INSITE™

QST30 G-DRIVE™

User's Manual

INTEGRATED ELECTRONICS SOFTWARE

INSITE™ QST30 G-Drive

User's Manual

CEL/Cadec

Cummins Engine Company, Inc.
Box 3005
Columbus, IN, USA, 47202-3005

Service and Support

To receive support and service information for INSITE™ QST30 G-Drive and other Cummins electronic tools, contact 812-377-8136.

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™ QST30 G-Drive on a network.
2. Run the ScanDisk command to perform routine maintenance and repair functions on your hard disk.
3. Turn OFF your computer and then turn it ON again.
4. Start INSITE™ QST30 G-Drive and try the function again.

If the problem persists, gather the following information to discuss with your Cummins support representative:

- The exact wording of any error messages that display.
- What you were doing when the problem occurred.

Remote Control Service

We can establish remote control sessions to assist you online with any problems you encounter. For information about setting up remote control service at your facility, call 812-377-8136.

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Revised: September 6, 1996

About This Manual

The *INSITE™ QST30 G-Drive User's Manual* is for mechanics who use the INSITE™ QST30 G-Drive software to troubleshoot and maintain Cummins QST30 G-Drive electronic engine modules. This manual assumes that you have a working knowledge of Windows® 95 and that you have a mouse or other Windows® compatible pointing device.

This manual uses the term "mouse" to refer to any Windows® compatible pointing device.

You should be able to use a mouse to:

- Open an icon into a window
- Make a window active
- Close, maximize, and minimize a window
- Select an entry by highlighting it or checking a box, or by turning a radio button on or off

For more information about working with Windows® 95, refer to the following source:

- *Easy Windows 95*, published by Que® Corporation and available at most major bookstores.

The *INSITE™ QST30 G-Drive User's Manual* has four sections:

- Section 1, Working with INSITE™, presents the basic concepts and procedures you need to know to use INSITE™ QST30 G-Drive.
- Section 2, Menus and Commands, describes each of the menus, commands, dialog boxes, and fields in INSITE™ QST30 G-Drive, in order by menu. This section serves as a quick reference for finding more information about a specific function.
- Section 3, Menu Maps, illustrates the path you take to get to each of the dialog boxes in INSITE™ QST30 G-Drive.
- Section 4, Reference Information, contains information about troubleshooting communications messages that display in INSITE™ QST30 G-Drive, and also contains a Glossary of terms.

When using INSITE™ QST30 G-Drive for the first time, be sure to read Section 1, Working with INSITE™. After learning how to use INSITE™, refer to Sections 2, 3, and 4, as needed, for further information about INSITE™ QST30 G-Drive.

Also, refer to the Help system within INSITE™ QST30 G-Drive. It contains most of the same information as this manual, in a format that you can quickly access on your computer.

For information about system administration functions, refer to the *INSITE™ System Administrator's Guide.*

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Working with INSITE™

What INSITE™ QST30 G-Drive Does

INSITE™ QST30 G-Drive is a Windows® 95 software application that works with Cummins electronic control modules (ECMs) to diagnose and troubleshoot engine problems, and modify an engine's operating settings. The INSITE™ QST30 G-Drive software works with all QST30 G-Drive ECM part numbers.

You use INSITE™ QST30 G-Drive on an IBM-compatible personal computer (PC), often a laptop computer, that is attached to an ECM with a serial interconnect cable. When a PC is attached to an engine, you can retrieve the latest information about that engine. You can also analyze ECM data to monitor and assess the operation of your engines.

Hooking Up to an Engine

To gather the latest information about an engine, attach your PC to a QST30 G-Drive ECM using a serial interconnect cable, Cummins Part No. 3825183. After the PC is attached to an ECM, use the INSITE™ QST30 G-Drive software to read data from the ECM or to change settings in the ECM.

When the PC Must Be Attached to an Engine

A PC must be attached to an ECM to:

- Set operating parameters for the engine.
- Read the most recent fault data for the engine.
- Clear fault data for the engine.
- Monitor and test a running engine.

When the PC Does Not Need to be Attached to an Engine

A PC does not need to be attached to an engine to:

- Use INSITE™ QST30 G-Drive in Simulator mode. See User Options on page 48 for more information.
- Use the Help system or read the online Fault Information System manual.
- Move or Install a security key.

To connect a standard PC to an ECM

1. Use serial interconnect cable, Part No. 3825183.
2. Connect the serial connector to the serial port on the back of your PC.
3. Connect the 9-pin Deutsch connector to the engine harness.

Note: *The 9-pin Deutsch connector on the engine harness is located near the flywheel housing.*

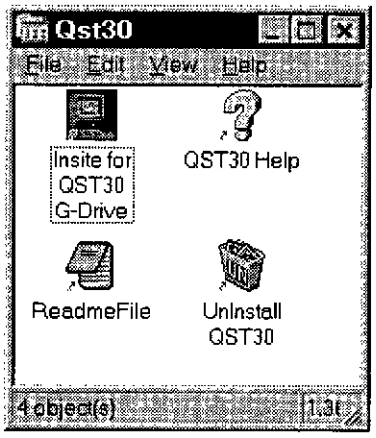
To connect an NGT computer to an ECM

Hookup procedures for NGT computers are the same as for standard computers. Use serial interconnect cable, Part No. 3825183, to connect the ECM to the NGT serial port.

INSITE™ QST30 G-Drive Basics

During installation, the QST30 program folder is created inside the Programs folder on the Start Menu.

If you have previously installed other INSITE™ products, your existing icons will be unchanged. You can access all existing INSITE™ products from your current icons.



The QST30 folder contains these icons:

- The Insite for QST30 G-Drive icon, which is used to access all of the features in INSITE™ QST30 G-Drive.
- The QST 30 Help icon, which is used to view the Help system without starting INSITE™ QST30 G-Drive.
- The QST 30 Read Me icon, which contains the latest information about INSITE™ QST30 G-Drive that may not be included in the manual.
- The UnInstall QST30 icon, which enables you to remove INSITE™ QST30 G-Drive from your system.

Opening the Insite for QST30 G-Drive Icon

Like other Windows applications, you start INSITE™ QST30 G-Drive by opening the Insite for QST30 G-Drive application icon.

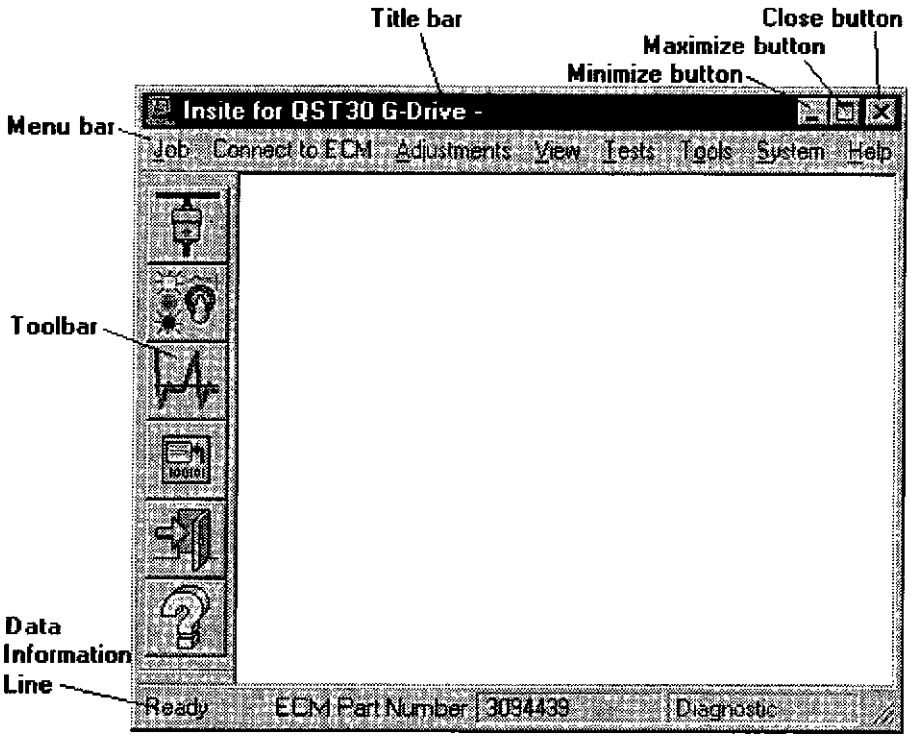
To open INSITE™ QST30 G-Drive:

1. Click the Windows® 95 Start button.
2. On the Programs menu, highlight QST30.
3. On the QST30 menu, click Insite for QST30 G-Drive.

Using the Main INSITE™ QST30 G-Drive Window

You perform all functions from the main INSITE™ QST30 G-Drive window. This window, shown on the next page, incorporates many of the standard operating techniques used in Windows® 95.

- The Title bar always displays the product name, INSITE for QST30 G-Drive.
- The Menu bar, below the Title bar, provides complete access to every function in INSITE™ QST30 G-Drive. Click a menu name to display menu commands. ***Note:*** *You can hold the mouse pointer over a command and press F1 on your keyboard to display Help for the command.*
- The Toolbar at the left of the main window contains buttons that you can click to quickly access the most frequently used commands. ***Note:*** *You can hold the mouse pointer over a button to display the name or function of the button.*
- The Data Information Line (DIL) near the bottom of the window displays reference information about the active function. It includes a description of the current function, the active ECM part number, and the current operation mode.



The Main INSITE™ QST30 G-Drive Window

- The Minimize and Maximize buttons at the top right corner are used to convert the window to a button on the Windows® 95 taskbar or to expand the window to the full size of your screen.
- The Close button at the top right corner is used to close a window. You can also use this button to exit INSITE™ QST30 G-Drive.

Getting Help

You can get information about every feature and function in INSITE™ QST30 G-Drive by using the Help system. You can get help in one of these ways:

- Click a command on the Help menu.
- Click the Help button on the Toolbar or in a dialog box.
- Press the F1 key on your keyboard. You can use this in any dialog box, and also whenever the mouse pointer is over a command on the Menu bar's pulldown menus.

The Help system contains most of the same information as the *INSITE™ QST30 G-Drive User's Manual* in a format that is easy to access on your computer.

Printing Help Topics

You can print any Help topic that appears in the Help system.

To print a Help topic:

- Click inside any Help window using the right mouse button, then select Print Topic, or
- Click the Print button on the button bar, if the button is present, or
- Click the Options button on the button bar, if the button is present, then select Print Topic.

Using Menus to Select Commands

INSITE™ QST30 G-Drive uses standard Windows® 95 procedures for selecting commands on a menu.

To select a command on a menu:

1. Click once on the menu name to display a pulldown menu with a list of commands. You can also hold down the ALT key while typing the underlined letter in the menu name. For example, type **ALT + A** to display the Adjustments menu.
2. Select a command on the menu by clicking it or by typing the underlined letter in the command name. The corresponding dialog box or submenu displays. For example, type **r** on the Job menu to display the Print Setup dialog box.

Using the Toolbar to Select Commands

You can use the Toolbar at the left of the main INSITE™ QST30 G-Drive window as an alternate way to view fault information, monitor and/or log a running engine, exit INSITE™ QST30 G-Drive, or view Help information.

To select a command on the Toolbar:

- Click *once* on a button.

  The corresponding dialog box displays, just as if you had selected the command on a menu.

Exiting INSITE™ QST30 G-Drive

You use standard Windows® 95 procedures to exit the program.

To exit INSITE™ QST30 G-Drive:

- Click the Close button at the top right corner of the main INSITE™ QST30 G-Drive window, or
- Click Exit on the Job menu, or
- Click the Exit button on the Toolbar.

Entering and Viewing Data

All data is viewed and entered in dialog boxes. You display dialog boxes by choosing commands on the menus or by clicking a button on the toolbar. This section describes the types of data used in INSITE™ QST30 G-Drive and the common techniques used for entering and viewing data in dialog boxes.

Becoming Familiar with Common Buttons

The following buttons display near the bottom or on the right side of dialog boxes:

- The **ECM Save button** saves all data in a dialog box to the ECM.

- The **Close button** closes dialog boxes that contain read-only data.

- The **Cancel button** closes a dialog box, usually without saving any changes made during the active session. In some dialog boxes, though, you must click Cancel to close the dialog box after clicking ECM Save.

- The **Help button** displays help information for the active dialog box or window.

- The **Keyboard button** enables you to use a mouse to click the keys of an on-screen keyboard. This is useful if you do not have access to a keyboard and want to use the mouse exclusively to enter data.

- The **Print button** enables you to print the contents of a dialog box.

Other buttons are also available, depending on the dialog box. The uses of other buttons is explained in their corresponding menu and command sections.

Using Common Data Entry Techniques

There are several data entry techniques that are commonly used in INSITE™ QST30 G-Drive:

- Type data by positioning the cursor inside the data entry box and typing keys on your keyboard.
- Type data by clicking inside the data entry box, and then clicking the Keyboard button. Then use the mouse to click the keys of the on-screen keyboard.

- Select a number in a **spin box** by clicking the up or down arrows until the number that you want displays. You can also type data directly into the data entry area of the spin box.

- Click a **Drop down list button** to display a list of entries, then highlight an entry in the list with the mouse 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 click as many check boxes as you want in a list of options.

- Click a **radio button** to turn it ON or OFF. A radio button is filled in with a dark circle when it is ON. Radio buttons are mutually exclusive in a list; you can select only one.

Responding to Messages

When working with INSITE™ QST30 G-Drive you may be prompted with a message that provides you with additional information about a function that you are performing or that alerts you to a possible problem. Most of the time you simply respond by clicking the OK button.

For example, when making a change to the ECM, a verification message such as this displays:

Do you want to modify the ECM?

You can click the OK button to go ahead and modify the ECM or click the Cancel button to return to the previous dialog box without modifying the ECM.

In the case of an error message, a short description of the error displays. For example:

ECM not responding.

In this case, you can click the OK button to return to the previous dialog box and try again.

When Data or Commands Are Disabled

As you work with INSITE™ QST30 G-Drive you will notice that data and commands are sometimes disabled (displayed in gray, or grayed-out). When data displays grayed-out it can only be viewed; it cannot be changed. When a command on a menu displays grayed-out, it cannot be accessed.

There is only one reason for this to happen in INSITE™ QST30 G-Drive:

- The proper type of data is not active to perform the function.

Note: *Sometimes when a field is grayed-out, you can hold the mouse pointer over the grayed out field and an explanation displays in the Data Information Line at the bottom of the main window.*

Menu Descriptions

This section briefly describes when you would use each menu in INSITE™ QST30 G-Drive. For more detailed information about each menu command, see the appropriate command heading in the Menus and Commands section of this manual.

Job Menu

Use commands on the Job menu to setup your printer for use with INSITE™ QST30 G-Drive, and to exit the program.

Connect to ECM

Use the Connect to ECM menu (or the Connect button on the toolbar) to open communications with an ECM.

Adjustments Menu

Use the Features and Parameters command on the Adjustments menu to set the operating parameters, or values, of various adjustable items related to engine operation. You must be attached to an ECM, or in Simulator mode, to view the latest operating parameters or to change operating parameters for an engine.

View Menu

Use the Fault Information command on the View menu to review fault information and snapshot data.

Tests Menu

Use commands on the Test menu to perform diagnostic tests on an engine. You must be attached to an ECM or in Simulator mode to perform any of these tests.

Tools Menu

Use commands on the Tools menu to control an engine with your PC, perform ECM meter calibrations, monitor a running engine, log data from an ECM to a file, and reset the ECM. You must be attached to an ECM or in Simulator mode to perform any of these functions.

System Menu

Use commands on the System menu to set user options for working with INSITE™ QST30 G-Drive, and to install, move, or view security information.

Help Menu

Use commands on the Help menu to find information about how to use INSITE™ QST30 G-Drive, learn how to use help, and display service and support information.

Setting Options

You can set several options for working with INSITE™ QST30 G-Drive including:

- COM port settings.
- Using Simulator mode.
- The units of measure used for temperature and pressure.

Setting the COM Port

Use the User Options command on the System menu to select the COM port on your PC to use to communicate with the ECM.

If you are not attached to an ECM and want to use INSITE™ QST30 G-Drive in Simulator mode, you can specify Sim R or Sim S in the Port Setup dialog box. If you do not specify a Simulator mode, most of INSITE™ QST30 G-Drive's features will be disabled, or grayed-out.

Specifying Units of Measure

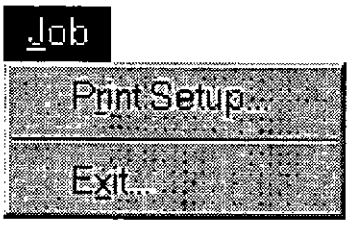
Use the Units of Measure command on the System menu to select a set of unit measurements for coolant temperature and oil

pressure. For example, select *US* to use all of the relevant unit measurements for the United States.

Menus and Commands

Job Menu

Use the **Job** menu to setup your printer and to exit INSITE™ QST30 G-Drive.



Job Menu

Each command on the Job menu is described in the following sections.

Print Setup

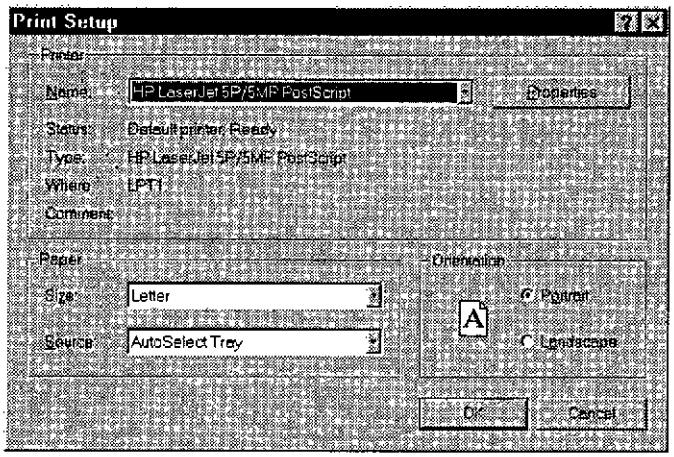
Use the **Print Setup** command on the Job menu to change the default printer used to print information from INSITE™ QST30 G-Drive. You can use the Print Setup command to select a default printer for INSITE™ QST30 G-Drive or a default printer to use with all of your Windows® 95 applications.

Printer

Name: Specifies the printer currently selected for use. To select another installed printer, use the drop down list box.

Status: Specifies whether the selected printer is the default printer, and whether it is ready to print.

Type: Specifies the printer driver in use for the selected printer.



Print Setup Dialog Box

Where: Specifies the port that the selected printer is connected to, if applicable.

Comment: Some printers enable comments to be inserted using their Properties dialog box(es). In most cases this field is blank.

Paper

Size: Select the size of paper you want to use for printing. All INSITE™ reports are designed to print on 8 1/2 x 11 inch sheets.

Source: Select the paper feeding location.

Orientation

Portrait: Select this option to print sheets using a standard vertical orientation. All INSITE™ QST30 G-Drive reports are designed to print in portrait orientation.

Landscape: This option would enable you to print sheets using a horizontal orientation. INSITE™ QST30 G-Drive does *not* support landscape orientation.

Buttons in Print Setup

Click the **Properties** button to specify additional options for your printer. The available options settings vary depending on the printer being used.

Exit

Use the **Exit** command on the Job menu to exit INSITE™ QST30 G-Drive.

Adjustments Menu

Use the **Adjustments** menu to view and/or adjust ECM settings of various engine operating parameters.

