![Donaldson FILTRATION SOLUTIONS logo]

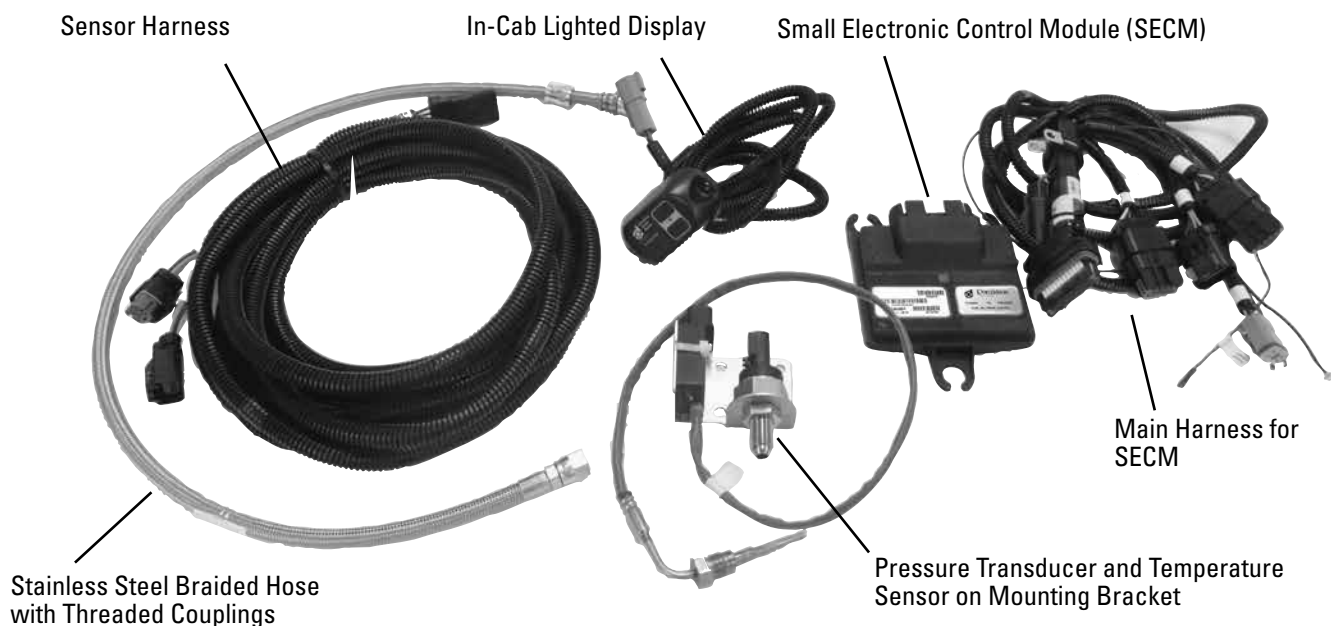# OWNER'S MANUAL
Installation, Operation, and Maintenance Information

EMISSIONS DEVICE MONITOR (EDM)
Manual No. P484891 Rev 4

Sensor Harness

In-Cab Lighted Display

Small Electronic Control Module (SECM)

Stainless Steel Braided Hose with Threaded Couplings

Main Harness for SECM

Pressure Transducer and Temperature Sensor on Mounting Bracket

This manual is property of the owner. Leave with the unit when installation and start-up are complete. Donaldson Company reserves the right to change design and specifications without prior notice.

Do not make any system modifications or adjustments that would alter the original retrofit installation. Modifications may not meet California ARB Executive Order requirements, be considered illegal devices and may result in denial of warranty coverage.

Consult your Donaldson certified emissions dealer if you have questions regarding the installation, operation, maintenance or warranty.
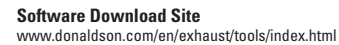
Illustrations are for reference only as actual product may vary.

⚠ **This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**

Contents

EDM (Emissions Device Monitor) Kit Illustration

Software Download Site
www.donaldson.com/en/exhaust/tools/index.html

COMS Connector
Computer Link-up and
Diagnostic Reset Tool (DRT)

In-Cab Display
Part No. P231733

Sensor Harness-20 ft.
Part No. P231738
-or-
**Dual Temperature
Sensor Harness**
Part No. P236775

DTM Assembly   -or-
On time/date equiped system
Part No. P236495

Memory Module
Part No. P232039

COMS Connector Lead - 3 ft.

Memory Module Lead - 6 inches

Main Harness
Part No. P231737
-or-
**Dual Temperature
Main Harness**
Part No. P236774

Display Cable
5 ft.

Power Wire - 8 ft.
Red to Keyed Power
Black to Ground

Isolators, bushing, and
washers (x3)

**Exhaust Gas
Temperature
(EGT) Sensor**
Part No. P232037
-or-
**Dual Temperature
Exhaust Gas
Temperature
(EGT) Sensor**
Part No. P236777

**Pressure
Transducer**
Part No. P232081

Fuse

Sensor Lead - 9 inches

**Mounting Bracket for
Pressure Transducer and
EGT Sensor**
Part No. P231735

Display Lead - 1 ft.

**Small Electronic
Control Module (SECM)**
Kit No. X007817 (with programming dongle)
Kit No. X011231 (without programming dongle)

**Stainless Steel
Braided Hose-3 ft.**
Part No. P231736

Rebuildable Fitting
Part No. P222531

90° Fitting
Part No. P232530

**Temperature Tap
M14 Half Coupling**
Part No. P231734

**Pressure Tap
1/4" NPT Half Coupling**
Part No. P227022

Outlet

For accurate readings,
weld half couplings for
temperature and pressure
taps on muffler tubing within
12" (305 mm) of Inlet / Outlet

Filter-based Muffler shown
SEF Muffler pressure tap coupling
has tap welded on inlet assembly.

Inlet

Optional Parts (sold separately)	
50 ft. Sensor Harness (ideal for rear engine vehicles) Part No. P231739	**4 ft. Temperature Sensor Extension Harness** (ideal when the temperature sensor needs to be mounted more than 4 ft from pressure sensor) Part No. P236497
50 ft. Display Extension Harness (ideal when SECM is mounted in rear of vehicle) Part No. P236736	**24-12V DC Converter** Part No. P232038
50 ft. Dual Temp Sensor Harness (ideal for "dual temp" rear engine vehicles) Part No. P236776	

Technician Service Tools
(sold separately)

Diagnostic Reset Tool (DRT)	Service Tool Link-up Cable	Diagnostic Reset Tool & Link-up Cable
Part No. P231740	Part No. X007999	Part No. X009649

Introduction

The Donaldson Emissions Device Monitor (EDM) is included with every diesel particulate filter (Filter) muffler kit. This monitor is key to the proper operation, service and maintenance and helps you understand how the unit is performing. The image to the left shows the EDM kit components.

