
INSITE™ Professional
INSITE™ Lite
INSITE™ RSGR

INSITE™ Help User's Manual

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Getting Started

What is INSITE

INSITE is a Windows software application that works with Cummins electronic control modules (ECMs) to diagnose and troubleshoot engine problems, store and analyze historical information about an engine, and modify an engine's operating parameters. INSITE Professional also enables you to download calibrations to an ECM.

You use INSITE on a Windows based PC that is attached to an ECM through a Cummins approved datalink adapter.

Note: After registering your copy of INSITE and connecting to an ECM data source, INSITE enables you to retrieve current or recorded data about an engine, alter ECM settings, store data for viewing at a later time, and analyze data to monitor and assess the operation of your engine.

Note: You may also be required to Log In before INSITE opens, depending on your system configuration.

Registering INSITE™

About

Before INSITE™ can be used, it must be registered with the nearest Cummins® distributor and a **Basic** password must be obtained. The **Basic** password provides read-only access to INSITE™, and does not expire. In order to have full access to all INSITE™ features, a functionality password is required. This password must be renewed annually.

When contacting the local Cummins® distributor, have the INSITE™ PCID available. It will be used to register the computer and to generate the required passwords.

Note: To obtain contact information for the nearest Cummins® distributor either visit the Cummins® web site (<http://www.cummins.com>) or call the INSITE™ Technical Support Center at 1-800-433-9341 or 1-812-377-8136 and select option 2.

Perform the following steps when using INSITE™ for the first time on a computer:

1. Log into the Windows account that will be used to access INSITE™. This will help prevent unnecessary INSITE™ PCID transfers.
2. Launch INSITE™. A window will appear that recommends logging into the Windows account that will be used to access INSITE™.
3. Select **OK** to continue. The **Cummins® INSITE™ Registration Required** window will appear. This window will display the INSITE™ PCID and will have fields available to enter the **Basic** password.
4. Select **Cancel** to close the window and exit INSITE™.
5. With the INSITE™ PCID available, contact the nearest Cummins® distributor to obtain a **Basic** and, if desired, functional password.
6. Enter the **Basic** password into the fields provided.

7. Select **OK** to close the widow. A window will appear confirming that the **Basic** password has been accepted and asks if a functionality password should be entered.
8. If INSITE™ is to be used in read-only mode, select **No**. An additional window will appear stating that no functionality password has been entered. Select **OK**. The window will close and INSITE™ will open in read-only mode.
9. To add a functionality password, select **Yes**. The **Cummins® INSITE™ New Functionality Password** window will appear. Enter the functionality password into the fields provided and select **OK**. The window will close and INSITE™ will open with the registered level of functionality.

INSITE™ functionality can be added or upgraded at any time and must be renewed annually. To add or renew a functionality level password, perform the following steps:

1. Select **Tools > Options** on the menu bar. The **Options** window will appear.
2. Select **Security** in the navigation tree to view the **Security: Tool Functionality** page.
3. Select the **Add** button. The **New Functionality Password** window will appear.
4. Enter the functionality password into the fields provided.
5. Select **OK**. The **New Functionality Password** window will disappear. The Tool Level and its expiration date will be displayed on the **Security: Tool Functionality** page.
6. Select **OK** to close the **Options** window.

The Help System

Help Window

The INSITE Help window is split into two frames:

- The left frame contains the Contents, Index, and Search tabs. Click a tab to bring it to the front.
- The right frame displays Help topic information, based on the topic selected from the tab in the left frame.

Use the buttons at the top of the Help window to Hide or Show the left frame, move Back and Forward through the topics you have already viewed, or Print a Help topic.

Help Links

Links within the Help system take you to other Help topics that are related to the topic you are reading. Click on a link to view related Help.

Links can be one of several types:

- Jumps and popup links are displayed blue and underlined. Click [here](#) to see an example jump, or click [here](#) to see an example popup. Note: After a jump or popup link has been clicked once, its color changes.
- Expanding Help is displayed using arrows:  and .

When you click on text that is preceded by , the arrow changes to  and the text expands to reveal more Help content. You can click on the  to collapse the expanded text.

Note: Some Help topics include the ability to expand all text marked by  and collapse all text marked by .

To view Help topics that are related to the one you are viewing, click the Related Topics button , then select a new topic in the list. If there is only one related topic, it opens automatically.

Looking at INSITE™

The INSITE Window

About

When you open INSITE, the working area of the INSITE window contains two sections:

- The Viewbar is displayed on the left side of the INSITE window. This is a special toolbar that enables you to display ECM data in the View window by simply clicking an icon.
- The View window occupies the right side of the INSITE window. It serves as a "workspace" to contain the windows and dialog boxes that you use to interact with an ECM data source or view ECM history data.

The INSITE window can be customized for the task you are trying to accomplish. Using menu commands, toolbar buttons, Viewbar icons, and right-click mouse functionality, you can open and close various elements within the main window.

Other components of the INSITE window include the menu bar, toolbar, and status bar.

The Viewbar

On the left side of the screen, the Viewbar displays a series of icons. Each icon represents a feature of INSITE™ and can be selected to open the feature.

Note: Some icons may display blank windows when selected, depending on which ECM data source is connected.

The feature names are displayed with the icons by default, but may be hidden. To hide or display the feature names, perform the following steps:

- Select **Tools > Options** on the menu bar. The **Options** window will appear.
- Select **General** in the navigation tree to view the **General** page.
- Select or deselect the **Display Feature Names** checkbox as desired.
- Click **OK** to close the **Options** window and apply the selection.

The Viewbar itself may be hidden or displayed by selecting or deselecting **View > Viewbar** from the Menu bar.

The following icons are available in the Viewbar:

- Connect to ECM
- Fault Codes
- Data Monitor/Logger
- ECM Diagnostic Tests (See Running Diagnostic Tests in the Contents tab, if available.)
- Advanced ECM Data (See Advanced ECM Data in the Contents tab, if available.)
- Features and Parameters

- Calibration Selection(INSITE Professional only)
- Work Orders
- Trip Information (See Viewing Trip Information in the Contents tab, if available.)
- Audit Trail
- Inquire Data Extraction
- OBD Monitors (See **OBD Monitor Analysis** in the Contents tab, if available.)

The View Window

The View window, or "INSITE workspace", displays on the right side of the INSITE window.

It is used to contain ECM and INSITE data windows, including work orders, fault data, monitoring and testing data (if available), trip information (if available), features and calibration settings, Inquire Data Extraction data, advanced ECM data (if available), the audit trail, and INSITE Options.

Note: Some INSITE functions are not available for all ECMs, as indicated by "if available" above.

INSITE™ Windows

Working with INSITE Windows

The individual windows within the View window can be resized, moved, closed, and reopened, depending on your preferences or the tasks you are performing.

► Resizing

There are several ways to resize a window within the INSITE View window:

- Use the mouse to "grab" an edge or a corner of the window, then drag the mouse until the window is the desired size. See the note below before attempting to resize a window.
- If available, use the Minimize and Maximize buttons in the upper right corner of a window to shrink or enlarge the window. Minimized windows are displayed as small bars at the bottom of the View window, where you can move them around as desired.

Most INSITE windows open in the View window maximized; they fill the View window completely. To be able to view two or windows simultaneously, click the Restore button  at the top right corner of any open window within the View window. This downsizes all open windows in the View window, enabling you to move them around individually.

The Fault Codes and Audit Trail windows behave somewhat differently: when opened they are "locked" (docked) on the bottom edge of the View window. You can resize only their height, using the procedure above.

► Moving

You can move a window within the INSITE View window by clicking in the window's title bar and then dragging the window with your mouse.

Note: The Fault Codes and Audit Trail windows are "locked" (docked) on the bottom left edge of the View window; they can not be moved.

► Closing and Reopening

Use the Close button  to close a window. To reopen the window, use the corresponding button on the Viewbar.

Data Entry Techniques

About

These data entry techniques are commonly used in INSITE:

- Type in data by positioning the cursor in a data entry box.
- Select a value in a spin box  by clicking on the up or down arrow until the value that you want displays. Entries in spin boxes have pre-set values for you to choose from.

You can also type data directly into the data entry area of a spin box.

- Click a dropdown list button  to display a list of entries and then click on an entry in the list to select it.
- Click in a check box  to turn it ON or OFF (enable or disable it). A check mark displays in the check box when it is ON. You can check as many check boxes as you want in a list of options.
- Click on a radio button  to turn it ON or OFF. A radio button is filled in with a dark circle when it is ON. You can select only one radio button in a list of options.

Using the Toolbar to Choose Commands

Use the toolbar at the top of the main INSITE window to perform common INSITE tasks. The buttons available on the toolbar vary according to the task you are performing. See Toolbar Buttons for more information.

To perform a task from the toolbar:

- Click on the desired button.

The corresponding task begins, just as if you had chosen it from a menu or the Viewbar.

Note: Buttons may be disabled (grayed out) if the function is not currently available.

Status Bar Information

About

The narrow bar at the bottom of the main INSITE window displays general instructions along with information related to ECM data source connections.

- Message Line
- Datalink Activity
- ECM Data Source
- Data Logging Activity

Note: You can turn the status bar on and off by selecting or deselecting it on the View menu.

Menus to Choose Commands

About

One of the ways to open and close INSITE windows or perform common tasks is by selecting commands from the menus on the menu bar.

To choose a command from a menu:

1. Click on a menu name to display a pulldown menu with a list of commands.

You can also press the ALT key while typing the underlined letter in the menu name. For example, press ALT + T to display the **Tools** menu.

1. Choose a command from the menu by clicking on it.

You can also type the underlined letter in the command name, and the corresponding view or sub-menu displays. For example, type P on the **Tools** menu to open the **ECM Passwords** window.

Note: Menu commands may be disabled (grayed out) if the command is not available or does not apply to the function being performed with INSITE.

When Options are Disabled

About

INSITE data and commands are sometimes disabled, or grayed out. When data is grayed out it can be viewed only; it can not be changed. When a button or menu command is grayed out, it can not be used.

There are several reasons why items may be grayed out:

- You are not attached to an ECM.
- The attached ECM does not support this function.
- The calibration of the attached ECM does not support this function.
- A Tool Functionality password is required.
- An ECM password is required.
- The proper type of data is not active to perform the function.
- You are viewing ECM image data.

INSITE automatically recognizes the attached ECM's type, calibration, and features, and grays out or removes any unusable options for the ECM.

Also, INSITE enables only those commands that are supported by your assigned user rights. If an ECM password is required to perform a function, you must be logged on (connected) to INSITE using the correct password. If you have questions about user rights or Tool Functionality passwords, talk with your system administrator or Cummins distributor.

Closing INSITE™

To close INSITE™:

Perform one of the following actions:

- Click the Close  button at the upper right corner of the main INSITE™ window.
- Select **Exit** on the **File** menu.
- Press and hold the **Ctrl** key then press **F4**.

A Dialog box will appear that reads "You are attempting to close INSITE™. Do you want to exit INSITE™?".

Select **Yes** to exit INSITE™, or **No** to return to INSITE™.

If **Yes** is selected, the INSITE™ application will disappear and a dialog box will appear that reads "Please wait while INSITE™ shuts down. This will take 10 to 20 seconds. Do **not** shut down the computer until this window disappears.

INSITE™ Connection

Connecting INSITE™

Connecting your PC to an ECM

Before you can use INSITE to communicate with an ECM, you must connect your PC to the ECM.

Note: You do not need to be connected to an ECM to use the INSITE Simulator or to view ECM images.

To connect your PC to an ECM:

1. Use a Cummins compatible datalink adapter.
2. Connect the PC to the datalink adapter using either a 9-pin serial cable or a USB Cable.
3. Connect the datalink adapter to the vehicle or engine using the appropriate cable supplied in the adapter kit
4. If the datalink adapter connector in the vehicle is a 2-pin Weather Pack or 3-pin Deutsch connector, connect the 12/24V DC power cable (C) to the cigarette lighter plug in the cab. If the datalink adapter connector in the cab is a 6-pin Deutsch, 9-pin Deutsch, or an 8-pin Amp, the power is drawn through the datalink adapter connector.
5. Run the Connection Wizard to configure INSITE for your specific datalink adapter connection.

Note: Refer to the Connection Wizard section, later in this document, for instructions in using the Connection Wizard.

Connection Options

To communicate with an ECM or an ECM simulator, you must establish a connection with the data source. There are two ways to do this.

Note: To connect to an ECM image, you must use the Work Orders window.

Using the Status bar to select a connection option

This is the simplest method for connecting.

1. Click the dropdown box on the Status bar to view a list of all currently available connection options.
2. Click on the connection options you want to use, or click Add New to create one.
 - If you click Add New, the Connection Wizard Opens.
 - If you select an existing connection options list, the Connect window is displayed. Continue with Steps 3 and 4 below.
3. In the Connect window, use one of these steps:
 - If you are connecting to a new ECM or an ECM without existing ECM passwords, select None in the Security Type: dropdown list. After you are connected in Step 4, you have complete access to all INSITE functionality. If you then want to define ECM security type passwords, select ECM Passwords on the Tools menu.

- If you are connecting to a password-protected ECM, select a security type in the dropdown list and enter the corresponding password for that type.
4. Click Connect.

Note: You can use the Properties button to rename the connection or change other details for the connection, if desired.

The Work Order Wizard is automatically displayed for you to create a work order for the selected connection.

Note: You can disable the Wizard from starting automatically by unchecking the Enable Work Order Mode checkbox in the Work Orders page of the Options window.

Using the Menu bar to select a connection option.

Alternatively, you can use the menu bar to establish a connection.

1. On the Tools menu, select Connect to ECM. The Connect dialog box displays.
2. Click Connect. INSITE uses the connection option currently displayed on the Status bar.

If you want to select a different connection option, you should connect using the Status bar as described above.

1. Follow steps 3 and 4 in “Using the Status bar to select a connection option” to connect.

New Connection

Use the connection wizard to set up new connection option.

To start the Connection Wizard

1. Select Add New in the status bar dropdown list or, on the File menu, select Add New Connection from the Connections submenu.
2. Click Next in the Wizard Welcome screen to begin configuring your connection.

Note: Refer to the Connection Wizard section, later in this document, for instructions in using the Connection Wizard.

Setting Passwords

ECM Passwords

About

ECMs are shipped from the factory with all ECM passwords disabled. The decision to use ECM passwords depends on the policies of the company or the vehicle owner. The engine and vehicle must be stopped before ECM passwords can be Added, Changed, Locked, Unlocked, Disabled or Removed.

Note: If the User Manager feature has been enabled, certain users may not have the authority to Add, Change, Disable, or Remove passwords. This authority depends upon the rights granted to the user.

Each ECM can have up to five types of ECM passwords:

Master Password

The Master password controls access to all password-protected functions in the ECM except for OEM and OEM 2 password-protected features. The Master password controls changes to features and parameters, sending templates to an ECM, calibrating an ECM, and resetting ECM data.

Unlocking the Master password also allows changes to the Adjustment and Reset passwords. The ECM must have a Master password before an Adjustment or Reset password can be entered.

Adjustment Password

The Adjustment password controls access to the functions that adjust settings in an ECM. This includes changes to the adjustable parameters and sending templates to the ECM.

Reset Password

The Reset password controls the ability to perform the various resets in INSITE™.

Note: Inactive Fault Codes can be reset even if the ECM is locked with either a Master or Reset password.

OEM and OEM 2 Passwords

The **OEM** and **OEM 2** passwords control access to certain functions and adjustable parameters in the ECM. The functions and adjustable parameters related to this password are specified in the engine calibration. These passwords can only be used if they are supported in the calibration.

Add

Before an ECM can be locked, a password must be added. A password can contain up to six characters and can include letters A through Z and the numbers 0 through 9. A password cannot include any special characters or spaces. Passwords are not case sensitive. A Master password must be added before an Adjustment or Reset password can be added.

To add a password:

1. Select **Tools > ECM Passwords...** from the menu bar. The **ECM Passwords** window will appear.
2. Select the security type in the **Passwords:** box
3. Enter a password in the **New Password:** box.
4. Confirm the new password by retyping it in the **Confirm Password:** box.
5. Select **Apply** to add the new password and continue working with passwords or select **OK** to add the new password and close the window. Functionality for the selected security types is now password enabled in INSITE™.

Note: After a password has been added to an ECM, that password will lock when INSITE™ disconnects from that ECM.

Lock

Once an ECM password has been added, that password may be locked at any time while INSITE™ is connected to the ECM. The ECM may be unlocked while INSITE™ is connected to the ECM or during the connection process.

Note: After a password has been added to an ECM, that password will lock when INSITE™ disconnects from that ECM.

To lock a password:

1. Select **Tools > ECM Passwords...** from the menu bar. The **ECM Passwords** window will appear.
2. Select the security type in the **Passwords:** box. (Add colons after Passwords and wherever else needed)
3. Select the **Lock** button. Access to functions and adjustable parameters related to the selected security type is now password protected.
4. Select **OK** to close the **ECM Passwords** window or return to step 2 to lock additional passwords.

To unlock a locked password while connected to an ECM:

1. Select **Tools > ECM Passwords...** from the menu bar. The **ECM Passwords** window will appear.
2. Select the security type in the **Passwords:** box.
3. Enter the password in the **Enter Password** box.
4. Select the **Unlock** button. Access to functions and adjustable parameters related to the selected security type is now permitted.
5. Select **OK** to close the **ECM Passwords** window or return to step 2 to unlock additional passwords.

To unlock a locked password while connecting to an ECM:

1. Follow normal procedures for connecting INSITE™ to an ECM.
2. When the Connect window appears, select the desired password type from the **Security Type** dropdown menu.
3. Enter the password for the selected password type.
4. Select **Connect**. INSITE™ will connect to the ECM and the selected password type will be unlocked.

Change

An ECM password can be changed without having to disable and re-enter a new password. A password must be unlocked to be changed.

Note: The password must be unlocked before it can be changed.

To change an ECM password:

1. Select **Tools > ECM Passwords...** from the menu bar. The **ECM Passwords** window will appear.
2. Select the security type in the **Passwords:** box.
3. Enter a new password in the **New Password:** box.
4. Confirm the new password by retyping it in the **Confirm Password:** box.
5. Select **Apply** to change the password and continue working with passwords or select **OK** to change the password and close the window. Functionality for the selected security type(s) is now password enabled in INSITE™ with a new password.

Disable

When a password is no longer needed it can be disabled or removed.

Note: The password must be unlocked before it can be disabled.

To disable a password:

1. Select **Tools > ECM Passwords...** from the menu bar. The **ECM Passwords** window will appear.
2. Select the security type in the **Passwords:** box.
3. Select the **Disable Password:** button.
4. Select **Apply** to disable the password and continue working with passwords, or select **OK** to disable the password and close the window.

To re-enable a password for the security type, see **Add**.

Remove

If an ECM password has been added and the password is then lost, that password can be removed using the ECM Password Removal feature. Using this feature will require purchasing ECM Password Removal counts from the nearest Cummins® distributor. These are also known as ZAP-IT counts. There are two type of counts; **ECM Password Removal** and **OEM, ECM Password Removal**. **ECM Password Removal** counts will remove the Master, Adjustment, and Reset passwords. **OEM, ECM Password Removal** counts will remove all passwords from the ECM.

When contacting the local Cummins® distributor, have the INSITE™ PCID available. The distributor will provide an 18-character password that adds the purchased counts.

Note: To obtain contact information for the nearest Cummins® distributor either visit the Cummins® web site (<http://www.cummins.com>) or call the INSITE™ Technical Support Center at 1-800-433-9341 or 1-812-377-8136 and select option 2.

To add ECM Password Removal counts:

1. Select **Tools> Options** on the menu bar. The **Options** window will appear.
2. Select **ECM Password Removal** in the navigation tree to view the **ECM Password Removal** page. The number and types of ECM Password Removal counts, if any, are displayed in this window.
3. Select the **Add** button. The **Enter New Password** window will appear.

4. Enter the password into the fields provided.
5. Select **OK**. The **New Functionality Password** window will disappear and the counts added by the password will be displayed in the **ECM Password Removal** page.
6. Select **OK** to close the **Options** window or return to step 3 to add additional ECM Password counts.

To remove ECM and OEM passwords:

1. Select **Tools> ECM Password Removal...** on the menu bar. The **ECM Password Removal** window will appear. This window is also called the **ZAP-IT** window.
2. Select the type of ECM Passwords to be removed.
3. Select **ZAP-IT**. The **ECM Password Removal Confirmation** window will appear.
4. Select **Yes** and follow the prompts to remove the ECM passwords.
5. The **ECM Password Removal** window will display the number of counts remaining, if any.
6. Select **Cancel** to close the **ECM Password Removal** screen.

Note: When removing passwords from a multi-module engine, one password removal count is required for each ECM.

PowerSpec Authorization

About

Note: PowerSpec is not available for some ECMS.

PowerSpec is an online web application (<http://www.powerspec.cummins.com>) that can be used to configure your engine's ECM settings. In order to control the use of PowerSpec, the PowerSpec End-User Authorization and PowerSpec Password are used along with standard ECM password security.

To configure PowerSpec:

1. On the **Tools** menu, select **PowerSpec** to open the **PowerSpec** window.
2. Click the **PowerSpec End-User Authorization** checkbox to allow PowerSpec to modify parameters in the ECM. Clear the checkbox to prevent PowerSpec from modifying parameters in the ECM.

Note: Even if PowerSpec is disabled in INSITE, Cummins distributors and authorized dealers can still use PowerSpec to modify an ECM. Both INSITE and PowerSpec can enable or disable this feature.

1. If you enable a PowerSpec password, it must be used to download and modify parameters in the ECM using PowerSpec.

The process of creating, changing, or disabling a password is the same as used for ECM Password configuration.

Note: Enabling a PowerSpec password does not restrict users from accessing the ECM via INSITE. Both INSITE and PowerSpec can modify the password.

Three conditions will prevent users from using PowerSpec to modify parameters in an ECM:

- PowerSpec End-User Authorization is disabled (unless the user is a Cummins authorized distributor or dealer).
- A PowerSpec password is set in the ECM but is not known by the user.
- A Master password is set in the ECM but is not known by the user.

Using Task Wizards

INSITE Wizards

About

Wizards help you set up or configure common tasks in INSITE. A sequence of wizard "pages" prompt you for necessary information, or you are shown preconfigured options to choose from.

The following Wizards are available to help you configure INSITE tasks:

- Connection Wizard
- Work Order Wizard
- ECM Diagnostic Tests Wizard

Select a wizard from the Contents tab for more information.

Connections Wizard

Connection Wizard

About

The Connection Wizard is used within INSITE™ to configure an ECM or ECM Simulator connection. The connection settings include selecting a datalink adapter, the computer port and the datalink protocol. The Connection Wizard will allow the creation of as many connections as necessary. There are three options within Connection Wizard.

- **Auto Configure** requires that the computer be connected to an ECM. The wizard will automatically detect and display all successful configurations. The desired configuration can be selected, named and saved.
- **Datalink Adapter** is a manual process. A connection can be defined by stepping through a series of drop-down menus to select the datalink adapter vendor, the specific adapter, the computer port, and the datalink protocol. Once the options have been selected, the connection can be named and saved.
- **Simulator** allows the configuration of a virtual connection to a simulated ECM. This can be used for training or familiarization.

Defining a Connection using Auto Configure:

1. Ensure that the Datalink Adapter driver has been installed, the Datalink Adapter is connected to a J1939 or J1708 communication network, the Datalink Adapter is connected to the computer, the key switch is on, and that power is supplied to the Datalink Adapter.
2. Open the ECM Connection Wizard. Either select Add New from the Connection Type dropdown list or select File > Connections > Add New Connection from the Menu Bar.
3. When the ECM Connection Wizard window opens, select Next.
4. Select Auto Configure from the Connection Type window. Then select Next.
5. Select Start in the Auto Configure window. The wizard will attempt to detect successful configurations using all installed Datalink Adapter drivers and available communications ports. During the process, the progress bar will display blue. Select Stop at any time to end the process.
6. When the process finishes, the progress bar will turn either red or green.
7. If the progress bar turns red, Auto Configure was not able to find a connection. To view the list of configurations attempted, select the Details button. This will open a window with the list of attempted configurations. Troubleshoot the datalink connection and select Start to retry, or select Back to return to the previous screen.
8. If the progress bar turns green, Auto Configure detected one or more successful configurations. Select Next to proceed.
9. All successful configurations found will be displayed. If more than one configuration is displayed, select the desired configuration. Select Next to proceed.
10. Specify a name for the connection. A default name is provided, but it may be changed if desired. Select Next to proceed.

11. A connection has now been defined. The screen will display two check boxes. Select the upper box to make this connection active or select the lower box to setup another connection. Select Finish.

Defining a Connection using Datalink Adapter

1. Ensure that a Datalink Adapter driver has been installed.
2. If desired, connect the Datalink Adapter to a J1939 or J1708 communication network. Connect the Datalink Adapter to the computer, ensure that the key switch is on, and that power is supplied to the Datalink Adapter.
3. Open the ECM Connection Wizard. Either select Add New from the Connection Type dropdown list or select File > Connections > Add New Connection from the Menu Bar.
4. When the ECM Connection Wizard window opens, select Next.
5. Select Datalink Adapter from the ECM Connection Type window. Select Next to proceed.
6. On the Connection Settings window, select the desired Datalink Adapter Vendor from the top dropdown menu. The dropdown menu will include vendor names for all installed datalink adapter drivers.
7. From the second dropdown menu, select the desired Datalink Adapter to be used in the connection.
8. If Computer Port options are available, select the preferred Computer Port.
9. Finally, select the preferred Datalink Protocol.
NOTE: The Auto Detect option will attempt to connect using J1939 protocol. If J1939 is not found it will attempt to connect using J1708 protocol.
10. If the computer is connected to an ECM, the connection may be tested by selecting the Datalink Adapter Connection Test button.
11. Select Next to proceed.
12. Specify a name for the connection. A default name is provided, but it may be changed if desired. Select Next to proceed.
13. A connection has now been defined. The screen will display two check boxes. Select the upper box to make this connection active or select the lower box to setup another connection. Select Finish.

Defining a Virtual Connection using Simulator

1. Open the ECM Connection Wizard. Either select Add New from the Connection Type dropdown list or select File > Connections > Add New Connection from the Menu Bar.
2. When the ECM Connection Wizard window opens, select Next.
3. Select Simulator from the ECM Connection Type window. Select Next to proceed.
4. A list of available ECM Simulators will be displayed in the Simulator Connection Settings widow. Select the desired ECM Simulator then select Next to proceed.
5. Specify a name for the connection. A default name is provided, but it may be changed if desired. Select Next to proceed.
6. A connection has now been defined. The screen will display two check boxes. Select the upper box to make this connection active or select the lower box to setup another connection. Select Finish.

ECM Connection Type

About

Use the ECM Connection Type page to select the type of connection you want to configure. The Wizard automatically detects your connection hardware and displays only the options that apply to your hardware configuration. Unavailable options are grayed out.

The possible connection options are:

- Cummins Adapter
- RP1210A
- USB
- Simulator

The Wiizard screen that displays next depends on the type of connection you select. Click on the links above to continue with Help for the type of connection you want to configure.

Note: Direct USB to ECM connections are possible only with specific engine ECMS manufactured in 2002 or later. If you would like to configure a USB connection, please consult your Cummins distributor.

Configuring a Cummins Adapter

About

Use the Serial Connection Settings page to choose settings for the Computer Port, Datalink Adapter, and Datalink Protocol based on your system configuration.

Note: USB connections do not require a datalink adapter to connect to an ECM.

The Datalink Protocol is automatically selected for you based on the Datalink Adapter that you select.

- If you choose INLINE as the datalink adapter, J1587/J1708 will be displayed as the Datalink Protocol. No other protocol options are available from the drop down list.
- If you choose INLINE I as the datalink adapter, J1587/J1708 will be displayed as the Datalink Protocol. No other protocol options are available from the drop down list.
- If you choose INLINE II/III as the datalink adapter, Auto Detect will be displayed as the Datalink Protocol. No other protocol options are available from the drop down list.

After defining the settings, Click Next to name the new connection. You can modify the name for the connection you choose or accept the default.

Click Next to complete the connection setup.

Configuring an RP1210A Connection

About

Use the **RP1210A Adapter Type** page to select an RP1210A configuration to use. Use the **Adapter Name**, **Adapter Description**, and **Protocol** columns to help select the correct configuration.

After selecting a configuration, click Next to complete the Wizard.

Note: The options in the configuration list are based on hardware drivers that must be installed on your PC. If no drivers are installed, a message will be displayed that advises you to install them. Consult your system administrator or Cummins distributor for further assistance.

Configuring a USB Connection

About

Universal Serial Bus (USB) connections are an alternative to serial connections on contemporary PCs. USB connections do not require a datalink adapter to connect to an ECM. Your PC must be USB-compatible and you must have a correct USB cable to use this option.

The Connection Wizard enables you to define a descriptive name for the USB connection. After typing a name or accepting the default, click Next to complete the connection setup.

Note: USB connections are possible only with ECMS manufactured in 2002 or later. If you would like to configure a USB connection, please consult your Cummins distributor.

Configuring a Simulator Connection

About

Use the Simulator Connection Settings page to select an ECM that you want to run in Simulator mode.

Select an ECM from the list and click Next to complete the connection setup.

Note: You can modify the name for the Simulator connection or accept the default.

Completing the Wizard

Complete

After configuring the type of connection that you are adding, the **Completing the ECM Connection Wizard** page displays.

- If you want to activate the connection and connect INSITE to the ECM, click the applicable checkbox.
- If you want to set up another connection, click the applicable checkbox.
- If you want to activate the connection **and** set up another one, click both checkboxes.
- If you do not want to activate the connection or set up another one, leave both checkboxes empty.

Click **Finish**. The new connection name displays in the connections list on the Status Bar.

Work Order Wizard

About

A work order is used to retain information about repair activity in a specific service shop location. It is recommended that you use work orders for each engine maintenance or repair job that you perform.

Note: Work orders are optional and are not required when working on an ECM.

The work order wizard can be configured to start automatically when you connect to an ECM or to an INSITE Simulator. Open the Work Orders page in the Options window and select Enable Work Order Mode if you want the wizard to start automatically.

You can also start the wizard manually any time you want to create a new work order, however you must be connected to an ECM.

Note: New work orders are automatically active in the Work Orders window.

To start the work order wizard manually

1. Click the Work Orders icon on the Viewbar.
2. From the File menu, select New > Work Order, or click the New Work Order button on the toolbar, or use the Work Orders right-click menu.
3. The New Work Order window opens.

Note: Work orders are similar to jobs in previous versions of INSITE, but with an important difference: an ECM image (snapshot) is not automatically captured after parameter modifications. This significantly improves INSITE's performance, and you can still choose to capture an ECM image at any time.

Data Entry

The New Work Order window contains identifying information about the engine or vehicle. You must be connected to an ECM data source to create a work order.

- Some of the required information is read from the ECM and automatically entered in the data fields. These fields cannot be edited, and are identified by the  icon.
- You can modify other information as described below, if desired. These fields are identified by the  icon.

Note: Whenever you create a new work order, an Initial ECM image is also created automatically.

To enter or change information

1. Double-click in a value cell (Note: Some cells cannot be edited, as described above.)
2. Type the applicable information.
3. Select another cell for editing, or click OK to proceed to work order and image creation. Optionally, you can choose to Print the work order and/or enter any descriptive notes in the Technician's Note box before clicking OK.

A work order contains the following information:

Summary Information

Work Order Number

A unique identifier for this work order. A default number beginning with W is displayed, based on the date and time. You can overwrite this number with up to 24 characters, including letters, numbers, or special characters.

Note: By default, INSITE uses the same number for a work order and its corresponding ECM images and ECM templates. However it differentiates between them using the prefix W, I, or T. For example Work Order W1234 would correspond to ECM Image I1234 and Template T1234 by default.

System Type

This box is not used for work orders, but is subsequently used to identify the type of image.

 **Customer Name**

The full name of the customer or company.

 **Customer Contact**

The name of the person who is the key contact for the work order.

 **Technician Name**

The name of the signed-on user when the work order was created. This name displays for reference only; it can not be changed.

 **Service Site Location**

The location where activity on this work order occurs.

 **Start Repair Date**

Today's date, or the date the work order was created.

 **Last ModifiedDate**

The date of the most recent change to the work order.

 **Vehicle Information**

 **Make**

The original equipment manufacturer of the vehicle, read from the ECM. Data entered here is saved with the work order, however it does not change ECM data.

 **Model**

The model name or number of the vehicle, read from the ECM. Data entered here is saved with the work order, however it does not change ECM data.

 **Unit Number**

A unique vehicle identifier assigned by the customer.

 **Identification**

The vehicle identification number (VIN) for this vehicle, read from the ECM. You can enter your own ID to identify this vehicle. Data entered here is saved with the work order, however it does not change ECM data.

 **Odometer**

The current vehicle odometer reading. Data entered here is saved with the work order, however it does not change ECM data.

 **Engine Information**

 **Make**

The manufacturer of this engine, read from the ECM. Data entered here is saved with the work order, however it does not change ECM data.

 **Model**

The model name or number of this engine, read from the ECM. Data entered here is saved with the work order, however it does not change ECM data.

 **Serial Number**

The unique serial number for this engine, read from the ECM. Data entered here is saved with the work order, however it does not change ECM data.

ECM Serial Number

The unique serial number of the ECM. Data entered here is saved with the work order, however it does not change ECM data.

The following fields define properties of the image that is created along with the new work order. These properties can be referenced later from an image's right-click menu.

Image-[ECM type]

Image Name

The name that will be automatically assigned to the image, based on the work order name. You can change the image name here.

System Type

This field always indicates "Initial" during work order creation.

Start Repair Date

The date that the Initial image is being created.

File Location

The location on your PC where the image will be stored. This location can be changed only in the Options window.

Note: The file name retains the original identification number associated with the Work Order, Image or Template.

Image Information

When a work order is created or closed, an ECM image is also recorded. This page of the Work Order Wizard contains identifying information about the ECM image.

This information is optional, however it is recommended that you complete all the data fields or accept the defaults. If you are connected to an ECM, some information is read from the ECM and automatically entered in the data fields.

To enter or change information

1. Double-click in a **Value** cell.
2. Type the applicable information, as described below.
3. Select another cell for editing, or click **Finish** to view the new work order and ECM image in the **Work Orders** window.

Image information includes the following:

Name

A numeric identifier for this image. The number begins with I by default, and the numeric characters are identical to the ones used for the corresponding work order. For example ECM Image I1234 would correspond to Work Order W1234 by default.

Date::Time

Today's date, or the date the image was created.

ECM Type

The type of Cummins ECM in use, such as ISB, ISM, etc.

ECM Diagnostic Tests Wizard

About

To perform ECM diagnostic tests:

- Click **ECM Diagnostic Tests** on the Viewbar.

The **ECM Diagnostic Tests Wizard** window is displayed. The Wizard lists all tests available for the connected ECM. This list will vary depending on the connected ECM.

- If the connected ECM does not have any diagnostic tests available, the **ECM Diagnostic Tests Wizard** window will display the reason.

Using the Wizard

1. From the list of available tests, double-click on the desired test or highlight it and click **Next**.
2. Depending on the test, instructions and test options may be displayed.
If a warning is displayed, follow the instructions carefully to ensure satisfactory and safe completion of the test.
Selecting the **Show** text on the test instructions box will cause a pop-up dialog box to appear displaying the complete instruction list.
3. Click **Start** to begin testing or **Stop** to end testing.

If desired, INSITE™ Data Monitor/Logger can be used to monitor the engine while the test is running.

For Help with a specific test, select F1 when in the test or refer to the **Running Diagnostic Tests** section of the Help contents.

Managing Repair History Data

Work Orders

About

Work Orders are used to record and view information about the ECM history enabling technicians to reference previous ECM settings. Work Orders contain one or more images that contain a snapshot of all INSITE™ accessible data.

The Work Orders window is used to manage Work Orders, Images and Templates. The Work Order window has an upper and lower section. The upper section shows Work Orders and summary information. The lower section shows Templates.

Select Work Orders from the Viewbar to open the Work Orders window. When connected to an ECM or Simulator, INSITE™ will only display the work orders and images associated with that specific Engine Serial Number and it will only show Templates for that ECM type. If not connected, all Work Orders and Templates will be displayed.

Work Orders are initially sorted by the Last Modified Date, with the most recent Work Orders at the top. The list may be resorted by the values in any of the columns. To resort either list, click on the column header. The table will be resorted based on the selected column in ascending order. Click on the column header again to resort the table again in descending order. Columns may be moved by selecting the column header and dragging it to the desired location.

INSITE™ can be configured to automatically start the Work Order creation process when connecting to an ECM or Simulator by enabling the Work Order Mode. Work Order Mode will also start the image creation process before disconnecting from an ECM or Simulator. The Work Order creation will be started automatically but it can be cancelled if Work Order is not desired. Perform the following steps to enable or disable Work Order Mode:

1. Select **Tools > Options** from the Menu Bar.
2. When the Options window appears, select Work Orders from the left side of the screen.
3. When the Work Order screen is displayed, select or deselect the Enable Work Order Mode check box as desired.
4. Enter a Service Site Location.
5. Select OK to close the window.

Create

Perform the following steps to manually create a Work Order:

1. Connect to an ECM or Simulator.
2. Perform one of the three steps below to start the New Work Order process:
 - Open the Work Orders window from the view bar, right click in the upper window and then select **New Work Order** from the menu.
 - Select the **New Work Order** icon from the toolbar.
 - Select **File > New > Work Order...** from the menu bar.

3. A New Work Order window will appear on the screen. This window contains the properties that describe the Work Order. Update property values and enter **Technician's notes** as desired.
4. Select OK.
5. INSITE™ will create a Work Order and an Image.

Note: Work orders may be created at any time while connected to an ECM or Simulator.

Right Click Menu

In the Work Orders window, right-click on a work order to perform other activities associated with the selected work order(s).

Note: To perform actions on multiple work orders at the same time, press CTRL on the keyboard and then use the mouse to select the desired work orders.

A popup menu displays the following options:

New Work Order

Select this option to open the Work Order wizard and create a new work order.

Delete Work Order(s)

Select this option to delete all data records associated with the selected work order(s)..

Note: Once deleted, Work Orders and their Images cannot be recovered.

Make Active

Select this option to activate a work order other than the current work order. When new Images are created, they are attached to the active Work Order.

New ECM Image

Select this option to create an ECM image of the selected work order.

Import Image

Select this option to import a saved image file into the **Work Orders** window.

Expand

Select this option to expand the selected work order to view its associated ECM images. Work Orders may also be expanded by selecting the  icon to the left of the Work Order name.

Note: To expand all work orders, right click in a column heading and select Expand All.

Collapse

Select this option to collapse the selected work order, hiding its associated ECM images. Work Orders may also be collapsed by selecting the  icon to the left of the Work Order name.

Note: To collapse all work orders, right click in a column heading and select Collapse All.

Print Work Order(s)

Select this option to print one or more work orders.

Properties

Select this option to view details about the Work Order. These details were created or edited when the Work Order was created or modified. Unlocked fields may be edited by

double-clicking in the edit box and typing new data. Information may be added to the Technician's Notes by clicking inside the box.

Parameters

The upper section of the **Work Orders** window contains a table that displays summary information that was recorded when the Work Orders and Images were created. The table has seven columns, explained below, and one row for each Work Order.

Work Orders/ECM Images

This column displays the Work Order Name. When creating a Work Order, a default name is provided, but it can be changed if desired. The default name is "WO-" followed by the year, month, day, hour, minute, and second the work order was created. (Example: WO-20090520-150532 was created on May 20th, 2009 at 3:05:32 pm.)

System Type

This column displays the system type obtained from the ECM.

Customer Name

This column displays the Customer Name retrieved from the System ID and Dataplate.

Vehicle Unit Number

This column displays the Vehicle Unit Number retrieved from the System ID and Dataplate.

Start Repair Date

This column displays the date and time that the first image was created in the work order.

Last Modified Date

This column displays the date and time that the most recent image was created in the work order.

Engine Serial Number

This column displays the Engine Serial Number retrieved from the System ID and Dataplate.

ECM Images

About

An ECM image is a snapshot of all INSITE™ data from a single ECM. This includes data available within Features and Parameters, Advanced ECM Data, Data Monitor/Logger, Fault Codes, Trip Information and the Audit Trail. ECM Images are attached to Work Orders. There can be several ECM Images within a single Work Order. ECM Images can be used to compare settings and values at two points in time or can be used to create an ECM Templates. An ECM Image can be viewed by connecting to or printing it. If Work Order Mode is enabled, ECM Images are created when connecting to and disconnecting from an ECM or Simulator. They can also be manually created.

ECM Images are managed in the upper section of the Work Orders window. They are displayed under their associated Work Orders.

Perform one of the steps below to display images under a specific Work Order:

- Double-click on the desired Work Order.
- Right-click on the desired Work Order and select Expand from the menu.
- Select to the left of the desired Work Order.

To display all ECM Images, right click on the column header line above the Work Orders and select **Expand All** from the menu.

Parameters

Each image is displayed with the following information:

▶ Work Orders/ECM Images

This column displays the Image Name from the New ECM Image dialog box. When creating an image, a default name is provided, but the technician may replace the name, if desired. The default value is "I-" followed by the year, month, day, hour, minute, and second the work image was created. (example: I-20090520-150532 was created on May 20th, 2009 at 3:05:32 pm.)

▶ System Type

This column displays one of the three values:

- Initial — This is the first Image created in a new Work Order or the first Image created after connecting to an ECM when Work Order Mode is enabled.
- User — These are Images created by the technician after the initial Image.
- Final — This is the Image captured immediately before disconnecting from an ECM when Work Order Mode is enabled.

▶ Customer Name

This field is left blank in an Image row.

▶ Vehicle Unit Number

This field is left blank in an Image row.

▶ Start Repair Date

This field is left blank in an Image row.

▶ Last Modified Date

This column displays the date and time that the Image was created.

▶ Engine Serial Number

This field is left blank in an Image row.

Right Click Menu

In the **Work Orders** window, right-click on an ECM image to perform other activities associated with the selected image.

Note: To perform actions on multiple images at the same time, press CTRL on the keyboard and then use the mouse to select the desired images.

A popup menu displays the following options:

▶ Connect to Image

Note: Select this option to connect INSITE™ to the selected Image. Once connected, all data contained within the image will be available to view in INSITE™.

Note: Selecting this option will automatically disconnect any existing ECM connection.

▶ Convert to Template(s)

Select this option to convert the selected image into a template. A New ECM Template dialog box will appear. The ECM Template Name and the System Comments can be edited.

Export Image(s)

Select this option to export selected images. An Export Location dialog box will appear. Select the desired file location and file name. The file will be saved in that location as an Exported Image File (.eif). This file may be imported into INSITE™ and viewed at a later date. Multiple images can be exported by holding the Ctrl key while selecting the images to be exported.

Note: Exported Image Files (.eif) may also be opened by double-clicking on the exported image. INSITE™ will open and display the selected Work Order Image.

Export Image(s) to external file

Select this option to export selected Images to a Comma Separated Values file (.csv). An Export Location window will appear. Select the desired file location and edit the file name, if desired. The default name "I-" is followed by the year, month, day, hour, minute, and second the work order was created. (Example: I-20090608-151806 was created on June 6th, 2009 at 3:18:06 pm.) The file may be viewed using third party software applications including Microsoft Excel. Comma Separated Values files cannot be imported back into INSITE™.

Print ECM Image(s)

Select this option to print selected images. Multiple images can be printed by holding the Ctrl key while selecting the images to be printed. When printing multiple images, the print procedure will be performed for each image.

- A Print ECM Images window will appear. All Features will be selected for printing and will appear in the right-hand window.
- Add or Remove individual features to or from the Selected Features list by selecting the feature and then selecting the "<->" and ">->" buttons.
- Add or Remove all features to or from the Selected Features list by selecting the "<<->>->" buttons.
- Choose Tool Display Format or Text Only Format by selecting the appropriate radio button. Tool Display Format prints the data as displayed in INSITE™. Text Only Format prints the data in table format.
- Select OK, and then proceed through the print wizard steps.

Note: Depending upon the number of features selected, the print-outs will be several pages in length.

Delete Image(s)

Select this option to delete selected images. Multiple images can be deleted at once by holding the Ctrl key while selecting the images to be deleted.

Properties

When this option is selected, an Image Properties dialog box will appear. This box will display the same information as the New Image dialog box. The **Image Name**, and the **Technicians Notes** may be edited.

Create

If Work Order Mode is enabled, ECM Images are created when connecting to and disconnecting from an ECM or Simulator. They can also be manually created. Perform the following steps to creating an ECM Image:

1. Connect to an ECM or Simulator.
2. Open the Work Order Window. Images can only be created while in the Work Order window.

3. If no Work Order is active, make a Work Order active or create a new Work Order. The **New ECM Image** window is displayed, listing details that will be recorded about the image for later reference. You can change the default Image Name if desired, otherwise the new image will use the same numeric identifier as the work order but with an "I" prefix.
4. Perform one of the steps below to start the Create ECM Image process:
 - Right-click on the active Work Order name in the upper section of the Open the Work Order window, then select New ECM Image from the menu.
 - Select the New ECM Image icon from the toolbar.
 - Select File > New > ECM Image from the menu bar.
5. A New ECM Image window will appear on the screen. This window contains the properties that describe the image. Update adjustable property values and enter **Technician's notes** if desired.
6. The Print button may be selected to print the Image properties.
7. Select OK. INSITE™ will create an ECM Image.

ECM Templates

About

Templates provide a convenient way to configure multiple ECMS using the same engine settings. An ECM can be adjusted to the required specifications for a fleet. An Image of that ECM can be created and converted into a template. The Template is then applied to other ECMS in that fleet, saving the time it would have taken to manually configure each ECM.

Templates are based on an existing ECM image but it contains only the adjustable Features and Parameters that can be modified within INSITE™. Templates can be created without being attached to an ECM or Simulator since they are created from an Image.

Parameters

The lower section of the **Work Orders** window contains a table that displays summary information that was recorded when the Templates were created. The table has six columns explained below and one row for each template.

➤ ECM Template

This column displays the ECM Template Name from the New Work Order window. When creating an ECM Template, a default Template Name is provided, but it can be edited. The default name is "T-" followed by the year, month, day, hour, minute, and second that the template was created. (Example: T-20090520-150532 was created on May 20th, 2009 at 3:05:32 pm.)

➤ System Type

This column displays the engine marketing name obtained from the ECM.

➤ Module Type

This column displays the ECM name obtained from the ECM.

➤ System Comment

This column displays any information that was entered into the System Comments box when the Template was created or modified.

➤ Date and Time

This column displays the date and time that the Template was created.

Origin

This column displays name of the Image used to create the Template.

Right Click Menu

Right-click on an ECM template(s) to perform other activities associated with the selected template(s).

Note: To perform actions on multiple templates at the same time, press CTRL on the keyboard and then use the mouse to select the desired templates.

A popup menu displays the following options:

Send to ECM

Select this option to apply the template values to an ECM.

Export Template(s)

Select this option to export a template. An Export Location window will appear. Select the file location and edit the file name, if desired. The file will be saved in that location as an Exported Template File (.etf). This file can then be imported into another PC that has INSITE™ .

Import Template(s)

Select this option to import a Template. An Import Location window will appear. Use the "Look in" dropdown menu to browse to the location of the Template File. Double-click on the desired file, or highlight it and select the Open button.

Print Template(s)

Select this option to print selected Template(s).

Delete Template(s)

Select this option to delete selected Template(s).

Properties

Select this option to view Template details. These details were created or edited when the image was created or modified. The ECM Template Name may be edited by double-clicking in the edit box and typing the new name. Information may be added to the System Comments box by clicking inside the box.

Create

Perform the following steps to create a Template:

1. Open the Work Orders window.
2. Expand a Work Order in the upper section of the Work Orders window.
3. Highlight one or more ECM Images. Multiple Images can be selected by holding the Ctrl key while selecting the Images to be converted.
4. Perform one of the following three steps to start the Template conversion process:
 - Select **Convert to Template(s)** from the right click menu.
 - Select the **Convert to Template** icon from the toolbar.
 - Select **File>Convert>ECM Template** from the Menu bar.
5. A New ECM Template window will appear on the screen. This window contains the properties that describe the Work Order. Update property values and enter **Technician's notes** as desired.

6. The Print button may be selected to print the Template properties prior to creating the template. The information will be sent to the PC's default printer.
7. Select OK.
8. INSITE™ will create the Template.
9. The new Template will be listed in the lower section of the Work Orders window.

Exporting and Importing

ECM Templates may be transferred between PCs by exporting and importing them.

Perform the following steps to export a template:

1. Open the Work Orders window.
2. Highlight one or more Template(s). To select multiple Templates, hold the CTRL key and highlight the desired Templates.
3. Perform one of the steps below to start the export process:
 - Select **Export Template(s)** from the right click menu.
 - Select **File>Export>Template** from the Menu bar.
4. An Export Location pop-up window will appear. Select the desired file location and edit the file name if desired. If multiple Templates are being exported, the export Location window will appear for each Template.
5. Select the Save button. The file will be saved in that location as an Exported Template File (.eft).

Perform the following steps to import a template:

1. Open the Work Orders window.
2. Perform one of the steps below to start the import process:
 - Select **Import Template(s)** from the right click menu while the cursor is in the Template section of the screen.
 - Select **File>Import>Template** from the Menu bar.
3. An Import Location pop-up window will appear. Select the file location. All templates files (.eft) will be displayed.
4. Select the desired template. If the desired Template is not displayed, verify the location of the file and perform step 3 again.
5. Double-click on the desired file, or highlight it and select the Open button. The Template will be displayed.

Adjustable Engine Features

Engine Feature Settings

About

Use the Features and Parameters window to enable or disable specific features associated with the current ECM data source connection, and to set the operating parameters, or values, for those features. It is especially important to use this window when setting up a new engine, after an ECM is re-calibrated, or when changing the use of a vehicle.

A PC must be connected to an ECM to change features and parameters. If your PC is not connected to an ECM, you can view the saved features and parameters for an ECM image. You can also view simulated features and parameters settings in Simulator mode.

Before changing ECM parameters

To open the Features and Parameters window:

- Click Features and Parameters on the Viewbar.

The features listed in the Features and Parameters window depend on the type of connected ECM data source. For help with a specific feature, and you are connected to an ECM, expand Features and Parameters in the Help Contents tab and select the feature name.

Note: Features & Parameters is not displayed in the Help Contents tab if you are not connected to an ECM.

Click here for help on viewing, enabling, and adjusting features and parameters.

Right Click Menu

In the **Features and Parameters** window, right-click anywhere with your mouse to perform activities associated with features, parameters, or the window display.

A popup menu displays the following options:

▶ **Find**

Select this option to search for a specific parameter that you want to view or change. This may be quicker than expanding features to locate the parameter.

▶ **Send To**

▶ **ECM**

Select this option to send features settings adjustments to the ECM. Be sure you are connected to an ECM before selecting this option.

▶ **Printer**

Select this option to send features settings to a printer. Be sure you are connected to a printer before selecting this option.

▶ **Expand**

Select this option to expand the selected feature.

Note: To expand all features, right click in a column heading and select Expand All.

► Collapse

Select this option to collapse the selected feature.

Note: To collapse all features, right click in a column heading and select Collapse All.

► Restore Original Value

Select this option to undo a change you made to a selected feature or parameter setting while the **Features and Parameters** window has been open.

► Restore All Original Values

Select this option to undo all changes you made to parameter settings while the **Features and Parameters** window has been open.

► Refresh

► All

Select this option to all refresh parameter settings from all connected ECMS.

► Selected Item

Select this option to refresh settings for the selected parameter.

► Selected ECM

Select this option to refresh all parameter settings from the selected ECM. If only one ECM is in use, this option is grayed out.

► Limits

Select this option to view the range, or possible maximum and minimum limits of the selected parameter in the **Parameter Limits** window. This option may not be available for all parameters.

Note: A slightly different popup menu is displayed when you right click in the top row (the heading row) of the Features and Parameter list. This menu also enables you to expand and collapse all features at once, and also to resize one or more columns in the window.

Viewing and Adjusting

The **Features and Parameters** window displays engine features and their associated parameters in a tree similar to Windows Explorer. To view parameters and their current settings or to change settings, expand and collapse features by clicking **[+]** and **[-]** for each feature. If multiple ECMS are in use, features and parameters are grouped for each module.

Note: Before changing ECM parameters

► To change a parameter value

► If it is a number value

Double click on the ECM parameter value that you want to change and type the new value, or use the spin box to change the value.

► If it is a text value

Double click on the ECM parameter value that you want to change and use the keyboard to edit the current text.

► To enable or disable a feature or parameter

Click in the **Enable** (or **Disable**) box, then click the drop down list button to select either **Enable** or **Disable**.

Note: Some parameter values use Yes and No rather than Enable and Disable.

After changing a parameter value

If you change a parameter, the original value from the ECM is displayed in the **Original Value** column for reference.

To send any changes to the ECM, click the **Send To ECM** button on the toolbar or select **Send To > ECM** on the right-click menu. All values displayed in the **Original Value** column are erased when you send changes to an ECM.

To resize column width

Use your mouse to click and drag a column header edge to resize it, or double-click on a column divider to auto-size the column. You can also right-click on a column header and select auto-size column or auto-size all (columns).

The status of features and parameters can be identified by their icons.

Right-click anywhere in the window with your mouse to perform other activities associated with features and parameters.

For help with a specific engine feature, expand the Features & Parameters "book" in the left side of this Help window and select the feature name.

Finding a Feature or Parameter

If you want to view a specific feature or parameter but don't want to browse the entire list in the **Features and Parameters** window, you can use Find to locate it. Right-click anywhere in the **Features and Parameters** window to open the **Find** window.

Use the options in the window to narrow your search:

1. In the **Find What:** box, enter keyword text or the parameter value you are looking for.
2. In the **Find In:** box, use the dropdown list to select the column to search.
3. Select whether to search the entire list, or down the list from the currently selected feature.
4. Optionally, select whether the case must match what you type in the **Find What:** box.

After specifying the desired search criteria, click **Find Next**. The first occurrence of the **Find What:** criteria will be highlighted in the list of features and parameters. Click the **Find Next** button as often as necessary to find more occurrences of the **Find What:** criteria.

Toolbox

 A toolbox represents a feature. The toolbox opens  when you select a feature with your mouse. You can expand and collapse the feature's parameter list by clicking  and .

 A locked toolbox indicates that the feature is disabled because of OEM security or user access privileges.

 A screwdriver represents a parameter. The screwdriver switches direction  when you select a parameter with your mouse.

 A locked screwdriver indicates that the parameter is disabled because of OEM security or user access privileges.

Note: You can perform other functions related to features and parameters by right-clicking anywhere in the Features and Parameters window.

System ID & Dataplate

Calibration Information

▶ Feature Description

Calibration Information parameters provide identifying information about the calibration associated with the current ECM data source connection..

▶ Adjustable Parameters

▶ Calibration Time Date Stamp

The time and date when the calibration originated.

Note: The ECM value displays for reference only - it can not be changed.

▶ Calibration Voltage Range Low

The lowest voltage at which this calibration can operate.

Note: The ECM value displays for reference only - it can not be changed.

▶ Calibration Software Phase

The calibration identification number. Calibration Software Phase is displayed as AAXXYYZZ, where:

1. AA = Marketing phase
2. XX = Software release level
3. YY = Software Release Level continued
4. ZZ = Software Release level continued

So, for example, 08000010 would be read as phase eight, zero, zero, 10.

Note: The ECM value displays for reference only - it can not be changed.

▶ Calibration Voltage Range High

The highest voltage at which this calibration can operate.

Note: The ECM value displays for reference only - it can not be changed.

▶ DO Option

A number that identifies calibration components.

Note: The ECM value displays for reference only - it can not be changed.

▶ ECM Code

A code that identifies a unique calibration.

Note: The ECM value displays for reference only - it can not be changed.

▶ Other Options

Additional information that describes this calibration.

Note: The ECM value displays for reference only - it can not be changed.

SC Option

A number that identifies calibration components.

Note: The ECM value displays for reference only - it can not be changed.

Customer Information

Feature Description

Customer Information parameters provide identifying information about the customer associated with the current ECM data source connection.

Adjustable Parameters

Customer Location

The geographic location of the customer. This information displays on reports and is stored with each work order you create.

The service location is especially useful if your shop has multiple sites and you need to identify job data by location.

Customer Name

The full name of the customer who purchased the engine.

Customer Unit Number

A unique vehicle identifier assigned by the customer.

ECM Information

About

Feature Description

ECM Information parameters provide identifying information about the ECM associated with the current ECM data source connection.

Adjustable Parameters

ECM Option

The ECM manufacturer's code.

Note: The ECM value displays for reference only - it can not be changed.

ECM Serial Number

The ECM serial number.

Note: The ECM value displays for reference only - it can not be changed.

ECM Part Number

The part number of the ECM.

Note: The ECM value displays for reference only - it can not be changed.

ECM Product ID

A unique product identifier for the ECM.

Note: The ECM value displays for reference only - it can not be changed.

ECM Voltage Range High

The highest voltage at which the ECM can operate.

Note: The ECM value displays for reference only - it can not be changed.

ECM Voltage Range Low

The lowest voltage at which the ECM can operate.

Note: The ECM value displays for reference only - it can not be changed.

Engine Information

About

Feature Description

Engine Information parameters provide identifying information about the engine associated with the current ECM data source connection.

Adjustable Parameters

Engine Make

The name of the original engine manufacturer.

Note: The ECM value displays for reference only - it can not be changed.

Engine Model

The name of the engine model.

Note: The ECM value displays for reference only - it can not be changed.

Engine Build Date

The date the engine was manufactured.

Engine Serial Number

The unique serial number for the engine.

System Information

About

Feature Description

System Information parameters provide technical information about the vehicle or equipment associated with the current ECM data source connection.

Adjustable Parameters

Advertised Power at RPM

The horsepower rating for this engine.

Note: The ECM value displays for reference only - it can not be changed.

Advertised PowerRPM

The RPM at which the horsepower rating is determined.

Note: The ECM value displays for reference only - it can not be changed.

Governed Speed

The maximum engine speed for this engine.

Note: The ECM value displays for reference only - it can not be changed.

Fuel Code (FC)

A code that identifies specific fuel system parameters.

Note: The ECM value displays for reference only - it can not be changed.

Peak Torque at RPM

The maximum engine power (rotational force) measured in foot-pounds.

Note: The ECM value displays for reference only - it can not be changed.

CPL

A code that identifies emissions critical parts of the fuel system.

Note: The ECM value displays for reference only - it can not be changed.

Peak Torque RPM

The RPM at which the peak torque rating is determined.

Note: The ECM value displays for reference only - it can not be changed.

Torque Rise

The rise in torque between the rated engine speed and the maximum torque.

Note: The ECM value displays for reference only - it can not be changed.

Vehicle Information

About

Feature Description

Vehicle Information parameters provide identifying information about the vehicle or equipment associated with the current ECM data source connection.

Adjustable Parameters

OEM Name

The name of the original vehicle or equipment manufacturer.

OEM Vehicle or Equipment Model

The type of chassis.

Vehicle Identification Number (VIN) or Equipment Serial Number

The unique vehicle identification number (VIN) for this vehicle, or equipment serial number.

Vehicle or Equipment Year

The year the vehicle or equipment was manufactured.

ICON™ Idle Control System

Feature Description

This feature can reduce idle time and keep the engine in a ready-to-run state while the vehicle is unattended or the driver is sleeping. The engine will be automatically started and shut down to maintain block temperature, battery voltage level, and cab temperature. An alarm is sounded before an automatic engine start to alert persons who may be in the immediate area that the engine is about to start.

There are three modes of ICON operation:

- **Engine Mode** - This mode monitors engine block temperature and battery voltage levels. If the oil temperature drops below 60F or battery voltage falls below 12.2 Volts, the engine will be started. The engine will continue to run for a time determined by the ECM and shut down when the oil temperature reaches 120F and battery voltage level reaches 13.5 volts.
- **Cab Comfort Mode** - This mode provides all the functions of Engine Mode plus the ability to maintain a desired cab temperature. This mode requires that a thermostat and ambient Air Temperature sensor be installed by the OEM. In this mode the cab thermostat is set to the desired temperature by the operator. The engine will be started and shut down automatically as necessary to maintain oil temperature, battery voltage levels, and cab temperature.
- **Mandatory Shutdown Mode** - When ICON is enabled in the ECM but not activated by the vehicle operator, shutdown mode activates when the vehicle is left to idle. Shutdown mode will shut down the engine after a specified amount of time as defined by the Idle Shutdown feature.

Adjustable Parameters

ICON - Idle Control System

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Cab Thermostat Installed

Select **Enable** only if a cab thermostat is installed on the vehicle, otherwise select **Disable**.

Idle Speed Adjustment

The speed the engine will run while ICON is activated. ICON uses its own idle speed, giving the operator flexibility to select an idle speed that works the best for a particular vehicle chassis.

For example, the normal engine idle speed setting may cause a vibration in the chassis that would be unacceptable to someone sleeping in a cab while ICON is activated. The operator could have a technician set an ICON idle speed that eliminates the chassis vibration.

Driver Activation/Deactivation

To activate ICON, perform the following steps:

1. Idle the engine. Do not turn on PTO, or touch the accelerator.
2. Set the parking brake.
3. Place the transmission in neutral.
4. Make sure the hood is closed.
5. Turn the cruise control switch from the OFF position to the ON position. If the switch is already in the ON position it must be turned OFF and then back to ON. The ICON lamp then starts flashing rapidly to let the operator know that it is ready to be activated.
6. While depressing the clutch pedal, shift the transmission into gear, then back to neutral and release the clutch pedal. The ICON lamp flashes at a slower rate than it did in step 5, letting the operator know that ICON is activated.
7. ICON is now set for Engine Mode operation. If you want the Cab thermostat to control engine startup and shutdown in addition to oil temperature and battery voltage levels, turn on the cab thermostat and set it to the desired temperature.

To Increase ICON idle speed, depress the accelerator pedal. Engine RPM will increase 12.5 RPMs for each second the accelerator pedal is depressed.

To decrease ICON idle speed, depress the clutch pedal. Engine RPM will decrease 12.5 RPMs for each second the clutch pedal is depressed.

To activate Cab Comfort Mode, turn on the cab thermostat.

Setting the Cab Thermostat

To enter the cab thermostat trim mode, first turn on the key switch. Press the UP or DOWN buttons on the cab thermostat 7 times while the software version is flashing on the cab thermostat display. You have 10 seconds to perform this process.

Once in the trim mode, UP will increment through the trims and DOWN will decrement through the trim modes. Select the trim desired to adjust by using the UP and DOWN buttons. Press enter to change the trim or enable. Use the UP and DOWN buttons to change the temperature values. Use the UP or DOWN button to enable or disable the items that are not temperature settings. To exit the Thermostat mode, press ON/Mode.

1. Extreme Hot - Default setting 100F

Below this ambient (outside air) temperature, if the cab temperature does not reach the desired set point within 45 minutes, or if sending an engine start request within 10 minutes of an engine stop request, an E3 fault (Fault code 469) will be logged. If the ambient temperature is above this temperature setting, an E3 fault will not be generated.

2. Extreme Cold - Default setting 0F

Above this ambient (outside air) temperature, if the cab temperature does not reach the desired set point within 45 minutes, or if sending an engine start request within 10 minutes of an engine stop request, an E3 fault (Fault code 469) will be logged. If the ambient temperature is below this temperature setting, an E3 fault will not be generated.

3. Auto Heat - Default setting 60F

Below this ambient (outside air) temperature, the thermostat will default into heat mode when ICON is activated and the cab thermostat is on.

4. Auto Cool - Default Setting 85F

Above this ambient (outside air) temperature, the thermostat will default into cool mode when ICON is activated and the cab thermostat is on.

5. Disable heat - Default Setting 80F

Above this ambient (outside air) temperature, the operator will not be able to activate the heat mode. **Note:** If the ambient air temperature is between the auto heat and auto cool temperature settings, the operator must manually select cool or heat mode if desired.

6. Disable Cool - Default Setting 60F

Below this ambient (outside air) temperature, the operator will not be able to activate the cool mode.

7. Response to E3 Fault - Default Setting - Enabled

If the thermostat logs an E3 fault, enabling this trim will cause the engine to cycle between 20 minutes running and 15 minutes shutdown regardless of the cab temperature. By disabling this trim, the engine will not restart regardless of cab temperature.

8. Alarm in Cab Comfort Mode - Default Setting - Enabled

Enabling this trim will allow the Engine Start Alarm to sound prior to any auto start of the engine. Disabling this trim will turn off the Engine Start Alarm when in Cab Comfort Mode

9. Unused

10. Unused
11. Unused
12. Temperature Scale - Default Setting - Fahrenheit
Allows for changing between Fahrenheit and Celsius temperature scales
13. Unused
14. Unused
15. Pre-Lube Enable - Default Setting - Disable
If the vehicle is equipped with a pre-lube system, this trim configures the ICON system appropriately.
16. Reset to Defaults
This resets all thermostat trims back to the factory default settings.

Interaction with other Features and Parameters

ICON requires that the Idle Shutdown feature be enabled.

The following features cannot be used at the same time as ICON, because of hardware and software limitations. INSITE will prevent these features from being turned on simultaneously.

- Starter Lockout
- RoadRelay Anti-theft Automatic mode
- Electronic Air Compressor Governor
- Fan 2
- Vehicle Speed Sensor type "None"

Special Instructions

In Order for ICON to operate, the following hardware must also be installed on the vehicle. If any one of these devices is not in the correct state (ie. hood is closed, parking brake set, transmission in neutral), ICON will not operate.

- **Parking Brake Switch** - A safety switch that is in-line with the parking brake hand valve, indicating that the parking brake has been set. ICON will not start the engine or allow it to run if the parking brake is not set.
- **Hood Tilt Switch** - A safety switch that indicates when the hood or cab is NOT in the closed position. ICON will not start the engine or allow it to run if the hood or cab is not in the closed position.
- **Neutral Position Switch** - A safety switch that indicates if the transmission is in neutral or in gear. ICON will not start the engine or allow it to run if the transmission is not in neutral.
- **Starter Relay** - Used by ICON to engage the starter. The ECM uses this relay to start the engine automatically without the need to manually start the engine.
- **Ignition Bus Relay** - Used by ICON to control power to the OEM ignition circuit. Typical controls on this circuit are dash controls such as heater and air conditioner blower motors. Since ICON starts and stops the engine while the ignition key remains on, it must also turn power on and off to these dash controls using the ignition bus relay.
- **Engine Start Alarm** - Prior to an ICON-controlled engine start, the engine start alarm will sound if enabled. This warns anyone near the engine that it is about to start. This alarm provides adequate time to move away from locations that could cause personal injury when the engine starts.

- **Cab Thermostat** - Optional. Allows the operator to set the desired temperature inside the cab. When the temperature is higher or lower than the temperature thresholds, the thermostat commands the ICON system to start and run the engine until the desired cab temperature has been reached.

As when setting normal idle speeds, the higher the ICON idle speed is set, the more fuel will be consumed when ICON starts and runs the engine. The ICON idle speed should be set as low as possible to maintain oil temperature, battery voltage, or cab temperature. This will help minimize fuel consumption while ICON is running the engine.

Disadvantages

The following situations may occur:

- Engine does not start with ICON activated because one or more of the pre-conditions (activation criteria) have not been met. Check the settings in INSITE.
- Engine starts automatically when ICON is active, but the driver is not aware that ICON is installed.

Visual Aids

None

Accelerator Interlock

Feature Description

This feature allows the engine to be kept at idle whenever an interlock switch is activated and the engine is not running in PTO (or remote PTO) mode.

When this feature is enabled, all accelerator input is disregarded and the engine runs at idle speed.

Adjustable Parameters

Accelerator Interlock

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column..

Accelerator Interlock Switch Setup

Defines whether an Open or Closed Accelerator Interlock Switch will activate the Accelerator Interlock feature.

Active Open will disable the accelerator when the accelerator interlock switch is open. Active Closed will disable the accelerator when the accelerator interlock switch is closed (grounded).

Driver Activation/Deactivation

The driver will normally activate this feature by turning a switch on or off. This switch may be incorporated into the door of a bus, for example, or another device on the vehicle.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

A failure in the interlock switch will hold the engine at idle speed.

For example a bus uses this feature while the bus door is open to keep the engine at a constant idle speed. Once the door is closed the accelerator pedal function should resume, however if the interlock switch fails the engine will run only at idle speed.

Visual Aids

None

Accelerator Maximum Manual Switch

Feature Description

This feature allows the operator to temporarily set the maximum vehicle speed limit by using a switch, typically the Cruise Set/Resume switch.

For example if a driver reaches a construction zone where the speed limit has decreased, the driver can adjust the maximum vehicle speed to the new speed limit. Once out of the construction zone the driver can then set the maximum vehicle speed back to the pre-programmed maximum vehicle speed.

The maximum vehicle speed limit cannot be adjusted to exceed the pre-programmed maximum vehicle speed. To make adjustments to the road speed, the Cruise On/Off switch must be in the Off position.

Adjustable Parameters

Accelerator Maximum Manual Vehicle Switch

Select the feature name to enable or disable the feature using the dropdown list in the ECM Value column.

Switched RSG

Enabling this parameter will allow the vehicle speed to be limited by the Maximum Allowable Vehicle Speed Two limit when a driver has activated the cruise set/resume switch instead of the Accelerator Maximum vehicle speed limit.

Maximum Allowable Vehicle Speed Two

The maximum vehicle speed possible when Switched RSG has been enabled and the driver has activated the cruise set/resume switch.

Driver Activation/Deactivation

The feature can be activated by the driver when the set/resume switch is toggled and will allow the maximum vehicle speed to be adjusted up or down. If the vehicle application supports Cruise Control, the maximum vehicle speed can be adjusted when the Cruise On/Off switch is in the Off position. The Cruise Switch Usage parameter can change how the switch operates when using this feature.

When Set/Accelerate (Resume/Coast) is selected and the Cruise On/Off switch is off, the Set position will increase the maximum vehicle speed to the pre-programmed limit. The Resume

position will decrease the maximum vehicle speed. The maximum vehicle speed can be decreased to the minimum cruise speed limit, which is typically 30 mph and not adjustable.

When Set/Coast (Resume/Accelerate) is selected and the Cruise On/Off switch is Off, the Set position will decrease the maximum vehicle speed. The Resume position will increase the maximum vehicle speed.

