



User Manual

Our energy working for you.™



**Power
Generation**

Software

InPower™ Pro

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2 Introduction

2.1 Warning

Electrical equipment and engines present hazards that can result in property damage, severe personal injury or death. The InPower tool is for use by trained and experienced technicians only. Refer to important Safety Instructions in the equipment's Operator and Maintenance manuals.



WARNING: *Electrical equipment and engines present hazards that can result in property damage, severe personal injury or death. The InPower tool is for use by trained and experienced technicians only. Refer to important Safety Instructions in the equipment's Operator and Maintenance manuals.*

2.2 InPower

InPower™ is a Windows-based service, maintenance and diagnostic tool. This tool provides electronic service functions including: adjustments for trims and settings, monitoring, strip chart, data logging, viewing faults, and report capability.



NOTE: PowerCommand is a registered trademark of Cummins Inc.

The InPower tool also can be used to save a device's trims and settings to a file. The stored settings can be viewed off-line and they can be used to configure multiple installations of the same application controller type.

Each copy of InPower is packaged and installed separately. No more than one InPower product can be installed on the same PC.

After successful completion of InPower version 9.5 and later versions, the tool must be registered and set up before it can be used. The user is prompted to register the product the first time InPower is started.

For detailed registration information, refer to the Registration and License Renewal Instruction Sheet (A030X097).

2.2.1 Commercial Products

InPower is available in two kits, one with calibration download capability and one without calibration download capability. Each product is packaged and installed separately, and each one has a unique serial number and registration password, to provide software security.

Refer to the recommended system hardware and software. Installing and using InPower requires experience using the Windows operating system.

The service PC, running InPower, is connected to the device via an RS-232 serial communications null-modem cable. (With InPower, the term device is used to describe an application controller, like a PowerCommand® genset control). [Figure 1](#) illustrates the typical method used to connect a service PC to different device types.



NOTE: The pin configuration for Cummins null-modem cables is included in [Section 2.2.3](#). Be sure to use a null-modem cable that matches this configuration (the 9th pin on the DB9 female-to-female serial cable must not be connected).

The serial cable is connected to the (COM) port on the PC with a DB9 connector. The other end of the serial cable is connected with either a DB9 connector or a 9-Pin Deutsch connector, depending on the application.

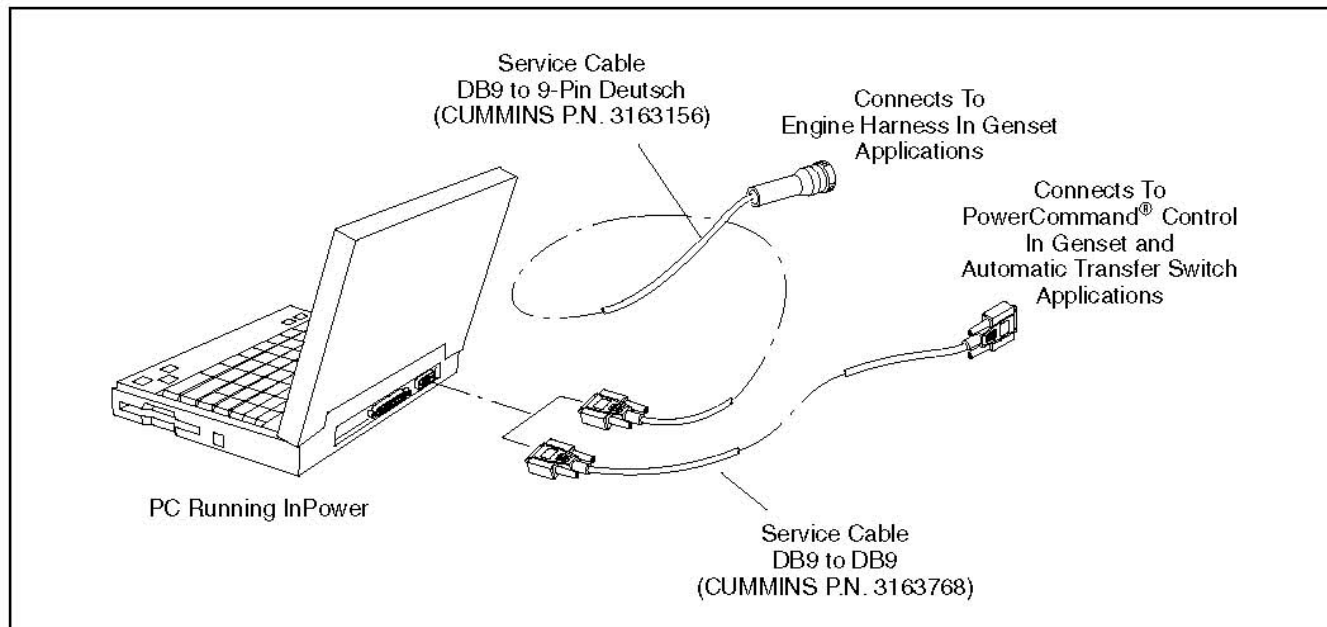


FIGURE 1. TYPICAL INPOWER SERIAL CONNECTION METHODS

2.2.1.1 Interface Harness Kits for Commercial Products

Controller	Required Kit/Part
PS 0500, PCC 1300, PCC 1301, PCC 1302, PCC 2300, PCC 3300, MCM 3320	541-1199
PCC 3100	3164721
PCC 1300, PCC 2100, PCC 3200 (DB9-to-DB9)	3163768
PCC 3200 (DB9-to-9-pin Deutsch)	3163156



NOTE: Your version of InPower may not support all of these devices.

2.2.2 Consumer Products

The service PC, running InPower, is connected to the genset control via an RS-232 serial communications harness. [Figure 2](#) illustrates a method used to connect a service PC to a RV genset.

The harness is connected to the (COM) port on the PC with a DB9 connector. Some gensets also require the use of an RS-232 to RS-485 converter. For RV installations, the other end of the serial cable is connected to the device (for example, the generator set). For Marine installations, the other end of the serial cable is connected with an 8-pin connector to the generator set and an 8-pin connector to the remote connection.

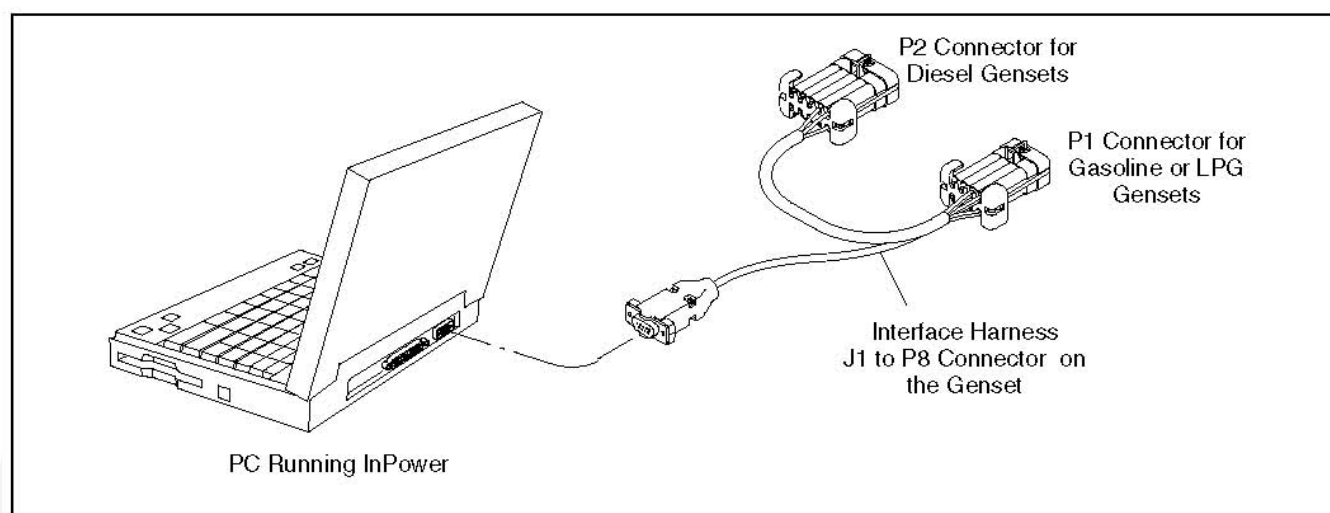


FIGURE 2. TYPICAL INPOWER SERIAL CONNECTION METHOD

2.2.2.1 Interface Harness Kits for Consumer Products

TABLE 1. INTERFACE HARNESS KITS FOR CONSUMER PRODUCTS

Model/Device	Fuel Type	Required Kit	RS-232 to RS-485 Converter
HDKAx (Starting with Spec K) and HDKAW	Diesel	541-1374	Yes
810HQD, 1215HQD, and 1218HQD	Diesel	541-1374	Yes
DKHA	Diesel	541-1374	Yes
HDKAx (Prior to Spec K), HDKBx, and HDKCx	Diesel	541-1287	No
HGJAA, HGJAB, HGJAC, HCJAD, HGJAE, and HGJAF (Units with controls built in 2005 or later, up to Spec E)	Gasoline/LPG	541-1287	No
HGJAA, HGJAB, HGJAD, HJGAE (Starting with Spec J)	Gasoline/LPG	541-1374	Yes
HGJBB	Gasoline/LPG	541-1374	Yes
MDKBH - MDKBS and MDDCx	Diesel	541-1289	Yes
MGKBx (Starting with Spec C)	Gasoline	541-1289	Yes
GSXX	Natural Gas/Propane	541-1374	Yes
KY and MKY	Gasoline/LPG	541-1287	No
MDDCx and MGKBx	Gasoline or Diesel	541-1289	Yes
HQGMx	Gasoline/LPG	541-1374	Yes
HJBAA	NA	541-1374	Yes
MDKBx and MDDCx	Diesel	541-1289	Yes
Network Interface Module (NIM)	NA		
PCC1301	NA	0541-1199	Yes

Model/Device	Fuel Type	Required Kit	RS-232 to RS-485 Converter
PCC1302	NA	0541-1199	Yes
HMI211RS	NA	0541-1199	Yes
RV/CM Display	NA	541-1374	Yes
Marine Display	NA	541-1289	Yes
All	Gasoline or Diesel	541-1389	Yes

2.2.3 Null Modem Cable Configuration

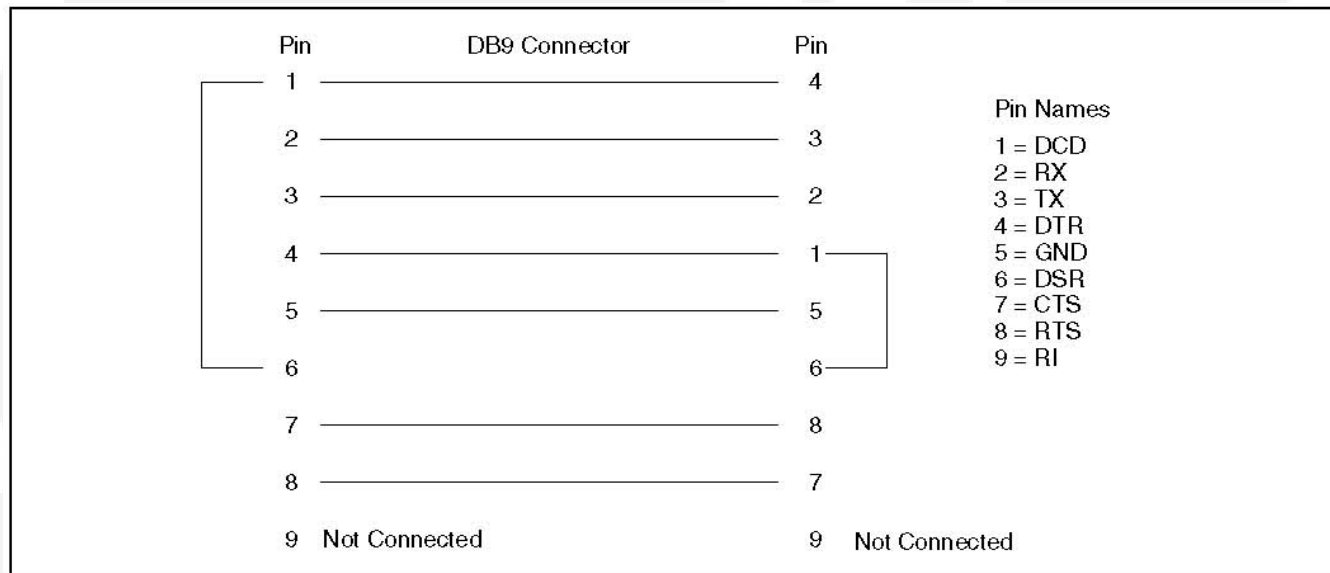


FIGURE 3. NULL MODEM CABLE CONFIGURATION

2.3 About This User's Guide

This User's Guide covers installation and operation of the InPower service tool. Last minute software changes and corrections may be found in the InPower ReadMe file.

2.4 Supported Devices

This version of InPower supports the following devices:

- Dominion (PCC3200)
- PCC3200 with CAN
- Operator Panel
- PCC 3100
- ATS(PCATS)
- Dynasty (PCC2100)
- GCP PCS

- NonGCP PCS
- PCC1300
- PCC 1300 User Interface
- Annunciator(HMI 113)
- HWSet_A(Generic)
- MCC3320
- PCC1301
- AUX101(Auxillary I/O Device)
- HMI 112
- PCC3300
- HMECM(AUX105)
- PCC2300
- HMI211
- HMI3320(HMI211 MCM3320)
- PCC1302
- HMI220(HMI320)
- HMI320(HMI320)
- HMI 114
- PS 0500
- PCC2300V2(PCC2300)
- HMI321
- Universal Simulator
- AUX 101LBNG(Auxillary I/O Device)
- QD75_OTP(Read-only ConDvc)
- RavenValue_OTP(Read-only ConDvc)
- RavenPremium(Read-only ConDvc)
- Microquiet_OTP(Read-only ConDvc)
- Ranger & QDSA(Read-only ConDvc)
- Equinox/RVInverter(HJBAA)
- MerlinLCD
- Equinox LCD(HJBAA LCD)
- Marine
- NIM
- RaptorECM(HQDECM)
- RaptorTS(HQDTS)
- RaptorLCD(HQDLCD)

- QD1012(HDKC)
- QD1012(RS485)
- QD55(RS485)
- Marquis(Marquis Premium)
- Raven Commercial
- HWSet_A(Generic)
- HQD Inverter(HQDInverter)
- QD75(HDKAJ)
- QDSA(HDCA)
- Raven485
- Generic device (Generic485)
- APU LCD
- GENERICINV4KW
- APU(DKHA)
- Stealth
- Stealth LCD(GSAALCD)
- APU DPF LCD(APUDPFLCD_96)
- Coyote
- Generic CommMobile(GeCommMobile)
- MARINE3LCD(MARINE3LCD)
- Razor(QG1012)
- EC30W Genset Module(EC30WGenmod)
- EC30W Display(EC30WDisplay)
- GENERICUMC3(GENERICUMC3)
- MARINE3(MARINE3)
- Annunciator
- CCMT
- CCMG
- DIM

2.5 System Requirements

2.5.1 Recommended PC

The following are the recommended laptop PC specifications.

- An IBM PC or 100% compatible PC

- Recommended Operating System: Windows XP Pro, Windows Vista, Windows 7, or Windows 8 (see details below)
- Windows Vista Capable or Windows Vista Premium Ready

TABLE 2. OPERATING SYSTEMS

	Windows XP Pro	Windows Vista Capable*	Windows Vista Premium Ready* or Windows 7**	Windows 8 or windows 8.1
Processor	500 MHz	800 MHz	1 GHz	1 GHz
Memory	256 MB RAM	512 MB RAM	1 GB RAM	1 gigabyte (GB) (32-bit) or 2 GB (64-bit)
Graphics Card	-	DirectX 9.0	DirectX 9.0 capable and WDDM 1.0 driver support	Microsoft DirectX 9 graphics device with WDDM driver
Graphics Memory	-	32 MB RAM	128 MB RAM (1920 x 1200 resolution) or 512 MB+ for greater resolution such as 2560 x 1600	Up to 1792 MB (1366 x 768 resolution) recommended
Hard Drive Capacity	1.5 GB	20 GB	40 GB	40 GB
Hard Drive Free Space	-	-	15 GB	15 GB
Other Drives	-	-	DVD-ROM	DVD-ROM
Audio	-	-	Audio output	Audio output
* Only 32-bit Windows Vista is supported. 64-bit Windows Vista is not supported.				
** Both 32-bit and 64-bit Windows 7, windows 8 and 8.1 are supported.				

- Microsoft Internet Explorer version 8.0 or higher
- SVGA (1024x768) color display
- Windows compatible pointing device and 101 key enhanced keyboard
- 16X CD-ROM
- One free serial communications port
- Serial to USB communications port
- Windows compatible printer (optional)



NOTE: Please note that InPower version 7.5 and higher does not support the Windows 95, Windows 98, Windows 2000, or Windows NT operating systems.



NOTE: Windows Vista requires the use of Adobe Acrobat 8 or newer.

2.5.2 Administrative Rights

Administrative rights are required for every installation and uninstallation.

2.6 Program Directories Installed with InPower

When InPower is installed, the InPower setup wizard creates several directories (folders) that are used by various features in InPower. You might want to look in these directories as you use the associated features.

The locations of these directories depend on two selections made during installation. If you do not know what these selections were, the default locations are shown in the following table.

TABLE 3. DEFAULT LOCATIONS OF PROGRAM DIRECTORIES

Description	Default Location
Folder in which InPower is installed	D:\Program Files
Folder in which strip chart and monitor files are stored	D:\Program Files\InPower

The strip chart and monitor directories are created in the folder that is selected during installation. Other directories are created in the <selected folder>\Power Generation\Shared folder.

The installation error message shown below is displayed if a restricted path is selected.

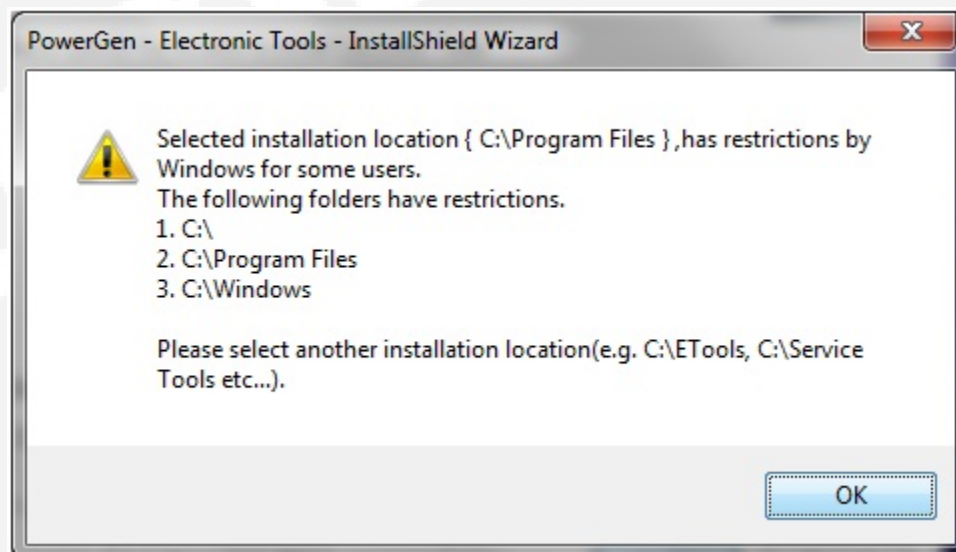


FIGURE 4. INSTALLATION ERROR MESSAGE

InPower cannot be installed in usage-restrictive folders on Windows 7 or Windows VISTA. Usage-restrictive folders include:

- C:\
- C:\Program Files
- C:\Windows

If any of the above paths are selected for installation, the error message displayed includes suggested alternate paths.

If the D:\ drive, (the default location) is not available, another folder on the C drive can be used, as long as it isn't one of those mentioned above. For example, InPower can be installed in one of the following locations.

- C:\ETools
- C:\Cummins
- C:\InPowerPro
- C:\Service Tool

A folder with your preferred name will need to be created before installing InPower. When installing InPower, the default installation path "D:\Program Files" is displayed as shown below. To select a different location, click on the **Browse** button and navigate to the appropriate folder and click **OK**.

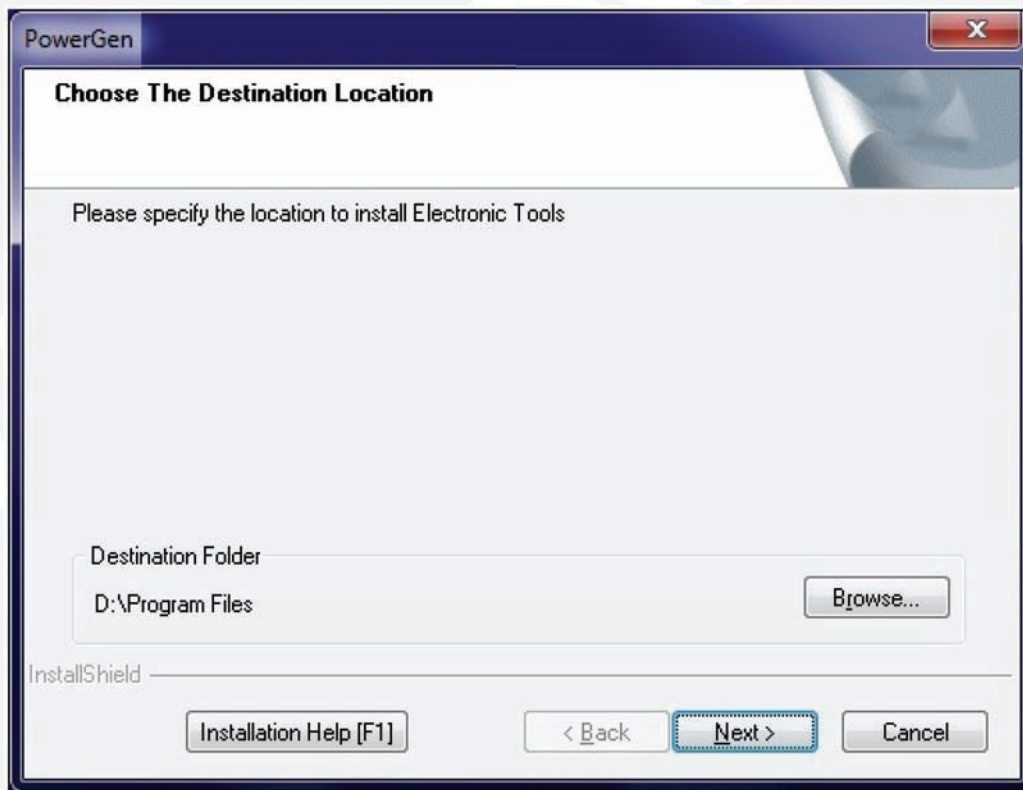


FIGURE 5. INSTALLATION DESTINATION LOCATION DIALOG

InPower cannot be installed on an external drive. If there is an attempt to install InPower on an external drive a message is displayed.

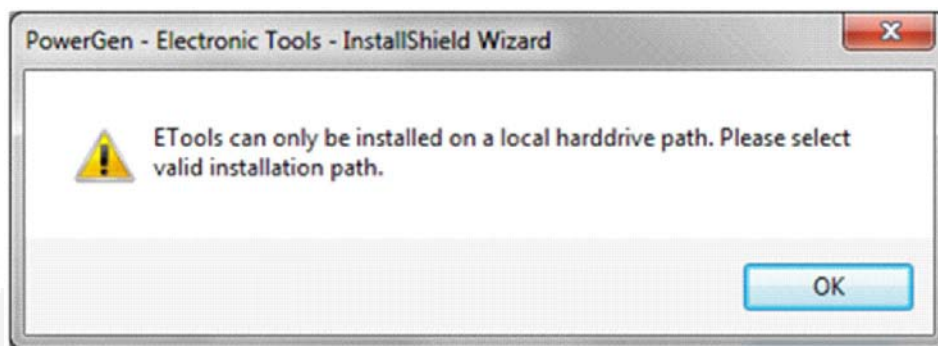


FIGURE 6. MESSAGE FOR ATTEMPTED INSTALLATION ON EXTERNAL DRIVE

The user must have write access to the installation directory.

When the Tool Registration starts, the **Welcome to the Tool Registration Wizard** window shows:



FIGURE 7. WELCOME TO THE TOOL REGISTRATION WIZARD WINDOW

If the user does not have write access to the installation directory when Next is selected for Manual or Web Registration, then a message window shows.



FIGURE 8. MESSAGE WINDOW FOR READ-ONLY ACCESS

2.6.1 Monitor

The Monitor folder contains the Target Parameter List files (.TPL). This folder will contain one or more .TPL files. These files support the InPower software. The user will not need to view or access any of these files.

2.6.2 Strip Chart

The Strip Chart folder contains one or more strip chart parameter listing files (.TPL).

The files contain chart design parameters, the user will not need to view or access these files.

2.6.3 Data

The two Data folders contain data files. These files support the InPower software. The user will not need to view or access any of these files.

2.6.4 Captured Files

The Captured Files folder stores extracted (captured) device information. Initially this folder will not contain any files. Files are created when the user chooses to **Capture to File** from a connected device (**Device** menu). The user names the file and InPower appends a .CAP extension.

Captured files are read-only files. You can connect to, and view these files, but you cannot modify the file contents. Captured files can be copied (written) to a connected device, as long as the captured file is from the same device type.

Example: The Captured file is from a Genset controller, this file can be written to another (connected) Genset controller. This file cannot be written to a G-Drive controller.

2.6.5 Simulator

The Simulator folder contains Captured (.CAP) files that are used to simulate a connected device. The files are read only; however, the user can simulate editing (the changes are not actually written to the file). The Simulator feature does not allow for simulating **Edit-Save Adjustments** operations.

2.7 Calibration Directories Installed with InPower

Starting with InPower version 6.0, an empty directory structure is created in the PGA directory during installation ([Figure 9](#)). This file structure is used for downloading calibration files from the InCal website.

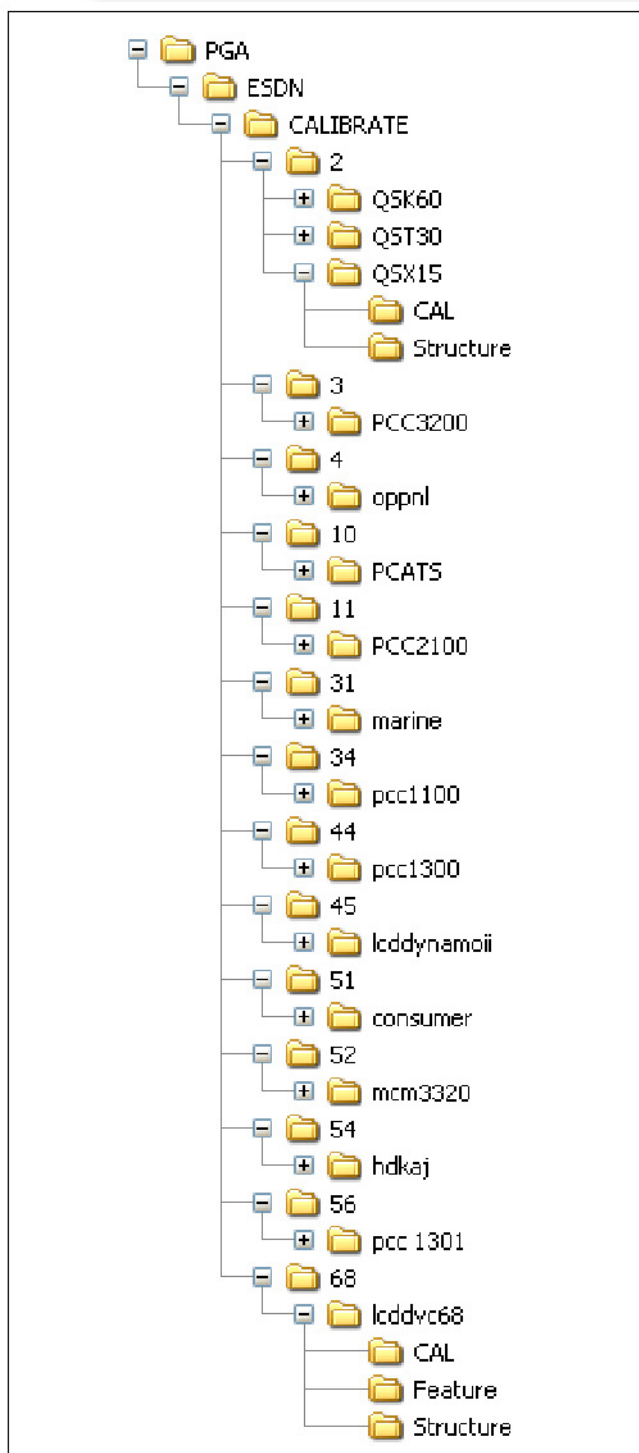


FIGURE 9. PGA DIRECTORY STRUCTURE

2.8 Service File and Logical DFA Directories Installed with InPower

Service files and logical DFAs are also part of the website InCal distribution and need to be copied to their respective folders.

- **Service Files:** <Installed Location>\InPower\Data
- **Logical DFAs:** <Installed Location>\Shared\Data

2.9 Start Menu Group Shortcuts

InPower installs **Start-Menu** shortcuts for the InPower applications. Clicking on any one of these shortcuts will launch the selected application.

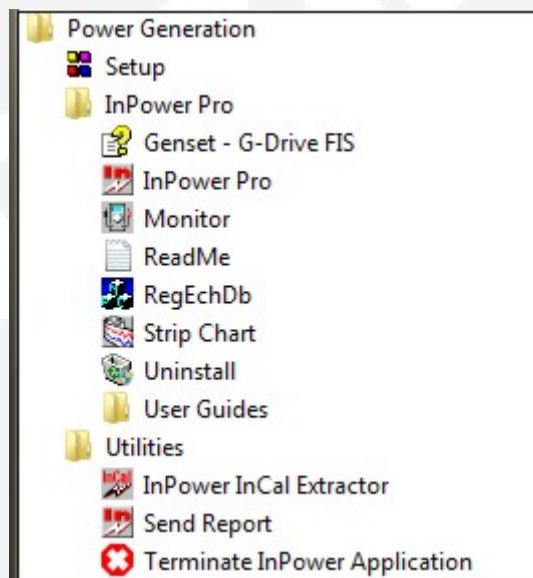


FIGURE 10. START MENU GROUP SHORTCUTS

2.9.1 Readme File

When InPower is installed, a Readme file is copied to the Power Generation group. This file contains last minute instructions for using InPower. Open and review these instructions after the initial software installation.

2.10 User Interface

The InPower software operates in the Windows graphical environment and is compatible with Windows. You can access the system like any other Windows application. If you are unfamiliar with Windows, or have questions, refer to the *Microsoft Windows User's Guide* for your specific operating system, or click on **Help**, from the Windows **Start** menu, to view the Windows Help Topics.

All system commands are accessible by mouse and keyboard. Frequently used commands have keyboard shortcuts and tool bar access.

InPower uses the Windows Explorer tree hierarchy for navigating a connected file or device (referred to as *Device Explorer*, in *InPower*).

The tool's main window displays a Menu Bar and a Toolbar for access to the tool's functions. Only commands applicable to the current active window are enabled, all other commands from the Menu Bar or Toolbar are grayed out.

2.11 How to Get Service

If you are having a problem with the software, follow these steps.

1. Write down what you can about the problem.
2. Determine whether or not the problem can be repeated.
3. Write down the software version. (This can be found in the Help-About window.)
4. Contact your distributor.

Distributors should contact Cummins Power Generation using standard channels.

2.12 Notification of Tool Expiration

A tool expiry notification message is displayed to inform InPower users that their license is about to expire. The message, such as "InPower Pro will expire on Mmmm dd, yyy," is automatically generated by the InPower software. The message snoozes, based upon the frequency set up by the user. When displayed, users should prepare for upgrading the subscription.

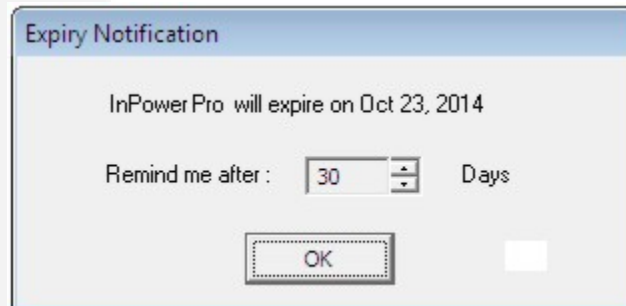


FIGURE 11. TOOL EXPIRY NOTIFICATION MESSAGE

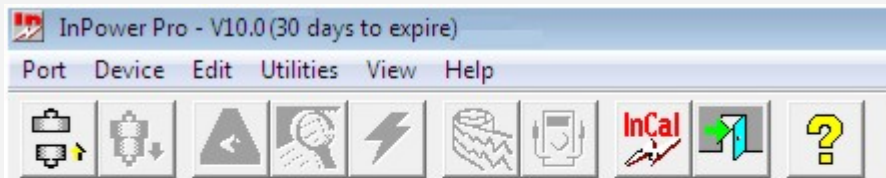


FIGURE 12. TOOL EXPIRY NOTIFICATION MESSAGE - 15 TO 30 DAYS

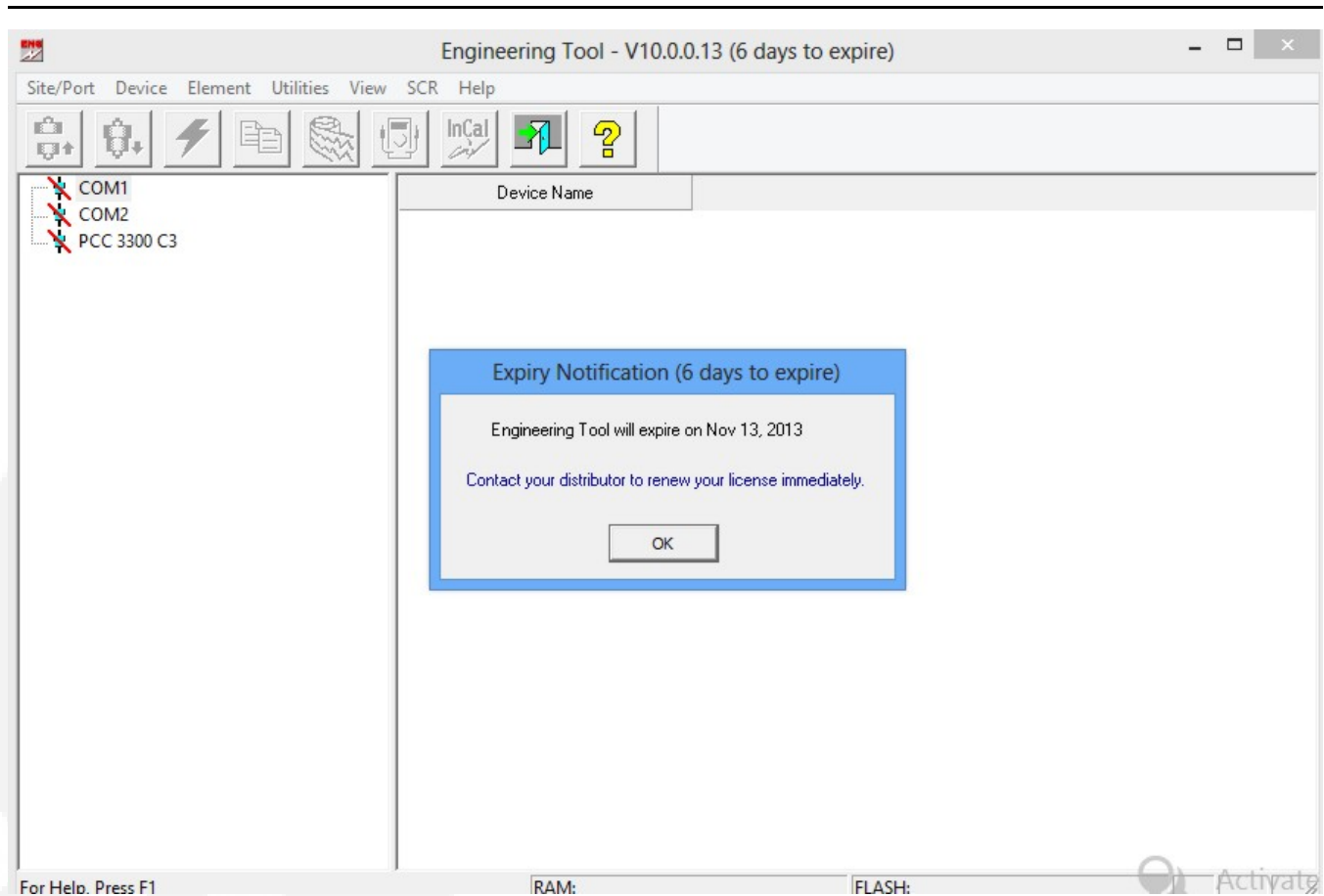
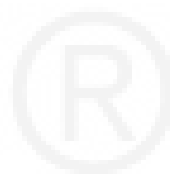


FIGURE 13. TOOL EXPIRY NOTIFICATION MESSAGE - 15 OR FEWER DAYS



NOTE: This expiry notification is mainly intended for non-Cummins users because they need to renew the InPower software license. All registered Cummins users will automatically be upgraded to a new release of InPower by SCCM. Any new Cummins users should request InPower from the Software Shelf.

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3 Setup

The **Setup** dialog allows the installer, or System Administrator, to set user preferences and make changes to both Sites and Devices.



NOTE: If you attempt to access the Setup program while InPower is running, the message "Initialization mode failed" is displayed. Make sure InPower is not running before accessing the Setup program.

3.1 General Setup

The **Setup** feature can be accessed from the **Start** menu (**Start -> All Programs -> Power Generation -> Setup**).

Four Setup tabs are displayed; the **Unit of Measurement** tab is the default tab selection. To select another tab, click on the desired tab. When the **Site Setup** tab is selected, clicking on an item from the Site List will add a button, named **Device Setup**.

The **Communications** tab is used in genset applications to configure the service PC for remote communications.

If you need to set up another COM port, refer to **Create Site**.

3.2 Unit of Measurement

This feature allows selection of a list of pre-defined units of measure, based on their region or country. InPower will convert and display values according to the units of measure selected from the **System Of Measurement** drop down list.

Users can create their own list by entering a name in the **System of Measurement** dialog. To customize a setup, select individual **Unit Descriptions**, by **Unit Type**, from the drop down lists. Click on the **Apply** button to save the changes.

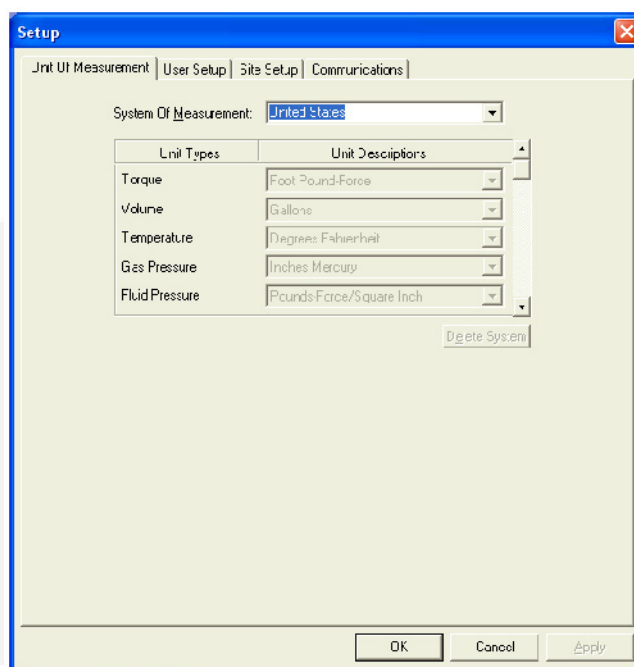


FIGURE 14. SETUP DIALOG - UNIT OF MEASURE

3.3 User Setup - System Administration

The System Administration feature (**User Setup**) allows a person using the Windows logon (with System Administrator privileges) to establish a user profile for each user on the system. After the initial setup, only the System Administrator will have access to the **User Setup** dialog.



NOTE: By default, the user will be set up as system administrator the first time they launch the program. After this initial launch, the user will have the ability to change this setting to different access levels if desired.

Three access levels are available as follows:

Read Only: User can connect to a device and read all parameter settings, fault information and history records.

Read/Write: User has full use of all InPower features, including making adjustments.

Administrator: Administrator has full use all InPower features and the ability to establish and maintain user privileges for all users on this PC.

3.4 Capture File Options

The **User Setup** dialog allows the user to set their preference to either automatically create a capture file each time they connect to a device or to be prompted before creating a capture file. Click inside the checkbox next to the desired setting then click on the **OK** button. See [Figure 15](#).

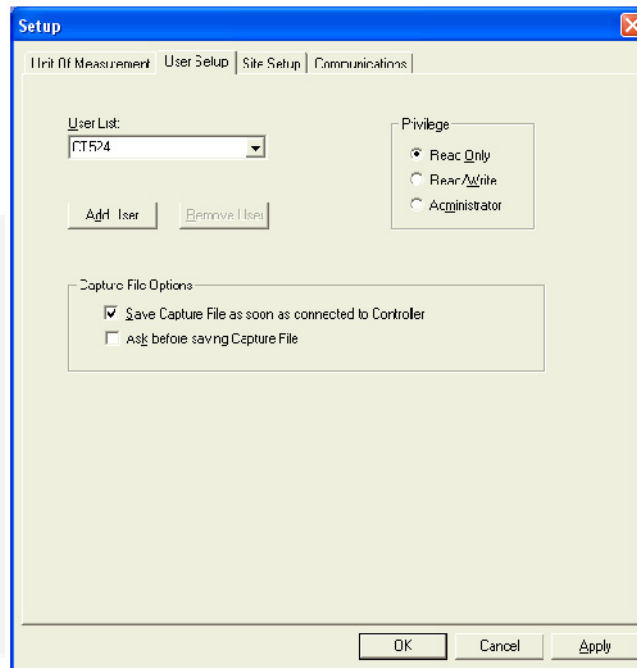


FIGURE 15. USER SETUP

3.5 Site Setup

The **Site Setup** dialog allows the user to **Add**, **Remove** or edit either a port or a file ([Figure 16](#)).

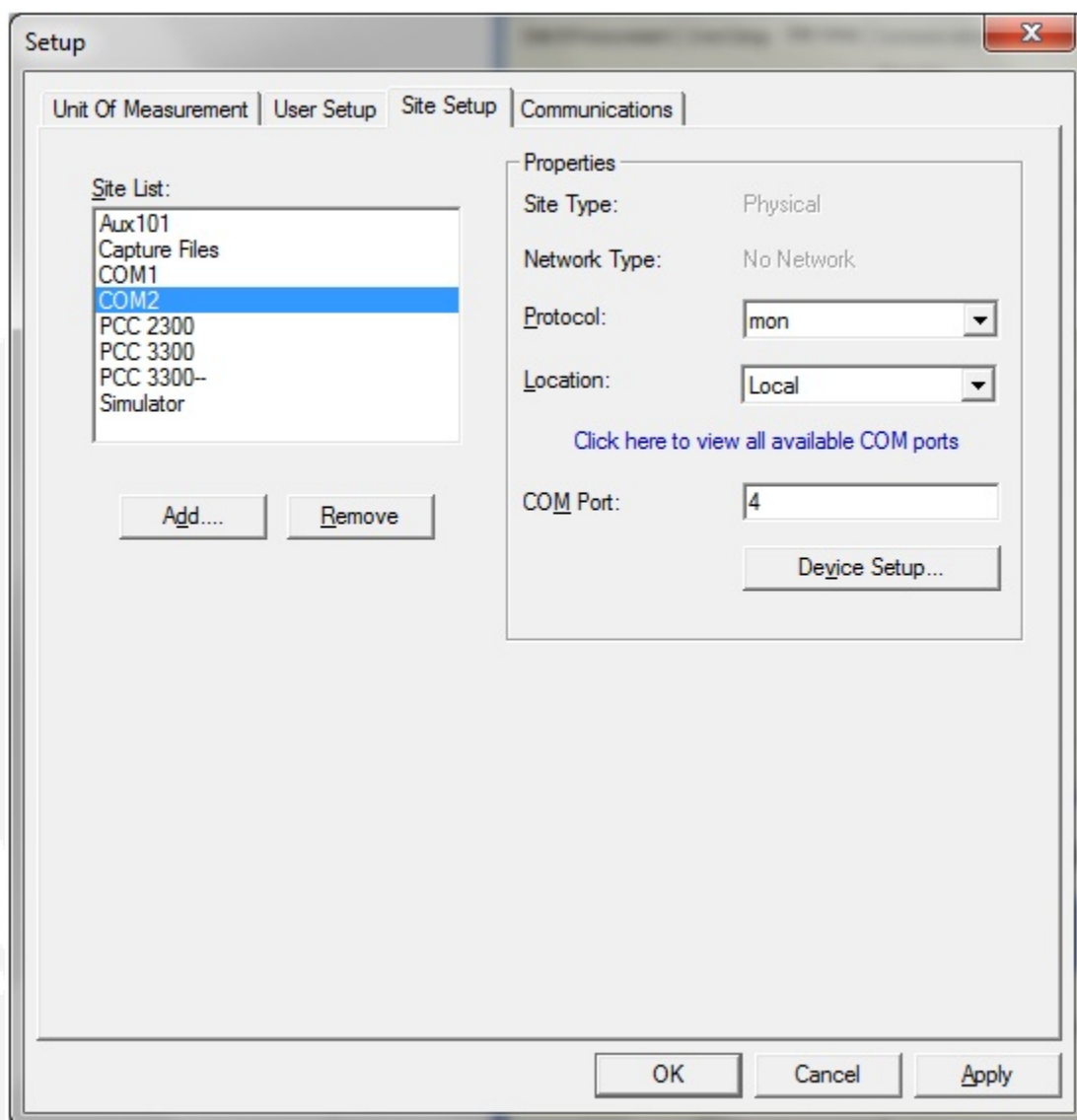


FIGURE 16. SITE SETUP DIALOG

To add a file or port, click on the **Add** button. The Create Site dialog is displayed. For more information, see [Section 3.6 on page 25](#).

To remove an item from the **Site List**, select the item and click on the **Remove** button. A popup will be displayed to prompt you to continue (**Yes**) or cancel this operation (**No**) ([Figure 17](#)). Click on the **Yes** button to remove the item, or click on the **No** button to cancel the removal.

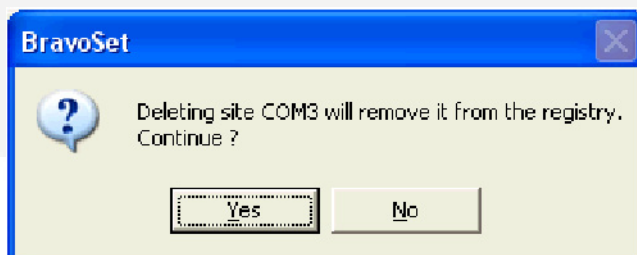


FIGURE 17. REMOVE DEVICE DIALOG

Selecting a site from the **Site List** enables the edit feature, allowing modifications to some item properties. When a file is selected, the file location (path) is displayed. This feature allows the user to edit the file location.

When a site is selected, the sites protocol and COM port can be edited. Also the **Device Setup** button is enabled. This feature allows the user to add or remove devices.

Use the **Apply** button to save the data in the current dialog box to the InPower settings. Use the **Cancel** button to close the **Site Setup** dialog without saving any changes made during this session. Use the **OK** button to accept the existing settings. The **Help** button is used to access help regarding the **Site Setup** dialog.

COM ports can be added or changed by clicking on **Click here to view all available COM ports** on the **Site Setup** dialog. When the **List of COM Port** dialog is displayed, select a port from the available list and click **OK**.

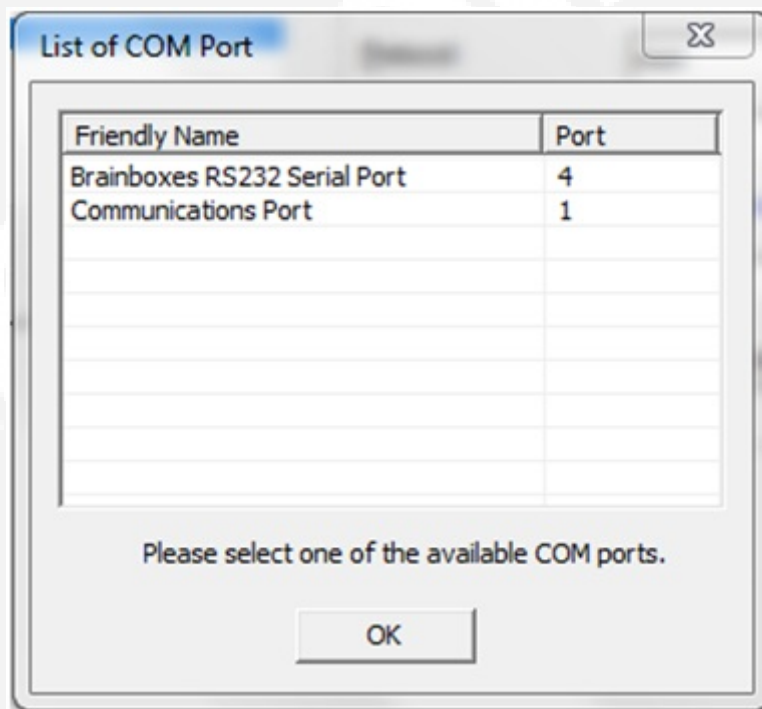


FIGURE 18. COM PORT LIST

3.6 Create Site

When the user selects the **Add** button, the **Create Site** dialog appears ([Figure 19](#)). This dialog allows the user to select a **Site Type**, **Site ID**, **Protocol**, **Location**, and **Name** (or **Device Type** and **Path** for files).



NOTE: All consumer devices will support generic device connections only. To create a site as a 'consumer device' use the 'add site' menu provided in the 'Tools' setup. Existing sites that were created previously will continue to be supported.

Use each of the dialog fields as follows:

Site Type - Use **Physical** for devices, **File_A** for capture files, or **Network** for connection to multiple devices. Network sites are available only if the RS-485 adapter is used to connect to the genset. A Physical connection connects to all devices and is the recommended site type for basic tool operation.



NOTE: Initial and Update Calibration features are disabled when the Site Type = Network.

Site ID - Typically use the name of the COM port for devices and the file name type (such as Capture File) for files.

Protocol - Select **goal** as the protocol for all devices and **Capture** for files.

Location - Use **Local**.

COM Port/Path: - Enter the COM port for devices and the directory path for files. You can use the link above it to look for available COM ports.



NOTE: To use COM3 or COM4 with InPower, use the following example to create them and to add them to the Site List.

FIGURE 19. CREATE SITE DIALOG

The following example describes how to add a new COM port.

Example: To add a COM3 port, click on the **Add** button in the **Site Setup** dialog. Select **Physical** from the **Site Type** drop-down list. Enter the **Site ID**: **COM3** and select the **Protocol**: **goal**. Next enter **Location**: **Local** and the **COM Port**: **3**. When finished click the **OK** button to save the entries. The new port will be added to the **Site List**.

Once the port is established, you can setup a device for the port (Device Setup is covered on the following page).

For this example, Select **COM3** in the **Site List**, click on the **Device Setup** button. Click on the **Add** button to add a device for COM3. Enter the following information in the **Create Device** dialog (Figure 22): **Device ID:** **COM3**, **Device Name:** **COM3**, **Device Type:** select **pcf_dvc** from the drop-down list. Click on the **OK** button to enter the information.

When the **OK** button is selected, the new site is added to the Site List in the Site Setup dialog and the message "Default device has been added to this site. Please click <Device Setup> button to modify default device settings" is displayed (Figure 20). Click **OK** to complete the setup.

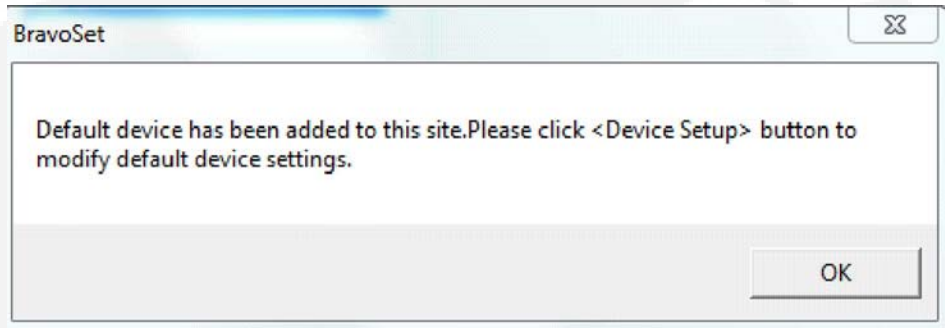


FIGURE 20. DEVICE SETUP INSTRUCTIONS

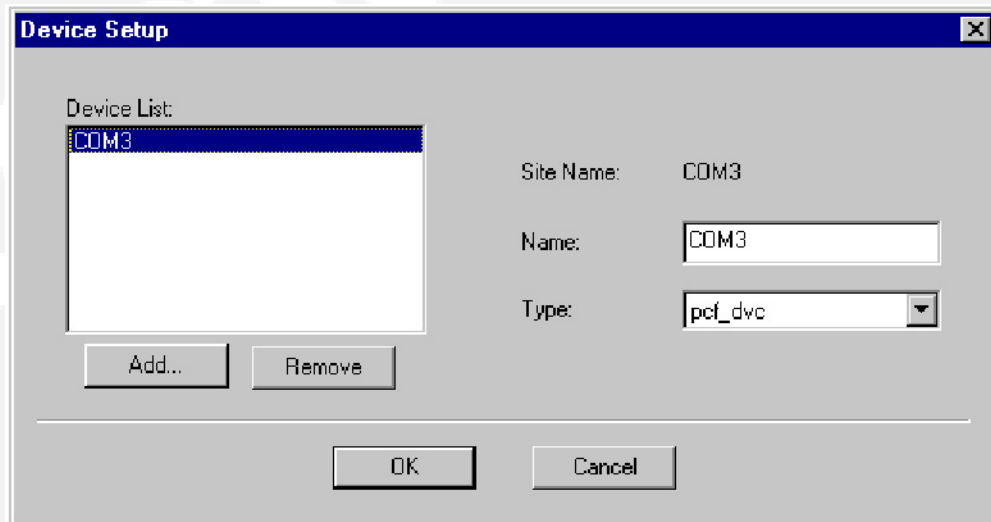


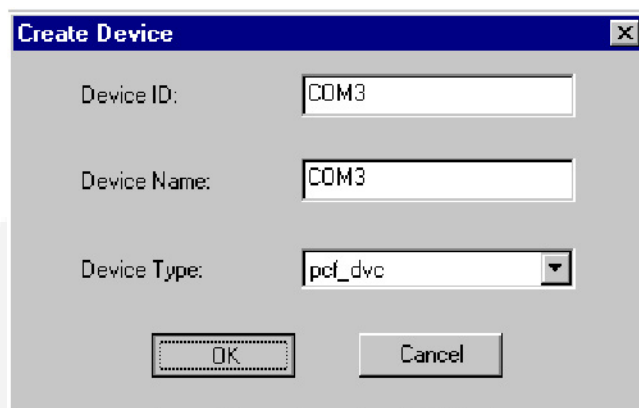
FIGURE 21. DEVICE SETUP DIALOG

3.7 Device Setup

The **Device Setup** dialog allows the user to Add, Remove, or edit a device (Figure 21).

Selecting a device from the **Device List** allows the user to edit the **Device Name** and **Type**. The dialog also displays the **Site Name**, that the Device is associated with.

Selecting the **Add** button displays the **Create Device** dialog (Figure 22). This dialog allows the user to enter a new **Device ID.**, **Device Name** and allows the user to select a **Device Type** from a drop-down list.

**FIGURE 22. CREATE DEVICE DIALOG**

Use each of the dialog fields as follows:

Device ID - Enter a name to identify the device.

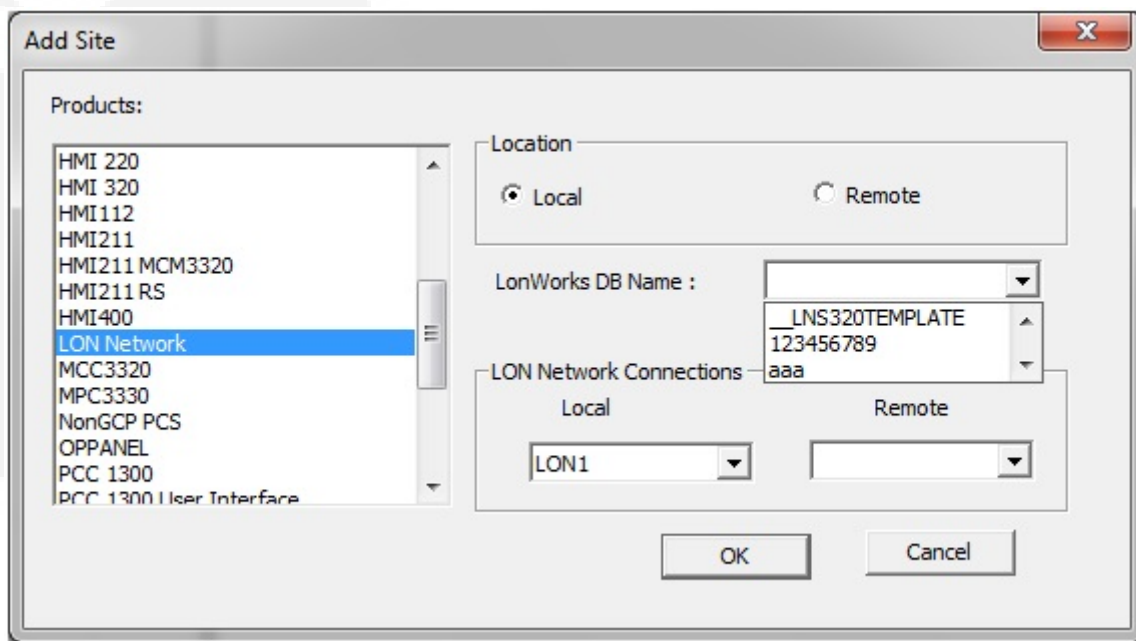
Device Name - Use a generic term to describe the device (such as GCS).

Device Type - Select **pcf_dvc** (dominion based control system).

3.8 Communications Setup

The **Communications Setup** dialog ([Figure 23](#)) allows the user to have the system allow incoming calls and to select a modem for incoming calls and remote connections.

If applicable, the user can also use this dialog to select local and remote LonWorks network connections.

**FIGURE 23. COMMUNICATIONS DIALOG**

3.9 PCC 1300 and PCC 1301 InPower Setup

Refer to Setup for a general description of the Setup feature. Launch the **Setup** program from the **Start** menu - **Power Generation** program group.

In this example, a new site will be created specifically for connecting to a PCC 1300 control. (The PCC 1301 uses the same Site Type setting and Protocol settings.)

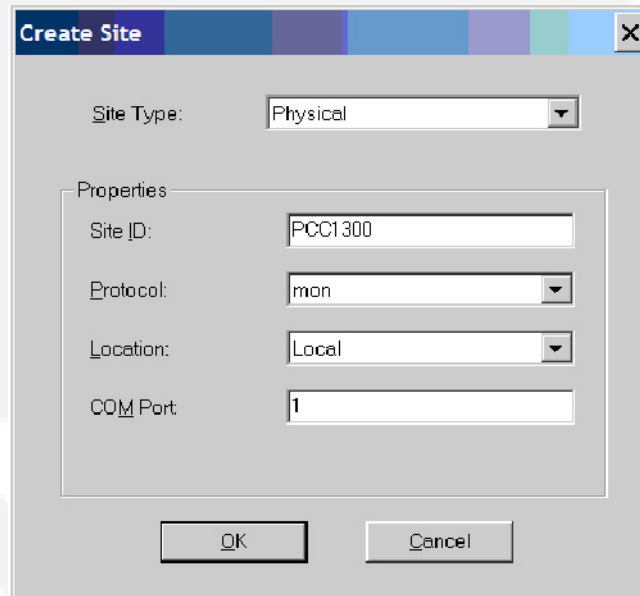


FIGURE 24. PCC 1300 SITE SETUP

Select the **Site Setup** tab and then click on the **Add** button, located below the **Site List**. Create a new site for connecting to the PCC 1300 control. Select the **Site Type: Physical**, from the drop-down list. Enter a **Site ID**. Select **mon** from the **Protocol** drop-down list. (PCC1301 select PCF Device in the Protocol list.) Select **Local** for the **Location** and enter **1** (or the desired com port) for the **COM Port**. Click on the **OK** button to create the new site.

With **PCC1300** selected in the **Site List**, click on the **Device Setup** button, then click on the **Add** button in the Device Setup window to create a new device.

Enter a Device ID and Device Name. Select **PCC1300**, from the **Device Type** drop-down list. Click on the **OK** button to create the device. Click on the Device Setup **OK** button to exit the Device Setup. Click on the **Apply** button to save the device setup.

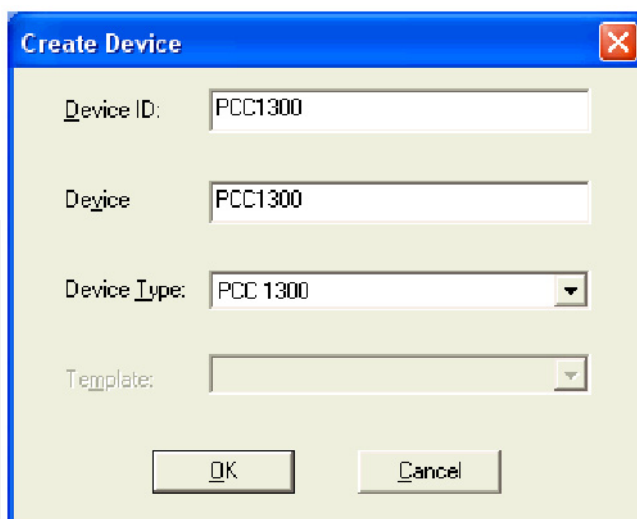


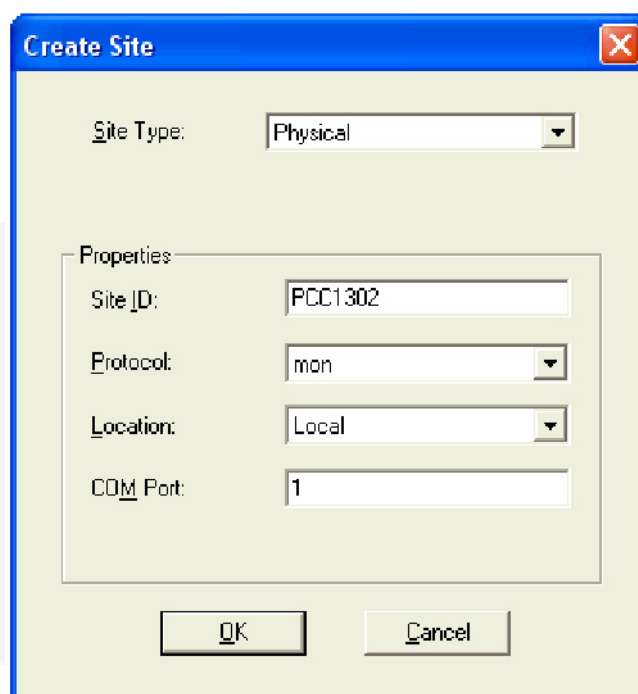
FIGURE 25. PCC 1300 DEVICE SETUP

3.10 PCC 1302 InPower Setup

Refer to Setup for a general description of the Setup feature. Launch the **Setup** program from the **Start** menu.

In this example, a new site will be created specifically for connecting to a PCC 1302 control.

Select the **Site Setup** tab and then click on the **Add** button, located below the **Site List**. Create a new site for connecting to the PCC 1302 control. Select the **Site Type: Physical**, from the drop-down list. Enter a **Site ID**. Select **mon** from the **Protocol** drop-down list. (PCC1302 select PCF Device in the Protocol list.) Select **Local** for the **Location** and enter **1** (or the desired com port) for the **COM Port**. Click on the **OK** button to create the new site ([Figure 26](#)).

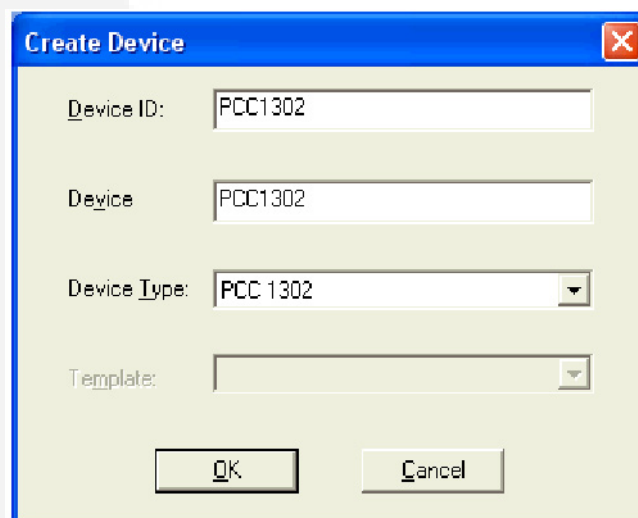


The 'Create Site' dialog box has a blue title bar with a close button. It contains a 'Site Type' dropdown menu set to 'Physical'. Below this is a 'Properties' section with four fields: 'Site ID' (text box with 'PCC1302'), 'Protocol' (dropdown menu with 'mon'), 'Location' (dropdown menu with 'Local'), and 'COM Port' (text box with '1'). At the bottom are 'OK' and 'Cancel' buttons.

FIGURE 26. PCC 1302 SITE SETUP

With **PCC1302** selected in the **Site List**, click on the **Device Setup** button, then click on the **Add** button in the Device Setup window to create a new device.

Enter a Device ID and Device Name ([Figure 27](#)). Select **PCC1302**, from the **Device Type** drop-down list. Click on the **OK** button to create the device. Click on the Device Setup **OK** button to exit the Device Setup. Click on the **Apply** button in the Setup dialog to save the device setup.



The 'Create Device' dialog box has a blue title bar with a close button. It contains four fields: 'Device ID' (text box with 'PCC1302'), 'Device' (text box with 'PCC1302'), 'Device Type' (dropdown menu with 'PCC 1302'), and 'Template' (empty dropdown menu). At the bottom are 'OK' and 'Cancel' buttons.

FIGURE 27. PCC 1302 DEVICE SETUP

3.11 PCC 2300 and PCC 3300 InPower OEM Setup

To set up a generator set with a PCC 2300 or PCC 3300 control, select the control name from the device list, right click and select **Genset OEM Setup...** to view the **Genset OEM Setup** menus. An example for the PCC 2300 is shown in the following figure.

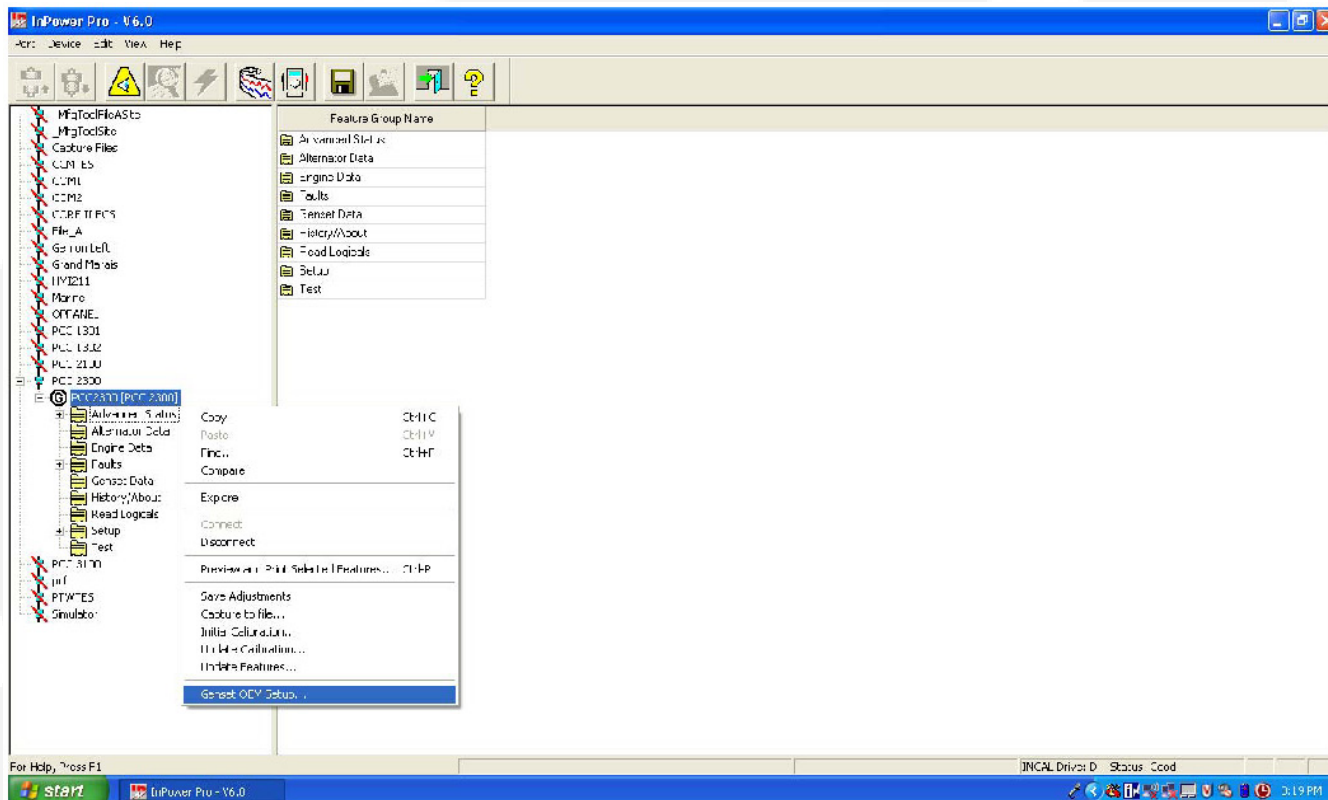


FIGURE 28. ACCESSING THE GENSET OEM SETUP MENUS FOR THE PCC 2300 CONTROL

The Genset OEM Setup menus consist of various tabs. Many parameters cannot be modified without first clicking on the **Enable Setup Mode** button.

3.12 PCC 3100 InPower Setup

Refer to the information included earlier in this section for a general description of the Setup feature. Launch the Setup program from the **Start** menu - **Power Generation** program group.

In this example a new site will be created specifically for connecting to a PCC 3100 control.

Select the **Site Setup** tab and then click on the **Add** button, located below the **Site List**. Create a new site for connecting to the PCC 3100 control. Select the **Site Type: Physical**, from the drop down list. Enter a **Site ID**. Selecting **mon** from the **Protocol** drop-down list. Select **Local** for the **Location** and enter **1** (or the desired com port) for the **COM Port**. Click on the **OK** button to create the new site ([Figure 29](#)).

With **PCC_3100** selected in the **Site List**, click on the **Device Setup** button, then click on the **Add** button to create a new device.

Enter a Device ID and Device Name ([Figure 30](#)). Select **pcc_dir**, from the **Device Type** drop-down list. Click on the **OK** button to create the device. Click on the Device Setup **OK** button to exit the Device Setup. Click on the **Apply** button to save the device setup.

FIGURE 29. PCC 3100 SITE SETUP

FIGURE 30. PCC 3100 DEVICE SETUP

3.13 PCC 3200 w/CAN (PCC 3201) InPower Setup

Refer to Setup for a general description of the Setup feature. Launch the **Setup** program from the **Start** menu - **Power Generation** program group.

In this example a new site will be created specifically for connecting to a PCC 3200 with CAN (PCC 3201) control.

Select the **Site Setup** tab and then click on the **Add** button, located below the **Site List**. Create a new site for connecting to the PCC 3200 control. Select the Site Type **Physical**, from the drop-down list. Enter a **Site ID**. Select **goal** from the **Protocol** drop-down list. Select **Local** for the **Location** and enter **1** (or the desired com port) for the **COM Port**. Click on the **OK** button to create the new site ([Figure 31](#)).

FIGURE 31. PCC 3200/CAN SITE SETUP

With **PCC 3200 with CAN** selected in the **Site List**, click on the **Device Setup** button, then click on the **Add** button, to create a new device.

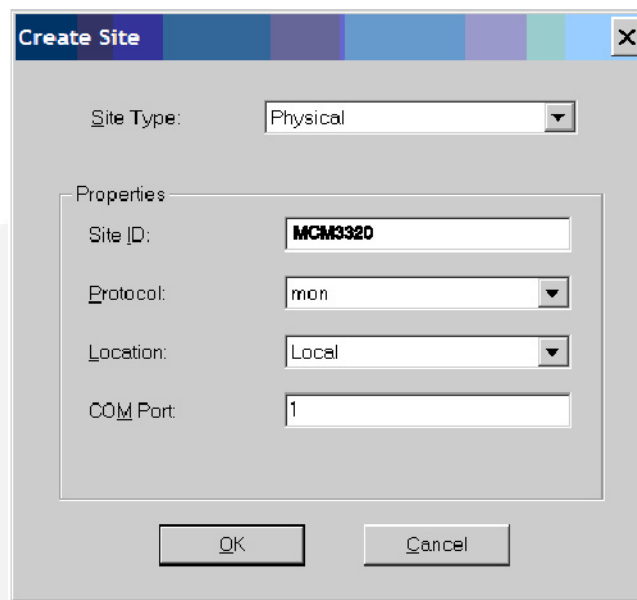
Enter a Device ID and Device Name ([Figure 32](#)). Select **PCC 3200**, from the **Device Type** drop-down list. Click on the **OK** button to create the device. Click on the Device Setup **OK** button to exit the Device Setup. Click on the **Apply** button to save the device setup.

FIGURE 32. PCC 3200/CAN DEVICE SETUP

3.14 MCM 3320 InPower Setup

Refer to Setup for a general description of the Setup feature. Launch the **Setup** program from the **Start** menu - **Power Generation** program group.

In this example a new site will be created specifically for connecting to an MCM 3320 master control.

A screenshot of the 'Create Site' dialog box. The title bar is 'Create Site' with a close button. The 'Site Type' dropdown is set to 'Physical'. Below it is a 'Properties' section with four fields: 'Site ID' (text box with 'MCM3320'), 'Protocol' (dropdown with 'mon'), 'Location' (dropdown with 'Local'), and 'COM Port' (text box with '1'). At the bottom are 'OK' and 'Cancel' buttons.

Site Type: Physical

Properties

Site ID: MCM3320

Protocol: mon

Location: Local

COM Port: 1

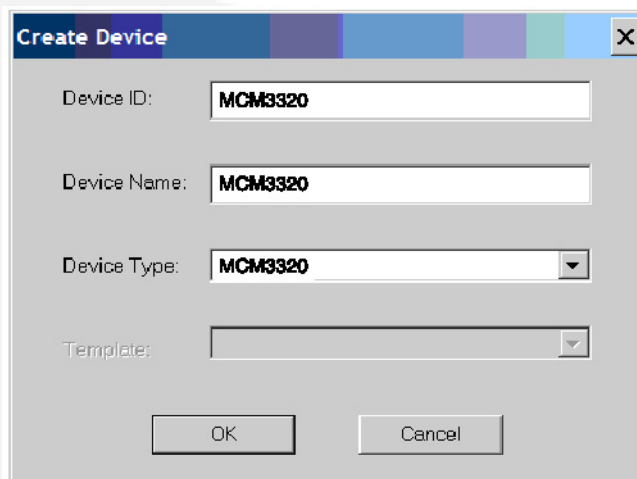
OK Cancel

FIGURE 33. MCM 3320 SITE SETUP

Select the **Site Setup** tab and then click on the **Add** button, located below the **Site List**. Create a new site for connecting to the MCM 3320 control. Select the **Site Type Physical**, from the drop-down list. Enter a **Site ID**. Select **mon** from the **Protocol** drop-down list. Select **Local** for the **Location** and enter **1** (or the desired com port) for the **COM Port**. Click on the **OK** button to create the new site ([Figure 33](#)).

