534 Pass-Thru OBD-II device into the OBD-II port of the vehicle. This port can be found in the steering column. If changing Pass-thru devices, RDT will have to be closed and re-opened each time a new device is to be used.
2. With Key On Engine Off (KOEO), locate the RDT icon on the desktop and open the program. If multiple Pass-Thru devices have been used, select the chosen device via the drop-down menu. Follow any messages from RDT to finish the device selection process.

Navigating RDT

For diagnostic purposes, there are five (5) sections of RDT that most technicians and customers will use.

1. **Vehicle ID**
   This tab is used to identify the vehicle that is to be diagnosed. This is the first required step for any work in RDT. Identifying the vehicle will give the technician the VIN, model and model year, and the engine.
2. **Module Programming**
   This tab will allow the user to see the ROUSH© calibration ID for the PCM and SRM, as well as update them to newer ROUSH© calibrations in some vehicles.

Note: The ROUSH© Performance calibration cannot be modified or edited by end users. This section should only be used by trained technicians working with the ROUSH© Performance Customer Success Team.

3. **Signals/Datalogger**
   This tab on RDT will allow users to monitor different vehicle parameters, or PIDs.
4. **Self Tests/Clear Codes**
   This will allow the technician to access three (3) tests that are designed to give the data needed to diagnose most issues, as well as show what diagnostic trouble codes (DTCs) are present on the vehicle. The fourth function in this section allows the user to delete the trouble codes.
5. **VID Parameters**
   This functionality allows the user to update the VID Block, which includes the axle ratios and the tire revolutions, which may need to be changed when the vehicle tires are changed. These variables are required to be correct for the vehicle to operate properly.

For Technical Assistance with the ROUSH© Diagnostic Tool, please contact RDT-Support@roush.com. For any other questions please contact ROUSH© Customer Success Team at (800) 59-ROUSH (597-6874).