The EDM will store and analyze operating information in the memory module to allow maintenance technicians to monitor Filter operation and troubleshoot fault conditions.

Stored information is accessible using a computer with special software and link-up cable (kit no. X007999 or X009649) sold separately.

A Diagnostic Reset Tool (DRT) is available (sold separately) that allows you to reset the EDM and retrieve current active faults without linking up to a computer.

> ⚠ **CAUTION!**
> **Follow Donaldson Installation Guidelines**
>
> Installations must follow Donaldson installation guidelines to ensure full warranty coverage. For optimum performance, follow all the installation, operation and maintenance recommendations covered in this manual.

EDM Kit Contents

Qty.	Description
1	SECM
3	Rubber isolator
3	Bushing
3	Washer
1	Main Harness
1	In-Cab Display
1	20 ft. Sensor Harness
1	Pressure Transducer
1	EGT Sensor
1	Memory Module or DTM Assembky
1	1/4" NPT Half Coupling
1	Mounting Bracket
1	Thermocouple M14 Half Coupling
1	Stainless Steel Braided Hose
1	Rebuildable Fitting
1	90º Fitting
1	Operator Quick Reference (F111244)

You may need or want any one of the following items to enhance the EDM for your maintenance technicians.

Part No.	Description
P231739	50 ft. Sensor Harness
P236776	50ft. Dual Temp Sensor Harness
P236736	50 ft. Display Extension Harness
P236497	4 ft. Temperature Sensor Extension Harness
P232038	24-12V DC Converter
X007999	PC Link-Up Cable
X009649	X007999 with Diagnostic Reset Tool (DRT)
P231740	Diagnostic Reset Tool (DRT)

Pre-Installation Requirements

Donaldson's pre-installation requirements are provided below. In order to maximize the diesel emission control system performance and life, the installation must meet these requirements.

Mounting Location - SECM

- Mount the SECM in a place at or near the fuse panel. Look for a keyed power source.
- Try to locate the SECM in the driver's cab; the engine cabin is a secondary choice. The SECM needs to be within 5 ft (or within 50 ft using optional display extension harness) of where the In-Cab Display will be mounted.

Mounting Location - DTM Assembly (If equipped)

- Mount ONLY in clean dry location such as in cab.

Mounting Location - In-Cab Display

- The In-Cab Display must be mounted in sight of the vehicle operator.

COMS Connection Access - Position for Easy Access

- A technician will need to access the connector labeled "COMS" when the Filter is serviced or cleaned. Make sure the COMS connector is easy to access.
- If retrofitting several vehicles in a fleet, consider positioning the COMS connector in the same general area so the technicians can locate it easier.

Extended Length Wiring Harnesses

- If installing the EDM on a rear engine vehicle, you will need to order the 50 foot sensor harness (P231739) or for dual temp systems (P236776) separately to reach the sensors.

> **NOTE** Pre-designed Donaldson Filter-based muffler Kits for rear engine school buses will include the 50 ft. (15.24m) sensor harness.

> **NOTE** Save Installation Time! To minimize your installation time, consider using self-drilling screws to mount the SECM and sensor mounting bracket.

- If installing the main harness (SECM & MM) in a location more than 5 ft. from the cab you will need to use the 50 ft. display extension harness (P236736) to reach the display.
- If installing the Temperature Sensor more than 4 ft. from the pressure sensor you will need to use the 4 ft. temperature sensor harness (P236497) to reach the connector.

Installation

The following items should be installed in the order presented:
a) Pressure tap and b) Exhaust Gas Temperature (EGT) tap, c) pressure and thermocouple transducers, d) In-Cab Display; e) and the SECM.

NOTE	Do not disassemble electrical connectors to facilitate install.

A. Pressure Tap Installation

Locate the backpressure tap between the turbocharger and the Filter-based muffler in a straight section of the exhaust pipe. Install the tap as follows (may already be installed on some kits:

1. Weld the ¼" NPT half coupling to the muffler inlet piping. The coupling must be located on the **upper half** of the pipe to ensure water cannot collect in the line and within 12" of the Filter-based muffler's inlet, with the threads facing out.
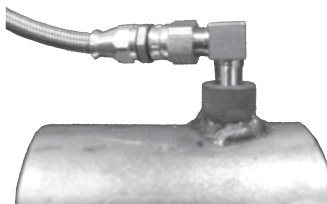
2. Temporarily install a ¼" NPT nipple in the coupling to center the drill bit so the coupling threads are not damaged by the drill bit. Drill a 1/4" (6mm) diameter hole through the exhaust pipe in the center of the coupling.

3. Install the 90° fitting with anti-seize compound and point it in the direction of the intended sensor mounting location.

B. Exhaust Gas Temperature (EGT) Tap Installation

The temperature tap should be installed on a straight section of the muffler outlet pipe. Install the tap as follows:

1. Weld the Temperature Sensor M14 half coupling to the muffler outlet pipe. The coupling must be located on the **upper half** of the pipe and within 12" of the muffler's outlet with the threads facing out.

2. Drill a 5/16"diameter hole through the exhaust pipe in the center of the coupling. The machined hole in the coupling will center the drill bit.
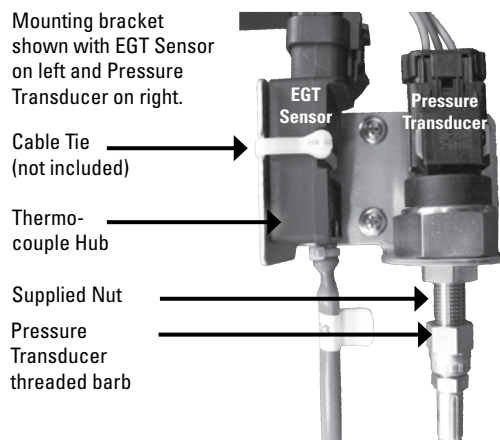

3. Insert the Temperature Sensor, using anti-seize compound, and tighten as shown above. Point the wire lead in the direction of the intended sensor mounting location and torque to 30 ft-lbs.