With **MCM3320** selected in the **Site List**, click on the **Device Setup** button, then click on the **Add** button, to create a new device.

Enter a Device ID and Device Name ([Figure 34](#)). Select **MCM3320**, from the **Device Type** drop-down list. Click on the **OK** button to create the device. Click on the Device Setup **OK** button to exit the Device Setup. Click on the **Apply** button to save the device setup.

A screenshot of the 'Create Device' dialog box. The title bar is 'Create Device' with a close button. It has four fields: 'Device ID' (text box with 'MCM3320'), 'Device Name' (text box with 'MCM3320'), 'Device Type' (dropdown with 'MCM3320'), and 'Template' (dropdown). At the bottom are 'OK' and 'Cancel' buttons.

Device ID: MCM3320

Device Name: MCM3320

Device Type: MCM3320

Template:

OK Cancel

FIGURE 34. MCM 3320 DEVICE SETUP

3.15 Monnet InPower Setup

Refer to Setup for a general description of the Setup feature. Launch the **Setup** program from the **Start** menu - **Power Generation** program group.

In this example a new site will be created specifically for connecting to a MONNet (PCCnet) network.

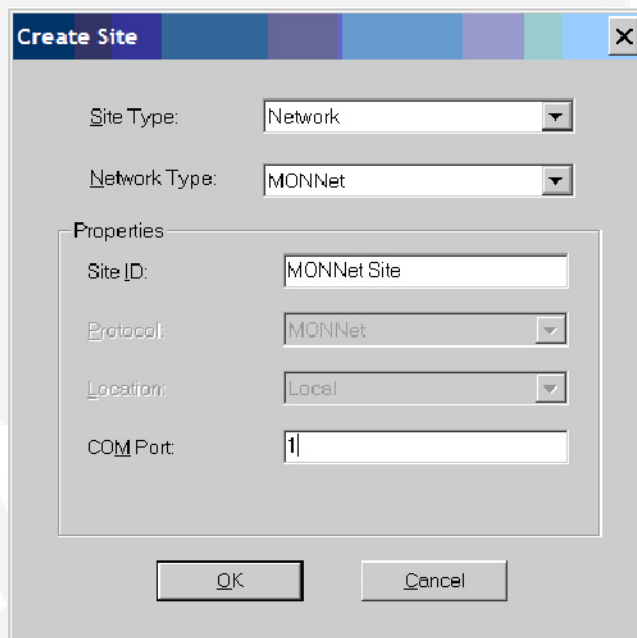


FIGURE 35. MONNET SITE SETUP

Select the **Site Setup** tab and then click on the **Add** button, located below the **Site List**. Create a new site for connecting to the MONNet. Select the Site Type **Network**, from the drop-down list. Select Network Type **MONNet**. Enter a **Site ID**. Enter **1** (or the desired com port) for the **COM Port**. Click on the **OK** button to create the new site ([Figure 35](#)).

Select the MONNet site from the site list and note that the Device Setup feature is disabled ([Figure 36](#)). When InPower is connected to a MONNet site it automatically checks the number of devices that are connected to the site and shows the active devices under the site.

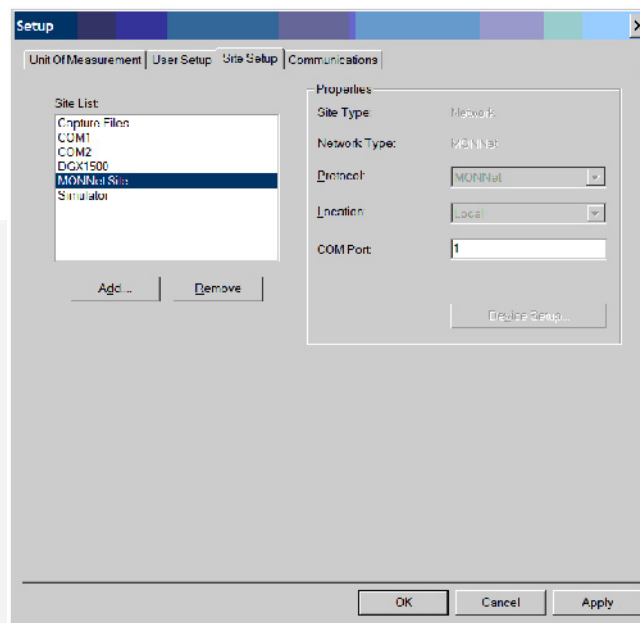


FIGURE 36. MONNET DEVICE SETUP

A typical connection for a MONNet application is shown in [Figure 37](#).

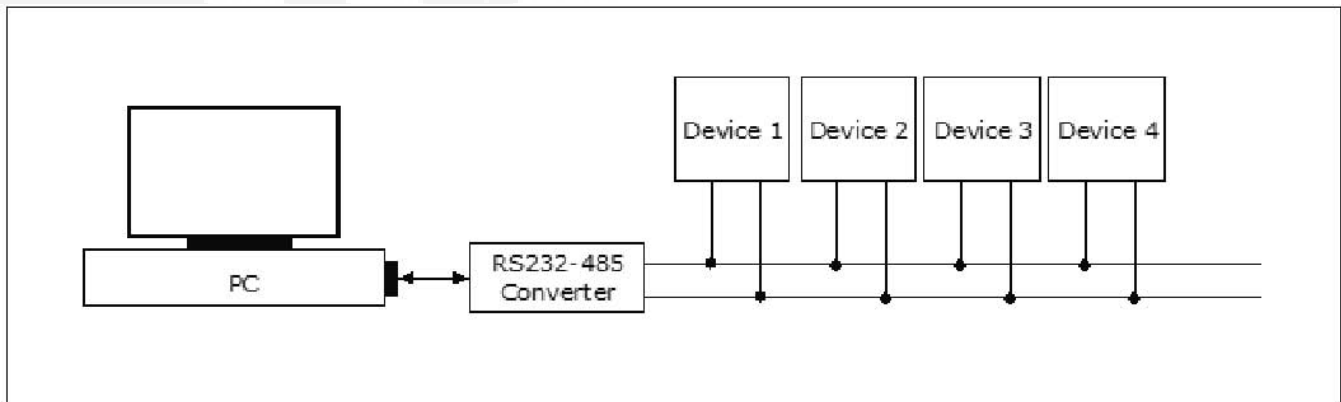
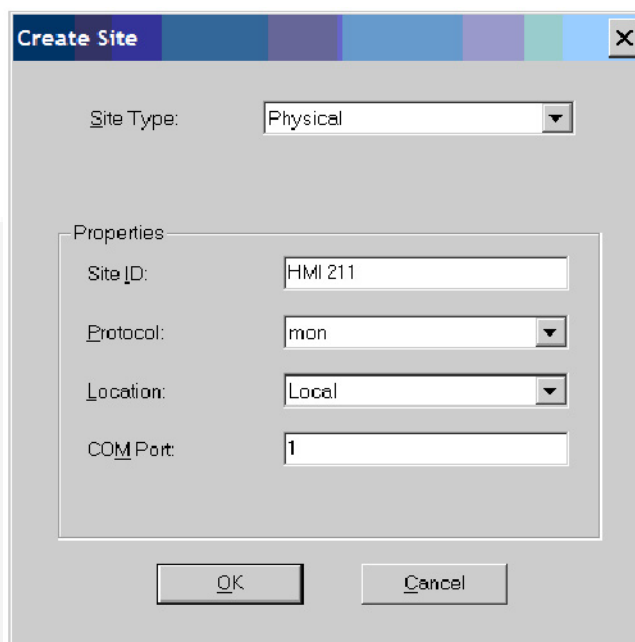


FIGURE 37. MONNET CONNECTION

3.16 HMI InPower Setup

Refer to Setup for a general description of the Setup feature. Launch the **Setup** program from the **Start** menu - **Power Generation** program group. The Setup for HMI220 and HMI320 control panels is similar to what is shown.

In this example a new site will be created specifically for connecting to an HMI 211 (bargraph display).

A screenshot of the 'Create Site' dialog box. The title bar is 'Create Site' with a close button. The 'Site Type' dropdown is set to 'Physical'. Below it is a 'Properties' section with four fields: 'Site ID' (HMI 211), 'Protocol' (mon), 'Location' (Local), and 'COM Port' (1). At the bottom are 'OK' and 'Cancel' buttons.

Create Site

Site Type: Physical

Properties

Site ID: HMI 211

Protocol: mon

Location: Local

COM Port: 1

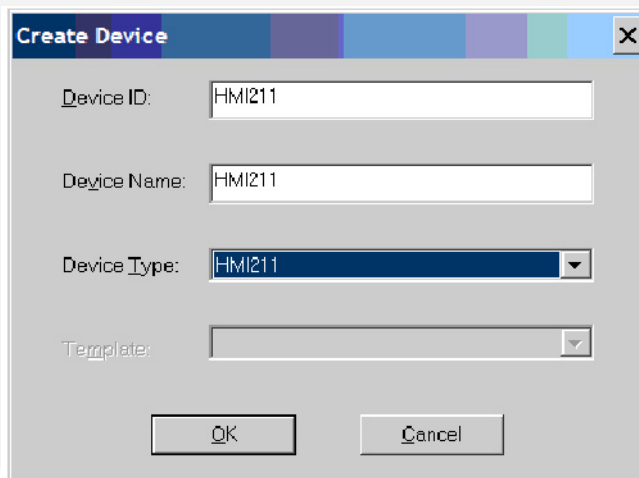
OK Cancel

FIGURE 38. HMI SITE SETUP

Select the **Site Setup** tab and then click on the **Add** button, located below the **Site List**. Create a new site for connecting to the HMI. Select the **Site Type Physical** from the drop-down list. Enter a **Site ID**. Select **mon** from the **Protocol** drop-down list. Select **Local** for the **Location** and enter **1** (or the desired com port) for the **COM Port**. Click on the **OK** button to create the new site ([Figure 38](#)).

With **HMI 211** selected in the **Site List**, click on the **Device Setup** button, then click on the **Add** button, to create a new device.

Enter a Device ID and Device Name ([Figure 38](#)). Select **HMI211** from the **Device Type** drop-down list. Click on the **OK** button to create the device. Click on the Device Setup **OK** button to exit the Device Setup. Click on the **Apply** button to save the device setup.

A screenshot of the 'Create Device' dialog box. The title bar is 'Create Device' with a close button. It has four fields: 'Device ID' (HMI211), 'Device Name' (HMI211), 'Device Type' (HMI211), and 'Template' (empty). At the bottom are 'OK' and 'Cancel' buttons.

Create Device

Device ID: HMI211

Device Name: HMI211

Device Type: HMI211

Template:

OK Cancel

FIGURE 39. HMI DEVICE SETUP

3.17 Core II ECS Device Setup

Make sure that the network adapter drivers are installed (supplied by adapter manufacturer) prior to performing this setup.

Launch the Setup program from the Start menu — Power Generation program group.

In this example, a new site will be created specifically for connecting to a Core II ECS (ECM) device.

Select the Site Setup tab and then click on the Add button, located below the Site List. Create a new site for connecting to the Core II ECS. Select Network from the Site Type drop-down list. Select ECS Configuration from the Network Type drop-down list. Enter a Site ID. Use the drop-down arrow to select the Adapter type and COM Port. Click on the OK button to create the new site ([Figure 40](#)). With Core II ECS selected in the Site List, note that the Device Setup button is disabled. A device setup is not necessary with this site type.

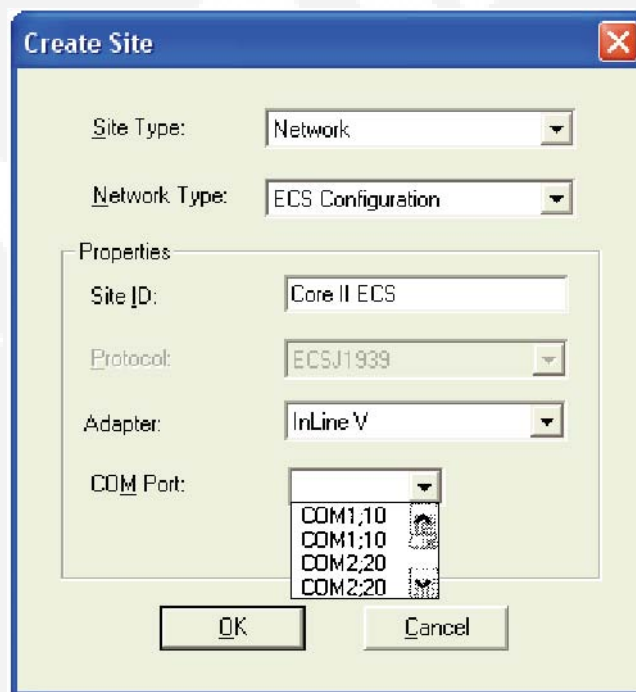


FIGURE 40. CORE II ECS SITE SETUP

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4 InPower Basics

This section describes InPower's user interface features.

4.1 How to Start InPower

1. Open the **Start** menu.
2. Click **All Programs > Power Generation > InPower Pro > InPower Pro**.

Attempting to launch InPower or the Bravo Setup when one of these programs is already running will result in an error message.

- If an attempt is made to run a second instance of Bravo Setup (Start > All Programs > Power Generation > Setup), the following message is displayed.

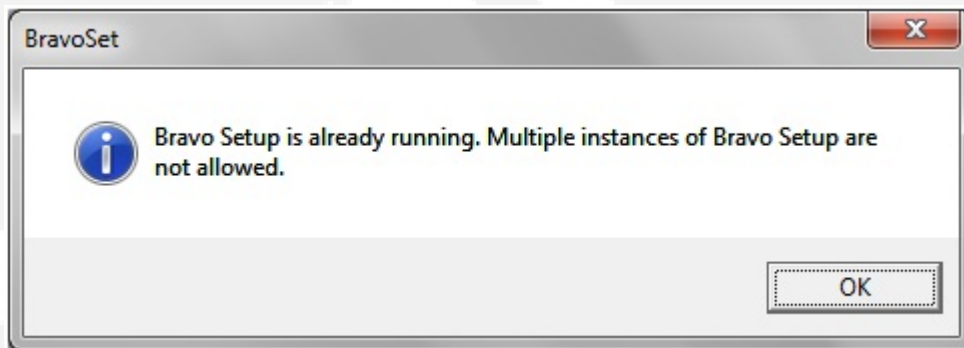


FIGURE 41. BRAVO SETUP MESSAGE FOR WHEN BRAVO SETUP IS ALREADY IN USE

- If InPower is launched and then an attempt is made to launch Bravo Setup (Start > All Programs > Power Generation > Setup while InPower is still running), the following message is displayed.

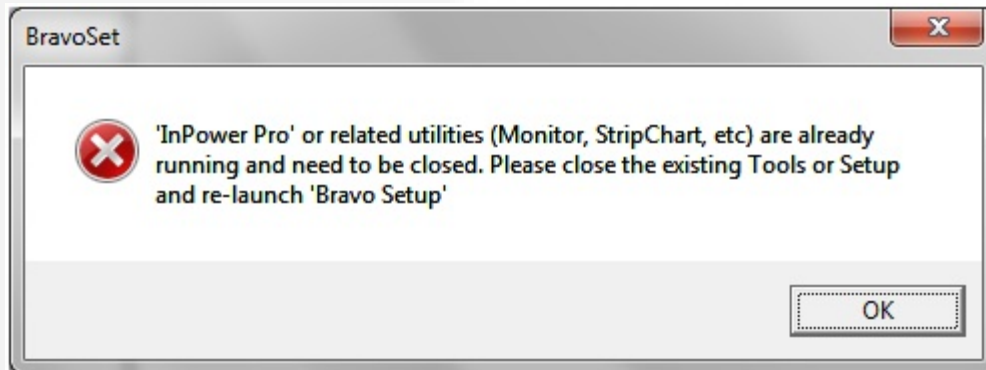


FIGURE 42. INPOWER IS RUNNING MESSAGE FOR WHEN ATTEMPTING TO USE BRAVO SETUP

- If the Bravo Setup is launched and then an attempt to launch InPower is made while Bravo Setup is still running, the following message is displayed.

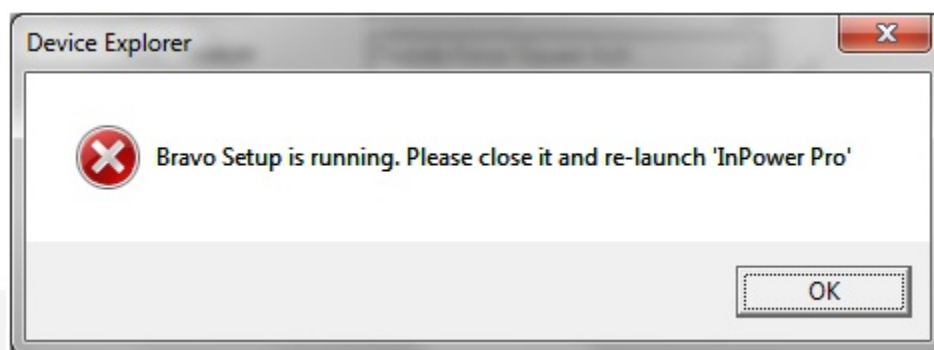


FIGURE 43. BRAVO SETUP IS RUNNING MESSAGE FOR WHEN ATTEMPTING TO USE INPOWER

- If the user has changed the system date, the following messages is displayed.

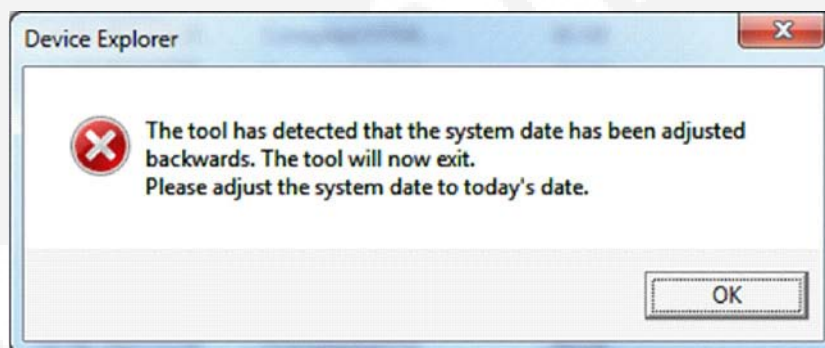


FIGURE 44. TOOL HAS DETECTED THAT THE SYSTEM DATE HAS BEEN ADJUSTED

- If the file is corrupt, the following message is displayed.

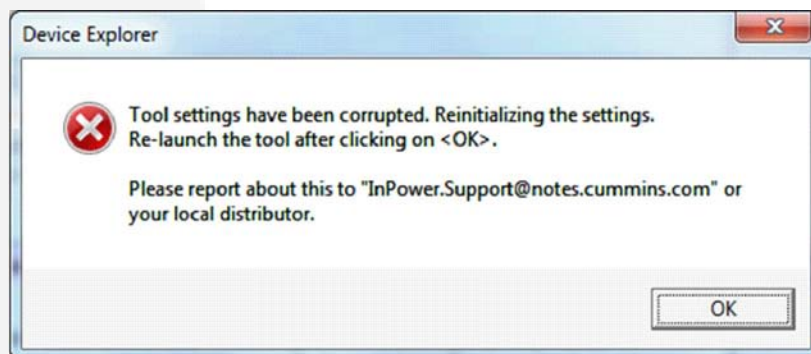


FIGURE 45. MESSAGE DISPLAYED FOR A CORRUPT FILE

4.2 The Main Window

The main window, named **Device Explorer**, includes the **Menu Bar**, the **Toolbar**, the **Status Bar**, and the left and right window panes.

The **Menu Bar** contains the groups of commands that are used to access tool functions and features. A list of menu options is available under each main menu entry.

The InPower **Menu Bar** expands to display additional menu features when InPower is connected to a device or a file.

When a **Menu Bar** command is grayed (dimmed), the command is not available. You may need to select another action (such as connecting to a port or device) before the grayed command will be displayed in black type—indicating that the feature is available.

- To display the list of options under a menu entry, move the mouse pointer to the menu name and click on the mouse button. (Clicking refers to using the mouse select button, typically the left button.)
- To select an option from a menu list, move the mouse pointer to the option name and click on it.

The **Toolbar** provides direct graphical interface shortcuts to some of the more frequently used menu options. Buttons on the Toolbar represent frequently used tool functions.

When a **Toolbar** button is grayed (dimmed), the shortcut to that command is not available. You may need to select another action (such as connecting to a device or file) before the grayed command will be displayed in color (or black type)—indicating that it is available.

Placing the mouse pointer on a **Toolbar** button, the **Status Bar** describes the function of the button. The Status Bar also shows a description of operations as they occur.

The left window pane works like Windows Explorer to navigate the directory tree. The right window pane displays the contents (or screens) for the item selected in the left window pane.

4.2.1 Main Window Example

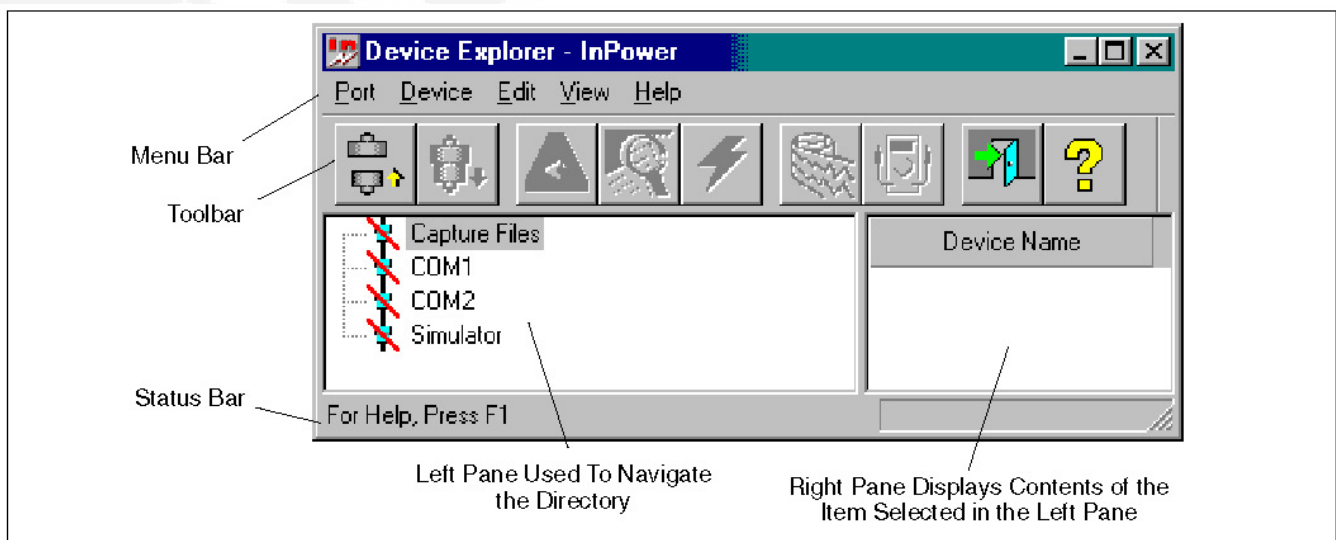


FIGURE 46. MAIN WINDOW

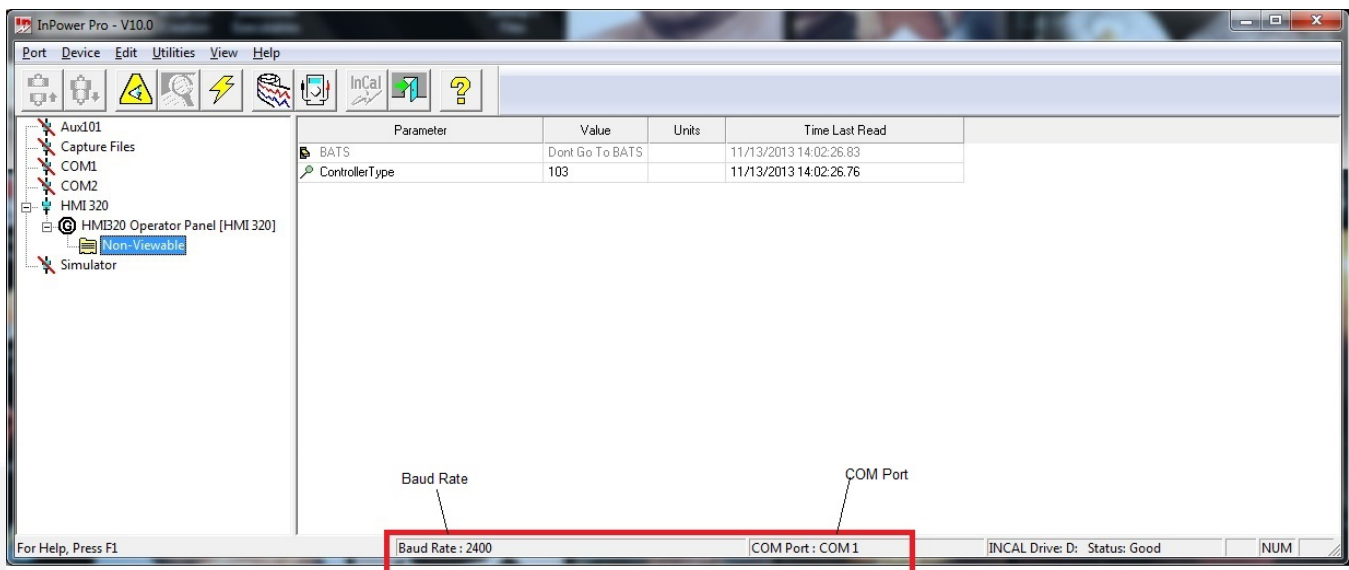


FIGURE 47. STATUS BAR DETAILS

4.3 Menu Descriptions

This section provides a brief description of the functions performed by each of the InPower menu commands. Some of the menus are not displayed until the tool is connected to a Port (COM port or .CAP file).

Several of the menu features have Toolbar shortcuts and some features can be enabled simply by double clicking on the item from the directory tree in the left window.

4.3.1 Port

The **Port** menu allows the user to **Connect** to and **Disconnect** from a port. *InPower uses the term Port to refer to either a COM Port or a .CAP(ture) File, including Simulator files.* The Port menu also allows the user to **Add** a local or remote **Site**, **find InCAL** calibrations, and it has an **Exit** selection for exiting InPower.

In order to connect to a COM port, the PC must be physically connected to a device via a serial communications null-modem cable.

COM port error messages are displayed at the following times:

- In Bravo Setup when the user selects add site
- In Bravo Setup when the user selects apply
- In Bravo Setup when the user selects another site
- When the user closes bravo setup
- In Engineering Tool when the user selects add site
- In InPower Tool when the user selects add site.

The following shows an example error message:

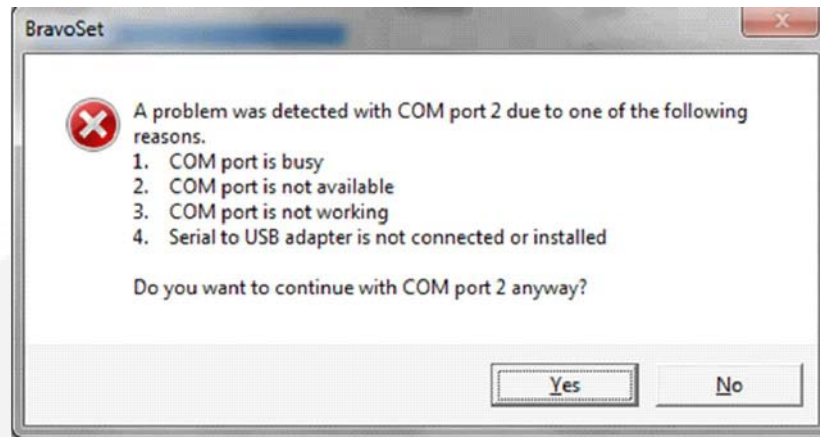


FIGURE 48. MESSAGE DISPLAYED FOR COM PORT

4.3.2 Device

The **Device** menu is used to **Connect** to, and **Disconnect** from, a device, and for performing read and write functions with a connected device. *InPower uses the term device when referring to a controller such as the generator set control.*

Use InPower to change a device's trims and settings, and then use the **Device** menu to **Save Adjustments**. The device's parameters can be **Captured** (saved) to a File.

The **Device** Menu can also be used to **Clear Faults** (inactive faults only) and to **Prepare CSV file with All Selected Features** of the device's settings.

When the InPower service tool is connected to a device, three new features are added to the Device menu; **Initial Calibration**, **Update Calibration**, and **Update Features**.

4.3.3 Edit

The **Edit** menu works within the directory of the connected device to **Find** a specified string of data. The *Edit* menu can also be used to **Copy** and **Paste** selected data.

4.3.4 Utilities

The **Utilities** menu is used to download simulator files from an InCal CD. When **Utilities -> Universal Simulator Download** is selected, a pop-up menu is displayed allowing you to set the COM port and baud rate. If the InCal CD is inserted in your local drive, you can navigate to the simulator file(s) you wish to download and then click on **Download**.

4.3.5 View

The **View** menu is used to view data from the connected device in a **Monitor** display or **Strip Chart** display. The **View** menu can also be used to access the FIS **Fault Tree** Main Window, view faults and refresh (update) all of the parameters displayed in the Value field.

4.3.6 Help

The **Help** menu commands are used to find online information about using InPower and Windows. **Help** is also used to display Service and Support information and to obtain InPower product and version information. A separate **Help** file contains information on consumer device fault codes for marine and RV products. The menu also allows the user to launch the registration program.

4.4 User Interface

Frequently used commands have keyboard shortcuts and toolbar access. Only commands applicable to the current active window are enabled. All other commands are grayed out.

4.4.1 Keyboard Access

InPower uses standard Windows keyboard conventions.

The underlined letter indicates the keyboard selection for a given menu option. For example, to select the Port menu, press and hold the "Alt" key and type a "P" (**Alt P**).

Once the menu is open, type just the underlined letter to select a specific menu item. For example, once the Port menu is open, type a (**C**) to select Connect.

4.4.2 Toolbar

Some frequently used commands have toolbar shortcut buttons. Each button is associated with one or more menu items. The buttons have the same effect as the menu items.

4.4.2.1 Toolbar Example

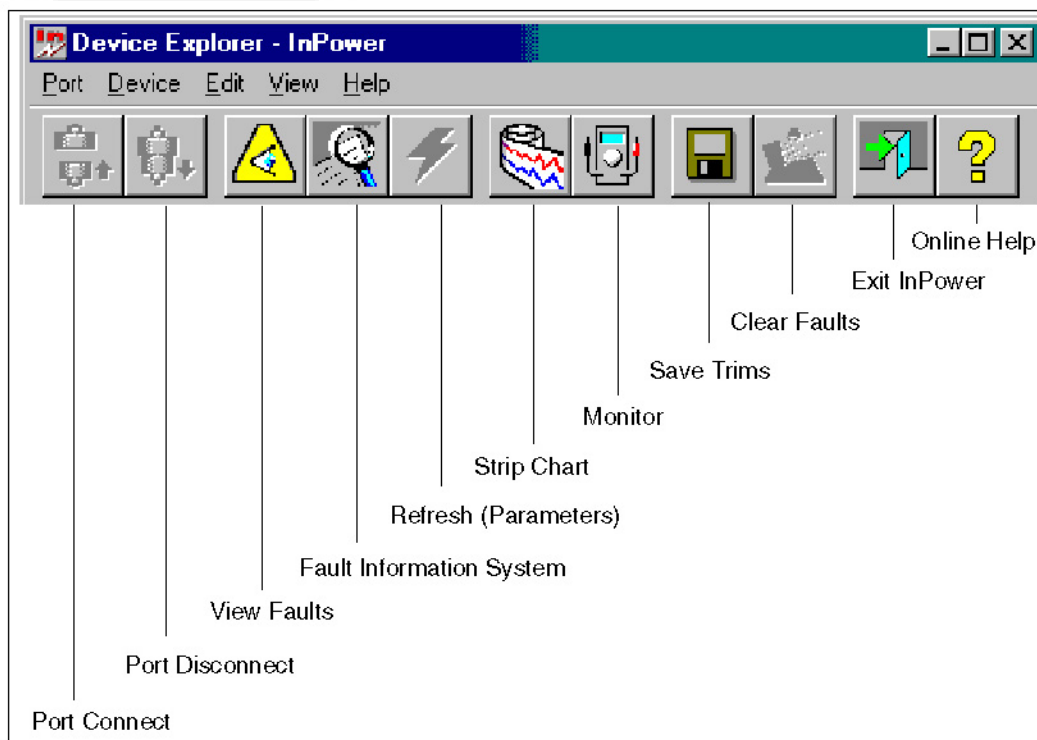


FIGURE 49. TOOLBAR

4.4.3 Dialog Boxes

A dialog box is a window that requires information from the user. Often, when you select a function or menu option, the software will display a dialog box. You will then provide the required information by selecting an item from a list, by clicking on an option button, or by entering text. Several different dialog boxes are used with InPower.

The following rules will apply to all the dialog boxes and system messages unless specified otherwise.

- The **Cancel** button allows you to close and exit a dialog box without saving any modifications, and without executing any commands.
- The **OK** button allows you to save any changes made and/or execute a command and close the dialog or message box.

All lists that the dialog boxes display are sorted alphabetically.

4.4.4 Mouse Menu Functions

In some Window views, clicking on the right mouse button will bring up a menu command related to that Window. (Some users change the right and left mouse functions to their preferences. The default settings for a two-button mouse are left for select and right for menu.)

Example: When viewing Faults in the Detail View, clicking on the right menu button will bring up three choices:

- View Snapshot
- View Fault Information
- Clear Faults

4.5 How to Terminate InPower

Should the InPower program ever hang up or crash abruptly, the Terminate InPower Application utility can be used to close all InPower applications. After the applications are closed, InPower can be re-launched and work can be resumed.



NOTE: This feature is not available on PCs with a Windows 2000 operating system.

To use this feature, go to **Start > All Programs > Power Generation > Utilities > Terminate InPower Application**.

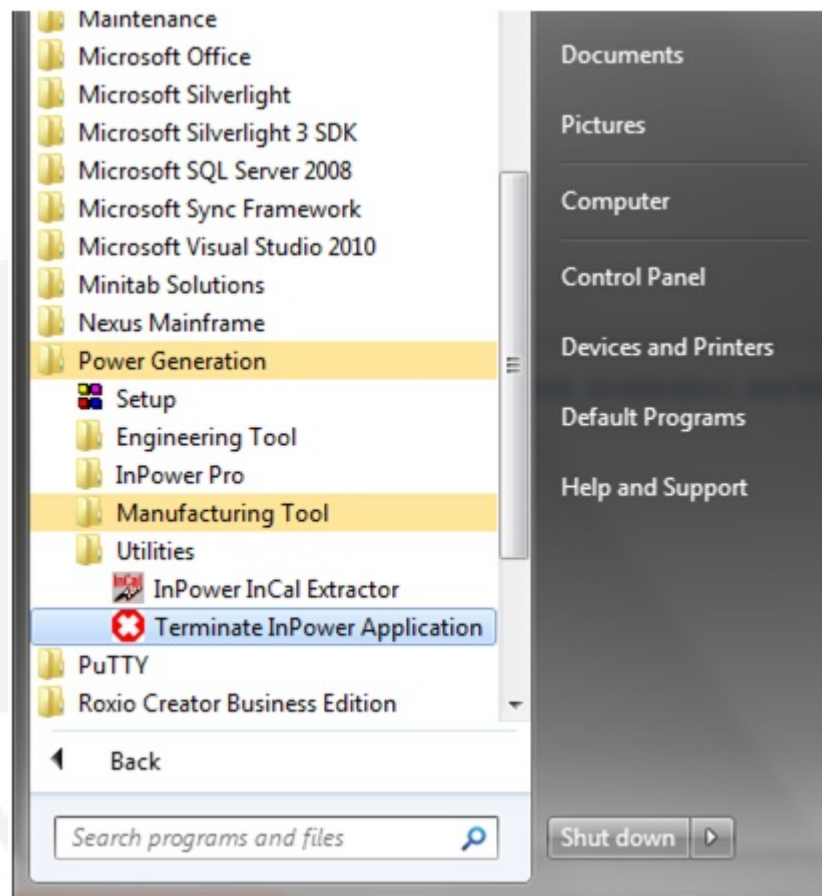


FIGURE 50. LAUNCHING THE TERMINATE INPOWER APPLICATION FEATURE

After the Terminate InPower Application is launched, the following message is displayed.

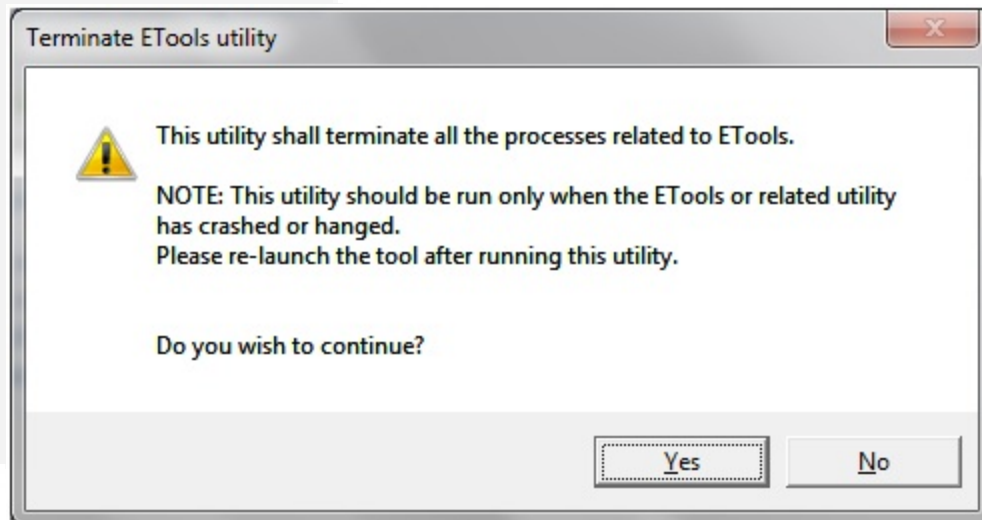


FIGURE 51. TERMINATING INPOWER APPLICATIONS MESSAGE

After clicking **Yes**, all Etool applications are terminated and the following message is displayed. Click **OK**.

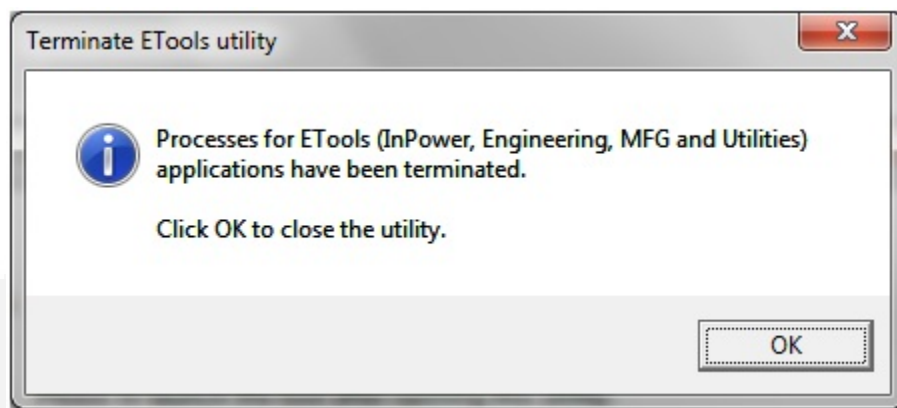


FIGURE 52. ETOOL TERMINATION MESSAGE

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5 Genset Service

This section describes how to use InPower for making adjustments and performing tests on commercial or consumer gensets. When the user is connected to a genset, they can also access the Monitor, Faults, and Events Configuration features.

5.1 Commercial Genset Service

InPower performs several functions including genset service and diagnostic functions. The **Adjustment** feature is used to perform service adjustments and trims.

The **Test** feature is used for diagnostics. **Test** is used to temporarily override a variety of input and output parameters. (The PCC 3100 does not include the Test Feature).



WARNING: *Electrical shock and moving parts can cause severe personal injury or death. Notify personnel before starting a generator set and before performing load transfer on a transfer switch. Refer to the equipment Operator's Manual for important safety precautions.*

You must be connected to the genset in order to write adjustment trims and setting changes to the controller, and to temporarily send test commands to the genset controller. The features described may not apply to all control types.

5.1.1 Connecting to a Genset

Connection between the service PC and some gensets is made with a special RS-232 serial null-modem cable. Some connections between the generator set and the PC require an interface wiring harness and an RS-232 to RS-485 converter.

If the service PC does not have a serial port, a USB-to-serial converter may be required as well.

5.1.1.1 Connecting to PS 0500

The PS 0500 control requires an RS-232 to RS-485 data converter and a unique cable. [Figure 53](#) shows the PS 0500 InPower connection.

Kit number 541-1199 is available for use with the PS 0500. The kit includes the RS-232 to RS-485 converter and the cable used for these applications. The 5-pin connector is used to connect to the back of the display at the TB15 connector.

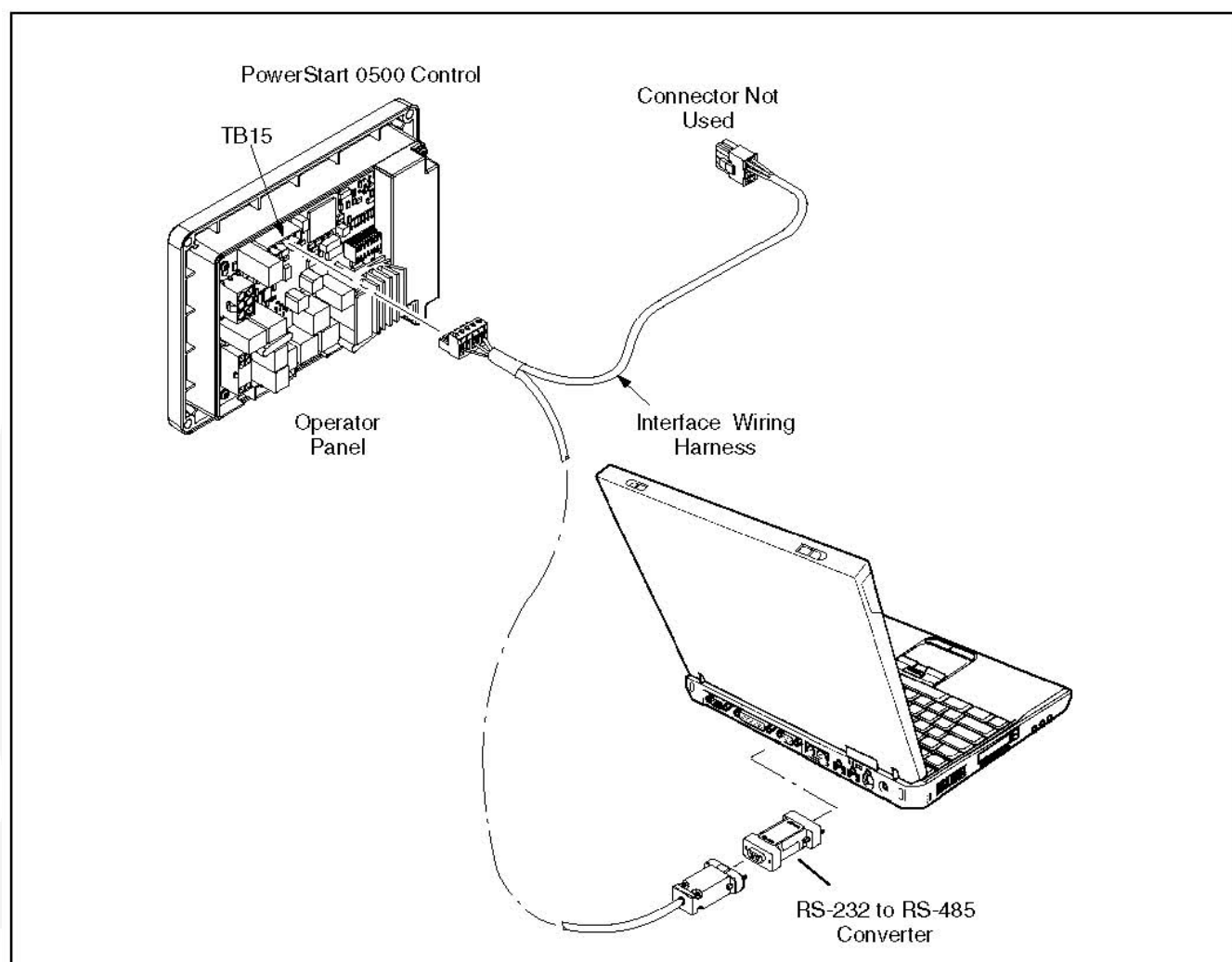


FIGURE 53. INPOWER SERIAL CONNECTION WITH POWERSTART 0500 CONTROL

5.1.1.2 Connecting to PCC 1100

The PCC 1100 requires an RS-232 to RS-485 data converter and a unique cable.

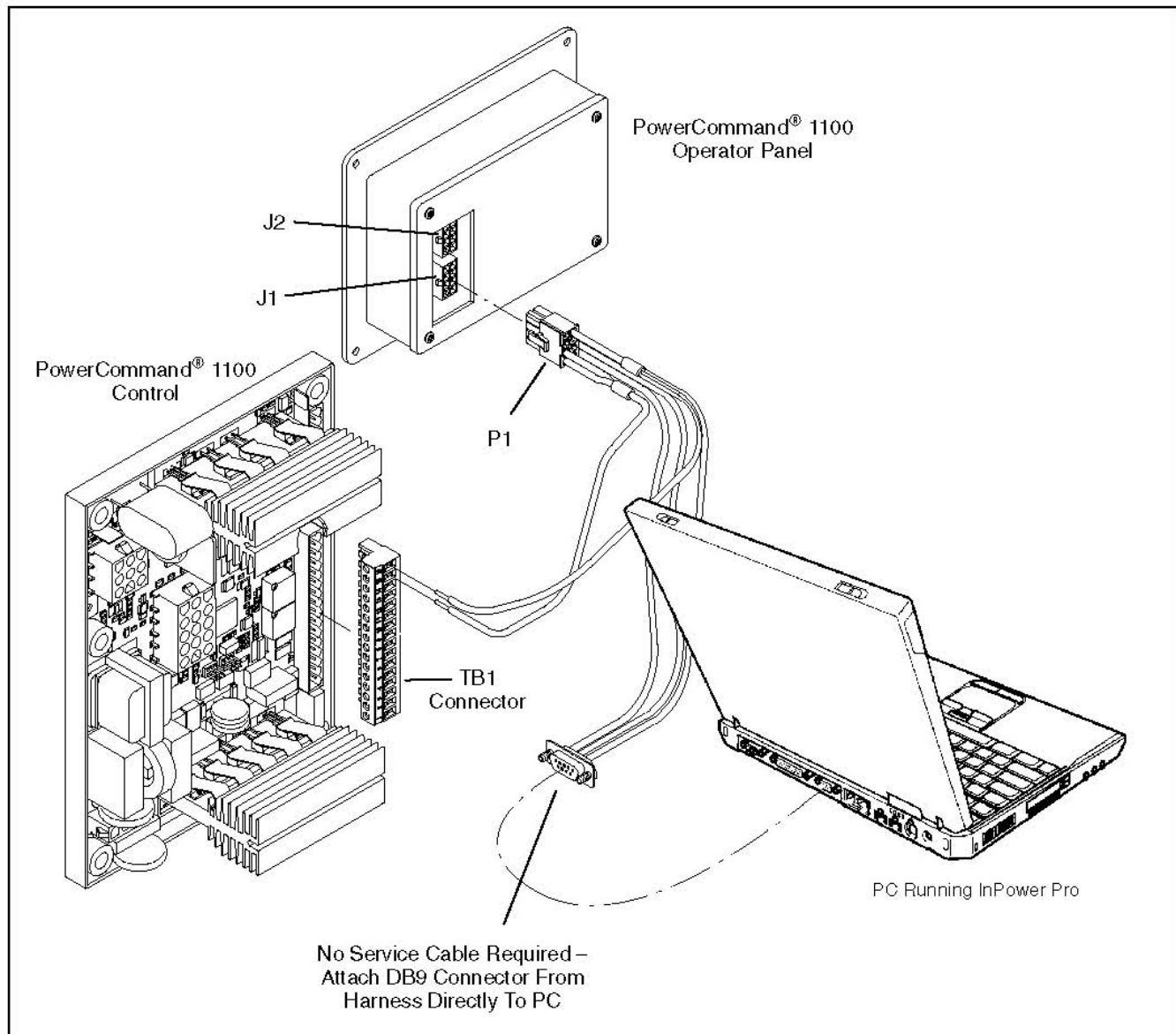


FIGURE 54. INPOWER PRO SERIAL CONNECTION PCC 1100

5.1.1.3 Connecting to a Genset with a PCC 1300 Control

The PCC 1300 requires only a DB9 to DB9 cable connected from the PC to the control board.

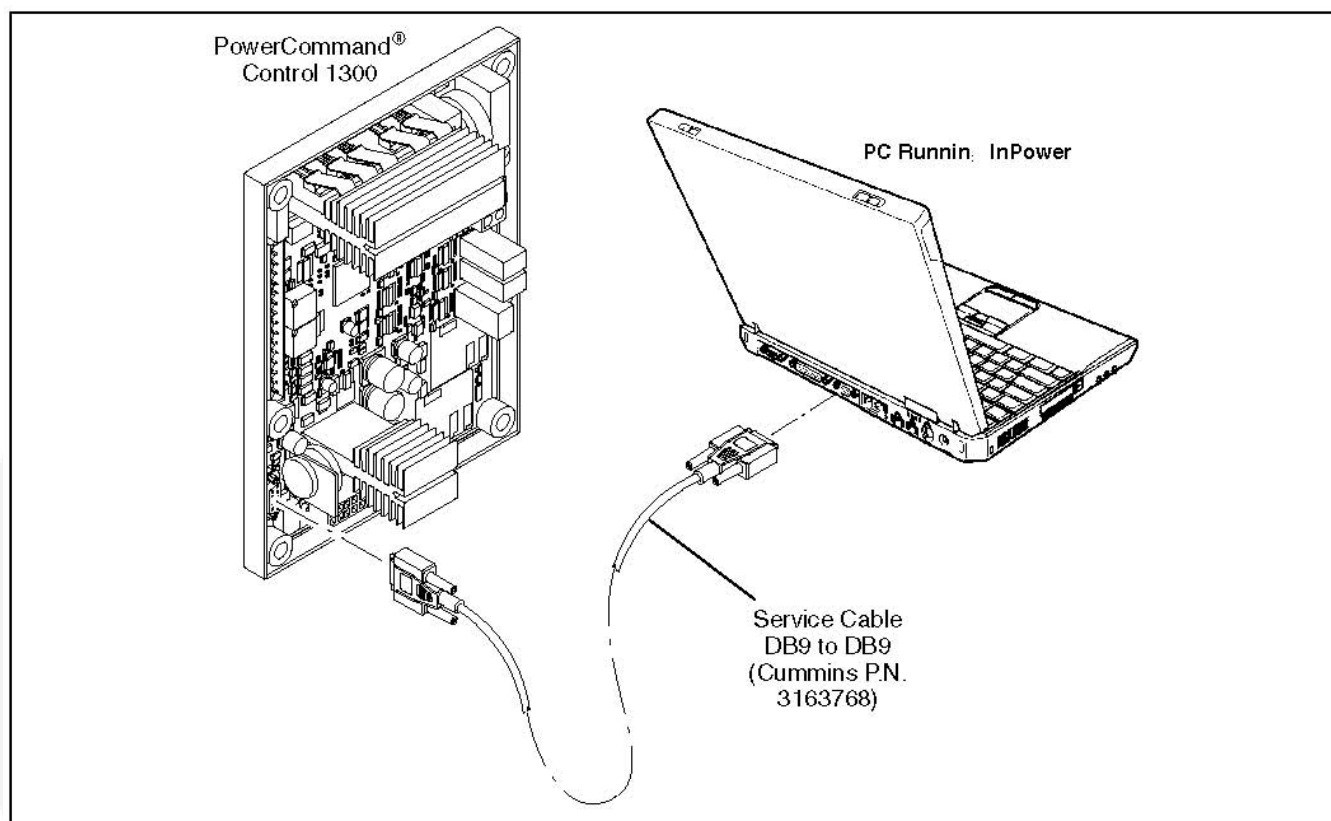


FIGURE 55. PCC 1300 INPOWER CONNECTION

5.1.1.4 Connecting to a Genset with a PCC 1301 Control

The PCC 1301 requires an interface wiring harness and an RS-232 to RS-485 converter.

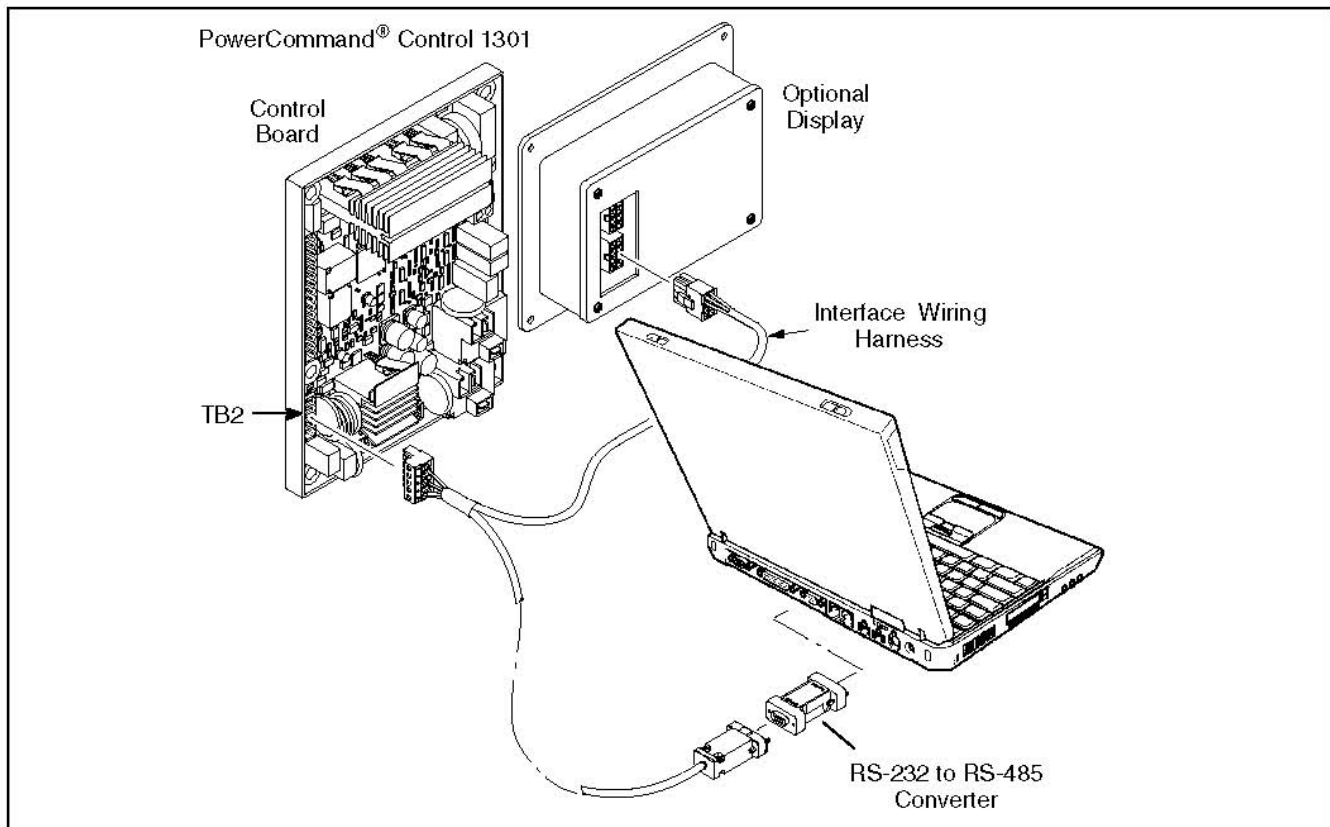


FIGURE 56. PCC 1301 INPOWER CONNECTION

5.1.1.5 Connecting to PCC 1302

The PCC 1302 control requires an RS-232 to RS-485 data converter and a unique cable. The PCC 1302 also requires an extension harness connected from the display to the engine harness J2 connector. [Figure 57](#) shows the PCC 1302 InPower connection.

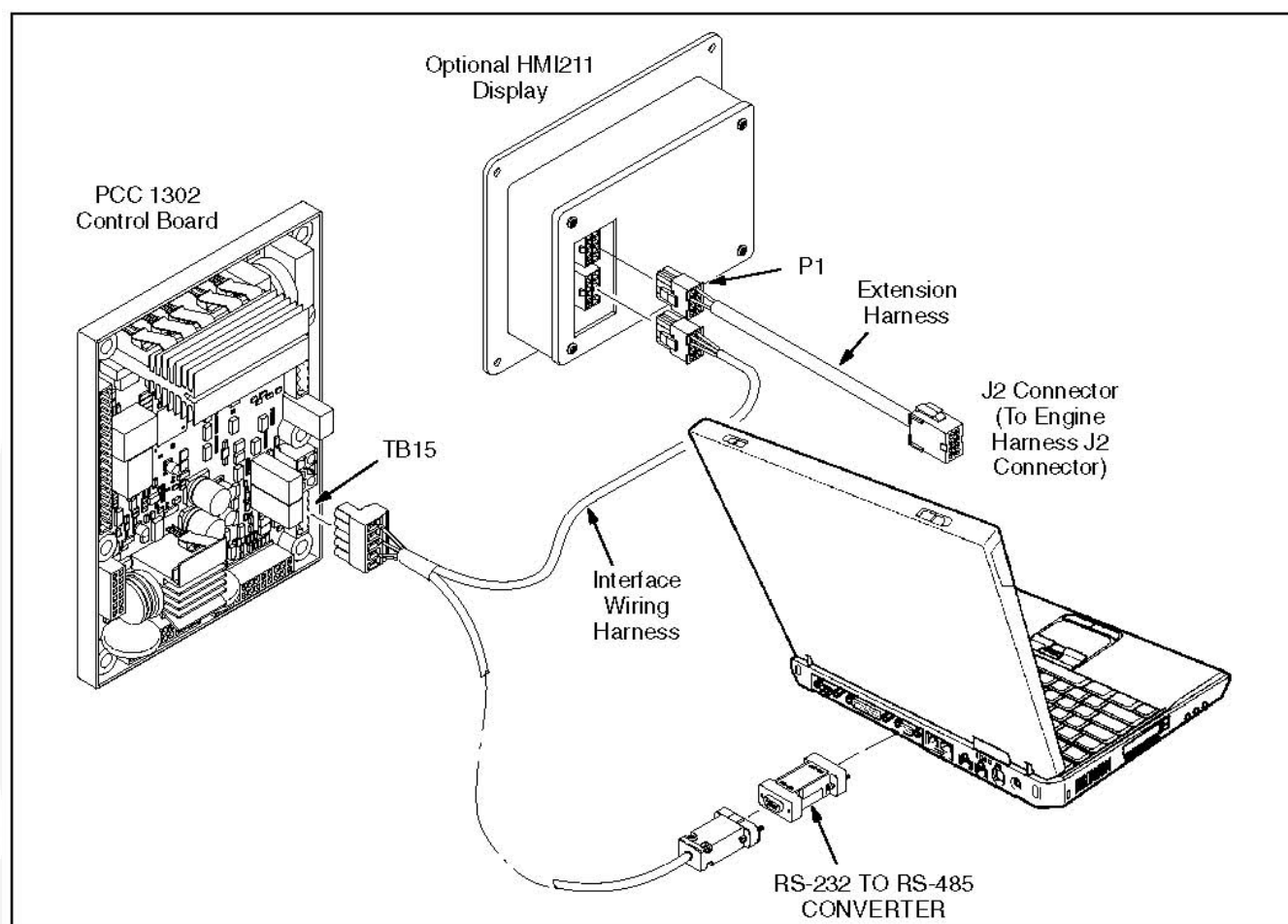


FIGURE 57. KIT INSTALLATION FOR POWERCOMMAND CONTROL 1302 WITH HMI211

5.1.1.6 Connecting to a Genset with a PCC 2100 Control

The PCC 2100 requires only a DB9 to DB9 cable connected from the PC to the control board inside the control box.

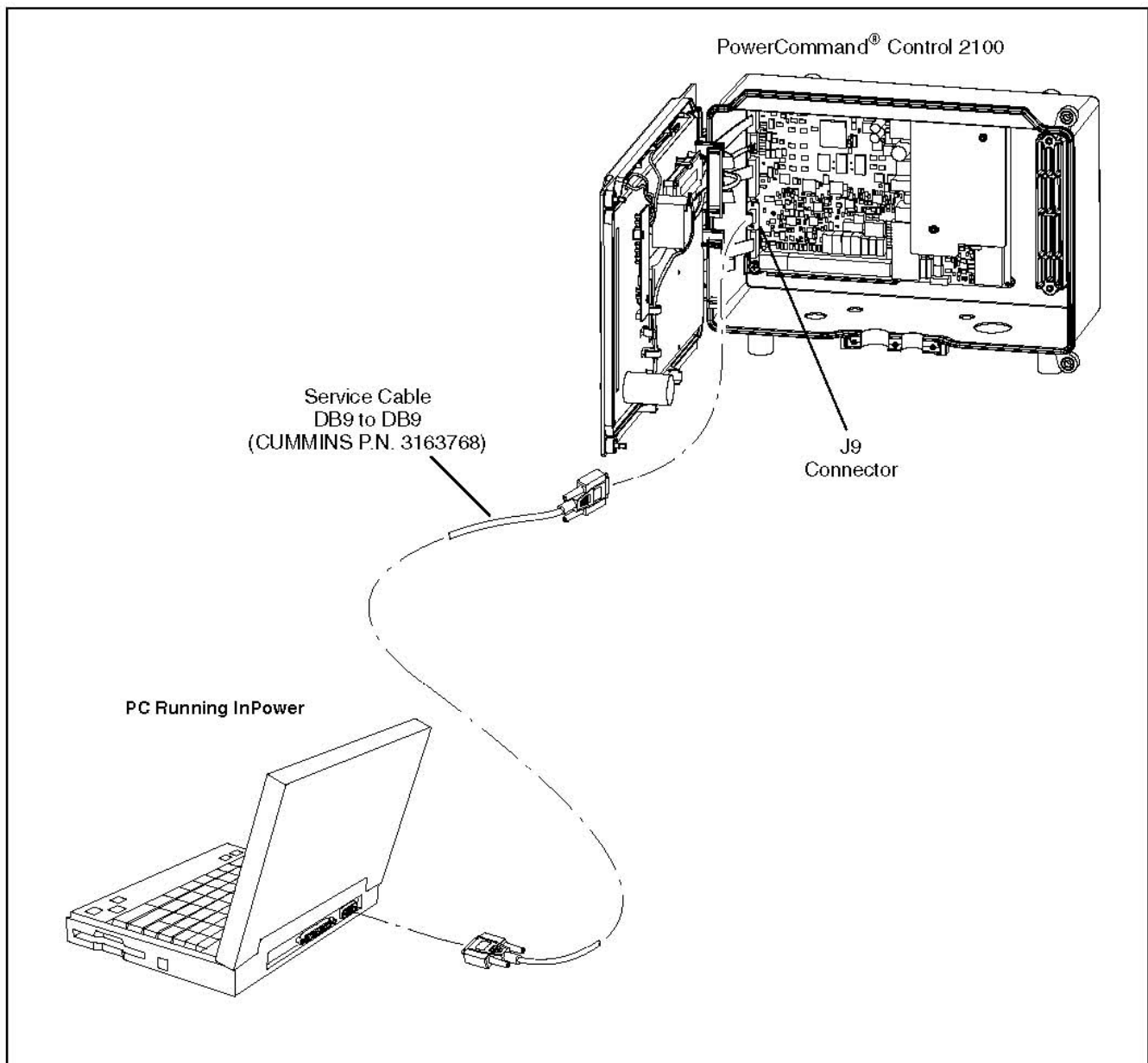


FIGURE 58. PCC 2100 INPOWER CONNECTION

5.1.1.7 Connecting to PCC2300 and PCC3300

The PCC2300 and PCC3300 controls require an RS-232 to RS-485 data converter and a unique cable. [Figure 59](#) shows the PCC2300 InPower connection and [Figure 60](#) shows the PCC3300 InPower connection.

Kit number 541-1199 is available for use with the PCC2300 and PCC3300. The kit includes the RS-232 to RS-485 converter and the cable used for these applications. The 5-pin connector is used to connect either to the control board or the display.

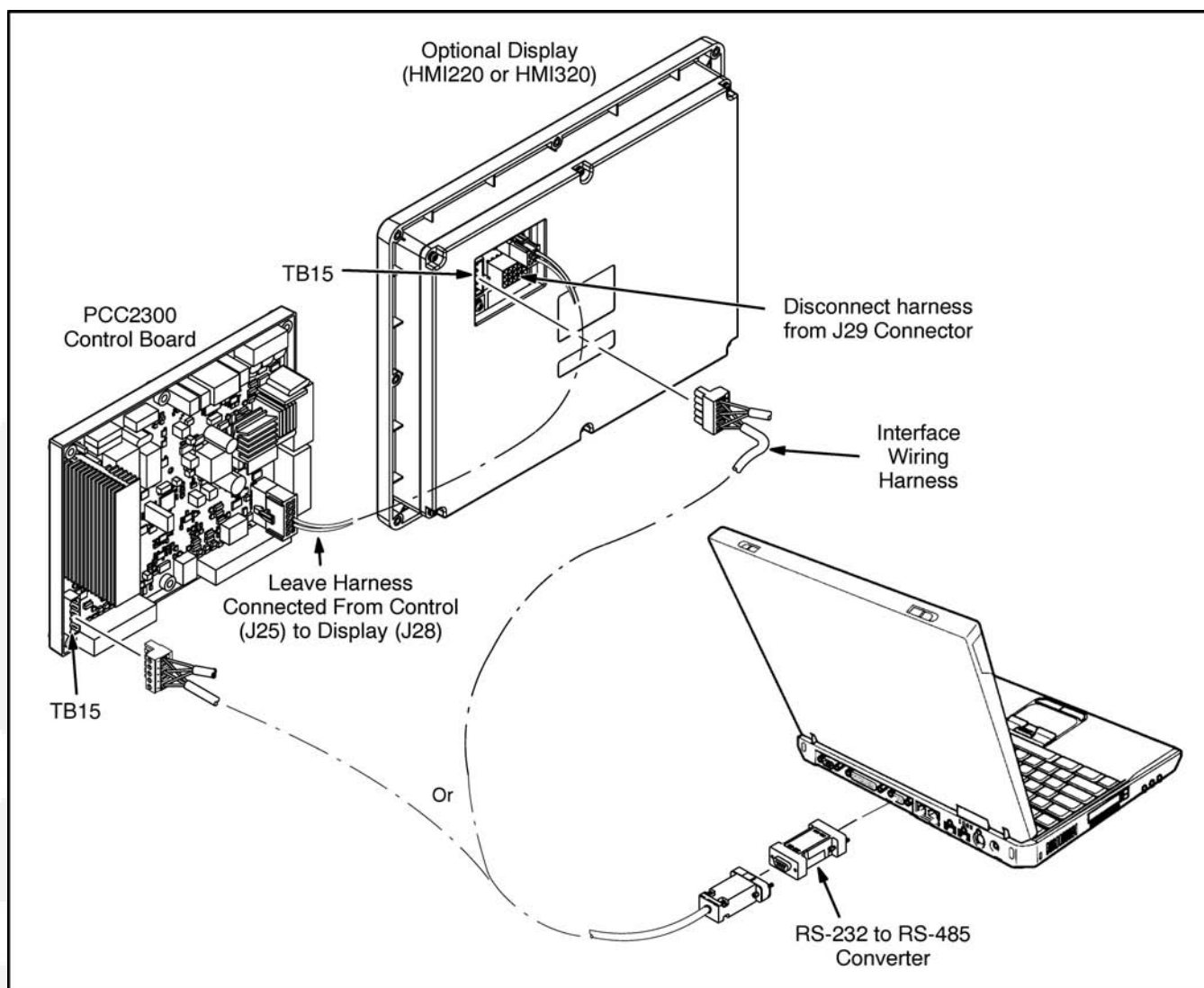


FIGURE 59. KIT INSTALLATION FOR PCC2300 WITH HMI220 OR HMI320 DISPLAY

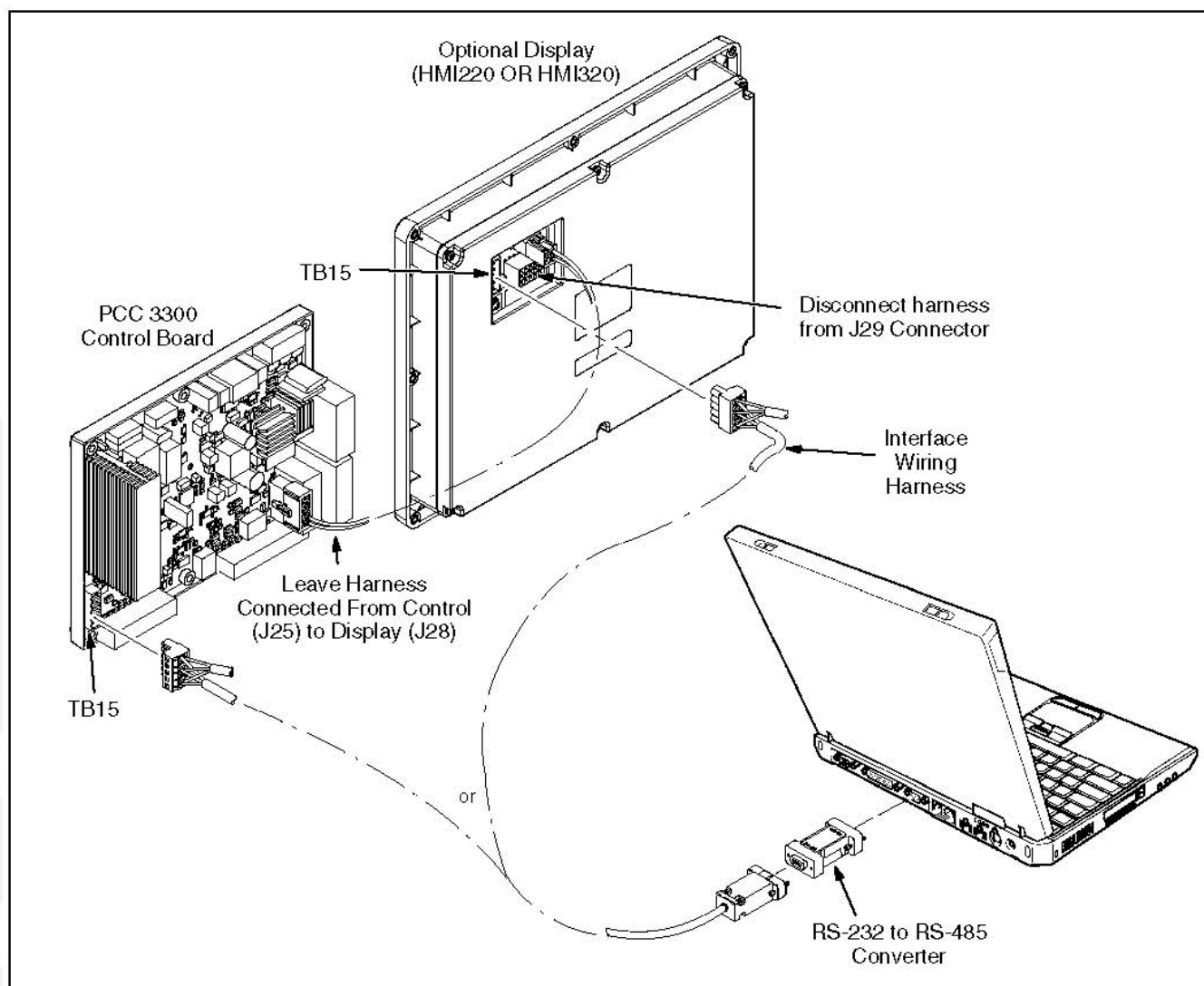


FIGURE 60. PCC3300 INPOWER CONNECTION

5.1.1.8 Connecting to a PCC 3100 Genset

The PCC 3100 requires a unique cable with a DB9 socket on one end of the null modem cable and a 10-pin connector on the other end ([Figure 61](#)).

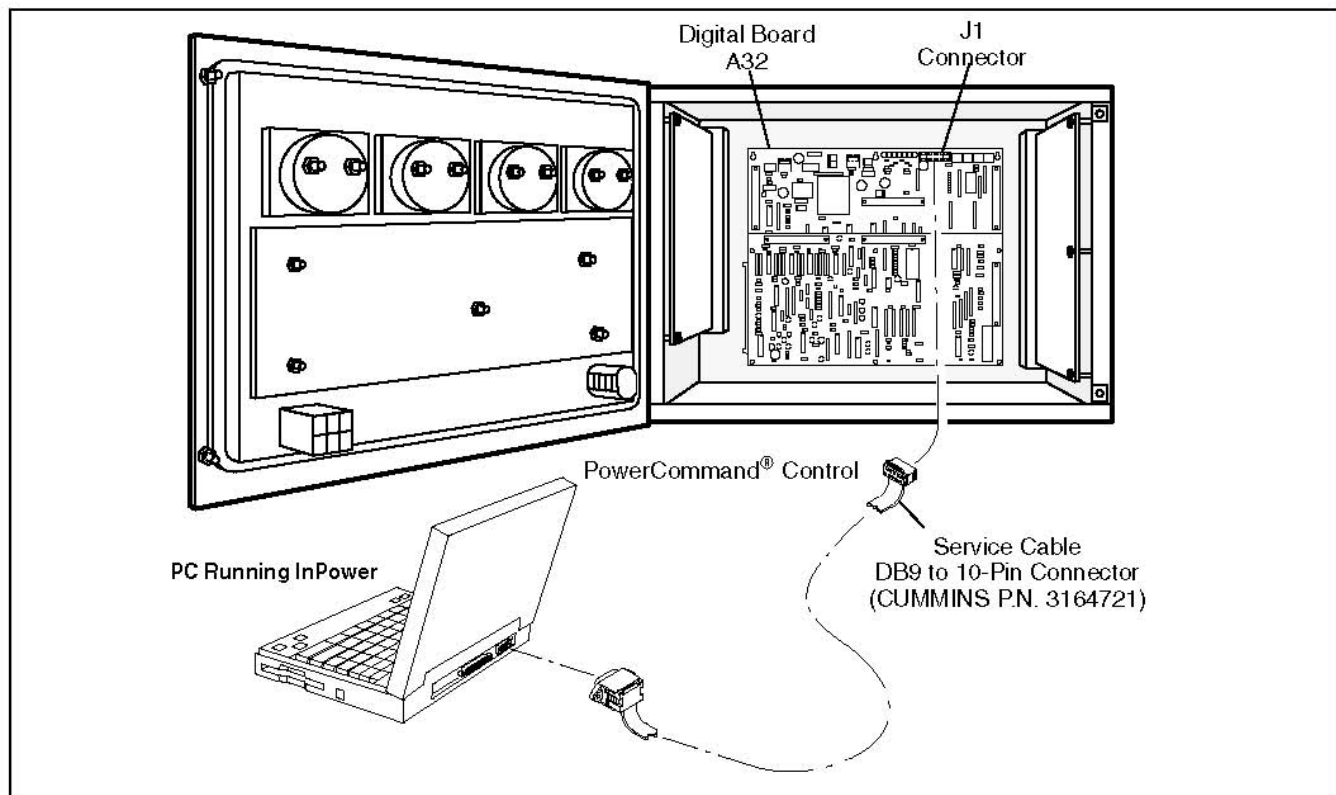


FIGURE 61. PCC 3100 INPOWER CONNECTION

5.1.1.9 Connecting to a PCC 3200 Genset

[Figure 62](#), [Figure 63](#), and [Figure 64](#) show three methods of connecting to a PCC 3200 genset. The cable has a DB9 socket on each end. The serial cable from the service PC can be connected to the engine harness or to the customer connection box.

