Distribution

OSBMA

School Bus Technical Update

Jack Szalka – Technical Support Manager (TSM)

Dave Dickerson – Account Executive (AE)

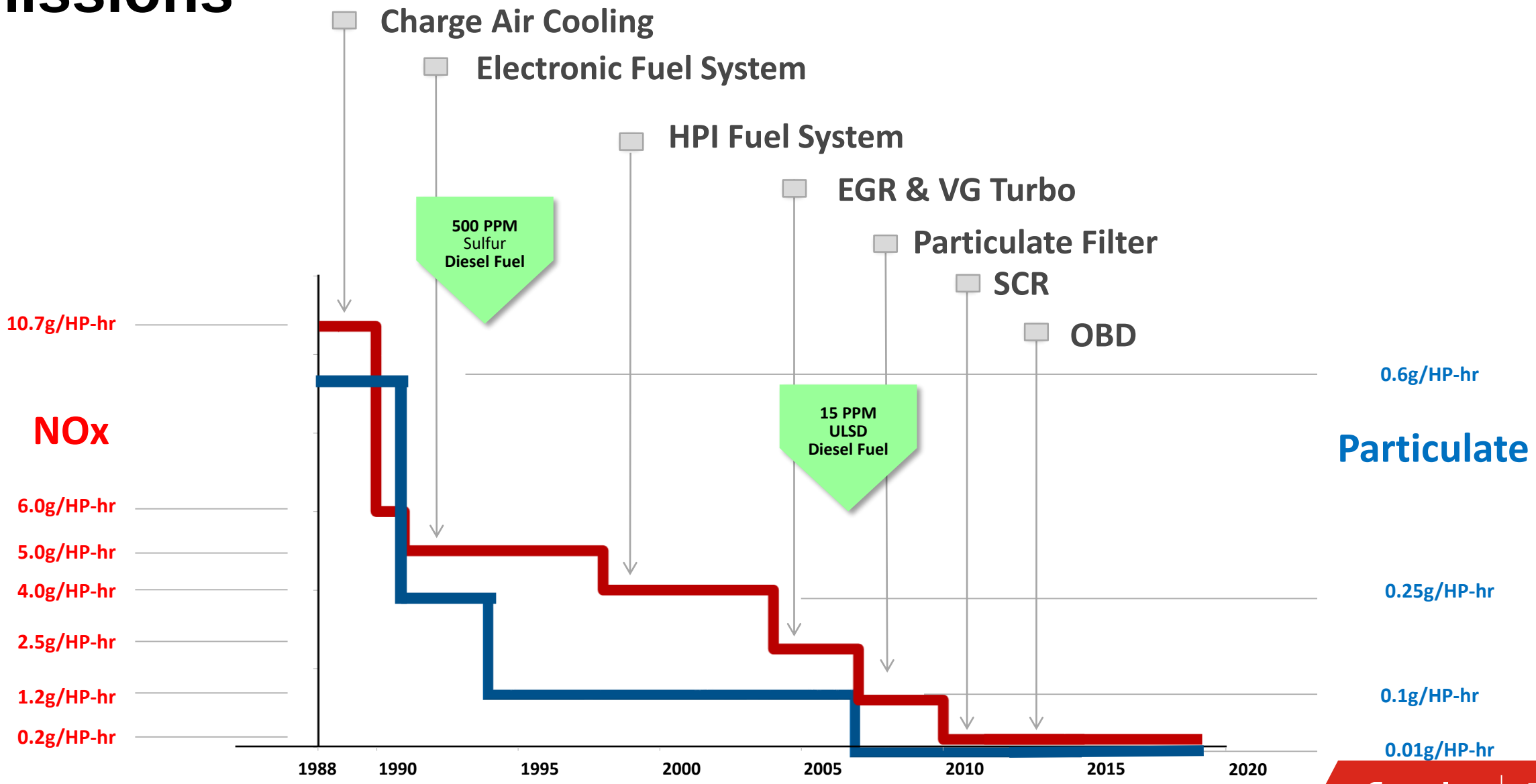
Bus – East Region

October 2019

EPA Emissions Road Map

Where we came from and where we are now !

Where We've Come From – EPA Diesel Emissions



Todays Diesel engines are ***90%*** cleaner than a decade ago!

97% cleaner than 20 years ago! ***With significantly better fuel economy…***

History of The B Series Engine

July 1983: B-Series Introduced

1998 ISB: 24V Cylinder Head

2002 ISB: EGR Introduced

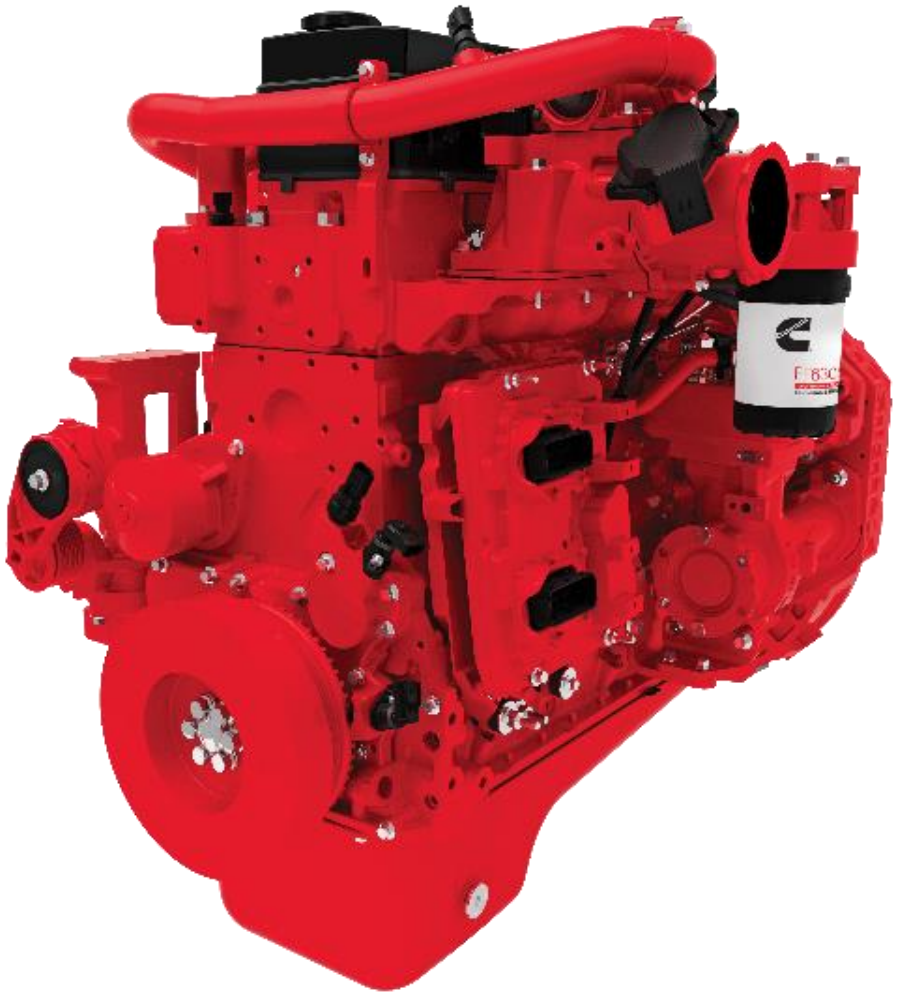
2007 ISB: 5.9L to 6.7L DPF introduced

2010 ISB6.7: SCR Introduced

2017 B6.7: Single Module Introduced

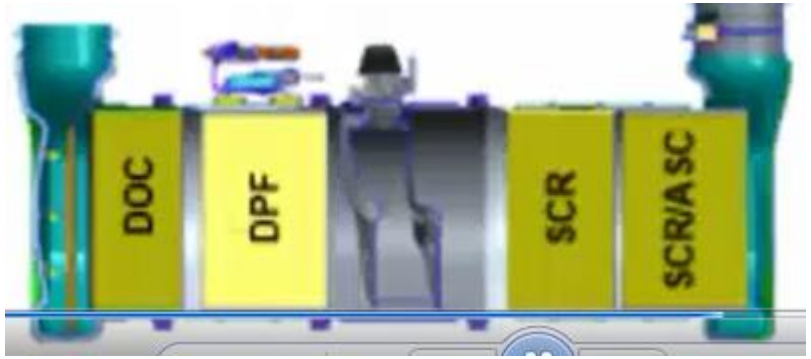
Stable Architectural Design

- 35+ Years of Parent Bore design
- 20+ Years of 4 valve head
- 17 Years:
  - Variable Geometry Turbocharge (VGT)
  - Exhaust Gas Recirculation (EGR)
  - High Pressure Common Rail (HPCR)
- 12 Years of 6.7 liters of displacement
- ***12 Years of Aftertreatment***

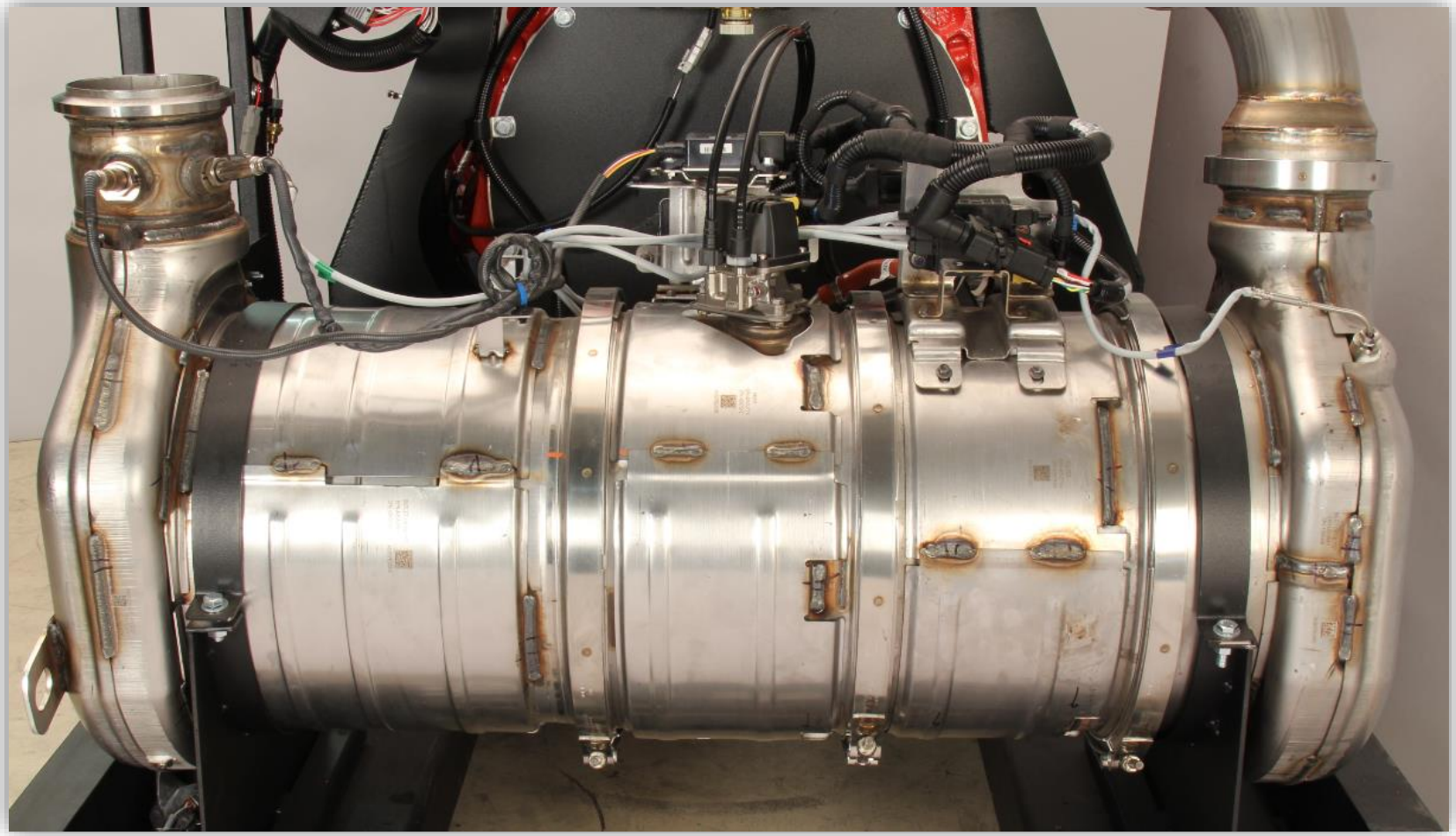


2017 MidRange Single Module Aftertreatment

- Customer voice-driven design
- MidRange System features:
  - Up to 70% reduction in size
  - Up to 30% reduction in weight
- Enhanced thermal efficiency reliability – durability



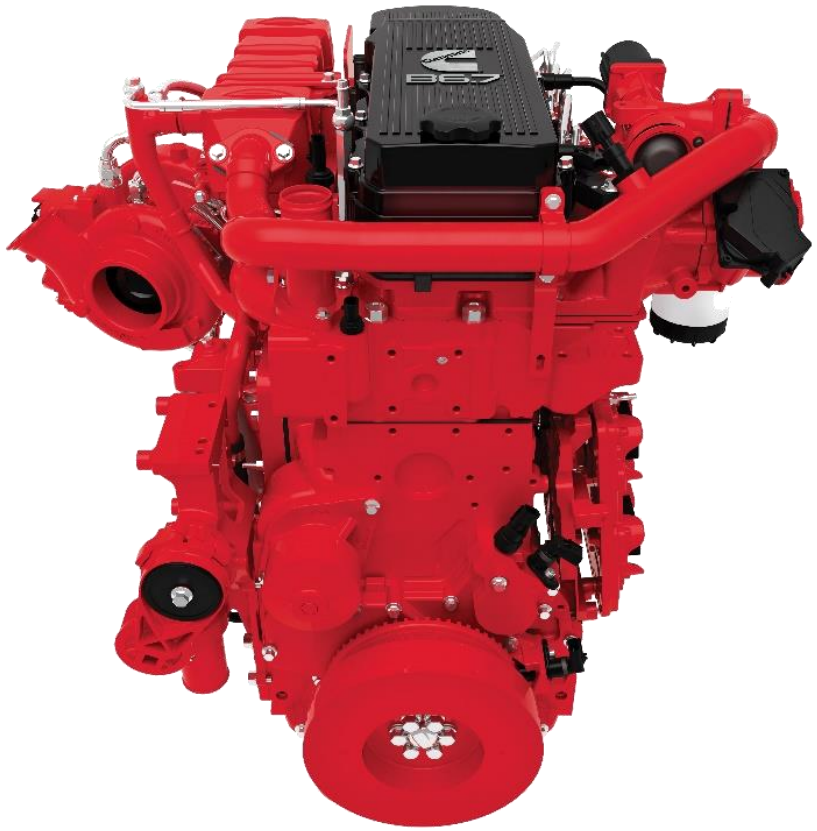
Compact Design for easy maintenance and access



Modular Components

B6.7™ Base Warranty

- 5 Years / 100,000 Miles
- 100% Coverage for:
  - Parts and labor on warrantable failures
  - Aftertreatment
  - Consumables used in the repair
- All with no deductible



B6.7™ Available Extended Coverages

Years	Miles	Kilometers
5	200,000	321,869
5	Unlimited	
7	150,000	241,402
10	200,000	321,869
10	Unlimited	

Additional coverage options available

Options shown available on select plans (i.e. EXC, SBP)

- Includes registered parts and labor
  - **EXC coverage** – *complete coverage including EGR components*
  - **SBP coverage** – *complete coverage minus injectors*
  - **NEC coverage** – *engine coverage including EGR minus maintenance components and accessories*
  - **SMC coverage** – *major components*

Aftertreatment Extended coverage

  - ***AB3 coverage*** – *MUST be packaged with the EXC coverage*

Service and Maintenance Best Practices

Pre-Trip Inspections

DAILY pre-trip inspection per OEM & Cummins maintenance manuals

- Air Cleaner Restriction
- Air Intake Piping
- Air Tanks and Reservoirs
- Coolant Level
- Charge Air Piping
- Crank Case Breather Tube
- Drive Belts
- Cooling Fan(s)
- Fuel-Water Separator
- Lube Oil Level
- Exhaust Piping
- DEF Level

B6.7™ Routine Maintenance Schedule

Maintenance Item	Miles	Kilometers	Hours
Oil and Filter	15,000	24,000	500
Fuel Filter	15,000	24,000	500
Coolant Filter	15,000	24,000	500
Standard Coolant	60,000	96,000	2,000
Overhead Adjustment	150,000	240,000	5,000
Coalescing Filter	Every 3rd to 4th Oil Change Interval		
DEF Filter	200,000	320,000	6,500
Particulate Filter Cleaning	200,000	320,000	6,500*

NOTE: Be aware of hours vs. mileage for maintenance intervals.

Maintenance Scheduling

- **Fleet Maintenance Guidelines:**
  - Service Intervals should be based on **HOURS**
  - Mileage based intervals assume a ***30 mph average vehicle speed which is*** **NOT THE CASE FOR MOST BUSES**
- **Calculating Maintenance Mileage Intervals:**
  - Determine fleet average speed via INSITE/Other
  - Multiply fleet average speed by maintenance hours to recalibrate mileage maintenance table
- **EXAMPLE:**
  - Fleet avg. speed = **11 mph**
  - DPF filter clean recommendation = **6500 hours**
    - Original recommended mileage = 200,000 miles
  - Adjusted mileage = **(**11mph x 6500h**) = 71,500 miles**

Adjusted Intervals (Ex: 11 mph average)

B6.7™ Maintenance Intervals

Kilometers	12,000	24,000	24,000	48,000	96,000	120,000	242,000	322,000
Miles	7500	15,000	15,000	30,000	60,000	75,000	150,000	200,000
Hours	250	500	500	1000	2000	2500	5000	6500
Months	3	6	12					
Years				1			4	
Procedure	**Step**							
Air Cleaner Restriction	Check	X						
Charge Air Piping	Check	X						
Charge Air Cooler	Check	X						
Lubricating Oil and Filters	Change	Refer to Procedure 359-003 in Section 3.						
Engine Coolant Antifreeze	Check		X					
Batteries	Check		X					
Battery Cables and Connections	Check		X					

B6.7™ Maintenance Intervals

Kilometers	4,500	9,000	9,000	18,000	35,500	44,000	89,000	115,000
Miles	2,750	5,500	5,500	11,000	22,000	27,500	55,000	71,500
Hours	250	500	500	1000	2000	2500	5000	6500
Months	3	6	12					
Years				1			4	
Procedure	**Step**							
Air Cleaner Restriction	Check	X						
Charge Air Piping	Check	X						
Charge Air Cooler	Check	X						
Lubricating Oil and Filters	Change	Refer to Procedure 359-003 in Section 3.						
Engine Coolant Antifreeze	Check		X					
Batteries	Check		X					
Battery Cables and Connections	Check		X					
Radiator Pressure Cap	Check		X					
Fuel Filter (Spin-On Type)	Change			X				
Drive Belt, Cooling Fan	Check				X			
Cooling Fan Belt Tensioner	Check				X			
Air Compressor Discharge Lines	Check				X			
Cooling System	Check					X		
Vibration Damper, Viscous	Check					X		
Engine Steam Cleaning	Clean					X		
Radiator Hoses	Check					X		
Crankcase Ventilation Filter	Change						X	
Overhead Set	Adjust							X
Aftertreatment Diesel Particulate Filter	Clean / Exchange							X
Aftertreatment Diesel Exhaust Fluid Dosing Unit Filter	Change							X

**See equipment manufacturer for service information*
Recommend Maintenance be preformed based on number of hours accumulated.

- *Schedule above reflects **11 mph** as 1 hour*
- Be aware of hours vs. mileage for maintenance intervals

ReCon® DPF Program

Rigorously cleaned, and tested to meet Cummins specifications for soot capacity, Cummins ReCon Diesel Particulate Filters (DPF) provide an efficient and cost-effective method to handle DPF maintenance and service requirements. Each Cummins ReCon DPF is subjected to a proprietary imaging test to verify soot capacity, thus ensuring engine backpressure will be minimized.

Less Time in the Shop

When you purchase a ReCon DPF, the DPF is simply removed and replaced, instead of waiting for a cleaning process that can keep your bus down for an extended time

Better to the Core

Cummins gives you full credit for acceptable cores exchanged when replacing the DPF with a ReCon DPF. This helps reduce cost and is the most cost-effective way of keeping your DPF working properly

We Have you Covered

Cummins ReCon DPF's are backed by a 1-year/100,000 miles warranty, ensuring that your filter will operate like new, with all parts and labor covered.