Special Requirements For Installation of Back Pressure and Temperature Taps in Dual Systems

Dual Muffler configurations require installation of two EGT taps. Temperature taps must be mounted on the outlet of each emissions muffler but before any collector pipe

C. Sensor Mounting Bracket Installation

Position the sensor mounting bracket at least 6 inches (152mm) or more from the pressure tap; if mounted too close to the exhaust system, heat may damage the sensors.

Mounting bracket shown with EGT Sensor on left and Pressure Transducer on right.

Cable Tie (not included)

Thermo-couple Hub

Supplied Nut

Pressure Transducer threaded barb

NOTE	Depending where the temperature sensor is mounted it may be necessary to use the temperature sensor extension harness to reach the connector.

1. Mount the bracket in position as shown above so that the pressure transducer's barb is pointing down ±45°. Fasteners are not included.

2. Mount the pressure transducer to the bracket using the supplied nut and torque to 30 ft-lbs.

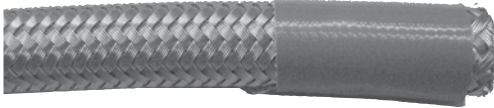| **NOTE**	Mount the bracket with the pressure transducer's threaded barb pointing downward to prevent water damage, (vertical to within 45°).

3. Modify the length of the stainless steel braided hose so it reaches the transducer. Make sure there are *no dips in the hose length*. Water may collect and prevent accurate readings or damage the sensor.

4. Trim the braided steel hose if required.

> **How to Trim the Braided Steel Hose.**
>
> 1 Wrap the hose with a piece of tape (glass filament strapping tape works best) where you need to cut it.
>
> 2 Place the hose in a vise and cut using a cut-off tool (preferred) or a fine-toothed hacksaw.
>
> 3 Remove the tape and trim away any loose wire or debris in the tube.

5. Attach the fitting to the braided stainless steel hose.

   a.) Disassemble the rebuildable fitting.

   Collar   Brass Sleeve   Tube Fitting

   b.) Slide the collar over the hose with the threaded end facing the cut end after installed.

   c.) Push the brass sleeve from the rebuildable fitting over the inner plastic hose but under the steel braiding by hand. Press the brass sleeve against a hard surface and push it on until the inner hose end is butted against the inside shoulder of the brass sleeve.
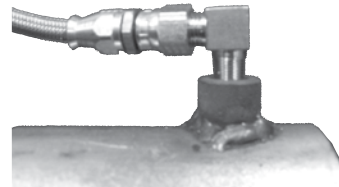
   d.) Press the tube fitting into the inner hose until it butts against the brass sleeve.

   e.) Slide the collar up to the tube fitting and tighten the assembly with a hand wrench. Do not use anti-sieze compound.
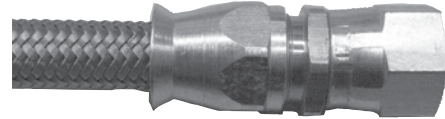
6. Thread rebuildable fitting to the 90º fitting and the 1/4" NPT half coupling on the muffler inlet tube. Do not use an anti-sieze compound.

7. Thread the other end to the pressure transducer barb.

8. Connect the thermocouple hub to the bracket using a cable tie (not included).

9. Secure the thermocouple wire away from the muffler and piping.

10. Connect the sensor harness to the backpressure sensor. You should hear a "click." Grab the sensor body and the harness connector, do not depress the release tab, and pull back on the connection to ensure the connector is locked in place. Be sure to pull on the connector only, not the wiring or loom. Slide the red secondary lock to the side. This ensures the release tab cannot be depressed and the connector released.

11 Connect the sensor harness to the temperature sensor. You should hear a "click." Grab the sensor body and the harness connector, do not depress the release tab, and pull back on the connection to ensure the connector is locked in place. Be sure to pull on the connector only, not the wiring or loom. Slide the red secondary lock forward under the release tab. This ensures the release tab cannot be depressed and the connector released.

12. Route sensor harness towards cab where SECM will be installed.

D. In-Cab Display Mounting Location

The in-cab display alerts the operator when the Filter requires service.

The display must be mounted in a location that is clearly visible to the vehicle operator, such as the dash board or other visible in-cab location.

NOTE	Depending where the main harness is mounted, it may be necessary to use the display harness extension to locate the driver's display in clear view of the operator.

Using the built-in mounting holes on the display, mount in place.

E. SECM Installation

Install the SECM in an accessible location inside the cab. See pre-installation tips for more information.

1. Disconnect the vehicle's battery to avoid personal injury or damage to the EDM system.

⚠	CAUTION Disconnect Battery

Disconnect the vehicle battery before making any electrical connections to avoid personal injury or damage to the EDM system.

2. Mount the SECM using the rubber isolators, aluminum bushings and washers provided. Use of self-drilling screws is recommended (not included).

3. Connect the main harness to the SECM. Pull back on the connector body to ensure the connector is locked in place.

4. Connect in-cab display harness to the main harness on the connector labeled "Monitor Lights." You should hear a "click." Grab each connector housing, do not depress the release tab, and pull back on the connection to ensure the connector is locked in place. Be sure to pull on the connector only, not the wiring or loom.

5. Connect the sensor harness to the main harness. You should hear a "click." Grab each connector housing, do not depress the release tab, and pull back on the connection to ensure the connector is locked in place. Be sure to pull on the connector only, not the wiring or loom. Slide the red secondary lock forward under the release tab. This ensures the release tab cannot be depressed and the connector released.

NOTE	On date/time equipped systems DTM assembly must be mounted in a clean dry location such as in-cab.

6. Connect the Memory Module or DTM assembly if equipped to the connector labeled "Memory Module" and secure with a cable tie (not supplied). You should hear a "click." Grab the connector housing and Memory Module or DTM assembly body, do not depress the release tab, and pull back on the connection to ensure the connector is locked in place. Be sure to pull on the connector only, not the wiring or loom.

7. Route the "COMS" connector to an accessible location as described in the **Pre-installation** section.

8. Optional use lead: The capped blue wire labeled "Engine Signal" may be attached (with OEM dealer approval) to the engine's ECU or any additional 12V electronic device (i.e., audible alarm). The device has a 3 amps maximum rating. This lead will go to ground whenever a RED light ("Temperature Alarm" or "Service Now") alarm is tripped. When wiring an electronic device through it, run power to the device and ground it through this blue wire (3 amps max current). Some software versions will include this action on "service soon".

NOTE	If Engine Signal lead is connected it will not activate during the start-up self test.