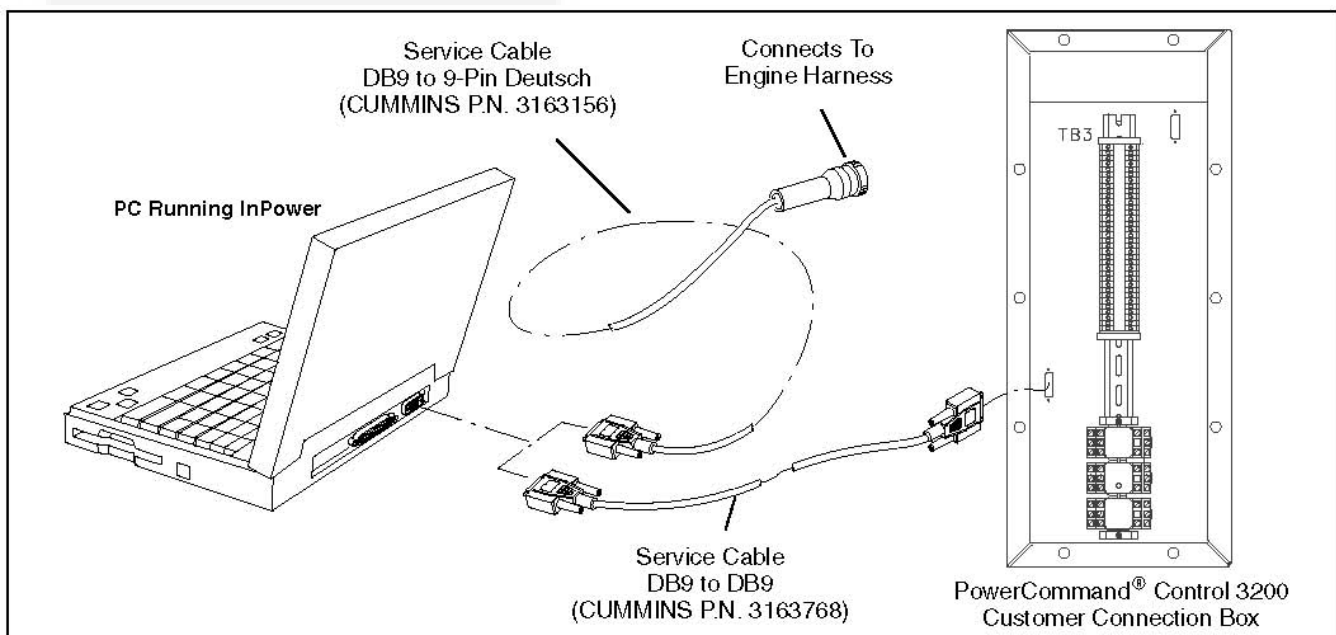


FIGURE 62. INPOWER CONNECTION (PCC 3200 TYPE 1 CONNECTION BOX)

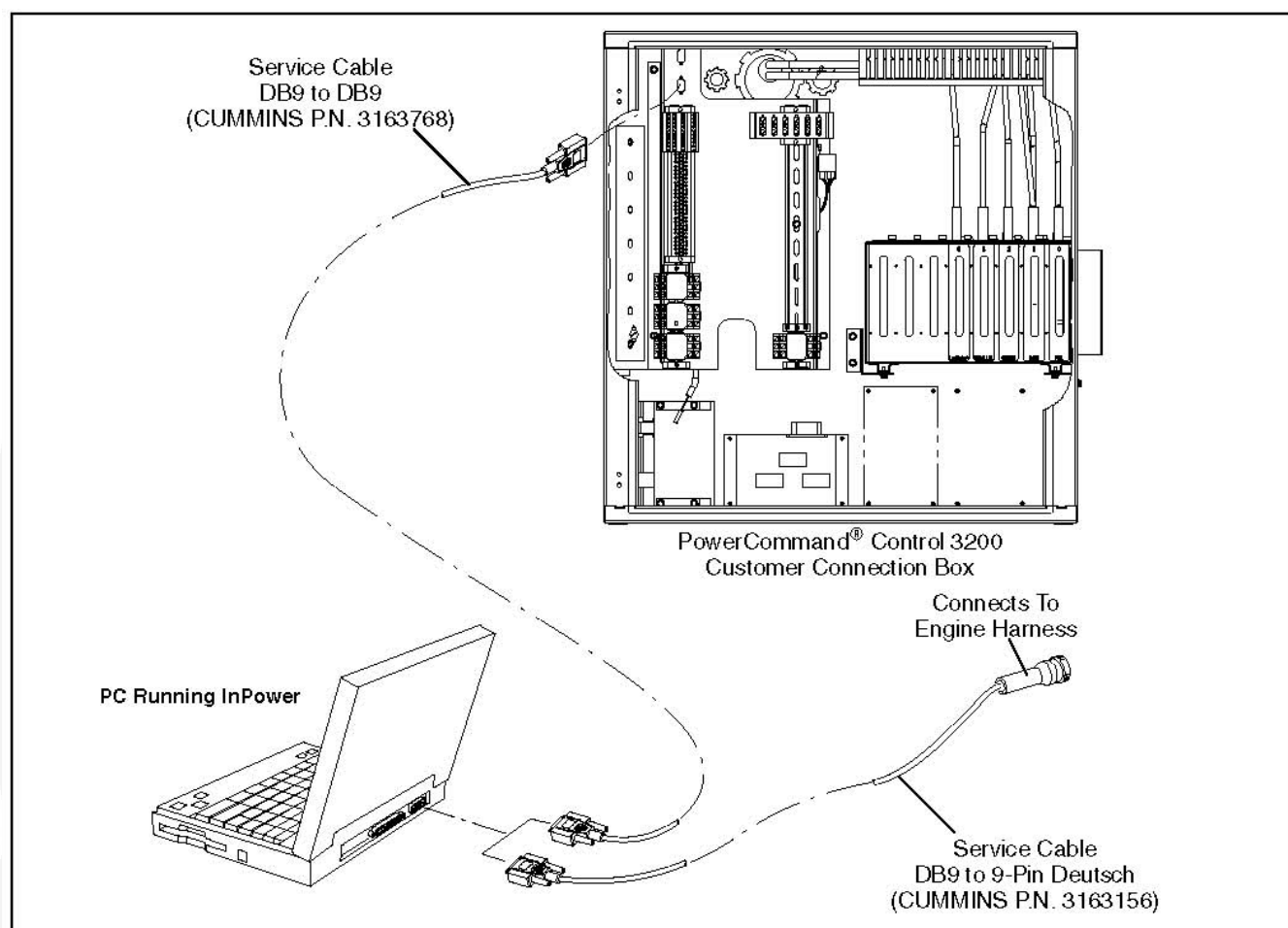


FIGURE 63. INPOWER CONNECTION (PCC 3200 TYPE 2 CONNECTION BOX)

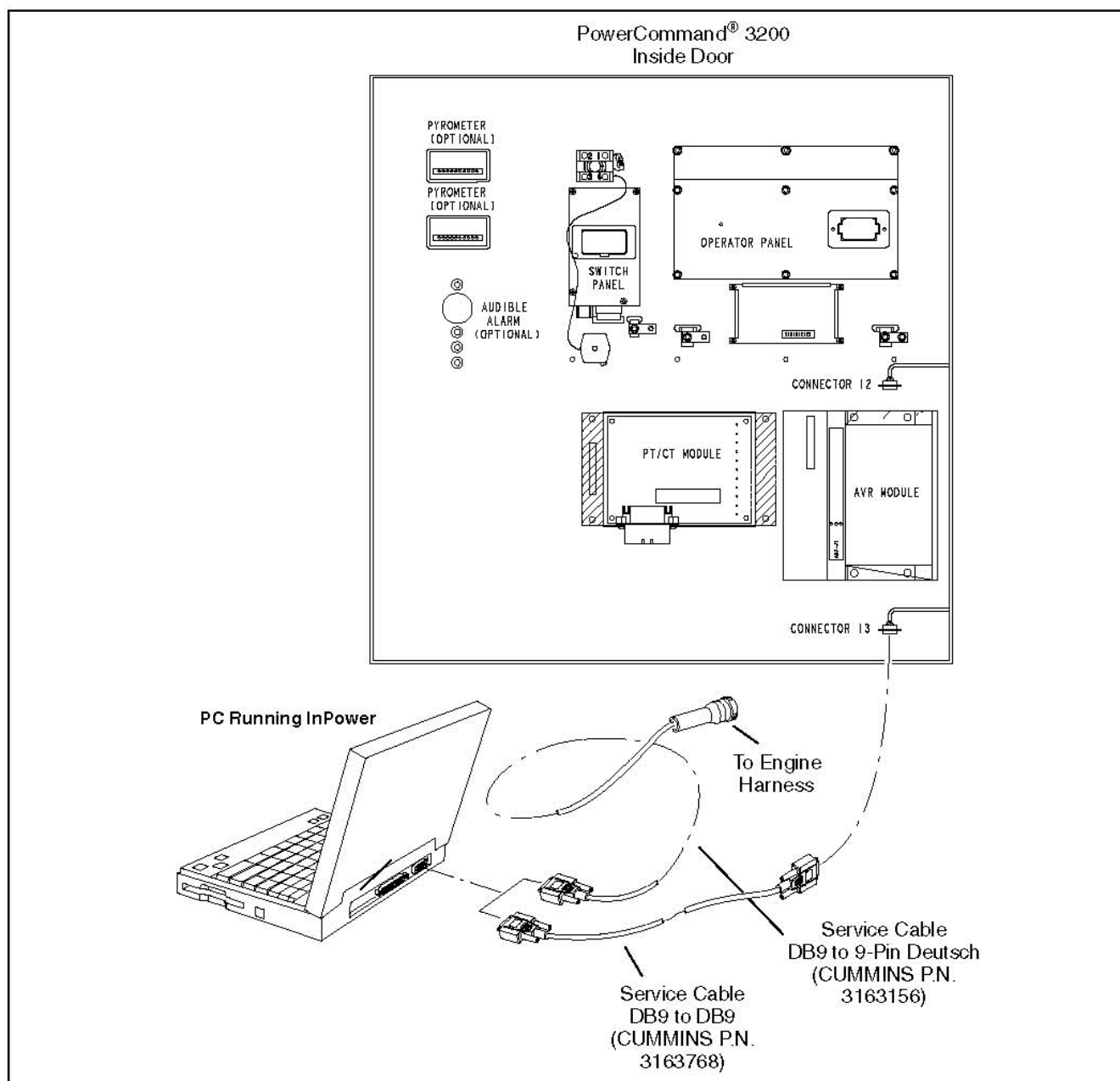


FIGURE 64. PCC 3200 SERIAL CONNECTION (TYPE 3, FOUR CARD CAGE STYLE)

5.2 Consumer Genset Service

InPower performs several functions including genset service and diagnostic functions. The **Adjustment** feature is used to perform service adjustments and trims.

The **Test** feature is used for diagnostics. **Test** is used to temporarily override a variety of input and output parameters.



WARNING: *Electrical shock and moving parts can cause severe personal injury or death. Notify personnel before starting a generator set. Refer to the equipment Operator's Manual for important safety precautions.*

You must be connected to the genset in order to write adjustment trims and setting changes to the controller, and to temporarily send test commands to the genset controller. The features described may not apply to all control types.

5.2.1 Connecting to a Genset

Connection between the service PC and the genset is made with a special RS-232 interface harness. If the service PC does not have a serial port, a USB-to-serial converter may be required as well.

[Figure 66](#) and [Figure 67](#) show two types of connections to a genset in a recreational vehicle. [Figure 68](#) shows how to connect to a marine genset. The interface harness from the service PC can be connected to the engine harness at the remote connector. Disconnect remote connections and connect the tools. Interface harnesses are available for all connection methods.

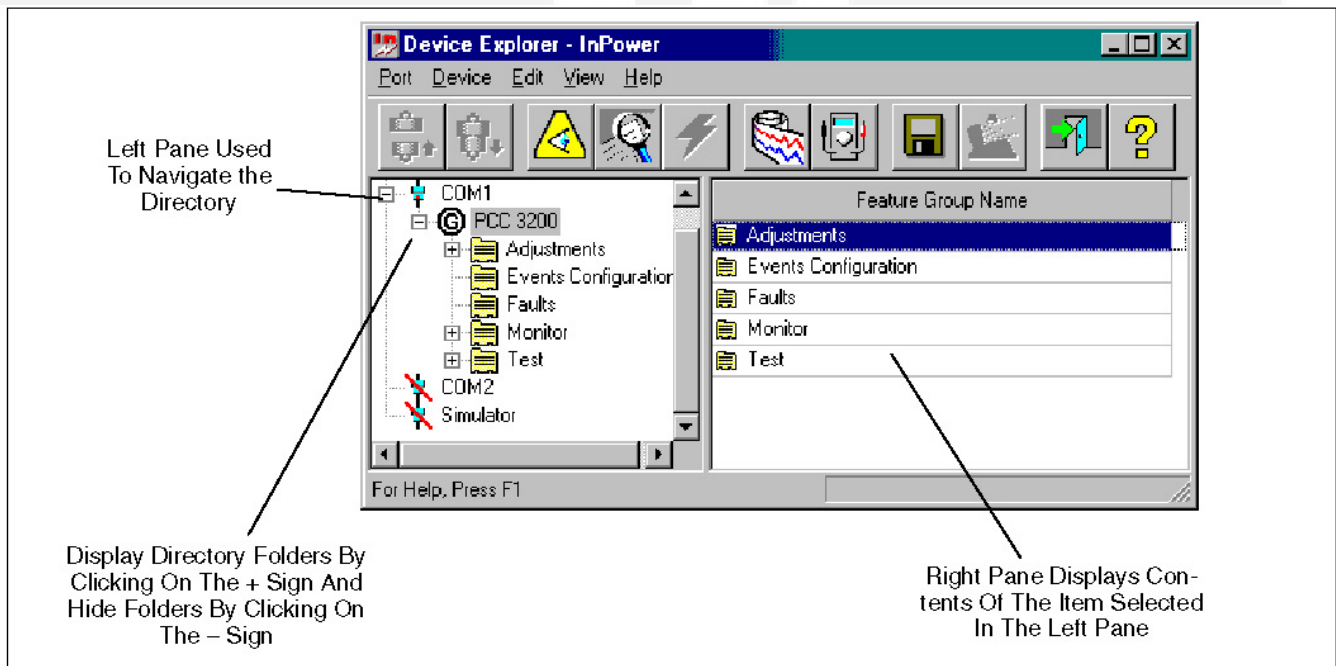


FIGURE 65. DEVICE EXPLORER - TYPICAL GENSET FEATURES

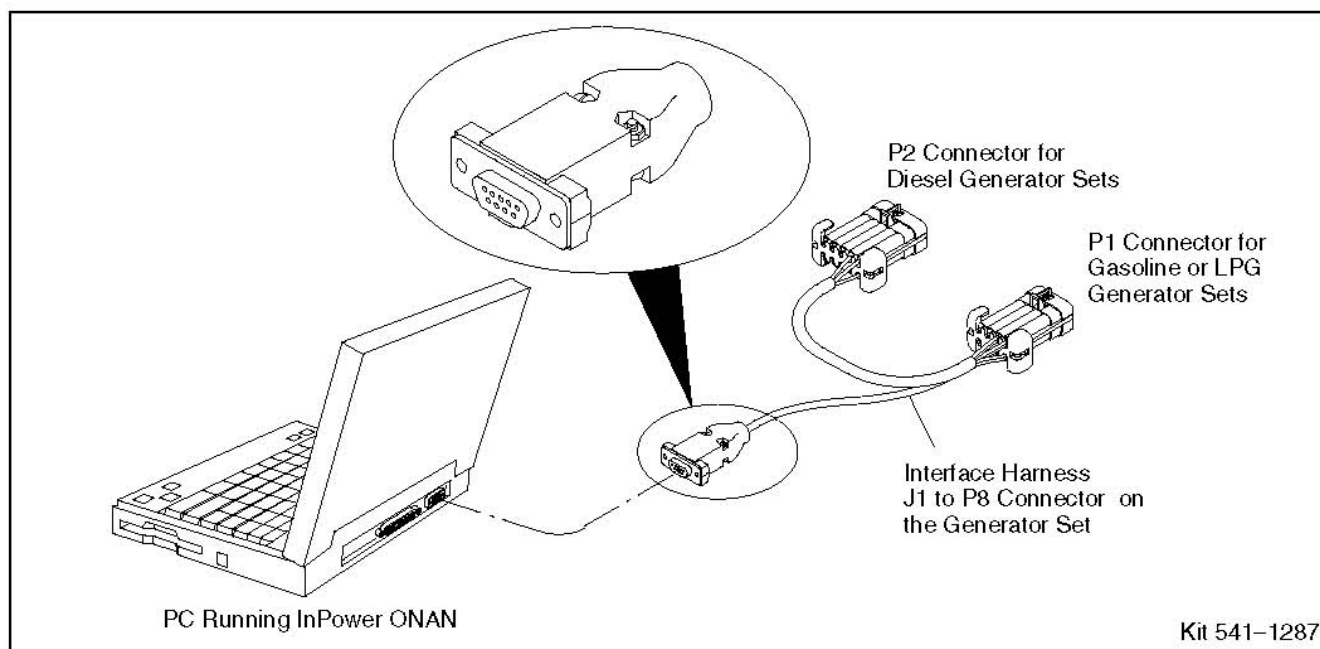


FIGURE 66. INPOWER SERIAL CONNECTION FOR HDKCX, HDKAX (PRIOR TO SPEC K, AND HDKBX DIESEL GENSETS AND HGJAA, HCJAD, HGJAB, HGJAC, HGJAE, HGJAF (UNITS WITH CONTROLS BUILT IN 2001 OR LATER), KY, AND MKY GASOLINE/LPG GENSETS

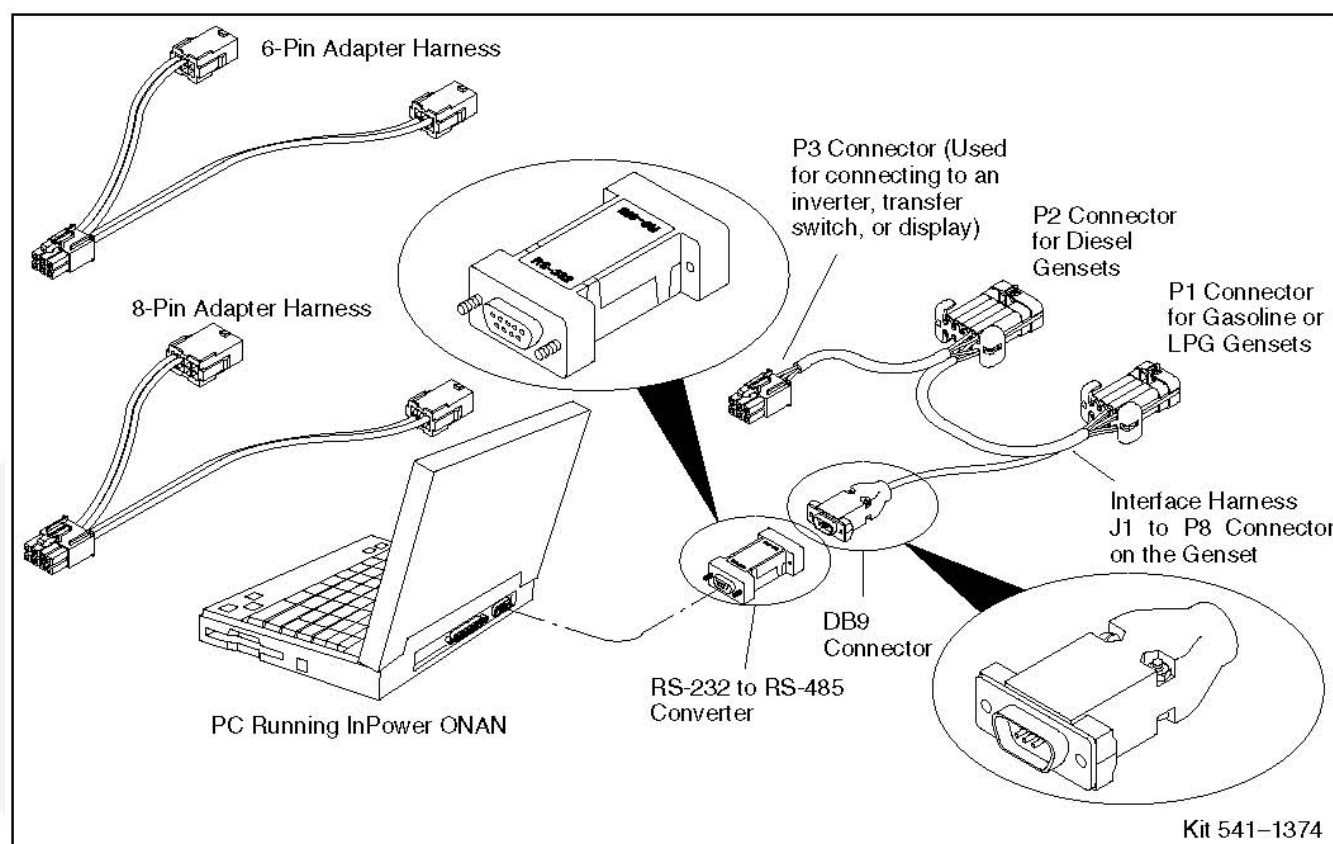


FIGURE 67. INPOWER SERIAL CONNECTION FOR HDKAX (STARTING WITH SPEC K), DKHA, HDKAW, 810HQD, 1215HQD, AND 1218HQD DIESEL GENSETS, HQGMX GASOLINE/LPG GENSETS, GSAAX NATURAL GAS/PROPANE GENSETS, AND HJBAAX AND RV/CM DISPLAYS

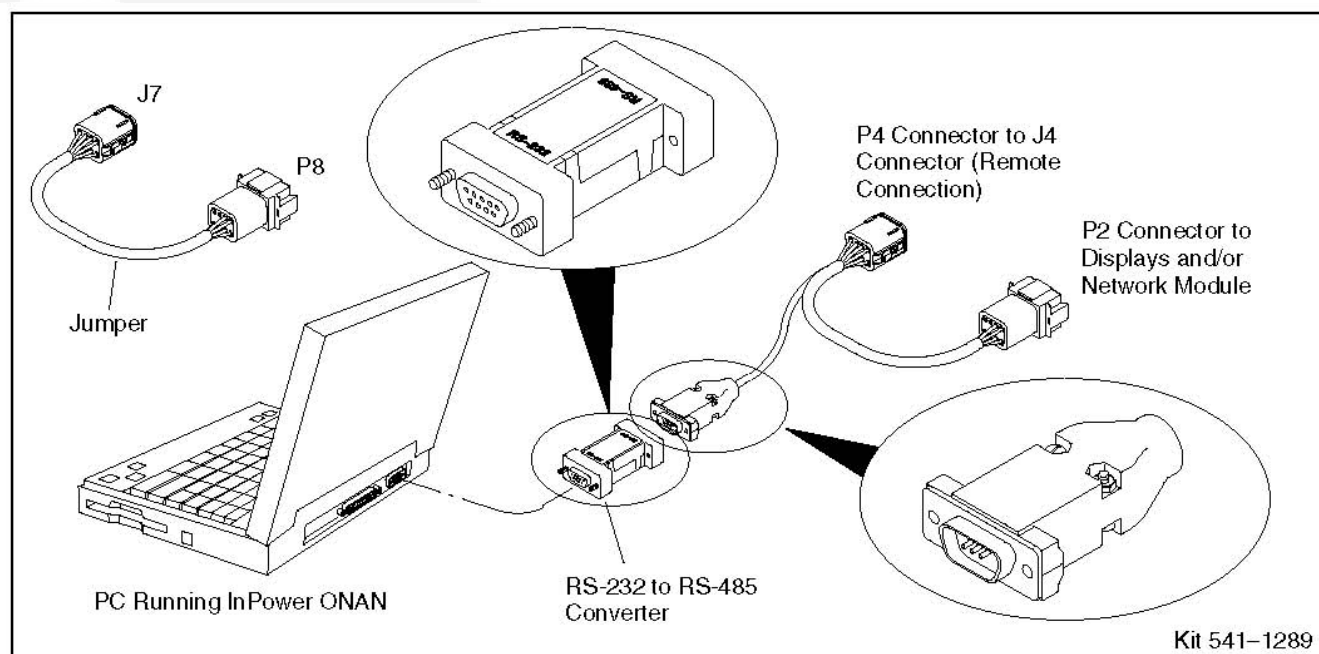


FIGURE 68. SHOWS HOW TO CONNECT TO A MARINE GENSET. THE INTERFACE HARNESS FROM THE SERVICE PC CAN BE CONNECTED

5.2.2 Connecting to an HQD Inverter/Charger, Transfer Switch, or Display and an RV Inverter and GSAA

InPower can also be used with recreational vehicles with an HQD generator to communicate with the inverter/charger, transfer switch, or the display.

Connection between the service PC and the device is made with a special RS-232 interface harness.

[Figure 69](#) shows how to connect to an inverter/charger or a transfer switch. [Figure 70](#) and [Figure 71](#) show how to connect to a display. The interface harness from the service PC can be connected to the inverter/charger or transfer switch. The interface harness from the service PC must be connected to an adapter harness that is connected to the display and a power source. Connections to these devices require an RS-232 to RS-485 communications converter. Interface harnesses are available for all connection methods.



NOTE: When using InPower is connected to the transfer switch to do an update or an initial calibration, the display must either be asleep or disconnected.

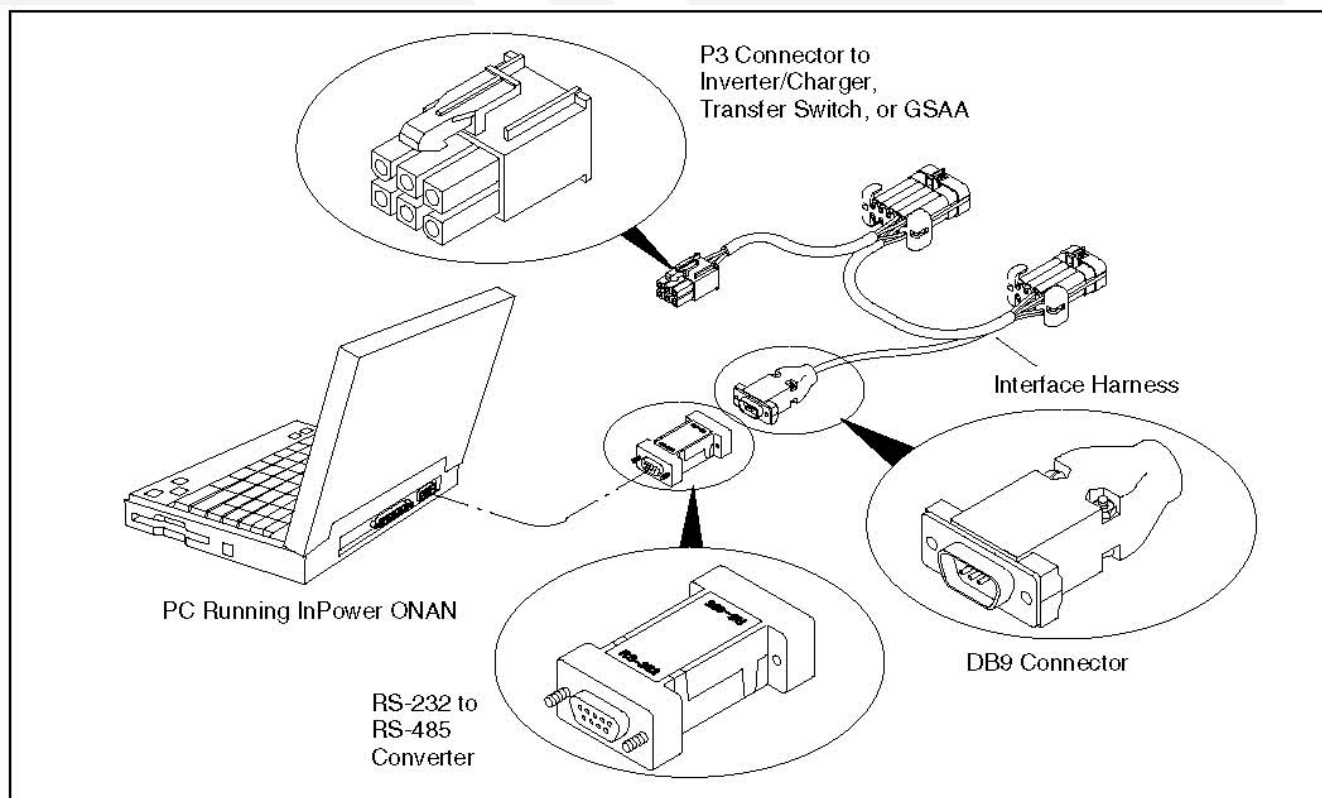


FIGURE 69. INPOWER SERIAL CONNECTION FOR AN HQD INVERTER/CHARGER OR TRANSFER SWITCH, RV INVERTER, AND GSAA

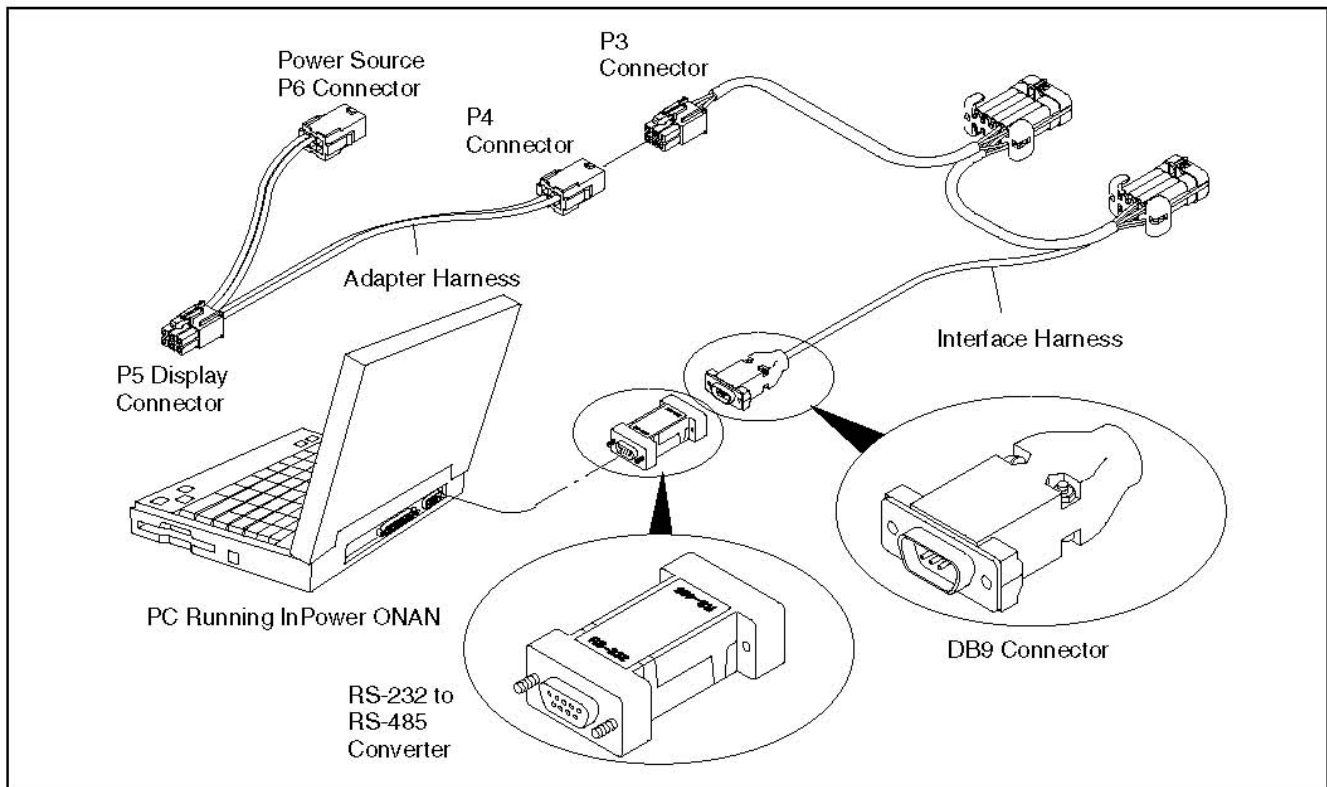


FIGURE 70. INPOWER SERIAL CONNECTION FOR 6-PIN RV/COMMERCIAL MOBILE DISPLAYS

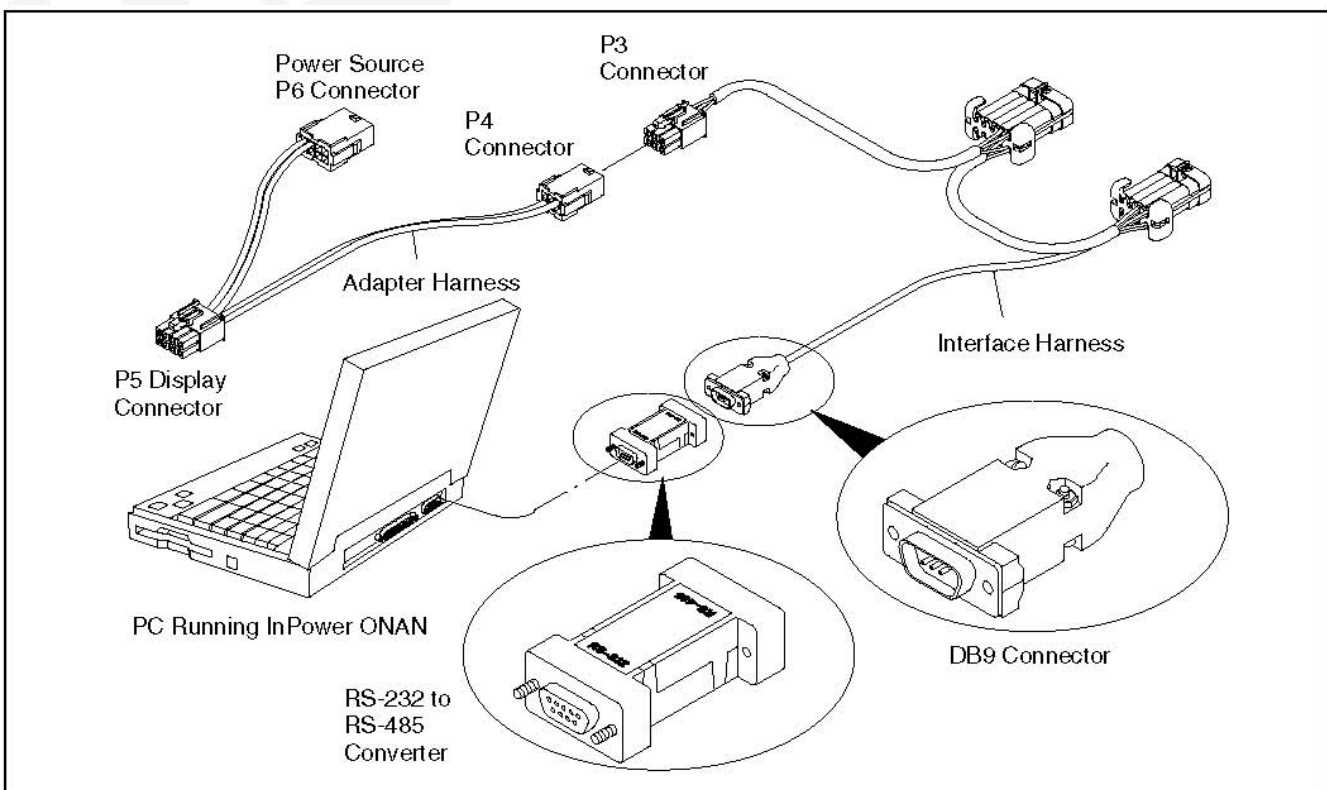


FIGURE 71. INPOWER SERIAL CONNECTION FOR 8-PIN RV/COMMERCIAL MOBILE DISPLAYS

5.2.3 Connecting to Marine Devices

5.2.3.1 Programming A Marine Control



NOTE: For communicating and troubleshooting only, use a MONnet connection and plug into the remote control. For programming using MON, refer to the wiring diagrams.

To program a Marine control, refer to the connections shown in [Figure 72](#).

1. If your installation includes a display or a Network Interface Module (NIM),
 - a. Disconnect the generator set remote control connector.
 - b. Connect the interface harness (P4) to the generator set remote control connector.
 - c. Connect the jumper (J7) to the interface harness (P2).
 - d. Connect the jumper (P8) to the adapter harness.
 - e. Install the RS-232 to RS-485 converter on the PC.
 - f. Connect the interface harness to the RS-232 to RS-485 converter.
2. If your installation does not include a display or a NIM, plug the interface harness into the remote control connector.
3. Wake up the control using the display or the Start/Stop switch. Press Stop until the status light comes on or the LCD screen shows genset data.
4. Program the control.
5. Remove the battery and reconnect the wiring to its original configuration.

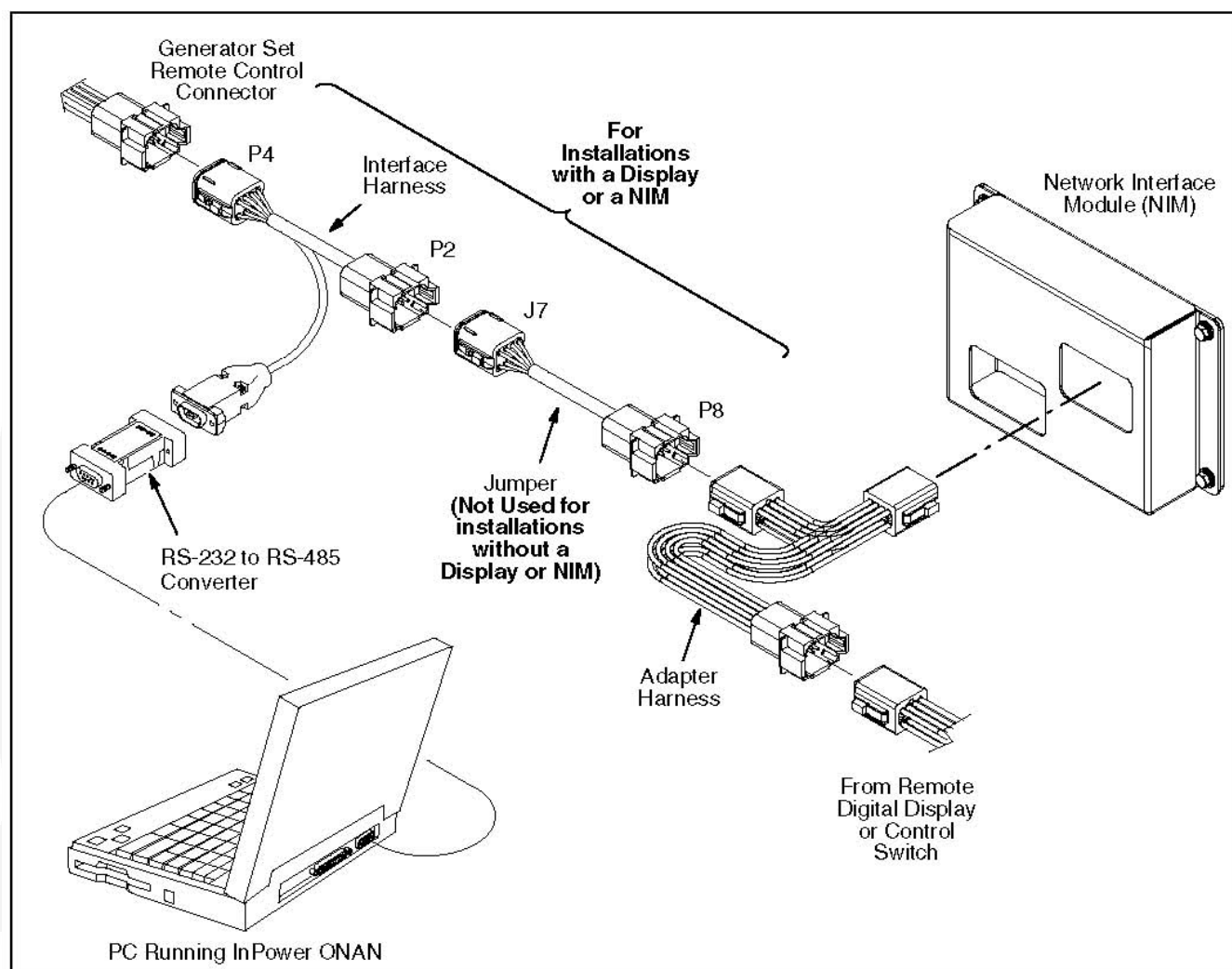


FIGURE 72. INPOWER SERIAL CONNECTION FOR MARINE CONTROLS

5.2.3.2 Programming A Marine Display

To program a Marine display, refer to the connections shown in [Figure 73](#).

1. Disconnect the adapter harness from the display.
2. Connect the jumper (J7) to the adapter harness.
3. Connect the jumper (P8) to the interface harness (P4).
4. Connect the interface harness (P2) to the digital display.
5. Install the RS-232 to RS-485 converter on the PC.
6. Wake up the control by pressing any button until the backlight is enabled on the display.
7. Connect the interface harness to the RS-232 to RS-485 converter.
8. Program the display.
9. Remove the battery and reconnect the wiring to its original configuration.

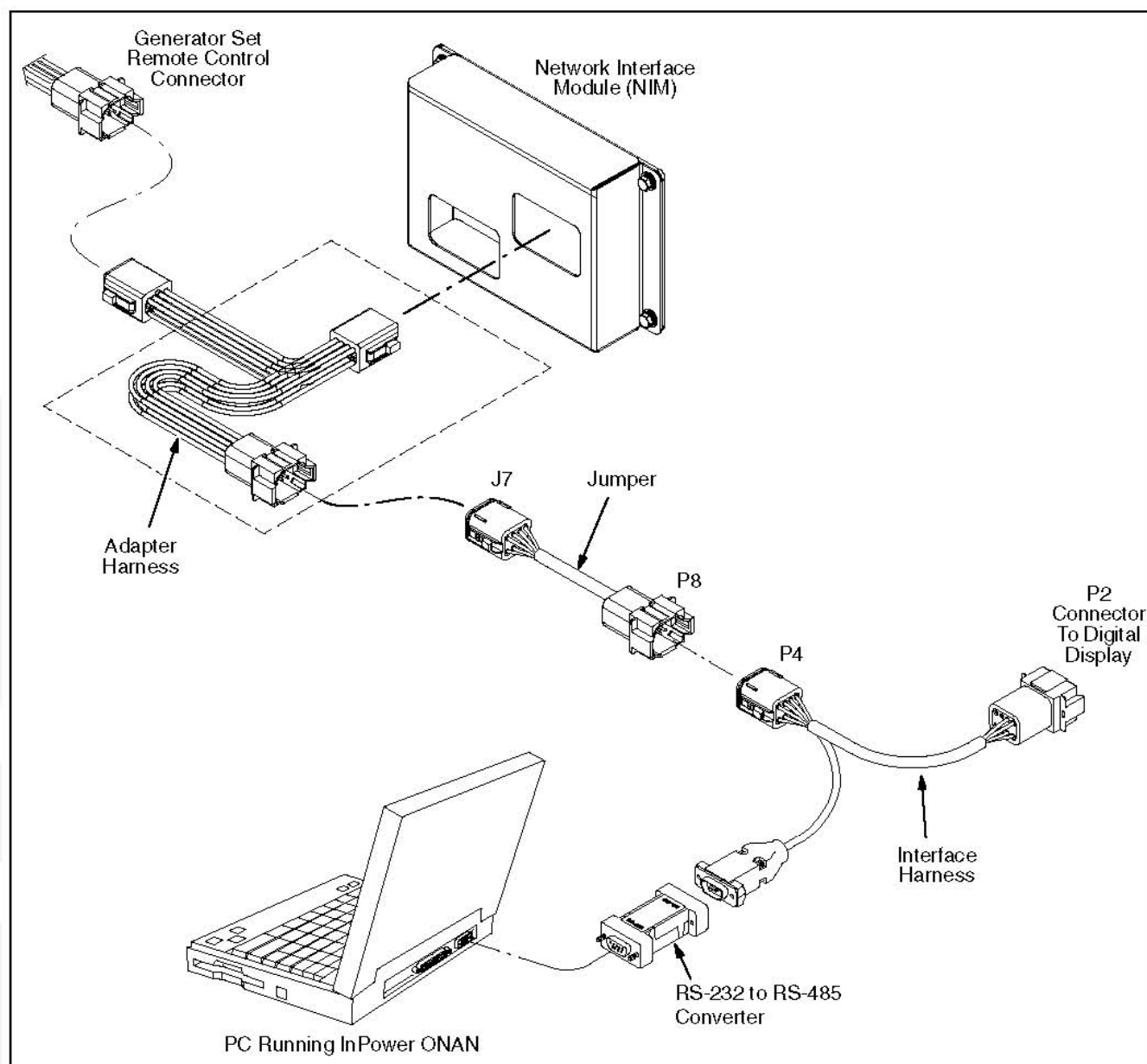


FIGURE 73. INPOWER SERIAL CONNECTION FOR MARINE DISPLAYS

5.2.3.3 Programming A Network Interface Module (NIM)

To program a Marine NIM, refer to the connections shown in [Figure 74](#).

1. Disconnect the generator set harness from the adapter harness.
2. Connect the jumper (J7) to the generator set harness.
3. Connect the jumper (P8) to the adapter harness.
4. Connect the interface harness (P4) to the adapter harness.
5. Connect the interface harness (P2) to the digital display.
6. Install the RS-232 to RS-485 converter on the PC.
7. Connect the interface harness to the RS-232 to RS-485 converter.

8. Wake up the control using the display or the Start/Stop switch. Press Stop until the status light comes on or the LCD screen shows genset data.
9. Unplug the display.
10. Program the NIM.
11. Remove the battery and reconnect the wiring to its original configuration.



NOTE: For communicating and troubleshooting only, use a MONnet connection and plug into the remote control. For programming using MON, refer to the wiring diagrams.

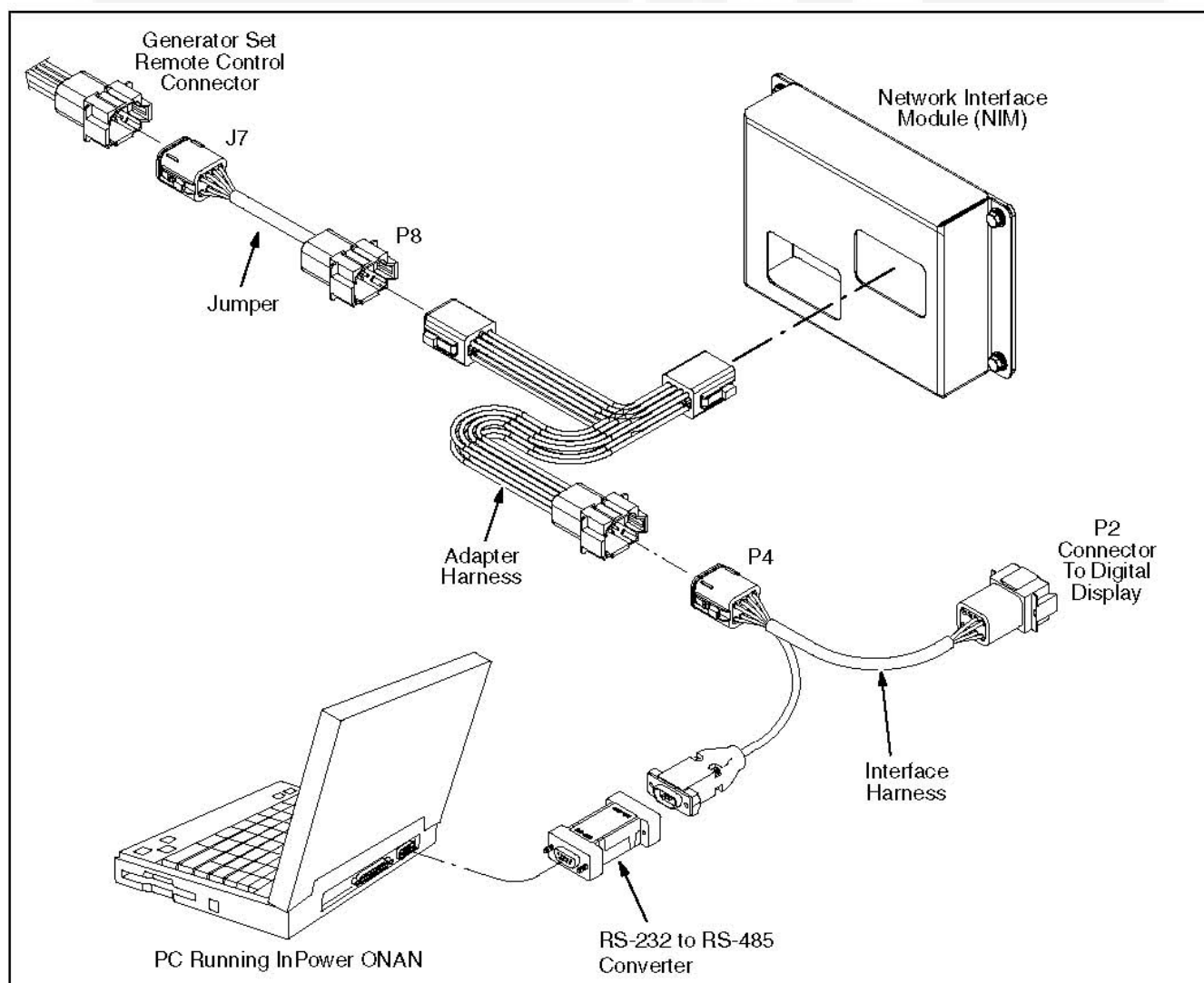


FIGURE 74. INPOWER SERIAL CONNECTION FOR PROGRAMMING A NIM

5.3 Starting InPower

Start InPower and connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC, that is being used for the genset connection. The available COM ports are displayed in the Device Explorer directory (left pane). Double click on the COM port (or click on the COM port and then click on the **Connect** button, on the toolbar).

If InPower has problems connecting to a site, the message shown in [Figure 75](#) is displayed. If, after a few seconds, the program still cannot connect to the site, the connection failure message shown in [Figure 75](#) is displayed. If you get this message, click on **OK**, make sure the selected COM port is available, make sure the COM port is being used, verify that the RS-485 adapter is correctly installed, make sure the genset is powered and the control is awake, check all connections, and repeat the procedure for connecting to the COM port.



NOTE: To wake up the genset control, press and hold the Stop button on the genset until the switch's status light is enabled.

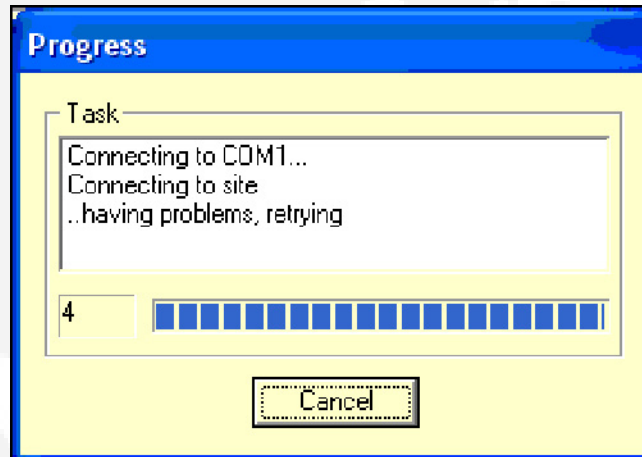


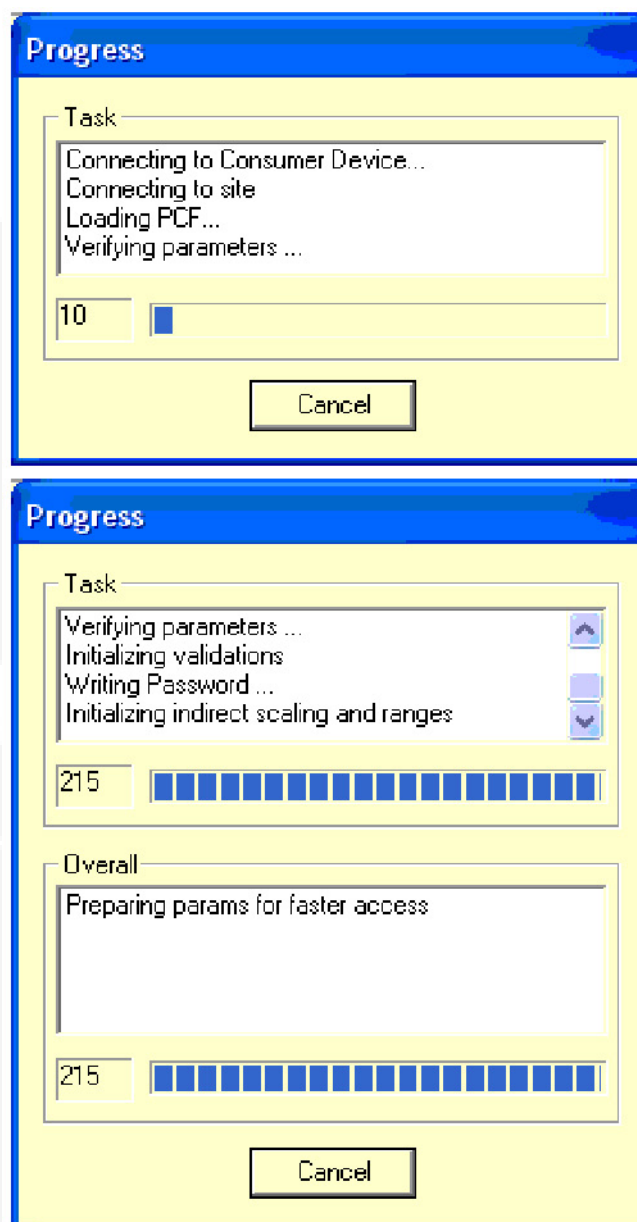
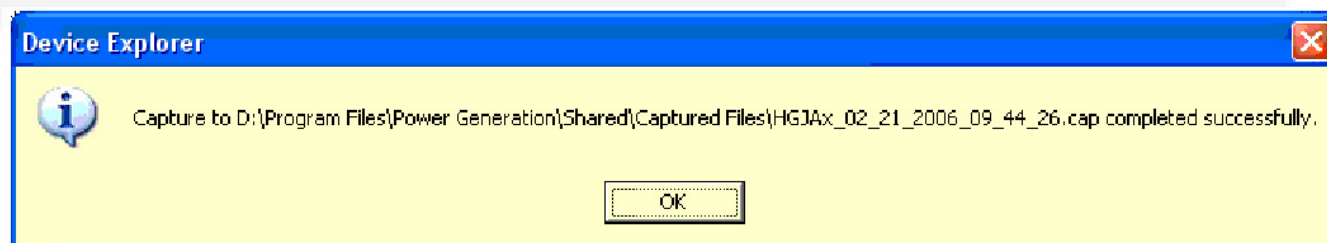
FIGURE 75. CONNECTION PROBLEM MESSAGE



FIGURE 76. CONNECTION FAILURE MESSAGE

The InPower Device Explorer displays the features that are available for gensets in the directory, listed under the device in the left pane. To view the genset features, make sure the genset is powered up and the genset control is awake, double click on the site (COM1, COM2, etc), and expand the genset directory.

When you double click on a site the first time after InPower is started, the Progress messages shown in [Figure 77](#) are displayed to show you that InPower is connecting to the device and verifying parameters. When completed, a message is displayed to inform you of the location where capture files were placed ([Figure 78](#)). Click on **OK** to acknowledge the message.

**FIGURE 77. DEVICE PROGRESS MESSAGES****FIGURE 78. ANNOUNCEMENT OF CAPTURE FILE LOCATION**

If a connection failure message is displayed when attempting to connect to an available device, make sure the device is turned on and check all connections.

The following is a typical list of available features.

- Adjustments
- Events Configuration
- Faults
- Monitor
- Test
- CAN Control
- Events and Faults



NOTE: The available features vary from genset to genset.

When you are connected to a genset, the **Capture File** feature is enabled. This feature is used to create a copy of the gensets existing parameter values. **Always create a Capture file of the device parameters for reference, prior to making any adjustments.**

5.4 Genset Adjustments

This section describes how to make genset parameter value adjustments for trims and settings. There are a large number of adjustable trims and settings available for gensets. Not all genset models will have the same adjustments available. This section will cover typical adjustment examples, to help demonstrate basic procedures for using the adjustment features.



CAUTION: *Improper adjustment can cause equipment malfunction or damage. Adjustments must be performed by trained and experienced personnel only. Refer to the equipment's Installation and Service manuals for adjustment sequences and procedures.*

5.4.1 Adjustment Basics

To access a group of adjustments or an individual adjustment, use Device Explorer to navigate the left pane until you reach the desired folder, and click on it. The right pane will display the parameter(s) associated with the adjustments for that feature.

[Figure 79](#) shows a list of parameters for the **Governor - Frequency selection**.

The right pane displays the **Parameter** description, **Value**, **Units** of measure and the **Last Time** that the value was **Read**.

Placing the mouse pointer over a parameter will bring up an information popup box. The popup provides a brief description of how the parameter value is used.



NOTE: Some values may require that the genset is running or stopped before they can be edited. Refer to the parameter's information pop-up for details.

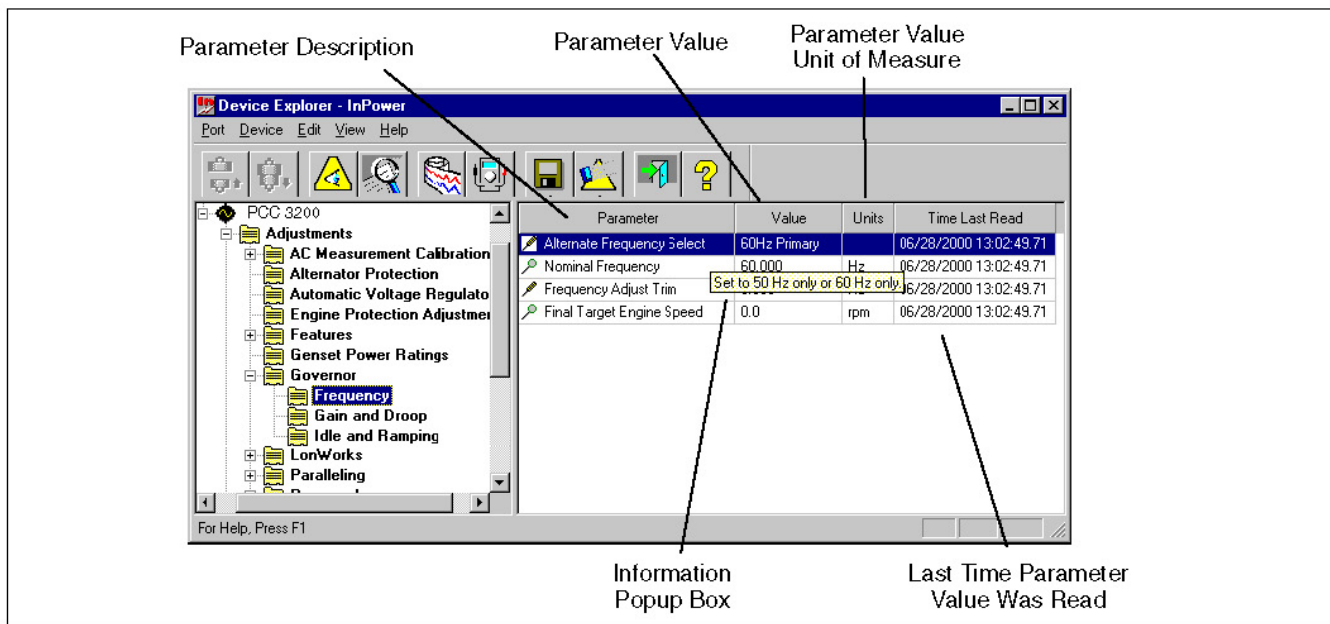


FIGURE 79. TYPICAL PARAMETER INFORMATION

5.4.2 Adjustment Features

The groups and the contents of the **Adjustment** features can vary by genset model, control software version, and InPower version.

The **Adjustments** directory for a typical genset contains the following groups (folders) of Adjustment options:

AC Measurement Calibration: This group contains Current, Voltage and Power Factor measurement parameters for the graphical display. Also contained in this group is the calibration for Voltage Measurement for Regulation.

Alternator Protection: Contains adjustments for Over and Under Frequency, High and Low AC Voltage, and related time delay settings.

Automatic Voltage Regulator: Contains adjustments for the Voltage Adjust trim for the nominal voltage offset, overall AVR gain adjust, and the V/Hz rolloff table.

Engine Protection Adjustments: Engine protection settings for high and low temperature, pressure settings, and related time delays.

Features: This group contains several genset setup and feature settings. For example, the Exercise Setup parameter allows the user to set the genset exercise duration, in hours.

Genset Power Ratings: Contains adjustments for setting up the application information such as Standby or Prime Power, Delta or Wye alternator connection, KVA rating, line-to-line voltage and generator connection for single or three phase.

Governor: This group contains Governor adjustments for Frequency settings, Gain and Droop settings, and Idle and Ramping.

LONWORKS: This group contains network settings, Controller Identification, modem Dialout Setup, network Fault Setup and Network Setup.

Paralleling: This group contains parameters for Breaker Interface, Bus Voltage Setup, Load Share Setup, Paralleling Mode, Protection, and Synchronizing.

Passwords: This group contains three features that are used for password administration.

The **Change Passwords** feature is used to establish initial passwords and to change existing passwords.

Passwords must be 5 to 8 characters in length. They may consist of any combination of alpha or numeric characters. Do not use special characters.

The **Clear Passwords** feature allows users, with a password, to clear the password. This is typically used if you wish to permanently remove the password. If you want to change an existing password, use the Change Passwords feature.

The **Enter Passwords** feature is used to gain access to password protected parameters. Entering the password allows the user to write changes to password protected parameters.

There are two predefined groups of parameters that can be protected by passwords, these are named **User** and **Application**. When a password is established for either of these groups, access becomes password protected. Users can view password protected parameters, but they cannot write changes to them without *Entering* the password first.

The **Site Password** feature is used to provide password protection when accessing a device from a remote (dial-in) location. This feature can also be used to administer an existing site password.

Refer to the examples of changing, entering and clearing passwords, in this section.

Reset History Counters: Allows the user to reset the history records for Fuel, Power, and Starts and Runs in a genset control.

Starting: Contains parameters for setting cranking time settings and attempts, and for Start Time Delay.

Switch Setup: Contains a group of miscellaneous switch parameters for monitoring and for setting switches to a specific state. An example of switch some states are: Enable or Disabled, Started or Stopped, On or Off, Active Open or Active Closed, etc., The settings depends on the type switch selected.

Many of these features contain sub menus of additional adjustment features. Use Device Explorer to expand each of these categories to view the sub-menu of adjustments.

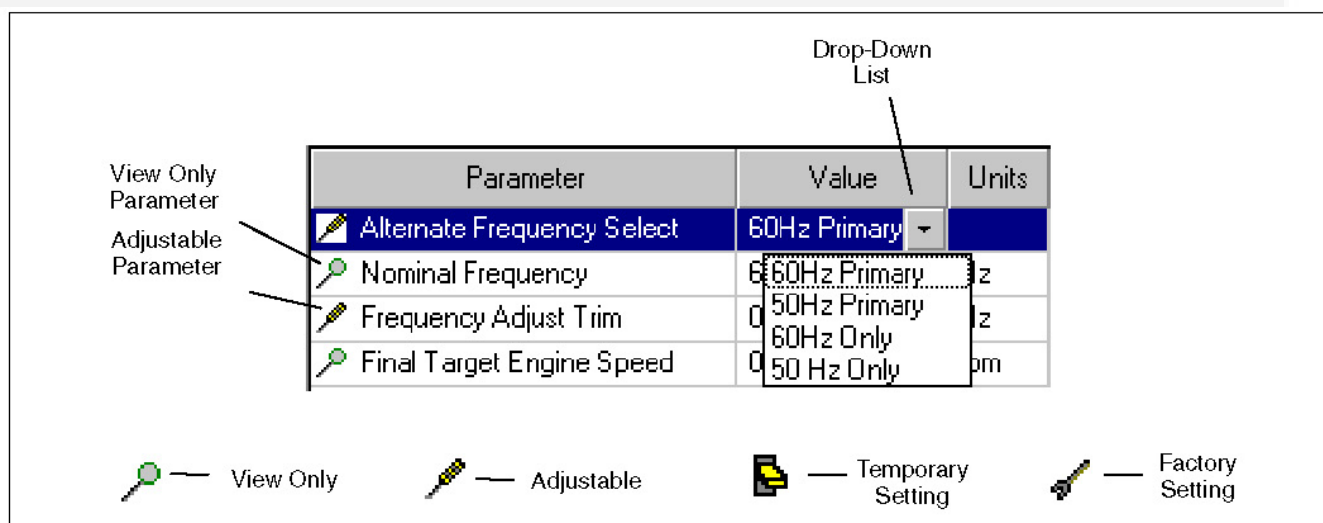


FIGURE 80. TYPICAL ADJUSTMENT FEATURES

5.4.3 Making Adjustments

Located to the left of each parameter is an icon that indicates if the parameter can be adjusted or if it is for monitoring (refer to [Figure 80](#)).

The screwdriver icon is used for trims and settings that can be written permanently to the device (read and write). When the cursor is placed over a parameter that can be adjust, the range for the parameter is displayed ([Figure 81](#)). The magnifying glass indicates that the parameter value is being monitored (read only). The switch icon is used to display settings that can be temporarily written to a device. The wrench icon represents factory settings that are not adjustable with InPower.





Parameter	Value	Units	
 Control Operational Minutes	81		02.
 Displayed Operational Minutes	90	Minutes	02.
 Active Fault Code	0		02.
 Operational Status	Stop		02.

FIGURE 81. PARAMETER RANGE



NOTE: The value being monitored will not automatically update. The user can double click on the parameter to update the value field or click on the Refresh button, on the toolbar.

Each parameter displays the current value and the units of measure for that value. Review this information before making adjustments. Parameter value trims and settings are displayed. **Trims** are numeric values that are entered directly into the Value cell. **Settings** are selected from drop down lists, and they consist of several types of values such as On/Off and Enable/Disable.

To change a parameter value, double click inside the Value cell of the parameter that you wish to change. The current value will be highlighted, if there are only a few choices, a drop-down arrow will be displayed next to the Value.

If an arrow is displayed, click on the arrow to view a drop-down list of the available settings. Click on the desired setting, and it will be entered into the Value cell.

If you do not see an arrow, begin typing the new value, the new value entry will overwrite the current value. If the value entered is above or below the range of acceptable values, an error message dialog box will be displayed ([Figure 82](#)). Review the information in the dialog box to see the value limits, before clicking **OK**, to close the error message dialog box.

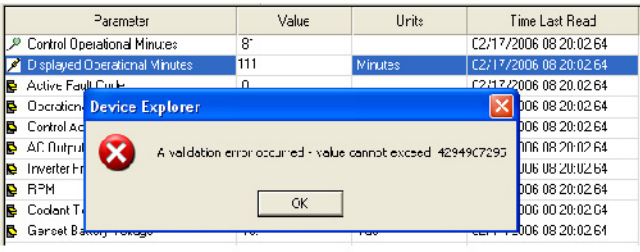


FIGURE 82. ADJUSTMENT ERROR

5.4.4 Saving Adjustments

Edit Mode: When selected, a parameter value remains in the edit mode (to change a numeric value or select from a drop-down list). When finished making adjustments, press the enter key or click on another parameter value to exit the edit mode.

Saving Adjustments: Adjustments are written to the device as they are entered. To make these changes permanent, click on the **Save Trims** button, on the toolbar (floppy disc) or click on the **Device** menu and select **Save Adjustments**. Changes in adjustments will immediately alter the device's performance.

After the **Save Adjustments** button is selected, a *Save Adjustments* dialog is displayed. This feature allows you to view and confirm your changes by clicking on **Save**. You can make final edits within this dialog by double clicking inside the New Value box and entering a new parameter value or you can reset all of your changes by clicking on the **Cancel** button.

Saved adjustments are written to the **Audit Trail** in the Monitor feature. Refer to the **Audit Trail** to review the record of adjustment changes.

If the user loses connection with the device before saving an adjustment, the change will not be saved.

5.5 Adjustment Examples

The following examples are provided to demonstrate how typical trim and setting adjustments are made. Some measurements and adjustments are done while the genset is running. Do not attach or remove test meters while the genset is running.



WARNING: *Hazardous voltage can cause severe personal injury or death. Voltage and frequency measurements must be performed by trained and experienced personnel only. Do not attach or remove test meters while the equipment is running. Refer to the equipment Operator's Manual for important safety precautions.*

Example: In this example ([Figure 83](#)), InPower is used to adjust the governor gain (refer to the specific engine model T&R manual for additional governor adjustment details)

Select the **Governor - Gain and Droop** feature and then double click on the **Gov. Gain Adjust Trim** Value cell.

Make a note of the existing Value reading. The range of adjustment is 0.05 to 10 (1 is the factory default setting).

Increase or decrease the value as needed to obtain the proper load response. If the gain is set too high, engine speed will hunt or oscillate, and if the gain is set too low, the engine will respond too slowly to changes in the load.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device. Continue adjusting until satisfactory response time and stability are obtained.

Example: In this example, InPower is used to increase the **Starting to Rated Ramp Time** (refer to [Figure 84](#)). Select the Governor - Idle and Ramping feature, from the **Adjustments** directory. Double click on the Value cell for **Starting to Rated Ramp Time**. This adjustment sets the desired time interval between starting and rated power. The current setting will be highlighted. For this example, enter 10 (for 10 seconds) into the Value cell. (For faster startup and for NFPA 110 compliance, set this value to zero.)

Click on the **Save Trims** button on the toolbar to write the new value to the device.

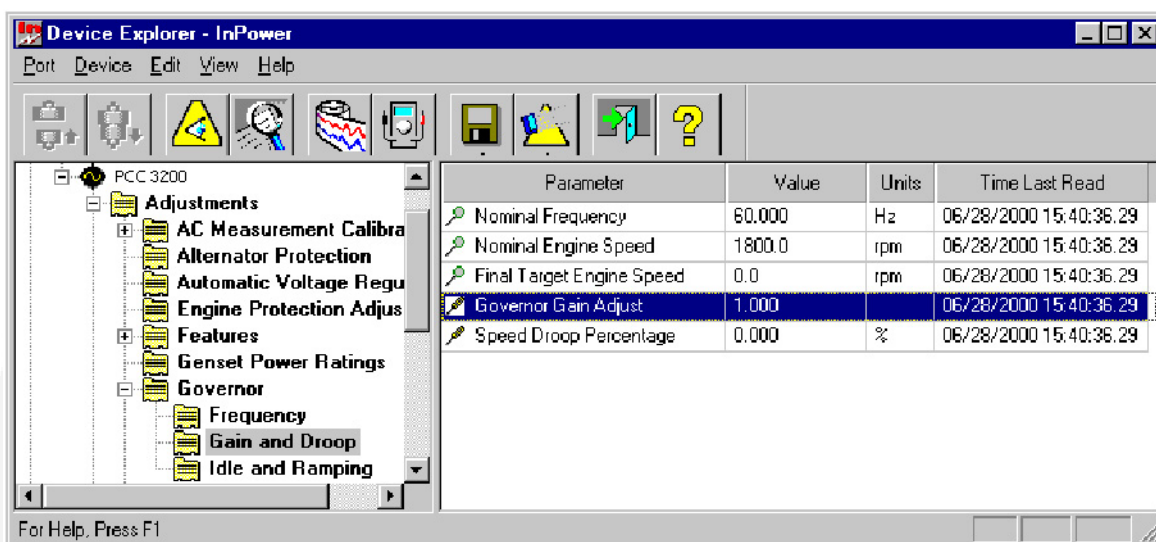


FIGURE 83. ADJUSTMENTS - GOVERNOR - GAIN AND DROOP

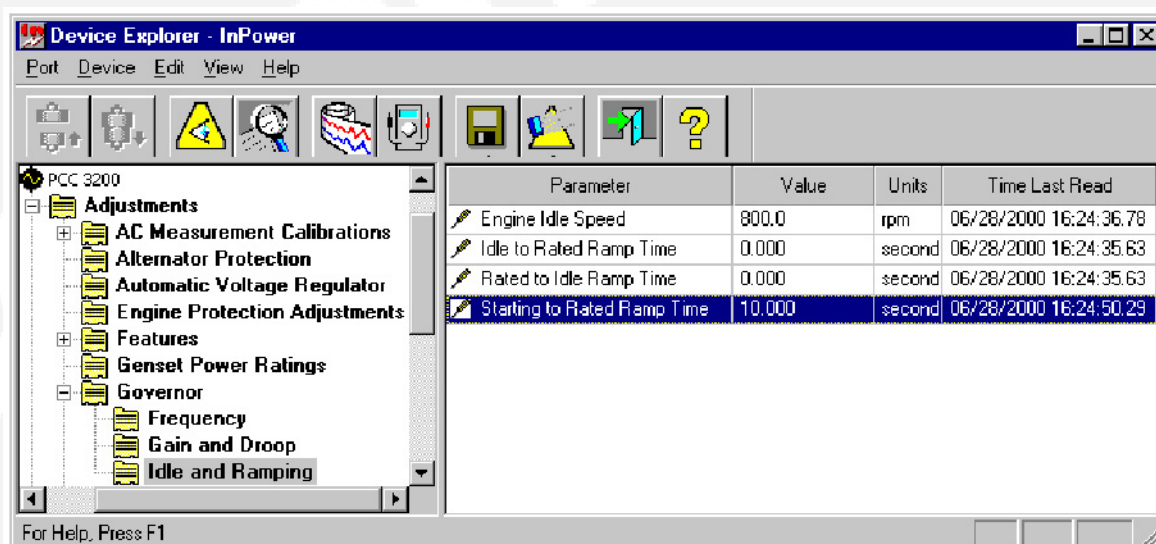


FIGURE 84. ADJUSTMENTS - GOVERNOR - IDLE AND RAMPING

Example: In this example ([Figure 85](#)), InPower is used to adjust the automatic voltage regulator to obtain the correct AVR gain setting.

With the genset OFF, attach a calibrated volt meter to the AC output leads from L1 to L2.

Start the genset and allow it to warm up. Apply and remove a load from the genset while observing the voltage meter reading.

Select the **Automatic Voltage Regulator** feature, and then double click on the **AVR Gain Adjust** parameter Value cell.

Make a note of the existing Value reading. The range of adjustment is 0.05 to 10. Enter a higher or lower value as required. If the gain is set too high, output voltage will be unstable. If the gain is set too low, the output voltage will respond sluggishly to changes in load and overshoot may result.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

Example: In this example, InPower is used to make a setting change to one of the **Switch Setup** parameters.

Select the **Switch Setup** feature in the **Adjustments** directory. Click on the Value cell for **Customer Switch Settings**. Double click on the Value cell for **Customer #1 Switch Active State Selection**. The current setting will be highlighted and a drop-down arrow will be displayed in the Value cell.