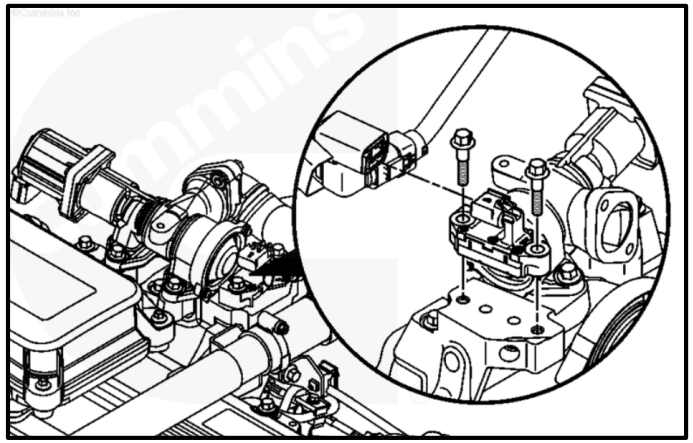
Additional Information

Visit Cummins Diesel Particulate Filter Website for more in-depth information surrounding using Cummins genuine DPF filters or consult the ReCon DPF Brochure

DPF and EGR Diff Sensor & Port Cleaning

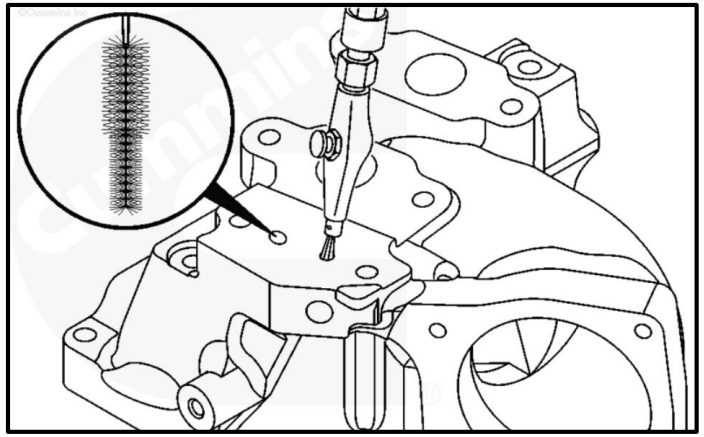
Best Practice

Inspect all INTAKE and EXHAUST CONNECTIONS for LEAKS at EVERY CHANCE.



Cleaning DPFs:

- Look at hours not miles to maximize uptime due to idle: **5,000 hours**
- Requires “Maintenance Reset” in ECM using Insite Software.
- **ALWAYS** use new exhaust gaskets in DPF and exhaust connections.
- Remove old gasket materials completely from connections.
- Inspect Aftertreatment Inlet for Oil, Coolant, Fuel Contamination.



Cleaning EGR differential sensor and ports:

- Packed or dirty EGR diff sensor and ports can create downstream issues in aftertreatments
- Look at intake air connection for EGR diff port cleaning
- EGR Valve cleaning procedure can be found in procedure **011-022 EGR Valve**
- Differential Port (DP) cleaning procedure can be found in procedure **010-080 Air Intake Connection**
- Benefit of **5000 hour** cleaning will **reduce bus downtime** due to EGR DP port and sensor related **faults – 3382, 1921, 1896, 3375**.

Mobile Regen Set Speed - Aftertreatment Diesel Particulate Filter - Temperature Stabilization

INSITE Programmable Parameters

Mobile Regen Set Speed & DPF Temp Stabilization

- School Bus OEM's have the minimum regen vehicle set speed parameter set to ***5 mph*** (default)
- Some School bus OEM's have the minimum regen set speed parameter ***locked*** at 5 MPH and it can't be adjusted without the OEM password
- The default for the DPF regen stay warm is ***"disabled"*** – (this parameter is adjustable) *Some OEM's are now setting this parameter to "enable"*

Mobile Regen Set Speed & DPF Temp Stabilization – Example – Insite General *Default* setting

Aftertreatment		
Diesel Particulate Filter		
Active Regeneration in PTO and Remote Modes	Disable	
Aftertreatment Diesel Particulate Filter Stationary Regeneration with Parking Brake	Disable	
Aftertreatment Diesel Particulate Filter Temperature Stabilization	Disable	
Automotive Mobile Regeneration	Enable	
Minimum Vehicle Speed	5	mph
Diesel Particulate Filter Lamp	Installed	
Diesel Particulate Filter Regeneration Permit Switch	Disable	

- **The CM2250 & CM2350 engines have a DPF stay warm feature – *aftertreatment temperature stabilization***

Mobile Regen Set Speed 5 MPH Temp stabilization disabled

- When the *"minimum regen set speed"* is set to a speed other than zero **(i.e.....5 MPH) and the temp stabilization is DISABLED** the *In-Mission* regen **<u>will not start</u>** until ***40 MPH*** is reached and will discontinue when drops below ***5 MPH***
- When speed drops below ***5 mph*** - the in-mission regen now is stopped and **will require the 40 MPH vehicle speed to re-start**
- Routes where a vehicle does not exceed 40 MPH could lead to regen issues

Mobile Regen Set Speed “Zero”

- If the mobile regen set speed is set to zero, the regen start does not require the 40 mph speed to initiate
- The regen will continue at zero road speed (i.e..... stopped in traffic or on the route) Dosing will decrease as temps drop
- The regen ***will stop*** if the aftertreatment temps can no longer be maintained (stopped or parked idling condition) The regen will restart once aftertreatment target temperatures are achieved

Mobile Regen Set Speed “5 MPH” Temp Stabilization “Enabled”

- When the regen speed parameter is ***set above zero***, (i.e..... 5 mph) the DPF temp stabilization (stay warm) can be ***enabled*** to dose low amounts and “keep the DPF warm” and the regen will not be required to completely start over again
- When the DPF temp stabilization is ***enabled*** the ***40 mph vehicle speed target is removed*** and the regen will start when the speed is 0.6 above the minimum set speed (i.e.....5.6 mph)

Mobile Regen Set Speed & DPF Temp Stabilization

- The DPF regen stay warm parameter should be enabled when the mobile regeneration set speed is something other than zero (i.e.…5 MPH)
- This parameter is designed for low duty cycle, low speed applications where minimum regen set speed is requested to be ***greater than zero***
- ***If "Mobile Regeneration Minimum Vehicle Speed" is set to 0 mph,*** active regeneration is **not** inhibited due to vehicle speed - use of the *"Aftertreatment Diesel Particulate Filter Temperature Stabilization" feature is unnecessary.*

Mobile Regen Set Speed & DPF Temp Stabilization

- Technical Service Bulletin - **TSB170058** was released to review the DPF temperature stabilization feature in detail
- In the past, many of the OEM's have defaulted DPF Temp stabilization to "Disabled" – Pre-2017
- Many delivering OEM dealers are changing the setting the DPF temp stabilization to "Enable"

The DPF temp stabilization feature is NOT available on 2007-2009 CM2150 vintage engines! -

School Bus DPF & Temp Stabilization Features

Aftertreatment		
Diesel Particulate Filter		
Active Regeneration in PTO and Remote Modes	Disable	
Aftertreatment Diesel Particulate Filter Stationary Regeneration with Parking Brake	Disable	
Aftertreatment Diesel Particulate Filter Temperature Stabilization	Enable	
Automotive Mobile Regeneration	Enable	
Minimum Vehicle Speed	5	mph

Campaigns & Temporary Repair Practices (TRP)

B6.7 Navistar Fuel Heater ~~Temporary Repair Practices (TRP) 2129 -~~ Campaign C2127

~~**T2129 – B6.7 Navistar Fuel Heater** – This was released March, 2019 to disable the fuel heater in the fuel filter head by removal of the 50 AMP fuse. If the heater was damaged it also provided the removal of the heater and installation of a temporary plug –~~ This TRP will soon be closed and replaced by an active campaign – ***TRP 2129 was closed 10-18-19 and all ESN's added to C2127***

The Safety Campaign C 2127 – Released 8/1/19 – Campaign is being done in phases – Phase 1 & 2 in process.

All new units built after February 2019 were shipped without a heater and only a plug in the filter head. **A different campaign is scheduled for late November early December 2018** to have the heater installed.

New IC buses after Mid October 2019 are being built with heaters

Heater was incorrectly wired – campaign will reverse the wires, replace fuse and install new heater – School bus campaign kit – Includes heater and 30 AMP fuse. Repairs should be completed in just under 1 hour.

Open Campaigns

- **C2191-B6.7 CM2350 MY17-MY18 Product Improvement Calibration Campaign –** Released to recalibrate the Engine Control Module on certain **B6.7 CM2350** engines with a product improvement calibration for improved reliability. Primarily to correct oil in the compressor side of the turbocharger – refer to **TSB190012**. The calibration update also has software updates for **FC3383** EGR port soot deposits – refer **TSB190165 -** This software also has improvements for **FC334** – coolant temp erratic – when using auxiliary heaters

- **C2115 - ISB CM2350 *265HP and Higher* Emissions Recall Campaign –** Released 6-13-19 This field action authorizes certified repair locations to upfit certain **ISB CM2350 higher HP** engines with an improved SCR Catalyst, if the engine meets the criteria listed below. **For MY2013 thru MY2014** engines that qualify for a new SCR Catalyst, a new wiring harness connector plug, and a calibration update will be required. This field action provides for retroactive coverage of repairs, including customer billable repairs, completed by Cummins authorized repair locations prior to the release date of this field action.

ISB CM2350 TRP's – SCR- VGT- NOx

T2084 – ISB and ISL CM2350 SCR Replacement - Engine Model year 2013 through 2014 – *This TRP authorizes replacement of the **SCR catalyst** when directed by troubleshooting to resolve a failure*. To qualify the ESN must be on the list attached to the TRP. Coverage will be regardless of warranty status and ***does include retroactive reimbursement.*** This is not yet a proactive repair and does require a failure.

T2083 - ISB, ISC, and ISL CM2250 SCR Replacement – Engine Model year 2010 – 2012 – Same as TRP 2084 -

The ***proactive*** SCR campaigns to replace T2084-T2083 for school bus application is expected early 2020.

T2145 - ISB6.7 CM2350 MY2013 and MY2014 Variable Geometry Turbocharger Actuators for Out of Warranty Failures. **Variable Geometry Turbocharger Actuator** failures on certain ISB6.7 CM2350 MY2013 engines. This TRP authorizes ***certified repair*** locations to replace the Variable Geometry Turbocharger Actuator if fault codes or troubleshooting lead to a confirmed failure of the VGT Actuator.

The failure must be under 10 years and/or 185,000 miles

This does allow retroactive reimbursement for prior repairs for VGT actuator replacement not covered by warranty

T2146 – ISB6.7 MY 2013 NOx Outlet Sensor - System Outlet NOx Sensor failures on certain ISB6.7 CM2350 engines if fault codes or troubleshooting lead to a confirmed failure of the System Outlet NOx Sensor.

The failure must be under 10 years and/or 185,000 miles

This does allow retroactive reimbursement for prior repairs for NOx outlet sensor replacement *not covered by warranty*

ISB CM2350 TRP's – SCR- VGT- NOx – Reimbursement

- **T2147 – ISB6.7 CM2350 MY2013 - Turbocharger Replacement** Retroactive - **Reimbursement for out of warranty failures**
- **T2148- ISB6.7 CM2350 MY2013 Diesel Exhaust Fluid Dosing Valve** Retroactive **– Reimbursement for Out of Warranty Failures**
- **T2160 – ISB6.7 CM2350 MY2013 Engine Outlet NOx Sensor** Retroactive **– Reimbursement for Out of Warranty Failures**

The three TRP's for ISB6.7 CM2350 MY2013 listed above allow for reimbursement of listed items that previously failed and were *not covered by warranty*. *Parts only if not done by a Cummins authorized location.*

ISB CM2350 MY2013-2015 – FC3375 Update

- The software update for FC 3375 – Excessive regen on ISB CM2350 MY2013-2015 should be available for download January 2020.
- ECM calibration may be available Mid December, but could have access on one off basis prior to then
- The updated software is only compatible with the updated SCR catalyst. MY2013 & MY2014 engines – will need SCR replaced. The SCR campaign is expected to be released in January 2020 and when replacing the SCR, the ECM will need to be calibrated to a different ECM code which will include the new software improvements for FC3375. **The MY2015 *does not require SCR replacement.***
- The update to the software for ISB CM2350 MY2016 may be slightly behind the MY2013-2015
- TSB will be published to review FC 3375 when the calibration is released. The TSB will include inspection of the EGR differential ports and EGR system for plugging

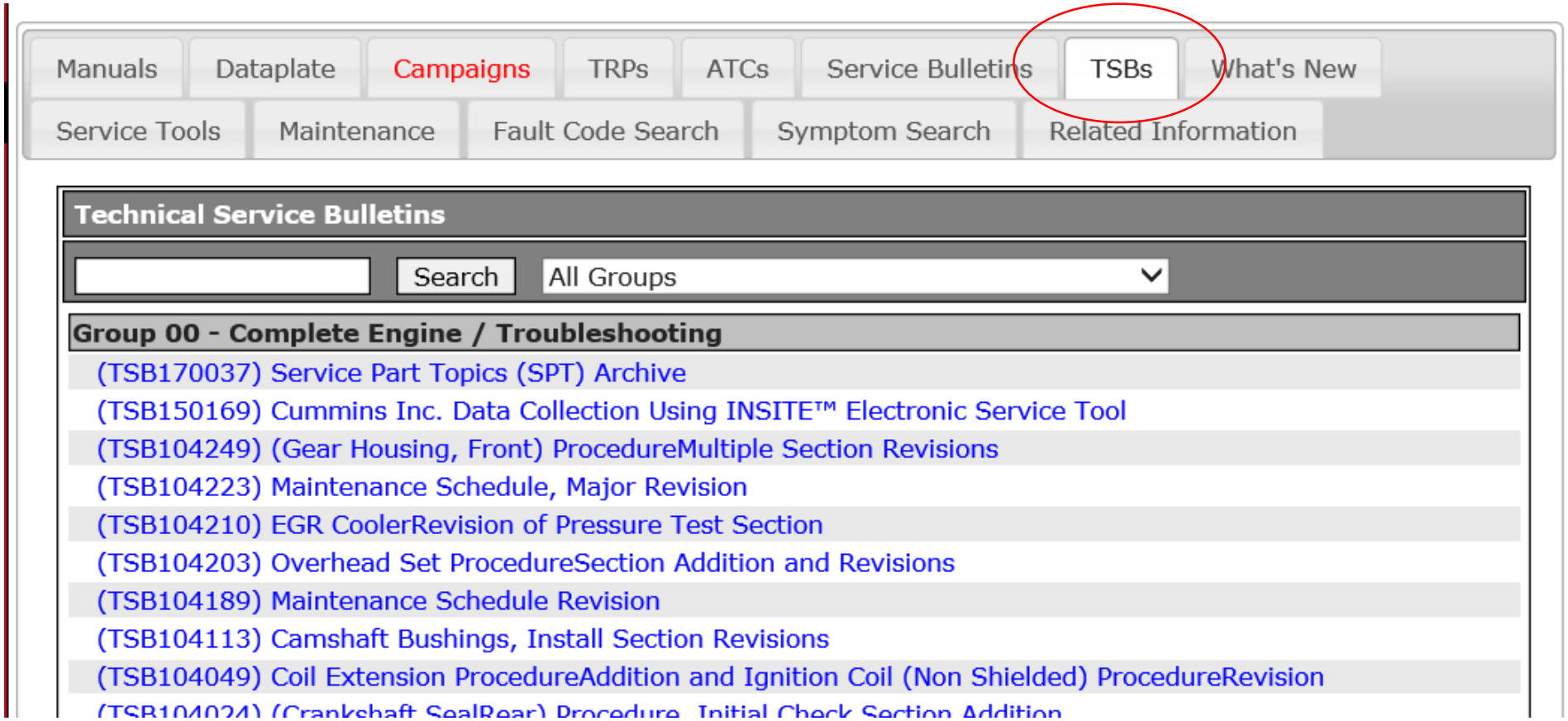
Technical Service Bulletins (TSB's)

QuickServe Online (QSOL)

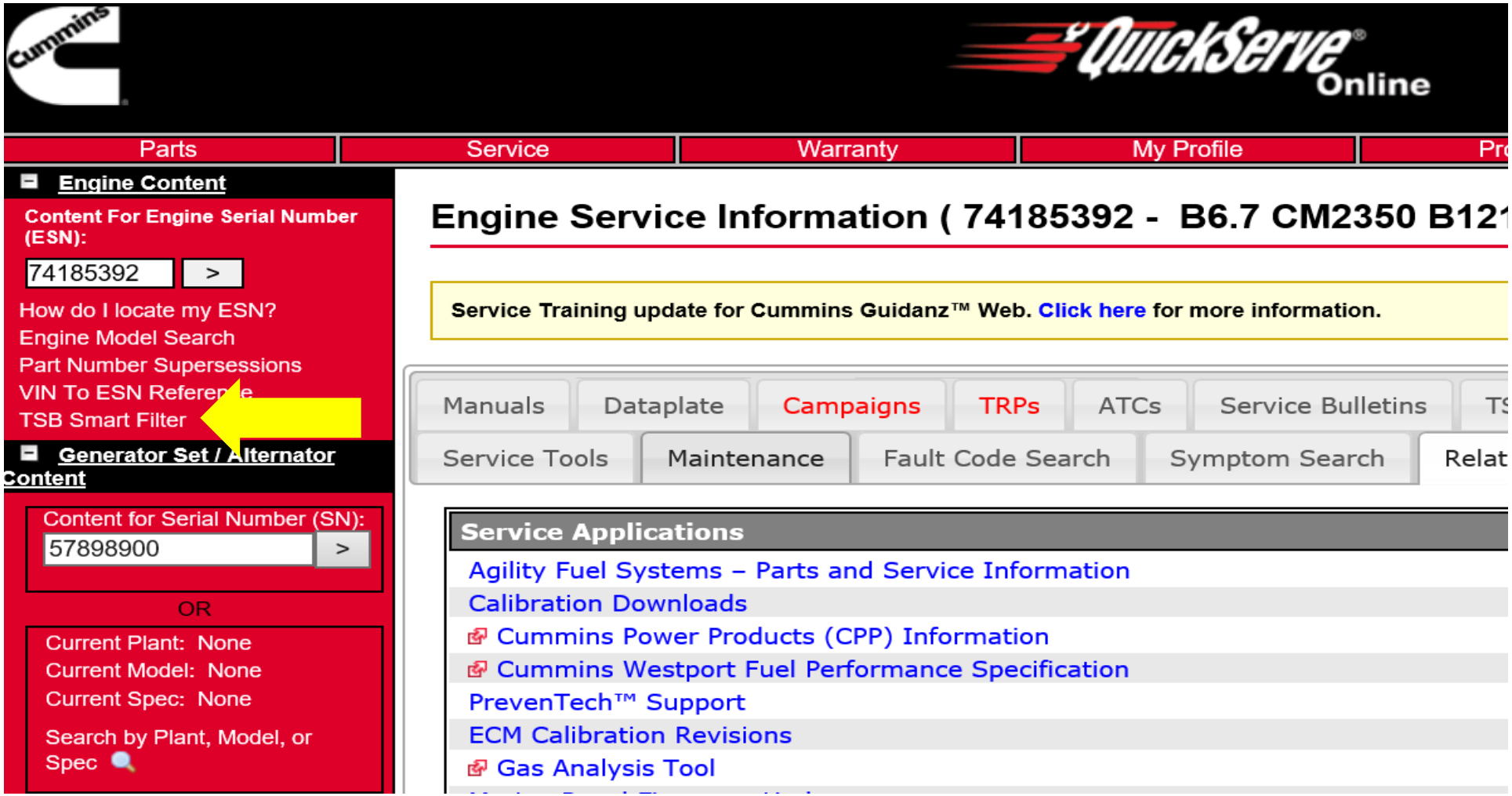
Cummins TSB's

- Technical Service Bulletins are available at ***Quickserve On-line.*** The TSB provides information related to specific reported issues by engine model
- TSB's are listed by group category – Complete Engine, Fuel system, Head, Injectors, Cooling etc.
- TSB's generally review issues that could be OEM related, parts changes, specific technical instructions or additional repair directions