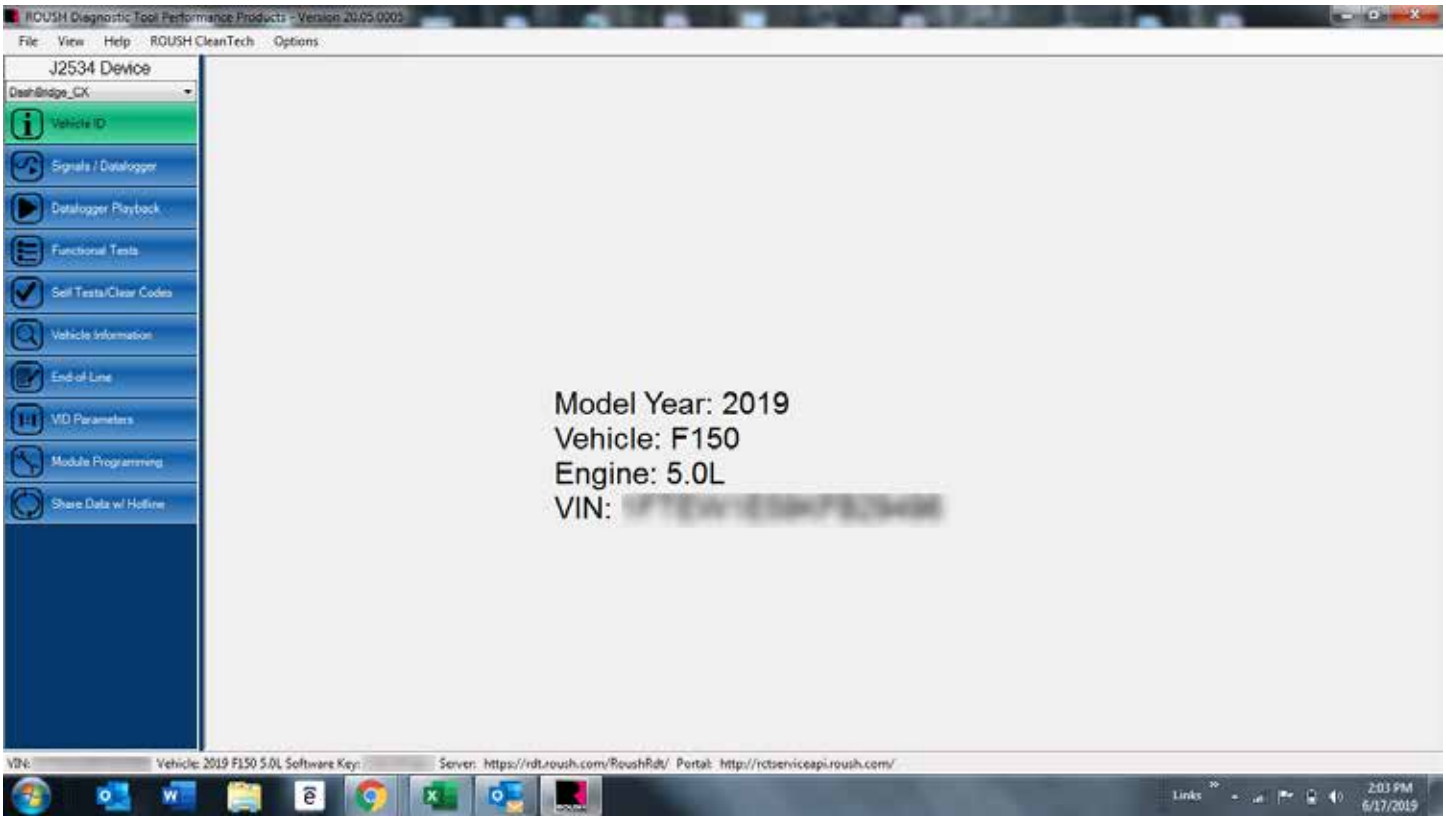
DIAGNOSTICS AND PINPOINT TESTS IN RDT

Identifying the Vehicle in RDT

This tab in RDT is the first step in using RDT on a ROUSH© Performance vehicle.

Identifying the Vehicle

1. Connect a capable J2534 Pass-Thru OBD-II device into the OBD-II port of the vehicle and open RDT on a laptop with an active internet connection.
2. With the key on and engine off, select Vehicle ID. This will allow RDT to identify the vehicle and its calibration.
3. When successful, the RDT will show the vehicle year, vehicle model, engine type, and VIN.