Click on the drop-down arrow to display the setting choices ([Figure 86](#)). The user can set the state to either **Active Open** or **Active Closed**. To make the selection, click on the desired switch state.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

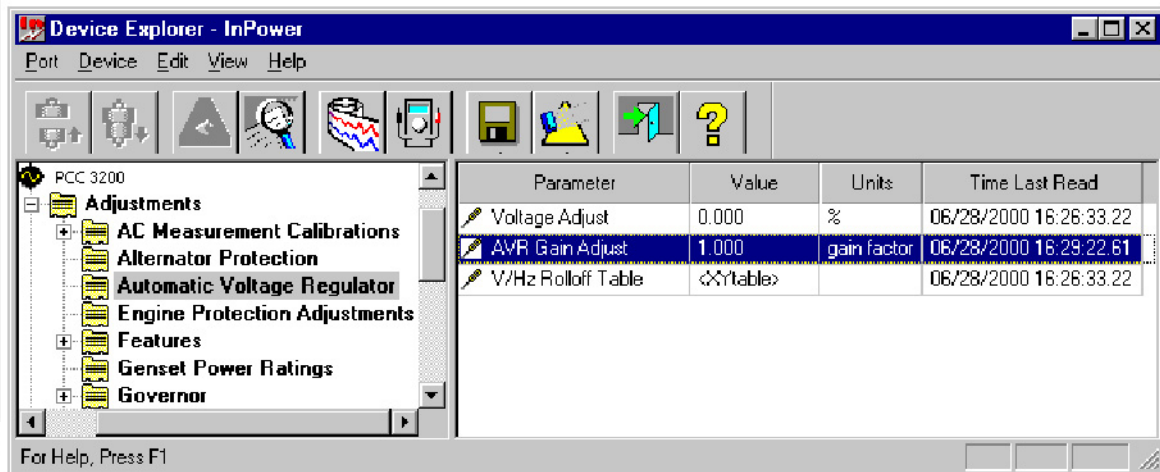


FIGURE 85. ADJUSTMENTS - AUTOMATIC VOLTAGE REGULATOR

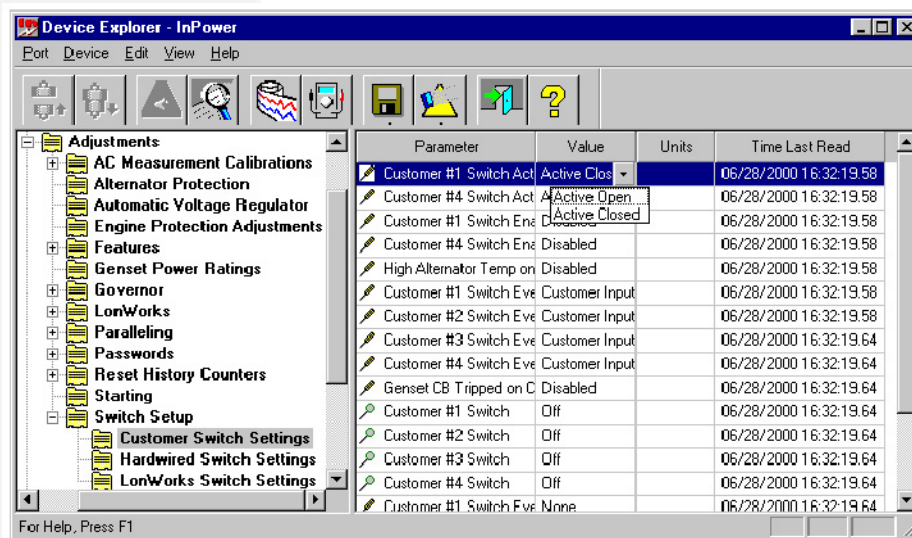


FIGURE 86. SWITCH SETUP - CUST. 1 SWITCH STATE

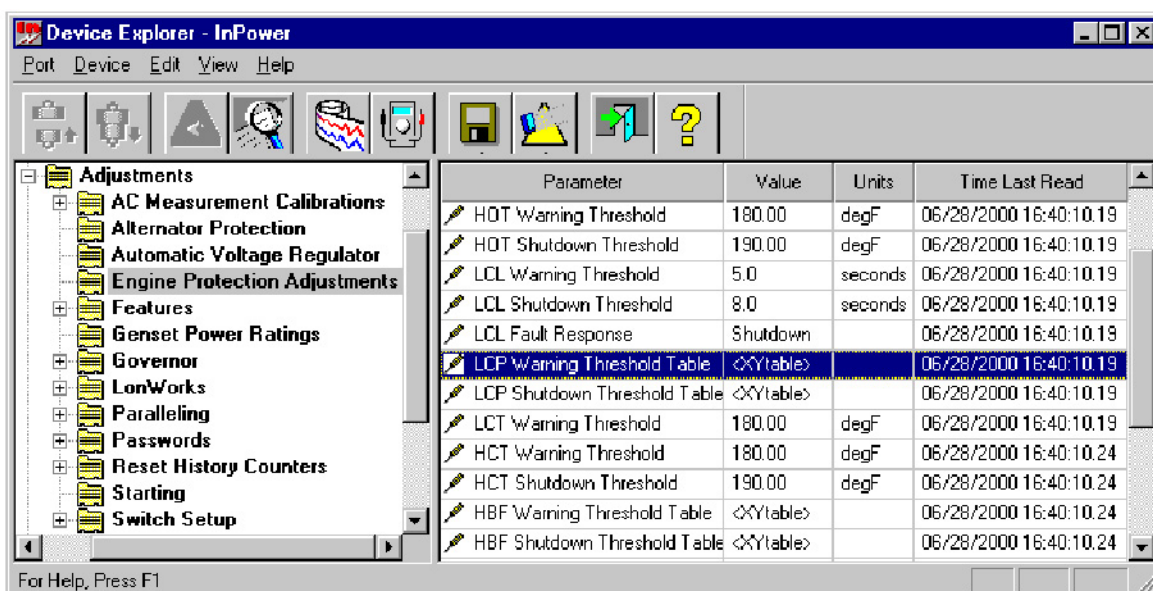


FIGURE 87. ENGINE PROTECTION ADJ. - LCP WARNING THRESHOLD

Example: In this example InPower is used to adjust an XY table.



NOTE: InPower will only allow adjustments to engine protection parameters that result in increased engine protection.

Select the **Engine Protection Adjustments** feature and double click on the Value cell for **LCP Warning Threshold** (Figure 87). The current threshold settings are displayed in a graph. Pressure, in psi, is displayed on the Y-axis and engine speed is displayed on the X-axis.

Editing can be performed in the Graph Mode (Figure 88) or in the Spreadsheet Mode (Figure 89). To change to the Spreadsheet Mode, click on the Graph Mode checkbox to remove the check mark.

Edit in the Graph Mode by dragging a threshold point on the graph to the desired setting. When the cursor is in the correct location, a pointing hand will appear on the graph. Select the hand by holding down on the mouse button, continue to hold down on the mouse button while dragging the point to the desired location.

Click on Save, to update the most recent changes. Click on Close when you are finished making changes.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

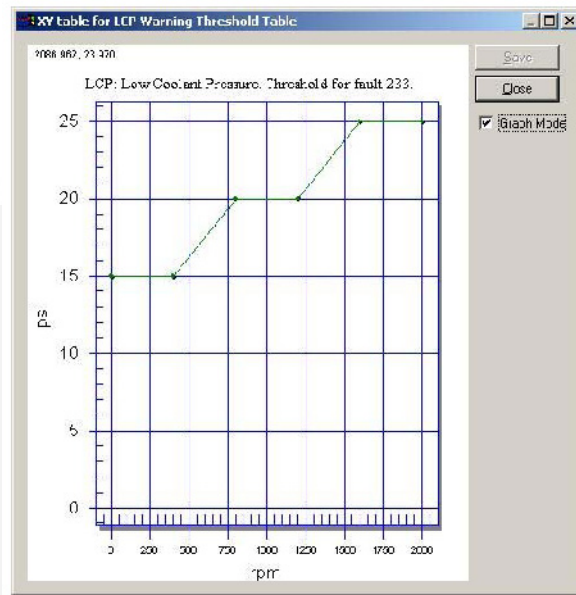


FIGURE 88. XY GRAPH

RPM	PSI
0.0	15.00
400.0	15.00
1200.0	20.00
2000.0	25.00

FIGURE 89. XY SPREADSHEET

Edit in the Spreadsheet Mode by clicking on a value cell and entering the parameter value in the edit box, next to the check mark. Click on the check mark to enter the new value into the spreadsheet. Both the RPM and PSI values can be edited.

In this example, the user can change the LCP warning threshold at 1200 rpm to 20.5 psi. Use either the drag-and-drop method to move the point on the graph, or enter the new value into the spreadsheet.

Click on **Save** to update the most recent changes. Click on **Close**, when you are finished making changes.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

The **Paste** button ([Figure 89](#)) is used to import spreadsheet value data from an Excel spreadsheet. **Service personnel will not need to use this feature because the data is already provided. Generally, only minor adjustments are required.**

Password Example 1: In this example ([Figure 90](#)), InPower is used to create both an Application password and a User password. These passwords are used to prevent unauthorized InPower users from writing changes to password protected parameters.

In examples 2 and 3, InPower is used to *Enter* these passwords to write changes to protected parameters and to *Clear* these Application and User passwords.

Connect to the device and open the **Adjustments - Passwords** parameter group. Click on the **Change Passwords** folder.

Double click on the value cell for the **Change Application Password** parameter. Enter the password *test21* (passwords must be 5 to 8 characters in length and may consist of any combination of alpha or numeric characters).

Make a note of the Application password.

Click on the **Save Trims** button, on the toolbar, to write the new password to the device.

Repeat this process for the **Change User Password** value cell. Enter *test22* and click on the **Save Trims** button again to write the new password to the device.

Make a note of the User password.

Close the connection to the device and exit InPower. Proceed to the next Password Example.

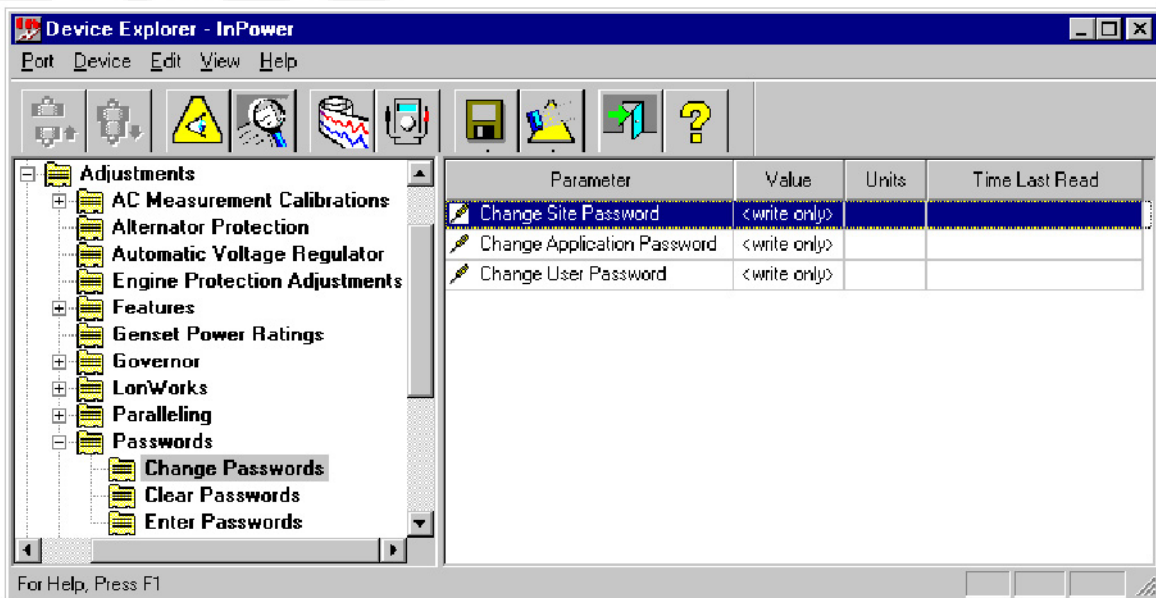


FIGURE 90. CHANGE PASSWORDS

Password Example 2: In this example ([Figure 91](#)), InPower is used to adjust parameters that have password protection.

Start InPower, connect to the device, and open the **Adjustments - Passwords** parameter group. Click on the **Enter Passwords** folder.

Double click on the value cell for the **Enter Application Password** parameter. Enter the password *test21*. Click on the **Save Trims** button. Repeat by entering *test22* in the **Enter User Password** value cell, and click on the **Save Trims** button.

Open the **Adjustments - Engine Protection Adjustments** parameter group and double click on the **Coolant Level Switch Enable** value cell (this parameter is Application Password protected). Select **Enable**, from the drop down list and click on the **Save Trims** button.

Next, double click on the **Engine Cold Warning Threshold** value cell (this parameter is User Password protected). Enter 20 (degF) and click on the **Save Trims** button.

Entering the password first allows the user access to write changes to these password protected parameters. Reset both of these parameters to their original settings before proceeding to the final password example. Do not disconnect from the device.

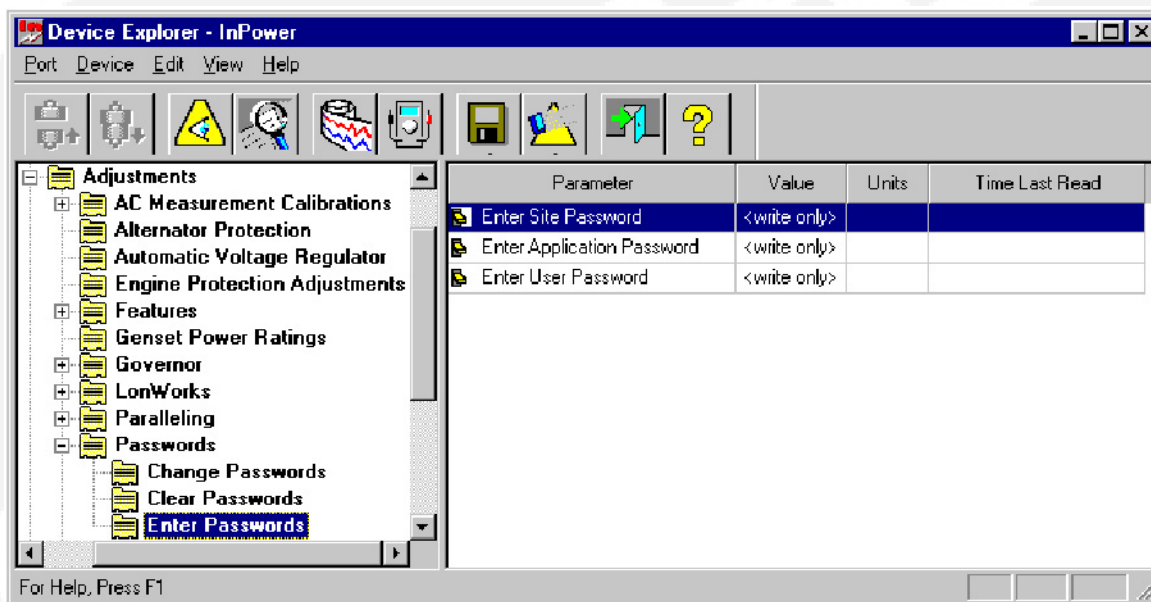


FIGURE 91. ENTER PASSWORDS

Password Example 3: In this example (Figure 92), InPower is used to clear the Application and User Passwords.

During an InPower session, you must *Enter* the password(s) before they can be cleared. Open the **Enter Passwords** parameter group and enter both the Application and User passwords.

Click on the **Clear Passwords** folder. Double click on the Value cell for the **Clear Application Password** parameter. Click on **Clear Password** in the drop-down list. Click on the **Save Trims** button. This will remove the Application password.

Double click on the Value cell for the **Clear User Password** parameter. Click on **Clear Password** in the drop-down list. Click on the **Save Trims** button. This will remove the User password.

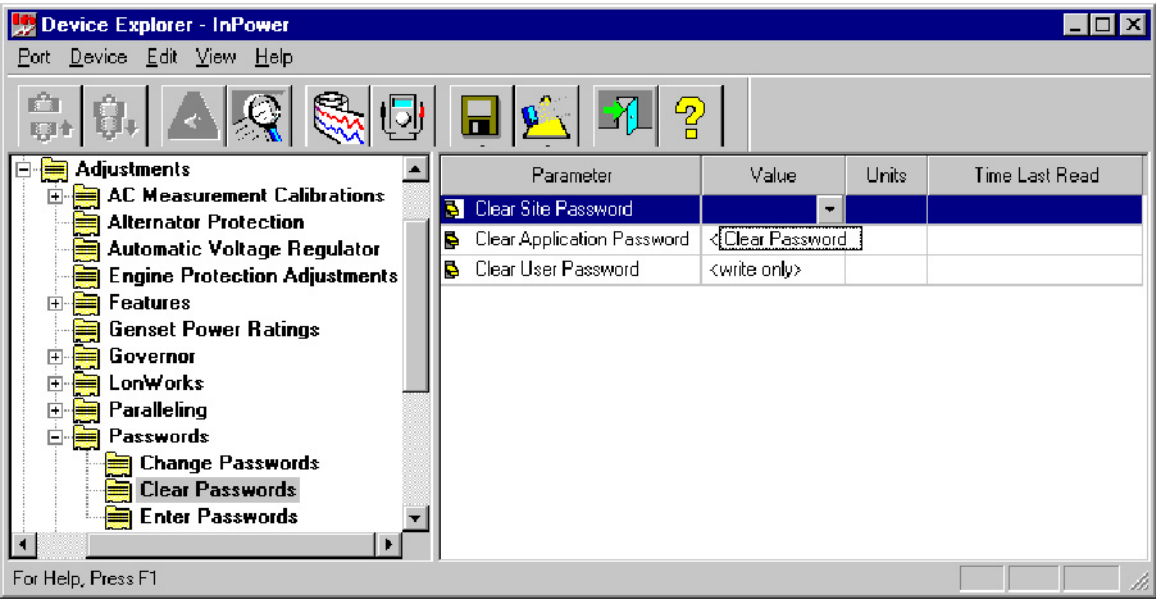


FIGURE 92. CLEAR PASSWORDS

Example: In this example (Figure 94), InPower is used to display a load profile for a PCC 3100 genset.

Connect to the PCC 3100 device and open the **Monitor** feature group. Select the **Genset Data** feature and double click on the Value cell to display a chart showing the for **Genset Load Profile** (Figure 93).

The load profile displays the number of hours that the generator set has operated between zero and 120 percent of rated power. The table is divided into 10 percent increments.

Click on the **Close** button when you are finished viewing the data.

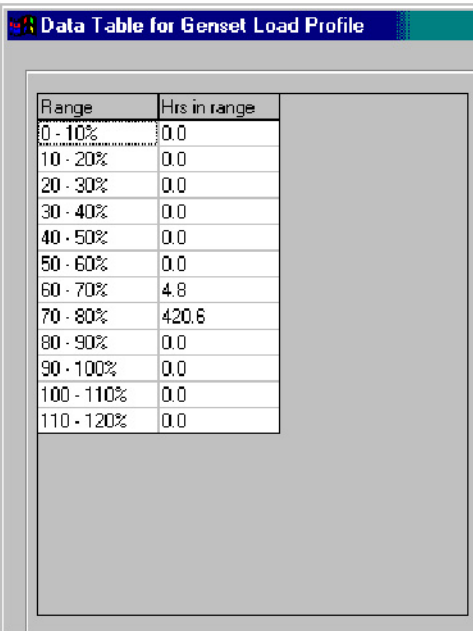


FIGURE 93. PCC 3100 LOAD PROFILE

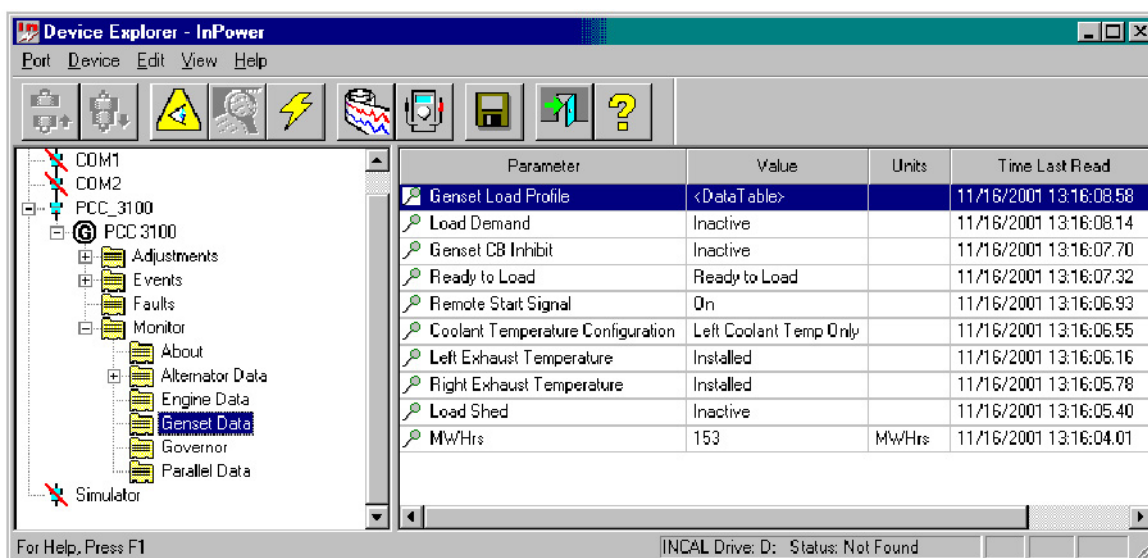


FIGURE 94. PCC 3100 GENSET LOAD PROFILE

Example: In this example (Figure 95), InPower displays a message and disables the Save Adjustment when the Genset State of the PCC1302 control is Fault Shutdown and the user tries to edit and save the parameter values.

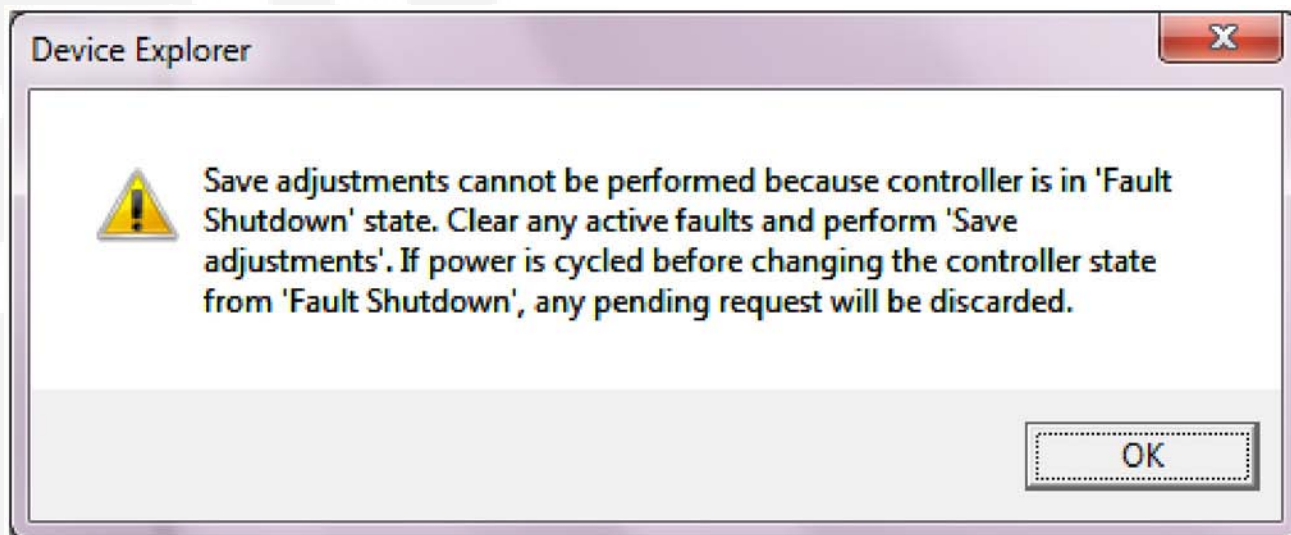


FIGURE 95. PCC1302 SAVE ADJUSTMETNS CANNOT BE PERFORMED MESSAGE

5.6 Test

The **Test** feature is a diagnostic tool that is used to perform internal self-checks on the device (**Self Test**). Use InPower to verify inputs and outputs of the device, and test device protection functions (like Overspeed).

After changing a **Test** parameter, the user can observe or measure the results of the changes.



NOTE: There are two types of Test Commands: maintained inputs and momentary inputs. When a maintained input is set to active, the input will remain active. The InPower user **MUST** set the input back to inactive, when they are finished with the test or before leaving the site, otherwise the command will remain active.

Momentary inputs automatically change state to inactive after one second.

Maintained inputs generally have the screwdriver icon next to the parameter name, and momentary inputs have the switch icon next to the parameter name.

This section describes each group of tests listed in the **Test** directory. The Self Test feature can be used as a quick check to determine if the genset control is responding, by sending control inputs that should activate the control outputs. The other Tests are used for performing more specific test functions.

The Test parameter values are adjustable ([Figure 96](#)). Some parameters have a numeric value that can be changed while others have values that can be selected from a drop-down list.

5.6.1 Commercial Gensets

The **Test** directory for a typical commercial genset may contain the following groups (folders) of Test options:

- Fault Simulation
- Inputs
- Manual Operation
- Outputs
- Self Test
- Speed Override
- Protection Verification
- Annunciator

The **Test** directory for a typical consumer genset may contain the following groups (folders) of Test options:

5.6.2 Consumer Gensets

The **Test** directory may contain the following groups (folders) of Test options for consumer gensets:

- Starter Override Request
- Starter Override Command
- Starter Override Status
- Glow Plugs Override Request
- Glow Plugs Override Command
- Glow Plugs Override Status
- Fuel Pump Override Request
- Fuel Pump Override Command

- Fuel Pump Override Status
- Run Output Override Request
- Run Output Override Command
- Run Override Status
- Status Light Override Request
- Status Light Override Command
- Status Light Override Status
- Power Latch Override Request
- Power Latch Override Command
- Power Latch Override Status
- Inverter Enable Override Request
- Inverter Enable Override Command
- Inverter Enable Output Status
- Governor Output Override Request
- Governor Output Override Command (in percent)
- Governor Output Override Status
- Set High Idle

5.6.3 Override Requests

This test option allows you to enable or disable an override for each of the eight devices.

5.6.4 Override Commands

For the starter, glow plugs, fuel pump, run output, status light, power latch, and inverter, this test option allows you to set the override command to On or Off. For the governor output, this test option allows you to set the range from 0 to 100%.

Pressing the Stop button disables any override. Overrides are active for 60 seconds, and then are disabled.



WARNING: *Overriding genset command may result in damage to the genset. Only trained and experienced personnel should override genset commands.*

5.6.5 Override Status

For the starter, glow plugs, fuel pump, run output, status light, power latch, and inverter, this test option allows you to see the current state of the override status. For the governor output, this test option allows you to vary the governor output from 0 to 100%.

5.6.6 Set High Idle

While the default value is **Normal**, this variable can be used to set a mechanical High Idle Stop by setting the value to "Set High Idle."























Parameter	Value	Units	Time Last Read
 Fuel Pump Override Request	Disable		03/02/2006 09:14:42.28
 Fuel Pump Override Command	Off		03/02/2006 09:14:42.21
 Fuel Pump Override Status	Off		03/02/2006 09:14:42.15
 Glow Plugs Override Request	Disable		03/02/2006 09:14:42.09
 Glow Plugs Override Command	Off		03/02/2006 09:14:42.02
 Glow Plugs Override Status	Off		03/02/2006 09:14:41.96
 Run Output Override Request	Disable		03/02/2006 09:14:41.90
 Run Output Override Command	Off		03/02/2006 09:14:41.84
 Run Override Status	Off		03/02/2006 09:14:41.76
 Starter Override Request	Disable		03/02/2006 09:14:41.70
 Starter Override Command	Off		03/02/2006 09:14:41.63
 Starter Override Status	Off		03/02/2006 09:14:41.57
 Status Light Override Request	Disable		03/02/2006 09:14:41.51
 Status Light Override Command	Off		03/02/2006 09:14:41.45
 Status Light Override Status	Off		03/02/2006 09:14:41.38
 Set High Idle	Normal		03/02/2006 09:14:41.32
 Power Latch Override Request	Disable		03/02/2006 09:14:41.26
 Power Latch Override Command	Off		03/02/2006 09:14:41.20
 Power Latch Override Status	On		03/02/2006 09:14:41.13
 Governor Output Override Request	Disable		03/02/2006 09:14:41.07
 Governor Output Override Command (in percent)	0	%	03/02/2006 09:14:41.01
 Governor Output Override Status	0	%	03/02/2006 09:14:40.95

FIGURE 96. ADJUSTABLE TEST PARAMETERS

5.6.7 Inputs

When inputs are externally activated, the **Inputs** feature can be used to monitor the inputs. The actual inputs can be measured with a multimeter and the results can be compared.

Example: To test the **Oil Pressure Input**, check the genset wiring diagram for the location of the oil pressure sender input. In this example the input is on connector 05 between pins 22 (+) and 23 (gnd). Remove the connector and insert the service breakout box. Check for voltage between pins 22 and 23.

If no voltage is present, check the harness and the sensor. If voltage is measured, and InPower and the Operator panel display no input, the connections to the control, or the control are suspect.

Figure 97 shows the results when an input voltage is present, in this example the oil pressure (approximately 26 psi) is displayed in InPower, and should also be displayed in the Operator Panel display.

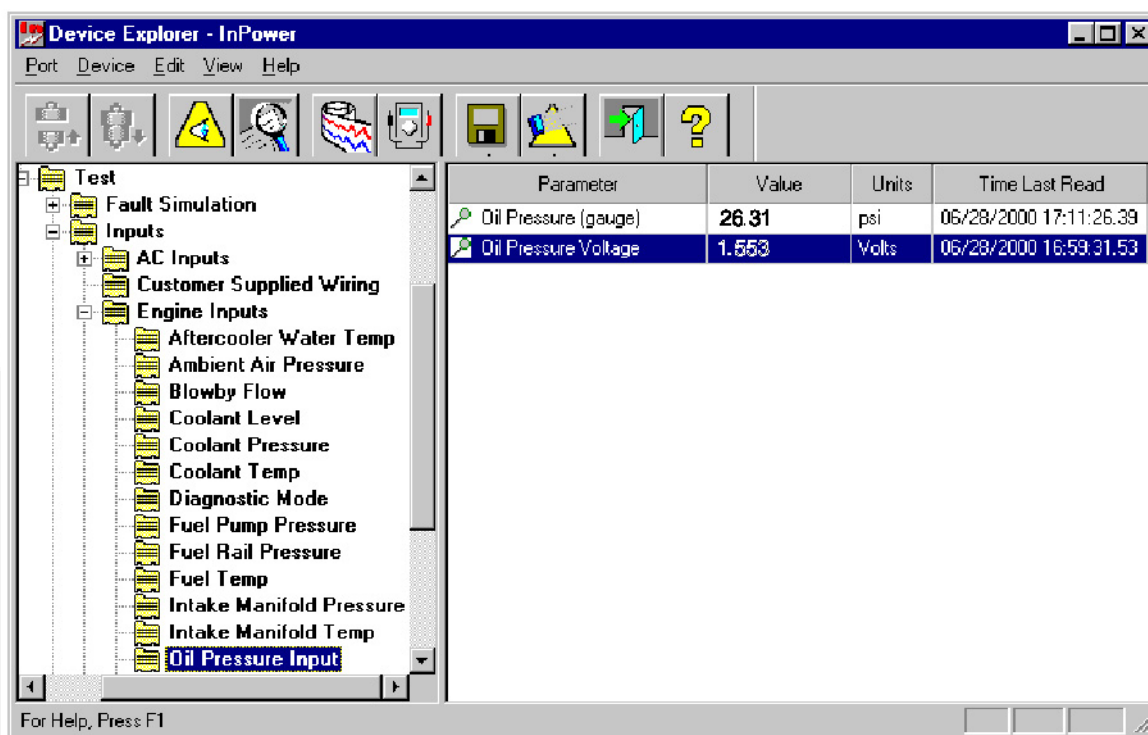


FIGURE 97. TEST - INPUTS - OIL PRESSURE

5.6.8 Manual Operation

This feature allows the user to perform genset operations including exercising the genset, stopping the genset and bypassing the warm-up period (used if the genset is already warmed up).

Example: In this example, InPower is used to initiate a **Manual Run Command**. Make sure that the Run/Off/Auto switch, on the genset control panel, is set to **Auto**. Double click on the **Manual Run Command** Value cell, and a drop-down list arrow is displayed (refer to [Figure 98](#)). Click on the drop-down arrow and click on **Run**. To initiate the **Manual Run Command**, click on the **Save Trims** button, on the toolbar. To end the **Run** command double click on the Value cell again, click on the drop-down arrow and click on **Stop**, then click on the **Save Trims** button, on the toolbar.

5.6.9 Outputs

The Outputs feature allows the user to activate relay drivers without running the genset. This feature can be used to test the relays and wiring, or measure the relay driver output with a voltmeter.

Example: In this example, InPower is used to enable the **Load Dump Override Command** (refer to [Figure 99](#)). Make sure that the **Load Dump** parameter is set to **Driver On**. (If it is not, change it with the **Load Dump Override Command** parameter, and save that parameter setting.)

Double click on the **Load Dump Override Enable** Value cell. A drop-down list arrow is displayed, click on the drop-down arrow and click on **Enabled**. To temporarily write this output to the **Load Dump Override Relay**, click on the **Save Trims** button, on the toolbar. The override can be disabled by selecting **Disabled** in the Value cell, then click on the **Save Trims** button, on the toolbar.

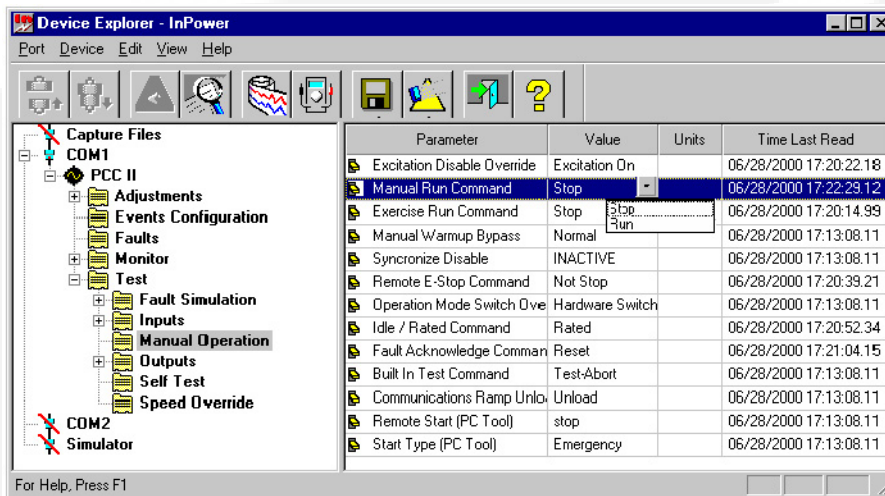


FIGURE 98. MANUAL OPERATION - MANUAL RUN COMMAND

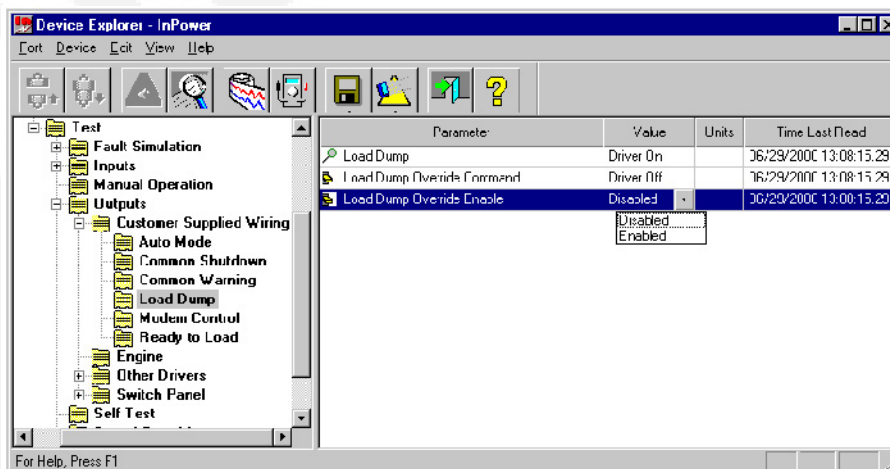


FIGURE 99. OUTPUTS - CUST. SUPPL. WIRING - LOAD DUMP

5.6.10 Fault Simulation

This feature allows the user to test alternator protection and engine protection devices by temporarily overriding the sensor inputs and verifying that the engine shuts down. There are a large number of protection features that can be checked.

Example: In this example, InPower is used to test an engine protection feature ([Figure 100](#)).

The user can make a check of the current engine protection settings for low oil pressure. Double clicking on the **XY Table** Value cell for the **LOP Warning Threshold Table**. Review the oil pressure Vs. RPM chart to see where the warning threshold points are set. Note the warning levels, and then close the XY table.

Double click on the **Oil Pressure Override Command** Value cell and enter a voltage amount that will be low enough to trigger the warning (or leave the setting at the default 0 volts).

Double click on the Value cell for the **Low Oil Pressure Override Enable**. A drop-down list arrow is displayed, click on the drop-down arrow and click on **Enabled**. To temporarily write this output to the device, click on the **Save Trims** button on the toolbar.

The Alarm popup will display the active warning ([Figure 100](#)).

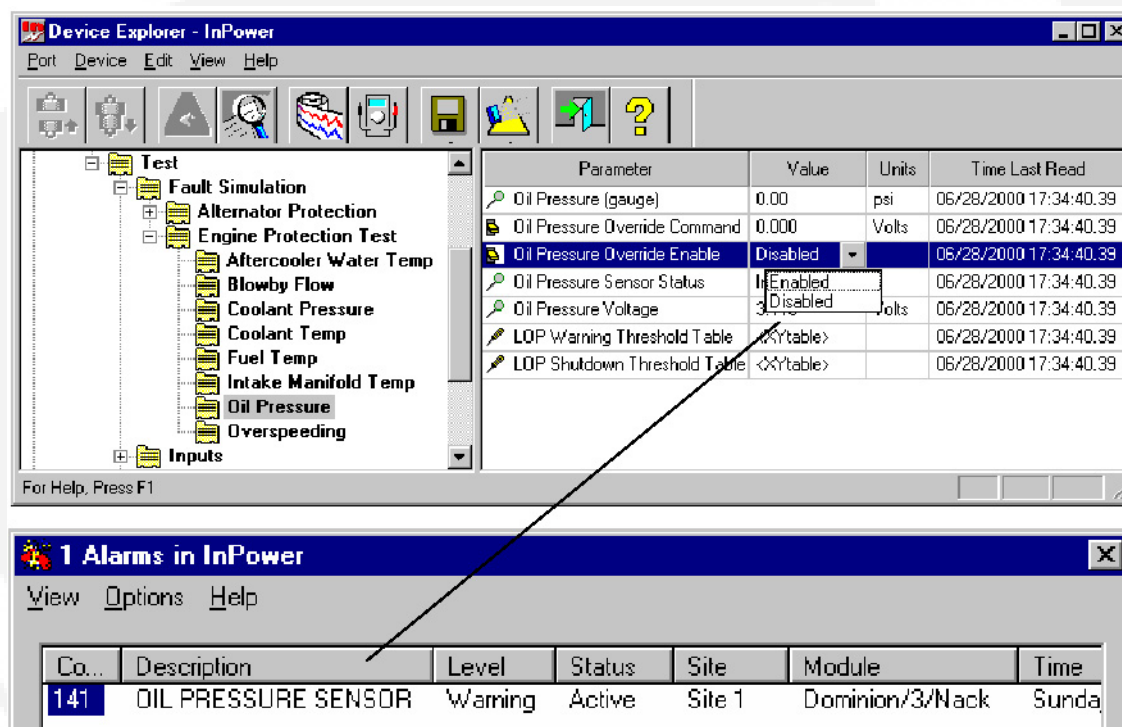


FIGURE 100. TEST - ENGINE PROTECTION -OIL PRESSURE TEST

5.6.11 Self Test

InPower has built in tests that can be used for diagnostics. The default setting is the **Test Abort** value (not in test mode) setting. [Figure 101](#) shows the **Self Test** options. Double click on the Value cell, then click on the arrow to display the drop-down list of settings.

The Self Test feature has two Built In Tests (**BIT Command**). The first test, named **Test Stationary**, is used to check all sensors and output relays by activating control outputs. The user can then monitor inputs, if fault conditions occur, the event handler will popup to display faults.



WARNING: *Notify personnel before using the Self Test Feature to crank the engine. Severe personal injury or death can result. See the equipment Operator's Manual for important safety precautions.*

The second test, named **Test Cranking**, sends a start cranking signal to the engine to test the magnetic pick-up (MPU) speed sensors, starter relay and battery level.

The **Test Abort** setting is the default setting, indicating that a Self Test is not in process. When you are finished with a **Self Test**, or to end a test, return the **BIT Command Value** to **Test Abort**.

5.6.12 Speed Override

The speed override options are used to override the normal governor reference input to the control. The **Speed Reference Override** feature can be Enabled to override the governor reference input in order to operate the engine at another speed, for diagnostics purposes.

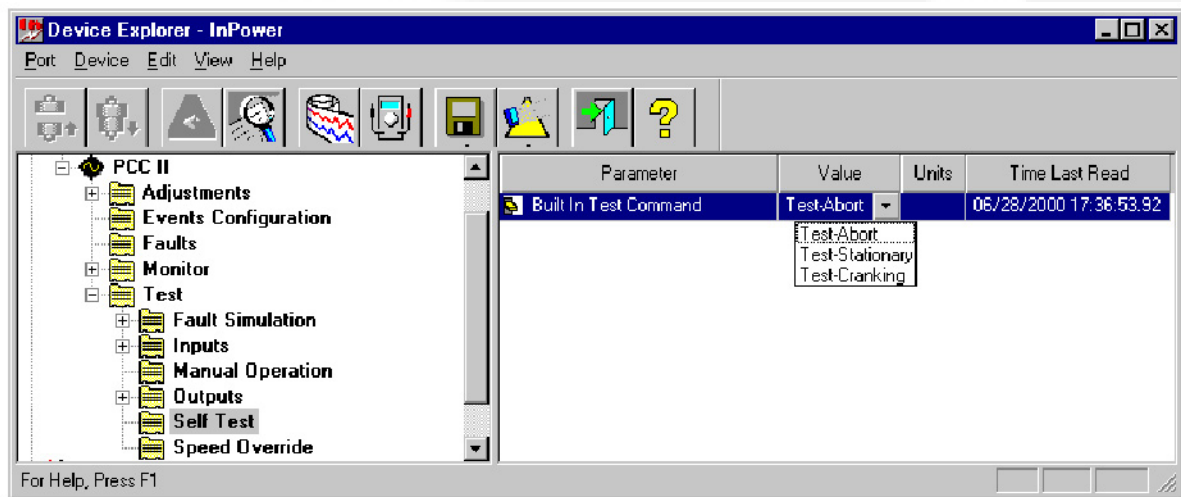


FIGURE 101. SELF TEST - TEST -BIT COMMAND

5.6.13 Single Cylinder Cutout Test

InPower can be used to cutout fueling to one cylinder at a time. This test can be used to help isolate a cylinder with fueling or combustion problems.

Example: InPower is used to perform a single cylinder cutout test (Figure 102). This test is used in genset applications that use QSX-15 series engines (part of DFE series).



CAUTION: Do not cutout fueling to more than one cylinder at a time or engine damage can result. Always change the Cylinder Cut Out Test Enable to Disabled, when finished testing. Follow these steps carefully and refer to the equipment Operator's Manual for Important Safety Precautions.

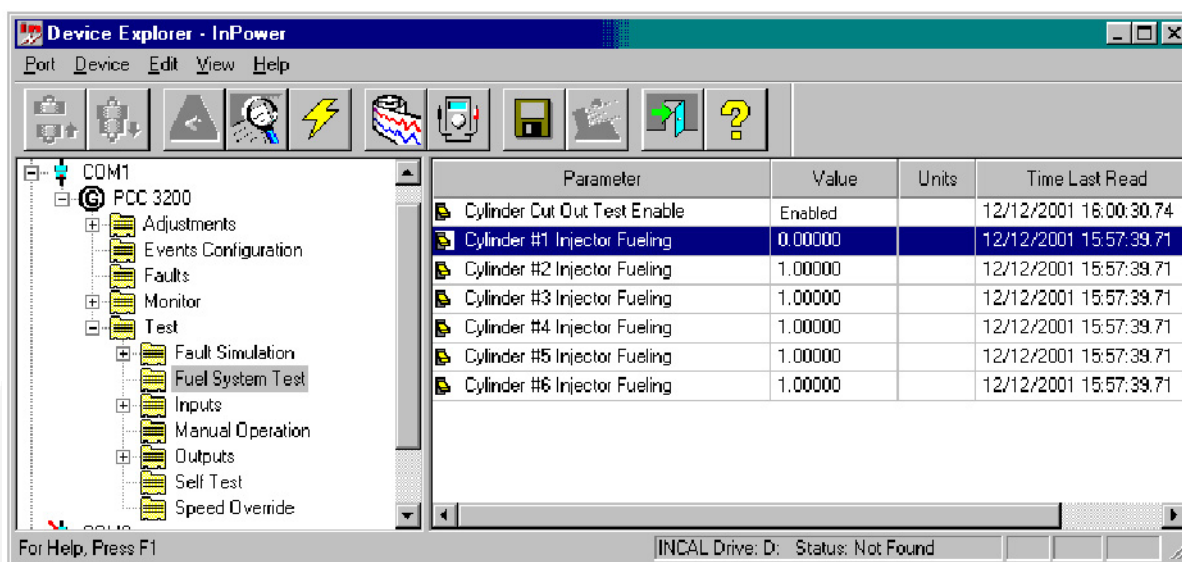
Connect the service PC to the genset. Start the genset and operate it at rated speed with no load.

Open the **Test\Fuel System Test** parameter group. Make sure each of the six cylinder parameter values are set at 1 (enabled).

Double click on the **Cylinder Cut Out Test Enable** parameter and select **Enabled**.

Double click on the desired cylinder for testing, in this example: **Cylinder #1 Injector Fueling**. Enter 0 (disabled). Use the **Save** button on the toolbar to save the change and perform the cutout test on cylinder number 1.

When finished, always remember to return the **Cylinder Cut Out Test Enable** to **Disabled**, and return the cylinder being tested to 1 (enabled). Use the **Save** button on the toolbar to save the change.

**FIGURE 102. SINGLE CYLINDER CUTOUT TEST**

6 ATS Service

This section describes how to use InPower to configure and make adjustments to a PowerCommand® controlled Automatic Transfer Switch (ATS). When the user is connected to the ATS, they can configure the transfer switch, make adjustments, and access the **Monitor** and **Faults** features.

6.1 ATS Service

The **Adjustment** feature is used to configure the ATS for the application, set exercise times and exceptions, and perform service adjustments and trims. The **Test** feature is used to configure the Test Mode, and for diagnostics.

You must be connected to the ATS in order to write adjustment trims and setting changes to the controller, and to use the **Test** feature.



WARNING: *AC power within the cabinet and the rear side of cabinet door present a shock hazard that can cause severe personal injury or death. Use extreme caution to avoid touching electrical contacts with hair, clothing, tools or body. Do not wear jewelry. Stand on a rubber mat or dry wood platform. The following procedures are to be performed by trained and experienced personnel only.*

6.1.1 Connecting to An ATS with the Original Digital Display

A connection between the service PC and the ATS is made with a special RS-232 serial null-modem cable. The cable has a DB9 socket on each end. If the service PC does not have a serial port, a USB-to-serial converter may be required as well.

The serial cable from the service PC is connected to the upper right side of the Digital Module. This module is located inside the ATS ([Figure 103](#)).

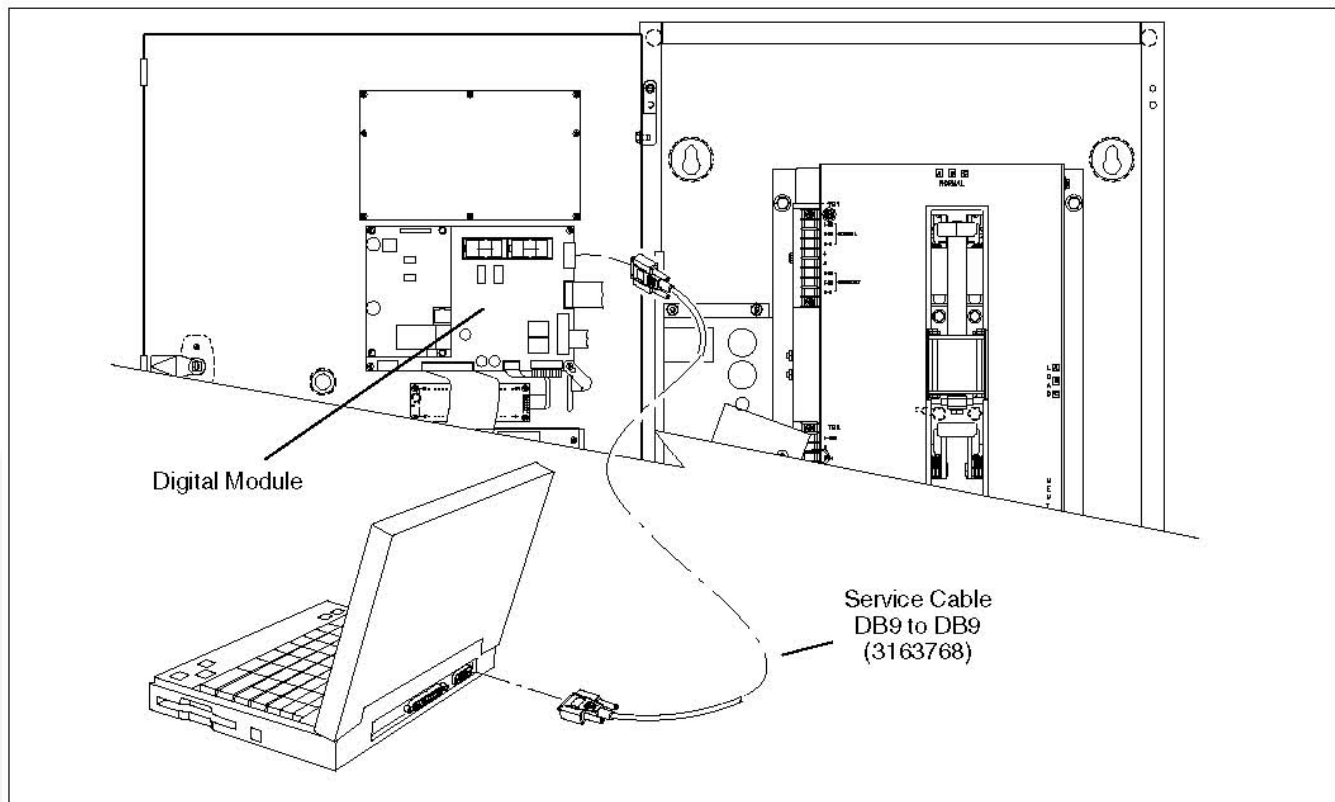


FIGURE 103. INPOWER SERVICE CONNECTION (ORIGINAL ATS APPLICATIONS)

6.1.2 Starting InPower

Start InPower and connect to the port that matches the COM port on the service PC being used for the ATS connection (COM1, COM2, etc.). The available COM ports are displayed in the Device Explorer directory (left pane). Double click on the COM port (or click on the COM port and then click on the **Connect** button on the tool bar).

The InPower Device Explorer displays the features that are available for the ATS in the directory, listed under the device in the left pane.

[Figure 104](#) shows the features listed for an ATS. These features are:

- Adjustments
- Faults
- Monitor
- Test

When you are connected to an ATS, the **Capture File** feature is enabled. This feature is used to create a copy of the existing parameter values for the ATS. **Always create a Capture file of the ATS parameters for reference, prior to making adjustments.**

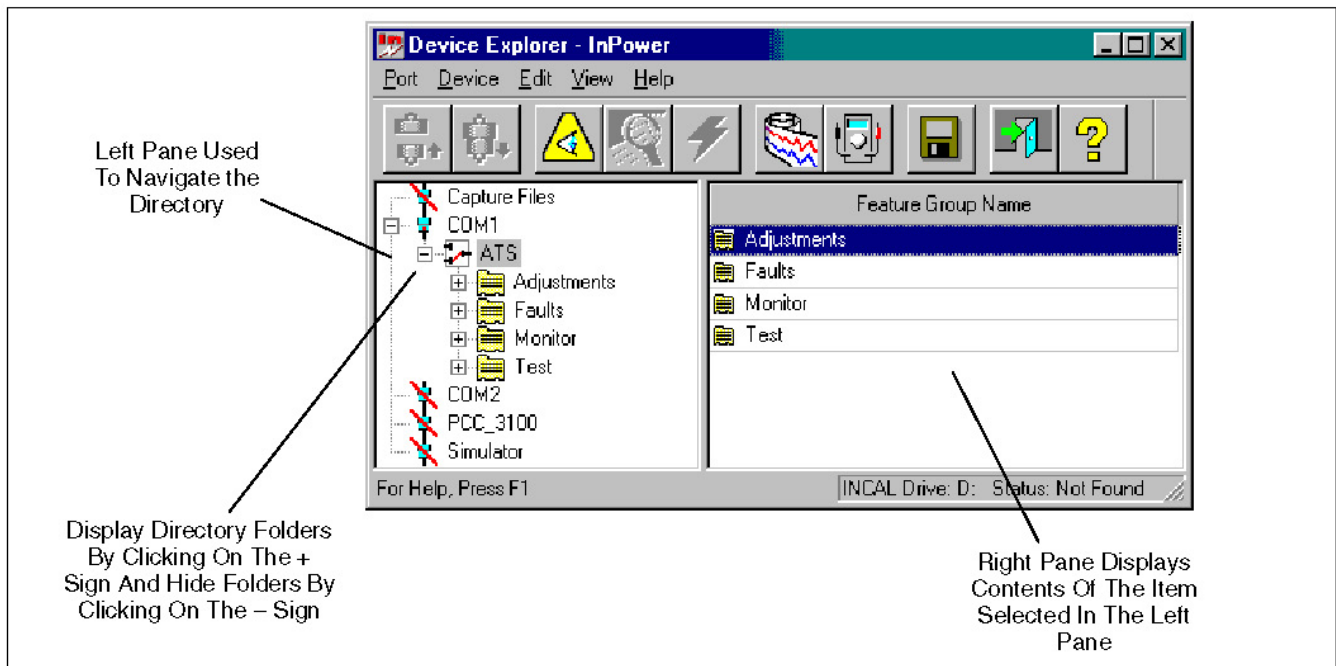


FIGURE 104. DEVICE EXPLORER - TYPICAL ATS FEATURES

6.2 ATS Adjustments

This section describes how to make ATS parameter value adjustments for trims and settings. Not all ATS models will have the same adjustments or features available. This section will cover typical adjustment examples, to demonstrate basic procedures for using the **Adjustments** feature.



CAUTION: *Improper adjustment can cause equipment malfunction or damage. Adjustment must be performed by technically qualified personnel only. Refer to the equipment's Installation and Service manuals for adjustment sequences and procedures.*

6.2.1 Adjustment Basics

To access an individual adjustment, or group of adjustments, use Device Explorer to navigate the left pane until you reach the desired folder, and then click on it. The right pane will display the parameter(s) associated with the adjustments for that feature. [Figure 105](#) shows a list of parameters for the **Time Delays** selection.

The right pane displays the **Parameter** description, **Value**, **Units** of measure and the **Last Time** that the value was **Read**.

Placing the mouse pointer over a parameter will bring up an information popup box. The popup provides a brief description of how the parameter value is used.

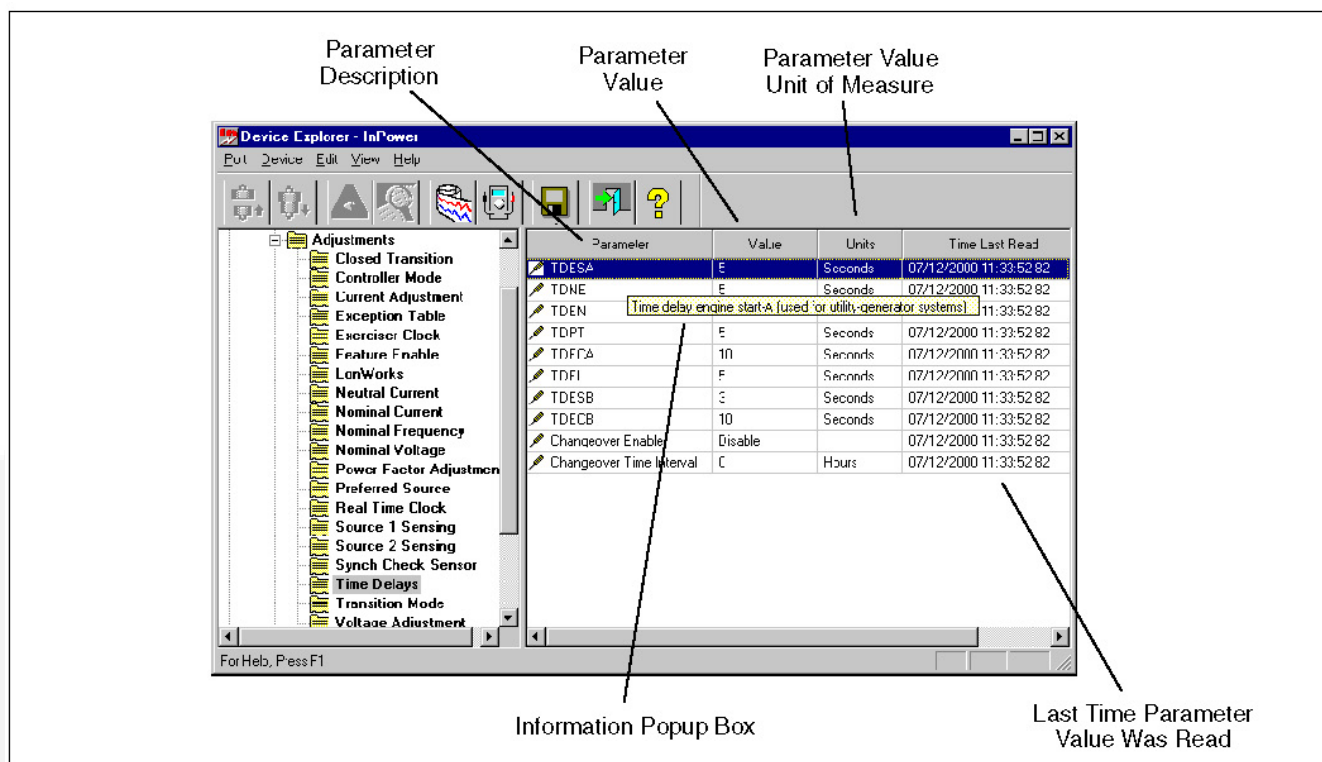


FIGURE 105. TYPICAL PARAMETER INFORMATION

6.2.2 Adjustment Features

See [Section 6.4](#) for examples mentioned in this section.

The contents of the **Adjustments** folder can vary by transfer switch model. The **Adjustments** directory for a typical transfer switch contains the following groups (folders) of Adjustment options:

Closed Transition: Contains timing and Common Alarm parameters for closed transition applications.

Controller Mode: These parameters are used to make significant changes to the ATS, such as changing from one application to another. Some factory settings cannot be changed with the InPower service tool.

Current Adjustment: This group contains current measurement parameters for the graphical display.

Exception Table: Allows up to eight exceptions to the exerciser clock settings.

Exercise Clock: Allows programming of exercise time and duration. Up to eight repeating exercise programs can be programmed on some models.

Feature Enable: Used to enable available features. The InPower tool recognizes if the feature (and if needed, the related hardware) are installed and allows the user to enable the feature.

LonWorks: This group of parameters is used when the network module is installed and enabled. The parameters are used to configure the dial out settings, identify the device on the network, and check the network status.

Neutral Current: Used to set the neutral current warning threshold in amperes and the time delay for the neutral current warning.

Nominal Current: Displays the nominal current for the transfer switch. Do not adjust this parameter without reviewing the Controller Mode example.

Nominal Frequency: Displays the nominal frequency for Source 1 and Source 2 in the current application. Do not adjust this parameter without reviewing the Controller Mode example.

Nominal Voltage: Displays the nominal Voltage for Source 1 and Source 2 in the current application. Do not adjust this parameter without reviewing the Controller Mode example.

Power Factor Adjustment: This group contains Power Factor measurement parameters for the graphical display. The multiplier and trim offset are shown for each phase. Do not adjust this parameter without reviewing the Voltage Adjustment example.

Preferred Source: This parameter is used to select the preferred source in utility-to-utility applications and for genset-to-genset applications.

Real Time Clock: These parameters set the time and date information, Hours are displayed in military time only (no A.M and P.M. designations). the control will automatically adjust for leap year and daylight savings time (if enabled).

Source-1 Sensing: This group contains all of the Source 1 sensor settings normally associated with transfer switch operation (refer to the equipment's Operator's or Installation Manual for a detailed description of each sensor setting).

Source-2 Sensing: This group contains all of the Source 2 sensor settings normally associated with transfer switch operation (refer to the equipment's Operator's or Installation Manual for a detailed description of each sensor setting).



NOTE: Level 1 controls do not support 3-phase sensing on Source 2. Do not select the 3-phase option for the Source 2 Sensing adjustment, with Level 1 controls, even if the system is three phase. This setting will prevent Source 2 from becoming available.

Sync Check Sensor: Used in closed transition applications only, this group sets the acceptable conditions for closed-transition transfers.

Time Delays: This group contains all of time delay settings normally associated with transfer switch operation (refer to the equipment's Operator's or Installation Manual for a detailed description of each time delay. This group also contains the Changeover Timer used in genset-to-genset applications only).

Transition (Transfer) Mode: Used to select one of five possible transfer modes used for various applications. Initial product offerings only support the Open Program Transition mode.

Voltage Adjustment: This group contains voltage measurement parameters for the graphical display.

6.3 Service Replacement Controls

Service replacement controls for the OTPC/BTPC series transfer switches are factory set to **Configuration - Offline**. They are also set to Switch **Configuration Type - Zenith**. These settings, along with the voltage and current settings will need to be changed when the replacement control is installed.

The switch mechanism types available are shown below, along with their descriptions:

OTPC/BTPC -	OTPC and BTPC models less than 1,200 Amps
Zenith -	Use on all OTPC/BTPC models 1,200 Amp to 4,000 Amp capable of Delayed Transition (Programmed Transition) or Closed Transition
Zenith2 -	Use on all OTPC/BTPC models 1,200 Amp to 4,000 Amp capable of In-Phase Transition
OHPC/CHPC -	OHPC and CHPC models
PLT -	PLTH and PLTS models

After identifying the Configuration Type, check the transfer switch nameplate voltage and amperage. Use InPower to adjust the replacement control to the appropriate settings, before changing the Configuration from **Offline** to the application configuration (Utility-to-GenSet, etc.). Review the first adjustment example in this section.

Source 1 and Source 2 Sensing features Voltage Imbalance Sensing and Loss of Phase Detection are disabled by default. These features may not be needed in most applications. Do not enable these features without an understanding of the feature.

Voltage Imbalance Sensing: This feature is used in three-phase applications. It informs the operator when there is a significant voltage imbalance between the phases of Source 1 or Source 2. The imbalance is typically caused by severe single phase loading. To prevent nuisance faults, the setting can be increased up to ten percent of the nominal voltage. This feature is used for equipment protection.

Loss of Phase Detection: Only used with Level 2 controls, in three phase applications. This feature will initiate a transfer away from a source that has lost a single phase and it prevents transfer to a source that has lost a single phase. This is generally caused by a single phase to line ground or open. This feature is mainly used to protect three phase devices, like motors.

Phase Rotation Sensing: This feature is required in fire pump applications and it is enabled by default. The feature monitors the phase rotation of the source opposite from the connected source. When the alternate source is out of phase rotation with the connected source, transfer is inhibited. This generally occurs on new installations or after storm damage or generator rewiring.

This feature is used to protect against equipment damage.

The screenshot shows a window with a table of parameters. The table has four columns: Parameter, Value, Units, and Time Last Read. The 'Nominal Current' row is highlighted in blue. To the left of the table, there are four icons with labels: a magnifying glass for 'View Only Parameter', a screwdriver for 'Adjustable Parameter', a switch for 'Temporary Setting', and a wrench for 'Factory Setting'. Below the table, there is a legend with the same icons and labels.

Parameter	Value	Units	Time Last Read
Load Amps Line 1	511	Amps	06/30/2000 11:02:14.59
Load Amps Line 2	509	Amps	06/30/2000 11:02:14.59
Load Amps Line 3	512	Amps	06/30/2000 11:02:14.59
Load Amps Neutral	511	Amps	06/30/2000 11:02:14.59
Nominal Current	800	Amps	06/30/2000 11:02:14.59
Neutral Current Trim Multiplier	1024		06/30/2000 11:02:14.59
Neutral Current Trim Offset	0		06/30/2000 11:02:14.59
Phase 1 Current Trim Multiplier	1024		06/30/2000 11:02:14.59
Phase 1 Current Trim Offset	0		06/30/2000 11:02:14.59

View Only Parameter

Adjustable Parameter

Editable Value

View Only

Adjustable

Temporary Setting

Factory Setting

FIGURE 106. TYPICAL ADJUSTMENT FEATURES

6.3.1 Making Adjustments

[Figure 106](#) shows a typical set of parameters from the Adjustments group. Located to the left of each parameter is an icon that indicates if the parameter is used for adjustment or monitoring.

The screwdriver icon is used for trims and settings that can be written to the device (read and write). The magnifying glass indicates that the parameter value is being monitored (read only). The switch icon is used to display settings that can be temporarily written to a device. The wrench icon represents factory settings that are not adjustable with InPower.



NOTE: The value being monitored will not automatically update. The user can double click on the parameter to update the value field or click on the toolbar Refresh button.

Each parameter displays the current value and the units of measure for that value. Review this information before making adjustments. Parameter value trims and settings are displayed. **Trims** are numeric values that are entered directly into the Value cell. **Settings** are selected from drop down lists, and they consist of several type of values such as On/Off, 50Hz/60Hz, Enable/Disable, etc.

To change a parameter value, double click inside the Value cell of the parameter that you wish to change. The current value will be highlighted, if there are only a few choices, an arrow will be displayed next to the Value.

If an arrow is displayed, click on the arrow to view a drop-down list of the available settings. Click on the desired setting, and it will be entered into the Value cell.

If you do not see an arrow, enter the new value, to overwrite the current value. If the value entered is above or below the range of acceptable values, an error message dialog box will be displayed ([Figure 107](#)). Review the information in the error message box to see the value limits, before clicking **OK**.

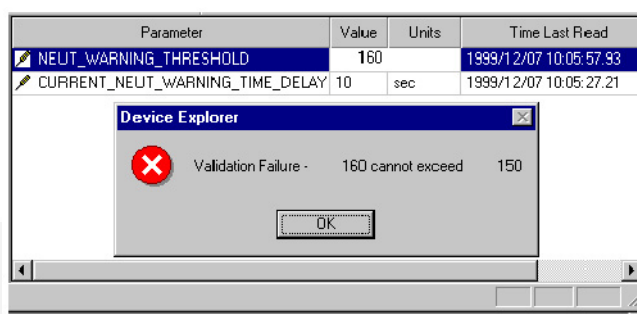


FIGURE 107. ADJUSTMENT ERROR

6.3.2 Saving Adjustments

Edit Mode: When selected, a parameter value remains in the edit mode, as indicated by a flashing cursor (numeric values) or the drop down arrow (settings). When finished making adjustments, press the enter key or click on another parameter value to exit the edit mode.

Saving Adjustments: Adjustments are written to the device as they are entered. To make these changes permanent, click on the **Save Trims** button, on the toolbar (floppy disc) or click on the **Device** menu and select **Save Adjustments**. Changes in adjustments will immediately alter the device's performance.

After the **Save Trims** button is selected a *Save Adjustments* dialog is displayed. This feature allows you to view and confirm your changes by clicking on **Save**. You can make final edits within this dialog by double clicking inside the New Value box and entering a new parameter value or you can reset all of your changes by clicking on the **Cancel** button.

Saved adjustments are written to the **Audit Trail**. Refer to the **Audit Trail** to review the record of adjustment changes.

Refer to the Controller Mode example, for making application changes.

If the user loses connection with the device before saving an adjustment, the change will not be saved.

6.4 Adjustment Examples

The following examples are provided to demonstrate how typical trim and setting adjustments are made. Some measurements and adjustments are done while the equipment is energized, do not attach or remove test meters while the equipment is energized.



WARNING: *Hazardous voltage can cause severe personal injury or death. Voltage and frequency measurements must be performed by trained and experienced personnel only. Do not attach or remove test meters while the equipment is energized. Use extreme caution to avoid touching electrical contacts with hair, clothing, tools or body. Do not wear jewelry. Refer to the equipment Operator's Manual for important safety precautions.*

6.4.1 Controller Mode

These parameters are used to make significant changes to the ATS factory application settings. The four features in the **Controller Mode** group are described here, followed by an example of how to use some of the Controller Mode features.

Configuration: This feature contains four settings. The **Offline** feature puts the controller into a standby, or non-automatic state. The control will continue to monitor conditions, but it will not perform any automatic functions, like initiating a transfer. This prevents faults from occurring while you are making adjustments to a transfer switch that is in use.

The other three Configuration features are application choices: **Utility-to-Genset**, **Utility-to-Utility**, and **Genset-to-Genset**.

Refresh_Controller: Updates the device for changes made to voltage, current, frequency or power. This feature must be used after saving changes to any trims for voltage, current, frequency or power. For a complete listing of the changes that require use of this feature, refer to the end of this example.



CAUTION: *The Refresh feature uses a lot of the control processing resources. Do not use this feature during paralleling or critical applications, because the control may not respond as needed during the refresh process.*

Permanent_Save_Settings: Used to permanently change the device settings.

Restore_Factory_Settings: Restores all parameter changes to the original factory settings. Use caution, this change overwrites previous adjustments. Previous adjustments cannot be restored unless a capture file was created. The Operator must remove all power from the device (including the batteries) after changing this setting, for the changes to take effect.

Example: In this example, InPower is used to change the Source 1 and Source 2 nominal voltage, on an ATS with a Level 1 control, from 208 VAC, line to line, to 240 VAC, line to line. Use step 1 if the transfer switch has power applied to Source 1, otherwise begin at step 2.

1. Open the **Adjustments** folder, in the left pane and click on the **Controller Mode** folder. Select the value field for the Configuration parameter and click on **Offline**, in the drop down list.
2. Click on the **Nominal Voltage** folder in the left pane. Enter the new nominal voltage in the **Source 1** and **Source 2** value fields.
3. Go back to the left pane and click on the **Controller Mode** folder again. Change the **Refresh Controller** value setting to update the device settings for changes to the nominal voltage.
4. Verify Nominal Voltage settings. If step one was used, change the **Configuration** value setting, in the **Controller Mode** folder, from **Offline** to the original application.
5. To permanently preserve this change, click on the **Controller Mode** folder again and change the **Permanent_Save_Settings** to **On**.

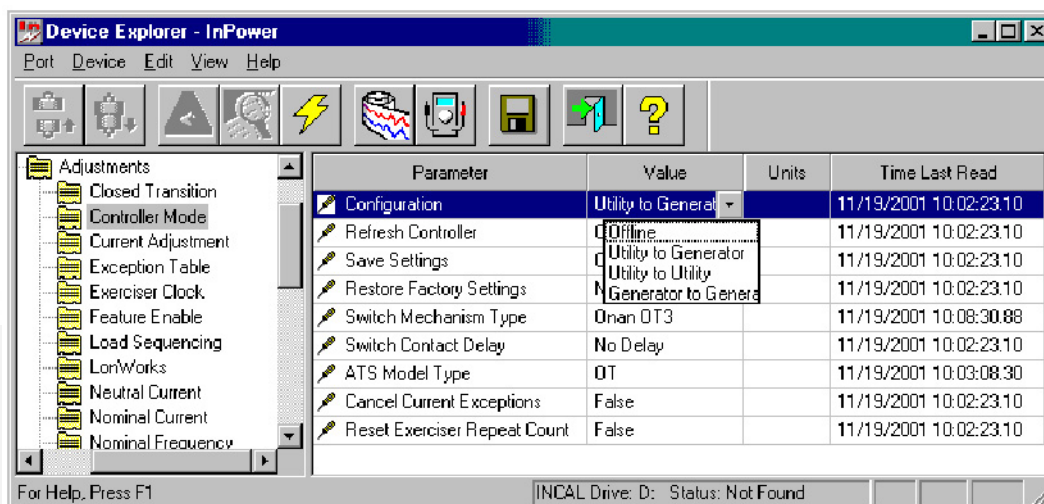


FIGURE 108. ADJUSTMENTS - CONTROLLER MODE

6.4.2 List of Parameters Requiring the Refresh Controller Feature

When any of the following parameters are changed, save the change and then use the **Refresh Controller** Feature to complete the save process.

Current Adjustment

- Nominal Current
- Neutral Current Trim Multiplier
- Neutral Current Trim Offset
- Phase 1 Current Trim Multiplier
- Phase 1 Current Trim Offset
- Phase 2 Current Trim Multiplier
- Phase 2 Current Trim Offset
- Phase 3 Current Trim Multiplier
- Phase 3 Current Trim Offset
- Current Transformer Max Amps

Nominal Current

- Nominal Current

Nominal Frequency

- Source 1 Nominal Frequency
- Source 2 Nominal Frequency

Nominal Voltage

- Source 1 Nominal Volts
- Source 2 Nominal Volts

Source 1 Sensing

Source 1 Sensing

Source 1 Nominal Volts

Source 1 Under Voltage Pickup

Source 1 Under Voltage Dropout

Source 1 Over Voltage Pickup

Source 1 Over Voltage Dropout

Source 1 Nominal Frequency

Source 1 Frequency Pickup

Source 1 Frequency Dropout

Source 1 Voltage Imbalance Dropout

Source 2 Sensing

Source 2 Sensing

Source 2 Nominal Volts

Source 2 Under Voltage Pickup

Source 2 Under Voltage Dropout

Source 2 Over Voltage Pickup

Source 2 Over Voltage Dropout

Source 2 Nominal Frequency

Source 2 Frequency Pickup

Source 2 Frequency Dropout

Source 2 Voltage Imbalance Dropout

Synch Check Sensor

Frequency Bandwidth

Voltage Window

Voltage Adjustment

Source 1 Phase 1 Trim Multiplier

Source 1 Phase 1 Trim Offset

Source 2 Phase 1 Trim Multiplier

Source 2 Phase 1 Trim Offset

Source 1 Phase 2 Trim Multiplier

Source 1 Phase 2 Trim Offset

Source 2 Phase 2 Trim Multiplier

Source 2 Phase 2 Trim Offset

Source 1 Phase 3 Trim Multiplier

Source 1 Phase 3 Trim Offset

Source 2 Phase 3 Trim Multiplier

Source 2 Phase 3 Trim Offset

Model Data

Nominal Current

Source 1 Nominal Volts

Nominal Voltage Source 2

6.4.3 Exerciser Clock

Example: In this example, InPower is used to set an exercise time and duration. The ATS exercise program, shown in [Figure 109](#), is set to begin every Monday evening at 22:00 hours and run for one hour, with load.



NOTE: Before setting the exerciser clock, make sure that the real time clock is set to the correct time.

1. Select the **Exerciser Clock** feature in the **Adjustments** directory.
2. Double click on the Program 1 Enabled value cell. Click on the drop down arrow and click on **Enable**.
3. Select each of the remaining value cells for program 1 and set the Start Day, Start Time, Duration, Interval, and Load.
4. To save the changes, click on the **Save Trims** button, on the toolbar.