Cruise Switch Usage

Switch Position

Maximum Vehicle Speed

Set/Accelerate (Resume/Coast)

Set

Increase

Set/Accelerate (Resume/Coast)

Resume

Decrease

Set/Coast (Resume/Accelerate)

Set

Decrease

Set/Coast (Resume/Accelerate)

Resume

Increase

Interaction with other Features and Parameters

Note the following interactions:

- The Cruise On/Off switch must be Off for the maximum vehicle speed to be adjusted.
- Maximum road speed can not exceed maximum vehicle speed.
- A vehicle speed sensor must be installed and no vehicle speed sensor faults can be active.

Special Instructions

Note the following special instructions:

- Ensure that a vehicle speed sensor is installed and properly setup.
- Ensure that Cruise Switch Usage is properly set up.
- Cycling the vehicle keyswitch will reset the maximum vehicle speed to its original value.

Disadvantages

Low power complaints if the vehicle won't reach a desired speed because this feature is still active and the maximum allowable vehicle speed has not been bumped up using the set/resume switch.

Visual Aids

None

Accelerator Options

Feature Description

This feature provides default speeds in the following circumstances:

- The accelerator voltage is out of range (either high or low).
- There is a fault with the idle validation switch.
- An in-range accelerator fault occurs when the idle validation switch is used.

In any of these instances, the Idle Validation feature enables the operator to "limp" home (1400 rpm engine speed) with enough fueling to obtain a calibratable engine speed.

Adjustable Parameters

Accelerator Default Mode

Select to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Accelerator Type (Automotive/VS Governor)

Feature Description

Use this feature to define the type of engine governor control in use: Automotive (Min/Max) or Variable Speed (VS or ASG - All Speed Governor).

The Automotive governor provides constant fueling for a given accelerator position. Engine speed can vary with changes in engine loading for a constant accelerator position.

The Variable Speed governor is an option, providing a constant engine speed for a given throttle position. Engine speed remains constant with changes in engine loading for a constant accelerator position. This type of governor is best suited for applications requiring engine or PTO speed remain constant.

Adjustable Parameters

Governor Type

Select whether an Automotive or Variable Speed governor is being used.

Governor Type Switch

If enabled, the governor type can be controlled by the operator.

Engine Speed Acceleration Management

The benefits of enabling this feature are smoother, more predictable engine response while on All-Speed Governor, and potentially better fuel economy. The customer is allowed to set acceleration and deceleration rates within pre-defined limits set by the calibration. These rates allow for custom adjustment of engine response while stationary and on-the-road. Typical values for Heavy-Duty engines are 2000RPM/sec and — 1000RPM/sec for acceleration and deceleration limits, respectively. This feature is only used when the Governor Type is set to Variable Speed 1.

Acceleration Rate

This parameter specifies the acceleration rate of an engine in revolutions per minute per second.

Deceleration Rate

This parameter specifies the deceleration rate of an engine in revolutions per minute per second.

Driver Activation/Deactivation

Selecting the governor type can be done two ways:

- If the vehicle is equipped with a cab-mounted switch, the driver can use this switch to select either the Automotive or Variable Speed governor.
- If a cab switch is not available, INSITE™ can be used to select the governor type.

Interaction with other Features and Parameters

None

Special Instructions

Note the following:

- The Automotive governor is typically used for vehicles that are operated on-highway. The Variable Speed governor is typically used in vehicles operated in an industrial environment.
- If the constant speed capability of the Variable Speed governor is not required, the Automotive governor should be used.

Disadvantages

For applications that require a constant engine speed, the Automotive governor will not hold the engine or PTO speed constant for a given accelerator position.

Visual Aids

None

Adaptive Cruise

Feature Description

This feature is a Cruise Control enhancement and driver convenience.

When Adaptive Cruise is enabled, the adaptive cruise controller commands the ECM to reduce engine speed in order to maintain a minimum distance when following vehicles while Cruise Control is activated. If the following distance continues to decrease, the controller sends another command to the ECM to engage the engine retarder - typically the engine brakes, if installed on the engine - to further reduce engine speed.

Adaptive Cruise has two recovery modes that either allow or prohibit the use of standard Cruise Control in the event of an Adaptive Cruise system failure. Fault code 784, "Loss of Communication with Adaptive Cruise Control," is logged when a failure occurs.

Adjustable Parameters

Adaptive Cruise

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Adaptive Cruise Recovery

Select to enable or disable Recovery mode using the dropdown list in the **ECM Value** column:

- If enabled, standard Cruise Control can be used in the event of an Adaptive Cruise system failure.
- If disabled, standard Cruise Control can **not** be used in the event of an Adaptive Cruise system failure.

Note: Fault code 784, Loss of Communication with Adaptive Cruise Control, is logged when an Adaptive Cruise system failure occurs.

Driver Activation/Deactivation

Adaptive Cruise is activated when the Cruise Control On/Off switch is activated by the user, and a Cruise Control speed is set.

Interaction with other Features and Parameters

Cruise Control must be enabled for this feature to be enabled. In addition, Cruise Control must be activated and controlling vehicle speed for the Adaptive Cruise feature to activate.

Special Instructions

This feature requires additional OEM hardware.

Disadvantages

None

Visual Aids

None

Adjustable High Idle Governor Speed

Feature Description

This feature is used to adjust the engine high idle governor speed. The adjusted speed must be within the OEM Maximum and OEM Minimum High Idle Governor Speed settings.

A disabled or valid OEM password is required to adjust the OEM speed settings.

Adjustable Parameters

High Idle Governor Speed

Engine rpm will be limited to this speed during normal operation.

OEM Minimum High Idle Governor Speed

The minimum governed speed allowed by the vehicle OEM. This parameter can be adjusted only if the OEM password is valid or disabled.

High Idle Governor Speed must be set higher than this speed.

OEM Maximum High Idle Governor Speed

The maximum governed speed allowed by the vehicle OEM. This parameter can be adjusted only if the OEM password is valid or disabled.

High Idle Governor Speed must be set lower than this speed.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

For low engine speed complaints, check the setting of High Idle Governor Speed for the proper setup.

Disadvantages

None

Visual Aids

None

Adjustable Low Idle Speed

Feature Description

This feature can reduce the amount of fuel burned and decrease cab noise and vibration. The low idle speed can be set to the desired value using INSITE™, however the operator can override this value using an OEM-supplied idle speed adjustment switch.

Low idle speed is controlled by the low idle governor which prevents the engine speed from dropping below a predetermined value by controlling engine fueling. The default low idle speed is defined by the calibration.

The low idle speed adjustment switch enables the driver to adjust the low idle speed using a two-position momentary toggle switch. Pressing and releasing the switch in one direction raises the low idle speed by a calibrated increment, such as 25 RPM, and pressing and releasing the switch in the other direction lowers the idle speed by the same calibrated increment. When the switch is held in either adjust position, the idle speed gradually increases or decreases by the calibrated increment.

Adjustable Parameters

➤ Adjustable Low Idle Speed

When enabled, this feature allows the user to configure **Low Idle Speed**.

➤ Low Idle Speed

This allows the user to set the engine idle speed that will be maintained when the accelerator pedal or lever is released.

➤ Low Idle Speed Adjustment Switch

When enabled, the engine idle speed can be adjusted using an OEM-supplied switch in the cab.

➤ Low Idle Speed Droop

The percent change in RPM allowed in the Low Idle Speed before the ECM makes an adjustment.

➤ Low Idle Speed Additional Settings

When enabled, the following additional settings are available.

➤ Save Idle Speed on Power Down

When enabled, the low idle speed prior to shutdown will be resumed after the next restart.

When disabled, it will reset to **Low Idle Speed** after restart.

➤ Step Size

This parameter is used to set an incremental change in acceleration or deceleration.

Driver Activation/Deactivation

The operator can adjust the idle speed in 25 RPM increments if an OEM-supplied idle adjustment switch is installed.

Interaction with other Features and Parameters

A Low Idle Adjustment Switch monitor parameter is provided to help diagnosis issues related to the low idle adjustment switch. The monitor has three states:

- **Increment** — The low idle engine speed is increasing.
- **Decrement** — The low idle engine speed is decreasing.
- **Center Off** — The low idle adjustment switch is in the normal or center position.

When increasing the low idle engine speed, the Low Idle Adjustment Switch parameter will indicate Increment. When decreasing the low idle engine speed, Low Idle Adjustment Switch parameter will indicate Decrement. When the low idle adjustment switch is in the normal or center position, the Low Idle Adjustment Switch parameter will indicate Center Off.

Special Instructions

None

Disadvantages

Incorrect adjustment of the low idle speed may cause excessive vehicle vibration or slightly decreased fuel economy.

Visual Aids

None

Advantage Torque

Feature Description

This feature sets full load points on the rail pressure vs. engine speed curve. See the diagram in Visual Aids below.

Adjustable Parameters

Advantage Torque Speed (2-5)

The engine speed that, when coupled with the corresponding rail pressure, defines a point on the rail pressure vs. engine speed curve. See the diagram in Visual Aids below.

Advantage Rail Pressure at Speed (2-5)

A rail pressure value that, when coupled with the corresponding engine speed, defines the rail pressure vs. engine speed curve. See the diagram in Visual Aids below.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

Advantage Curve Parameters

This procedure is not yet available at the time of publication.

Aftertreatment

Feature Description

The Aftertreatment system continuously monitors the sensors of the exhaust system and calculates the efficiency and effectiveness of the various components of that system. The features listed below provide users the ability to make adjustments to the Aftertreatment system.

Adjustable Parameters

► Automatic Stationary Regeneration

This parameter enables or disables the Automatic Stationary Regeneration feature. When enabled, this feature allows the ECM to initiate, or continue an on-going Diesel Particulate Filter regeneration cycle when no vehicle speed is present.

► Automotive Mobile Regeneration Minimum Vehicle Speed

This parameter sets the minimum vehicle speed at which the ECM is allowed to initiate or continue a Diesel Particulate Filter regeneration cycle. If the vehicle speed drops below the threshold speed, active regeneration will stop, but the regeneration's chemical reaction and high temperatures may continue for several minutes. This parameter may not be available for all engines.

► Diesel Particulate Filter Lamp

This feature enables or disables the Diesel Particulate Filter Lamp. The Diesel Particulate Filter Lamp indicates that the soot load present in the Diesel Particulate Filter is high enough that some corrective measure is required. That corrective measure may include either regeneration, or replacement depending upon the severity of the soot load.

► Diesel Particulate Filter Regeneration Permit Switch

This parameter enables or disables the Diesel Particulate Filter Regeneration Permit Switch. The Diesel Particulate Filter Regeneration Permit Switch allows the operator to prevent active regeneration events when it is not desirable to do so. The INSITE™ Aftertreatment Diesel Particulate Filter Regeneration Diagnostic Test can still be used to trigger a stationary regeneration regardless of the Diesel Particulate Filter Regeneration Permit Switch's state. SAE J1939 Multiplexing may be required to enable this switch, refer to engine wiring diagram for further guidance.

► Diesel Particulate Filter Regeneration Start Switch

This parameter enables or disables the Diesel Particulate Filter Regeneration Start Switch. The Regeneration Start Switch forces the engine into regeneration state if all preconditions are properly met.

► High Exhaust System Temperature Lamp

This parameter enables or disables the High Exhaust System Temperature Lamp.

► Diesel Particulate Filter Temperature Stabilization

This parameter enables or disables the Diesel Particulate Filter Temperature Stabilization feature. Active mobile regeneration is suspended when vehicle speed falls below the Automotive Mobile Regeneration Minimum Vehicle Speed. (See Automotive Mobile Regeneration Minimum Vehicle Speed) When enabled, this feature allows dosing to continue at low levels to maintain a target temperature when active mobile regeneration is suspended. By maintaining the target temperature, regeneration can quickly resume once the vehicle reaches the minimum speed.

► Diesel Particulate Filter Regeneration with Parking Brake

This parameter enables or disables the Diesel Particulate Filter Regeneration with Parking Brake feature. When the Diesel Particulate Filter Regeneration with Parking Brake feature and the Parking Brake Switch are both enabled, stationary regeneration of the diesel particulate filter can only be performed when the parking brake is engaged.

► Active Due to Regeneration

This parameter, when enabled, causes the High Exhaust System Temperature Lamp to illuminate during active regeneration, regardless of the exhaust system's temperature.

The High Exhaust System Temperature Lamp will remain illuminated until either the vehicle speed exceeds the Active Maximum Speed or the diesel particulate filter outlet temperature falls below the Inactive Temperature.

Active Maximum Speed

This parameter defines the vehicle speed threshold that extinguishes the High Exhaust System Temperature Lamp. The High Exhaust System Temperature Lamp will re-illuminate when the vehicle speed falls below the set threshold provided the diesel particulate outlet temperature is above the Inactive Temperature. The range can vary by application

Active Temperature

This parameter defines the diesel particulate filter outlet temperature threshold to illuminate the High Exhaust System Temperature Lamp. The High Exhaust System Temperature Lamp will remain illuminated until either the vehicle speed exceeds the Active Maximum Speed or the diesel particulate filter outlet temperature falls below the Inactive Temperature. The range can vary by application

Inactive Temperature

This parameter defines the diesel particulate filter outlet temperature threshold to extinguish the High Exhaust System Temperature Lamp. The range can vary by application

Stationary Regeneration in PTO

This parameter enables or disables the Stationary Regeneration in PTO feature. When enabled, this feature allows an active regeneration event to occur automatically if the ECM detects that the engine is in PTO or remote PTO regardless of vehicle speed. This parameter may not be available for all engines.

High Soot Load Shutdown

This parameter enables or disables the High Soot Load Shutdown feature. This feature will shutdown the engine when the calculated Diesel Particulate Filter soot load has exceeded the shutdown threshold due to extended idle or PTO operation. The shutdown threshold is set by the engine's calibration.

Driver Activation/Deactivation

The driver can use the **Diesel Particulate Filter Regeneration Permit Switch** to prevent active regeneration events when it is not desirable for such an event to occur.

The driver can use the **Diesel Particulate Filter Regeneration Start Switch** to initiate a Diesel Particulate Filter regeneration cycle provided the all other conditions for regeneration are met. (Driver should refer to the Original Equipment Manufacturer's Operator's Manual for further information.)

Interaction with other Features and Parameters

When the "Diesel Particulate Filter Regeneration with Parking Brake" feature is enabled, the driver can prevent a stationary regeneration by failing to engage the parking brake.

SAE J1939 Multiplexing may be required to enable the Diesel Particulate Filter Regeneration Permit Switch, refer to engine wiring diagram for further guidance.

Special Instructions

The feature "Automotive Mobile Regeneration" is locked and displayed for informational purposes only. It cannot be modified.

All of the parameters within this feature are set by the original equipment manufacturer and should not be changed unless instructed to do so by the manufacturer's representative.

Disadvantages

None

Visual Aids

None

Air Conditioning Control

Feature Description

The air conditioning fan running could decrease the Engine Speed. When the engine is at idle and the air conditioning fan comes on, the engine speed could go below the **Low Idle Speed** setting. This feature compensates for this decreased engine speed and sets it to the **Low Speed Idle Setpoint with Air Conditioning** value.

Adjustable Parameters

Air Conditioner Control

This parameter enables and disables the **Air Conditioner Control** feature.

Air Conditioner on Idle Speed Adjust

When enabled, the **Low Speed Idle Setpoint with Air Conditioning** can be set.

Low Speed Idle Setpoint with Air Conditioning

This is the Low Idle Speed value requested when the air conditioning fan turns on.

Driver Activation/Deactivation:

None

Interaction with other Features and Parameters:

None

Special Instructions:

None

Disadvantages:

None

Air Shut Off Valve

Feature Description

This feature was designed for engines running in environments that could contain combustible gasses. When the ECM detects an engine overspeed, this feature can cut the air flow to the engine, which will shut the engine down.

Adjustable Parameters

Air Shut Off Valve

When enabled during an engine overspeed, the Air Shut Off Valve cuts the air flow to the engine.

Air Shut Off Valve Parking Brake Interlock

When enabled, if the ECM detects an engine overspeed and the parking brake is set, the Air Shut Off Valve will cut the airflow to the engine. If the parking brake is not set, it disables the Air Shut Off Valve and will not cut the air flow to the engine. This will prevent the engine from shutting down.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

The Air Shut Off Valve Parking Brake Interlock can only be enabled when either the Parking Brake Switch or the Parking Brake Switch Multiplexing is set to enable.

Special Instructions

None

Disadvantages

None

Visual Aids

None

Alternate Droop

Feature Description

This feature enables droop characteristics to be changed for the high-speed governor (HSG) and variable speed governor (VSG). This feature provides the ability to select an additional alternate droop setting via an OEM-provided switch.

Less governor droop (lower percentage) provides a more responsive governor for more precise engine control. More governor droop (higher percentage) provides smoother shifting and smoother mechanical clutch engagement.

Adjustable Parameters

Alternate Droop

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Alternate Droop Switch Type

The number of available Alternate Droop Switch positions.

Breakpoint 2 Speed

The engine speed at which Droop at Breakpoint 2 activates during normal engine operating conditions. The Alternate Droop Switch must be in the correct position (depending on the type of switch) for this droop setting to activate.

Droop at Breakpoint 2

The percentage of droop at Breakpoint 2 Speed. A lower value enables more precise engine control for the operator. A higher value enables smoother shifting and mechanical clutch engagement. The Alternate Droop Switch must be in the correct position (depending on the type of switch) for this droop setting to activate.

Droop at Maximum Throttle 2

The percentage of droop at maximum throttle position.

Droop at Minimum Throttle 2

The percentage of droop at minimum throttle position.

Isochronous Breakpoint Speed 2

Sets the isochronous breakpoint speed in rpm. When the engine reaches this rpm while on the droop curve, the governor acts as an isochronous governor (a governor without droop). The Alternate Droop Switch must be in the correct position (depending on the type of switch) for this droop setting to activate.

Driver Activation/Deactivation

Alternate Droop is activated by the calibration, but uses a switch to toggle between the alternate droop settings. Depending on the application the alternate droop switch may be a 2 or 3-position switch. Toggling the switch into the 2nd and 3rd positions activates the 2nd and 3rd droop settings accordingly.

Interaction with other Features and Parameters

None

Special Instructions

An OEM switch must be provided and the Alternate Droop Switch Type parameter must be set properly to obtain the expected functionality.

Disadvantages

Driver complains of low power.

Driver complains of poor or unexpected throttle reaction.

Visual Aids

None

Alternate Low Idle Speed

Feature Description

This feature enables an increase in engine speed and torque in advance of a load being applied to the engine at low idle. The feature is programmable from 600 to 1200 rpm or throughout normal idle speed of the engine.

Adjustable Parameters

Alternate Idle Speed

Select to enable or disable the feature using the dropdown list in the **ECM Value** column.

Alternate Low Idle Speed

Select an alternate idle speed using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

This feature can be toggled ON/OFF by a manual switch, which can be located in various places: transmission, hydraulic (pressure) lines, shift levers, etc.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Alternator Failure Warning

Feature Description

When an alternator failure occurs the ECM has the ability to detect a small battery voltage drop and then warn the driver. The amber warning lamp will be illuminated when either a high or a low voltage condition exists, indicating a potential charging system failure. Whenever a very low voltage condition exists which might endanger the continued proper operation of the ECM, the stop lamp will be illuminated. Also a customer enabled feature will increase idle speed, when a low voltage condition exists, in an effort to increase alternator output to maintain battery voltage.

Adjustable Parameters

Alternator Failure Warning

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column

When enabled, this will warn the driver if the ECM detects a high or low voltage condition.

Idle Speedup

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column

When enabled, this parameter will automatically adjust the idle speed if a low voltage condition is detected

Driver Activation/Deactivation

This feature can only be activated or deactivated by the Cummins INSITE service tool.

Interaction with other Features and Parameters

Idle speed will increase if a low voltage condition is detected

Special Instructions

None

Disadvantages

None

Visual Aids

None

Alternate Torque

Feature Description

Alternate Torque provides derated torque curves other than the 100% torque curve. These torque curves are normally used to help limit the torque output of the engine. This can help to protect drivetrain components such as axles and transmissions and in some cases can help protect the engine from damage.

Adjustable Parameters

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

Alternate Torque is activated by INSITE and uses an OEM-supplied switch to toggle between torque curves.

Interaction with other Features and Parameters

None

Special Instructions

Alternate Torque functionality depends on an OEM-supplied switch.

Disadvantages

Possible operator complaints of low power.

Visual Aids

None

Ambient Temperature Derate

Feature Description

This feature reduces wear on the turbocharger by derating engine fueling to limit the turbine inlet temperature and the compressor discharge temperature.

Adjustable Parameters

Ambient Temperature Derate

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

More information will be provided in an upcoming version of INSITE.

Automatic Boost Power

Feature Description

Boost Power is a torque curve that is calibrated for a higher torque/horsepower than the normal engine rating. The ECM monitors engine speed, intake manifold temperature, and coolant temperature to determine if boost power can be activated.

If boost power is enabled, the operator can activate boost power using a dash mounted switch, and the engine switches to the higher torque curve/power rating for a limited period of time. The higher torque curve/power rating is calibrated for an intermittent or non-continuous torque/power rating that is higher than the normal torque/horsepower rating for the engine.

Boost power is not available if coolant temperature or intake manifold temperature are above calibrated thresholds. If engine speed is below a calibrated threshold, then boost power may not be time limited.

Adjustable Parameters

Boost Power

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

If the feature is enabled and certain operating thresholds are met for intake manifold temperature, coolant temperature, and engine speed, the operator can activate Boost Power with an OEM-provided switch. Boost power is not available continuously.

Automatic Boost Power

Select the feature name to enable or disable the feature using the dropdown list in the ECM Value column.

Pulse Width Modulation Output Mode

Defines the PWM output signal that the ECM uses to drive certain vehicle components such as transmissions. Refer to the manufacturer's documentation.

Driver Activation/Deactivation

If the feature is enabled and certain operating thresholds are met for intake manifold temperature, coolant temperature, and engine speed, the operator can activate Boost Power with an OEM-provided switch. Boost power is not available continuously.

There is no operator interaction to activate or deactivate automatic boost power.

Interaction with other Features and Parameters

Boost Power must be enabled in order to enable **Automatic Boost Power**.

Special Instructions

Some OEM applications have a boost power lamp that lights while boost power is active and flashes as boost power nears its expiration limit. The availability of this feature is dependent on the individual OEM application.

Disadvantages

Note: Automatic Boost Power can be monitored to determine when it is active or not active.

Note the following:

- Customer complains of intermittent low power.
- The boost power load threshold parameter may be set above the lowest percentage load experienced while operating on the normal torque/power rating.
- There could be a J1939 vehicle speed error when the J1939 vehicle speed error override calibration parameter is not set.
- The J1939 vehicle speed cycle timer has timed out.

Visual Aids

None

This procedure is not yet available at the time of publication.

Battery Voltage Monitor

Feature Description

This feature monitors battery voltage and provides an early warning if the voltage level is outside a set threshold for a specific length of time. If the ECM detects either low or high battery voltage, fault codes are logged and a fault lamp is lit to alert the operator.

On automotive engines, idle speed will be increased automatically to increase alternator output if the voltage falls below a very low threshold. This occurs only if **Idle Speedup** is enabled.

Adjustable Parameters

➤ Battery Voltage Monitor

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

➤ Electrical System Voltage

This parameter enables you to modify the ECM calibration to operate on a 12 or 24 volt vehicle or machine electrical system.

➤ Idle Speedup Enable

This parameter enables idle speed to be increased automatically to increase alternator output if the voltage falls below a very low threshold.

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE.

Interaction with other Features and Parameters

If **Idle Speedup** causes engine idle speed to increase, the idle speed will return to the normal idle speed as selected with INSITE after battery voltage increases. If the battery voltage does not increase, the engine will continue to operate at the increased idle speed.

Fault code 597 indicates a low charging system voltage and lights an amber warning lamp. This fault is also logged if the ICON system is installed and ICON has started the engine 3 times within 3 hours for low system battery voltage.

Special Instructions

You must select the correct value for the **Electrical System Voltage** for this feature to operate correctly. This value enables the ECM to determine which set of voltage thresholds to use.

There are three voltage-warning levels with associated fault codes:

- **Fault Code 596 - Electrical Charging System Malfunction:** Indicates a high charging system voltage and an amber warning lamp will be lit.
- **Fault Code 597 - Electrical Charging System Malfunction - Warning Level:** Indicates a low charging system voltage and an amber warning lamp will be lit. This fault is also logged if the ICON system is installed and ICON has started the engine 3 times within 3 hours for low system battery voltage.
- **Fault Code 598 - Electrical Charging System Malfunction - Critical Level:** Indicates a very low charging system voltage and the red stop lamp will be lit.

When any of the above charging system malfunction faults are logged, the fault goes inactive at key off. When the engine is restarted, there will be a delay during which the monitor feature will not check for voltage faults. Once a set time has elapsed the feature will resume monitoring battery voltage.

Disadvantages

Note:

- Voltage thresholds and Idle Speedup RPM are not adjustable by INSITE.
- If this feature is enabled, the Idle Decrement switch is disabled to prevent the operator from lowering the idle speed.

Visual Aids

None

This procedure is not yet available at the time of publication.

Centinel™

Feature Description

Note: This Help topic describes the integrated Centinel system that is controlled by the ECM. There is also an aftermarket Centinel system available through PowerCare that can be used as a stand-alone system.

The integrated Centinel system is an electronically controlled oil replenishment system that allows extended oil drain intervals. It is enabled by calibration and can be used only on vehicles on which Centinel components are installed, including a burn valve, plumbing, and wiring connections to the engine control module. Centinel may also be used with or without an external make-up oil tank with a low oil level sensor.

For proper engine oil and oil filter change intervals, consult the Operation and Maintenance Manual for the engine and the Centinel Master Repair Manual. For proper lubricating oil and oil filter recommendations and required oil sampling rates for use with Centinel, consult the Centinel Master Repair Manual.

The Centinel system extends engine oil and engine oil filter change intervals through continuous oil exchange. This is accomplished by injecting oil into the fuel system at a rate that is proportional to the fuel consumed. The grade of oil being used also helps determine the rate of oil being injected. Make-up oil is introduced into the engine at a rate equal to the amount injected for consumption. This oil addition occurs in one of two ways:

- The first version is a burn with make-up system. In this case, there is an on-board fresh oil tank. Oil is delivered from this tank by the Centinel oil control valve to the engine sump during each cycle of the valve. The Centinel system monitors the oil level in the make up tank with a low oil level sensor.
- The second version is a burn-only system. In this case, make-up oil is added manually to the engine oil sump during the daily preventative maintenance process. This burn-only system is only for those operators who have routine, daily maintenance practices in place.

The valve that controls the amount of oil injected in the fuel system is an electromechanical piston valve. It exchanges used engine oil with fresh engine oil if a make-up tank is used. The valve uses engine oil rifle pressure to drive piston displacement. The ECM monitors oil rifle pressure and prevents operation of the oil control valve until oil pressure rises enough to drive the valve. The ECM will not allow the valve to operate until the engine reaches its operating temperature of 125 F (52 C).

During operation, Centinel tracks the number of times the burn valve should have injected used engine oil into the fuel system and counts the number of times when the valve did not, such as when the oil pressure is not high enough, the temperature requirements have not been met, or if there is a low oil level in the make-up tank. Centinel will then "make up" for these missed burn pulses. This count can be reset with INSITE if desired, such as at an oil change.

Centinel does not extend the service interval for other maintenance items. Consult your Operation and Maintenance manual for proper maintenance intervals. Centinel does not compensate for engine oil leakage or engine oil consumption.

Adjustable Parameters

Centinel Oil System

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Oil Type

This parameter determines the rate at which Centinel injects oil.

- Select **Normal** to indicate that the oil being used is grade CG-4 or higher.

Note: Cummins does not recommend using an oil grade less than CG-4.

- Select **Premium** to indicate that the oil being used is CH-4 or higher. Premium oil type also indicates that Premium Blue 2000 is being used.

ResetMissed Oil Valve Pulses

This parameter monitors the Centinel Missed Oil Valve Pulses.

- If the missed pulse count is zero, this parameter will read Reset.
- If the missed pulse count is not zero, this parameter will read Not Reset.

To clear the missed pulse count after a 649 fault code and oil change, change the ECM Value from Not Reset to Reset and then Send Changes to ECM.

If the Centinel system misses a burn cycle, it will count a missed pulse. The Centinel system can miss a burn cycle if there is an active Centinel electronic fault code or if the oil pressure or temperature requirements are not met.

The Centinel system has been designed to compensate for burn cycles that are missed by switching to an accelerated burn rate. However, it can only compensate for a limited amount of missed burn cycles. Beyond that point, the Centinel system will set a 649 fault code, which will require the engine oil and filter to be changed.

Once the oil and filter are changed and the issue that caused the missed pulses is fixed, the Centinel Missed Oil Valve Pulses must be reset to zero to clear the 649 fault code. If the Missed Oil Valve Pulses is not reset, the system will continue to burn at an accelerated rate. This is the only time that the Centinel Missed Oil Valve Pulses should be reset.

The actual number of Centinel Missed Oil Valve Pulses can also be monitored in the Diagnostics function with the Data Monitor/Logger.

Driver Activation/Deactivation

Centinel operates automatically. There is no operator interaction to activate or deactivate the Centinel system.

Interaction with other Features and Parameters

Note the following interactions:

- The Centinel System and Maintenance Monitor use different methods to accomplish the same purpose, and are mutually exclusive. Centinel should not be enabled when the Maintenance Monitor feature is enabled.
- Centinel cannot be used with Spicer Automate-2 transmissions.
- The maintenance lamp will light if Centinel faults become active or if the oil level in the make-up tank is low. RoadRelay also displays these faults.

Special Instructions

IMPORTANT:

- Centinel requires that a Centinel-capable calibration be loaded in the ECM.
- Vehicles domiciled in California cannot use any system (like Centinel) that blends used engine oil with diesel fuel. Check CARB regulations.

For component installation instructions, oil drain interval recommendations, and required oil sampling intervals, consult the Centinel Master Repair Manual.

Disadvantages

The following situations may result from use of Centinel:

- The maintenance lamp is lit.
- Oil consumption seems excessive.
- Make-up oil level is high or no additional oil is required when Centinel is installed.
- Oil level measured on the dipstick fluctuates.

Visual Aids

None

Clutch Pedal Position Switch Adjustables

Feature Description

The clutch switch may be an optional OEM-installed component. This feature enables the clutch switch to be disabled when no clutch pedal switch functionality (hardwired or multiplexed) is desired.

Adjustable Parameters

Clutch Pedal Position Switch

Select the feature name and use the dropdown list in the **ECM Value** column to indicate whether a switch is **Installed** or **Not Installed**.

Clutch Switch Logic

When the **Clutch Pedal Position Switch** is enabled, this parameter will allow the user to set logic of the depressed clutch.

- **Normally Closed** — The switch or relay is closed until the clutch is depressed, and then the relay is open.
- **Normally Open** — The switch or relay is open until the clutch is depressed, and then the relay is closed.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Cold Idle Warmup

Feature Description

The Cold Idle Warmup feature increases the idle speed to shorten the time to warmup the engine in cold climate conditions. After the engine is started, if the coolant temperature is below the **Active Coolant Temperature**, the idle speed is increased to a higher idle or **Reference Speed**. The engine stays at this **Reference Speed** for a maximum **Time Limit**. If the coolant temperature reaches the **Inactive Coolant Temperature** during this time, the engine idle speed will return to low idle speed.

Adjustable Parameters

► Cold Idle Warmup

When enabled, this feature will shorten the time to warmup the engine by increasing the low idle speed.

► Active Coolant Temperature

This parameter allows the user to set the coolant temperature that will activate the cold idle warmup.

► Inactive Coolant Temperature

This parameter allows the user to set the coolant temperature where cold idle warmup will go inactive and the engine speed will return to low idle.

► Reference Speed

This parameter allows the user to set the engine speed that will be reached when cold idle warmup is activated.

► Time Limit

This parameter allows the user to set the maximum time that the engine will stay at **Reference Speed** when cold idle warmup is active.

► Cold Idle Warmup Extended

When enabled, this feature allows additional settings to be set to extend or increase the range that will activate cold idle warmup.

► Extended Active Coolant Temperature

This parameter sets the value of the coolant temperature threshold below which cold idle warmup is active.

► Extended Inactive Coolant Temperature

This parameter sets the value of the coolant temperature threshold above which cold idle warmup is inactive.

Extended Reference Speed

This parameter is used to set the value of the idle engine speed as a result of cold idle warmup becoming active.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

This feature will activate after the **Engine Warmup Protection Status** goes to **Inactive**.

Special Instructions

None

Disadvantages

None

Commissioning Setup

Feature Description

This feature is used to configure the engine's primary ECM when a generator set control system is present. The feature also defines that the engine control will be receiving start commands from an external source.

Adjustable Parameters

Alternator Efficiency

The alternator electrical efficiency in the engine ECM. This value must be obtained from the alternator manufacturer. For example, if the efficiency percentage for frame 7 alternator is 96.5%, you would enter .965 here.

Note: This value must be obtained from the alternator manufacturer.

PLC Present Flag

Indicate whether a PLC (programmable logic controller) is **Present** or **Absent** in the generator set control panel of the engine's primary ECM.

Battery Conservation

Select whether to turn the parameter ON or OFF in the ECM.

This parameter is intended to lengthen battery life and also help prolong the life span of actuators and powered sensors, because they will be de-powered when not in use. When enabled, the feature will shut down power to select actuators and sensors.

See Visual Aids below for the exact components affected. Once engine RPM > 0, the actuators and sensors are automatically powered.

Driver Activation/Deactivation

This feature can be configured only by INSITE.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

Battery Conservation Circuit

Coolant Level Sensor

Feature Description

This feature enables you to select whether a coolant level sensor is installed. This sensor eliminates the need to install a shorting plug on the engine's OEM harness.

Adjustable Parameters

Coolant Level Sensor

Select the feature name to enable or disable the coolant level sensor. This parameter should be disabled if a coolant level sensor is not in use.

Coolant Level RPM Limiting Enable

Limits engine rpm if a low coolant level is present and the coolant level sensor is enabled.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

This procedure is not yet available at the time of publication.

Cranking and Vent Cycle Duration

Feature Description

This feature is used to define how long the control system will vent and crank during a normal startup. During startup, the primary ECM controls a Vent Attempt cycle, followed by an Engine Start Attempt cycle.

During the Engine Start Attempt cycle, the primary ECM cranks the engine with the starter motor and opens the fuel valve, allowing fuel to flow into the cylinders for engine startup. If the engine does not start, this will be followed by a Vent Attempt cycle.

During the Vent Attempt cycle, the primary ECM cranks the engine with the starter motor, but does not enable the fuel valve. This part of the cycle is used to purge the exhaust system of unburned fuel.

Adjustable Parameters

▶ Starter Control

This parameter is not user adjustable. If the feature is enabled in the calibration, INSITE displays the other adjustable parameters for this feature.

If this feature is not enabled in the calibration, this parameter and the other adjustable parameters for this feature will not be available.

▶ Engine Start Attempt 1

The amount of time the engine will crank with the fueling valve open during the first attempt to start the engine.

▶ Engine Start Attempt 2

The amount of time the engine will crank with the fueling valve open during the second attempt to start the engine.

▶ Engine Start Attempt 3

The amount of time the engine will crank with the fueling valve open during the third attempt to start the engine.

▶ Vent Attempt After Third Start

The amount of time the engine will crank with the fueling valve closed to purge the exhaust system of unburned fuel after the third start attempt.

▶ Vent Attempt Before First Start

The amount of time the engine will crank with the fueling valve closed to purge the exhaust system of unburned fuel prior to the first start attempt.

▶ Vent Attempt Between First and Second Starts

The amount of time the engine will crank with the fueling valve closed to purge the exhaust system of unburned fuel prior to the second start attempt.

▶ Vent Attempt Between Second and Third Starts

The amount of time the engine will crank with the fueling valve closed to purge the exhaust system of unburned fuel prior to the third start attempt.

Driver Activation/Deactivation

This feature can be adjusted only with INSITE.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Cruise Control

Feature Description

Cruise Control provides the driver with foot-off-throttle cruise operation, with the ability to adjust and maintain a desired road speed. Cruise Control and its capabilities vary according to its operational mode.

Two switches are used to operate this feature:

- The Cruise Control On/Off switch enables the operator to turn Cruise Control ON or OFF.
- The Set/Resume-Coast/Accelerate switch enables the driver to set and resume Cruise Control.

Operational Modes

Three operational modes are possible, depending on switch settings and operating conditions:

- **Off** - Cruise Control does not affect engine operation, and it cannot be activated. The Cruise Control On/Off switch is OFF.
- **Standby** - The Cruise Control On/Off switch is ON, but Cruise Control has been deactivated and does not affect engine operation. Cruise Control remains on standby when the Cruise Control On/Off switch is initially placed ON until activation is requested by the driver using the Cruise Set/Resume switch. The driver can either set a desired speed or resume a desired speed. Activation is possible only when all of the following conditions are met:
 - Vehicle speed is **not** below 30 mph.
 - Engine speed is **not** at idle.
 - Brake pedal is **not** depressed.
 - Clutch pedal is **not** depressed.
 - A vehicle speed sensor fault is **not** present.
- **Active** - Cruise Control is currently controlling engine fueling to maintain the desired road speed. Once activated, a Cruise Control reference speed is calculated by using information for the Cruise Control Maximum Speed, Driver Reward's reward speed, and the Cruise Control Set Speed. Cruise Control maintains vehicle speed at the Cruise Control Set Speed unless an interaction occurs with any one of the following: maximum torque curve, programmable droops, accelerator, or maximum vehicle speed (road speed governor limit).

Cruise Control cannot achieve vehicle speeds that require fueling that exceeds the maximum torque curve of the engine. The maximum torque curve is the maximum fueling allowed at an engine speed versus rpm for the horsepower rating of the engine.

Droops

Two programmable droops are available:

- The **Upper Droop** causes vehicle speed to decrease slightly below the Cruise Control reference speed at high engine loads, such as when climbing a grade.
- The **Lower Droop** allows vehicle speed to increase slightly above the Cruise Control reference speed at low engine loads, such as when nearing the bottom of a grade.

For example, when climbing a steep grade in Cruise Control and the Upper Droop (uphill droop) is set to 0 mph and the Cruise Control speed is set to 62 mph, the engine will maintain vehicle speed at 62 mph as long as the maximum torque curve is not exceeded. However if the Upper Droop is set to a value such as 2 mph, Cruise Control will allow vehicle speed to drop to 60 mph. After this drop, Cruise Control will maintain vehicle speed at 60 mph. As the vehicle nears the top of the grade and accelerates toward 62 mph, Cruise Control will slightly limit vehicle speed between 60 and 62 mph.

When nearing the bottom of a steep grade in Cruise Control and the Lower Droop (downhill droop) is set to 0 mph and the Cruise Control speed is set to 62 mph, the engine will maintain vehicle speed at 62 mph. If the Lower Droop is set to 2 mph, Cruise Control will allow the vehicle speed to "roll out" to 64 mph.

Adjustable Parameters

Cruise Control

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Cruise Control Lower Droop

This parameter sets the maximum vehicle speed for Cruise Control Lower Droop. A lower droop increases vehicle speed above the Cruise Control reference speed under light engine loads.

A greater droop can result in better fuel economy in hilly or rolling terrain. A lesser droop provides better speed control. The recommended setting is **2 MPH**.

Cruise Control Upper Droop

This parameter sets the maximum vehicle speed for Cruise Control Upper Droop. An upper droop decreases vehicle speed below the Cruise Control reference speed under heavy engine loads.

A greater droop can result in better fuel economy in hilly or rolling terrain. A lesser droop provides better speed control. The recommended setting is **0 MPH**.

Maximum Cruise Control Speed

The upper limit of the Cruise Control speed, unless Driver Reward is active. If Driver Reward is active, the upper limit is the sum of maximum Cruise Control Maximum Speed and Driver Reward's reward speed. The recommended setting is **62 MPH**.

Adaptive Cruise

When enabled, this feature allows an adaptive cruise control system, installed by the OEM, to override the normal vehicle cruise control set speed, when the following distance behind another vehicle is reduced below the OEM set threshold.

When the vehicle in front pulls away or is no longer in the path, the vehicle speed will slowly ramp back up to the original cruise control set speed.

► Adaptive Cruise Recovery

When enabled, a key switch cycle is not needed to go back to the original cruise control set speed. When disabled, a key switch cycle is needed to return to the original cruise control set speed.

► Cruise Control Auto-Resume

This parameter allows the operator to resume to the cruise control set speed without pushing the Cruise Resume switch on the dash after the clutch has been pressed and released.

► Cruise Control Pause Switch

When enabled, **Cruise Control** is disabled if the Cruise Control Pause Switch is **On**.

► Cruise Control Ramp Rate

When enabled, this will allow the **Ramp Rate** and **Step Size** to be configured.

► Ramp Rate

This parameter determines the rate of change for vehicle speed when the Cruise Control increment switch is engaged.

► Step Size

This parameter determines how much the vehicle speed changes when the Cruise Control speed is increased.

► Cruise Control Save Set Speed

When enabled, the Cruise Control speed established prior to shutdown can be resumed after the next restart using the resume function of the Cruise Set/Resume switch.

When disabled, the resume function is inoperative until an adjustable Cruise Control speed has been established using the Set function.

► Cruise Control without Parking Brake Set

This feature extends the Cruise Control feature by adding the ability to enable or disable the interaction between cruise control and parking brake switch.

This parameter allows the user to enable or disable Cruise-Parking Brake interaction. When enabled, cruise control is only allowed if the Parking Brake switch is **OFF**.

Driver Activation/Deactivation

To activate Cruise Control, turn the Cruise Control on/off switch ON. Press the set switch when the desired cruise speed is achieved.

To put Cruise Control in standby mode, depress the brake pedal or clutch pedal. Cruise Control will automatically go to standby when vehicle speed falls below 30 MPH, engine speed is too low, or a vehicle speed sensor error occurs.

To deactivate Cruise Control, turn the Cruise Control on/off switch to the OFF position.

Interaction with other Features and Parameters

Driver Reward

If the Driver Reward feature is enabled, Cruise Control may allow vehicle cruise speeds higher than the maximum Cruise Control speed. Cruise Control compares the Cruise Control Set

Speed and the Driver Reward cruise speed, and the lesser of the two is used as the Cruise Control speed.

Engine Brakes

Cruise Control Activation can be used to apply the engine brakes during cruise control use (see the Engine Brake Control feature description). Engine braking effort is determined by vehicle speed, the Cruise Control reference speed, Cruise Control speed for initial engine brake, and Cruise Control speed for maximum engine brake. In order for the Cruise Control to activate engine brakes, Engine Brake must be enabled, and all engine brake activation conditions must be met.

If vehicle speed exceeds the Cruise Control reference speed for initial engine brake, Cruise Control will request the engine brakes to activate. If all requirements are met, the engine brakes will be applied at the minimum level. If vehicle speed exceeds the Cruise Control reference speed for maximum engine brake, the engine brakes will be applied at their maximum level. Engine brakes will not increase beyond the level set by the engine brake level switch. Engine brakes will automatically deactivate as vehicle speed approaches the Cruise Control reference speed.

Gear Down Protection

Cruise Control Auto-Resume automatically deactivates and reactivates during Top 2 and manual shifts.

- When Top 2 performs a shift, Cruise Control automatically deactivates and reactivates.
- When a manual shift is performed, Cruise Control deactivates when the clutch is depressed. It will automatically reactivate after the ECM detects an out-of-gear condition and the in-gear condition resumes in a different gear than the previous gear.

Road Speed Governor Override

Depending on the status Gear-Down Protection, Cruise Control may or may not be able to cruise at vehicle speeds greater than the road speed governor's RSG reference speed. If Gear-Down Protection is active, the Cruise Control governor cannot exceed the road speed governor's RSG reference speed. If Gear-Down Protection is not active, the Cruise Control governor may cruise at speeds higher than road speed governor's RSG reference speed - up to a maximum vehicle speed.

Maximum Accelerator Vehicle Speed Limit

The accelerator can be used to increase vehicle speed temporarily above the Cruise Control set speed but below the global maximum vehicle speed. When the accelerator is released, Cruise Control automatically resumes the Cruise Control Set Speed.

Vehicle Speed

If the Vehicle Speed Sensor Type is set to **None** and Cruise Control is then disabled, you can not re-enable Cruise Control until the Vehicle Speed Sensor Type is changed to a type other than **None**.

Special Instructions

None

Disadvantages

Possible complaints include:

- Low Power - Upper Droop settings greater than zero lessen the engine's grade climbing and accelerating performance near the Cruise Control Maximum Speed.

- Cruise Control does not operate at Set Speed, which could be caused by the Driver Reward setting, the Maximum Accelerator Override setting, or droop settings.

Visual Aids

None

Cruise Control and Engine Brake Interaction

About

More information will be provided in an upcoming version of INSITE™.

Cruise Control Switch Setup

Feature Description

This feature is used to set the configuration of the Cruise Control set/resume switch. This feature reserves the switch throw for the accelerate and coast functions of the cruise set/resume switch.

Adjustable Parameters

Cruise Control Switch Setup

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Switch Setup

Sets the function of the switch throw. Set/Accelerate is the up position and Resume/Coast in the down position. Either this choice or the Set/Coast switch usage can be selected.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

This feature interacts with the Cruise Control feature.

Special Instructions

None

Disadvantages

None

Visual Aids

None

Customer Power Limiter

Feature Description

This feature allows technicians to lower the maximum torque output of the engine.

Adjustable Parameters

Customer Power Limiter

This parameter allows the user to enable or disable the Customer Power Limiter feature.

Customer Power Limit Application

This parameter allows the user to select the application torque limit for the system. The user has the following options: Standby, Part Time Prime, Full Time Prime, or Continuous

Customer Power Limit Percentage

This parameter allows the user to set the torque limit for a Customer Power Limit Application. This value can range from 0 to 100%

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Cyclical Load Acceptance Gain Adjust

Feature Description

This feature allows the user to adjust the engine response to transient loads as instructed by INSITE™ or a datalink input message. This feature allows for gradual engine response when going from No/Low Load to Full Load and for instantaneous engine response when going from Full Load to No/Low Load.

Adjustable Parameters

Cyclical Load Acceptance Gain Adjust

This parameter allows the user to enable or disable the Cyclic Load Acceptance Gain Adjust feature.

Cyclical Load Acceptance Cyclic Load Gain

This parameter allows the user to adjust the gain when a cyclic load is present. This value may also be changed with a datalink message, if so enabled. The range will vary by application.

Cyclical Load Acceptance No Cyclic Load Gain

This parameter allows the user to adjust the gain when no cyclic load is present. This value may also be changed with a datalink message, if so enabled. The range will vary by application.

Cyclical Load Acceptance Datalink Message

This parameter allows the user to enable or disable the acceptance of Datalink Messages that change the cyclic load gains. This sub-feature is an extension of the Cyclical Load Acceptance Gain Adjust.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

The parameter "Cyclical Load Acceptance Last Adjustment Device" is displayed for informational purposes only and cannot be adjusted. This parameter indicates the method last used to change the gain value. "Datalink Adjusted" refers to an OEM device that changes the gain through the datalink. "Tool Adjusted" refers to INSITE™.

Disadvantages

None

Visual Aids

None

This procedure is not yet available at the time of publication.

Dedicated Pulse Width Modulation Output

Feature Description

This feature allows the ECM to output an analog signal that is proportional to engine speed, engine load, engine torque output, or throttle input. The frequency and signal types can be configured, depending on the type of equipment to be controlled. The intended use of the signal is to control any electronic device.

The signal can be configured as on or off, where voltage is greater than or equal to 0, depending on the device.

Adjustable Parameters

Dedicated Pulse Width Modulation Output

When enabled, this feature will allow the ECM to output an analog signal.

Dedicated Pulse Width Modulation Output

This parameter allows the user to set the analog signal type.

Dedicated Pulse Width Modulation Output Frequency

This parameter allows the user to set the analog signal frequency.

Driver Activation/Deactivation:

None

Interaction with other Features and Parameters:

None

Special Instructions:

None

Disadvantages:

None

Visual Aid:

None

Driver Reward

Feature Description

This feature attempts to modify driver behavior by offering incentives to use less fuel. Desirable driving habits, such as low percentage of idle time, high percentage of top gear time, and high MPG are rewarded with higher limits on the Road Speed Governor, Cruise Control, or both. Drivers operating engines with Electronic Smart Power (ESP) can also be rewarded with an earlier transition to a higher torque output during torque transitions.

The feature monitors and averages the driver's trip fuel economy and trip idle percent time at regular intervals, providing the driver with rewards once customer-selected threshold standards are achieved. The monitored trip information continues to average driver performance data and update reward levels accordingly, until reset using INSITE. The Driver Reward log is reset when Trip information is reset. With an optional Cummins RoadRelay installed, drivers have continuous access to their real-time performance and current Driver Reward level.

Drivers who achieve the programmed company fuel economy and time spent at idle standards can be rewarded with speed rewards and/or, for those vehicles equipped with ESP, an earlier transition to higher torque. Drivers who do not achieve the programmed company fuel economy and time spent at idle standards can be penalized by reduced maximum vehicle speed and/or a longer transition to high torque if the vehicle is equipped with ESP.

CONFIGURING DRIVER REWARD

Driver Reward is configured in two stages: first by setting company fuel economy and idle time standards, and then setting Driver Reward options and levels. In order to determine specific Driver Rewards, it is necessary to set performance goals and define values for "Best", "Good", and "Expected" fuel economy and idle standards.

If the vehicle is equipped with Electronic Smart Power (ESP), additional rewards or penalties can be given as varying transitions to higher torque availability. The speed values selected indicate the speed decrease required before ESP is activated. The better the reward, the smaller the decrease.

Adjustable Parameters

▶ Driver Reward

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

▶ ESP Rewards

When drivers meet the determined criteria in both the time spent at idle and fuel economy standards, they can be given speed rewards provided by the **Road Speed Governor**, **Cruise Control**, or **Both**.

Select the mode that best meets your requirements.

▶ Fuel Economy Standards

When drivers meet the determined criteria in both the time spent at idle and fuel economy standards, they can be given speed rewards provided by the **Road Speed Governor**, **Cruise Control**, or **Both**.

Select the mode that best meets your requirements.

▶ Idle Standards

When drivers meet the determined criteria in both the time spent at idle and fuel economy standards, they can be given speed rewards provided by the **Road Speed Governor**, **Cruise Control**, or **Both**.

Select the mode that best meets your requirements.

▶ Road Speed Governor Mode

When drivers meet the determined criteria in both the time spent at idle and fuel economy standards, they can be given speed rewards provided by the **Road Speed Governor**, **Cruise Control**, or **Both**.

Select the mode that best meets your requirements.

▶ Speed Rewards

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE.

Interaction with other Features and Parameters

Driver Reward can interact with Vehicle Speed, Cruise Control, and Electronic Smart Power (ESP). With Vehicle Speed and Cruise Control, Driver Reward can cause the maximum vehicle speed in top gear and maximum speed available in Cruise Control to be exceeded by award levels determined in INSITE. With Electronic Smart Power, Driver Reward can shorten the transition time to higher torque output.

Once an award level has been achieved, that award remains in effect until a new award level is reached or trip information is reset.

Special Instructions

Resetting Driver Reward Logs

Ensure that Trip Information is reset prior to beginning a trip, and then at least 50 miles must be traveled to allow the system to initialize. After the first 50 miles, the system will begin another trip interval during which the trip data will be monitored and analyzed. This accumulation and averaging of trip information continues until the Driver Reward logs are reset as a result of resetting the Trip Information logs using INSITE.

Driver Reward monitors and analyzes the driver's trip fuel economy and trip idle time at regular intervals, providing the appropriate speed rewards or penalties once the selected company threshold standards are met. As the driver performance data accumulates over the course of a trip, INSITE averages the information and updates the Driver Reward level. This accumulation and averaging of Trip Information continues until the Driver Reward logs are reset.

Disadvantages

Increased road speed is one of the possible rewards for fuel-efficient driving habits. Thus, if you enable Driver Reward, a driver's Maximum Vehicle or Cruise Control speed could conceivably exceed the set limit for these parameters.

Driver Reward is based on a driver's performance on fuel economy and percent idle time. These performance parameters accumulate in the Trip Information feature as trip average fuel economy, trip idle time, and trip time, until they are reset. If the Driver Reward feature is turned on but is not being used by the customer, and the customer is not resetting it periodically, the Trip Information data will result in a large Trip Information history.

Recent driver performance, whether good or bad, has little impact on fuel economy/percent idle, and makes it very difficult to move up or down between different award levels.

Visual Aids

This table shows the reward provided according to various combinations of fuel economy and percent idle. The Less Than and Greater Than values are based on goals set by the customer.

Less Than Best Percent Idle

Less Than Good Percent Idle

Less Than Expected Percent Idle

Greater Than Expected Percent Idle

Greater Than Best Fuel Economy

Best Reward

Good Reward

Expected Reward

Penalty

Greater Than Good Fuel Economy

Good Reward

Good Reward

Expected Reward

Penalty

Greater Than Expected Fuel Economy

Expected Reward

Expected Reward

Expected Reward

Penalty

Less Than Expected Fuel Economy

Penalty

Penalty

Penalty

Penalty

Driver Reward monitors and analyzes the driver's trip fuel economy and trip idle time at regular intervals, providing the appropriate speed rewards or penalties once the selected company threshold standards are met. As the driver performance data accumulates over the course of a trip, the ECM averages the information and updates the reward level.

A driver must meet both fuel economy and time spent at idle performance standards at a particular level before the appropriate reward is provided.

Dual Accelerator Pedal

Feature Description

More information will be provided in an upcoming version of INSITE.

This procedure is not yet available at the time of publication.

Dual Outputs Based on Sensed Parameters

Feature Description

This feature provides up to two independent switched outputs for OEM use. The state of each switched output is determined by up to 13 different inputs to the ECM, depending on the engine.

The ECM can provide different outputs to OEM devices if any of the inputs are above or below calibrated thresholds. Control parameter input and threshold settings for each switched output are independent of other switched outlet settings.

The ECM determines the state of the switched outputs based on the following possible inputs (either one or both switched outputs can use the same inputs):

- Engine Speed (RPM)
- Commanded Fueling (mm³ per second)
- Boost Pressure (In Hg)
- Auxiliary Speed Input (rpm)
- Oil Pressure (psi)
- Coolant Temperature (degrees F)
- Commanded Throttle (percent)
- Intermediate Speed Control 2 Status (off or active)
- OEM Temperature (degrees F)
- OEM Pressure (psi)
- OEM Supplied Pressure (volts)
- OEM Supplied Switch (open or ground)
- Battery Voltage

Each of these inputs can have a specified threshold and threshold type (over or under). Each of the switched outputs can be calibrated to be either on or off after a threshold is passed. Also, each output can be calibrated to change states if any one or all thresholds are passed.

Note: INSITE can enable or disable this feature but cannot adjust the thresholds.

Adjustable Parameters

Dual Outputs Based on Sensed Parameters

Enable or disable this feature using the dropdown list in the **ECM Value** column.

The feature inputs, outputs, and thresholds must be set by a calibration that is specific to the application. INSITE can enable or disable this feature but cannot adjust the thresholds.

Driver Activation/Deactivation

This feature is activated or deactivated only by INSITE.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Electronic Air Compressor Governor

Feature Description

This feature controls the operation of the air compressor to maintain air pressure within acceptable limits. The air compressor is controlled to reduce its impact on engine performance and fuel consumption, unlike mechanical air compressor governors. A compatible air compressor governor, called an E-governor, must be installed for this feature to function. The E-governor contains an air pressure sensor and an air control valve that interface with the ECM.

This system uses the electronic air governor and the engine control system to save fuel and increase the life of the air compressor. It reduces the amount of fuel used by the engine to operate the air compressor by using available free energy during vehicle/engine braking. This feature also incorporates diagnostics that track air system usage and will log faults if minor or major air leaks are detected.

The ECM determines if air can be added to the wet tank when the engine is operating at light load or when the service brake and/or engine brakes are being applied during down hill operation. This can occur even if there is enough wet tank air pressure to operate the brakes. The operation allows the use of free energy to compress air for the wet tank/brake system.

The electronic air compressor governor loads or unloads the air compressor according to wet tank pressure and the engine motoring state. The engine is motoring if little or no fuel is being consumed, such as when traveling downhill.

- **Load Compressor** - The air compressor starts pumping air when the wet tank pressure falls to 105 psi. If the engine is motoring, the compressor starts pumping air

when wet tank pressure falls to 115 psi. If an air pressure sensor or valve control signal fault becomes active, the compressor will start pumping.

- **Unload Compressor** - The compressor stops pumping when wet tank pressure reaches 125 psi. If the engine is motoring, the compressor stops pumping when wet tank pressure reaches 135 psi. If an air pressure sensor or valve control signal fault are active, the compressor will continue to pump.

Adjustable Parameters

➤ Electronic Air Compressor Governor

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column. When enabled, the ECM controls the loading and unloading of the air compressor.

➤ OEM Minimum Wet Tank Pressure (OEM PasswordProtected)

This parameter defines the minimum wet tank air pressure, which the Electronic Air Compressor Governor feature uses as one reference to turn the air compressor on.

This setting is only available if **Electronic Air Compressor Governor** is enabled.

Driver Activation/Deactivation

There is no driver interaction to activate or deactivate the Electronic Air Compressor Governor.

Interaction with other Features and Parameters

This feature cannot be used in conjunction with ICON.

Special Instructions

A compatible air compressor governor, called an e-governor, must be installed for this feature to function.

Disadvantages

Possible complaints associated with this feature are that the compressor pumps when not expected or unloads when not expected, as compared to a mechanical air compressor governor.

Visual Aids

None

Electronic Smart Power (ESP)

Feature Description

This feature is available only in Electronic Smart Power ratings for N14, M11, ISM, Signature/ISX, and Signature/ISX - CM870 engines, and requires a special calibration to be loaded in the ECM by the OEM. The ratings are designed to improve driveability and performance.

Three types of ratings are available:

- Electronic Smart Power (ESP ratings)
- Smart Torque (ST ratings)
- Vocational Smart Power (VSP Ratings)

Electronic Smart Power (ESP ratings)

Electronic Smart Power ratings improve driveability in hilly terrain, which can result in more consistent road speed, faster trip times, less down-shifting, and greater driver satisfaction. Ratings use a control logic that switches to a higher power rating when operating conditions indicate that more torque is needed.

For Electronic Smart Power to engage, the following conditions must be met:

- Cruise Control is active or the accelerator is between 90%-100%.
- The transmission is in gear and the transmission drive ratio is less than 15.00-1.
- Vehicle speed is not above the maximum Cruise Control speed.
- No active fault codes related to the accelerator pedal, vehicle speed sensor, or engine position sensor are active.

While driving on near-level roads, the ECM monitors vehicle speed to determine a "learned speed". If vehicle speed drops below its "learned speed" by more than a calculated value (approximately 3 mph), the engine switches to the Electronic Smart Power high power rating. As soon as the "learned speed" is regained and the engine load is reduced (on near-level terrain), the engine returns to the normal power rating.

A momentary drop in acceleration, such as during a normal gearshift sequence, will not deactivate Electronic Smart Power. Using the service brake to reduce vehicle speed will not activate Electronic Smart Power mode, but if the vehicle is in cruise control, momentary use of the foot brake or clutch is allowed without disabling Electronic Smart Power.

Smart Torque (ST ratings)

Smart Torque ratings provide a higher torque curve while operating in the top two gears, regardless of vehicle speed. For Smart Torque to engage, the transmission must be in one of the top two gears.

Note: The top transmission gear ratio and one gear down transmission ratio must be set correctly for Smart Torque to operate properly.

Vocational Smart Power (VSP Ratings)

Vocational Smart Power ratings provide more torque at low vehicle speeds to help with hill climbing while loaded, truck acceleration from stop and/or merging into highway traffic, or in logging operations.

For Vocational Smart Power to engage, the following conditions must be met:

- The accelerator is between 90%-100%.
- The transmission is in gear and the transmission drive ratio is less than 9.0-1.
- Vehicle speed is not above the ECM-programmed maximum Cruise Control speed.
- No fault codes related to the accelerator pedal, vehicle speed sensor, or engine position sensor are active.

Adjustable Parameters

Electronic Smart Power, Smart Torque, and Vocational Smart Power can be enabled only by transferring an Electronic Smart Power calibration to the ECM. There are no adjustable parameters associated with the feature.

Driver Activation/Deactivation

There is no driver activation or deactivation for this feature.

Interaction with other Features and Parameters

Note:

- Electronic Smart Power will not activate if the intake manifold temperature is greater than a calibrated threshold, and will deactivate if the intake manifold temperature exceeds the threshold.
- Electronic Smart Power will not activate if the coolant temperature is greater than a calibrated threshold, and will deactivate if the coolant temperature exceeds the threshold.
- Smart Torque provides a higher torque curve while operating in the top two gears, regardless of vehicle speed.

Special Instructions

Electronic Smart Power, Smart Torque, and Vocational Smart Power can be enabled only by transferring an Electronic Smart Power calibration to the ECM.

Disadvantages

None

Visual Aids

None

Electronic Step Timing Control

Feature Description

Electronic STC (Step Timing Control) enables the ECM to control the STC valve, which controls and optimizes the engine timing over various engine speed and load conditions.

Adjustable Parameters

▶ Step Timing Control Engine Speed Hysteresis

The hysteresis around the engine speed switch point for the electronic STC control. See the diagram in Visual Aids below.

▶ Step Timing Control Engine Speed Threshold

The engine speed used as an engine speed switch point for the electronic STC control. See the diagram in Visual Aids below.

▶ Step Timing Control Fault Derate

The commanded rail pressure when an electronic STC fault is active.

▶ Step Timing Control Rail Pressure - Hysteresis 1

The hysteresis around the rail pressure switch point for the electronic STC control at Threshold 1. This amount of hysteresis will be used both above and below the pressure threshold value for Threshold 1.

See the diagram in Visual Aids below.

▶ Step Timing Control Rail Pressure - Hysteresis 2

The hysteresis around the rail pressure switch point for the electronic STC control at Threshold 2. This amount of hysteresis will be used both above and below the pressure threshold value for Threshold 2.

See the diagram in Visual Aids below.

Step Timing Control Rail Pressure - Threshold 1

A rail pressure point that defines the rail pressure switch points for the electronic STC control at lower engine speeds. See the diagram in Visual Aids below.

Step Timing Control Rail Pressure - Threshold 2

A rail pressure point that defines the rail pressure switch points for the electronic STC control at higher engine speeds. See the diagram in Visual Aids below.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

Electronic STC Parameters

Engine Brake Control

Feature Description

Engine brakes use the engine as an energy-absorbing air compressor that is used to slow the vehicle. The use of engine brakes along with the vehicle service brake can reduce wear on the service brakes and prolong their life.

Engine Brake Control options control the method of engine brake engagement, the rate at which the engine brakes are applied, and the vehicle speed range in which engine braking is allowed to operate when Cruise Control is engaged.

Engine brakes are activated when the OEM-supplied, cab-mounted On/Off engine brake switch is set ON. With the switch on, automatic activation of the engine brakes occurs when the following conditions (if applicable) are met:

- Clutch pedal is released
- Service brake is released
- Accelerator pedal is released
- No active vehicle speed sensor faults are present
- PTO and Remote PTO must be off
- Top 2 feature must be off
- Vehicle speed must be greater than the **Engine Brake Minimum Vehicle Speed** parameter
- Cruise control must not be performing Auto-Resume

A second OEM-mounted cab switch is provided to select the number of cylinders to use when the engine brake is activated. More cylinders enable greater braking power.

Adjustable Parameters

► Cruise Control Activation

Enables engine brake activation when vehicle speed exceeds the Cruise Control Set Speed.

Note: Engine brakes are available only when the OEM-supplied, cab-mounted On/Off engine brake switch is turned ON.

► Cruise Control Speed Delta for Maximum Engine Brake

The vehicle speed above the selected vehicle speed at which the Cruise Control feature will apply the maximum level of engine brakes. Application of the engine brakes will reduce the vehicle speed to the Cruise Control Set Speed. The cab-mounted engine brake selector switch determines the maximum level of engine brakes that is applied. Up to 100 percent of available engine braking can be applied.

Cruise Control Speed Delta for Maximum Engine Brake should be set at least 1 mph greater than **Cruise Control Speed Delta for Minimum Engine Brake**.

► Cruise Control Speed Delta for Minimum Engine Brake

The vehicle speed above the cruise control speed at which the cruise control feature will apply the minimum level of engine brakes. Application of the engine brakes will reduce the vehicle speed to the cruise control set speed. The cab-mounted engine brake selector switch determines the maximum level of engine brakes that is applied. Up to 33 percent of the available engine braking can be applied.

Cruise Control Speed Delta for Minimum Engine Brake should be set 1 mph greater than **Cruise Control Lower Droop**, to not interfere with normal Cruise Control speed fluctuations.

► Engine Brake Delay Time

Enables a delay after the engine brakes have been activated before the engine brakes are applied. This is used on automatic transmission, torque converter applications where a delay is required before the engine brakes are applied, enabling the transmission to shift.

Note: This should not be used with automated transmissions.

► Minimum Vehicle Speed

Sets the vehicle speed below which the engine brakes cannot be activated. This parameter prevents brake operation in urban areas where noise could be a problem.

► Rate Limit

Controls the rate at which the engine brakes are engaged and disengaged. When the brakes are initially activated the engine brakes are slowly engaged until the maximum brake level is reached.

The progressively increasing brake level is defined by the **Maximum Level Step Size** parameter and the position of the engine brake selector switch.

► Maximum Level Step Size

A percentage of the available engine braking that will be applied in steps when engine brakes are engaged or disengaged. The braking level increases by the maximum level step size percentage until 100 percent of the available braking level has been applied.

For example if the maximum level step size is set to 33 percent when the engine brakes are activated, 33 percent of the available braking level will be applied, then 66 percent,

then 100 percent until the maximum available braking level is reached. The engine brakes will be disengaged at the same rate.

The **Maximum Level Step Size** parameter is only adjustable if the **Rate Limit** parameter is enabled.

Service Brake Activation

Enables engine brake activation by releasing the accelerator pedal and depressing the service brake pedal.

Note: Engine brakes are available only when the OEM-supplied, cab-mounted On/Off engine brake switch is turned ON.

Driver Activation/Deactivation

The driver can activate the engine brakes by turning on the OEM-supplied, cab-mounted On/Off engine brake switch. With this switch turned on, automatic activation of the engine brakes occurs when the following conditions (if applicable) are met:

- Clutch pedal is released
- Service brake is released
- Accelerator pedal is released
- No active vehicle speed sensor faults are present
- PTO and Remote PTO must be off
- Top 2 feature must be off
- Vehicle speed must be greater than the engine brake **Minimum Vehicle Speed** parameter
- Cruise Control must not be performing Auto-Resume

A second OEM-mounted cab switch is provided to select the number of cylinders to use when the engine brake is activated. More cylinders enable greater braking power.

Interaction with other Features and Parameters

Enabling the **Cruise Control Activation** parameter allows the Cruise Control feature to automatically engage the engine brakes when the selected vehicle speed is exceeded while Cruise Control is active.

Special Instructions

The following special instructions apply:

- When the **Rate Limit** parameter is enabled the recommended setting for **Maximum Level Step Size** is 17, 33, or 50 percent. Other settings will result in an irregular rate of engine brake engagement.

For example if the **Maximum Level Step Size** is set to 40 percent, 40 percent of the available engine braking will be applied initially, followed by 40 percent more braking power for a total 80 percent, and then the final 20 percent of the braking will be applied for a total of 100 percent of the available braking. The application of the last 20 percent of available engine braking may be perceived by the driver as an irregular application of the engine brakes.

- **Cruise Control Speed Delta for Minimum Engine Brake** should be set 1 mph greater than the **Cruise Control Lower Droop** parameter, to not interfere with normal Cruise Control speed fluctuations.
- **Cruise Control Speed Delta for Maximum Engine Brake** should be set 1 mph greater than **Cruise Control Speed Delta for Minimum Engine Brake**, to not interfere with normal Cruise Control speed fluctuations.

Disadvantages

None

Visual Aids

None

Engine Oil Pressure Sensor

Feature Description:

The feature allows the user to adjust oil pressure settings on applications that can support multiple sensor types.

Adjustable Parameters:

Engine Oil Pressure Sensor

This is set by the calibration and may not be adjustable. When enabled, the Oil Pressure Sensor can be configured.

Oil Pressure Sensor

When enabled, the Oil Pressure Sensor allows the user to specify the oil pressure sensor type.

Sensor Type

This allows the user to select the oil pressure type that is installed on the engine.

- Analog — Analog to Digital (A/D) sensor
- Discrete — Switch

Auto Detect

When enabled, the ECM determines what type of oil pressure sensor type is installed.

Driver Activation/Deactivation:

None

Interaction with Other Features and Parameters:

None

Special Instructions:

None

Disadvantages:

None

Visual Aid:

None

Engine Performance Maximum Switched Engine Speed

Feature Description

This feature limits engine speed to a lower maximum speed when the engine is powering speed-sensitive equipment, such as a vehicle hydraulic system used in refuse trucks. An OEM-supplied switch is required for the operator to activate or deactivate the Maximum Switched Engine Speed.

When deactivated, the engine's maximum speed will be limited to the governed engine speed.

Adjustable Parameters

Switched Maximum Engine Operating Speed

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Maximum Switched Engine Speed

The speed at which engine RPM will be limited if the operator activates the switched speed.

This switched speed is most common in refuse trucks utilizing the "continuous packing" feature. A maximum engine operating speed is desired during operation so that the vehicle hydraulic system is not damaged by overspeed.

Maximum Operating Speed Switch Setup

Defines whether an open or closed maximum operating speed switch will activate the Maximum Switched Engine Speed.

Active Open will limit the engine speed to the value set for Maximum Switched Engine Speed when the switch is open. Active Closed will limit the engine speed to the value set for Maximum Switched Engine Speed when the switch is closed (grounded).

Driver Activation/Deactivation

Maximum Switched Engine Speed can be activated and deactivated by a switch on the dashboard or by OEM equipment switches.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Engine Protection

Feature Description

This feature monitors critical engine operating conditions such as coolant temperature, oil temperature, oil pressure, coolant level, intake air temperature, and intake manifold pressure. When an operating condition is outside of calibrated limits, a speed or fuel derate results. All calibrations except fire trucks and fire pumps include this feature.