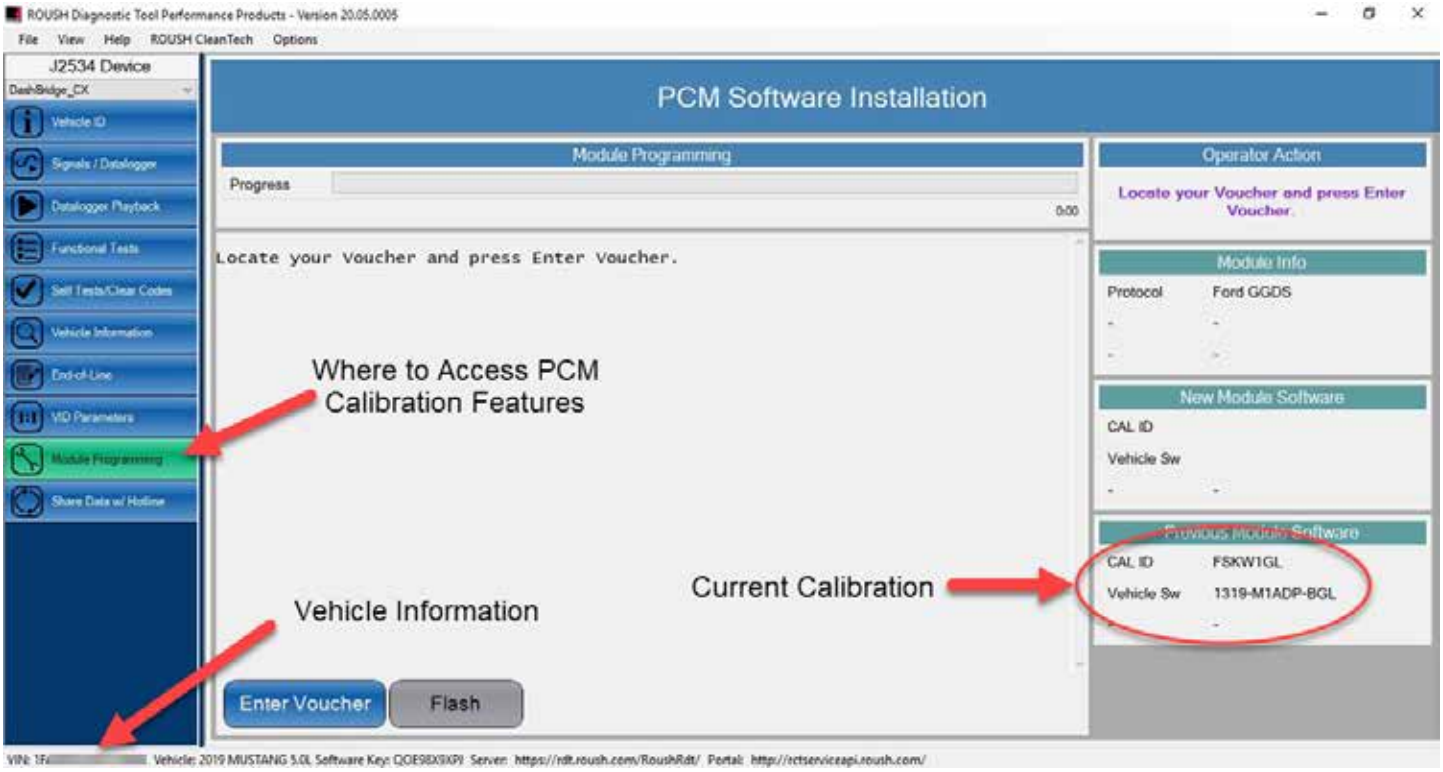


Verifying the Calibration ID

The Calibration ID is the identifier for which calibration the vehicle in question is using. This ID is required for some diagnostic test for ROUSH© Performance vehicles and a technician should have this ID available when calling 800.59-ROUSH©.

Identifying the Calibration ID Using RDT

1. Connect a capable J2534 Pass-Thru OBD-II device into the OBD-II port of the vehicle and open RDT on a laptop with an active internet connection. Click on Vehicle ID to identify the vehicle in RDT (this is required to continue).
2. After verifying the ID of the vehicle, click on Module Programming.
3. The current calibration ID is located in the bottom right corner of the page. Record this number before calling ROUSH© Performance Customer Success.