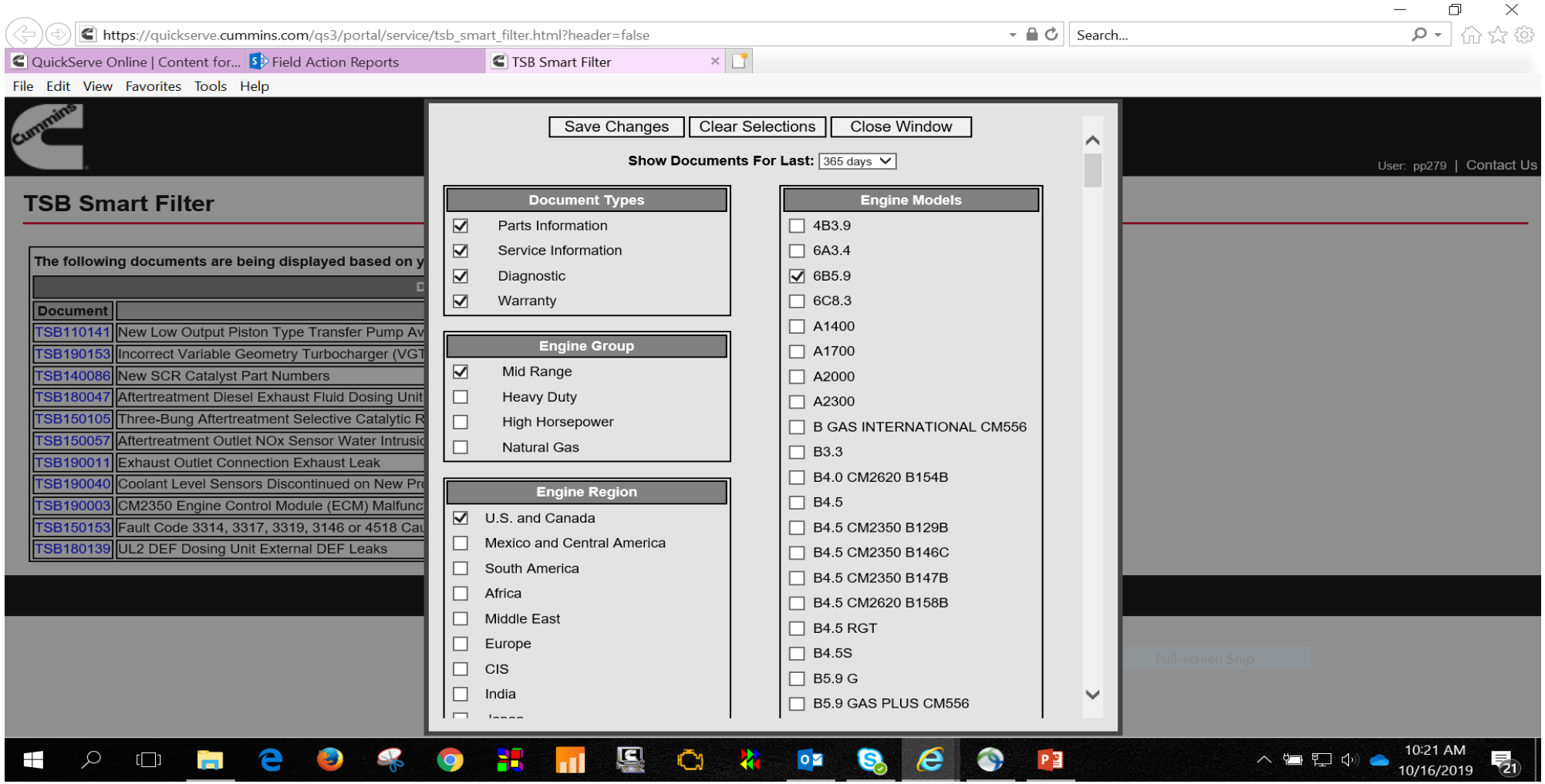
TSB – QuickServe Online



TSB - Smart Search



TSB – Smart Search – This does default to your ESN or can be sorted



School Bus TSB's

All School Bus Applications – Refer to TSB's for details

TSB170058 – Aftertreatment Temp Stabilization Setting – ISB CM2250- ISB CM2350- B6.7 CM2350 – The temp stabilization feature should be ***enabled*** on any school bus that has the minimum regen road speed set ***above zero***.

TSB190012 – ECM Calibration update to correct turbo compressor side oil leak – B6.7 CM2350 **– C2191** ECM calibration campaign was released 8/24/19

TSB190165 – B6.7 CM2350 - FC 3383 - Soot deposits in the intake air connection exhaust gas entrance ports are present and have affected EGR flow measurements. After troubleshooting and inspection If ECM calibration code revision on unit was released prior to December 2018, calibrate the unit with the latest ECM calibration code revision. **C2191**

TSB - Navistar – IC School Bus

Navistar – IC School Bus

TSB190038 – Fuel Heater Failure – Can cause FC 559-4691 – hard start -stall – external fuel leak – Also refer to ~~**TRP 2129** for this issue –~~ B6.7 CM2350 – **Campaign C2127** released 8/1/19

TSB180009 – Navistar-IC - Charge air clamps loose or broken – Can cause aftertreatment codes to include but not limited to 1922, 1981 and failed DPF – B6.7 CM2350 - Refer to IC for repair

TSB170120 - Navistar-IC Hood seal issue – Can cause regen issues and FC3375 - B6.7-ISB CM2350 - Refer to IC for repair

TSB180032 – Navistar-IC - Ruptured Air Compressor supply hose – Can cause FC 3389 – FC3375 aftertreatment and regen issues – B6.7 – ISB CM2350 - Refer to IC for repair

TSB170046 – Navistar-IC – Belt chirp – Excessive length on IC belt – Can cause tensioner wear due to excessive length of belt leading to belt shredding – ISB – B6.7 CM2350

TSB150165 – Navistar-IC Starter Motor Malfunction – ISB CM2350 – Refer to IC for repair

TSB160031 – Navistar-IC – DEF Quality FC's – 1715,6766,6765,6767 – IC DEF quality sensor issue – Refer to IC for repair

TSB – Thomas/FCCC School Bus

Thomas School Bus

TSB110060 – Belt tensioner issues due to belt too long – ISB CM2250

TSB150040 – Belt shredding Thomas pusher bus – ISB CM2350

TSB120236 – FC 1679 – DEF Tank temp issues – Thomas/FCCC – ISB CM2250

TSB - Bluebird School Bus

Bluebird School Bus

TSB170089 – Allison trans FC P2637 – Corrected with engine ECM update – B6.7 CM2350

TSB170081 – FC 3555 after updating ECM calibration – Bluebird School Bus – TSB directs to different ECM code to correct – B6.7 CM2350

TSB150073 – ABS light on after engine ECM calibration – Issue was reported in 2016 and corrected but is happening on B6.7 CM2350 with latest version of Insite – Bendix Acom diagnostic software is required to reset ABS controller to clear lamp – or unplug the ABS fuse prior to calibrating the engine ECM – **Recent *TSB190174*** reviews the process for ECM calibration on **B6.7 – MY2017 and newer** – Directs removal of OEM - ABS and transmission fuse ***prior*** to engine ECM calibration. *The final correction is in process and should be corrected in engine ECM software.*

Cummins Bulletins

Refer to the following bulletins for Cummins engines

3379001 – **Fuels for Cummins Engines** – Specs/Properties/Analysis/Additives/Biofuels/Filtration/Natural Gas/NG-LPG Spec

3810340 – Link to 5411406 - **Oil & Oil Analysis Recommendations** – Classification/Grades/Specs/Sampling/Analysis Interpretation

3666286 – Link to 5411406 - **Cummins Requirements for Cooling System Extended Service** Intervals – & 3666132 – Link to 5411406 – **Coolant Requirements and Maintenance** Specs/Testing/Maintenance/Cleaning/Filtration

4021566 **- Diesel Exhaust Fluid (DEF) Specifications** for Cummins® Selective Catalytic Reduction (SCR) – Specs/Handling/Storage/Testing

3379000 – **Air for your engine**

Oil & Coolant Registration List

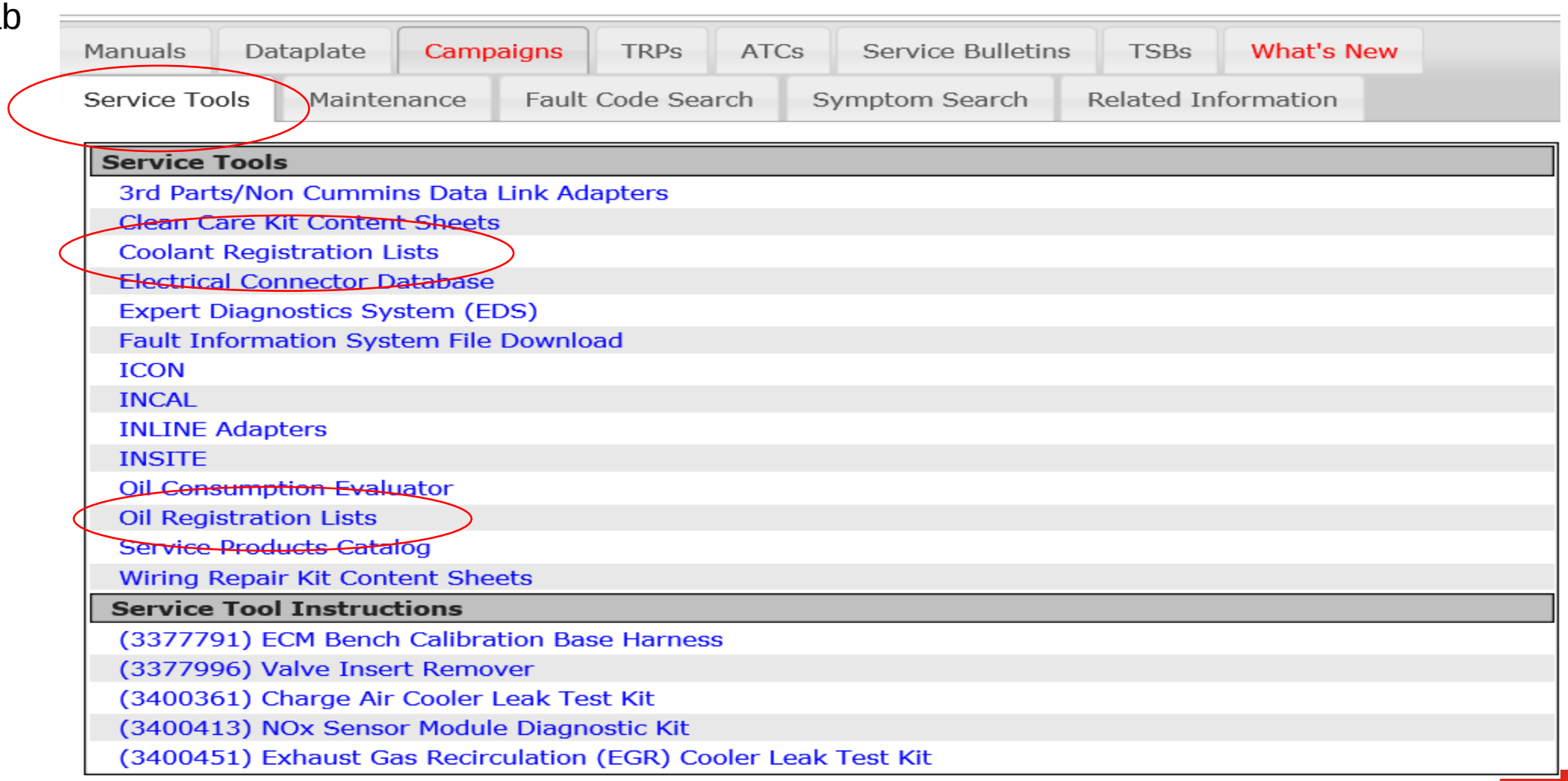
Cummins has an oil and coolant registration list available for review on QuickServe

The oil/coolant manufactures who have supplied the requested information and have met the appropriate Cummins Engineering Standard (CES) standard will appear on the registration list

If they are not on the list, they may not have applied or did not meet the CES standard – It’s also possible the fluid is under a different brand name or description

Oil & Coolant Registration List

The published list of oils and coolants are on Quickserve online in the service area under the service tools tab



Oil Registration List

Oil Registration by Cummins Engineering Standards (CES) - QuickServe

QuickServe® Online

Service | Warranty | My Profile | Products

Oil Registration List

Click a Cummins Engineering Standards (CES) Number below to view the list of registered oils.

- CES 20074
- CES 20075
- CES 20076
- CES 20077
- CES 20078
- CES 20081
- CES 20085
- CES 20086
- CES 20087
- CES 20088
- CES 20092

How to select the right engine oil for your Cummins engine:

1. Enter your ESN (if available) into the left hand navigation box.
2. In your owner's/operation and maintenance manual, Section V Maintenance Specifications, find 018-003 Lubricating Oil Recommendations and Specifications.
3. Find the recommended viscosity grade and Cummins Engineering Standard (CES) number for your engine.
4. Use the CES number to pick the correct oil registration list.
5. Once on the correct oil registration CES number list, find an oil you prefer that has the recommended viscosity grade.

Coolant Registration List

Coolant Registration by Cummins Engineering Standard (CES) QuickServe

Coolant Registration Lists

Click a Cummins Engineering Standards (CES) Number below to view the list of registered coolants and chemicals.

- CES 14603
- CES 14439
- CES 14636

Insite – Quickserve Online

Insite – Subscriptions - Renewal & Technical Support

- Software - Insite renewals, license transfer, Guidanz, Fleet Cals, Zap Its, Incal, Quickserve, and PowerSpec we have one contact number for the **East Region**

1-888-861-5123 – 6:30 AM to 5:30 PM – Monday through Friday

You can also email subscription.support@cummins.com

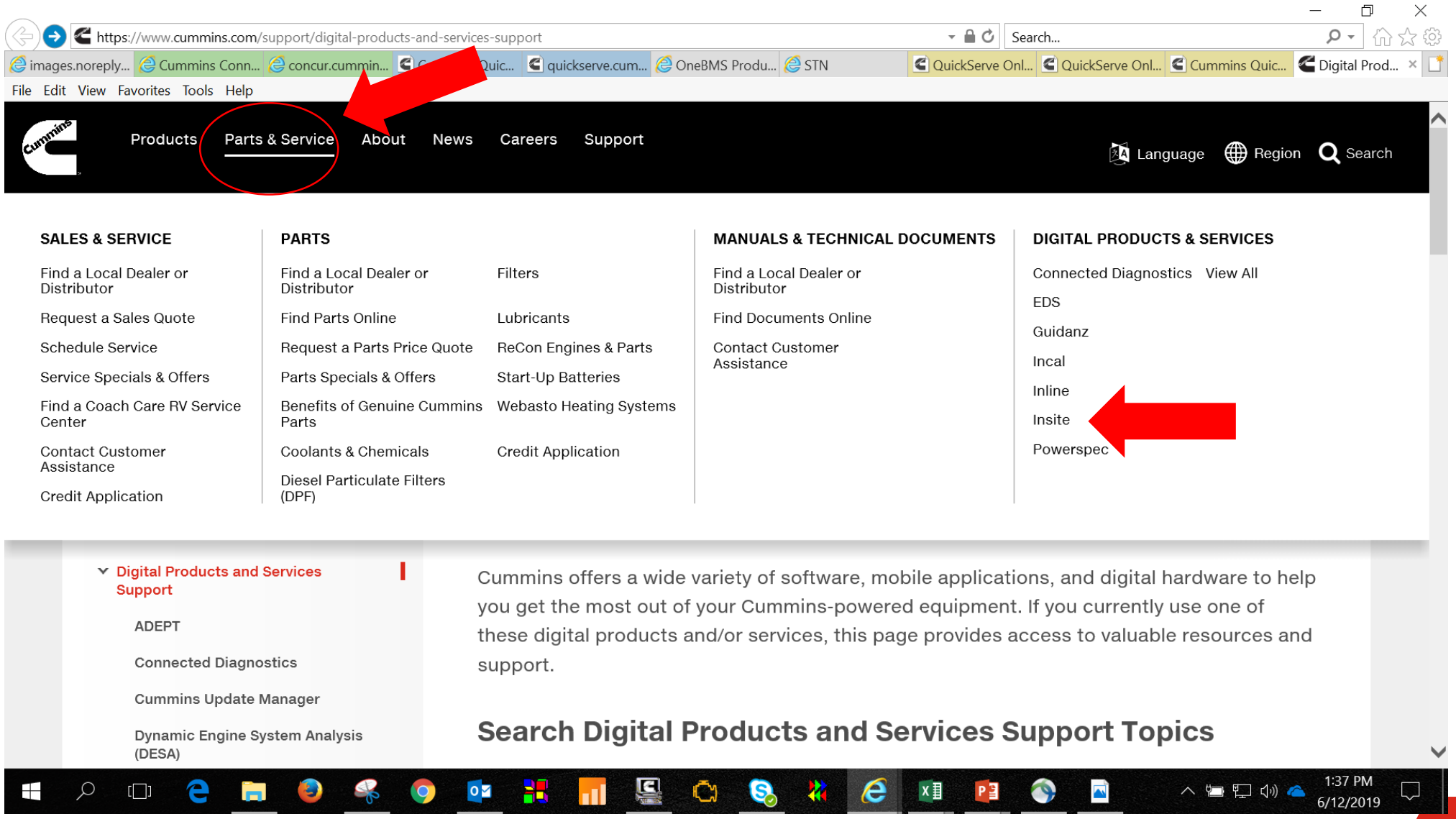
- Insite Program Technical Support

1-800-Cummins (800-286-6467) 24 hours – 7 days

Insite.cummins.com also has a live chat support and e-mail request options.

If you are requesting technical support with an Insite tool issue, please have your Insite open and available to review - Connected to WIFI if available

Cummins.com – Insite Training Material



Insite Training Presentations - cummins.com

Products Parts & Service About News Careers Support

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INSITE™

Digital Products and Services

- Connected Diagnostics
- Connected Advisor
- Connected Software Updates
- Cummins Update Manager
- Dynamic Engine System Analysis (DESA)
- Expert Diagnostic System
- Guidanz™
- HOLSET E-Tool
- INCAL
- INLINE™
- INSITE™
- INSITE CENSE™

INSITE performs engine diagnostics and displays electronic engine information on your PC. With step-by-step diagnostics, built-in engine drawings and schematic diagrams, working with INSITE is easy. Using this software application will reduce troubleshooting time, errors and incorrect procedures and quickly get your vehicle back on the road again.

Features:

- Quick access to trip information
- Adjust parameters and review/clear fault information quickly and easily
- Easy-to-follow troubleshooting assistance
- Wiring and sensor location diagrams
- Store engine and trip information for future use, or as programming templates

Looking for Support? Click Here

HOLSET E-Tool
INCAL
INLINE™
INSITE™
INSITE CENSE™
INSITE™ Fault Viewer
JoystickConfig Service
License Configuration Tool
Marine Component Software Download Tool
PowerSpec
PreventTech
QuickCheck
QuickServe Online
RoadRelay
Woodward Toolkit Support Resource

- Quick access to trip information
- Adjust parameters and review/clear fault information quickly and easily
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- Wiring and sensor location diagrams
- Store engine and trip information for future use, or as programming templates

Software Downloads Software Licensing Training Videos

Training Materials

SOFTWARE DOWNLOADS

Your company's firewall may inhibit the installation of these files.
Please contact your system administrator for assistance if you receive such a message.