In operation, the ECM monitors engine operating conditions while the engine is running. If one of the critical parameters exceeds the Engine Protection limit, as defined in the calibration, a derate occurs and a warning lamp is lit. The severity of the derate varies according to which engine operating condition has exceeded its Engine Protection limit.

Also, the severity of the derate may vary in relation to the severity of the event. For example, Intake Manifold Temperature that is slightly above a threshold for a short period of time will result in a mild derate. The purpose of the derate is to return intake temperature to a normal range. If the condition worsens, the derate will be more severe. If the condition persists or worsens, and **Engine Protection Shutdown** is enabled, the Stop lamp will flash to warn the operator of an impending shutdown event, and the engine will shutdown.

Note: If Restart Inhibit is enabled, the operator will not be permitted to restart the engine after an Engine Protection shutdown without first cycling the key switch to the OFF position.

Adjustable Parameters

Some of the parameters may not be available depending on the calibration.

▶ Engine Protection

The Engine Protection feature is either Enabled or Disabled by the calibration. This parameter can not be adjusted in INSITE™.

▶ Limited Restart

This option prevents the operator from restarting the engine after an Engine Protection shutdown without first cycling the key switch to the OFF position.

Note: If this option is not available or enabled, the engine may be restarted following an Engine Protection Shutdown event without the need to cycle the key switch to the OFF position.

▶ Engine Protection Shutdown

If enabled, engine shutdown occurs if Engine Protection limits are exceeded. This prevents or limits engine damage if an Engine Protection derate does not return operating conditions to an acceptable range, as defined by the calibration.

▶ Shutdown Manual Override

This option enables Engine Protection shutdown to be disabled by setting an OEM-installed manual override switch to the Override position.

▶ Engine Protection Exhaust Stack Temperature 1 and 2 Torque Derate Enable

When either of these is enabled, the engine will experience a speed or torque derate if the temperature in the exhaust stack of either the Left (A) or Right (B) Bank exceeds the calibrated threshold. Engine shutdown may occur if a derate does not return operating conditions to an acceptable range, as defined by the calibration.

Engine Protection Coolant Level Shutdown

The Engine Protection Coolant Level Shutdown is either Enabled or Disabled by the calibration. This parameter can not be adjusted in INSITE™.

Shutdown

If enabled, engine shutdown occurs when low coolant level is detected. This prevents or limits engine damage if a derate does not return operating conditions to an acceptable range, as defined by the calibration.

This will not be adjustable if a Coolant Level Sensor is not installed.

Switch Configuration

This parameter allows the user to select the type of override for the the engine protection override switch. There are two types of overrides

- a. **Shutdown and Derate Override** — the engine protection shutdown or derate can be temporarily overridden.
- b. **Shutdown Override** — the engine protection shutdown can be temporarily be overridden.

Note: Using these overrides to extend the run time of the engine with a possible engine protection fault, can cause damage to the engine and could negate the manufacturer's warranty. Overriding engine protection shutdown or derate is only recommended for safety reasons.

Engine Coolant Level Shutdown Type

This parameter simplifies the multiplexing design of the coolant level shutdown by selecting what input defines whether a shutdown will occur with low coolant. This can be set to either Trim or Multiplexing.

When set to Trim and a low coolant level is detected, the ECM will shutdown the engine if Shutdown is enabled.

When set to Multiplexing, it will follow the commands from the module selected in the Source Address.

Source Address

This is the source address of the module that is sending messages across the datalink. This parameter can only be adjusted when Engine Coolant Level Shutdown Type is set to Multiplexing.

Driver Activation/Deactivation

If Shutdown Manual Override is available in the calibration AND has been enabled with INSITE™ AND the OEM has installed a switch in the cab, the driver may disable shutdown using the cab-mounted switch.

Interaction with other Features and Parameters

None

Special Instructions

Do NOT enable **Engine Protection Shutdown** if the engine is installed in a school bus.

Disadvantages

None

Visual Aids

None

Engine Speed

Feature Description

This feature enables you to define values for engine speed parameters.

Adjustable Parameters

Maximum Engine Speed without Vehicle Speed Sensor

This parameter limits engine RPM if no vehicle speed is detected or if a fault is detected with the vehicle speed sensor or circuit.

1400 RPM is the recommended setting to maximize potential fuel savings while the vehicle is not moving. This setting also enables most vehicles to be driven to a repair location if a sensor or circuit fault is detected.

Maximum Switched Engine Speed

The speed at which engine RPM will be limited if switched engine speed is activated by the operator.

Driver Activation/Deactivation

Maximum Switched Engine Speed is activated and deactivated by a switch on the dashboard.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

Possible customer complaints due to **Maximum Engine Speed without Vehicle Speed Sensor** are engine RPM does not reach governed speed while vehicle is not moving.

Visual Aids

None

Engine Speed Cruise Control

Feature Description

Engine Speed Cruise Control Offers the ability to maintain a desired engine speed without an accelerator pedal or lever. The operator accelerates the engine to the desired engine speed, which becomes the engine speed cruise control set speed when the operator activates **Engine Speed Cruise Control**. Once activated, it controls the engine as needed to maintain the engine speed cruise control set speed. The operator may increase or decrease speed while **Engine Speed Cruise Control** has been deactivated.

Three operational modes are Active, Off and Standby are possible when Engine Speed Cruise Control is selected, depending on switch settings and operating conditions. See Driver Activation/Deactivation for additional information.

▶ **Engine Speed Cruise Control**

When enabled, this feature will allow the operator to automatically maintain a desired engine speed without an accelerator pedal or lever

▶ **Engine Speed Cruise Control Additional Settings**

When enabled, the following additional setting are available.

▶ **Accelerator Input Handling**

This parameter sets the mode of operation for Engine Speed Cruise Control when the accelerator pedal or lever is depressed.

- Increase Speed — allows the operator to increase engine speed above the cruise set speed.
- Decrease Speed — allows the operator to decrease engine speed below the cruise set speed.

▶ **Ramp Rate**

This parameter allows the user to set the rate of acceleration or deceleration for engine speed when the Engine Speed Cruise Control increment switch is engaged.

▶ **Save Speed at Power Down**

When enabled, the cruise set speed established prior to shutdown can be resumed after the next restart, using the resume function of the Cruise Set/Resume switch.

When disabled, the resume function is inoperative until a cruise set speed has been established using the Set function.

▶ **Step Size**

This parameter is used to set an incremental change in acceleration or deceleration.

▶ **Driver Activation/Deactivation**

Three operational modes are possible when Engine Speed Cruise Control is selected, depending on switch settings and operating conditions:

- **Active** — Engine Speed Cruise Control is currently controlling engine fueling to maintain the desired engine speed.
- **Off** — Engine Speed Cruise Control does not affect engine operation, and it can not be activated. The Engine Speed Cruise Control On/Off switch is OFF.
- **Standby** — The Engine Speed Cruise Control On/Off switch is **ON**, but Engine Speed Cruise Control has been deactivated and is no longer controlling the engine speed. Engine Speed Cruise Control remains on **Standby** when the Engine Speed Cruise Control On/Off switch is **ON**, until activation is requested by the operator using the Cruise Set/Resume switch. The operator can either set a new engine speed cruise control set speed or resume the current engine speed cruise control set speed. Activation is possible only when all of the following conditions are met:
 - Engine speed is **not** at idle.
 - Brake pedal is **not** depressed.
 - Clutch pedal is **not** depressed.

Interaction with Other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Engine Warmup Protection

Feature Description

This feature limits engine speed and torque upon startup, until sufficient oil pressure is available to the engine.

Note: No active oil pressure or oil pressure sensor faults can be present..

Adjustable Parameters

Engine Warmup Protection

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

None

Enhanced Auxiliary Shutdown Switch

Feature Description

This feature provides the adjustments to set up the Enhanced Auxiliary Shutdown Switch. When this feature is enabled, the Engine Protection Shutdown occurs as defined by the Enhanced Auxiliary Shutdown Switch Logic.

Adjustable Parameters

► Enhanced Auxiliary Shutdown Switch

This parameter allows the user to enable or disable the Enhanced Auxiliary Shutdown Switch.

► Enhanced Auxiliary Shutdown Switch Logic

This parameter allows the user to define whether an Open or Closed Enhanced Auxiliary Shutdown Switch will activate the Enhanced Auxiliary Shutdown Switch feature, when not multiplexed.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Enhanced Electronic Oil Level Sensor

Feature Description

This feature reads oil level at key-on and checks it against add thresholds, similar to a mechanical dipstick. The level is only read if the engine has been stopped long enough to allow the oil to drain back to the pan. This feature expands upon the capability of the Oil Level Electronic Dipstick.

Adjustable Parameters

► Oil Level Sensor Enhanced

This parameter allows the user to enable or disable the Enhanced Electronic Oil Level Sensor feature.

► Oil Level Electronic Dipstick Engine Power Angle

This parameter allows the user to set the power angle of the engine installed in the vehicle chassis.

► Oil Level Electronic Dipstick Horizontal Engine Tilt Angle

This parameter allows the user to set the angle at which the engine is installed in the chassis. When facing the front of the block, a negative tilt angle indicates that the engine has been tilted counter clockwise.

► Oil Level Electronic Dipstick Oil Pan Port Location

This parameter allows the user to specify the port in which the electronic oil dipstick level sensor is installed, which can be front port and cold engine side or middle port and cold side.

Oil Level Electronic Dipstick Oil Pan Type

This parameter allows the user to set the oil sump location. This can be either Front Sump or Rear Sump.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

This feature utilizes the Oil Level Electronic Dipstick Level monitor.

Special Instructions

None

Disadvantages

None

Ether Injection

Feature Description

More information will be provided in an upcoming version of INSITE.

Adjustable Parameters

Ether Injection

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

None

Fan Control

Feature Description

This feature controls an OEM supplied fan that is installed to meet the needs of vehicle and engine systems that rely on fan cooling for proper operation. This feature enables the ECM to turn the fan on or off in response to any of the following inputs:

- Engine operating conditions (coolant temperature, intake manifold temperature, etc.)
- Fan overspeed control
- Air conditioner operation
- Manual fan switch
- Engine performance requirements, such as engine braking
- Vehicle speed

Adjustable Parameters

► Fan Control

When enabled, this allows the user to set up the parameters for proper engine cooling, reducing intake manifold temperature, air conditioner refrigerant temperature, and aiding in engine braking.

► Fan Control Logic

When the **Fan Control** is enabled, this parameter will allow the user to set logic of the fan voltage.

- **0 Volt On** — The fan will turn ON at 0 volts and turn OFF at 12/24 volts.
- **12/24 Volt On** — The fan will turn ON at 12/24 volts and turn OFF at 0 volts.

► Air Conditioner Pressure Switch Input

Enables the ECM to respond to an air conditioner pressure switch installed by the vehicle manufacturer. The ECM will turn on the fan in response to signals from the air conditioner pressure switch.

► Minimum Fan On Time for Air Conditioner Pressure Switch

The minimum time that the fan will operate in response to the air conditioner pressure switch. This parameter can reduce fan cycling.

► Vehicle Speed Interaction

When enabled and the vehicle is stationary or at a low speed, when the air conditioning causes the fan to run, it will run continuously. The fan will continue to run until the vehicle exceeds a predefined calibrated vehicle speed threshold or the engine is shut down and restarted.

► Fan Control Switch

When enabled, the ECM will respond to a manual fan switch installed in the cab by the vehicle manufacturer. The operator may turn the fan on regardless of operating conditions.

► Air Conditioner Speed Control

This feature enables the fan to run continuously during idle with the air conditioner on. If this feature is enabled and the air conditioner pressure switch causes the fan to turn on, the fan will remain engaged until vehicle speed exceeds 6 miles per hour. When the

vehicle speed is above 6 miles per hour, the fan will run for at least the time specified by **Minimum Fan On Time for Air Conditioner Pressure Switch**.

► **Fan On During Engine Braking**

If enabled, the ECM turns on the fan with the engine brakes. This is typically calibrated to occur with extended brake operation only; for example, some calibrations will activate the fan if the engine brakes are held on for more than 15 seconds.

This feature provides extra parasitic load during periods of extended engine braking. Heavy-duty engines include a built-in delay that causes the fan to turn on after the engine brakes are activated.

► **Fan Minimum Run Time**

When enabled, the **Minimum Run Time** can be configured. This parameter is set by the calibration.

► **Minimum Run Time**

This is the minimum time the fan will run when ON.

► **Fan On With Remote Throttle**

When enabled, this will allow the fan to turn on when the remote throttle is in use.

► **Fan Type**

The ECM sends a signal to the fan actuator according to the type of fan selected:

- **On/Off** - also called "two-speed" fans; most ECM-controlled fans are this type. Many of these fans have an air-actuated clutch that is either completely engaged or completely disengaged.
- **Variable Speed** - Varies the speed as required to attain lowest noise and power loss.
- **Variable Speed Fan Frequency** - The frequency required by a variable speed fan. This value should be supplied by the vehicle manufacturer.
- **Tri-State** - also called a "three-speed" fan. It runs at a low speed when possible, for lower noise and power loss.
- **Electronic Viscous without Speed Sensor** - When the air temperature reaches a specific level, the control moves an actuator that allows viscous fluid to engage the fan drive and increase the fan speed. The Pulse Width Modulation fan control signal from the ECM is used to control the fan speed.
- **Electronic Viscous with Speed Sensor** - When the air temperature reaches a specific level, the control moves an actuator that allows viscous fluid to engage the fan drive and increase the fan speed. The fan speed sensor provides speed feedback to more accurately control the speed of the fan.
- **Variable Speed without Speed Sensor** - The Pulse Width Modulation fan control signal from the ECM is used to control and vary the speed.
- **Datalink Output** - this will allow the ECM to accept input from a multiplexed signal.
- **High Efficiency Viscous** - The Pulse Width Modulation fan control signal from the ECM is used to control and vary the speed at higher frequencies.

Note: If the fan controls are installed by the OEM and not controlled by the ECM, the fan is not affected by any of these choices.

► **OEM Pressure Input**

When enabled, the fan speed will be controlled by the OEM pressure sensor.

OEM Temperature Input

When enabled, the fan speed will be controlled by the OEM temperature sensor.

Drive Ratio

The ratio of the fan pulley revolutions to crankshaft pulley revolutions. For example a **Drive Ratio** of 1.2 indicates a fan pulley that is smaller than the crankshaft pulley, resulting in 1.2 fan revolutions for every crankshaft revolution.

The **Drive Ratio** enables the ECM to calculate fan speed and turn the fan off if the maximum fan speed is exceeded (refer to the vehicle manufacturer or fan manufacturer recommendations).

Maximum Fan Speed

The ECM prevents the fan from running above this speed, which is defined by the vehicle manufacturer (refer to the vehicle manufacturer or fan manufacturer recommendations). The correct fan **Drive Ratio** must be entered for this parameter to function properly.

Pulse Width Modulation Frequency

The pulse width modulation frequency required by a variable speed fan. This value should be supplied by the vehicle manufacturer.

Driver Activation/Deactivation

The driver may override the ECM to turn the fan on using the manual fan switch installed in the cab by the vehicle manufacturer.

When the manual fan switch is in the ON position, the fan remains on regardless of other engine operating conditions. When the manual fan switch is in the OFF position, the fan operates according to engine operating conditions and fan control parameters.

Interaction with other Features and Parameters

None

Special Instructions

The following special instructions apply:

- When troubleshooting a fan that won't turn on, first ensure that the correct type fan is selected.
- Most heavy-duty trucks use On/Off air-actuated fans.
- Many buses and RVs use hydraulically driven fans that are not controlled by the ECM.
- Verify system wiring.
- Does the fan clutch require 12 Volts or 0 Volts to turn ON?
- Is the ECM fan clutch driver wired directly to the fan clutch or is there a relay in between?
- If the fan is on all the time, ensure that the OEM-installed air conditioner pressure switch or manual fan switch has not failed.
- Ensure that the OEM-installed fan clutch solenoid is grounded. If the solenoid grounds through the body of the fan solenoid, it may be necessary to remove the solenoid and clean paint or corrosion from the mounting surface.

Disadvantages

Due to heat rejection, the **Fan On During Engine Braking** feature may appear inconsistent to some vehicle operators. For example, consider a calibration that engages the fan 15

seconds after engine braking starts. It may be possible for the fan to sometimes turn on sooner in response to air intake temperatures, coolant temperatures, or the air conditioner pressure switch.

Visual Aids

None

Fast Idle Warm-Up

Feature Description

This feature increases idle speed and runs the engine on 3 cylinders during extended idle periods in cold ambient conditions. When enabled, Fast Idle Warmup activates when the following conditions are met:

- The engine idles for 30 seconds
- No vehicle speed is detected
- Coolant temperature is 140 degrees Fahrenheit or colder
- Intake manifold temperature is 15 degrees Fahrenheit or colder

The ECM then commands the idle speed to increase to 1200 RPM and cuts out three cylinders. To maintain the fast idle speed while running on 3 cylinders, fueling for those cylinders is increased. This improves combustion efficiency and increases engine temperatures during extended idle periods in cold weather.

If the engine coolant temperature is below 32 degrees Fahrenheit, Fast Idle Warmup will activate regardless of intake manifold temperature. Subsequently if coolant temperature increases above 170 degrees Fahrenheit, Fast Idle Warmup automatically deactivates. Fast Idle Warmup can also be deactivated under the following conditions:

- The vehicle is equipped with a clutch switch and the clutch is depressed
- The vehicle is equipped with a brake switch and the service brake pedal is depressed
- The accelerator is depressed

When Fast Idle Warmup deactivates, engine speed returns to the normal idle speed, and the engine idles on all 6 cylinders.

Fast Idle Warmup can be activated on vehicles equipped with manual transmissions, when coolant temperature is below 140 degrees Fahrenheit and intake manifold temperature is below 15 degrees Fahrenheit, by depressing the brake pedal and holding it in the depressed position. Fast Idle Warmup will activate after 30 seconds. Fast Idle Warmup will NOT activate by this method if any one of the following conditions are present:

- Vehicle speed is present
- Vehicle Speed tampering faults are active
- Vehicle speed signal faults are active
- On vehicles equipped with manual transmissions, Fast Idle Warmup will activate if the clutch or service brake are held in a depressed position. To deactivate Fast Idle Warmup when this occurs, be sure the vehicle transmission is in neutral, then release the clutch or service brake.
- If the vehicle is equipped with an automatic transmission and the service brake is depressed, Fast Idle Warmup will deactivate.
- While Fast Idle Warmup is active, you can not adjust the low idle speed using the increment or decrement switch.

- If the low idle shutdown feature is enabled, it will shut off the engine after the low idle shutdown time has expired. If the low idle shutdown override feature is enabled, the low idle shutdown can be overridden just as if the Fast Idle Warmup feature were not active. Using the accelerator, clutch, or service brake to override low idle shutdown will not deactivate Fast Idle Warmup during the low idle shutdown override period.
- If the vehicle is equipped with PTO, Fast Idle Warmup will activate during PTO if the PTO speed is below 1600 RPM, the PTO load is below a set threshold, and the conditions outlined above are met. If the PTO engine speed is greater than a 1600 RPM or the load is greater than the threshold that has been set, Fast Idle Warmup will not activate. The default load percentage is set at 10%.
- If the engine ECM is responding to a J1939 engine control message from a transmission controller, Fast Idle Warmup will deactivate.

Adjustable Parameters

Fast Idle Warmup

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Fast Idle Warmup Idle Speed

This parameter allows minor adjustment of the Fast Idle Warmup speed and can be used to reduce vibration, such as mirror shake, depending on the application. The default speed is set at 1200 RPM.

Fast Idle Warmup PTO Load Threshold

The PTO load that is used to determine whether Fast Idle Warmup should activate. This parameter should be set as low as possible to insure that Fast Idle Warmup will activate to maintain engine temperatures without interfering with the PTO operating speed or load.

The default value for this parameter is 10%.

Driver Activation/Deactivation

On vehicles equipped with manual transmissions, the driver can activate Fast Idle Warmup by depressing and holding the service brake pedal. Fast Idle Warmup will activate after 30 seconds if the coolant and intake manifold temperatures are below the set thresholds.

To deactivate Fast Idle Warmup, depress the clutch pedal, service brake pedal, or accelerator.

- The vehicle must be equipped with a clutch switch for the clutch to deactivate Fast Idle Warmup.
- The vehicle must be equipped with a service brake switch for the service brake pedal to deactivate Fast Idle Warmup.

Interaction with other Features and Parameters

Fast Idle Warmup will not activate if PTO is activated and the load exceeds the defined threshold. Fast Idle Warmup will deactivate if the PTO load is under the load threshold, but exceeds the threshold during PTO operation.

If faults are detected on either the coolant temperature sensor circuit or the intake manifold temperature sensor circuit, Fast Idle Warmup uses the lowest intake manifold and coolant temperatures recorded since the key switch was turned ON to determine whether Fast Idle Warmup will activate.

If vehicle speed tampering or vehicle speed signal faults are detected, Fast Idle Warmup will not activate.

Special Instructions

On vehicles equipped with manual transmissions, Fast Idle Warmup will activate if the clutch or service brake are held in a depressed position. To deactivate Fast Idle Warmup when this occurs, make sure the vehicle transmission is in neutral, then release the clutch or service brake.

The **Fast Idle Warmup State** Monitor parameter can be used to determine whether the ECM is commanding Fast Idle Warmup:

- If the state is **Inactive** Fast Idle Warmup is not active.
- If the state is **Delay** the ECM is within the 30 seconds delay time before Fast Idle Warmup will become active.
- If the state is **Ramp** Fast Idle Warmup is active and the engine speed is ramping from the low idle speed to the Fast Idle Warmup speed.
- If the state is **Active** then Fast Idle Warmup is active.

Disadvantages

Possible complaints are:

- The engine speed and sound changes automatically - check to see if Fast Idle Warmup is enabled.
- Minor mirror shake may be present when Fast Idle Warmup is active, depending on the OEM equipment.

Visual Aids

None

This procedure is not yet available at the time of publication.

This procedure is not yet available at the time of publication.

Fuel Consumption Rate Logger

Feature Description

This feature monitors fuel usage over the life of the engine. It also maintains a bar graph of short term fuel consumption for each of the last 40 hours of engine operation. Fuel consumption is measured in gallons per hour (gph).

The bar graph displays engine hours on the horizontal axis and fuel consumption on the vertical axis. A maximum of 40 bars, representing 40 hours of engine operation, can be displayed. Each bar represents average fuel consumption for one hour of engine operation.

The Fuel Consumption Rate Logger also displays the following information:

Instantaneous Fuel Rate: The current fuel consumption rate at the moment the Fuel Consumption Rate Logger is opened. This rate represents the rate of diesel fuel injection.

Short Term Hour: Identifies which hour is being monitored in the current 40-hour period that is displayed in the bar graph.

Hour Counter: The number of minutes elapsed in the current hour being monitored.

Long Term Fuel Rate: The average fuel consumption rate over the life of the engine.

Long Term Time: The number of engine hours included in the calculation of the Long Term Rate.

Adjustable Parameters

▶ Reset

This function clears the currently displayed short term fuel rate graph, however the long term (cumulative) fuel rate information is retained.

The Fuel Consumption Rate Logger (short term fuel rate) can be reset at any time.

▶ Print

This function prints the graph and its related information.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

The Short Term Rate Logger has logged 15 hours of data since the last RESET. Currently the engine has run for 32 minutes into the 16th hour of engine operation.

The engine has averaged 34.1 L/hr over its life.

Fuel Heater Control

Feature Description

This feature monitors the fuel temperature and is used to raise fuel inlet temperature when it is below a set temperature. The fuel temperature will cause a relay that controls the fuel heater to either turn on or off.

If On, the fuel temperature is below the accepted value and the fuel heater is being commanded on so that the fuel heater element can raise the fuel temperature. If Off, the fuel temperature is above the set value and does not require heating.

The fuel heater control attempts to minimize the number of times it is turned on/off in order to prevent excessive cycling of the fuel heater.

Adjustable Parameters

None

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

The parameter "Fuel Heater" will not function if fault code 261 - Fuel Temperature High Warning is active.

Special Instructions

The parameter "Fuel Heater" can be monitored with the INSITE Monitor feature.

Disadvantages

None

Visual Aids

None

Fuel Inlet Restriction Monitor

Feature Description

This feature alerts the operator that the fuel inlet restriction is above specification at the fuel pump inlet. This condition is usually caused by a plugged fuel filter that requires a service interval.

Fuel restriction is continually monitored by the ECM. If the restriction reaches a calibrated level, a fault code is logged and the warning lamp will be lit.

Adjustable Parameters

Fuel Inlet Restriction Monitor

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

This feature can be activated and deactivated only by INSITE.

Interaction with other Features and Parameters

Fault code 583, "Fuel Supply Pump Inlet Pressure Low - Warning Level", is logged when the inlet restriction value is above specification.

Special Instructions

Note:

- The Fuel Inlet Restriction Monitor feature requires the installation of specific hardware, including an electronic pressure sensor, OEM wiring harness, and mounting hardware.
- Fuel inlet restriction pressure can be monitored in INSITE using the Data Monitor/Logger feature.

Disadvantages

None

Visual Aids

None

Fuel Usage Adjustment Factor

Feature Description

This feature allows adjustment of the cumulative Fuel Used displayed in Trip Information to correct for any difference between the actual fuel usage and the cumulative Fuel Used displayed in Trip Information.

Adjustable Parameters

Adjustment Factor

Factor which is applied to the ECM Fuel Usage value. The range will vary by engine platform

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Gear-Down Protection

Feature Description

This feature encourages the operator to use the more fuel-efficient top gear by allowing maximum vehicle speed only while driving in the top gear.

Example

An on-highway truck is programmed as follows:

- Accelerator Maximum: 70 mph (this is a Vehicle Speed parameter)
- Maximum Speed - Light Engine Load: 66 mph
- Maximum Speed - Heavy Engine Load: 69 mph

In this example, the operator of the truck can achieve 70 mph only while in the top gear. If the ECM detects that the engine is heavily loaded, the engine will provide full power up to 69 mph in the lower gears. Meanwhile, if the ECM detects that the engine is not heavily loaded, the

engine will provide full power up to 66 mph (as defined by the **Maximum Speed - Light Engine Load** and **Maximum Speed - Heavy Engine Load**).

In this example, the **Maximum Speed - Light Engine Load** is set low enough that when the truck is lightly loaded and could be driven in the top gear, there is sufficient incentive to drive in the top gear. The **Maximum Speed - Heavy Engine Load** is set closer to the maximum speed in top gear; this allows the driver to "pull" in a gear lower than top gear if the engine is heavily loaded.

With the feature activated, driving in one gear lower than top gear will result in engine speeds limited to those defined by **Maximum Speed - Light Engine Load** or **Maximum Speed - Heavy Engine Load**. If the vehicle is downshifted more than one gear, the maximum vehicle speeds will be limited further by an additional -3 mph.

Transmission Gear

Heavy Load - Max. Speed

Light Load - Max. Speed

Top Gear

70

70

Gear Down

69

66

All Lower Gears

66

63

Adjustable Parameters

► Gear-Down Protection

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

► Maximum Speed - Heavy Engine Load

The maximum speed allowed while not in the top transmission gear when the engine is heavily loaded. This speed should be set close to or equal to the **Vehicle Speed Accelerator Maximum** parameter.

► Maximum Speed - Light Engine Load

The maximum speed allowed while not in the top transmission gear and the engine is lightly loaded.

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE.

Interaction with other Features and Parameters

Gear-Down Maximum Speeds can be set no higher than the settings for **Accelerator Maximum** and **Global Maximum** speeds. (These are both Vehicle Speed parameters.)

The following Transmission parameters must be set properly or this feature will not work as expected:

- **Top Gear Transmission Ratio** - if set incorrectly high or low, the ECM calculation of selected gear will be incorrect.
- **Gear Down Transmission Ratio** - if set incorrectly high or low, ECM calculation of gear selected gear will be incorrect.
- **Tire Revolutions per Distance** - if set incorrectly high or low, ECM calculation of vehicle speed will be incorrect.
- **Rear Axle Ratio** - if set incorrectly high or low, ECM calculation of vehicle speed will be incorrect.
- **Tailshaft Gear Teeth** - if set incorrectly high or low, ECM calculation of vehicle speed will be incorrect.

Special Instructions

It is recommended that **Maximum Speed - Heavy Engine Load** be set no more than 3 mph less than the **Accelerator Maximum** and **Maximum Speed - Light Engine Load** be set no more than 5 mph less than the **Accelerator Maximum**.

Example

A truck is powered by an 8.3 liter engine with torque peak at 1500 rpm, and is equipped with a 10-Speed Transmission. This truck can obtain 60 mph in 9th gear at a corresponding 1600 rpm engine speed, but 60 mph in 10th gear corresponds to 1300 rpm engine speed. If **Maximum Speed - Heavy Engine Load** is set to 60 mph, the driver will be forced to "lug" the engine in top gear. This setup will likely lead to performance complaints.

Disadvantages

If the difference between **Maximum Speed - Heavy Engine Load** and **Accelerator Maximum** is too great, the customer may be forced to "lug" the engine in top gear (a possible performance complaint).

Visual Aids

None

Governor Setup

Feature Description

This feature enables you to set breakpoint and droop for Switch position 1 (Primary) of either the Automotive (Breakpoint 1) or Variable Speed (Maximum and Minimum Throttle) governors. The initial settings in this window are the default settings for the engine, regardless of whether Alternate Droop settings are enabled.

Adjustable Parameters

Breakpoint 1 Speed

Sets the engine speed (RPM) that activates droop during normal operating conditions. Use the spin box to adjust the rpm value up or down.

Droop at Breakpoint 1

Sets the percentage of droop at Breakpoint 1. Use the spin box to adjust the percentage up or down.

Isochronous Breakpoint Speed

Sets the breakpoint speed in rpms. Use the spinbox to adjust the speed up or down.

Droop at Maximum Throttle

Sets the percentage of droop for Throttle Droop Switch position 1 at maximum throttle.
Use the spin box to adjust the percentage up or down.

Droop at Minimum Throttle

Sets the percentage of droop for Throttle Droop Switch position 1 at minimum throttle.
Use the spin box to adjust the percentage up or down.

Auxiliary Speed Governor Enable

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Grid Heater

Feature Description

The air intake heater control helps the combustion process while starting in cold temperatures by controlling the heating elements in the engine's intake air system. The ECM controls the heating elements in two phases, pre-heat and post-heat. The amount of time that the intake air heater remains on depends on the intake manifold temperature at key On.

Pre-heat (after key On and before cranking):At key On, the ECM checks the intake manifold air temperature. Based on this temperature, the ECM lights a "Wait to Start" lamp and energizes the intake air heaters. After a calibrated period of time, the ECM turns off the intake air heaters and the "Wait to Start" lamp turns off. Once the lamp is off, the operator can crank the engine. Pre-heat time increases with colder intake manifold air temperatures.

Post-heat (after successful engine starting):During cranking, the intake air heater is turned off to allow maximum current for the starter. The post-heat phase starts after a successful engine start. The ECM cycles the heaters based on the intake manifold air temperature at key On. This cycle can operate for several minutes on very cold days before the heaters are de-energized. The post-heat phase controls white smoke after startup.

Adjustable Parameters

IAH24V Enable

Enables 24V system voltage.

Intake Air Heater Enable

Select to enable or disable this feature using the dropdown list in the ECM Value column.

Driver Activation/Deactivation

This feature is calibration-dependent and is not adjustable.

Interaction with other Features and Parameters

This feature interacts with the Starter Lockout feature. During the post-heat phase after the engine has been started (and only when the intake air heaters are on), the starter lockout feature will not prevent the starter from being engaged by the operator.

Special Instructions

Depending on the application, the engine may have 1 or more intake air heaters. The heaters are controlled by the ECM via a relay connected to the battery supply.

Disadvantages

During the post-heat phase after the engine has started, the ammeter gauge may fluctuate during the automatic cycling of the intake air heaters.

To eliminate the possibility of hard starting in cold ambient temperatures, the operator should wait for the "Wait to Start" lamp to turn off before attempting to start the engine.

Visual Aids

None

Hybrid Power

Disadvantages

More information will be provided in an upcoming version of INSITE

Idle Management

Feature Description

Idle speed can reduce the amount of fuel burned or decrease cab noise and vibration. INSITE is used to set the desired low idle speed, however the driver can override the preset value by using an OEM-supplied idle speed adjustment switch.

Idle shutdown reduces the amount of fuel burned and increases engine life by shutting down the engine after a period of engine idling with no driver activity. Before the shutdown occurs a flashing warning lamp warns the driver of an impending shutdown.

Idle shutdown operates when the engine is in the ISC mode unless a specific load threshold is exceeded. Idle shutdown can be automatically overridden during cold ambient temperatures if equipped with an OEM supplied ambient air temperature sensor.

Adjustable Parameters

Idle Shutdown

Helps increase fuel efficiency and engine life by shutting down an idling engine when there is no operator input for a specified time period.

Before shutdown occurs, a warning period is provided during which the warning lamp flashes. During the warning period, the pending shutdown may be halted by a change in engine speed or throttle position.

▶ Low Idle Speed

Sets the default low idle speed. Use the spin box to adjust RPM up or down.

▶ Low Idle Droop

The percentage of droop at low idle. This allows the engine to idle above the low idle speed setting and droop back to low idle speed when load is applied to the engine.

▶ Low Idle Adjustment

Enables an increase or decrease of the low idle speed by 25 RPM increments using the toggle switch in the cab. This is an operator's convenience that allows for elevated engine speeds during idle operation, however it can reduce fuel economy.

▶ Alternate Low Idle Speed

The idle speed when the Alternate Low Idle Switch is ON. Use the spin box to adjust rpm up or down.

This parameter may be configured to require a normal idle to alternate idle switch transition before switching to alternate idle at start-up.

- Alternate Idle Speed is adjustable only by the ECM; it cannot be changed or adjusted using the increment/decrement switch in the cab.
- The Alternate Idle Speed can never be less than the Low Idle Speed.

▶ Idle Speedup Enable

Enables an automatic increase in idle speed if low battery voltage levels are detected. The idle speed will be increased to the high idle setting in an effort to increase battery voltage during conditions that place a heavy electrical load on the charging system.

▶ Idle Shutdown Time

The number of minutes that an engine will idle before it is automatically shut down.

▶ Ambient Temperature Override

Select to enable or disable this parameter using the dropdown list in the **ECM Value** column. **Ambient Temperature Override** serves two purposes:

- It can prevent a manual override in temperate climates when heating and cooling are not required.
- It can perform an automatic override in cold weather, when heating is always required.

Note: An OEM-supplied ambient air temperature sensor is required to use this parameter.

▶ Cold Ambient Air Temperature

Below this threshold idle shutdown will be automatically overridden to allow for cab heating. This parameter is available only if **Ambient Temperature Override** is enabled.

This value can be set between 0 and 160 Fahrenheit but must be equal to or less than the **Intermediate Ambient Air Temperature**. An OEM-supplied ambient air temperature sensor is required.

▶ Hot Ambient Air Temperature

Above this temperature, the driver can manually override idle shutdown during the shutdown period. This allows continued vehicle cab cooling during high outside air temperatures.

This value must be equal to or greater than the Intermediate Air Temperature. The parameter is available only if the manual override parameter is enabled.

An OEM-supplied ambient air temperature sensor is required to use this parameter.

► **Intermediate Ambient Air Temperature**

Below this temperature the driver can manually override idle shutdown. Above this temperature but below the hot air temperature, manual shutdown is disabled because vehicle cab heating or cooling should not be required.

This value must be equal to or less than the Hot Air Temperature. The parameter is available only if the manual override parameter is enabled.

An OEM-supplied ambient air temperature sensor is required to use this parameter.

► **In ISC**

Enables idle shutdown when ISC (Intermediate Speed Control) mode is engaged.

► **Manual Override**

Enables an idle shutdown to be overridden during the pending shutdown period. To override automatic shutdown, the driver must activate the service brake, clutch, or accelerator pedal during the 30-second period prior to shutdown. During this period a flashing warning lamp notifies the driver of the impending shutdown. If the override is successful the warning lamp flashes every half second for 2 minutes.

If an override occurs during the 30-second warning period, the shutdown timer is reset.

Driver Activation/Deactivation

The driver can not activate or deactivate the idle shutdown feature. This feature can only be activated or deactivated by INSITE. However the driver can adjust the idle speed if an OEM-supplied idle adjustment switch is available in the cab.

To manually override an automatic idle shutdown, **Manual Override** must be enabled in INSITE and the driver must activate the brake, clutch or accelerator pedal during the 30 second period prior to shutdown. A flashing warning lamp notifies the driver that engine shutdown is pending. If the override is successful the warning lamp will flash every half second for 2 minutes.

Interaction with other Features and Parameters

Idle shutdown can cause the engine to shutdown when in ISC mode.

Special Instructions

The idle shutdown feature shuts the engine off but does not turn off power to accessories powered by the key switch. Note that vehicle accessories that are left on can drain the batteries.

Disadvantages

Note the following:

- Incorrect adjustment of the low idle speed may cause excessive vehicle vibration or slightly decreased fuel economy.
- The idle shutdown feature will not activate if fault code 241 is active.
- When stopped in traffic for extended periods the engine will be shutdown.

Visual Aids

Idle speed can reduce the amount of fuel burned or decrease cab noise and vibration. INSITE is used to set the desired low idle speed, however the driver can override the preset value by using an OEM-supplied idle speed adjustment switch.

Idle shutdown reduces the amount of fuel burned and increases engine life by shutting down the engine after a period of engine idling with no driver activity. Before the shutdown occurs a flashing warning lamp warns the driver of an impending shutdown. The driver can override the shutdown by depressing the service brake, clutch or accelerator pedal during the warning period.

Idle shutdown operates when the engine is in the ISC (Intermediate Speed Control) mode unless a specific load threshold is exceeded. Idle shutdown can be automatically overridden during cold ambient temperatures if equipped with an OEM supplied ambient air temperature sensor.

The chart below indicates when manual and automatic overrides are available.

Manual Override

Automatic Override

Below Cold Air temperature

No

Yes

Between Cold and Intermediate Air Temperature

Yes

No

Between Intermediate and Hot Air Temperature

No

Yes

Above Hot Air Temperature

Yes

No

Idle Ramp Down

Feature Description

The Idle Rampdown feature ramps down the idle speed when the engine is left to idle beyond the **Idle Rampdown Period** and below the **Idle Rampdown Load Threshold**. Before an idle rampdown occurs, a warning is provided as defined by the **Idle Rampdown Warning Period**.

Adjustable Parameters

Idle Rampdown

When enabled, this parameter allows the Idle Rampdown feature to function.

Idle Rampdown Load Threshold

This parameter allows the user to set the engine load above which idle rampdown will not occur.

Idle Rampdown Override Enable

When enabled, the operator will be able to override an impending idle rampdown.

Idle Rampdown Period

This parameter allows the user to set the amount of time the engine will idle before an idle rampdown occurs.

Idle Rampdown Warning Period

This parameter is the amount of time after the warning before an idle rampdown occurs. It is set by the calibration.

Idle Rampdown Additional Settings

When enabled, this parameter allows the user to set additional parameters that affect, or conditions that must be met, before an idle rampdown occurs.

Accelerator Position Override

This parameter allows the user to set the accelerator pedal or lever position where an idle rampdown will not occur.

Coolant Temperature Threshold

This parameter allows the user to set the coolant temperature that has to be reached before an idle rampdown will occur. This can be used to ensure that the engine stays warm during cold weather conditions.

Low Speed Limit

This parameter allows the user to set the final engine speed when idle rampdown occurs.

Ramp Up Rate

This parameter allows the user to set the rate at which the engine speed increases to **Low Idle Speed** after an idle rampdown.

Rampdown Rate

This parameter allows the user to set the rate at which the engine speed decreases to **Low Speed Limit** when idle rampdown occurs.

Warning Lamp Enable

When enabled, a warning light will alert the operator of an impending idle rampdown.

Driver Activation/Deactivation

When **Idle Rampdown Override Enable** is enabled, a pending rampdown may be temporarily overridden by depressing the service brake, clutch, or accelerator.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Idle Shutdown

Feature Description

This feature shuts down the engine after a period of engine idling and no driver activity, reducing the amount of fuel burned and increasing engine life. Before the shutdown occurs a flashing lamp warns of an impending shutdown. The driver can override shutdown by depressing the service brake, clutch, or accelerator pedal during the warning period.

Idle Shutdown operates when the engine is in Power Take Off (PTO) mode unless a specific load threshold is exceeded. Idle Shutdown is automatically overridden during cold ambient temperatures if equipped with an OEM-supplied ambient air temperature sensor.

Adjustable Parameters

▶ Idle Shutdown

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

▶ Ambient Temperature Override

Check the box to enable this feature, which serves two purposes:

- It can prevent a manual override in temperate climates when heating and cooling are not required
- It can perform an automatic override in cold weather, when heating is always required.

Note: An OEM-supplied ambient air temperature sensor is required to use this parameter.

▶ Cold Ambient Air Temperature

Below this threshold idle shutdown will be automatically overridden to allow for cab heating. This parameter is available only if **Ambient Temperature Override** is enabled.

This value can be set between 0 and 160 Fahrenheit but must be equal to or less than the **Intermediate Ambient Air Temperature**. An OEM-supplied ambient air temperature sensor is required.

▶ Hot Ambient Air Temperature

Above this temperature the driver can manually override idle shutdown during the shutdown period. This allows continued vehicle cab cooling during high outside air temperatures.

This parameter can be set to any value between 0 and 160 Fahrenheit but must be equal to or greater than the **Intermediate Ambient Air Temperature**. This parameter is available only if **Manual Override** is enabled. Also, an OEM-supplied ambient air temperature sensor is required.

▶ Intermediate Ambient Air Temperature

Below this temperature the driver can manually override idle shutdown during the shutdown period. Above this temperature and below the **Hot Ambient Air Temperature**, manual shutdown is disabled because cab heating or cooling should not be required.

This parameter can be set to any value between 0 and 160 Fahrenheit but must be equal to or less than the **Hot Ambient Air Temperature**. This parameter is available only if

Manual Override is enabled. Also, an OEM-supplied ambient air temperature sensor is required.

► Service Brake Switch Interaction

When this feature is enabled and a Service Brake Switch is available, Idle Shutdown is overridden when the Service Brake is depressed.

► Shutdown in PTO

Enables idle shutdown when PTO mode is engaged and the percent loading on the engine is below the **Shutdown Percent Engine Load** threshold.

► Shutdown Percent Engine Load

The percent engine load threshold that is required when in PTO mode to prevent the engine from being shutdown. If this threshold is not exceeded the engine will be shutdown.

The parameter should be set low enough to prevent unwanted idle shutdowns if the PTO governor is operated while the vehicle is parked, but high enough to prevent defeating engine shutdown by the PTO feature.

► Manual Override

This parameter allows a pending idle shutdown to be overridden during a 30-second period prior to shutdown.

To override a shutdown the driver must activate the service brake, clutch, or accelerator pedal during the 30-second period prior to shutdown. During this period a flashing warning lamp notifies the driver of the impending shutdown. If the override is successful the warning lamp will flash every half-second for 2 minutes.

If this parameter is disabled, the operator can still reset the idle shutdown timer to zero by activating the service brake, clutch, or accelerator pedal during the 30-second warning period. When an idle condition is detected again the warning period restarts.

Note: If an OEM-supplied ambient air temperature sensor is installed, manual override is not allowed when outside air temperatures eliminate the need for heating or cooling.

► Idle Shutdown with Parking Brake Set

When this feature is enabled, and a Parking Brake Switch is available, Idle Shutdown will only occur when the Parking Brake is set.

► Time Before Shutdown

The number of minutes that the engine can idle before it is automatically shut down. The idle shutdown time begins once the engine reaches idle speed with or without PTO (or remote PTO) mode turned on.

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE.

To override an automatic idle shutdown, the driver must activate the brake, clutch, or accelerator pedal during the 30-second period prior to shutdown. During this period a flashing warning lamp notifies the driver of the impending shutdown. If the override is successful the warning lamp flashes every half-second for 2 minutes.

Interaction with other Features and Parameters

The following interactions apply:

- Idle Shutdown can cause the engine to shutdown in PTO if the **Shutdown Percent Engine Load** threshold is not exceeded.
- Idle Shutdown must be enabled if ICON is enabled, and **Ambient Temperature Override** should be disabled.

Special Instructions

Note the following:

- Idle Shutdown shuts the engine off but does not turn off power to accessories powered by the key switch. Therefore vehicle accessories that are left on may drain the batteries.

Note: An optional idle shutdown relay is available that will turn off power to accessories powered by the key switch.

- The **Ambient Temperature Override**, **Cold Ambient Air Temperature**, **Intermediate Ambient Air Temperature**, and **Hot Ambient Air Temperature** parameters are available only if an OEM-supplied ambient air temperature sensor is used.
- With bus engine calibrations, holding the brake pedal depressed overrides Idle Shutdown in traffic jams until vehicle speed is sensed by the ECM.
- **Manual Override** resets the idle timer. When the ECM senses vehicle speed after an idle period, the idle timer is reset.

Disadvantages

Idle Shutdown cannot activate if fault code 241 is active.

When stopped in traffic for extended periods, the engine will be shutdown.

Visual Aids

None

Idle Speed

Feature Description

This feature can reduce the amount of fuel burned and/or decrease cab noise and vibration. The low idle speed can be set to the desired idle speed, however the driver can override this value using an OEM-supplied idle speed adjustment switch.

Adjustable Parameters

➤ Low Idle Adjustment

Using the dropdown list, select to **Enable** or **Disable** adjustment of the engine idle speed via an OEM-supplied idle speed adjustment switch.

➤ Low Idle Speed

The engine idle speed when the throttle is released and the Cruise Control and PTO features are disengaged.

Driver Activation/Deactivation

The driver can adjust the idle speed if an OEM-supplied idle adjustment switch is installed in the cab.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

Incorrect adjustment of the **Low Idle Speed** setting may cause excessive vehicle vibration or slightly decreased fuel economy.

Visual Aids

None

Immobilizer

Feature Description

This feature is an anti-theft device. It prevents anyone from starting the engine with a key that does not have the correct embedded electronic code.

When the key is inserted into the key switch, encrypted data is sent to the ECM. If the encrypted data is validated as being correct, then the engine will be allowed to start.

Adjustable Parameters

Immobilizer

Select the feature name to enable or disable the feature using the dropdown list in the ECM Value column.

Immobilizer Key Known

If this option is available, contact your Cummins distributor for more information.

Driver Activation/Deactivation

This feature can be activated or deactivated only with INSITE.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Intake Air Heater Control

Feature Description

The air intake heater control helps the combustion process while starting in cold temperatures by controlling the heating elements in the engine's intake air system. The ECM controls the heating elements in two phases, pre-heat and post-heat. The amount of time that the intake air heater remains on depends on the intake manifold temperature at key On.

Pre-heat (after key On and before cranking):At key On, the ECM checks the intake manifold air temperature. Based on this temperature, the ECM lights a "Wait to Start" lamp and energizes the intake air heaters. After a calibrated period of time, the ECM turns off the intake air heaters and the "Wait to Start" lamp turns off. Once the lamp is off, the operator can crank the engine. Pre-heat time increases with colder intake manifold air temperatures.

Post-heat (after successful engine starting):During cranking, the intake air heater is turned off to allow maximum current for the starter. The post-heat phase starts after a successful engine start. The ECM cycles the heaters based on the intake manifold air temperature at key On. This cycle can operate for several minutes on very cold days before the heaters are de-energized. The post-heat phase controls white smoke after startup.

Adjustable Parameters

This feature controls the heating elements, which will turn on and heat the intake air in cold temperatures.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

Depending on the application, the engine may have 1 or more intake air heaters. The heaters are controlled by the ECM via a relay connected to the battery supply.

Disadvantages

During the post-heat phase after the engine has started, the ammeter gauge may fluctuate during the automatic cycling of the intake air heaters.

To eliminate the possibility of hard starting in cold ambient temperatures, the operator should wait for the "Wait to Start" lamp to turn off before attempting to start the engine.

Visual Aids

None

Intermediate Speed Control (ISC)

Feature Description

Up to 3 Intermediate Speed Control set speeds (1,2,3) can be selected, depending on OEM availability. A multi-position switch or three toggle switches must be installed by the OEM to

support this feature. Additionally, up to 5 Variable Intermediate Speed Control set speeds (1,2,3,4,5) can be selected and the operator can select these speeds using an OEM installed accelerator lever.

Note: The interaction between Intermediate Speed Control Set Speeds and the accelerator pedal is NOT adjustable. It is determined by the OEM and built into the ECM calibration.

The three preset Intermediate Speed Control set speeds may be adjusted with an increment / decrement switch or with INSITE, and may not exceed the low or high idle governor engine speed limits. The 5 Intermediate Speed Control Variable Speed Control set speeds are not adjustable with the increment / decrement switch, but are adjustable with INSITE. Only one droop setting is available for all Intermediate Speed Control speeds.

One of the switch inputs may be used as a validation input. In this case, the ECM calibration uses the ECM pin for Intermediate Speed Control 3 as the input and only two Intermediate Speed Control set speeds will be available. The five variable Intermediate Speed Control inputs will NOT be available.

If more than one Intermediate Speed Control switch is turned ON, the lowest speed switch has priority.

Adjustable Parameters

► **Intermediate Speed Control (ISC)**

Select the feature name to enable or disable the feature using the drop down list in the **ECM Value** column.

► **Intermediate Speed Control Droop**

Sets the percentage of droop if the maximum speed is reached while using any ISC (1, 2, or 3). Use the spin box to adjust the percentage up or down.

A smaller value results in a governor droop with a steeper slope.

► **Intermediate Speed Control Maximum Speed**

This is the maximum allowable engine speed while Intermediate Speed Control is active

► **Minimum Speed**

This is the minimum allowable engine speed while Intermediate Speed Control is active

► **Switch 1-3 Mode**

These parameters controls the operating mode for the ISX (1, 2, and 3) switch and can be configured as:

- Low Speed Governor — (Mode A) The Intermediate Speed Control set speed acts as a low speed governor, and the set speed becomes the Minimum Engine Speed. The operator can use the accelerator pedal to increase the engine speed above the set speed.
- Accelerator Override — (Mode C) The Intermediate Speed Control set speed runs as constant speed, and accelerator pedal input is ignored.
- High Speed Governor — (Mode B) The Intermediate Speed Control set speed acts as high speed governor, and the set speed becomes the Maximum Engine Speed. The operator can use the accelerator pedal to control the engine speed up to the set speed.

Note: Switch 3 Mode cannot be changed when the Idle Validation Switch is enabled.

► **Switched Set Speed 1-3**

These parameters sets the engine speed activated by the ISC 1, 2, or 3 switch.

Idle Validation Switch

When enabled, the ISC 3 switch is used as a validation input instead of a third speed switch. This allows the **Variable Speed** and **Set Points 1-5** to be used by the operator. When disabled and the ISC 3 is selected, the engine speed will use the **Switch 3 Mode** setting.

Increment / Decrement Switch

When enabled, the ramp rates and step size can be configured.

Acceleration Ramp Rate

This parameter determines the rate of increase for engine speed when the increment switch is engaged for more than a calibrated amount of time.

Deceleration Ramp Rate

This parameter determines the rate of decrease for engine speed when the decrement switch is engaged for more than a calibrated amount of time.

Intermediate Speed Control Speed Step Size

This parameter determines how much the engine speed changes when the Increment or Decrement speed is engaged for less than a calibrated amount of time.

Save Set Speeds on Power Down

When enabled, the current intermediate Speed Control settings are saved when the key switch is turned off. This engine speed will be resumed when the engine is restarted and Intermediate Speed Control is engaged.

Variable Speed

This is set by the calibration and may not be adjustable. When enabled and the ISC 3 switch is selected, the five set points can be used by the operator.

Set Points 1-5

Five unique engine speed settings can be configured. Each speed setting corresponds to a position on a five-position rotary switch located on the control panel of the remote device. These are not adjustable with the increment or decrement switch.

Driver Activation/Deactivation

When an ISC switch is activated, the operator can also use the Idle Adjustment Switch to increment or decrement the engine speed.

Interaction with other Features and Parameters

Intermediate Speed Control and Cruise Control can not be active at the same time.

Variable Speed and Remote Throttle can not be active at the same time.

Special Instructions

None

Disadvantages

None

Visual Aids

None

J1939 Data Link

Feature Description

This feature enables control of various diagnostic and information features via the public J1939 datalink when using a generic electronic service tool.

Adjustable Parameters

J1939 Service Reset

Enables a generic tool to command the ECM to reset service component information, including maintenance monitor, tire wear monitor.

J1939 Stop Broadcast Allowed

Enables a generic tool to command the ECM to Stop/Start Broadcast according to requirements defined by Society of Automotive Engineers.

J1939 Trip Reset

Enables a generic tool to command the ECM to reset trip information.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

You can Monitor/Log the following:

J1939 Broadcast: On/OffThis Indicates whether the ECM is broadcasting J1939 information or not.

J1939 Engine Source Address: XXXXXX (6 unit places)The unique source address of the engine on the J1939 datalink.

J1939 Stop Broadcast Source Address One: XXXXXX (6 unit places)The unique source address of a smart device that is commanding the J1939 broadcast from the ECM to stop.

J1939 Stop Broadcast Source Address Two: XXXXXX (6 unit places)The unique source address of a smart device that is commanding the J1939 broadcast from the ECM to stop.

J1939 Stop Broadcast Source Address Three: XXXXXX (6 unit places)

The unique source address of a smart device that is commanding the J1939 broadcast from the ECM to stop.

Disadvantages

None

Visual Aids

None

J1939 Generic Tool Permissions

Feature Description

This feature enables control of various diagnostic and information features via the public J1939 datalink.

The feature supports four Parameter Group Numbers (SAE definitions):

- **PGN 00DF00h:** This Parameter Group Number (also labeled as DM13) allows modules on the network to stop engine ECM broadcast. Activity of the Parameter Group Number (PGN) can be controlled by the J1939 Stop Broadcast allowed.
- **PGN 00DE00h:** This PGN allows service features such as Maintenance Monitor, Tire Wear, and Trip Information to be reset over the J1939 datalink. Activity of the PGN can be controlled by the J1939 Service Reset and J1939 Trip Reset parameters.
- **PGN 00FEDAh:** This PGN provides ECM hardware/software information to the public datalink, including the Module Part Number, Module Serial Number, Engine Calibration Date, the Software Phase, the ECM Hardware Type, and an Application Identifier. This information is automatically broadcast over the J1939 datalink, and does not require an INSITE parameter adjustment.
- **PGN 00FEC0h:** This PGN transmits service information over the J1939 datalink. Information is displayed about the service components that have the (1) shortest distance until service is required, (2) nearest time (in weeks) until service is required, and (3) nearest time (in vehicle operation time) until service is required. This PGN currently supports the Maintenance Monitor and Tire Wear features.

Adjustable Parameters

➤ J1939 Service Reset

Enables a generic tool to command the ECM to reset service component information, including the Maintenance Monitor and Tire Wear monitor.

➤ J1939 Stop Broadcast Allowed

Enables a generic tool to command the ECM to Stop/Start Broadcast according to requirements defined by SAE.

➤ J1939 Trip Reset

Enables a generic tool to command the ECM to reset trip information.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

You can Monitor/Log the following:

J1939 Broadcast: On/OffThis Indicates whether the ECM is broadcasting J1939 information or not.

J1939 Engine Source Address: XXXXXX (6 unit places)The unique source address of the engine on the J1939 datalink.

J1939 Stop Broadcast Source Address One: XXXXXX (6 unit places)The unique source address of a smart device that is commanding the J1939 broadcast from the ECM to stop.

J1939 Stop Broadcast Source Address Two: XXXXXX (6 unit places)The unique source address of a smart device that is commanding the J1939 broadcast from the ECM to stop.

J1939 Stop Broadcast Source Address Three: XXXXXX (6 unit places)The unique source address of a smart device that is commanding the J1939 broadcast from the ECM to stop.

Disadvantages

None

Visual Aids

None

J1939 Multiplexing

Feature Description

Multiplexing is the ability to send and receive messages over a J1939 datalink rather than using hardwire connections. This is accomplished through a Vehicle Electronic Control Unit (VECU).

Inputs from switches, status parameters, and sensors can be hardwired directly to the VECU. The VECU then broadcasts this information throughout a vehicle system, and the onboard Cummins® Electronic Control Module (ECM) is one receiver of this information.

The Cummins® ECM communicates with service tools and other vehicle controllers, such as transmissions, ABS, and other external devices, using the SAE J1939 datalink and corresponding SAE device source addresses. When multiplexing is enabled in INSITE™, the ECM receives sensor and switch input form the J1939 datalink rather than from a direct connection to the ECM input pins.

Some vehicles and equipment have J1939 networks that link the various “smart” controllers together. This enables certain vehicle control devices to temporarily command engine speed or torque to perform functions such as transmission shifting and anti-lock braking.

The J1939 Multiplexing feature requires each switch or sensor that is multiplexed to be enabled and a source address of the module that is sending the messages to be entered. The feature is OEM-specific. For more information about which switches or sensors are multiplexed and which source addresses should be entered, please refer to the OEM manual.

Adjustable Parameters

SAE J1939 Multiplexing

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Note: This parameter must be enabled if you want to enable multiplexing for specific switches and/or sensors.

Maintenance Lamp

When enabled, the ECM sends the lamp status across the datalink.

Stop Lamp

When enabled, the ECM sends the lamp status across the datalink.

 **Wait to Start Lamp**

When enabled, the ECM sends the lamp status across the datalink.

 **Warning Lamp**

When enabled, the ECM sends the lamp status across the datalink.

 **Water in Fuel Lamp**

When enabled, the ECM sends the lamp status across the datalink.

 **Accelerator Interlock Switch**

Enables the Accelerator Interlock Switch to be multiplexed.

 **Accelerator Interlock Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Accelerator Pedal or Lever Position**

Enables the Accelerator Pedal or Lever Position to be multiplexed.

 **Accelerator Pedal or Lever Position Source Address**

The source address of the module that is sending messages across the datalink.

 **Aftertreatment Regeneration Permit Switch**

Enables the Aftertreatment Regeneration Permit Switch to be multiplexed.

 **Aftertreatment Regeneration Permit Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Aftertreatment Regeneration Start Switch**

Enables the Aftertreatment Regeneration Start Switch to be multiplexed.

 **Aftertreatment Regeneration Start Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Air Conditioning Pressure Switch**

Enables the Air Conditioning Pressure Switch to be multiplexed.

 **Air Conditioning Pressure Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Alternate Droop Select Switch**

Enables the Alternate Droop Select Switch to be multiplexed.

 **Alternate Droop Select Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Alternate Frequency Switch**

Enables the Alternate Frequency Switch to be multiplexed.

 **Alternate Frequency Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Alternate Idle Speed Switch**

Enables the Alternate Idle Speed Switch to be multiplexed.

 **Alternate Idle Speed Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Alternate Torque Derate Switch**

Enables the Alternate Torque Derate Switch to be multiplexed.

 **Alternate Torque Derate Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Ambient Air Temperature Sensor**

Enables the Ambient Air Temperature Sensor to be multiplexed.

 **Ambient Air Temperature Sensor Source Address**

The source address of the module that is sending messages across the datalink.

 **Auxiliary Discrete Input 1**

Enables the Auxiliary Discrete Input 1 to be multiplexed.

 **Auxiliary Discrete Input 1 Source Address**

The source address of the module that is sending messages across the datalink.

 **Auxiliary Governor On/Off Switch**

Enables the Auxiliary Governor On/Off Switch to be multiplexed.

 **Auxiliary Governor On/Off Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Auxiliary Pressure 1**

Enables the Auxiliary Pressure 1 to be multiplexed.

 **Auxiliary Pressure 1 Source Address**

The source address of the module that is sending messages across the datalink.

 **Auxiliary Pressure 2**

Enables the Auxiliary Pressure 2 to be multiplexed.

 **Auxiliary Pressure 2 Source Address**

The source address of the module that is sending messages across the datalink.

 **Auxiliary Shutdown Switch**

Enables the Auxiliary Shutdown Switch to be multiplexed.

 **Auxiliary Shutdown Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Auxiliary Temperature 1**

Enables the Auxiliary Temperature 1 to be multiplexed.

 **Auxiliary Temperature 1 Source Address**

The source address of the module that is sending messages across the datalink.

 **Auxiliary Temperature 2**

Enables the Auxiliary Temperature 2 to be multiplexed.

 **Auxiliary Temperature 2 Source Address**

The source address of the module that is sending messages across the datalink.

 **Boost Power Switch Status**

Enables the Boost Power Switch Status to be multiplexed.

 **Boost Power Switch Status Source Address**

The source address of the module that is sending messages across the datalink.

 **Brake Switch**

Enables the Brake Switch to be multiplexed.

 **Brake Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Clutch Pedal Position Switch**

Enables the Clutch Pedal Position Switch to be multiplexed.

 **Clutch Pedal Position Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Coolant Level Switch**

Enables the Coolant Level Switch to be multiplexed.

 **Coolant Level Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Cruise Control On/Off Switch**

Enables the Cruise Control On/Off Switch to be multiplexed.

Note: It is recommended that all Cruise Control switches be multiplexed if one Cruise Control switch is multiplexed.

 **Cruise Control On/Off Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Cruise Control Pause Switch**

Enables the Cruise Control Pause Switch to be multiplexed.

Note: It is recommended that all Cruise Control switches be multiplexed if one Cruise Control switch is multiplexed.

 **Cruise Control Pause Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Cruise Control Switch**

Enables the Cruise Control Switch to be multiplexed.

Note: It is recommended that all Cruise Control switches be multiplexed if one Cruise Control switch is multiplexed.

 **Cruise Control Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Cruise Control Set/Resume Switch**

Enables the Cruise Control Set/Resume Switch to be multiplexed.

Note: It is recommended that all Cruise Control switches be multiplexed if one Cruise Control switch is multiplexed.

 **Cruise Control Set/Resume Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **Diagnostic Test Mode Switch**

Enables the Diagnostic Test Mode Switch to be multiplexed.

► **Diagnostic Test Mode Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **Droop Adjust Switch**

Enables the Droop Adjust Switch to be multiplexed.

► **Droop Adjust Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **Engine Brake Switch**

Enables the Engine Brake Switch to be multiplexed.

► **Engine Brake Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **Engine Brake Switch Level**

Enables the Engine Brake Switch Level to be multiplexed.

► **Engine Brake Switch Level Source Address**

The source address of the module that is sending messages across the datalink.

► **Engine Protection Shutdown Manual Override**

Enables the Engine Protection Shutdown Manual Override to be multiplexed.

► **Engine Protection Shutdown Manual Override Source Address**

The source address of the module that is sending messages across the datalink.

► **Engine Speed Cruise Control ON Switch**

Enables the Engine Speed Cruise Control ON Switch to be multiplexed.

► **Engine Speed Cruise Control ON Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **Engine Speed Cruise Control Set/Resume Switch**

Enables the Engine Speed Cruise Control Set/Resume Switch to be multiplexed.

► **Engine Speed Cruise Control Set/Resume Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **Engine Auxiliary Shutdown Switch**

Enables the Engine Auxiliary Shutdown Switch to be multiplexed.

► **Engine Auxiliary Shutdown Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **EPD Shutdown Override Switch**

Enables the EPD Shutdown Override Switch to be multiplexed.

► **EPD Shutdown Override Switch Source Address**

The source address of the module that is sending messages across the datalink.

► **Fan Control Switch**

Enables the Fan Control Switch to be multiplexed.

► Fan Control Switch Source Address

The source address of the module that is sending messages across the datalink.

► Fan Control Switch 2

Enables the Fan Control Switch 2 to be multiplexed.

► Fan Control Switch 2 Source Address

The source address of the module that is sending messages across the datalink.

► Frequency Adjust Switch

Enables the Frequency Adjust Switch to be multiplexed.

► Frequency Adjust Switch Source Address

The source address of the module that is sending messages across the datalink.

► Gain Adjust Switch

Enables the Gain Adjust Switch to be multiplexed.

► Gain Adjust Switch Source Address

The source address of the module that is sending messages across the datalink.

► Idle Increment/Idle Decrement Switch

Enables the Idle Increment/Idle Decrement Switch to be multiplexed.

► Idle Increment/Idle Decrement Switch Source Address

The source address of the module that is sending messages across the datalink.

► Idle Rated Switch

Enables the Idle Rated Switch to be multiplexed.

► Idle Rated Switch Source Address

The source address of the module that is sending messages across the datalink.

► Idle Validation Switch

Enables the Idle Validation Switch to be multiplexed.

► Idle Validation Switch Source Address

The source address of the module that is sending messages across the datalink.

► Malfunction Indicator Lamp

Enables the Malfunction Indicator Lamp to be multiplexed.

► Malfunction Indicator Lamp Source Address

The source address of the module that is sending messages across the datalink.

► Multiple Unit Synchronization On/Off Switch

Enables the Multiple Unit Synchronization On/Off Switch to be multiplexed.

► Multiple Unit Synchronization On/Off Switch Source Address

The source address of the module that is sending messages across the datalink.

► Output Shaft Speed

Enables the Output Shaft Speed to be multiplexed.

► Output Shaft Speed Source Address

The source address of the module that is sending messages across the datalink.

 **Parking Brake**

Enables the Parking Brake to be multiplexed.

 **Parking Brake Source Address**

The source address of the module that is sending messages across the datalink.

 **PTO On/Off Switch**

Enables the PTO On/Off Switch to be multiplexed.

Note: It is recommended that all PTO switches be multiplexed if one PTO switch is multiplexed.

 **PTO On/Off Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **PTO Set/Resume Switch**

Enables the PTO Set/Resume Switch to be multiplexed.

Note: It is recommended that all PTO switches be multiplexed if one PTO switch is multiplexed.

 **PTO Set/Resume Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Rear Axle Ratio Switch**

Enables the Rear Axle Ratio Switch to be multiplexed.

 **Rear Axle Ratio Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Remote Accelerator Pedal or Lever**

Enables the Remote Accelerator Pedal or Lever to be multiplexed.

 **Remote Accelerator Pedal or Lever Source Address**

The source address of the module that is sending messages across the datalink.

 **Remote Accelerator Pedal or Lever Switch**

Enables the Remote Accelerator Pedal or Lever Switch to be multiplexed.

 **Remote Accelerator Pedal or Lever Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Remote Accelerator Position/Remote Accelerator Switch**

Enables the Remote Accelerator Position/Remote Accelerator Switch to be multiplexed.

 **Remote Accelerator Position/Remote Accelerator Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Remote PTO Switch**

Enables the Remote PTO Switch to be multiplexed.

 **Remote PTO Switch Source Address**

The source address of the module that is sending messages across the datalink.

 **Service Brake Switch**

Enables the Service Brake Switch to be multiplexed.

Service Brake Switch Source Address

The source address of the module that is sending messages across the datalink.

Speed Bias Switch

Enables the Speed Bias Switch to be multiplexed.

Speed Bias Switch Source Address

The source address of the module that is sending messages across the datalink.

Torque Derate Switch

Enables the Torque Derate Switch to be multiplexed.

Torque Derate Switch Source Address

The source address of the module that is sending messages across the datalink.

Water in Fuel Sensor

Enables the Water in Fuel Sensor to be multiplexed.

Water in Fuel Sensor Source Address

The source address of the module that is sending messages across the datalink.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

This feature enables the ECM to receive switch status and sensor values from the datalink. However, the feature that actually uses the specific switch or sensor must be enabled.

For example, the Cruise Control switches can be setup in the J1939 Multiplexing feature to be multiplexed, but the Cruise Control feature must be enabled for the switches to function properly.

Special Instructions

Ensure that the associated features are enabled and setup properly before adjusting any parameters for this feature.

Disadvantages

None

Visual Aids

None.

Light Fuel

Feature Description

This feature is used to indicate that an acceptable fuel other than number 2 diesel fuel is being used. When the feature is enabled, the ECM improves hot weather starts when lighter fuels than number 2 diesel are used.

Adjustable Parameters

Light Fuel

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

There is no driver activation or deactivation for this feature.

Interaction with other Features and Parameters

None

Special Instructions

This feature should only be used when there are starting problems, typically during hot weather, and you are using an acceptable fuel other than number 2 diesel fuel. Refer to Bulletin 3379001 (Fuel for Cummins Engines) for additional information.

Disadvantages

None

Visual Aids

None

Load Based Speed Control

Feature Description

This feature limits the maximum operating speed of the engine under low load conditions while allowing the engine full engine speed range under high load and out of gear conditions. There are two possible breakpoint configurations: single RPM breakpoint and dual RPM breakpoints. Additionally, if the **Vehicle Mass Threshold** is active, the Load Based Speed Control will be disabled if the vehicle mass exceeds the set threshold.

In single RPM breakpoint configuration, the **RPM Breakpoint** is the level at which Load Based Speed Control will limit the torque output when the engine speed reaches this engine speed. This requires the operator to shift to the next gear.

In the dual RPM breakpoint configuration, Load Based Speed Control creates a “boundary” from the **Low Engine Speed Breakpoint** to the **High Engine Speed Breakpoint**, and limits the engine output torque as the engine approaches this boundary. This requires the operator to shift to the next gear.

A **Load Based Speed Control Status** monitor is available to determine if Load Based Speed Control is actively limiting the engine.

Adjustable Parameters

Load Based Speed Control

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

High Engine Speed Breakpoint

The high engine speed that determines the boundary that limits the engine torque output in the dual breakpoint configuration.

Low Engine Speed Breakpoint

The low engine speed that determines the boundary that limits the engine torque output in the dual breakpoint configuration.

RPM Breakpoint

The engine speed at which the engine output torque will be limited when in single breakpoint configuration.

Vehicle Mass Threshold

If the calculated mass of the vehicle is greater than this threshold, the **Load Based Speed Control** feature will be disabled.

Driver Activation/Deactivation

The operator will need to shift to the next gear when the breakpoint configuration is limiting the torque output.

Interaction with other Features and Parameters

The **Vehicle Speed Sensor Type** must be set to any type other than **None**.

Special Instructions

None

Disadvantages

The operator may complain of low power, or that the engine will not reach full engine operating speed.

Visual Aids

None

Load Based Speed Control - Enhanced

Feature Description

This feature is designed to keep the engine in the optimal RPM and torque ranges by restricting engine speed at low torque. This feature will not restrict the engine speed during an out of gear condition, while PTO is Active, or while a "J-comm Progressive Shift Disable" is active.

Adjustable Parameters

Load Based Speed Control - Enhanced

This parameter enables or disables the Enhanced Load Based Speed Control.