F. Power Connection

1. Connect power to the SECM. The EDM must be connected to 12V DC, 10 Amp fuse-protected, keyed power.

NOTE	To avoid damage, DO NOT connect to a 24V power supply. An optional 24-12V DC converter is available if needed. Request Part No. P232038

The in-line 10 amp fuse located near the SECM in the main harness is to protect the SECM and subsequent components. This fuse is not intended to protect the preceding power wire (7.5 feet). This wire must be protected near the power source during installation. Power connection options for fusing power include tapping an empty fuse tap, an in-line fuse holder, in-line fused circuit tap or clip-type wire connector with a fuse holder.

Fusing should always take place on the red power (12V DC positive) wire. Make sure the black wire is properly grounded to the chassis.

2. To test the connection, key up the vehicle. All three (3) lights on the display will light solid for three (3) seconds during the start-up self test. Older systems will flash on start-up.

Fusing Options
(in order of preference)

Best Option: Empty Fuse Tap
Connect to an unused fuse slot in the vehicle's OEM fuse panel which is ignition activated (12VDC) and install a 10A fuse.

2nd Best Option
Use a circuit tap such as the one at right to connect into an existing fuse slot which is ignition activated (12VDC) and install a 10A fuse for the EDM. Avoid tapping into OEM circuits that are vehicle or engine critical.
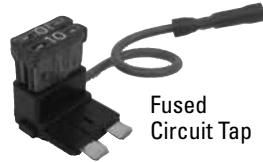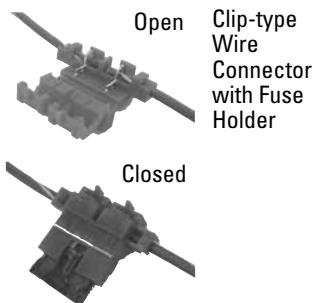
Fused Circuit Tap

3rd Best Option

Connect to a 12VDC ignition activated power source and install an in-line fuse holder with a 10 amp fuse. A maximum of 6 inches lead length is allowed before the in-line fuse.

In-line Fuse Holder

Open

Closed

Clip-type Wire Connector with Fuse Holder

4th Option
Locate a 12VDC ignition activated existing OEM wire and splice into it (this wire would be fuse protected from the factory).

- OEM wire must be 18 gauge or heavier.
- OEM wire must be fuse protected between ten and 20 amps.
- OEM wire and fusing must be able to handle the additional load of the EDM (1 amp).
- Avoid tapping into OEM wires that are vehicle or engine critical.
- Splice joints must be adequately sealed and insulated.
  - Adhesive lined heat-shrink protected, rosin-core soldered joints are recommended.
  - Crimp or clip connectors are allowed if appropriate crimping tools are used.

G. Final Setup – Confirmation

Finally, to confirm the EDM is connected properly and functional, perform the following three steps.

1. Turn the key on the confirm all three lights illuminate solid (on older systems all lights will flash with key on).

2. With the key on and the engine off, connect to the EDM using DCI Console. Download the logfile per Step 8 in the EDM Software &

Service Tool Use Section (pg 13). The downloaded logfile should only have a few points at this time. The backpressure reading should be "0" $\pm$ 3" H_2O and the temperature reading should be near the ambient temperature (e.g. 70° F= 21°C $\pm$15°C).

> If the backpressure reads "100," check the backpressure connections and/or reconnect them, recycle the key and repeat the download process again.

> If the temperature reads "360," check the temperature connections and/or reconnect them, recycle the key and repeat the download process.

The 100 and 360 numbers above are default settings and indicate the EDM is NOT recognizing the sensor as being online.

3. With the key on, and the DCI Console connected, select Vehicle Setup and continue on to fill in the blank vehicle identification fields (VIN, DECS Serial Number, Install Date, Miles/Hours, etc.) and click "Apply."

H. Installation Checklist

❑ No dips (low spots) in stainless steel braided hose (must have an uphill path to the pressure transducer to avoid water damage)

❑ Pressure transducer threaded barb points downward ($\pm$ 45°) to avoid water damage

❑ Temperature probe wire secured at least 6" (152 mm) away from hot exhaust pipes

❑ In-Cab Display mounted in sight of the driver

❑ COMS connection on wiring harness mounted in a location that can be easily accessed by the mechanic

❑ All wire harnesses secured at least 6" (152 mm) away from high heat and moving parts

❑ All connectors mated securely. Pull on connector bodies to ensure they are locked into position. Do not pull on wires.

❑ Memory module plugged in

❑ 12V DC, 10 Amp fuse-protected, keyed power connections

❑ Any wires mounted through holes must have hole edges protected by a grommets

❑ Wires should be protected in looms

❑ Wiring between two members where relative motion can occur should be secured to each member and have enough slack to allow motion without damage to the wire

❑ At key up, all three LED lights on the In-Cab Display light solid for three seconds, on older systems lights will flash for 3 seconds

❑ Vehicle operators trained on new In-Cab Display and alerts

❑ Complete Vehicle Setup: Connect laptop with COMS port and enter information into SECM "Vehicle Setup." (VIN, Diesel Emission Control Strategy [DECS] Serial No., install date, etc.)

NOTE	Once Vehicle Setup information is entered and "Apply" is clicked, the information cannot be changed.

❑ Confirm sensors are working properly per "Final Setup" procedure.

In-Cab Display Alerts and Actions Required

After installing the new display, you will need to introduce the vehicle operator to this new device and provide training on what actions need to be taken based on the alerts the operator may encounter during vehicle operation. Consider making a copy of the light actions and descriptions table for the operator.

During vehicle start-up, the LED lights will illuminate solid as the monitor runs through a self-test (on older systems light will flash). If TEMP ALARM or SERVICE NOW (red) lights were illuminated prior to engine shutdown, they will continue to be illuminated after the self-test.

Faults should be attended to as soon as possible to protect your filter-based device.

Service Soon

Temp Alarm

Service Now

Service Soon - Steady Yellow Light

Schedule filter service once the SERVICE SOON light is illuminated to avoid having to reset any faults.

The SERVICE SOON light indicates that the filter is starting to overload with soot or ash. The filter must be serviced in the next 8 hours. You can continue to operate the vehicle with the yellow light illuminated, but you should service the filter as soon as it can practically be completed within a few days.

NOTE	This light will stay on for the duration of the key cycle once the limit is met. Older systems will only illuminate "service soon" while back pressure is applied.

The light WILL turn off automatically after the next key cycle.