Looking for Support? Click Here

ATTENTION INSITE USERS: INSITE 8.5 has been released. With this release there is a special requirement customers need to prepare for:

Products Parts and Service About News Careers Support

Country/Region

Search

TRAINING MATERIALS

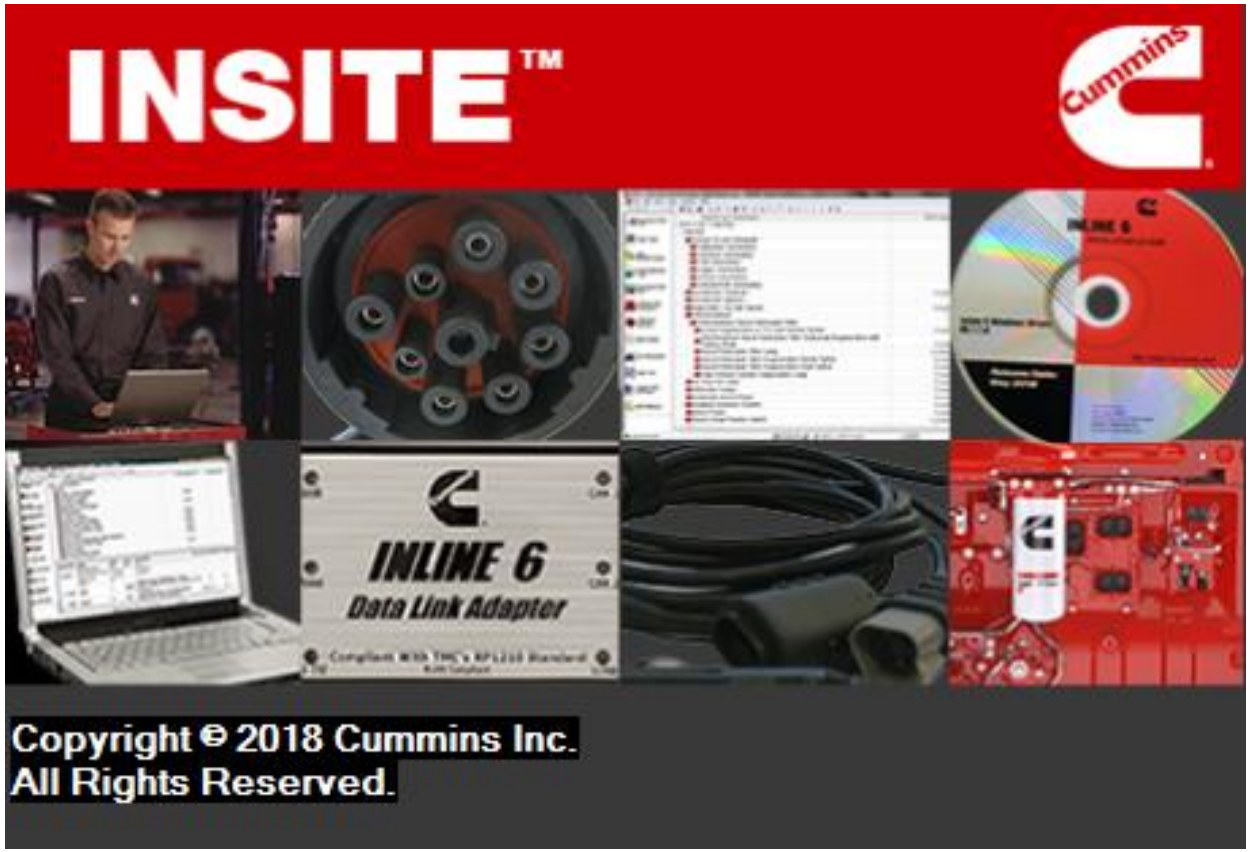
- INSITE Overview, updated 3/19/2018 (Size: 6 MB)
- Licensing & License Configuration Tool Overview, updated 4/14/14 (Size: 3.8 MB)
- INSITE 8.0.3 New Feature Training: ECM Code Search, updated 5/11/15 (Size: 0.9 MB)
- How to Backup INSITE Work Orders (Size: 0.5 MB)

Chat with Support

CONTACT CUMMINS

For general inquiries or questions regarding your Cummins product, please use the form below, or call us anytime.

Insite Training Contents



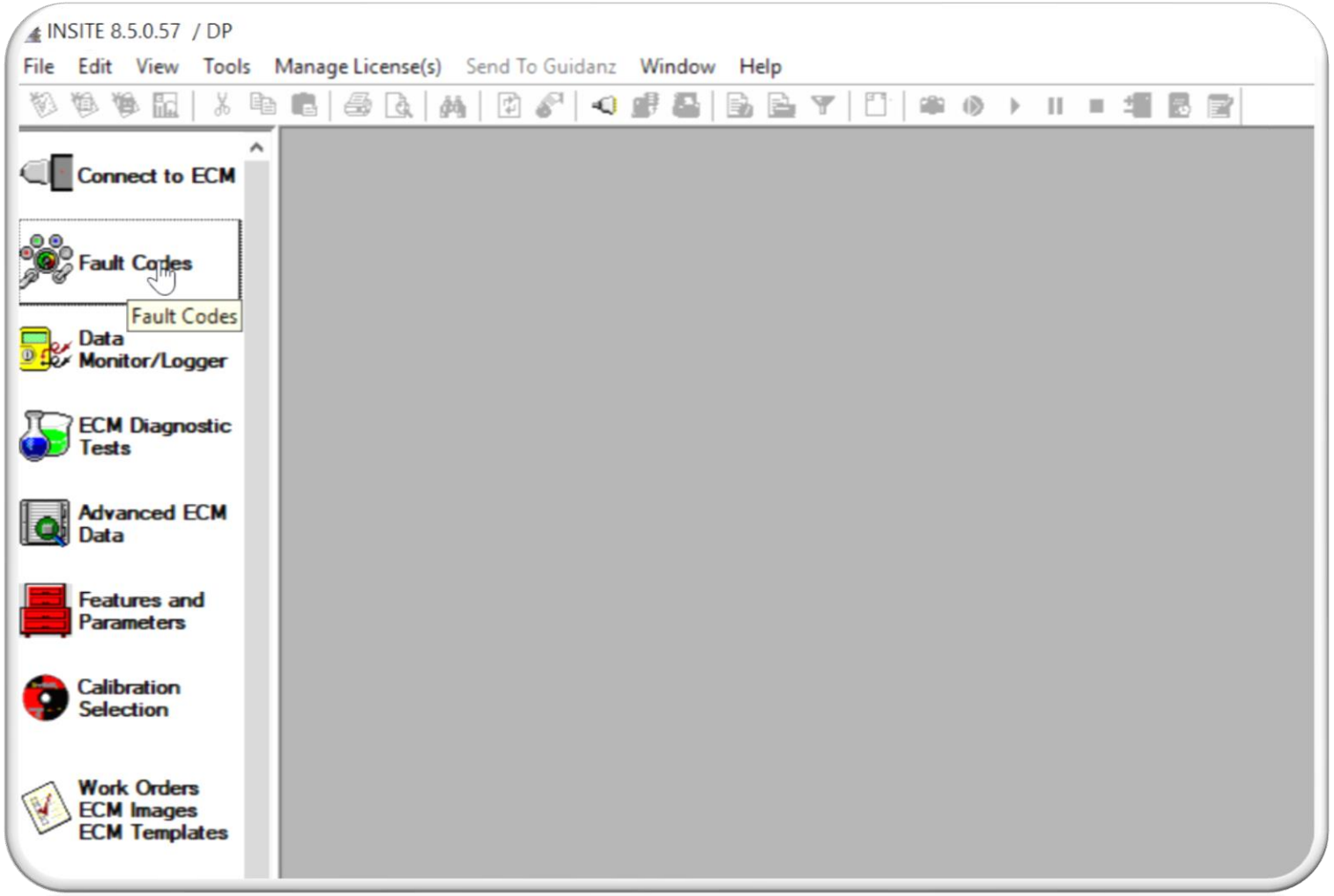
Troubleshooting

To perform even ***the basic*** troubleshooting on the engine you ***must have these tools !!!***

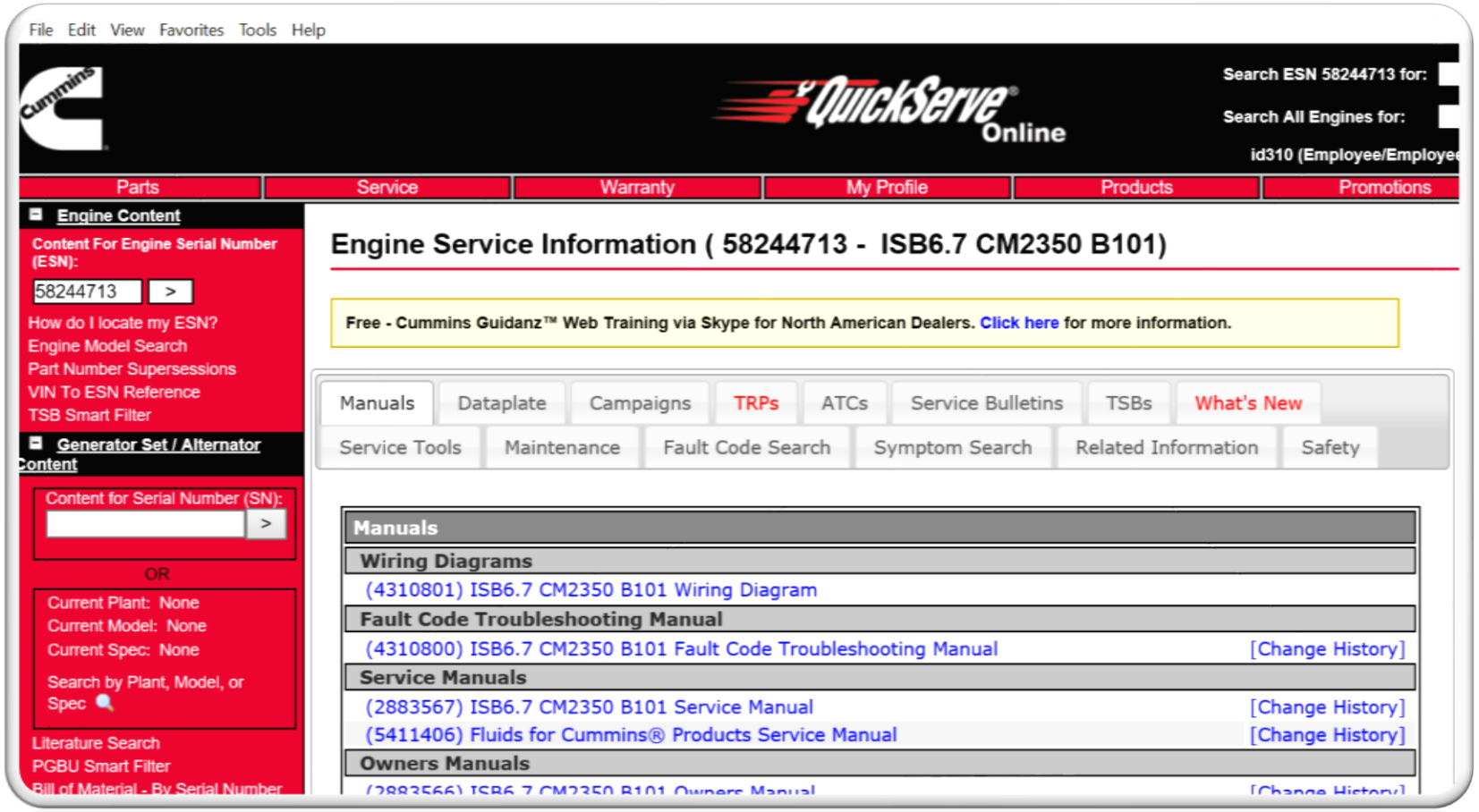
- Insite – Pro is available if ECM calibration is desired
- QuickServe On Line (QSOL) Full Access Version – Provides access to T/Shooting, Shop Manuals, Technical Service Bulletins (TSB's), Warranty Manuals, Campaign information and more!
- QuickServe also offers access to the individual Cummins Online training database – It does require personal login

*The days of flashing out codes has past. Fault codes can be related and caused by other codes. You need to look at **all codes** and have an understanding of them to determine where to go!*

Identifying Fault Codes Using INSITE



Using QSOL to Troubleshoot Fault Codes



Diagnostic Process Unit # / ESN

Get all the facts

- Lube Analysis - Fluid contaminants
- Add Oil History
- ECM Download

Relate the symptoms

- To the basic engine systems and components
- Check QuickServe
- TSB/ TRP's Campaign's

Who completed last repair?

- Repair History Maintenance History
- DPF / Aftertreatment Cleaning

Do the easiest things first

- Follow the published repair Processes
- Engine Fault Code Analyzer
- All fault codes with more than one count logged in the last 25 engine hours.

Determine the cause of the problem and make a thorough repair

- Double-check before beginning any disassembly

Data Collection In Action

ECM Image

- Fault Codes
- Regeneration Frequency
- Idle Time

Repair Records

- Maintenance
- Warranty
- Campaigns / TSB / TRP

Fluid

- Analysis
- Consumption

Fault Lamps

2013 to Current – OBD

On-Board Diagnostics

- Continuously monitors performance of the emissions system
- The MIL illuminates when the OBD system detects a malfunction that can increase exhaust emission levels.
- Used in thousands of on-road vehicles since 2007

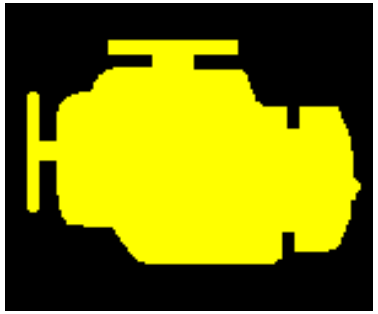
Requirements – MIL Lamp

- ISO 2575 Symbol F01 (Engine Outline)
- Must be amber in color
- Can be used in conjunction with other lamps
- Is ***required*** on all 2013 certified on-highway diesel engines (ISB, ISL, ISX-12 and ISX-15 CM2350 on-highway engines have full OBD

Malfunction Indicator Lamp

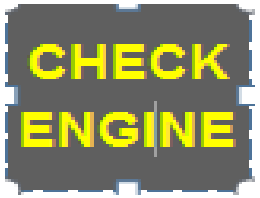
Malfunction Indicator Lamp (MIL)

- Requirements – MIL Lamp
  - ISO 2575 Symbol F01 (Engine Outline)
  - Must be amber in color
  - Can be used in conjunction with other lamps



Dash Lamp – Check Engine

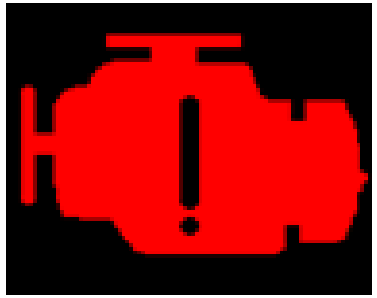
- The **“Check Engine Lamp”** amber in color and can either be the image of an engine featuring a wrench ***Or can be text “ Check “ or “ Check Engine”*** – It is illuminated for non-OBD faults but can be illuminated in conjunction with the MIL



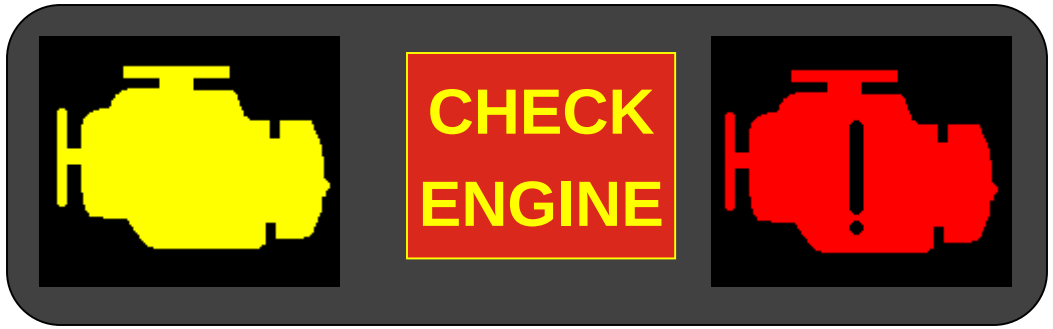
Dash Lamp – Red Warning Lamp

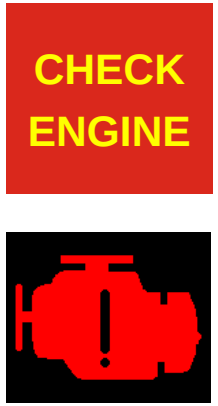
- The “Red Stop Lamp” Can be the image of an engine with an exclamation point (!) the outline of a stop sign featuring and engine, ***Or the text “Stop’ or “Stop Engine “***

STOP



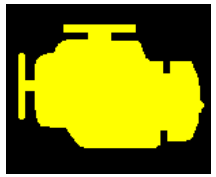
2013 - OBD Driver Interface 3 Lamp Strategy





Check Engine Lamp - (Amber Warning Lamp)
This is the standard lamp that we have used in all previous Cummins applications. Used for Non-OBD faults.

Stop Engine Lamp
Used to indicate Engine Protection Fault Codes.



Malfunction Indicator Lamp (MIL)
This lamp is used to indicate an Emissions Related Failure has occurred (OBD Faults).

MIL Lamp

ANY issue that would cause “out of emission” will generate a fault/MIL lamp and likely engine ECM fault code!

(Notice - I did not state ENGINE problem)

The MIL lamp may be on, but depending on the code, it may take more than one event (trip) to log a code. Most codes log on first event (trip) but a few are multiple trip to log.

*Fault codes related to emissions must be cleared by using the **“conditions for clearing”** process in the fault code description*

If the engine is run for a period of time with a emission related FC it will generate a de-rate resulting in fault codes 3712 and/or 3714

Derate is required to prevent extended “out of emission” operation

When a fault code is logged and has a associated derate, to clear the derate code**, YOU MUST OPERATE** the engine in the condition described for clearing the codes and/or run the diagnostics. If you don’t you could get FC 3712 and/or 3714 ***return with no other codes***

If you don’t have the work saved with the codes, you may not know what generated the code and no way to know what the original code was and proper steps to clear the code. The derate code ***MAY NOT*** clear until conditions are met (or recalibrate the ECM)

So, Now you have codes – What do you do now?

- You have dozens of fault codes – What now? Where do you go?
- How do you do troubleshooting engine faults on Cummins products?
- What level of repair do you do? Bolt on components only?
- How do you determine if the fault code is a OEM issue, engine problem, maintenance issue?
- What code do you troubleshoot first ?
- ***First*** recorded fault code could lend a clue – But may not be the correct direction!

Active - Highest Count – First – Last – Best Guess ????

- Should any be disregarded?

More Later ……..

Fault Code Rules

- **RULE #1** - If you are sending the unit out to a vendor for repairs, ***DO NOT CLEAR CODES !!!!!***
- **RULE #2** – Don't just clear ***active*** codes with the hope it will fix the issue
- **RULE #3** – ALWAYS make a Insite work order/ECM image

It's ***VERY difficult*** to troubleshoot fault codes or issues without a code to reference – or knowing frequency – or when it logged – or other related codes

The work order/ECM image provides a great deal of information – so if you learn one thing in this session – It's always create a work order/ECM image

Fault Codes

- All fault codes record ***snap shot history*** the first and last time it logs along with ECM time and engine run time
- Fault code history and fault code “snap shots” tell you more about the issue than just the code itself – Read the story the code is telling
- Knowing which code logged first ***along with*** what the engine was doing when the code logged can be helpful when troubleshooting
- The fault code snap shot data records the operating state and condition of the engine when the code logged – That is very helpful when diagnosing or trying to ***re-create*** the code(s)

Insite Work Order/ECM Image

- ALWAYS create an Insite Work order (ECM Image) – Takes just a few seconds to create
- The work order (Image) will have all features and parameters retained in the event of ECM failures
- Abuse and engine protection history is available to help in failure analysis – These can not be cleared or reset
- The initial work order will have the fault codes saved, so codes could be cleared and original work order referenced or sent for review (.eif file)
- The work order has endless information about the engine and engine history

Understanding Fault Codes

- Component Description
- Component Location
- Conditions for **Running** the Diagnostics
- Conditions for **Setting** the Fault Codes
- Action Taken When the Fault Code Is **Active**

Things to remember with Fault Codes Always;

- Create INSITE work order prior diagnostics
- Follow Troubleshooting steps per QuickServe Online

File: 193-fc3574 Page 1 of 3

Fault Code 3574

Aftertreatment 1 Diesel Exhaust Fluid Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level

CODES	REASON	EFFECT
Fault Code: 3574 PID(P), SID(S): SPN: 4334 FMI: 1/18 Lamp: Amber SRT:	Aftertreatment Diesel Exhaust Fluid Pressure Sensor - Data Valid But Below Normal Operating Range - Moderately Severe Level. Low diesel exhaust fluid pressure has been detected in the dosing unit.	Possible reduced engine performance.

Conditions for Setting the Fault Codes:

The Engine Control Module (ECM) detected the aftertreatment diesel exhaust fluid pressure was less than a threshold.

Action Taken When the Fault Code is Active:

The ECM illuminates the amber CHECK ENGINE lamp and/or the malfunction indicator lamp (MIL) immediately when the diagnostic runs and fails.

Engine torque will be reduced if the engine is operated for an extended period of time with this fault active.

Engine torque will be severely reduced.

Vehicle speed will be limited to 8 km [5 mi] per hour after extended engine operation with the fault code active.

FC 3754 – Overview

File: 193-fc3574

Page 1 of 3

Fault Code 3574

Aftertreatment 1 Diesel Exhaust Fluid Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level

CODES	REASON	EFFECT
Fault Code: 3574 PID(P), SID(S): SPN: 4334 FMI: 1/18 Lamp: Amber SRT:	Aftertreatment Diesel Exhaust Fluid Pressure Sensor - Data Valid But Below Normal Operating Range - Moderately Severe Level. Low diesel exhaust fluid pressure has been detected in the dosing unit.	Possible reduced engine performance.

FC 3574 – Description – Location – Conditions for Running Diagnostics

Component Description

The Engine Control Module (ECM) provides a 5 volt supply and a ground to the aftertreatment diesel exhaust fluid pressure sensor. The pressure sensor provides a signal to the ECM on the sensor signal circuit. This sensor signal voltage changes, based on the aftertreatment diesel exhaust fluid pressure supplied by the dosing unit. The ECM will detect a low signal voltage at low diesel exhaust fluid pressures, and a high signal voltage at high diesel exhaust fluid pressures.

Component Location

The aftertreatment diesel exhaust fluid pressure sensor is internal to the aftertreatment diesel exhaust fluid dosing unit and can not be serviced separately.