Adjustments Menu

Before You Begin Changing ECM Parameters

Be sure to follow these steps before changing ECM parameters:

- Make sure the ECM is attached to your PC. For more information, see Hooking Up to an Engine in the previous chapter.
- Make sure the engine is *not* running. INSITE™ QST30 G-Drive does not allow you to change ECM parameters while the engine is running.

Features and Parameters

Use the **Features and Parameters** command on the Adjustments menu to open the Field Parameter Editor. Use the editor to view or edit the values for all of INSITE™ QST30 G-Drive's adjustable parameters.

About the Adjustable Items

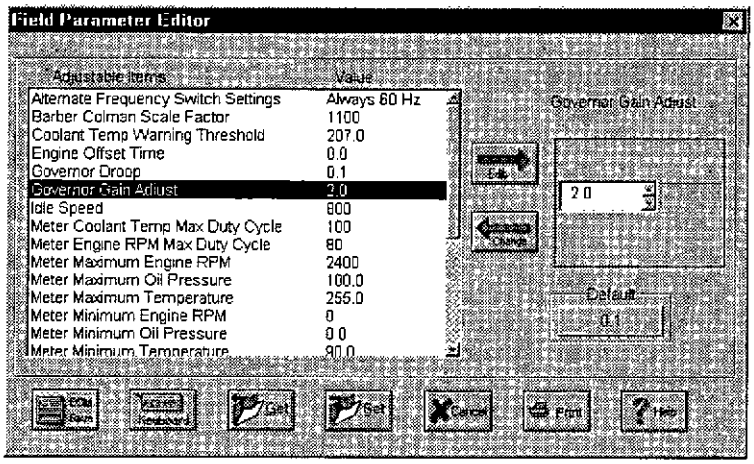
You use the Field Parameter Editor dialog box to adjust or change the values for all of INSITE™ QST30 G-Drive's adjustable parameters. The Adjustable Items list in the Editor window contains parameters that affect the performance and proper functioning of the engine.

***Note:** Complete definitions for all the Adjustable Items are in the Glossary on page 68. A table of **Ramp Times** is on page 15.*

When you first open the Field Parameter Editor, current ECM values display for the Adjustable Items.

To change a parameter setting:

1. Double click a parameter in the list of Adjustable Items, or highlight one with the mouse and then click the Edit button.



Field Parameter Editor Dialog Box

2. Edit the parameter value using either the data entry field/spin box or the Default button. See the next section for more information.
3. Click the Change button to change the parameter's value in the list of Adjustable Items.

Editing Parameter Values

When you select a parameter to edit, the parameter name displays on the right side of the window. The current value for the parameter displays in the spin box and the ECM default value displays on the Default button.

Adjust the value up or down using the spin box, or type a new value. You can also return to the default setting by clicking the Default button.

When you are finished adjusting the parameter value, click the Change button to change the parameter's value in the list of Adjustable Items. The new value(s) become permanent in the ECM after you click the ECM Save button at the button of the dialog.

Adjustment Ranges

Most of the Adjustable Items have a range of possible values; the parameters and their ranges are listed below. For definitions of the Adjustable Items, see the Glossary on page 68.

Barber Colman Scale Factor: 500 to 2000

Coolant Temp Warning Threshold: 0 to 255

Engine Offset Time: 0 to 9,999,999.9

Governor Droop: 0 to 10

Governor Gain Adjust: 0.1 to 10

Idle Speed: 700 to 900

Meter Coolant Temp Max Duty Cycle: 0 to 100

Meter Engine RPM Max Duty Cycle: 0 to 100

Meter Maximum Engine RPM: 0 to 2400

Meter Maximum Oil Pressure: 0 to 100

Meter Maximum Temperature: 0 to 255

Meter Minimum Engine RPM: 0 to 2400

Meter Minimum Oil Pressure: 0 to 100

Meter Minimum Temperature: 0 to 255

Meter Oil Press Max Duty Cycle: 0 to 100

Oil Press Warn Threshold at Idle: 0 to 100

Oil Press Warn Threshold at Rated: 0 to 100

Overspeed Shutdown RPM: 800 to 2070

Ramp Time (Crank to Rated): 0 to 30 (see table below)

Ramp Time (Idle to Rated): 0 to 30 (see table below)

	1500 rpm Total Ramp Time			1800 rpm Total Ramp Time		
Ramp #	from 700rpm Idle	from Crank or from 800rpm Idle	from 900rpm Idle	from 700rpm Idle	from Crank or from 800rpm Idle	from 900rpm Idle
0	2 sec	1 sec	1 sec	2 sec	2 sec	2 sec
1	3 sec	3 sec	2 sec	4 sec	4 sec	4 sec
2	5 sec	4 sec	4 sec	7 sec	6 sec	5 sec
3	6 sec	6 sec	5 sec	9 sec	8 sec	7 sec
4	8 sec	7 sec	6 sec	11 sec	10 sec	9 sec
5	10 sec	8 sec	7 sec	13 sec	12 sec	11 sec
6	11 sec	10 sec	8 sec	15 sec	14 sec	13 sec
7	13 sec	11 sec	10 sec	18 sec	16 sec	14 sec
8	14 sec	13 sec	11 sec	20 sec	18 sec	16 sec
9	16 sec	14 sec	12 sec	22 sec	20 sec	18 sec
10	18 sec	15 sec	13 sec	24 sec	22 sec	20 sec
11	19 sec	17 sec	14 sec	26 sec	24 sec	22 sec
12	21 sec	18 sec	16 sec	29 sec	26 sec	23 sec
13	22 sec	20 sec	17 sec	31 sec	28 sec	25 sec
14	24 sec	21 sec	18 sec	33 sec	30 sec	27 sec
15	26 sec	22 sec	19 sec	35 sec	32 sec	29 sec
16	27 sec	24 sec	20 sec	37 sec	34 sec	31 sec
17	29 sec	25 sec	22 sec	40 sec	36 sec	32 sec
18	30 sec	27 sec	23 sec	42 sec	38 sec	34 sec
19	32 sec	28 sec	24 sec	44 sec	40 sec	36 sec
20	34 sec	29 sec	25 sec	46 sec	42 sec	38 sec
21	35 sec	31 sec	26 sec	48 sec	44 sec	40 sec
22	37 sec	32 sec	28 sec	51 sec	46 sec	41 sec
23	38 sec	34 sec	29 sec	53 sec	48 sec	43 sec
24	40 sec	35 sec	30 sec	55 sec	50 sec	45 sec
25	42 sec	36 sec	31 sec	57 sec	52 sec	47 sec
26	43 sec	38 sec	32 sec	59 sec	54 sec	49 sec
27	45 sec	39 sec	34 sec	62 sec	56 sec	50 sec
28	46 sec	41 sec	35 sec	64 sec	58 sec	52 sec
29	48 sec	42 sec	36 sec	66 sec	60 sec	54 sec
30	49 sec	43 sec	37 sec	68 sec	62 sec	56 sec

Table of Ramp Times

Torque Curve Adjustment: 0.0 to 1.0

Woodward Scale Factor: 20 to 60

To save parameter values to a file for use in a later session:

1. Make all necessary changes to parameters in the Adjustable Items list.
2. Click the Set button.
3. Name this set of parameter values using the file format *anyname.fpe*. It is best to use as descriptive a filename as possible, so that the file can be easily identified later.

To use a set of user-defined parameter values from a previous session:

1. Click the Get button.
2. Select the desired **.fpe* file from the list of available files. The parameters in the Adjustable Items list will acquire the values defined in the file.
3. If you want to save the new parameter values in the ECM, click the ECM Save button.

Buttons in the Field Parameter Editor

Use the **Edit** button to "open" a parameter in the right side of the window; there you can edit its value in the spin box.

Use the **Change** button to transfer an edited parameter value from the spin box back to the list of Adjustable Items. If you do not click this button the parameter value in the list remains the same, unaffected by any changes you make in the spin box.

The **Default** button displays the default ECM value of the parameter opened in the spin box for editing. Also, you can click the Default button to automatically insert the default value in the edit field. This is useful if you start editing a parameter value but decide to return it to its default.

Use the **ECM Save** button to save all parameter values of the Adjustable Items in the ECM. Any edited values do not change in the ECM until you click this button.

Use the **Get** button to retrieve a file containing a list of specific pre-defined parameter values. After clicking Get, the parameter values in the file display in the Adjustable Items list.

Use the **Set** button to save a list of specific parameter values for the Adjustable Items to a file. The file is stored in the \Log directory and uses the file extension *.fpe*. You can use any descriptive name to describe the file such as *anyname.fpe*.

Use the **Print** button to print the Adjustable Items list and the associated parameter values.

Use the **Cancel** button to close the dialog box, *whether or not* you saved changes to the ECM.

View Menu

Use the **View** menu to display fault and snapshot information.

View Menu

Fault Information

Use the **Fault Information** command on the View menu to display information about an engine's fault data as well as to clear fault data. Each fault is represented by a fault code that indicates a particular malfunction or abnormal condition within the ECM, subsystem, or engine.

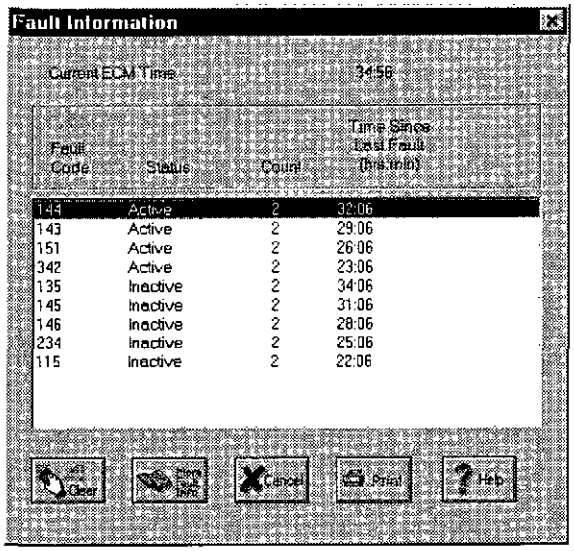
Faults can be active or inactive. Active faults indicate that the fault condition is present now. Inactive faults indicate a condition that occurred since the last time fault data was cleared, however inactive faults are not presently active.

There are several dialog boxes associated with the Fault Information command. Each of these dialog boxes is described in the following sections:

- The **Fault Information** dialog box displays a summary list of fault data for an engine.
- The **Fault Information - Additional Information** dialog box allows you to select diagnostic information or more detailed fault data for display.
- The **Fault Overview** window provides access to the Fault Information System and describes each fault in detail.
- The **Troubleshooting Steps** window provides access to the Fault Information System and describes specific actions you can take to correct a fault.
- The **Snapshot** dialog box displays key engine sensor data and switch settings that were recorded at the first and last occurrences of each fault.

Fault Information Dialog Box

The **Fault Information** dialog box displays immediately after choosing the Fault Information command. It shows a multi-column entry for each fault generated by the engine.



Fault Information Dialog Box

Current ECM Time: The cumulative ECM running time to date.

Fault Code: A numeric Cummins code that identifies the fault. Refer to the Fault Information System for a detailed explanation of each specific fault code.

Status: Indicates whether the fault is currently active or inactive.

Count: Indicates the number of times the fault has occurred since the last time fault data was cleared.

Time Since Last Fault: Indicates how much ECM time has elapsed, in hours and minutes, since the fault was last recorded. For example, a value of 20:10 indicates that 20 hours and 10 minutes has elapsed, in ECM time, since the last fault of this type occurred.

Buttons in the Fault Information Dialog Box

Click the **Clear** button to erase all faults in the ECM. This button is disabled when the engine is running.

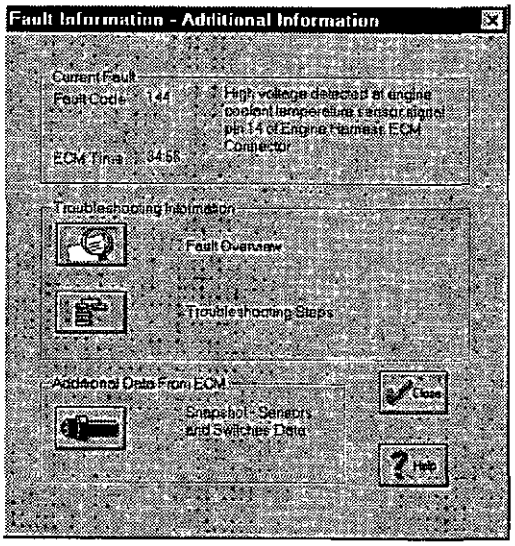
Select a fault in the Fault Information dialog box and click the **More Fault Info** button to see more detailed diagnostic and supporting information about a fault. See the following section for more information.

Click the **Print** button to print a report of all fault information.

Fault Information - Additional Information Dialog Box

To display the Fault Information - Additional Information dialog box:

1. In the Fault Information dialog box, select a fault that you want more information about.
2. Click the More Fault Info button.



Fault Information - Additional Information Dialog Box

The top section of the Fault Information - Additional Information dialog box displays summary information about the fault, including the fault code and the ECM time of the fault.

The bottom of the dialog box contains two categories of buttons: Troubleshooting Information and Additional Data from ECM.

The Troubleshooting Information buttons (**Fault Overview** and **Troubleshooting Steps**) provide access to the online Fault Information System manual that contains detailed fault descriptions and troubleshooting techniques.

The Additional Data From ECM button(**Snapshot - Sensors and Switches Data**) provides access to sensor and switch data associated with the fault. These buttons and their associated dialog boxes are described in the following sections.

Fault Overview Window

The **Fault Overview** window contains an online reference manual within INSITE™ QST30 G-Drive and is part of the Fault Information System. Use the Fault Overview window to find concise, yet detailed, information about any fault code in the system.

Working Inside the Fault Information System

The Fault Information System is designed as a standard Windows® Help system. While inside this system, you can use conventional Windows® 95 Help techniques to display and find information. For example:

- Click text marked by a dotted underline to display a pop-up window related to the text.
- Click text marked by a solid underline to go to another window related to that topic.
- Click once in a pop-up window to remove it from the screen.
- Use the buttons on the Button bar to perform common Windows® 95 Help functions (Search, Back, etc.).
- Use the Print Topic command on the File menu to print information related to the current screen.

Working with Fault Overview Information

Fault overview information includes summary information about the selected fault including the fault code, reason for the fault, and possible effects of the fault. It also contains the SRT code for estimating your repair time.

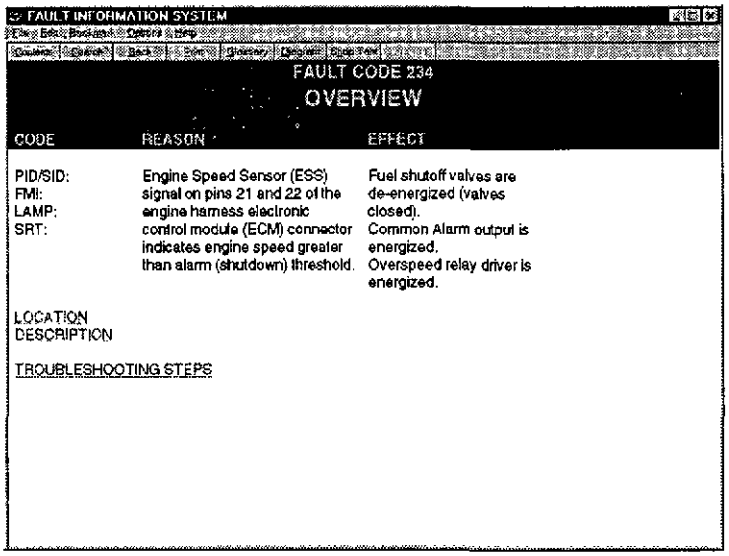
From the Fault Overview window, you can display additional information about the fault and its symptoms:

- Click the **Diagram** button to display a specific circuit wiring diagram for the component that is related to this fault.
- Click the **Shop Talk** button to display added background information about the fault and helpful troubleshooting tips.
- Click the Location text (marked by a dotted underline) for a pop-up diagram that shows the physical location of the part that is related to this fault.
- Click the Description text (marked by a dotted underline) for a pop-up description of the part related to this fault and the purpose of the part.
- Click the Troubleshooting Steps text (marked by a solid underline) for a list of steps to correct this fault.

To display the Fault Overview window:

1. Click the **Fault Overview** button in the More Fault Information dialog box.

A concise overview of the selected fault displays.



Fault Overview Window

2. Use the Contents, Search, Back, and Glossary buttons to find more information about each fault and to navigate through the online database. In addition, you can use the Diagram and Shop Talk buttons previously described.

   Also, click the Location, Description, or Troubleshooting Steps text for more information about the fault.

3. Use the Annotate command on the Edit menu to enter comments related to a fault. This allows you to personalize the fault information for your site.

   After entering a comment, a paper clip icon displays on the screen where you entered the information. Click the paper clip icon to display the note.

4. Close the Fault Overview window to return to the Fault Information - Additional Information dialog box.

Troubleshooting Steps Window

The **Troubleshooting Steps** window contains an online reference manual within INSITE™ QST30 G-Drive and is part of the Fault Information System. Use this window to find concise as well as detailed information about how to correct a fault.

Working Inside the Fault Information System

The Fault Information System is designed as a standard Windows® Help system. Use conventional Windows® 95 Help techniques to display and find information. For example:

- Click text marked by a dotted underline to display a pop-up window related to the text.
- Click text marked by a solid underline to go to another window related to that topic.
- Click once in a pop-up window to remove it from the screen.
- Use the buttons on the Button bar to perform common Windows® 95 Help functions (Search, Back, etc.).
- Use the Print Topic command on the File menu to print information related to the current screen.

Working with Troubleshooting Information

There are three levels of diagnostic help available:

1. **Troubleshooting Steps** are designed for the experienced mechanic who needs a quick outline of the steps to take to correct the fault. This is the first screen that displays when you open the Troubleshooting Steps window.
2. **Summary Steps** are designed for the mechanic who wants a more detailed overview of the major troubleshooting steps, as needed, to correct the fault. A summary topic includes the step description, a diagram, and specifications related to that step. It also provides some guidelines for taking actions to correct the fault.
3. **Guided Steps** are designed for mechanics who want the most detailed information about each step in the troubleshooting process. Guided steps provide a step-by-step path through the troubleshooting process. Click an **OK** icon to proceed to the next step or click the **Not OK** icon to receive summary information on how to correct the problem before proceeding.

Each of these uses is illustrated later in this section.

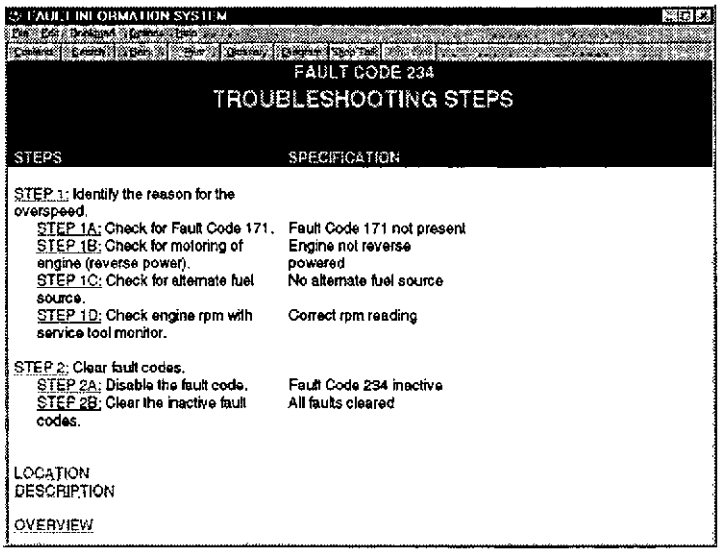
The Troubleshooting Steps window contains the following buttons that provide quick access to other related information about the fault and its symptoms: .