Service Now - Steady Red Light

If the SERVICE NOW light illuminates the filter must be serviced within the next two (2) hours of operation or before the next working shift, whichever comes first.

The light WILL NOT turn off automatically after filter service. Either the computer link-up connection or the Diagnostic Reset Tool is required to reset this condition.

Temp Alarm - Flashing Red Light

If the vehicle is in operation and the TEMP ALARM light flashes, the operator must safely stop operating the vehicle immediately and service/inspect the filter as filter damage may have occurred.

The light WILL NOT turn off automatically after filter service. See your Filter manual for inspection guidelines. Either the computer link-up connection or the Diagnostic Reset Tool is required to reset this condition.

⚠	**Caution: No Action on Alerts May Damage Filter & Void Warranty**

Failure to take action on the In-Cab Display alerts as directed by Donaldson may damage your filter and void your warranty.

⚠	**Caution: Flashing Temp Alarm - Filter May Be Damaged!**

If the TEMP ALARM light flashes, the operator must get the filter serviced and inspected immediately. Damage may have occurred.

Alternate Flashing of Service Soon & Service Now

This light sequence indicates a problem with the wiring or connections. To diagnose, connect the EDM to a laptop using the service tool/software or use the Diagnostic Reset Tool to retrieve specific fault codes for troubleshooting.

After repairing the issue, the lights will shut off automatically after cycling power.

Resetting Lights & Retrieving the Fault Codes

There are two ways to retrieve and/or reset the lights: (1) connect the diagnostic computer link-up connection to the COMS connector; or (2) connect the Diagnostic Reset Tool to the COMS connector on the wiring harness. Instructions for using the tools are included in this manual.
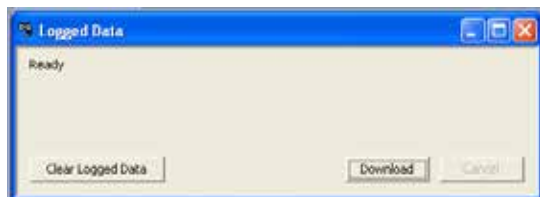
Annual Maintenance

Once a year, or whenever the filter requires service (whichever comes first)

- verify that all three EDM lights illuminate steady when key is turned on. Older systems all lights will flash when the key is turned on.
- remove backpressure line, verify that it is free of soot material or contaminant that could plug the tube. If plugged, use compressed air to clear tube.
- If the system is equiped with date and time, replace battery.
  - battery is located in the DTM assembly
  - remove cover according to direction arrow on cover
  - carefully remove battery, notice polarity
  - replace cover

Light Actions and Descriptions

Display	Lights Action	Description
Start-up	All LEDs Illuminate Steady	A self-test is performed at start-up and all lights illuminate steady for a three seconds. When done, the In-Cab Display will reveal any fault condition activated prior to shutdown. On older systems all lights will flash on start-up.
Service Soon	Steady Yellow	Filter requires service within 8 hours. This light will turn off after key cycle. This light will stay on for the duration of the key cycle. On older systems this light will only stay on while back pressure is applied.
Service Now	Steady Red	Service the filter within 2 hours of operation or before the next work shift. Reset Service Now light after Filter service.
Temp Alarm	Flashing Red	Safely stop engine immediately. An engine situation has caused elevated exhaust temperatures. Visually inspect the Filter for physical damage. If okay, service Filter and reinstall. If not, Filter will need to be replaced. Reset Temp Alarm light after Filter service.
Service Soon & Service Now	Alternate Flashing	This action indicates a problem with, filter missing, the wiring and/or connections. To diagnose, connect the EDM to a laptop using the computer link-up cable or use the Diagnostic Reset Tool to retrieve specific fault codes for troubleshooting.

EDM Software & Service Tool

For technicians to properly maintain and diagnose the Donaldson filter, the EDM software and link-up cable is needed (sold separately). The software is compatible with any Donaldson filter emissions monitor. A single software program works for any number of Donaldson EDM devices.

Service Tool Link-up Cable

Part No. X007999

Software Installation

Prior to using the service tool, install the software (DCI Console) and USB drivers on the computer that you will use to run the diagnostics.

Software, USB drivers and software install instructions (Adobe Reader PDF document) can be found at the following Donaldson web site address:
www.donaldson.com/en/exhaust/tools/index.html

NOTE	To connect to a computer using the USB port connection, the computer link-up cable (part no X007999 or X009649) must be purchased separately for the software to work.

Software trouble shooting section is located at the end of this manual.

Service Tool Use

Once the red light has been tripped, the service tool must be used to clear the faults and reset the lights. The link-up cable plugs into the USB port on your computer and the EDM main harness connector labeled "COMS".

1. Remove and save the protective cap from the COMS connector on the main wiring harness.

2. Connect computer link-up cable to EDM and USB port on the computer.

3. Turn on vehicle ignition. DO NOT start engine.

4. Open the DCI Console program.
   Go to Start/Programs/Donaldson/DCI Console

5. When the window opens, click on "Connect."

6. For systems with date/time module see below.

Date And Time

DTM System Time: November 12, 2012 13:25:01
PC System Time: November 12, 2012 12:24:39

Sync To PC Time | Enter New DTM Time | Confirm Changes | No Change

Change EDM system time to match PC time | Manually enter EDM system time | No changes, proceed to DCI console menu

DCI Console Menu Descriptions

This DCI Console menu will appear after you "Connect." See menu descriptions on the right.

Disconnect - Stops communication using console.

Connection Details - Details of your link-up, does not change.

Vehicle Setup - Records vehicle information, data fields include VIN, mileage, install date and name of installer. Once data fields have been entered, they download with file and cannot be edited.

Inspect Fault Log - Displays the last five recorded faults. Go here to clear faults.

Retrieve Logged Data - Select to download the last 500 hours of exhaust backpressure, temperature and fault code data.

7. Select "Inspect Fault Log" from the Toolbox Fault and Logged Data menu on the left side of the screen. A "Fault Status" window (example below) will appear listing the past five Fault IDs, with fault count. The EDM Fault Explanations Table on the back cover describes problems and corrective actions for Fault IDs. The fault status window also displays "Real Time" values of back pressure and EGT temperature

Fault Status

Active Faults	(None)				
Occurred Faults	(None)				
Suspected Faults	(None)				

Back Pressure	EGT Temp	EGT2 Temp			
82.000 inWC	284.000 deaC	291.000 deaC			

Fault History

FltName	RunTimeFF	FltCount	BackPress...	EGTFF	EGT2FF
None	0.000 Hr	0	0	0	0
None	0.000 Hr	0	0	0	0
None	0.000 Hr	0	0	0	0
None	0.000 Hr	0	0	0	0
None	0.000 Hr	0	0	0	0

8. To reset the red light click on "Clear Faults Related to Logging Data" in the lower right hand corner of the "Fault Status" window (not shown).