Conditions For Running The Diagnostics

This diagnostic runs when the diesel exhaust fluid dosing unit is in the priming or dosing state.

FC 3574 – Conditions for Setting the Code and Actions Taken

Conditions for Setting the Fault Codes:

The Engine Control Module (ECM) detected the aftertreatment diesel exhaust fluid pressure was less than a threshold.

Action Taken When the Fault Code is Active:

The ECM illuminates the amber CHECK ENGINE lamp and/or the malfunction indicator lamp (MIL) immediately when the diagnostic runs and fails.

Engine torque will be reduced if the engine is operated for an extended period of time with this fault active.

Engine torque will be severely reduced.

Vehicle speed will be limited to 8 km [5 mi] per hour after extended engine operation with the fault code active.

Clearing Fault Codes – MIL Lamp

Conditions For Clearing The Fault Code

- To validate the repair, perform the "Aftertreatment Diesel Exhaust Fluid Doser Pump Override Test" found under "ECM Diagnostic Tests" in the recommended Cummins electronic service tool or equivalent.
- The fault code status displayed by the recommended Cummins electronic service tool or equivalent will change to INACTIVE immediately after the diagnostic runs and passes.
- The ECM will turn off the amber CHECK ENGINE lamp immediately after the diagnostic runs and passes.
- For On-Board Diagnostics (OBD) engines, the ECM will extinguish the Malfunction Indicator Lamp (MIL) after three consecutive trips where the diagnostic runs and passes.
- The “Reset All Faults” command in the recommended Cummins electronic service tool or equivalent can be used to clear active and inactive faults, as well as extinguish the MIL for OBD applications.

Troubleshooting

Use QSOL for troubleshooting steps

- Campaign notifications
- Fault Code Analyzer
- Updated regularly

DO NOT use INSITE for troubleshooting steps

- Troubleshooting steps within INSITE are not updated as regularly as other sources
- Do use INSITE for additional fault code diagnostics and service procedures

Fault Codes

If the engine is run for a period of time with a emission related FC it will generate a de-rate resulting in fault codes 3712 and/or 3714

Derate is required to prevent extended “out of emission” operation

When a fault code is logged and has a associated derate, to clear the derate code, ***YOU MUST OPERATE*** *the engine in the condition described for clearing the codes and/or run the diagnostics.* If you don’t you could get FC 3712 and/or 3714 ***return with no other codes***

If you don’t have the work saved with the codes, you may not know what generated the code and no way to know what the original code was and proper steps to clear the code. The derate code ***MAY NOT*** clear until conditions are met (or recalibrate the ECM)

Fault Code 3714 Active with No Other Active Fault Codes TSB120309

- SCR related Fault Code(s) 1682, 1683, 1713, 2976, 3151, 3238, 3241, 3258, 3261, 3423, 3425, 3558, 3559, 3563, 3567, 3568, 3572, 3574, 3575, 3596, 3748, 4156, 4169, or 4769 **can lead to Fault Code 3714 (inducement) within 1 hour and will eventually lead to Fault Code 3712 (severe inducement) if not addressed.**
- Even when those active fault(s) are addressed before Fault Code 3714 becomes active and are cleared, Fault Codes 3714 and 3712 will still become active due to a diagnostic **not** verifying that the fault codes are cleared.
- To correct the issue, troubleshoot all active fault codes. Verify all fault codes, except a possible Fault Code 3714 or 3712, are inactive. Use INSITE™ 7.6 electronic service tool or higher to calibrate the engine control module (ECM) with the latest calibration from QuickServe™ Online or the April 2013 INCAL Calibration DVD. Once the ECM has the new software, all fault codes will be cleared.

Fault Codes

Things to remember with Fault Codes

- Always create a work order/image with Insite prior to clearing codes
- Always follow steps in fault code overview for the conditions for clearing fault codes – Some codes will require the diagnostics to run before turning off the MIL lamp and/or associated derate. The fault code diagnostics are what determines how many “Trips” (FC diagnostics) are required to run to clear MIL and/or code
- The MIL may not always go out when you reset the engine check engine fault - It has to be satisfied the issue has been corrected to turn off the MIL or eliminate the derate code

OEM Wiring Effect: Aftertreatment Related Codes

Complaint

- Check engine light, fault codes, and possible engine derates.
- Cummins Inc. (CMI) ***part replacements do not resolve the issue.***

Additional Troubleshooting

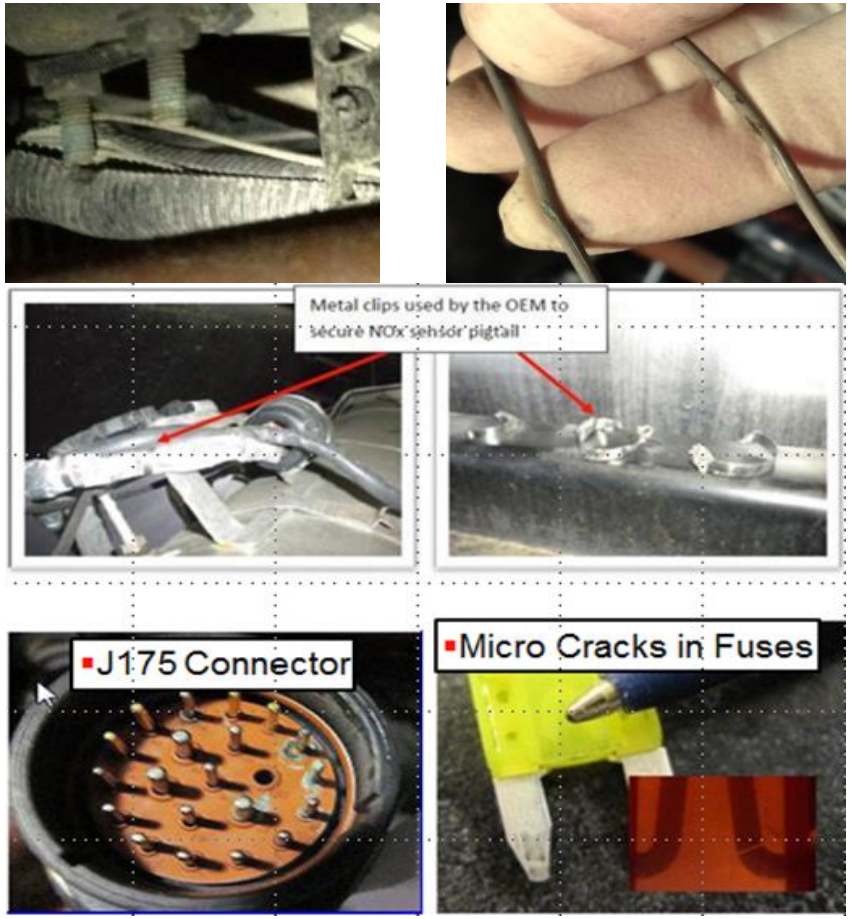
- Currently root cause is a suspected to be an OEM harness issues.

Correction

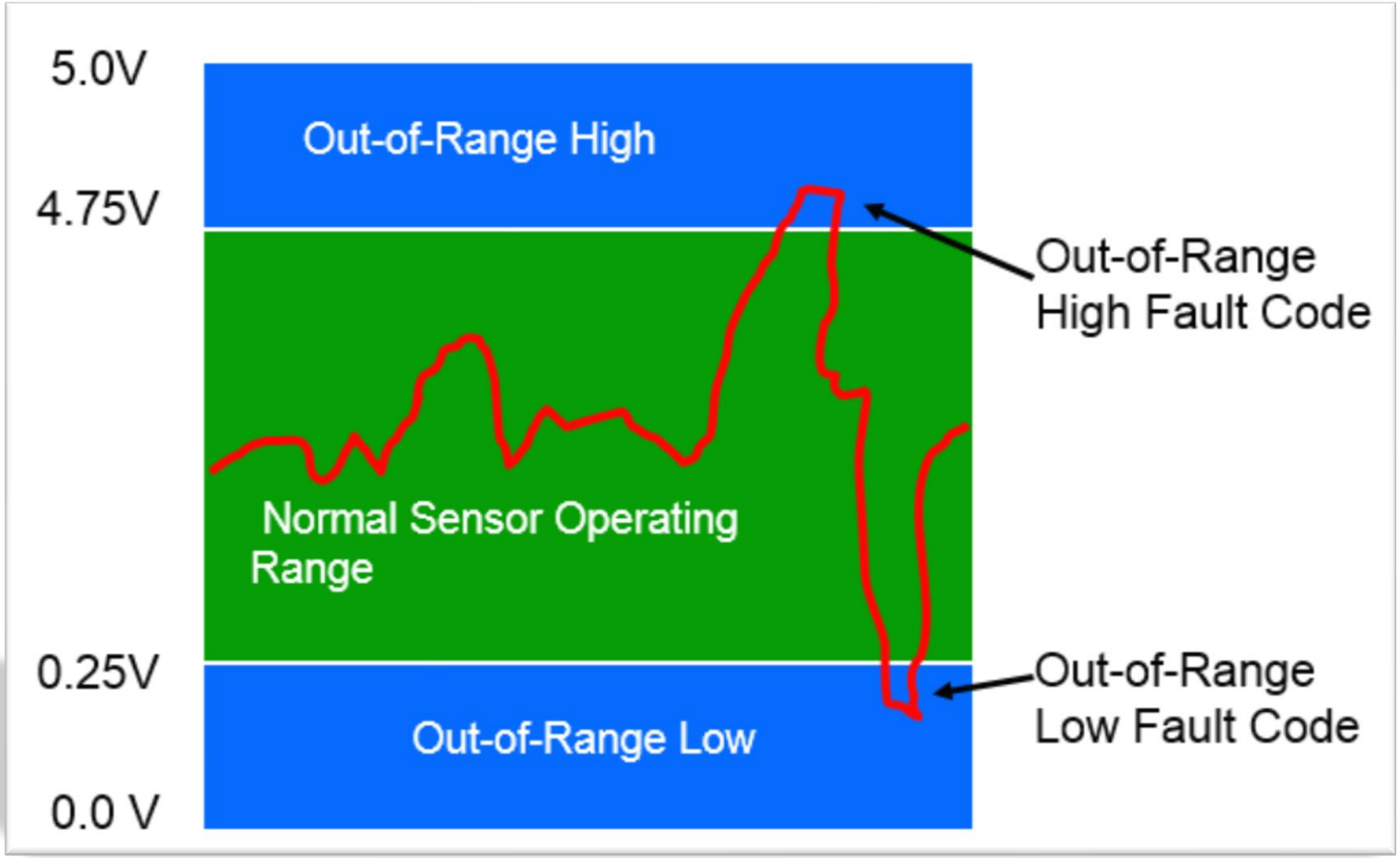
- Repair OEM aftertreatment wiring harness
- Reference TSB's and OEM service bulletins

Fault Code Facts

- More than 200 of the 415 fault codes can be OEM induced



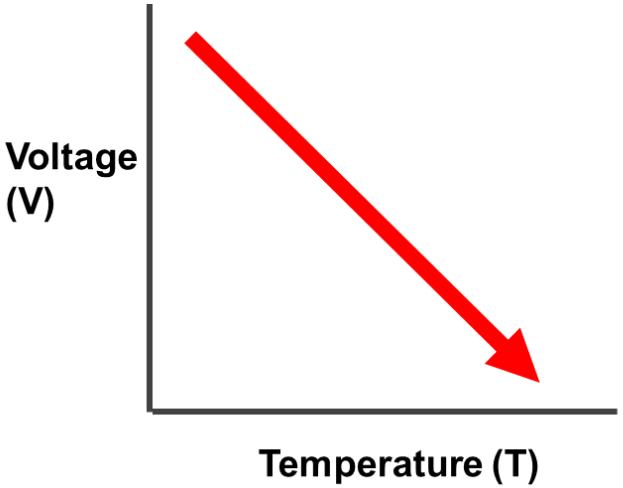
Sensor Wiring and Operation

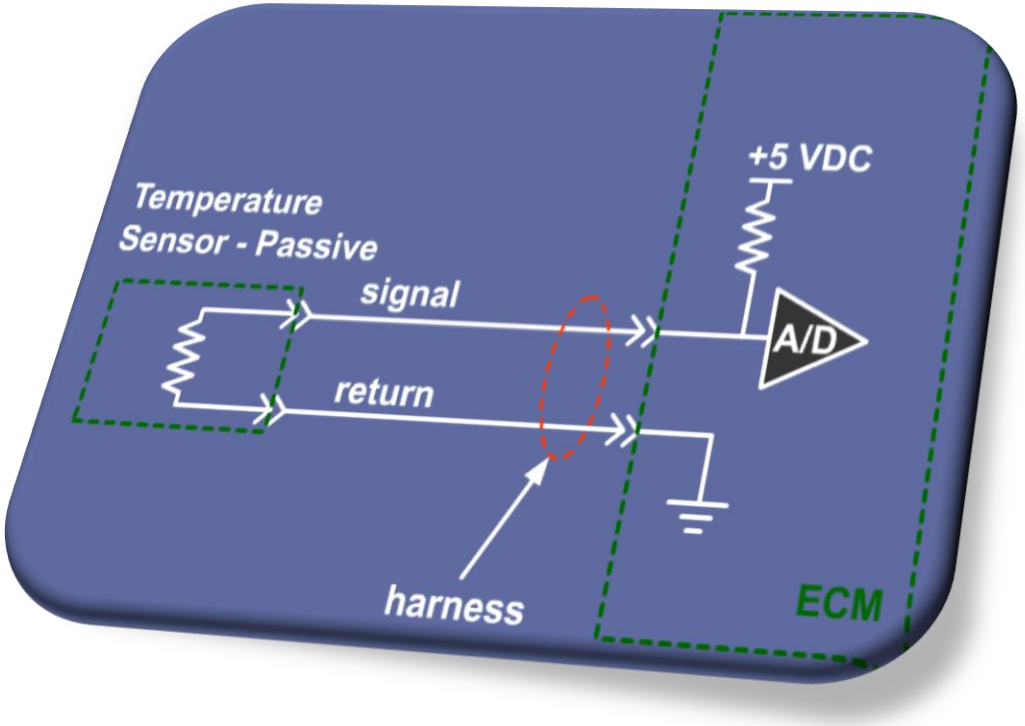


Temperature Sensor Operation

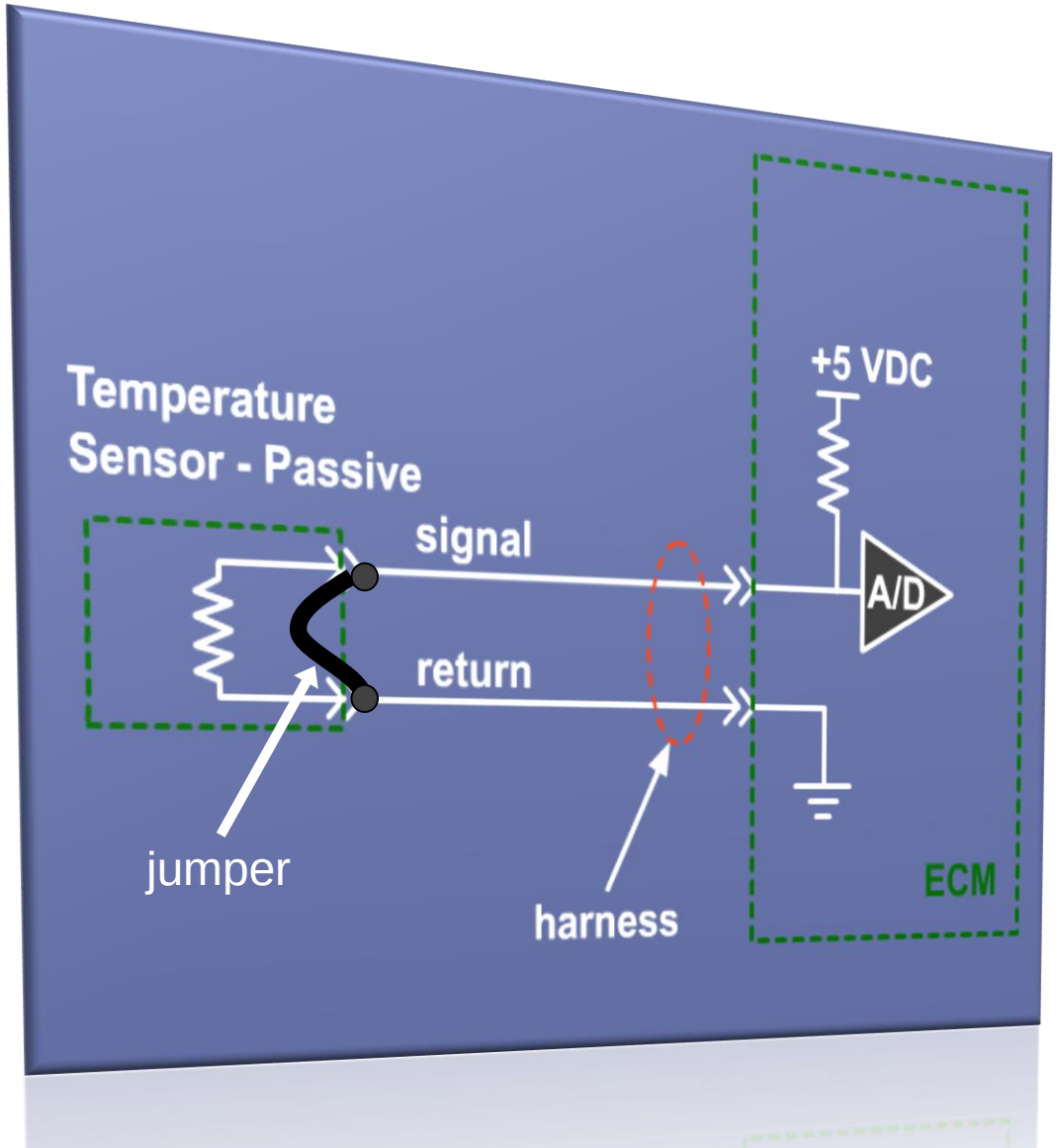
Temperature and voltage are inversely proportional:

- As temperature **increases**, signal voltage **decreases**.
- As temperature **decreases**, the signal voltage **increases**.