To program an exception to the exercise program, proceed to the next example.

Changes made to an exercise program (or exception), while the event is active, will not take effect until the next time the program starts.

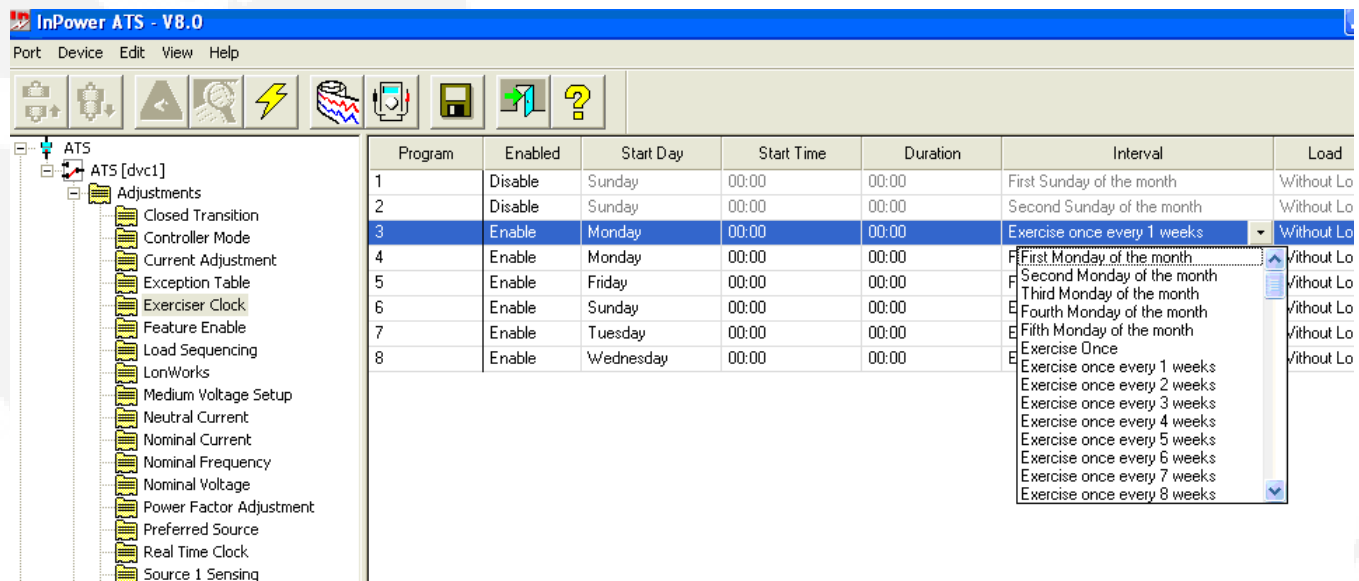


FIGURE 109. ADJUSTMENTS - EXERCISER CLOCK

6.4.4 Exception Table

This feature is used to set time periods during which exercises cannot be performed. This feature can be used to set up to eight exceptions on Level 2 controls and one exception on Level 1 controls (not available on Level 1 controls with early production software).

Example: In this example, InPower is used to set one exception period. This will prevent any previously programmed exercise from starting during that time period.

1. Select the **Exception Table** feature in the **Adjustments** directory.
2. Double click on the Exception 1 Enabled value cell. Click on the drop down arrow and click on Enable.
3. Select each of the remaining value cells for program 1 and Start Month, Start Day, Start Time, Duration Days and Repeat.
4. (The duration in days and Time (hours) are additive, 1 day and 26 hours equals 2 days and 2 hours.
5. The Repeat can be either False, for a one time exception, or True, to repeat the exception each year.
6. To save the changes, click on the **Save Trims** button, on the toolbar.

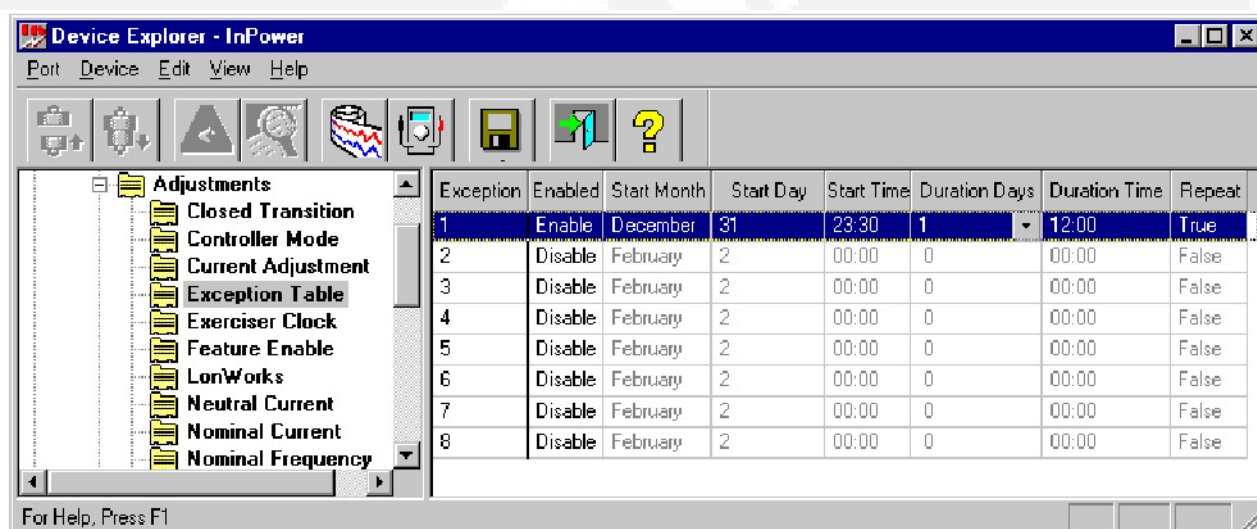


FIGURE 110. ADJUSTMENTS - EXCEPTION TABLE

6.4.5 Time Delays

Example: In this example, InPower is used to change the time delay for transferring from Emergency to Normal (**TDEN**). The Default factory setting for each of the time delays are displayed. A brief description of time delay is displayed in the pop-up box. Refer to the ATS Operator's manual for a complete description of each time delay.

1. Select the **Time Delays** feature in the **Adjustments** directory.
2. Double click on the **TDEN** Value cell. Enter the desired time (in seconds).
3. To save the changes, click on the **Save Trims** button, on the toolbar.

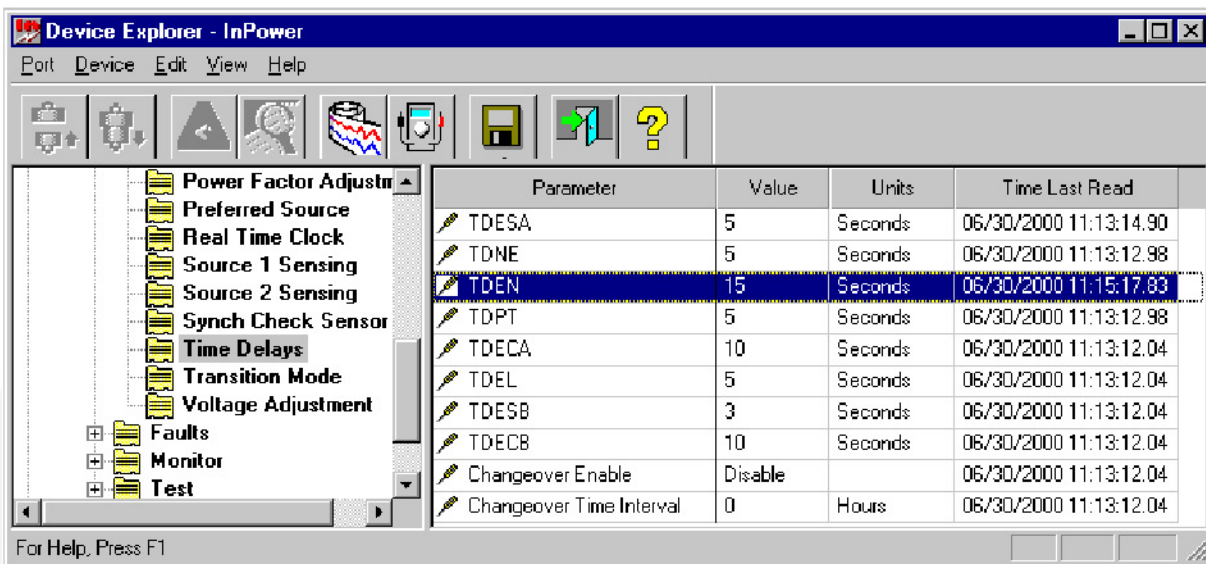


FIGURE 111. ADJUSTMENTS - TIME DELAYS

6.4.6 Voltage Adjustment - For Display

This adjustment is only required when either the Current Module or Digital Module have been replaced and the digital display reading appears to be inaccurate.

Examples are given for both the Level 2 and Level 1 controls, because the methods of adjustment are different. To adjust the display voltage, Level 1 controls will use a line-to-line calculation and Level 2 controls will use a line-to-neutral calculation. (Adjusting line-to-neutral voltage automatically adjusts the line-to-line voltage).

To determine the control package level with InPower, click on the About Controller folder in the **Monitor** parameter group.

If the optional Bar Graph is available (Level 2 only), these adjustments will also correct the bargraph voltage display.



WARNING: *AC power within the cabinet and the rear side of the cabinet door presents a shock hazard that can cause severe personal injury or death. Use extreme caution to avoid touching electrical contacts when the cabinet door is open. The following procedures are to be performed only by technically qualified personnel.*

When making adjustments on parameters like voltage and frequency, that can result in an unintentional load transfer, the user can place the Motor Disconnect Switch in the **Off** position (if available). The ATS control can also be taken **Offline**, with the **Controller Mode** feature in the the **Adjustments** folder. Make sure that you reset the switch or change the **Configuration** value setting, in the **Controller Mode** folder, from **Offline** to the original application when finished.

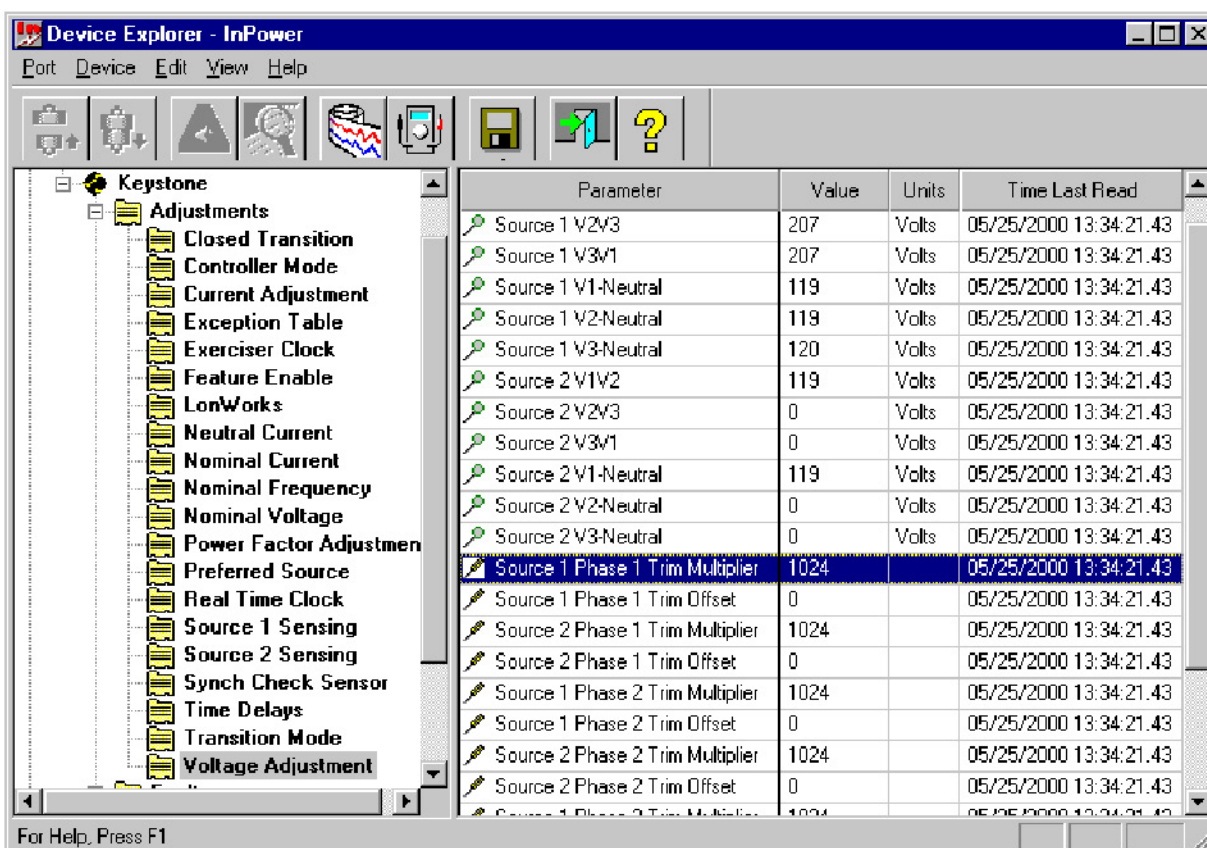


FIGURE 112. ADJUSTMENTS - DISPLAY VOLTAGE

Example 1 (Level 2 Control): InPower is used to adjust the voltage as displayed in the digital display (and optional bargraph) on a Level 2 control).

In this example, the transfer switch is configured for 3 phase, and a nominal 208 VAC line-to-line. The digital display is displaying source 1 line-to-neutral voltage as 118 VAC. The bargraph is displaying 98% for Line 1, with Source 1 connected.

1. Select the Voltage Adjustment feature in the **Adjustments** directory. Observe the Source 1 V1-Neutral value that is being monitored (signified by magnifying glass). This is the display voltage.
2. Measure the actual Source 1 voltage at the power Module between NA and NN (Line 1 to neutral). (Line 2 would be measured from NB to NN and line 3 would be measured from NC to NN).
3. Calculate the Trim Multiplier (K) needed to adjust the displayed voltage as follows:

$$K = \frac{\text{Measured Voltage (L1-N)}}{\text{Displayed Voltage (L1-N)}} \times 1024$$

Example 1:

$$K = \frac{120}{118} = 1.017 \times 1024 = 1041$$

4. Double click on the Voltage PH1S1 Trim Mult (multiplier) Value cell, and enter 1041.
5. To save the changes, click on the **Save Trims** button, on the toolbar.
6. Check the results to make sure the displayed voltage is close to the actual voltage.

Example 2 (Level 1 Control): InPower is used to adjust the voltage as displayed on the optional digital display on a Level 2 control.

In this example the transfer switch is configured for 3 phase, with a nominal 208 VAC line-to-line. The digital display reads 210 VAC for Source 1, phase A.

1. Select the Voltage Adjustment feature in the **Adjustments** directory. Observe the Source 1 V1-V2 value that is being monitored (signified by magnifying glass). This is the display voltage.
2. Measure the actual Source 1 voltage at the power Module between NA and NB (Phase A). (Phase B would be measured from NB to NC and phase 3 would be measured from NC to NA).
3. Calculate the Trim Multiplier (K) needed to adjust the displayed voltage as follows:

$$K = \frac{\text{Measured Voltage (Phase A)}}{\text{Displayed Voltage (S1-V1V2)}} \times 1024$$

Example 2:

$$K = \frac{208}{210} = 0.99 \times 1024 = 1014$$

4. Double click on the Voltage PH1S1 Trim Mult (multiplier) Value cell, and enter 1014.
5. To save the changes, click on the **Save Trims** button, on the toolbar.
6. Check the results to make sure the displayed voltage is close to the actual voltage.

6.4.7 Feature Enable

When a feature is present, and its hardware is installed and connected, the feature can be enabled using InPower.

Example: In this example, InPower is used to enable the Digital Display feature.

1. Select **Feature Enable**, in the **Adjustments** directory.
2. Double click on the **Alphanumeric Display** Feature.
3. Double click on the Disable/Enable Value cell. Click on the arrow to view a drop-down list and click on **Enable**.
4. To save the changes, click on the **Save Trims** button, on the toolbar.
5. Changes to features are only recognized on power up. Remove all power from the transfer switch, including battery power. Then restore AC power and install the batteries.

After installing the batteries, reprogram the Real Time Clock settings.

An optional procedure for step five is to remove all AC power and wait until the control resets (takes approximately 2 and 1/2 minutes). When AC is restored, the control powers up with the feature change, and without losing the real time clock settings.

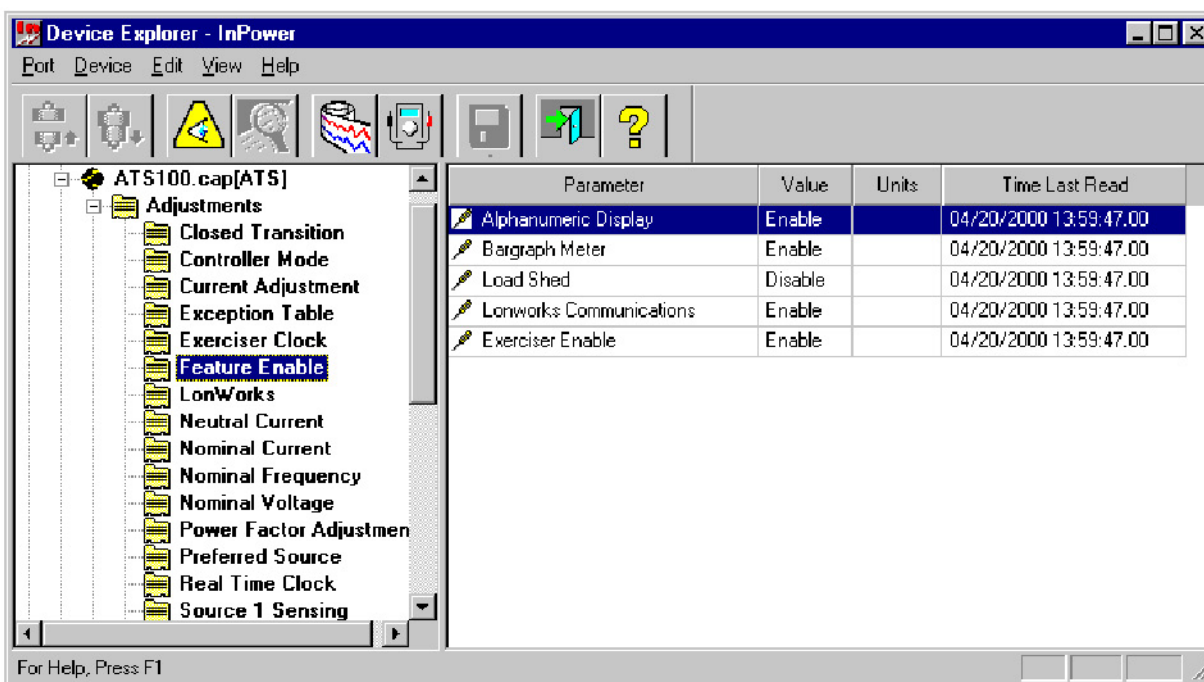


FIGURE 113. FEATURE ENABLE

6.4.8 PTC Settings

When a Power Transfer Control (PTC) is installed and connected, the feature can be enabled using InPower.

Example: In this example, InPower is used to enable the **Power Transfer Control (PTC)**. Enabling this feature can only be performed with InPower. The PTC is only used in utility to genset applications. Source one (S1), in this example will always refer to the utility source.

Before connecting InPower, make sure the PTC module is installed including the data cable connection from the PTC to the PCC 2100 control. The PTC status light should be flashing.

Select the **Power Transfer Control (PTC)** feature in the **Adjustments** directory. Click on the **PTC S1 Setpoints** parameter group and confirm that the default parameters settings are adequate for your application.

Click on the **PTC Settings** parameter group and click on the **Switch Device Type** parameter. Select the correct switch device type from the drop-down list. Choose between the Circuit Breaker, Contactor, or OT 3. (OT 3 refers to OTPC and BTPC transfer switches of less than 1,200 amps).

Confirm that the **S1 Nominal Voltage** and **S1 Nominal Frequency** match the utility.

Set the **Power Transfer Test Configuration** to the desired setting. Review the remaining PTC Settings before enabling the PTC feature.

Select the PTC Feature Enable parameter and select Enable from the drop-down list.

Click on the **Save Trims** button, on the toolbar, to save the changes and enable the PTC feature.



NOTE: The Power Transfer Test Configuration Setting is used for the remote test input. This setting does not apply to the InPower Test/S1 Protection tests.

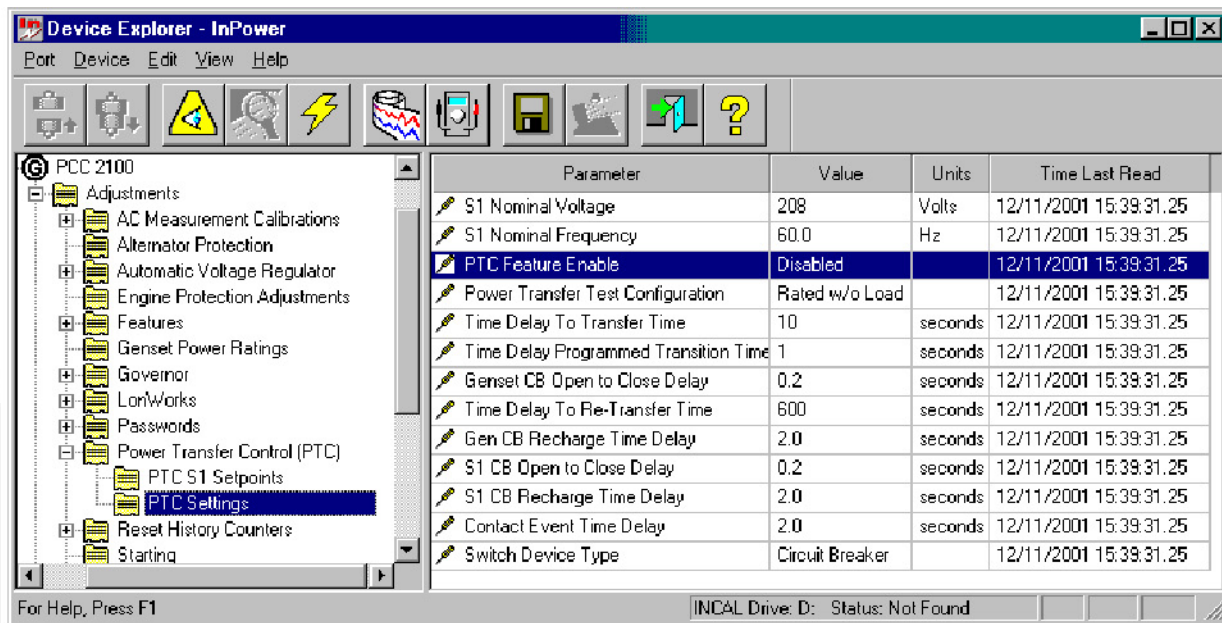


FIGURE 114. PCC 2100 POWER TRANSFER CONTROL (PTC) SETUP

6.5 Test

The **Test** feature contains two groups of parameters, Remote and Setup. The **Remote** parameters are used for diagnostics and the **Setup** parameter is used to set the with/without load setting for the Test button on the front panel of the ATS.

Typically, the Test button on the front panel is used to perform a transfer switch test. Pressing the Test button a second time will stop a test in progress. As a diagnostics example, if the Test button does not appear to work, the InPower **Test Command** can be used to initiate a test.



WARNING: *Notify personnel before using the Test button or InPower Test features on the ATS, to start the genset or transfer the load. Severe personal injury or death can result. See the equipment Operator's Manual for important safety precautions.*

6.5.1 Test - Remote Features

The commands that are available in this group interact with the corresponding hardware inputs. For example, if the Load Shed Command is deactivated, but the Load Shed input is activated, the ATS will shed the load.



NOTE: There are two types of Test Commands: maintained inputs and momentary inputs. When a maintained input is set to active, the input will remain active. The InPower user **MUST** set the input back to inactive, when they are finished with the test or before leaving the site, otherwise the command will remain active.

Momentary inputs automatically change state to inactive after one second.

Maintained Inputs for Test are: Test Command, Remote Start (Dual Standby), Load Shed Command, Transfer Inhibit, Retransfer Inhibit

Momentary Inputs for Test are: Reset Command and Override Command.

Features can vary by transfer switch model. The **Test - Remote** directory for a typical transfer switch contains the following features:

Test Command: Allows the user to initiate an ATS Test. The user can then monitor the ATS, if fault conditions occur, the event handler will popup to display faults. In utility-to-genset applications the Test Command sends a start signal to the genset designated as Source 2.

Remote Start (Dual Standby): Used only in dual standby genset-to-genset applications, to start the main (Source 1) genset.

Load Shed Command: Allows the user to initiate a Load Shed command, when the Load Shed feature is installed and enabled. This function moves the transfer switch from Source 2 (genset) to neutral. This will remove the load from the genset.

Transfer Inhibit Command: Allows the user to initiate a Transfer Inhibit command. This command, typically used in paralleling applications, is used to control the load transfer to a genset.

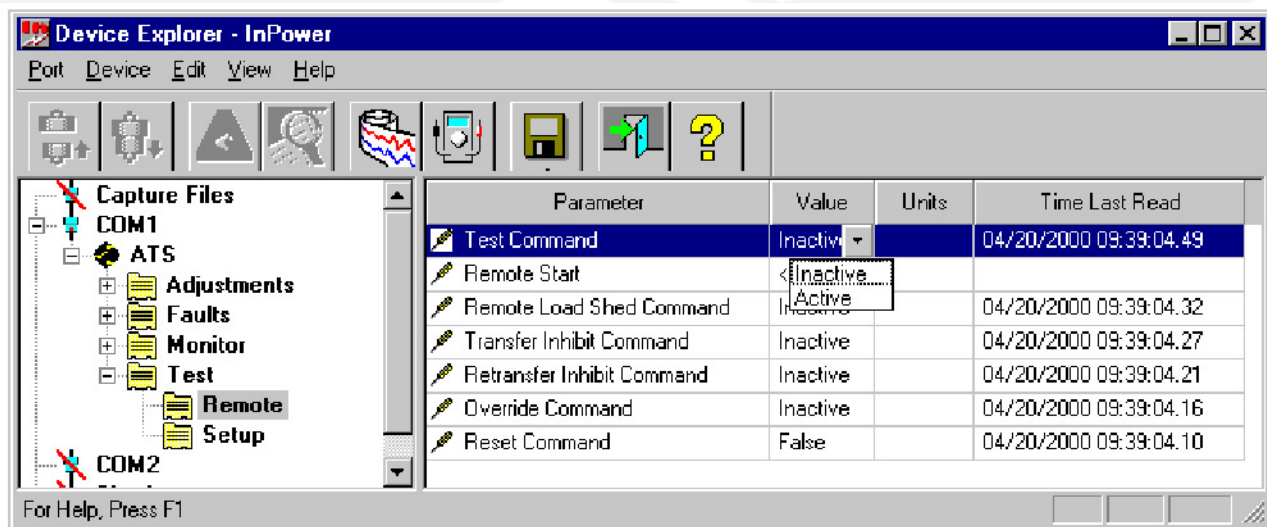


FIGURE 115. TEST - REMOTE

Retransfer Inhibit Command: Allows the user to initiate a Retransfer Inhibit command. This command is used when the operator wants manually control the retransfer of the load back to Source 1. Once the source appears stable the operator can use the Override input to transfer the load to Source 1.

Override Command: Allows the InPower user to initiate an Override command. This command is used to override most of the time delays. The Program Transition, Elevator Signal, and Engine Coldown delays are not affected by this command.

Reset Command: Allows the InPower user to initiate a Reset command. This command acknowledges events.

Refer to the ATS Operator's Manual for detailed feature descriptions.

6.5.2 Test - Setup Features

The **Test** feature can be used to set the With/Without Load setting for the Test button on the front panel.

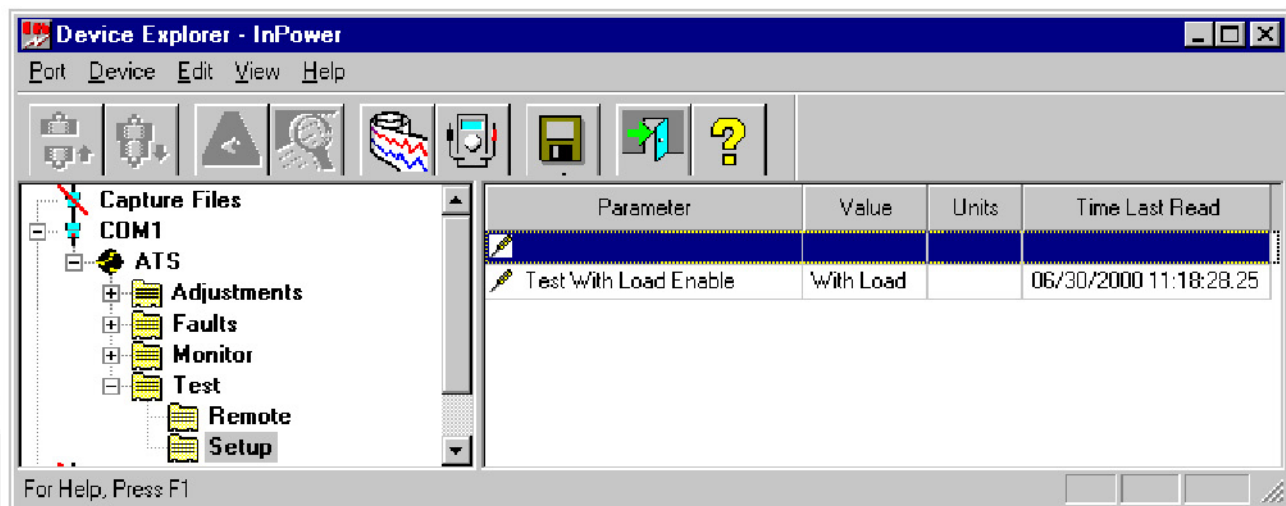


FIGURE 116. TEST - SETUP

6.5.3 Test - S1 Protection (PTC Test)

When a Power Transfer Control (PTC) is installed and connected, the PTC can be tested using InPower.

Example: In this example, InPower is used to test for a Source 1 (S1) overvoltage condition. When installed and enabled, the **Power Transfer Control (PTC)**, will start the genset and transfer the load.

Source one (S1), in this example will always refer to the utility source.

Connect InPower to the PCC 2100. Make sure the PTC feature is enabled and the PTC status light is flashing, to indicate that it is installed.

Select the **S1 Protection** feature in the **Test** directory. Click on the **Overvoltage** parameter group.

To test the PTC, an Analog Input Override Command value must be entered first, then the Analog Input Override is Enabled.

The Analog Input Override Command value is a scaled input value. The input range is zero to five volts. This range represents zero to 150 percent of nominal voltage.

Note that the S1 Overvoltage Drop-Out Percentage is at the default setting of 110 percent of nominal voltage. In this example, InPower will be used to simulate an S1 L1-L2 overvoltage input of 115 percent of nominal L1-L2 voltage.

Determine the input value:

$$(115 \div 150) \times 5.0 = 3.833$$

Click on the **S1 L1-L2 Analog Input Override command** value cell and enter 3.833. Click on **S1 L1-L2 Analog Input Override Enable** and select **Enabled** from the drop-down list.

Click on the **Save Trims** button, on the toolbar, to save the changes and enable the PTC test. The PTC will start the genset and transfer the load to the genset.

To end the test, select **Disabled** in the **S1 L1-L2 Analog Input Override Enable** drop-down list and Click on the **Save Trims** button, on the toolbar, to save the changes and enable the PTC feature.

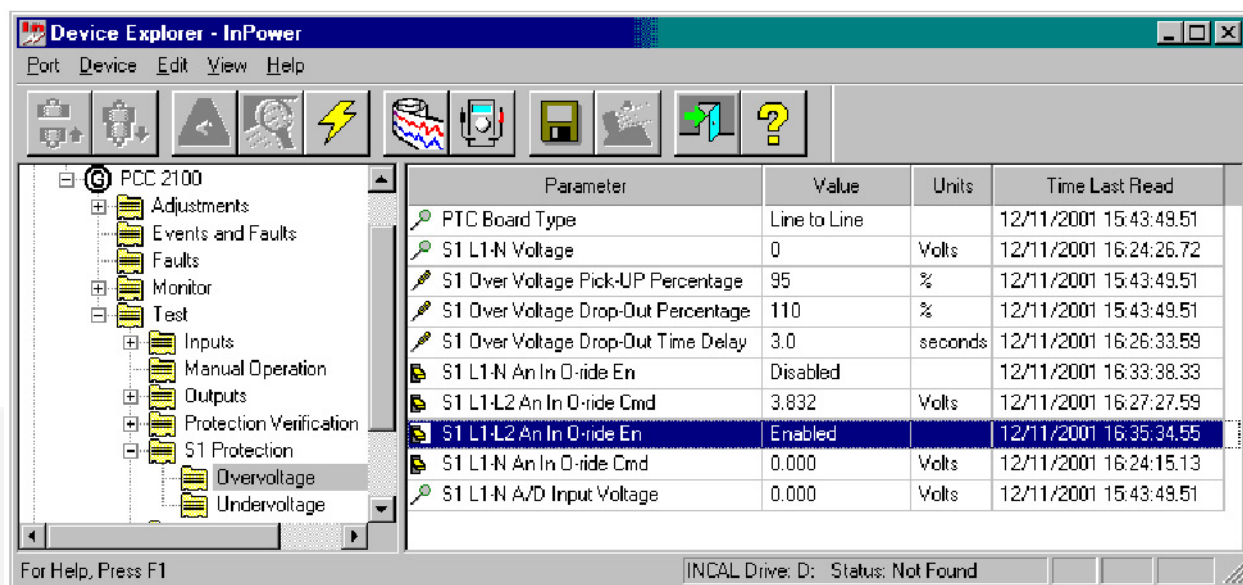
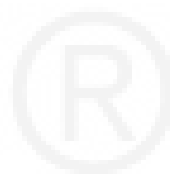


FIGURE 117. PCC 2100 POWER TRANSFER CONTROL (PTC) TEST

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7 Master Control Module Service

This section describes how to connect InPower to a Master Control Module (MCM) 3320 and how to make adjustments and perform tests.

7.1 Connecting an MCM3320

The MCM3320 master control requires an RS-232 to RS-485 data converter and a unique cable. [Figure 118](#) shows the MCM3320 InPower connection.

Kit number 541-1199 is available for use with the MCM3320. The kit includes the RS-232 to RS-485 converter and the cable used for this application.

If the service PC does not have a serial port, a USB-to-serial converter may be required as well.

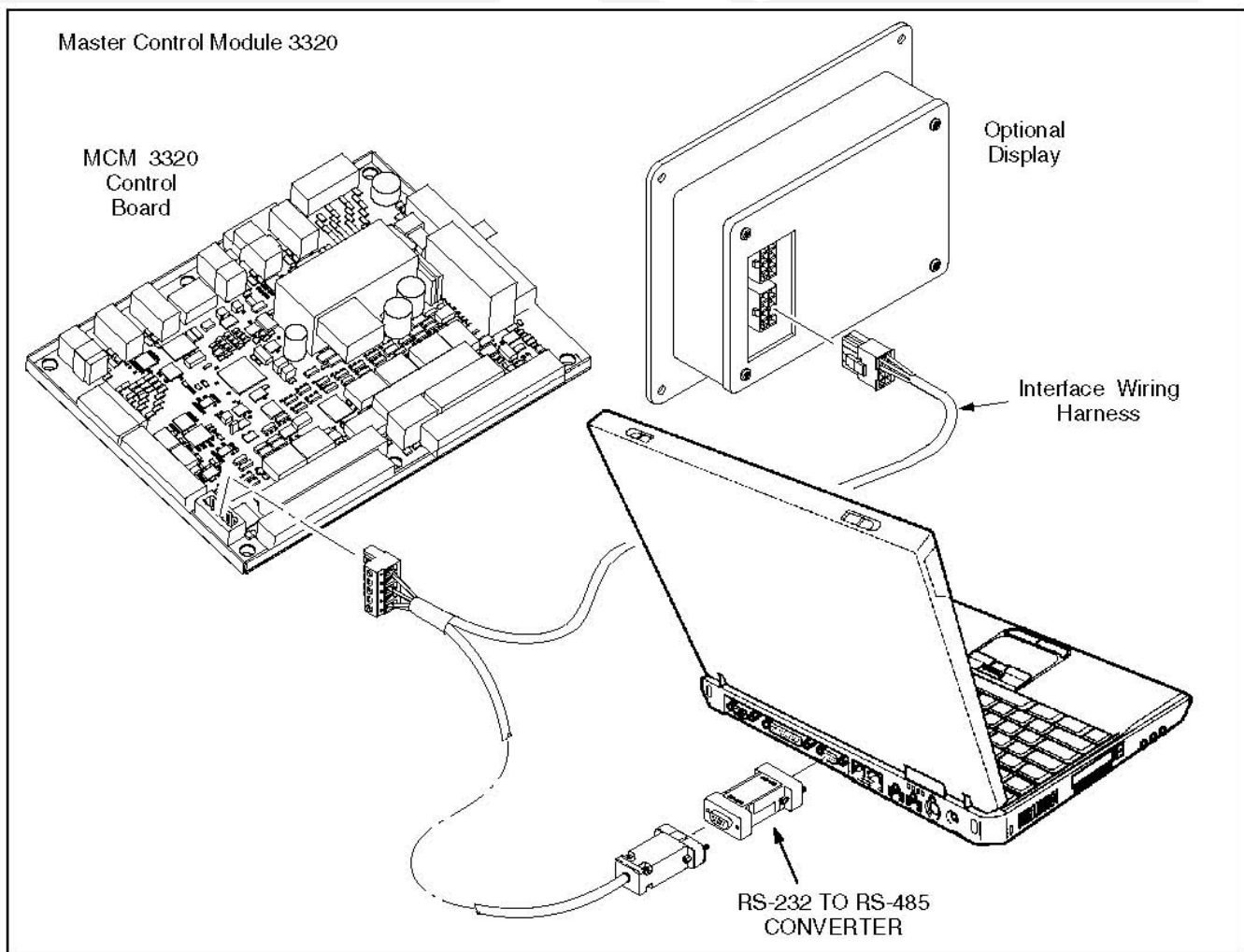


FIGURE 118. INPOWER SERIAL CONNECTION WITH MCM3320 CONTROL

7.2 Configuring the MCM3320

There are two ways to configure the MCM3320 in InPower.

- Use the folders in the device explorer, the same way you configure any device.
- Use the MCM3320 setup screens. Right-click on the device to open these screens.

8 G-Drive Service

This section describes how to use InPower for making adjustments and performing tests on a G-Drive control. The G-Drive control is referred to as an ECM (Electronic Control Module). When the user connects InPower to an ECM, they can also access the Monitor and Faults features.

8.1 G-Drive Service

InPower performs several functions including service and diagnostic functions. The **Adjustment** feature is used to perform service adjustments and trims.

The **Test** feature is used for diagnostics. Test is used to temporarily override a variety of input and output parameters.

You must be connected to the ECM, via the engine harness, in order to write adjustment trims and setting changes to the controller, and to temporarily send test commands to the ECM.



WARNING: *Notify personnel before starting an engine. Severe personal injury or death can result. Refer to the equipment Operator's Manual for important safety precautions.*

8.1.1 Connecting to an ECM

Connection between the service PC and the ECM is made with a special RS-232 serial null-modem cable. [Figure 119](#) shows the connections needed on the service PC. The serial cable from the service PC must be connected to the engine harness. The service cable and part number are shown in [Figure 119](#).

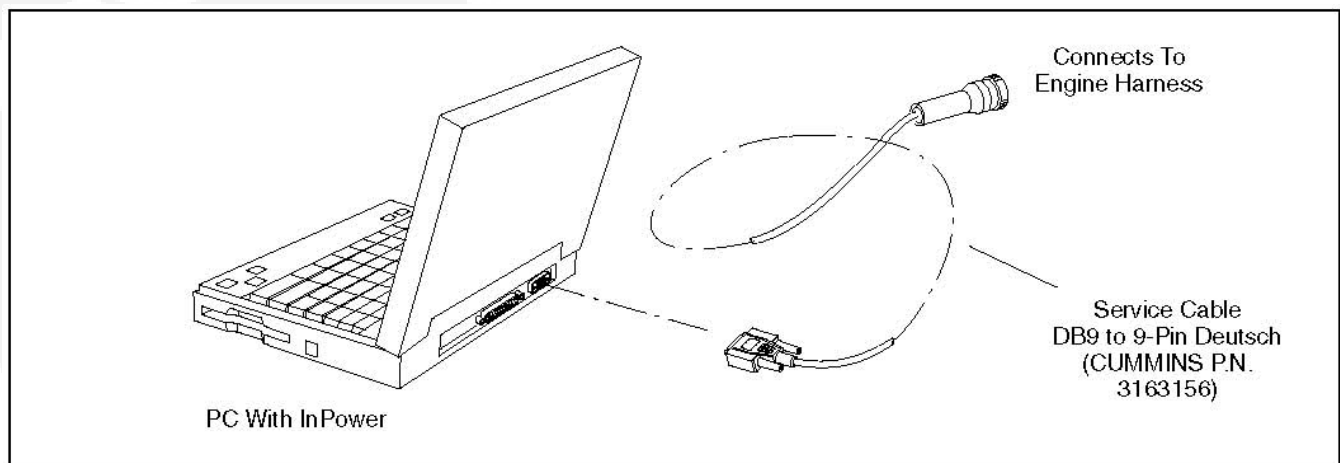


FIGURE 119. INPOWER SERIAL CONNECTION

8.1.2 Starting InPower

Start InPower and connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC, that is being used for the G-Drive connection. The available COM ports are displayed in the Device Explorer directory (left pane). Double click on the COM port (or click on the COM port and then click on the Connect button, on the toolbar).

The InPower Device Explorer displays the features that are available for the ECM in the directory shown under the device.

Figure 120 shows the features listed for the ECM. These features are:

- Adjustments
- Faults
- Monitor
- Test

When you are connected to a G-Drive, the *Capture File* feature is enabled. This feature is used to create a copy of the controls existing parameter values. **Always create a Capture file of the device's parameters for reference, prior to making any adjustments.**

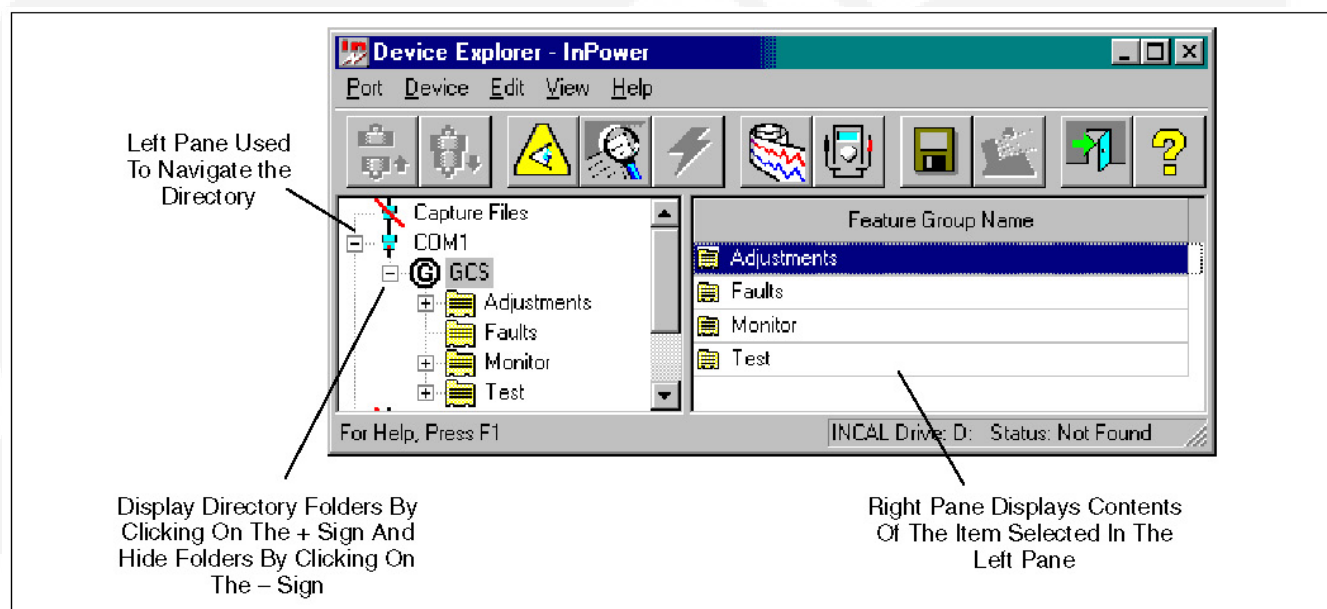


FIGURE 120. DEVICE EXPLORER - TYPICAL GCS FEATURES

8.2 ECM Adjustments

This section describes how to make parameter value adjustments for trims and settings. There are a large number of adjustable trims and settings. Not all engines will have the same adjustments available. This section will cover typical adjustment examples, to help demonstrate basic procedures for using the **Adjustment** features.



CAUTION: *Improper adjustment can cause equipment malfunction or damage. Adjustments must be performed by technically qualified personnel only. Refer to the equipment's Installation and Service manuals for adjustment sequences and procedures.*

8.2.1 Adjustment Basics

To access a group of adjustments or an individual adjustment, use Device Explorer to navigate the left pane until you reach the desired folder, and click on it. The right pane will display the parameter(s) associated with the adjustments for that feature. **Figure 121** shows a list of parameters for the **Governor - Frequency** selection.

The right pane displays the **Parameter** description, **Value**, **Units** of measure and the **Last Time** that the value was **Read**.

Placing the mouse pointer over a parameter will bring up an information popup box. The popup provides a brief description of how the parameter value is used.

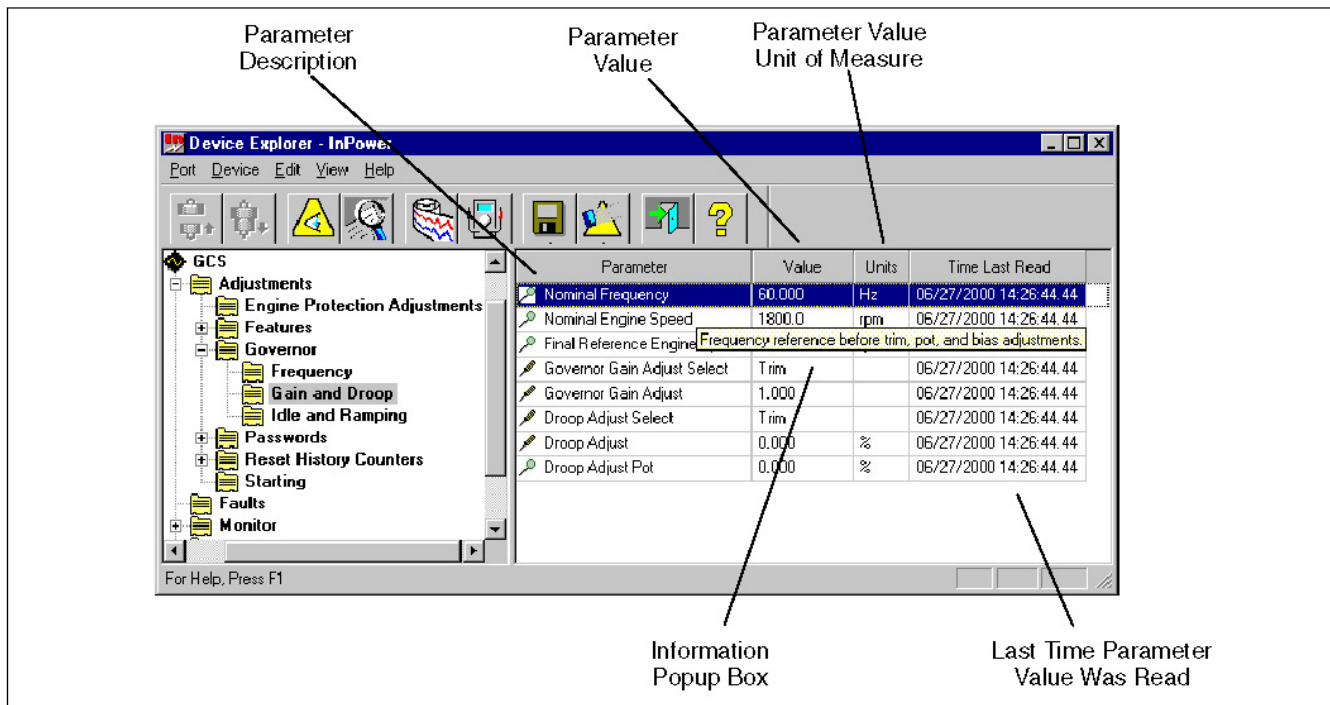


FIGURE 121. TYPICAL PARAMETER INFORMATION

8.2.2 Adjustment Features

The groups and the contents of the **Adjustment** features can vary by engine model. The **Adjustment** directory for a typical G-Drive Control contains the following groups (folders) of Adjustment options:

Engine Protection Adjustments: This folder contains a large number of adjustable engine protection settings for limits like high and low temperature, various pressure settings, and related time delays.

Features: This group contains five folders: Inputs, Meter Drivers, Power Limiter, Relay Drivers and Shutdown Override.

The **Inputs** folder allows the user to enable a number of adjustments and select between a trim or a pot adjustment for some parameters. (The term pot refers to a physical hardware adjustment such as a trimmer pot.)

The **Meter Drivers** feature provides outputs for three external meters.

Power Limiter parameters are used enable the power limiter feature and reduce fueling below the continuous rating.

The **Relay Drivers** folder contains a number of diagnostic faults that can be enabled.

The **Shutdown Override** feature must be used with care. The default setting is False, indicating that the normal engine protection warnings and shutdowns are enabled.



WARNING: *The Shutdown Override setting bypasses all engine protection warnings and shutdowns. Operating the engine under these conditions can cause severe personal injury or death and can result in equipment damage. Refer to the equipment Operator's Manual for important safety precautions.*

When the **Shutdown Override Enable** value is set to True, the engine will not be protected and will not shutdown under abnormal operating conditions. The engine will still shutdown due to engine overspeed, loss of speed signal or loss of power to the E-Stop input.

Setting the Shutdown Override value to True can void the engine warranty. If engine damage occurs from operating the engine beyond the normal shutdown limits, the resulting damage is not covered under warranty.

The **Shutdown Override** feature will not prevent shutdown due to: engine overspeed, loss of speed sensor signal, E-Stop, or loss of power in the E-Stop circuit.

Governor: This group contains Governor adjustments for Frequency settings, Gain and Droop settings, and Idle and Ramping. Many of these parameters must be enabled before the adjustments can be made (Refer to the Features - Inputs folder).

Passwords: This group contains three features that are used for password administration.

The **Change Passwords** feature is used to establish initial passwords and to change existing passwords.

Passwords must be 5 to 8 characters in length. They may consist of any combination of alpha or numeric characters. Do not use special characters.

The **Clear Passwords** feature allows users, with a password, to clear the password. This is typically used if you wish to permanently remove the password. If you want to change an existing password, use the Change Passwords feature.

The **Enter Passwords** feature is used to gain access to password protected parameters. Entering the password allows the user to write changes to password protected parameters.

There are two predefined groups of parameters that can be protected by passwords, these are named **User** and **Application**. When a password is established for either of these groups, access becomes password protected. Users can view password protected parameters, but they cannot write changes to them without *Entering* the password first.

Reset History: Allows the user to reset the history records for Fuel consumption.

Starting: Contains parameters for all of the engine cranking settings.

Many of these features contain sub menus of additional adjustment features. Use Device Explorer to expand each of these categories to view the sub-menu of adjustments. Hold the mouse pointer over the parameters to display the information pop-up box describing how the parameter is used.

Parameter	Value	Units
Frequency Adjust Pot Enable	Disabled	
Frequency Adjust Pot	0.0000	Hz
Droop Adjust Select	Trim	
Droop Adjust Pot Enable	Disabled	
Droop Adjust Pot	8.043	%

View Only Adjustable Temporary Setting Factory Setting

FIGURE 122. TYPICAL ADJUSTMENT FEATURES

8.2.3 Making Adjustments

Located to the left of each parameter is an icon that indicates if the parameter is for adjustment or monitoring (refer to [Figure 122](#)).

The screwdriver icon is used for trims and settings that can be written to the device (read and write). The magnifying glass indicates that the parameter value is being monitored (read only). The switch icon is used to display settings that can be temporarily written to a device. The wrench icon represents factory settings that are not adjustable with InPower.



NOTE: The value being monitored will not automatically update. The user can double click on the parameter to update the value field or click on the Refresh button, on the toolbar.

Each parameter displays the current value and the units of measure for that value. Review this information before making adjustments. Parameter value trims and settings are displayed. **Trims** are numeric values that are entered directly into the Value cell. **Settings** are selected from drop down lists, and they consist of several type of values such as On/Off, Enable/Disable, etc.

To change a parameter value, double click inside the Value cell of the parameter that you wish to change. The current value will be highlighted, if there are only a few choices, a drop-down arrow will be displayed next to the Value.

If an arrow is displayed, click on the arrow to view a drop-down list of the available settings. Click on the desired setting, and it will be entered into the value cell.

If you do not see an arrow, begin typing the new value, the new value entry will overwrite the current value. If the value entered is above or below the range of acceptable values, an error message dialog box will be displayed ([Figure 123](#)). Review the information in the dialog box to see the value limits, before clicking **OK**, to close the error message dialog box.

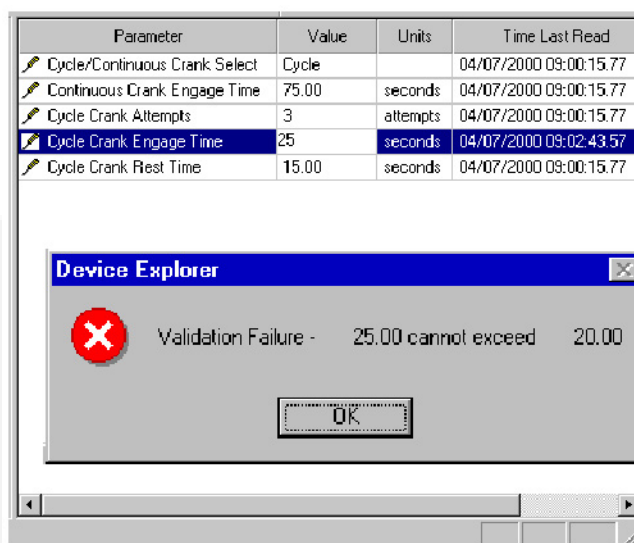


FIGURE 123. ADJUSTMENT ERROR

8.2.4 Saving Adjustments

Edit Mode: When selected, a parameter value remains in the edit mode, as indicated by a flashing cursor (numeric values) or the drop down arrow (settings). When finished making adjustments, press the enter key or click on another parameter value to exit the edit mode.

Saving Adjustments: Adjustments are written to the device as they are entered. To make these changes permanent, click on the **Save Trims** button, on the toolbar (floppy disc) or click on the **Device** menu and select **Save Adjustments**. Changes in adjustments will immediately alter the device's performance.

Saved adjustments are written to the **Audit Trail**. Refer to the **Audit Trail** to review the record of adjustment changes.

If the user loses connection with the device before saving an adjustment, the change will not be saved.

8.3 Adjustment Examples

The following examples are provided to demonstrate how typical trim and setting adjustments are made. Some measurements and adjustments are done while the engine is running, do not attach or remove test meters while the engine is running.



WARNING: Hazardous voltage can cause electrocution, resulting in severe personal injury or death. Voltage and frequency measurements must be performed by technically qualified personnel only. Do not attach or remove test meters while the equipment is running. Refer to the equipment Operator's Manual for important safety precautions.

Example: In this example, InPower is used to adjust the governor gain (refer to the specific engine model T&R manual for additional governor adjustment details)

Begin by setting the **Governor Gain Adjust Select** value setting to **Trim**. Then double click on the **Governor Gain Adjust** value cell.

Make a note of the existing Value reading. The range of adjustment is 0.05 to 10 (1.0 is the factory default setting). Increase or decrease the value as needed to obtain the proper load response. If the gain is set too high, engine speed will hunt or oscillate, and if the gain is set too low, the engine will respond too slowly to changes in the load.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device. Continue adjusting until satisfactory response time and stability are obtained.

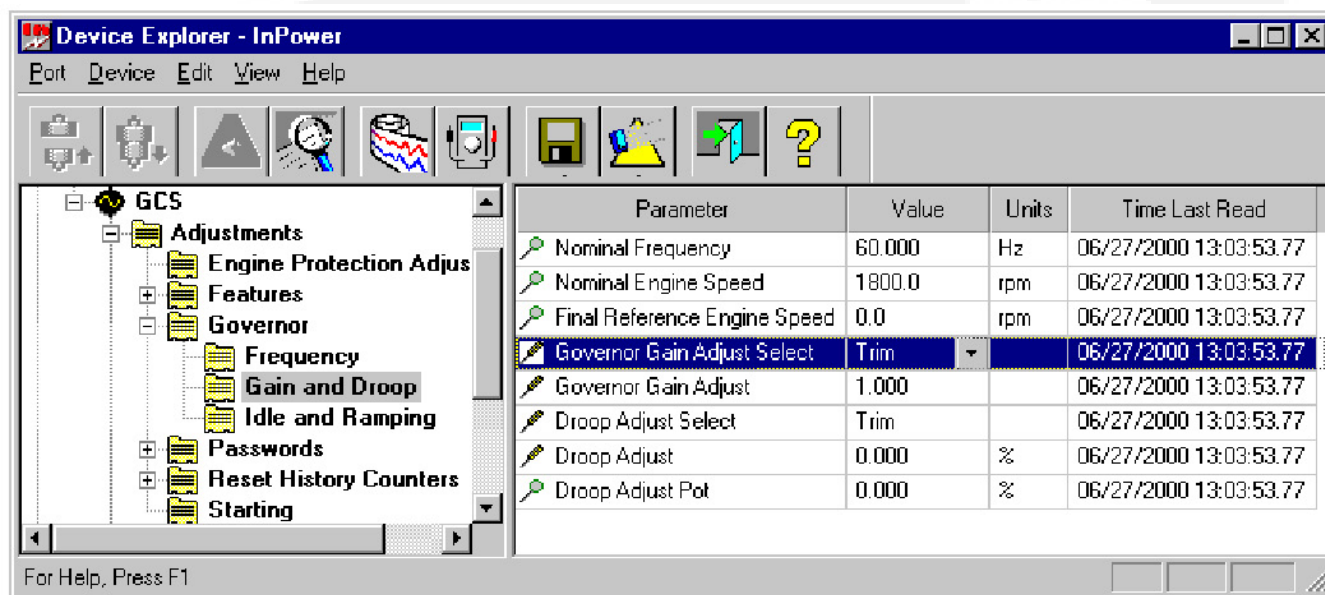


FIGURE 124. ADJUSTMENTS - GOVERNOR - GAIN AND DROOP

Example: In this example, InPower is used to increase the **Starting to Rated Ramp Time** (refer to [Figure 125](#)). Select the **Governor - Idle and Ramping** feature, from the **Adjustments** directory. Double click on the Value cell for **Starting to Rated Ramp Time**. This adjustment sets the desired time interval between starting and rated power. The current setting will be highlighted, for this example enter 5 (for 5 seconds) into the Value cell. (For faster startup and for NFPA 110 compliance, set this value to zero.)

Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

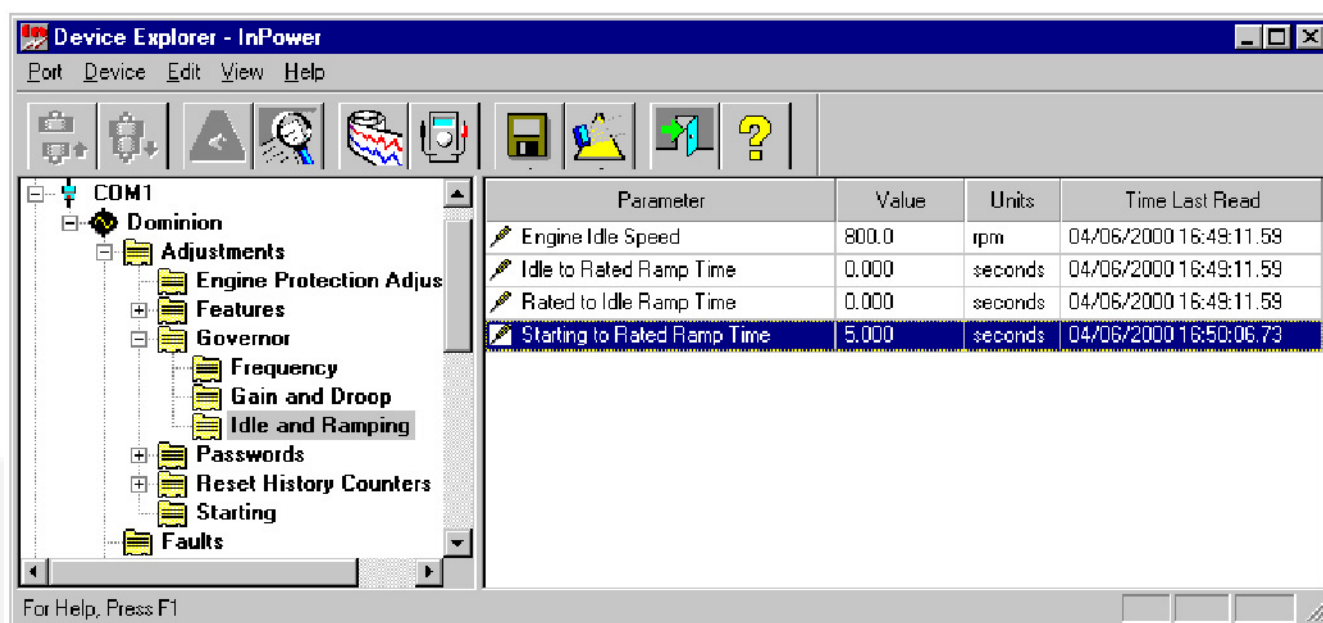


FIGURE 125. ADJUSTMENTS - GOVERNOR - IDLE AND RAMPING

Example: In this example InPower is used to adjust an XY table.



NOTE: InPower only allows adjustments to engine protection parameters that result in increased engine protection.

Select the **Engine Protection Adjustments** feature and double click on the Value cell for **LCP Warning Threshold**. The current threshold settings are displayed in a graph. Pressure, in psi, is displayed on the Y-axis and engine speed is displayed on the X-axis.

Editing can be performed in the Graph Mode ([Figure 127](#)) or in the Spreadsheet Mode ([Figure 128](#)). To change to the Spreadsheet Mode, click on the Graph Mode checkbox to remove the check mark.

Edit in the Graph Mode by dragging a threshold point on the graph to the desired setting. When the cursor is in the correct location, a pointing hand will appear on the graph. Select the hand by holding down on the mouse button, continue to hold down on the mouse button while dragging the point to the desired location.

Click on **Save** to update the most recent changes. Click on **Close** when you are finished making changes.

Select another parameter or exit the Engine Protection Adjustments directory to write the new values to the device.

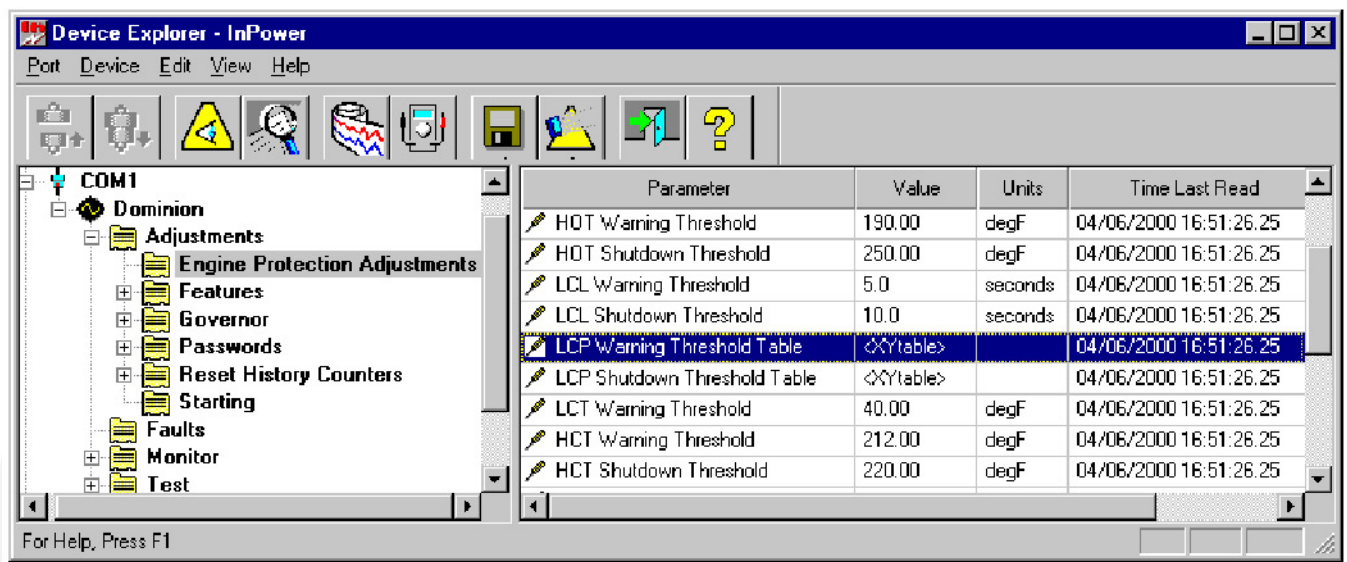


FIGURE 126. ENGINE PROTECTION ADJ. - LCP WARNING THRESHOLD

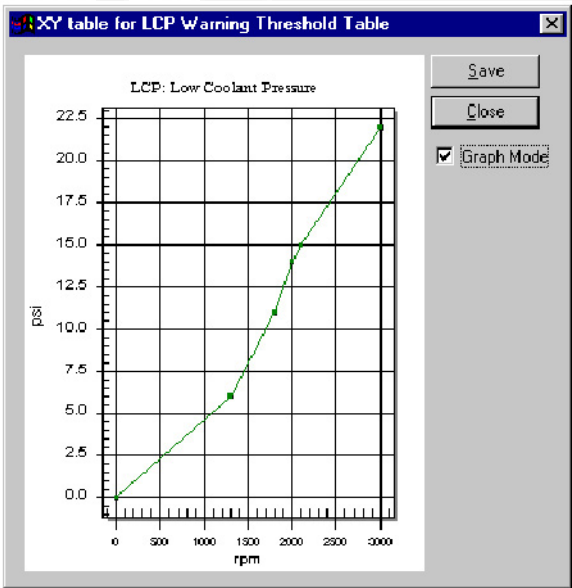


FIGURE 127. XY GRAPH

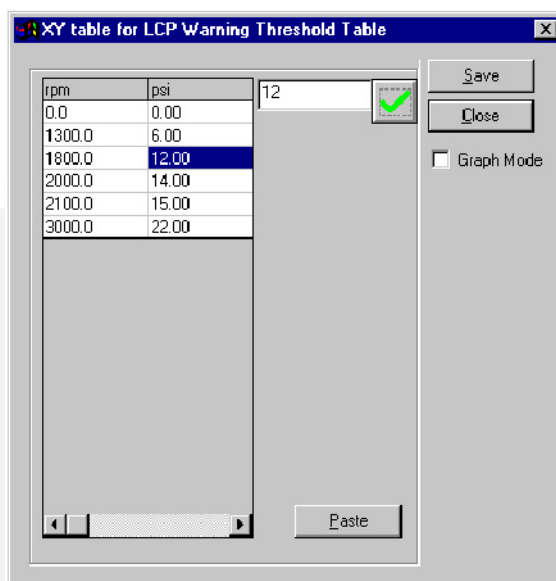


FIGURE 128. XY SPREADSHEET

Edit in the Spreadsheet Mode by clicking on a value cell and entering the parameter value in the edit box, next to the check mark. Click on the check mark to enter the new value into the spreadsheet. Both the RPM and PSI values can be edited.

In this example, the user can change the LCP warning threshold at 1800 rpm to 12 psi. Use either the drag-and-drop method to move the point on the graph, or enter the new value into the spreadsheet.

Click on **Save** to update the most recent changes. Click on **Close**, when you are finished making changes.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

The **Paste** button is used to import spreadsheet value data from an Excel spreadsheet. **Service personnel will not need to use this feature because the data is already provided. Generally, only minor adjustments are required.**

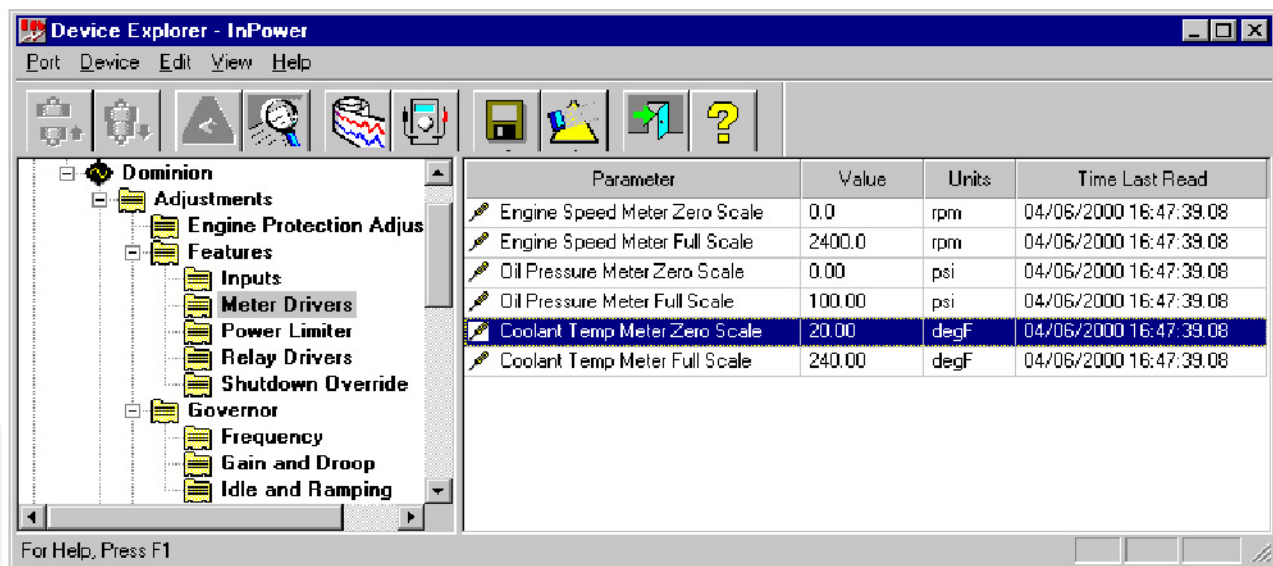


FIGURE 129. ADJUSTMENTS - FEATURES - METER DRIVERS

Example: In this example the Coolant Temp Meter Driver is adjusted for use with an external coolant temperature meter. The **Meter Drivers** feature is located in the **Adjustment - Features** folder.

Note that two parameters are displayed for this feature, **Coolant Temp Meter Zero Scale** and **Coolant Temp Meter Full Scale**. The default setting for the Zero Scale is 20 degF at 0 mA, and the default setting for Full Scale is 240 degF at 1 mA.

The meter selected for use with this feature must have a 0 to 1 mA meter movement, preferably with less than 100 ohm impedance. (The lower the impedance the higher the accuracy. A meter with 50 ohm impedance will provide an accuracy of approximately 1.2%.)

The range displayed on the meter must be within the range of the sensor.

In this example InPower is used to drive a Coolant Temp meter with a range of 100 to 250 degF.

Double click on the value cell for **Coolant Temp Meter Zero Scale** and enter 100, then double click on the value cell for **Coolant Temp Meter Full Scale**, and enter 250. Click on the **Save Trims** button, on the toolbar.

[Figure 130](#) shows the customer connections for the meter drivers.

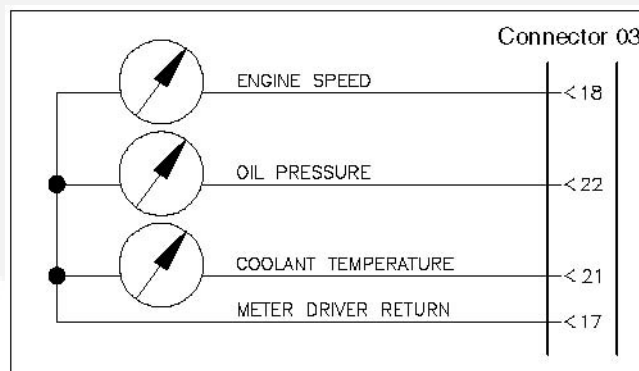


FIGURE 130. METER DRIVERS

Password Example 1: In this example, InPower is used to create both an Application password and a User password. These passwords are used to prevent unauthorized InPower users from writing changes to password protected parameters.

In examples 2 and 3, InPower is used to *Enter* these passwords to write changes to protected parameters and to *Clear* these Application and User passwords.

Connect to the ECM and open the **Adjustments - Passwords** parameter group. Click on the **Change Passwords** folder.

Double click on the value cell for the **Change Application Password** parameter. Enter the password *test21* (passwords must be 5 to 8 characters in length and may consist of any combination of alpha or numeric characters).

Make a note of the Application password.

Click on the **Save Trims** button, on the toolbar, to write the new password to the device.

Repeat this process for the **Change User Password** value cell. Enter *test22* and click on the **Save Trims** button again to write the new password to the device.

Make a note of the User password.

Close the connection to the ECM and exit InPower. Proceed to the next Password Example.

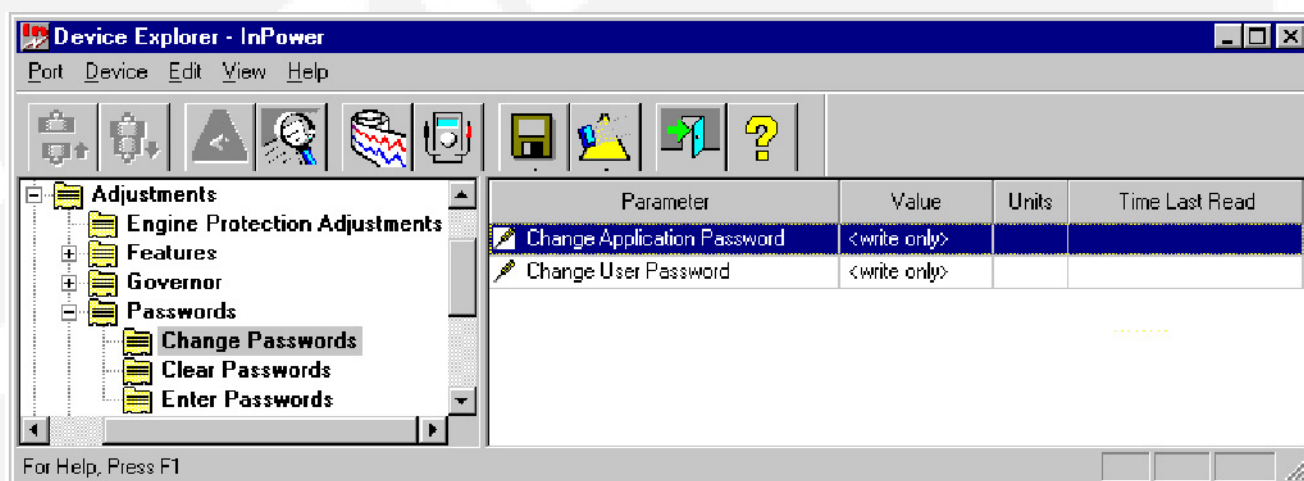


FIGURE 131. CHANGE PASSWORDS

Password Example 2: In this example, InPower is used to adjust parameters that have password protection.