After faults have been cleared, the steady red light on the In-Cab Display should turn off. The fault history will not clear. It always retains the last five faults and will add to the fault count as more are encountered.

9. To retrieve the logfile for analysis, click on "Retrieve Logged Data" from the Toolbox Fault and Logged Data menu on the left side of the screen.

10. To extract the data, select "Download" to download the backpressure history. A comma separated value file (.csv) will be extracted for you to save on your computer. See the following page for help interpreting the logged data.

TIP	When you are asked to save the file, rename the file so you can recognize it easily; i.e., include vehicle ID or vehicle VIN and date in file name.

11. Click "Disconnect" from the Connections Control menu on the left side of the screen and close DCI Console program.

12. Turn OFF Engine Ignition

13. Disconnect computer link-up cable from EDM.

14. Reinstall the protective cap on the "COMS" connector.

Memory Module Download File Descriptions

Data Values Provided in Downloaded File

The downloaded logfile (shown below) will contain a header which displays the information entered by the user in the "Vehicle Setup" area along with a date and time stamp or time in hours indicating when the download took place. If the Vehicle Set-up information was not entered using DCI Console, the header will display defaulted values. EGT2 will only appear in logfile on dual temp systems.

The file will contain the following five separate data fields (6 fields on dual temperature version):

1. Time(secs) – Elapsed time, in hours, with the 0 point being the oldest data point in the logfile (FIFO). *Date/time will show on DTM equipped systems.*

2. EGT (degC) – Exhaust gas temperature, in ℃. EGT2 will show on dual temp systems.

3. BackPress (inWC) – Exhaust backpressure, in inches of water column.

4. Fault – Fault code number(s) indicates an active fault at that time.

5. RunTime (hrs) – Total run time of the SECM's internal hour meter since it was installed.

NOTE	Technicians can review how long faults occurred before appropriate action was taken to correct them.

Fault Explanations

See back page of this manual for a complete table of all fault codes numbers, their ID, problems and corrective actions.

Suspected Faults are real time issues the ECU is seeing. It is not until a **Suspected Fault** has occurred for 9 (nine) seconds that it becomes an **Active Fault**.

Active Faults are faults that have occurred long enough that the ECU believes them to be real and are happening in real time. These faults are recorded to the logfile and fault history.

Occurred Faults are faults that have occurred since the last key up but are no longer active.

The **Fault History** window is a running list of the last five faults that have occurred in the system, regardless of key up or fault clearing. The associated temperature and back pressure at the time of fault occurrence will be recorded along with a time stamp.

Interpreting the Logfile for Trends & Troubleshooting

Importing the Logfile into Microsoft Excel:

The Memory Module holds a large amount of data. The best way to look at trends to interpret the data is by downloading the logfile, opening the file in Microsoft Excel and creating graphs.

A Logfile Plotter is available be email request emissions@donaldson.com. Open this file and click the tab labeled "Import". A window will appear asking for the file you wish to import. Select the downloaded logfile from your computer and click "Open". The file will be automatically imported. Once the file has been imported then select "plot", a graphic display of data will be created. You will want to save this new excel file so it can be accessed again.
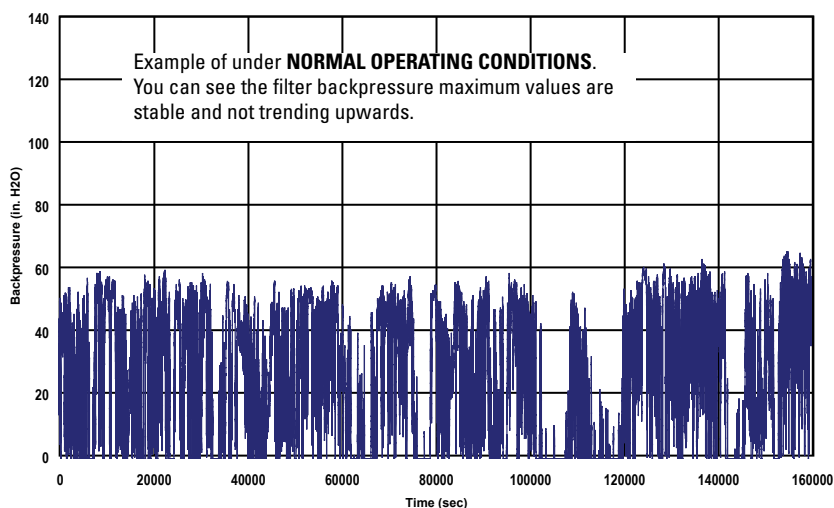
Temperature and Backpressure Interpretation:

Reviewing backpressure versus time to see the historical trend of your filter's backpressure is a good way to troubleshoot frequent plugging issues. You should see relatively level peak backpressure values that over time eventually trend upwards. You can also compare high backpressure levels to fault values. Below are examples of good and bad plots.

Temperature can be used to see historical trending. If you have frequent filter plugging, it may be related to a duty cycle change resulting in low exhaust temperatures. By looking at the historical temperature you can see if this is the case or if another issue is causing frequent plugging.

Contact Donaldson for help interpreting logfile data.

Backpressure History Graphs - Real Logfile Examples

Example of under **NORMAL OPERATING CONDITIONS**. You can see the filter backpressure maximum values are stable and not trending upwards.

Example showing a **FILTER NEEDS SERVICING**. You can see the backpressure trending upwards to the alarm point. Once a filter begins to load up the backpressure will typically trend upward fairly quickly (within a couple weeks).

Example indicates an **ENGINE ISSUE**. Notice how quickly the backpressure values increased from steady low levels and quickly shot up to high levels. This is typically caused by an engine issue that increases soot output, prematurely plugging a filter.

EDM Diagnostic Reset Tool

The Diagnostic Reset Tool (DRT) is a quick and easy way to reset faults and retrieve Fault Code Numbers from the EDM without a laptop computer. The DRT cannot be used to download the logfile from the Memory Module.

Diagnostic Reset Tool

Maintenance Tip!

The DRT permits retrieval of Fault Code Numbers from the EDM without using a laptop computer!