- Click the **Diagram** button to display a circuit wiring diagram for the component that is related to this fault.
- Click the **Shop Talk** button to display added background information about the fault and helpful troubleshooting tips.
- Click the **Conditions** button to display a list of pre-testing conditions or setup requirements that you *must* follow to get the best possible outcome from the troubleshooting steps.
- Click the Location text (which is marked by a dotted underline) for a pop-up diagram that shows the physical location of the part that is related to this fault.

- Click the Description text (which is marked by a dotted underline) for a pop-up description of the part related to this fault and the purpose of the part.
- Click the Overview text (marked by a solid underline) for descriptive information about this fault.

To display troubleshooting steps:

1. Click the **Troubleshooting Steps** button in the More Fault Information dialog box.



Troubleshooting Steps Window

A summary list of troubleshooting steps displays in outline format. For example, Step 1, Step 1A, Step 1B, Step 2, Step 2A, Step 2B, and so on.

WARNING! *Troubleshooting may present hazards that can result in severe personal injury or death. Before performing any troubleshooting steps, see important safety instructions in the Service Manual.*

Any cautionary notes or warnings associated with the steps display in a pop-up box. Click anywhere outside these boxes to remove them from the screen and resume viewing the window. To display them at any time, click the Caution or Warning icon.

2. Use the Contents, Search, Back, and Glossary buttons to find more information about a fault and to navigate through the online database. In addition, you can use the Diagram, Shop Talk, and Conditions buttons previously described.

   Also, click the Location, Description, or Overview text for more information about the fault.

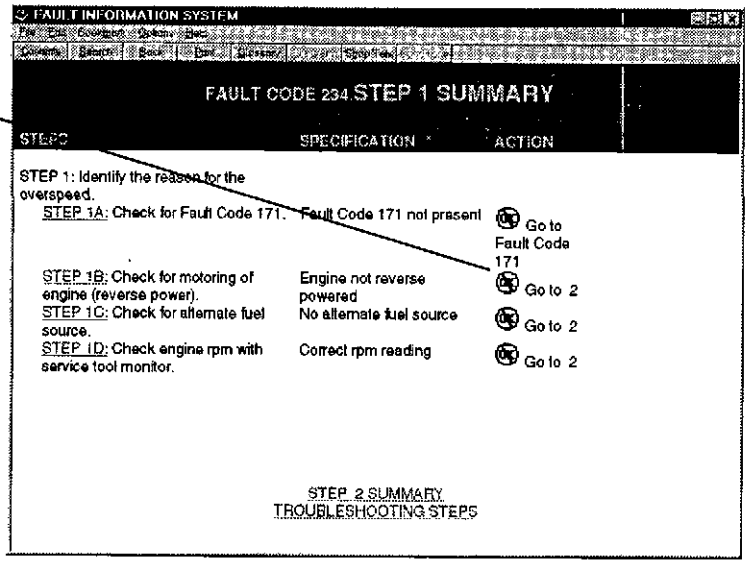
3. Close the Troubleshooting Steps window to return to the Additional Information dialog box.

To display summary steps:

1. From the Troubleshooting Steps window, click a major underlined step. For example, click Step 1 (*not* Step 1A).

   The Summary window displays. It contains diagrams and specifications related to this step.

Not OK icon



Summary Window

The troubleshooting procedures are organized so that a satisfactory result from each step will lead to the next step in the procedure. For example, if Step 1A is OK, you can immediately proceed to Step 1B. Simply click the underlined Step number to go directly to it.

If, after performing a step, the results are *not* satisfactory, click the **Not OK** icon in the Actions column. A pop-up window will provide summary information on what to do to correct the problem.

2. After reviewing the information, you can click:

   Summary Text to display the next summary step for this fault.

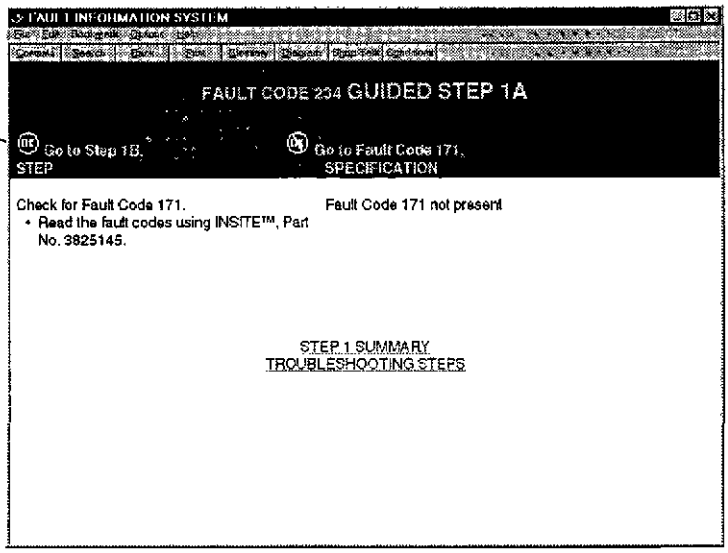
   Troubleshooting Steps to display the high-level summary of troubleshooting steps.

To display guided steps:

1. From the Troubleshooting Steps window or Summary window, click one of the detailed troubleshooting steps. For example, click Step 1A (*not* Step 1).

   The Guided Step window displays. It contains diagnostic information specific to this step.

You can click any graphic icon, like the OK icon, for additional information.



Guided Step Window

Any general conditions that *must* be met prior to performing the steps display in a pop-up box. Click anywhere onscreen to remove them from the screen and to scroll through the window. Display them again by clicking the Conditions button on the Button bar.

2. If you received satisfactory results from a step, click the **OK** icon to display the next guided step for troubleshooting this fault.

   If, after performing a step, the results are *not* satisfactory, click the **Not OK** icon. A pop-up window provides summary information about what to do to correct the problem. Once the problem is repaired, click the Repair Complete text in the pop-up window to go to the next guided step.

3. At any time you can also click:

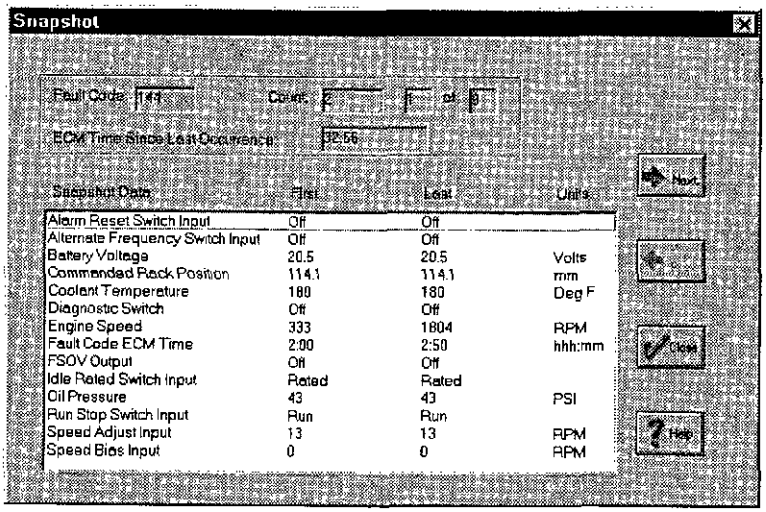
   Summary Text to display the next summary step for this fault.

   Troubleshooting Steps to display the high-level outline of troubleshooting steps.

Snapshot Dialog Box

The Snapshot Dialog Box displays key engine sensor and switch data for each fault selected in the Fault Information dialog box.

Sensors and switches are listed in the Snapshot Data column. The corresponding values display for the first and last occurrences of the selected fault.



Snapshot Dialog Box

Fault Code: A numeric Cummins code that identifies the fault. Refer to the Fault Information System for a detailed explanation of a specific fault code.

Count: The first box indicates the total number of occurrences of this fault since the last time fault data was cleared.

The second and third boxes show the total number of different faults for this engine and the relative position of this fault in that group. For example, 7 of 10 indicates that there are 10 different faults recorded for this engine and this is the seventh of those ten faults.

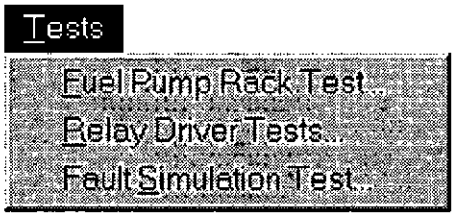
ECM Time Since Last Occurrence: Indicates how much ECM time has elapsed, in hours and minutes, since the fault was last recorded. For example, a value of 20:10 indicates that 20 hours and 10 minutes has elapsed, in ECM time, since the last fault of this type occurred.

Buttons in the Snapshot Dialog Box

Click the **Next** or **Prev** buttons to view sensor and switch data for the next or previous fault listed in the Fault Information dialog box.

Tests Menu

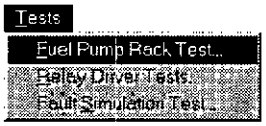
Use the **Tests** menu to perform diagnostic tests on an engine.



Tests Menu

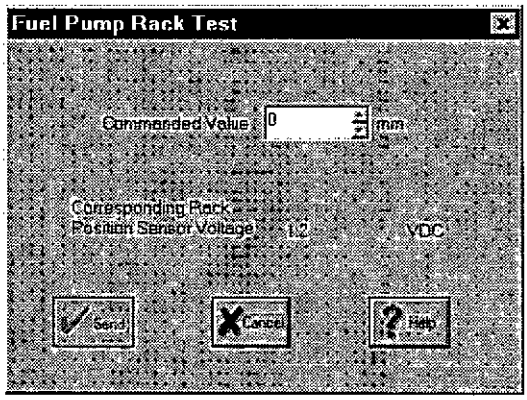
Each command on the Tests menu is described in the following sections.

Fuel Pump Rack Test



Use the **Fuel Pump Rack Test** command on the Tests menu to help troubleshoot the fuel pump rack, the rack actuator circuit, or the rack position sensor circuit. This test can only be performed when the engine is *not* running.

The test allows you to position the fuel pump rack between 0 and 20 mm of rack travel. For any position you command, the test displays the voltage you should read on the rack position signal wires at the engine harness diagnostic connector.



Fuel Pump Rack Test Dialog Box

Commanded Value: The desired rack position to use for diagnostic testing.

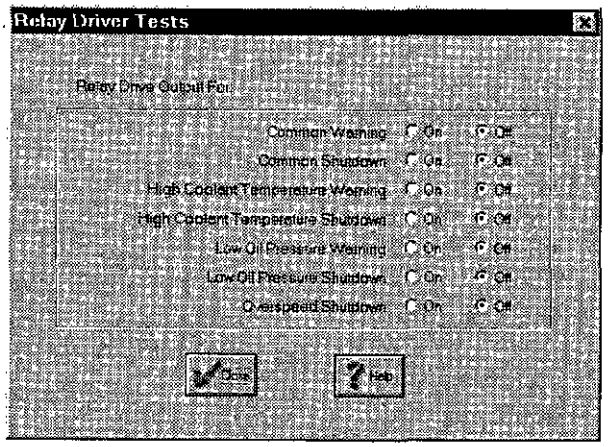
Corresponding Rack Position Sensor Voltage: The correct voltage for the rack position selected in the Commanded Value field. This value should correspond to the actual voltage measured at the harness.

To change the rack position:

- Use the up or down arrows to change the position setting. The new value is automatically sent to the ECM, or
- Type a new value in the data entry field. You must also click the Send button to send the new value to the ECM.

Relay Driver Tests

Use the **Relay Driver Tests** command on the Tests menu to toggle the available relay drivers on or off for diagnostic testing. The test can be used to help troubleshoot the ECM relay driver output, the relay being driven, the relay wiring, and the device (lamps, alarms, etc.) being activated.



Relay Driver Tests Dialog Box

When you open the Relay Driver Tests dialog box, current ECM settings display for the listed parameters. When you close the dialog box, the settings automatically return to their original positions.

Common Warning: The output relay for the common warning sensor.

Common Shutdown: The output relay for the common shutdown sensor.

High Coolant Temperature Warning: The output relay for the high coolant temperature warning sensor.

High Coolant Temperature Shutdown: The output relay for the high coolant temperature shutdown sensor.

Low Oil Pressure Warning: The output relay for the low oil pressure warning sensor.

Low Oil Pressure Shutdown: The output relay for the low oil pressure shutdown sensor.

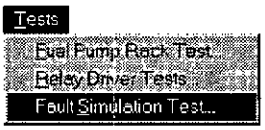
Overspeed Shutdown: The output relay for the overspeed shutdown sensor.

To select a parameter for testing:

- Click the On radio button to energize an output for a parameter.

  Click the Off radio button to de-energize an output for a parameter.

Fault Simulation Test



Use the **Fault Simulation Test** command on the Tests menu to simulate conditions in the engine that would cause faults. This is useful for testing the proper functioning of the fault information system including fault sensors and fault diagnostics.

Click the tabs in the dialog box to view fault simulation options for:

- Low Oil Pressure
- High Coolant Temperature
- Overspeed

After completing simulation, use the Fault Information command on the View menu to check the results of fault simulation including fault codes and associated snapshot data. See page 17 for more information.

CAUTION! *Fault simulation temporarily overrides the engine's actual fault sensors. Be sure to exit the Fault Simulation tabs normally, using either the Cancel button or the Windows 95 close window button. Otherwise the fault sensors remain disabled, leaving the engine defenseless if an actual fault occurs.*

If your PC shuts down for any reason during simulation, you must power off the engine and restart it for the fault sensors to be reactivated.

Working with Tab Dialogs

When the Fault Simulation dialog box first displays, the Low Oil Press tab dialog displays in the forefront.

To display a different tab:

- Click the tab you want to display.

  The selected tab is highlighted and moved to the forefront.

Each tab is described in the following sections.

Low Oil Pressure

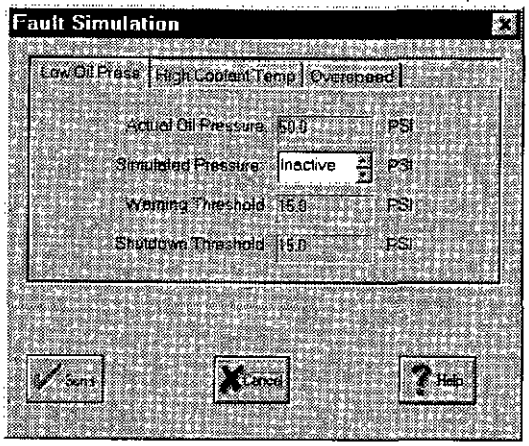
Low Oil Press

Use the **Low Oil Pressure** tab dialog box to simulate an oil pressure condition that would cause a fault. You can override the actual sensor input value by adjusting the simulated value. The control system then responds to the simulated value as if it were the actual input.

After completing simulation, use the Fault Information command on the View menu to check the results of fault simulation including fault codes and associated snapshot data. See page 17 for more information.

CAUTION! *Fault simulation temporarily overrides the engine's actual fault sensors. Be sure to exit the Fault Simulation tabs normally, using either the Cancel button or the Windows 95 close window button. Otherwise the fault sensors remain disabled, leaving the engine defenseless if an actual fault occurs.*

If your PC shuts down for any reason during simulation, you must power off the engine and restart it for the fault sensors to be reactivated.



Low Oil Pressure Tab Dialog

Actual Oil Pressure: The current engine oil pressure, read from the ECM.

Simulated Pressure: This spin box enables you to temporarily change the engine oil pressure in order to simulate an oil pressure fault.

Warning Threshold: The current warning threshold value in the ECM. You can change this value using the Field Parameter Editor; see page 13 for more information.

Shutdown Threshold: The shutdown threshold value in the ECM.

To simulate an oil pressure condition that causes a fault:

Note: *The Simulated Pressure spin box is Inactive when you first see the tab. Clicking an up or down arrow activates the spin box, displaying the current oil pressure read from the ECM.*

- Click an up or down arrow again to simulate changing the current pressure in 1 unit increments. This value is automatically sent to the ECM, or

- Type a simulated pressure value in the data entry field. You must also click the Send button to send the value to the ECM.

The simulated oil pressure condition remains in effect for 20 seconds, then control returns to the actual engine sensors.

High Coolant Temp

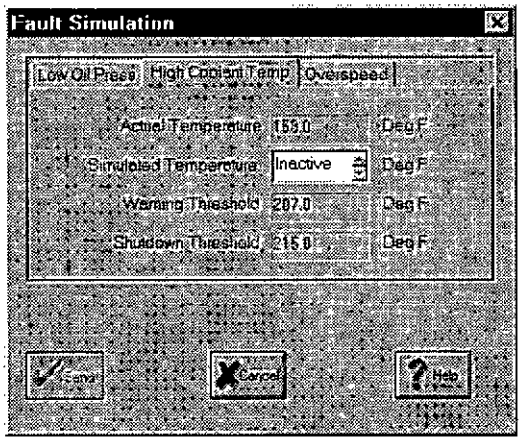
High Coolant Temp

Use the **High Coolant Temp** tab dialog box to simulate a coolant temperature condition that would cause a fault. You can override the actual sensor input value by adjusting the simulated value. The control system then responds to the simulated value as if it were the actual input.

After completing simulation, use the Fault Information command on the View menu to check the results of fault simulation including fault codes and associated snapshot data. See page 17 for more information.

CAUTION! *Fault simulation temporarily overrides the engine's actual fault sensors. Be sure to exit the Fault Simulation tabs normally, using either the Cancel button or the Windows 95 close window button. Otherwise the fault sensors remain disabled, leaving the engine defenseless if an actual fault occurs.*

If your PC shuts down for any reason during simulation, you must power off the engine and restart it for the fault sensors to be reactivated.



High Coolant Temp Tab Dialog

Actual Temperature: The current engine temperature, read from the ECM.

Simulated Temperature: This spin box enables you to temporarily change the engine coolant temperature in order to simulate a coolant temperature fault.

Warning Threshold: The current warning threshold value in the ECM. You can change this value using the Field Parameter Editor. See page 13 for more information.

Shutdown Threshold: The shutdown threshold value in the ECM.

To simulate a coolant temperature condition that causes a fault:

Note: *The Simulated Temperature spin box is Inactive when you first click the Coolant Temp tab. Clicking an up or down arrow activates the spin box, displaying the current coolant temperature read from the ECM.*

- Click an up or down arrow again to simulate changing the current temperature in 1 unit increments. This value is automatically sent to the ECM, or
- Type a simulated temperature value in the data entry field. You must also click the Send button to send the value to the ECM.

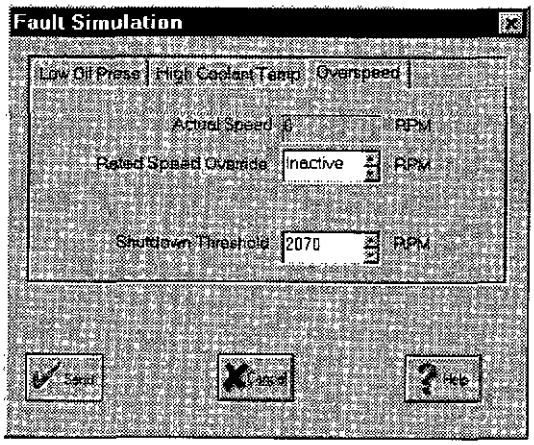
The simulated coolant temperature condition remains in effect for 20 seconds, then control returns to the actual engine sensors.