High Engine Speed Breakpoint

This parameter sets the maximum engine speed allowed before restrictions engage. The range varies by application

Low Engine Speed Breakpoint

This parameter sets the minimum engine speed allowed before restrictions engage. The range varies by application

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Machine Electrical Voltage

Feature Description

Specifies whether the vehicle has a 12 or 24 volt charging system. This value determines which calibrated thresholds will be used in determining voltage faults.

Adjustable Parameters

Machine Electrical System Voltage

Select either 12 volt or 24 volt.

Driver Activation/Deactivation

Content.

Interaction with other Features and Parameters

Content.

Special Instructions

Content.

Disadvantages

Content.

Visual Aids

Content

Maintenance Monitor

Feature Description

This feature causes the ECM to light a maintenance lamp that alerts the operator when it is time to service the engine oil and oil filter. The feature may be adjusted to light the maintenance lamp based on ECM-measured distance or engine running time. When the ECM determines that the maintenance interval has expired, the maintenance lamp will light at the next key ON.

The feature can be configured with an Alert Percentage value to light the lamp prior to the end of the maintenance interval. For example the lamp might light after 50% of the maintenance interval has expired.

Note: Not all engines are equipped with a separate maintenance lamp, and may use another method. For example CELECT engines alert the operator by flashing the engine protection lamp through 5 three-flash cycles approximately 12 seconds after key ON. REFER TO THE ENGINE OPERATION AND MAINTENANCE MANUAL FOR A DESCRIPTION OF HOW THE OPERATOR IS ALERTED WHEN THIS FEATURE IS ENABLED.

Adjustable Parameters

► Maintenance Monitor

Select the feature name to enable or disable the feature using the dropdown list in the ECM Value column.

► Mode

This setting determines how the ECM applies the Maintenance Monitor feature.

Distance The maintenance interval will be based on ECM-measured distance traveled. If you select this mode, you must also enter a distance. The vehicle must have a working vehicle speed sensor for this mode to work properly.

Time The maintenance interval is based on the ECM-measured engine run time. If you select this mode, you must also enter a time.

► Distance

When operating in "Distance" mode, the value entered here defines the maintenance interval. Refer to the engine Operation and Maintenance Manual for the correct oil drain interval.

► Time

When operating in "Time" mode, the value entered here defines the maintenance interval. Refer to the engine Operation and Maintenance Manual for the correct oil drain interval.

► Alert Percentage

The percent of the current maintenance interval that triggers when the dash light will come on, indicating the need for an oil change (for example 90 percent). This percentage acts as an early warning for a maintenance stop.

Driver Activation/Deactivation

This feature is activated only by INSITE.

The only driver/user interaction is to reset the warning lamp manually. Refer to the engine operation and maintenance manual for proper manual lamp reset methods. Otherwise INSITE can be used to reset the maintenance lamp.

Interaction with other Features and Parameters

Not all engines are equipped with a separate maintenance lamp, and may use another method. REFER TO THE ENGINE OPERATION AND MAINTENANCE MANUAL FOR A DESCRIPTION OF HOW THE OPERATOR IS ALERTED WHEN THIS FEATURE IS ENABLED.

Special Instructions

None

Disadvantages

Applications that do not use a separate maintenance lamp may light engine warning lamps that result in false service complaints if drivers are not trained to use the maintenance monitor feature.

Visual Aids

None

Maximum Progressive Shift

Feature Description

This feature define an engine's normal acceleration rate along the shift line (refer to diagram). Engine acceleration above these limits is controlled to reduce the acceleration rate. This encourages drivers to shift into higher gears more quickly.

Enter two RPM settings: the maximum RPM setting at 0 and the maximum RPM setting at a higher speed of your choice. The maximum RPM setting at 0 defines the starting point of the progressive shift line. The second, higher maximum progressive shift value defines the endpoint of the maximum progressive shift line.

Adjustable Parameters

▶ Progressive Shift

More information will be provided in an upcoming version of INSITE.

▶ Maximum Engine Speed

More information will be provided in an upcoming version of INSITE.

▶ Maximum RPM at 0 Road Speed

More information will be provided in an upcoming version of INSITE.

▶ Road Speed at Maximum RPM

More information will be provided in an upcoming version of INSITE.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

None

Multi-Function Switch Setup

Feature Description

This feature is used to set the configuration of the Cruise Control set/resume switch. This feature reserves the switch throw for the accelerate and coast functions for the cruise set/resume switch.

Adjustable Parameters

Switch Usage

Sets the function of the switch throw. Set/Accelerate is the up position and Resume/Coast in the down position. Either this choice or the Set/Coast switch usage can be selected.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

This feature interacts with the Cruise Control feature.

Special Instructions

None

Disadvantages

None

Visual Aids

None

Multiple Unit Synchronization

Feature Description

This feature enables two or more engines (up to a maximum of 3) to be controlled by a single throttle signal and run at a similar speed.

Adjustable Parameters

None

Driver Activation/Deactivation

Multiple Unit Synchronization is turned ON or OFF by a user-activated switch. Also, a Multiple Unit Synchronization Complementary Switch must be present and always in the opposite state of the Multiple Unit Synchronization On/Off Switch.

To activate the feature, the Multiple Unit Synchronization On/Off Switch must be in the ON position and the Multiple Unit Synchronization On/Off Complementary Switch must be in the OFF position. If the ECM detects both switches in the ON or OFF position at the same time, fault code 497 will be logged.

Interaction with other Features and Parameters

None

Special Instructions

Note the following:

- INSITE can monitor the following parameters associated with this feature:
- Multiple Unit Synchronization On/Off Switch
- Multiple Unit Synchronization On/Off Complementary Switch
- Multiple Unit Synchronization Engine Type Switch 1
- Multiple Unit Synchronization Engine Type Switch 2
- Multiple Unit Synchronization Engine Type.
- Multiple Unit Synchronization On/Off Switch must be ON and Multiple Unit Synchronization On/Off Complementary Switch must be OFF in order for the feature to activate. If both switches read ON or OFF at the same time, fault code 497 will become active.
- Multiple Unit Synchronization Engine Type Switch 1 must be ON if the engine is a primary engine. This parameter represents the configuration of the shorting plug in the engine harness.
- Multiple Unit Synchronization Engine Type Switch 2 must be ON if the engine is a secondary engine. This parameter also represents the Multiple Unit Synchronization shorting plug configuration in the engine harness.
- Multiple Unit Synchronization Engine Type is another way to determine what engine type the tool is communicating with. If Primary is displayed then the engine is the primary engine and Multiple Unit Synchronization Engine Type Switch 1 will display ON. If Secondary is displayed then the engine is a secondary engine and Multiple Unit Synchronization Engine Type Switch 2 will display ON.

Disadvantages

None

Visual Aids

None

This procedure is not yet available at the time of publication.

OEM Auxiliary Switch

Feature Description

This feature allows the user to adjust the switch logic, when the OEM Auxiliary Switch is installed. The switch is configured by the OEM.

Adjustable Parameters

➤ OEM Auxiliary Switch Input

The OEM Auxiliary Switch Input is either enabled or disabled, depending on the calibration. This parameter can not be adjusted in INSITE™.

➤ Auxiliary Discrete Input

When enabled, this allows the **Switch Logic** to be configured.

➤ Switch Logic

This parameter is used to configure the Switch Logic in the ECM Value column as:

- **Normally Closed** — The switch is closed until it is toggled.
- **Normally Open** — The switch is open until it is toggled.

Driver Activation/Deactivation:

None

Interaction with other Features and Parameters:

None

Special Instructions:

None

Disadvantages:

None

OEM Blocking Table

Feature Description

This feature is used to prevent a horsepower rating from being used on engines that offer Programmable Power. This is useful when one or more horsepower (programmable power) ratings are not compatible with the current vehicle setup. Ratings that are blocked will not be shown in the Engine Performance Rating feature.

The feature can also be used to change the engine horsepower rating without downloading a new calibration to the ECM. Each calibration in the ECM can contain up to 16 different horsepower (or programmable power) ratings. This feature is available on engines using Programmable Power.

An OEM password is required to access this feature. If an ECM contains a Master or Adjustable password, both the OEM and the Master or Adjustable password must be valid or disabled in order to block or change the ratings.

Adjustable Parameters

Change

Blocks or unblocks the horsepower (programmable power) rating that is highlighted.

Select

Activates the horsepower (programmable power) rating currently being used by the ECM.

To change a horsepower rating, highlight an unblocked rating and choose **Select**. "Current" displays next to the rating that has been selected. Click **OK** and follow the instructions to complete the selection process.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

This feature is available on engines that offer Programmable Power. An OEM password is required to access feature. If an ECM contains a Master or Adjustable password, both the OEM and the Master or Adjustable password must be valid or disabled in order to block or change the ratings.

Special Instructions

None

Disadvantages

Note the following:

- Upgrades in horsepower or torque for the calibration in the ECM are limited to ratings that are unblocked.
- Blocked horsepower ratings may need to be adjusted whenever vehicle powertrain equipment is changed.
- If an OEM Blocking Table change needs to be made and the OEM password is not available (or unknown), the Zap-It program must be used to disable the OEM password before a change can occur.

Visual Aids

None

OEM Sensor Faults

Feature Description

This feature enables sensor faults for OEM temperature and pressure.

Adjustable Parameters

OEM Sensor Faults

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

More information will be provided in an upcoming version of INSITE.

OEM Sensors

Feature Description

This feature provides up to two independent switched outputs for OEM use. The state of each switched output is determined by up to 13 different inputs to the ECM, depending on the engine.

The ECM can provide different outputs to OEM devices if any of the inputs are above or below calibrated thresholds. Control parameter input and threshold settings for each switched output are independent of other switched outlet settings.

The ECM determines the state of the switched outputs based on the following possible inputs (either one or both switched outputs can use the same inputs):

- Engine Speed (RPM)
- Commanded Fueling (mm³ per second)
- Boost Pressure (In Hg)
- Auxiliary Speed Input (rpm)
- Oil Pressure (psi)
- Coolant Temperature (degrees F)
- Commanded Throttle (percent)
- Intermediate Speed Control 2 Status (off or active)
- OEM Temperature (degrees F)
- OEM Pressure (psi)
- OEM Supplied Pressure (volts)
- OEM Supplied Switch (open or ground)
- Battery Voltage

Each of these inputs can have a specified threshold and threshold type (over or under). Each of the switched outputs can be calibrated to be either on or off after a threshold is passed. Also, each output can be calibrated to change states if any one or all thresholds are passed.

Note: INSITE can enable or disable this feature but cannot adjust the thresholds.

Adjustable Parameters

➤ Dual Outputs Based on Sensed Parameters

Enable or disable this feature using the dropdown list in the **ECM Value** column.

The feature inputs, outputs, and thresholds must be set by a calibration that is specific to the application. INSITE can enable or disable this feature but cannot adjust the thresholds.

Driver Activation/Deactivation

This feature is activated or deactivated only by INSITE.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

This procedure is not yet available at the time of publication.

Oil Level Monitor

Feature Description

This feature determines the volume of oil in the oil pan after the engine has been shutdown. A multilevel oil sensor is installed in the pan, and is used to determine if the oil level is low or very low.

Either condition causes the ECM to log a diagnostic fault code. At the next key-on, a dash lamp will be lit to notify the operator of the oil level condition.

Adjustable Parameters

➤ Engine Oil Level Monitor

Select the feature name to enable or disable the feature using the dropdown list in the ECM Value column.

➤ Engine Power Angle

Indicates whether the power angle of the engine is known or unknown. The power angle is the slat of the engine as measured from the horizontal, in degrees.

A typical power angle is from 2 to 8 degrees.

➤ Power Angle

The power angle of the engine. The power angle is the slat of the engine as measured from the horizontal, in degrees.

A typical power angle is from 2 to 8 degrees.

▶ Engine Oil Pan Sump Location

Sump location is determined by the location of the deepest part of the oil pan, either at the front or rear of the engine.

Driver Activation/Deactivation

There is no driver activation or deactivation of this feature.

Interaction with other Features and Parameters

None

Special Instructions

The engine oil temperature must reach operating temperature before this feature will be activated.

If the oil temperature does not reach operating temperature, this feature will not run after the next key-off.

Disadvantages

After engine operation, shutdown, and key-off the key switch must remain OFF for an extended period of time. This allows the ECM to determine if a low oil level condition exists.

Visual Aids

None

Output Voltages

Feature Description

Content.

Adjustable Parameters

▶ Accelerator Pedal Released

The voltage sent to the automatic transmission when the accelerator pedal is in the released position. This voltage is appropriate for the selected transmission only.

You can change the voltage only if Other is the selected Transmission Type.

▶ Accelerator Pedal Depressed

The voltage sent to the automatic transmission when the accelerator pedal is in the depressed position. This voltage is appropriate for the selected transmission only.

You can change the voltage only if "Other" is the selected Transmission Type.

Driver Activation/Deactivation

Content.

Interaction with other Features and Parameters

Content.

Special Instructions

Content.

Disadvantages

Content.

Visual Aids

Content

Oxygen Sensor Offset

Feature Description

More information will be provided in an upcoming version of INSITE.

Adjustable Parameters

Oxygen Sensor Offset

This value is used to adjust for heated oxygen sensor variability. The value is printed on a label located near the sensor connectors on the sensor.

The sensor setting must be accurately set to ensure proper engine performance.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

Content

Parking Brake Switch State

Feature Description

This feature is an optional OEM-installed component which allows the parking brake switch to be disabled when parking brake switch functionality is not desired. Applications not using a parking brake switch would have the option of disabling the parking brake switch completely or multiplexing, if available, freeing up the physical input.

Adjustable Parameters

Parking Brake Switch

This parameter allows the user to enable or disable the Parking Brake Switch input.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Power Take-Off (PTO)

Feature Description

Applications like cement mixers, dry bulk haulers, dump trucks, and refuse vehicles require the engine to provide constant speeds regardless of engine load. The Power Take Off (PTO) feature allows the operator to select three pre-programmed engine speeds, and to adjust engine speed with the use of cruise control switches in the cab or remotely.

This feature is active only below the speed selected by the PTO maximum vehicle speed. A separate remote-mounted switch controls remote PTO.

The **PTO Pump Mode** feature uses the engine as the power source for stationary pumping applications.

Adjustable Parameters

PTO/Remote PTO

Select the feature name to enable or disable the Power Take Off (PTO) and Remote PTO features using the dropdown list in the ECM Value column.

Additional Switch Speed

The speed setting that can be attained by activation of an additional switch while Power Take Off is active. This is a separate switch from the cruise control set/resume switch. The additional switch engine speed can be set to a different speed from the set switch engine speed and the resume switch engine speed, enabling the availability of up to 3 different power take off speeds. This speed must be set equal to or greater than Minimum Engine Speed and less than or equal to Maximum Engine Speed.

Maximum Engine Load

Limits maximum engine torque to ensure that the Power Take Off drive and connected equipment are not damaged by excessive engine torque input.

Maximum Speed

The highest engine speed setting at which Power Take Off will operate. This speed must be set equal to or greater than Minimum Engine Speed.

Maximum Vehicle Speed

Enables Power Take Off operation up to the maximum vehicle speed when the vehicle speed has been detected by the ECM.

Minimum Speed

The lowest engine speed setting at which Power Take Off will operate. This speed must be set equal to or less than Maximum Engine Speed.

PTO Speed 1 through 8 Device

Individual PTO Speed Devices can be assigned an identification tag or descriptive name that aids in understanding Trip Information data. Each Speed Device name corresponds to a specific PTO device or switch.

Ramp Rate

Determines how quickly engine speed changes to the selected Power Take Off speed or to a new Power Take Off speed when the Power Take Off speed is increased or decreased.

Resume Switch Speed

The speed setting that can be attained by activation of the resume switch while Power Take Off is active. The resume switch engine speed can be set to a different speed from the set switch engine speed. This provides two speeds for various Power Take Off requirements. This speed must be set equal to or greater than Minimum Engine Speed and less than or equal to Maximum Engine Speed.

Set Switch Speed

The speed setting that can be attained by activation of the set switch while Power Take Off is active. This speed must be equal to or greater than Minimum Engine Speed and less than or equal to Maximum Engine Speed.

Accelerator Pedal or Lever Override

Enables the operator to increase the Power Take Off speed by using the accelerator, up to the accelerator override maximum speed.

Maximum Engine Speed

The maximum engine speed that can be obtained when the maximum engine speed limit is overridden by the accelerator. This speed must be set greater than Maximum Engine Speed.

Note: This parameter is not available if Accelerator Override is disabled.

Additional Switch Speed

The speed setting that can be attained by activation of an additional switch while Power Take Off is active. This is a separate switch from the cruise control set/resume switch. The additional switch engine speed can be set to a different speed from the set switch engine speed and the resume switch engine speed, enabling the availability of up to 3 different power take off speeds.

This speed must be set equal to or greater than Minimum Engine Speed and less than or equal to Maximum Engine Speed.

Maximum Engine Load

Limits maximum engine torque to ensure that the Power Take Off drive and connected equipment are not damaged by excessive engine torque input.

Accelerator Override

Enables the operator to increase the Power Take Off speed by using the accelerator, up to the accelerator override maximum speed.

Alternate Operation

This option alters the function of the set/resume switch while Power Take Off is active. It causes the set resume switch to provide only one set speed and the switch can be used to increase or decrease this set speed. This prevents sudden speed changes that could cause problems with some Power Take Off applications if two speeds are available.

Clutch Override

Enables the clutch pedal to interrupt Power Take Off operation.

Remote PTO

When enabled, this parameter allows the engine, while in PTO, to be controlled by a control panel or device outside of the vehicle cab.

Number of Speeds

This parameter specifies the number of programmable speeds that are available for Remote PTO operation. Values for this parameter can range from 1 through 5.

Set Speed 1 through 5

When the remote PTO is used, the operator controls the engine speed by selecting one of the Set Speeds. These parameters specify those Set Speeds. Speed must be set equal to or greater than PTO Minimum Engine Speed and less than or equal to PTO Maximum Engine Speed.

Service Brake Override

Enables the service brake to interrupt Power Take Off operation.

Transmission Driven PTO

This parameter is used to enable or disable the Transmission Driven PTO feature. On the engine applications which run a PTO off the transmission tail shaft, vehicle speed is still detected even though the drive axle is disengaged and the vehicle is stationary. This can cause excessive instability and intermittent PTO operation response. When this feature is enabled, the ECM will use the Transmission Driven PTO Type to select the appropriate gain and stabilize the engine.

Transmission Driven PTO Type

This parameter sets the PTO gain type to improve the performance and stability of the engine application. There are four types available:

- Engine Driven - Steady Load -- For applications that only use PTO for fast engine idling (i.e. no PTO devices installed in the vehicle). Also for applications that use a PTO transmission, a direct-drive "Front Engine PTO" or a direct-drive "Rear Engine PTO" which operates the hydraulic pumps (e.g. Dump Truck, Tow Truck, Snow Plow, etc).
- Transmission Driven - Steady Load -- For applications with a transfer case installed downstream of the transmission, which is used to drive the PTO device.

Applications will require the transmission to be in-gear and vehicle speed will be detected during the PTO operation (e.g. Fire Truck).

- Transmission Driven - Irregular Load -- For applications with a transfer case installed downstream of the transmission, which is used to drive the PTO device through a drive shaft that may exhibit torsional oscillations (surge) during the PTO operation. Applications will require the transmission to be in-gear and vehicle speed will be detected during the PTO operation (e.g. Vacuum Truck).
- Transmission Driven - Cyclic Load -- For applications with a transfer case installed downstream of the transmission, which is used to drive the PTO device. During the operation, the engine loading will be highly cyclic, characterized by the large load spikes at regular intervals. Applications will require the transmission to be in-gear vehicle speed will be detected during the PTO operation (e.g. Concrete Pumper, Hay Baler, etc).

PTO with Parking Brake Set

When this parameter is enabled, the Parking Brake to be set before the Power Take Off can be engaged. When it is disabled, Power Take Off is allowed regardless of the Parking Brake status.

Zero Vehicle Speed Source Limit

Limits maximum Power Take Off speed to a value equal to maximum engine speed minus maximum engine speed without VSS.

Accelerator Override Maximum Engine Speed

The maximum engine speed that can be obtained when the maximum engine speed limit is overridden by the accelerator. This speed must be set greater than Maximum Engine Speed.

Note: This parameter is not available if Accelerator Override is disabled.

Switch Ramp Rate

Determines how quickly engine speed changes to the selected Power Take Off speed or to a new Power Take Off speed when the Power Take Off speed is increased or decreased.

Ignore Vehicle Speed Source in PTO

When enabled, this feature will cause the ECM to disregard the Vehicle Speed Source while operating in PTO status.

PTO Pump Mode

When enabled, the engine will supply the power to the pumping system. This can be used for stationary pumping applications.

PTO Pump Mode Maximum Vehicle Speed

When PTO Pump Mode is enabled, the user can set the maximum vehicle speed allowed for the PTO Pump Mode operation.

PTO Pump Mode Vehicle Speed Sensor Override

When enabled, the vehicle speed processing is disabled and the vehicle speed is set to Zero during the PTO Pump Mode operation. This prevents excessive vehicle speed from overriding the operation, and it disables the odometer distance accumulation for applications that has the transmission tail shaft engaged during operation.

Driver Activation/Deactivation

The driver can activate Power Take Off by moving the cruise control switch to the on position. To set the engine speed to the first preset PTO speed, move the cruise control select switch to the set position. To set the engine speed to the second preset PTO speed, move the cruise control select switch to the resume position. A third engine speed is available if Additional Switch Engine Speed is enabled and the corresponding switch is selected. If Alternate Operation is enabled, only one preset speed is available.

The driver can deactivate the Power Take Off feature by depressing the brake or clutch (if the brake or clutch override has been enabled), or by turning the cruise control on/off switch to the off position.

Interaction with other Features and Parameters

Ignore Vehicle Speed Source in PTO must be disabled to enable **Transmission Driven PTO**.

Special Instructions

Note the following:

- During Power Take Off operation the accelerator is disabled unless accelerator override is enabled.
- Depending on the OEM, activating the trailer brakes will deactivate the Power Take Off feature if an OEM switch is present.

Disadvantages

None

Visual Aids

None

Powertrain Protection

Feature Description

This feature provides torque management capabilities, limiting engine torque when operating in a gear range that exceeds the torque limits of powertrain components.

Note: Disabling Powertrain Protection may affect warranty coverage of powertrain components. Refer to the vehicle manufacturer's recommendations.

Adjustable Parameters

Powertrain Protection

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driveshaft/Axle Torque Limit

Due to mechanical advantage, axles are subject to higher torque than other drive line components. This parameter allows an axle to be used with a torque rating lower than the torque that may be transmitted to the axle in the lowest gears.

Set a value that is equal to the torque limit for the vehicle's axle (ECM will limit torque in lower gears).

Note: Vehicle Speed parameters must be entered correctly for this component of Powertrain Protection to work properly. If Rear Axle Ratio or Tire Revolutions Per Distance is entered incorrectly, the ECM will not be able to accurately determine the gear range.

► **Gear Ratios and Torque Limits**

Three adjustable transmission gear ranges and corresponding engine torque limits can also be entered. First define the transmission ranges (up to three), and then the corresponding engine torque limits where Powertrain Protection is desired. The maximum transmission gear range is not adjustable.

► **Maximum Torque at Zero Road/Vehicle Speed**

This limit provides axle torque protection during vehicle acceleration from a stopped position. It should be used in conjunction with **Driveshaft/Axle Torque Limit**.

► **Torque Limit Switch**

When enabled, this will allow the operator to switch to a different torque output limit as defined by the ECM calibration. Activating this switch limits the maximum output torque of the engine and protects the engine from damage.

► **Maximum Torque Allowed Switched**

This is the maximum torque that the engine will produce when the **Torque Limit Switch** is activated.

► **Torque Limit Setup**

This parameter provides the operator the ability to alter the switch logic of the Torque Limit Switch. Select from the following options:

- Active Open
- Active Closed

Note: This parameter does not apply to multiplexed engines.

► **Powertrain Protection Lugback**

Enables the torque limit imposed by Switched Axle Torque or **Driveshaft/Axle Torque Limit** to be exceeded in conditions where the vehicle is decelerating.

For example: A truck that is beginning to move in first gear will have a torque limit if Switched Axle Torque is enabled. If the truck enters soft ground, the Switched Axle Torque limits will be ignored so that the vehicle is less likely to stall.

Driver Activation/Deactivation

The operator can activate the feature only when using the Switched Torque Limit mode. Typically this switch will be installed into the shift mechanism. The switch is automatically made when the operator shifts into the low range of a two speed axle.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Primary Accelerator Pedal or Lever

Feature Description

This feature allows the user to select different throttle types, such as throttle with idle validation, throttle without idle validation, decelerator, etc.

Adjustable Parameters

▶ Primary Accelerator or Lever Option

Select the desired option or disable the feature using the dropdown list in the ECM Value column.

▶ Remote Accelerator or Lever Option

Select the desired option or disable the feature using the dropdown list in the ECM Value column.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

This procedure is not yet available at the time of publication.

Rated Speed Adjust

About

The **Rated Speed Adjust** feature must be enabled for any of the Power Generation Interface (PGI) Rated Speed Adjust parameters to function. In PGI engines, Rated Speed is considered to be the engine operating speed at which the genset is able to produce electrical power at the desired frequency, typically either 50 Hz. or 60 Hz. This feature allows for adjustment of the speed the engine is governed to. It also allows for adjustment of the engine gains to impact the engine speed stability and response to sudden load changes.

Adjustable Parameters:

Rated Speed Adjust Offset:

When enabled, this will allow the Power Generation Interface (PGI) Rated Speed Adjust parameters to function.

Frequency Adjust Offset:

This allows adjustment over the range -180 to 180 RPM. Frequency Adjust Offset will be added to any additional active input, hardwired or multiplexed.

Note: Frequency Adjust Offset and Frequency Adjust are added together to give total Frequency Adjust value. See Frequency Adjust.

Alternate Frequency:

When enabled, this feature gives the ability to switch the frequency between 50Hz and 60Hz by adjusting the engine speed. This feature is only adjustable and functional on engines that have been rated for dual speed operations.

Note: If the hardwired or multiplexed input changes while the engine is running, the engine operating speed will not be affected.

See SAE J1939 Multiplexing help for additional information.

Alternate Frequency Type

This is used to select between three modes of operation:

1. **Primary** — the engine will operate at an engine speed to produce 50Hz power, typically 1500 RPM
2. **Secondary** — the engine will operate at an engine speed to produce 60Hz power, typically 1800 RPM.
3. **Switch Based** — the engine operating speed will be set by the hardwired or multiplexed input.

Note: The generator set output power frequency and engine RPM is dependent on the AC alternator used in the generator set.

Droop Adjust:

When enabled, this will allow the ECM to accept input from a multiplexed or hardwired external input or INSITE™. This feature is used to automatically share load between engines. Droop is a governor function which reduces the governor reference speed as load (fueling) increases.

Engine Speed is a function of engine load by the following relationship:

$$((\%Droop/100)*RPM /100)*(\%ofFullLoad-100)+RPM$$

RPM at full load, which is the standby rating of the engine, is equal to adjusted rated speed. Adjusted rated speed is the speed at which the engine would run if droop is not enabled. The adjusted rated speed will vary based on the value of Speed Bias and Frequency Adjust Offset.

$$((RPM -RPM)/RPM)*100=\%Droop, \text{ where FL = full load and NL = no load}$$

The percentage of Droop, which is defined as the percentage change of speed from no load to full load.

See SAE J1939 Multiplexing help for additional information.

Droop Adjust Select

If Droop Adjust Select is set to **Potentiometer**, then Droop will be determined through a multiplexed or hardwired external input. If Droop Adjust Select is set to **Tool**, then Droop will be determined by the value of **User Droop Adjust**.

User Droop Adjust

When Droop Adjust Select is set to **Tool**, this value will determine the system droop.

Frequency Adjust:

When enabled, this will allow the ECM to accept input from a multiplexed or hardwired external input. This input adjusts the speed the engine is governed to.

Note: Frequency Adjust Offset and external input are added together to give the total Frequency Adjust value. See Frequency Adjust Offset.

See SAE J1939 Multiplexing help for additional information.

Gain Adjustment:

When enabled, this will allow the ECM to accept input from a multiplexed or hardwired external input or INSITE™. These inputs adjust the ECM gains to achieve the desired engine speed stability and response to sudden load changes.

See SAE J1939 Multiplexing help for additional information.

Gain Adjustment Type

When Gain Adjustment Type is set to **Potentiometer** then Gain Adjustment will be determined through a multiplexed or hardwired external input. If Gain Adjustment Type is set to **Trim** then Gain Adjustment will be determined by the value of **Tool Gain Adjustment**.

Tool Gain Adjustment

When **Gain Adjustment Type** is set to **Trim**, then this value will determine the engine gains.

Note: The typical calibrated range is 0 — 10. If the gains need to be adjusted, it is recommended starting with Tool Gain Adjustment value of 5. Increasing the value increases the responsiveness of the engine, and decreasing the value decreases the responsiveness of the engine.

Idle / Rated Control:

When enabled, this feature is the primary operator control for power generation applications. Depending on the position of the Idle / Rated switch, the engine will operate at Idle or at Rated Speed. Idle speed is used for warm-up and cool-down. Rated speed is used for synchronization and power generation. The Idle / Rated switch state can be overridden to Idle with INSITE™. The idle speed is adjustable by INSITE™ multiplexed input or hardwired switch.

When the state of the Idle / Rated switch transitions between Idle and Rated, engine speed transitions from idle to rated or rated to idle over a programmable time. The time to go from idle to rated and from rated to idle must be two independently configurable values. The adjustment of the time to go from idle to rated and the time to go from rated to idle may be adjusted in INSITE™. The adjustable range is between 0 to 30 seconds.

To change between hardwired and multiplexed input, use the **Idle Rated Switch** under **SAE J1939 Multiplexing**.

See SAE J1939 Multiplexing help for additional information.

Idle to Rated Ramp Time

This parameter sets the minimum time it will take the engine to go from idle speed to rated speed. This value can be set between 0 and 30 seconds.

Idle / Rated Switch Logic

This parameter determines the logic of the Idle / Rated switch. There are two states:

1. **Ground is Idle — the engine will go to idle speed, when the switch input is connected to ground.**
2. **Ground is Rated — the engine will go to rated speed, when the switch input is connected to ground.**

Rated to Idle Ramp Time

This parameter determines the minimum time it will take the engine to go from rated speed to idle speed. This value can be set between 0 to 30 seconds.

Service Tool Idle Rated Command

This parameter allows the engine to go between idle and rated speed if the external Idle / Rated switch is in the Rated position. If the external Idle / Rated switch is in the Idle position, the engine will only idle.

Note: This parameter will have no effect if the external Idle / Rated switch is in the Idle position.

Speed Bias:

When enabled, this feature will allow the ECM to accept input from a multiplexed or hardwired external input. Speed Bias allows adjustment of the engine speed set point while the engine is running.

This feature is used to synchronize an electric generator set with other electric generators, a power grid, or an electric utility. Synchronization of the generator sets power output by varying the engine speed is required for electrical paralleling applications. Once synchronized, Speed Bias is used to make the engine and electrical generator pick up or shed load.

See SAE J1939 Multiplexing help for additional information

Driver Activation/Deactivation:

None

Interaction with other Features and Parameters:

None

Special Instructions:

None

Disadvantages:

None

Visual Aids

None

Remote Accelerator Pedal or Lever

Feature Description

This feature provides the operator a means to control the engine from a remote location when the remote accelerator cab switch is ON. When the remote accelerator is being operated, the ECM will not recognize signals from the primary accelerator unless the Remote Accelerator Override feature is enabled.

If the Remote Accelerator Override feature is enabled the ECM will use whichever accelerator value is higher. The remote accelerator can be configured as either a switch input or an accelerator potentiometer. Unlike the primary accelerator, the remote accelerator does not employ idle validation switches.

Adjustable Parameters

Remote Accelerator Pedal or Lever

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Remote Accelerator Pedal or Lever Mode

Select the desired option or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Remote Power Take-Off (PTO)

Feature Description

Applications like cement mixers, dry bulk haulers, dump trucks, and refuse vehicles require the engine to provide constant speeds regardless of engine load. The Remote Power Take Off (PTO) feature enables the operator to select up to five pre-programmed engine speeds with a remote-mounted switch. These five speeds are in addition to the 3 speeds available with the Power Take Off feature.

If activated, Remote Power Take Off overrides Power Take Off settings.

Adjustable Parameters

▶ Number of Speeds

The number of Remote Power Take Off speeds available, from 1-5.

▶ Set Speeds 1-5

Speed settings between minimum and maximum engine speeds that can be attained by activation of the corresponding Set Speed switch while Remote Power Take Off is active. Speeds must be set equal to or greater than Minimum Engine Speed and less than or equal to Maximum Engine Speed.

Driver Activation/Deactivation

The driver can **activate** Remote Power Take Off by toggling the Remote Power Take Off switch to the ON position, and then selecting the correct set speed on an OEM-provided switch.

The driver can **deactivate** Remote Power Take Off by turning the Remote Power Take Off switch to the OFF position.

Interaction with other Features and Parameters

Remote Power Take Off is dependent upon the following Power Take Off parameters:

▶ PTO/Remote PTO

Click the checkbox to enable or disable the Power Take Off and Remote PTO features.

▶ Maximum Engine Speed

The highest engine speed setting at which Remote Power Take Off will operate. This speed must be set equal to or greater than Minimum Engine Speed.

▶ Minimum Engine Speed

The lowest engine speed setting at which Remote Power Take Off will operate. This speed must be set equal to or less than Maximum Engine Speed.

▶ Maximum Engine Load

Limits maximum engine torque to ensure that the Remote Power Take Off drive and connected equipment are not damaged by excessive engine torque input.

▶ Accelerator Override

Enables the operator to increase the Remote Power Take Off speed by using the accelerator, up to the accelerator override maximum speed.

▶ Maximum Vehicle Speed

Enables Remote Power Take Off operation up to maximum vehicle speed when vehicle speed has been detected by the ECM.

▶ Accelerator Override Maximum Engine Speed

The maximum engine speed that can be obtained when the maximum engine speed limit is overridden by the accelerator. This speed must be set greater than Maximum Engine Speed. This parameter is not available if the Accelerator Override parameter is disabled.

Special Instructions

Note the following:

- During Remote Power Take Off operation the accelerator is disabled unless accelerator override is enabled.

- Remote Power Take Off will not activate if fault code 241 is active.

Disadvantages

None

Visual Aids

None

Remote Start

Feature Description

This feature is used during engine maintenance to start or crank the engine when the cab is tilted and the KEY switch is ON.

Adjustable Parameters

Remote Start

When enabled, the engine can be started when the truck cab is tilted forward using the remote starter button. While the engine is running, the following can also be performed by pressing the R0 “-” and R1 “+” push switches in the correct order:

- Ramp-up to increase the engine speed
- Ramp-down to decrease the engine speed
- Shutdown the engine

The feature also allows cranking of the engine without starting, but the engine can only be cranked for a limited amount of time as defined by the calibration.

Relay Logic

This parameter is used to configure the logic for the Remote Start Relay as:

- Normally Closed-The contacts are closed until the relay is energized.
- Normally Open-The contacts are open until the relay is energized.

Driver Activation/Deactivation:

None

Interaction with other Features and Parameters:

None

Special Instructions:

None

Disadvantages:

None

Remote Throttle

Feature Description

This feature enables the user to control the engine throttle from a separate location on the vessel. Also, remote throttle can be used as a backup throttle in case of a failure of the main throttle.

Adjustable Parameters

The feature is not adjustable and is not displayed in INSITE.

Driver Activation/Deactivation

The feature is calibration-dependent and is not adjustable. However to activate the remote throttle, the Remote Throttle Switch must be in the ON position.

Interaction with other Features and Parameters

None

Special Instructions

Note the following:

- A "Remote Throttle Switch" monitor parameter is provided for diagnostics.
- There are two positions for the remote throttle switch: ON and OFF. The Remote Throttle Switch must be ON for the remote throttle to control the engine.

Disadvantages

Customer complains that the main throttle will not control the engine, because the Remote Throttle Switch is in the ON position.

Visual Aids

None

Road Speed Governor

Feature Description

This feature provides various parameters associated with vehicle speed setup. The maximum vehicle speed and upper and lower road speed governor droop settings are adjustable.

Droop settings enable the vehicle to accelerate above or below the **Maximum Vehicle Speed** if the load on the engine increases or decreases.

Adjustable Parameters

Road Speed Governor

Select the feature name to enable or disable the feature using the dropdown list in the ECM Value column. This enables the operator to temporarily set a maximum vehicle speed limit by using a switch, typically the Cruise Set/Resume switch.

The maximum vehicle speed limit can not be adjusted to exceed the pre-programmed **Maximum Vehicle Speed**. The Cruise On/Off switch must be in the OFF position to make adjustments to the road speed.

► Maximum Accelerator Vehicle Speed

The maximum speed the vehicle can travel on level ground in top gear. This value must be as high as the Gear-Down Protection speed for heavy engine load and lower than the Cruise Control Maximum Speed.

► Maximum Vehicle Speed

The fastest vehicle speed possible on level ground. This speed must be set equal to or higher than the **Maximum Accelerator Vehicle Speed** setting.

Note: Vehicle speed cannot exceed this value regardless of Driver Reward settings.

► Road Speed Governor Lower Droop

The rate of vehicle speed increase in a downhill or no-load condition, while operating on the road speed governor, before fuel is completely cut off. A faster downhill speed can increase momentum up the next hill and improve fuel economy.

► Road Speed Governor Upper Droop

The rate of vehicle speed decrease before full engine torque is reached, while operating on the road speed governor.

► Reserve Speed

This parameter allows the operator to exceed the **Maximum Vehicle Speed**.

► Override Distance

This is the distance an operator is allowed to use **Reserve Speed**.

► Speed Increase

This is the amount of speed the operator can exceed the **Maximum Vehicle Speed**.

► Smart Road Speed Governor

This parameter enables the operator to temporarily set a maximum vehicle speed limit by using a switch, typically the Cruise Set/Resume switch.

For example if an operator reaches a construction zone where the speed limit has decreased, the operator can adjust the maximum vehicle speed to the new speed limit. Once out of the construction zone, the operator can then set the maximum vehicle speed back to the pre-programmed **Maximum Vehicle Speed**.

Note:

- The **Maximum Vehicle Speed** limit cannot be adjusted to exceed the calibrated maximum vehicle speed.
- The Cruise On/Off switch must be in the off position to make adjustments to the road speed.

► Kickdown Pedal Smart Road Speed Governor

When enabled, this allows the operation of Smart Road Speed Governor by using the kickdown pedal.

► Switched Maximum Vehicle Speed

When enabled, this allows the value of the **Switched Maximum Road Speed Setting** to be set.

Switched Maximum Road Speed Setting

The value is used as a secondary maximum vehicle speed.

Driver Activation/Deactivation

Smart Road Speed Governor Enable is the only parameter that can be adjusted by the operator. This is accomplished when the set/resume switch is toggled, adjusting the maximum vehicle speed up or down. If the vehicle application supports Cruise Control, the maximum vehicle speed can be adjusted when the Cruise On/Off switch is in the OFF position.

The **Cruise Control Switch Setup** feature can change how the switch operates when using this feature. When Set/Accelerate (Resume/Coast) is selected and the Cruise On/Off switch is OFF, the Set position increases the maximum vehicle speed to the pre-programmed limit. The Resume position decreases the maximum vehicle speed. Note that the maximum vehicle speed can be decreased to the minimum cruise speed limit, which is typically 30 mph and not adjustable.

When Set/Coast (Resume/Accelerate) is selected and the Cruise On/Off switch is OFF the Set position decreases the maximum vehicle speed. The Resume position increases the maximum vehicle speed.

To activate Reserve Speed, the vehicle must be in Top Gear, the operator must press the accelerator pedal to the floor twice and then hold it above 70% within 15 seconds.

As long as the operator keeps the accelerator above 70% this speed is maintained until the accelerator is released or the **Override Distance** is met. However, once the accelerator is released or the vehicle has traveled the **Override Distance**, the speed will return to the **Maximum Vehicle Speed**.

Note: Once the Override Distance has been traveled, Reserve Speed will be deactivated and the feature will only be available once the vehicle has traveled the calibrated distance.

Interaction with other Features and Parameters

Note the following:

- The Cruise Control On/Off switch must be OFF for the maximum vehicle speed to be adjusted.
- The vehicle must have a vehicle speed sensor installed and no vehicle speed sensor faults can be active.

Special Instructions

Note the following:

- Ensure that a vehicle speed sensor is installed and that the **Vehicle Speed Sensor Type** and **Cruise Control Switch Setup** are properly set up in INSITE™.
- Cycling the vehicle keyswitch resets the maximum vehicle speed to its original value.

Disadvantages

Low power complaints if the vehicle does not reach a desired speed because this feature is active and the maximum allowable vehicle speed has not been bumped up using the set/resume switch.

Visual Aids

None

SCR Aftertreatment

Feature Description

Selective catalytic reduction (SCR) is an aftertreatment process that converts nitrogen oxides (NOx), which are present in diesel exhaust, into nitrogen and water. This conversion is done through the introduction of diesel exhaust fluid into the stream of exhaust gasses. The diesel exhaust fluid is stored in a tank on the vehicle and delivered via tubes or lines to the exhaust system. The parameters listed below define the Diesel Exhaust Fluid Tank and the heater relays used to provide the diesel exhaust fluid.

The diesel exhaust fluid heater system keeps the fluid at a high enough temperature to ensure delivery as required.

The Diesel Exhaust Fluid Tank can be configured as either linear or non-linear. The terms linear and non-linear refer to the general shape of the tank. A linear tank has a constant shape throughout its height. A non-linear tank has an irregular shape throughout its height. Because of this shape, the available volume of diesel exhaust fluid and the percentage of full for each of the regularly spaced breakpoints **must** be entered manually.

Adjustable Parameters

► Diesel Exhaust Fluid System Heating Type

This parameter specifies the type of heater used in the Diesel Exhaust Fluid tank. The possible values for this parameter are Electric, Coolant, Hybrid, and None. This parameter should reflect the physical configuration of the Diesel Exhaust Fluid Heater System and should not be changed unless there is a change to that system.

► Diesel Exhaust Fluid Line Heater Relay 1 through 3

This parameter enables or disables the relays for the Diesel Exhaust Fluid Line Heaters if the vehicle is equipped with them.

► Diesel Exhaust Fluid Tank Heater Relay 1 through 2

This parameter enables or disables the relays for the Diesel Exhaust Fluid Tank Heaters. These parameters are only displayed in the engine's calibration supports tank heaters.

► Diesel Exhaust Fluid Tank Type

This parameter has a range of linear and non-linear, and specifies basic shape of the diesel exhaust fluid tank used by the system. A linear tank has a constant shape throughout its height. A non-linear tank has an irregular shape throughout its height.

► Breakpoints

This parameter has a range of integer 2 through 11, and defines the number reference points for calculating the volume of fluid in the tank. The values for breakpoints of a linear tank are calculated by dividing the total volume of the tank by the number of breakpoints. The values for breakpoints of a non-linear tank are manually calculated based upon the shape of the tank.

► Non-Linear Diesel Exhaust Fluid Tank Levels 1 through 11

These parameters have a percentage range, and define the percentage of the diesel exhaust fluid tank at each of the breakpoints. The first breakpoint is set to 0 percent and the last breakpoint is set to 100 percent. These parameters **cannot** be adjusted. The other parameters are adjustable but **must** be incremental. For example, the percentage for level 6 should be between the percentages for levels 5 and 7. These parameters are only displayed if the Diesel Exhaust Fluid Tank Type is set to Non-Linear.

Non-Linear Diesel Exhaust Fluid Tank Volume 1 through 11

These parameters range vary by application, and define the volume of diesel exhaust fluid present at each of the breakpoints. The first break point is set to zero. The last breakpoint is set to the maximum capacity of the tank. These two values **cannot** be adjusted. The other parameters are adjustable but **must** be incremental. For example the volume for level 6 should be between level 5 and level 7. These parameters are only displayed if the Diesel Exhaust Fluid Tank Type is set to Non-Linear.

Aftertreatment Diesel Exhaust Fluid Low Level

This parameter specifies the point at which a Diesel Exhaust Fluid Low Level condition exists. When this condition is triggered, the Diesel Exhaust Fluid Lamp illuminates. The value is expressed as a percentage of the total volume of the Diesel Exhaust Fluid tank. The minimum value for this parameter is determined by guidance from the United States Environmental Protection Agency. This value must be greater than the Aftertreatment Diesel Exhaust Fluid Warning Level.

Aftertreatment Diesel Exhaust Fluid Warning Level

This parameter specifies the point at which a Diesel Exhaust Fluid Level Warning condition exists. When this condition is triggered, the Diesel Exhaust Fluid Lamp flashes. The value is expressed as percentage of the total volume of the Diesel Exhaust Fluid tank. The minimum value for this parameter is determined by guidance from the United States Environmental Protection Agency. This value must be less than the Aftertreatment Diesel Exhaust Fluid Low Level but greater than the Diesel Exhaust Fluid Inducement Level.

Aftertreatment Diesel Exhaust Fluid Inducement Level

This parameter specifies the point at which a Diesel Exhaust Fluid Level Inducement condition exists. When this condition is triggered, the Diesel Exhaust Fluid Lamp continues to flash and an amber warning lamp will illuminate. The engine then experiences a torque derate. This value is expressed as a percentage of the total volume of the Diesel Exhaust Fluid tank. This value must be less than the Aftertreatment Diesel Exhaust Fluid Warning Level. The minimum value for this parameter is determined by guidance from the United States Environmental Protection Agency.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

Diesel Exhaust Fluid Heater Configuration is a displayed value but cannot be adjusted from INSITE™.

Diesel Exhaust Fluid Tank Configuration is a displayed value but cannot be adjusted from INSITE™.

Linear Diesel Exhaust Fluid Tank Volume is a displayed value but **cannot** be adjusted from INSITE™. It specifies the volume of a linear diesel exhaust fluid tank. This parameter is only displayed if the Diesel Exhaust Fluid Tank Type is set to Linear.

There is a further inducement level that is not adjustable within INSITE™. Once the Diesel Exhaust Fluid Tank is empty, the Diesel Exhaust Fluid Lamp will continue to flash, the amber warning lamp will remain illuminated and a red warning lamp will illuminate as well. On certain heavy duty engines, the Check Engine lamp may also be illuminated. If the engine is shut off

and restarted, or the engine is left in extended idle, the torque derate will continue and the vehicle speed will be limited to 5 miles per hour.

Disadvantages

None

Visual Aids

None

Service Brake Switch

Feature Description

This feature allows Power Take-Off (PTO) or Cruise Control to be temporarily disabled when the service brake switch is depressed.

Adjustable Parameters

Service Brake Switch

When enabled and the service brake switch is depressed, the PTO or Cruise Control will be temporarily disabled.

Service Brake Switch Logic

This allows the user to set the logic when the service brake switch is depressed.

- **Normally Closed** — the switch is closed until it is toggled.
- **Normally Open** — the switch is open until it is toggled.

Driver Activation/Deactivation

When the operator depresses the service brake switch, the PTO or Cruise Control is temporarily disabled.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Slow Idle

Feature Description

This feature can reduce the amount of fuel burned and/or decrease cab noise and vibration. The low idle speed can be set to the desired idle speed, however the driver can override this value using an OEM-supplied idle speed adjustment switch.

Adjustable Parameters

➤ Adjustable Low Idle Speed

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

➤ Low Idle Speed

The engine idle speed when the throttle is released.

➤ Low Idle Speed Adjustment Switch

If enabled, idle speed can be adjusted using an OEM-supplied switch in the cab.

➤ Low Idle Speed Droop

Use the dropdown list in the ECM Value column to set the low idle speed droop value.

Driver Activation/Deactivation

The driver can adjust the idle speed if an OEM-supplied idle adjustment switch is installed in the cab.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

Incorrect adjustment of the low idle speed may cause excessive vehicle vibration or slightly decreased fuel economy.

Visual Aids

None

Smart Road Speed Governor

Feature Description

This feature allows the operator to temporarily set the maximum vehicle speed limit by using a switch, typically the Cruise Set/Resume switch.

For example if a driver reaches a construction zone where the speed limit has decreased, the driver can adjust the maximum vehicle speed to that new speed limit. Once out of the construction zone the maximum vehicle speed can be set back to the preprogrammed maximum vehicle speed. The maximum vehicle speed limit cannot be adjusted to exceed the preprogrammed maximum vehicle speed.

To make adjustments to the road speed the Cruise On/Off switch must be in the off position.

Adjustable Parameters

➤ Enable

Turns the feature on in the ECM.

Driver Activation/Deactivation

This feature can be enabled only by INSITE. However if the vehicle application supports Cruise Control, the maximum vehicle speed can be adjusted when the Cruise On/Off switch is in the off position.

This table shows the interaction between Cruise Switch Usage and Smart Road Speed Governor:

Cruise Switch Usage

Set/Resume Switch Position

Maximum Vehicle Speed

Set/Accelerate (Resume/Coast)

Set

Increase

Set/Accelerate (Resume/Coast)

Resume

Decrease

Set/Resume (Accelerate/Coast)

Set

Increase

Set/Resume (Accelerate/Coast)

Resume

Decrease

When Set/Accelerate (Resume/Coast) is selected and the Cruise On/Off switch is OFF the Set position will increase the maximum vehicle speed to the pre-programmed limit. The Resume position will decrease the maximum vehicle speed. The maximum vehicle speed can be decreased to the minimum cruise speed limit which is typically 30 mph and not adjustable.

When Set/Coast (Resume/Accelerate) is selected and the Cruise On/Off switch is OFF, the Set position will decrease the maximum vehicle speed. The Resume position will increase the maximum vehicle speed.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

Content.

Visual Aids

None

Speed Bias Setup

Feature Description

This feature is used to enable and set up the speed bias signal that will be received by the engine controller. The speed bias signal is used to adjust the speed of the engine during synchronization and to adjust the torque output of the engine when the generator is running parallel to the utility.

For engines equipped with PCC generator set controls, speed bias must be enabled.

Adjustable Parameters

Speed Bias Setup

Select the feature name to enable or disable the feature using the dropdown list in the ECM Value column.

Input Type

Select the speed bias input type:

- Pulse Width Modulation
- 4-20 mA Current
- Woodward Voltage
- Barber Coleman Voltage
- Ratio Metric

Duty Cycle Gain

The gain value for the PCS (power command supervisor) speed bias signal input.

Duty Cycle Offset

The offset value for the PCS (power command supervisor) speed bias signal input.

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Starter Lockout

Feature Description

Prevents the starter motor from engaging when the engine is already started and running. This feature is intended to extend starter motor life.

- When enabled, starter motor engagement is not permitted in the following engine states: run, brake, overspeed, and crank re-entry.
- Starter motor engagement is permitted during these engine states: shutdown, stop, crank, and jump start.

Adjustable Parameters

Starter Lockout

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

This feature is activated only by INSITE.

Interaction with other Features and Parameters

None

Special Instructions

- An OEM-supplied starter lockout relay must be installed in order for this feature to work.
- Use the "Starter Lockout Relay Command" this parameter to determine if an open or closed command is being sent to the relay.

Disadvantages

None

Visual Aids

None

Switch Position Priority

Feature Description

You can define which input has priority for alternate droop when the alternate droop switch is in the open position, closed position, and the intermediate position between open and closed (when the switch is being moved). The input choice is either the switch or the vehicle speed from the J1939 datalink (from vehicle speed-based droop).

Adjustable Parameters

Closed Switch Droop Priority

Use the dropdown list in the **ECM Value** column to assign priority for the closed alternate droop switch position to either **Switch** or **Vehicle Speed**.

Intermediate Switch Droop Priority

Use the dropdown list in the **ECM Value** column to assign priority for the intermediate alternate droop switch position to either **Switch** or **Vehicle Speed**.

Open Switch Droop Priority

Use the dropdown list in the **ECM Value** column to assign priority for the open alternate droop switch position to either **Switch** or **Vehicle Speed**.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

If no switch position is given priority, vehicle speed-based droop has priority.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

None

Switched Alternate Low Idle Speed

Feature Description

The **Switched Alternate Low Idle Speed** feature allows the operator to switch the low idle set speed between **Low Idle Speed** and **Switched Alternate Low Idle Speed** by the use of a cab-mounted Alternate Low Idle Switch.

Adjustable Parameters

Switched Alternate Low Idle Speed

When enabled, this will allow the Alternate Low Idle Switch to function.

Switched Alternate Low Idle Speed

This parameter allows the user to set the engine idle speed when the Alternate Low Idle Switch is **ON**.

Switched Alternate Low Idle at Startup

When enabled, this will activate the **Switched Alternate Low Idle Speed** at engine start.

Driver Activation/Deactivation

To activate the alternate low idle speed, the Alternate Low Idle Switch must be moved to the **ON** position.

If the Alternate Low Idle Switch is **ON** at engine startup and the **Switched Alternate Low Idle at Startup** feature is disabled, the Alternate Low Idle Switch will need to be set to **OFF** then **ON** to activate the **Switched Alternate Low Idle Speed** feature.

Interaction with other Features and Parameters

None

Special Instructions

Note:

- An "Alternate Low Idle Switch" monitor parameter is provided for diagnostics.
- There are two positions for the Alternate Low Idle Switch: **ON** and **OFF**. The switch must be **ON** for the engine to idle at the **Switched Alternate Low Idle Speed**.

Disadvantages

Incorrect adjustment of the Switched Alternate Low Idle Speed may cause excessive vessel vibration or slightly decreased fuel economy.

Visual Aids

None

Switched Droop

Feature Description

This feature allows an engine to have multiple droop settings. The droop settings limit engine speed under various loads to protect engine attachments from damage. Each of these droop settings can be tailored to a specific application or engine attachment. The operator selects these alternate droop settings by using a two or three position switch in the cab or on the control panel. This feature can also be multiplexed.

Droop defines the maximum speed of an engine under a given load. This definition is calculated by specifying the maximum speed of the engine at maximum torque (**Speed**) and the slope of a line from that point (**Percent**). There is an additional parameter, **Isochronous Breakpoint Speed**, which may be set as the overall maximum engine speed, regardless of the load.

Two additional droop values may also be specified. **Droop at Maximum Throttle** and **Droop at Minimum Throttle** are the slope of the lines from the maximum and minimum throttle break points, which are specified in the calibration. These two lines are used by the ECM to calculate the engine speed under a given load and a given throttle percentage.

Adjustable Parameters

➤ **Switched Droop**

When enabled, the user may select alternate droop settings for the engine.

➤ **Alternate Droop Switch Type**

This parameter indicates the type of switch used by the application. Possible values are No Switch, Two Position Switch, Three Position Switch and Additional Inputs.

➤ **Additional Switched Droop Inputs/Expanded Droop Input**

When enabled, the datalink droop switch command provides additional Switched Droop inputs.

Droop at Maximum Throttle 1 through 10 (if available)

This value is the slope of a line that specifies the maximum engine speed under various loads at 100% throttle. (See line H in figure below)

Droop at Minimum Throttle 1 through 10 (if available)

This value is the slope of a line that specifies the minimum engine speed under various loads at 0% applied throttle (idle). (See line E in figure below)

Isochronous Breakpoint Speed 1 through 10 (if available)

This optional value is the maximum engine speed regardless of the load on the engine. (See line G in figure below) This value must be greater than or equal to the **Speed**.

Percent 1 through 10 (if available)

This value is the slope of the droop line that specifies the maximum engine speed under various loads for given engine application or attachment. (See line F in figure below)

Speed 1 through 10 (if available)

This value specifies the maximum speed of an engine under maximum load and the starting point for droop line. (See point B in figure below) This value must be less than or equal to the **Isochronous Breakpoint Speed**.

Driver Activation/Deactivation

Drops are selected by the operator using either a two or three position switch or a multiplex interface device located either in the vehicle cab or on the control panel.

Interaction with other Features and Parameters

None

Special Instructions

A lower governor droop setting provides a more responsive governor for more precise engine control. A higher governor droop setting provides smoother shifting and smoother mechanical clutch engagement.

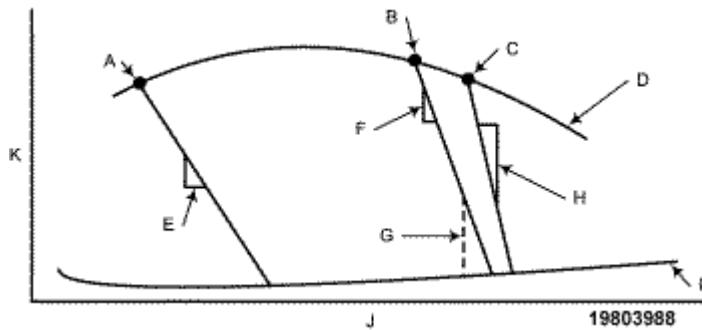
The Minimum and Maximum Throttle Breakpoints as well as the Maximum Torque Curve and the No Load Curves for the engine are defined by the engine's calibration. They are not adjustable with INSITE™.

As engine load increases, engine speed is limited by the **Isochronous Break Point Speed** (if defined) or the breakpoint line defined by the Speed and Percent. (See Visual Aids below)

Disadvantages

None

Visual Aids



This diagram shows how fueling is varied depending on the Torque (K) and Engine Speed (J). As load on the engine increases, engine speed is limited by the **Isochronous Breakpoint Speed** (G) or the droop line defined by the **Speed** (B) and **Percent** (F). The **Droop at Maximum Throttle** (H) and The **Droop at Minimum Throttle** (E) provide the lines used by the ECM to calculate engine speed based on load and throttle percentage. The Minimum Throttle Breakpoint Speed (A), the Maximum Throttle Breakpoint Speed (C), the Maximum Torque Curve (D) and the No Load Curve (I) are all set by the engine calibration.

Switched Maximum Operating Speed

Feature Description

This feature limits the engine speed to a lower maximum speed when the engine is powering speed sensitive equipment, such as a vehicle hydraulic system used in refuse trucks.

An OEM supplied switch is required for the operator to activate or deactivate the Switched Maximum Operating Speed. When deactivated, the engine's maximum speed will be limited to the governed engine speed

Adjustable Parameters

► High Speed Governor Switched Speed

Sets the speed at which engine RPM will be limited if the operator activates the switched speed.

The use of an operating speed is most common in refuse trucks utilizing the "continuous packing" feature. In this situation a maximum engine operating speed is desired during operation such that the vehicle hydraulic system is not damaged due to overspeed..

Driver Activation/Deactivation

Switched Maximum Operating Speed can be activated and deactivated by a switch on the dashboard or by OEM equipment switches.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Switched Speeds

Feature Description

This feature enables you to define up to five different speed settings for an "alternate" remote throttle control. Switched Speeds must be enabled by calibration, otherwise these speeds are not adjustable.

Calibration can enable either Remote Throttle (ISC 2), or Switched Speeds (ISC 4), but not both:

- If Remote Throttle is enabled (displayed on the Features tab), then Switched Speeds is disabled and displays grayed out.
- If Switched Speeds is enabled, then Remote Throttle displays grayed out on the Features tab.

Adjustable Parameters

Set Speed 1 - 5

You can set up to five different remote throttle speeds. Use the spin box to adjust the speed up or down for each Set Speed setting (1-5).

Each speed setting corresponds to a position on a five position rotary switch located on the control panel of the remote application.

Driver Activation/Deactivation

Content.

Interaction with other Features and Parameters

Content.

Special Instructions

Content.

Disadvantages

Content.

Visual Aids

Content

Throttle Settings

Feature Description

Throttle settings are specific to individual OEMs. If you need to adjust these parameters please contact your local dealer for more information.

Adjustable Parameters

Throttle Settings

This feature is designed to eliminate the need for, or act as a substitute for, the OEM-provided Diagnostic Switch. When this feature is enabled and the engine is not running, a series of throttle movements activate the diagnostic mode and any active fault codes will be flashed via the in-cab lamps. For specific details on throttle sequence please refer to the engine O&M manual.

Main Throttle Option

Use the spin box to select the correct option.

Remote Throttle Option

Use the spin box to select the correct option.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

None

Throttle Setup

Feature Description

Throttle setup settings are specific to individual OEMs. If you need to adjust these parameters please contact your local dealer for more information.

Adjustable Parameters

Frequency

Enables a filtered throttle frequency from an OEM-provided control unit to a sampled throttle percentage for use by the ECM, eliminating the need for an analog throttle input. The frequency and voltage levels vary by OEM application.

Remote

Click the check box to indicate that a standard remote throttle is enabled on the vehicle by calibration. If remote throttle is enabled, the corresponding dashboard switch is activated.

System Mode

Use the spin box to select the type of system to use for remote throttle.

Type

Identifies whether an automotive or a variable speed governor is used for the engine.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

Tire Wear Adjustment

Feature Description

This feature enables trucks in a single fleet that travel in pairs to maintain consistent Road Speed Governed Speed throughout the range of tire-wear.

Tire size and wear may affect the accuracy with which the ECM calculates road speed and distance traveled. As tires wear, the distance traveled per tire revolution decreases. The decrease can affect road speed and various other vehicle performance parameters unless calculated compensation is enabled in the ECM.

Consider the example of two identical trucks in the same fleet with the same Road Speed Governor Speed. These trucks should be able to maintain the same road speed if driving the same route at the same time. In actuality, if one truck has new tires installed compared to the other truck with worn tires, the truck with new tires travels slightly more distance per each axle revolution resulting in more road speed.

Caution: For this feature to work correctly, tire wear data must be collected by the fleet. This is best accomplished by running several trucks and collecting data of tire size vs. miles. An example of data collected is represented in the following table. Note that tire wear as a function of distance may be different for different fleets for many reasons, so this data must first be collected before the feature is used.

Distance

Tire Size

Tire Wear (%)

0
500 rev/mile
New Drive Tires Installed, Wear(%)=0%
40,000
512 rev/mile
Wear (%) = 2.4%
60,000
520 rev/mile
Wear (%) = 4.0%

Measuring Tire Size

Tire size is measured by marking a tire on the drive axle and rolling the truck in a straight line for one tire revolution.

1. First, inflate tires to recommended pressure.
2. Second, back the truck under a loaded trailer.
3. Third, put a mark on the tire corresponding to a mark on flat and level ground.
4. Finally, roll the vehicle as the tire completes one (1) revolution and mark on the ground both points where the mark on the tire touches.

The length (L) in inches along the ground for one tire revolution and calculate the tire size according to the following equation:

Tire Size (revs/mile) = 63360 L (inches)

Be sure when measuring the tires size that the tire is properly inflated.

Calculating Percent Wear

Percent wear is simply the comparison of the tire's size after use to the tire's original size. The following formula can be used to calculate Percent wear:

Percent Tire Wear (%) = ((Worn Tire Size - New Tire Size) / New Tire Size) x 100

Adjustable Parameters

➤ Tire Wear Adjustment

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

➤ New Tires Installed

Select **Yes** to refresh the Tire Wear Adjustment parameters.

The associated tire parameter adjustments are not enabled unless you select **Yes**.

➤ Expected Percent Change in Tire Size

The expected change in tire size over the **Expected Tire Service Life**, based on test information from the fleet.

For example if a tire's initial size is 500 rev/mile and it wears to a size of 520 rev/mile, then the expected percent change in tire size is $((520-500)/500) \times 100 = 4\%$.

➤ Expected Tire Service Life

The number of miles that can be expected from the tire over its useful life, based on the **Expected Percent Change in Tire Size**.

For example (referring to the table above), if 4.0% is the **Expected Percent Change in Tire Size**, then 60,000 miles is the corresponding distance that should be entered as **Expected Tire Service Life**.

Initial Tire Size

The number of tire revolutions per mile.

This value may be obtained from the tire manufacturer, however you should measure the actual tire size for an accurate value as described in the Feature Description above.

Driver Activation/Deactivation

Sometimes it may be necessary to install new tires when access to INSITE is impossible. A manual reset is possible that allows refreshing the Tire Wear Adjustment parameters without connecting a service tool to the datalink - while on a trip, for example.

To enable a manual **New Tires Installed** reset in the ECM, without using INSITE:

1. Turn the keyswitch ON. Do not start the engine.
2. Apply the service brake.
3. Press the accelerator pedal.
4. Move the Cruise Control switch from OFF to ON while maintaining zero road and engine speed.
5. **Initial Tire Size, Expected Percent Change in Tire Size, and Expected Tire Service Life** will be reset to the last values entered in INSITE.
6. The amber warning lamp flashes 3 times to confirm the reset.

Interaction with other Features and Parameters

Note the following interactions:

- This feature modifies the value that the ECM uses for tire size (revs/miles). Features such as Cruise Control, Road Speed Governor, and Progressive Shift utilize tire size in calculating road speed. If the Tire Wear Adjustment parameters are incorrectly entered, features which rely on an accurate calculation of vehicle speed may not work as expected.

For example the shift points associated with the Progressive Shift feature may change slightly if the **Expected Percent Change In Tire Size** is entered incorrectly. In this case the actual percent change is much smaller than the percent change entered using INSITE.

- This feature cannot be used if VSS type is set to **None**.

Special Instructions

Note:

- This feature is intended to be used by fleets with specific needs to maintain consistent Road Speed Governor Speeds. It is recommended that tire wear data be collected and understood by fleet managers before implementing this feature.
- This feature is most effective when tires are swapped in complete sets, and only when new tires are installed. It is recommended that all tires on the drive axle be replaced at the same time when using this feature.
- If INSITE detects that a tire's expected service life has ended and **New Tire Installed** has not been reset, it will continue to use the last adjusted tire size calculations.

If miles continue to increase past the expected service life without **New Tires Installed** being reset, the ECM will gradually adjust the tire size to a size between the **Initial Tire Size** and the

expected final tire size. This may result in a lower maximum vehicle speed which could be perceived as low power.

Disadvantages

If tire wear rate is not evaluated properly, the adjustable parameters associated with this feature will contain incorrect values. This may result in noticeable changes in maximum vehicle speed as tires wear, and may be perceived as low power.

Visual Aids

None

Transient Smoke Control

Feature Description

These feature settings assist and simulate the Air Fuel Control (AFC) found on the Cummins pressure-time (PT) fuel pump.

Adjustable Parameters

► Crank Fuel Pressure at High Crank Speed

This value defines the rail pressure curve used during high engine cranking conditions. This assists engine startup by reducing overfueling during engine cranking and start-up conditions.

► Crank Fuel Pressure at Low Crank Speed

The rail pressure curve used during low engine cranking conditions. This assists engine startup by reducing overfueling during engine cranking and start-up conditions.

► Smoke Control Enable

Select whether to enable or disable the feature, using the dropdown list in the **ECM Value** column.

► Smoke Control Delay

This value extends the amount of time the fueling is controlled by ramp 1 (between "A" and "B" on the diagram in Visual Aids below) before beginning ramp 2 (past "B" on the diagram).

► Smoke Control No Air

The starting point at which rail pressure increases when the Transient Smoke Control feature is active. The starting point is designated as "A" in Visual Aids below.

The value is a relative rail pressure setting (high or low). Specify a value between 1 and 5, where 1 is the highest rail pressure value (and the factory default setting) and 5 is the lowest rail pressure value.

► Smoke Control Spring Rate

This value simulates the AFC mechanical spring rate. It is used to adjust the rate at which the rail pressure can increase when the Transient Smoke Control feature is commanding fuel (past "Point B" on the diagram in Visual Aids below).

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

Electronic Smoke Control Parameters



Transmission

Feature Description

This feature enables you to specify or enable several parameters that interact with the transmission installed on the vehicle:

- Transmission type
- Style of Top 2 transmission
- Gear ratios in the transmission
- Activate Top 2 with Cruise Control switch

Adjustable Parameters

Activate Top 2 with Cruise Control Switch

This parameter enables the operator to select a Partially Automated or Manual transmission using the OEM-supplied Cruise Control On/Off switch. The operator must set the Cruise Control switch to ON before activating Top 2 automated shifting.

- If an Eaton transmission is installed and Top 2 automated shifting is active when the driver turns the Cruise Control switch to OFF, manual shifting is possible.
- If a Spicer transmission is installed and Top 2 automated shifting is active when the driver turns the Cruise Control switch to OFF, there is no effect on Top 2 automated shifting until the gearshift is moved out of the AUTO position.

This parameter requires that a Cruise Control switch be installed.

Gear Down Ratio

This parameter sets the one gear down gear ratio of the transmission, for example the gear ratio value for the 9th gear of a 10-gear transmission.

Gear Down Ratio interacts with the Eaton Top2 transmission, Vehicle Speed Sensor Anti-Tampering, Cruise Control, Road Speed Governor, and Gear-Down Protection features to help determine state changes and perform required calculations.

Top Gear Ratio

This parameter sets the top gear ratio of the transmission, for example the gear ratio value for the 10th gear of a 10-gear transmission.

Top Gear Ratio interacts with the Eaton Top2 transmission, Vehicle Speed Sensor Anti-Tampering, Cruise Control, Road Speed Governor, and Gear-Down Protection features to help determine state changes and perform required calculations.

► **Top 2 Transmission Type**

This parameter defines the type of Top 2 transmission installed in the vehicle, either Eaton, Spicer, or Non Top 2. **Top 2 Transmission Type** can be selected only when **Partially Automated** has been selected as the **Transmission Type**. A compatible transmission must be installed.

Note: The Spicer AutoMate-2 transmission shares a reconfigurable pinout with Centinel hardware. The Top 2 Transmission Type cannot be Spicer when Centinel system hardware is installed.

► **Transmission Type**

This parameter defines the type of transmission that is installed in the vehicle:

- **Manual** - The vehicle or equipment has a manual transmission.
- **Automatic** - The vehicle or equipment has an automatic transmission.
- **Fully Automated** - The vehicle or equipment has an electronic transmission that communicates with the ECM via the datalink.
- **Partially Automated** - The vehicle or equipment has either an Eaton or Spicer Top 2 transmission.

Driver Activation/Deactivation

Activate Top 2 with Cruise Control Switch enables the operator to select a Partially Automated or Manual transmission using the OEM-supplied Cruise Control On/Off switch. The operator must set the Cruise Control switch to ON before activating Top 2 automated shifting.

- If an Eaton transmission is installed and Top 2 automated shifting is active when the driver turns the Cruise Control switch to OFF, manual shifting is possible.
- If a Spicer transmission is installed and Top 2 automated shifting is active when the driver turns the cruise control switch to OFF, there is no effect on Top 2 automated shifting until the gearshift is moved out of the AUTO position.