Start InPower, connect to the ECM, and open the **Adjustments - Passwords** parameter group. Click on the **Enter Passwords** folder.

Double click on the value cell for the **Enter Application Password** parameter. Enter the password *test21*. Click on the **Save Trims** button. Repeat by entering *test22* in the **Enter User Password** value cell, and click on the **Save Trims** button.

Open the **Adjustments - Engine Protection Adjustments** parameter group and double click on the **Coolant Level Switch Enable** value cell (this parameter is Application Password protected). Select **Enable**, from the drop down list and click on the **Save Trims** button.

Next, double click on the **Engine Cold Warning Threshold** value cell (this parameter is User Password protected). Enter 20 (degF) and click on the **Save Trims** button.

Entering the password first allows the user access to write changes to these password protected parameters. Reset both of these parameters to their original settings before proceeding to the final password example. Do not disconnect from the ECM.

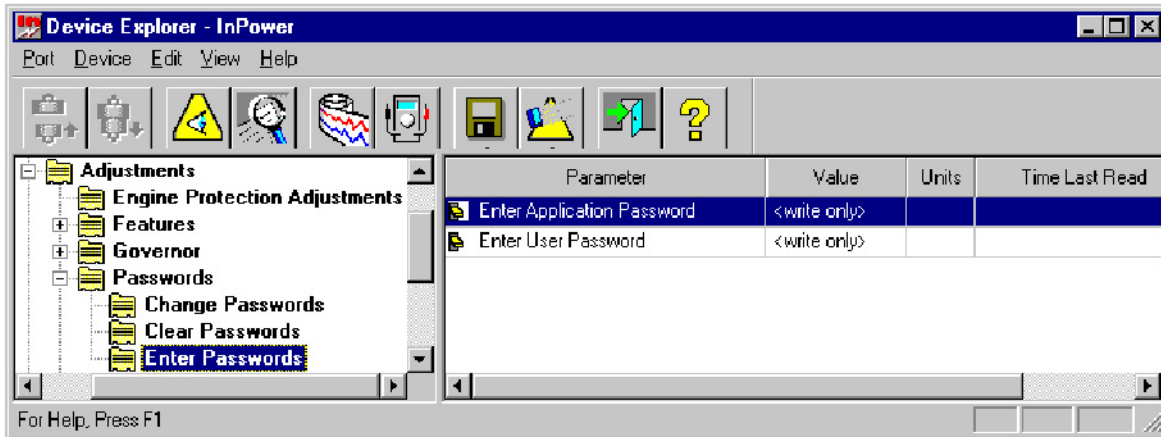


FIGURE 132. ENTER PASSWORDS

Password Example 3: In this example, InPower is used to clear the Application and User Passwords.

During an InPower session, you must *Enter* the password(s) before they can be cleared. Open the **Enter Passwords** parameter group and enter both the Application and User passwords.

Click on the **Clear Passwords** folder. Double click on the value cell for the **Clear Application Password** parameter. Click on **Clear Password** in the drop-down list. Click on the **Save Trims** button. This will remove the Application password.

Double click on the value cell for the **Clear User Password** parameter. Click on **Clear Password** in the drop-down list. Click on the **Save Trims** button. This will remove the User password.

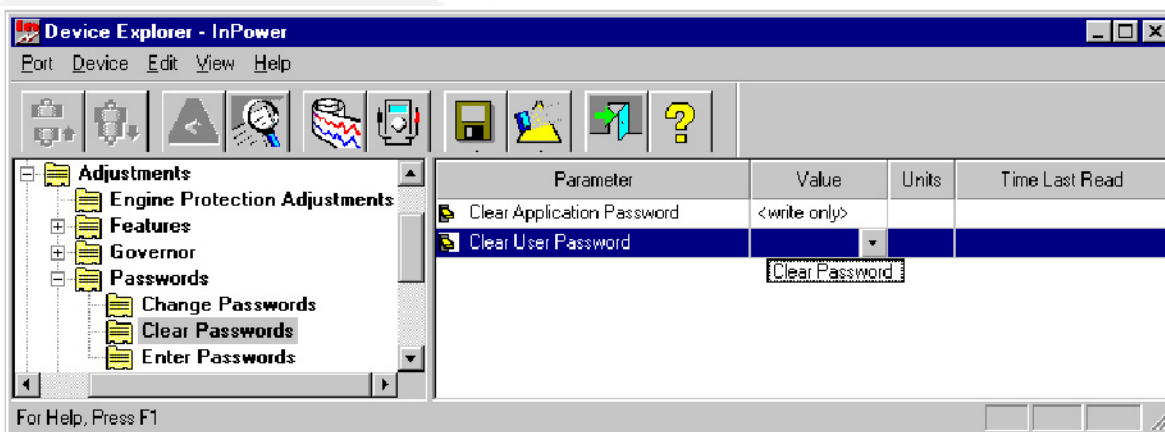


FIGURE 133. CLEAR PASSWORDS

8.4 Test

The **Test** feature is a diagnostic tool that is used to perform internal self-checks on the device (**Self Test**). Verify inputs and outputs of the device, and test device protection functions (like Overspeed).

After changing a **Test** parameter, the user can observe or measure the results of the changes.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the device (ECM). When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the control, you must use the Adjustment feature.

The **Test** directory for a typical ECM contains the following groups (folders) of Test options:

- Fault Simulation
- Inputs
- Output
- Self Test
- Speed Override

This section describes each of the groups of tests listed in the Test directory. The Self Test feature can be used as a quick check to determine if the ECM is responding, by sending control inputs that should activate the control outputs. The other Tests are used for performing more specific test functions.

8.4.1 Inputs - Oil Pressure

When inputs are externally activated, the **Engine Inputs** feature can be used to monitor the inputs. The actual inputs can be measured with a multimeter and the results can be compared.

Example: To test the **Oil Pressure Input**, check the G-Drive Control System Wiring Diagram for the location of the oil pressure sender input. In this example the input is on connector 02, between pins 22 (+) and 10 (gnd). Remove the connector and insert the service breakout box. Check for voltage between pins 22 and 10.

If no voltage is present, check the harness and the sensor. If voltage is measured, and InPower and the Operator panel display no input, the connections to the control, or the control are suspect.

[Figure 134](#) shows the results when an input voltage is present, in this example the oil pressure (approximately 85 psi) is displayed in InPower, and should also be displayed in the Operator Panel display (if equipped).

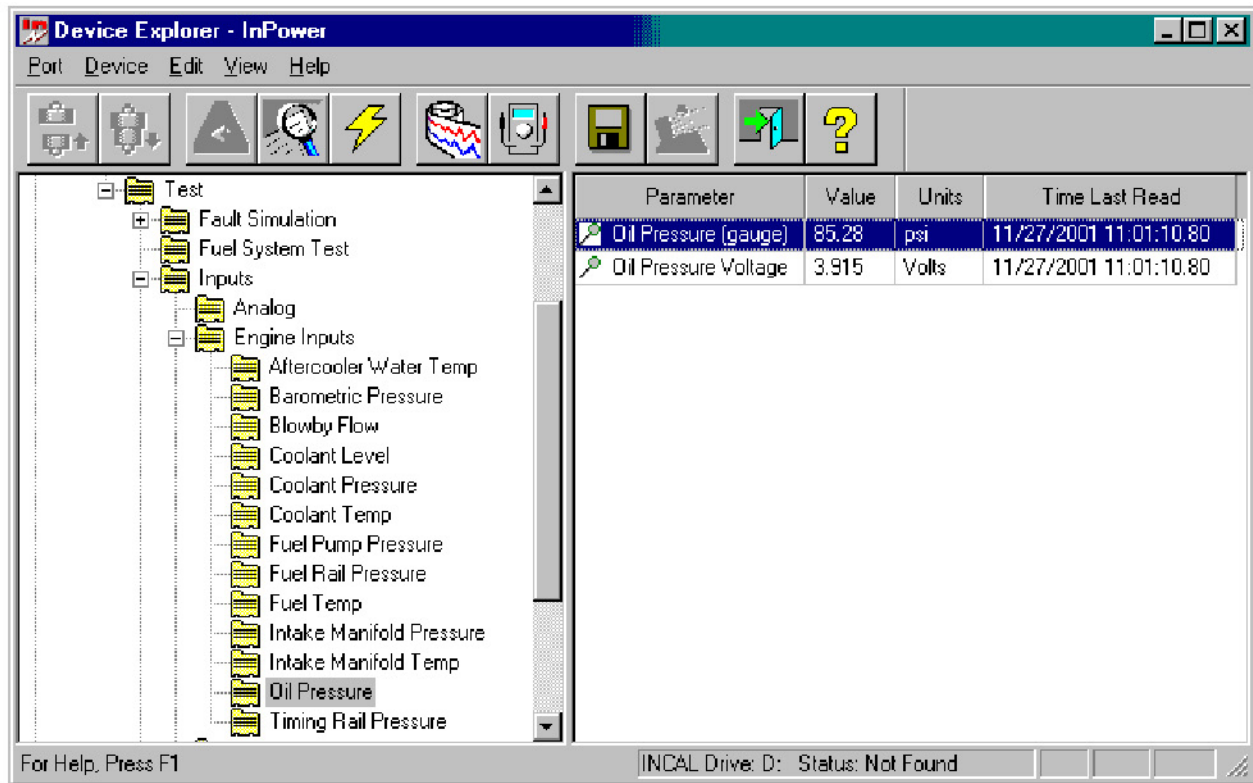


FIGURE 134. TEST - INPUTS - ENGINE INPUTS - OIL PRESSURE

8.4.2 Inputs - Switches

This feature allows the user to perform G-Drive Control System operations including exercising the engine, stopping the engine and bypassing the warm-up period (used if the engine is already warmed up).

Example: In this example, InPower is used to initiate a **Run Command**. Double click on the **Run/Stop Command** value cell, and a drop-down list arrow is displayed (refer to [Figure 135](#)). Click on the drop-down arrow and click on Run. To initiate the **Run Command**, click on the **Save Trims** button on the toolbar. To end the **Run** command double click on the Value cell again, click on the drop-down arrow and click on **Stop**, then click on **Save Trims** button again.

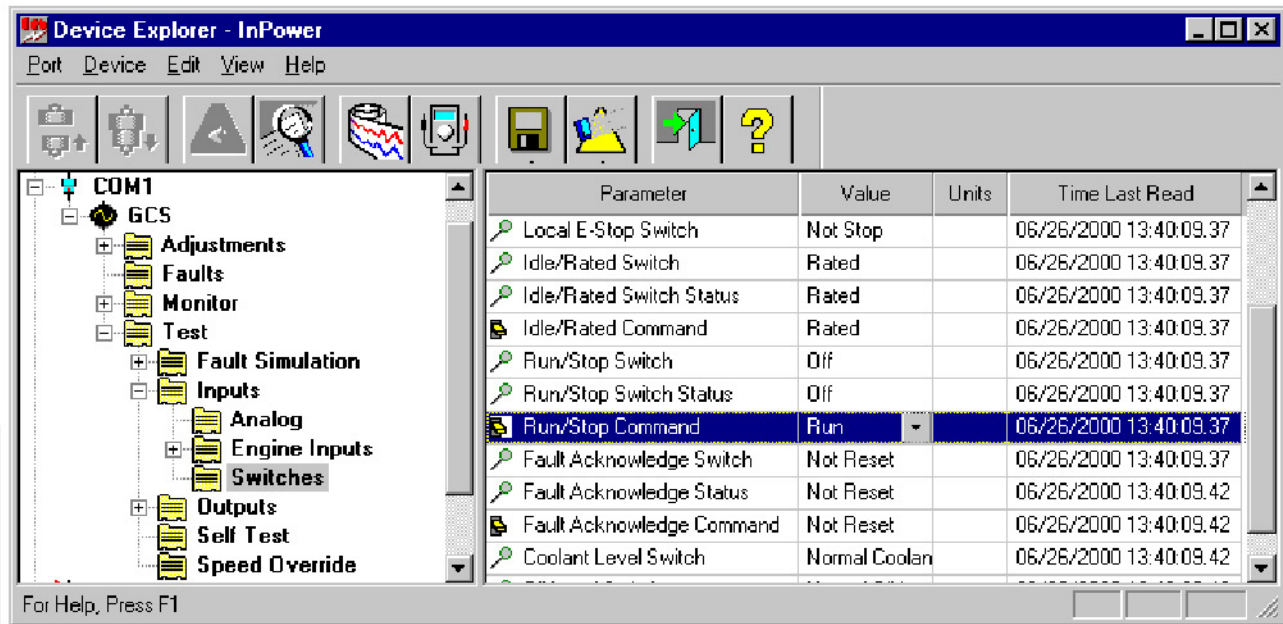


FIGURE 135. TEST -INPUTS - SWITCHES - RUN/STOP COMMAND

8.4.3 Fault Simulation

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine shuts down. There are a large number of protection features that can be checked.

Example: In this example, InPower is used to test an engine protection feature (refer to [Figure 136](#)).

The user can make a check of the current engine protection settings for low oil pressure. Double clicking on the **XY Table** value cell for the **LOP Warning Threshold Table**. Review the oil pressure Vs. RPM chart to see where the warning threshold points are set. Note the warning levels, and then close the XY table.

Double click on the **Oil Pressure Override Enable** value cell and enter a voltage amount that will be low enough to trigger the warning.

Double click on the value cell for the **Low Oil Pressure Override Enable**. A drop-down list arrow is displayed, click on the drop-down arrow and click on **Enabled**. To temporarily write this output to the device, click on the **Save Trims** button on the toolbar.

The Alarm popup will display the active warning ([Figure 136](#)).

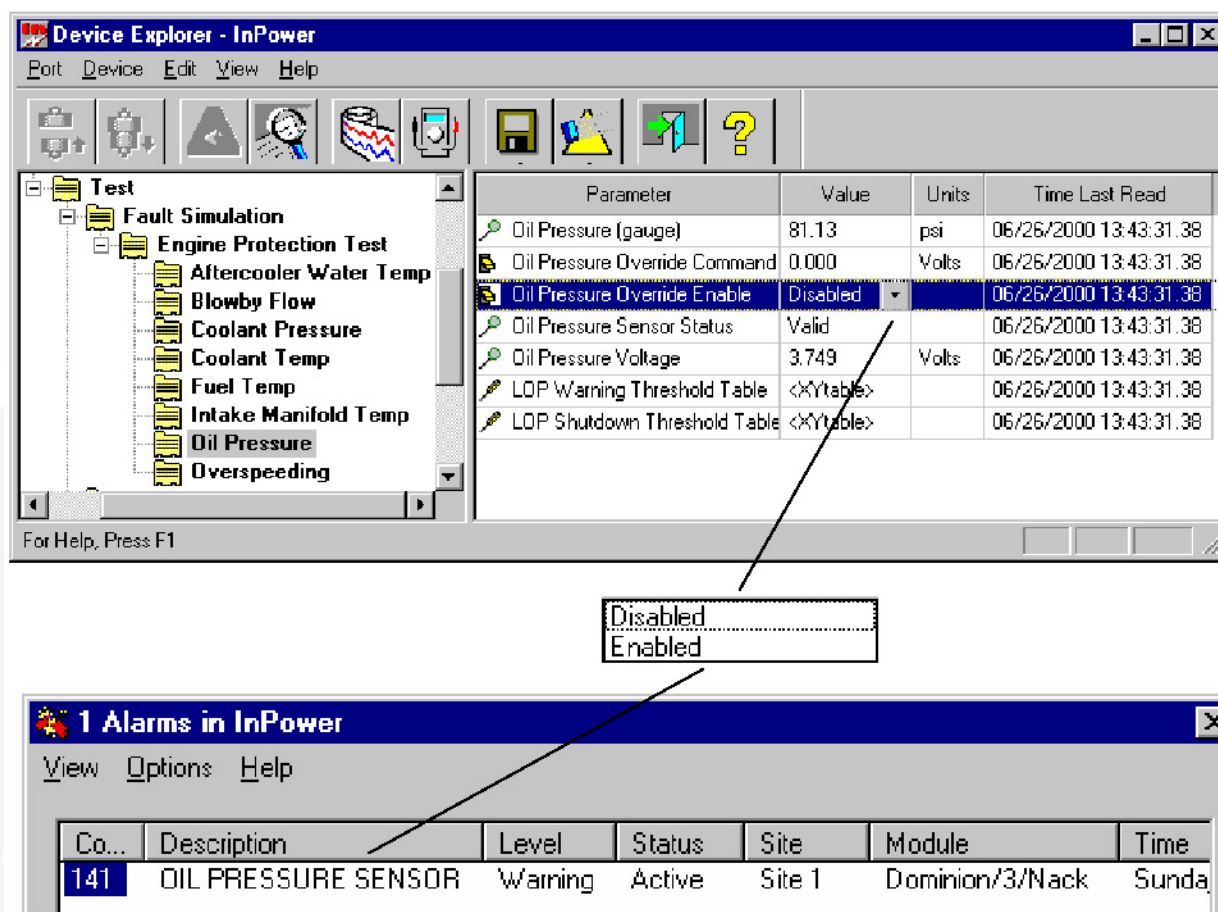


FIGURE 136. TEST - ENGINE PROTECTION - OIL PRESSURE TEST

8.4.4 Self Test

InPower has built in tests that can be used for diagnostics. The default setting is the **Test Abort** value (not in test mode) setting. [Figure 137](#) shows the **Self Test** options. Double click on the Value cell, then click on the arrow to display the drop-down list of settings.

The Self Test feature has two Built In Tests (BIT Command). The first test, named Test Stationary, is used to check all sensors and output relays by activating control outputs. The user can then monitor inputs, if fault conditions occur, the event handler will popup to display faults.



WARNING: *Notify personnel before using the Self Test Feature to crank the engine. Severe personal injury or death can result. See the equipment Operator's Manual for important safety precautions.*

The second test, named **Test Cranking**, sends a start cranking signal to the engine to test the mag pick-up (MPU) speed sensors, starter relay and battery level.

The **Test Abort** setting is the default setting, indicating that a Self Test is not in process. To end a test in process, return the **BIT Command Value** to **Test Abort**.

8.4.5 Speed Override

The speed override options are used to override the normal governor reference input to the control. The **Speed Reference Override** feature can be Enabled to override the governor reference input in order to simulate the engine operation at another speed, for diagnostics purposes.

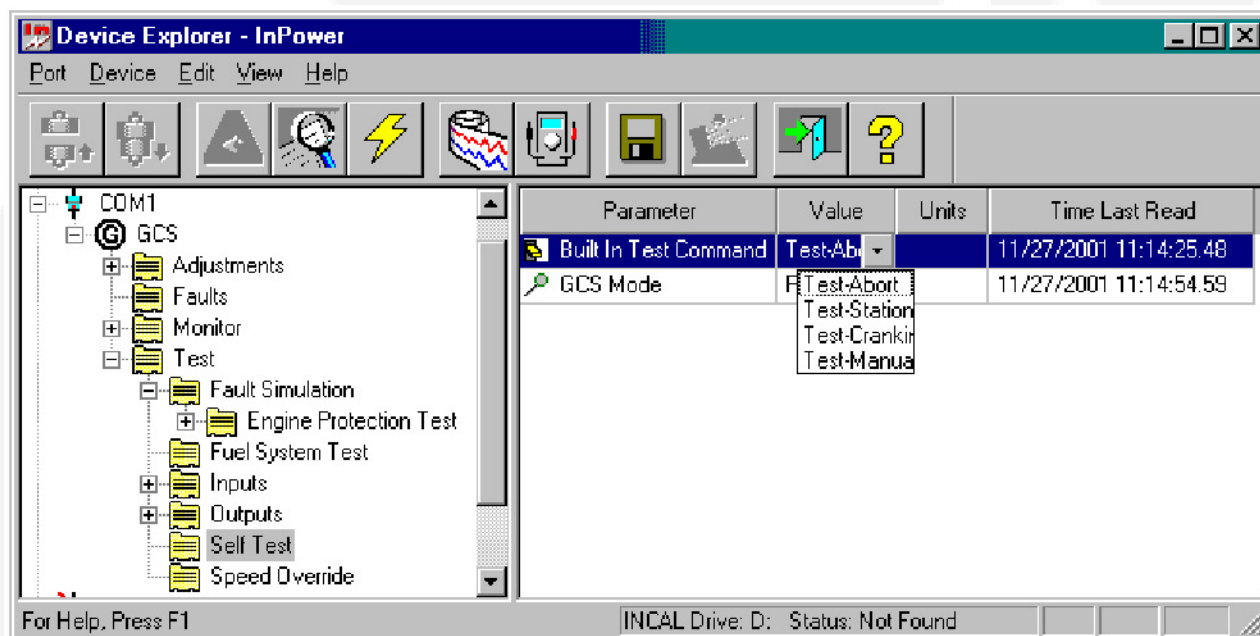


FIGURE 137. SELF TEST - TEST -BIT COMMAND

8.4.6 Fuel Rack Position Test

This test is used to check the fuel rack position sensor. InPower can be used to move the fuel rack position, and the results can be measured.

Example: InPower is used to perform a fuel system test. The **Fuel Rack Position Override Command** is used to move the fuel rack and monitor its position. This test is used in G-drive applications that use QST30 series engines.

Make sure all of the fuel system components are connected.



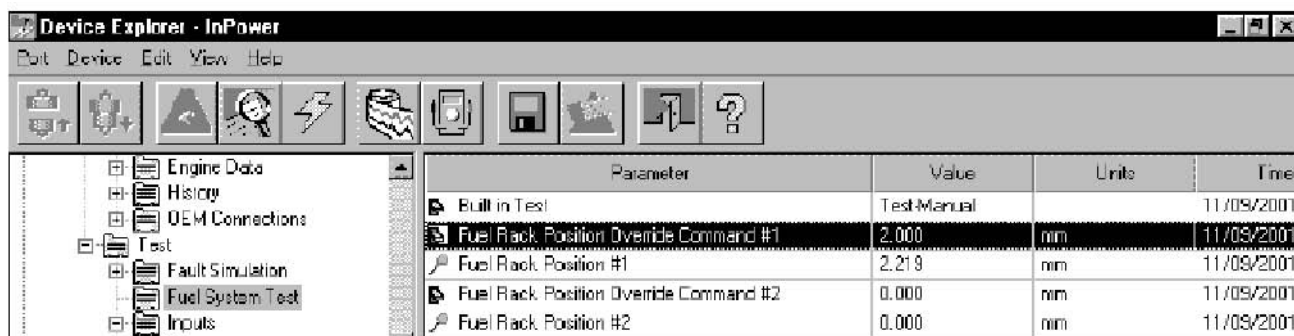
NOTE: Fuel pump faults are suppressed in the Test-Manual mode.

Open the **Test\Fuel System Test** parameter group. Double click on the **Built in Test** parameter and select **Test-Manual**.

Double click on the **Fuel Rack Position Override Command #1** parameter to change the position on the left bank fuel pump (as viewed from the flywheel end). (**Fuel Rack Position Override Command #2** is used to change the position on the right bank fuel pump).

Enter the desired rack position in millimeters. The allowable range is 0 to 15 millimeters. In this example, enter 2.

Use the **Save** button on the toolbar to save the change. Click on the **Refresh** button, on the toolbar. Read **Fuel Rack Position #1**, the result is typically within +/- 0.5 millimeters.



The screenshot shows the 'Device Explorer - InPower' window. On the left, a tree view shows the hierarchy: Engine Data, History, OEM Connections, Test, Fault Simulation, Fuel System Test, and Inputs. The 'Test' folder is expanded, and 'Fuel System Test' is selected. The main pane displays a table of test results.

Parameter	Value	Units	Time
Built in Test	Test Manual		11/09/2001
Fuel Rack Position Override Command #1	2.000	mm	11/09/2001
Fuel Rack Position #1	2.219	mm	11/09/2001
Fuel Rack Position Override Command #2	0.000	mm	11/09/2001
Fuel Rack Position #2	0.000	mm	11/09/2001

FIGURE 138. FUEL RACK POSITION TEST

8.4.7 Single Cylinder Cutout Test

InPower can be used to cutout fueling to one cylinder at a time. This test can be used to help isolate a cylinder with fueling or combustion problems.

Example: InPower is used to perform a single cylinder cutout test. This test is used in applications that use QSX15 series engines.



CAUTION: Do not cutout fueling to more than one cylinder at a time or engine damage can result. Always change the Cylinder Cut Out Test Enable to Disabled, when finished testing. Follow these steps carefully and refer to the equipment Operator's Manual for Important Safety Precautions.

Connect the service PC to the genset. Start the genset and operate it at rated speed with no load.

Open the **Test\Fuel System Test** parameter group. Make sure each of the six cylinder parameter values are set at 1 (enabled).

Double click on the **Cylinder Cut Out Test Enable** parameter and select **Enabled**.

Double click on the desired cylinder for testing, in this example: **Cylinder #1 Injector Fueling**. Enter 0 (disabled). Use the **Save** button on the toolbar to save the change and perform the cutout test on cylinder number 1.

When finished, always remember to return the **Cylinder Cut Out Test Enable** to **Disabled**, and return the cylinder being tested to 1 (enabled). Use the **Save** button on the toolbar to save the change.

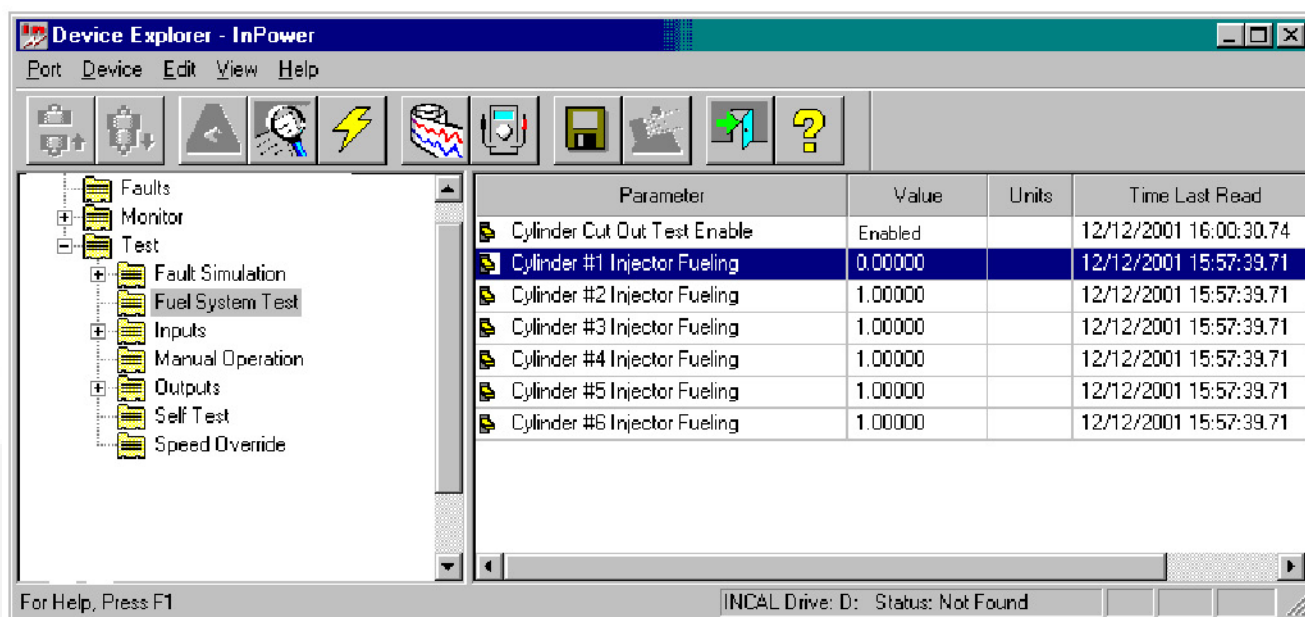


FIGURE 139. SINGLE CYLINDER CUTOOUT TEST

9 Initial Calibration for Commercial Gensets

9.1 About Initial Calibration

The Initial Calibration feature is used to download a calibration file into a service replacement genset control (base board). This section covers the procedures for performing an Initial Calibration on commercial gensets.

Starting with version 5.5, InPower calibration files for commercial and consumer controllers can be downloaded from the InCal CD or from the CPG InCal website.

9.2 Initial Calibration

Use of a Capture File can reduce the amount of adjustment that may be required when replacing the base board. If the old base board is operational, and a capture file has not already been created, correct any active faults (if possible).

Refer to the generator set service manual for control replacement procedures. Before replacing the control, remove power from the battery charger and block heater, if equipped, and remove power from the genset control.

Complete all necessary service replacement procedures and power the control.

Reconnect power to the battery charger and block heater, if applicable.

Connect the serial communication cable from the service PC to the device.

Start InPower and launch the Alarm Popup Window by clicking on the firecracker icon, located on the lower right corner of the Windows status bar. Click on the Alarm Popup **Options** menu, then click on **AutoAnnounce** to deselect (uncheck) it. Disabling this feature prevents nuisance alarms during the calibration download.

Connect to the port by double clicking on the port that matches the COM port on the service PC being used for the genset connection (COM1, COM2, etc.). The available COM ports are displayed in the Device Explorer directory (left pane).

Select the device **DVC1** (or **PCC##00**, if the device already has a calibration file) by clicking on it ([Figure 140](#)).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration** ([Figure 141](#)).

If prompted to select between G-Drive and Genset applications, select **Genset**; then select **Next**.

Refer to the genset calibration label, located inside the control housing, for the calibration part number ([Figure 142](#)).

This label also lists the features that were originally installed in this device.

In this example, calibration part number 0326-0264 is displayed on the label.

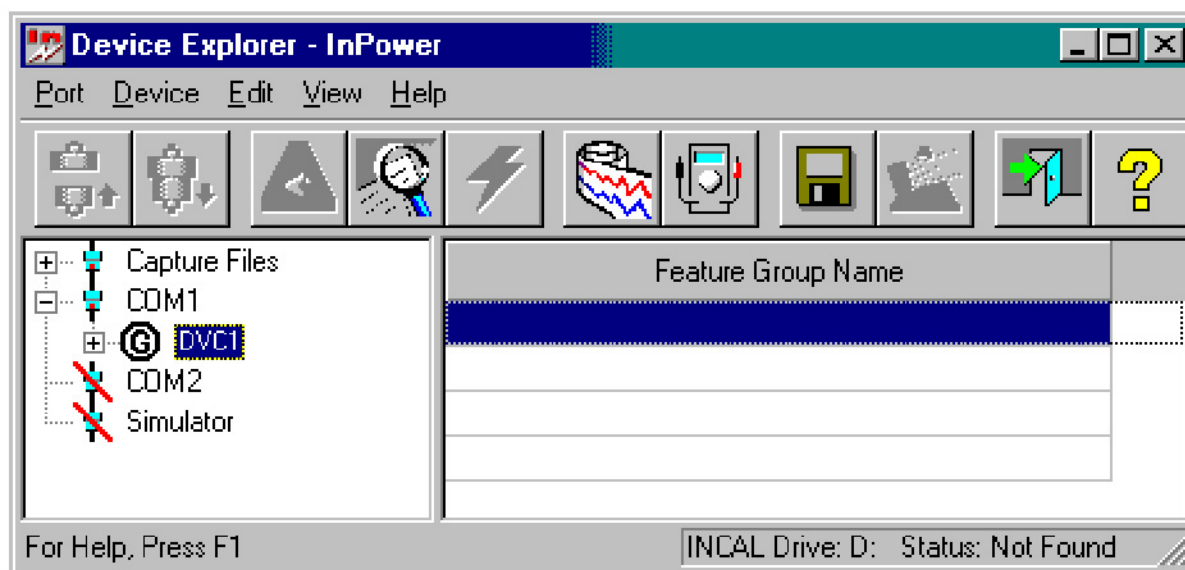


FIGURE 140. MAIN WINDOW

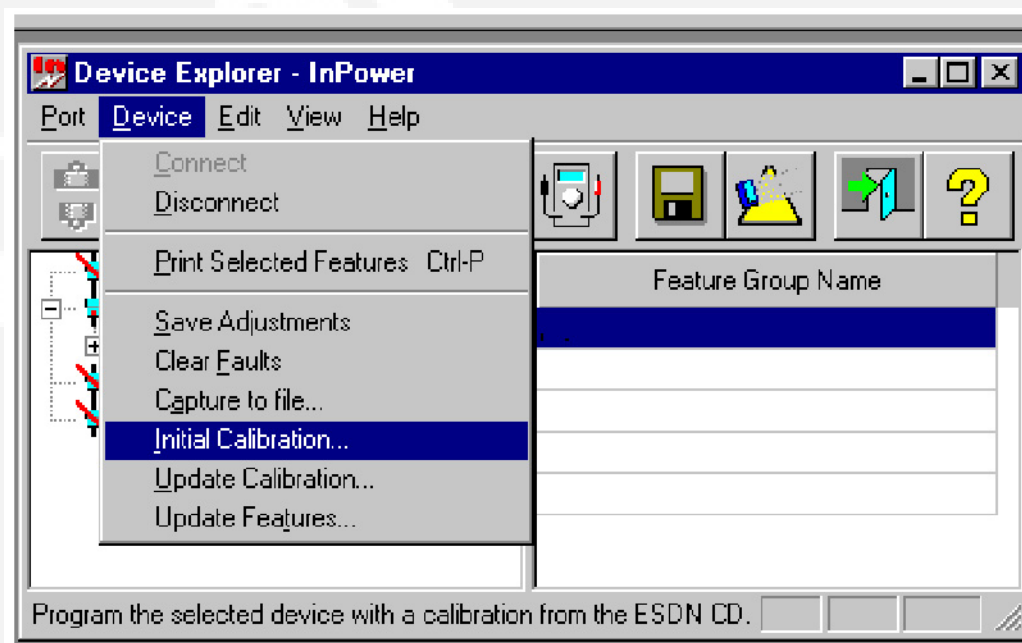


FIGURE 141. MAIN WINDOW

Model No.					
Serial No.			Spec.		
FREQUENCY:		60 HZ			
SERVICE RATING:					
PHASE:		1PH	3PH	1PH	3PH
RATED KW:					
POWER FACTOR:		1.0	0.8	1.0	0.8
RATED KVA:					
12 CAPABILITY:					
CONNECTIONS:					
BATTERY:	VOLTS	AMPS		AMPS	
VDC	110/220				
	115/230				
	120/240				
ROTATING	110/190				
SPEED:	115/200				
1800RPM	120/208				
	127/220				
NOMINAL	139/240				
RATED	220/380				
	230/400				
	240/418				
	255/440				
	266/460				
FUEL:	277/480				
WIRING DIAGRAM:					

FIGURE 142. GENSET DATAPLATE AND CALIBRATION LABEL

If a pop-up message indicates that there is an error loading from the INCAL CD, either the CD drive letter was not correctly specified during InPower installation, or the CD is not installed or is defective. If the CD is in the CD drive, click on **Yes**, and specify the correct CD drive designation. If the CD is not in the drive, insert the CD and click on **No**.

The INCAL CD location can be verified by clicking on the **Port** menu and clicking on **Find InCal** ([Figure 143](#)). Select INCAL CD drive designation from the drop-down list, then click on **Verify INCAL Structure**. A popup message will verify the INCAL location ([Figure 144](#)).

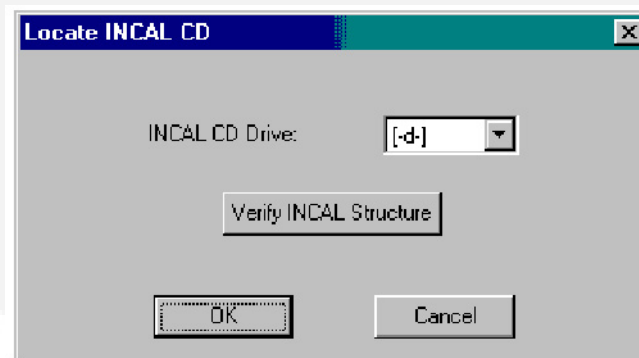


FIGURE 143. FIND INCAL



FIGURE 144. INCAL LOCATION FOUND

9.2.1 Selecting Calibration Part Number

The Select Calibration window (Figure 145) lists all of the calibration files that are available from the Power Generation INCAL CD. Also shown are the Engine Control Parts List (CPL) and Calibration Description.

Use the scroll bar to locate the Calibration Part Number that matches the calibration part number shown on the genset Calibration Label.

The data, displayed in each column, can be sorted in ascending or descending order by clicking on the column heading.

Click on the matching calibration part number to select it. When the matching calibration part number is selected, click on **Next**, to continue the Initial Calibration.

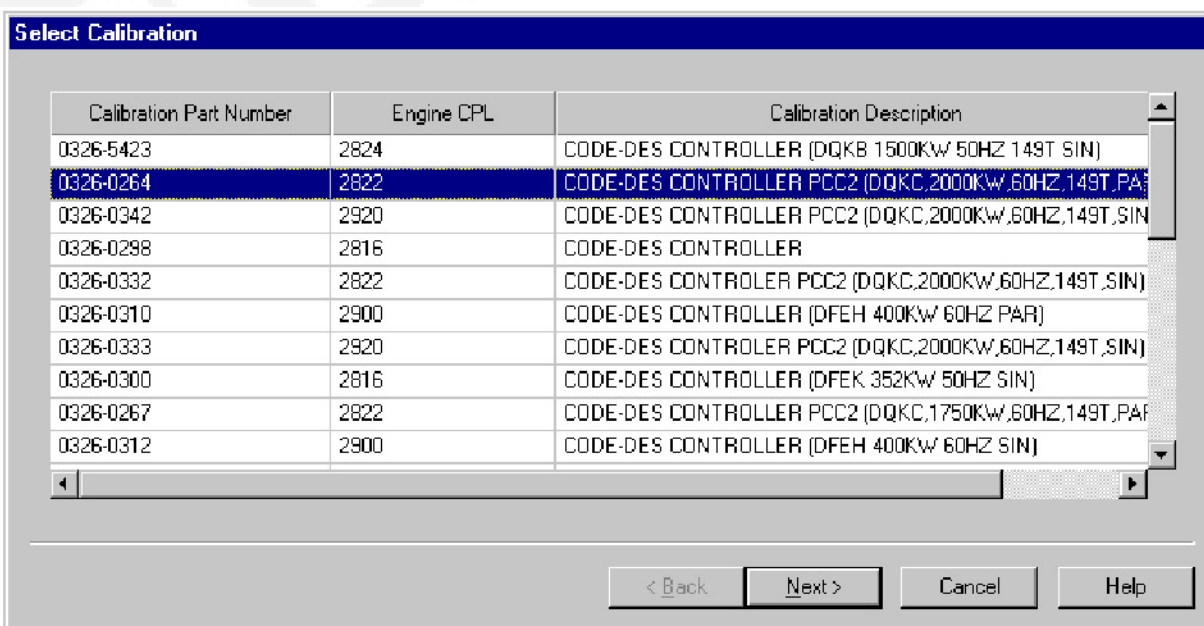


FIGURE 145. SELECT CALIBRATION

9.2.2 History

The History window is displayed after the calibration part number is selected. This feature displays the calibration file Revision History, Calibration File (part number) and Revision Description.

If this window displays a calibration file that does not match the calibration part number on the calibration label, click on the **Back** button to choose the correct calibration file.

If History displays the calibration file part number that was previously selected, click on the **Next** button to proceed to the Save and Restore Parameters feature.

9.2.3 Save and Restore Parameters

The Save and Restore Parameters window displays the Parameter Descriptions, Value, and Units of measure information ([Figure 147](#)).

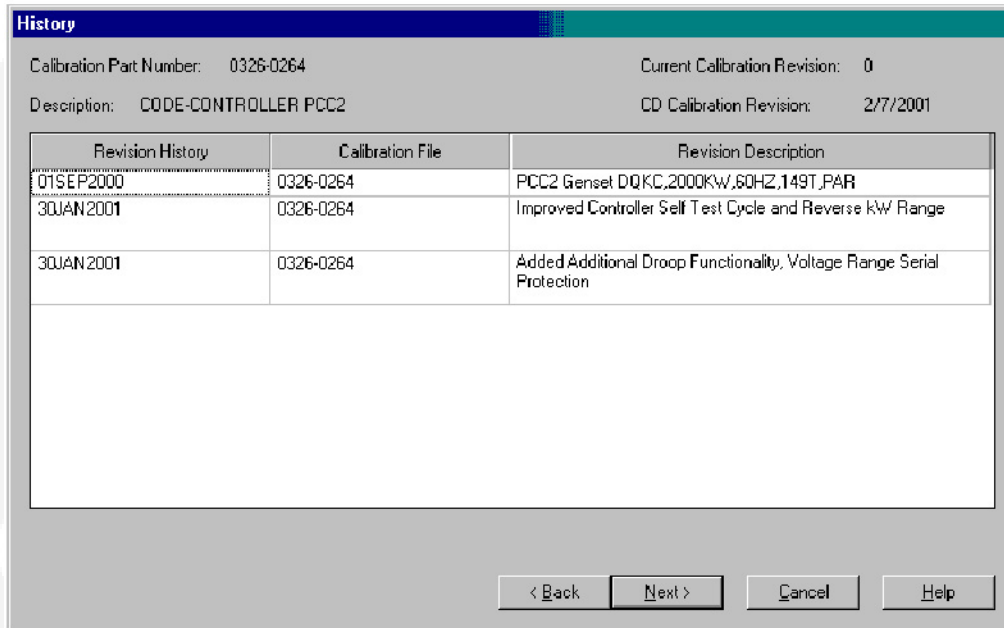


FIGURE 146. HISTORY

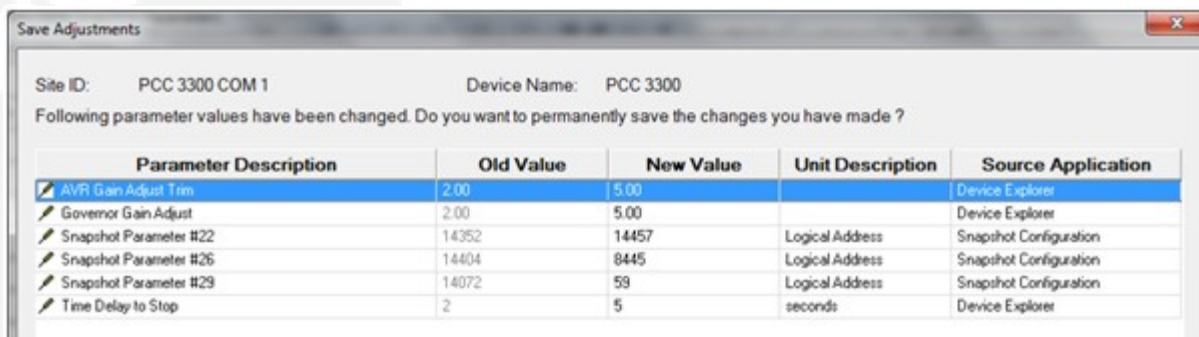


FIGURE 147. SAVE AND RESTORE PARAMETERS

9.2.4 Use Capture File Feature

Click on the **Set Data Plate From Capture File** button, in the Save and Restore Parameters window, to select the capture file created from the previous control (if available).

If using the Set Data Plate From Capture File button, browse to the Capture file location and select the file, then click on the **OK** button ([Figure 148](#)). Using a capture file, during an initial calibration, will only restore the dataplate information. To restore the remaining capture file parameter settings, click on the box next to the **Overlay Capture File After Calibration**. If this feature is not used, the capture can still be used after performing the initial calibration to overwrite the parameter settings.

The Save and Restore window will display the capture file name selected ([Figure 149](#)).

Verify that the information displayed in the parameter list matches the information shown on the genset, alternator and engine data tags. Use the scroll bar to review all of the information. If any information needs to be corrected, double click on the data and enter the correct information.



NOTE: If a capture file is not being used, the genset serial number and Engine CPL number *must* be entered.

After confirming that the correct information is displayed in the parameter list, click on the **Next** button.

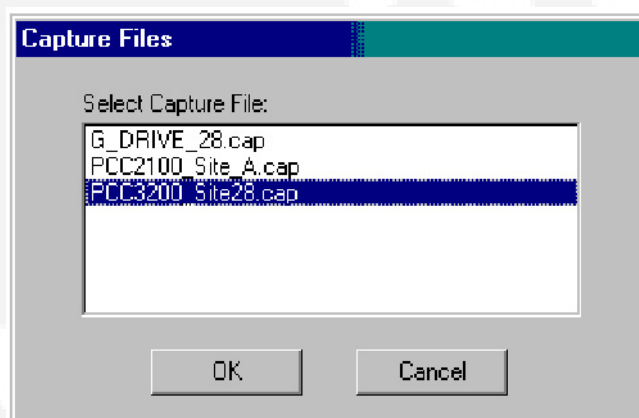


FIGURE 148. MAIN WINDOW

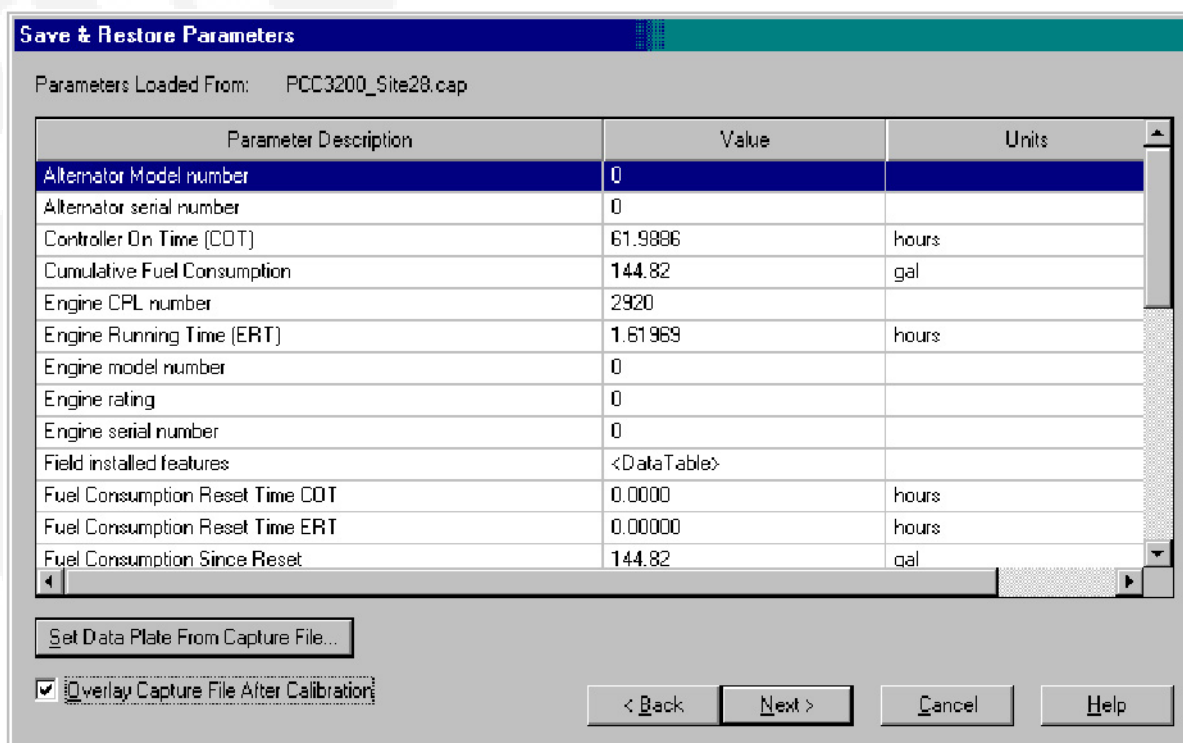


FIGURE 149. CAPTURE FILE SELECTED

9.2.5 Feature List

The Feature List window displays all of the feature part numbers that are available for the selected calibration file ([Figure 150](#)). This screen also displays the feature descriptions and a dialog for entering the dataplate checksum data from the calibration label.

Selected	Feature Number	Feature Description
<input type="checkbox"/>	3415090	CODE - DES FEATURE PCC2 (RECONNECTABLE DELTA)
<input type="checkbox"/>	3415091	CODE - DES FEATURE PCC2 (RECONNECTABLE WYE)
<input checked="" type="checkbox"/>	3415092	CODE - DES FEATURE PCC2 (PHASES - THREE)
<input type="checkbox"/>	3415093	CODE - DES FEATURE PCC2 (PHASES - SINGLE)
<input type="checkbox"/>	3415094	CODE - DES FEATURE PCC2 (FREQ - 50HZ)
<input checked="" type="checkbox"/>	3415095	CODE - DES FEATURE PCC2 (FREQ - 60HZ)
<input type="checkbox"/>	3415096	CODE - DES FEATURE PCC2 (CT RATIO 6250:1)
<input type="checkbox"/>	3415097	CODE - DES FEATURE PCC2 (CT RATIO 5750:1)
<input type="checkbox"/>	3415098	CODE - DES FEATURE PCC2 (CT RATIO 4000:1)

Dataplate Checksum:

< Back Finish Cancel Help

FIGURE 150. FEATURE LIST

Refer to the calibration label ([Figure 142](#)), located inside the control housing, for the list of features that were factory installed on this genset.

Click on the checkbox, next to each of the feature part numbers, that correspond to the feature part numbers on the calibration label.

Enter the Checksum data into the **Dataplate Checksum** dialog. The checksum data must be entered exactly as it appears on the calibration label (case sensitive). Click on the **Next** button to continue. **PCC 1300, PCC 1301, PCC 1302, PCC 2100, PCC2300, PCC3300, and MCM3320 applications do not use the checksum feature. Beginning with InPower v4.5 only PCC 3200/PCC 3201 controls require the checksum.**

If all of the information has been entered correctly, a popup window prompts the user with the question "Do you wish to calibrate the controller now?" ([Figure 151](#)). Click on the **Yes** button to continue.

If you receive an "Invalid Checksum" error message, check the calibration part number, the Save and Restore information, the Feature part numbers, and the Checksum. Use the **Back** button to navigate through the information. Make any necessary corrections, and reenter the checksum data exactly as it appears on the calibration label.



NOTE: The genset serial number and the checksum are case sensitive.

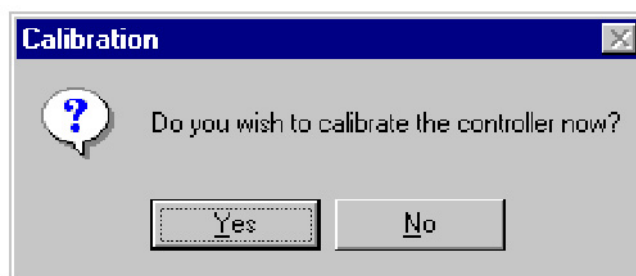


FIGURE 151. CALIBRATION POPUP

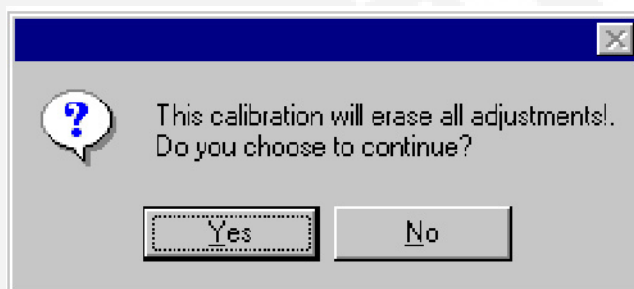


FIGURE 152. FEATURE LIST

A popup window informs the user that the calibration file download will erase all adjustments, and it prompts the user with the question "Do you choose to continue?" ([Figure 152](#)). Click on the **Yes** button, to begin the initial calibration download.



NOTE: Pop-up messages may be displayed behind an open window. To view all open windows, including popup messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

9.2.6 Calibration Download

The calibration file download may take 20 minutes or longer, depending on the service PC and the communication port.

During the download, it is normal operation for the genset control to display warnings. Do not hit the "**Fault Acknowledge**" button during the calibration file download, or the download may be interrupted.

When the download is complete, a final popup message informs the user if the download completed successfully. If the download completed successfully, click on the **OK** button to close the popup message. ([Figure 153](#)).

If the popup message indicates that the download was not successful, repeat the Initial Calibration procedure. If the download is still not successful, record the error message and contact service for help.



FIGURE 153. FEATURE LIST

If a "Breaker Fail to Open" fault message is displayed, after the initial calibration, change the breaker position input to the control from a Form "B" contact to a form "A" contact. After making this change, acknowledge the fault first with the operator interface panel, and then with InPower.

If the genset is part of a utility paralleling system, the utility breaker position input should also be changed to a form "A" contact, before operating the system.

9.2.7 Correcting a Corrupted Calibration of a Control

Loss of power or a disconnection during initial calibration can result in the control's memory being corrupted. If this occurs, an error message is displayed when attempting to **Connect** to the corrupted control with InPower.



NOTE: Below is the connection error message that is displayed for a PCC1302. A similar error messages is displayed for all controls that support this feature, including: PCC1302, PCC2100, PCC3200, PCC3201, PCC2300, PC3300, PS0500, MPC3300, HMI112, HMI114, HMI211, HMI211R, HMI211RS, HMI400, HMI3320, HMECM, AUX107, and AUX101LBNG.

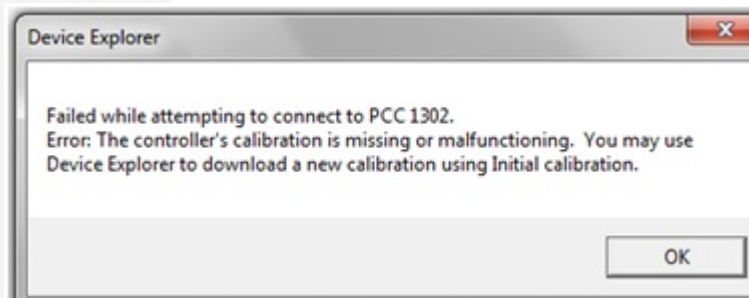


FIGURE 154. CONNECTION ERROR MESSAGE FOR A PCC1302

To recover the corrupted control, use the control's **Initial Calibration** menu selection. After the control has been calibrated, use the **Connect** command to verify that the control has been recovered.



NOTE: The following figure shows the Initial Calibration and Connect commands for the PCC1302. These commands are also available for the other controls that support this feature.

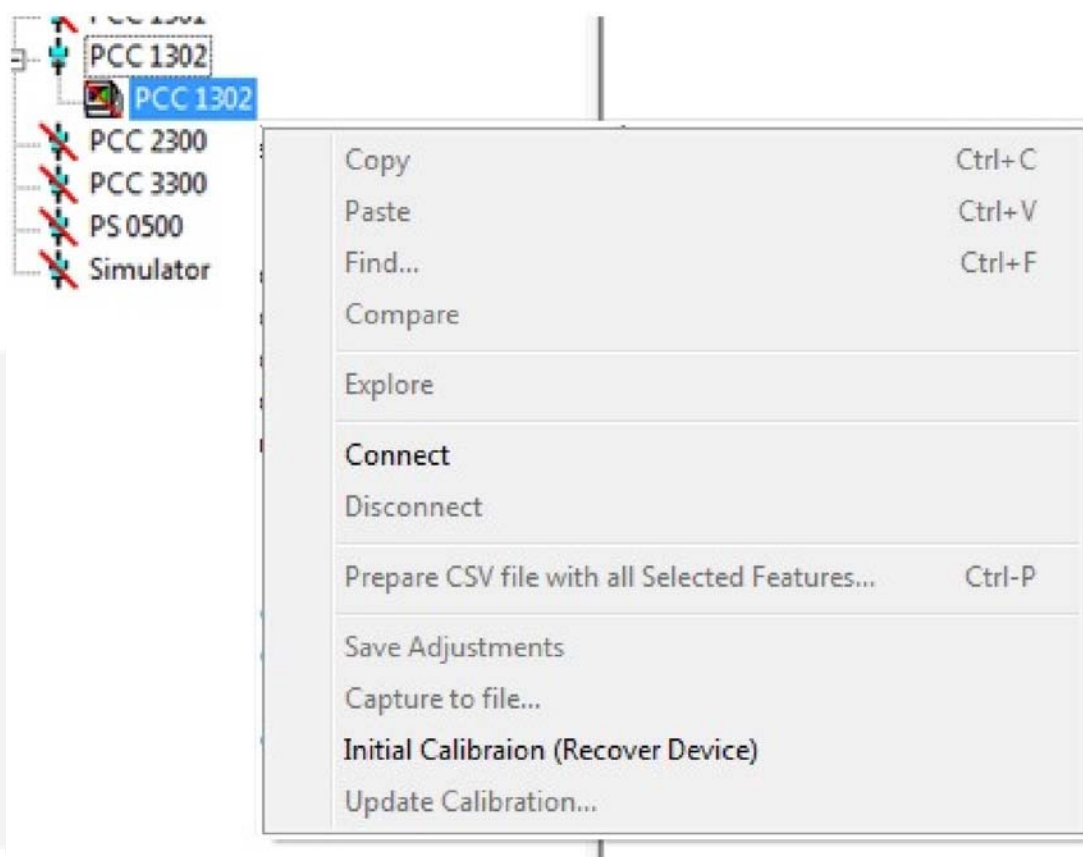


FIGURE 155. INITIAL CALIBRATION MENU SELECTION FOR A PCC1302

9.2.8 Correcting a Corrupted Calibration of a AMMPS or BEAR Control

Loss of power or a disconnection during initial calibration can result in the control's memory being corrupted. If this occurs, an error message is displayed when attempting to **Connect** to the corrupted control with InPower.

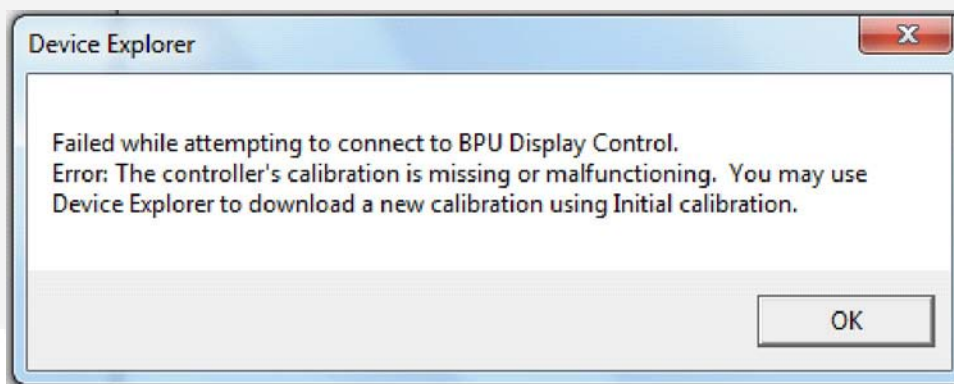


FIGURE 156. CONNECTION ERROR MESSAGE

To recover the corrupted control, use the control's **Initial Calibration** menu selection. After the control has been calibrated, use the **Connect** command to verify that the control has been recovered.

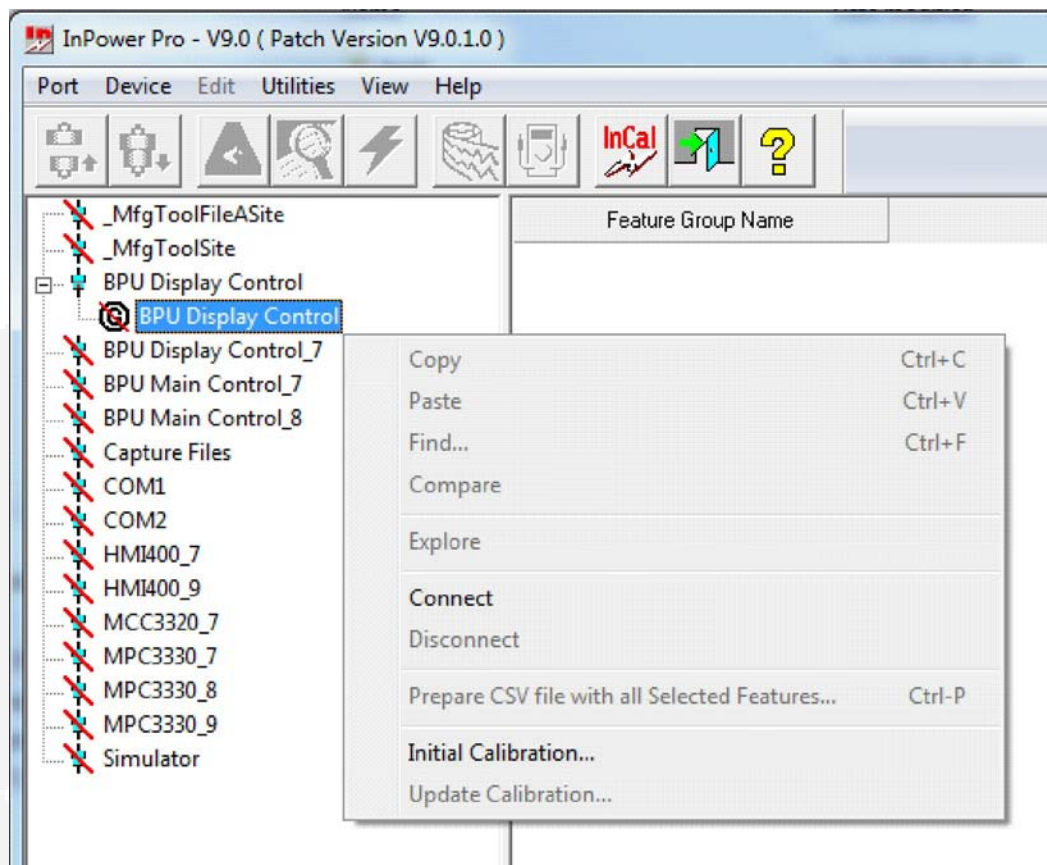


FIGURE 157. INITIAL CALIBRATION MENU SELECTION

9.2.9 Correcting a Corrupted Calibration of an HMI

Loss of power or a disconnection during initial calibration can result in the HMI's controller memory being corrupted. If this occurs, an error message is displayed when attempting to **Connect** to the corrupted HMI with InPower.



NOTE: Below is the connection error message that is displayed for a HMI320. A similar error messages is displayed for the other HMIs that support this feature, including: HMI220 and HMI321.

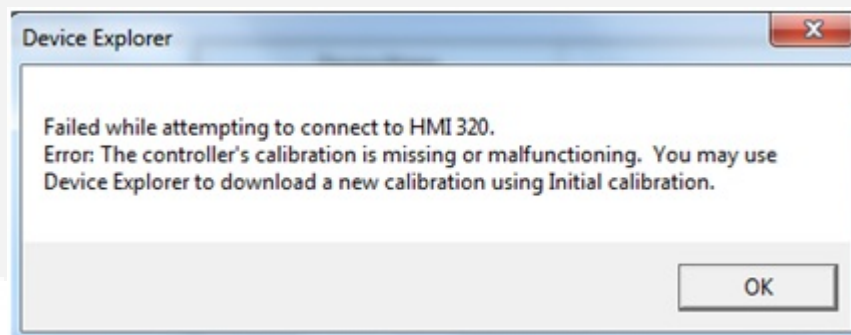


FIGURE 158. CONNECTION ERROR MESSAGE FOR AN HMI320

To recover the corrupted control, use the HMI's **Initial Calibration** menu selection. After the HMI has been calibrated, use the **Connect** command to verify that the HMI has been recovered.



NOTE: The following figure shows the Initial Calibration and Connect commands for the HMI320. These commands are also available for the other HMIs that support this feature.

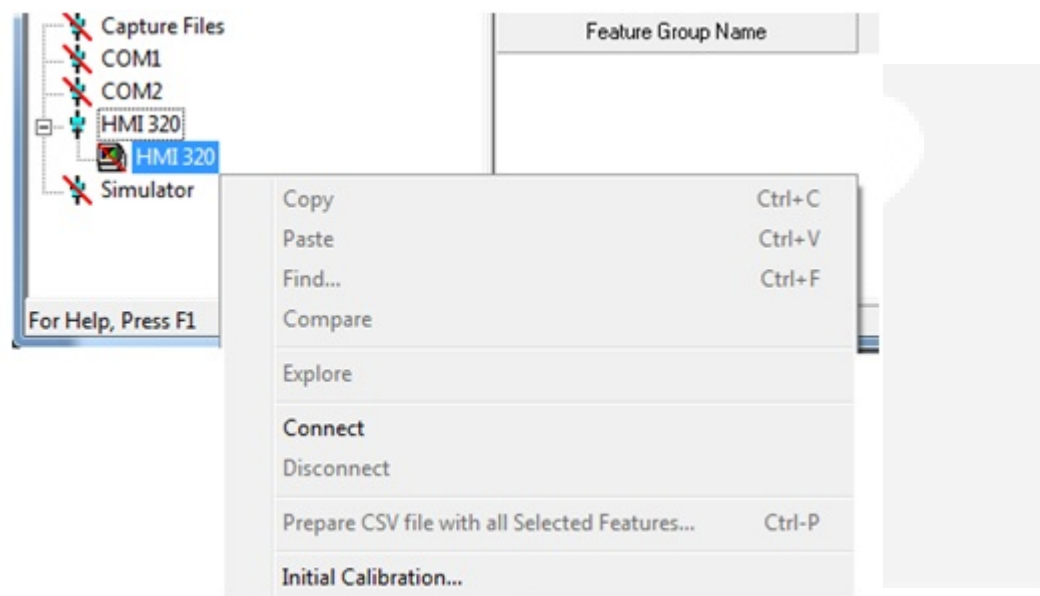


FIGURE 159. INITIAL CALIBRATION MENU SELECTION FOR AN HMI320

9.3 Writing Adjustments From a Capture File

If a capture file was made prior to the control being replaced, and the **Overlay Capture File After Calibration** feature was not used, the capture file can still be used after performing the initial calibration. The previous parameter adjustments and settings, stored in the capture file, can be written to the new control (device).

The Capture file feature is not applicable to the PCC 1100.

9.4 Final Adjustments

Prepare to start the genset and test the operation of the entire system. Refer to the genset service manual for adjustment procedures and observe all safety precautions described in the genset service manual.

After completing all necessary adjustments, make a new capture file. Store a copy of the capture file at the site and return a copy to Service for cataloging.

10 Update Calibration for Commercial Gensets

10.1 About Update Calibration

The Update Calibration feature is used to replace a current calibration file with a newer version from the Power Generation INCAL CD or downloaded from the CPG InCal website. The new calibration file is written over the current calibration file in the genset baseboard.

Calibration updates are performed at the site, using InPower. This section covers the procedures for performing Update Calibration for commercial gensets.

Starting with version 5.5, InPower calibration files for commercial and consumer controllers can be downloaded from the InCal CD or from the CPG InCal website.

10.2 Update Calibration

After connecting to the device, click on the **Device** menu and click on **Update Calibration** ([Figure 160](#)). If prompted to select between G-Drive and Genset applications, select **Genset**, then select **Next**.

If prompted with the message, "Could not find a matching Calibration Part Number ...," click on the **OK** button. Use the Initial Calibration feature to update the calibration file.

After selecting **Update Calibration**, the History window is displayed.

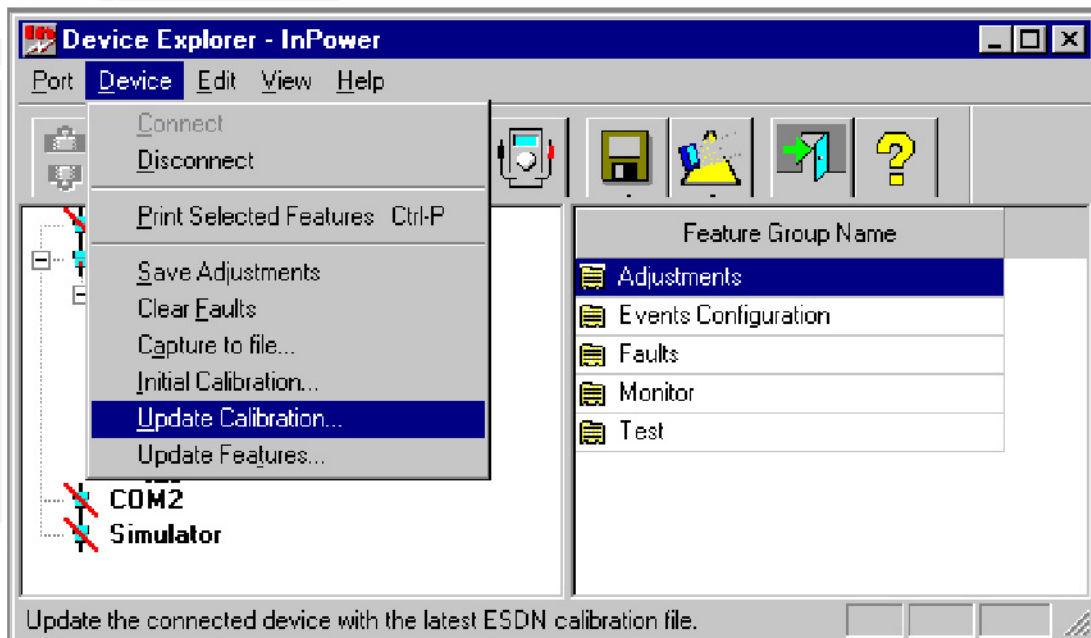


FIGURE 160. UPDATE - DEVICE MENU

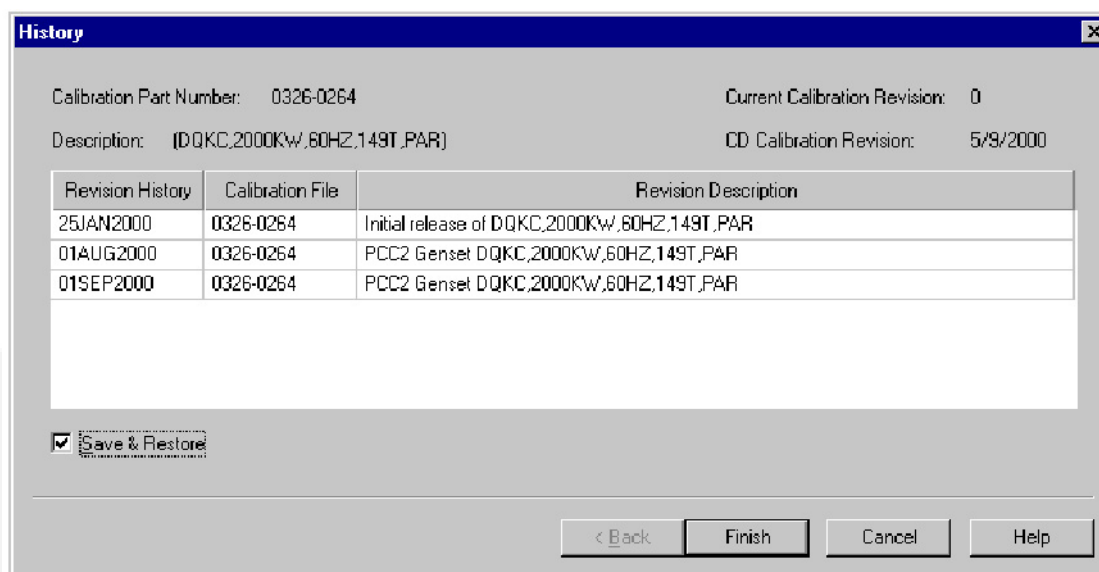


FIGURE 161. HISTORY

10.2.1 History

The History window displays information about the currently installed calibration part number and calibration revision across the top of the window ([Figure 161](#)).

The History window also displays information, from the Power Generation INCAL CD, about the Revision History, Calibration File part number and Revision Description.

The **Save and Restore** checkbox is used to save the current adjustment trims and settings. Make sure the checkbox is enabled (checked) before proceeding.

Click on the **Finish** button to proceed with the calibration update.

If a newer calibration is available with INCAL, a popup window prompts the user with the question "Do you wish to calibrate the controller now?" ([Figure 162](#)). Click on the **Yes** button to continue.



NOTE: Pop-up messages may be displayed behind an open window. To view all open windows, including popup messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

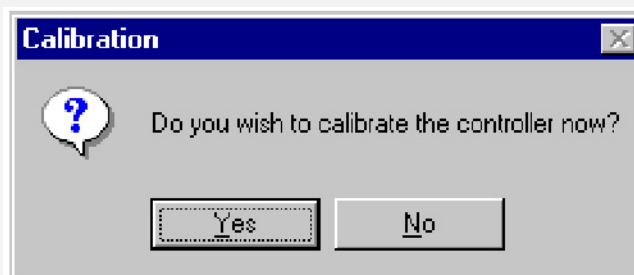


FIGURE 162. UPDATE NOW

When the download is complete, a popup message informs the user if the download completed successfully ([Figure 163](#)). Click on the **OK** button to acknowledge.

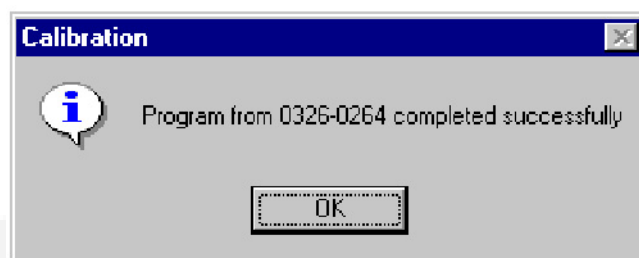


FIGURE 163. COMPLETED

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11 PCC Operator Panel Updates

11.1 About Genset Operator Panel Updates

The Operator Panel Updates feature is used to download new software into a PCC 3200 generator set Operator Panel or a PCC 1100 Operator Panel. This section covers the procedures for performing an Operator Panel Update. (PCC 2100, PCC 1300, PCC 1301, PCC 1302, PCC 2300, PCC 3300, and MCM3320 Operator Panel updates are written through the initial or update calibration procedure.)

11.2 Operator Panel Update

Start InPower and connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC being used for the operator panel connection. The available COM ports are displayed in the Device Explorer directory (left pane). Double click on the COM port (or click on the COM port and then click on the **Connect** button, on the toolbar).

Select the device (**OPANEL**), by clicking on it. Device Explorer displays the features that are available for gensets [Figure 164](#).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration** ([Figure 165](#)).

After selecting **Initial Calibration**, the Select Calibration window is displayed.



FIGURE 164. MAIN WINDOW

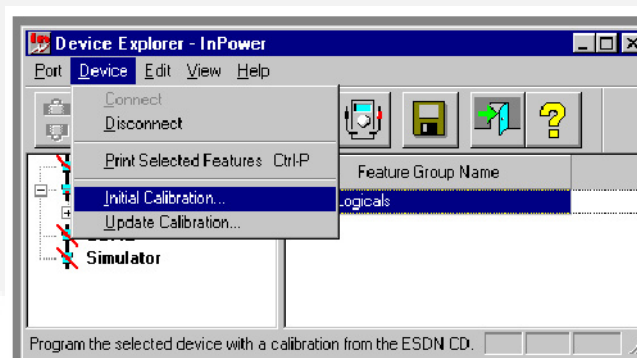


FIGURE 165. OPERATOR PANEL

11.2.1 Selecting Calibration Part Number

The Select Calibration window ([Figure 166](#)) displays the calibration part numbers that are available from the Power Generation INCAL CD.

This feature is normally used to update the operator panel firmware (RTOP), also known as the application code. Updating the RTOP file will be described in this section.

The display operating system software (BATS), also known as bootloader code, generally does not need to be updated.

The Engine Control Parts List (CPL), shown in this window, is not applicable.

Click on the desired RTOP Calibration Part Number, then click on **Next**, to continue the Operator Panel Update.

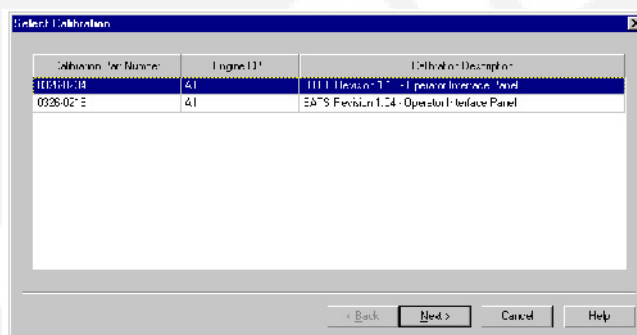


FIGURE 166. SELECT CALIBRATION

11.2.2 History

The History window displays information about the currently installed calibration part number and calibration revision across the top of the window ([Figure 167](#)).