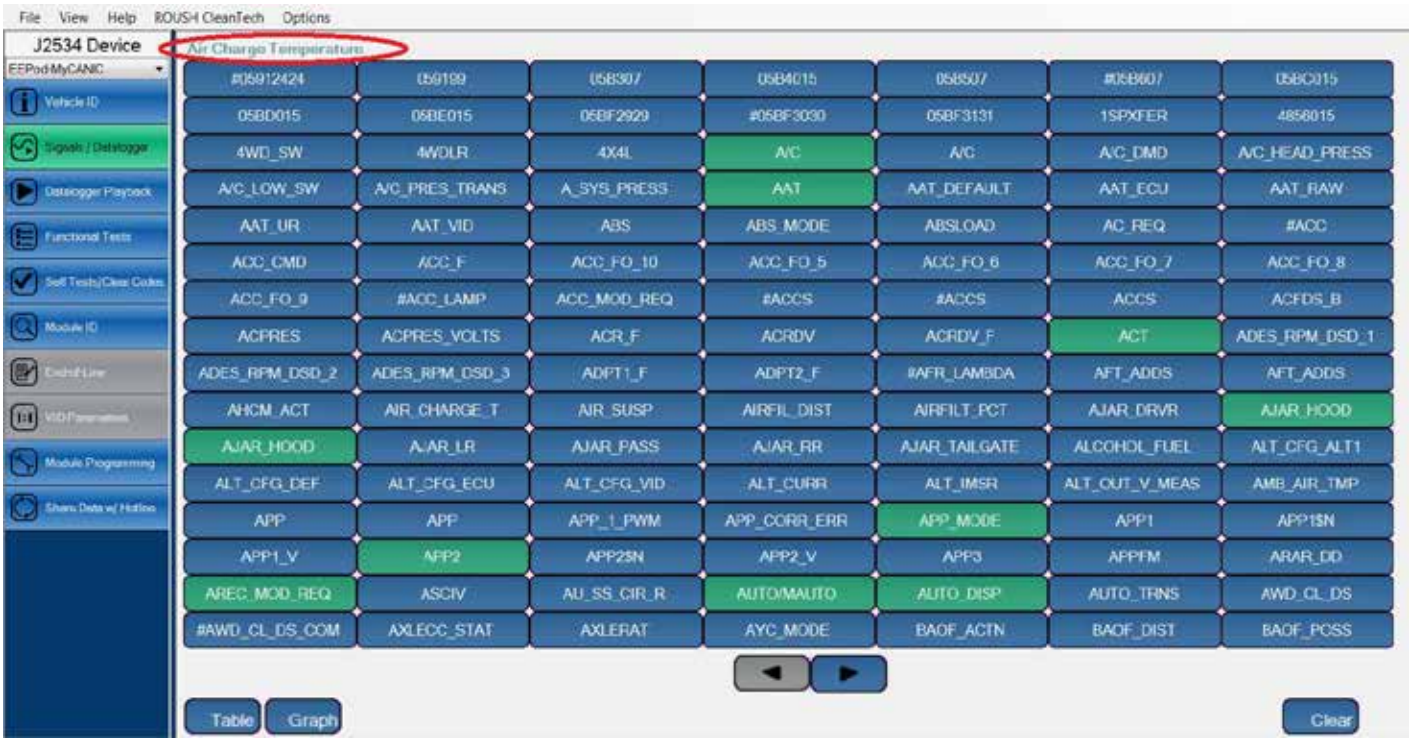


Data Logging

RDT can be used to check various parameters in real time. These parameters, also known as PIDs, VID Block Updating

Using the Datalogger

1. Connect J2534 Pass-Thru OBD-II device into the OBD-II port of the vehicle and open RDT on a laptop.
2. After verifying the ID of the vehicle, click on Signals/Datalogger.
3. Select the PIDs that you wish to monitor and select either Table or Graph to activate them. You can monitor up to 25 PIDs at one time.



Self Running Tests and Clearing Codes in RDT

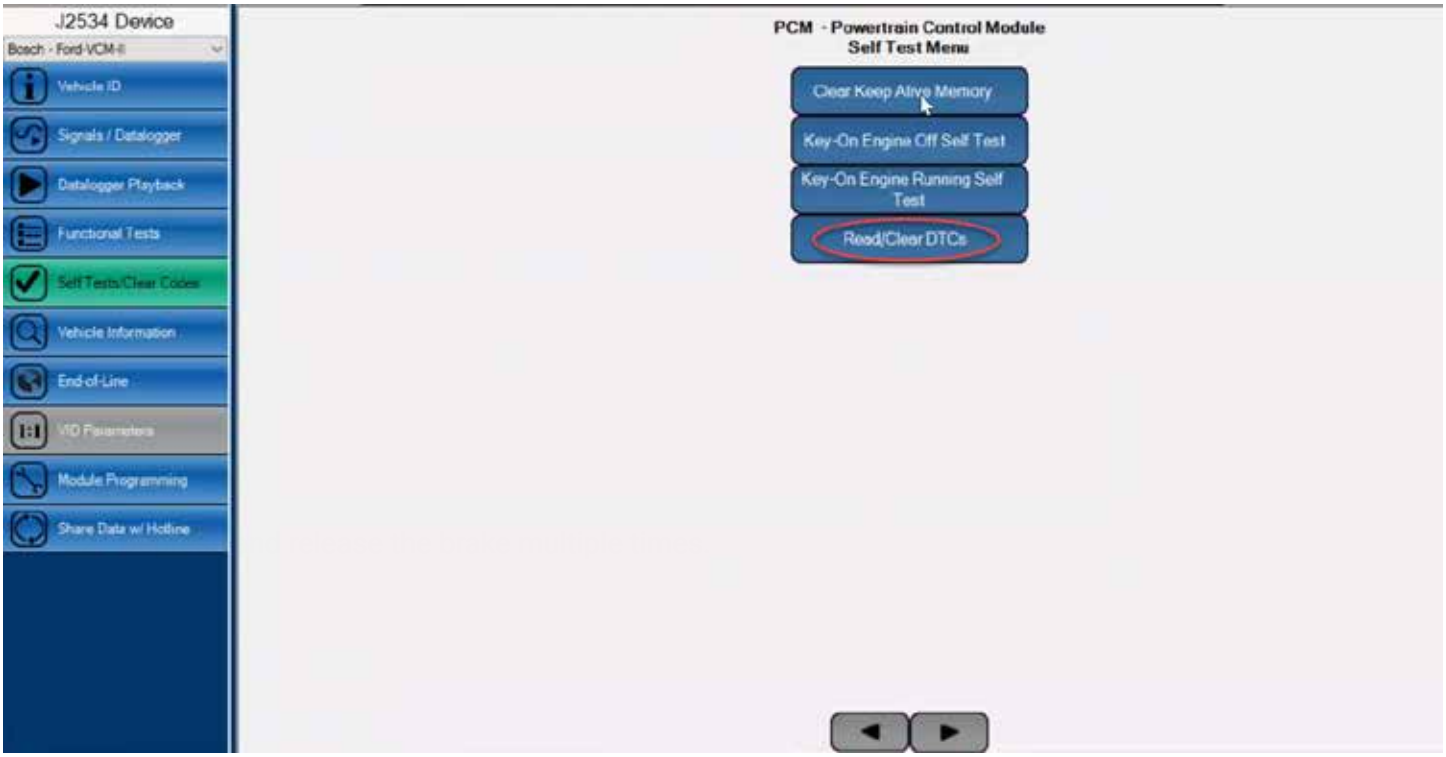
There are two (2) self tests that can be run through RDT. These include:

1. Key-On Engine-Off Self Test, which will test all of the circuits in the vehicle.
2. Key-On Engine Running Self Test, which is a performance test that will test the steering, braking, and other aspects of the vehicle.

In addition to these tests, this section will also allow you to clear most diagnostic trouble codes (DTCs).
Note, if the issue that caused the DTC is not resolved, the code will most likely come back.

Performing Self Tests and Clearing Codes

1. Connect J2534 Pass-Thru OBD-II device into the OBD-II port of the vehicle and open RDT on a laptop.
2. After verifying the ID of the vehicle, click on Self Tests/Clear Codes.
3. Select the test that you would like to run and follow the instructions.
   a. For the Key-On Engine-Off Self test.
      1. This test does not require any inputs from the driver.
   b. Key-On Engine Running Self Test, the user will need to perform and couple of tasks so that RDT can gather data.
      1. Turn the wheel in each direction multiple times.



Clearing Codes

1. Connect J2534 Pass-Thru OBD-II device into the OBD-II port of the vehicle and open RDT on a laptop.
2. After verifying the ID of the vehicle, click on Self Tests/Clear Codes.
3. Select the test that you would like to run and follow the instructions.
   a. For the Key-On Engine-Off Self test.
      1. This test does not require any inputs from the driver.
   b. Key-On Engine Running Self Test, the user will need to perform and couple of tasks so that RDT can gather data.
      1. Turn the wheel in each direction multiple times.
      2. Depress and release the brake multiple times.