Interaction with other Features and Parameters

The following interactions are present:

- All gear ratio settings interact with the Eaton Top2 transmission, Vehicle Speed Sensor Anti-Tampering, Cruise Control, Road Speed Governor, and Gear-Down Protection features to help determine state changes and perform required calculations.
- The Spicer AutoMate-2 transmission shares a reconfigurable pinout with Centinel hardware. The **Top 2 Transmission Type** cannot be **Spicer** when Centinel system hardware is installed.

Special Instructions

Activate Top 2 with Cruise Control Switch requires an OEM-supplied Cruise Control On/Off switch.

Disadvantages

If **Activate Top 2 with Cruise Control Switch** is enabled, Cruise Control is available when Top 2 is available.

The Spicer AutoMate-2 transmission shares a reconfigurable pinout with Centinel hardware. The **Top 2 Transmission Type** cannot be **Spicer** when Centinel system hardware is installed.

Visual Aids

None

Transmission Accelerator Interlock

Feature Description

The Transmission Accelerator Interlock feature disables the accelerator if the operator attempts to accelerate from a stopped position with the vehicle in any gear above first. Once the vehicle is in motion, the accelerator will function normally in any gear.

Adjustable Parameters

Transmission Accelerator Interlock

When enabled, this will allow the Transmission Accelerator Interlock feature to function.

Driver Activation/Deactivation:

None

Interaction with other Features and Parameters:

Transmission Accelerator Interlock can only be adjusted when **Transmission Type** is set to **Manual**.

Special Instructions:

None

Disadvantages:

None

Transmission Synchronization

Feature Description

This feature enables the ECM to briefly change the commanded accelerator percentage independent of the operator-commanded accelerator during a gear shift. This enables smoother shifts and reduces shift shock on the engine.

For example, consider a tractor whose accelerator is at 100%. When the automatic transmission shift point is reached, the ECM would briefly limit fueling during the transmission shift change even though the accelerator is still at 100%.

Adjustable Parameters

Transmission Synchronization

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Driver Activation/Deactivation

This feature is activated only by INSITE.

Interaction with other Features and Parameters

Frequency Throttle cannot be used if Transmission Synchronization is enabled.

Special Instructions

None

Disadvantages

None

Visual Aids

None

Trip Information

Feature Description

This feature is used when an ECM is replaced or an engine is rebuilt. It enables an accurate representation of trip information, despite the ECM or engine changes.

Adjustable Parameters

➤ ECM Distance Offset

The total distance (miles or kilometers) that the keyswitch was in the ON state before a new ECM was installed. This parameter is used as an offset to correct the total ECM distance value stored in the ECM. It should only be set when the engine is equipped with a replacement ECM. The offset assures accuracy in the trip information report after an ECM replacement.

➤ ECM Time Offset

The amount of time, in hours, minutes, and seconds, that the key switch was in the ON state before a new ECM was installed. This parameter is used as an offset to correct the total ECM time value stored in the ECM. It should only be set if the engine must be equipped with a replacement ECM. The offset assures accuracy in the trip information report after an ECM replacement.

➤ Engine Distance Offset

The number of miles that the engine was in operation before a new ECM was installed.

➤ Engine Time Offset

The amount of time, in hours, that the engine was in operation before a new ECM was installed.

➤ Vehicle Overspeed 1

The road speed at which the ECM will begin recording various parameters while the vehicle stays at or above this speed.

For example if you set the overspeed limit to 55 mph, the amount of time, fuel used, and distance traveled is recorded each time the vehicle exceeds this speed.

This speed must be set equal to or lower than **Vehicle Overspeed 2**.

Vehicle Overspeed 2

The road speed at which the ECM will begin recording various parameters while the vehicle stays at or above this speed.

For example if you set the overspeed limit to 55 mph, the amount of time, fuel used and distance traveled is recorded each time the vehicle exceeds this speed.

This speed must be set equal to or higher than **Vehicle Overspeed 1**.

Driver Activation/Deactivation

None

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

User Adjustable Fuel Economy

Feature Description

This feature allows the operator to choose between maximum performance and maximum fuel efficiency with a selection device within the vehicle.

Adjustable Parameters

User Adjustable Fuel Economy

When enabled, the selection device can be used by the operator.

Driver Activation/Deactivation

A selection device will be available in the vehicle for the operator to select the desired performance level.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Variable Rate Vehicle Acceleration Management

Feature Description

This feature controls the acceleration rate of the vehicle below a calibrated speed. This limitation is used to encourage safer driving, better fuel economy, and decreased wear on the engine and drive train. Acceleration rates are limited by controlling the torque output of the engine. This will provide consistent acceleration rates regardless of variations in road grade and vehicle load.

Two acceleration rates can be programmed for different vehicle speed ranges. A faster rate, for example, may be desired when starting from a dead stop, while a slower rate might be preferred once the vehicle is underway.

Adjustable Parameters

➤ Variable Acceleration 1

This parameter is the maximum rate at which a vehicle can accelerate from a complete stop to Variable Acceleration Speed 1. The value is in miles (or kilometers) per hour per second.

➤ Variable Acceleration 2

This parameter is the maximum rate at which a vehicle can accelerate at speeds between Variable Acceleration Speed 2 and Variable Acceleration Speed Upper Limit. The value is in miles (or kilometers) per hour per second.

➤ Variable Acceleration Speed 1

This parameter defines the upper limit of the speed range associated with Variable Acceleration 1. This value must be less than the value of Variable Acceleration Speed Upper Limit and should be less than Variable Acceleration Speed 2.

➤ Variable Acceleration Speed 2

This parameter defines the lower limit of the speed range associated with Variable Acceleration 2. This value must be less than the value of Variable Acceleration Speed Upper Limit and should be greater than Variable Acceleration Speed 1.

Driver Activation/Deactivation

None.

Interaction with other Features and Parameters

Vehicle Speed Sensor Type, which is a parameter of Vehicle Speed Source, must be set to a value other than **None**.

Special Instructions

The acceleration rate for the range of speed between Variable Acceleration 1 and Variable Acceleration 2 is defined by the straight line between those two parameters.

If the value for Variable Acceleration Speed 1 is greater than the value for Variable Acceleration Speed 2, the lesser of two acceleration rates will be used.

There are two additional parameters that are displayed, but can not be adjusted, within INSITE™. Their values are set by the calibration. Those parameters are Variable Rate Vehicle Acceleration Management and Variable Acceleration Speed Upper Limit.

Variable Rate Vehicle Acceleration Management displays that the feature is enabled or disabled. If the feature is disabled, the other parameters of the feature will not be displayed.

Variable Acceleration Speed Upper Limit is the maximum speed of this feature. Once the vehicle is traveling at a speed greater than this value, this feature will no longer control the rate of acceleration.

It is recommended to use the **Vehicle Acceleration Rate** Monitor parameter to determine the correct value for the **Acceleration Rate** adjustable parameter:

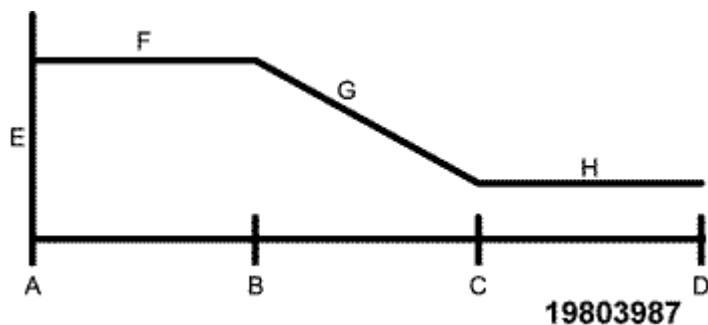
1. Enable the Vehicle Acceleration Management feature using INSITE™.
2. Set the **Acceleration Rate** to its maximum value so that it will not limit vehicle acceleration.
3. Drive the vehicle under the conditions where it is desired to limit the vehicle acceleration.
4. Enter the maximum value recorded by the **Vehicle Acceleration Rate** Monitor parameter.

When the vehicle tries to accelerate at a rate higher than the defined **Acceleration Rate**, Vehicle Acceleration Management will limit acceleration.

Disadvantages

Drivers may complain of low power under light loaded conditions due to the limited acceleration rate of the engine.

Visual Aids



This diagram shows a typical application of Variable Rate Acceleration Management. As the vehicle accelerates from Zero Speed (A) to Variable Acceleration Speed 1 (B) the Acceleration Rate (E) is limited to Variable Acceleration 1 (F). Once the vehicle passes Acceleration Speed 1 (B), an Interpolated Acceleration Rate (G) is calculated to smoothly transition from Variable Acceleration 1 (F) to Variable Acceleration 2 (H). As the vehicle exceeds Variable Acceleration Speed 2 (C) the vehicle's acceleration rate is limited to Variable Acceleration 2 (H) until the vehicle reaches the Variable Acceleration Speed Upper Limit (D).

Vehicle Acceleration Management

Feature Description

This feature regulates engine torque output based on vehicle acceleration and pre-defined acceleration limits. Engine torque is regulated based on vehicle acceleration, which limits

engine torque output under high acceleration conditions, such as level road, and light vehicle loads. Full engine torque is still available under heavy load conditions and low acceleration, such as climbing a grade with a loaded vehicle.

Vehicle Acceleration Management enables lightly and heavily loaded vehicles to accelerate equally. The limit of acceleration (or engine torque output) is based on vehicle acceleration, gear ratio, and the Acceleration Rate adjustable parameter.

Adjustable Parameters

▶ Vehicle Acceleration Management

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

▶ Acceleration Rate

The maximum rate at which the vehicle can accelerate. To set this parameter correctly, it is recommended to load the vehicle to its average expected operating weight. Then use the **Vehicle Acceleration Rate** Monitor parameter to capture the maximum or highest rate at which the vehicle accelerated.

When the vehicle is lightly loaded, Vehicle Acceleration Management limits vehicle acceleration to this value.

Driver Activation/Deactivation

There is no driver activation or deactivation for this feature.

Interaction with other Features and Parameters

Vehicle Speed Sensor Type must be set to a value other than **None**. This is a Vehicle Speed parameter.

Special Instructions

It is recommended to use the **Vehicle Acceleration Rate** Monitor parameter to determine the correct value for the **Acceleration Rate** adjustable parameter:

1. Enable the Vehicle Acceleration Management feature using INSITE.
2. Set the **Acceleration Rate** to its maximum value so that it will not limit vehicle acceleration.
3. Drive the vehicle under the conditions for which you want to limit the vehicle acceleration, such as with a loaded vehicle.
4. Enter the maximum value recorded by the **Vehicle Acceleration Rate** Monitor parameter.

When the vehicle tries to accelerate at a rate higher than the defined **Acceleration Rate**, Vehicle Acceleration Management will limit acceleration.

Disadvantages

Drivers may complain of low power under lightly loaded conditions due to the limited acceleration rate of the engine.

Visual Aids

None

Vehicle Electrical System Voltage

Feature Description

This feature defines whether the vehicle electrical system voltage is 12 or 24 volts. The ECM requires this to properly drive electrical loads that come in both 12 and 24 volt packages.

Adjustable Parameters

Vehicle Electrical System Voltage

The operating electrical system voltage of the vehicle. This must be set to the correct voltage for proper operation of electrical loads connected to the ECM.

Driver Activation/Deactivation

This feature can be adjusted only by INSITE.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

This parameter must be set to the correct voltage for the ECM to properly drive electrical loads connected to it. Engine performance could be negatively affected if the parameter is set to the incorrect value.

Visual Aids

None

Vehicle Speed

Feature Description

This feature provides various parameters associated with vehicle speed setup.

Adjustable Parameters

Accelerator Maximum

The maximum speed the vehicle can travel on level ground in top gear. This value must be as high as the Gear Down Protection speed for heavy engine load and lower than the Cruise Control Maximum Speed.

Note: Vehicle speed can exceed this value if Driver Reward is enabled.

Global Maximum

The fastest vehicle speed possible on level ground.

Note: Vehicle speed cannot exceed this value regardless of Driver Reward settings.

Pulses per Distance Traveled

This parameter allows the user to view and adjust the number of pulses that are accumulated for every unit of distance that is traveled, when the Vehicle Speed Sensor Type is set to Pulses per Distance Traveled.

Rear Axle Ratio

The gear ratio of the rear axle. The ECM uses this parameter and the number of transmission tailshaft gear teeth to determine vehicle speed.

Road Speed Governor Lower Droop

The rate of vehicle speed increase in a downhill or no-load condition, while operating on the road speed governor, before fuel is completely cut off. A faster downhill speed can increase momentum up the next hill and improve fuel economy.

Road Speed Governor Upper Droop

The rate of vehicle speed decrease before full engine torque is reached, while operating on the road speed governor. Increasing this rate can increase fuel economy in hilly terrain.

Tailshaft Gear Teeth

The number of teeth used on the transmission tailshaft gear. The ECM uses this information along with the rear axle ratio and tire revolutions per distance to determine vehicle speed.

Tire Revolutions per Distance

The number of times the tire will revolve over a specific distance.

Two Speed Rear Axle

This parameter enables the ECM to calculate vehicle speed and engine torque output using the low gear range of the two-speed rear axle.

Two Speed Rear Axle Ratio

The lower gear ratio of the two-speed axle. This can be adjusted only when **Two Speed Rear Axle** is enabled.

Vehicle Speed Sensor Type

Specifies the type of vehicle speed sensor used on the vehicle:

- **Datalink — Tachograph** - Used primarily in Europe, this is a dash-mounted datalogging device that supplies a vehicle speed signal to the ECM through the vehicle datalink.
- **Datalink — Tailshaft** - Also known as J1939 without gear ratio, this is a J1939 message supplied by a transmission that is equipped with a vehicle speed sensor. The message provides transmission tailshaft speed in rpm.
- **Datalink — VSS** - Also known as J1939 with gear ratio, this is a proprietary J1939 message used only by Scania applications. The message provides vehicle speed in kilometers per hour.
- **Magnetic** - This type of sensor uses the transmission tailshaft gear to determine vehicle speed. As each tooth of the tailshaft gear passes the sensor, the sensor generates an AC sinusoidal pulse that is interpreted by the ECM. **NOTE:** This is the most common type of sensor.
- **Mechanical** - This type of sensor is driven by the vehicle speedometer cable. The vehicle speed sensor generates a sinusoidal signal with a frequency that is proportional to the speed of the drive cable. For each cable rotation, the sensor typically generates 30 cycles of AC voltage.

- **None** - No vehicle speed sensor is present.
- **Pulses per Distance Traveled** - This type of sensor uses the accumulated pulses for the distance that is traveled.
- **Tachograph** - Used primarily in Europe, this is a dash-mounted datalogging device that supplies a vehicle speed signal. This device supplies a pulse stream with variable frequency and a fixed pulse width. The frequency of the pulse width represents the speed of the vehicle.

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE™.

Interaction with other Features and Parameters

None

Special Instructions

None

Disadvantages

None

Visual Aids

None

Vehicle Speed Droop

Feature Description

More information will be provided in an upcoming version of INSITE.

Adjustable Parameters

➤ Vehicle Speed Droop

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

➤ Thresholds

Use the **Low Threshold** and **High Threshold** spin boxes to set rpm values that result in three possible speed ranges:

- Low Speed - Speeds below the Low Threshold setting
- Mid Speed - Speeds between the Low and High Threshold settings
- High Speed - Speeds above the High Threshold setting

Setting rpm ranges enables you to define a droop curve to use with each range.

➤ Curves

The spin boxes enable you to define the droop curve that will be used in the rpm ranges that are defined in the Threshold settings. The options are:

- 0 - Uses base droop
- 1 - Uses Alternate Droop 1
- 2 - Uses Alternate Droop 2

- 3 - Uses Jcomm Droop
- 4 - None. This option turns off vehicle speed-based droop.

Driver Activation/Deactivation

More information will be provided in an upcoming version of INSITE.

Interaction with other Features and Parameters

More information will be provided in an upcoming version of INSITE.

Special Instructions

More information will be provided in an upcoming version of INSITE.

Disadvantages

More information will be provided in an upcoming version of INSITE.

Visual Aids

More information will be provided in an upcoming version of INSITE.

Vehicle Speed Sensor Anti-Tampering

Feature Description

This feature detects whenever the vehicle speed signal to the ECM has been lost or when attempts have been made to tamper with the vehicle speed input device. If either problem occurs, an engine derate will cause a loss of engine speed. The purpose of this feature is to discourage tampering with the vehicle speed input device.

The Vehicle Speed Sensor (VSS) Anti-Tampering feature provides two functions. First, the feature activates fault code 241, if a failed sensor, a failed harness, or an intentionally disconnected sensor is detected. When vehicle parameters such as clutch switch, brake switch, accelerator pedal position, or percent load indicate that the vehicle is in motion but there is no vehicle speed input signal to the ECM, the fault code is logged. An engine speed derate also occurs if the fault is logged.

Second, VSS Anti-Tampering logs fault code 242, whenever the ECM detects an attempt to tamper with the vehicle speed signal. An engine speed derate also occurs if this fault is logged, and the following message is displayed: "Invalid or inappropriate vehicle speed signal detected. Signal indicates an intermittent connection or vehicle speed sensor tampering."

Adjustable Parameters

► Tampering Sensitivity Level

The Tampering Sensitivity Level can be set to High or Low.

- High should be selected when tampering is most likely.
- Low should be selected when the loss or tampering of the Vehicle Speed Sensor is less likely or if the vehicle has an automatic transmission.

► Vehicle Speed Sensor Anti-Tampering

Select the feature name to enable or disable the feature using the dropdown list in the **ECM Value** column.

Note: Depending on the calibration, this parameter may not be adjustable in INSITE™.

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE™.

Interaction with other Features and Parameters

Note the following:

- This feature interacts with the **Transmission Type** in order to properly activate transmission-specific anti-tampering protection.
- If PTO or Remote PTO is active and the vehicle is stationary, fault code 242 will not be logged.
- **Top Gear Transmission Ratio, Rear Axle Ratio, Tire Revolutions per Distance, and Tailshaft Gear Teeth** must be set correctly to ensure that this feature works correctly.

Special Instructions

Note the following:

- Fault code 241 will be logged if the vehicle speed sensor signal is lost and this feature is not enabled.
- If you are using the vehicle speed sensor signal provided by the transmission datalink, be sure **Vehicle Speed Sensor Type** is set to **None** in the Vehicle Speed feature settings.

Disadvantages

The amber lamp will light and the engine speed will be derated to **Maximum Engine Speed Without Vehicle Speed Sensor** if fault code 241 or 242 is logged.

Visual Aids

None

Water-in-Fuel Sensor

Feature Description

The Water in Fuel Sensor protects the fuel system by alerting the vehicle operator that water has accumulated in the fuel filter and should be drained. The operator is warned of a high water condition by a flashing lamp on the dash, and fault code 418 "Water in fuel indicator high - maintenance" is logged.

The fuel filter removes emulsified and free water from the fuel as it passes through the filter media. The removed water is heavier than fuel and falls to the bottom of the filter canister where it accumulates.

The Water in Fuel Sensor is installed in the base of the fuel filter canister. The sensor consists of two metallic probes that sense the electrical conductivity of the surrounding solution. A change in conductivity can be detected when sufficient water accumulates around the probes and displaces the diesel fuel. When this happens the ECM lights the warning light on the dash.

Adjustable Parameters

Water in Fuel Sensor

Select the feature name and use the dropdown list in the **ECM Value** column to indicate whether a sensor is **Installed** or **Not Installed**.

Note: This feature requires a fuel filter with integral water in fuel sensor built into the bottom of the filter.

Driver Activation/Deactivation

This feature can be activated or deactivated only by INSITE.

Interaction with other Features and Parameters

None

Special Instructions

Note:

- Depending on the engine, some engines light the maintenance light but others light the warning lamp.
- This feature requires a fuel filter with integral Water in Fuel Sensor built into the bottom of the filter.

Disadvantages

None

Visual Aids

None

Monitoring an Engine

Data Monitor/Logger

About

Use the Data Monitor/Logger to view live engine data, or to log monitor data to a file for later analysis. The user can select specific parameters for monitoring or select predefined or customized parameter groups. The sampling rate that the monitored parameters are updated can also be adjusted.

Once the parameters have been selected, they can be monitored only (no recording) or monitored and logged (recorded as a flow of data). While monitoring and logging, and event can be recorded by the user by pressing the spacebar. Additionally, Snapshots can be taken at any time. A Snapshot is a file showing the values of the selected parameters at a specific moment.

The Data Monitor/Logger can also be used to monitor or log ECM data during testing.

- Select Data Monitor/Logger from the Viewbar
- Select **View > Current > Data Monitor/Logger** from the menu bar.

The Data Monitor/Logger Window

The Data Monitor/Logger window has three areas: Parameter Groups, Parameters and Selected Parameters List.

Parameters Groups

Parameter Groups are displayed in the upper left portion of the Data Monitor/Logger window. INSITE™ has predefined monitor groups (e.g. Engine Braking, Switches, Sensors, etc.) Custom groups may also be defined as needed. (See Custom Monitor Groups for more information.)

► Parameters

Parameters are displayed in the lower left portion of the Data Monitor/Logger window. They are grouped by ECM. Individual parameters may be selected from this area to be monitored. Parameters that have been added to the Selected Parameters list will have a monitor icon in front of them. Parameters that are part of a Predefined or Custom Monitor Group are displayed in bold font when that monitor group is selected. (See Monitor Groups or Custom Monitor Groups for more information.)

► Selected Parameters List

Selected Parameters are displayed on the right-hand portion of the Data Monitor/Logger window. The selected parameters, the current values of those parameters (once logging or monitoring is started), the units of measure and the Upper and Lower Limits for the parameters are displayed in this area when available. The lower section of this window displays all parameters that have been selected.

The upper section of this window displays **Out of Range Parameters** which are parameters that are not within the Upper and Lower Limits. These parameters are displayed in bolded red with the most recent out of range parameter first on the list. When

an out of range parameter returns to an in range value, the parameter color will change to bolded black in the Out Of Range Parameters window.

Once the parameters have been selected, the Parameter Groups and Parameters areas can be hidden by selecting the Hide button on the bar to the left of the Selected Parameters List. Select the Show button to display these areas again.

Right Click Menu

Right-click menus provide the ability to perform various functions in the Data/Monitor/Logger Window. The menu selections will change depending upon the location of the mouse cursor.

Parameter Group

The following selections are available on the right-click menu when the cursor is in the Parameter Groups area. Certain selections may display as grayed out.

Add to Monitor/Logger

Select this option to add all parameters within the highlighted group to the Selected Parameters list.

Remove from Monitor/Logger

Select this option to remove any parameters from the Selected Parameter List within the highlighted group.

Create New Group

Select this option to create a new Custom Monitor Group. (See Custom Monitor Groups for more information.)

Edit Group

Select this option to edit the highlighted Custom Monitor Group. (See Custom Monitor Groups for more information.)

Delete Group

Select this option to delete the highlighted Custom Monitor Group. (See Custom Monitor Groups for more information.)

Rename Group

Select this option to rename the highlighted Custom Monitor Group. (See Custom Monitor Groups for more information.)

Export to File

Select this option to export the highlighted Custom Monitor Group or groups to a file. (See Custom Monitor Groups for more information.)

Import from File

Select this option to import Custom Monitor Groups from previously exported files. (See Custom Monitor Groups for more information.)

Expand

Select this option to expand the group listings.

Collapse

Select this option to collapse the group listings.

Set Sampling Rate

Select this option to specify the monitor sampling rate. (See Monitor Setup for more information.)

Event Marker Setup

Select this option to set up the event marker and event description function in the log file. (See Monitor Setup for more information.)

Start Graphical Monitoring

Select this option to set up graphical monitoring of the ECM data. (See Graphical Monitoring for more information.)

Parameters

The following selections are available on the right-click menu when the cursor is in the Parameters area. Certain selections may display as grayed out.

Add to Monitor/Logger

Select this option to add the highlighted parameter or parameters to the Selected Parameters list.

Remove from Monitor/Logger

Select this option to remove the highlighted parameter or parameters from the Selected Parameters list.

Add to Group

Select this option to add the highlighted parameter to an existing Custom Monitor Group. (See Custom Monitor Groups for more information.)

Expand

Select this option to expand the parameter group.

Collapse

Select this option to collapse the parameter group.

Set Sampling Rate

Select this option to specify the monitor sampling rate. (See Monitor Setup for more information.)

Event Marker Setup

Select this option to set up the event marker and event description function in the log file. (See Monitor Setup for more information.)

Selected Parameters List

The following selections are available on the right click menu when the cursor is in the Selected Parameters area. Certain selections may appear as grayed out.

Snapshot

Select this option to capture current monitor data and write it to a file. (See Data Snapshots for more information.)

Log Data

Select this option to begin logging monitor data. (See Data Logs or Viewing Monitor Data for more information.)

If you are currently logging data, select this option to clear the check mark and pause data logging. Reselect it to resume logging.

Start/Resume

If the data monitoring or logging process has not been started, select this option to begin monitoring the selected parameters. If data was being monitored or logged and then paused, selecting this option will resume the monitoring or logging process. (See Data Logs or Viewing Monitor Data for more information.)

Pause

Select this option to pause the monitoring or data logging. (See Data Logs or Viewing Monitor Data for more information.)

Stop

Select this option to stop the monitoring or logging data. (See Data Logs or Viewing Monitor Data for more information.)

Print

Select this option to print the information displayed in the Selected Parameter List. (See Viewing Monitor Data for more information.)

Save as Group

Select this option to create a new Custom Monitor Group containing the highlighted parameters. (See Custom Monitor Groups for more information.)

Add to Group

Select this option to add the highlighted parameter(s) to an existing Custom Monitor Group.

Remove Parameter(s)

Select this option to remove the selected parameter from the Data Monitor/Logger setup. (See Custom Monitor Groups for more information.)

Remove All Parameters

Select this option to clear the Selected Parameter List. (See Monitor Setup for more information.)

Set Sampling Rate

Select this option to specify the monitor sampling rate. (See Monitor Setup for more information.)

Event Marker Setup

Select this option to set up the event marker and event description function in the log file. (See Monitor Setup for more information.)

Start Graphical Monitoring

Select this option to set up graphical monitoring of the ECM data. (See Graphical Monitoring for more information.)

Monitor Setup

About

Once the **Data Monitor/Logger** window is open, the next step is to select the parameters, set the Sampling Rate, and configure the Event Marker.

Selecting Parameters

Parameters are selected from the left side of the Data Monitor/Logger screen. The upper section, the Parameter Groups area, lists the available parameter groups. The lower section, the Parameters area, lists the individual parameters.

To add a Parameter Group or individual parameter, either double-click or right-click on the parameter and select Add to Monitor/Logger. Parameters that have been added to the Selected Parameter List have the monitor icon in front of them.

Note: The sampling rate may be affected by the number of parameters being monitored. The more parameters selected, the longer a sampling cycle will take.

Removing Parameters

There are several ways to remove parameters from the Selected Parameter List:

- Double-click on the parameter to be removed.
- Select one or a group of consecutive parameters to be removed and right-click anywhere on the group. Then, select Remove Parameter(s) from the menu.
- Right-click anywhere in the Selected Parameters List area and select Remove All Parameters to clear the Selected Parameters List.

Setting Up the Event Marker

An event can be marked while logging in the main Data Monitor / Logger screen, or when in Graphical Monitoring, by pressing the spacebar. This provides the option to enable or disable the Event Marker as well as providing the option to create comments for event markers.

1. Perform one of the following steps to open the Event Marker window:
 - Select **Edit > Event Marker Setup** from the menu.
 - Select the  from the tool bar,
2. The Event Marker Setup window will appear with the following options:
 - **Enable Event Marker** — When this is checked, pressing the spacebar will place a mark in the log file.
 - **Enable Event Description** — When the spacebar is pressed, a window will pop up to allow a description of the event to be entered. When this is unchecked and the spacebar is pressed, the log file will only contain an event number.

Note: The event number will be highlighted and displayed in the lower right corner of the INSITE™ window.

Setting the Sampling Rate

The sampling rate should be set before data monitoring or logging begins. The Sampling Rate is the speed at which the selected parameters are updated.

1. Perform one of the following steps to open the Sampling Rate window:
 - Right-click anywhere in the Data Monitor/Logger window, and then select **Set Sampling Rate...** from the menu.
 - Select the  icon from the toolbar.
 - Select Tools > Data Monitor/Logger > Set Sampling Rate... from the menu.
2. The Set Sampling Rate pop-up window will appear. Select either Real Time or User Specified Rate.
 - Real Time sampling rate will cause the parameters to be continuously updated.

- The User Specified Rate will cause the parameters to be updated once for each period of time selected. To specify the sampling rate, first select a time unit from the dropdown list, and then use the spin boxes or enter a number to set the rate.

Note: The sampling rate may be affected by the number of parameters being monitored. The more parameters selected, the longer a sampling cycle will take.

Monitor Groups

About

Monitor groups enable common monitoring or logging setups to be selected quickly without selecting individual parameters. Depending on the engine, there may be several **Predefined Groups** from which to choose, or **Custom Monitor Groups** can be created.

To see which parameters are within a group, select the group and expand the parameter list in the **Parameters Area**. The parameters within the selected group will display in bold font.

To add a Monitor Group to the Selected Parameter List, either double-click on a group name or right click on the desired group name and select **Add to Monitor/Logger** from the menu. All parameters associated with the group will appear in the Selected Parameter List. Multiple groups can be added, but if a parameter is included in more than one group, it will only be displayed once.

Monitor Groups Setup

Monitor groups enable common monitoring setups to be selected quickly without setting up individual parameters. You can add multiple groups to a session if desired.

Note: You can also define Custom monitor groups for your engine.

Custom Monitor Groups

About

Custom Monitor Groups, like Predefined Groups, provide the ability to quickly perform a monitor setup without selecting individual parameters. These groups are created by the technician and contain the specific parameters required by that technician. Custom Monitor Groups are created for a specific engine type and will not be available when connected to a different engine type. (For Example: If a Custom Engine Group is created while connected to an ISB - CM2250, it will only be displayed when connected to another ISB - CM2250.) Custom Monitor Groups can be modified, renamed, exported and imported as necessary.

Creating a Custom Monitor Group

There are two ways to create a Custom Monitor Group. The first way is to perform a monitor setup (See Monitor Setup for more information) and then highlight the parameters to be included in the Custom Monitor Group. This method allows the technician see the group displayed in the Selected Parameter List. The other way is to create the group using the right click menu in the Parameter Groups.

Creating a Custom Monitor Group from the Selected Parameter List:

1. Specify the Monitor/Logger as described in the Monitor Setup Section.
2. Highlight the desired parameters by dragging the cursor across one or more parameters in the Selected Parameter List.

3. Right click on one of the highlighted parameters and select **Save As Group...** from the menu.
4. The **Created Parameter Group** window will appear with the highlighted parameters listed in the Group Parameters box.
5. Enter the Group Name.
6. If desired, add additional parameters to the Group Parameters list by highlighting other Custom Parameter Groups or parameters in the Available Parameters box and selecting **ADD->**.
7. If desired, remove parameters from the Group Parameters list by highlighting parameters in the Group Parameters box and selecting **<-Remove**.
8. Once the Group Parameters list is complete, Select OK. The new group will be listed under the Custom heading in the Parameter Groups area.

Creating a Custom Monitor Group using the right click menu in the Parameter Groups:

1. Right click in the Parameters Group area and select **Create New Group...** from the menu.
2. The **Create Parameter Group** window will appear.
3. Enter the Group Name.
4. Add parameters to the Group Parameters list by highlighting other Custom Parameter Groups or parameters in the Available Parameters box and selecting **Add->**.
5. If desired, remove parameters from the Group Parameters list by highlighting parameters in the Group Parameters box and selecting **<-Remove**.
6. Once the Group Parameters list is complete, Select OK. The new group will be listed under the Custom heading in the Parameter Groups area.

Modifying an existing group:

There are three ways to modify a Custom Monitor Group. The first way is to open the **Edit Parameter Group** window. From this window, parameters can be added or removed as necessary. Another way is to add parameters to a group from the Selected Parameters area of the Data Monitor/Logger window. The third way is to add individual parameters to a group from the Parameters area of the Data Monitor/Logger window.

Using the Edit Parameter Group Window:

1. In the **Parameter Groups** area of the **Data Monitor/Logger** window, highlight a Custom group, then, either right click and select **Edit Group** or select **Tools > Data Monitor/Logger > Edit Custom Group** from the menu bar.
2. The **Edit Parameter Group** window will appear. Use the **Add** or **Remove** buttons to modify the list of **Group Parameters**.
3. When finished, select **Apply** to save the changes.
4. Select **Exit** to close the window.

Adding parameters to an existing group:

1. In either the **Parameters** or Selected Parameter List sections of the **Data Monitor/Logger** window, highlight one or more parameters.
2. Right click on one of the highlighted parameters and select **Add to Group**.
3. The **Add to Group** window will appear. Select an existing group from the drop-down menu.
4. Select **OK**.

Changing a group name:

1. In the **Parameter Groups** section of the **Data Monitor/Logger** window, select a Custom group name.
2. From the right-click menu, select **Rename Group**.
3. Type the new name in the **Rename Group** window and select **OK**.

Exporting and Importing

Custom monitor groups can be exported and imported.

Exporting custom groups:

1. Open the Data Monitor/Logger window.
2. Highlight one or more Custom groups in the Parameter Groups section of the Data Monitor/Logger window.
3. Perform one of the steps below to start the export process:
 - Right click on one of the selected Custom Groups and select **Export to File....**
 - Select **File > Export > Parameter Group...** from the menu bar.
4. An Export Custom Group window will appear. Select the desired file location and edit the file name if desired. If multiple groups are being exported, the Export Custom Group window will appear for each group.
5. Select the **Save** button. The file will be saved in the selected location as an Exported Group File (.egf).

Importing a custom group:

1. Open the Data Monitor/Logger window.
2. Perform one of the steps below to start the import process:
 - Right click in the Parameter Groups section of the Data Monitor/Logger window and select **Import from File....**
 - Select **File > Import > Parameter Group...** from the menu bar.
3. An Import Custom Group window will appear. Select the file location. All Exported Group Files (.egf) will be displayed. If the desired group file is not displayed, verify the location and perform this step again.
4. Double-click on the desired file or select one or more files it, and then click the **Open** button. The group(s) will now be listed with the other Custom groups.

Note: If a group is imported with the same name as an existing group, "CopyX" will be added to the group name. The X will be a number. (For Example: If a custom group exists with the name "MyGroup" and a custom group is imported with the same name, the imported group will have the same name, the imported group will have the name "MyGroupCopy1".)

Viewing Monitor Data

About

Selected parameters may be monitored without being saved to a file.

Viewing monitor data:

1. Specify the Monitor/Logger setup. (See Monitor Setup for more information.)
NOTE: Parameters may be added or removed from the Selected Parameter List while monitoring is in progress.
2. Perform one of the three steps below to begin monitoring data:

- Right click anywhere in the Selected Parameter List and select **Start/Resume** from the menu.
 - Select the **Start/Resume** icon from the toolbar.
 - Select **Tools > Data Monitor/Logger > Start/Resume** from the menu bar.
3. The selected parameters will begin to be updated at the specified sampling rate. (See Monitor Setup for more information)
 4. Monitoring may be paused or stopped at any time by performing one of the steps listed below:
 - Right click anywhere in the Selected Parameter List and select either **Pause** or **Stop** from the menu.
 - Select either the **Pause** or **Stop** icon from the toolbar.
 - Select **Tools > Data Monitor/Logger > Pause or Stop** from the menu bar.
 5. The selected parameters will stop being updated but the last value will continue to be displayed.
 6. To resume or restart monitoring, return to Step 2 above.

Logs and Snapshots

About

There are two ways to save monitoring data for later review. It can be saved as a Snapshot or as a Log. Snapshots contain a single occurrence of all selected parameters. A Log contains data from each of the selected parameters while the log was running.

Data Logs

About

A data log captures the values of the Selected Parameter List as they are updated in the Data Monitor/Logger window. When the data has been collected, it can be written to a file. Log files can become very large. The amount of data collected for each parameter is determined by the Sampling Rate and the duration of the log. (For Example: If the sampling rate is set to 10 seconds and the log is run for 5 minutes, there will be 30 values recorded for each parameter.)

Logging data:

1. Specify the Monitor/Logger setup. (See Monitor setup for more information.)
Note: Parameters may be added or removed from the selected parameter list while logging is in progress.
2. Perform one of the three steps below to begin logging data:
 - Right-click anywhere in the Selected Parameter List and select **Log Data** from the menu.
 - Select the **Log Data** icon from the toolbar.
 - Select **Tools > Data Monitor/Logger > Log Data** from the menu bar.
3. The selected parameters will begin to update at the specified sampling rate and an animated scrolling icon will appear in the status bar.
4. Events can be noted during logging. This will add either a number or a number with a comment in the log file depending on the setup. An event can be marked at any time by pressing the spacebar on the keyboard. (See Monitor setup for more information.)

- The user will then hear a beep and the Status Bar at the bottom of the Data Monitor/Logger window will display the event number. For Example: Event #: 0 will display, until the spacebar is pressed, and then Event # 1 will display.
 - If prompted, enter an event description and click **OK**.
5. Data logging may be paused at any time by performing one of the steps listed below:
- Right-click anywhere in the Selected Parameter List and select **Pause** from the menu.
 - Select either the **Log Data** or **Pause** icon from the toolbar.
 - Select **Tools > Data Monitor/Logger > Pause** from the menu bar.
6. The selected Parameter List will stop being updated. The scrolling icon in the status bar will remain, but will stop scrolling.
7. To resume data logging, perform one of the steps below:
- Right-click anywhere in the Selected Parameter List and select either **Log Data** or **Start/Resume** from the menu.
 - Select either the **Start** or **Log Data** icon from the toolbar.
 - Select **Tools > Data Monitor/Logger > Start/Resume** or **Log Data** from the menu bar.
8. When the desired data has been collected, perform one of the steps below to stop logging:
- Right-click anywhere in the Selected Parameter List and select **Stop** from the menu bar.
 - Select the **Stop** icon from the toolbar.
 - Select **Tools > Data Monitor/Logger > Stop** from the menu bar.
 - Select **Data Monitor/Logger** from the view bar. This will close the **Data Monitor/Logger** window after the log file is saved.
9. The selected parameters will stop being updated. The scrolling icon in the status bar will disappear and the **Save Logged Data** window will appear.
10. If desired, select file location, file name, and file format or accept default values.
Note: The default file name starts with the user name (if User Manager is enabled) or "DML-" (if User Manager is disabled) followed by the year, month, day, hour, minute and second that the snapshot was captured. (Example: DML-20090605-143854 was captured at 2:38:54 PM on June 5, 2009)
11. Select Save.

Note: The Log File can be viewed using any third party software that will accept the selected format.

Data Snapshots

About

A data snapshot is an instantaneous record of all selected parameters. A snapshot can be captured at any time while monitoring or logging is in progress or paused. A snapshot can only be captured while viewing the Data Monitor/Logger window.

Capturing a snapshot:

1. Specify the Monitor/Logger setup. (See Monitor Setup for more information.)
2. Ensure that the monitoring or logging process is running.
3. Perform one of the three steps below to capture a snapshot:
 - Right click anywhere in the Selected Parameter List and select **Snapshot** from the menu.

- Select the **Snapshot** icon from the toolbar.
 - Select **Tools> Data Monitor/Logger> Snapshot** from the menu bar.
4. The Save Snapshot Data pop-up window will appear.
 5. If desired, select file location, file name, and file format or accept default values.
Note: The default file name starts with the user name (if User Manager is enabled) or "DML-" (if User Manager is disabled) followed by the year, month, day, hour, minute and second that the snapshot was captured. (Example: DML-20090605-143854 was captured at 2:38:54 PM on June 5, 2009)
 6. Select Save.

The snapshot file can be viewed using any third party software that will accept the selected format.

Graphical Monitoring

About

Graphical Monitoring is a way to display, log, print, and save data for up to six parameters in a graph. Graphical Monitoring visually monitors and plots multiple parameters into a graphical display.

The X, or horizontal, axis shows the sample rate, while the Y, or vertical, axis displays the parameter value. The scale will automatically update if the data increases or decreases to a point outside of the current range. If more than one parameter is selected, each graph will have the parameter listed on the right side and units on the left side of the window. Each data point represents a value at that sample point.

Parameters can also be added or removed during graphical monitoring and the data from the graph can be saved, exported or imported.

Special Instructions

1. Select Data/Monitor/Logger on the Viewbar.
2. Perform one of the steps below to begin graphical monitoring:
 - a. From the **menu bar**, click on **Tools** and select **Data Monitor/Logger**, then select **Start Graphical Monitoring**.
 - b. From the **tool bar**, click .
 - c. From the **Parameter Groups** or the individual **Parameters** list, **right-click** and select **Start Graphical Monitoring**.
3. From the **Available Groups** list, select the parameter(s) to monitor, log, and set the sampling rate. See the **Selecting Parameters** section for more details.
4. Select **OK** to graph the selected parameters or click on **Cancel** to return to Data Monitor/Logger.
5. To start monitoring data, click  or select **Graphing** then **Start Graphing** on the menu bar.

Note: Graphical Monitoring can not be opened when Data Monitor/Logging is monitoring or logging data.

Selecting Parameters

Adding/Removing Parameters:

The Parameter Selection window displays the All Parameters group and Predefined Parameter groups in the Available Groups list. A total of up to six parameters can be

selected for graphing. Parameters can be added to or removed from Selected Parameters list in the Parameter Selection window.

► Adding Parameters:

1. Under the Available Groups, click on the  icon to expand the group name. This will display the parameters that can be selected for graphing.
2. Select a parameter from the list and click on the **Add** button or double-click on the parameter. This will add the parameter to the Selected Parameters list. Once six parameters are selected, the Add button will be grayed out.

Note: Only parameters that are supported by the connected ECM will be displayed in the Parameter Selection window.

► Removing Parameters:

1. Select a parameter from the **Selected Parameters** list and click on the **Remove** button or double-click on a parameter.

► Import from a File:

Graphical Monitoring allows importing of a saved graph for viewing. Scrolling to the right and left allows viewing of the full graph.

1. Select **Import** from the Parameter Selection window.
2. The **Open Log File** window will open.
 - a. Browse to the log file. This file will have an .elf extension.
 - b. Click on **Open** to view the graph or **Cancel** to return to the Parameter Selection Window.
3. Click **>>** to scroll right or click **<<** to scroll left, to view the graph at different times.

Note: The Import button will be grayed out if there are parameters listed in the Parameter Selection window.

Setting Up the Event Marker

An event can be marked while logging in Graphical Monitoring by pressing the spacebar. This provides the option to enable or disable the Event Marker as well as providing the option to create comments for event markers.

1. Perform one of the following steps to open the Event Marker window:
 - From the menu bar, Select Edit > Event Marker Setup.
 - From the tool bar, click 
2. The Event Marker Setup window will appear with the following options:
 - **Enable Event Marker** — When this is checked, pressing the spacebar will place a mark in the log file.
 - **Enable Event Description** — When the spacebar is pressed, a window will pop up to allow the description of the event to be entered. When this is unchecked and the spacebar is pressed, the log file will only contain an event number.

Note: The event number will be highlighted and displayed in the lower right corner of the Graphical Display window.

Setting the Sampling Rate

From the Parameter Selection window the Sampling Rate can be set.

- Enter the desired **Sampling Rate** (zero is out of range).

- Select milliseconds, seconds, minutes or hour.

Note: When a sampling rate has been selected that is outside the limits, the following message will be displayed: The Sample Rate selected is outside the allowable range. Please select a sample rate within the range.

Edit Menu

➤ Add/Remove Parameters

Add/Remove Parameters

Select this option to add or remove parameters from the graph. See the Parameter Selection Window section for details.

➤ Set Sampling Rate

Select this option to add or remove parameters fro the graph. See the Parameter Selection Window section for details.

File Menu

➤ Exit

Select this option or select the  on the top right corner of the screen to close the Graphical display window. If graphical data is logged, an **Exit Graph** window will open giving the option to save the log file.

Select from the following:

- Select **Yes** to save the graph. See Save/Export File for more details.
- Select **No** to exit without saving the graph.
- Select **Cancel** to return to the Graphical Display window.

➤ Import Log File

Select this option to import a saved graph for viewing. See Import from a File for more details.

➤ Print

Select this option to print the current view of the graph as it is displayed on the screen. The printer, print orientation, and paper can be specified on the Print window.

➤ Print Preview

Select this option to view how the graph will look when printed.

➤ Save As Picture

Select this option to save the graph as a picture file.

- Select the location to save the picture (default path is `\Intelect\INSITE\Logs`).
- Enter the file name.
- Select a file type. JPEG (.jpg) file is the default file type, but BMP, GIF, etc. are available from the dropdown list.

➤ Save/Export File

Select this option to save the logged data.

- The **Save Log File** window will display.
 - Select the desired file format and click on **Save**.
- Electronic Log File (.elf) format, which will allow the data to be imported and viewed in the Graphical Display.

- Comma Separated Values (.csv) or Tab-Delimited Text (.txt) format.
- b. After selecting the format, click Save.
- c. On the Export Log File window, use the default file name or enter a new file name.
- d. Select **Save** to save the data or **Cancel** to return to Graphical Display.

Graphing Menu

Start Graphing

Select this option to start Graphical Monitoring.

Stop Graphing

Select this option to stop Graphical Monitoring.

Help Menu

Contents

Select this option to open the base tool help.

View Menu

Changing the view will stop monitoring and data will be lost. It is recommended to save the graph before changing the view if the data is needed.

Parameter Graph

The parameter graph will monitor each parameter individually, regardless of the units of measure.

Units Graph

The units graph will combine parameters that use the same unit of measure. For example, if there are 4 temperature parameters selected they will be displayed in one graph.

Note: After changing the view, select  or select **Graphing>Start Graphing** to restart graphing.

Tool Bar Menu

Add/Remove Parameters:

Select  to add and remove parameters while graphing. A window will open asking if the existing graph needs to be saved.

Select one of the following:

- Select **OK** to save the existing graph.
- Select **Cancel** to continue adding or removing parameters.

Axis Scroll:

Select  to scroll along the X (horizontal) or Y (vertical) axes of the graph. If there are multiple graphs in this window, the X (horizontal) can only be moved by the graph at the bottom of the window. the Y (vertical) can be used on all graphs.

Axis Zoom:

Select  to zoom in or out along the X (horizontal) or Y (vertical) axes of the graph. If there are multiple graphs in this window, the X (horizontal) can only zoom in and out by the graph at the bottom of the window. the Y (vertical) can be used on all graphs.

 **Data Cursor:**

Select  to display the value of the data point on the graph. When first selected, a vertical line appears in the center of the graph. This can be moved by selecting it with the mouse and dragging the line to either side of the graph.

 **Page Setup:**

Select  to select paper size, orientation, margins, printer properties, etc.

 **Pause:**

Select  to pause Graphical Monitoring.

 **Play/Reset View:**

Select  to play or reset Graphical Monitoring.

 **Print:**

Select  to print the graph as it is displayed on the screen. See Print for more detail.

 **Print Preview:**

Select  to preview the graph before printing. See Print Preview for more detail.

 **Save As Picture:**

Select this option  to save the graph as a picture. See Save as Picture for more detail.

 **Select:**

Select  to select a single graph for zooming and scrolling. See Axis Scroll for more detail.

 **Zoom Box:**

Select  to select a section of the graph for zooming.

 **Zoom In:**

Select  to zoom in and decrease the scale of the graph.

 **Zoom Out:**

Select  to zoom out and expand the scale of the graph.

Related Topics

Running Diagnostic Tests

Before running the Accelerator Based Cutout Test

About

1. Clear the areas around the engine and the fan and make sure the exhaust is vented correctly.
2. Operate the engine until the engine oil temperature is a minimum of 76.7°C (170°F).
3. Lock the fan clutch in the "ON" position for continuous operation.
4. Shut off the air conditioning, to prevent the air conditioning compressor from cycling ON and OFF during the test operation.
5. Ensure the vehicle air tanks are fully pressurized, to avoid air compressor cycling during the test.
6. Disengage any devices that can cause load on the engine to vary.
7. With the vehicle stationary, idle the engine.

Note: The throttle control will be removed from the foot pedal during this test. INSITE will control of the percent throttle.

[Click here to return to Help on the test.](#)

Accelerator Based Cutout Test

About

This test is used to identify weak or misfiring cylinders by holding engine fueling at a specific level while cylinders are cutout one at a time. INSITE records engine speed before and after cylinders are cutout and calculates the engine speed change. The change must fall within calibration limits for a cylinder to pass.

If the engine speed change falls outside these limits, the cylinder fails. INSITE displays the pass or fail result for each cylinder that is tested.

IMPORTANT !! - Before running the test

To run the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **Accelerator Based Cutout Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Accelerator Based Cutout Test** window opens.

INSITE automatically increases or decreases the percent throttle to maintain engine RPM between 1400-1600.

1. Observe all instructions in the window.
2. Select which cylinder to cut out.

You can shut off one cylinder at a time or choose **Normal Operation** to run all cylinders. Once a cylinder is selected to be cutout, the test will take approximately 20 seconds to be completed.

Note: You can not cut another cylinder until you first select Normal Operation, allowing all the cylinders to go back to their active states.

1. INSITE displays the current engine RPM, Base RPM, and RPM change while the cylinder is cutout. Record the RPM change after a cylinder has been cutout for 15 seconds.

Also note any instructions or comments in the lower right hand corner of the window.

1. After you have completed the test, click **Stop**. All cylinders will be automatically enabled and throttle control will return to the foot pedal.

Click **Back** to perform a different test.

Note: If the engine stalls, or communication with the ECM is lost during test operation, the keyswitch must be cycled to restore cylinders to their active state.

Aftertreatment Diagnostic Tests

About

Use these tests to troubleshoot problems with the aftertreatment system. Three tests can be used to troubleshoot specific parts of the system:

- **Diesel Exhaust Fluid Heater Relay Override Test** - Tests the heater relay driver. Click on the test name below for a detailed description of the test.
- **Diesel Exhaust Fluid Doser Pump Override Test** - Tests the complete dosing system by commanding the doser to dose at a fixed rate for a fixed amount of time. Click on the test name below for a detailed description of the test.
- **Diesel Exhaust Fluid Doser Air Solenoid Click Test** - Tests the audibility of the air solenoid, to verify that the dosing pump air solenoid is functioning. Click on the test name below for a detailed description of the test.

You can also reset the **Doser Pump Incomplete Purge Count** monitor in the test window. This enables you to determine whether there have been any instances in which the dosing control unit has failed to complete a full 30 seconds purge. This might be seen on vehicles that have an electrical isolator fitted.

Diesel Exhaust Fluid Heater Relay Override Test: Details

This test is used to check that the relay controlling the tank heater is working correctly. Check for the correct voltage at the relay once the test is energized. The voltage expected should be the vehicle voltage , ie: for the European market either 12 or 24volts .

Diesel Exhaust Fluid Doser Pump Override Test: Details

The purpose of this test is to run the diesel exhaust fluid dosing pump through its dosing cycle. The override test is automated and once it has started it should not be stopped until it has completed its test cycle. Do not stop the test prematurely because it is checking for a specific amount of aqueous diesel exhaust fluid solution to be delivered in a specified time, i.e. 1 litre in 10 minutes.

Note: If there is a problem during the test, it can be stopped by clicking the STOP button. The results of an aborted test should be discarded and the test rerun after the problem has been corrected.

Test Setup

1. Remove the nozzle from the boss in the exhaust system.
2. Place the nozzle in a measuring container with the nozzle line connected before starting the test.

The best way to perform the test is to place the nozzle into 1 litre of water before starting the test. This will limit any excess aqueous diesel exhaust fluid solution being sprayed out of the container. When the test is complete, a total of 1.5 litres of solution should be present in the measuring container.

There are 3 stages of the SCR (Selective Catalytic Reduction) aftertreatment cycle:

1. Priming

The Doser pump will first prime itself, pumping the diesel exhaust fluid solution from the diesel exhaust fluid tank into the dosing pump and reaching a state where the pump has the correct pressure internally to reach the dose condition. This takes approximately 30 seconds.

If the pump does not prime successfully the first time it will try again automatically. This can occur up to a maximum of 20 times or 12 minutes. If a successful prime is not achieved the test will be stopped.

If a successful prime is not achieved, check the following:

1. Is there diesel exhaust fluid solution in the tank? Check the tank as well as the gauge.
2. Are the supply lines connected?
3. Are the supply lines clear of contamination?

2. Dosing

Once the pump has been primed it will proceed to the dosing stage. During this stage the pump will deliver 500ml (1/2 Litre) of aqueous diesel exhaust fluid solution into the measuring container, which should take approximately 5 minutes.

If 500ml +/- 50ml is not present in the container, check the following:

- Is there air to the nozzle? This can be checked by running the Intake Air Heater Override Test.
- Check for contamination in the lines to and from the pump.
- Check for active fault codes.

Note that during normal operation of the SCR (Selective Catalytic Reduction) system, the dosing control unit will proceed to dosing in normal operation after prime. It will just dose at a 0 rate until all the other required parameters are met:

- Both catalyst thermistors must be over 200 deg C.
- The engine must be running at a speed and load point that requires injection of aqueous diesel exhaust fluid solution to reduce emissions .

3. Purging

After 500ml (1/2 Litre) of aqueous diesel exhaust fluid solution has been delivered to the container, the diesel exhaust fluid dosing pump will proceed to a 30 second air purge, which clears the injection line of any excess aqueous diesel exhaust fluid solution . This is normal and a click will be heard at the end of the purge cycle as the air solenoid closes.

Diesel Exhaust Fluid Doser Air Solenoid Click Test: Details

This test can be used to check that the air solenoid that is an integral part of the dosing control unit is functioning correctly. When initiating the test you will hear a click as the air solenoid is energized. Click **Start** again to close the air solenoid.

This test can also be used to ensure that the correct amount of air is flowing down the injection line to the nozzle. To check this, disconnect the nozzle line at the connector on

the nozzle; air should be flowing freely down the line. This can be measured and should be 20 +/- 2 liters per minute.

To perform the tests:

1. Attach the PC to the engine and turn the key ON.
2. Select **Aftertreatment Diagnostic Tests** from the list in the ECM Diagnostic Tests Wizard Welcome window.
3. Click **Next**, and the **Aftertreatment Diagnostic Tests** window opens. **Note:** The engine must be running at idle to perform the Doser Pump Override Test. Complete the test setup as described above before starting the engine.
4. Note any messages or warnings in the **Instructions** box.
5. In the **Test Choices** box, select one of the three tests to run.
6. Click **Start**.
7. Monitor the Results and Status boxes for each test.

To reset the Incomplete Purge Count:

- Follow steps 1 and 2 above.
- Click **Reset** in the **Doser Pump Incomplete Purge Count** box. The counter will be reset to 0.

Click **Back** to perform a different test, if desired.

Aftertreatment Diesel Exhaust Fluid System Leak Test

About

The Aftertreatment Diesel Exhaust Fluid System Leak Test is designed to command the dosing system to build and maintain prime regardless of SCR Inlet Temperature. This test can be used to verify that the system is free of leaks after reassembly or to validate the repair of a faulty component in the dosing system.

This test will pump diesel exhaust fluid to prime the system regardless of the SCR temperature. If the system fails to prime or the engine is running during the test, a key off will be required to reset the test.

A key off will be required to stop the test when:

- The test is priming
- The test fails to stop when Stop is selected

Once primed, the system will remain primed and at pressure for twenty minutes or until Stop is selected.

If the system loses pressure during testing, the test will pause to allow time for the operator to determine the source of the pressure loss. The test will then require acknowledgement of this pressure loss before it will continue.

If an Aftertreatment Fault Code is Active, the test will not start. Troubleshoot and repair any Aftertreatment Fault Codes before starting this test.

Test Initial Conditions:

1. The Aftertreatment Diesel Exhaust Fluid System is intact and all mechanical joints have been reassembled
2. Engine is stopped
3. There are no active Aftertreatment Fault Codes

Test Procedure:

1. Select **Aftertreatment Diesel Exhaust Fluid System Leak Test** from the ECM Diagnostic Tests Wizard and select **Next** or double click on **Aftertreatment Diesel Exhaust Fluid System Leak Test**.
2. Follow the steps in the **Instructions** box. Select **Show** to view the complete instructions in a separate window.
3. Select **Start**.
4. Wait for the system to prime.
 - a. The **Status** box will display the current status of the test.
 - b. The system will remain primed and at pressure for twenty minutes. A timer will countdown and display the test time remaining.
5. Perform system inspections as needed.
6. Select **Stop** when the inspections are completed.
7. Select **Back** to return to the ECM Diagnostic Tests Wizard.

Additional Details:

- If the system loses pressure during the test for any reason, the test will Stop and allow time for the operator to determine the source of the pressure loss. The test will require acknowledgement of the pressure loss before continuing with the test.
- The system will remain primed and at pressure until the timer reaches zero or **Stop** is selected to end the test.
- Key off is required to stop the test while priming.
- If the system fails to prime or the engine is running during the test, a key off will be required to reset the test.
- The test has a 20 minute countdown timer that starts once the system is primed. If the inspections are completed prior to the timer expiring, select **Stop** to end the test early.
- If the test continues to run after **Stop** is selected, a key off will be required to stop the test.

Special Instructions:

The Aftertreatment Diesel Exhaust Fluid System Leak Test may not start or could stop early for several reasons.

1. If the Test Initial Conditions are not met when selecting Start, the test will not begin.
2. If the test automatically stops before priming is completed, the test will end.
 - a. Review the **Status** box for more information.
3. Once the system reaches the primed state and has any of the following, the test will stop and the system will complete a full purge cycle.
 - a. An active Aftertreatment Fault Code is present.
 - b. The engine is started.
 - c. The countdown timer reaches zero.
 - d. **Stop** is selected.
4. If INSITE™ is disconnected before stopping or completing the test, the system will remain pressurized until the key switch is cycled off. The system will go through a purge cycle on the next key off.

Aftertreatment Diesel Particulate Filter Regeneration

About

The Aftertreatment Diesel Particulate Filter Regeneration Test is used to clean the Diesel Particulate Filter of soot.

Safety Precautions

1. During regeneration, exhaust gas temperature could reach 800°C (1472°F), and exhaust system surface temperature could exceed 700°C (1292°F). Expected engine speed may reach between 1000 to 1500 RPM. Please read carefully and follow these instructions to avoid the risk of fire, property damage, burns or other serious personal injury.
2. Ensure that the vehicle and surrounding area are monitored during regeneration. If any unsafe condition occurs, STOP regeneration immediately.
3. Once regeneration is completed, exhaust gas and exhaust surface temperatures will remain elevated for 3 to 5 minutes.

Test Initial Conditions

1. The Aftertreatment Diesel Particulate Filter Regeneration requires the engine running at idle with vehicle stopped.
2. The INSITE™ tool has to be connected to start the test and while the test is in progress.
3. To prepare for a stationary regeneration:
 - a. Select an appropriate location to park the vehicle:
 - i. On a surface that will **not** burn or melt under high temperatures (such as clean concrete or gravel, **NOT** grass or asphalt).
 - ii. Away from anything that can burn, melt, or explode.
 - iii. Nothing within 2 feet of the exhaust outlet.
 - iv. Nothing that can burn, melt, or explode within 5 feet (such as gasoline, wood, paper, plastics, fabric, compressed gas containers, hydraulic lines).
 - v. No gas or vapors nearby that could burn, explode, or contribute to a fire (such as LP gas, gasoline vapors, oxygen, nitrous oxide).
 - vi. Away from people who might come near the exhaust outlet.
 - vii. A location where you can observe the exhaust area during regeneration.
 - b. Park the truck securely.
 - i. Set the parking brake.
 - ii. Place transmission in "Park" if provided, otherwise in "Neutral".
 - iii. Set wheel chocks at front and rear of at least one tire.
 - c. Set up a safe exhaust area.
 - i. Set up barriers to keep people at least 5 feet from the exhaust outlet during regeneration.
 - ii. When indoors, attach an exhaust discharge pipe rated for at least 800°C (1472°F).
 - iii. Keep a fire extinguisher nearby.
 - d. Check exhaust system surfaces.
 - i. Confirm that nothing is on or near the exhaust system surfaces (such as tools, rags, grease, debris).

- e. Prepare for engine speed changes during regeneration.
 - i. PTO powered devices **must** be disconnected before starting the regeneration.
 - ii. Stay clear of the engine compartment.

Test Procedure

To select Aftertreatment Diesel Particulate Filter Regeneration:

1. Click ECM Diagnostic Tests on the left sidebar.
2. In the ECM Diagnostic Test Wizard select Aftertreatment Diesel Particulate Filter Regeneration and then click on the Next button.
3. When the Aftertreatment Diesel Particulate Filter Regeneration Window opens:
 - a. Verify that all the Instructions and prerequisites are met. If **not**, click on the Back button and complete setting the test up before proceeding.
 - b. If all Instructions and prerequisites have been met, then click on the Start button.
4. The cleaning will stop automatically when the particulate filter is sufficiently cleaned of soot. The test can also be stopped by selecting the Stop button. When the test completes the status will be displayed in the status window.

Adjustable Parameters

There are no adjustable parameters connected to this test.

Driver Activation/Deactivation

This feature can only be activated or deactivated by a trained service technician with the Cummins INSITE™ service tool.

Interaction with other Features and Parameters

The cleaning process will only start if the ECM detects suitable conditions.

Related Monitor Parameters

The following parameters will be monitored and displayed:

- A. Aftertreatment Diesel Oxidation Catalyst Inlet Temperature: This monitor gives the temperature at the inlet of the Diesel Oxidation Catalyst. It records the value in temperature units (degree C/degree F).
- B. Aftertreatment Diesel Particulate Filter Inlet Temperature: This monitor gives the temperature recorded at the inlet of the Diesel Particulate Filter. It records the value in temperature units (degree C/degree F).
- C. Aftertreatment Diesel Particulate Filter Outlet Temperature: This monitor gives the temperature recorded at the outlet of the Diesel Particulate Filter. It records the value in temperature units (degree C/degree F).
- D. Aftertreatment Diesel Particulate Filter Soot Load: There are 4 possible values that can be displayed: Normal, Above Normal - Least Severe, Above Normal - Moderately Severe or Above Normal - Most Severe.
- E. Aftertreatment Injector Status: This monitor indicates whether the Aftertreatment Fuel Injector is dosing or **not** dosing. Dosing means that fuel is being injected into the Aftertreatment System.

Related Trip Information Parameters

Number of Desired Regenerations: The Desired Regeneration count is increased each time the diesel particulate filter soot load exceeds a value that demands a regeneration event (i.e.

exceeds the 'start of regeneration' (SOR) threshold). This parameter records the number of Desired Regenerations.

Number of Incomplete Regenerations: This parameter records the number of Incomplete Regenerations. The Incomplete Regeneration count is incremented each time the regeneration event commences but ends before completion.

If the number of incomplete regenerations is close to the number of desired regenerations then this is an indication that the vehicle operates in a duty cycle where the required temperatures only occur for short periods of time.

Number of Complete Regenerations: The Complete Regeneration count is incremented each time the regeneration event commences and completes successfully. This parameter records the number of Complete Regenerations. If the number of complete regenerations is close to the number of desired regenerations then this is an indication that the vehicle operates in a duty cycle where it is able to achieve regeneration temperatures effectively.

Special Instructions

1. This test could take up to one hour to complete depending on the soot loading of the filter.
2. Possible Causes for a failure of the test to complete could be electronic fault codes, high count of inactive fault codes, soot load of the Aftertreatment Diesel Particulate Filter is too low, the proper procedure is **not** being followed, an OEM or customer selected inhibit feature is active, correct programmable parameters or selected features are **not** correct, vehicle brake switch or circuit is malfunctioning, Vehicle Speed Sensor (VSS) or circuit is malfunctioning, clutch switch or circuit is malfunctioning, accelerator pedal position sensor or circuit is malfunctioning, Cruise Control/PTO selector switch or circuit is malfunctioning, transmission is **not** in park, if provided, otherwise in neutral, or the ECM calibration is malfunctioning. Please refer to the appropriate troubleshooting tree to identify the exact cause and remedy for any abnormalities.

Disadvantages

None.

Aftertreatment High NOx Reset

About

The Aftertreatment High NOx Reset test is used to turn off a Malfunction Indicator Lamp (MIL) once the issues causing the fault has been corrected. The faults that cause the MIL lamp cannot be reset by INSITE™.

Initial Conditions:

1. High NOx faults identified and corrected.
2. Engine running at normal operating temperatures.
3. Engine running between 1000 and 2500 rpm.

To Perform The Test:

1. Select Aftertreatment High NOx Reset from the ECM Diagnostic Tests window, and then select Next.
2. Select Start. The progress indicator bar will display "Paused" and the Status window will display the reason that the test is paused.
3. Start the drive cycle.

4. Maintain an Engine Speed of 1000 to 2500 rpm.
5. Drive or operate vehicle until the operating temperatures are in normal ranges.
6. When the required conditions are met, the test will begin. The progress indicator bar will change from yellow to green. The status of the test, shown as percent completed, will be displayed in the progress indicator bar as well as the Monitors window.
7. Once the test has completed, the progress indicator bar will display "Passed" and the MIL lamp will turn off.
8. Select Stop to end the test early. When the test is stopped, the progress indicator bar will display "Stopped".

Additional Information

1. The test will **not** begin until the engine has reached normal operating temperatures, as specified by the engine's calibration, and the engine's speed is between 1000 and 2500 rpm.
2. If any of the test parameter values fall outside the required range during the test, the test will pause. The progress indicator bar will display "Paused" and the Status window will display the reason why the test is paused. Once the parameters have returned to the required range, the test will resume.
3. If the ECM detects a condition that prohibits the Aftertreatment High NOx Reset Test from running, the progress indicator bar will display "Stopped". Refer to the appropriate service manual for further details.
4. If the engine's calibration does **not** support the Aftertreatment High NOx Reset Test, a message will be displayed and the Start button will be grayed out.
5. If the engine stops during the test, the test will stop and the progress indicator bar will display "Stopped". Once the engine is restarted, the test will have to be manually restarted.

Aftertreatment SCR Catalyst Desulphurization

About

The Aftertreatment SCR Catalyst Desulphurization is designed to remove an excess buildup of sulphur on the catalyst. The process will raise the engine speed for a defined period. The length of a stationary (parked) desulphurization will take approximately 2 hours to complete, and the vehicle **must** be attended during this period.

The desulphurization process will continue to run after INSITE™ has been physically disconnected from the ECM. This can be done by removing the datalink adapter connection from the PC.

Test Initial Conditions

- Vehicle must be stopped.
- Engine running at low idle.
- Transmission in 'Park' or 'Neutral'.
- Parking brake is set.
- Power Take Off (PTO) is not active.

Test Procedure

1. Select **Aftertreatment SCR Catalyst Desulphurization** from the ECM Diagnostic Tests Wizard and select **Next** or double-click on **Aftertreatment SCR Catalyst Desulphurization**.

2. Verify the initial conditions are met, and click **Start**.
3. If needed, select **Stop** to end the desulphurization process.

Additional Details

- The engine will remain at idle until the warm-up is completed.
- The engine speed will gradually increase until it reaches the required elevated engine speed for the desulphurization process. At the end of this elevated engine speed period, the engine speed will decrease to idle for the cooling phase to complete the desulphurization.
- During the elevated engine speed period, the fuel injection sequencing is adjusted and the engine running tone will change. This is normal during the process.
- The process will stop and the engine speed will return to normal when the desulphurization has been completed.
- The desulphurization will stop if any of the following occur:
 1. A fault becomes active.
 2. The accelerator is depressed.
 3. The clutch is depressed.
 4. The brake is depressed.
 5. The transmission is put into gear.
 6. The PTO becomes active.
 7. A datalink device causes the process to stop.
 8. INSITE™ is disconnected using the 'Disconnect from ECM button'.
 9. INSITE™ is closed while connected to the ECM.
 10. The 'ECM Diagnostics Tests' page is closed while the process is running, and INSITE™ is connected to the ECM.
- Once the process runs to completion, a key cycle is necessary for the process to be run again.
- The desulphurization process will continue to run if INSITE™ is physically disconnected from the ECM without closing INSITE™. To disconnect, perform the following steps:
 1. Halt any Data Monitor Logging sessions within INSITE™.
 2. Remove the USB or serial cable form the PC.

Note: A communication error may appear.

Aftertreatment Shutoff Valve and Injector Override Test

About

The Aftertreatment Shutoff Valve and Injector Override Test can be used to troubleshoot possible problems associated with a faulty Aftertreatment Fuel Injector, Aftertreatment Fuel Drain Valve, and Aftertreatment Fuel Shutoff Valve.

The test has three modes: a System Test, a Shutoff Valve Test, and an Injector Leak Test.

- System Test — Tests the ability of the Aftertreatment Fuel Injection system. Click on the test name below for a detailed description.
- Shutoff Valve Test — Tests if the Aftertreatment Fuel Shutoff Valve is operating correctly. Click on the test name below for a detailed description.

- Injector Leak Test — Tests the Aftertreatment Fuel System for leaks. Click on the test name below for a detailed description.

System Test: Details

This is used to test the ability of the Aftertreatment Fuel Injection system to dispense 300 ml of fuel in 2.5 minutes. The operator can measure the fuel actually dispensed from the injector and determine whether or **not** it equals 300 ml. This test stops automatically after 2.5 minutes, plus any Delay Time if applicable; see procedure steps below for more information about a Delay Time. During this test the Aftertreatment Fuel Shutoff Valve is open and the Aftertreatment Fuel Drain Valve is closed.

Fuel Shutoff Valve Test: Details

This test opens the Aftertreatment Fuel Shutoff Valve, closes the Aftertreatment Fuel Drain Valve, and closes the Aftertreatment Fuel Injector. The test is used to determine if the Aftertreatment Fuel Shutoff Valve is operating correctly. The Shutoff Valve Test stops automatically after 60 seconds plus any delay time if applicable, or can also be stopped using the Stop button in INSITE™.

Injector Leak Test: Details

This test opens the Aftertreatment Fuel Shutoff Valve, closes the Aftertreatment Fuel Drain Valve, and closes the Aftertreatment Fuel Injector. This test is used to pressurize the Aftertreatment fuel system so that it can be checked for leaks. This test stops automatically after 60 seconds plus any delay time, if applicable, or can also be stopped using the Stop button in INSITE™.