Overspeed

Overspeed

Use the **Overspeed** tab dialog box to simulate an overspeed condition that would cause a fault. You can adjust the shutdown threshold to the desired test point, and then change the engine speed to that point by adjusting Rated Speed Override.

After completing simulation, use the Fault Information command on the View menu to check the results of fault simulation including fault codes and associated snapshot data. See page 17 for more information.



Overspeed Tab Dialog

Actual Speed: The current engine speed, read from the ECM.

Rated Speed Override: Use this spin box to increase the engine's operating speed in order to simulate an overspeed fault.

Shutdown Threshold: The shutdown threshold value in the ECM. You can change this value, in order to simulate a fault, using the spin box.

To simulate a speed override condition that causes a fault:

Note: *The Rated Speed Override spin box is Inactive when you first click the Overspeed tab. Clicking an up or down arrow activates the spin box, displaying the current override speed read from the ECM.*

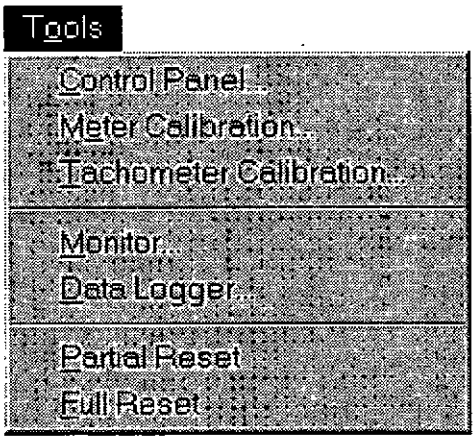
- Click an up or down arrow again to simulate changing the speed in 10 RPM increments. This value is automatically sent to the ECM, or
- Type a simulated speed value in the data entry field. You must also click the Send button to send the value to the ECM.

The shutdown threshold value can be altered, just for this test, in its spin box.

Tools Menu

Use the **Tools menu** to control an engine using INSITE™ QST30 G-Drive, and to calibrate the ECM meters. You can also monitor a running engine and save current diagnostic information to a file. Both functions are useful for troubleshooting and general engine diagnostics.

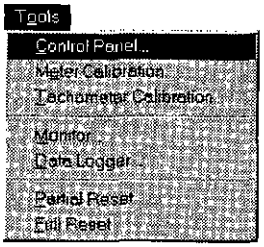
Use the Reset commands on this menu to return the ECM to original factory settings.



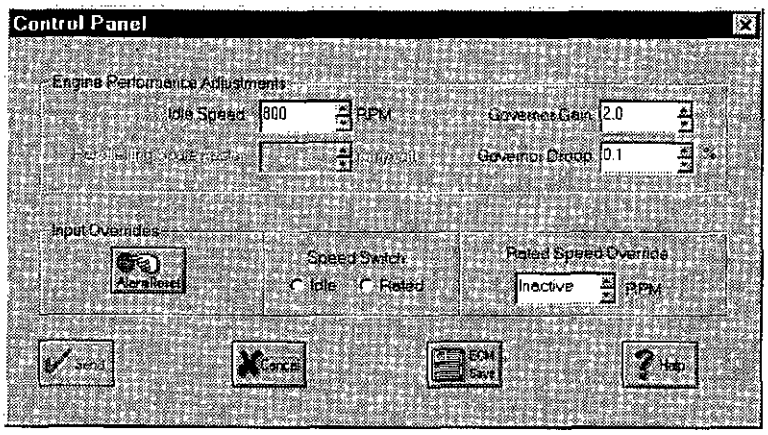
Tools Menu

Each command on the Tools menu is described in the following sections.

Control Panel



Use the **Control Panel** command on the Tools menu to control a running engine directly from INSITE™ QST30 G-Drive. This is useful for diagnostics when the actual engine controls are not located on or near the engine.



Control Panel Dialog Box

Engine Performance Adjustments

The Engine Performance Adjustments section of Control Panel displays current engine settings read from the ECM. You can control the engine directly from here by changing the values displayed.

Use the spin boxes or type in the data entry fields to adjust the engine settings up or down.**Idle Speed:** Use the Idle Speed spin box to adjust the engine's idle speed up or down.

Paralleling Scale Factor: Use the Paralleling Scale Factor spin box to adjust the engine's paralleling scale factor up or down.

Governor Gain: Use the Governor Gain spin box to adjust the engine's governor gain up or down.

Governor Droop: Use the Governor Droop spin box to adjust the engine's governor droop up or down.

Input Overrides

The Input Overrides section of Control Panel enables you to control switched inputs to the ECM directly from INSITE™ QST30 G-Drive.

Alarm Reset: Click the Alarm Reset button to reset the engine's fault indicators. This button functions the same as the actual Alarm Reset switch.

Speed Switch: Use the Speed Switch radio buttons to set the engine's operating speed to either Idle or Rated. These radio buttons function the same as the actual Idle and Rated speed switches.

Rated Speed Override: Use the Rated Speed Override spin box to increase or decrease the engine's operating speed.

To change adjustable parameters:

- Use the up or down arrows to change the parameter value. The new value is automatically sent to the ECM, or
- Type a new value in the data entry field. You must also click the Send button to send the new value to the ECM.

In both cases, the new value is not saved permanently in the ECM until you click the ECM Save button.

Note: *The Rated Speed Override spin box is Inactive when you open Control Panel. Clicking an up or down arrow activates the override feature, displaying the current rated speed. Click an up or down arrow again to change the rated speed.*

To activate the Speed Switch:

- Click either the Idle or Rated radio buttons to set engine speed. These buttons are blank (inactive) when you open Control Panel, and are not activated until you click one of them.

To de-activate the Speed Switch:

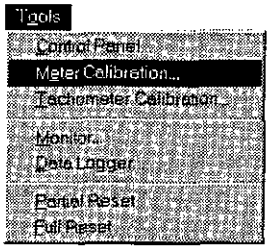
- Click once on an active button. This removes the mark, and both buttons are blank (inactive) again.

Buttons in Control Panel

Click the **Send** button to activate new parameter value(s) in the ECM for diagnostic purposes. Click the **ECM Save** button to permanently change the values in the ECM.

Use the **Cancel** button to close the dialog box.

Meter Calibration



Use the **Meter Calibration** command on the Tools menu to set your meter displays and also to verify correct meter functioning.

Click the tabs in the Customer Meter Calibration dialog box to view meter calibration options for:

- Coolant Temp
- Oil Pressure

Working with Tab Dialogs

When the Customer Meter Calibration dialog box first displays, the Coolant Temp tab dialog displays in the forefront.

To display a different tab:

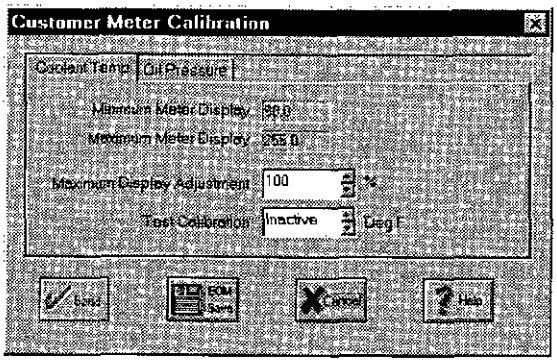
- Click the tab you want to display.

  The selected tab is highlighted and moved to the forefront.

Each tab is described in the following sections.

Coolant Temp

Use the **Coolant Temp** tab dialog to set your coolant temperature meter display, and also to verify correct meter functioning.



Coolant Temp Tab Dialog

Minimum Meter Display: Displays the current ECM value for minimum meter display. This value can be changed using the Field Parameter Editor. See page 13 for more information.

Maximum Meter Display: Displays the current ECM value for maximum meter display. This value can be changed using the Field Parameter Editor.

Maximum Display Adjustment: Edit this percentage setting up or down until the engine RPM meter needle tops out at exactly the maximum value on the meter.

Test Calibration: Use this spin box to test meter functioning by sending unit increments or decrements to the ECM.

The spin box is Inactive when you open the Customer Meter Calibration dialog box. Clicking an up or down arrow activates the feature, displaying the current value. Click an up or down arrow again to change the current value.

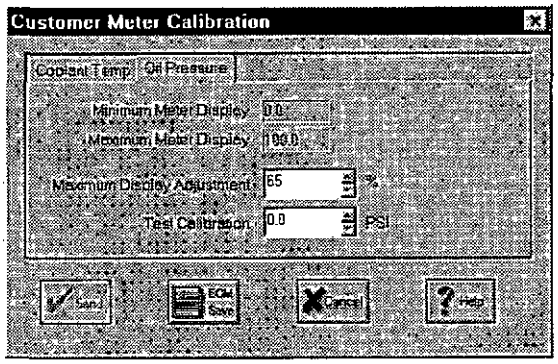
To change parameter settings:

- Type values into the data entry boxes or use the spin boxes to select values.

Oil Pressure

Oil Pressure

Use the **Oil Pressure** tab dialog to set your oil pressure meter display and also to verify correct meter functioning.



Oil Pressure Tab Dialog

Minimum Meter Display: Displays the current ECM value for minimum meter display. This value can be changed using the Field Parameter Editor. See page 13 for more information.

Maximum Meter Display: Displays the current ECM value for maximum meter display. This value can be changed using the Field Parameter Editor.

Maximum Display Adjustment: Edit this percentage setting up or down until the engine RPM meter needle tops out at exactly the maximum value on the meter.

Test Calibration: Use this spin box to test meter functioning by sending unit increments or decrements to the ECM.

The spin box is Inactive when you open the Customer Meter Calibration dialog box. Clicking an up or down arrow activates the feature, displaying the current value. Click an up or down arrow again to change the current value.

To change parameter settings:

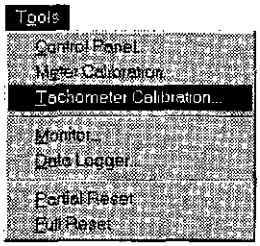
- Type values into the data entry boxes or use the spin boxes to select values.

Buttons in the Customer Meter Calibration Tab Dialogs

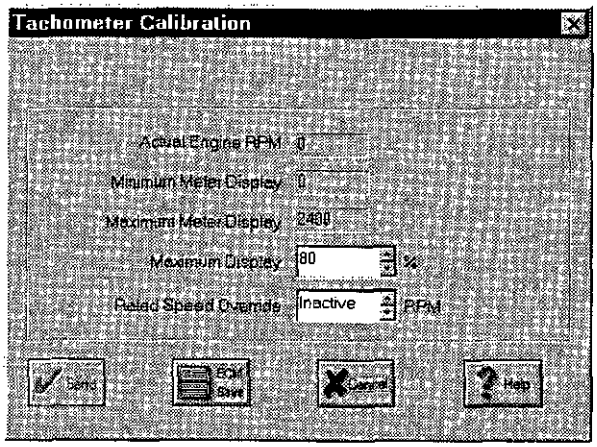
Click the **Send** button to activate new parameter value(s) in the ECM for diagnostic purposes. Click the **ECM Save** button to permanently change the values in the ECM.

Use the **Cancel** button to close the dialog box.

Tachometer Calibration



Use the **Tachometer Calibration** command on the Tools menu to set your tachometer display and also to verify correct meter functioning.



Tachometer Calibration Dialog Box

Actual Engine RPM: The current engine RPM, read from the ECM.

Minimum Meter Display: Displays the current ECM value for minimum meter display. This value can be changed using the Field Parameter Editor. See page 13 for more information.

Maximum Meter Display: Displays the current ECM value for maximum meter display. This value can be changed using the Field Parameter Editor.

Maximum Display Adjustment: Edit this percentage setting up or down until the engine RPM meter needle tops out at exactly the maximum value on the meter.

Rated Speed Override: Use the Rated Speed Override spin box to increase or decrease the engine's operating speed until the Maximum Meter Display value equals the desired position on the ECM meter. If necessary, adjust the Maximum Display percentage up or down to accomplish this.

The spin box is Inactive when you open the Tachometer Calibration dialog box. Clicking an up or down arrow activates the

override feature, displaying the current rated speed. Click an up or down arrow again to change the current speed.

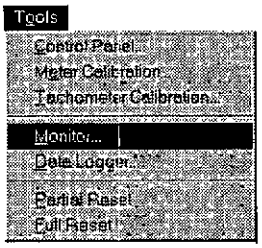
Note: *The override feature is temporary only and cannot be saved to the ECM.*

Buttons in the Tachometer Calibration Dialog Box

Click the **Send** button to activate new parameter value(s) in the ECM for diagnostic purposes. Click the **ECM Save** button to permanently change the values in the ECM.

Use the **Cancel** button to close the dialog box.

Monitor



Use the **Monitor** command on the Tools menu to view specific parameters of a running engine. First you specify in the Monitor Setup dialog box which parameters to monitor and display.

Then, the Monitor dialog box shows the latest status of ECM inputs and outputs. This is a convenient way of checking the operation of each ECM input circuit without disconnecting the circuit from the ECM.

Your PC must be connected to an ECM on a running engine to use the diagnostic tests. The engine does not have to be running to monitor the switches only, but the ECM must be in the diagnostic mode.

Using the Monitor Feature

Follow these steps:

1. Select the Monitor command on the Tools menu.
2. Specify which parameters to display in the **Monitor Setup** dialog box.

   See the following sections for more information.
3. Begin monitoring the data in the **Monitor** dialog box.

   See "Beginning the Data Monitoring Process" on page 42 for more information.

Available Parameters

The following parameters are available in the Monitor Setup and Data Logger Setup dialog boxes.

Alarm Reset Switch Input: Either depressed (On) or released (Off).

Alternate Frequency Switch Input: Either Normal or Alternate.

Barber Colman Bias: RPM increase or decrease (This parameter displays only if Barber Colman is enabled in Features and Parameters).

Battery Voltage: The unswitched battery supply voltage at the ECM.

Commanded Rack Position: The rack position commanded by the ECM.

Common Alarm: Lamp indicator = On or Off.

Common Warning: Lamp indicator = On or Off.

Coolant Temperature: The value read from the ECM.

Coolant Temperature Meter Driver: Duty cycle percentage.

Coolant Temperature Shutdown: Lamp indicator = On or Off.

Coolant Temperature Warning: Lamp indicator = On or Off.

Diagnostic Switch: Either On or Off. (On = Diagnostic mode, Off = Running mode).

ECM Run Time: The total amount of time the ECM has been powered On, regardless of whether or not the engine has been running.

Engine Run Time: The value read from the ECM.

Engine Speed: The value read from the ECM.

Engine Speed Meter Driver: Duty cycle percentage.

Fuel Shutoff Valve: Either On or Off (***Note:*** The setting applies to both shutoff valves).

Idle Rated Switch Input: Either Idle or Rated.

Mode: The current operating state.

Oil Pressure: The value read from the ECM.

Oil Pressure Meter Driver: Duty cycle percentage.

Oil Pressure Shutdown: Lamp indicator = On or Off.

Oil Pressure Warning: Lamp indicator = On or Off.

Overspeed Shutdown: Lamp indicator = On or Off.

Run Stop Switch Input: Either Run or Stop.

Speed Adjust Input: A plus or minus RPM value caused by the Speed Adjust Knob.

Speed Adjust Knob: Either enabled or disabled.

Speed Bias Input Type: From Features and Parameters: either Barber Colman, Woodward, or Disabled.

Version Number: The ECM software version number.

Woodward Bias: RPM increase or decrease (This parameter displays only if Woodward is enabled in Features and Parameters).

Specifying Which Parameters to Monitor

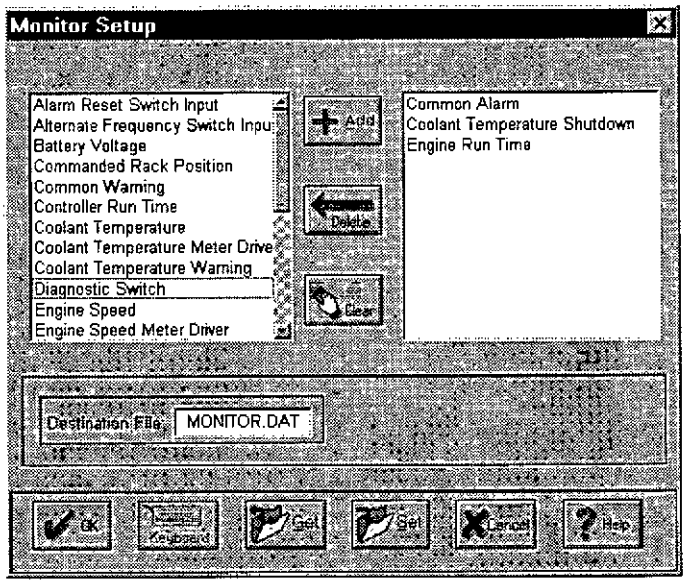
Before monitoring data, you must specify which parameters to monitor. Either select a new group of parameters to monitor or use an existing custom monitor setup.

The first time you use the monitor feature, you *must* select a new group of parameters to monitor. After that, you can use a saved setup or create a new setup with different parameters.

To specify a new group of parameters to monitor:

1. Click Monitor on the Tools menu.

   The Monitor Setup dialog box displays. The Available Parameters scroll box lists all of the parameters that can be monitored.



Monitor Setup Dialog Box

2. Include in the Selected Parameters scroll box the names of the parameters you want to monitor.

   To add a parameter to the Selected Parameters box, select the name of the parameter in the Available Parameters box and click the **Add** button, or double-click the name in the Available Parameters box.

   To delete a parameter from the Selected Parameters box, select the name of the parameter in the Selected Parameters box and click the **Delete** button, or double-click the name in the Selected Parameters box.

   If you make a mistake and want to start over, click the **Clear** button. You will be prompted to confirm that you want to erase all of the entries in the Selected Parameters box. If you

click OK, all of the parameters will be deleted from the Selected Parameters box and you can rebuild the list.

3. If this is a custom monitor setup that will be used again, click the **Set** button.

   A standard Windows Save As dialog box displays. Fill it in as usual using a file name extension of *.cfg*. Then, click OK.

4. As an option, fill in the Destination File name to specify a log file name for capturing this monitored information to a log file.

   A default destination file name of *MONITOR.DAT* displays. This file name is used when you click the Capture button on the Monitor dialog box. The captured data is stored in standard log file format with a .DAT file and a .HDR file. Both files use the same file name that you specify. Log files are stored in \Log.

5. Click **OK** to start monitoring data with this setup.

To use an existing custom monitor setup:

1. Click Monitor on the Tools menu.

   The Monitor Setup dialog box displays.

2. Click the **Get** button in the Monitor Setup dialog box.

   A standard Windows Open dialog box displays. Specify the file location as usual and click OK. The custom monitor setup files are stored in the \Log directory.

3. Click **OK** to start monitoring data with this setup.

Beginning the Data Monitoring Process

Once the Monitor dialog box displays, you can monitor and display realtime data from the ECM.

To monitor data:

1. Specify which parameters to monitor.

   For more information, see "Specifying Which Parameters to Monitor" on page 40.