Temperature Sensor Diagnostics

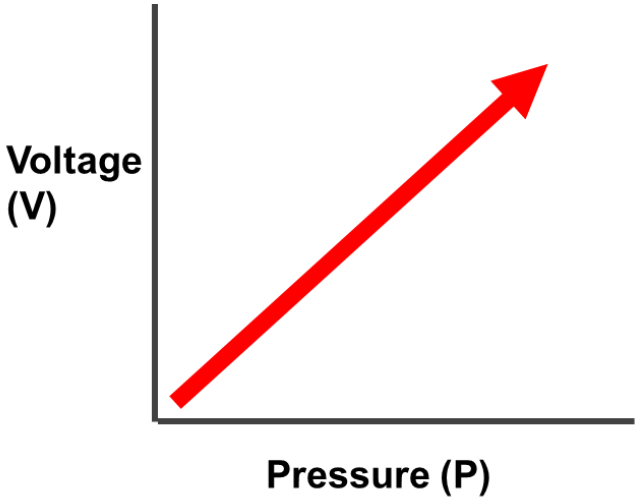


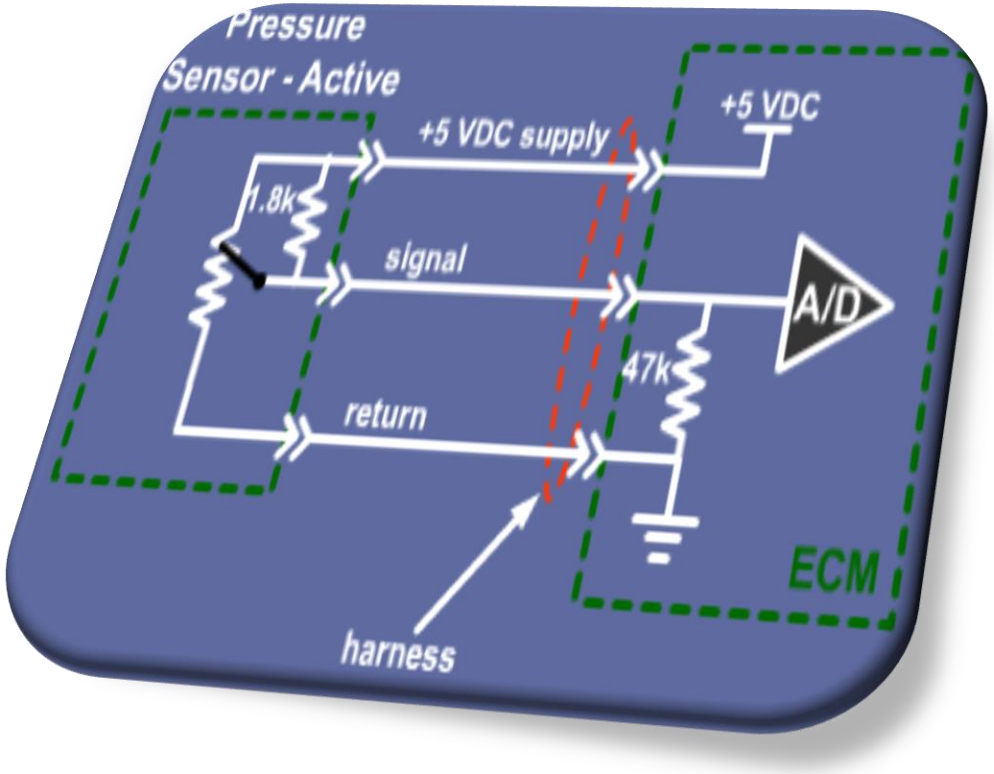
Continuity Test: *Jump the signal wire to the return wire to create an out-of-range low fault code on temperature sensors (verify in INSITE).*

Pressure Sensor Operation

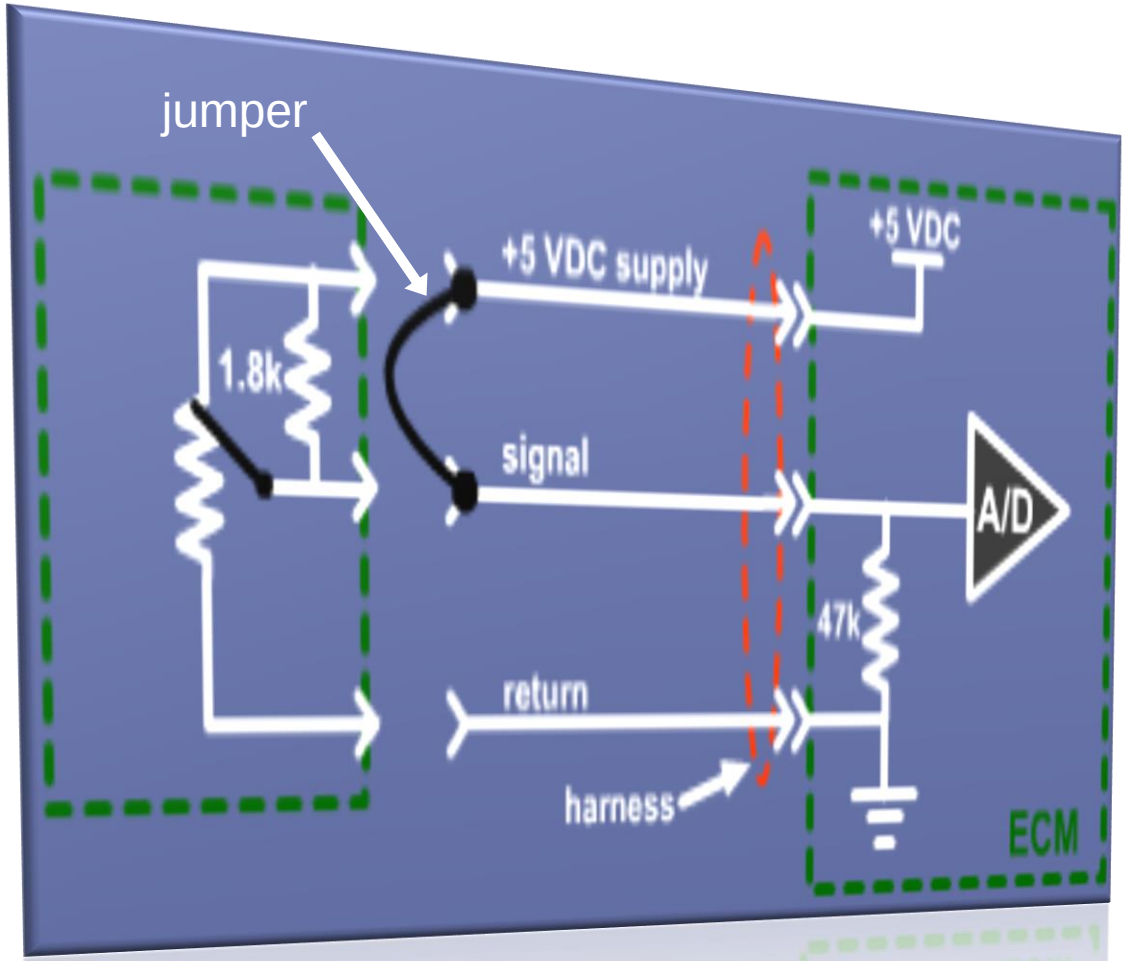
Pressure and Voltage are proportionally related.

- As pressure **increases**, the signal voltage **increases**.
- As pressure **decreases**, the signal voltage **decreases**.





Pressure Sensor Diagnostics

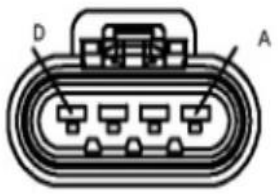


Continuity Test: *Jump the 5 volt supply to the signal wire to create an out-of-range high fault code on pressure sensors (verify in INSITE).*

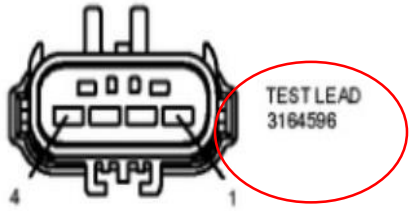
Using Test Leads to Change the Fault Code State

Wiring diagrams show the correct test lead required for testing

INJECTOR PASS THROUGH CONNECTOR



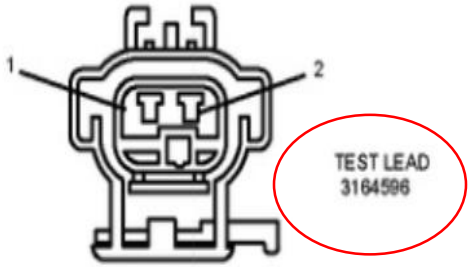
VARIABLE GEOMETRY TURBOCHARGER ACTUATOR
JUMPER HARNESS CONNECTOR



EXHAUST GAS RECIRCULATION TEMPERATURE SENSOR

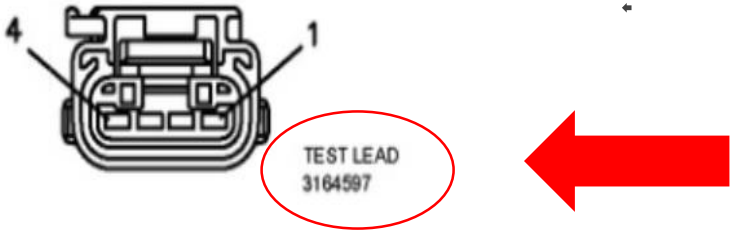
OIL PRESSURE SWITCH

CONNECTOR MATING FACE



TURBOCHARGER COMPRESSOR INTAKE
PRESSURE/TEMPERATURE SENSOR

CONNECTOR MATING FACE



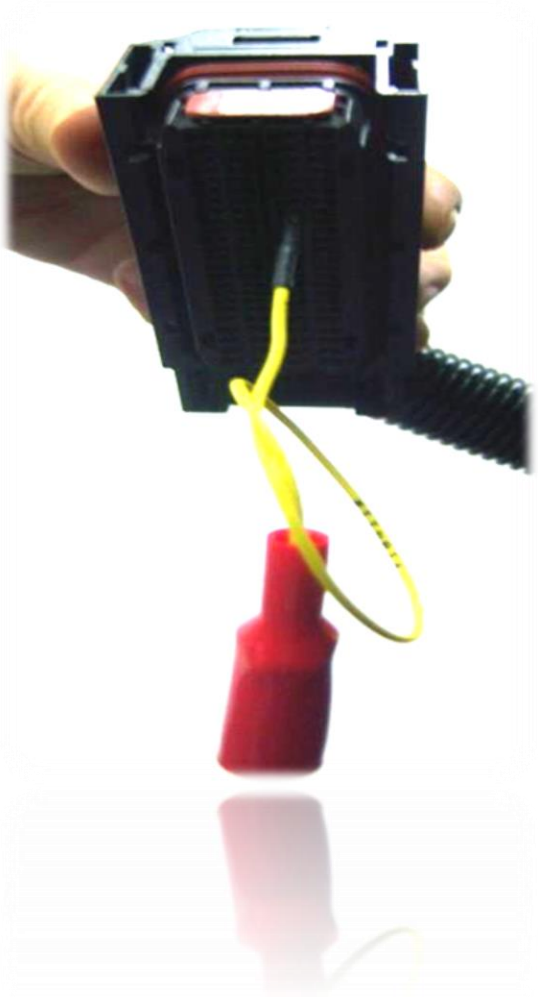
Test Lead Kit P/N 5299367

Tension Testing

Visual inspection can't confirm pin/socket tension

Proper Tension Testing Best Practices

- Always straighten the test lead so the pins/sockets are not side loaded
- Test lead must be inserted vertically into a connector
- Let gravity alone pull on the lead so each pin/socket is tested with equal force
- Compare known good and suspect pins/sockets



Using Test Leads

Normal Pin to Socket relationship occurs when correct test lead is used

Integrity of connection is maintained

Pin to Socket relationship following use of incorrect test lead

Integrity of connection is lost

Pin to Socket relationship following use of multimeter lead

Integrity of connection is lost

Using Test Leads to Change the Fault Code State

Fault Codes – Using Image Analyzer

Customer Name : Customer Name** **System Type :** ISB6.7 CM2350 B101 **ECM Code :** DT90002.36 **Engine Serial Number :** 73671741

Unit Number : ********** **Image Date :** 5/26/2016 7:25:38 AM **Software Phase :** 1F020806 Export Current Feature Export All Features

Please select display option from the drop down list: Total Engine Hours 001512:31:52 Active Fault Most Recent Fault Codes

Sr. No	Fault Codes	Status	Counts	Lamp	Description	First	Last	Time Since First Fault	Time Since Last Fault
1	1922	Active	1	Red	Aftertreatment Diesel Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Most Severe Level	001512:19:36	001512:19:36	0:12:16	0:12:16
2	1921	Inactive	1	Amber	Aftertreatment Diesel Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	001512:18:20	001512:18:20	0:13:32	0:13:32
3	2639	Inactive	1	None	Aftertreatment Diesel Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Least Severe Level	001512:18:16	001512:18:16	0:13:36	0:13:36

Fault Code – Snap Shot Image Analyzer

Customer Name : Customer Name** **System Type :** ISB6.7 CM2350 B101 **ECM Code :** DT90002.36 **Engine Serial Number :** 736

Rectangular Snip

Unit Number : ********** **Image Date :** 5/26/2016 7:25:38 AM **Software Phase :** 1F020806

Export Current Feature

Please select Fault Code: 2639

Fault Code description: Aftertreatment Diesel Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Least Severe Level

Parameter	First Occurrence	Last Occurrence	Unit	Time since First Fault
Aftertreatment Diesel Exhaust Fluid Dosing Unit State	Dosing	Dosing		
Aftertreatment Diesel Exhaust Fluid Dosing Valve Commanded Position	Closed	Closed		
Aftertreatment Diesel Exhaust Fluid Pressure	130.7	130.7	psi	
Aftertreatment Diesel Exhaust Fluid Tank Heating Valve Position Commanded	Closed	Closed		
Aftertreatment Diesel Exhaust Fluid Tank Level	73	73	percent	
Aftertreatment Diesel Exhaust Fluid Tank Temperature	90	90	°F	
Aftertreatment Diesel Oxidation Catalyst Intake Temperature	759.0	759.0	°F	
Aftertreatment Diesel Particulate Filter Differential Pressure	4.70	4.70	inHg	
Aftertreatment Diesel Particulate Filter Intake Temperature	781.3	781.3	°F	
Aftertreatment Diesel Particulate Filter Operating State	Active DPF Regeneration	Active DPF Regeneration		

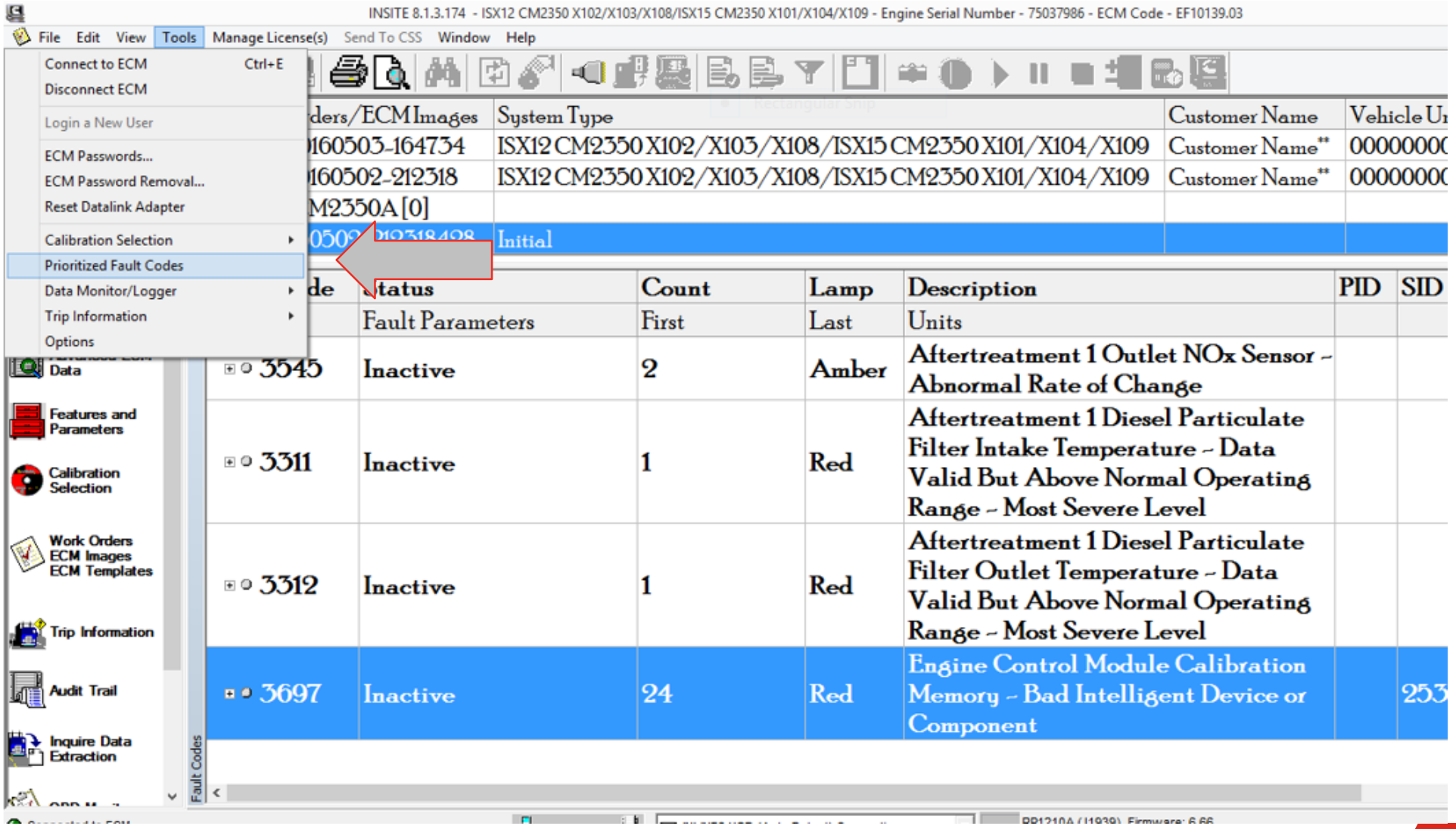
Fault Code Analyzer – Insite - QuickServe

Insite – Fault Code Analyzer

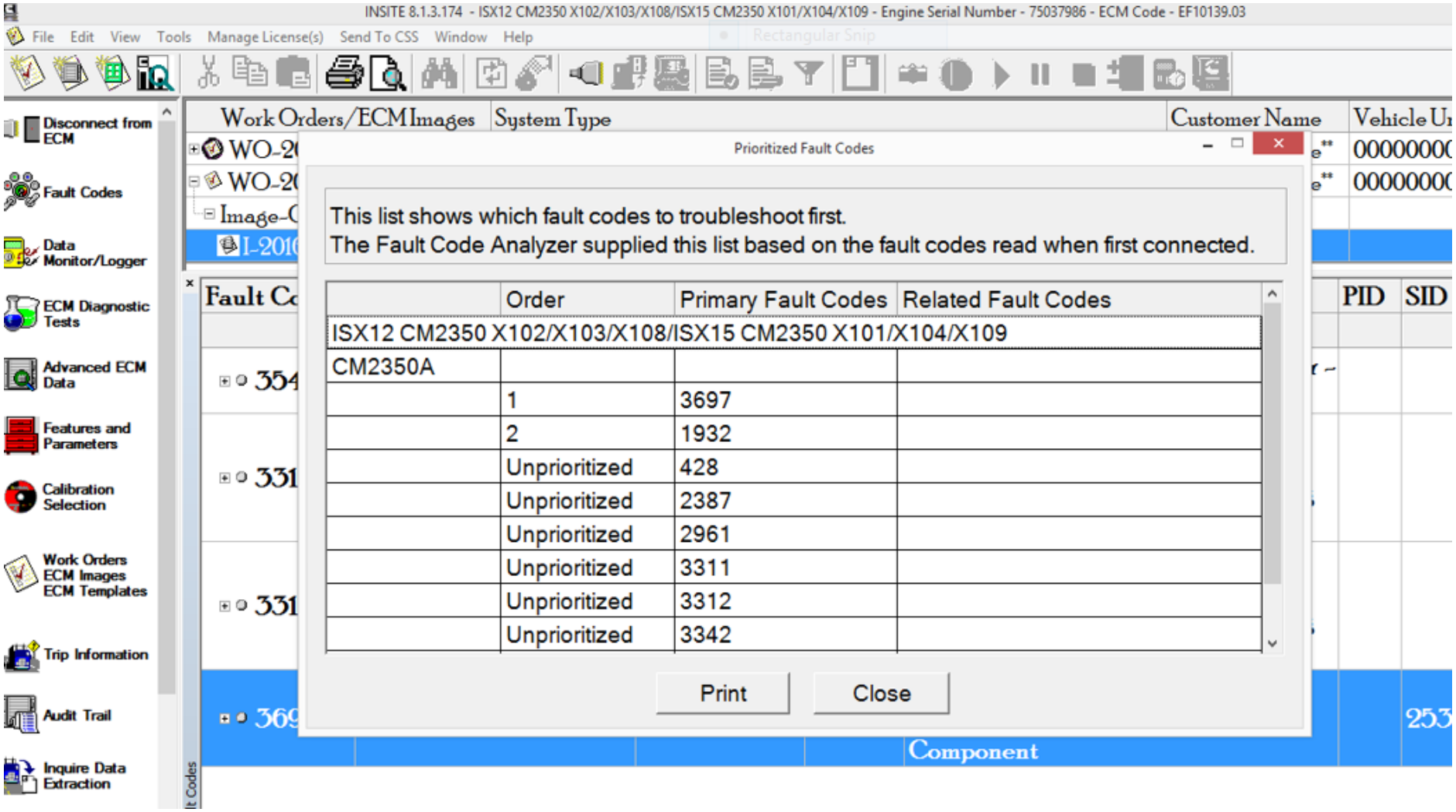
- Version 8.1.3 was released April 20th 2015 – To download Insite updates you must run the update tool **(Current Version is now at 8.5.1)**
- **8.1.3 has a built in fault code analyzer (FCA) that will work *if the PC has an active internet connection***
- Insite will send the fault codes via the internet connection to the FCA component – the FCA will return the codes in a prioritized order and display related codes –
- You MUST be connected live to the engine, with internet access for the FCA to work – ***It does not show if it's primary or related***

- Fault Code Analyzer (FCA) is tuned for 2010 – 2013 ISX ISC/L ISB automotive products. It may not be specifically tuned for use with some industrial and older legacy automotive products

Fault Code Analyzer - FCA



Fault Code Analyzer – FCA – This one may not be as accurate as QSOL



What code do you troubleshoot first ???