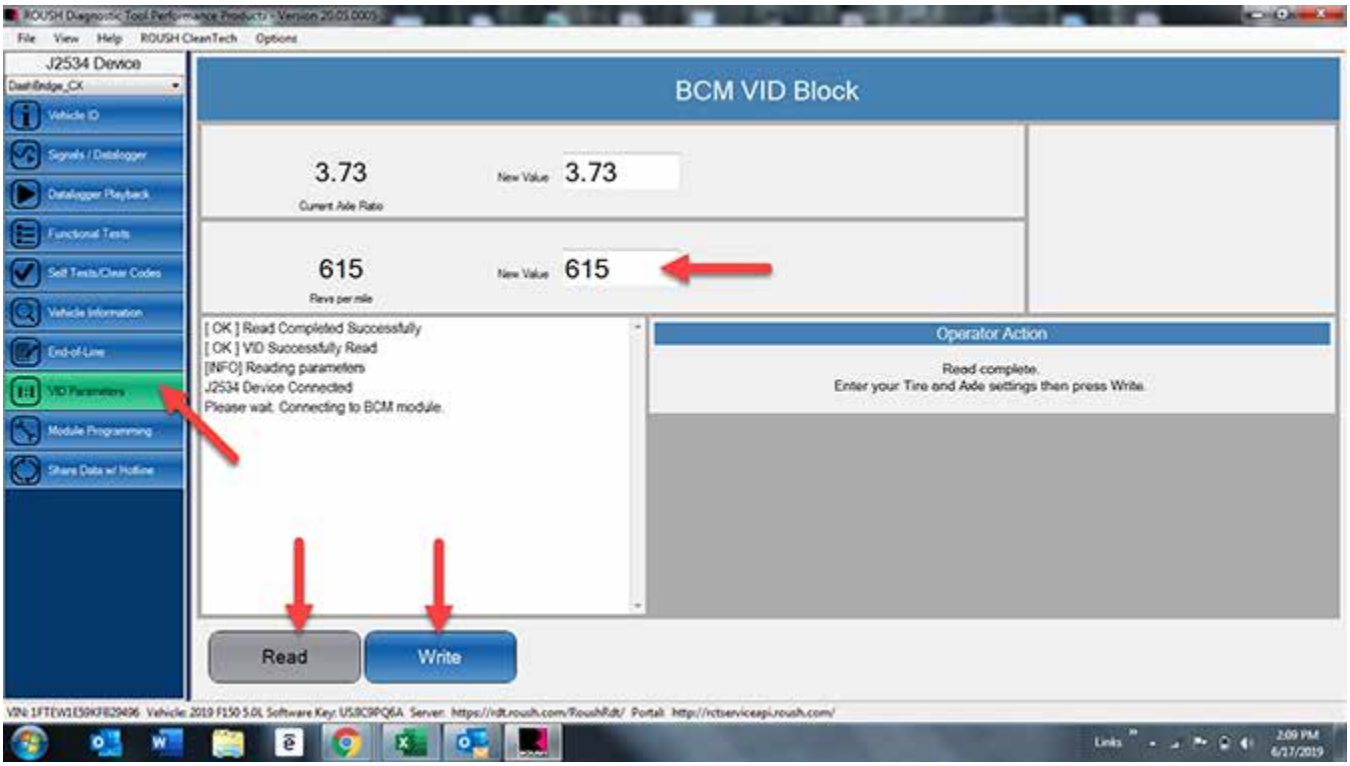
VID Block Updating

When tire size or axle ratios are changed on a ROUSHCharged vehicle, the Vehicle Identification Block (VID Block) will need to be updated.

Updating the VID Block on RDT

1. Connect J2534 Pass-Thru OBD-II device into the OBD-II port of the vehicle and open RDT on a laptop.
2. After verifying the ID of the vehicle, click on VID Parameters and select Read.
3. After RDT reads the Current Axel and Revs Per Mile, these values can be updated. This number can be obtained by accessing a Tire Rev Calculator from where the new tires were purchased.
4. Enter the three digit in the New Value box on the BCM VID Block page in RDT.

Note: Incorrect information entered into VID block can lead to drivability issues and potential catastrophic damage to the engine and/or transmission that will not be covered under warranty.