2. Make sure the ECM is attached to your PC and the engine is running.

3. Click the **Start** button in the Monitor dialog box.

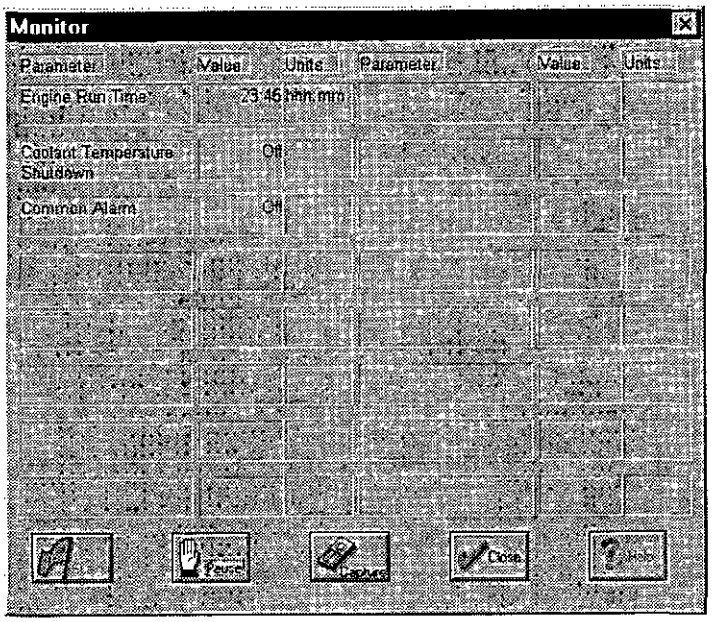
   As data is read from the ECM, values display on the screen for each parameter. These values are updated automatically while the engine is being monitored.

   For each parameter, the following items display:

   Parameter: The name of the parameter being monitored.

   Value: The data value of the parameter.

   Units: The unit of measurement for the value.



Monitor Dialog Box

4. To pause and then start the monitoring process again, click the **Pause** button and then click the Start button again.

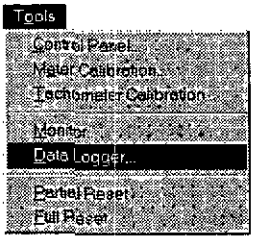
   This is useful if the engine state changes temporarily and you want to stop the monitoring process until the engine returns to its previous state.

5. To capture monitored data to a log file, click the Capture button.

   The log files are stored in \Log. The file names correspond to the Destination File name specified in the Monitor Setup dialog box.

6. To stop monitoring the engine, click the **Close** button. You return to the INSITE™ QST30 G-Drive Main window.

Data Logger



Use the **Data Logger** command on the Tools menu to save data from a running engine to a data file. This data file can be imported into a spreadsheet or graphics application for reporting, graphing, or further analysis.

The Data Logger feature helps troubleshoot engine problems by allowing you to isolate and analyze specific operating parameters over time. For example, if an engine is overheating, you can log the coolant temperature at specific intervals to pinpoint the cause of overheating. You can specify which types of data to log to the data file and when to record the data.

Logging Data to a File

Follow these steps:

1. Select the Data Logger command on the Tools menu.
2. Specify the parameters that you want to log.

   Also specify the data file name and the frequency of the sampling period. See the following section for more information.
3. Start the data logging process.

   See "Beginning the Data Logging Process" on page 46 for more information.

Specifying Which Parameters to Log

Before logging data to a log file, you must either open an existing configuration file or select a new set of parameters to log. When using the data logger function for the first time, a new set of parameters *must* be created. After that, you can use a saved configuration file again or create a new set of parameters to log.

You can specify an unlimited number of parameters to log. Keep in mind that the more parameters that are logged, the more time it takes to log the data.

See page 39 for a list of the Available Parameters.

To select a new set of parameters to log:

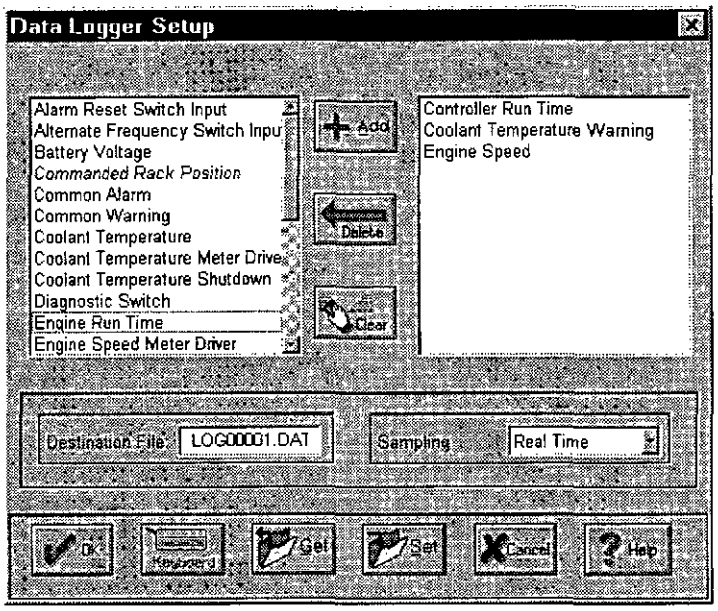
1. Click Data Logger on the Tools menu.

   The Data Logger Setup dialog box displays. The Available Parameters scroll box lists all of the parameters that can be logged.
2. Fill the Selected Parameters scroll box with the names of the parameters you want to log.

   To add a parameter to the Selected Parameters box, select the name of the parameter in the Available Parameters box and click the **Add** button, or double-click the name in the Available Parameters box.

   To delete a parameter from the Selected Parameters box, select the name of the parameter in the Selected Parameters box and click the **Delete** button, or double-click on the name in the Selected Parameters box.

   If you make a mistake and want to start over, click the **Clear** button. You will be prompted to confirm that you want to erase all of the entries in the Selected Parameters box. If you click OK, all of the parameters will be deleted from the Selected Parameters box and you can rebuild the list.
3. Enter a sampling period and a name for the data file.



Data Logger Setup Dialog Box

Destination File: The name of the data file. Enter a name of up to eight characters. This name will be used to create a header file with an extension of .HDR, and a data file with an extension of .DAT. If you do not specify the file name, INSITE™ uses a default file name of *LOGXXXXX.DAT*, where *XXXXX* is the next sequential number in the series starting from *00001*.

It may take a few seconds to gather a complete set of data (the data does not reflect a single point in time, but rather a short range of time). After each set of data is collected, the sampling period passes, and a new set of data is gathered.

Sampling Period: The time interval that you want to pass between data "snapshots". For example, if you choose *10 seconds*, INSITE™ QST30 G-Drive will poll the ECM for data at 10-second intervals. The *Real Time* option allows you to perform continuous polling, reading between two and five values per second depending on your hardware and software configuration. If you do not specify a sampling period, INSITE™ QST30 G-Drive uses a default sampling period of *Real Time*.

4. To save these parameters in a configuration file for later use, click the **Set** button.

   A standard Windows Save As dialog box displays. Fill it in as usual and click OK. Use a file name extension of *.cfg*.

5. Click **OK** to start logging data with these preferences.

   The Data Logger dialog box displays. For more information, see "Beginning the Data Logging Process" on the next page.

To open an existing configuration file for logging data:

1. Click Data Logger from the Tools menu.

The Data Logger Setup dialog box displays.

2. Click the **Get** button.

   A standard Windows Open dialog box displays. Specify the file location as usual and click OK. Configuration files for INSITE™ are stored in the \Log subdirectory.

3. Click **OK** to start logging data with this configuration file.

   The Data Logger dialog box displays.

Beginning the Data Logging Process

After specifying which parameters to use, you can begin logging data in the Data Logger dialog box.

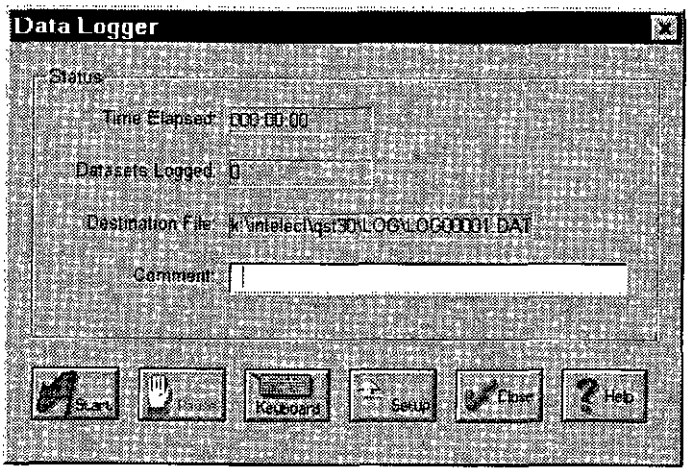
To log data in the Data Logger dialog box:

1. Make sure the ECM is attached to your PC and the engine is running.
2. Click the Start button to begin the data logging process.

   Time Elapsed: The amount of time that has passed since the data logging process began. The time elapsed measures the actual data logging time; it does *not* include any pause periods. This value is updated as data is logged from the engine.

The higher the number of datasets logged, the greater the amount of disk space required. To conserve disk space, keep the number of datasets logged to a minimum. Typically, you do not need more than 100 datasets to generate an adequate amount of data.

   Datasets Logged: The number of data sets that have been logged during this data logging session. This value depends on the sampling period specified in the Data Log Setup dialog box and the time elapsed. The value is updated as data is logged from the engine.



Data Logger Dialog Box

As logging progresses, free space is checked to make sure that there is enough space to write to a file. If the log file grows so large that there is not enough disk space to contain it, you will be prompted to close the log file and logging will be stopped.

Destination File: The name of the data file that will store the logged data. If you entered a file name on the Data Log Setup dialog box, it will display here. If not, a default name with the format *LOGXXXXX.DAT* will display.

Comment: A note that can be included to describe this set of logged data. The comment displays in the header file as a reference.

3. To pause and start the logging process again, click the Pause button and then the Start button again.

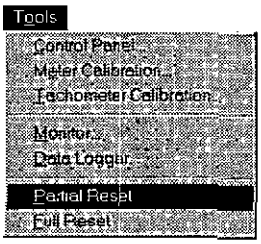
   This is useful if there is a temporary change in engine state that you do not want to record. Press the Pause button until the engine returns to its previous state.

4. To stop logging data, click the Close button.

Deleting Log Files

It is easy to accumulate many log files, each of which can contain large amounts of data. Check your log files frequently and regularly delete any unnecessary files using Explorer. The INSITE™ QST30 G-Drive log files are stored in \Log.

Partial Reset



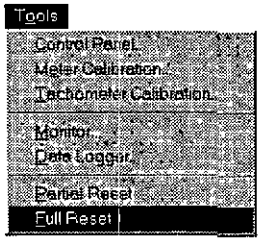
Use the **Partial Reset** command on the Tools menu to reset features and functions in the ECM that do not affect customer-defined settings.

Note: *This function should* not *be performed unless it is recommended by either the Fault Information System or the Troubleshooting and Repair Manual.*

The Partial Reset command does *not* erase any customer-defined settings from the ECM, such as parameter adjustments and meter calibrations.

After selecting this command, you must power the ECM off and then back on again for the reset to take effect.

Full Reset



Use the **Full Reset** command on the Tools menu to reset all features and functions in the ECM to their default settings. This command returns the ECM to its original factory settings.

Note: *This function should* not *be performed unless it is recommended by either the Fault Information System or the Troubleshooting and Repair Manual.*

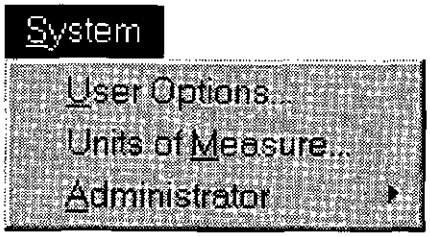
WARNING! The Full Reset command also erases *all* customer-defined settings from the ECM, such as parameter adjustments and meter calibrations.

After selecting this command, you must power the ECM off and then back on again for the reset to take effect.

System Menu

Use the **System** menu to set options for working with INSITE™ QST30 G-Drive, including setting the COM port and units of measure.

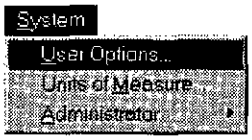
You do not have to be connected to an ECM to use the commands on this menu.



System Menu

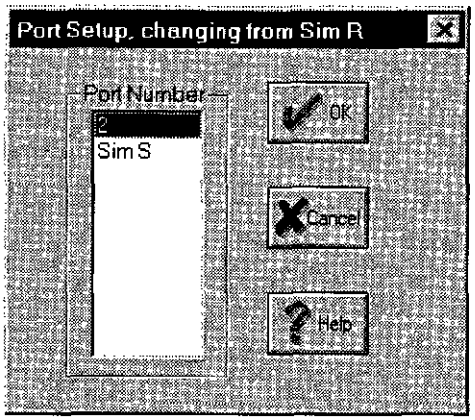
Each command on the System menu is described in the following sections.

User Options



Use the **User Options** command on the System menu to set the COM port on your PC to use with INSITE™ QST30 G-Drive.

You also use the User Options command if you are not connected to an ECM and want to run INSITE™ QST30 G-Drive in Simulator mode. Simulator modes are explained on the next page.



User Options Dialog Box

The COM port or Simulator mode you are using is specified in the title bar of the dialog box.

Note: *If you are* not *connected to an ECM the first time you run INSITE™ QST30 G-Drive, the application automatically opens in Simulator (Sim R) mode.*

To specify a COM port:

1. Select the port you want to use in the Port Number list by highlighting the port number.
2. Click the **OK** button.

The selected port setting is activated immediately.

Using Simulator Modes

Simulator modes are provided so that you can use INSITE™ QST30 G-Drive without being attached to an ECM. These modes are useful for training, viewing ECM parameters, or any other situation where you are not or cannot be connected to an ECM.

You do not need a Security key to use a Simulator mode.

To use a Simulator mode:

1. In the Port Setup dialog box, highlight either Sim R or Sim S in the Port Number list.
2. Click the OK button.

The selected Simulator mode is activated immediately.

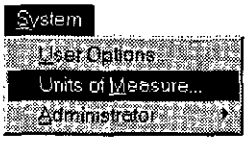
Differences between Sim R and Sim S

Sim R (Running mode):

- INSITE™ QST30 G-Drive functions as if you were attached to a running engine.
- No features or commands are available that require the engine to be *not* running. These include the Field Parameter Editor, the Fuel Pump Rack Test, Meter Calibration, etc.

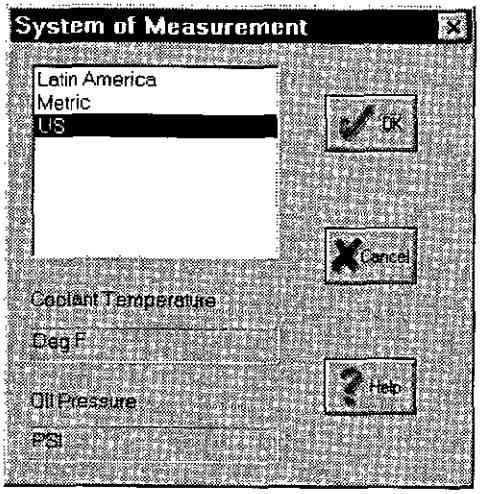
Sim S (Diagnostic mode):

- INSITE™ QST30 G-Drive functions as if you were attached to an engine that is *not* running.
- All diagnostic features and commands are available.



Units of Measure

Use the **Units of Measure** command on the System menu to specify the measurement units you want to use for coolant temperature and oil pressure. This preference setting affects the display of data only. Data is always stored in standard U.S. units.



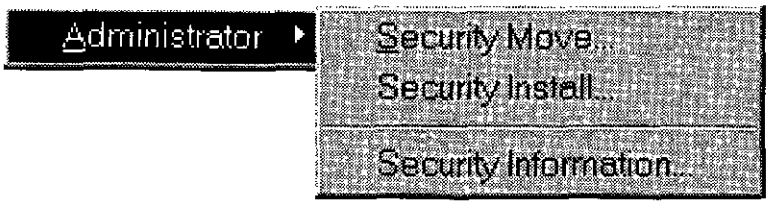
Units of Measure Dialog Box

To specify the units of measurement for coolant temperature and oil pressure:

1. Select the name of a region or measurement system in the list by highlighting it.
2. Click the **OK** button.

Administrator Submenu

Use the **Administrator** submenu on the System menu to move, install, or view Security information for INSITE™ QST30 G-Drive.



Administrator Submenu

Each command on the Administrator submenu is described in the following sections.

INSITE™ for QST30 G-Drive

User's Manual Update

The following changes have been made to the INSITE™ QST30 G-Drive User's Manual, bulletin no. 3666196, since the manual went to press. Please make the following changes on the corresponding pages in your copy of the manual.

These changes identify the differences between version 1.00 and version 1.10 of INSITE™ QST30 G-Drive. The changes do not apply if you are using version 1.00 of INSITE™ QST30 G-Drive.

1. Under the Feature and Parameter **Adjustment Ranges** on page 14:

   Change **Governor Gain Adjust**: 0.1 to 10

   to **Governor Gain Adjust:** 1 to 100.

2. Add the following note to the **Table of Ramp Times** on page 15:

   Note: *Ramp time values listed in this table are approximate, and may vary. For example, there will be slight time variations if Speed Bias Input is enabled.*

3. In the **Monitor Setup Dialog Box** on page 41 and the paragraph describing its use (Step 4 on page 42), the destination file name ***MONITOR.DAT*** *should be changed to* ***MONXXXXX.DAT,*** *where XXXXX is the next* sequential number in a series starting from 00001. If this filename is not specified by the tool user, INSITE™ for QST30 G-Drive will automatically default to the filename of the first unused sequential number (e. g. MON00002.DAT).

   This is the destination file used to store monitor data when the **Capture** button is pressed while monitoring data.

4. A new button has been added to the **Fault Information Dialog Box** on page 18. This new button is titled **Reload**, and has the following description:

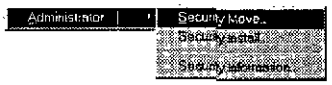
   Click the **Reload** button to re-read fault data from the ECM while the Fault Information Dialog box is still open. This may be useful during troubleshooting.

5. The following note should be deleted from the **User Options** section on page 49:

   Note: *If you are* not *connected to an ECM the first time you run INSITE™ QST30 G-Drive, the application automatically opens in Simulator (Sim R) mode.*

6. To provide you with information on which COM port or Simulator mode INSITE™ QST30 G-Drive is using, the COM port or Simulator mode is specified in the title bar of the main INSITE™ QST30 G-Drive window, and also in the title bar of the Port Setup dialog box.

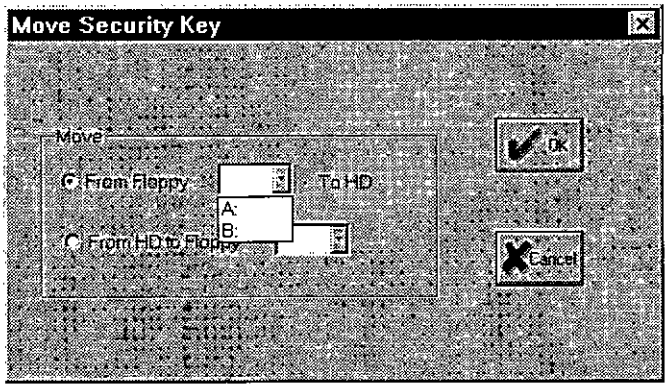
Security Move



Use the **Security Move** command on the Administrator submenu to move the security key for this copy of INSITE™ QST30 G-Drive. You can move the key to *or from* your hard disk.