ECM Image Analyzer I-20190516-141649821

Data Collection | Aftertreatment System | Calculators | Image Summary | Sensor Monitor Parameters

Duty Cycle Monitor | Fault Codes | Fault Snapshot | Engine Abuse History | Engine Protection | Audit Trail

Customer Name : Customer Name** **System Type :** ISB6.7 CM2350 B101 **ECM Code :** DT90113.05 **Engine Serial Number :** 73796906

Unit Number : ********** **Image Date :** 5/16/2019 2:16:49 PM **Software Phase :** 143C4701 Export Current Feature Export All Features

ect display option from the drop down list: Total Engine Hours 005675:06:40 Active Fault Most Recent Fault Co

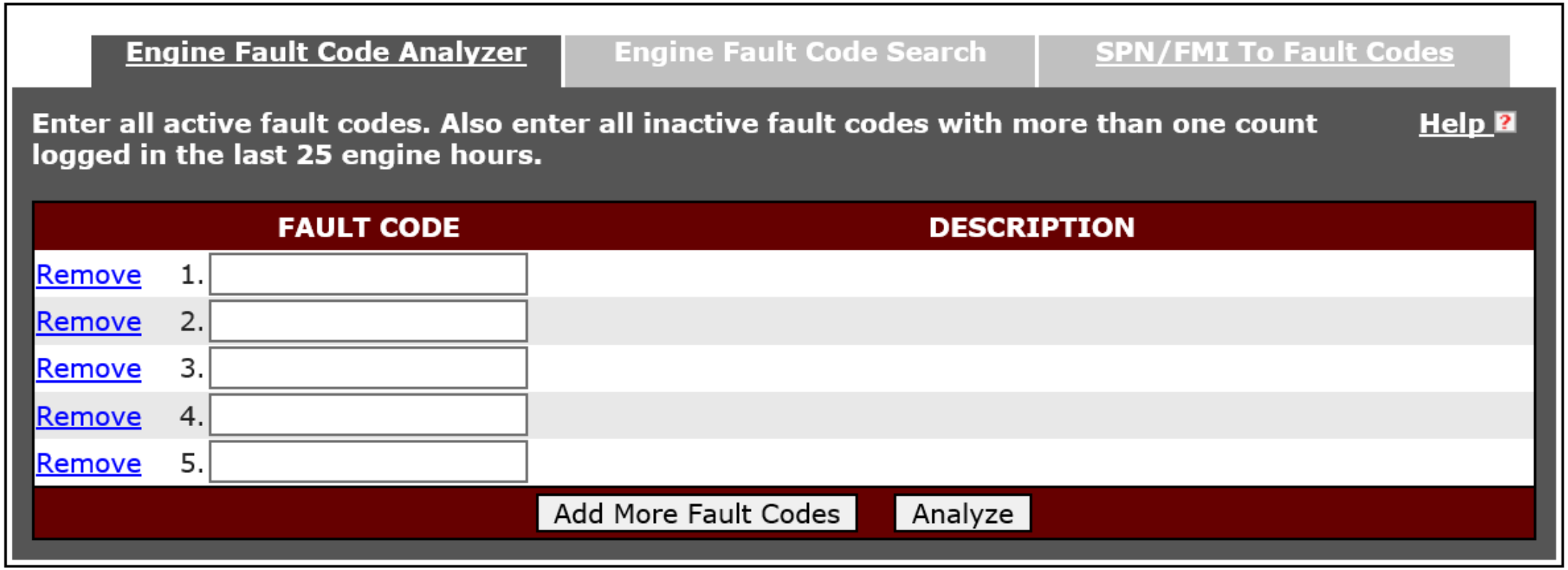
Fault Codes	Status	Counts	Lamp	Description	First	Last	Time Since First Fault	Time Since L Fault
1921	Active	1	Amber	Aftertreatment Diesel Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	005673:34:13	005673:34:13	1:32:27	1:32:27
2639	Inactive	3	None	Aftertreatment Diesel Particulate Filter Differential Pressure - Data Valid But Above Normal Operating Range - Least Severe Level	005672:13:48	005673:34:10	2:52:52	1:32:30
3376	Active	1	Amber	Aftertreatment Diesel Particulate Filter Incomplete Regeneration - Condition Exists	005672:51:50	005672:51:50	2:14:50	2:14:50
2272	Inactive	89	Amber	EGR Valve Position Circuit - Voltage Below Normal or Shorted to Low Source	005548:35:36	005648:02:21	126:31:04	27:04:19
1228	Inactive	20	Amber	EGR Valve Position - Data Erratic, Intermittent, or Incorrect	005544:31:52	005648:02:17	130:34:48	27:04:23
3714	Inactive	49	Amber	Engine Protection Torque Derate - Condition Exists	005544:04:58	005648:00:48	131:01:42	27:05:52
2349	Inactive	13	Amber	EGR Valve Control Circuit - Current Below Normal or Open Circuit	005557:44:32	005648:00:48	117:22:08	27:05:52
1896	Inactive	17	Amber	EGR Valve Controller - Out of Calibration	005544:29:19	005642:00:41	130:37:21	33:05:59
285	Inactive	1	Amber	SAE J1939 Multiplexing PGN Timeout Error - Abnormal Update Rate	Not Available	Not Available	Not Available	Not Available

10:57 AM 6/21/2019

QSOL Fault Code Analyzer Demo

Fault Code Search Tab

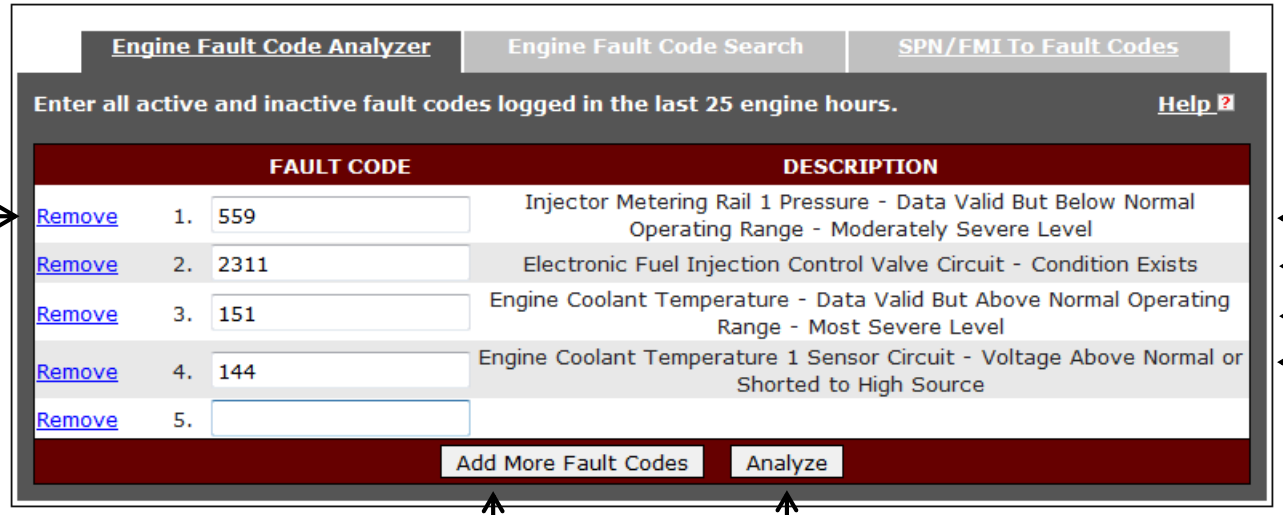
If an engine has multiple active Fault Codes, the Engine Fault Code Analyzer can help you determine which one to troubleshoot first. Click on the Fault Code Search mini tab located under the main Service tab.



Fault Code Search Tab

An ESN or Service Model Name has to be entered into QuickServe Online for the Fault Code Analyzer Tool to be used. Enter all active fault codes and any inactive fault codes that have been logged in the last 25 engine hours.

Once a fault code is entered, the Fault Code Analyzer Tool will display the fault code description.

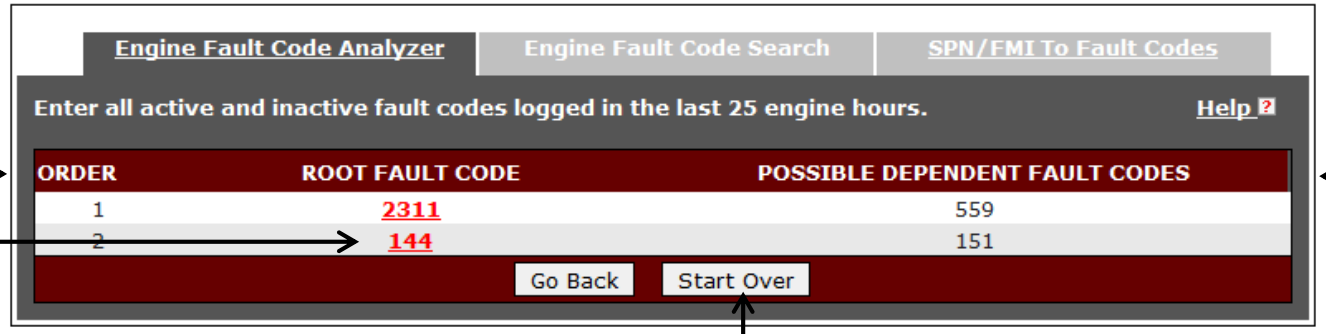


Add or remove fault codes by clicking these links.

After entering all of the fault codes, click “Analyze”.

Fault Code Search Tab

Fault Code Analyzer Tool will display the Root Fault Code and the Dependent Fault Codes. You should then troubleshoot each Root Fault Code one at a time in the order displayed.



Click on the fault code to see the troubleshooting steps for that fault code.

To reset the search, click here.

The Dependant Fault Codes are codes that can be eliminated from the troubleshooting process by troubleshooting the Root Fault Codes.

Fault Code Search Tab

As you click on the fault codes, the links turn green to let you know which ones you've checked.

Engine Fault Code Analyzer | Engine Fault Code Search | SPN/FMI To Fault Codes

Enter all active and inactive fault codes logged in the last 25 engine hours. Help

ORDER	ROOT FAULT CODE	POSSIBLE DEPENDENT FAULT CODES
1	2311	559
2	144	151

Go Back | Start Over

Click "Go Back" to jump back and add or remove fault codes.

Click here to clear the fault codes and analyze more.

Engine Fault Code Analyzer | Engine Fault Code Search | SPN/FMI To Fault Codes

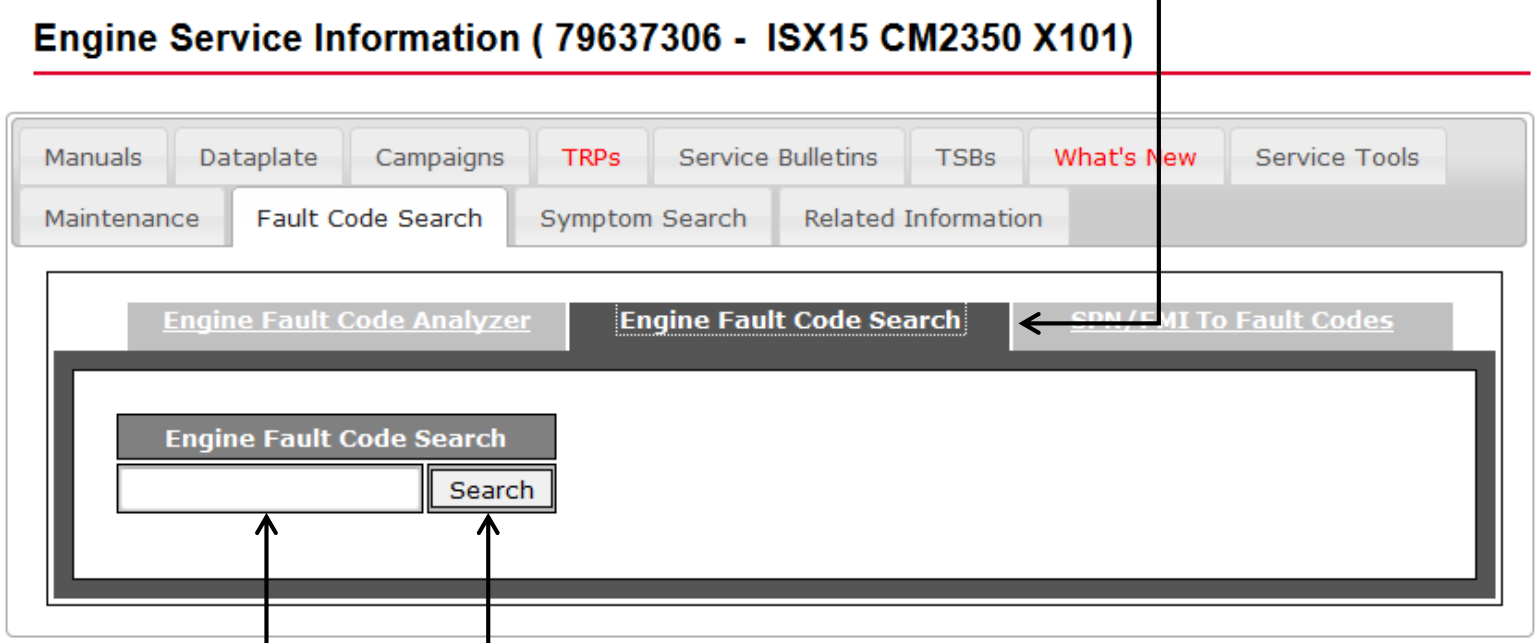
Enter all active and inactive fault codes logged in the last 25 engine hours. Help

		FAULT CODE	DESCRIPTION
Remove	1.	559	Injector Metering Rail 1 Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level
Remove	2.	2311	Electronic Fuel Injection Control Valve Circuit - Condition Exists
Remove	3.	151	Engine Coolant Temperature - Data Valid But Above Normal Operating Range - Most Severe Level
Remove	4.	144	Engine Coolant Temperature 1 Sensor Circuit - Voltage Above Normal or Shorted to High Source
Remove	5.		

Add More Fault Codes | Analyze

Fault Code Search Tab

You can use the Engine Fault Code Search tool to quickly find troubleshooting steps for a particular Fault Code.

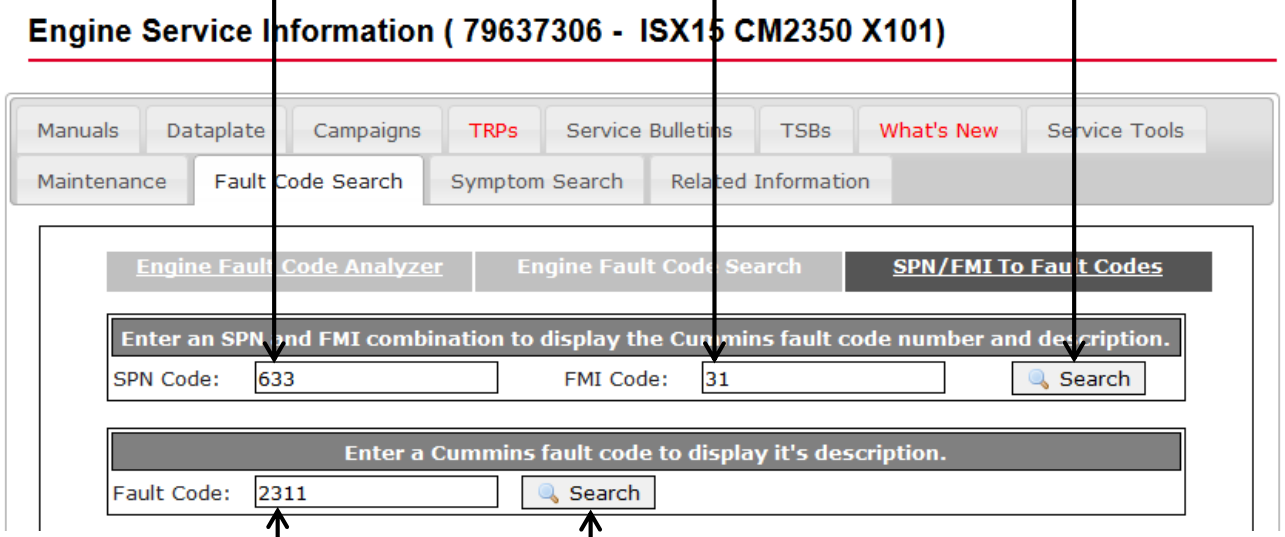


When you enter the Fault Code and click “Search” you are automatically taken to the Fault Code overview page.

Fault Code Search Tab

You can use the SPN/FMI to Fault Code Tool to cross-reference SPN/FMI Codes with Cummins Fault Codes.

Enter a SPN and a FMI code and click “Search”.



The equivalent fault code will appear here. Click “Search” to see a detailed summary of the fault code.

Fault Code Search Tab

After clicking “Search” you can see detailed information about the fault code including Description, reason that the fault code appears, possible effect it will have on the engine, and more.

Engine Fault Code Analyzer | Engine Fault Code Search | SPN/FMI To Fault Codes

Enter an SPN and FMI combination to display the Cummins fault code number and description.

SPN Code: 633 FMI Code: 31 Search

Enter a Cummins fault code to display it's description.

Fault Code: 2311 Search

Details for Cummins fault code: 2311

SPN	FMI	Lamp Color	Description
633	31	Amber	Electronic Fuel Injection Control Valve Circuit - Condition Exists

Reason

Electronic Fuel Injection Control Valve Circuit - Condition Exists. The fuel pump actuator circuit resistance is too high or too low, or an intermittent connection has been detected.

Effect

Possible reduced engine performance.

Component Location

The high-pressure fuel pump is mounted to the gear housing. The fuel pump actuator is mounted on the fuel pump. The fuel pressure sensor is mounted in the high pressure fuel rail. The fuel pressure relief valve is mounted on the high pressure fuel rail.

Circuit Description

The circuit is a pulse-width modulation (PWM) driver in the engine control module (ECM) that controls the fuel pump actuator. The actuator is grounded in the ECM. The actuator is normally open. The PWM duty cycle to the fuel pump actuator depends on the difference between desired rail pressure and sensed rail pressure.

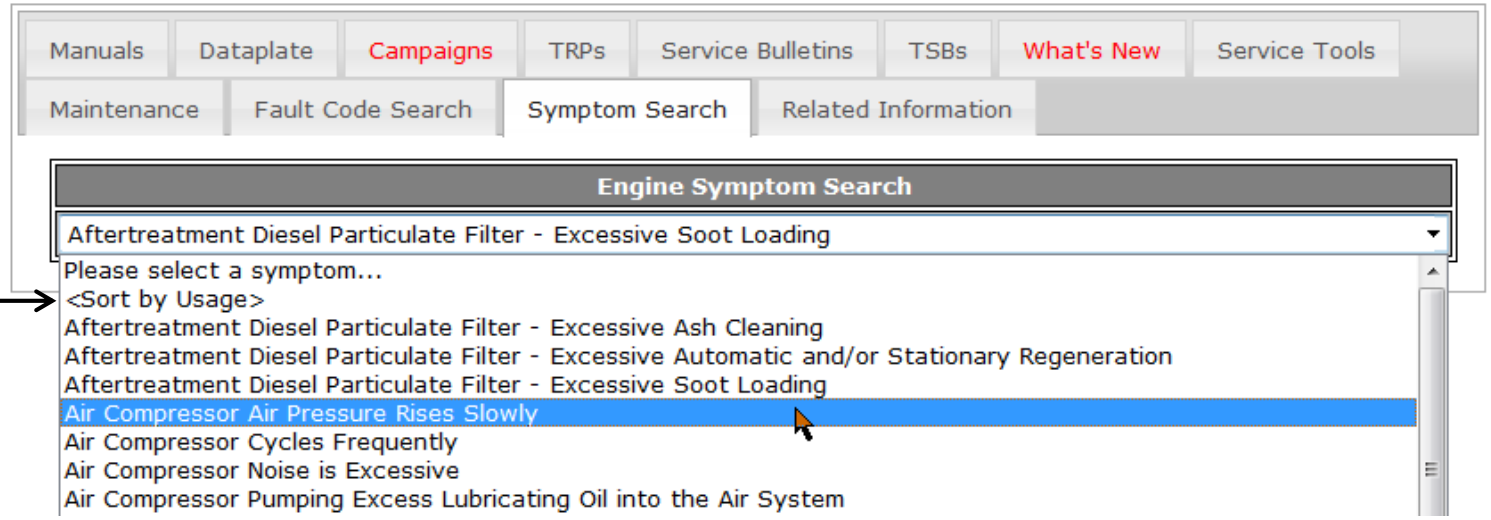
Troubleshooting Information

Click Here To View The Complete Fault Code Information

Click here to see the troubleshooting steps for this fault code.