Diagnostic Tool Use

1. Remove and save the protective cap from the COMS connector on the EDM main harness.

2. Connect the DRT to the COMS connector

3. Turn the vehicle ignition on. DO NOT start the engine.

4. Press the button on the DRT once to retrieve Fault Code Numbers.

   a. The In-Cab Display will use the "Service Soon" light to flash 2-digit Fault Code Numbers.

   b. This code can be cross referenced with the table on the back cover to diagnose the issue.

   c. The flashing code will repeat over and over again with a 5 second delay between codes until the key is cycled or the fault is reset.

5. After retrieving the code and correcting the issue, reset the EDM using the DRT. Simply press and hold the button for 5 seconds and the fault will reset. It will not clear the logfile.

6. Turn off vehicle ignition.

7. Replace the protective cap on COMS connector.

If the issue has not been corrected, the fault light will return when the ignition is turned back on.

NOTE	For common filter service, the filter can be cleaned and the DRT can be used to reset the light quickly without the use of a laptop.

Sensor Troubleshooting

Temperature Sensor

The Temperature Sensor can be checked by applying a known temperature or ambient temperature and comparing it to real time values displayed in the fault screen of DCI Console.

Pressure Sensor

The pressure transducer can also be checked using a commercially available pressure calibrator, offered from companies including Fluke. Connect to the pressure transducer barb and place specific pressures on it and watch for the In-Cab Display response. The SERVICE SOON light should trip at around 100" H2O (7.5" Hg) and the SERVICE NOW light should trip at about 127" H2O (8.5" Hg). You must hold this pressure for about 9 seconds before the lights will trip. Real time values of pressure are displayed in the fault status screen of DCI Console.

EDM Software (DCI Console) Error Messages

Not able to connect to SECM. The "drop downs" do not appear on the left side of the DCI Console screen in the tool box menu.

If this messages appears, DCI Console must be reloaded on PC.

Note:
- Administrative rights are required on PCs to load and run console.
- Software must be loaded as a package with the ".exe" file contained in the same location as the "ecu files" & "ISSetupPrerequisites" folders.
- Separation of these files will cause incorrect loading of software.
- Detailed software install instructions can be found on the web at www.donaldson.com/en/exhaust/tools/index.html

If this messages appears, check the possible causes below.

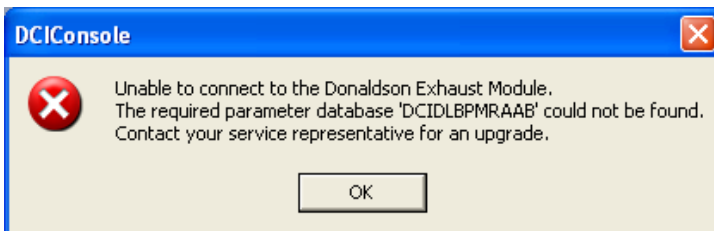| Possible Cause	Remedy
No power to vehicle	Verify that the power is on to the vehicle.
	Verify that the EDM has power. Verify that the connection from the main harness to engine has power. The lights on the monitor box should illuminated solid at key up.
	Verify the in-line fuse is still intact and has not tripped. If so, replace and try to connect.
No communication from SECM to Console.	When connecting, the "CAN" light on the link-up cable flashes a few times. This indicates the cable is sending a signal but the SECM is not communicating back.
	If there are no flashes, this is a cable or software issue. Swap out link-up tools and retry. Download new software from the Donaldson website. www.donaldson.com/en/exhaust/tools/index.html
Linked up to wrong port on BP Monitor	Verify that the Linkup cable is connected to the open "COMS" port on the EDM.
Server not running	There should be a picture of a "Satellite" on the bottom, right hand corner of the desktop.
	If the server is not running, restart the computer. Once the PC is restarted open then open DCI Console.
Faulty connection to SECM	Verify the wires in the main harness are not severed, shorted or open.
	Replace the main harness to isolate problem. If problem persists, re-install the original harness.

SECM flashed incorrectly	Verify there is a Donaldson label on the SECM.
Bent or damaged terminals	Replace specific wire harness component.
Incorrect drivers being used	Reinstall DCI Console software from Donaldson web site. www.donaldson.com/en/exhaust/tools/index.html

Able to connect to SECM and "drop downs" appear, however communication between DCI Console and SECM is intermittent and/or can not be established.
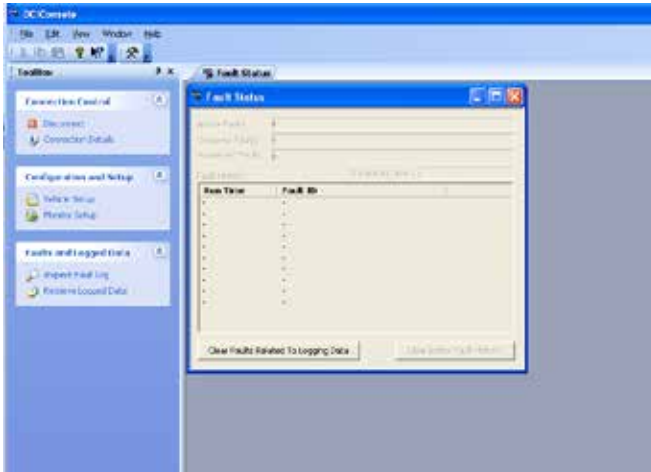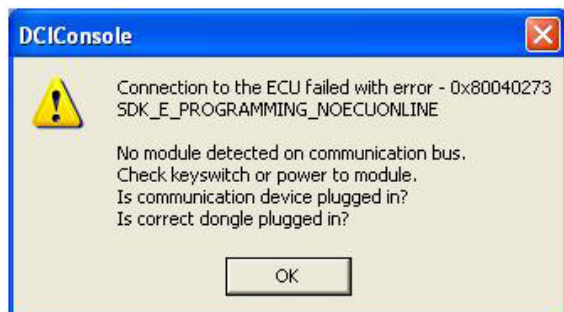

Possible Cause	Remedy
Loss of power during linkup with SECM	Verify that the vehicle key is on and there is power to the EDM.
	Verify continuity of the wire harness.
Corrupt DCI Console software	Re-install DCI Console

Not able to connect to SECM. There is a file missing on the hard drive not allowing you to connect to the SECM

Possible Cause	Remedy
"RAAB.dll" file is not in the appropriate file folder, ("RAAB" is one of many .dll files, version may vary)	Re-install DCI Console

Not able to connect to SECM. There is a file missing on the hard drive not allowing you to connect to the SECM

DCIConsole

⚠ Connection to the ECU failed with error - 0x80040273
SDK_E_PROGRAMMING_NOECUONLINE

No module detected on communication bus.
Check keyswitch or power to module.
Is communication device plugged in?
Is correct dongle plugged in?