To move the security key:

1. Insert the security key diskette in the diskette drive. In the Move Security Key dialog box, click the radio button that corresponds to the type of move you want.



Move Security Key Dialog Box

2. Select the drive letter of your diskette drive in the spin box.
3. Click **OK**.

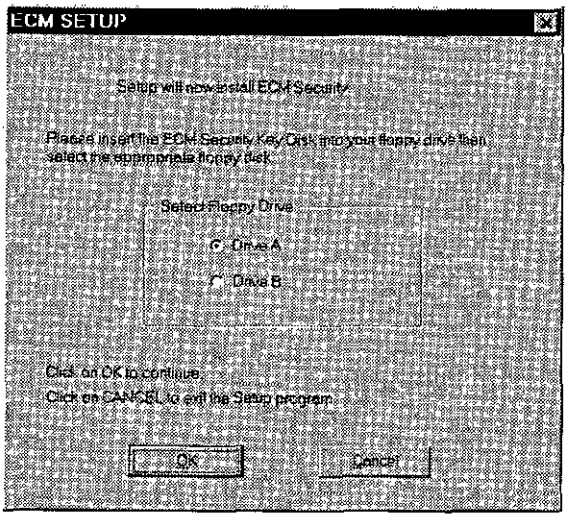
Security Install

Use the **Security Install** command on the Administrator submenu to install a security key after INSITE™ QST30 G-Drive has already been installed. A security key must be present on either a diskette or the PC's hard drive in order to use INSITE™ QST30 G-Drive for diagnostics.

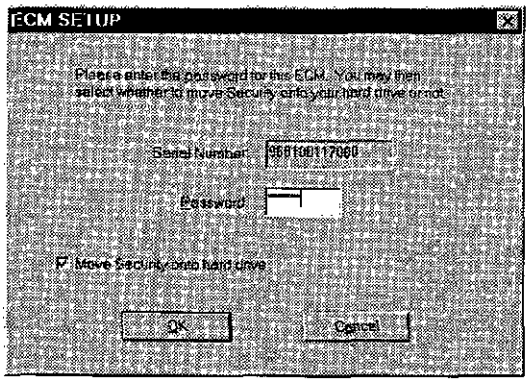
To install security:

1. Insert the security key diskette in the diskette drive. In the ECM Setup dialog box, click either the Drive A or Drive B radio buttons, depending on your PC's configuration.
2. Click **OK**.
3. Type your password in the Password field. The password is unique to your copy of INSITE™ QST30 G-Drive.

   You also have the option of transferring the security key to your hard drive. This is recommended, since otherwise you will always need the original security diskette in order to use INSITE™ QST30 G-Drive.



ECM Setup (Security Install) Dialog Box



ECM Setup (Password) Dialog Box

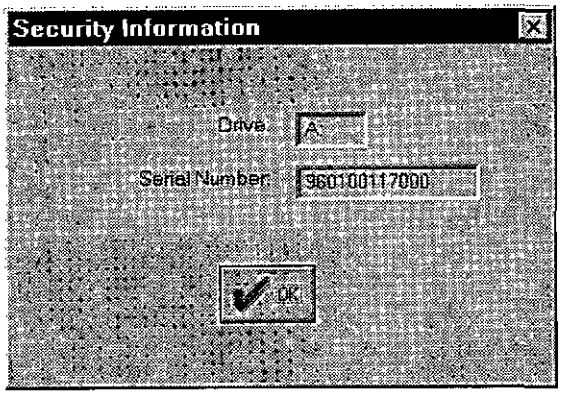
Note: *If you do transfer security to the hard drive, be sure to keep your original security key diskette in a safe place. If you later decide to transfer security back to the diskette, you need to use the original diskette.*

4. Click OK.

Security Information

Use the **Security Information** command on the Administrator submenu to identify:

- The location of the security key for this copy of INSITE™ QST30 G-Drive.
- The serial number of the original security key diskette that was used to install security.



Security Information Window

Drive: *Indicates which drive contains the security key:* either A, B, or C. You need to know the drive letter if you want to move your security key.

Serial Number: The twelve digit serial number on the security key diskette that was originally used to install security. You *must* use the original security key diskette if you want to move security from drive C to the diskette.

Note: *If question marks appear in both fields, either security is not installed or there is a problem. See your system administrator or contact Service and Support.*

Click **OK** to close the Security Information window.

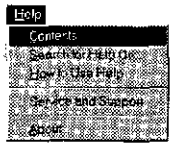
Help Menu

Use the **Help** menu to get information about how to work with INSITE™ QST30 G-Drive. You can access the Help system any time; your PC does not need to be connected to an ECM.

Help Menu

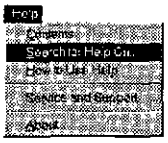
Each command on the Help menu is described in the following sections.

Contents



Use the **Contents** command on the Help menu to display the Table of Contents of the INSITE™ QST30 G-Drive Help System. Click icons or underlined text to move throughout Help.

Search for Help On



Use the **Search for Help On** command from the Help menu to select keywords to search on and display related topics.

To search for help by topic title:

1. Select a topic title in the list box and click the Display button.

   To select a topic title, either scroll through the list of topics in the list box, or type the first letter(s) of the topic you want to find.

2. The selected help topic displays.

To search for help by individual words:

1. Click the Find tab.
2. Click the Next button in the Find Setup Wizard dialog box.
3. Click the Finish button in the Find Setup Wizard dialog box.
4. Type a word in field 1 or select a word in field 2.

   All Help topics which contain your selection are listed in field 3.

5. Select a topic and click the Display button.

   The selected help topic displays.

Note: *You can customize your search options in the Find tab using the buttons on the right. See the Windows® 95 documentation for details.*

How to Use Help

Use the **How to Use Help** command from the Help menu for instructions on how to use a Windows® Help system. This information includes how to use a keyword search list, how to browse through help screens, and how to retrace your steps when using Help.

Service and Support

Use the **Service and Support** command on the Help menu to display pertinent telephone numbers and addresses for you to get more information about using INSITE™ QST30 G-Drive.

About

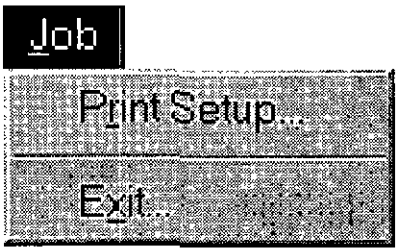
Use the **About** command on the Help menu to display identifying information about the use of INSITE™ QST30 G-Drive at your location. This information includes the serial number and version number for this copy of the software. This information is helpful when seeking technical support.

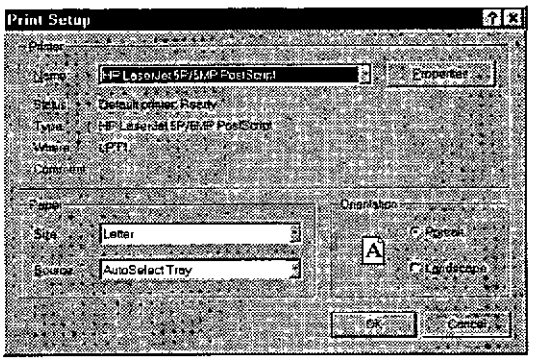
Menu Maps

This section illustrates the paths to take from each menu to get to each of the dialog boxes in INSITE™ QST30 G-Drive. Use this section as a visual guide to find the dialog box you want.

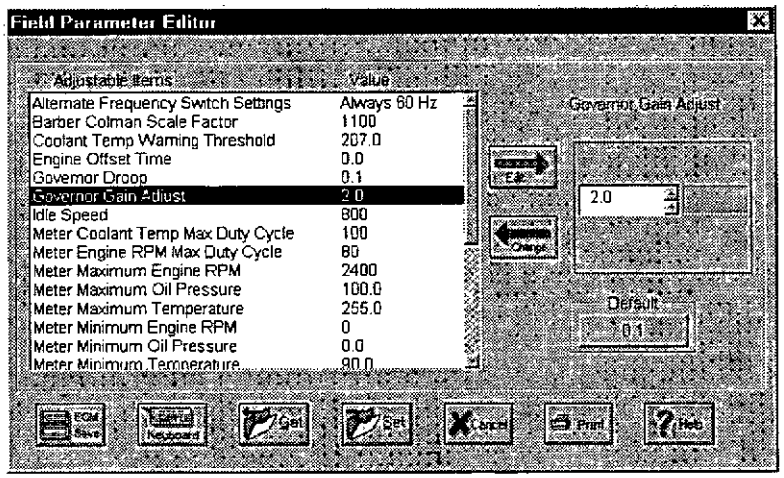
This section is organized by menu, in the order that the menus display on the Menu bar.

Job Menu

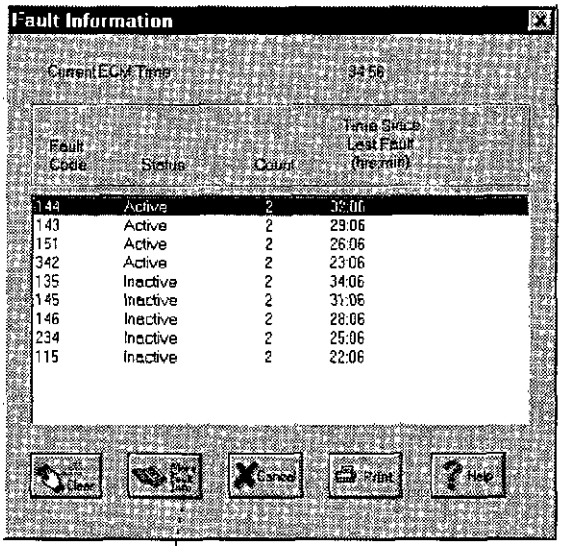


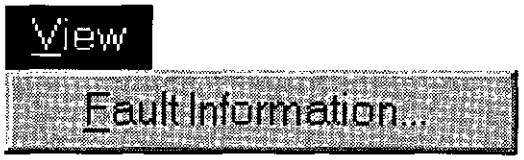


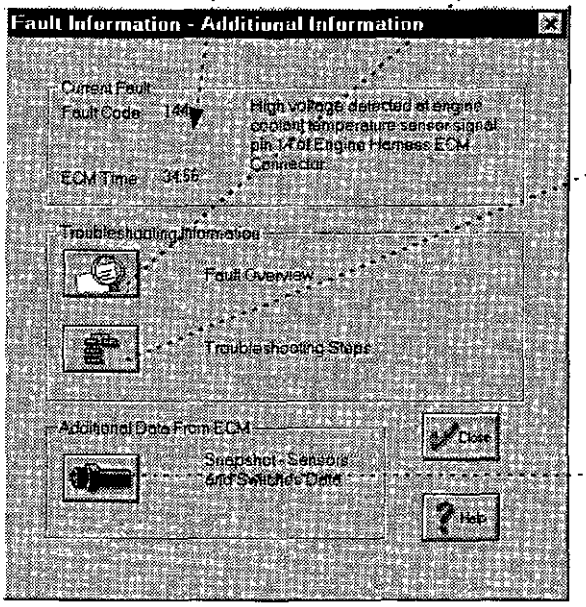
Adjustments Menu

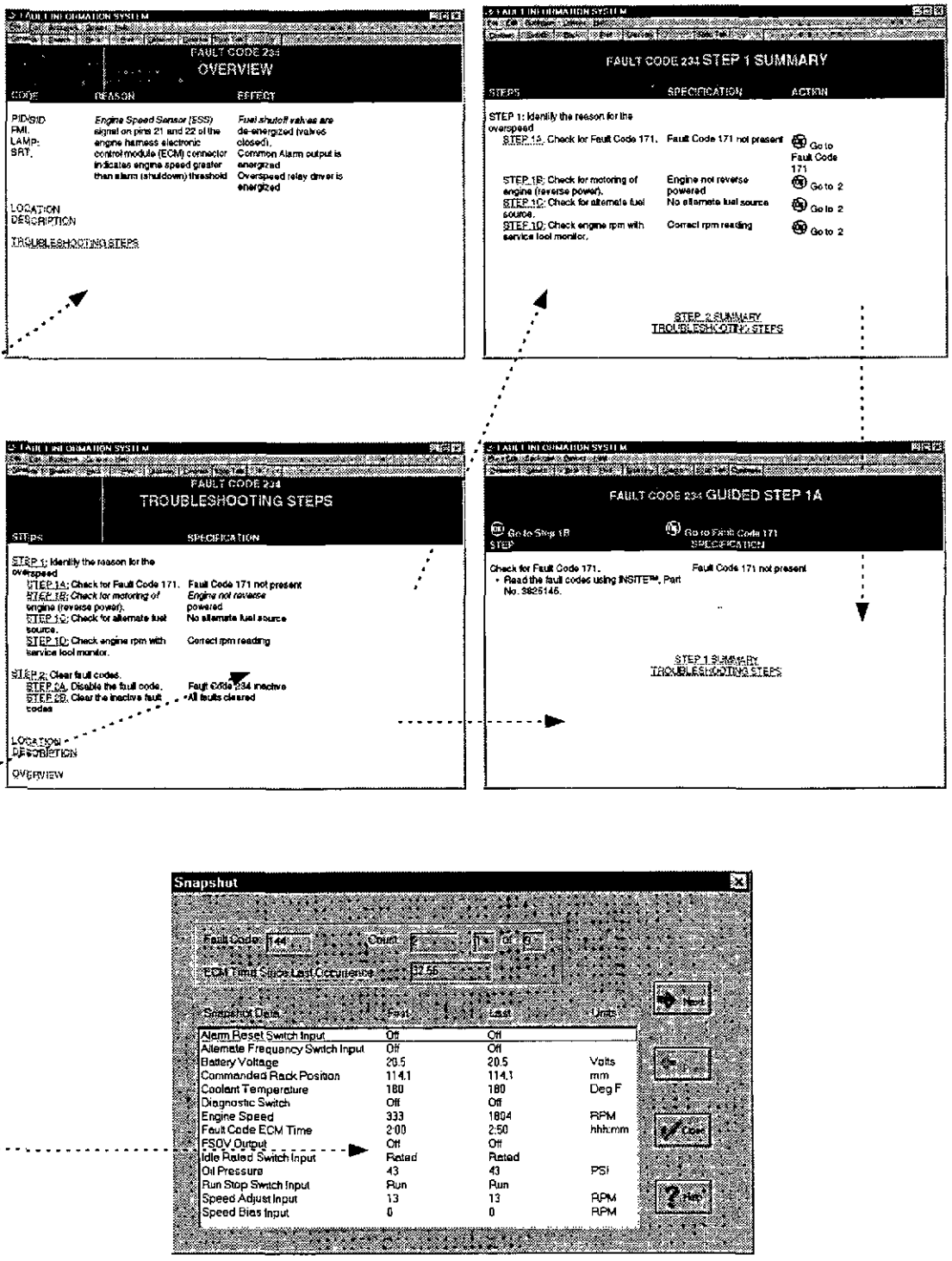


View Menu

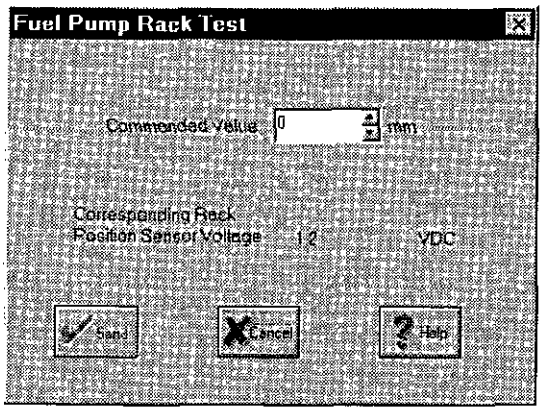

Fault Information
Current ECM Time
34:56
Fault Code
Status
Count
Time Since Last Fault (hr:min)
144 Active 2 35:06
143 Active 2 29:06
151 Active 2 26:06
342 Active 2 23:06
135 Inactive 2 34:06
145 Inactive 2 31:06
146 Inactive 2 28:06
234 Inactive 2 25:06
115 Inactive 2 22:06
Clear
Print
Help

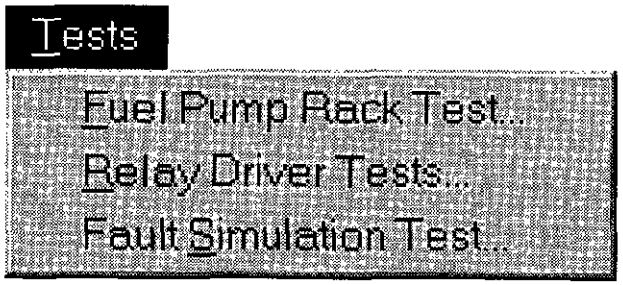

View
Fault Information...