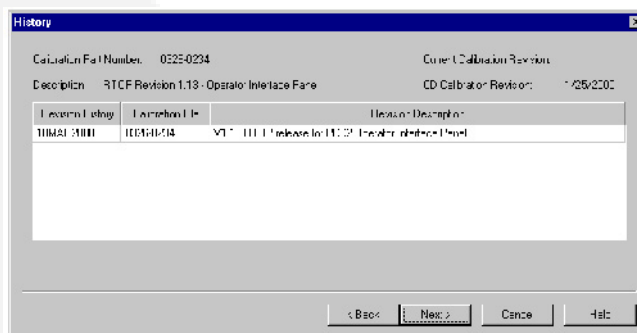


FIGURE 167. HISTORY WINDOW

The History window also displays information, from the Power Generation INCAL CD, about the Revision History, Calibration File part number and Revision Description. Click on the **Next** button to proceed with the Operator Panel Update.

The Save and Restore window is displayed next. This feature is not used, click on the **Next** button to proceed.

The Feature List window is displayed next and this feature also is not used, click on the **Finish** button.

If a newer calibration file is available with INCAL, a popup window prompts the user with the question "Do you wish to calibrate the controller now?" ([Figure 168](#)). Click on the **Yes** button to continue.



NOTE: Pop-up messages may be displayed behind an open window. To view all open windows, including pop-up messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

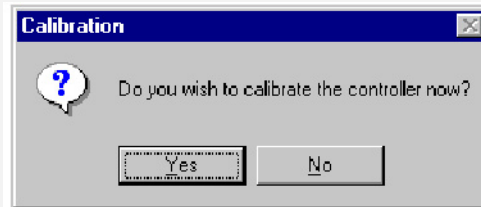


FIGURE 168. UPDATE NOW

11.2.3 During Download

During the download procedure, the current BATS file software version is displayed in the genset operator display panel. This is normal operation, do not confuse this with the RTOP version that is being downloaded in the background with InPower.

When the download process completes, a popup message displays the INCAL file path and informs the user if the download completed successfully ([Figure 169](#)). Click on the **OK** button to acknowledge.



FIGURE 169. COMPLETED FROM INCAL PATH

A second pop-up message confirms that the download completed successfully ([Figure 170](#)). Click on the **OK** button to acknowledge.

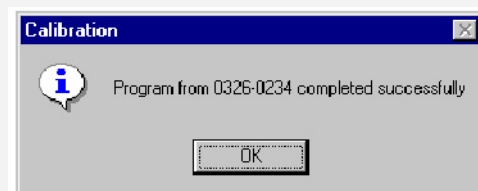


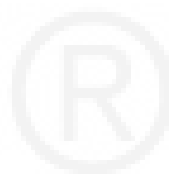
FIGURE 170. DOWNLOAD COMPLETED

If a pop-up messages indicate that the download was not successful, repeat the Initial Calibration procedure. If the download was still not successful, record any error messages and contact service for help.

11.3 Final Check

The results of the RTOP file download can be viewed in the genset operator display panel (if equipped). View the History - About screen, to see the currently installed RTOP software version.

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12 Initial Calibration for Consumer Products

12.1 About Initial Calibration

The Initial Calibration feature is used to download a calibration file into a corrupt control that will not respond to an Update Calibration. An Update Calibration should be used whenever possible. Initial Calibration should be used as a recovery method only. This section covers the procedures for performing an Initial Calibration for consumer products.

Starting with version 5.5, InPower calibration files for commercial and consumer controllers can be downloaded from the CPG InCal website.

12.2 Initial Calibration

Use of a Capture File can reduce the amount of adjustment that may be required when replacing the base board. If the old base board is operational, and a capture file has not already been created, correct any active faults (if possible).

Connect the interface wiring harness from the service PC to the device.

Connect to the port by double clicking on the port that matches the COM port on the service PC being used for the genset connection (COM1, COM2, etc.) or the Site Setup. The available COM ports are displayed in the Device Explorer directory (left pane).



NOTE: Initial Calibration and Update Calibration are only available with a physical connection type (MON protocol). Calibration is not available via MONnet or through network site connections.

Select the device by clicking on it ([Figure 171](#)).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration** ([Figure 172](#)).

InCal calibration files are available at <http://www.cumminspower.com>.

Refer to the genset engine label for the calibration part number ([Figure 173](#)). The model family is needed to select the correct calibration.

If a pop-up message is displayed, indicating that there is an error loading INCAL, the disk drive letter was not correctly specified during InPower installation. Click on **Yes**, and specify the correct CD drive designation.

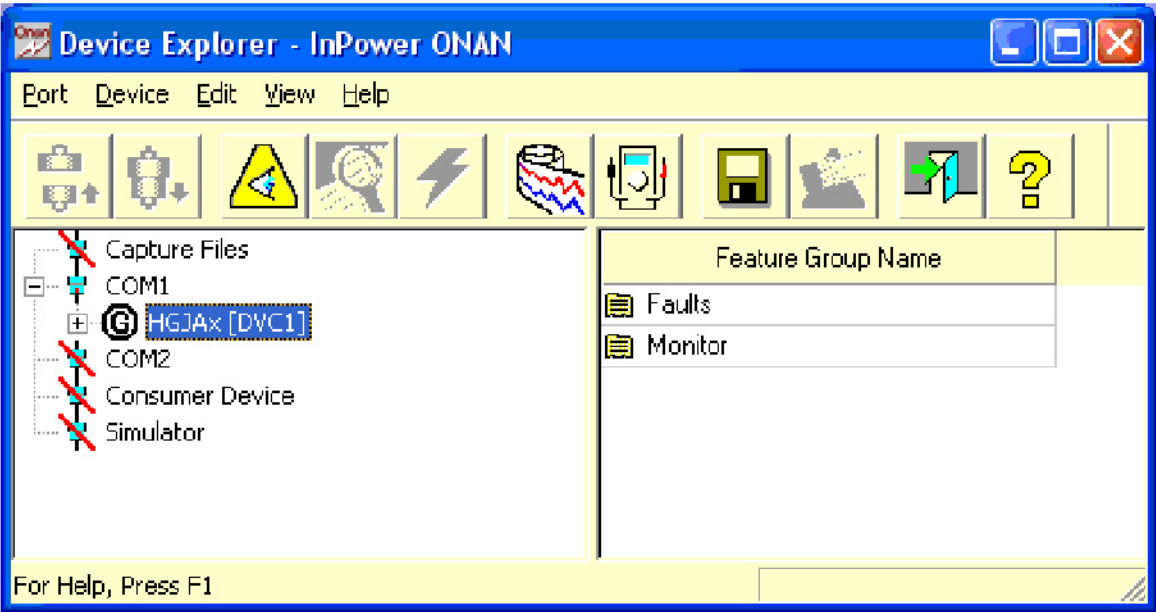


FIGURE 171. MAIN WINDOW

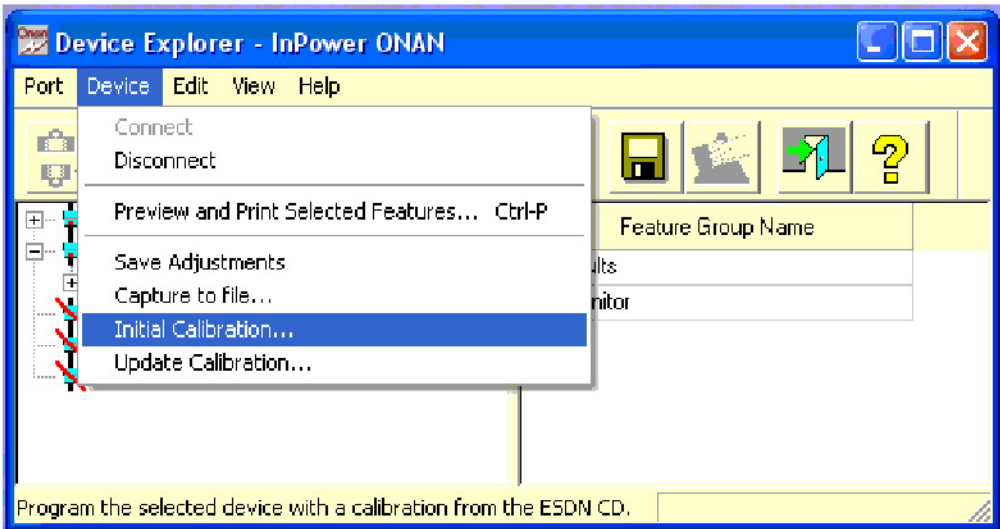


FIGURE 172. MAIN WINDOW

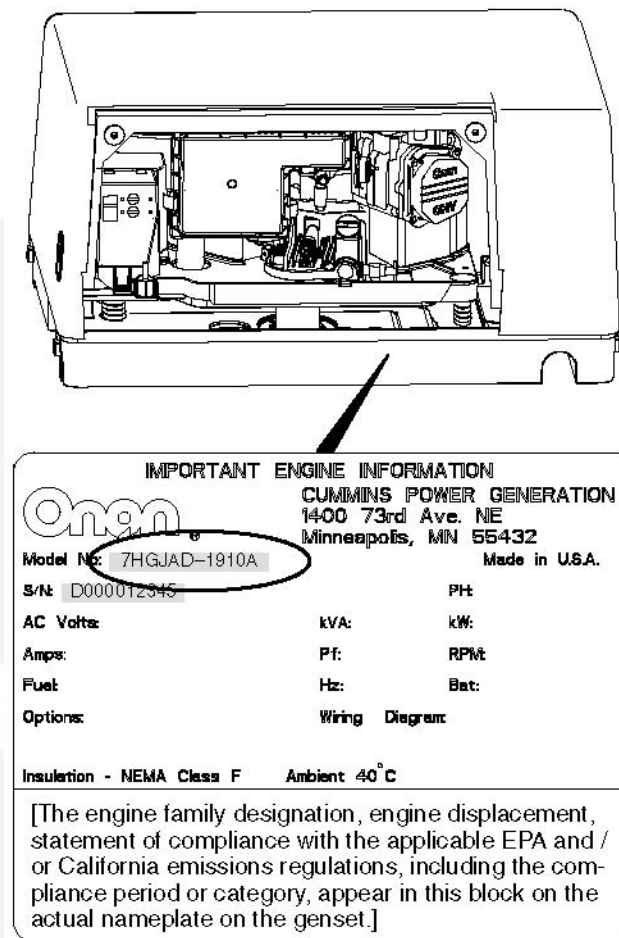


FIGURE 173. GENSET DATAPLATE AND CALIBRATION LABEL

The INCAL CD location can be verified by clicking on the **Port** menu and clicking on **Find INCAL** (Figure 174). Select INCAL CD drive designation from the drop-down list, then click on **Verify INCAL Structure**. A pop-up message will verify the INCAL location (Figure 175).

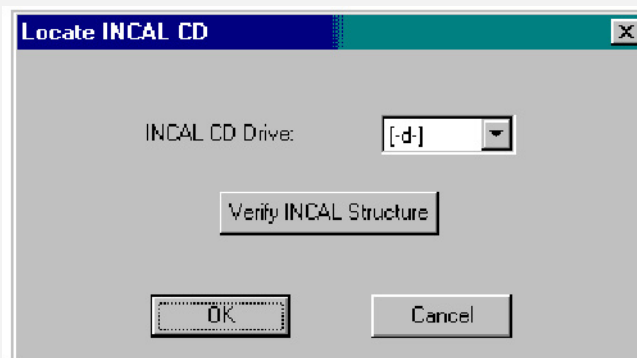


FIGURE 174. FIND INCAL



FIGURE 175. INCAL LOCATION FOUND

12.2.1 Selecting Calibration Part Number

The Select Calibration window ([Figure 176](#)) lists all of the calibration files that are available from the Power Generation INCAL CD.

Use the scroll bar to locate the Calibration model that matches the model shown on the genset engine label ([Figure 173](#)).

The data, displayed in each column, can be sorted in ascending or descending order by clicking on the column heading.

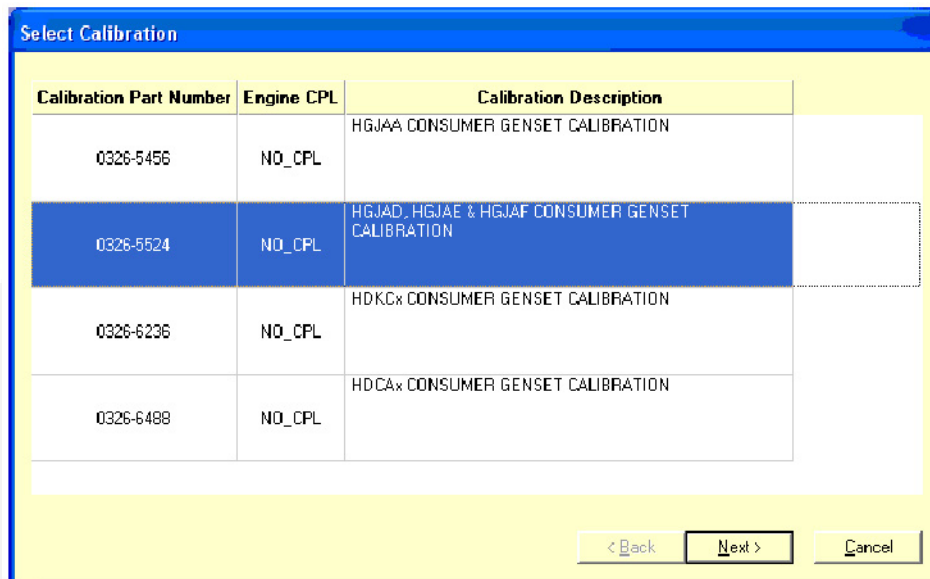
Click on the matching calibration part number to select it. When the matching calibration part number for the genset model is selected, click on **Next**, to continue the Initial Calibration.

12.2.2 History

The History window is displayed when the **NEXT** button is selected ([Figure 177](#)). This feature displays the calibration file Revision History, Calibration File (part number) and Revision Description.

If this window displays a calibration file that does not match the model listed on the genset engine label, click on the **Back** button to choose the correct calibration file.

If History displays the calibration file part number that was previously selected, click on the **Next** button to proceed to the Save and Restore Parameters feature.

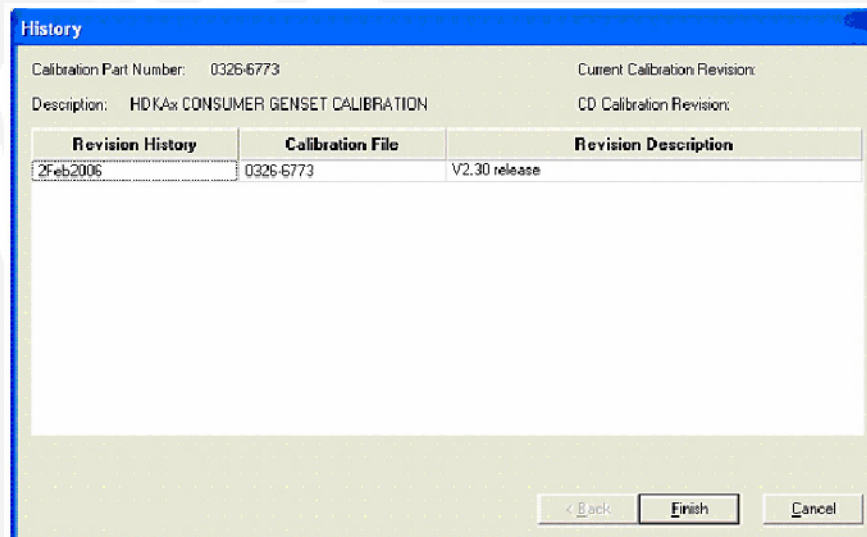


Select Calibration

Calibration Part Number	Engine CPL	Calibration Description
0326-5456	NO_CPL	HGJAA CONSUMER GENSET CALIBRATION
0326-5524	NO_CPL	HGJAD, HGJAE & HGJAF CONSUMER GENSET CALIBRATION
0326-6236	NO_CPL	HDKCx CONSUMER GENSET CALIBRATION
0326-6488	NO_CPL	HDCAx CONSUMER GENSET CALIBRATION

< Back Next > Cancel

FIGURE 176. SELECT CALIBRATION



History

Calibration Part Number: 0326-6773 Current Calibration Revision:

Description: HDKAx CONSUMER GENSET CALIBRATION CD Calibration Revision:

Revision History	Calibration File	Revision Description
2Feb2006	0326-6773	V2.30 release

< Back Finish Cancel

FIGURE 177. HISTORY

12.2.3 Save and Restore Parameters

The Save and Restore Parameters window displays the Parameter Descriptions, Values, and Units of measure information ([Figure 179](#)).

12.2.4 Use Capture File Feature

From the Save and Restore Parameters window, click on the **Set Data Plate From Capture File** button to select the capture file created from the previous control (if available).

If using the Set Data Plate From Capture File button, browse to the Capture file location and select the file, then click on the **OK** button ([Figure 178](#)). Using a capture file, during an initial calibration, will only restore the dataplate information. To restore the remaining capture file parameter settings, click on the box next to the **Overlay Capture File After Calibration**. If this feature is not used, the capture file can still be used after performing the initial calibration to overwrite the parameter settings. This is not recommended because user data will be cleared during the download.

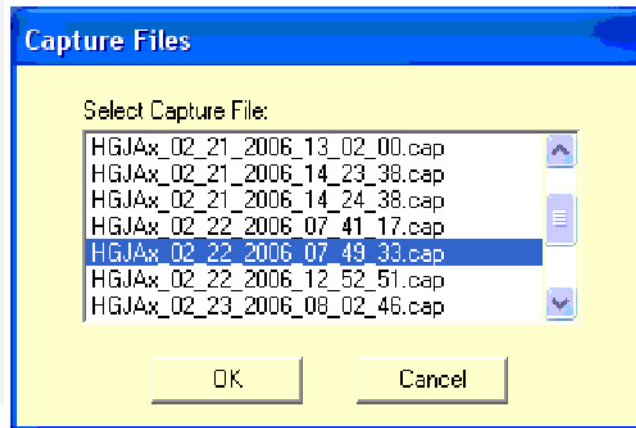


FIGURE 178. SELECTING A CAPTURE FILE

The Save and Restore window will display the capture file name selected ([Figure 180](#)).

Verify that the information displayed in the parameter list matches the information shown on the genset, alternator and engine data tags. Use the scroll bar to review all of the information. If any information needs to be corrected, double click on the data and enter the correct information.

After confirming that the correct information is displayed in the parameter list, click on the **Next** button.

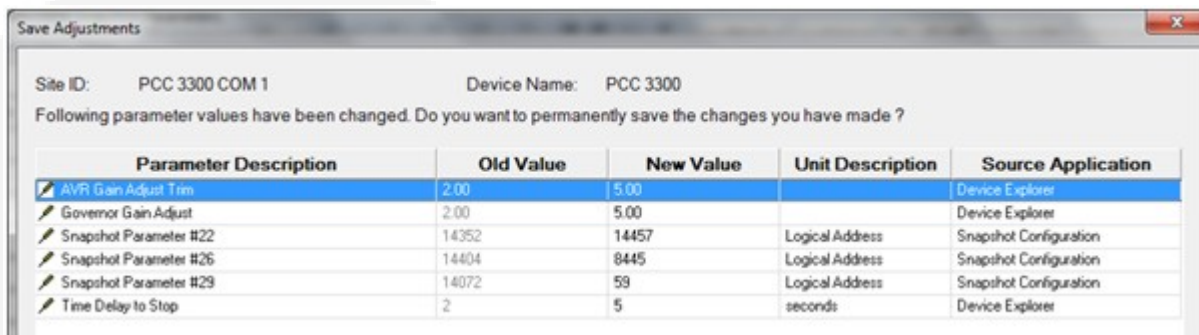


FIGURE 179. SAVE AND RESTORE PARAMETERS

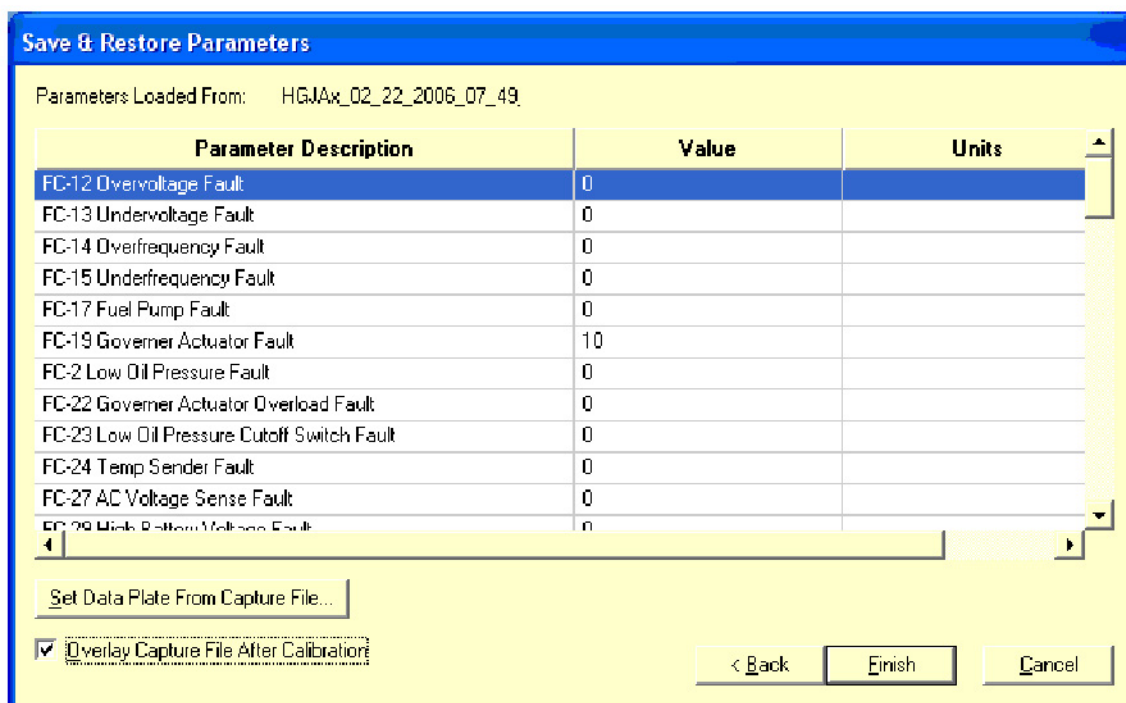


FIGURE 180. CAPTURE FILE SELECTED

12.2.5 Calibration Download

The calibration file download may take a few minutes or longer, depending on the service PC and the communication port.

When the download is complete, a final pop-up message informs the user if the download completed successfully. If the download completed successfully, click on the **OK** button to close the pop-up message. (Figure 181).

If the pop-up message indicates that the download was not successful, repeat the Initial Calibration procedure. If the download is still not successful, record the error message and contact service for help.

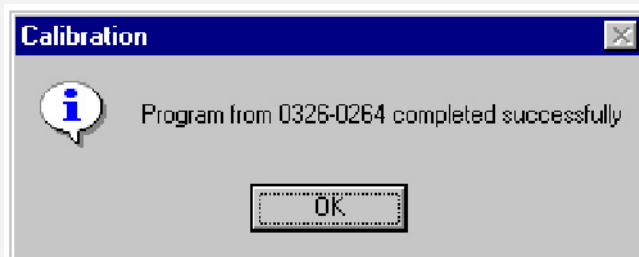


FIGURE 181. FEATURE LIST

12.3 Writing Adjustments From a Capture File

If a capture file was made prior to the control being replaced, and the **Overlay Capture File After Calibration** feature was not used, the capture file can still be used after performing the initial calibration. The previous parameter adjustments and settings, stored in the capture file, can be written to the new control (device).



NOTE: Read only information cannot be written to when overlaying a capture file.

12.4 Final Adjustments

Prepare to start the genset and test the operation of the entire system. Refer to the genset service manual for adjustment procedures and observe all safety precautions described in the genset service manual.

After completing all necessary adjustments, make a new capture file. Store a copy of the capture file at the site and return a copy to Service for cataloging.

13 Update Calibration for Consumer Products

13.1 About Update Calibration

The Update Calibration feature is used to replace a current calibration file with a newer version from the Power Generation INCAL web site. The new calibration file is written over the current calibration file in the genset baseboard. This section covers the procedures for performing Update Calibration for consumer products.



NOTE: Initial Calibration and Update Calibration are only available with a physical connection type (MON protocol).

Starting with version 5.5, InPower calibration files for commercial and consumer controllers can be downloaded from the InCal CD or from the CPG InCal website.

Calibration updates are performed at the site, using InPower. This section describes the procedures for performing Update Calibration.



NOTE: InPower calibration fails if the InCal CD is being accessed from a shared drive.

13.2 Update Calibration

After connecting to the device, click on the **Device** menu and click on **Update Calibration** (Figure 182).

If prompted with the message, "Could not find a matching Calibration Part Number ...," click on the **OK** button. Use the Initial Calibration feature to update the calibration file.

After selecting **Update Calibration**, the History window is displayed.

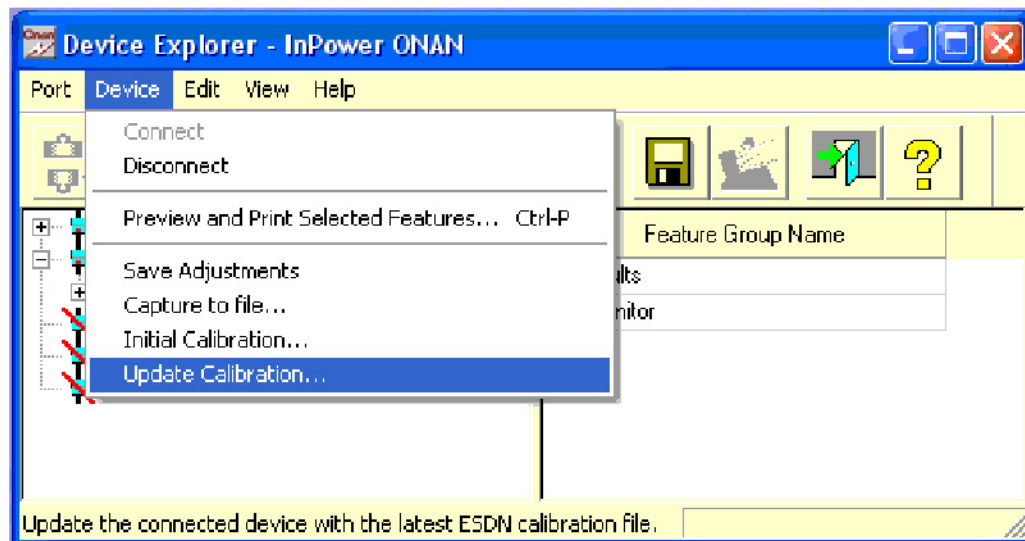


FIGURE 182. UPDATE - DEVICE MENU

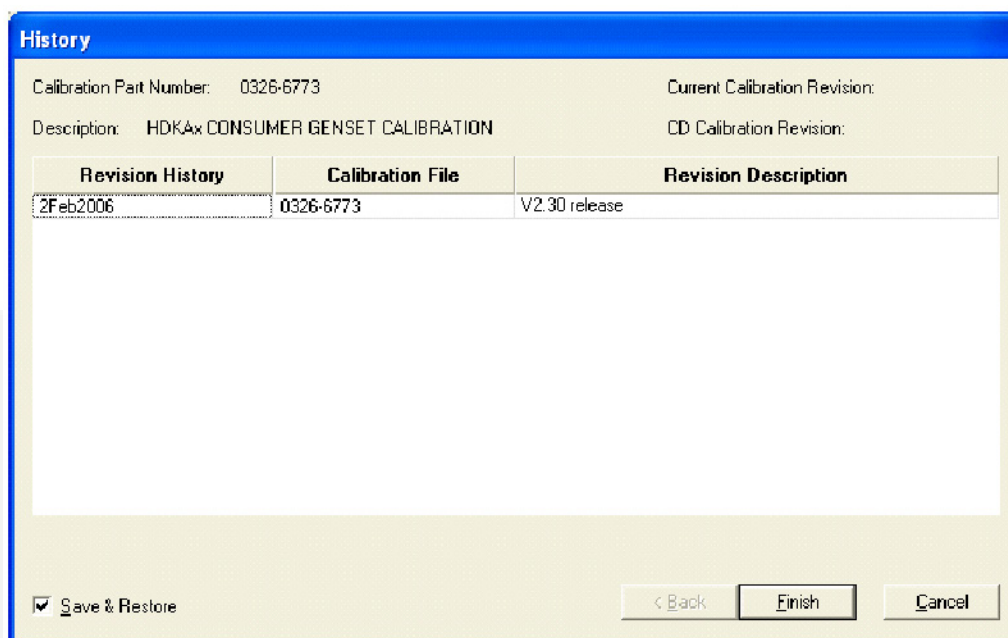


FIGURE 183. HISTORY

13.2.1 History

The History window displays information about the currently installed calibration part number and calibration revision across the top of the window (Figure 183).

The History window also displays information, from the Power Generation INCAL CD, about the Revision History, Calibration File part number and Revision Description.

The **Save and Restore** checkbox is used to save the current adjustment trims and settings. Make sure the checkbox is enabled (checked) before proceeding.

Click on the **Finish** button to proceed with the calibration update.

The message "Do you wish to calibrate the controller now?" is displayed. (Figure 184). Click on the **Yes** button to continue.



NOTE: Pop-up messages may be displayed behind an open window. To view all open windows, including pop-up messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

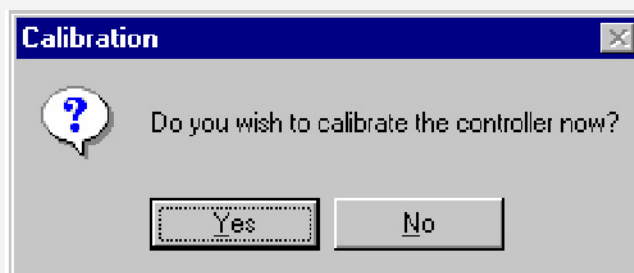


FIGURE 184. UPDATE NOW

When the download is complete, a popup message informs the user if the download completed successfully (Figure 185). Click on the **OK** button to acknowledge.

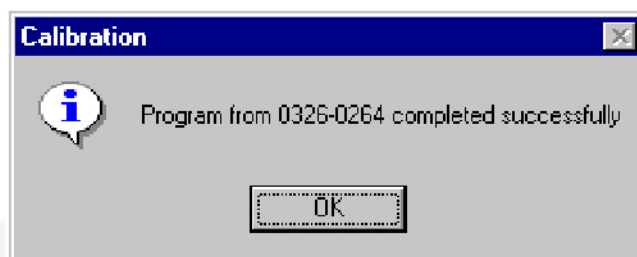
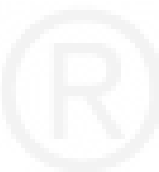


FIGURE 185. COMPLETED

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14 Initial Calibration for ATS

14.1 About Initial Calibration

The Initial Calibration feature is used to download a calibration file into a service replacement Automatic Transfer Switch (ATS) control (Digital Module). This section covers the procedures for performing an Initial Calibration on a replacement Digital Module.



WARNING: *AC power within the cabinet and the rear side of cabinet door present a shock hazard that can cause severe personal injury or death. Use extreme caution to avoid touching electrical contacts with hair, clothing, tools or body. Do not wear jewelry. Stand on a rubber mat or dry wood platform. The following procedures are to be performed by trained and experienced personnel only.*

14.2 Initial Calibration

Use of a Capture File can reduce the amount of adjustment that may be required when replacing the Digital Module. If the original Digital Module is operational, and a capture file has not already been created, correct any active faults (if possible). Then, create a capture file.

Refer to the ATS service manual for control replacement procedures. Before replacing the control, remove power from the battery charger, if equipped, and remove power from the ATS control.

Complete all necessary service replacement procedures and power the control. Reconnect power to the battery charger, if applicable.

Connect the serial communication cable from the service PC to the Digital Module.

Start InPower and launch the Alarm Pop-up Window by clicking on the firecracker icon, located on the lower right corner of the Windows status bar. Click on the Alarm Pop-up **Options** menu, then click on **AutoAnnounce** to deselect (uncheck) it. Disabling this feature prevents nuisance alarms during the calibration download.

Connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC being used for the ATS connection. The available COM ports are displayed in the Device Explorer directory (left pane). Double click on the COM port (or click on the COM port and then click on the **Connect** button, on the toolbar).

Select the device (ATS) by clicking on it. Device Explorer displays the features that are available for the ATS ([Figure 186](#)).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration** ([Figure 187](#)).

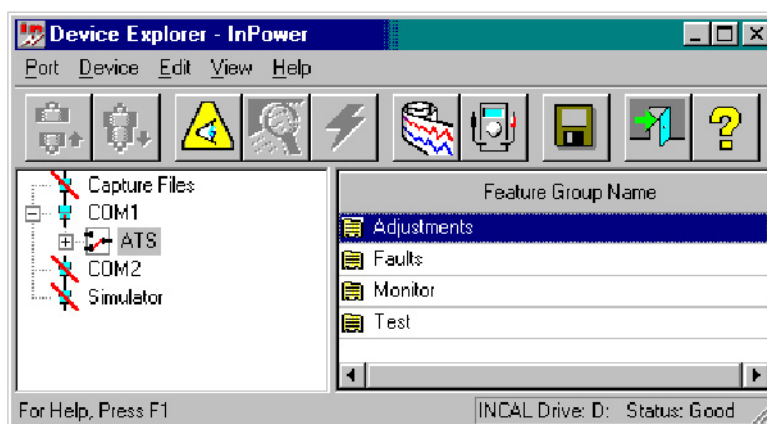


FIGURE 186. MAIN WINDOW

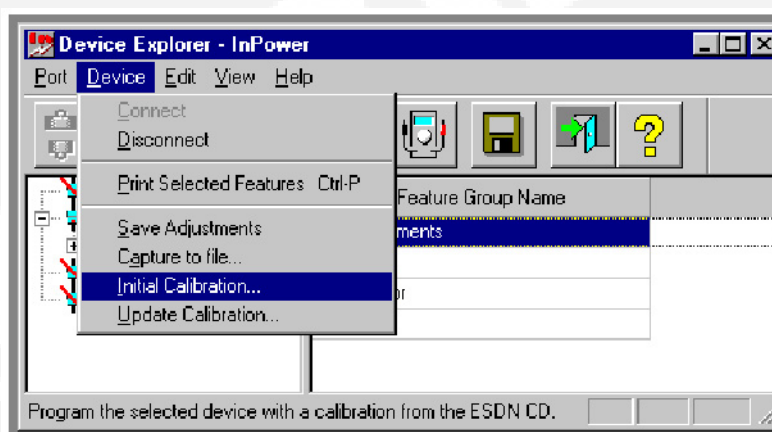


FIGURE 187. MAIN WINDOW

14.2.1 Selecting Calibration Part Number

The Select Calibration window is displayed ([Figure 188](#)). This feature lists all of the calibration files that are available from the Power Generation INCAL CD. Also shown are the Engine parts list reference number (not applicable to ATS applications) and Calibration Description.

Click on this calibration part number to select it. Click on **Next**, to continue the Initial Calibration.

Future ATS models may have more than one calibration part number. When more than one number is available, it will necessary to look at the ATS dataplate to locate the Calibration Part Number.

14.2.2 History

The History window is displayed after the Calibration Part Number is selected ([Figure 189](#)). This feature displays the Revision History, Calibration File (part number) and Revision Description.

If this window displays the wrong calibration file, click on the **Back** button to choose the correct Calibration File.

If this window is blank, or if it displays the desired Calibration File part number, click on the **Next** button to proceed to the Feature List.

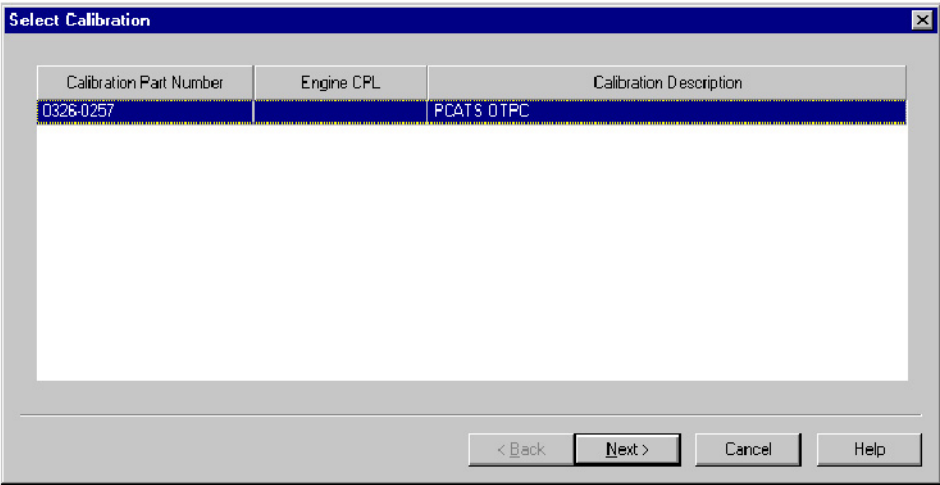


FIGURE 188. SELECT CALIBRATION

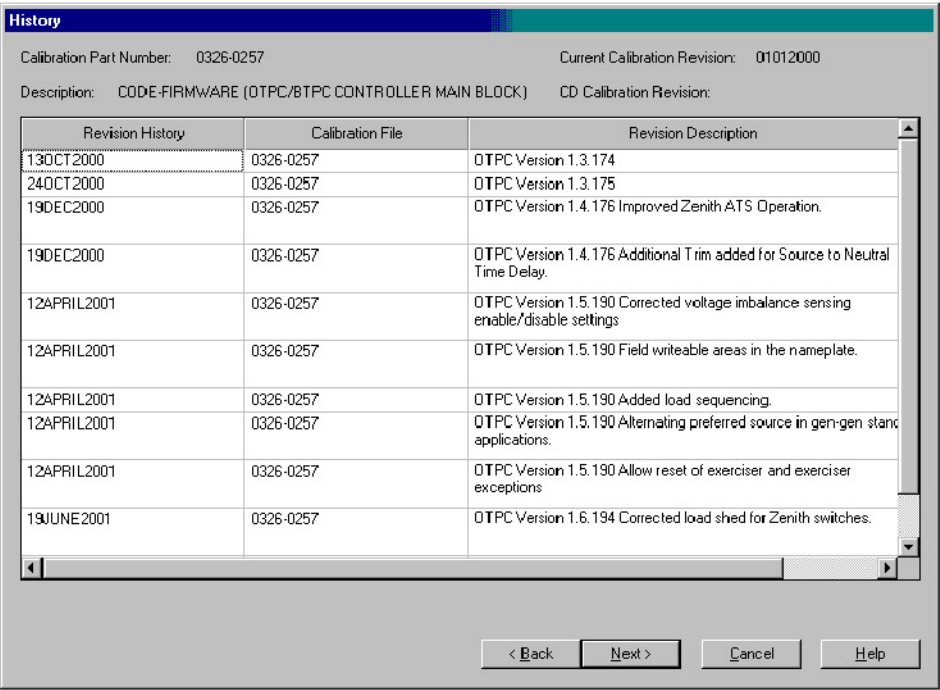


FIGURE 189. HISTORY

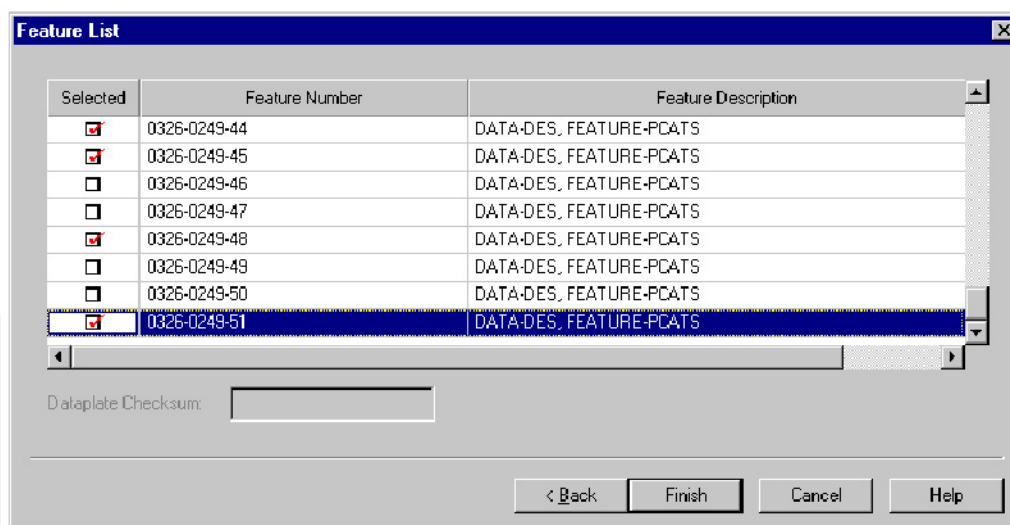


FIGURE 190. FEATURE LIST

14.2.3 Feature List

The Feature List window displays all of the feature part numbers that are available for the selected calibration file ([Figure 190](#)). This screen also displays the feature descriptions.

Refer to the calibration label, located inside the door on the ATS ([Figure 191](#)), for the list of Features (listed by Feature Code) that were originally installed on this ATS.

Refer to [Figure 192](#) for a cross reference between the Feature codes shown on the ATS dataplate and the Feature Part Numbers, required for the Feature List.

Select all of the original features, by Feature Number, in the Feature List. Click on the checkbox next to each Feature Number. Use the scroll bar to access all of the Feature Numbers.

The Dataplate Checksum feature is greyed out in this version of InPower. This feature may be used in future versions, when optional feature upgrades are available for ATS applications.

Click on the **Finish** button, to continue the Initial Calibration.

Model No.
Modèle

Serial No.
Série

Spec.

IMPORTANT!
Model & Serial No. Required When Ordering Parts.
Modèle & No. Série Requis Pour Commander Des Pièces.

CUMMINS POWER GENERATION
1400 73rd Avenue N.E.
Minneapolis, MN 55432 MADE IN U.S.A.

CURRENT RATING: AMPS
CONTINUOUS LOAD CURRENT
NOT TO EXCEED 80 PERCENT
OF SWITCH RATING

VOLTAGE- VAC
FREQUENCY- Hertz
POLES-
APPL-
FEATURES:

WIRING DIAGRAM:

BUILT IN COMPLIANCE WITH NFPA 70.
AUTOMATIC TRANSFER SWITCH FOR EMERGENCY SYSTEMS.

Feature
Codes

FIGURE 191. DATAPLATE

Data From Drawing
0326-0249 (Rev. A)

Feature Part Numbers	Feature Codes	Software P/N	ECO Number	Feature Codes	Software Feature Description
0326-0249-01	FRD1824	S046	OTPC40	40 Amps	Must Select One Note1: Newer Models Use Model Letters and Amperage For The Feature Code. Note2: Amperage of ATS Automatically Selects the Mechanism Type.
0326-0249-02	FRD1824	S047	OTPC70	70 Amps	
0326-0249-03	FRD1824	S048	OTPC125	125 Amps	
0326-0249-04	FRD1824	S049	OTPC150	150 Amps	
0326-0249-05	FRD1824	S050	OTPC225	225 Amps	
0326-0249-06	FRD1824	S051	OTPC260	260 Amps	
0326-0249-07	FRD1824	S052	OTPC300	300 Amps	
0326-0249-08	FRD1824	S053	OTPC400	400 Amps	
0326-0249-09	FRD1824	S054	OTPC600	600 Amps	
0326-0249-10	FRD1824	S055	OTPC800	800 Amps	
0326-0249-11	FRD1824	S056	OTPC1000	1000 Amps	Level 1 Control Voltage Selection Only
0326-0249-12	FRD1824	S057	OTPC1200	1200 Amps	
0326-0249-13	FRD1824	S058	OTPC1600	1600 Amps	
0326-0249-14	FRD1824	S059	OTPC2000	2000 Amps	
0326-0249-15	FRD1824	S060	OTPC3000	3000 Amps	
0326-0249-16	FRD1824	A035	Appl-Utility to Genset		
0326-0249-17	FRD1824	A036	Appl-Utility to Utility		
0326-0249-18	FRD1824	A037	Appl-Genset to Genset		
0326-0249-19	FRD1824	A044	Frequency-60 Hertz		
0326-0249-20	FRD1824	A045	Frequency-50 Hertz		Level 2 Control Voltage Selection Only
0326-0249-21	FRD1824	R020	C023	Level-1, 120V	
0326-0249-22	FRD1824	R038	C023	Level-1, 180V	
0326-0249-23	FRD1824	R021	C023	Level-1, 208V	
0326-0249-24	FRD1824	R022	C023	Level-1, 220V	
0326-0249-25	FRD1824	R023	C023	Level-1, 240V	
0326-0249-26	FRD1824	R024	C023	Level-1, 380V	
0326-0249-27	FRD1824	R025	C023	Level-1, 415V	
0326-0249-28	FRD1824	R035	C023	Level-1, 440V	
0326-0249-29	FRD1824	R026	C023	Level-1, 480V	
0326-0249-30	FRD1824	R027	C023	Level-1, 800V	Must Select One
0326-0249-31	FRD1824	R020	C024	Level-2, 120V	
0326-0249-32	FRD1824	R038	C024	Level-2, 180V/110V	
0326-0249-33	FRD1824	R021	C024	Level-2, 208V/120V	
0326-0249-34	FRD1824	R022	C024	Level-2, 220V/127V	
0326-0249-35	FRD1824	R023	C024	Level-2, 240V/139V	
0326-0249-36	FRD1824	R024	C024	Level-2, 380V/219V	
0326-0249-37	FRD1824	R025	C024	Level-2, 415V/240V	
0326-0249-38	FRD1824	R035	C024	Level-2, 440V/254V	
0326-0249-39	FRD1824	R026	C024	Level-2, 480V/277V	
0326-0249-40	FRD1824	R027	C024	Level-2, 800V/346V	Must Select One
0326-0249-41	FRD1824	A041	C023	Level-1, Single Phase, 2W or 3W	
0326-0249-42	FRD1824	A042	C023	Level-1, Three Phase, 3W or 4W	
0326-0249-43	FRD1824	A041	C024	Level-2, Single Phase, 2W or 3W	
0326-0249-44	FRD1824	A042	C024	Level-2, Three Phase, 3W or 4W	
0326-0249-45	FRD1824	M016	Display-Digital		
0326-0249-46	FRD1824	M020	Communications-LonWorksNet		
0326-0249-47	FRD1824	M022	Monitoring-Load		
0326-0249-48	FRD1824	D009	Bar Graph		
0326-0249-49	FRD1824	M007	Load Shed-From Emergency		
0326-0249-50	FRD1824	C023	Level-1 Control, Initialization		
0326-0249-51	FRD1824	C024	Level-2 Control, Initialization		

FIGURE 192. FEATURE LIST TO FEATURE CODE CROSS REFERENCE

A pop-up window prompts the user with the question "Do you wish to calibrate the controller now?" (Figure 193). Click on the **Yes** button to continue.

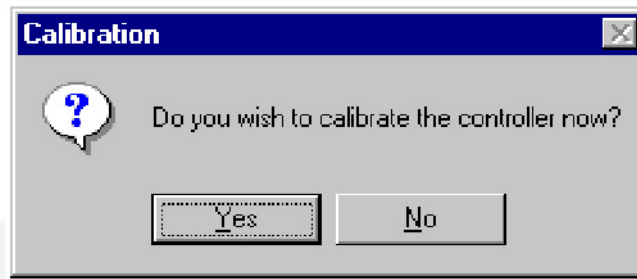


FIGURE 193. CALIBRATION POP-UP

14.2.4 Calibration Download

The calibration file download may take 10 minutes or longer, depending on the service PC and the communication port.

During the download, it is normal operation for the ATS control to display warnings (if equipped with a display). Do not hit the "**Fault Acknowledge**" button during the calibration file download, or the download may be interrupted.



NOTE: Pop-up messages may be displayed behind an open window. To view all open windows, including pop-up messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

When the download process is over, a pop-up message displays the INCAL file path and informs the user if the download completed successfully ([Figure 194](#)). Click on the **OK** button to acknowledge.



FIGURE 194. COMPLETED FROM INCAL PATH

A second pop-up message confirms that the download completed successfully ([Figure 195](#)). Click on the **OK** button to acknowledge.

If a pop-up messages indicate that the download was not successful, repeat the Initial Calibration procedure. If the download was still not successful, record any error messages and contact service for help.

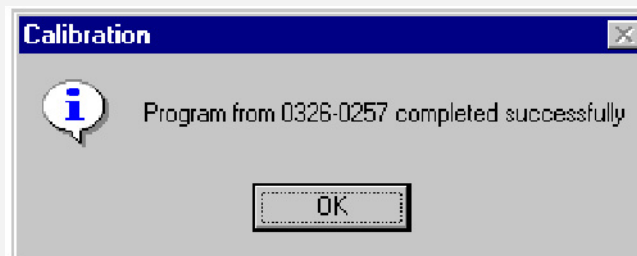


FIGURE 195. DOWNLOAD COMPLETED

14.3 Writing Adjustments From a Capture File

If a capture file was made prior to the Digital Module being replaced, the previous parameter adjustments and settings, that were stored in the capture file, can be written to the new Digital Module.

14.4 Final Adjustments

After writing the initial calibration, repower the control by removing all power from the control, including the battery power.

Prepare to operate the ATS and test the operation of the entire system. Refer to the ATS service manual for adjustment procedures and observe all of the safety precautions described in the ATS service manual.

After completing all necessary adjustments, make a new capture file. Store a copy of the capture file at the site and return a copy to Service for cataloging.

15 Update Calibration for ATS

15.1 About Update Calibration

The Update Calibration feature is used to replace a current calibration file with a newer version from the Power Generation INCAL CD. The new calibration file is written over the current calibration file, in the ATS control (Digital Module).

Calibration updates are performed at the site using InPower. This section covers the procedures for performing Update Calibration.



WARNING: AC power within the cabinet and the rear side of cabinet door present a shock hazard that can cause severe personal injury or death. Use extreme caution to avoid touching electrical contacts with hair, clothing, tools or body. Do not wear jewelry. Stand on a rubber mat or dry wood platform. The following procedures are to be performed by trained and experienced personnel only.

15.2 Update Calibration

After connecting to the device, click on the **Device** menu and then click on **Update Calibration** (Figure 197).

After selecting **Update Calibration**, the History window is displayed.

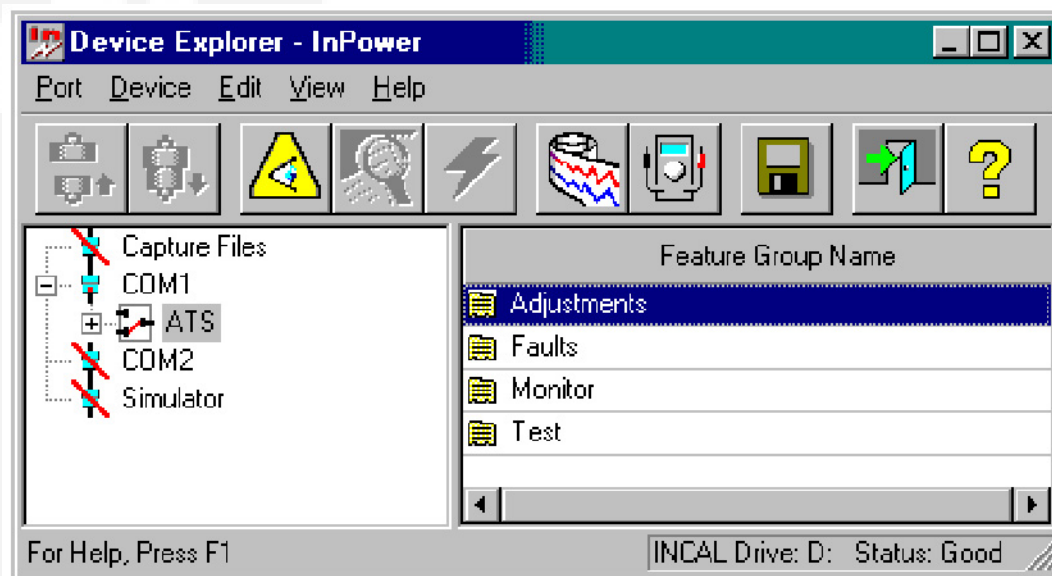


FIGURE 196. MAIN WINDOW

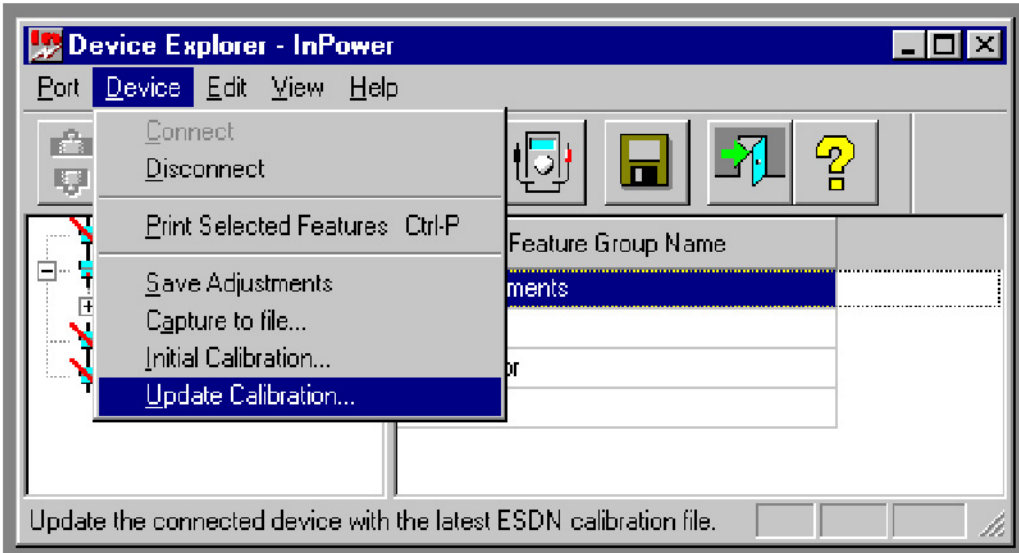


FIGURE 197. UPDATE - DEVICE MENU

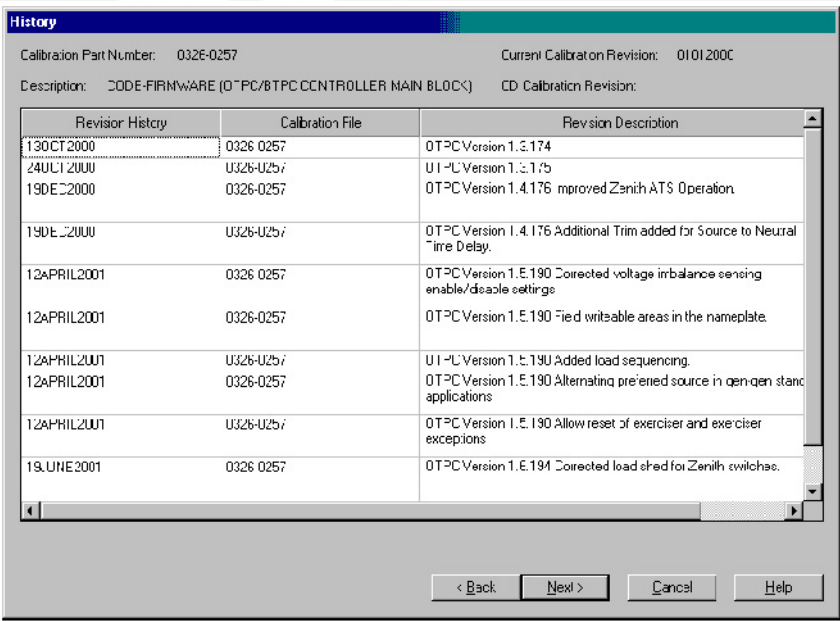


FIGURE 198. HISTORY

15.2.1 History

The History window displays information about the currently installed Calibration Part Number and Calibration Revision, at the top of the window (Figure 198).

The History window also displays information, from the Power Generation INCAL CD, about the Revision History, Calibration File part number and Revision Description.

The **Save and Restore** checkbox is used to save the current adjustment trims and settings. Make sure the check box is enabled (checked) before proceeding.

Click on the **Finish** button to proceed with the Calibration Update.

If a newer calibration is available with INCAL, a pop-up window prompts the user with the question "Do you wish to calibrate the controller now?" ([Figure 199](#)). Click on the **Yes** button to continue.



NOTE: Pop-up messages may be displayed behind an open window. To view all open windows, including pop-up messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

When the download process is over, a popup message displaying the INCAL file path informs the user if the download completed successfully ([Figure 200](#)). Click on the **OK** button to acknowledge.

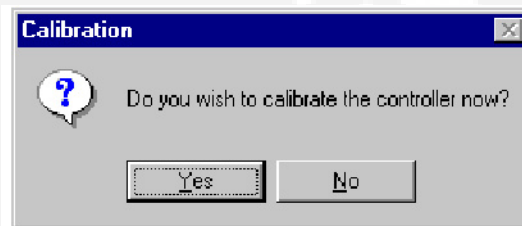


FIGURE 199. UPDATE NOW

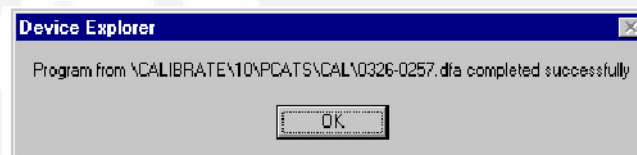


FIGURE 200. COMPLETED FROM INCAL PATH

A second popup message confirms that the download completed successfully ([Figure 201](#)). Click on the **OK** button to acknowledge.

If a popup messages indicate that the download was not successful, repeat the Update Calibration procedure. If the download was still not successful, record the error message and contact service for help.

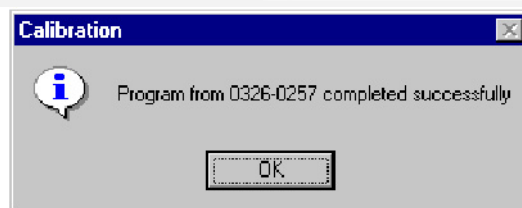
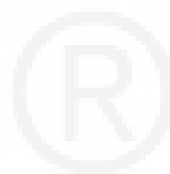


FIGURE 201. DOWNLOAD COMPLETED

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16 Initial Calibration for G-Drive

16.1 About Initial Calibration

The Initial Calibration feature is used to download a calibration file into a service replacement Electronic Control Module (ECM). This section covers the procedures for performing an Initial Calibration.

16.2 Initial Calibration

Use of a Capture File can reduce the amount of adjustment that may be required when replacing the ECM. If the old ECM is operational, and a capture file has not already been created, correct any active faults (if possible). Then, create a capture file.

Refer to the service manual for control replacement procedures. Before replacing the control, remove power from the battery charger and block heater, if equipped, then remove power from the control.

Complete all necessary service replacement procedures and power the control. Reconnect power to the battery charger and block heater, if applicable.

Connect the serial communication cable from the service PC to the device.

Start InPower and launch the Alarm Popup Window by clicking on the firecracker icon, located on the lower right corner of the Windows status bar. Click on the Alarm Popup Options menu, then click on AutoAnnounce to deselect (uncheck) it. Disabling this feature prevents nuisance alarms during the calibration download.

Connect to the port by double clicking on the port that matches the COM port on the service PC being used for the ECM connection (COM1, COM2, etc.). The available COM ports are displayed in the Device Explorer directory (left pane).

Select the device DVC1 (or GCS, if the device already has a calibration file) by clicking on it ([Figure 202](#)).

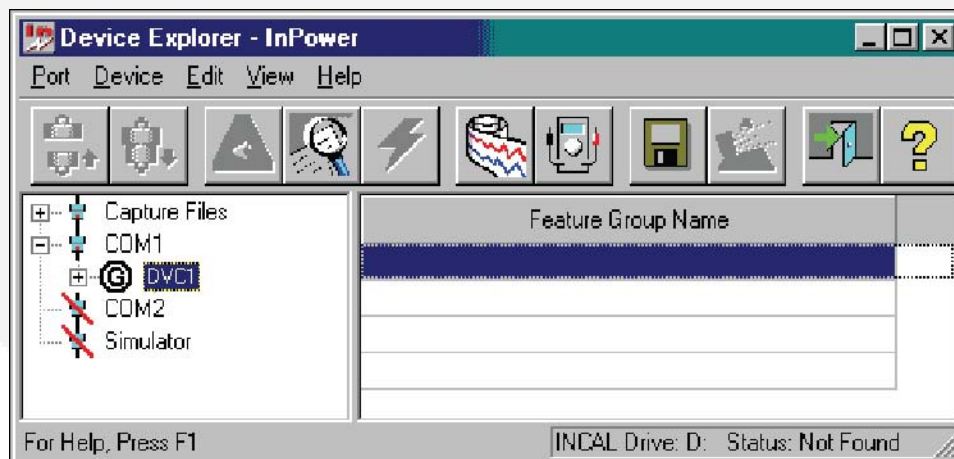


FIGURE 202. MAIN WINDOW

After connecting to the device, click on the Device menu and click on Initial Calibration ([Figure 203](#)).

If prompted to select between G-Drive and Genset applications, select G-Drive, then select Next.

Refer to the Dataplate, located on the side of the ECM, for the electronic configuration (calibration part number). See [Figure 204](#).

If a popup message indicates that there is an error loading from the INCAL CD, either the CD drive letter was not correctly specified during InPower installation, or the CD is not installed or is defective. If the CD is in the CD drive, click on Yes, and specify the correct CD drive designation. If the CD is not in the drive, insert the CD and click on No.

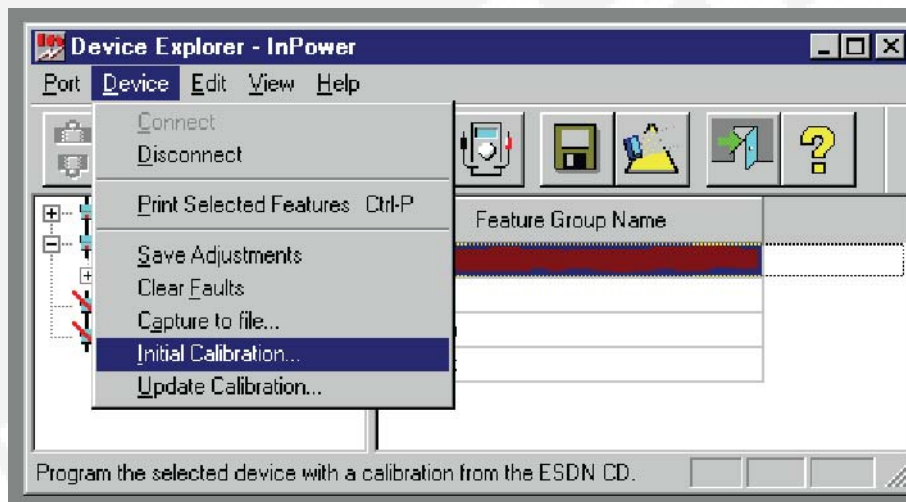


FIGURE 203. MAIN WINDOW

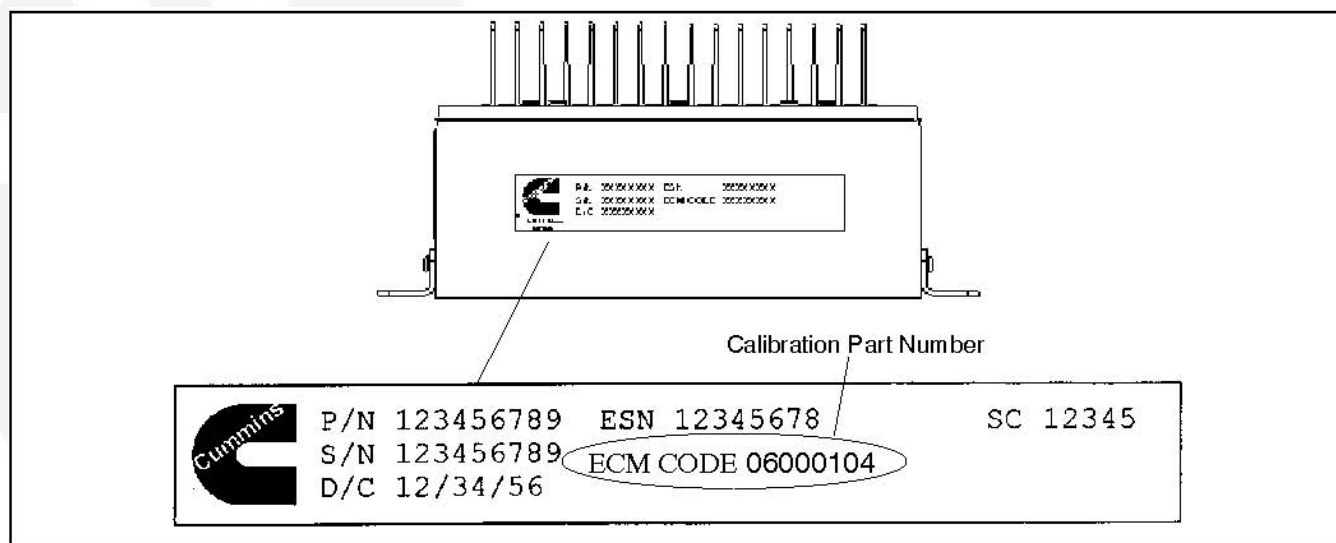
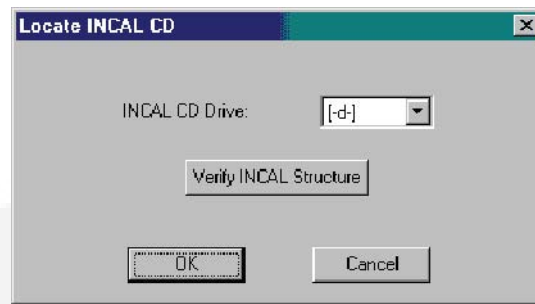


FIGURE 204. DATAPLATE

The INCAL CD location can be verified by clicking on the Port menu and clicking on Find InCal ([Figure 205](#)). Select the INCAL CD drive designation from the drop-down list, then click on Verify INCAL Structure. A popup message will verify the INCAL location ([Figure 206](#)).

**FIGURE 205. FIND INCAL****FIGURE 206. INCAL LOCATION FOUND**

16.2.1 Selecting Calibration Part Number

After clicking on Initial Calibration, the Select Calibration window is displayed ([Figure 207](#)). This feature lists the calibration files (ECM Codes) that are available from the Power Generation INCAL CD. Also shown are the Engine Control Parts List (CPL) and other related application descriptions.

Refer to the Dataplate, located on the side of the ECM, for the electronic configuration (ECM Code). See [Figure 204](#).

Use the scroll bar to locate the ECM Code that matches the number shown on the Dataplate ([Figure 204](#)). The data, displayed in each column, can be sorted in ascending or descending order by clicking on the column heading.

Select the matching calibration part number by clicking on it. When the matching calibration part number is selected, click on Next to continue the initial calibration.

Select Calibration											
ECM Code	SC	DO	CPL	Rating Designation	Maximum Power	Certified By	Cert Level	Duty Cycle	Ring Gear Teeth	Data Link	Centinel Provision
AC1C00105	SC10664	D001152	8C81	QSK15-68	0613 EHP @ 1800 RPM 0670 3HP @ 1500 RPM	EPA, CARB,		STANDEY	NA	RS232	CENTINEL - NO.
AC1C00405	SC10794	D001152	8142	QSK15-65	0613 EHP @ 1800 RPM 0000 3HP @ 1500 RPM	EPA, CARB,		STANDEY	NA	RS232	CENTINEL - NO.
AC1C00705	SC10795	D001152	8142	QSK15-67	0685 EHP @ 1800 RPM 0000 3HP @ 1500 RPM	EPA, CARB,		STANDEY	NA	RS232	CENTINEL - NO.
AC1C01005	SC10703	D001152	0142	QSK15-G3	0753 EHP @ 1800 RPM 0000 3HP @ 1500 RPM	EPA, CARB,		STANDEY	NA	RS232	CENTINEL - NO.
AC1C01305	SC10797	D001152	8C81	QSK15-63	0653 EHP @ 1800 RPM 0505 3HP @ 1500 RPM	EPA, CARB,		STANDEY	NA	RS232	CENTINEL - NO.
AC1C01605	SC10799	D001152	8C81	QSK15-64	0613 EHP @ 1800 RPM 0545 3HP @ 1500 RPM	EPA, CARB,		STANDEY	NA	RS232	CENTINEL - NO.
AC1C01905	SC10799	D001152	8C81	QSK15-66	0613 EHP @ 1800 RPM 0653 3HP @ 1500 RPM	EPA, CARB,		STANDEY	NA	RS232	CENTINEL - NO.

FIGURE 207. SELECT CALIBRATION

16.2.2 History

The History window (Figure 208) displays the Revision History, Calibration File (part number) and Revision Description.

If the History this window displays a calibration file that does not match the calibration file on the Dataplate, click on the Back button to choose the correct calibration file.

If the History window displays the calibration file part number that was previously selected, click on the Next button to proceed to the Save and Restore Parameters feature.

History		
ECM Code:	06000104	Current Calibration Revision: 0
Description:	SC06794 D006071 QSK60-G6 Standby 2921HP @ 1800RPM	CD Calibration Revision:
Revision History	Calibration File	Revision Description
14NOV00	06000100	EPA, CARB, STANDBY, SAE 0
14NOV00	06000101	F4037BD/BA28GA2 TURBOCHARGER
14NOV00	06000102	
14NOV00	06000103	
14NOV00	06000104	QSK60-G6, SC06794, D006071, CPL 2920, 2922 BHP @ 1800 RPM, 8526 FT LB @ 1800 RPM

FIGURE 208. HISTORY

16.2.3 Save and Restore Parameters

The Save and Restore Parameters window displays the Parameter Descriptions, Value and Units of measure information ([Figure 209](#)).

Parameter Description	Value	Units
Controller On Time	6.0542	hours
Cumulative Fuel Consumption	0.78	gal
Engine CPL number		
Engine Running Time	0.25464	hours
Engine model number	0	
Engine rating	0	
Engine serial number	GENSET	
Field installed features	<DataTable>	
Fuel Consumption Reset Time COT	0.0000	hours
Fuel Consumption Reset Time ERT	0.00000	hours
Fuel Consumption Since Reset	0.78	gal
Load Profile Log 50 Hz	<DataTable>	
Load Profile Log 60 Hz	<DataTable>	

FIGURE 209. SAVE AND RESTORE PARAMETERS

16.2.4 Use Capture File Feature

Click on the Set Data Plate From Capture File button to select the capture file created from the previous ECM (if available).

If using the Set Data Plate From Capture File button, browse to the Capture file location and select the file, then click on the OK button ([Figure 210](#)). Using a capture file, during an initial calibration, will only restore the dataplate information. To restore the remaining capture file parameter settings, click on the box next to the Overlay Capture File After Calibration. If this feature is not used, the capture can still be used after performing the initial calibration to overwrite the parameter settings.

The Save and Restore window will display the capture file name selected ([Figure 211](#)).

Verify that the information displayed in the parameter list matches the information shown on the data tags. Use the scroll bar to review all of the information. If any information needs to be corrected, double click on the data and enter the correct information.

When the correct information is displayed, click on the Next button.

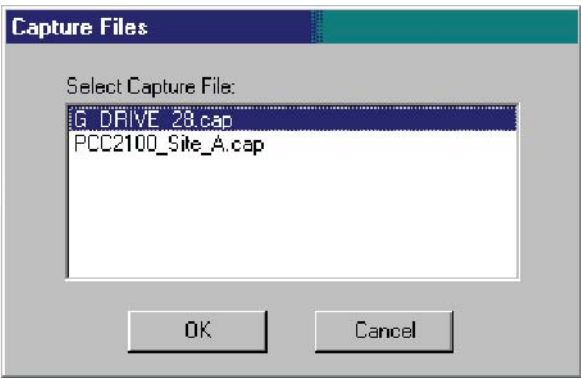


FIGURE 210. MAIN WINDOW

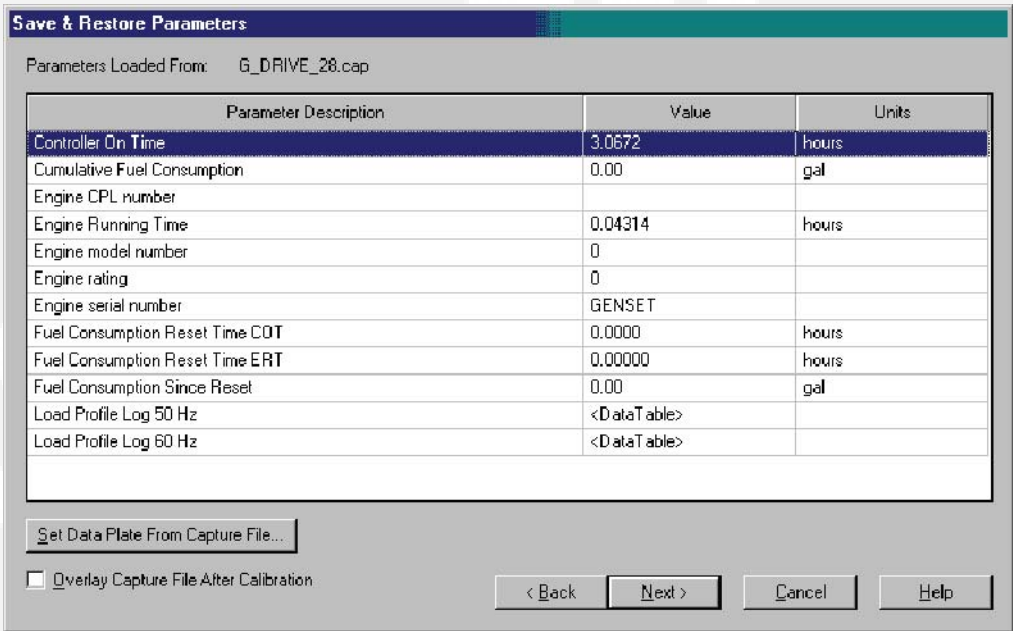


FIGURE 211. CAPTURE FILE SELECTED

16.2.5 Feature List

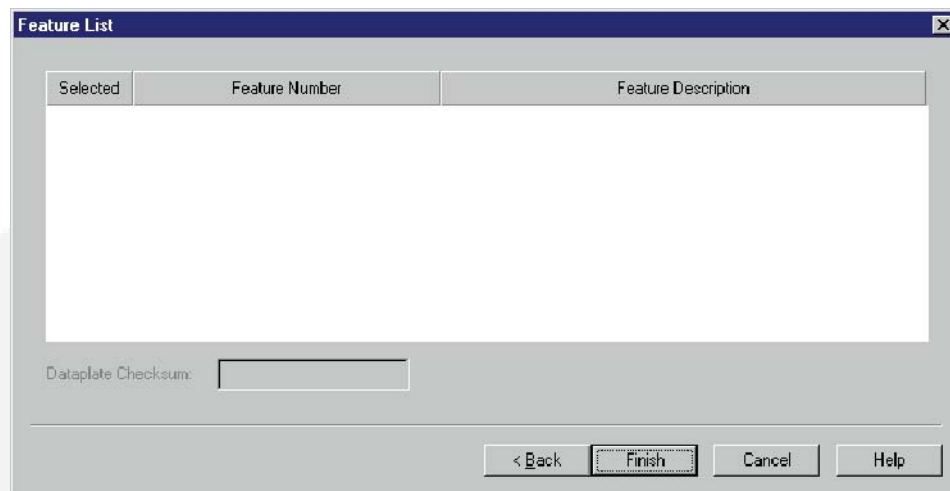


FIGURE 212. FEATURE LIST

The Feature List window is displayed (Figure 212) following the Save and Restore Parameters window. Feature selection is not used with G-Drive applications. Click on the Finish button to continue.