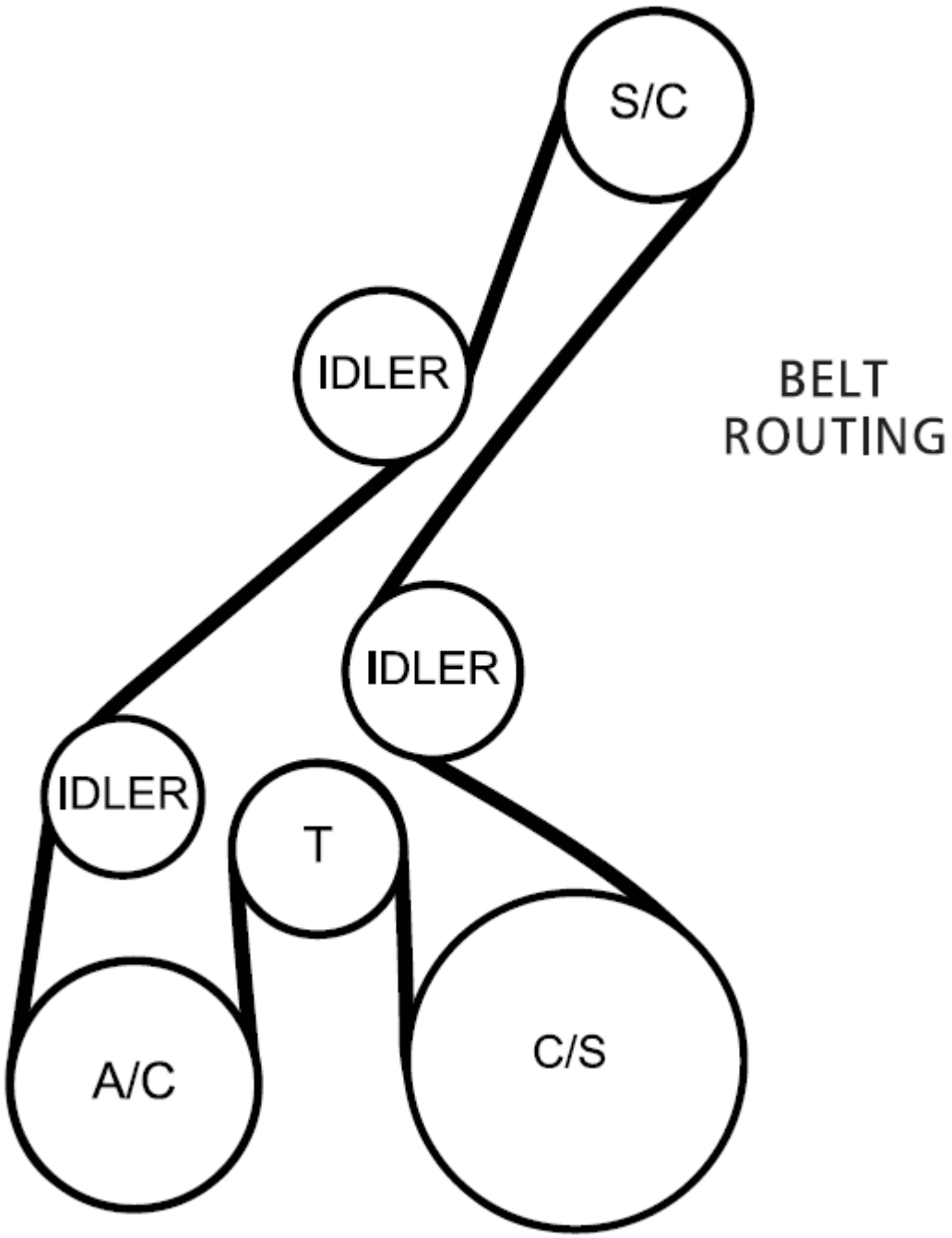


APPENDICES

Consumable Specifications

Part	Part Number	Specification	Frequency	Quantity
Accessory Drive Belt	Ford Part	--	As needed	1
Air Filter - Dry	131550-9601R	--	--	1
Coolant	--	Motorcraft Specialty Orange Engine Coolant and distilled water	3 Years / 50,000 miles	--
Engine Oil	--	5W50 SN or SP Full Synthetic Oil	Replace oil as prompted. Refer to the Ford Maintenance Schedule in your vehicle for more information.	--
Engine Oil Filter	FL-500-S	Motorcraft FL-500-S	Replace at each oil change	1
Fuel Injectors	13119F593K	--	As needed	Pk of 8
Gasoline	--	Premium, 91 octane or greater	--	--
Serpentine Belt	K060806	--	--	1
Spark Plug	M-12405-M50A	Gap 0.028-0.031" (0.7-0.8mm)	--	Pk of 8
Supercharger Oil	--	Motorcraft XL-4 Supercharger Oil	Approximately every 50,000 miles	150mL

Supercharger Accessory Belt Routing Diagram



Vacuum Routing Diagram