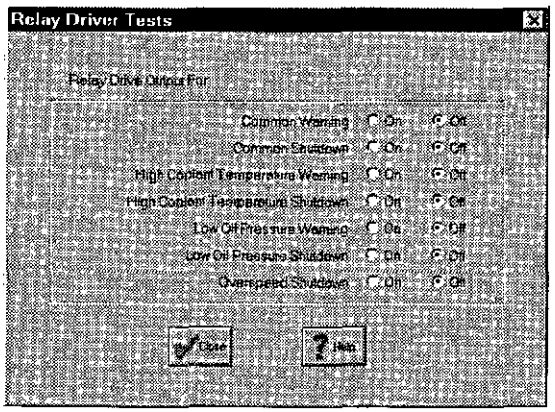

Fault Information - Additional Information
Current Fault
Fault Code 144
High voltage detected at engine coolant temperature sensor signal pin 1 of Engine Harness ECM Connector
ECM Time 34:56
Troubleshooting Information
Fault Overview
Troubleshooting Steps
Additional Data From ECM
Snapshot - Sensors, On/Off Switches Data
Close
Help

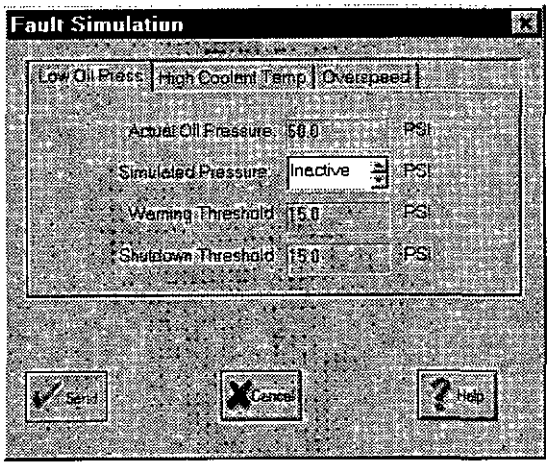

FAULT CODE 234
OVERVIEW
CODE
REASON
EFFECT
PID/SID
FMI
LAMP:
SRT
Engine Speed Sensor (ESS) signal on pins 21 and 22 of the engine harness electronic control module (ECM) connector indicates engine speed greater than alarm (shutdown) threshold
Fuel shutoff valves are de-energized (valves closed).
Common Alarm output is energized
Overspeed relay driver is energized
LOCATION
DESCRIPTION
TROUBLESHOOTING STEPS
FAULT CODE 234 STEP 1 SUMMARY
STEPS
SPECIFICATION
ACTION
STEP 1: Identify the reason for the overspeed
STEP 1A: Check for Fault Code 171.
Fault Code 171 not present
Go to Fault Code 171
STEP 1B: Check for motoring of engine (reverse power).
Engine not reverse powered
Go to 2
STEP 1C: Check for alternate fuel source.
No alternate fuel source
Go to 2
STEP 1D: Check engine rpm with service tool monitor.
Correct rpm reading
Go to 2
STEP 2 SUMMARY
TROUBLESHOOTING STEPS
FAULT CODE 234
TROUBLESHOOTING STEPS
STEPS
SPECIFICATION
STEP 1: Identify the reason for the overspeed
STEP 1A: Check for Fault Code 171.
Fault Code 171 not present
STEP 1B: Check for motoring of engine (reverse power).
Engine not reverse powered
STEP 1C: Check for alternate fuel source.
No alternate fuel source
STEP 1D: Check engine rpm with service tool monitor.
Correct rpm reading
STEP 2: Clear fault codes.
STEP 2A: Disable the fault code.
STEP 2B: Clear the inactive fault codes
Fault Code 234 inactive
All faults cleared
LOCATION
DESCRIPTION
OVERVIEW
FAULT CODE 234 GUIDED STEP 1A
Go to Step 1B
Go to Fault Code 171
STEP
SPECIFICATION
Check for Fault Code 171.
Fault Code 171 not present
Read the fault codes using INSITE™, Part No. 3825146.
STEP 1 SUMMARY
TROUBLESHOOTING STEPS
Snapshot
Fault Code: 144
Count:
ECM Time Since Last Occurrence:
Snapshot Data
First
Last
Units
Alarm Reset Switch Input Off Off
Alternate Frequency Switch Input Off Off
Battery Voltage 20.5 20.5 Volts
Commanded Rack Position 114.1 114.1 mm
Coolant Temperature 180 180 Deg F
Diagnostic Switch Off Off
Engine Speed 333 1804 RPM
Fault Code ECM Time 2:00 2:50 hhh:mm
FSOV Output Off Off
Idle Rated Switch Input Rated Rated
Oil Pressure 43 43 PSI
Run Stop Switch Input Run Run
Speed Adjust Input 13 13 RPM
Speed Bias Input 0 0 RPM
Next
Close
Help

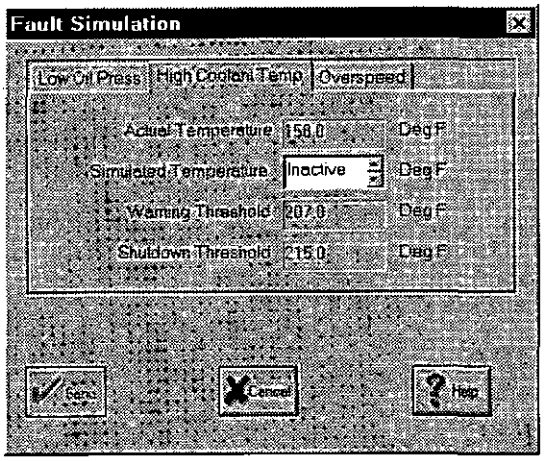
Tests Menu

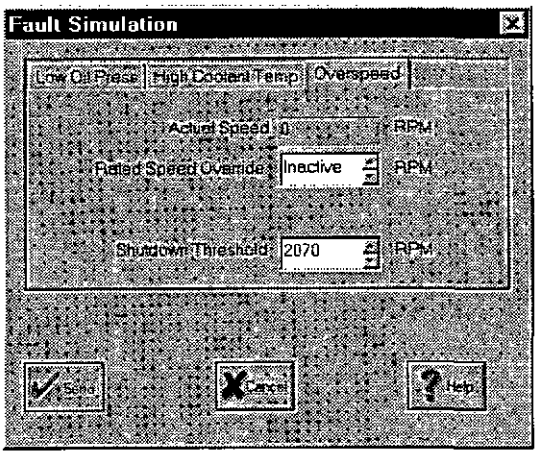

Fuel Pump Rack Test
Commanded Value
0
mm
Corresponding Rack
Position Sensor Voltage
VDC
Send
Cancel
Help


Tests
Fuel Pump Rack Test...
Relay Driver Tests...
Fault Simulation Test...

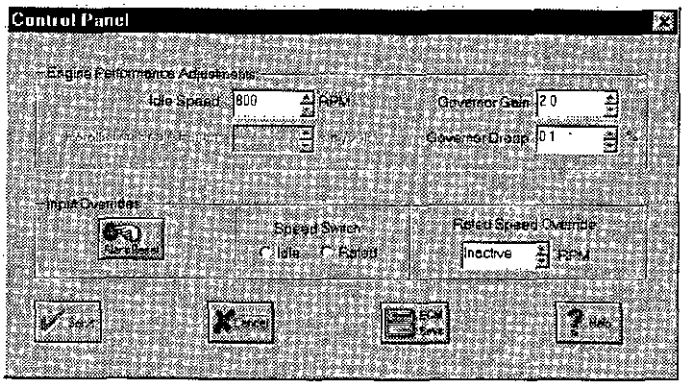

Relay Driver Tests
Relay Drive Output For:
Common Warning
Common Shutdown
High Coolant Temperature Warning
High Coolant Temperature Shutdown
Low Oil Pressure Warning
Low Oil Pressure Shutdown
Overspeed Shutdown
On
Off
Close
Help

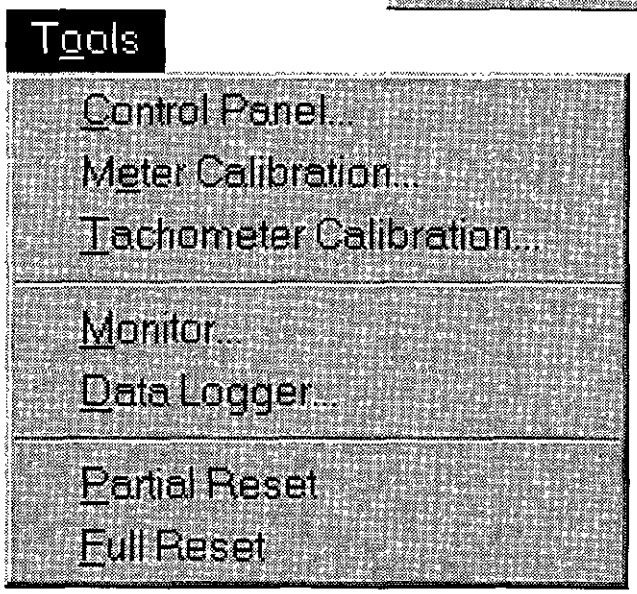

Fault Simulation
Low Oil Press
High Coolant Temp
Overspeed
Actual Oil Pressure: 50.0 PSI
Simulated Pressure: Inactive PSI
Warning Threshold: 15.0 PSI
Shutdown Threshold: 15.0 PSI
Send
Cancel
Help

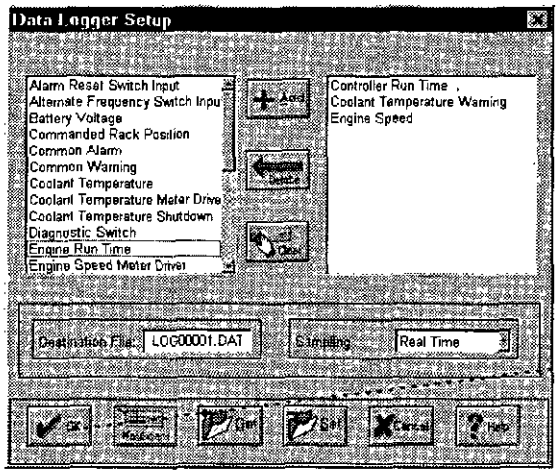

Fault Simulation
Low Oil Press
High Coolant Temp
Overspeed
Actual Temperature: 158.0 Deg F
Simulated Temperature: Inactive Deg F
Warning Threshold: 207.0 Deg F
Shutdown Threshold: 215.0 Deg F
Send
Cancel
Help

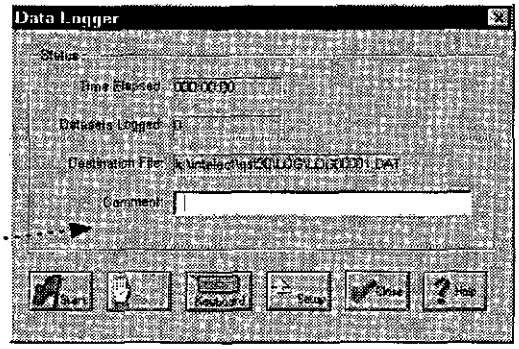

Fault Simulation
Low Oil Press
High Coolant Temp
Overspeed
Actual Speed: 0 RPM
Rated Speed Override: Inactive RPM
Shutdown Threshold: 2070 RPM
Send
Cancel
Help

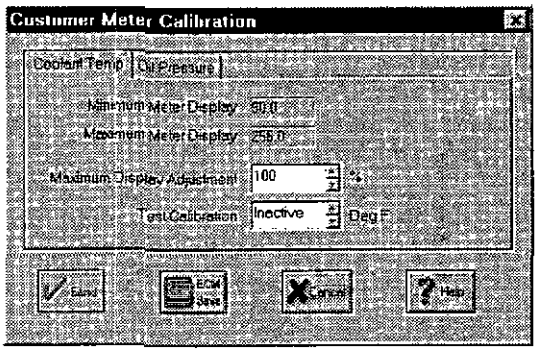
Tools Menu

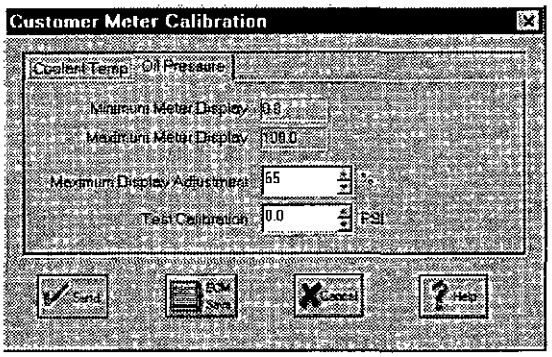

Control Panel
Engine Performance Adjustments
Idle Speed
800
RPM
Governor Gain
20
Governor Droop
01
Input Overrides
Speed Switch
Idle
Rated
Rated Speed Override
Inactive
RPM
Set
Cancel
Help

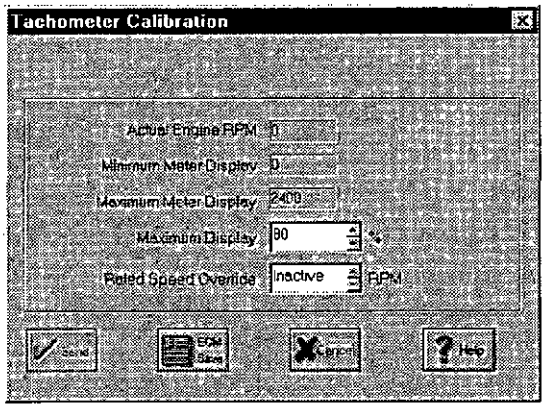

Tools
Control Panel...
Meter Calibration...
Tachometer Calibration...
Monitor...
Data Logger...
Partial Reset
Full Reset

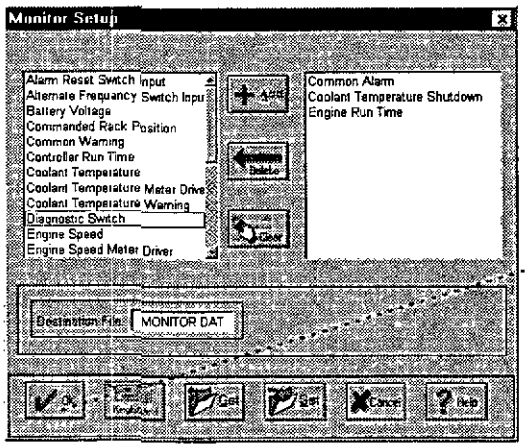

Data Logger Setup
Alarm Reset Switch Input
Alternate Frequency Switch Input
Battery Voltage
Commanded Rack Position
Common Alarm
Common Warning
Coolant Temperature
Coolant Temperature Meter Drive
Coolant Temperature Shutdown
Diagnostic Switch
Engine Run Time
Engine Speed Meter Drive
Add
Remove
Clear
Controller Run Time
Coolant Temperature Warning
Engine Speed
Destination File:
LOG00001.DAT
Sampling:
Real Time
OK
Start
Set
Cancel
Help

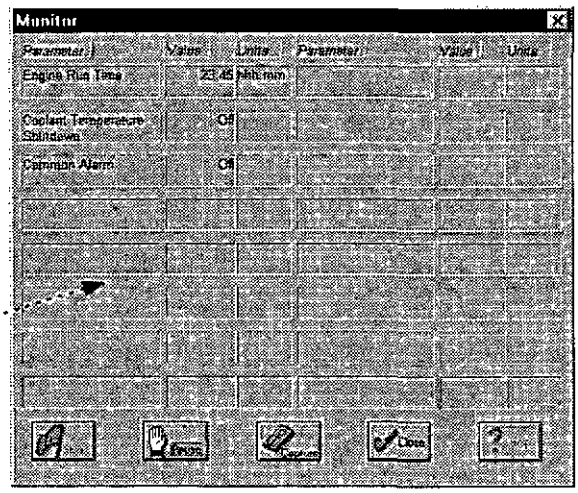

Data Logger
Status
Time Elapsed:
Datasets Logged:
Destination File:
Comment:
Start
Keyboard
Setup
Close
Help


Customer Meter Calibration
Coolant Temp
Oil Pressure
Minimum Meter Display 50.0
Maximum Meter Display 256.0
Maximum Display Adjustment 100 %
Test Calibration Inactive Deg F
Send
EOM Data
Cancel
Help

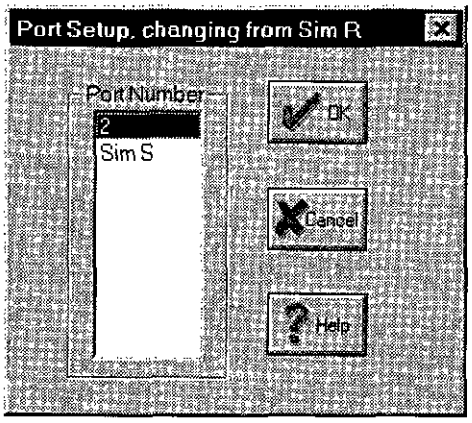

Customer Meter Calibration
Coolant Temp
Oil Pressure
Minimum Meter Display 0.0
Maximum Meter Display 100.0
Maximum Display Adjustment 65 %
Test Calibration 0.0 PSI
Send
EOM Data
Cancel
Help

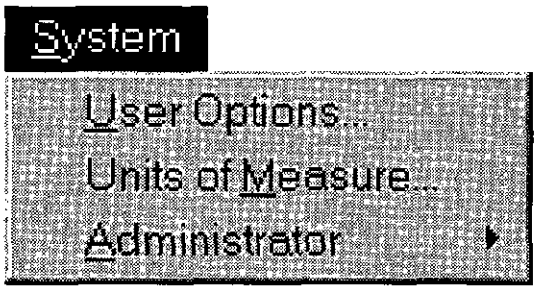

Tachometer Calibration
Actual Engine RPM 0
Minimum Meter Display 0
Maximum Meter Display 2400
Maximum Display 80 %
Rated Speed Override Inactive RPM
Send
EOM Data
Cancel
Help

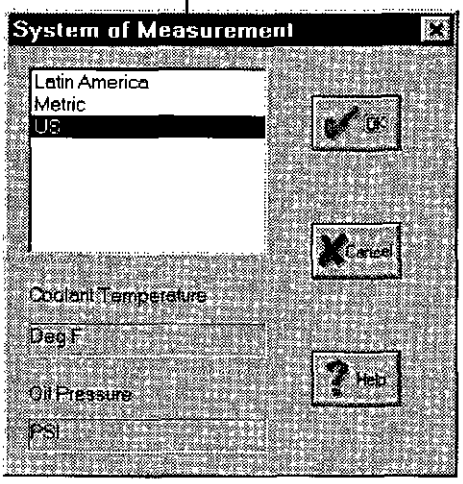

Monitor Setup
Alarm Reset Switch Input
Alternate Frequency Switch Input
Battery Voltage
Commanded Rack Position
Common Warning
Controller Run Time
Coolant Temperature
Coolant Temperature Meter Drive
Coolant Temperature Warning
Diagnostic Switch
Engine Speed
Engine Speed Meter Driver
Add
Delete
Clear
Common Alarm
Coolant Temperature Shutdown
Engine Run Time
Destination File MONITOR.DAT
OK
Get
Set
Cancel
Help

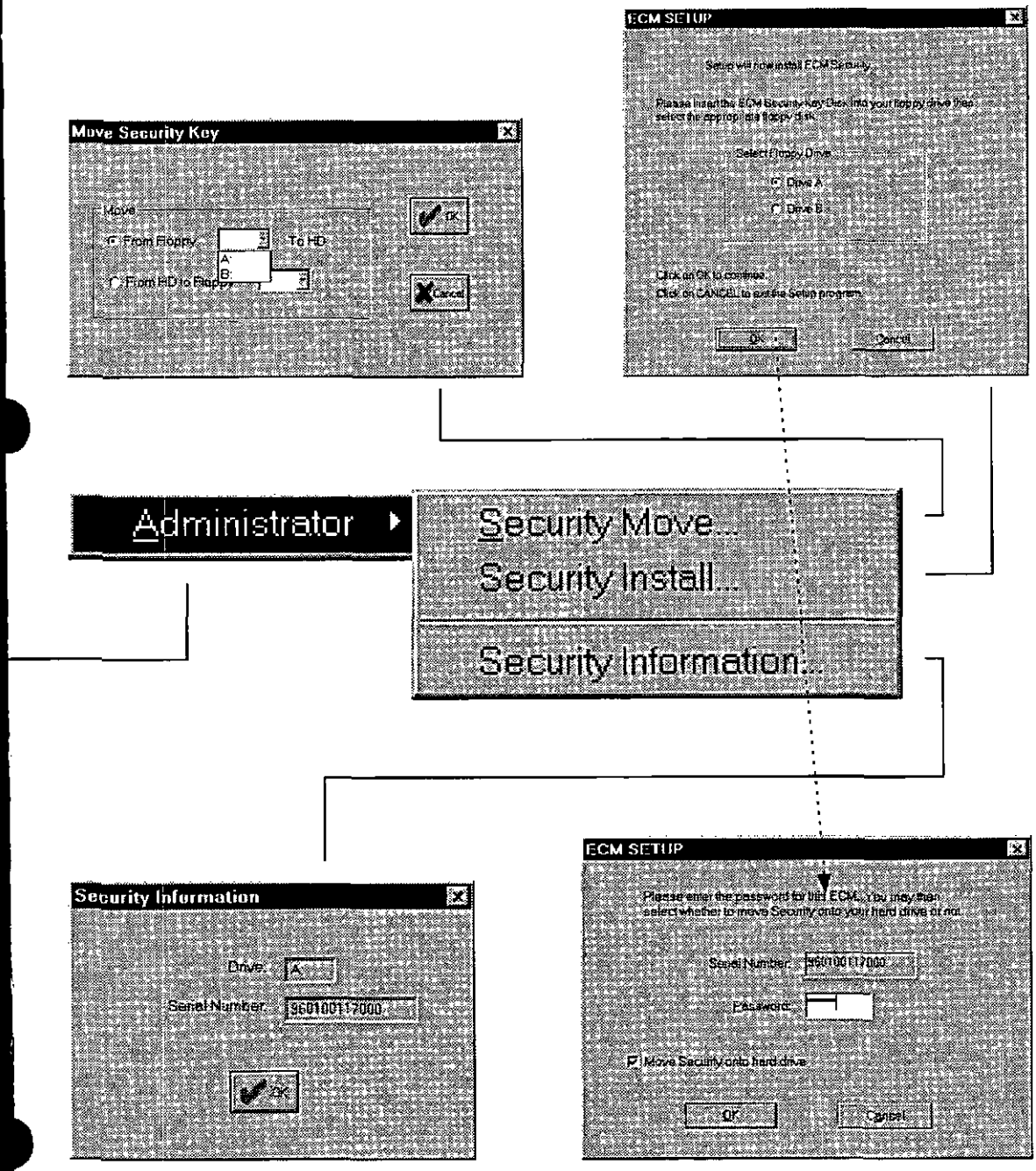

Monitor
Parameter
Value
Units
Parameter
Value
Units
Engine Run Time
23:45
Hh:mm
Coolant Temperature Shutdown
Off
Common Alarm
Off
Errors
Close

System Menu


Port Setup, changing from Sim R
Port Number
2
Sim S
OK
Cancel
Help


System
User Options...
Units of Measure...
Administrator


System of Measurement
Latin America
Metric
US
OK
Cancel
Coolant Temperature
Deg F
Oil Pressure
PSI
Help


Move Security Key
Move
From Floppy
To HD
A:
B:
From HD to Floppy
OK
Cancel
ECM SETUP
Select Floppy Drive
Drive A
Drive B
Click on OK to Continue
Click on CANCEL to exit the Setup program
OK
Cancel
Administrator
Security Move...
Security Install...
Security Information...
Security Information
Drive:
A:
Serial Number:
960100117000
OK
ECM SETUP
Serial Number:
960100117000
Password:
Move Security onto hard drive
OK
Cancel

Reference Information

Communications Messages

If you encounter a communications error of any kind, follow these troubleshooting steps:

To troubleshoot a communications problem:

1. Check the COM port setting in the User Options dialog box to make sure it is correct.
2. Check the cable connections to make sure all cables are securely in place.
3. Make sure the ECM is powered ON.
4. Try the function again.
5. If the problem persists, exit from INSITE™ QST30 G-Drive and contact your system administrator for assistance.