Safety Precautions

1. Wear proper protective clothing and equipment including safety goggles, or face shield, chemical resistant gloves.
2. Eliminate all ignition sources (e.g. sparks, open flames, hot surfaces). Keep away from heat. Post "NO-SMOKING" signs. It is very important to keep areas where this material is used clear of other materials which can burn.
3. Diesel Fuel is extremely flammable. It will readily ignite at room temperature. It can release vapors that form explosive mixtures with air. Liquid can accumulate static charge by flow or agitation. Vapors can be ignited by a static discharge. Fuel vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back to a leak or open container. Liquid can float on water and may travel to distant locations and/or spread fire. During a fire, irritating/toxic gases may be generated. Can accumulate in confined spaces, resulting in a toxicity and flammability hazard. Containers may explode in heat of fire.

Test Initial Conditions

1. Verify Safety precautions are met.
2. Have a suitable container available to collect any leakage or runoff.
3. Remove the aftertreatment injector from the engine. Refer to the appropriate service manual for more details about removing the aftertreatment injector and reinstalling it.
4. Attach the PC to a running engine in a non-moving vehicle.
5. Open INSITE™ and establish a connection with the engine.

Test Procedure

To select Aftertreatment Shutoff Valve and Injector Override Test:

1. Click ECM Diagnostic Tests on the Viewbar.

2. In the ECM Diagnostic Test Wizard select Aftertreatment Shutoff Valve and Injector Override Test and then click on the Next button.
3. Note the messages in the Instructions and Status boxes. In the Inputs box, use the Test Modes dropdown list to select a test. After you select a test, a popup window will appear instructing you that the injector **must** be removed from the engine.
4. Use the up or down arrows to select a Delay Time before the test begins, if desired. A delay time may be necessary if you need to position yourself at the engine after clicking Start to start the test. The Delay Time Value box is in MM:SS (minutes:seconds) format. To increase or decrease the delay time by minutes, highlight MM before using the up or down arrows. To increase or decrease the delay time by seconds, highlight SS before using the up or down arrows. You can also type in the desired Delay Time after highlighting MM or SS, rather than using the arrows. After selecting the Delay Time, click Start.
5. Observe the test status in the Status box. Click Stop to stop the System Test. After 2.5 minutes the test will time out and stop automatically. The Shutoff Test and Injector Leak Test will time out after 60 seconds. The Stop button may be used to stop these tests. The Instructions box and the Status box will display the test completion. Click the Test Modes dropdown list to perform a different test upon completion of any or all of these tests.
6. Once the tests are completed, restore the aftertreatment injector to its original configuration.
7. Refer to procedure 011-054 in the appropriate Service Manual for the pass/fail criteria.
8. Upon completion of any or all of these tests, click the Back button to return to the ECM Diagnostic Test window.

Adjustable Parameters

There are no adjustable parameters in this test.

Driver Activation/Deactivation

This test can only be performed using the Cummins INSITE™ service tool.

Interaction with other Features and Parameters

1. The test will only start if the ECM detects suitable conditions.
2. The engine **must** be running at idle with no vehicle speed to perform the Aftertreatment Shutoff Valve and Injector Override Test.

Related Monitor Parameters

1. This test can **not** be performed while the Monitor/Logger screen is open in INSITE™.

Related Trip Information Parameters

1. There are no related trip information parameters.

Special Instructions

None.

Disadvantages

None.

Air Compressor Solenoid Test

About

This test helps diagnose problems with the Electronic Air Compressor feature (Smart Air Compressor). You can activate or deactivate the air compressor solenoid on command, and an audible 'click' indicates whether the solenoid is activating and deactivating properly.

Note: Please make sure Engine Speed and Vehicle Speed are zero prior to starting the test.

To perform the test:

1. Make sure the engine is **not** running and the key switch is ON.
2. Select **Air Compressor Solenoid Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Air Compressor Solenoid Test** window opens.
3. Select **Start** to start the test. The status of the solenoid is displayed in the bottom left window.
4. Select **Solenoid On** to turn on the solenoid, and wait for at least five seconds. If you hear a click, the solenoid is working properly.
5. Select **Solenoid Off** to turn off the solenoid.
6. Select **Stop** to stop the test.

Click **Back** to perform a different test.

Air to Fuel Ratio Test

About

Content will be included in the INSITE 7.3 version

Boost Override Test

Use this test to run the engine on the 100% torque curve for diagnostic purposes.

Boost Power Override ensures that Boost Power is not activated and then deactivated during a dynamometer run. If Boost Power were allowed to activate and/or deactivate during such testing, it would seem that the engine had a performance problem from a mysterious increase/decrease in power and torque. The override prevents the engine from switching to a lower torque curve.

About Boost Power

Boost Power is a torque curve that is calibrated for a higher torque/horsepower than the normal engine rating for industrial engines. The ECM monitors engine speed, intake manifold temperature, and coolant temperature to determine if boost power can be activated.

If boost power is available, the operator can activate it using a dash-mounted switch. The engine will switch to the higher torque curve/power rating for a limited period of time.

Boost power is not available if coolant temperature or intake manifold temperatures are above calibrated thresholds. If engine speed is below a calibrated threshold, then boost power may not be time-limited.

Note: Boost Power Override must be enabled in the calibration or this test is disabled.

To run the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **Boost Override Test** from the list in the ECM Diagnostic Tests Wizard Welcome window. Click **Next**, and the **Boost Override Test** window opens.
3. Note any instructions in the **Instructions** box, then click **Start**.

Note: There can not be any active fault codes or the test will not run.

1. Click **Stop** to deactivate Boost Override.

Click  to close the **ECM Diagnostic Tests** window, or click **Back** to perform a different test.

This procedure is not yet available at the time of publication.

Control Valve Click Test

About

This test enables you to activate the Injection Control Valve, Front Pumping Control Valve, and the Rear Pumping Control Valve for diagnostic purposes.

To perform the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **Control Valve Click Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Control Valve Click Test** window opens.
3. Select which valve to test: **Injection Control Valve**, **Front Pumping Control Valve**, or **Rear Pumping Control Valve**.

A clicking sound indicates that the control valve is operating correctly. If a clicking sound is not heard, the valve may be seized or is not receiving an electrical signal for activation.

To re-enable all valves after testing:

- Click **Back** to perform a different test.

Cylinder Cutout Test

About

Use this test to remove individual cylinders from the engine firing cycle and to monitor the engine while the selected cylinder is disabled.

To perform the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **Cylinder Cutout Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Cylinder Cutout Test** window opens.
3. Note any messages or warnings in the **Instructions** box.
4. Click **Start**.
5. Select which cylinder to cut out by clicking it with your mouse.
6. Monitor the percent fuel and the RPM values while the cylinder is disabled.

Note: When you select a cylinder, the cylinder number represents the cylinder position number, not its firing order.

To re-enable all cylinders after testing:

- Click **Restore All**, or **Stop** to stop the test and restore all cylinders.

Click **Back** to perform a different test.

Cylinder Performance Test

About

The Cylinder Performance Test performs an automated procedure to test the relative contribution of each cylinder to the engine's overall power. The cylinders that are performing within the normal operating range will display Pass as a test result. Those performing outside of the normal operating range will display Fail.

Test Initial Conditions

- Ensure all air has been purged from the fuel system prior to starting the test. This test will not function properly if air is present in the fuel system.
- Engine idling below 900 RPM.
- Engine coolant temperature at 150 degrees F (66 degrees C) or greater.

Test Procedure

1. Select Cylinder Performance Test from the ECM diagnostic Tests Wizard and select Next or double-click on Cylinder Performance Test.
2. Click on the Start button.
3. The test will perform a set-up procedure. During this set-up, the Test Results column will display **Testing** for all cylinders and banks.
4. Once the set-up is completed, the Results window will display either **Pass** or **Fail** for each cylinder and bank. The Results window will update once per second until the test is stopped or paused.
5. Click on the Pause button to pause the test. The Results window will display the most recent test results while paused. Click on the Resume button to resume the test.
6. Select Stop to end the test.

Additional Details

- If the engine speed exceeds 900 RPM, the test will pause. Once the engine speed drops below 900 RPM the test will automatically resume.

Right Click Menu

Print — Select this option to print the displayed test results and the engine speed.

Detonation Sensor Offset Calibration

About

This test enables you to calibrate the offset values for the detonation sensors, so that the ECM can effectively control detonation. The output of each sensor must be normalized to 1.0v, by the use of its offset stored within the ECM.

The test determines offset values needed for each detonation sensor on the current bank. Calibration requires tuning while the engine is running and at varying load levels. If the engine

stops running at any time during calibration, the test will stop and all of the detonation sensor offsets will be set back to their original values.

Note: Calibration must be completed on both the A and B banks on the engine.

To begin the test:

1. Be sure the engine is running, at no load.
2. Select **Detonation Sensor Offset Calibration** in the QSK19G/45G/60G, QSV81/91 - SSM558 Test Selector window, then click **Next**.
3. Follow the instructions to load the engine to 75 percent.
4. Click **Next** to continue the test, or **Back** to return to the **QSK19G/45G/60G, QSV81/91 - SSM558 Test Selector** window.

Diesel Exhaust Fluid Doser Pump Air Solenoid Click Test

About

The Diesel Exhaust Fluid Doser Air Solenoid Click Test cycles this solenoid open and closed. The Click Time indicates the number of seconds between cycles of the air solenoid. This allows for testing of the solenoid at various speeds.

Note: This test will continue to run until Stop is selected.

To perform “Click” test:

1. Disconnect the air tubing from the injector.
2. Select Diesel Exhaust Fluid Doser Pump Air Solenoid Click Test in the ECM Diagnostic Tests window, and then select Next.
3. Set the Click Time to a small value.
4. Select Start.
5. An audible “Click” should be heard as the solenoid cycles.
6. Select Stop to end the test.

Diesel Exhaust Fluid Doser Pump Override Test

About

The Diesel Exhaust Fluid Doser Pump Override Test dispenses diesel exhaust fluid at a specified rate, over a specified period of time. The duration of the test and the amount of fluid dispensed are determined by the calibration and are displayed by the test.

Initial Conditions:

The following conditions are required before running the test. If test conditions are **not** met, the test will **not** start and an error message will be issued.

1. Engine **must** be running.
2. The diesel exhaust fluid tank level **must** be above the low level alarm.
3. The diesel exhaust fluid **must not** be frozen.
4. Dosing nozzle has been removed from the exhaust pipe and placed it in a graduated container.

To perform the test:

1. Select Diesel Exhaust Fluid Doser Pump Override Test from the ECM Diagnostic Tests window, and select Next.

2. A warning window will appear. When test conditions have been met, click OK.
3. When the warning window clears, select Start.
4. The Monitor window will display specified parameters and values.
5. The Start button will change to Stop.
6. Depending on the type of doser system, there may be pre-test line purge cycle. The duration of this cycle is determined by the calibration. When the dosing starts, the Pump Test Time will begin incrementing.
7. The Status window will display the status of the test.
8. The test will stop automatically, once dispensing is completed. Select Stop to end the test early.
9. Upon completion of the test, the Status window may display a message stating that an after-test purge cycle is running. Once that purge is completed, the test may be closed

Diesel Exhaust Fluid System Heater Test

About

This test is used to ensure that the relays controlling the diesel exhaust fluid system heaters are working correctly. The relays may be tested individually or as a group. The duration that relays are energized is displayed as the Test Time Limit. This Test Time Limit has been established to prevent system damage from overheating. There is also a limit to the number of times the test may be run without cycling the key switch. Both of these limits are set by the engine's calibration.

To perform the test:

1. Select Diesel Exhaust Fluid Doser System Heater Test from the ECM Diagnostic Tests window, and then click Next.
2. Select the relays to be tested. **Note:** If a relay selection is grayed out, it is disabled. Go to Features and Parameters and enable the relay.
3. Select the Delay Time desired. The Delay Time can be set to a maximum of two minutes. The Delay Time is to allow time to reach the heater relays being tested prior to the test starting.
4. Select Start. The Test State will display Running.
5. The Test Time Limit value for each selected supported device will be displayed when the test begins.
6. Test will stop automatically once time limit is reached. Select Stop to end the test early. When the test stops, the Test State will display Stopped

Additional Information:

1. If a high temperature condition is detected with any of the selected supported devices the test will stop.

This procedure is not yet available at the time of publication.

EFC Actuator Override Test

About

This is an automated test that manually operates the EFC Actuator to ensure that the EFC Actuator is functioning properly. The test runs for a maximum of 60 seconds.

To perform the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **EFC Actuator Override Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **EFC Actuator Override** window opens.
3. Note any messages or warnings in the **Instructions** box.
4. Click **Start**.
5. Click the checkbox in the **Overrides** box to open the actuator.
6. Click **Stop** to stop the test.

After steps 5 and 6, observe the **Status** and **Current Parameters** panels to ensure that the EFC Actuator is functioning properly.

Click **Back** to perform a different test.

EGR Valve and Turbocharger Operational Test

About

This is an automated test that verifies the functionality of the EGR valve. During this test, INSITE will raise the engine speed to 1300 rpm. After the engine speed has increased to 1300 rpm, INSITE will command the Variable Geometry Turbocharger (VGT) to the fully open position and the EGR valve to the fully closed position.

At this condition, a turbo speed reading will be recorded. INSITE will then command the EGR valve to fully open and a second turbo speed reading will be taken.

When the EGR valve opens during the test, turbo speed will decrease because some of the exhaust gas is being recirculated to the intake and less exhaust gas is flowing through the turbo. INSITE will calculate the percent decrease in turbo speed and display pass/fail results.

To perform the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select EGR Valve/Turbocharger Test from the list in the ECM Diagnostic Tests Wizard window. Click **Next**, and the EGR Valve/Turbocharger Test window opens.
3. Select whether you want to test the EGR Valve, Turbocharger, or both.
4. Click **Start**.
5. Observe any messages that display.
6. Click **Stop** to stop the test.

Click **Back** to perform a different test.

EGR Valve Test

About

This test is used to override the EGR valve to the fully open or fully closed position. Certain fault codes will instruct you to perform this test to verify EGR valve operation.

By performing this test, correct movement of the EGR valve can be verified.

To perform the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select EGR Valve Test from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the EGR Valve Test window opens.
3. Click **Start**.
4. Observe the **Instructions**, **Command**, **Valve Position**, **Delay**, and **Status** boxes for complete instructions on completing the test.
5. Click **Stop** when the test is complete.

Click **Back** to perform a different test.

Engine Protection Witness Test

About

The Engine Protection System monitors critical engine operating conditions such as engine speed, temperatures, levels and pressures. When one of these critical operating conditions is outside of the calibrated limits, a warning lamp may be turned on, the engine may be derated or shutdown, or both. The Engine Protection Witness Test verifies that this system is working properly. It does this by overriding actual sensor values with simulated values that will trigger an Engine Protection response.

Initial Conditions:

1. Engine running.

To Perform The Test:

1. Select Engine Protection Witness Test from the ECM Diagnostic Tests window, and then select Next.
2. Select the desired Engine Protection Channel. Only one condition may be selected at a time.
3. Select the Severity value (Low, Medium, or High).
4. Select Start.
5. Monitor the engine for changes and the dashboard or control panel for warning lamps.
6. Test will stop automatically once the Test Duration is reached. Select Stop to end the test early.
7. If additional testing is desired, return to Step 2.

Additional Information:

1. The duration of the test is determined by the calibration and will **not** exceed 30 minutes.
2. During this test, engine warnings and derates, including engine shutdown, may occur depending on the Engine Protection Channel and Severity selected.
3. Engine will return to normal operating conditions when the test stops.

Engine State Monitor

About

The Engine State Monitor displays the active control state of an engine including any active derates. This feature can be used to identify the root cause of an engine's performance issue.

To Perform the Test:

1. Select ECM Diagnostic Tests from the INSITE Viewbar.
2. In the ECM Diagnostic Test Wizard, select Engine State Monitor.
3. Click Next and the Engine State Monitor Test window will open.
4. Note the messages in the Instructions and Status boxes.
5. Click on the Start button
6. Operate the vehicle on a chassis dynamometer or drive the vehicle at the same operating conditions where the performance complaint exists.
7. Click on the Stop button to stop the test.
8. Click on the Back button to return to the ECM Diagnostic Test Wizard

Engine State Descriptions:

Aftertreatment Regeneration Active

The engine is performing a regeneration of the diesel particulate filter. This is normal operation during regeneration of the diesel particulate filter.

Air Density Limit State

The engine is currently being derated for high altitude conditions.

Air Fuel Control Derate

The engine fueling is being limited due to lack of oxygen (boost pressure). This state will normally be active for a few seconds during a hard acceleration to prevent excessive black smoke. Excessive time operating in this states indicates the lack of boost pressure (oxygen) entering the engine. Troubleshoot the air intake system.

All Speed Accelerator

The All Speed Governor is controlling the engine speed. This is a normal state when the throttle pedal is depressed and the All Speed Governor is enabled.

All Speed Governor Application

The industrial All Speed Governor is controlling engine speed. This is a normal state when the all speed governor is enabled.

Alternate Torque

This is a normal state when the alternate torque feature is enabled.

Alternator Failure Warning

The Alternator Failure Warning Feature is active. Check the alternator for correct operation.

Altitude Derate

The engine torque output is being limited due to high altitude conditions. Confirm the altitude operation of the engine and the ambient air pressure sensor reading.

Ambient Derate State

The engine torque output is being limited due to high altitude conditions. Confirm the altitude operation of the engine and the ambient air pressure sensor reading.

Anti-Theft Derate

An anti-theft device is currently derating the engine.

Automotive Governor

The Automotive Throttle is controlling the engine speed. This is a normal state when the throttle pedal is depressed and the automotive governor is enabled.

Charge Manager State

The ECM is limiting the amount of charge pressure to protect the air handling system. This is normal operation to prevent air handling system damage.

Coolant Derate State

The engine torque output is being limited due to high coolant temperature. Troubleshoot the high coolant temperature conditions.

Crank State

The engine is cranking and is in the process of starting. The engine speed sensor is receiving a good speed signal and the fuel system is delivering the recommended fueling to start the engine.

Cruise Control

The vehicle is currently operating with the cruise control feature active. This is a normal state when the vehicle is operating in cruise control.

Data Link Powertrain Protection State

The engines torque output is currently limited by the power train protection feature. Please verify the Powertrain Protection adjustable parameter settings.

Data Link Speed

The engine torque output is being controlled by a J1939 device such as an automatic transmission. This state should only be active during a shifting event.

Data Link Torque Derate

The engine torque output is being controlled by a J1939 device.

EGR Fueling Limit State

The engine is currently operating on the torque curve and maximum fueling. This is a normal state when the engine is operating at maximum fueling on the torque curve.

Engine Brake

The engine brakes are currently activated. This is a normal state when the engine brakes are active.

Engine Overspeed

The engine speed has exceeded the overspeed limit set in the calibration. The engine is being operated downhill or operating from a secondary fuel source.

Engine Protection

The engine torque output is currently limited by an engine protection state. Check the fault codes and determine the root cause of the engine protection derate.

Engine Protection Derate

The engine is currently being derated by an engine protection state. Check the fault codes and determine the root cause of the engine protection derate.

Engine Startup Oil Limit

The engine startup protection feature is limiting throttle control until oil pressure is reached. This is normal operation at startup until operating oil pressure is reached.

Engine Stop

This is a normal state when the key switch is on and the engine is not running.

Engine Warm-up Protection

The engine Warm-Up Protection feature is active. This is a normal operation at startup until operating oil pressure and temperature is reached.

Firetruck Governor

The firetruck governor is controlling the engine. This is a normal state when the firetruck governor feature is enabled

Fuel System Derate

A fuel system fault code is active and is currently limiting the engine torque and/or speed output. Check for active fuel system fault codes causing the derate.

Fueling High Speed Governor State

The engine is operating at the maximum engine speed. This is a normal state when the engine is operating on the high speed governor.

High Fuel Temperature Engine Protection

The engine torque output is being limited to high fuel temperature. Troubleshoot the high fuel temperature conditions.

Industrial Auxiliary Governor

The industrial auxiliary governor is controlling engine speed. This is a normal state when the auxiliary governor is enabled.

Industrial Engine Speed Cruise Control

The industrial engine speed cruise control feature is active. This is normal operation when the engine speed cruise control feature is active.

Limp Home

A throttle pedal fault code is currently active, the throttle pedal operation will be disabled until the fault is cleared.

Load Based Speed Control

The Load Based Speed Control feature is active. Use INSITE™ to verify the Load Based Speed Control feature settings.

Low Speed Governor State

The engine is currently idling on the low speed governor. The throttle pedal is released, the vehicle is stationary, and the engine is idling.

Maximum Throttle

The engine is currently operating on the torque curve and maximum fueling. This is a normal state when the engine is operating at maximum fueling on the torque curve.

Momentary Engine Override

The engine speed is being momentarily overwritten by a device such as an automatic transmission. This state should only be active during shifting events.

Noise Control Derate

The injection timing is being adjusted to reduce engine noise. Excessive amount of time in this state could be caused by a failed barometric air pressure sensor.

OBD Fueling Derate

An OBD system fault is active and is currently limiting the engine torque and the speed output. Check for active fault codes or conditions causing the derate.

Out Of Gear

The ECM has detected the transmission is in neutral or the clutch has been disengaged.

Partial Throttle Limit State

The industrial hybrid governor is controlling engine. This is a normal state when the industrial hybrid governor feature is enabled.

Powertrain Protection Derate

The engine's torque output is currently limited by the power train protection feature. Please verify the Powertrain Protection adjustable parameter settings.

Primary / Secondary

This is a normal state when the multi-unit synchronization feature is active.

PTO

The engine speed is currently operating in Power Take Off Mode and being controlled by the Power Take Off feature.

PTO Derate

The engine torque output is limited in Power Take Off mode. Check for active fault codes causing the Power Take Off derate.

Road Speed Governor State

The vehicle's maximum speed is currently being limited by the Road Speed Governor setting. Check the adjustable parameter settings for tire size, rear axle ratio, transmission tail shaft gear teeth, and maximum vehicle speed.

Setup For Dynamometer

The electronic control system has been configured so that engine performance testing can be done on a dynamometer without restrictions on Engine Speed, Power and Torque.

Shutdown

The engine is in the process of being shut down. The key switch has been turned off, but engine speed has not yet reached zero rpm.

Top2 Derate

The engine torque is limited by the Eaton Top 2 transmission. This state should only be active during a Top 2 transmission shifting event.

Top2 Speed

The engine speed is limited by the Eaton Top 2 transmission. This state should only be active during a Top 2 transmission shifting event.

Top2 Torque

The engine torque is limited by the Eaton Top 2 transmission. This state should only be active during a Top 2 transmission shifting event.

Torque Rate Limit

A fuel system fault is active and is currently limiting the engine torque or speed output. Check for charge air leaks in the system.

Turbocharger Fuel Control State

The engine torque output has been limited to reduce the engine exhaust temperature. Check for charge air leaks in the system.

Turbocharger Speed Derate

The engine torque output has been limited to reduce the turbocharger speed. Check for high altitude operating conditions.

Turbocharger Surge Limit

The turbocharger surge limit has been exceeded. Check the turbocharger for correct operation.

Vehicle Acceleration Management State

The vehicle acceleration rate is being limited by the Acceleration Management feature. Please verify the vehicle acceleration adjustable parameter settings.

Vehicle Speed Sensor Diagnostic

The engine speed is limited by the Maximum Engine Speed without Vehicle Speed Source feature. Please verify the Maximum Engine Speed without Vehicle Speed Source parameter settings.

ESP Lock-In Mode

About

The test enables you to temporarily lock the Electronic Smart Power (ESP) curve into high, low, or normal horsepower for troubleshooting purposes.

To temporarily set the ESP mode for use during testing:

1. Select **ESP Lock-In Mode** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **ESP Lock-In Mode** window opens.
2. Select the ESP mode you want to use and the operation mode display will update.
3. Select **Start** to begin the test. The operation mode is displayed in the bottom left window.
4. Select **Stop** to stop the test.

Click **Back** to perform a different test.

Ether Injection Reset

Controlled ether injection provides a method to automatically inject ether into the intake manifold dependent upon engine speed and either coolant or intake manifold temperature. There are two types of ether injection systems available and this feature supports both types:

- The first type of ether injection is a measured shot system. When it is appropriate to inject ether, a solenoid output will be pulsed ON and OFF. This provides a measured shot of ether each time the sequence is completed.
- The second type of ether injection system is the constant on system. Ether is injected in this system by constantly energizing the ether solenoid. The constantly energized system uses an orifice to meter the amount of ether injected. The type of ether injection being used will be determined by calibratiible parameters.

Both systems drive the ether solenoid output of the ECM to control a relay, which in turn will control the ether solenoid.

The Ether Injection Reset feature records the amount of ether that has been injected over time and compares that to the amount available.

To perform the reset:

1. Select **Ether Injection Reset** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Ether Injection Reset** window opens.
2. Note the message in the **Instructions** box.
3. Click **Start**.
4. The **Monitors** box indicates the amount of percent of ether used.
5. In the **Ether Injection** box, click **Reset** to restart the maintenance interval of ether consumption.
6. Click **Stop** to complete the reset.

Click **Back** to perform a different test.

Fan Override Test

About

ECM fan control is used for proper engine cooling, reducing intake manifold temperature, and reducing air conditioner refrigerant temperature. This test enables you to run the fan at full speed for an adjustable amount of time to aid with troubleshooting.

Note: Be sure the fan area is clear before starting the test.

To run the fan for a specified period of time:

1. Select **Fan Override Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Fan Override Test** window opens.
2. Note any messages or warnings in the **Instructions** box.
3. Use the spin box to enter the number of seconds that you want the fan to run for testing, then click **Start**. The fan runs for the specified number of seconds, then shuts off.
4. The number of seconds remaining in the test is displayed in the **Time remaining** box. You can click the **Stop** button and change the **Fan Engage Time** if desired.
5. Select **Stop** to stop the test.

Click **Back** to perform a different test.

Fast Idle Warmup

About

Use this test to manually engage the Fast Idle Warmup feature. The test functions as a simulator of the feature, enabling you to determine the most suitable engine speed when the feature is activated.

Note: Fast Idle Warmup must be enabled in the Features and Parameters window before this test can be run.

To perform the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **Fast Idle Warmup Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Fast Idle Warmup Test** window opens.
3. Be sure the engine speed is 600 rpm or higher.
4. Note any messages or warnings that may be displayed.
5. Click **Start**.
6. Use the **Fast Idle Warmup Speed** spinbox to adjust the idle speed up or down.
7. When the desired speed is displayed, click **Adjust** to send the speed to the ECM.

The ECM change is temporary, lasting only as long as the test is running. To permanently change the Fast Idle Warmup speed in the ECM, use the **Features and Parameters** window.

Note: The maximum amount of time that the test will run is 15 minutes, at which point the test will stop automatically. The Timer box displays the currently elapsed test time.

To stop the test:

- Click **Stop**.

Click **Back** to perform a different test.

Fuel Control Valve Initial Position Setup

About

Content will be included in the INSITE 7.3 version

Fuel Lift Pump Override Test

About

This tests the operation of the electric lift pump and primes the fuel system to eliminate any air in the system. Manual control of the fuel lift pump is independent of engine speed.

To manually override the electric fuel lift pump:

1. Attach the PC to a non-running engine. Also ensure that battery voltage is above 10.5V in a 12V electrical system, or above 22V in a 24V system.
2. Select **Fuel Lift Pump Override** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Fuel Lift Pump Override** window opens.
3. Observe and perform anything specified in the **Instructions** box.
4. Click **Start**.

5. Click **Stop** when the test is complete.

To return the lift pump to its automatic settings:

- Click **Back** to perform a different test.

Fuel Pump Test

About

This test helps to troubleshoot the fuel system by running a series of system health and consistency checks. There are five distinct parts to the Fuel System Test that, if enabled by the calibration, are automatically run in the following sequence:

- **Fault Test:** Engine speed is overridden to peak torque speed while various fuel system-related sensors and measurements are checked, some of which may **not** normally generate fault codes: Engine Speed Sensor, Engine Position Sensor, and needle movement sensors, along with rack position, rack current, and timing sleeve current feedback measurements.
- **Running Rack Test:** Engine speed is brought down to idle and both fueling racks are pulsed three times to determine if they respond properly.
- **Timing Test:** Engine speed is brought to torque peak speed, and injection timing control is tested. The static timing of each fuel pump and the timing range and response to timing sleeve current pulses are checked.
- **Load Balance Test:** Engine speed is brought to torque peak speed and the left and right banks are alternately cut out. This test checks if one bank/fuel pump is carrying more load than the other.
- **Stopped Rack Test:** The Stopped Rack Test is more extensive than the Running Rack Test. The proper operation of the fueling racks is checked while the engine is stopped. The minimum and maximum rack positions are tested along with their transient response to one-Amp increments in rack current.

Test Procedure

1. Attach the PC to a running engine in a non-moving vehicle. The engine **must** be at idle speed.
2. Select **Fuel Pump Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Fuel Pump Test** window opens.
3. Click **Start**.
4. Observe the **Status** box and any messages that are displayed while performing the test.
5. Results will be displayed in the **Monitors** section.
6. Select **Stop** to stop the test.

Click **Back** to perform a different test.

Fuel System Leakage Test

About

This test helps identify injector leaks. It is a manual test used to pressurize the fuel system and enable you to remove the fuel line from the end of the injector return line.

The engine is run with one of the fuel injection lines disconnected while you count the seconds needed to fill a specific volume of fuel in a bucket. The flow rate is compared between each of the cylinders to determine which injector has a leak.

Note: Engine speed must be greater than 600 rpm to run this test.

To run the test:

1. Select **Fuel System Leakage Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Fuel System Leakage Test** window opens.
2. Observe the **Instructions** box, then click **Start**.
3. Observe the **Test Status** box and any messages that display while performing the test.
4. Click **Stop** when the test is completed.
5. Use the **Current Values** box to evaluate the injectors.

Click **Back** to perform a different test.

Gas Throttle Control Test

About

The Gas Throttle Control Test is used to help isolate and troubleshoot throttle actuator problems by controlling the throttle actuator and monitoring its response.

Test Initial Conditions

1. Engine **must** be stopped.
2. No active throttle actuator circuit faults.

Test Procedure

1. Select Gas Throttle Control Test from the ECM Diagnostic Tests window, and then select **Next** or double-click on Gas Throttle Control Test.
2. Select **Start**. The test will perform an automated diagnostic test of the Gas Throttle. This test will run approximately 3 minutes.
3. Upon completion of the test, either **Test Passed** or **Test Failed** will be displayed. If the test fails, refer to the Troubleshooting and Repair Manual for further instructions.

Note: Select Stop to stop the test early if necessary.

General Information

1. If desired, open the INSITE™ Data Monitor/Logger to view the Throttle Position Command and Throttle Position while the Gas Throttle Control Test is in progress to monitor the commanded and the measured positions of the throttle plate.

Heated Oxygen Sensor Test

About

The heated oxygen sensor determines the amount of oxygen present in the exhaust gas stream. The ECM then uses that information to adjust the gas-to-air fueling mixture. This test is used to help isolate and troubleshoot heated oxygen sensor issues.

At the beginning of the test, the fuel supply to the engine is shut off while the engine is cranked. This forces ambient air into the exhaust stream. The test then engages the heated oxygen sensor to measure the oxygen present in the exhaust system.

Test Initial Conditions

1. Parking Brake Set
2. Transmission in Neutral or Park
3. Engine NOT running
4. No active Heated Oxygen Sensor circuit fault codes

Test Procedure

1. Select Heated Oxygen Sensor Test from the list in the ECM Diagnostic Tests Wizard.
2. Select Start.
3. When prompted, crank the engine for the instructed period of time.
4. After the engine has been cranked, the test will start and run for approximately five minutes.
5. Monitor the Test Status field for additional information during the test.
6. If necessary, select Stop to end the test early.
7. Once the test is completed, the results of the test will be displayed in the Test Status field.

Additional Details

Clicking on the Show control or double clicking in the Instructions area will cause the complete instruction list to be displayed in a pop-up dialog box.

ICON Alarm Test

About

This test sounds the ICON Engine Start alarm, to confirm that the alarm is working properly.

Note: Please make sure Engine Speed and Vehicle Speed are zero prior to starting the test.

To test the alarm:

1. Make sure the engine is **not** running and the key switch is ON.
2. Select **ICON Alarm Test** from the list in the ECM Diagnostic Tests Wizard window. Click **Next**, and the **ICON Alarm Test** window opens.
3. Select **Start** in the **ICON Alarm Test** window to begin the test.
4. Select **ON** to activate the alarm.
5. Select **OFF** deactivate the alarm.
6. Select **Stop** to stop the test.

Click **Back** to perform a different test.

ICON Starter Relay and Interlocks Test

About

This test includes the capability to test the Ignition Relay and the Starter Relay and Interlocks.

The Ignition portion of this test cycles power to the Ignition Bus Relay to determine if the circuitry and hardware from the ECM to the Ignition Bus Relay is functioning properly. Because this relay is often located in a difficult to reach location behind the dash, this test serves as a quick way to tell if the relay is functioning without having direct physical access to it.

The Starter portion of this test briefly engages the starter to determine if the wiring and hardware from the ECM to the starter is functioning properly. The test also indicates if all the safety interlocks such as the Hood Tilt Switch, Parking Brake Switch, and Neutral Safety Switch are functioning properly.

The starter will not engage during this test if any interlock is open.

Note: The engine may turn over briefly during this test so it is important to follow all warning messages that are displayed in the Icon Relay/Interlock Test window during the test.

To test the Starter Relay and Interlocks:

1. Make sure the engine is **not** running and the key switch is ON.
2. Select **ICON Relay/Interlock Test** from the list in the ECM Diagnostic Tests Wizard Welcome window. Click **Next**, and the **ICON Relay/Interlock Test** window opens.
3. Select **Start** in the **ICON Relay/Interlock Test** window and the Ignition Relay will activate.
4. Select the **Starter Relay and Interlock** option button and the Ignition Relay will deactivate and the Starter Relay / Interlocks will activate.
5. Select **Stop** to end the test.

Click **Back** to perform a different test.

Injector Check Valve Diagnostics Test

About

Content will be included in the INSITE 7.3 version

Intake Air Heater Override

Intake Air Heater Control manages the heating elements in the engine intake air stream. These elements heat the intake air when starting the engine in cold ambient conditions.

Startability and white smoke control are enhanced by the use of an intake air heater. Some applications use a "Wait to Start" lamp to indicate when to crank the engine. The ECM monitors the intake manifold temperature and, once above a certain temperature, extinguishes the "Wait to Start" lamp and turns the heating elements off. This control is the pre-heat phase. Once the engine is started, the heater will be cycled based on intake air temperature and fuel temperature. This control is the post-heat phase.

This test enables you to override the intake air heater controls and manually turn ON or OFF the intake air heater solenoid(s). This is useful for troubleshooting and diagnosing startability, white smoke issues, and intake air heater fault codes. When the relays are energized, an audible click should be heard.

For some engines, grid heaters for 12V systems are wired in parallel with two drivers, and each driver controls only one grid heater. Grid heaters for 24V systems are configured in series, with one driver controlling both grid heaters. Consequently, the second driver is not used for 24V systems and does not display in INSITE.

The intake heater(s) could be on with just key-on (pre-heat cycle), depending on the intake air temperature. They will pre-heat up to an intake manifold temperature of 66 degrees F.

To prevent burn out of the intake air heaters, some engine applications use a timer that turns off the heaters even though they are commanded on. For those applications that don't use a timer, the Intake Air Heater Override Test must turn them off after a short time.

To test the elements of the intake air heater:

1. Select **Intake Air Heater Override** from the list in the ECM Diagnostic Tests Wizard window.
2. Click **Next**, and the **Intake Air Heater Override** window opens.
3. Click **Start** to begin the test.
4. Click in the checkbox(es) to turn an Air Heater ON or OFF for testing. The Air Heater will be activated for a predetermined time, depending on the calibration.
5. Click **Stop** to stop the test.

Note: Capture any messages or warnings in the Instructions box.

Click **Back** to exit the test.

Kilowatt Load Sensor Calibration

About

This test provides you with an automated routine to calibrate the kilowatt load sensor. An accurate kilowatt load signal is required for engine speed control and also for closed loop fueling calculations.

The test requires tuning while the engine is running and at varying load levels. If the engine stops running at any time during the test, the test will stop and the kilowatt load sensor offset and gain will be set back to their original values.

To begin the test:

1. Be sure the engine is running.
2. Select **Kilowatt Load Sensor Calibration** in the QSK19G/45G/60G, QSV81/91 - SSM558 Test Selector window, then click **Next**.
3. Follow the instructions to load the engine to between 5 and 25 percent and enter the load in kilowatts (from the kilowatt meter) in the **Low Engine Load** box.
4. Click **Next**.

Note: You can click Cancel at any time to return to the QSK19G/45G/60G, QSV81/91 - SSM558 Test Selector window. All settings are returned to the original values.

Open and Closed Loop Fueling Control Tuning

About

This test enables you to tune the control system for proper operation on varying fuel qualities. Each installation has different requirements and different specifications for natural gas quality.

You can offset the open loop fueling portion of the fueling control to provide the required emissions output. Once open loop fueling has been offset, you can tune and enable the closed loop fueling control. The closed loop control ensures that the control system maintains the desired operating point if fuel quality or operating conditions change.

The test encompasses two different types of closed loop control. The first uses an exhaust oxygen sensor and the second uses a kilowatt load sensor. The procedure for tuning each of these systems is different.

To begin the test:

1. Be sure the engine is running.
2. Select **Open/Closed Loop Fueling Control Tuning** in the QSK19G/45G/60G, QSV81/91 - SSM558 Test Selector window, then click **Next**.
3. Follow the instructions to take the engine to minimum load, where Intake Manifold Pressure is less than 11psia.
4. Click **Next** to continue the test, or **Cancel** or **Back** to return to the **QSK19G/45G/60G, QSV81/91 - SSM558 Test Selector** window.

Open Loop Mode Lock-In

About

The Open Loop Mode Lock-In test enables the ECM to eliminate feedback from the oxygen sensor during testing. Eliminating this feedback helps troubleshoot and engine for low or high power.

The default operation mode of the engine control system is the Open/Closed Loop (Normal) Mode. This mode enables the ECM to use normal feedback from the oxygen sensor during testing. Open loop mode eliminates feedback from the oxygen sensor, enabling diagnostic testing of the engine control components.

Test Initial Conditions

- Parking Brake Engaged
- Transmission in Neutral or Park
- Engine Running
- No active air to fuel ratio related faults

Test Procedure

1. Select **Open Loop Mode Lock-In** from the list in the ECM Diagnostic Tests Wizard and select **Next** or double-click on **Open Loop Mode Lock-In**.
2. Select **Start**. The ECM will be locked into Open Loop Mode. The Engine Operating Mode window will display **Open Loop**.
3. Monitor the engine as required.
4. Once testing is completed, select **Stop**. The Engine Operating Mode window will display **Open/Closed Loop (Normal) Mode**.

Additional Details

- The **Open Loop Mode Lock-In** test can be run as long as necessary and must be manually stopped. Once the test is stopped, the ECM is returned to normal operational mode.

Power Generation Tuning Test

About

This test is used to modify four engine parameters while the engine is running. Those parameters are (1) Low Idle Speed, (2) Frequency Adjust Offset, (3) User Droop Adjust and (4) Tool Gain Adjustment. Values for these parameters are entered in the **New Value** column and then sent to the ECM by selecting **Apply**. After all the desired values are set and the test is stopped the values can be permanently saved in the ECM. This test allows these parameters to be adjusted, tested and permanently saved, requiring only a single key off.

Test Initial Conditions:

- None

Test Procedure:

1. Select **Power Generation Tuning Test** from the ECM Diagnostic Tests Wizard and select **Next** or double click on **Power Generation Tuning Test**.
2. If any of the parameters are not available for adjustment, a message will appear in the status box of the test. The message will provide the reason that the parameter is not available.
3. Select **Start**. The current value of the available parameters will display in the Current Value column. Applicable engine parameters will be displayed in the Monitors window.
4. Enter values for the available parameters in the New Values column as desired.
5. Select **Apply**. The new values will be temporarily applied to the ECM. Once they have been written to the ECM, those values will be moved to the Current Value column and the New Values column will be cleared.
6. Repeat steps 4 and 5 as necessary.
7. Once all adjustments have been completed, click **Stop**.
8. A pop-up will appear asking if the applied changes should be permanently saved within the ECM. Select **Yes** and follow the on-screen instructions to permanently save the changes. Select **No** to restore the original values to the ECM.
9. Click the **Back** button to return to the ECM Diagnostic Tests Wizard.

Additional Details:

- All Changes made during the test will be temporary until the test is stopped and parameter adjustments are permanently saved to the ECM.
- If the engine is running, changes made during the test will be reflected by the monitor parameters
- If an attempt is made to exit or close the test before applying new values, a pop-up window will appear asking if the New Values are to be applied.

Right Click Menu:

Restore Original Value

When this option is selected, the original value of the selected parameter will appear in the New Value column. Once the value appears, click on the **Apply** button to send the value to the ECM.

Restore All Original Values

When this option is selected, the original values of all four parameters will appear in the **New Value** column. Once the values appear, select **Apply** to move them to the ECM.

Limits

When this option is selected, a Parameter Limits pop-up window will appear. This window will display the minimum and maximum values for the selected parameter. Select **OK** to close the window.

Pumping Control Valve Cutout Test

About

To perform the pumping control valve cutout test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **Pumping Control Valve Cutout Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Pumping Control Valve Cutout Test** window opens.
3. Select which pumping valve to cut out.

Select **Front Valve** or **Rear Valve** to disable the pumping control valves one at a time. Select **None** to run all valves.

You can monitor the test in-progress by opening the INSITE Monitor.

To re-enable the valves after testing:

- Click **Cancel** to exit from the ECM Tests Wizard, or click **Back** to perform a different test.

SAE J1939 Datalink Control Test

About

This test temporarily enables or disables the J1939 control datalink. This allows disconnection of devices such as traction control systems and electronically controlled transmissions without physically disconnecting the datalink connector.

To perform the test:

1. Make sure the engine is not running and the key switch is ON.
2. Select **SAE J1939 Datalink Control Test** from the list in the ECM Diagnostic Tests Wizard window. Click **Next**, and the **SAE J1939 Datalink Control Test** window opens.
3. Select **Start** to start the test. The status of the J1939 Datalink is displayed in the bottom left window.
4. Select **Disable** to turn off the J1939 control datalink.
5. Select **Enable** to turn on the J1939 control datalink.
6. Select **Stop** to stop the test.

Click **Back** to perform a different test.

Setup for Dynamometer

Setup for Dynamometer configures the ECM so that engine performance testing can be done on a dynamometer without interference.

Features such as Idle Shutdown, Gear-down Protection, Accelerator Interlock, Boost Power, Alternate Torque, Road Speed Governor, Fan Control, Electronic Smart Power, Power Train Protection, and J1939 Control can affect engine performance by restricting engine speed, power, or torque. Setup for Dynamometer sets these features and associated parameters "out of the way," to allow effective testing on a dynamometer.

You can also block or unblock control commands by J1939 devices that are supported by the ECM. Devices such as transmissions and ASR (Anti-Slip Reduction) systems can interfere with dynamometer tests by controlling the engine fueling rather than allowing full control from an accelerator pedal. Transmissions can limit power based on which gear the transmission is in. An ASR system can command for lower torque when a truck is on a chassis dynamometer because the rear wheels are moving while the front wheels are stationary.

To diagnose low engine power problems, it is necessary to disable engine controls coming from these systems. When a system or device is blocked, the ECM ignores all messages originating from that system or device.

To prepare an ECM for diagnostic testing on a Dynamometer:

1. Select **Setup for Dynamometer** from the list in the ECM Diagnostic Tests Wizard Welcome window.
2. Click the **Next** button, and the **Setup for Dynamometer** window opens.
3. Click the **Start** button to set up the ECM for the dynamometer.
4. In the **SAE J1939 Datalink Control** box, select whether to **Enable** (unblock) or **Disable** (block) J1939 control commands during testing.
5. After setup values are displayed and the **Status** message indicates that the ECM is initialized, use the Dynamometer to test the engine. You can monitor the test in-progress by opening the INSITE Data Monitor/Logger.

The following features or feature parameters are set up for this test:

- **Accelerator Interlock** - For testing, this feature is temporarily disabled.
- **Accelerator Maximum**- For testing, this speed is temporarily set to the maximum value allowed.
- **Fan Engage Time** - For testing, the fan will be turned on for 6 minutes.
- **Gear-Down Protection** - This feature is temporarily disabled for testing.
- **Idle Shutdown**- For testing, this feature is temporarily disabled.
- **Manual Fan Switch** - For testing, this parameter is temporarily set to ON.
- **Maximum Engine Speed without Vehicle Speed Sensor**- For testing, this speed is temporarily set to the maximum value allowed.
- **Maximum Vehicle Speed** - For testing, this speed is temporarily set to the maximum value allowed.

To restore all test parameters to their original values:

- Click the **Stop** button.

Click **Back** to perform a different test.

Starter Lockout Relay Driver Override Test

About

Starter lockout prevents the starter motor from being engaged if the engine has already been started and there is no need for cranking. This prevents unnecessary wear on the starter motor.

The starter motor can also be locked out if a specific error condition exists, such as low oil pressure.

The Starter Lockout Relay Driver Override Test enables the operator to test the operation of the starter motor lockout relay by manually overriding the starter lockout relay driver.

To begin the test:

1. Attach the PC to a running engine in a non-moving vehicle.
2. Select **Starter Lockout Relay Driver Override Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Starter Lockout Relay Driver Override Test** window opens.
3. Note any messages or warnings in the **Instructions** box.

Selecting an override option:

Use the **Overrides** box to select a starter lockout option for the test.

- If you select **Close**, the starter motor will be engaged. To verify that the starter lockout relay has closed properly, ensure that the engine can be started.
- If you select **Open**, the starter motor will be disengaged. To verify that the starter lockout relay has opened properly, ensure that the engine cannot be started (the starter motor has been locked out).

To run the test:

1. Select whether to **Close** or **Open** the starter lockout relay driver, as described above.
2. Click **Start**.
3. The test will run for a calibrated maximum time in seconds. The **Monitors** box begins counting down from this maximum value and the **Status** box indicates that the test is **Running**.

To stop the test:

- The test stops automatically after the timer runs down to 0. The test can also be stopped by clicking the **Stop** button.

Click **Back** to perform a different test.

Switch and Sensor Intermittent Connection Test

About

The Switch and Sensor Intermittent Connection Test is designed to aid in the identification of intermittent wiring connection problems that are difficult to locate. This test displays switch and sensor values as read from the ECM. Up to five switches or five sensors may be tested at one time. Once the test is started, it will display a bar graph showing the current value of each selected switch or sensor. While the test is running, wires can be gently twisted, bent, and pulled. As changes to the switch or sensor values occur, they are displayed on the test screen.

Initial Conditions:

1. Attempt to recreate the conditions present when the issue was originally observed. (For example, engine speed, engine temperature, and vehicle speed.)

To Perform The Test:

1. Select Switch and Sensor Intermittent Connection Test from the ECM Diagnostic Tests window, and then select Next.
2. Select up to five switch or sensor connections to be tested. **Note:** Only switches or sensors can be tested at one time, **not** both.

3. Select Next.

Switch Testing:

- The test will display the name of each switch selected. It will then read the initial status of the switch from the ECM, and display that status in the Baseline column.
- Select Start.
- Beginning as close to the tested switch as possible and working back through the harness to the ECM, gently twist, bend and pull on the wire and connections. Changes to the switches status will be displayed as they occur. These changes are displayed in the Current column as well as the bar graph.
- Select Stop to freeze the values on the screen.
- If necessary, select Start again to reinitialize the test screen and continue testing.
- When finished, select Back to return to the previous screen.
- Select Back again to close the test, or return to step two for additional testing.

Sensor Testing:

- The test will display the name of each sensor selected. It will then determine an initial value for each selected sensor and display that value in the Baseline column.
- If necessary, adjust the Voltage Range before starting the test by using the up and down controls. The Voltage Range is added and subtracted from the baseline value to define the Out of Range limits on the graph. It can be adjusted depending upon the sensitivity required for the monitored sensor.
- Select Start.
- Beginning as close to the tested sensor as possible and working back through the harness to the ECM, gently twist, bend and pull on the wire and connections.
- Changes to the sensor value will be displayed as they occur. The numeric value of each sensor will be continuously updated in the Current column as the test is running. The bar graph will display this value as well. If the sensor value goes outside of the voltage range, the graph's bar will change from green to red. The largest changes in voltage will be displayed in the Min and Max columns as well as on the bar graph.
- Select Stop to freeze the values on the screen.
- Select Start again to reinitialize the screen and continue testing or select Back to return to the previous screen.
- Select Back again to close the test or return to step 2 for additional testing.

Additional Information:

1. The fewer parameters that are being monitored, the faster the sample rate.
2. Wiring issues are normally indicated by rapid Voltage changes. Sensor value fluctuations may occur based on valid sensor data. This will be especially true if the engine is running. For example, a truck that is cooling down may show exhaust temperature voltages rapidly changing even if the wiring is good.

Transmission Solenoid Test

About

Use this test to evaluate the proper operation of the two solenoid actuators on transmissions that have the Top 2 Autoshift feature. The Top 2 Autoshift feature allows for automatic shifting between the two top gears. This test allows you to override the Top 2 solenoid actuators during troubleshooting.

Note: This test supports only Eaton Top 2 transmissions.

To test the solenoid actuators used with the Top 2 Autoshift feature:

1. Make sure the engine is not running and the key switch is ON.
2. Select **Transmission Solenoid Test** from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the **Transmission Solenoid Test** window opens.
3. Select **Lockout Solenoid Actuator Test** and click **Start**.

Wait at least five seconds. If you hear a click, the lockout solenoid actuator is working properly. Click **Stop**.

1. Select **Shift Solenoid Actuator Test** and click **Start**.

Wait at least five seconds. If you hear a click, the shift solenoid actuator is working properly. Click **Stop**.

Note: The vehicle air system must be fully charged and the Top 2 shift button must be in the correct position for either solenoid to actuate properly during the test.

To restore the solenoid actuators to normal operation:

- Click **Back** to perform a different test.

Turbocharger Actuator Test

This test verifies the performance of the Variable Geometry Turbocharger (VGT) Actuator. During the test, you can extend or retract the VGT Actuator by selecting the **Extend** or **Retract Actuator** commands in the command box.

You can delay the VGT actuation by specifying a delay time in the **Delay** box.

To perform the test:

1. Attach the PC to a stopped engine.
2. Select Turbocharger Actuator Test from the list in the ECM Diagnostic Tests Wizard. Click **Next**, and the Turbocharger Actuator Test window opens.. Click **Next**, and the Turbocharger Actuator Test window opens.
3. Click **Start**.
4. Observe the **Instructions** and **Status** boxes for complete instructions on completing the test.
5. Select a delay time in the **Delay** box if you need to delay VGT actuation. This can be useful if you need time to position yourself to actually observe actuation during Step 6 below.
6. In the **Command** box, click **Extend Actuator** or **Retract Actuator** to test the actuator.
7. Click **Stop** when you have completed the test.

Click **Back** to perform a different test.

VGT Electronic Actuator Installation and Calibration

About

VGT Electronic Actuator Installation and Calibration enables accurate installation and calibration of a new VGT actuator when replacing a defective actuator in the field. After a replacement actuator is installed, the VGT controller must perform a self-calibration to detect its internal reference magnet and the position of the two end stops.

During installation, the gear on the VGT actuator will be aligned to the proper position for installation on the turbocharger. Calibration can then be performed with this test after the new actuator is installed.

To perform the installation and calibration:

1. Select **VGT Electronic Actuator Installation and Calibration** from the list in the ECM Diagnostic Tests Wizard Welcome window. Click **Next**, and the **VGT Electronic Actuator Installation and Calibration** window opens.
2. Attach the replacement actuator to the power source, but do **not** attach it to the turbocharger. Turn the keyswitch ON.
3. In the **Inputs** box, select **Install Actuator** in the **Value** dropdown list.
4. Click **Start**. When the installation is complete, the **Status** box will indicate that installation has completed successfully.
5. Align the actuator mounting bolts to the turbocharger and install it on the turbocharger.
6. In the **Inputs** box, select **Calibrate Actuator** in the **Value** dropdown list.
7. Click **Start**. When calibration is complete, the **Status** box will indicate that calibration has completed successfully.

Click **Back** to perform a different test.

Fault Analysis

The Fault Codes Window

About

The Fault Codes window displays an engine's fault data, including both engine faults and engine protection faults. Each fault is represented by a fault code that indicates a specific malfunction or abnormal condition within the controller, subsystem, or engine.

To open the Fault Code Window, select Fault Codes from the Viewbar.

To close the Fault Code Window, either select Fault Codes from the Viewbar or select the close control  in the top left corner of the window.

The Fault Code window is automatically refreshed every 30 seconds. This setting can be changed if desired.

To change the Fault Code Refresh Rate:

1. Select Tools > Options from the menu bar.
2. Select General from the left side of the screen when the Options window appears.
3. Select or deselect the Enable Auto Refresh check box as desired when the General screen is displayed.
4. If the Enable Auto Refresh check box is selected, modify the refresh rate as desired.
5. Select OK to close the window.

The Fault Code window contains a table that displays all active and inactive fault codes as well as additional information about each fault. The table has eleven columns, explained below, and one row for each fault. Each fault code may be expanded to display a list of parameter values captured at the time of the first and last occurrence of that fault. Select  and  to expand and collapse each fault.

Note: If multiple ECUs are in use, fault data are grouped for each module.

The Fault Code data can be sorted by clicking on the column header for a single column sort. The data will be resorted based on the selected column in ascending order. Click on the column header again to resort the data again in descending order.

Note: Sorting can only be used on the Fault Code, Status, Count, or Lamp columns.

Fault Code

This column displays a numeric Cummins fault code that identifies the fault and a graphic that shows the lamp status (See Lamp/Last column below). One of five lamp indicators will be displayed:

- Red - The fault is active and the lamp value is Red.
- Amber - The fault is active and the lamp value is Amber.
- Blue - The fault is active and the lamp value is Maintenance.
- Gray - The fault is inactive.
- Blank Space - No lamp information is available for the fault.

Identifier

This column is present only when multiple ECUs are in use, such as for QST30. Each ECU is identified by its source address in this column, and faults for each ECU are listed separately.

Status / Fault Parameters

This column displays whether the fault is active or inactive.

When the fault is expanded, sensor and switch parameters are displayed in this column.

Count / First

This column displays the number of times that the fault has occurred since the last time the fault code was cleared.

When the fault is expanded, sensor and switch parameter values from the first occurrence of the fault are displayed.

Lamp / Last

This column displays the color or type of dash warning lamp when active: Amber (warning), Red (stop or shutdown), Maintenance, or None (no lamp information available).

When the fault is expanded, sensor and switch parameter values from the last occurrence of the fault are displayed.

Description / Units

This column displays a brief description of the fault.

When the fault is expanded, this column displays the units of measure for the sensor and switch parameters.

PID

This column displays the American Trucking Association Parameter Identification Description (PID) number that equates to the displayed Cummins® fault code.

SID

This column displays the American Trucking Association Sub-system Identification Description (SID) number that equates to the displayed Cummins® fault code.

J1587 FMI

This column displays the SAE-defined J1587 Failure Mode Identifier (FMI) number that equates to the displayed Cummins® fault code.

J1939 FMI

This column displays the SAE-defined J1939 Failure Mode Identifier (FMI) number that equates to the displayed Cummins® fault code.

SPN

This column displays the SAE-defined J1939 Suspect Parameter Number (SPN) that equates to the displayed Cummins® fault code.

Right Click Menu

In the Fault Codes window, right-click on a fault to perform other activities associated with the selected fault.

A popup menu displays the following options:

Expand All

Select this option to expand all fault occurrences when the mouse cursor is over the column headers or a single fault code when the cursor is over that fault code.

Collapse All

Select this option to collapse all fault occurrences when the mouse cursor is over the column headers or a single fault code when the cursor is over that fault code.

Reset Inactive Faults

All

Select this option to clear all inactive faults in a single ECM system, or all inactive faults in all ECMS in a multi-module system. If an ECM is not connected, this option displays as grayed out.

Note: Inactive Faults may also be reset by selecting the Reset icon from the toolbar.

Selected ECM

Select this option to clear all inactive faults in the selected ECM in a multi-module system. This option displays as grayed out for single module systems.

Reset All Faults

All

Select this option to clear all inactive and active faults in a single module system, or all ECMS in a multi-module system. If an ECM is not connected or is not supported, this option displays as grayed out. This feature may not work if the ECM has multi-level security enabled.

Selected ECM

Select this option to clear all inactive and active faults in the selected ECM in a multi-module system. This option displays as grayed out for single module systems. This feature may not work if the ECM has multi-level security enabled.

Refresh All

Select this option to update the Fault Codes window with current data from the ECM. If an ECM is not connected, this option displays as grayed out.

Sort

Select this option to sort the fault code data. Use the drop down list to select the column to sort by. Up to 3 columns can be selected for sorting in ascending or descending order. Select OK to sort the data.

If multiple ECMS are in use, the sorting will be grouped for each module.

If a new fault code occurs, it will be displayed at the top of the list on the next refresh.

Note: The sort selection is maintained until INSITE™ is closed, the ECM is disconnected, or a Key-off occurs.

Print

Select this option to print current fault information.

Fault Trees Overview

Select this option to open the Fault Information System online troubleshooting manual for the selected fault. Double-clicking on the selected fault code will also open this manual.

Fault Trees Troubleshooting Steps

Select this option to open the Troubleshooting Steps page of the Fault Information System online troubleshooting manual. This can also be opened by double-clicking on the selected Fault Code.

Fault Trees Index

Select this option to open the Fault Information System online troubleshooting manual.

SAE J1939 Multiplexed Fault Data

Select this option to open the SAE J1939 Multiplexed Fault Data special feature. If the connected ECM does not support SAE J1939 Multiplexed Fault Data, this option displays as grayed out.

Fault Information System

About

Select Fault Trees on the right-click menu in the Fault Codes window to open the INSITE Fault Information System. The Fault Information System is an online manual that displays comprehensive diagnostic and troubleshooting information about ECM faults.

Fault Code Diagnostics

Select Fault Code Diagnostics to view diagnostic and troubleshooting information for a specific fault code. In the Contents tab, click on a fault code to get more information about troubleshooting the fault. This information includes:

- Fault Code Overview displays the fault code, the cause of the fault, and the effect of the fault. This gives you a general understanding of what caused the fault and which fault to work on first. It also may contain the standard repair time (SRT) code for estimating the repair time.
- Troubleshooting Steps displays a list of corrective actions to take to troubleshoot the fault. Various levels of detail can be displayed for each troubleshooting step. Click the underlined text to view lists of steps to correct the fault.

You can also display a variety of other information related to a fault including a wiring diagram and fault location.

Symptom Based Diagnostics

If the fault code is unknown, use Symptom Based Diagnostics to diagnose and troubleshoot a fault based solely on observation. A list of common symptoms display that are related to that engine. Click on a symptom to display a brief description of what caused the symptom and possible corrective actions.

Additional Information

Select Additional Information to view information about service tools and general engine servicing procedures, such as steam cleaning. A list of general service topics provide general cleaning, safety, and maintenance information.

Locations and Descriptions

Select Locations and Descriptions to view a list of system components and a description of each component. Click on the text in the Location column for a pop-up description of the component's location. Click on the text in the Description column for a pop-up description of the component.

Specifications

Select Specifications to display a list of electrical, sensor, or mechanical specifications.

Theory of Operation

Select Theory of Operation to view descriptive overviews of how INSITE interacts with an ECM. Choose one of these options:

- General Information
- Diagnostic Fault Codes
- Fault Code Snapshot Data
- INSITE Description
- INSITE Monitor Mode
- Fuel Control Module Data Link

Circuit Diagrams

Select Circuit Diagrams to view circuit wiring diagrams for each component in the system. Select an engine system component in the list to view its wiring circuit diagram.

Note: The Fault Information System can remain open while you are using INSITE. If necessary, use the Windows taskbar to switch between them.

Viewing Trip Information

Trip Information

About

The Trip Information system continuously monitors and records engine operating data that tracks engine and driver performance. The stored data can be viewed using INSITE or INSPEC, Cummins fleet management tool. In INSITE, trip information can be viewed in the **Trip Information** window.

Note: Not all ECMS log trip information data. If your ECM does not, the Trip Information window is empty and Viewing Trip Information is not displayed in the Help Contents tab.

To open the Trip Information window

- Click **Trip Information** on the Viewbar.

Trip Information parameters are grouped differently, according to the ECM, and not all ECMS list the same parameters. Within each group, the ECM value and units of measure for each trip data parameter are displayed.

Note: If multiple ECMS are in use, trip information data are grouped for each module.

For help with specific Trip Information data, and you are connected to an ECM, expand the **Trip Information Parameters** "book" in the left side of this Help window.

Note: The Viewing Trip Information "book" is not displayed if you are not connected to an ECM that supports this feature.

In the Trip Information window, you can right-click on any item with your mouse to perform other activities associated with trip data. Among theselections in the popup list that displays is **Reset**, which clears all trip data from the ECM except total (cumulative) data

- When trip information is reset, the Driver Reward log is reset automatically.
- When recalibrating an ECM, Save and Restore must be used or trip information will be reset.
- If the ECM is replaced, total trip information is lost and engine time offset, engine distance offset, ECM time offset, and ECM distance offset must be entered. This enables accurate tracking of total trip information for the life of the engine with the new electronic control module.
- Logging of certain ECM fault codes can corrupt trip information. If this occurs, you will be notified when viewing the data. You can reset trip information, however total (cumulative) trip data can not be reset and may still contain data errors.

Right Click Menu

In the **Trip Information** window, right-click anywhere with your mouse to perform other activities associated with the trip data.

A popup menu displays the following options:

Find

Select this option to search for specific trip information parameters or details. This may be quicker than scrolling the lists in the window.

Expand

Select this option to expand all the groups.

Collapse

Select this option to collapse all the groups.

Trip Fuel Report

Select this option to display only Trip Fuel Report parameters.

Reset

Select this option to reset all trip counters to zero to start logging data for a new trip. When prompted, turn off the key on the vehicle for five seconds to complete the process of resetting trip data.

If an ECM is not connected, this option displays grayed out.

Note: Reset does not affect cumulative trip data.

Refresh

All

Select this option to update the **Trip Information** window with all current data from the ECM. If an ECM is not connected, this option displays grayed out.

Selected ECM

Select this option to update the **Trip Information** window with current data for the selected ECM only. If only one ECM is in use, this option is grayed out.

Note: A slightly different popup menu is displayed when you right click in the top row (the heading row) of the Trip Information window. This menu also enables you to automatically size one or more columns in the window.

Parameters

The information provided in the Trip Information Window varies according to the connected ECM. Trip Information parameters are grouped by Total, Trip, and Vehicle.

The following categories contain descriptions of all the parameters that may be displayed:

Total Data accumulated over the life of the engine

Note: Total Data is not resettable.

- **Total Fuel Used** - Total fuel consumed as recorded by the ECM
- **Total ECM Time** - Total ECM run time as recorded by the ECM
- **Total Engine Time** - Total engine run time for all ECMS operated on this engine. Prior 'ECM times must be entered by the user.
- **Total ECM Distance** - Distance vehicle has traveled as recorded by the ECM.
- **Total Engine Distance** - Cumulative distance vehicle has traveled for all ECMS on this engine. User must enter prior distances.
- **Total PTO Time** - Cumulative time the PTO has been engaged as recorded by this ECM.
- **Total PTO Fuel Used** - Total cumulative fuel consumed while the PTO has been engaged as recorded by the ECM.

- **Total PTO Drive Time** - Total time the PTO has been engaged with the vehicle moving as recorded by the ECM.
- **Total PTO Drive Fuel Used** - Total fuel consumed while the PTO has been engaged with the vehicle moving as recorded by the ECM.
- **Idle Time** - Total time the engine has been at idle speed as recorded by the ECM.
- **Idle Fuel Used** - Total fuel consumed while the engine has been at idle as recorded by the ECM.
- **Total Engine Protection Shutdown Overrides** - Total engine protection shutdown overrides as recorded by the ECM.
- **Total Air Compressor Duty Cycle** - Total amount of time the electronic air compressor governor has been commanded on. It is expressed as a percentage.
Example: A 25% duty cycle indicates that the electronic air compressor was commanded on and building air pressure one quarter of the time the engine was running.
- **Cruise Control Fuel Used** - Total fuel consumed while the cruise control has been on as recorded by the ECM.
- **Cruise Control Time** - Total time the cruise control has been on as recorded by the ECM.
- **Maximum Vehicle Speed Fuel Used** - Total fuel consumed while the vehicle has been at maximum vehicle speed as recorded by the ECM.
- **Maximum Vehicle Speed Time** - Total time the engine has been at maximum vehicle speed as recorded by the ECM.
- **Top Gear Fuel Used** - Total fuel used while the vehicle has been at top gear as recorded by this ECM.
- **Top Gear Time** - Total time the vehicle has been at top gear as recorded by the ECM.
- **Gear Down Fuel Used** - Total fuel used while the vehicle has been at one gear down as recorded by the ECM.
- **Gear Down Time** - Total time the vehicle has been at one gear down as recorded by the ECM.
- **Coast Fuel Used** - Total time the engine has been at coast as recorded by the ECM.
- **Coast Time** - Total time the engine has been at coast as recorded by the ECM.
- **Coast Distance** - Total distance the engine has been at coast as recorded by the ECM.
- **Total Sweet Spot Fuel Used** - Total fuel used when the vehicle engine was operating in the optimum engine performance and fuel efficiency range since last reset.
- **Total Sweet Spot Time** - Total amount of time the engine spent operating in the optimum engine performance and fuel efficiency range since last reset.
- **Total Engine Brake Time** - Total time the engine brakes have activated as recorded by the ECM.
- **Total Engine Brake Distance** - Total distance the engine brakes have activated as recorded by the ECM.
- **Total Engine Brake Actuation** - Total actuations the engine brakes have activated as recorded by the ECM.
- **Total Service Brake Time** - Total time the service brakes have activated as recorded by the ECM.

- **Total Service Brake Distance** - Total distance the service brakes have activated as recorded by the ECM.
- **Total Average Engine Load** - Average percent load on the engine as recorded by the ECM.
- **Total ESP Time** - Total Time Spent on the upper ESP curve as recorded by the ECM.
- **Total PTO Set Speed Fuel Used** - Total Fuel Consumed with set speed engaged as recorded by the ECM.
- **Total PTO Set Speed Time** - Total time PTO set speed engaged as recorded by the ECM.
- **Total PTO Resume Fuel Used** - Total fuel consumed with resume speed engaged as recorded by the ECM.
- **Total PTO Resume Speed Time** - Total time PTO resume speed engaged as recorded by the ECM.
- **Total PTO Additional Speed Fuel Used** - Total fuel consumed with additional speed engaged as recorded by this ECM.
- **Total PTO Additional Speed Time** - Total time PTO additional speed engaged as recorded by the ECM.
- **Total Remote PTO Speed 1 Fuel Used** - Total fuel consumed with remote PTO speed 1 engaged as recorded by the ECM.
- **Total Remote PTO Speed 1 Time** - Total time the remote PTO speed 1 has been on as recorded by the ECM.
- **Total Remote PTO Speed 2 Fuel Used** - Total fuel consumed with remote PTO speed 2 engaged as recorded by the ECM.
- **Total Remote PTO Speed 2 Time** - Total time the remote PTO speed 2 has been on as recorded by the ECM.
- **Total Remote PTO Speed 3 Fuel Used** - Total fuel consumed with remote PTO speed 3 engaged as recorded by the ECM.
- **Total Remote PTO Speed 3 Time** - Total time the remote PTO speed 3 has been on as recorded by the ECM.
- **Total Remote PTO Speed 4 Fuel Used** - Total fuel consumed with remote PTO speed 4 engaged as recorded by the ECM.
- **Total Remote PTO Speed 4 Time** - Total time the remote PTO speed 4 has been on as recorded by the ECM.
- **Total Remote PTO Speed 5 Fuel Used** - Total fuel consumed with remote PTO speed 5 engaged as recorded by the ECM.
- **Total Remote PTO Speed 5 Time** - Total time the remote PTO speed 5 has been on as recorded by the ECM.

 **Trip Data accumulated since the last time trip information was reset**

Note: Trip Data is resettable.

- **Trip Fuel Used** - Fuel Consumed since last reset.
- **Trip Average Engine Speed** - Average engine speed since last reset.
- **Trip Average Engine Load** - Average percent engine load since last reset.
- **Trip Average Fuel Rate** - Average fuel rate since last reset.
- **Trip Average Fuel Economy** - MPG calculated since last reset.
- **Trip Maximum Vehicle Speed** - Maximum vehicle speed in fueled state since last reset.

- **Trip Time** - Engine run time since last reset.
- **Trip Gear-Down Distance** - Miles traveled with transmission in one-gear-down position since last reset.
- **Trip Top Gear Time** - Time spent with transmission in top gear position since last reset.
- **Trip Top Gear Distance** - Miles traveled with transmission in top gear position since last reset.
- **Trip Maximum Vehicle Speed Fuel Used** - Fuel used on the road speed governor limit since last reset.
- **Trip Maximum Vehicle Speed Time** - Time spent on the road speed governor limit since last reset.
- **Trip Maximum Vehicle Speed Distance** - Miles traveled on the road speed governor limit since last reset.
- **Trip Distance** - Miles traveled since last reset.
- **Trip Cruise Control Distance** - Miles traveled with cruise control engaged since last reset.
- **Trip Top Gear Fuel Used** - Fuel consumed with transmission in top gear position since last reset.
- **Trip Gear-Down Fuel Used** - Fuel consumed with transmission in gear-down position since last reset.
- **Trip Gear-Down Time** - Time spent with transmission in one-gear-down position since last reset.
- **Trip Coast Fuel Used** - Fuel Consumed while coasting since last reset.
- **Trip Coast Time** - Time spent while coasting since last reset.
- **Trip Coast Distance** - Distance traveled while coasting since last reset.
- **Trip Cruise Control Time** - Time spent with the cruise control engaged since last reset.
- **Trip Engine Brake Time** - Time spent with the engine brakes engaged since last reset.
- **Trip Maximum Engine Speed** - Maximum engine speed since last reset.
- **Trip ESP Time** - Time spent on the ESP upper curve since last reset.
- **Trip ESP Distance** - Distance traveled on the ESP upper curve since last reset.
- **Trip Fan On Time** - Total time the fan has been on since last reset.
- **Trip Fan 2 Time** - Total time the secondary fan has been on since last reset.
- **Trip Fan On Time Due to Engine System** - Time the No. 1 fan has been on due to high coolant temperatures, high intake manifold temperatures, or engine brake demand since last reset.
- **Trip Fan On Due to Vehicle Speed** - Time the No. 1 fan has been on due to vehicle speed since last reset.
- **Trip Fan Run Time Due to Manual Switch** - Time the No. 1 fan has been on due to the manual switch position.
- **Trip Fan On Time Due to A/C System** - Time the No. 1 fan has been on due to A/C command since last reset.
- **Trip Power Protection Engine Derate Time** - Time spent in an engine derate condition since last reset.
- **Trip A/C Run Time** - Time the air conditioning switch has been on since last reset.