OK

Possible Cause	Remedy
Link-up cable has failed and is faulty.	Inspect the Linkup tool and investigate continuity. Check pins on the link-up cable with pins on the male connector end.
	Verify the EDM has power..
	Try linking up to a sister vehicle with a similar EDM.

Frequently Asked Questions

Question	Answer
Filter was plugged, but the lights didn't trip.	1. Check power to the SECM, including the in-line fuse and the main harness wiring for continuity. The start up bulb check will verify proper power to system. 2. Check the connector to the in-cab display or for a broken display LED bulb. 3. Check to make sure a hole was drilled into the exhaust pipe and that the half coupling has an air tight weld around it. 4. Visually inspect hose and steel lines to make sure they are air tight and undamaged. 5. Make sure there is no dip in the braided steel line to prevent condensation build-up. 6. Check line for soot, water, or other obstructions. Clean as necessary.
After key-up, the In-Cab Display lights do not illuminate steady for 3 seconds or flashing on older systems.	1. Validate the power connection. 2. Check the in-line fuse near the SECM and the in-line fuse where power was connected to see if either has blown. 3. Check the connection between the In-Cab Display harness and the main harness. 4. Check if memory module and display are connected to main harness correctly. 5. Check that the EDM was connected to keyed power and not constant power.
"No ECU Found" error while trying to connect with DCI Console software.	1. Make sure the vehicle's key is turned on and the EDM has power to it. (All light illuminate solid on key-up will verify this, or flashing on older systems). 2. Re-install DCI Console per the software install instructions from DCI Console (at www.donaldsonexhaust.com - Diagnostic Tools).
Password prompted when I try to clear logged data.	"Clear Logged" is only for Donaldson Engineering purposes and never needs to be cleared. Use "Clear Faults" to reset the EDM faults and clear the lights.
I see both "System Voltage Input High" and/or "System Voltage Input Low" faults but the power supply to the EDM seems normal (12V DC 10 Amp).	1. Check the vehicle's alternator. When an alternator is beginning to fail it causes voltage spikes that the SECM can sense. 2. Attach your power connection to a less "noisy" source on the vehicle. 3. Check for intermittent power or ground connection.

EDM Fault Explanation Table

Fault Code Number	Fault ID	Problem	Corrective Actions
0	No faults	None	None
13	EGT Sensor Input High	The signal voltage from the sensor is out of range. Usually caused by a broken wire on the Sensor Harness, a short or unattached connector.	1. Check connectors on Sensor Harness for shorts 2. Continuity check Sensor Harness for open or shorts to other wires 3. Visually check wires for frays or breaks between probe tip and connector 4. See below for Temperature sensor testing
17	EGT2 Sensor Input High		
14	EGT Sensor Input Low	The signal voltage from the sensor is out of range. Usually caused by a broken wire on the Sensor Harness, a short or unattached connector.	1. Check connectors on Sensor Harness for shorts 2. Continuity check Sensor Harness for opens or shorts to other wires 3. Visually check wires for frays or breaks between probe tip and connector 4. See Sensor Troubleshooting section for sensor testing
18	EGT2 Sensor Input Low		
15	EGT Sensor Range High	High exhaust temperature detected that could damage filter.	Shut off vehicle and have the Filter cleaned and inspected for physical damage. Reset the "Temp Alarm" light using the Service Tool or Diagnostic Reset Tool, after corrective action and problem has been resolved.
19	EGT2 Sensor Range High		
16	Spike Detection	Temperature reading change greater than 100ºC /second	None, the software internally logs this fault and is viewable only with DCI Console.
21	Backpressure Caution Limit	Filter is nearing its service limit	Plan for Filter cleaning service within the next 8 hours.
22	Backpressure Warning Limit	Filter is in need of service	Service Filter within the next 2 hours. Reset "Service Now" light using Service Tool or Diagnostic Reset Tool, after corrective action and problem is resolved.
23	Backpressure Sensor Input High	The signal voltage from the sensor is too high. Usually caused by a shorted wire on the Sensor Harness.	1. Check connectors on Sensor Harness for shorts 2. Continuity check Sensor Harness for shorts to other wires 3. See Sensor Troubleshooting section for sensor testing
24	Backpressure Sensor Input Low	The signal voltage from the sensor is too low or nonexistent. Usually caused by a broken wire on the Sensor Harness or unattached connector.	1. Check connectors on Sensor Harness for good connection 2. Continuity check Sensor Harness for opens or shorts to other wires 3. See Sensor Troubleshooting section for sensor testing
25	Missing DPF	Filter not installed or severely damaged.	Reinstall filter or inspect for severe damage.
26	Sensor Rationality	Backpressure sense line disconnected or plugged. EGT Sensor not installed in exhaust flow.	Check for disconnected or plugged backpressure sense line. Ensure EGT sensor is properly installed.
31	DTM Dead Battery	DTM battery is loose or needs replacement	Resecure or replace battery with CR2032 lithium battery.
32	Sensor Voltage Input High	The SECM is supplying too much voltage to the sensors.	Reset the fault. If it occurs again replace the SECM.
33	Sensor Voltage Input Low	The SECM is not supplying enough or no voltage to the sensors.	Reset the fault. If it occurs again replace the SECM.
34	System Voltage Input High	Power from vehicle to the SECM is too high. Usually caused by connecting to 24vDC power or by a failing alternator.	Check the voltage supply to the SECM. Must be 12vDC keyed. Apply 24/12V converter if 24vDC was connector (converter sold separately).
35	System Voltage Input Low	Power from vehicle to the SECM is too low. Usually caused by connecting to a poor power source or by a failing alternator.	Check the voltage supply to the SECM. Must be 12vDC keyed. Check vehicle battery system for failure.
36	DTM Fault	After key-up the Memory Module did not respond, is not online, or is not installed.	1. Cycle the key to see if the fault code returns. 2. Make sure Memory Module is plugged into the main harness 3. Check the connection and connector where the Memory Module plugs into the main harness.
37	Memory Module Fault		

EGT = Exhaust Gas Temperature

IOM P484891, Revision 4
December, 2012