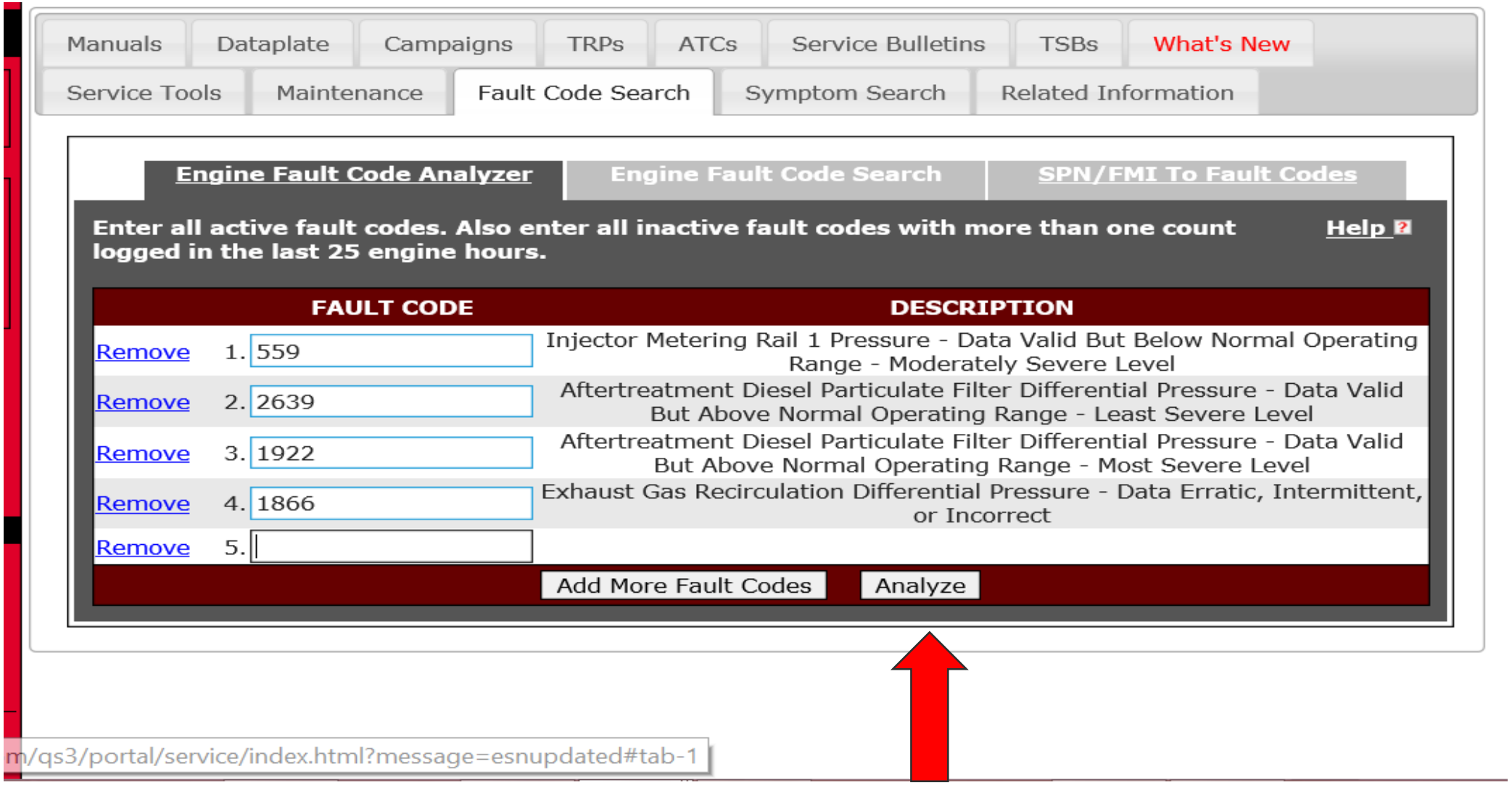
You can use the Engine Symptom Search tool to find troubleshooting steps based on symptoms rather than Fault Codes.

Engine Service Information (73472878 - ISB6.7 CM2350 B101)



Select the symptom that you are looking for from the drop-down list and you will be automatically taken to the troubleshooting steps for that symptom. Alphabetical order is the default for the drop-down menu but you can sort by most used symptom trees by clicking here.

QuickServe Version Fault Code Analyzer



QuickServe FCA

Manuals | Dataplate | Campaigns | TRPs | ATCs | Service Bulletins | TSBs | What's New

Service Tools | Maintenance | Fault Code Search | Symptom Search | Related Information

Engine Fault Code Analyzer | Engine Fault Code Search | SPN/FMI To Fault Codes

Enter all active fault codes. Also enter all inactive fault codes with more than one count logged in the last 25 engine hours. Help

ORDER	PRIMARY FAULT CODES	RELATED FAULT CODES
1	1866	
2	559	
3	1922	2639

Go Back | Start Over

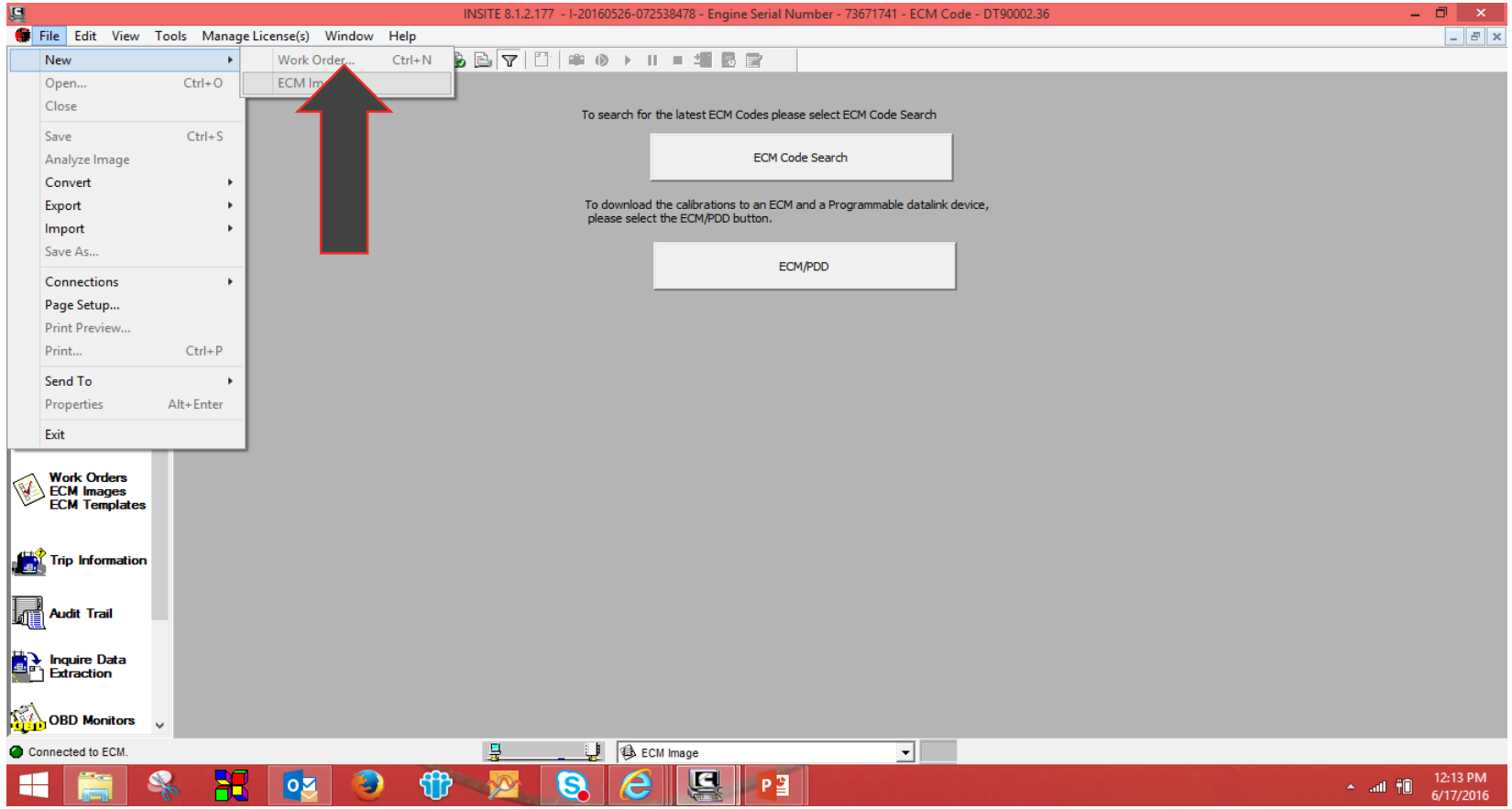
If any additional fault codes are still active after validating the first three primary fault codes, then re-enter the remaining fault codes.

Insite – Work Order – Image

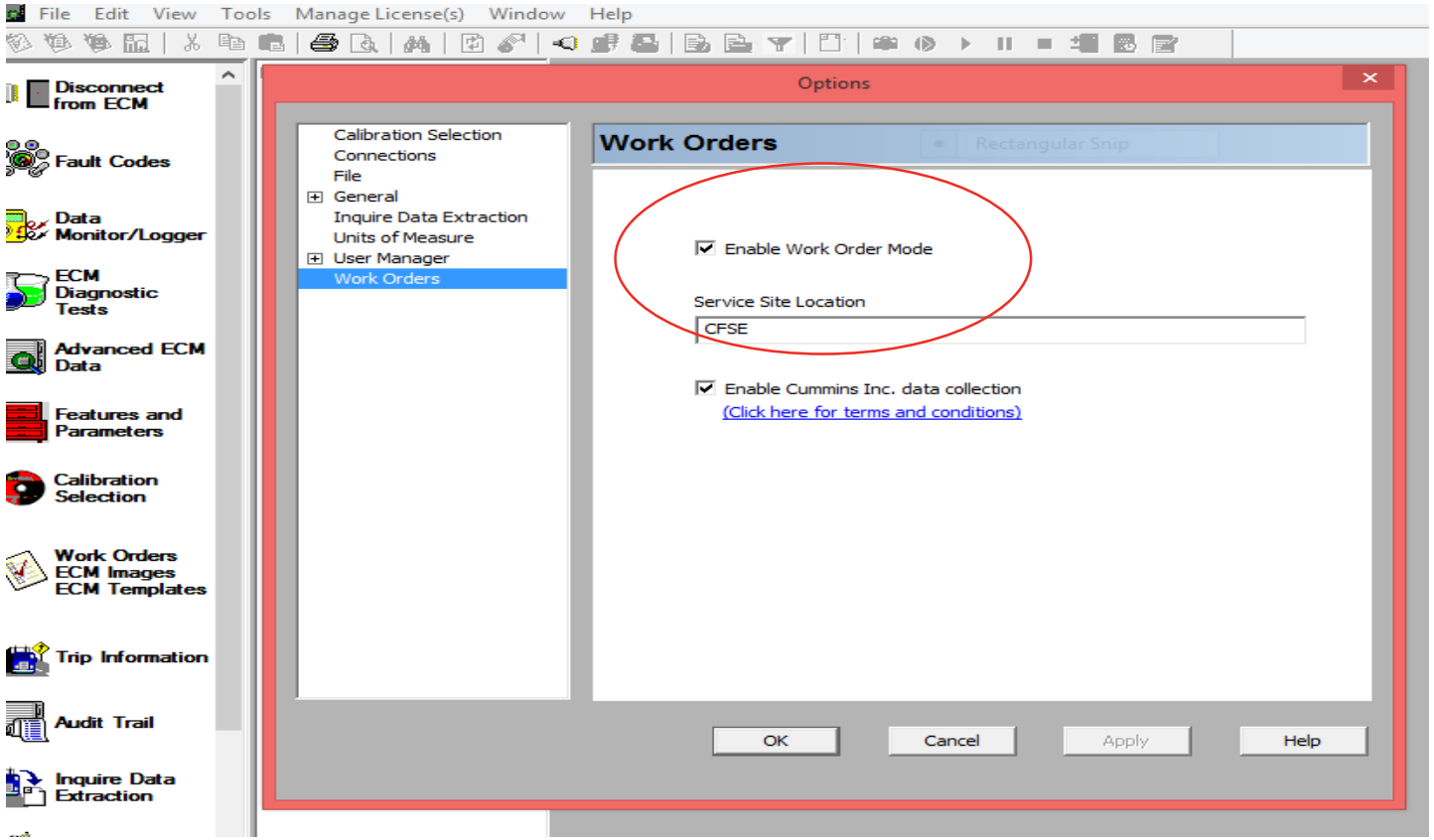
Work Orders/Images

- It’s recommended to set up your Insite so it will auto create work orders (images) whenever first connecting and will create another when disconnecting from the ECM
- No technical support group can offer assistance without seeing ECM images (work orders)
- The image provides powerful information to help start the troubleshooting process
- ***Don’t clear Fault Codes!*** Unless YOU are doing the repair – or saving work orders (images)

Work Orders


INSITE 8.1.2.177 - I-20160526-072538478 - Engine Serial Number - 73671741 - ECM Code - DT90002.36
File Edit View Tools Manage License(s) Window Help
New
Open... Ctrl+O
Close
Save Ctrl+S
Analyze Image
Convert
Export
Import
Save As...
Connections
Page Setup...
Print Preview...
Print... Ctrl+P
Send To
Properties Alt+Enter
Exit
Work Order... Ctrl+N
ECM Im
To search for the latest ECM Codes please select ECM Code Search
ECM Code Search
To download the calibrations to an ECM and a Programmable datalink device, please select the ECM/PDD button.
ECM/PDD
Work Orders
ECM Images
ECM Templates
Trip Information
Audit Trail
Inquire Data Extraction
OBD Monitors
Connected to ECM.
ECM Image
12:13 PM
6/17/2016

Insite Work Order - Auto



ECM Image Analyzer

Insite Image Analyzer

- The ECM image analyzer was added to Insite several versions ago
- It’s a very good, quick easy way to look at the ECM work order/image in a quick concise way
- ***You must generate an Insite work order (Image) to use the Insite Image Analyzer***

INSITE 8.1.4.129 - I-20161206-161332741 - Engine Serial Number - 73550170 - ECM Code - DT90002.18

File Edit View Tools Manage License(s) Send To CSS Window Help

Data ECM

Fault

Data Monitor/Logger

ECM Diagnostic Tests

Advanced ECM Data

Features and Parameters

Calibration Selection

Work Orders ECM Images ECM Templates

Trip Information

Audit Trail

Inquire Data Extraction

OBD Monitors

Work Orders/ECM Images	System Type	Customer Name	Vehicle Unit Number	Engine Serial Number	Start Repair Date	Last Mod
261431	ISB6.7 CM2350 B101	Caledonia Schools	15-1	73550170	06-Dec-2016 04:13:39 PM	06-Dec-2
Image-CM2350A [0]						
I-20161206-161332741	Initial					06-Dec-2
WO-20161109-093552	ISB6.7 CM2350 B101	Customer Name**	**********	73550170	09-Nov-2016 09:35:52 AM	09-Nov-2
WO-20161102-142838	ISB6.7 CM2350 B101	Caledonia	15-1	73550170	02-Nov-2016 02:28:38 PM	02-Nov-2
WO-20161025-145540	ISB6.7 CM2350 B101	Customer Name**	**********	73550170	25-Oct-2016 02:55:40 PM	25-Oct-2
261431 10/20/16	ISB6.7 CM2350 B101	Caledonia	15-1	73550170	20-Oct-2016 02:12:42 PM	20-Oct-2
WO-20161010-103921	ISB6.7 CM2350 B101	Customer Name**	**********	73550170	10-Oct-2016 10:39:21 AM	10-Oct-2

ECM Template	System Type	Module Type	System Comment	Date And Time	Origin
T-20160519-133741	ISB6.7 CM2350 B101	CM2350A [0]		19-May-2016 01:37:41 PM	I-20160519-130253050
T-20161003-174842	ISB6.7 CM2350 B101	CM2350A [0]		03-Oct-2016 05:48:42 PM	I-20160929-103525973

Connected to ECM.

ECM Image

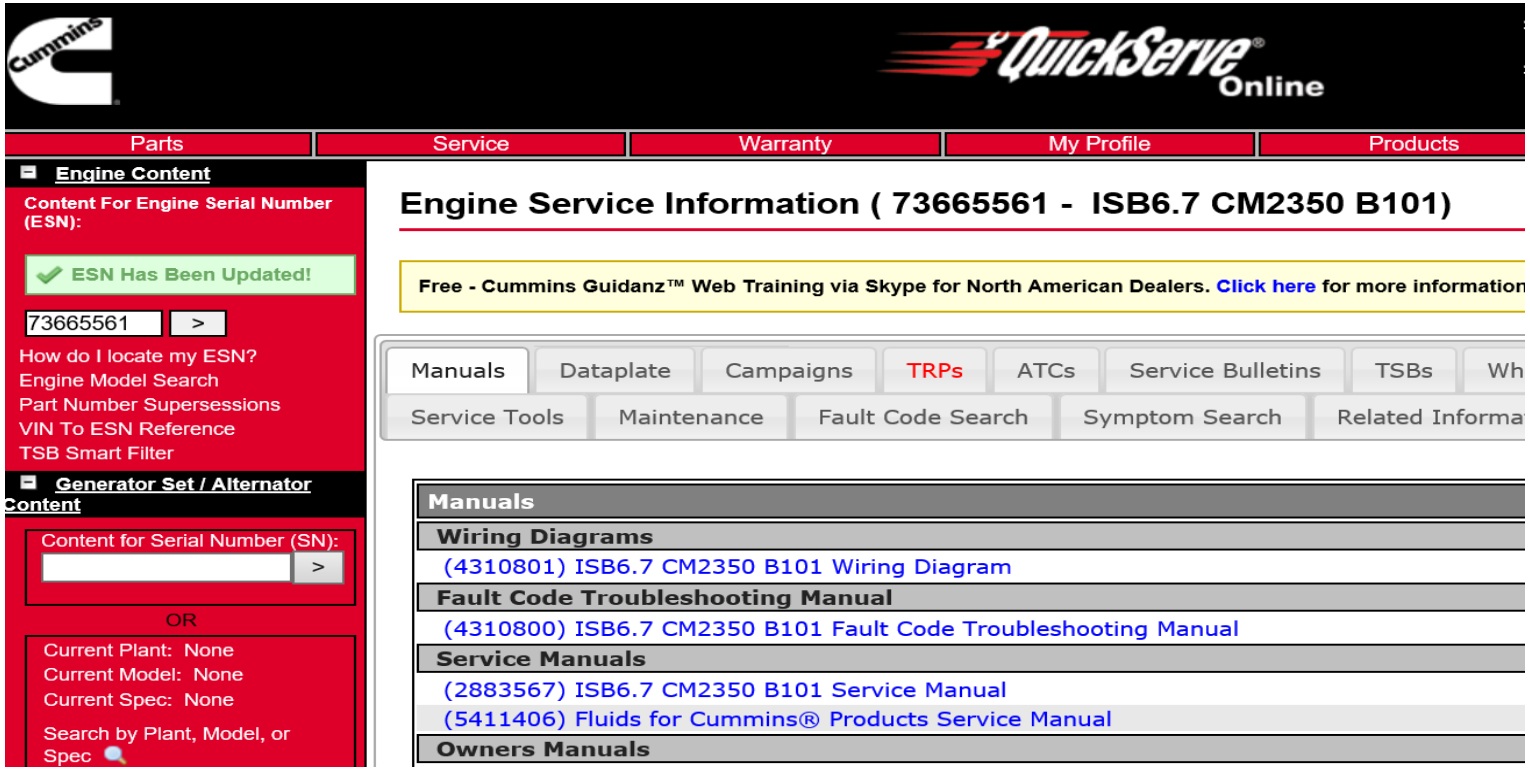
Insite Image Analyzer

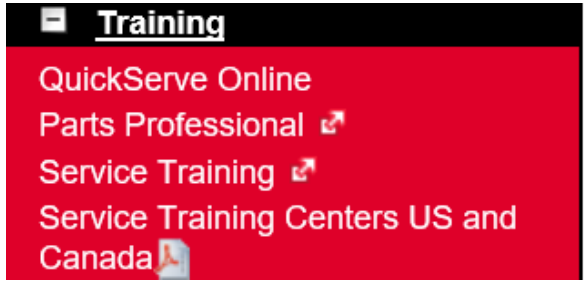
Demo

QuickServe Online Service Training

Live Demo

QuickServe Online Service Training





QuickServe Online Service Training

Welcome to Cummins Service Training, Jack Szalka (A520700/pp279) EAST - NEW HUDSON (02857)

Training Programs | Training Courses | Classes | Upload Scores | User Profile | Technician FAQ

Copy | Excel | CSV | PDF | Show 10 entries

○ Only My Location Programs ◉ All Programs

Search: ISB CM2350

Program ID	Color	Program Name	Completed Date (m/d/y)	% Completed	Product Filter
2013-07Q	Green	ISB6.7 CM2350 B103 Maintenance	08/31/2016	100	
2016-41F	Green	ISB6.7 CM2350 B101, ISB6.7 CM2350 B103 Parts Familiarization	08/31/2016	100	
2012-24L	Green	ISB6.7 CM2350 B101 Lite Repair	09/13/2013	100	
2012-26Q	Green	ISB6.7 CM2350 B101 Maintenance	09/13/2013	100	
2016-06Q	Green	ISB6.7 CM2250 and ISB6.7 CM2350 B101 - CIHR Level 1	09/13/2013	100	
2016-07Q	Green	ISB6.7 CM2250 and ISB6.7 CM2350 B101 - CIHR Level 2	09/13/2013	100	

Q+A


Cummins