- **Trip Hot Shutdown** - Number of hot shutdowns since last reset.
- **Trip Air Compressor Time** - Time the air compressor has been on since last reset.
- **Trip PTO Set Speed Fuel Used** - Fuel consumed while PTO operating at set speed since last reset.
- **Trip PTO Set Speed Time** - Time elapsed while PTO was operating at set speed since last reset.
- **Trip PTO Resume Speed Fuel Used** - Fuel consumed while PTO operating at resume speed since last reset.
- **Trip PTO Resume Speed Time** - Time elapsed while PTO was operating at resume speed since last reset.
- **Trip PTO Additional Speed Fuel Used** - Fuel consumed while PTO operating at additional speed since last reset.
- **Trip PTO Additional Speed Time** - Time elapsed while PTO was operating at additional speed since last reset.
- **Trip Remote PTO Speed 1 Fuel Used** - Fuel consumed with remote PTO speed 1 engaged since last reset.
- **Trip Remote PTO Speed 1 Time** - Time the remote PTO speed 1 has been on since last reset.
- **Trip Remote PTO Speed 2 Fuel Used** - Fuel consumed with remote PTO speed 2 engaged since last reset.
- **Trip Remote PTO Speed 2 Time** - Time the remote PTO speed 2 has been on since last reset.
- **Trip Remote PTO Speed 3 Fuel Used** - Fuel consumed with remote PTO speed 3 engaged since last reset.
- **Trip Remote PTO Speed 3 Time** - Time the remote PTO speed 3 has been on since last reset.
- **Trip Remote PTO Speed 4 Fuel Used** - Fuel consumed with remote PTO speed 4 engaged since last reset.
- **Trip Remote PTO Speed 4 Time** - Time the remote PTO speed 4 has been on since last reset.
- **Trip Remote PTO Speed 5 Fuel Used** - Fuel consumed with remote PTO speed 5 engaged since last reset.
- **Trip Remote PTO Speed 5 Time** - Time the remote PTO speed 5 has been on since last reset.
- **Trip Engine Protection Overrides** - Number of engine protection overrides since last reset.
- **Trip Air Compressor Duty Cycle** - Amount of time electronic air compressor governor has been commanded on expressed as a percentage.
- **Trip ICON Starts Due to Cab Thermostat** - Number of ICON starts due to cab thermostat since last reset.
- **Trip ICON Starts Due to Low Battery Voltage** - Number of ICON starts due to low battery voltage since last reset.
- **Trip ICON Starts Due to Low Oil Temperature** - Number of ICON starts due to low oil temperature since last reset.
- **Trip Engine Run Time in ICON Cab Comfort Mode** - Engine run time in ICON cab comfort mode since last reset.

- **Trip Engine Run Time in ICON Engine Mode** - Engine run time in ICON engine mode since last reset.
- **ECM Distance** - Distance traveled since last reset.
- **Cruise Control Fuel Used** - Fuel consumed with cruise control engaged since last reset.
- **Cruise Control Time** - Time cruise control has been on since last reset.

Trip Drive Data accumulated since last reset while the vehicle was moving

Note: Trip Drive Data is resettable.

- **Drive Fuel Used** - Fuel used only when the vehicle was moving since last reset.
- **Drive Fuel Economy** - MPG calculated only when the vehicle was moving since last reset.
- **Drive Time** - Hours the vehicle was moving since last reset.
- **Distance** - Distance the vehicle was moving since last reset.
- **Average Vehicle Speed** - Average speed the vehicle was moving since last reset.
- **Sweet Spot Time** - Amount of time the engine spent operating in the optimum engine performance and fuel efficiency range since last reset.
- **Sweet Spot Distance** - Distance the vehicle traveled while operating in the optimum engine performance and fuel efficiency range since last reset.
- **Vehicle Overspeed 1 Fuel Used** - Fuel used while vehicle was traveling at speeds equal to or above overspeed 1 parameter setting.
- **Vehicle Overspeed 1 Time** - Time vehicle was traveling at speeds equal to or above vehicle overspeed 1 parameter setting.
- **Vehicle Overspeed 1 Distance** - Distance vehicle was traveling at speeds equal to or above vehicle overspeed 1 parameter setting.
- **Vehicle Overspeed 2 Fuel Used** - Fuel used while vehicle was traveling at speeds equal to or above overspeed 2 parameter setting.
- **Vehicle Overspeed 2 Time** - Time vehicle was traveling at speeds equal to or above vehicle overspeed 1 parameter setting.
- **Vehicle Overspeed 2 Distance** - Distance vehicle was traveling at speeds equal to or above vehicle overspeed 2 parameter setting.
- **Engine Brake Distance** - Distance engine brake engaged since last reset.
- **Idle Fuel Used** - Fuel consumed while the engine was at idle and the vehicle was not moving since last reset.
- **Idle Time** - Time the engine was at idle and the vehicle was not moving since last reset.
- **Idle Shutdown Count** - Number of times the idle shutdown feature shut the engine down since last reset.
- **Idle Shutdown Override Count** - Number of times the idle shutdown timer override was used since last reset.
- **Percent Idle Time** - Percent of total trip time spent at idle and the vehicle was not moving since last reset.
- **Time** - Time the engine was at idle since last reset.
- **Percent Usage** - Percent of usage at idle since last reset.

Idle Data accumulated at idle speeds since the last time trip information was reset

Note: Idle Data is resettable.

► **Trip PTO Data accumulated while the PTO was engaged over the last trip or since the last time trip information was reset**

Note: Trip PTO Data is resettable.

- **PTO Fuel Used** - Fuel consumed while the PTO was engaged and the vehicle was not moving since last reset.
- **PTO Time** - Time the PTO was engaged and the vehicle was moving since last reset.
- **PTO Percent Usage** - Percent of usage the PTO was engaged and the vehicle was moving since last reset.
- **PTO Distance** - Distance the PTO was engaged and the vehicle was moving since last reset.
- **PTO Out-of-Gear Coast Time** - Time the ZPTO was out of gear and the vehicle was moving since last reset.
- **PTO Out-of-Gear Coasts** - Number of times the PTO was out of gear and the vehicle was coasting since reset.

► **Trip PTO Drive Data accumulated while in PTO when the vehicle was moving**

Note: Trip PTO Drive Data is resettable.

- **Drive PTO Fuel Used** - Fuel consumed while the PTO was engaged and the vehicle was moving since last reset.
- **Drive PTO Time** - Time the PTO was engaged and the vehicle was moving since last reset.
- **Percent Drive PTO Time** - Percent of drive time the PTO was engaged since last reset.
- **Time** - Time the PTO was engaged since last reset.
- **Percent Usage** - Percent of usage since last reset.

► **Trip Brake Utilization Data Service brake usage since the last time trip information was reset**

Note: Trip Brake Utilization Data is resettable.

- **Number of Sudden Decelerations** - Number of occurrences the vehicle has decelerated rapidly since last reset.
- **Service Brake Time** - Time the vehicle has decelerated rapidly since last reset.
- **Service Brake Distance** - Distance the vehicle has decelerated rapidly since last reset.
- **Service brake Actuations** - Number of service brake activations the vehicle has decelerated rapidly since last reset.
- **Engine Brake Actuations** - Number of engine brake activations the vehicle has decelerated rapidly since the last reset.
- **Brake Activations per 1000 Miles** - Number of service brake activations per 1,000 miles since last reset.

► **Trip Percent Time Data Percent time spent in various operating states since the last time information was reset**

Note: Trip Percent Time Data is resettable.

- **Cruise Control** - Percent of time spent in cruise control since last reset.
- **At Maximum Vehicle Speed** - percent of time vehicle was at maximum vehicle speed setting since last reset.

- **Top Gear** - Percent of time vehicle spent in top gear since last reset.
- **Gear Down** - Percent of time vehicle spent in one gear down from top gear since last reset.
- **Drive** - Percent of time spent driving since last reset.
- **On ESP Upper Curve** - Percent of time engine spent on the upper curve of ESP since last reset.
- **Engine Brake Usage** - Percent of time engine brakes were engaged since last reset.

Trip Driver Reward Data Driver's trip fuel economy and trip percent idle time at regular intervals

Note: Trip Driver Reward Data is resettable.

- **Driver Reward 1 Fuel Used** - Amount of fuel consumed while driver reward "Best" reward was active since last reset.
- **Driver Reward 1 Time** - Time that driver reward "Best" reward was active since last reset.
- **Driver Reward 1 Distance** - Distance traveled while driver reward "Best" reward was active since last reset.
- **Driver Reward 2 Fuel Used** - Amount of fuel consumed while driver reward "Good" reward was active since last reset.]
- **Driver Reward 2 Time** - Time that driver reward "Good" reward was active since last reset.
- **Driver Reward 2 Distance** - Distance traveled while driver reward "Good" reward was active since last reset.
- **Driver Reward 3 Fuel Used** - Amount of fuel consumed while driver reward "Expected" reward was active since last reset.
- **Driver Reward 3 Time** - Time that driver reward "Expected" reward was active since last reset.
- **Driver Reward 3 Distance** - Distance traveled while driver reward "Expected" reward was active since last reset.
- **Driver Reward 4 Fuel Used** - Amount of fuel consumed while driver reward "Penalty" reward was active since last reset.
- **Driver Reward 4 Time** - Time that driver reward "Penalty" reward was active since last reset.
- **Driver Reward 4 Distance** - Distance traveled while driver reward "Penalty" reward was active since last reset.

Trip Information parameters are grouped differently, according to the ECM, and not all ECMS list the same parameters. Use the lists below as a guide to understanding parameters that may display in your **Trip Information** window.

Regardless of the ECM-specific configuration, you can expand and collapse each group in the **Trip Information** window by clicking  and .

Note: If multiple ECMS are in use, trip information data are grouped for each module.

Cumulative Totals

All data is calculated over the life of the engine

Note: Cumulative data can not be reset.

- **Additional Speed Fuel Used** - The total amount of fuel used, to date, while operating PTO at the speed designated by an optional OEM installed PTO Speed Switch.
- **Additional Speed Time** - The total amount of time, to date, that PTO operated at the speed designated by an optional OEM installed PTO Speed Switch.
- **Air Compressor Duty Cycle** - The total amount of time that the Electronic Air Compressor Governor has been commanded on (pumping air), displayed as a percentage.
- **Average Fuel Economy** - The average MPG for the vehicle, to date.
- **Coast Fuel Used** - The total amount of fuel used while the vehicle was running and moving but not in gear, to date.
- **Coast Time** - The total amount of time the vehicle was running and moving but not in gear, to date.
- **Cruise Control Fuel Used** - The total amount of fuel used while cruise control was On, to date.
- **Cruise Control Time** - The total amount of time that cruise control has been On, to date.
- **Drive in PTO Loaded Fuel Used** - The total amount of fuel used while PTO was engaged under load while the vehicle was moving, to date.
- **Drive in PTO Fuel Used** - The total amount of fuel used while PTO was engaged but idle while the vehicle was moving, to date.
- **Drive in PTO Time** - The total amount of time that PTO was engaged and the vehicle was moving, to date.
- **ECM Time** - Total ECM run time, to date
- **ECM Distance** - Distance the vehicle has traveled using the current ECM, to date.
- **Engine Average Load** - The average percent load on the engine, to date.
- **Engine Brake Active Distance** -
- **Engine Brake Actuations** - The total number of times the engine brake was activated, to date.
- **Engine Brake Distance** - The total distance traveled by the vehicle while the engine brake was engaged, to date.
- **Engine Brake Number of Sudden Decelerations** - The number of times that the vehicle's deceleration exceeded the deceleration threshold as defined by the engine's calibration. This number represents the number of panic stops.
- **Engine Brake Time** - The total amount of time that the engine brake was activated, to date.
- **Engine Distance** - Total distance the vehicle has traveled for all ECMS on this engine. Prior ECM distances must be entered by the user.
- **Engine Hours** - Engine run time for all ECMS operated on this engine. Prior ECM times must be entered by the user.
- **Engine Protection Shutdown Overrides** - The total number of shutdown overrides, initiated by the operator, to date.
- **ESP Time** - The total amount of time that this engine has been used in ESP high mode, to date.
- **Fuel Used** - The amount of fuel used, to date, by this vehicle. This value is based on the amount of fuel commanded by the ECM, and is not a measurement of the actual fuel used.

- **Fuel Rate** - Average fuel rate, to date.
- **Gear Down Fuel Used** - The total amount of fuel used while the vehicle traveled one gear down from top gear, to date.
- **Gear Down Time** - The total amount of time the vehicle has traveled one gear down from top gear, to date.
- **Idle Fuel** - The total amount of fuel consumed while the engine has been at idle, to date.
- **Idle Time** - The total time the engine has run at idle, to date.
- **Maximum Vehicle Speed Fuel Used** - The total amount of fuel used while the vehicle was run at the maximum speed setting (rpm), to date.
- **Maximum Vehicle Speed Time** - The total amount of time the vehicle has been run at the maximum speed setting (rpm), to date.
- **PTO Fuel Used** - The total amount of fuel used while PTO was engaged and the vehicle was not moving, to date.
- **PTO Time** - The total amount of time that PTO was engaged and the vehicle was not moving, to date.
- **Remote PTO Speed 1 Fuel Used** - The total amount of fuel used while PTO Set Speed 1 was engaged, to date.
- **Remote PTO Speed 1 Time** - The total amount of time that PTO Set Speed 1 was engaged, to date.
- **Remote PTO Speed 2 Fuel Used** - The total amount of fuel used while PTO Set Speed 2 was engaged, to date.
- **Remote PTO Speed 2 Time** - The total amount of time that PTO Set Speed 2 was engaged, to date.
- **Remote PTO Speed 3 Fuel Used** - The total amount of fuel used while PTO Set Speed 3 was engaged, to date.
- **Remote PTO Speed 3 Time** - The total amount of time that PTO Set Speed 3 was engaged, to date.
- **Remote PTO Speed 4 Fuel Used** - The total amount of fuel used while PTO Set Speed 4 was engaged, to date.
- **Remote PTO Speed 4 Time** - The total amount of time that PTO Set Speed 4 was engaged, to date.
- **Remote PTO Speed 5 Fuel Used** - The total amount of fuel used while PTO Set Speed 5 was engaged, to date.
- **Remote PTO Speed 5 Time** - The total amount of time that PTO Set Speed 5 was engaged, to date.
- **Resume Speed Fuel Used** - The total amount of fuel used, to date, while operating PTO at the speed designated by the Resume Speed Switch.
- **Resume Speed Time** - The total amount of time, to date, that PTO operated at the speed designated by the Resume Speed switch.
- **Service Brake Time** - The total distance traveled by the vehicle while the service brake was engaged, to date.
- **Service Brake Distance** - The total number of times the service brake was activated, to date.
- **Set Speed Fuel Used** - The total amount of fuel used, to date, while operating PTO at the speed designated by the Set Speed Switch.
- **Set Speed Time** - The total amount of time, to date, that PTO operated at the speed designated by the Set Speed switch.

- **Sweet Spot Fuel Used** - The total fuel used while the vehicle was cruising at the optimum rpm for the engine speed and load.
- **Sweet Spot Time** - The total time the vehicle was cruising at the optimum rpm for the engine speed and load.
- **Top Gear Fuel Used** - The total amount of fuel used while the vehicle was run in top gear, to date.
- **Top Gear Time** - The total amount of time the vehicle has been run in top gear, to date..

Trip Totals Since Last Reset

All data is calculated since the last time trip information was reset.

- **Air Compressor Duty Cycle** - The amount of time that the Electronic Air Compressor Governor has been commanded on (pumping air), displayed as a percentage, since the data was last reset.
- **Air Compressor on Time** -The amount of time the air compressor was run, since the data was last reset.
- **Average Drive Speed** - The average vehicle speed since the data was last reset.
- **Average Fuel Economy** - The average miles per gallon achieved, since the data was last reset.
- **Average Fuel Rate** - The average gallons per hour consumed, since the data was last reset.
- **Average Load Factor** - The average percent engine load, since the data was last reset.
- **Average One Gear Down Speed** - The average vehicle speed while the vehicle was one gear down from top gear, since the data was last reset.
- **Average Top Gear Speed** - The average vehicle speed while the vehicle was running in top gear, since the data was last reset.
- **Coasting Distance** - The distance traveled by the vehicle while running but not in gear, since the data was last reset.
- **Coasting Fuel Used** - The amount of fuel used while the vehicle was running and moving but not in gear, since the data was last reset.
- **Coasting Time** - The amount of time the vehicle was running and moving but not in gear, since the data was last reset.
- **Cruise Control Distance** - The distance traveled while cruise control was ON, since the data was last reset.
- **Cruise Control Fuel Used** - The amount of fuel used while cruise control was ON, since the data was last reset.
- **Cruise Control Percent Time** - The percentage of time that Cruise Control was engaged, since the data was last reset.
- **Cruise Control Time** - The amount of time cruise control was ON, since the data was last reset.
- **Derate Time** - The amount of time spent in an engine derate condition, since the data was last reset.
- **ECM Distance** - The distance the vehicle traveled as recorded by the current ECM, since the data was last reset.
- **Engine Derate Time** - The amount of time spent in an engine derate condition, since the data was last reset.
- **Engine Protection Shutdown Overrides** - The number of shutdown overrides initiated by the operator, since the data was last reset.

- **ESP High Curve Time** - The amount of time that the engine ran on the high power ESP curve (for ESP calibrations only), since the data was last reset.
- **ESP Percent Time High Curve** - The percentage of time that the engine ran on the high power ESP curve (for ESP calibrations only), since the data was last reset.
- **ESP Time** - The amount of time that the vehicle was in ESP high mode, since the data was last reset.
- **Fan ON Time** - The amount of time the primary fan was on, since the data was last reset.
- **Fan 2 ON Time** - The amount of time the secondary fan was on, since the data was last reset.
- **Fan ON Due to Air Conditioner System** - The amount of time a fan was on because of air conditioning demand, since the data was last reset.
- **Fan ON Due to Engine System Time** - The amount of time a fan was On due to high coolant temperature, high intake manifold temperature, or engine brake demand, since the data was last reset.
- **Fan ON Due to Manual Switch** - The amount of time a fan was turned on at the switch, since the data was last reset.
- **Fan ON Due to Vehicle Speed** - The amount of time a fan was running while above a calibrated vehicle speed, since the data was last reset.
- **Fuel Used** - The total amount of fuel used, since the data was last reset.
- **Hours at Zero Speed** - The total amount of time that the vehicle was running but not moving, since the data was last reset.
- **Hot Shutdowns** -The number of hot shutdowns since the data was last reset.
- **In Top Gear Distance** - The distance traveled by the vehicle while in top gear, since the data was last reset.
- **In Top Gear Fuel Used** - The amount of fuel used while the vehicle was running in top gear, since the data was last reset.
- **In Top Gear Percent Time** - The percentage of time that the vehicle was running in top gear, since the data was last reset.
- **In Top Gear Time** - The amount of time the vehicle was run in top gear, since the data was last reset.
- **In Gear Down Distance** - The distance traveled by the vehicle while one gear down from top gear, since the data was last reset.
- **In Gear Down Fuel Used** - The amount of fuel used while the vehicle was one gear down from top gear, since the data was last reset.
- **In Gear Down Percent Time** - The percentage of time that the vehicle was one gear down from top gear, since the data was last reset.
- **In Gear Down Time** - The amount of time the vehicle was one gear down from top gear, since the data was last reset.
- **Maximum Engine Speed** - The maximum engine speed (rpm) recorded since the data was last reset.
- **Maximum Vehicle Speed** - The maximum vehicle speed recorded by the ECM, since the data was last reset.
- **Maximum Vehicle Speed Distance** - The distance traveled by the vehicle while running at the maximum speed setting (rpm), since the data was last reset.
- **Maximum Vehicle Speed Fuel Used** - The amount of fuel used while the vehicle was running at the maximum speed setting (rpm), since the data was last reset.

- **Maximum Vehicle Speed Percent Time** - The percentage of time that the vehicle was running at the maximum speed setting (rpm), since the data was last reset.
- **Maximum Vehicle Speed Time** - The amount of time the vehicle was running at the maximum speed setting (rpm), since the data was last reset.
- **Percent Fan On Time Due to Air Conditioning Pressure Switch** - The percentage of time a fan was on because of air conditioning demand, since the data was last reset.
- **Percent Fan On Time Due to Engine Conditions** - The percentage of time a fan was on due to high coolant temperature, high intake manifold temperature, or engine brake demand, since the data was last reset.
- **Percent Fan On Time Due to Fan Control Switch** - The percentage of time a fan was turned on at the switch, since the data was last reset.
- **Percent Fan On Time** - The percent of time the primary fan was on, since the data was last reset.
- **Percent Fan ON Time With Vehicle Speed** - The percentage of time a fan was turned on and the vehicle was moving, since the data was last reset.
- **Percent Fan ON Time Without Vehicle Speed** - The percentage of time a fan was turned on and the vehicle was not moving, since the data was last reset.
- **Percent Distance in Cruise Control** - The percentage of distance that Cruise Control was engaged, since the data was last reset.
- **Percent Distance in Top Gear** - The percentage of distance that the vehicle was running in top gear, since the data was last reset.
- **Percent Distance One Gear Down** - The percentage of distance that the vehicle was one gear down from top gear, since the data was last reset.
- **Percent Distance Vehicle Overspeed 1** - The percentage of distance that the vehicle was traveling at speeds equal to or above vehicle overspeed 1 parameter setting, since the data was last reset.
- **Percent Distance Vehicle Overspeed 2** - The percentage of distance that the vehicle was traveling at speeds equal to or above vehicle overspeed 2 parameter setting, since the data was last reset.
- **PTO Additional Speed Fuel Used** - The amount of fuel used while operating PTO at the speed designated by an optional OEM installed PTO Speed Switch, since the data was last reset.
- **PTO Additional Speed Time** - The amount of time that PTO operated at the speed designated by an optional OEM installed PTO Speed Switch, since the data was last reset.
- **PTO Resume Speed Fuel Used** - The amount of fuel used while operating PTO at the speed designated by the Resume Speed Switch, since the data was last reset.
- **PTO Resume Speed Time** - The amount of time that PTO operated at the speed designated by the Resume Speed switch, since the data was last reset.
- **PTO Set Speed Fuel Used** - The amount of fuel used while PTO Set Speeds were engaged, since the data was last reset.
- **PTO Set Speed Time** - The amount of time that PTO Set Speeds were engaged, since the data was last reset.
- **Remote PTO Speed 1 Fuel Used** - The amount of fuel used while Remote PTO Speed 1 was engaged, since the data was last reset.

- **Remote PTO Speed 1 Time** - The amount of time that Remote PTO Set Speed 1 was engaged, since the data was last reset.
- **Remote PTO Speed 2 Fuel Used** - The amount of fuel used while Remote PTO Speed 2 was engaged, since the data was last reset.
- **Remote PTO Speed 2 Time** - The amount of time that Remote PTO Set Speed 2 was engaged, since the data was last reset.
- **Remote PTO Speed 3 Fuel Used** - The amount of fuel used while Remote PTO Speed 3 was engaged, since the data was last reset.
- **Remote PTO Speed 3 Time** - The amount of time that Remote PTO Set Speed 3 was engaged, since the data was last reset.
- **Remote PTO Speed 4 Fuel Used** - The amount of fuel used while Remote PTO Speed 4 was engaged, since the data was last reset.
- **Remote PTO Speed 4 Time** - The amount of time that Remote PTO Set Speed 4 was engaged, since the data was last reset.
- **Remote PTO Speed 5 Fuel Used** - The amount of fuel used while Remote PTO Speed 5 was engaged, since the data was last reset.
- **Remote PTO Speed 5 Time** - The amount of time that Remote PTO Set Speed 5 was engaged, since the data was last reset.
- **Trip Time** - The amount of time that the vehicle was in operation, since the data was last reset.
- **Trip Distance** - The miles traveled, since the data was last reset.

Trip Totals Since Last Reset - Drive (Vehicle Speed > 0)

All data was recorded while the vehicle was moving, and is calculated since the last time trip information was reset.

- **Average Vehicle Speed** - The average vehicle speed since the data was last reset.
- **Coasting Distance** - Total distance the engine has been at coast, since the data was last reset.
- **Coasting Fuel Used** - Total time the engine has been at coast, since the data was last reset.
- **Coasting Time** - Total time the engine has been at coast, since the data was last reset.
- **Drive Distance** - The distance the vehicle was moving since last reset.
- **Drive Fuel Economy** - The MPG calculated while the vehicle was moving, since the data was last reset.
- **Drive Fuel Used** - The fuel used while the vehicle was moving, since the data was last reset.
- **Drive Percent Time** - The percentage of total trip time when the vehicle was moving, since the data was last reset.
- **Driver Reward 1 Fuel Used** - The amount of fuel used while a "Best" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 1 Time** - The amount of time the vehicle was operated while a "Best" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 1 Distance** - The distance traveled by the vehicle while a "Best" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 2 Fuel Used** - The amount of fuel used while a "Good" driver reward rating was in effect, since the data was last reset.

- **Driver Reward 2 Time** - The amount of time the vehicle was operated while a "Good" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 2 Distance** - The distance traveled by the vehicle while a "Good" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 3 Fuel Used** - The amount of fuel used while a "Expected" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 3 Time** - The amount of time the vehicle was operated while a "Expected" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 3 Distance** - The distance traveled by the vehicle while a "Expected" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 4 Fuel Used** - The amount of fuel used while a "Penalty" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 4 Time** - The amount of time the vehicle was operated while a "Penalty" driver reward rating was in effect, since the data was last reset.
- **Driver Reward 4 Distance** - The distance traveled by the vehicle while a "Penalty" driver reward rating was in effect, since the data was last reset.
- **Engine Brakes Actuations** - The average number of times the engine brake was applied while the vehicle was moving, since the data was last reset.
- **Engine Brakes Distance** - The distance traveled by the vehicle while the engine brake was applied, since the data was last reset.
- **Engine Brakes Percent Time** - The percentage of total drive time that the engine brake was applied, since the data was last reset.
- **Engine Brakes Time** - The amount of time the engine brake was applied while the vehicle was moving, since the data was last reset.
- **ICON Battery Voltage Starts** - The number of times ICON started the engine because of low battery voltage, since the data was last reset.
- **ICON Cab Mode** - The amount of time the ICON system was engaged in Cab Comfort mode, since the data was last reset.
- **ICON Engine Mode Time** - The amount of time the ICON system was engaged, since the data was last reset.
- **ICON Oil Temperature Starts** - The number of times ICON started the engine because of low oil temperature, since the data was last reset.
- **ICON Starts** - The number of times ICON started the engine because of the cab temperature, since the data was last reset.
- **ICON Time** -
- **In Direct Drive** - The number of hours the vehicle was moving, since the data was last reset.
- **Maximum Vehicle Speed** - The maximum vehicle speed recorded by the ECM, since the data was last reset.
- **Out of Gear Counts** - The number of times the engine was run out of gear, since the data was last reset.
- **Out of Gear Time** - The distance traveled while the engine was running and not in gear, since the data was last reset.
- **Overspeed Fuel 1 Used** - Fuel used while vehicle was traveling at speeds equal to or above overspeed 1 parameter setting, since the data was last reset.
- **Overspeed Time 1** - Time vehicle was traveling at speeds equal to or above vehicle overspeed 1 parameter setting, since the data was last reset.

- **Overspeed Distance 1** - Distance vehicle was traveling at speeds equal to or above vehicle overspeed 1 parameter setting, since the data was last reset.
- **Overspeed Fuel 2 Used** - Fuel used while vehicle was traveling at speeds equal to or above overspeed 2 parameter setting, since the data was last reset.
- **Overspeed Time 2** - Time vehicle was traveling at speeds equal to or above vehicle overspeed 1 parameter setting, since the data was last reset.
- **Overspeed Distance 2** - Distance vehicle was traveling at speeds equal to or above vehicle overspeed 2 parameter setting, since the data was last reset.
- **Overspeed Fuel 3 Used** - Fuel used while vehicle was traveling at speeds equal to or above overspeed 3 parameter setting, since the data was last reset.
- **Overspeed Time 3** - Time vehicle was traveling at speeds equal to or above vehicle overspeed 3 parameter setting, since the data was last reset.
- **Overspeed Distance 3** - Distance vehicle was traveling at speeds equal to or above vehicle overspeed 3 parameter setting, since the data was last reset.
- **PTO Additional Speed Fuel Used** - The amount of fuel used while operating PTO at the speed designated by an optional OEM installed PTO Speed Switch, since the data was last reset.
- **PTO Additional Speed Time** - The amount of time that PTO operated at the speed designated by an optional OEM installed PTO Speed Switch, since the data was last reset.
- **PTO Distance** - The total distance traveled while PTO was engaged, since the data was last reset.
- **PTO Fuel Used** - The total amount of fuel used while PTO was engaged and the vehicle was moving, since the data was last reset.
- **PTO Percent Time** - The percentage of total drive time when PTO was engaged and the vehicle was moving, since the data was last reset.
- **PTO Resume Speed Fuel Used** - The amount of fuel used while operating PTO at the speed designated by the Resume Speed Switch, since the data was last reset.
- **PTO Resume Speed Time** - The amount of time that PTO operated at the speed designated by the Resume Speed switch, since the data was last reset.
- **PTO Set Speed Fuel Used** - The amount of fuel used while PTO Set Speeds were engaged and the vehicle was moving, since the data was last reset.
- **PTO Set Speed Time** - The amount of time that PTO Set Speeds were engaged and the vehicle was moving, since the data was last reset.
- **PTO Time** - The total amount of time that PTO was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 1 Fuel Used** - The amount of fuel used while Remote PTO Speed 1 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 1 Time** - The amount of time that Remote PTO Set Speed 1 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 2 Fuel Used** - The amount of fuel used while Remote PTO Speed 2 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 2 Time** - The amount of time that Remote PTO Set Speed 2 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 3 Fuel Used** - The amount of fuel used while Remote PTO Speed 3 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 3 Time** - The amount of time that Remote PTO Set Speed 3 was engaged and the vehicle was moving, since the data was last reset.

- **Remote PTO Speed 4 Fuel Used** - The amount of fuel used while Remote PTO Speed 4 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 4 Time** - The amount of time that Remote PTO Set Speed 4 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 5 Fuel Used** - The amount of fuel used while Remote PTO Speed 5 was engaged and the vehicle was moving, since the data was last reset.
- **Remote PTO Speed 5 Time** - The amount of time that Remote PTO Set Speed 5 was engaged and the vehicle was moving, since the data was last reset.
- **Service Brake Active Distance** - The distance traveled by the vehicle while the service brake was applied, since the data was last reset.
- **Service Brake Active Time** - The amount of time the service brake was applied and the vehicle was moving, since the data was last reset.
- **Service Brake Actuations/1000 miles** - The average number of times the engine brake was applied per 1000 miles, since the data was last reset.
- **Service Brake Number of Sudden Decelerations** - The number of times that the vehicle's deceleration exceeded the deceleration threshold as defined by the engine's calibration. This number represents the number of panic stops.
- **Sweet Spot Distance** - The distance the vehicle traveled while operating in the optimum engine performance and fuel efficiency range, since the data was last reset.
- **Sweet Spot Fuel Used** - The total fuel used while the vehicle was cruising at the optimum rpm for the engine speed and load, since the data was last reset.
- **Sweet Spot Time** - The amount of time the engine spent operating in the optimum engine performance and fuel efficiency range, since the data was last reset.

Search

If you want to view specific trip information but don't want to browse the entire list in the **Trip Information** window, you can use Find to locate it. Right-click anywhere in the **Trip Information** window to open the **Find** window.

Use the options in the window to narrow your search:

1. In the **Find What:** box, enter keyword text or the parameter value you are looking for.
2. In the **Find In:** box, use the dropdown list to select the column to search.
3. Optionally, select whether the case must match what you type in the **Find What:** box.

After specifying the desired search criteria, click **Find Next**. The first occurrence of the **Find What:** criteria will be highlighted in the trip information list.

Using Audit Trail

Audit Trail

About

The INSITE Audit Trail tracks changes made to ECM settings. The **Audit Trail** window displays records of the last four times that the ECM was modified.

Note: Some ECMs may display less than four records.

A new Audit Trail record is created 20 minutes after the last parameter change, in ECM time. A single record can contain multiple changes, because the 20-minute "clock" includes all changes since the previous record.

To open (or close) the Audit Trail window:

- Click **Audit Trail** on the Viewbar.

Various data is displayed for each Audit Trail record. Use and in the **Audit Trail** window to expand and collapse details for each record.

Note: If multiple ECMs are in use, audit trail records are grouped for each module.

Note: You can move the Audit Trail window around inside the View window and also outside of the window onto the Windows desktop - it is not "locked" in place. Using your mouse, click on the title bar and drag the window to the desired location.

Record Number

The numeric identifier of a single Audit Trail record. Each record can contain multiple ECM changes, which can be viewed by expanding and contracting the record.

Tool Name

The type of tool used to modify ECM settings: either ECHEK, Compulink, VEPS, PowerSpec, DAVIE, or INSITE. If INSITE can not determine the tool that made the changes, **Unknown Software** is displayed.

Tool ID / Code

The serial number of the cartridge (for ECHEK, VEPS, and Compulink™ systems) or a alphanumeric identifier of the software application (INSITE, DAVIE, or PowerSpec) that was used to modify ECM settings. This number is automatically read from the ECM.

When you expand an Audit Trail record, numeric codes that identify the types of ECM changes are displayed.

User Type / Description

The tool used to modify ECM settings, categorized as either Software (INSITE, DAVIE, or PowerSpec), or Cartridge (ECHEK, VEPS, or Compulink).

When you expand an Audit Trail record, a brief description of each ECM change is displayed.

User ID

If **Software** is the User Type (INSITE, DAVIE, or PowerSpec), this is the PC ID of the PC running INSITE or the PowerSpec User ID.

For **Cartridge** User Types (ECHEK, VEPS, or Compulink), the hardware serial number is displayed.

ECM Time (key on time)

The time at which the ECM changes were recorded.

Right-click anywhere with your mouse to perform other activities associated with the Audit Trail window, as described below.

Right Click Menu

In the **Audit Trail** window, right-click anywhere with your mouse to perform other associated activities.

A popup menu displays the following options:

Expand All

Select this option to expand all Audit Trail records.

Collapse All

Select this option to collapse all Audit Trail records.

Refresh

All

Select this option to update the **Audit Trail** window with current data from the ECM. If an ECM is not connected, this option displays grayed out.

Selected ECM

Select this option to update the **Audit Trail** window with current data for the selected ECM only. If only one ECM is in use, this option is grayed out.

Print

Select this option to print the Audit Trail data using your default printer.

Advanced ECM Data

This procedure is not yet available at the time of publication.

This procedure is not yet available at the time of publication.

This procedure is not yet available at the time of publication.

Aftertreatment History

About

Aftertreatment History is designed to display historical records regarding the Aftertreatment System. It records data associated with last 10 active regeneration events (both complete and incomplete). The feature also has two other records that capture data associated with the Maximum Soot Load Condition and the Maximum Diesel Particulate Filter Outlet Temperature Conditions achieved over the life of the engine.

To View Aftertreatment History

1. Connect with INSITE™.
2. Click Advanced ECM Data on the Viewbar.
3. In the Advanced ECM Data select Aftertreatment History

Viewing Data

1. The top portion of the viewing area contains the Regeneration History Log. The Log will retain up to 10 entries associated with the last 10 complete and/or incomplete active regeneration events.
The data captured in the Aftertreatment History Log includes:
 - a. ECM Run Time (Key-On Time)
 - b. ECM Real Time: If Real Time Clock is not available, ECM Real Time will be displayed as "Not Available".
 - c. Starting Diesel Particulate Filter Soot Load: This parameter records the Diesel Particulate Filter Soot Load at the beginning of the regeneration event. There are 4 possible values that can be displayed: Normal, Above Normal - Least Severe, Above Normal - Moderately Severe or Above Normal - Most Severe.
 - d. Ending Diesel Particulate Filter Soot Load: This parameter records the Diesel Particulate Filter Soot Load at the end of the regeneration event. There are 4 possible values that can be displayed: Normal, Above Normal - Least Severe, Above Normal - Moderately Severe or Above Normal - Most Severe.
 - e. Starting Diesel Oxidation Catalyst Inlet Temperature: This parameter gives the temperature at the inlet of the Diesel Oxidation Catalyst at the start of the regeneration event. It records the value in degrees (deg C / deg F).

- f. Maximum Diesel Particulate Filter Inlet Temperature: This parameter gives the maximum temperature recorded at the inlet of the Diesel Particulate Filter during the regeneration event. It records the value in degrees (deg C / deg F).
 - g. Maximum Diesel Particulate Filter Outlet Temperature: This parameter gives the maximum temperature recorded at the outlet of the Diesel Particulate Filter during the regeneration event. It records the value in degrees (deg C / deg F).
 - h. Maximum Diesel Particulate Filter Differential Pressure: This parameter gives the maximum Diesel Particulate Filter Differential Pressure recorded during the regeneration event. It records the value in Pressure units (kPa / Psia).
2. The bottom portion of the viewing area allows the user to view the data associated with either the Maximum Soot Load condition or the Maximum Diesel Particulate Filter Outlet Temperature condition achieved over the life of the engine. These records may not be associated with a regeneration event.
- Both these records (Maximum Soot Load Condition and Maximum Diesel Particulate Filter Outlet Temperature Condition) capture the following data:
- a. ECM Run Time (Key-On Time).
 - b. ECM Real Time: If Real Time Clock is not available, ECM Real Time will be displayed as "Not Available".
 - c. Diesel Particulate Filter Soot Load: This parameter records the Diesel Particulate Filter Soot Load at the time the condition was recorded. There are 4 possible values that can be displayed: Normal, Above Normal - Least Severe, Above Normal - Moderately Severe or Above Normal - Most Severe.
 - d. Diesel Oxidation Catalyst Inlet Temperature: This parameter gives the temperature at the inlet of the Diesel Oxidation Catalyst at the time the condition was recorded. This monitor reads from Diesel Oxidation Catalyst Inlet Temperature Sensor, which gives the temperature at the inlet of the diesel oxidation catalyst and is usually the first sensor in the aftertreatment system. It records the value in temperature units (deg C / deg F).
 - e. Diesel Particulate Filter Inlet Temperature: This parameter gives the temperature recorded at the inlet of the Diesel Particulate Filter at the time the condition was recorded. This monitor reads from Diesel Particulate Filter Inlet Temperature Sensor, which gives the temperature at the inlet of the diesel particulate filter and is usually the sensor located midway in the aftertreatment system. It records the value in temperature units (deg C / deg F).
 - f. Aftertreatment Diesel Particulate Filter Outlet Temperature: This parameter gives the temperature recorded at the outlet of the Diesel Particulate Filter at the time the condition was recorded. This monitor reads from the Diesel Particulate Filter Outlet Temperature Sensor, which gives the temperature at the outlet of the diesel particulate filter and is usually the last sensor in the aftertreatment system. It records the value in Temperature units (deg C / deg F).
 - g. Diesel Particulate Filter Differential Pressure: This parameter gives the Diesel Particulate Filter Differential Pressure at the time the condition was recorded. This monitor reads the Diesel Particulate Filter Differential Pressure which is the difference in pressure across the diesel particulate filter. It records the value in pressure units (kPa / Psia).

Right Click Menu

This feature does not support a right click menu, but there are limited functions available which includes the following

- The ability to toggle between displaying The Maximum Soot Load Condition Log and The Maximum Diesel Particulate Filter Outlet Temperature Condition.

- The ability to Refresh the display using the Refresh button.
 - The ability to print or save the current display using the Print or Save buttons.
-

Aftertreatment Maintenance

Feature Description

Aftertreatment Maintenance provides the ability for a user to reset the ECM to allow Diesel Particulate Filter regeneration after replacement or servicing of diesel exhaust system components. This feature is to be used only when the most severe aftertreatment fault conditions exist, and corrective actions have been taken. These fault conditions include: 1691 (Diesel Oxidation Catalyst Efficiency Warning), 2637 (Diesel Oxidation Catalyst Face Plugged), 1922 (Severe Diesel Particulate Filter Soot Load) and, on heavy duty engines, 2638 (Diesel Oxidation Catalyst Low Efficiency). Corrective actions may include replacement of the Diesel Oxidation Catalyst, replacement or servicing of the Diesel Particulate Filter, and, on heavy duty engines, repair or replacement of the hydrocarbon injector unit.

Special Instructions

To Select Aftertreatment Maintenance

1. Click on Advanced ECM Data on the Viewbar
2. Click on Aftertreatment Maintenance in the Advanced ECM Data Window
3. When the Aftertreatment Maintenance Window opens:
 - a. Select "Diesel Oxidation Catalyst Maintenance Reset", "Diesel Particulate Filter Reset", or "All" from the Reset Options dropdown.
 - b. Click on the "Reset" button to initiate the process.
 - c. An "Aftertreatment Maintenance" window will appear. Click on "Yes"
 - d. A "Key Switch" window will appear. Turn the Key Switch off, wait 30 seconds, turn the Key Switch back on, and then click "OK".
 - e. A "Reset Complete" window will appear. Click "OK".
 - f. The Refresh button will update the Aftertreatment History Log, adding the latest addition. If the Aftertreatment History Log contains a total of 10 entries prior to this reset, the oldest reset information will be removed, and the newest added. Histories for both components are maintained in the same log.
4. Once the reset is completed, a regeneration cycle is still required to clear the fault code.

Aftertreatment Maintenance Filter Installation

About

Aftertreatment Maintenance Filter Installation is a feature that informs the Electronic Control Module (ECM) that the Diesel Particulate Filter has been replaced. This causes the ECM to allow the Diesel Particulate Filter an initial period of operation during which the filter's efficiency improves.

Test Initial Conditions

1. Engine is not running.
2. The Diesel Particulate Filter has been replaced
3. All aftertreatment fault codes have been cleared

Test Procedure

1. Select Aftertreatment Maintenance Filter Installation from the menu bar in the Advanced ECM Data Window.
2. Click on the Reset button on the screen and follow the prompts.
3. Once the reset is complete, cycle the key switch to store the reset values.
4. Once the key switch has been cycled, an informational box will appear that reads: The Reset process has been successful. Click on the OK button to acknowledge.

Additional Details

1. Use of this feature may be part of a larger process accessing other INSITE™ features. Refer to the Troubleshooting and Repair manuals for more information.

Anti-Theft

Feature Description

This feature can be used only with vehicles equipped with Cummins Road Relay, and is used to secure the engine in the idling or shut down state. The feature is enabled by either INSITE or the Cummins INSPEC fleet management tool.

When enabled, six unique user-selected passwords, all of equal priority and capable of activating or deactivating anti-theft, are entered using either INSITE, INSPEC, or the Road Relay keypad. If activated at idle, the anti-theft feature locks the throttle at idle and allows normal throttle operation only when a valid password is entered. If an unauthorized attempt is made to start the engine with the anti-theft feature active, a fault will be logged and a red fault lamp will flash.

If an incorrect password is entered when deactivating anti-theft, the operator is prompted to re-enter the correct password. If the correct password is entered, the operator is prompted to enter it again to confirm the password. If the correct password is not entered in 5 attempts, anti-theft will lock out any further attempts for 10 minutes. After 10 minutes have elapsed, anti-theft can then be deactivated with the a correct password.

Adjustable Parameters

Semi-Automatic

If this option is selected, Anti-theft will not be activated without operator action. At each engine shut down, the user is prompted by a message on Road Relay whether anti-theft should be activated.

To activate anti-theft, the operator must then turn the key ON and, if desired, enter a customer-selected PIN number. If no PIN number is required and the user has selected anti-theft, the feature is activated by turning the key ON immediately after engine shut down. Any one of the six passwords is needed to unlock the ECM and start the engine.

Manual

If this option is selected, Anti-theft will be activated only if the operator enters a user-selected preprogrammed activation PIN. If this PIN is not entered, the ECM will not lock the engine.

Change Password

The "Change" password is selected using the Road Relay keypad. The operator must first enter an existing password. The operator can then enter a new password. Road

Road Relay prompts the operator to confirm the new password once a new password is entered.

Anti-TheftPIN 1

The first operator Password (PIN) for activating/deactivating anti-theft. This PIN cannot be the same as any other anti-theft PIN and cannot be six zeros. It can be adjusted only with Insite or the Inspec fleet management tool.

Anti-TheftPIN 2

The second operator Password (PIN) for activating/deactivating anti-theft. This PIN cannot be the same as any other anti-theft PIN and cannot be six zeros. It can be adjusted only with Insite or the Inspec fleet management tool.

Anti-TheftPIN 3

The third operator Password (PIN) for activating/deactivating anti-theft. This PIN cannot be the same as any other anti-theft PIN and cannot be six zeros. It can be adjusted only with Insite or the Inspec fleet management tool.

Anti-TheftPIN 4

The fourth operator Password (PIN) for activating/deactivating anti-theft. This PIN cannot be the same as any other anti-theft PIN and cannot be six zeros. It can be adjusted only with Insite or the Inspec fleet management tool.

Anti-TheftPIN 5

The fifth operator Password (PIN) for activating/deactivating anti-theft. This PIN cannot be the same as any other anti-theft PIN and cannot be six zeros. It can be adjusted only with Insite or the Inspec fleet management tool.

Anti-TheftPIN 6

The sixth operator Password (PIN) for activating/deactivating anti-theft. This PIN cannot be the same as any other anti-theft PIN and cannot be six zeros. It can be adjusted only with Insite or the Inspec fleet management tool.

Driver Activation/Deactivation

The driver can activate or deactivate this feature by entering a password in Road Relay. Also see the Special Instructions below.

Interaction with other Features and Parameters

Road Relay is required for this feature to be enabled. Refer to the Road Relay documentation for more information.

Special Instructions

None

Disadvantages

The following complaints may result from use of this feature:

- Engine does not start, with no exhaust smoke present and the red fault lamp on.
- Engine will only idle.

Visual Aids

Anti-Theft Mode

Key Switch State

Engine Running

Prevents Restart

Locks Throttle at Idle

Semi-Automatic

On

No

Yes

No

Semi-Automatic

On

Yes

No

Yes

Manual

On

No

Yes

No

Manual

On

Yes

No

Yes

Engine

Availability

Enter passwords with INSITE

ISM

Phase 9 or later

Yes

ISX

Phase 9 or later

Yes

Signature

Phase 9 or later

Yes

Road Relay

Version 4 or later

N/A

Anti-Theft Passwords

General Information

The Anti-Theft Protection window contains a list of six passwords, and provides the ability to set, validate, or disable passwords for each of the six listings. Anti-Theft Protection depends on a validated password.

To set a password:

1. Highlight the password number in the **Passwords** list.
2. Click **New Password**.
3. Enter the password in the **New Password** and **Confirm Password** boxes.
4. Click **Apply**. The password is displayed as **Validated** in the password **Status** column.
5. Enter the new password in the **Enter Password** box and click **Validate**. This step enables Anti-Theft Protection.

To validate an existing password, and enable anti-theft protection:

1. Highlight the password number in the **Passwords** list.
2. Type the password in the **Enter Password** box.
3. Click **Validate**. This enables anti-theft protection, and both the **Anti-Theft Protection Enable** and **Automatic Engine Lock Mode** checkboxes are automatically selected.

To change a password:

1. Validate an existing password.
2. Follow the steps above to set a password.

To disable a password:

1. Highlight the password number in the **Passwords** list.
2. Type the password in the **Enter Password** box.
3. Click **Disable**.

You can also customize password Status options.

Anti-Theft Protection

General Information

Note: Vehicle Anti-Theft must be enabled in Features & Parameters for this feature to be active. See Engine Feature Settings in the Help Contents tab for more information.

The Anti-Theft Protection feature prevents the engine from starting until a password is entered in the ECM using the Cummins RoadRelay. A total of six user passwords are possible for locking or unlocking an engine. Adjustment to the Anti-Theft Protection feature itself is password-protected.

Note: RoadRelay must be installed in the vehicle to use Anti-Theft passwords.

To configure Anti-Theft Protection:

1. Click **Advanced ECM Data** on the Viewbar.
2. In the **Advanced ECM Datawindow**, select Anti-Theft Protection from the list of engine features.

3. Enter or set up passwords, as required.

Diesel Exhaust Fluid Dosing System Purge Count Reset

About

Engines equipped with Selective Catalyst Reduction (SCR) Aftertreatment (airless) need to purge the Diesel Exhaust Fluid Doser at every key off. This prevents doser pump damage due to fluid freezing in the pump. After every key off, power is maintained to the pump for a calibrated time and the ECM will log a complete purge count. If power is **not** maintained to the pump after a key off, the ECM will log an incomplete purge count.

If the pump is replaced, the counters will need to be reset. It may be necessary to note the complete and incomplete purge counter values, or create an ECM image, before resetting the counters.

Note: These counters are to be reset only after the pump is replaced.

To View and Reset Doser Purge Counts:

1. Select Diesel Exhaust Fluid Doser Purge Counter from the Advanced ECM Data window. The Complete and Incomplete Purge Counters will be displayed.
2. If necessary, make a note of these values or create an ECM image prior to resetting the counters.
3. If the Diesel Exhaust Fluid Doser pump has been replaced, select Reset to clear these values.

Additional Information:

1. See Troubleshooting and Repair Manual for doser pump replacement procedure.

Duty Cycle Monitor

About

The Duty Cycle Monitor graphically displays percentages of time that the vehicle has run within specific operating ranges. Operating ranges are based on engine speed (rpm) vs. torque. Engine speed displays on the X axis and torque displays on the Y axis of the graph. The values for rpm and torque are defined by the calibration. A bold line is displayed on the graph as a generic torque curve reference. This curve is the same across all engines.

Each block on the graph shows an intersection of rpm values and torque values that represent a specific operating range for the vehicle. The number displayed in each block is a percentage of the total time that the vehicle operated in that range. For example, if a graph has a total of 500 hours of operating time with 5% displayed in a block, then the vehicle spent 25 hours operating within that range.

"The number under the horizontal axis represents the percentage of time the engine has spent "motoring", or being driven by an external load. For example, a truck going downhill, with the load providing the driving force instead of the engine."

When the engine is running, the current operating region will be highlighted in red.

Note: The total of the percentages displayed in the graph may be a little more or less than 100%. This is due to rounding when INSITE™ reads the data from the ECM.

To view Duty Cycle Monitor data:

1. Click **Advanced ECM Data** on the **Viewbar**.

2. In the **Advanced ECM Data** window, select **Duty Cycle Monitor** from the list of engine features.

Three different Duty Cycle maps can be displayed in the **Duty Cycle Monitor** window:

- Short Term Map 1
- Short Term Map 2
- Long Term Map

Related parameters are displayed at the bottom of each map, and each map can be printed, along with its parameters. Short Term Maps can also be reset as necessary.

Right-Click Menu

In the **Duty Cycle Monitor** window, right-click anywhere to perform other related activities.

A popup menu displays the following options:

Choose Map

Short Term Map 1

Select this option to display Short Term Map 1 in the **Duty Cycle Monitor** window.

Short Term Map 2

Select this option to display Short Term Map 2 in the **Duty Cycle Monitor** window.

Long Term Map

Select this option to display the Long Term Map in the **Duty Cycle Monitor** window.

Change Title

Select this option to change the title of the map that is currently displayed in the **Duty Cycle Monitor** window.

Refresh

Select this option to refresh data from the ECM.

Reset

Clears the hours displayed on the selected Short Term Map and begins logging data from the current ECM time forward. See Reset for more information.

This option is disabled if the Long Term Map is displayed.

Note: After performing a Reset on either Short Term Map, please allow 3-5 minutes for the new data to stabilize. During this stabilization, the Duty Cycle Monitor percentage may be higher or lower than 100%.

Print

Select this option to print the currently displayed duty cycle map and its related data.

Parameters

Related parameters are displayed at the bottom of each map:

- Short Term Map 1
- Short Term Map 2
- Long Term Map

Note: The parameter values will vary depending on which map is displayed.

Time Remaining - the amount of time remaining for the displayed map. The Short Term Maps last for 500 hours, and the Long Term Map is practically infinite.

Map Start Time - the ECM time when logging began for the currently selected map.

Advertised Power RPM - the engine speed at which the power peak is achieved.

Advertised Power at RPM - the maximum horsepower rating for this engine.

Replace Torque RPM - the engine speed at which peak torque is achieved.

Peak Torque at RPM - the maximum engine power supported by this engine.

Reset

1. Open Short Term Map 1 or Short Term Map 2 by selecting **Choose Map** on the right-click menu.

1. Click **Reset** on the right-click menu or on the toolbar.

After the **Reset**, INSITE™ clears the hours displayed on the selected map and begins logging data from the current ECM time forward.

About resetting Maps:

- If both Short Term Maps have logged 500 hours each, the maps are “frozen” and can not continue logging until one or both of them is reset.
- If one map is reset and the other is not yet full, data is not logged in the newly reset map until the other map is full.
- If both Short Term Maps are reset, logging begins in Short Term Map 1 first.

Logging continues on the Long Term Map, regardless of the status of the Short Term Maps. The Long Term Map can not be reset.

Note: After performing a Reset on either Short Term Map, please allow 3-5 minutes for the new data to stabilize. During this stabilization, the Duty Cycle Monitor percentage may be higher or lower than 100%.

Long Term Map

About

Long Term Map

This map records operating ranges over the life of the engine or vehicle. It can not be reset.

Short Term Map 1

About

Short Term Map 1

This map logs a total of 500 hours. When 500 hours have elapsed, INSITE automatically begins logging on Short Term Map 2.

Once Short Term Map 2 has logged 500 hours, both Short Term Maps are “frozen” until either one or both of them is reset.

See To reset the Duty Cycle Monitor for more information.

Short Term Map 2

About

Short Term Map 2

This map logs a total of 500 hours. INSITE automatically begins logging on Short Term Map 2 after 500 hours have been logged on Short Term Map 1.

After 500 hours have been logged on Short Term Map 2, both Short Term Maps are “frozen” until one or both of them is reset.

See To Reset the Duty Cycle Monitor for more information.

Changing Map Title

About

Changing a map title

You change the default title of either Short Term Map 1, Short Term Map 2, or the Long Term Map.

1. Be sure the map you want to change is displayed in the **Duty Cycle Monitor** window.
 2. Select **Change Title** on the right click menu.
 3. In the **Change Chart Title** window, type a new map name in the box.
 4. Click **OK**.
-

Engine Abuse History

About

The Engine Abuse History feature tracks the time the engine has been running above recommended values for various engine parameters. This provides comprehensive data about the life of the engine, how it has been used, how it has been maintained, and what abuse it may have been subjected to.

To view Engine Abuse History data:

1. Click **Advanced ECM Data** on the Viewbar.
2. In the **Advanced ECM Data** window, select Engine Abuse History from the list of engine features.

Engine Abuse History data is displayed in the right side of the **Advanced ECM Data** window.

Right Click Menu

In the Engine Abuse History table, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options:



Select this option to refresh data from the ECM.

Print Preview

Select this option to view how the Engine Abuse History data will look when it is printed.
Use the **Page Setup** option to make any changes to the layout if desired.

Print

Select this option to print the currently displayed Engine Abuse History data.

Parameters

Monitored parameters (Engine Abuse History)

The following parameters are monitored in the Out of Range Operation History dialog box:

- Engine Overspeed
- Coolant Pressure
- Coolant Temperature
- Oil Pressure
- Intake Manifold Temperature

Engine Performance Rating

About

Programmable power allows the engine horsepower to be changed without downloading a new calibration to the ECM. Each calibration in the ECM can contain up to 16 different horsepower ratings.

The Engine Performance Rating window displays the ratings that are available and enables you to select one. Each rating contains a variety of associated parameters.

To select a horsepower rating:

1. Click Advanced ECM Data on the Viewbar.
2. In the Advanced ECM Data window, select Engine Performance Rating from the list of engine features.

Horsepower ratings and related data are displayed in the right side of the Advanced ECM Data window.

1. Highlight a rating in the list and click Select Curve on the right click menu.

Note: Only ratings that are Unblocked can be changed.

1. Current displays in the Power Curve column of the selected rating.
2. If desired, adjust the Governed Engine Speed.
3. Click Send to ECM on the right click menu, or  on the toolbar
4. Follow the instructions in the message box.

Right Click Menu

In the **Engine Performance Rating** window, right-click anywhere in the list of horsepower ratings with your mouse to perform other related activities.

A popup menu displays the following options:

Refresh

Select this option to refresh data from the ECM.

Select Curve

Select this option to use the selected horsepower rating.

Send to ECM

Select this option to send the **Current** horsepower rating to the ECM.

Print

Select this option to print the currently displayed Engine Performance Rating data.

Parameters

Each horsepower rating in the **Engine Performance Rating** window contains the following associated parameters:

- **Power Curve** - Indicates which torque rating is **Current**, and which ones are **Blocked** or **Unblocked**.
- **FR Number** - The FR number for the horsepower rating.
- **Low Horsepower** - The Low Horsepower value for the horsepower rating.
- **High Horsepower** - The High Horsepower value for the horsepower rating.
- **Low Peak Torque** - The Low Peak Torque value for the horsepower rating.
- **High Peak Torque** - The High Peak Torque value for the horsepower rating.
- **Governed Speed** - The Governor RPM value for the horsepower rating.

Note: You can adjust this value using the Governed Engine Speed slider.

- **Comment** - Any comment about or description of the rating, as defined in the calibration.

Engine Protection

About

Engine Protection is designed to prevent engine damage when a sensor value exceeds a certain limit for critical engine operating parameters. The Engine Protection feature enables you to view the Engine Protection fault history associated with a specific Engine Protection fault.

A fault history log is provided for each Engine Protection parameter. The last five occurrences of each Engine Protection fault are displayed.

To view Engine Protection data:

1. Click Advanced ECM Data on the Viewbar.
2. In the **Advanced ECM Data** window, select **Engine Protection** from the list of engine features.

Engine Protection data is displayed in the right side of the **Advanced ECM Data** window.

Right Click Menu

In the **Engine Protection** list, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options:

Refresh

Select this option to refresh data from the ECM.

Expand All

Select this option to expand all engine protection parameters.

Collapse All

Select this option to collapse all engine protection parameters.

Print

Select this option to print the currently displayed engine protection data.

Viewing Data

Engine Protection fault history is displayed in an expandable/collapsible list. Use  and  to expand each Engine Protection parameter in the list. Newest to oldest fault occurrences are listed for each parameter.

Related Engine Protection fault history data is displayed in the following columns:

Description

The Engine Protection parameter for which a fault was recorded.

Fault Code

The fault code number.

Occurrence

This can be one of five possible values: Newest, 2, 3, 4, or Oldest.

Value

The value of the Engine Protection parameter associated with the fault, at the time of the fault.

Duration

The duration of the Engine Protection fault in Hour:Minute:Second format.

ECM Time

The time that the Engine Protection fault occurred.

Right-click with your mouse anywhere in the Engine Protection list to perform other related activities.

Engine Protection Settings

About

More information will be provided in an upcoming version of INSITE.

Engine Status Options

General Information

Two checkboxes in the Anti-Theft Protection window can be enabled or disabled after an anti-theft password has been validated.

Anti-Theft Protection Enable

This option is enabled by default, if Vehicle Anti-Theft is enabled in Features & Parameters. You must enter and validate an anti-theft password to disable it from the Anti-Theft Protection window.

Automatic Engine Lock Mode

This option is enabled by default, if Vehicle Anti-Theft is enabled in Features & Parameters. When checked, the engine is locked automatically after every shutdown. You must enter and validate an anti-theft password to either enable or disable this feature manually.

Engine Torque History

About

Engine Torque History records the 4 most recent horsepower ratings applied to an engine via calibration. This enables you to determine if the engine's peak torque curve values have been updated above the torque ratings of the transmission or other drivetrain components.

This feature detects changes in Powertrain Protection (PTP), and records and reports the highest horsepower (HP) rating available.

To view Engine Torque History:

1. Click Advanced ECM Data on the Viewbar.
2. In the Advanced ECM Datawindow, select Engine Torque History from the list of engine features.

Torque history data is displayed in the right side of the Advanced ECM Datawindow.

Right Click Menu

In the Engine Torque History list, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options:

Refresh

Select this option to refresh data from the ECM.

Expand All

Select this option to expand all available torque recordings.

Collapse All

Select this option to collapse all available torque recordings.

Print

Select this option to print the currently displayed torque data.

Viewing Data

Torque history data is displayed for the 4 most recent horsepower ratings applied to an engine.

Use and to expand and collapse the details for each each rating in the list.

ECM Start Time

The ECM time when the engine was first run at the highest torque rating for this calibration.

High Power Rating / Description

The high horsepower rating for the torque rating.

When you expand a horsepower rating, maximum torque and gear ratio data is displayed.

Low Power Rating / Value

The low horsepower rating for the torque rating.

When you expand a horsepower rating, values for the maximum torque and gear ratio data are displayed.

Peak High Torque

A value in this column indicates that an ESP calibration has been applied sometime in the engine's history. The highest ESP-enabled torque rating ever used is displayed in this column.

Note: If an ESP calibration has never been used, this field is blank.

Peak Low Torque

The significance of the Peak Low Torque value depends on whether a Peak High Torque value is present. If a Peak High Torque value is present, then this column indicates the highest Low Torque rating ever used while an ESP calibration was in effect.

If the Peak High Torque column is blank, Peak Low Torque indicates the highest torque rating ever used while a standard calibration was in effect.

Peak Torque Duration

The length of time that the engine was run using the highest torque rating for this calibration. If the calibration is ESP-enabled, then Duration indicates how long the listed Peak High Torque rating was in effect.

If no ESP calibration has ever been used, Duration indicates how long the Peak Low Torque value was in effect.

Right-click with your mouse anywhere in the Engine Torque History list to perform other related activities.

Using Data

Today's engines have the ability to produce more torque than ever before. It is possible to adjust an engine to produce more torque and power than the drivetrain and cooling package are designed to handle.

The audit trail of engine torque history is useful when determining the potential causes of drive line or overheat-related failures.

Note: The Audit Trail contains data about which INSITE tool and password were used to make a rating selection. The date from the Engine Torque History dialog box can be matched with the date in the Audit Trail window to determine where the ratings were selected and who made the selections.

Fuel Consumption Monitor

About

The Fuel Consumption Monitor enables you to view the engine's fuel consumption rate over the last 40 hours and also over the life of the engine. You can view the fuel consumption rate for any single hour in the last monitored 40 hour period by locating the hour on the horizontal axis and then reading its fuel consumption rate on the vertical axis.

To view Fuel Consumption Monitor data:

1. Click Advanced ECM Data on the Viewbar.
2. In the **Advanced ECM Databwindow**, select Fuel Consumption Monitor from the list of engine features.

Fuel Consumption Monitor data is displayed in the right side of the Advanced ECM Datawindow.

Right Click Menu

In the Fuel Consumption Monitor graph or table, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options:

▶ Change Title

Select this option to change the default title of the graph.

Type the new title in the Change Chart Title window, then click OK. The new name is displayed above the graph.

▶ Refresh

Select this option to refresh data from the ECM.

▶ Reset

Select this option to clear the currently displayed graph. The Monitor can be reset at any time; you don't have to wait for 40 hours to elapse.

▶ Print

Select this option to print the currently displayed fuel consumption graph and related data.

Viewing Data

The graph in the Fuel Consumption Monitor window displays the fuel consumption rate for the most recent 40 hours. It represents the Short Term Fuel Consumption Rate.

The display is a simple bar graph, with hours elapsed on the horizontal axis and fuel consumed on the vertical axis. After 40 hours, you must reset the short-term fuel consumption data by clicking the Reset button.

Below the graph, additional information about fuel consumption is displayed. Unit values are displayed for each fuel consumption parameter:

▶ Instantaneous Fuel Rate

The immediate fuel consumption rate when the Fuel Consumption Monitor window is opened. It represents the rate of diesel fuel injection, measured in gallons per hour (gal/hr).

▶ Short Term Hour

Identifies which hour is being monitored in the current 40 hour period represented by the graph.

▶ Hour Counter

Shows the minutes elapsed in the current hour being monitored.

▶ Long Term Fuel Rate

The average fuel consumption rate over the life of the engine.

▶ Long Term Time

The total engine time that is the basis for the Long Term Fuel Rate.

Right-click with your mouse anywhere in the Fuel Consumption monitor window to perform other related activities.

Fuel System Table Reset

About

The engine's electronic control system has the ability to adapt to changing exhaust gas oxygen and gas mass flow sensor information. This changing sensor data is stored in the ECM, where it is used to adapt the engine's control system to changes in an engine's operating characteristics over time.

The Fuel System Table Reset feature resets the sensor data to original values after a fuel system or engine repair, such as replacing a Universal Exhaust Gas Oxygen (UEGO) or Gas Mass Flow (GMF) Sensor.

To reset the fuel system tables:

1. Attach the PC to a non-moving vehicle.
2. Turn the keyswitch ON.
3. Select **Fuel System Table Reset** from the list in the ECM Diagnostic Tests Wizard. Click the Next button, and the **Fuel System Table Reset** window opens.
4. Note any messages or warnings in the **Instructions** box.
5. Click **Reset** to reset the fuel system tables.
6. Turn the keyswitch OFF and wait 10 seconds, then turn the keyswitch ON according to the instructions.
7. A message will be displayed to inform you whether the reset was successful.

Click **Back** if you want to perform another test.

High Pressure Common Rail Injector Setup

About

This special feature is used to display and update the barcode values for each injector installed on the engine. The Injector Barcode is an alpha-numeric character sequence, physically marked on the injector. This barcode indicates the injector's fueling characterization. The ECM uses this information to adjust the injection commands, improving fueling accuracy and minimizing injector-to-injector fueling variations. It is important to update this information when an injector or ECM is replaced. The manual procedure should be used when replacing an injector. The import procedure should be used when replacing or ROM booting an ECM.

Safety Precautions

None

Test Initial Conditions

1. Engine Stopped
2. ECM or Injectors have been replaced as necessary

Test Procedure

Manual Procedure

1. Select High Pressure Common Rail Injector Set from the Advanced ECM Data window, and then select Next
2. Enter Injector Barcodes in the New Barcode column as necessary

3. Select Apply
4. A pop-up window will appear stating the status of the update. Select OK
5. If any of the updates were unsuccessful, the reason for that failure will be provided in the pop-up window as well as the Change Status Column. Return to step two

Import Procedure

1. Select High Pressure Common Rail Injector Set from the Advanced ECM Data window, and then select Next
2. Select Import. A Work Orders window will appear. It will list all work orders with a matching Engine Serial Number.
3. Select the desired Work Order and then the desired Image within the work order.
4. Select the desired import file. Once the file is selected the OK button in the window will be enabled.
5. Select OK. The barcodes from the image will populate the New Barcode column
6. Select Apply
7. A pop-up window will appear stating the status of the update. Select OK

Additional Details

1. Once an Injector Barcode is updated, the old value is lost. It is strongly recommended that a Work Order is created or the barcode table be printed before any Barcodes are changed
2. If the barcodes are inadvertently lost, the original injector barcodes can be obtained from QuikServe Online by looking up the engine's serial number
3. Injector Barcodes may be imported from an ECM image if the Engine Serial Number in the image matches the connected engine and is not zero. ECM images must be imported into Work Orders before they are available to select
4. The injector barcode values could, in previous INSITE™ versions, be changed in Features and Parameters. This special feature replaces that functionality.

Idle Shutdown Override

About

Idle Shutdown Override allows the service technician to override the mandatory idle shutdown on a vehicle for a calibrated time during a maintenance event. Once the mandatory idle shutdown override is triggered, the service technician can disconnect the tool from the vehicle and the override stays active until the override time expires.

Test Initial Conditions

1. Key Switch on

Test Procedure

1. Select Idle Shutdown Override from the Advanced ECM Data menu.
2. Select Start. The Idle Shutdown Override Status parameter will change from Inactive to Active. The Idle Shutdown Override Time Remaining parameter will begin counting down.
3. Select Stop or key off to stop the override.

Additional Details

1. This feature overrides Idle Shutdown for the time remaining on the counter after selecting Start.
 2. INSITE™ can be disconnected from the engine and this feature will remain active for the period of time remaining on the counter when INSITE™ is disconnected.
 3. The override can be stopped by key off regardless of INSITE™ being connected or disconnected.
 4. Clicking on the Show control, or double clicking in the Instructions area will cause the complete instruction list to be displayed in a pop-up dialog box.
-

Immobilizer Installation

About

When the Immobilizer device needs to be replaced, the ECM needs to reset the Key Known State to Unknown and relearn the key code from the Immobilizer device. This feature resets the Immobilizer Key Known State parameter and allows the ECM to learn the key code from the Immobilizer.

Test Initial Conditions

1. Immobilizer device replaced
2. Engine stopped

Test Procedure

1. Connect to INSITE™
2. Select Advanced ECM Data
 - Select Immobilizer Installation
 - Click on the Reset button
 - Click on the Yes to continue
 - The Status window will display the results of the Reset.

Special Instructions

Another method to reset the Key Known State is to recalibrate the ECM.

Viewing Data

The Immobilizer Key Known and Immobilizer Key State can be viewed in the Monitor window. The Status window will display messages and the result of the Reset.

J1922 Control History

About

The J1922 Control feature allows the engine to be controlled by J1922 devices. A history of attempts to control the ECM through a J1922 device can be helpful during troubleshooting.

J1922 Control History is measured from the last time J1922 data was reset.

To view J1922 Control History data:

1. Click **Advanced ECM Data** on the Viewbar.
2. In the **Advanced ECM Data** window, select J1922 Control History from the list of engine features.

J1922 Control History data is displayed in the right side of the **Advanced ECM Data** window.

J1922 devices are listed in the Parameters column. Control counts and Times (total duration) for each device are listed in the Value column.

Right-click with your mouse anywhere in the J1922 Control History table to perform other related activities.

Right Click Menu

In the J1922 Control History table, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options:

▶ Reset

Select this option to clear any logged J1922 events and start recording new J1922 events. This enables you to track J1922 device usage from this time forward.