Glossary

Alarm Reset Switch

The alarm reset switch is used to send a signal to the ECM to reset any active fault indicators. The switch does not clear any actual fault codes – it merely clears the fault indicators (lamps, alarms, etc.).

If the engine was shut down by an active fault, the ECM will not allow the engine to be restarted until the fault has been reset with the alarm reset switch.

Alternate Frequency Switch Settings

The alternate frequency switch tells the ECM what frequency (50 or 60 Hz) the generator set operator wishes to use to generate electricity. The ECM uses this input to determine at what speed the engine should turn the generator. To change frequencies, the engine must first be shut down or brought to idle then back to rated speed.

The ECM input for this switch can be configured for Normal = 60, Alternate = 50; Normal = 50, Alternate = 60; Always 60; or Always 50. The Always 60 or Always 50 options will disable the switch and lock the input to the selected frequency.

ASCII

The American Standard for Communication and Information Interchange format commonly used to exchange data.

Barber-Colman Scale Factor

Enables the ECM to be adjusted for optimum paralleling operation when using Barber-Colman paralleling equipment. Also see Speed Bias Inputs.

Check Box

A box that you click once to select an option, then click again to de-select the option. You can select multiple check boxes in a list.

Close button

The button at the top right corner of a window that is used to close it. You can use this button in the main window to exit the INSITE™ QST30 G-Drive application.

Command

An option that you select on a menu.

Common Alarm Shutdown Output

The common alarm shutdown output is energized when a shutdown condition is detected by the engine control system. This output consists of a set of relay contacts rated for 2 Amps at 30 VDC and 12 Amps at 50 VDC. The output can be used to drive lamps, buzzers, or any other alarm device meeting the above specifications.

Common Shutdown

This output is energized whenever any shutdown fault becomes active. Shutdown faults will shut the engine down and prevent a re-start until the fault has been reset.

Common Warning

This output is energized whenever any warning fault becomes active. Warning faults indicate a pending shutdown if conditions worsen. The engine will continue to operate during a warning fault.

Coolant Temp Warning Threshold

The coolant temperature at which the ECM will report and record a warning fault condition.

Coolant Temperature Sensor

Measures the temperature of the coolant in the thermostat housing. The ECM measures coolant temperature by measuring the resistance of the sensor. It measures sensor resistance by measuring the voltage drop across a known resistance in the ECM that is in series with the temperature sensor.

Data Information Line (DIL)

A status line near the bottom of the main INSITE™ QST30 G-Drive window that displays the active function, the ECM part number, and the current operating mode (i.e. Running, Diagnostic, etc.).

Diagnostic Switch/Input

The diagnostic input to the ECM can either be connected to a switch or terminated in the harness with a shorting cap. When the diagnostic input is shorted to ground (through the switch or cap), the ECM is in its normal state and will power down when

the stop/run input is in the stop state and there are no active faults. When the diagnostic input is removed from ground (open circuited), the ECM enters diagnostic mode. This powers the ECM up for service tool communication and diagnostic troubleshooting.

Drop Down List Button

A button with a down arrow that you click with the mouse to display a list of entries.

Dynamometer

A Cummins diagnostic tool used to measure the power output of an engine.

ECM

The Electronic Control Module that contains the microprocessor and related circuitry for QST30 engines.

ECM Run Time

The amount of time spent with the ECM powered on – regardless of whether the engine is running or not.

Engine Offset Time

The actual runtime hours on the engine. The ECM value for this parameter must be edited when a new ECM is installed on an older engine, an older ECM on a newer engine, or if an engine is rebuilt.

For example, if a new ECM is installed on an engine with 10,000 hours, you would enter 10,000 for Engine Offset Time. The new ECM will now track Engine Run Time starting with the 10,000 hours run with the previous ECM.

Engine Run Time

The amount of time the engine was actually running (RPM > 0). Time spent with the ECM powered up but the engine not running does not get added to Engine Run Time.

Engine Speed Sensor

The engine speed sensor is mounted so that it can count the teeth on the flywheel ring gear as the teeth pass in front of the sensor. The sensor produces a frequency signal that the ECM uses to calculate engine speed.

Fault

Any problematic condition recorded while the engine was operating.

Fuel Pump Rack Actuators

The ECM commands the desired fueling to the fuel pump through the fuel pump rack actuators. The ECM has two outputs, one for each fuel pump, and controls the rack actuator with a Pulse Width Modulated (PWM) signal.

A constant 24 VDC signal is sent from the ECM to the rack actuator. The return signal from the actuator is then switched on and off by the ECM to generate the PWM signal. This PWM signal drives the fuel pump actuator, which in turn moves the fuel rack to the desired rack position.

Fuel Pump Rack Position Sensor

The fuel pump rack position sensor provides the ECM with information about the actual location of the fuel pump rack. The ECM then compares this information with the commanded rack position. If the two values do not match, the ECM will log fault code 171.

The signal provided from the sensor is a sinusoidal signal centered on a 2.5 VDC offset voltage. This signal received by the ECM is compared to a reference signal to obtain the position of the fuel pump rack.

Fuel shutoff valves

On/off solenoid valves used to cut off the supply of fuel to the engine. The QST30 engine has a fuel shutoff valve on each bank, one for each fuel pump. The valves open when the ECM detects engine speed during cranking; they automatically shut when power is removed. The ECM closes the valves under certain fault conditions.

G-Drive

An engine designed and built for generator set assemblers and GOEMs to be used in the power generation market. G-Drive refers only to the engine part of an assembled generator set.

Genset

A completely assembled power generation set consisting of the engine, alternator, cooling package, frame, and other mounting hardware.

GOEM

Generator Original Equipment Manufacturer

Governor Droop

The engine speed governor droop can be set to any value between 0 and 10 percent.

High Coolant Temperature Shutdown

This output is energized when the coolant temperature exceeds the coolant temperature shutdown threshold (*not* adjustable by INSITE™ QST30 G-Drive).

High Coolant Temperature Warning

This output is energized when the coolant temperature exceeds the coolant temperature warning threshold (adjustable by INSITE™ QST30 G-Drive).

Icon

A graphic symbol that you click to open a window or program.

Idle/Rated Switch

This switch input instructs the ECM to run the engine at idle or rated speed. The acceleration/deceleration time when switching between idle and rated is adjustable with INSITE™ QST30 G-Drive.

Idle Speed

The engine idle speed can be set to any value between 700 and 900 RPM.

Low Oil Pressure Shutdown

This output is energized when oil pressure drops below the Oil Pressure Warning Threshold (adjustable by INSITE™ QST30 G-Drive).

Low Oil Pressure Warning

This output is energized when oil pressure drops below the Oil Pressure Warning Threshold (adjustable by INSITE™ QST30 G-Drive).

Maximize button

This button is used to enlarge a window to the full size of your screen.

Menu Bar

A row of menu names near the top of the main INSITE™ QST30 G-Drive window.

Meter Coolant Temp Max Duty Cycle

Edit this percentage setting up or down until the coolant meter needle tops out at exactly the maximum value on the meter.

Meter Drivers

The ECM provides meter driver outputs for engine speed, oil pressure, and coolant temperature. Each meter driver is rated for 0 to 1 mA operation.

Meter Engine RPM Max Duty Cycle

Edit this percentage setting up or down until the engine RPM meter needle tops out at exactly the maximum value on the meter.

Meter Maximum Engine RPM

The value that displays at the upper limit of your meter scale. For example, if the highest value on your meter is 2400 then you should enter 2400 in the spinbox.

Meter Maximum Oil Pressure

The value that displays at the upper limit of your meter scale. For example, if the highest value on your meter is 100 then you should enter 100 in the spinbox.

Meter Maximum Temperature

The value that displays at the upper limit of your meter scale. For example, if the highest value on your meter is 255 then you should enter 255 in the spinbox.

Minimize button

This button is used to convert a window to a button on the Windows® 95 taskbar, enabling INSITE™ QST30 G-Drive to run in the background.

Meter Minimum Engine RPM

The value that displays at the lower limit of your meter scale. For example, if the lowest value on your meter is 0 then you should enter 0 in the spinbox.

Meter Minimum Oil Pressure

The value that displays at the lower limit of your meter scale. For example, if the lowest value on your meter is 0 then you should enter 0 in the spinbox.

Meter Minimum Temperature

The value that displays at the lower limit of your meter scale. For example, if the lowest value on your meter is 0 then you should enter 0 in the spinbox.

Meter Oil Press Max Duty Cycle

Edit this percentage setting up or down until the oil pressure meter needle tops out at exactly the maximum value on the meter.

Oil Press Warn Threshold at Idle

The oil pressure at which the ECM will report and record a warning fault condition at idle.

Oil Press Warn Threshold at Rated

The oil pressure at which the ECM will report and record a warning fault condition at rated speed.

Oil Pressure Sensor

This sensor measures the capacitance between two circular plates inside the sensor. As the measured pressure changes, the distance between the two plates changes. This change in distance changes the capacitance between the two plates. The sensor has built-in circuitry that measures the capacitance and turns it into a pressure signal that the ECM can use.

Overspeed Shutdown RPM

The engine speed at which the ECM will shut off the fuel supply to the engine.

Overspeed Shutdown

This output is energized when engine speed exceeds the Overspeed Shutdown threshold. The threshold can be lowered from its default setting only with INSITE™ QST30 G-Drive.

Parameters

Operating values that govern how an engine performs.

PC

An IBM-compatible desktop or laptop computer.

Rack Position Voltages

The rack position voltage outputs from the ECM provide service technicians with a voltage reading between 0 and 5 volts. This voltage corresponds to the rack position detected by the fuel pump rack position sensor. The ECM converts the sinusoidal signal from the rack position sensor to a DC voltage that can be read with a volt/ohm meter.

Radio Button

A mutually exclusive option that you select from a group of options.

Ramp Time (Crank to Rated)

The amount of time it takes (in seconds) for the engine speed to accelerate from crank to rated speed. See the Table of Ramp Times on page 15.

Ramp Time (Idle to Rated)

The amount of time it takes (in seconds) for the engine speed to accelerate from idle to rated speed. See the Table of Ramp Times on page 15.

Relay Drivers

The ECM provides relay driver outputs for high coolant temperature, pre-high coolant temperature, low oil pressure, pre-low oil pressure, and engine overspeed. These drivers are rated for a maximum current of 200 mA at 24 VDC and should be used to drive non-polarized relays. These relay driver outputs provide individual notification for the five fault conditions listed above.

RPM

Revolutions per Minute.

RS232 Datalink

The ECM provides an RS232 datalink connection for communication with INSITE™ QST30 G-Drive. This datalink connector can be found on the engine harness, near the flywheel housing on the left hand side of the engine.

SAE

Society of Automotive Engineers.

Speed Adjust Knob

A variable resistor that enables adjustment of rated engine speed by ± 6 percent. This ECM input can be enabled or disabled using INSITE ™ QST30 G-Drive.

Speed Bias Inputs

The ECM accommodates speed bias inputs for both Woodward and Barber-Colman paralleling devices. It uses these inputs to adjust the rated engine speed for generating electricity in parallel with the utility or other generators.

Woodward devices provide the ECM with ±3 VDC; Barber-Colman provides ±58 mV centered around 5 VDC. The type of paralleling device to be used by the ECM, Woodward, Barber-Colman, or none (disabled), is entered using INSITE™ QST30 G-Drive.

Speed Bias Reference Voltages

The ECM provides two reference voltages for use with external paralleling devices. A 5 VDC reference voltage is provided for both Woodward and Barber-Colman digital devices. A 7.75 VDC reference voltage is provided for use with Barber-Colman analog devices.

Spin Box

An entry box with two arrowheads at the right. You can click the up arrowhead to raise the number in the spin box or click the down arrowhead to lower the number in the spin box. You can also type an entry directly in the data entry box.

Stop/Run Switch

This switch instructs the ECM to either stop or run. In the stop state, the ECM does not command any fueling, and if there are no active faults or an active diagnostic input, the ECM will power down.

The run state alerts the ECM to monitor engine speed. Once engine (cranking) speed is detected, the ECM opens the fuel shut-off valves and commands the proper fueling.

Toolbar

A group of buttons that displays in a column on the left side of the main INSITE™ QST30 G-Drive window. You click a button to display its corresponding dialog box.

Torque Curve Adjustment

Adjusts the torque curve percentage for fine tuning the engine output power to meet the alternator input requirements.

Woodward Scale Factor

Enables the ECM to be adjusted for optimum paralleling operation when using Woodward paralleling equipment. Also see Speed Bias Inputs

Customer Feedback Questionnaire

We appreciate your feedback about our products and services. Fax your completed questionnaire to us at 812-377-6340 or mail it to us at:

Cummins Engine Company, Inc.
MC 41317
1460 National Road
Columbus, IN 47201

Customer Feedback

Did We?	**Y/N**
Respond quickly?	
Respond knowledgeably?	
Respond courteously?	
Solve the problem?	

Product Feedback Questionnaire

Product	**Rating (5=excellent; 1=poor)**				
Timeliness of delivery	5	4	3	2	1
Ease of installation	5	4	3	2	1
Ease of learning	5	4	3	2	1
Usefulness of manual	5	4	3	2	1
Overall value	5	4	3	2	1

Suggestions or Improvements (please be specific)

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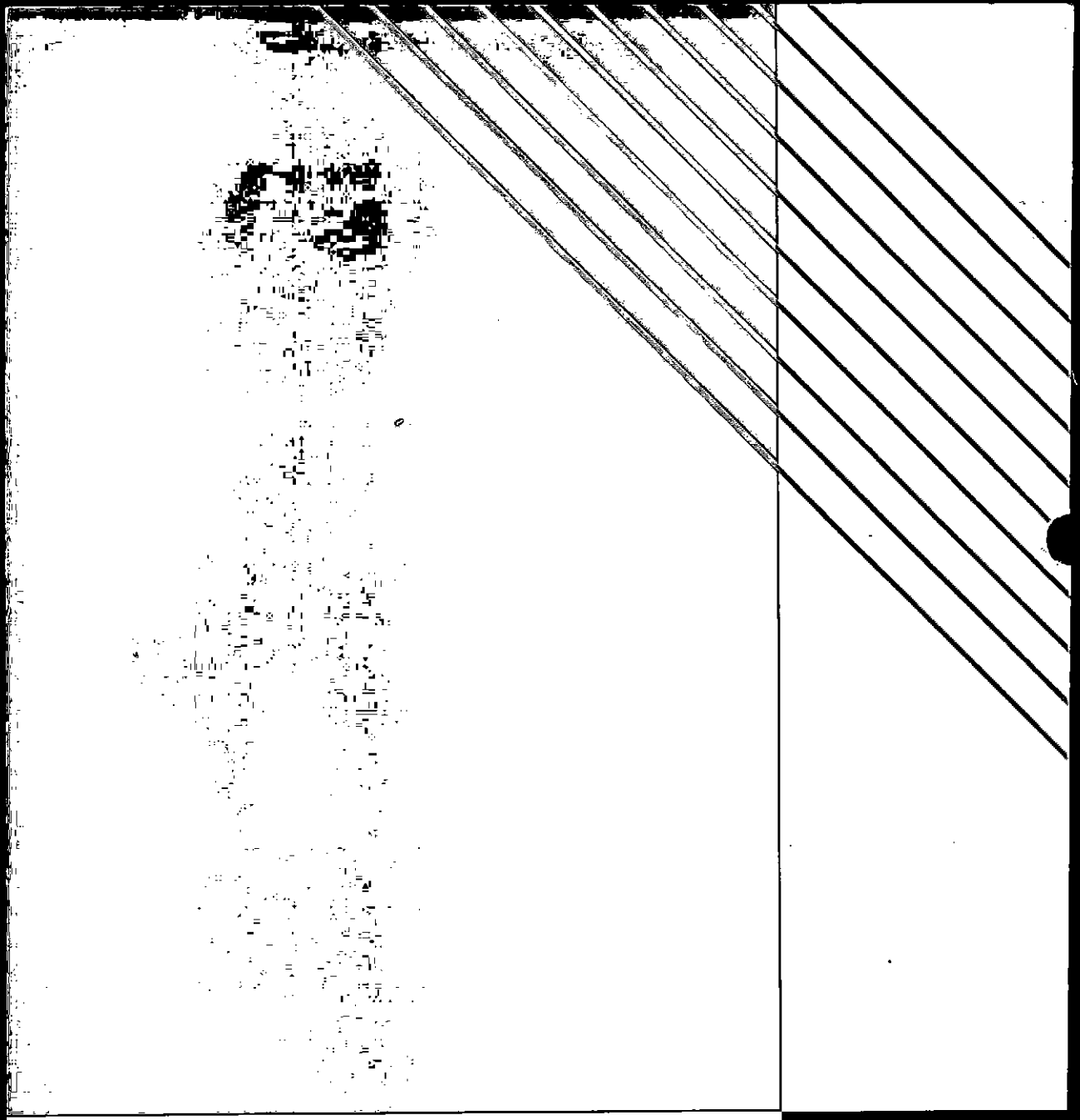

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