▶ Refresh

Select this option to refresh data from the ECM.

▶ Print Preview

Select this option to view how the J1922 Control History data will look when it is printed. Use the buttons in this view to make any changes to the layout if desired.

▶ Print

Select this option to print the currently displayed J1922 Control History data.

Knock Count Reset

About

The ECM tracks the number of Knock Counts and Final Knock Count Derate percentages detected in each cylinder for both Bank A and Bank B. If the number of knocks detected reaches a calibrated trigger value, the engine will experience a derate. The number of knocks counted are from the previous reset, and does **not** refer to a number of knocks during a period of time. This feature displays those values and allows them to be reset and to clear the derate.

Initial Conditions:

1. Engine may be running or stopped.

To Perform The Knock Count Reset:

1. Select Knock Count Reset from the Advanced ECM Data window.
2. View the Knock Counts per cylinder in the Current Column.
3. Select Knock Count Reset to reset the Knock Counts for both Bank A and B.
4. Select OK on the Reset Complete window. The Knock Count values for both banks will be copied to the Previous Column and then the values in the Current Column will be reset to zero. The Status Box will also display a Knock Count Reset message.
5. View the Final Knock Derate value for each bank.
6. Select Knock Derate Reset to reset the Knock Derate.

7. Select OK on the Reset Complete window. The Knock Derate values for both banks will reset to zero.

Additional Information:

1. The Previous Column data is only for reference and will **not** be saved once the window is closed.

Maintenance Monitor

About

The Maintenance Monitor displays information about the current maintenance interval, along with records of the last three times the Maintenance Monitor was reset from this window. The Maintenance Monitor is used to determine when specific maintenance tasks should be performed, including changing the oil, changing filters, rotating tires, etc.

Current maintenance interval data are accumulated totals since the last time the Maintenance Monitor was reset. The specific maintenance interval data shown is based on Maintenance Monitor settings you define in the Features and Parameters window. See **Engine Feature Settings** in the Help Contents tab for more information about Maintenance Monitor settings.

To view Maintenance Monitor data:

1. Click Advanced ECM Data on the Viewbar.
2. In the Advanced ECM Data window, select Maintenance Monitor from the list of engine features.

Maintenance Monitor data is displayed in the right side of the **Advanced ECM Data window**.

Note: If Maintenance Monitor is not enabled in the Features and Parameters window, no current interval data will be displayed.

Right Click Menu

In the **Maintenance Monitor** window, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options:

Reset

Select this option to reset the maintenance counter. It is recommended that the maintenance counter be reset immediately after each maintenance check.

When prompted, turn off the key on the vehicle for thirty seconds to complete the reset process.

Refresh

Select this option to refresh data from the ECM.

Expand All

Select this option to expand all maintenance data.

Collapse All

Select this option to collapse all maintenance data.

Print

Select this option to print the currently displayed maintenance data.

Reset

It is recommended that the maintenance counter be reset immediately after each maintenance check, so that only current data is displayed in this window.

To reset the Maintenance Monitor:

- Hold the mouse anywhere in the Maintenance Monitor window and select **Reset** on the right click menu.

When prompted, turn off the vehicle key switch for thirty seconds to complete the reset process.

Viewing Data

Current maintenance interval data are accumulated totals since the last time the Maintenance Monitor was reset. The specific maintenance interval data shown is based on Maintenance Monitor settings you define in the Features and Parameters window. This window is accessed from the Adjustments group on the Viewbar.

Maintenance Monitor data is displayed in an expandable/collapsible list. Use  and  to expand or collapse the list of parameters.

Operating Mode

Defines how the interval between regular maintenance checks is measured: in time, distance, or automatically by the ECM (auto). When using the auto option, the current interval for time, distance, or fuel is shown, depending on which of these measures is closest to reaching its maintenance checkpoint.

The mode is determined by the setting in the Features and Parameters window.

Note: Auto mode is not available on some ECMS.

Maintenance Monitor - Interval Used

The portion of the maintenance interval that has passed since the last reset.

For example, if a vehicle is scheduled for maintenance every 8000 miles and has logged 6000 miles since the last maintenance check, the current interval used is 75 percent.

Maintenance Monitor - Distance Used

The number of miles traveled since the last reset.

Maintenance Monitor - Time Used

The number of hours of engine operation since the last reset.

Maintenance Monitor Error Log

Indicates whether a Maintenance Monitor Error Log has been generated. Errors are a result of a vehicle speed sensor fault, injector fault, or power down fault.

Right-click with your mouse anywhere in the Maintenance Monitor window to perform other related activities.

Log Data

Log Data displays Maintenance Monitor data for the oldest and most recent times that the Maintenance Monitor has been reset. If no resets have occurred, **No Data Available** will be displayed.

Reset data includes accumulated totals for Distance, Time, and Fuel for the oldest and most recent times that the Maintenance Monitor was reset. Read across these three rows for each reset to view related information for each parameter.

Note: The Fuel row is not displayed for some ECMS.

Reset information is displayed in the following columns:

► **Maximum Threshold**

Shows the maximum thresholds for distance, time, and fuel when the Maintenance Monitor was reset. These values were either entered manually in the **Features and Parameters** window or determined by the Interval Factor specified in that window.

Note: Interval Factor is not applicable to some ECMS.

► **Adjusted Threshold**

Shows the adjusted thresholds for distance, time, and fuel when the Maintenance Monitor was reset. Adjusted thresholds are set when the Auto mode is selected in the **Features and Parameters** window. The Maintenance Monitor automatically reduces the maintenance interval when the engine is operating outside of the optimum oil temperature range.

Note: This column is not displayed for some ECMS.

► **Interval Reset at:**

Shows the values for distance, time, and fuel between maintenance checkpoints.

► **Cumulative Reset at:**

Shows the total ECM values for distance, time, and fuel at the time that the Maintenance Monitor was reset.

► **Possible Error**

Error displays next to a row of data that can be in error in the Maintenance Monitor log. Errors are a result of a vehicle speed sensor fault, injector fault, or power down fault. If an error displays, the data may be inaccurate for this reset occurrence.

Right-click with your mouse anywhere in the Engine Protection list to perform other related activities.

OEM Engine Performance Rating

About

Use the **OEM Engine Performance Rating** window to block a horsepower rating from being used. This may be useful when one or more ratings is not compatible with the current vehicle setup.

Ratings that are blocked do not display in the **OEM Engine Performance Rating** window, and thus can not be selected or used.

You can also use the window to change the engine horsepower rating without downloading a new calibration to the ECM. Each calibration in the ECM can contain up to 16 different horsepower ratings. Each rating contains a variety of associated parameters.

Note: Access to this feature requires an OEM password. However if the ECM also has a Master or Adjustable password enabled, both the OEM and the Master (or Adjustable) passwords must be validated in order to change ratings.

To select a horsepower rating:

- See the Engine Performance Rating overview.

To block or unblock a horsepower rating:

1. Highlight a rating and select **Toggle OEM Blocking** on the right click menu.
2. Click **Send to ECM** on the right click menu, or 

3. Follow the instructions in the message box.

Right Click Menu

In the **OEM Engine Performance Rating** window, right-click anywhere in the list of horsepower ratings with your mouse to perform other related activities.

A popup menu displays the following options:

► Refresh

Select this option to refresh data from the ECM.

► Toggle OEM Blocking

Select this option to block or unblock the selected horsepower rating.

► Select Curve

Select this option to use the selected horsepower rating.

► Send to ECM

Select this option to send the **Current** horsepower rating to the ECM.

► Print

Select this option to print the currently displayed Engine Performance Rating data.

Adjusting the Engine Speed

General Information

Adjusting the Engine Speed

Use the **Governed Engine Speed** slider at the top of the window to adjust the governor RPM listed for the horsepower rating. The upper and lower limits of adjustment are dependent on the calibration in use.

Real Time Clock

About

During operation of the engine, the ECM records and stores information related to a wide range of events, which includes time stamping. Two different measures of time are available: ECM Time, which is the cumulative ECM hours, or ECM Real Time, which gives a date and 24 hour based time stamp. This feature allows automatic synchronization of ECM Real Time to match the PC Date and Time or a manual change to enter the current ECM Real Time. It is also important to ensure that the local time zone is set correctly to maintain the correct local time.

A battery backup is used to maintain constant power to the Real Time Clock. If the battery backup is not present, a power loss to the Real Time Clock (such as disconnecting the batteries in excess of 5 seconds) causes a loss of Real Time Clock accuracy. This situation generates fault code 319, and the maintenance lamp will light.

Note: Once Enabled, Real Time Clock can not be disabled.

► Procedure:

To enable the Real Time Clock:

1. From Advanced ECM Data, select **Real Time Clock**.
2. Select the **Enable Real Time Clock** checkbox.

3. The **Real Time Clock** can either be set automatically or manually:
 - a. **Automatically setting the Real Time Clock**
 - Verify that the Local PC Date and Time are correctly displayed. **If this needs to be corrected, it must be done within Windows. Select Undo and close INSITE™. Adjust the PC Date and Time as needed.**
 - If the Local PC Time and Date are correct, select the **Auto Set** button.
 - b. **Manually setting the Real Time Clock**
 - Verify that the Local Time Zone is correct, and then set the correct date and time in the **ECM Date and Time** frame.
 - Select **Apply** to save these settings to the ECM.
4. Follow the prompts to save the changes to the ECM.

Note: Once enabled, the Real Time Clock can NOT be disabled and ECM cumulative hours are no longer available.

 **To reset Real Time Clock data:**

Note: Loss of the real time clock setting can result from hardware failure or power failure. If this occurs, reset the time after correcting the cause of the problem.

1. Set the correct date and time in the **ECM Date and Time** frame.
2. Select **Apply**.
3. Follow the prompts to save the changes to the ECM.

 **To exit the Real Time Clock window without sending changes to the ECM:**

1. Select **Undo**.

Additional Details:

1. When enabled, all time-stamped ECM events will be stamped with Real Time instead of ECM run time.
2. Once enabled, the Real Time Clock feature can NOT be disabled and ECM cumulative hours are no longer available.
3. The Real Time Clock feature requires a battery backup.
4. The Local Time Zone is the time zone on which the Real Time Clock will be based.
5. When the battery has been disconnected, the maintenance light turns on and the time stamp may be incorrect.

This procedure is not yet available at the time of publication.

SAE J1939 Powertrain Control

About

SAE J1939 Powertrain Control enables on-board vehicle control devices such as Acceleration Slip Regulation (ASR) for traction control or electronically controlled transmissions to take control of the engine and/or engine subassemblies via the SAE J1939 datalink (network).

Use the SAE J1939 Powertrain Control feature to view a history of when the engine was controlled by a J1939 device. A record of attempts made to control the ECM through a J1939 device can be helpful during troubleshooting.

To view SAE J1939 Powertrain Control history data:

1. Click Advanced ECM Data on the Viewbar.

2. In the **Advanced ECM Datawindow**, select SAE J1939 Powertrain Control from the list of engine features.

SAE J1939 Powetrain Control history data is displayed in the right side of the **Advanced ECM Datawindow**.

Right Click Menu

In the SAE J1939 Powertrain Control list, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options:

► Refresh

Select this option to refresh data from the ECM.

► Print

Select this option to print the currently displayed SAE J1939 Powertrain Control data.

Viewing Data

SAE J1939 Powetrain Control displays records of the last five events in which devices were controlled via the SAE J1939 datalink.

Related SAE J1939 Powertrain Control data is displayed in the following columns:

► Event

A historical indicator starting from the Newest (or most recent) occurrence, followed by the second most recent occurrence (2), third most recent occurrence (3), fourth most recent occurrence (4), and fifth most recent occurrence (Oldest). A total of up to five occurrences can display.

As new occurrences appear, the oldest occurrence drops off the list.

► Source

The SAE J1939 device that originated the engine control request.

► Destination

The device that received the engine control request.

► Modes

The types of requests received by the engine from the SAE J1939 device.

Typically a single event will have a sequence of control requests (commands) associated with it, up to a maximum of five.

► ECM Time (Start)

Indicates when the event was first recorded.

Note: This value indicates an instantaneous time; it does not measure duration.

► Duration

The total amount of time during which the J1939 device was in use. The time is measured in hours, minutes, and seconds.

Right-click with your mouse anywhere in the J1939 Control History list to perform other related activities.

Vehicle Classification

About

This feature allows the Vehicle Classification to be set. Vehicle Classification is used by European applications to determine the amount of engine torque derate when an On Board Diagnostic (OBD) fault condition exists. This feature can only be set if the vehicle has traveled less than a calibrated distance. This distance is normally 40 kilometers (25 miles). If the Vehicle Classification is **not** set within that distance, it is set to the highest derate, regardless of the vehicle's application.

To Set the Vehicle Classification:

1. Select Vehicle Classification from the Advance ECM Data menu.
2. The Distance Remaining refers to the distance that the vehicle may travel before the Vehicle Classification is permanently set.
3. Select the Vehicle Purpose from the drop down menu.
4. Select the Gross Vehicle Weight from the drop down menu. The Gross Vehicle Weight can be obtained from the vehicle's data plate.
5. Once the Gross Vehicle Weight has been selected, the applicable Vehicle Classifications are displayed below the Gross Vehicle Weight. These should be verified to insure proper selection.
6. Select Apply to set the Vehicle Classification.

Vehicle Classification may be changed again as long as the Distance Remaining is greater than zero.

Warning: Inaccurate Vehicle Classifications may lead to sanctions from government agencies. Great care should be taken in selecting these settings.

Setting INSITE™ Options

INSITE Options

About

On the Tools menu, select Options to open the Options window. This window enables you to enter your Registration passwords and to specify various global settings for INSITE.

The window contains a navigation tree on the left side of the window from which you select "pages" that display on the right side of the window. The navigation tree is similar to Windows Explorer. Expand and collapse items in the tree by clicking and , then select the page that you want to configure.

The following Options pages are available. Click on the links to view Help for the pages.

- The Connections page - Enables you to manage ECM data source connections.
- The File page - Enables you to manage the data files that are generated by INSITE.
- General pages - Enable you to specify INSITE startup options and general appearance options.
- The Inquire Data Extraction page - Enables you to define settings for Inquire Data Extraction.
- Security pages - Enable you to register your functionality level password, which provides you with access privileges to INSITE features. You can also remove ECM passwords, and setup fleet calibration counts.
- The Units of Measure page - Enables you to define the units of measure used throughout INSITE.
- The User Manager page - Enables you to assign specific user rights to individual users and groups of users.
- The Work Orders page - Enables work orders and ECM images to be created automatically when you connect to an ECM or ECM simulator.

Options Buttons

About

The buttons at the bottom of the **Options** window affect all of the Options pages, not just the page you are viewing. When you click a button, the button action applies to all pages.

For example if you make changes to one page and then click **Cancel** while viewing a different page, the **Options** window closes and the changes you made to the first page are cancelled. To prevent losing changes to a page, always click **Apply** before viewing a different page.

Click **OK** to apply all changes to all pages and close the **Options** window.

Connections Page

About

Use this page to view the status of the ECM data source connections that you have configured, or to add new connections.

The tabs on this page group the data source connections by type:

- All - Lists connections of all types
- Serial - Lists only connections to a serial port
- Simulator - Lists only Simulator connections

Use the Add or Remove buttons on each tab to add or remove connections. Highlight a connection, then click a button. When you click the Add button, the Connection Wizard opens and guides you through connection configuration.

Note: You can not remove a connection whose status is Connected. You can remove only Disconnected connections.

Use the Properties button to rename a connection, if desired.

File Page

About

Use this page to manage the data files that are generated by INSITE:

- Data Monitor/Logger
- Export
- Import
- Inquire Data Extraction
- Work Orders/ECM Images, Templates
- Calibration Log

The top of the page shows the current path of the INSITE data files on your PC. You can change a path by selecting an item and then clicking the Modify Path button to browse for a different location.

Use the Purge button to delete all user-generated data files from a selected directory. Click on an item in the list, then click Purge.

Note: The Purge button is grayed out for some of the data file directories.

General Settings

General Page

About

Use this page to specify general system options. You can also use the button at the bottom of the page to restore the original INSITE default selections if desired.

Start Up

- **Display Splash Screen** - This option enables the INSITE graphic to display when you open INSITE. Clear the checkbox to not display the graphic.

Toolbar

You can select the button size, and also whether you want descriptive text (Tool Tips) to appear when you move your mouse over a button.

Fault Codes

- Click the checkbox if you want fault information to refresh automatically from the ECM. Then specify how often the refresh should occur.
- Clear the checkbox if you do not want fault information to be refreshed automatically.
- Click the **Enable Auto Refresh** checkbox if you want fault information to refresh automatically from the ECM. Then specify, in the **Refresh Fault Info Every** spinbox, how often the refresh should occur.
- Use the **Display Options** dropdown list to choose the toolbar button size.
- Use the **Tool Tips** dropdown list to choose whether you want to Display or Hide descriptive text when you move your mouse pointer over a toolbar button.

Viewbar

- Click the **Display Feature Names** checkbox to enable Feature names to be displayed in the Viewbar, along with the Feature icons.
- Clear the checkbox to display only the icons in the Viewbar, without their Feature names.

Calibration Selection

- **Auto Detect** - If selected, the connected ECM's part number and calibration information is automatically highlighted in the calibration list. See page 97 for more information.
- **View Network Calibration Drives** - If selected, all PCs on the network that contain calibrations are displayed.

Reset to Cummins Default Settings

Click this button to reset all options on this page to their INSITE defaults.

Appearance Page

About

Use this page to modify the font and color schemes used throughout INSITE.

Use the spin boxes to select a component to modify, then click the button beneath each spin box to select a different font or color. Note that the color selection buttons indicate the color currently used for the selected item.

Any changes you make are previewed in the **Current Selection** box. The changes do not take effect, however, until you click **OK** or **Apply**.

Using Inquire Data Extraction

Inquire Data Extraction

About

This feature is used to quickly extract and store ECM data and reset selected parameters from a connected engine. When no active faults or other issues are present, Inquire Data Extraction is typically performed while fueling the vehicle.

To open the Inquire Data Extraction window:

- Click **Inquire Data Extraction** on the Viewbar.

To begin data extraction:

- If you have already performed data extraction on an engine, engine data is displayed in the **Vehicle Properties** box. If you are connected to the same engine, highlight it and click **Connect**. The Engine Information window is displayed, showing **Engine Serial Number**, **Unit Number**, **Customer Name**, and **Group Name**.
- If you have not performed data extraction on the connected vehicle, the **New Engine Information** window is displayed when you click **Connect**. The Engine Serial Number is read from the ECM and displays in this window. In the **Value** column, type entries for **Unit Number**, **Customer Name**, and **Group Name**. This information will be used the next time you perform data extraction on this engine.

Click **Continue**. Data extraction progress is shown in the **Inquire Data Extraction Status** box. Observe any message windows or prompts that display during extraction, until the process completes.

Extracted data is stored in a *.csv file, in the location specified in the Options window. The default name of this file combines the engine serial number with the date and time. Note that the name of this file is listed in the Vehicle Properties box on completion of data extraction.

To configure data extraction options:

- Click the **Options** button to open the Inquire Data Extraction page in the Options window.

Page

Use this page to define settings for the Inquire Data Extraction feature, which can be accessed from the Viewbar.

You can define settings for each configured ECM data source connection. Use the dropdown list to select the connection to use for data extraction. Connection data is then displayed below the selected connection.

Use the **Available Operations** and **Selected Operations** panes to define which operations will occur during data extraction. You can select one or more of these options:

- **Reset Trip Information**
- **Reset Maintenance Monitor Data**

- **Reset Inactive Fault Codes**
- **Reset Duty Cycle Monitor Groups**
- **Reset All Fault Codes**

Use the arrow buttons to move individual operations, or all the operations between panes.

Security Settings

Security

Tool Functionality Page

This page lists the tool level licenses that have been activated for your copy of INSITE. You can select a different tool level, if desired, if you want to restrict access to certain INSITE features.

You entered your Basic password when you opened INSITE for the first time, so it is listed here by default. To gain full access to INSITE, or add additional licenses, you must enter a functionality level password.

Note: Passwords can be obtained from your Cummins distributor.

To enter a functionality level password:

1. Click the **Add** button.
2. Type your password into the spaces provided.

Note: Do not use the hyphens. The spaces are arranged so that the alphanumeric groups are automatically separated as you type.

1. Click **Apply** to activate your password without closing the **Options** window. You will have full access to INSITE when you close the window.

Click **OK** to gain full access to your copy of INSITE and close the **Options** Window.

To change tool levels:

1. Highlight the desired tool level in the list.
2. Click **Apply** to activate this tool level without closing the **Options** window.

Click **OK** to activate this tool level and close the **Options** window.

Authorization Password List Page

About

This page automatically saves authorization passwords and related engine data that have been entered in the Calibration Authorization window during previous calibration transfers.

Subsequent calibration transfers using the same ECM Code will automatically read the corresponding password from this list and skip the **Calibration Authorization** window.

ECM Password Removal Page

About

This page lists your remaining Password Removal Counts, and the corresponding ECMS to which they apply. If Password Removal is not enabled, the list is blank.

To add Password Removal functionality:

1. Click **Add** to open the **Enter New Password** window.
2. Type your password in the blanks. You can obtain this password from your Cummins distributor.
3. Click **OK**.
4. Removal authorization and the corresponding Removal Count are now displayed.

To add another removal authorization, start again with Step 1 above.

To remove one or more ECM passwords, select ECM Password Removal on the **Tools** menu.

Note: Once you obtain a new password from your distributor, you must enter it here within 30 days.

Fleet Calibration Counts Page

About

Use this page to enter a Fleet Calibration Count into INSITE. Fleet Calibration Counts make it easier to transfer calibrations to an ECM because you don't have to enter a password during the transfer.

To add Fleet Calibration Counts:

1. Click **New** to open the **New Fleet Count Password** window.
2. Type your password in the blanks. You can obtain this password from your Cummins distributor.
3. Click **OK**.
4. Your available Fleet Calibration Counts are displayed.

Note: Once you obtain a new password from your distributor, you must enter it here within 30 days.

Units of Measure Page

Units of Measure Page

About

Use this page to specify which Units of Measure system to use in INSITE, using either predefined groups or custom groups.

Predefined groups include:

- Latin America
- Metric
- UK
- USA

You can expand each group to see the units of measure for all INSITE parameters in the selected group. Units of measure cannot be changed for the predefined groups.

To create a custom group:

1. Click the **Add** button.
2. In the **Add Custom Group** window, type a **Group Name** and select which of the four predefined groups to use as the basis for the new group.
3. Click **OK** to return to the Units of Measure page.
4. Expand the group name to change the units of measure for each INSITE parameter as desired.

Highlight a parameter, then use the dropdown list to select a different unit of measurement for the parameter.

To remove a custom group:

1. Highlight the group name.
2. Click the **Remove** button.

User Manager Settings

User Manager Page

Use this page to enable User Manager functionality and assign specific user rights to individuals and groups.

Users and groups of users can be given access to any combination of the following INSITE functions:

- System Administrator — Allows full access to the User Manager function.
- Calibration Download
- Adjust ECM Features and Parameters
- Change ECM Password
- Import ECM Image Data
- Export ECM Image Data
- Reset Trip Information Data
- Reset Faults
- Adjust User Options — The Engable Key Switch Timer or Enable Work Order Mode under the Tools > Options menu can only be modified when checked.
- Reset Advance ECM Data

To enable User Manager and configure user/group rights:

1. Click the **Enable User Manager** checkbox.
2. Click **Apply**. The **Modify User** window opens, with System Administrator as the initial default user name.
3. Enter and confirm a password containing 5 to 10 characters, then click **OK** to return to the **User Manager** page.

From the Options window navigation tree, select **Users** or **Groups** to define or modify user rights for each. If you are running User Manager for the first time, you should first set up at least one group.

Note: When User Manager is enabled, INSITE displays a Log In window before the application opens. Users must type a valid User Name and Password, as defined in the User Manager Options pages described here, in order to use INSITE.

Groups Page

About

Use this page to define new Custom user groups or manage existing groups.

INSITE provides one Predined group, with full system privileges: System Administrators. This group cannot be removed or modified.

Note: Group lists can be imported and exported, for use at other INSITE locations.

To add a new Custom group:

1. Highlight **Custom** in the **Current Groups Configuration** pane, then click **Add**.
2. In the **New Group** window, enter a **Group Name** for the new group.
3. In the **Group Rights** box, click the checkboxes to enable access by this group to the listed INSITE functions.
4. Click **OK** to return to the **Groups** page.

The new group is listed under the **Custom** in the **Current Groups Configuration** pane. Use the  sign to expand a group and view the user rights assigned to the group.

Note: Only members of the System Administrators group can add or modify groups.

To modify an existing group:

1. Highlight a **Custom** group in the **Current Groups Configuration** pane, then click **Modify**.
2. In the **Modify Group** window, make any changes as desired as described in steps 2 and 3 above.
3. Click **OK** to return to the **Groups** page.

To remove an existing group:

- Highlight a **Custom** group in the **Current Groups Configuration** pane, then click **Remove**.

Users Page

About

Use this page to define new users or change the profiles for existing users.

Note: You should define at least one Group before adding users.

To add a user:

1. Click **Add**.
2. In the **New User** window, enter a **User Name** and **Password** for the new user, then confirm the password by retyping it.
3. In the **Group** box, select an existing group from the dropdown list. The group membership determines the user rights of the new user.
4. Click **OK** to return to the **Users** page.

The user and the associated group are listed in the **Current Users Configuration** pane.

Note: Only members of the System Administrators group can add or modify users.

To modify an existing user's profile:

1. Highlight a **User Name** in the **Current Users Configuration** pane, then click **Modify**.
2. In the **Modify User** window, make any changes as desired as described in steps 2 and 3 above.
3. Click **OK** to return to the **Users** page.

To remove an existing user:

- Highlight a **User Name** in the **Current Users Configuration** pane, then click **Remove**.

Note: User lists can be imported and exported, for use at other INSITE locations.

Users and Groups

Exporting and Importing

INSITE users and groups can be exported to or imported from a file. This is useful if you are using INSITE in multiple locations, saving you from configuring the same user and group properties more than once.

Only members of the System Administrators group can import or export users and groups.

To import users and groups:

1. On the User Manager page, click **Import**.
2. In the **Import Location** window, browse to locate the user and group list to import. These lists are saved with an *.euf extension, and are stored in the Import location defined in the File page.
3. Click **Open** to import the list data and return to the **User Manager** page.

Use the Users and Groups pages to view the imported users and groups.

To export users and groups:

1. On the User Manager page, click **Export**.
2. In the **Export Location** window, define a name for the list of users and groups. These lists are saved with an *.euf extension, and are stored in the Export location defined in the File page.
3. Click **Save** to save the list to the specified location.

Work Orders Page

About

Use this page to enable the automatic creation of work orders, ECM images, and ECM templates in INSITE.

To enable work orders and related files:

1. Click the **Enable Work Order Mode** check box.
2. Type a name that describes your location or shop in the **Service Site Location** box.

Calibrating an ECM (INSITE™ Pro)

ECM Calibration

About

INSITE Professional enables ECM calibrations to be downloaded directly to an ECM. Click **Calibration Selection** on the Viewbar to select, view, and transfer calibrations.

The process of downloading a calibration can be summarized in four steps. Click the links to learn more about each step.

1. Select an ECM part number.
2. Select a Certification Code for your location.
3. Select a calibration.

You can also search for a specific calibration if desired.

1. Send the calibration to the ECM, or perform other activities related to the selected calibration.

Note: You must be connected to an ECM to send a calibration.

Right Click Menu

In the Calibration Selection window, right-click anywhere with your mouse to perform other related activities.

A popup menu displays the following options.

Note: Some options are available only from the Calibration Explorer, and some are available only from the calibration list. For easier viewing, the complete list of options is shown here in alphabetical order.

Apply Custom Filter

Select this option to apply custom filters to the calibration list, enabling you to view calibrations that meet specific criteria.

Auto-Detect Calibration

Select this option to automatically highlight the connected ECM's part number and calibration information in the calibration list. You must be connected to an ECM for this command to be available.

Certification Codes

Select this option to open the Certification Codes window. This enables you to select a different Code and Agency, which filters the list accordingly.

Copy/Paste

Select these options to copy a calibration or engine program database from one drive to another.

To copy a calibration:

1. Select a calibration in the calibration list and select Copy on the right-click menu.
2. Left-click on a drive in the Calibration Explorer.
3. Right-click on the same drive and select Paste to copy the selected calibration to this drive.

To copy a database:

1. Select an engine program in the Calibration Explorer and select Copy on the right-click menu.
2. Left-click on a drive in the Calibration Explorer.
3. Right-click on the same drive and select Paste to copy the selected engine program database to this drive.

Empty Calibration Workspace

Select this option to empty all calibration files from the Calibration Workspace.

Print

Select this option to print the active calibration window.

Properties

Select this option to open the Calibration Properties window.

Select All Calibrations

Select this option to highlight all calibrations. This option can be used in combination with the Copy or Print commands.

Send to Calibration Workspace

Select this option to send the floppy drive contents to the Calibration Workspace.

Send to Floppy Drive

Select this option to copy calibration files from the Calibration Workspace to the floppy drive.

Set as Default Calibration Drive

Select this option to always use the selected drive as the calibration source.

Note: INSITE will automatically consider the first CD-ROM detected on the local PC to be the default search path when looking for calibrations. If no CD-ROM drive is present, it will default to the operating system drive.

Show Active Calibrations

Select this option to display in the calibration list only calibrations that have not been superceded.

Show Compatible Calibrations

This option is automatically selected when you are viewing compatible calibrations from the View Compatible ECM/FCM Calibrations option.

- ECM - Engine Control Module
- FCM - Fuel Control Module

If you deselect this option, the calibration list is refreshed to display all calibrations for the selected ECM part number. To view compatible calibrations again, you must use the View Compatible ECM/FCM Calibrations option.

Show Installed Calibrations

Select this option to display in the calibration list only calibrations that have been installed on a hard drive.

Transfer to ECM

Select this option after highlighting a single calibration to transfer the selected calibration to the ECM.

Note: This option is not available if you are not connected to an ECM.

View Active Calibrations File

Select this option to view the Active Calibrations file.

View Calibration Change History File

Select this option to view the Calibration Change History file.

View Compatible ECM/FCM Calibrations

Use this option when the selected calibration is an ISM - CM870 or Fuel Control Module (FCM) calibration. The submenu contains part numbers of calibrations that are compatible with the selected calibration.

Select a part number from the submenu to view calibrations that are compatible with the previously selected calibration. The calibration list automatically displays only compatible calibrations.

For example, you can view FCM calibrations that are compatible with a selected CM870 calibration by selecting a part number on the submenu. Compatible FCM calibrations are displayed in the calibration list automatically.

View Replacement Calibrations

Select this option to open the Replacement Calibrations window, after highlighting a calibration in the calibration list.

Active

You can view or print a report of all calibrations that are currently available in the INSITE database. It can be printed using a Windows compatible printer.

Superseded and obsolete calibrations are not included in this report.

Calibration Change History File

You can view or print a calibration change history report using a Windows-compatible printer.

The report includes a history of all superseded and obsolete calibrations, and may be useful during troubleshooting.

Icons in the Calibration Explorer

In the **Calibration Selection** window, icons represent branches of the Calibration Explorer. Click each branch to open the next lower branch.

 The local PC. If you click on this branch, details about all the attached (and networked) drives are displayed in the right side of the window.

 The Calibration Workspace.

 Indicates that the Calibration Workspace contains calibrations.

 Indicates that the Calibration Workspace contains expired calibrations.

-  Indicates that the floppy drive contains a multiple volume set, before extraction.
-  Indicates that the floppy drive contains a multiple volume set, after extraction has completed.
-  A floppy drive containing a complete calibration database.
-  Indicates that the hard disk or CD-ROM drive contains calibrations.
-  Indicates that the hard disk or CD-ROM drive contains expired calibrations.
-  This branch contains calibrations from a single, specific date.
-  This branch contains calibrations for a specific ECM type: ISB, ISM, etc.
-  This branch contains expired calibrations for the ECM type.
-  This branch represents an ECM part number. Click on it to display all calibrations for the part number in the calibration list.
-  An individual calibration, displayed in the calibration list. This icon indicates that the calibration is not superceded and resides on the selected drive.
-  An individual calibration, displayed in the calibration list. This icon indicates that the calibration is not superceded but does not reside on the selected drive.
-  An individual calibration, displayed in the calibration list. This icon indicates that the calibration has been superceded and is not on the selected drive.

Note: You can refresh the Explorer view at any time by clicking on the toolbar.

Transferring Calibrations to Disk

Calibration files and databases can be transferred to and from one or more floppy disks. This enables:

- Transferring calibrations to another PC running INSITE.
- Importing calibrations from another PC running INSITE.

Use the Calibration Workspace and floppy drive icons in the Calibration Selection window to perform the transfers.

To copy files to floppy disk (transferring calibrations):

1. In the **Calibration Selection** window, select one or more calibration(s) on a disk drive and use the **Copy** and **Paste** commands on the **Edit** or right-click menus to copy the calibration file(s) to the Calibration Workspace.

Note: For a single calibration, use the same technique to copy a selected calibration directly to the floppy drive icon.

1. On the Calibration Workspace right-click menu, select **Send to Floppy Drive**. You will be prompted if more than one disk is required to complete the transfer.

Note: All data currently on the disk(s) is automatically deleted.

1. Observe all prompts or message windows to complete the transfer.

Note: Use the CTRL or SHIFT keys on the keyboard to select multiple calibrations for transfer.

To copy files from floppy disk (importing calibrations):

1. Insert the calibration diskette(s) into the floppy drive and double-click on the floppy drive icon, or click on the icon and select **Send to Calibration Workspace** on the right-click menu.

2. If the calibration file(s) span more than one floppy disk, you will be prompted when to insert each disk.
3. Observe all prompts or message windows to complete the transfer.
4. After the calibration(s) has been copied from the floppy disk to the Calibration Workspace, it can be transferred directly to an ECM or copied to any disk drive.

The Calibration List

The calibration list in the right side of the **Calibration Selection** window lists all calibrations for the ECM part number selected in the Calibration Explorer. The list of available calibrations also complies with the Certification Code and Agency that you selected when the list opened.

The column headers show the parameters for each calibration. You can resize the columns for easier viewing by moving the cursor between the column headings until it changes to parallel lines. Then click and drag the column to the desired size.

Note: You can refresh the list at any time by clicking on the toolbar.

Right-click with your mouse anywhere in the calibration list to perform other related activities.

Using the Calibration Selection Window

To open the Calibration Selection window

- Click **Calibration** on the Viewbar.

The **Calibration Selection** window is displayed. The window is split vertically, with the Calibration Explorer on the left and the calibration list on the right.

Note: The calibration list is blank until you select an ECM part number in the Explorer, unless you have selected Enable Auto-Detect in the Options window.

If the list is blank, use the Calibration Explorer to locate calibrations on a local PC drive or a mapped network drive. Note that the Explorer is similar to Windows Explorer, showing all drives in an expandable/collapsible tree. If you are using the InCal™ CD, for example, calibrations are located beneath a CD-ROM drive in the tree.

You can highlight any icon in the Explorer to view related information in the right side of the window. Use and as necessary to expand and collapse the Explorer, using the icons as guides. You will see at least one ECM listed, and under each ECM the applicable part number(s) will be displayed with the icon.

Click on a part number, then select a Certification Code, and all available calibrations will be displayed in the calibration list on the right side of the window.

Note: Right-click anywhere in the calibration list with your mouse to perform other related activities.

Finding a Calibration

You can filter the calibration list to display only those calibrations that contain specific parameter values.

To find a calibration(s):

1. Select **Find** on the **Edit** menu to open the **Find** window, or click on the toolbar.
2. Use the options in the window to narrow your search:
 - In the **Find What** box, enter a parameter value.
 - In the **Find In** box, use the dropdown list to select the column in which the parameter can be found.
 - Optionally, select whether the case must match what you type in the **Find What** box.

- Select whether to search up or down from your current position in the calibration list.
- 3. After selecting the desired search criteria, click **Find Next**. The calibration list will be re-displayed, containing only those calibrations that match your search criteria.

Right click with your mouse anywhere in the filtered list to perform other related activities.

Certification Codes and Agencies

About

Double click a certification code in the **Available Certification** panel to select it, or highlight a code and click **Add**. Use the same procedure to remove a code from the **Selected Certification** panel, except use the Remove button.

Note: You add or remove all codes to and from each panel by clicking Add All or Remove All.

When you click **OK**, calibrations that comply with the selected certification requirements will be displayed in the calibration list.

Code — Agency

ADR — Australian Motor Vehicle Certification Board

ADR3 — ADR30/00 (Australian Certification)

ADR7 — ADR70/00 (Australian Certification)

AUSF — AUSFORS (Australia)

CARB — California Air Resources Board

CONA — Conoma

EEC — European Economic Communities

EPA — Environmental Protection Agency

EU — Europe in General

EUR1 — European Sub-Classification 1

EUR2 — European Sub-Classification 2

EUR3 — European Sub-Classification 3

EX97 — EPA Export 1997

LR — Lloyd's Register of Shipping

NONE — Not Certified

SEDE — Sedesol - Mexico

TEPA — Taiwan Environmental Protection Agency

Note: NONE applies to calibrations that do not need certification, or that were certified in a previous year. Many early CENTRY calibrations did not require certification, for example.

Custom Filters

About

You can filter the calibration list to display only calibrations that meet specific criteria. By selecting any column(s) in the Calibration Selection window, you can set specific criteria such

as CPL, Advertised Power, Horse Power, SC Option, and DO Option. Setting specific criteria will narrow the search for a desired calibration.

- The custom filter persists when the Calibration Selection window is closed and reopened.
- The filter can be removed or reapplied any time the Calibration Selection window is open.

To enable Custom Filters:

Filters can be enabled several ways:

- Use the Apply Custom Filter button  on the toolbar
- Use the right click menu in the calibration list.
- On the Tools menu, select Calibration Selection | Apply Custom Filter.

You can remove a Custom Filter by reselecting the commands on the menus, thus removing the checkmark, or by clicking the toolbar button again.

Note: Removing a Custom Filter does not erase it from INSITE, it simply reenables display of the entire calibration list. The filter can be reapplied at any time, even after closing and reopening INSITE.

To configure a Custom Filter:

Click on a column heading in the calibration list to display a dropdown list for the column. The list will contain all possible values for this column. Select a value from the list to use as a Custom Filter. This value will be displayed on the first line of the calibration list, and the entire list will be sorted so that only calibrations that contain this value are listed.

You can repeat this procedure with as many columns as desired, to further refine selection criteria.

Note: Because the custom filter is persistent, it is possible for the calibration list to be filtered when you open it. Check whether the Apply Custom Filter button on the toolbar is depressed. If it is, you are viewing a filtered calibration list. Click on the button to display all, unfiltered calibrations.

ECM Code Identification

About

The ECM Code is a top level number used to describe or identify an electronic ECM software calibration. The ECM code was developed to be an easier method of identifying and remembering a calibration and its history.

The ECM Code format was derived from the PT fuel pump coding scheme, and eliminates confusion associated with remembering SC and DO combinations; i.e. there may be multiple SCs with same DOs, and there may be same SCs with different DOs. Unique ECM codes will be provided for each SC/DO combination.

The following rules further define the ECM code:

- A new calibration (SC/DO) will be assigned a new and unique ECM code.
- A change or revision to the contents of an electronic ECM calibration will increment the ECM Code revision level.

Format

The format of the ECM Code is:

ECM Code: abcd^{aaaa}.ee

a - Product Identifier

b - Product Identifier

c - Engine Family (Note: This position may be set to '0' on CENTRY ECM Codes)

dddd - Sequential number starting at 0001, which is the actual ECM Code numerical value.
For CENTRY, the number is the same as the FQ Option.

ee - Sequential number starting at 00 that represents the revision level of the ECM Code.

Examples

A02001.00

CENTRY with no revisions

B10001.00

CELECT for N14E with no revisions

C20001.01

CELECT Plus for M11E with one revision

Note: CELECT modules do not store the ECM Code in the dataplate. Instead, the SC and DO options are stored.

Calibration Properties

The Calibration Properties window displays a variety of descriptive information about a selected calibration. First select a calibration in the calibration list, then select Properties on the right-click menu to open this window.

The window includes the Engine Program name, the ECM Code and part number, and date of the selected calibration. Select a category from the list on the left side of the window to view more detailed information about the selected calibration:

- Application Information
- Base Engine Information
- Calibration History
- Performance Parameters
- Special Requirements

Note: You can right-click any item in the list and select Print to print the information it contains, or select the Print All button in the window to print all of the items.

Calibration Parameters

About

Columns in the calibration list may contain some or all of the following information for each calibration, depending on the ECM:

- ECM Code
- Model
- Market
- CPL
- Advertised Power
- Governed Power

- Torque Peak
- OEM Name
- OEM Model
- OEM Application Comments
- Transmission Type
- Axle Type
- Performance Options
- Centinel CPL
- Voltage
- CPL Comments
- SC Comments
- DO Comments
- FR Option
- SC Option
- DO Option
- Power Curve
- Certification Code
- Certification Year
- Rating
- Fuel Code
- Datalink
- High Idle
- Injector Part Number
- PP Comments

Replacement Calibrations

About

Replacement Calibrations

The first line in this window shows the calibration that you highlighted in the calibration list. Possible replacement calibrations are listed beneath the first line. Click on a calibration to use and click **OK**.

Sending a Calibration to an ECM

About

This procedure describes the steps for sending calibrations to an Electronic Control Module (ECM). It also includes instructions on the Save/Restore Adjustable Parameters option. This option will automatically restore the adjustable parameters to the ECM after the calibration download is complete.

If a calibration download fails when **Save/Restore Adjustable Parameters** is selected, INSITE™ will save these parameters to an **Adjustable Parameter Recovery File**. This file can be used by INSITE™ to restore the Dataplate and adjustable parameters on this ECM if it is in a ROM Booted or Foot Printed state on the next successful download. See Additional Details for more information.

To send a calibration to a single ECM setup:

1. If INSITE™ did not autodetect the most recent calibration revision for the connected ECM, manually find and highlight the desired calibration in the calibration list (linked).
2. Double-click the highlighted calibration or right-click on the calibration and select **Transfer to ECM**. **IMPORTANT!!** Read the “Warning!” message displayed on the welcome page carefully and select **Next** to continue.
3. If a calibration authorization password is required, the Calibration Authorization window will open. This displays the requested ECM Code and PCID which is needed to obtain a password from the Cummins Distributor. A Fleet Calibration Count or a Calibration Authorization Password must be entered. Select **Next** to continue.
4. A System ID and Dataplate Information window will open.
 - a. Verify or modify the System ID and Dataplate information. The values that are not locked may be changed by double-clicking in the right-hand column and entering a new value.
 - b. If desired, select Save / Restore Adjustable Parameters if available. This option saves the adjustable parameters and then restores them to the ECM after calibration download has been successfully completed. If Save / Restore Adjustable Parameters is not selected, or if the connected ECM does not support it, the adjustable parameters will be set to the default values of the new calibration.
- NOTE:** The Save/Restore Adjustable Parameters option is unchecked by default for industrial applications and checked for automotive applications.
- c. To undo changes, click **Restore Original Values** or select Next to continue.
5. Verify the Summary information is correct and select **Next** to continue.
6. An Adjustment Confirmation message will appear. Select **OK** to continue.
7. INSITE™ will begin calibrating the ECM. Follow the prompts and do not turn off the key switch unless instructed.
 - a. **IMPORTANT!!** Celect Plus, Celect Plus Industrial and the QSK 19/23/45/60/78 require the key switch to be off during the calibration transfer. If this is required, a window will be displayed with this message. Follow the instructions and select **OK**.
8. At the end of the calibration download, it will be necessary to cycle the key switch. Follow the INSITE™ prompts as required.
9. After calibration transfer has completed, the results of the calibration transfer and **Save and Restore** (if selected) will be displayed in the Calibration Transfer Results window. This will also appear in the summary of the Calibration Transfer window. Select **OK**.
 - a. If some of the parameters can not be restored, they will be listed in the Parameters Not Restored window. This list of parameters can be saved or printed, and can be manually adjusted through Features and Parameters on the View bar.
10. Select **Next** to continue.
11. Select **Finish** to close the ECM Calibration Download Wizard.

Additional Details

Adjustable Parameter Recovery File:

If a calibration download fails when **Save/Restore Adjustable Parameters** is selected, INSITE™ will save these parameters to an **Adjustable Parameter Recovery File**. This file can be used by INSITE™ to restore the Dataplate and adjustable parameters of this ECM if it is in a ROM Booted or Foot Printed state on the next successful download. This file can not be printed, transferred to another PC or used on another ECM.

Note: If an ECM is replaced, this feature will not be available on the replacement ECM.

Calibration Procedure for an ECM (with saved adjustable parameters) that has been ROM Booted or Foot Printed:

1. Connect to the ECM with INSITE™.
2. Select **OK** to the ROM Boot or Foot Print error window.
3. Open Calibration Selection, navigate to the desired calibration and click to highlight it.
4. Double-click the highlighted calibration or right-click on the calibration and select **Transfer to ECM**. Read the “Warning!” message displayed on the welcome page carefully and select **Next** to continue.
5. Select **Next** to proceed to the **Adjustable Parameter Recovery File** window.
Note: A calibration authorization password may be required.
6. The calibration download wizard displays an **Adjustable Parameter Recovery File** window. This file was created when the calibration download with save and restore failed. The ECM name, date, and time the calibration transfer failed are displayed. The recovery file will be used unless the Adjustable Parameter Recover File box is unchecked. If unchecked, the adjustable parameters will be set to the calibration default values. Select **Next** to continue.
7. An Adjustment Confirmation message will appear. Select **OK** to continue.
8. INSITE™ will begin calibrating the ECM. Follow all prompts and do not turn off the key switch unless instructed.
9. After Calibration Transfer has completed, the results of the transfer and Adjustable Parameters Recovery File restore will be displayed in the Results window as well as shown in the Calibration Download window. Select **OK**.
10. Select **Next** to continue.
11. Select **Finish** to close the ECM Calibration Download Wizard.

Programmable Device Calibration

About

INSITE™ Pro functionality level provides the ability to download a calibration to an Aftertreatment Diesel Exhaust Fluid Controller using any RP1210A adapter.

Sending a Calibration:

Initial Conditions:

1. Key switch on.
2. An Aftertreatment Diesel Exhaust Fluid Controller calibration, which can be found on the INCAL™ DVD.

Procedure:

1. Connect to the ECM with INSITE™.
2. Open Calibration Selection.
 - a. Expand the drive and month of the INCAL™ DVD.
 - b. Expand the Aftertreatment Diesel Exhaust Fluid Controller.
 - c. Select the part number.
 - d. Highlight and double-click on the **Device Code** or right-click on the code and select **Transfer to ECM**.
3. The Calibration Download Wizard window will open. Select **Next** to continue or **Cancel** to exit the Calibration Download Wizard.

4. An Adjustment Confirmation window will open. Select **OK** to continue or select **Cancel** to go back to the previous window.
 - a. After selecting OK, a process bar will display as the calibration is downloading.

Note: While calibrating the Aftertreatment Diesel Exhaust Fluid Controller, do not change the key switch state.
5. After the calibration is complete, the progress bar will close.
 - a. If Work Order mode is enabled, a New ECM Image window will open to create a new Work Order. Select **OK** to create a new ECM Image or click **Cancel** to continue without creating a new ECM Image.
6. The Calibration Transfer Results window will display the results of the calibration transfer. Select **OK** to continue.

Right Click Menu

See Calibration Download right-click menu for more information.

Reference

Toolbar Buttons

About

The buttons available on the toolbar vary according to the task you are performing.

Note: Buttons may be disabled (grayed out) if the function is not currently available.

Work Order buttons

Opens the Work Order Wizard, to create a new Work Order.

Captures a new ECM Image of the active Work Order.

Converts an ECM Image to an ECM Template.

Common buttons

Cuts out the selected text.

Copies the selected text to the Windows clipboard.

Pastes the contents of the Windows clipboard into INSITE, wherever the cursor is situated.

Prints the active window.

Shows how the active window will look when printed.

Task buttons

Searches for specified criteria in the Features and Parameters, Calibration, or Trip Information windows (if available).

Retrieves current data from the ECM, or refreshes a current view in INSITE.

Resets Trip Information (if available) or the Duty Cycle Monitor (if available). Also used to clear inactive faults from the Fault Codes window. If prompted, turn off the key on the vehicle for 30 seconds to complete the procedure.

Note: The Reset button does not affect cumulative trip data.

Connects to an ECM data source.

Sends Features & Parameters settings or a calibration to the connected ECM.

If User Manager is enabled, this button disconnects the current logged in user and opens the User Manager Log In window to change users.

Displays (in the calibration list) only calibrations that have not been superceded.

Displays (in the calibration list) only calibrations that have been installed on a hard drive.

Enables you to apply custom filters to the calibration list, so that you can view only calibrations that meet specific criteria.

Enables you to toggle the Trip Fuel Report view in the Trip Information window, if this window is available for your ECM.

Sets the Sampling Rate for monitoring.

Monitor buttons

Captures current monitor snapshot data to a file, which may be useful to a qualified technician during troubleshooting. The default location of the file is defined in the Options window.

Starts or resumes the Data Logger.

Starts or resumes the Data Monitor.

Stops the Data Monitor or Data Logger. If you are logging data, you will be prompted to save the data to a file. The default location of the file is defined in the Options window.

Pauses the Data Monitor or Data Logger. To resume, click the applicable Start/Resume button.

Menu Commands

About

Menu commands provide another way to perform tasks in INSITE, or view and/or adjust ECM data. Select a menu below to view detailed descriptions of its individual commands.

- File menu
- Edit menu
- View menu
- Tools menu
- Window menu
- Help menu

File

Note: Menu commands may be disabled (grayed out) if the command is not available or does not apply to the function being performed with INSITE.

New

Note:The New commands are available only when:

- Work Orders has been selected on the Viewbar and is the active view, and
- You are connected to an ECM data source.

Work Order

Opens the Work Order Wizard, to create a new work order.

ECM Image

Captures a new ECM image of the active work order.

Open

This command is unavailable, and is grayed out.

Close

This command is unavailable, and is grayed out.

Save

This command is unavailable, and is grayed out.

▶ Save As...

This command is unavailable, and is grayed out.

▶ Convert

▶ ECM Template

Converts the selected ECM image to an ECM template.

▶ Log

Enables you to convert a Monitor log file (*.log) or Monitor snapshot (*.snp) to *.csv or *.txt format. These formats can be opened by a spreadsheet application or a text editor respectively.

▶ Export

▶ Image

Select this option to save an image to a file. This may be useful if you want to use an image on a different PC.

▶ Image to external file

Enables you to convert an Image to *.csv format, which can be opened by a spreadsheet application.

▶ Template

Select this option to save a template to a file. This may be useful if you want to use a template on a different PC.

▶ Parameter Group

Select this option to export a Custom Monitor Group. This may be useful if you want to use the customized setup on a different PC.

▶ Import

▶ Image

Select this option to import a saved image file. This may be useful if you want to use an image from a different PC.

▶ Template

Select this option to import a saved template file. This may be useful if you want to use a template from a different PC.

▶ Parameter Group

Select this option to import a pre-configured Custom monitor group. This may be useful for sharing custom configurations on different PCs.

▶ Connections

▶ Add New Connection...

Opens the Connection Wizard, in which you can set up new or additional ECM data source connections.

▶ Page Setup...

Enables you to specify the dimensions and related formatting characteristics of the paper you are using for printing INSITE data.

▶ Print Preview...

Shows how data in the active INSITE window will look when printed. If necessary, use the **Page Setup...** or **Print...** commands to change the page layout or printer options.

Print...

Opens Windows' **Print** dialog box, in which you can specify options for the printer, print orientation, and paper.

Send To

Mail Recipient...

This command is unavailable, and is grayed out.

ECM...

Sends the content of the active window to the ECM. This command is used with Features & Parameters settings, calibrations (if Centry click here), and ECM templates.

Properties

This command is unavailable, and is grayed out.

Exit

Closes INSITE.

Edit

Cut

This command is unavailable, and is grayed out.

Copy

Select this option to copy a calibration from one PC drive to another.

Paste

Select this option to paste a copied calibration onto a hard drive.

Clear

This command is unavailable, and is grayed out.

Select All

Select this option to select all calibrations in the calibration list. This option can be used in combination with the **Copy** or **Paste** commands.

Find...

Searches for specified criteria in the Features and Parameters, Calibration, or Trip Information (if available) windows.

Find Next

Searches for the next occurrence of the criteria you specified in the **Find** window.

Restore All Original Values

Select this option to undo all changes you made to parameter settings while the **Features and Parameters** window has been open.

Note: This option must be selected before sending any changes to the ECM.

View

Toolbar

Select this command to view or hide the toolbar. A check mark indicates that the toolbar is currently visible.

Status Bar

Select this command to view or hide the status bar. A check mark indicates that the status bar is currently visible.

Viewbar

Select this command to view or hide the Viewbar. A check mark indicates that the Viewbar is currently visible.

Current View

This option provides an alternative to using the Viewbar to open INSITE windows. Use the submenu to select the window you want to open.

Reset

Resets Trip Information (if available), the Maintenance Monitor (if available), or the Duty Cycle Monitor (if available). Also can be used to clear inactive faults from the Fault Codes window. When prompted, if applicable, turn off the key on the vehicle for 30 seconds to complete the procedure.

Note: The Reset command does not affect cumulative trip data.

Refresh

Retrieves current data from the ECM, or refreshes a current view in INSITE.

Expand All

Expands all layers in the active window.

Collapse All

Collapses all layers in the active window.

Tools

Note: Menu commands may be disabled (grayed out) if the command is not available or does not apply to the function being performed with INSITE.

Connect to ECM

Connects INSITE to the ECM data source that is currently displayed on the Status bar.

Note: If you want to connect to a different ECM data source, you should connect using the Status bar dropdown list.

Disconnect ECM

Disconnects INSITE from the current ECM data source, as shown on the Status bar. Selecting this command also results in a final ECM image of the active work order.

Login a New User

If User Manager is enabled, this command disconnects the current logged in user, and opens the **User Manager Log In** window to change users. This can affect user rights in INSITE.

ECM Passwords...

Opens the ECM Passwords window, enabling you to set up new user passwords or change or disable existing ones.

ECM Password Removal...

Opens the ECM Password Removal window, enabling you to remove existing ECM passwords.

Note: If your Removal Count is "0", this option is grayed out.

▶ **Power Spec...**

Opens the PowerSpec window, where you can enable and configure PowerSpec.

Note: This option is not available for some ECMS, and is grayed out.

▶ **Reset Datalink Adapter**

Re-establishes communication with the datalink adapter.

Note: This option does not help adapters that have both the PC and Power lamps on continuously, or when all lamps are on. In these cases, power to the adapter must be turned off for a few seconds and then reapplied.

▶ **Calibration Selection**

▶ **View Replacement Calibrations...**

Select this option to open the Replacement Calibrations window, after highlighting a calibration in the calibration list.

▶ **Show Compatible Calibrations**

This option is automatically selected when you are viewing compatible calibrations from the **View Compatible ECM/FCM Calibrations** option.

If you deselect this option, the calibration list is refreshed to display all calibrations for the selected ECM part number. To view compatible calibrations again, you must use the **View Compatible ECM/FCM Calibrations** option.

▶ **View Compatible ECM/FCM Calibrations**

Use this option when the selected calibration is an ISM - CM870 or Fuel Control Module (FCM) calibration. The submenu contains part numbers of calibrations that are compatible with the selected calibration.

Select a part number from the submenu to view calibrations that are compatible with the previously selected calibration. The calibration list automatically displays only compatible calibrations.

For example, you can view FCM calibrations that are compatible with a selected CM870 calibration by selecting a part number on the submenu. Compatible FCM calibrations are displayed in the calibration list automatically.

▶ **Show Active Calibrations**

Only calibrations that have not been obsoleted or superseded are displayed in the calibration list.

If you clear this option, every calibration ever released is displayed in the list.

▶ **Show Installed Calibrations**

Only calibrations that are located on one or more of the PC's drives are displayed in the calibration list.

If you clear this option, calibration information may be displayed even if the corresponding calibration is not present on the PC.

▶ **Apply Custom Filter**

Select this option to apply custom filters to the calibration list, enabling you to view calibrations that meet specific criteria.

 **Certification Codes...**

Opens the Certification Codes window. This enables you to select a Code and Agency, which filters the calibration list accordingly.

 **Send to Calibration Workspace**

Select this option to send the floppy drive contents to the Calibration Workspace.

 **Send to Floppy Drive**

Select this option to copy calibration files from the Calibration Workspace to the floppy drive.

 **Empty Calibration Workspace**

Select this option to empty all calibration files from the Calibration Workspace.

 **Auto Detect**

Auto Detect automatically highlights the connected ECM's part number and calibration information in the calibration list when the Calibration Selection window is opened. You must be connected to an ECM for this command to be available.

If the calibration is not in the ECM part number's database, no calibration is highlighted. If there are multiple databases to choose from, such as the hard drive and the CDROM, the ECM part number/calibration with the latest date is highlighted.

Note: Auto Detect on the Calibration Selection window right-click menu looks only at the database on the drive selected in the Calibration Explorer.

 **Properties**

Select this option to open the Calibration Properties window.

 **Data Monitor / Logger**

 **Snapshot**

Select this option to capture current monitor data to a file, which may be useful to a qualified technician during troubleshooting. The location of the file is defined in the Options window.

 **Log Data**

Select this option to log monitor data to a file, which may be useful to a qualified technician during troubleshooting. The location of the file is defined in the Options window.

If you are currently logging data, select this option to clear the check mark and pause data logging. Reselect it to resume logging.

 **Start/Resume**

Select this command to begin or resume monitoring the ECM using the setup you have defined in the right pane.

 **Pause**

Pauses the Monitor or the Data Logger.

 **Stop**

Stops the Monitor or the Data Logger.

 **Set Sample Rate**

Select this option to specify the monitor sampling rate.

Create Custom Group...

Select this option to create a Custom monitor group.

Edit Custom Group...

Select this option to edit the highlighted Custom monitor group.

Delete Custom Group...

Select this option to delete the highlighted Custom monitor group.

Trip Information

Trip Fuel Report

Select this option to filter the Trip Information window to include only current trip fuel information.

Note: This option will be grayed out if your ECM does not log trip information.

Options

Opens the Options window, which enables you to specify various global settings for INSITE. This window also enables entering additional functionality passwords.

Window

Close

Closes the active window.

Close All

Closes all windows that are open in the View window.

Cascade

Causes all open windows to overlap each other so that all the title bars are visible.

Tile Horizontally

Resizes and fits all open windows across the View window.

Tile Vertically

Resizes and fits all open windows down the View window.

Arrange Icons

Lines up all minimized windows along the bottom edge of the View window.

The bottom of the Window menu also lists any windows that are currently open in the View window. This is useful for quickly selecting a specific window when many windows are open.

Help

Contents...

Displays the INSITE Help **Contents** tab. The contents displays Help topics organized by feature, function, etc.

Search...

Displays the INSITE Help Search tab. This is useful for searching the entire Help system for specific text.

1. Type text in the box.
2. Click the **List Topics** button.

3. Highlight a Help topic that you want to view and click **Display**. (Alternatively, you can double-click on the Help topic name.)

► **What's This?**

This command is unavailable, and is grayed out.

► **Index...**

Displays the INSITE Help **Index** tab. This is useful for finding help using keywords.

There are two ways to use this tab:

- Scroll through the list to locate keywords.
- Type a keyword in the box. The list automatically displays the closest match as you type.

► **Fault Trees Overview**

Select this option to open the **Fault Overview** page of the Fault Information System online troubleshooting manual for the connected ECM data source. You must select a fault in the Fault Codes window for this option to be available.

► **Fault Trees Troubleshooting Steps**

Select this option to open the Troubleshooting Steps page of the Fault Information System online troubleshooting manual for the connected ECM data source. You must select a fault in the Fault Codes window for this option to be available.

► **Fault Trees Index...**

Select this option to open the Fault Information System online troubleshooting manual for the connected ECM data source.

► **About INSITE**

Provides various information about your copy of INSITE and your PC:

- The INSITE version number.
- Your PC ID, which is used to register your copy of INSITE.

The **About INSITE** window also contains information that may be useful if you or your Cummins distributor is troubleshooting INSITE:

- Click the **System Info** button to display information about your PC and Windows software setups.
- Click the **Versions** hyperlink to display information about the specific INSITE files, including the currently installed feature pack. If applicable, the feature pack is listed as the first row/line of the list.

Finally, click the www.cummins.com hyperlink to open the Cummins World Wide Web home page in your browser. You must be actively connected to the Internet to use this link.

Troubleshooting Communications Problems

About

► **If you receive INSITE™ Communication Error: 5023:**

1. Make sure the key switch is in the ON position and the datalink adapter 'POWER' lamp is lit.

Note: The INLINE™ I datalink adapter is powered by the serial port on the PC. If the 'POWER' lamp is not lit, the serial port has not been initialized yet. Once INSITE™ is

opened and an attempt to 'Connect to ECM' is made, the serial port will be initialized and the 'POWER' lamp should light.

2. Check the connection selection at the bottom of the main screen to verify that the datalink adapter, Com/USB port and protocol selected are correct.
3. Check for other devices using the communication port selected, such as PDA hot sync, infrared, etc., and disable if detected. If necessary, contact PC administration support for assistance.
4. Verify that the datalink is working.

For J1587/J1708 connections, verify that the 'RECEIVE FROM ECM' lamp on the INLINE™ adapter or the 'POWER' lamp on the INLINE™ I adapter is flashing.

Note: Reconditioned ECMS, new ECMS or ECMS on which a calibration transfer has failed, may not create the conditions described above.

5. Verify that the INLINE™ 'TRANSMIT FROM PC' lamp or the INLINE™ I 'POWER' lamp is flashing when transferring information from the PC to the ECM.
6. Check all cable connections for water, bent or broken pins, continuity, and corrosion. Repair or replace any damaged connectors or cables.
7. Reconnect all cables and tighten all connector screws at both ends of the datalink adapter and at the PC.
8. Close INSITE™ and any other open programs, then properly shut down the PC and restart again. Attempt to communicate with the ECM again.
9. If the problem persists, close INSITE™ and continue with the following steps (or contact the local Cummins distributor).
10. Open the HyperTerminal application on the **Accessories** menu. Type a descriptive name to define this new connection. For example, type **INSITE™ Test**. Click **OK**.

Note: This procedure will not work with the INLINE™ II or INLINE™ 4/5 datalink adapters.

11. Make sure the key switch is in the ON position and verify that the datalink adapter is connected properly to the engine and to the PC.
12. Select the COM port you are using in the **Connect using:** drop down list box in the **Connect To** dialog box. With the ECM turned on and hooked up to the PC, click **OK**.
13. In the **COM Properties** dialog box, specify these settings and then click **OK**:

- **Baud Rate:** 9600
- **Data Bits:** 8
- **Parity:** None
- **Stop Bits:** 1
- **Flow Control:** Xon/Xoff

14. If a series of characters displays across the screen, then data is being received from the ECM.

If no characters display on the screen, there may be a problem with the COM port. Double-check the physical COM port setting and the COM port setting in the **Connect To** dialog box. Then try the test again.

If the problem persists, try to configure your machine to use a different COM port and repeat the steps above. If the problem still persists, please contact your local IT support for assistance.

If you receive INSITE™ Communication Error: 5200 or Error: 5202

Note: This Error: 5200 occurs when communication between the computer and datalink adapter has been lost.

Note: Note: This Error: 5202 occurs when communication between the computer and datalink adapter could not be established.

1. Make sure the key switch is in the ON position and the datalink adapter 'POWER' lamp is lit.
2. Check the Connections page in the **Options** window to be certain that the datalink adapter you are connecting to is currently selected.
3. Check for other devices using the communication port selected, such as PDA hot sync, infrared, etc., and disable if detected. If necessary, contact PC administration support for assistance.
4. Verify that the INLINE™ II 'TO PC' or INLINE™ 4/5 RS-232 lamp is flashing when transferring information from the PC to the ECM.
5. Check all cable connections for water, bent or broken pins, continuity, and corrosion. Repair or replace any damaged connectors or cables.
6. Reconnect all cables and tighten all connector screws at both ends of the datalink adapter and at the PC.
7. Close INSITE™ and any other open programs, then properly shut down the PC and restart again. Attempt to communicate with the ECM again.
8. If there is another adapter and set of cables available, try to establish a connection using this equipment.
9. If the problem persists, close INSITE™ and contact the local Cummins distributor.

If you receive INSITE™ Communication Error: 5201 or Error: 5204

Note: This Error: 5201 occurs when communication between the datalink adapter and the ECM has been lost.

Note: Note: This Error: 5204 occurs when communication between the datalink adapter and ECM could not be established.

1. Make sure the key switch is in the ON position and the datalink adapter 'POWER' lamp is lit.
2. Check the Connections page in the **Options** window to be certain that the datalink adapter you are connecting to is currently selected.
3. Check all cable connections for water, bent or broken pins, continuity, and corrosion. Repair or replace any damaged connectors or cables.
4. Reconnect all cables and tighten all connector screws at both ends of the datalink adapter and at the PC.
5. Verify that the datalink is communicating with the selected protocol:

For J1587/J1708 connections:

Verify that the '1708' lamp on the INLINE™ II or 'J1708' lamp on the INLINE™ 4/ 5 adapter is flashing. If it is not flashing, check the voltage level from the engine; refer to the wiring diagram for details.

For J1939 connections:

Verify that the '1939' lamp on the INLINE™ II or 'J1939' lamp on the INLINE™ 4/ 5 adapter is flashing. If it is not flashing, check the resistance measurement from the engine; refer to the wiring diagram for details. There is no flashing light when using the 3-pin on-engine connector.

Note: Reconditioned ECMS, new ECMS or ECMS on which a calibration transfer has failed, may not create the conditions described above.

6. If there is another adapter and set of cables available, try to establish a connection using this equipment.
7. If the problem persists, close INSITE™ and contact the local Cummins distributor.

 **If you receive INSITE™ Communication Errors while working with your INLINE™ 4/5 adapter:**

Connection Issues:

1. Use a USB cable or your DB9F to DB9M serial cable to connect the INLINE™ 5 adapter to the correct PC USB or COM port.
2. Check the Connections page in the **Options** window to be certain that the datalink adapter you are connecting to is selected.
3. Open the INLINE™ 4-5 Get Version application in the INTELECT™ folder on the **Start** menu. This program enables the user to connect to the adapter and determine the firmware, bootloader, and driver versions.

Note: This application is supported only on the INLINE™ 4 and 5 datalink adapters.

4. If the INLINE™ 4-5 Get Version application does not properly connect to the ECM, perform the following steps:

1. Determine if the key switch is ON.
2. Determine if power is properly supplied to adapter.
3. Determine that all cables are connected properly.
4. Check the lights on the adapter. If no protocol (J1708 or J1939) light is flashing, see the Error 5201 troubleshooting steps on this page.
5. Contact your local Cummins distributor if the problem still persists.

If the INLINE™ 4-5 Get Version application connects to the datalink adapter, confirm that the PC and the adapter have the latest drivers and firmware. The Get Version utility reports three numbers: firmware version, bootloader version, and PC Driver version.

Driver installation packages are distributed using the PC Driver version number. Firmware is associated with a specific PC driver version and will be distributed with the installation package. Please check the INLINE™ Web site (inline.cummins.com) to determine whether you have the latest version of the software and firmware.

Note: The latest drivers and firmware can be found at the inline.cummins.com Web site.

Reflash Instructions:

5. An adapter will typically require a firmware reflash after installing a new PC Driver:
 1. Start the INLINE™ 4/5 Reflash Utility on your PC. The application can be found at **Start | All Programs | Intelect | Inline™ 4-5 Reflash Tool**.
 2. Browse and select the firmware file; the Reflash program should point to this file after installation. Firmware filenames contain the version number and typically end in '.s'. The path to the firmware storage folder is C:\ Program Files\Common Files\Cummins\Inline5.

3. Select the appropriate COM device (COM1, COM2, etc.). **NOTE:** At this time, reflash over USB is not supported. If you do not have a COM port on your PC, a Reflash Kit can be found at inline.cummins.com that will enable you to install the reflash utility and the latest firmware files on any PC.
4. Click **Reflash** to start the reflash operation. The RS-232 light on your INLINE™ 5 may be lit continuously during programming, depending on which port you are using. The status and progress bar in the program window will indicate the status of the reprogramming operation. The Reflash Utility will indicate when the firmware has been successfully downloaded to your INLINE™ 5 and if there was an error.

USB Installation Issues:

6. When using a USB cable, verify that the adapter is properly configured on the PC:
 1. Select **Run** on the **Start** menu. Type 'devmgmt.msc' (without quotes) and click **OK** to open the Device Manager.
 2. Expand the **Universal Serial Bus Controllers** section by selecting the '+' sign.
 3. Verify that a Cummins device is identified in this section. (If a Cummins device exists, you can skip the remaining steps in this section.)
 4. If an 'Unknown Device' or a Cummins device with a yellow exclamation is identified, select the device and follow these steps:
 1. Right-click on 'Unknown Device' and select **Uninstall**.
 2. Unplug the USB cable and then reconnect it to the PC.
 3. The operating system should detect a new device connected to your PC.
 4. The **Found New Hardware** wizard will prompt you to associate drivers with the new device. Select **Install this software automatically** and click the **Next** button.
 5. Select **Finish** to complete the process.

Service and Support

About

Contacting Service and Support

To receive support and service information for INSITE from a Cummins distributor:

1. Visit the Cummins Web site at www.cummins.com.
2. Select **Distributor Network**.
3. Find the Cummins distributor closest to you and contact them for assistance.

What To Do Before You Call

Before you place a support call, you may be able to troubleshoot the problem yourself by trying these steps:

1. Make sure you are not trying to run INSITE on a network drive. INSITE is designed to be installed on a single PC and not a network server.
2. Windows 98 and Millennium Edition: Run Scandisk from the **System Tools** folder.
3. Turn OFF your computer and then turn it ON again.
4. Restart INSITE and try the function again.

If the problem persists, gather the following information to discuss with your local Cummins distributor:

- The exact wording and error number of any error messages that are displayed.
- Which functions or operations were being used when the problem occurred.
- Select the About INSITE command on the Help menu, then click Versions and record the INSITE version number from the first row of the list.

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