If all of the information has been entered correctly, a popup window prompts the user with the question "Do you wish to calibrate the controller now?" (Figure 213). Click on the Yes button to continue.

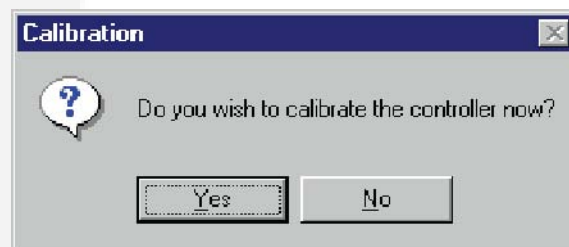


FIGURE 213. CALIBRATION POPUP

Next, a pop-up window informs the user that the calibration file download will erase all adjustments and prompts the user with the question "Do you choose to continue?" (Figure 214). Click on the Yes button, to begin the initial calibration download.

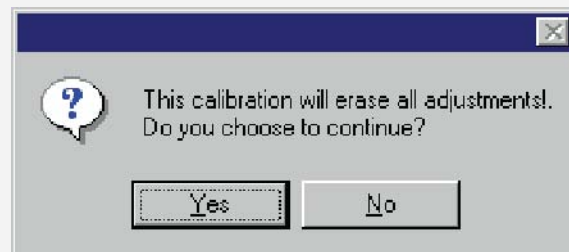


FIGURE 214. FEATURE LIST



NOTE:

Pop-up messages may be displayed behind an open window. To view all open windows, including popup messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

16.2.6 Calibration Download

The calibration file download may take up to 20 minutes, depending on the service PC and the communication port.

During the download, it is normal operation for the control display (if equipped) to display warnings. Do not hit the “Fault Acknowledge” button during the calibration file download, or the download may be interrupted.

When the download is complete, a final popup message informs the user of the download status ([Figure 215](#)). If the download completed successfully, click on the OK button to close the popup message.

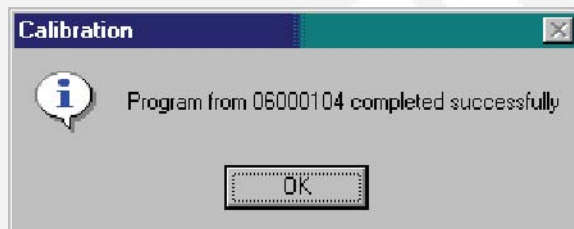


FIGURE 215. DOWNLOAD STATUS

If the pop-up message indicates that the download was not successful, perform the Initial Calibration procedure again. If the procedure still does not work, record any the error messages and contact service for help.

16.3 Writing Adjustments From a Capture File

If a capture file was made prior to the control being replaced, and the Overlay Capture File After Calibration feature was not used the, the capture can still used after performing the initial calibration. The previous parameter adjustments and settings, stored in the capture file, can be written to the new control (device).

16.4 Final Adjustments

Prepare to start the genset and test the operation of the entire system. Refer to the Service Manual for adjustment procedures and observe all safety precautions described in the Service Manual.

After completing all necessary adjustments, make a new capture file. Store a copy of the capture file at the site and return a copy to Service for cataloging.

17 Update Calibration for G-Drive

17.1 About Update Calibration

The Update Calibration feature is used to replace a current calibration file with a newer version from the Power Generation INCAL CD. The new calibration file is written over the current calibration file, in the ECM.

Calibration updates are performed at the site using InPower.

17.2 Update Calibration Setup

You must connect the service PC to the ECM in order to perform the Update Calibration procedure. Connection between the service PC and the ECM is made with a special RS-232 serial null-modem cable.



CAUTION: *Improper calibration can cause equipment malfunction or damage. Adjustments must be performed by trained and experienced personnel only.*

Start InPower and launch the Alarm Popup Window by clicking on the firecracker icon, located on the lower right corner of the Windows status bar. Click on the Alarm Popup Options menu, then click on AutoAnnounce to deselect (uncheck) it. Disabling this feature prevents nuisance alarms during the calibration download.

17.2.1 Connecting to the Device

Connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC being used for the ECM connection. The available COM ports are displayed in the Device Explorer directory (left pane). Double click on the COM port (or click on the COM port and then click on the Connect button, on the toolbar).

Select the device (GCS) by clicking on it. Device Explorer displays the features that are available for the device [Figure 216](#).

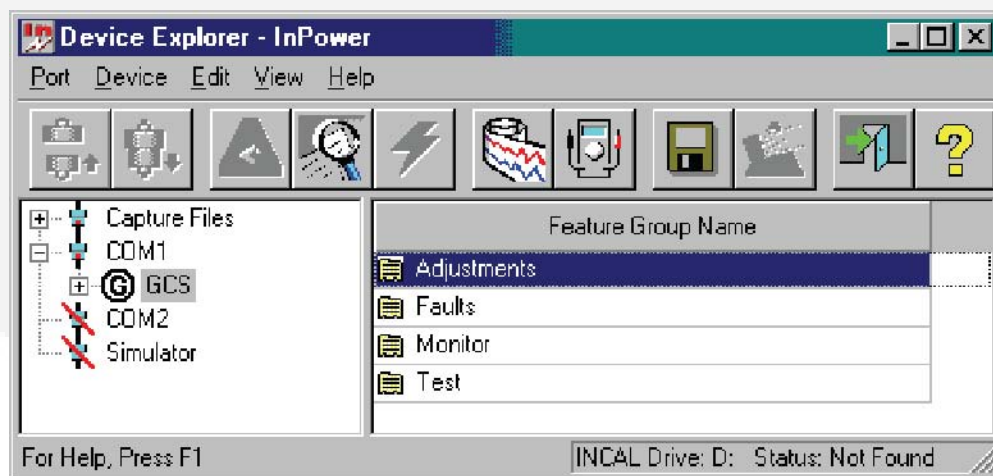


FIGURE 216. MAIN WINDOW

17.3 Update Calibration

After connecting to the device, click on the Device menu and click on Update Calibration (Figure 217). If prompted to select between G-Drive and Genset applications, select G-Drive, then select Next.

If prompted with the message, “Could not find a matching Calibration Part Number ...,” click on the OK button. Use the Initial Calibration feature to update the calibration file.

After selecting Update Calibration, the History window is displayed.

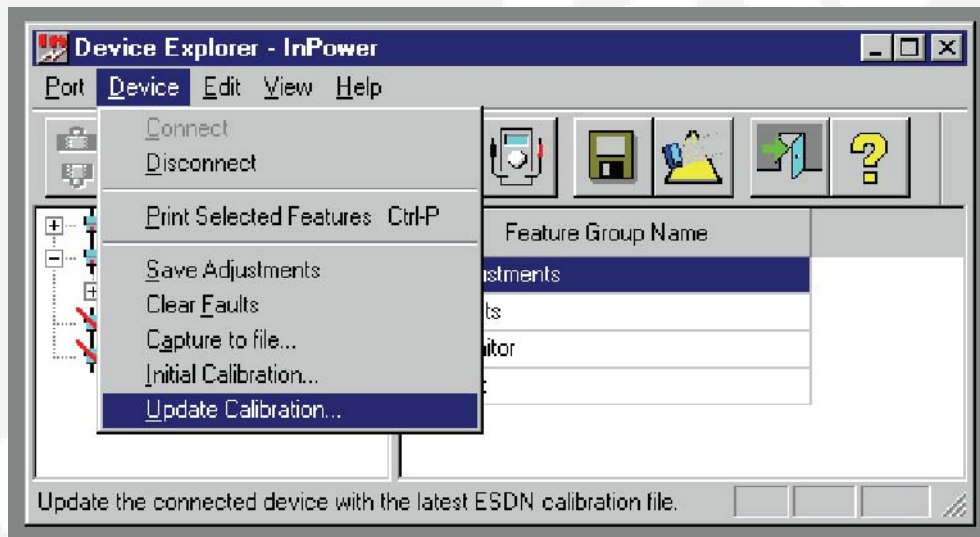


FIGURE 217. UPDATE - DEVICE MENU

17.3.1 History

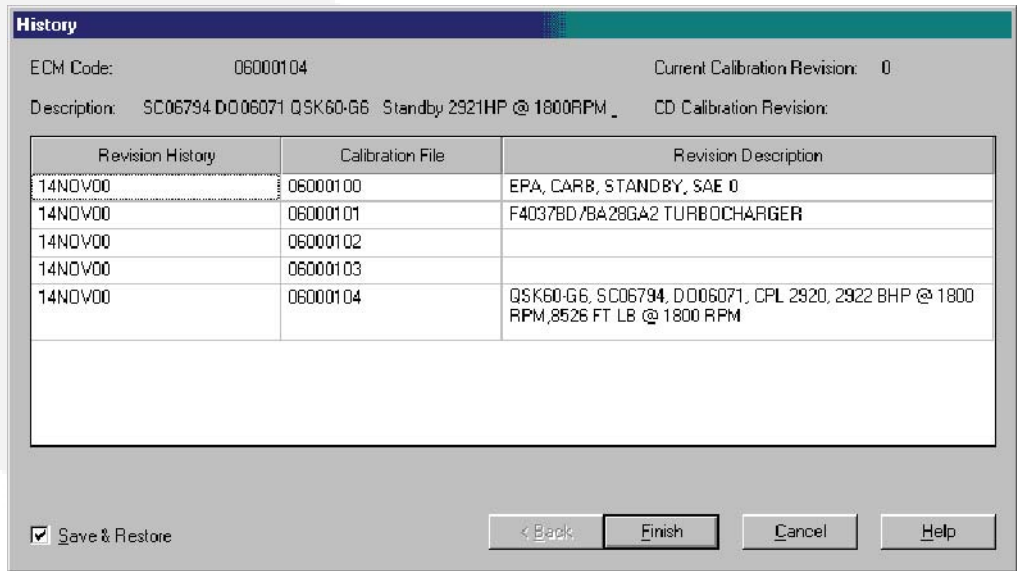


FIGURE 218. HISTORY

The History window displays information about the currently installed calibration part number and calibration revision across the top of the window (Figure 218).

History also displays information from the Power Generation INCAL CD about the Revision History, Calibration File part number and Revision Description.

The Save and Restore checkbox is used to save the current adjustment trims and settings. Make sure the checkbox is enabled (checked) before proceeding.

Click on the Finish button to proceed with the calibration update.

If a newer calibration is available with INCAL, a popup window prompts the user with the question "Do you wish to calibrate the controller now?" ([Figure 219](#)). Click on the Yes button to continue.



NOTE: Pop-up messages may be displayed behind an open window. To view all open windows, including pop-up messages, hold down the Alt key and repeatedly press the Tab key to view each open window.

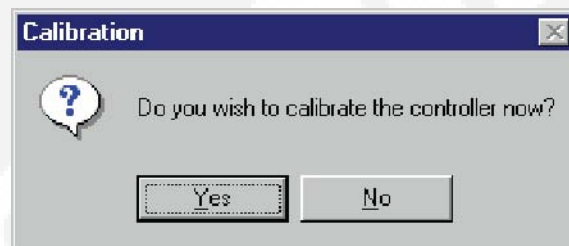


FIGURE 219. UPDATE NOW

When the download is complete, a final popup message informs the user of the download status. If the download completed successfully, click on the OK button to close the popup message ([Figure 220](#)).

If the pop-up message indicates that the download was not successful, perform the Update Calibration procedure again. If the procedure still does not work, record any the error messages and contact service for help.

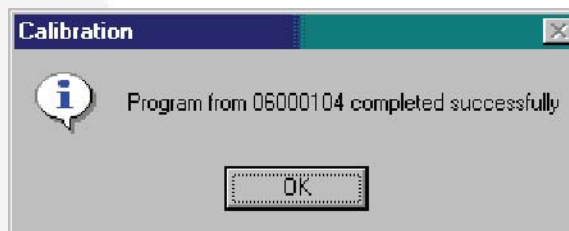
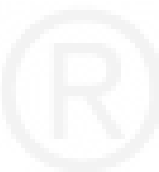


FIGURE 220. COMPLETED

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18 Core II ECM Engine Protection Witness Test Procedure

18.1 Adding a Core II ECS Site from InPower

18.1.1 Adding a Site Using the Port Menu

To add a Core II ECS site from within InPower:

1. Click on the **Port** menu and select **Add Site** ([Figure 221](#)).
2. From the **Products** list, select *CORE II ECS* ([Figure 222](#)). Click on the **OK** button.
3. A reminder that the adapter drivers must be installed is then displayed. Click on the **OK** button to continue ([Figure 223](#)).
4. Select the *Adapter* to be used ([Figure 224](#)).
5. Select the COM port to be used ([Figure 225](#)).



NOTE: COM port drop down items will appear only if the adapter drivers are installed.

6. Change the *Site ID* as you wish to have it appear in InPower ([Figure 226](#)).
7. Select **OK** to Add the site. The site will be added to the list of devices/ports ([Figure 227](#)).

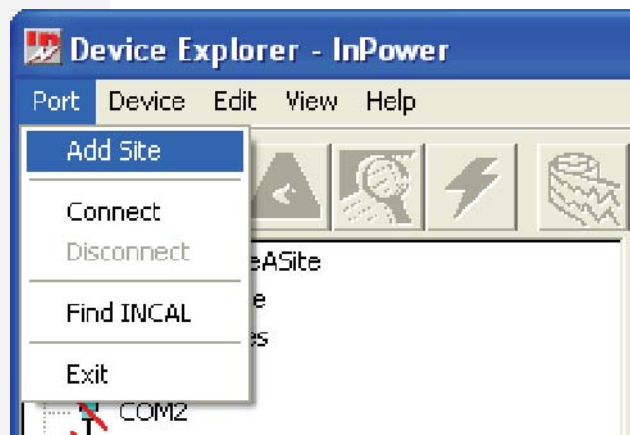


FIGURE 221. ADDING A SITE

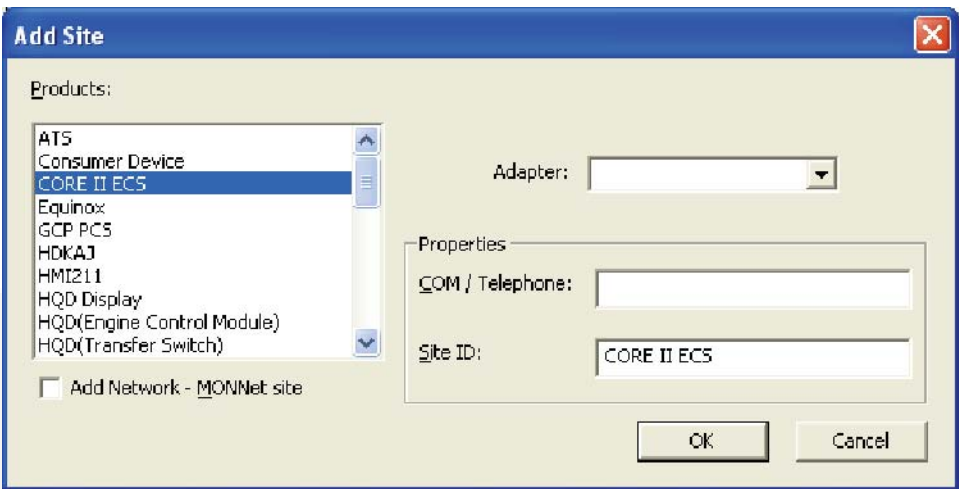


FIGURE 222. SELECTING A PRODUCT



FIGURE 223. INSTALLATION OF DRIVERS REMINDER

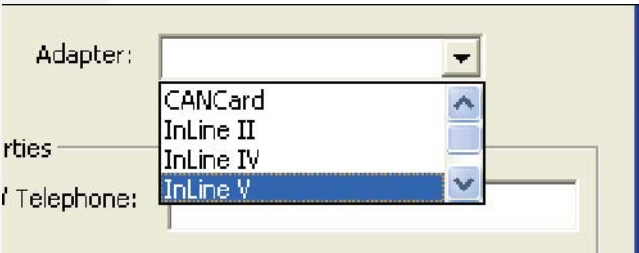


FIGURE 224. SELECTING AN ADAPTER

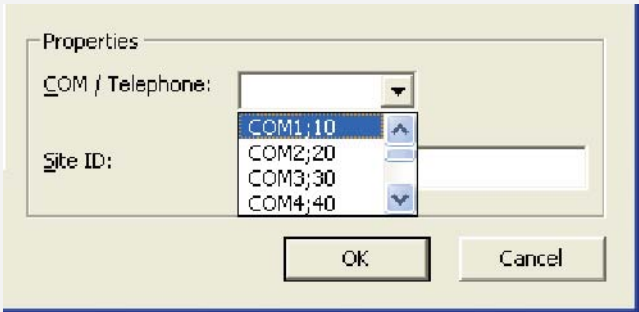


FIGURE 225. SELECTING A COM PORT



FIGURE 226. NAMING THE SITE ID

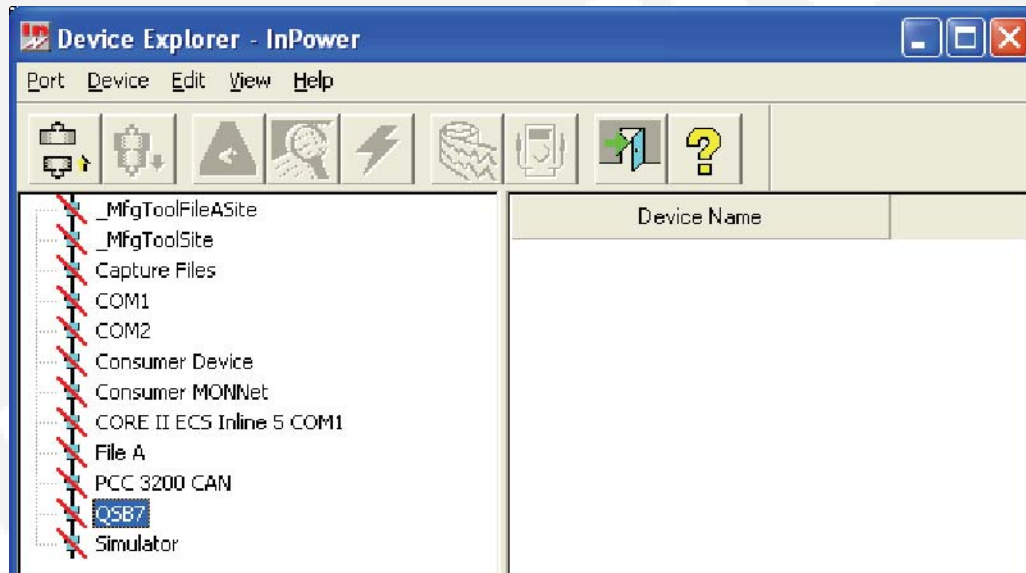


FIGURE 227. ADDED SITE

18.1.2 Adding a Site Using the Setup Menu

To add a Core II ECS site using the Setup menu:

1. Go to **Start -> Programs -> Power Generation -> Setup**. The Setup window is displayed ([Figure 228](#)).
2. Select a site from the Site List and click on **Add**.
3. The Create Site window is displayed ([Figure 229](#)). Select 'Network' for the Site Type, select 'ECS Configuration' for the Network Type, type in the appropriate Site ID, select the Adapter being used, and select the COM Port being used. Click on **OK**.
4. Connect to the Site - QSB7 – The ECM(s) on the generator will be listed ([Figure 230](#)).



NOTE: If there is only one ECM it will be connected by default.

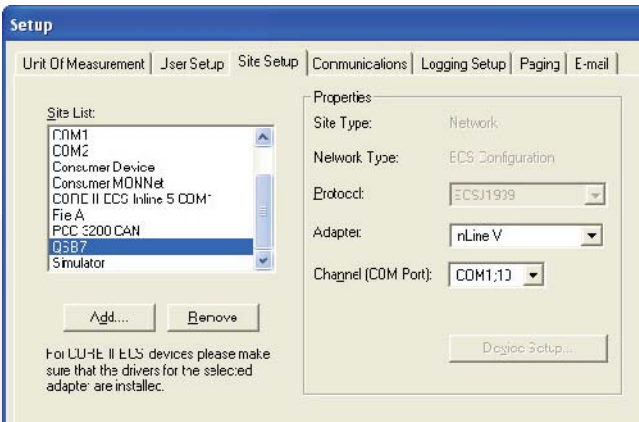


FIGURE 228. THE SETUP WINDOW

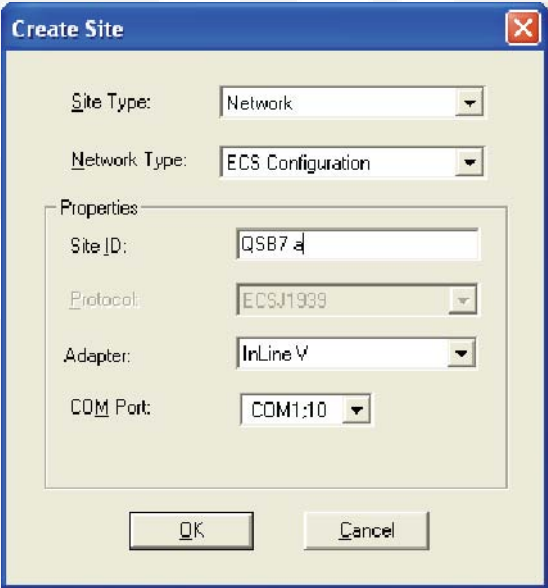


FIGURE 229. ADDING SITE INFORMATION

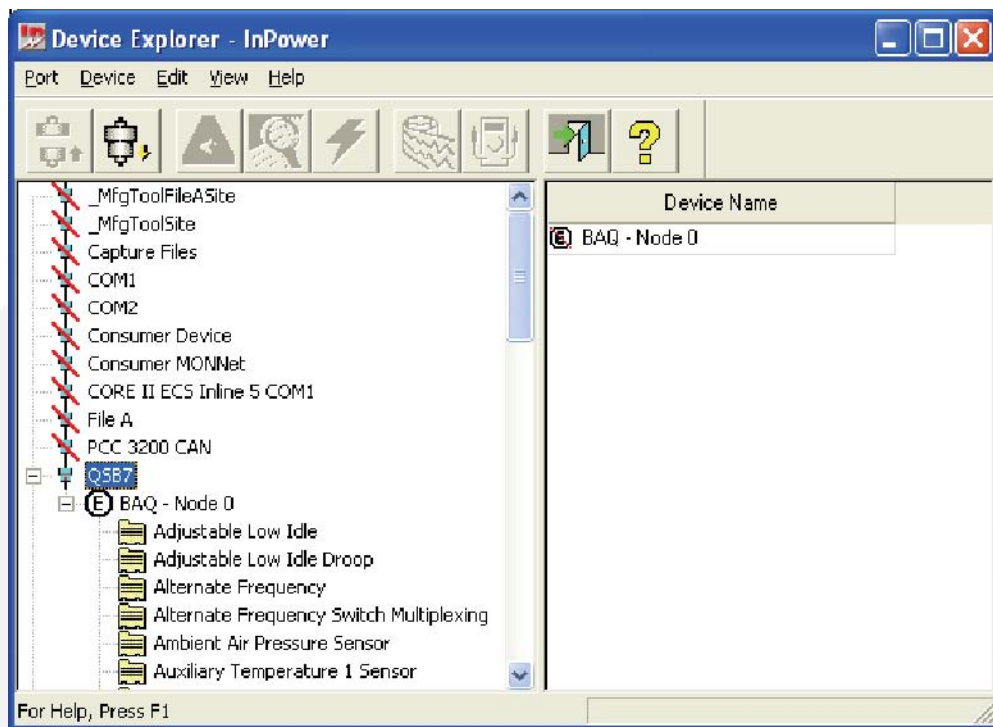


FIGURE 230. CONNECTING TO THE QSB7 SITE

18.2 How to Start an Engine Protection Witness Test

There are two ways to start an engine protection witness test.

- Right-click on the device, and select **Engine Protection Witness Test**.
- Select the device, and click **Device > Engine Protection Witness Test**.

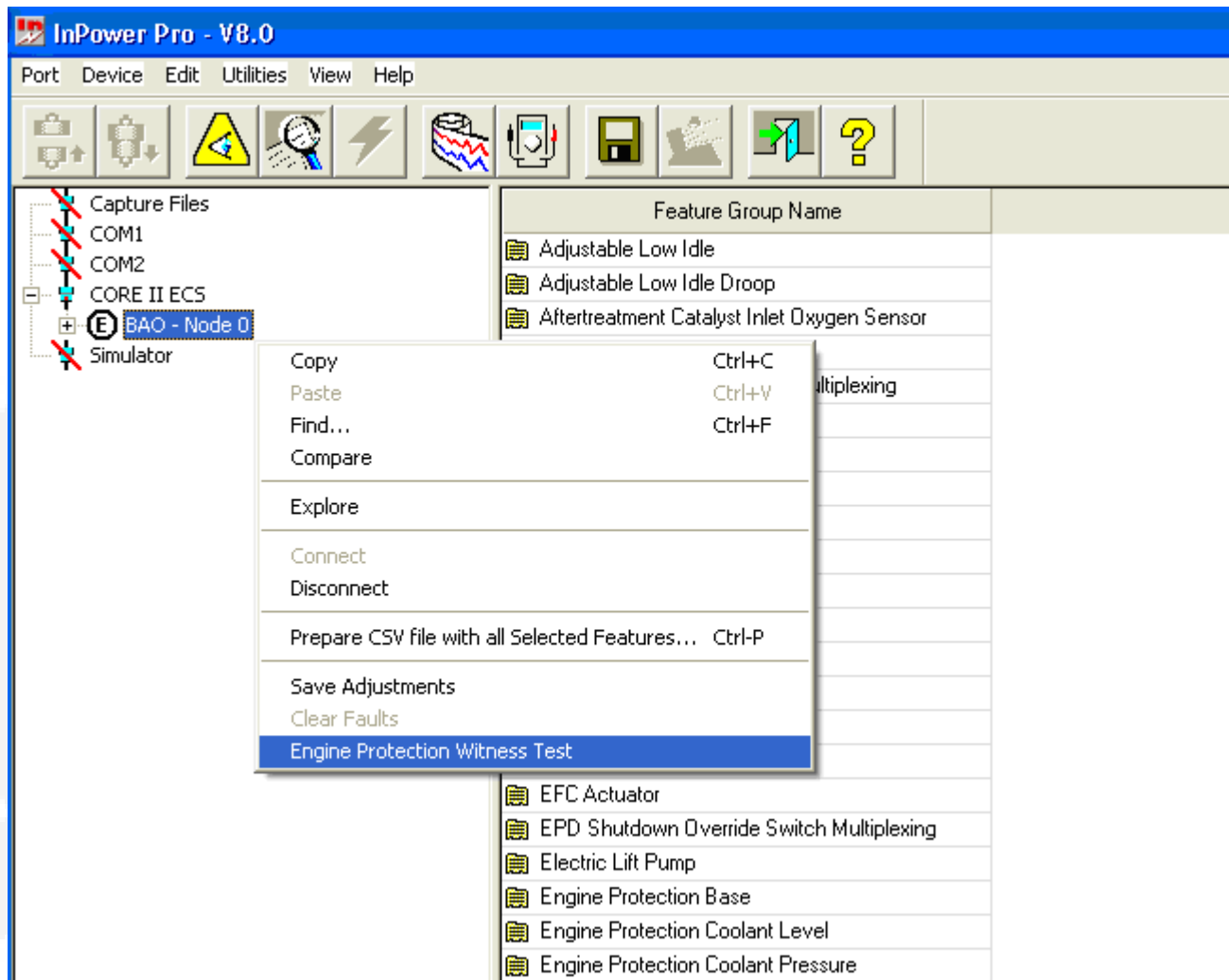


FIGURE 231. STARTING AN ENGINE PROTECTION WITNESS TEST BY RIGHT-CLICKING

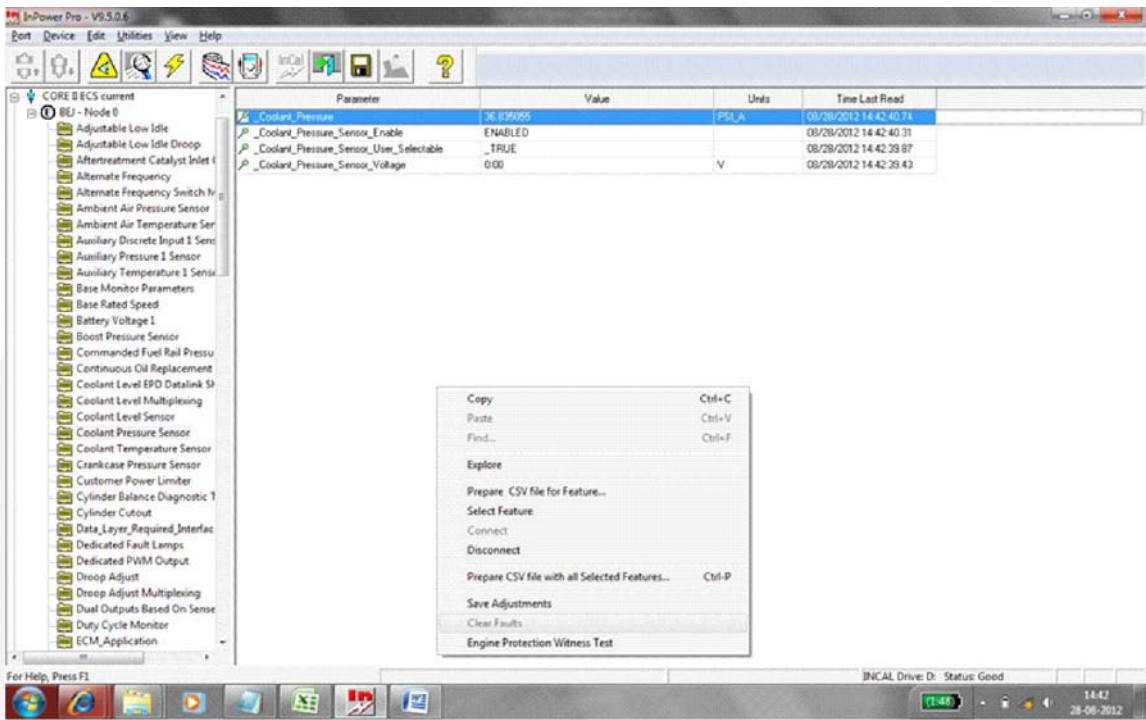


FIGURE 232. STARTING AN ENGINE PROTECTION WITNESS TEST USING THE DEVICE MENU

Use the **Engine Protection Witness Test** dialog to execute the witness test.

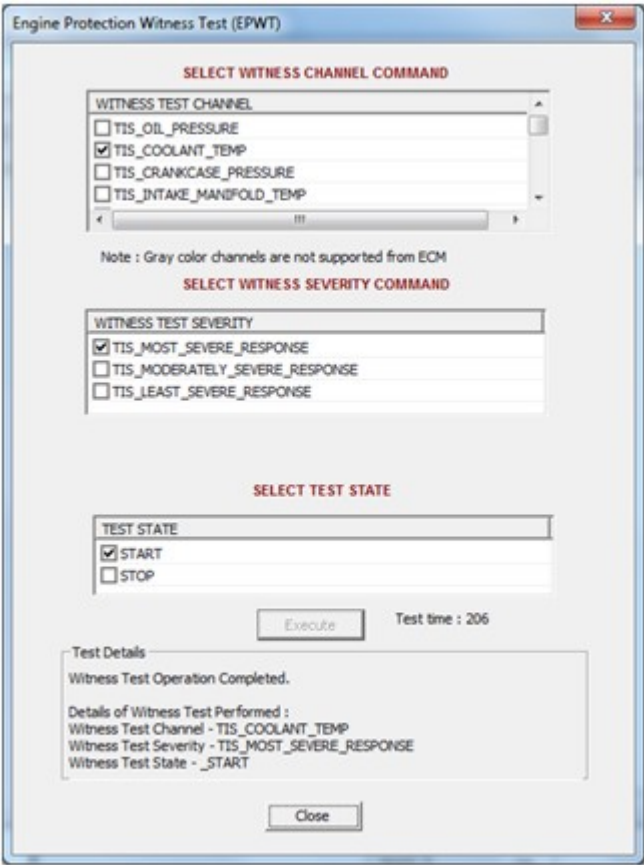


FIGURE 233. ENGINE PROTECTION WITNESS TEST

If a channel is not defined properly then it shows as Unknown in the Engine Protection Witness Test dialog box and the Execute button is disabled.

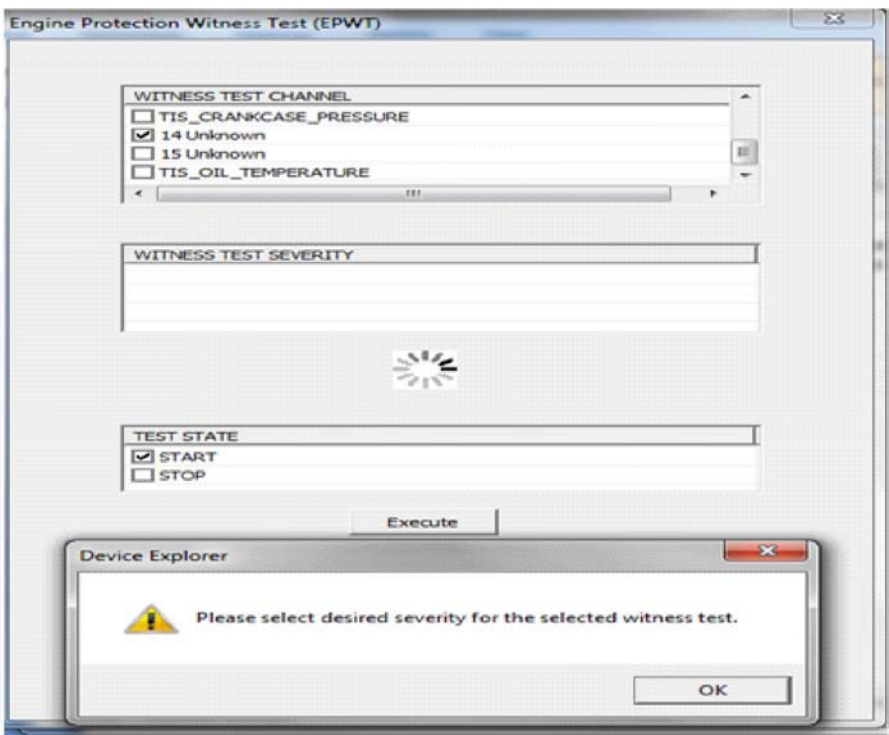


FIGURE 234. ENGINE PROTECTION WITNESS TEST FOR UNKNOWN OR UNDEFINED CHANNELS

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19 Update Features

19.1 About Update Features

Update Features can be used to enable features or change feature settings. Feature changes are performed at the site, using InPower. This section covers the procedures for changing a feature setting, and describes how to enable a feature.

19.2 Update Features Setup

The service PC must be connected to the genset in order to perform the Feature Update procedure. Connection between the service PC and the genset is made with a special RS-232 serial null-modem cable.

The serial cable from the service PC can be connected to the engine harness or to the customer connection box. Service cables are available for both connection methods.



CAUTION: *Improper feature changes can cause equipment malfunction or damage. Feature changes must be performed by trained and experienced personnel only.*

Connect the serial communication cable from the service PC to the device.

Start InPower. Launch the Alarm Pop-up Window by clicking on the firecracker icon, located on the lower right corner of the Windows status bar. Click on the Alarm Popup **Options** menu, then click on **AutoAnnounce** to deselect (uncheck) it. Disabling this feature prevents nuisance alarms during feature updates.

19.3 Update Features

There are two ways to look at the list of features available for a device.

1. After connecting to the device, click on the **Device** menu and click on **Update Features**. If prompted to select between G-Drive and Genset applications, select **Genset**, then select **Next**. After selecting **Update Features**, the Feature List window is displayed.
2. After connecting to the device, select the **Factory Installed Feature List** or **Field Installed Feature List** folder.

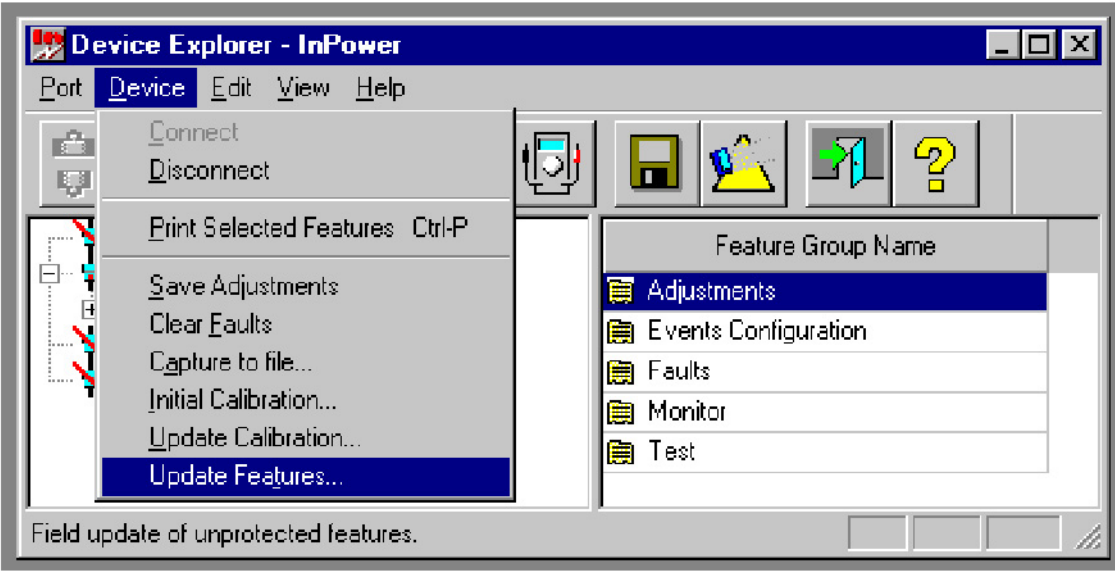


FIGURE 235. UPDATE FEATURES IN DEVICE MENU

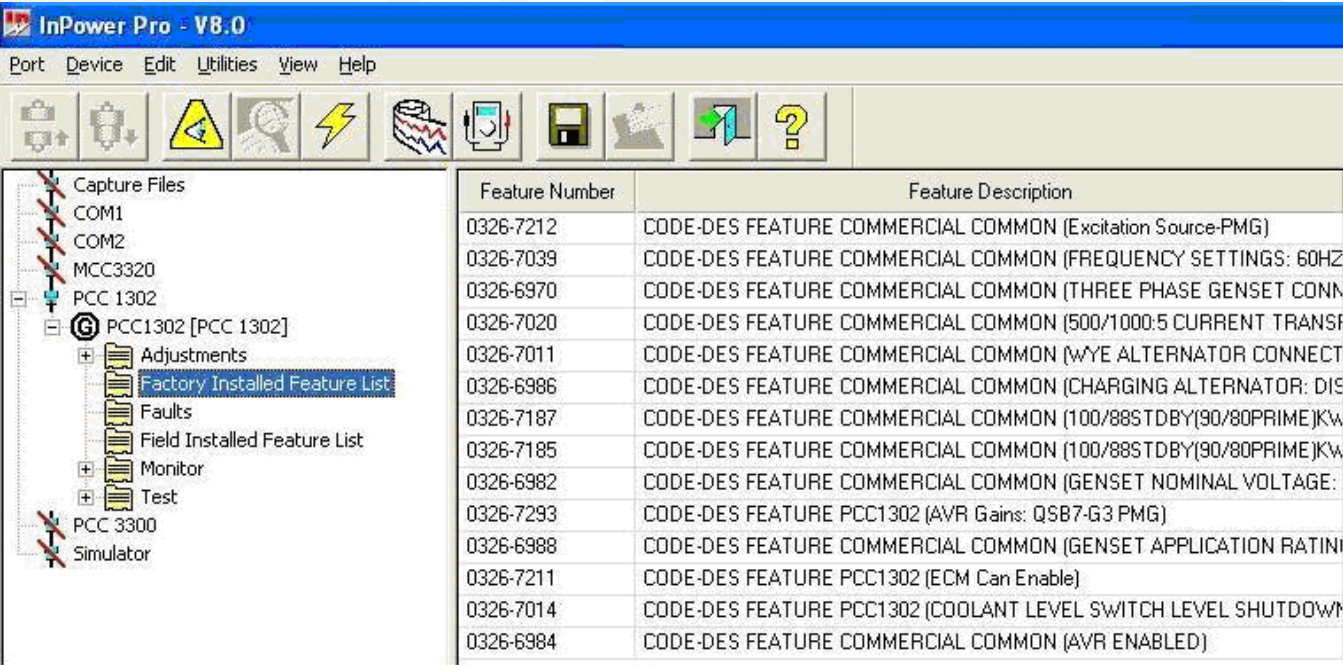


FIGURE 236. FACTORY-INSTALLED FEATURE LIST

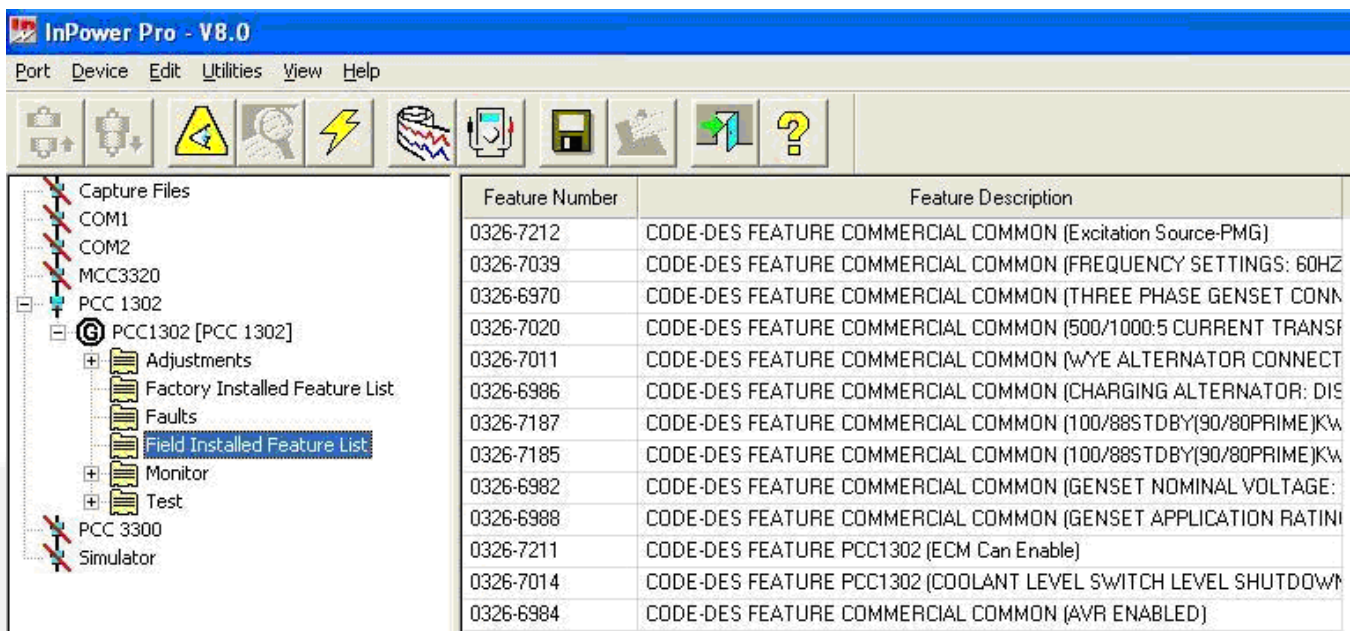


FIGURE 237. FIELD-INSTALLED FEATURE LIST

19.4 Changing a Feature Setting

The Feature List window (Figure 238) displays information about all of the features for the installed Calibration File. The window displays a Selected column, a Feature Number column and a Feature Description column.

Features that have already been selected have a check mark next to the feature part number, in the Selected column. Features that have already been selected along with features that are protected (cannot be selected) are grayed out.

Scroll through the feature list to see all of the feature part numbers and their descriptions.

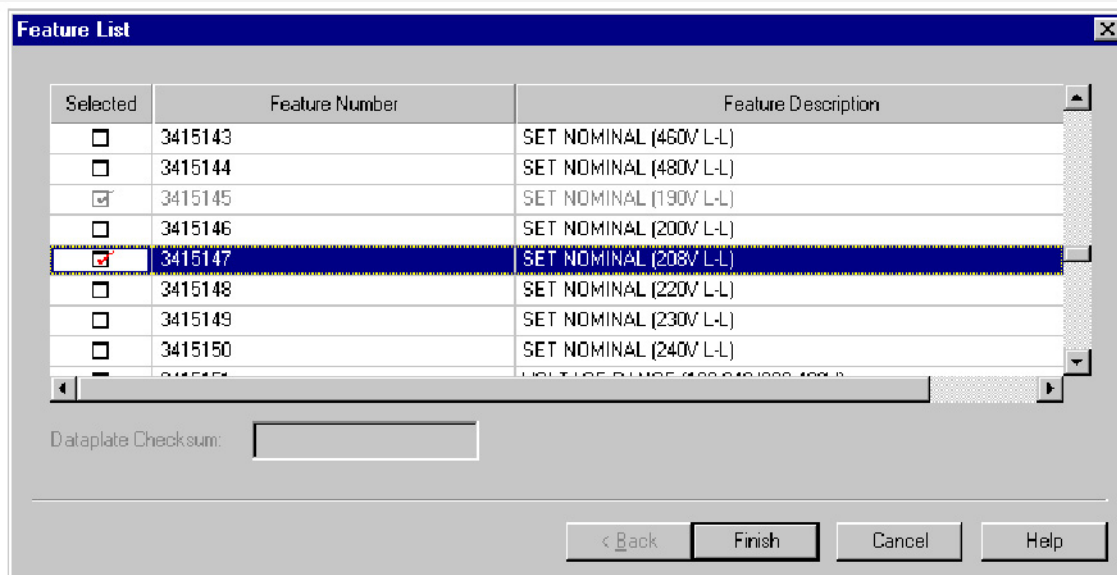


FIGURE 238. FEATURE LIST

19.4.1 Feature Change Example:

In this example, Update Features will be used to change from a 190V L-L setting, to a 208V L-L setting.

Scroll past the Set Range & Nominal (voltage settings) to the Set Nominal (voltage settings). Note in this example that the 190V L-L setting is already checked and greyed out. This indicates that 190V L-L is the current voltage setting.

Click on the checkbox for the Set Nominal (208V L-L). A check mark will appear in the checkbox.

Click on the **Finish** button to change this voltage setting.



NOTE: On reconnectable gensets, when making voltage changes that require reconnection of the alternator output leads (like a change from 208V L-L to 480V L-L), you must also change the CT tap connections.



CAUTION: If reconnection is required, Do Not start the generator set until the reconnection and CT tap changes are complete or equipment damage could result. Refer to the genset reconnection diagram.

If a feature was selected that is not allowed, the pop-up shown in [Figure 239](#) is displayed, indicating that the feature could not be written (changed or enabled).

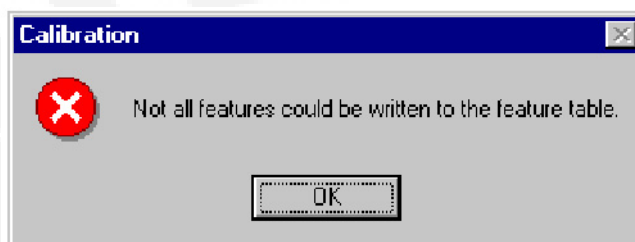


FIGURE 239. ERROR MESSAGE

To check if the feature changed successfully, use Update Features to view the Feature List. Scroll to the Set Nominal (voltage settings). The new setting should have a check mark in the checkbox, and the feature should be greyed out, as shown in [Figure 240](#). Click the **Cancel** button when finished checking the results.

If no error messages were received, and the change did not occur, repeat the Update Features procedure. If the download was still not successful, record any error messages and contact service for help.

19.5 Enabling a Feature

There are a limited number of features that can be enabled. Some features can only be set at the factory (greyed out), while others, like the network module (LonWorks), can only be enabled after the network module has been installed.

Enabling a feature is similar to changing a feature. Start InPower, connect to the device, and click on **Update Features**. Scroll to the desired feature and click on the checkbox, then click on the **Finish** button, to enable the feature.

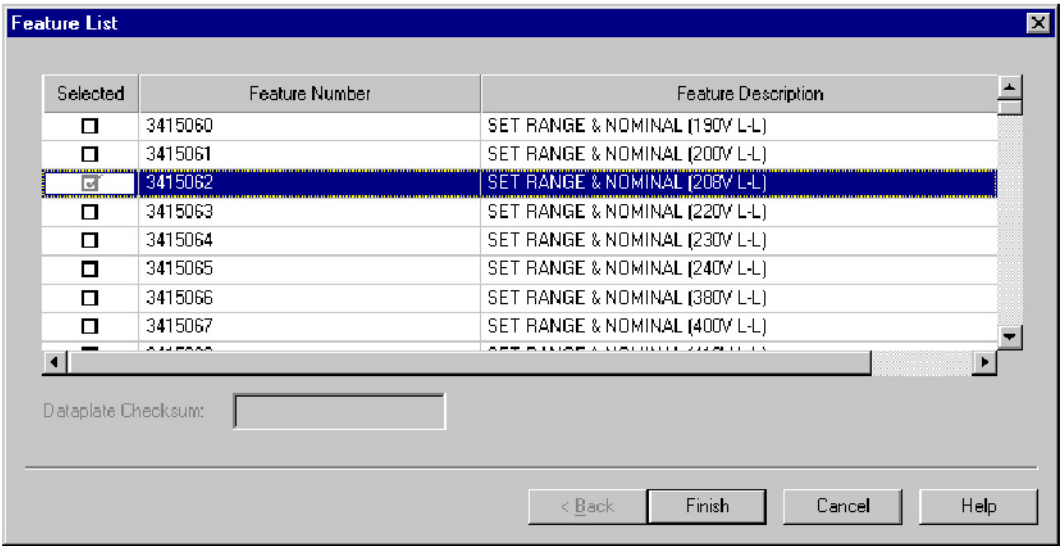


FIGURE 240. FEATURE LIST - AFTER UPDATE



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20 Monitor

This section describes how to use the Monitor and Datalog features. There are two methods of monitoring parameters, the user can create a custom Monitor dialog for viewing selected parameters, or the user can view pre-selected parameters, based on the device type.

20.1 Monitor and Datalog

The Monitor and Datalog features are used to view and record (datalog) parameters. The user can monitor preselected parameters with Device Explorer, or they can select the specific parameters they want to monitor and record, using the Monitor Dialog feature.

InPower's Device Explorer allows the user to navigate and view preselected parameters.

20.2 Monitor Dialog

The Monitor Dialog allows the user to select the parameters they want to view, set a sampling rate and enable the data logging feature. Sampling allows realtime data viewing. Data logging stores information in a file for later use.

The Monitor Dialog is displayed when the Monitor command is launched from either the **Start** menu or the **Monitor** button, on the InPower toolbar.

20.2.1 Monitor Dialog Features

The Monitor Dialog is shown in [Figure 241](#). This section describes how to use the Monitor Dialog features.

File Menu: Used to create a **New** Monitor file or to **Open** an existing Monitor file. Also used to **Save** changes to an opened file or **Save As...**, to save changes to a new file. **Recent** allows the user to view recently opened files and is used as a shortcut to open a file.

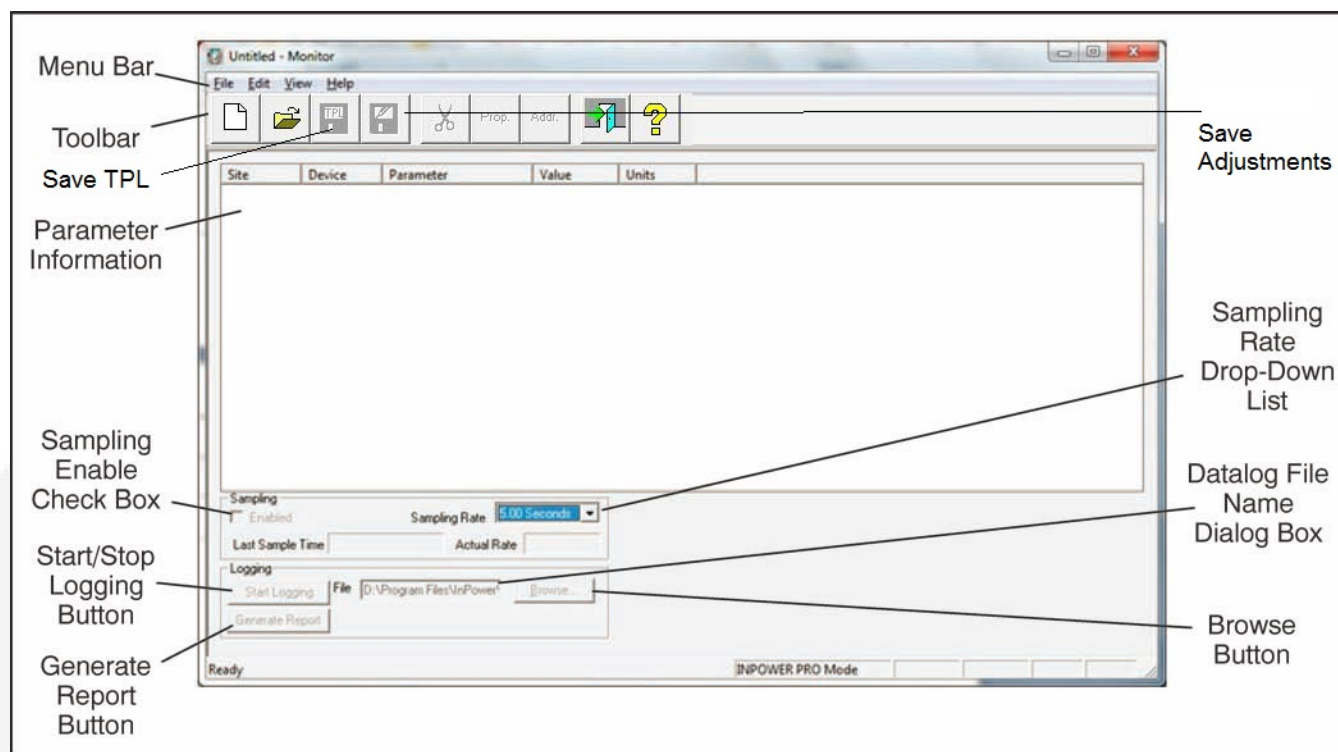


FIGURE 241. MONITOR DIALOG FEATURES

Edit Menu: Use the **Edit** menu commands to **Add**, **Delete**, **Edit**, **Cut**, **Copy**, **Paste**, and **Save Adjustment** parameters into and out of the Monitor Dialog.

View Menu: Use the **View** command to hide or display the **Toolbar** and **Status Bar**.

Help Menu: Provides InPower **Help Topics** and **About Monitor** help.

Sampling: The **Monitor** dialog will sample at the selected setting. To select the sample rate, click on the **Sampling - Enabled** check box (enabled when checked). Enabling the Sampling feature activates the **Sampling Rate** list box. Select the desired sampling rate from the list box. Sample rates are available from 0.05 seconds to 60 seconds.

Logging: **Logging** allows the user to log parameter information to a .LOG file (at the selected Sampling Rate). **Sampling** must be enabled to use this feature. Before enabling data logging, enter a name in the file dialog. The log file uses the tab delimited file format. To select the **Logging** feature, click on the **Start Logging** button. When data logging begins, the button text switches from **Start Logging** to **Stop Logging**. Click on the **Stop Logging** button to stop data logging.

Data can be logged to the default (Monitor_<Time Stamp>.001.log) file where the time stamp is "MM_DD_YYYY_HH_MM_SS" (for example, Monitor_12_22_2011_13_46_10.001.log). If this file exceeds the size limit of 4 MB, a new file is created where the last digits that were 001 are incremented to 002 (for example, Monitor_12_22_2011_13_46_10.002.log).

A report can be generated if you click on the **Generate Report** button. The **Browse** button allows the user to locate and overwrite a .log file in another directory.

A report can be generated if you click the **Generate Report** button. The **Browse** button allows the user to locate and overwrite a .log file in another directory. The Monitor utility displays reports correctly when parameters from multiple sites are being logged.



NOTE: If the list of variables is long, the actual log rate may be longer than the selected rate.

If logging is stopped and started again, the message shown below is displayed.

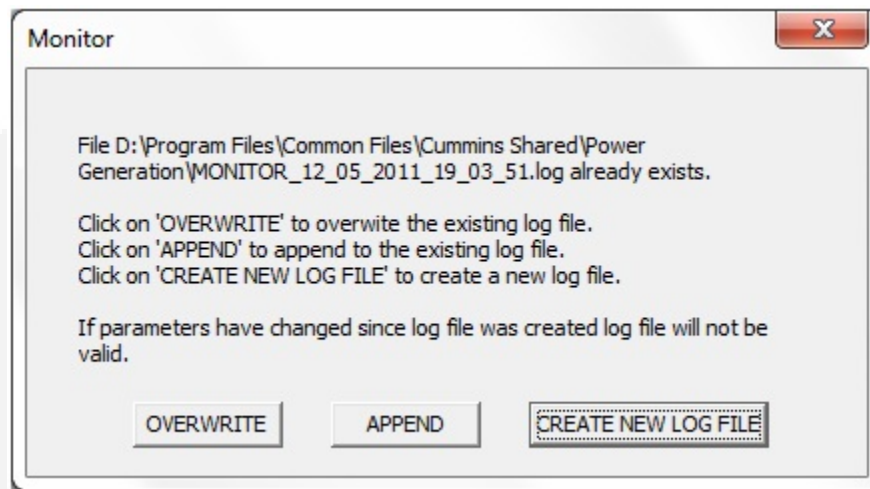


FIGURE 242. LOG FILE ALREADY EXISTS MESSAGE

Three buttons are available.

- Click the **OVERWRITE** button if the existing log file is to be overwritten.



NOTE: Because all previously saved data will be erased, overwriting an existing file is not advisable.

If the **OVERWRITE** button is selected, the following message is displayed to remind the operator that using this feature will result in the existing file being overwritten. Click **Yes** to overwrite the existing log. If **No** is selected, the message shown above will be redisplayed.

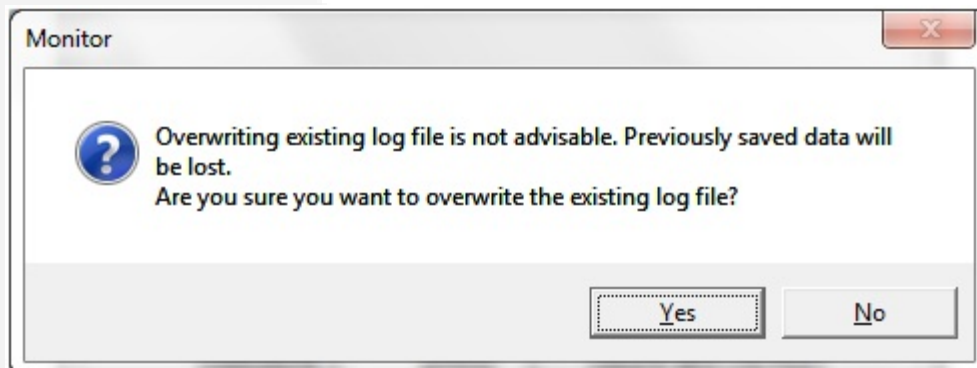


FIGURE 243. OVERWRITE CONFIGURATION MESSAGE

- Click the **APPEND** button if the existing log file is to be appended with the new data logs.
- Click the **CREATE NEW LOG FILE** button if the data logging is to be continued in a new log file.

20.2.2 Adding Parameters

Parameters can be added to the Monitor Dialog by selecting **Edit - Add** from the Menu bar or by clicking on the **Add** button, on the toolbar. The **Add** command launches InPower. Use Device Explorer to locate, select and copy the parameters that you want to add to the **Monitor** dialog.

After selecting a parameter, use the drag-and-drop procedure to add the parameter to the Monitor Dialog. (Or use the right menu button to **Copy** it, then move the cursor to the Monitor Dialog and use the right menu button again to **Paste** the parameter into the Monitor Dialog.)

Monitor settings can be saved to a template (.TPL file). These files are saved in the Monitor subdirectory of InPower. The template file stores the COM port information, this prevents the file from working on another COM port.

Each monitor screen provides the ability to log sampled values into a tab delimited .LOG file. This file format allows the data to be imported into Microsoft Excel.

20.2.3 Saving Parameters

Parameters values can be edited and saved in the controller flash memory from monitor utility.

1. To edit the parameter from monitor utility, double click on parameter or select the parameter from monitor and go to menu **Edit->Edit**. The Change/Write dialog is launched.

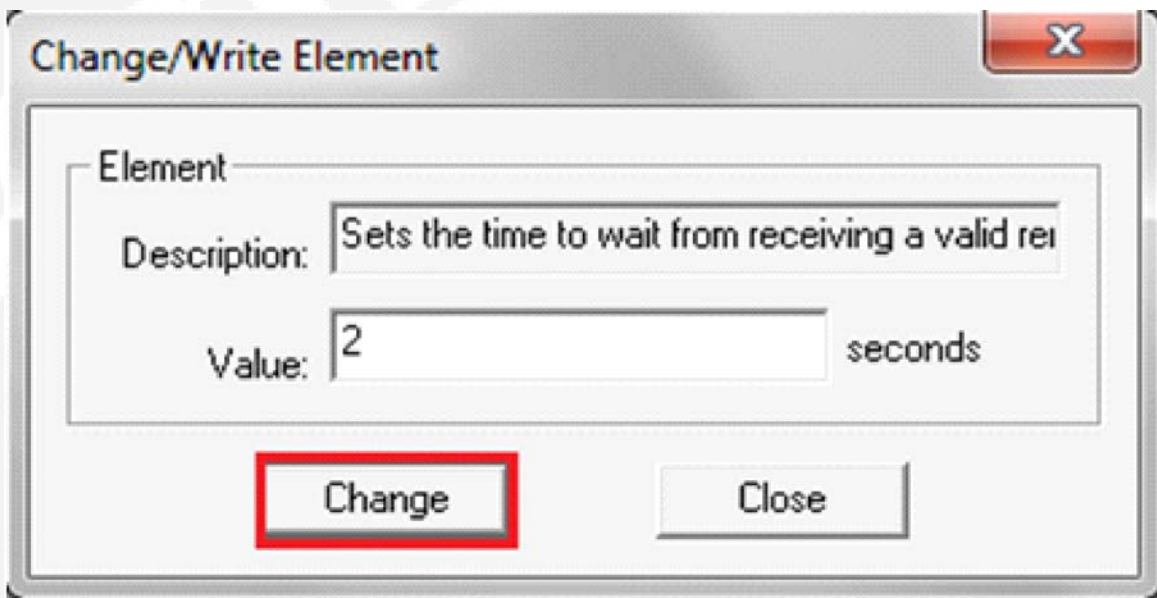


FIGURE 244. CHANGE/WRITE ELEMENT DIALOG

2. After changing the value click on **Change** button. After clicking on **Change** button, The Change/Write dialog closes and the monitor shows the changed parameter row in blue.

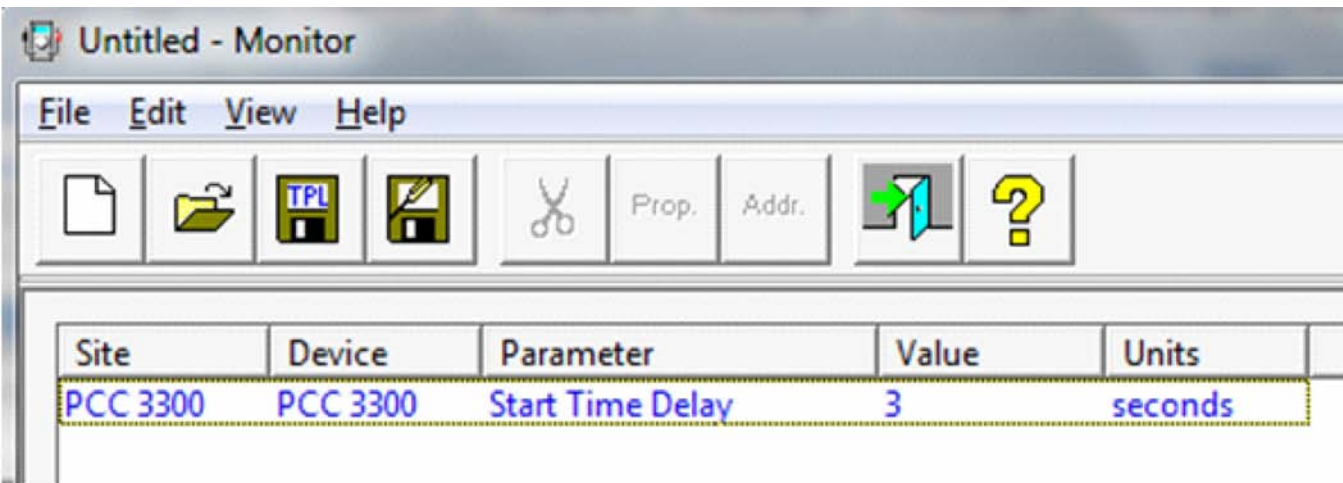


FIGURE 245. CHANGED VALUE SHOWN IN BLUE

3. To launch the save adjustment dialog from the monitor utility, select menu items **Edit->Save Adjustment** or click on the save adjustment icon on the tool bar.

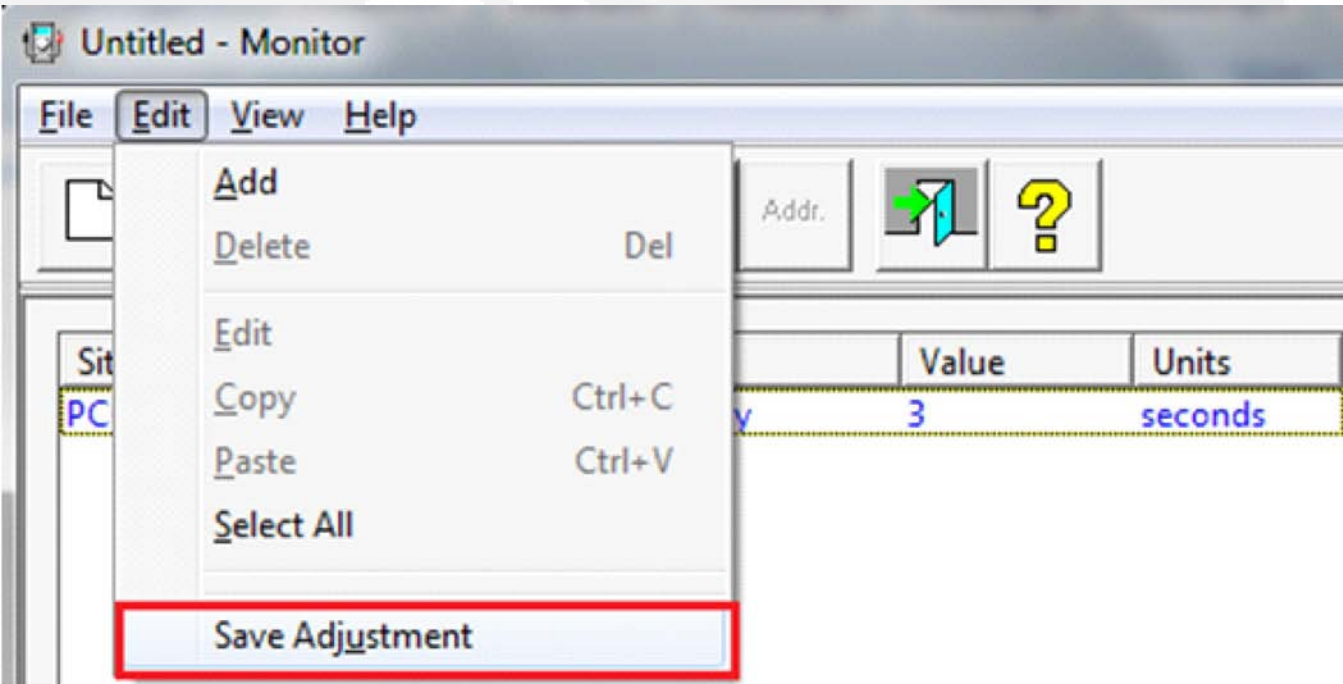


FIGURE 246. SAVE ADJUSTMENT MENU ITEM

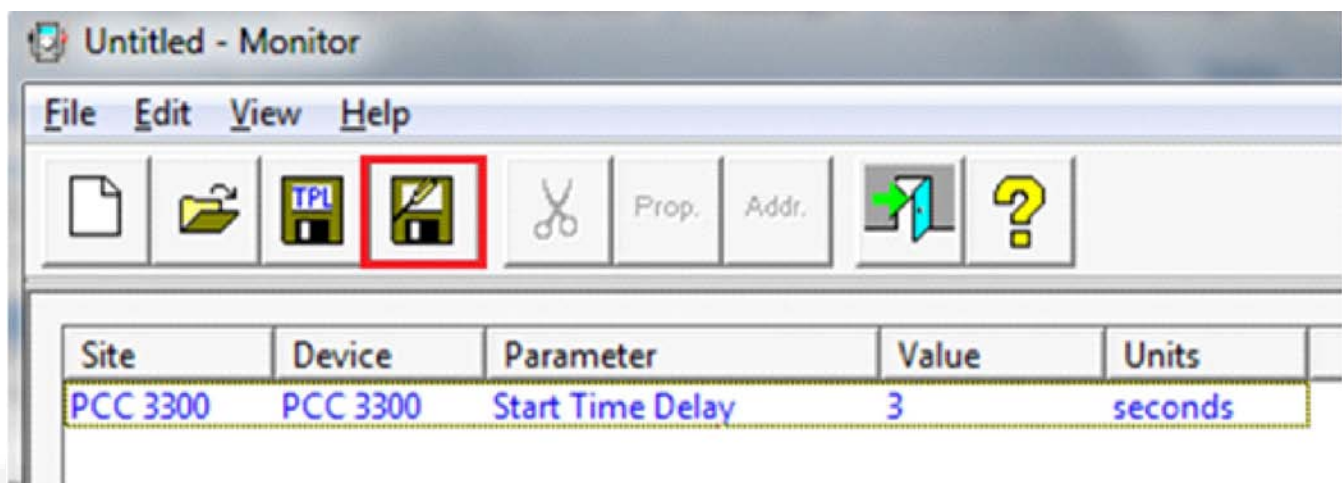


FIGURE 247. SAVE ADJUSTMENT TOOL BAR ICON

4. If one or more parameters are present in the save adjustment list. The Save adjustments dialog is launched. The Save adjustment functionality is only supported by applications the "Device explorer", "Monitor utility" and "Snapshot Configuration".

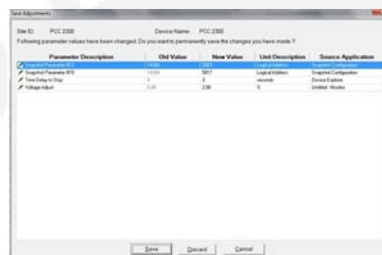


FIGURE 248.

21 Faults and the Fault Information System

This section describes the fault information features available for various types of devices.

21.1 Commercial Device Fault Information

The features include a **Fault Information Window** listing all active and inactive faults for a connected device, a **Snapshot** dialog displaying additional details about those faults, and the **Fault Information System** (FIS). The FIS feature is an online manual used to help diagnose the fault.

21.1.1 Fault Information Window

Use the InPower Device Explorer to view **Faults** for a connected device. Fault information for a device is only available when you are connected to the device.

To access the **Fault Information Window**, start InPower and connect to a port, then connect to a device. Click on the **Faults** directory, listed under the device, to display fault information in the right pane of Device Explorer.

Faults can also be viewed when connected to a device by clicking on the **View Faults** button, on the toolbar. This shortcut displays the faults in the **Faults** directory.

Each fault is represented by a fault code indicating a particular malfunction or abnormal condition within the device. The Service Manual and FIS reference this fault code to identify the fault condition and facilitate diagnosis and repair.

Faults are either active or inactive. Active faults indicate that the fault condition is present now. Inactive faults indicate a conditions that are no longer active. To change an active fault to inactive, make the necessary adjustment or repair to correct the fault condition.

The **Fault Information Window** displays an entry for each fault that has been generated by the device. All active faults are displayed first, followed by all inactive faults. The most recent fault is displayed at the top of each list.

The following information describes the titles in the Fault Information dialog.

Fault Code: A numeric code that identifies the fault.

Description: A brief description of the fault.

Fault Status: Indicates whether the fault is active or inactive, at this time.

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

Last Occurrence: Indicates the amount of controller on time at the last occurrence. Time is given in hours.

First Occurrence: Indicates the amount of controller on time at the first occurrence. Time is given in hours.

Effect: Displays the effect of the fault on the device. The effect can be a Warning, Derate, Shutdown with Cool Down, Shutdown, or none.

Use this information to match a specific fault to the symptoms observed by the operator. This information can help you determine which fault to address first.

21.1.2 Clearing Inactive Faults

Inactive faults can be cleared when the user is connected to the device. Click on the **Clear Faults** button, on the toolbar (or select the **Device** menu, and click on **Clear Faults**, to remove the faults). All inactive faults will be removed.

InPower does not allow removal of an individual inactive fault. If no inactive faults are present, the **Clear Faults** button is disabled.

21.1.3 Snapshot

Snapshot contains sensor and switch values that are captured when the fault occurred. Snapshot information is displayed in a separate **Snapshot** dialog.

To see snapshot information, double click on the Fault, or right click the mouse and select the **View-Snapshot** menu item. The **Snapshot** dialog has a **Previous** (<<) and **Next** (>>) button to move between the faults.

An engine related fault will have a Snapshot containing engine operating conditions at the time the fault occurred. Some faults may not have a Snapshot.



NOTE: COT is Controller on Time and ERT stands for Engine Run Time.

21.1.3.1 Devices That Do Not Support Snapshot

Snapshot is not available with the PCC 1100, PCC 1300, PCC 1301, and PCC 1302.

21.1.4 Fault Information System

The Fault Information System (FIS) contains an online manual that displays troubleshooting and repair (help) files for commercial gensets.

To access the main Fault Information Window, select **Fault Trees** from the **View** menu or click the **View Fault Info.** (magnifying glass icon), on the toolbar. The main Fault Information System Window is displayed ([Figure 249](#)).

The FIS is designed as a standard Windows Help system. The system uses conventional Windows Help techniques to display and find information. For example, you can:

- Click on text marked by a solid underline to open the window for that topic.
- Click on text marked by a dashed underline to display a pop-up window related to the text. Click once to close the pop-up window.
- Use the buttons on the Button Bar to perform common Windows Help functions (**Contents**, **Search**, **Back**, etc.).
- Use the **Print Topic** command from the **File** menu to print information related to the current screen. (Note: pop-up windows and secondary Help windows will not print.)

Use the FIS main window to navigate to each of the systems main features as follows:

- Click on **Fault Code Diagnostics** to display descriptive information about a specific, identifiable fault, or to display a troubleshooting step to correct a specific fault.
- Click on **Symptom Based Diagnostics** when a fault code is not available and you need to diagnose and troubleshoot the problem based on your observations.

- Click on **Additional Information** text to display information about service tools and general engine servicing procedures, such as performing a continuity check.
- Click on **Component Listing** to display a list of components and a description of each component.
- Click on **Specifications** to display a list of electrical or sensor specifications.
- Click on **Theory of Operation** to view a list of available subjects. Click on the desired subject to view the basic theory of operation for the selected subject.
- Click on **Wiring Diagrams** to view a list of available wiring diagrams. Click on the desired circuit text to view the wiring diagram.

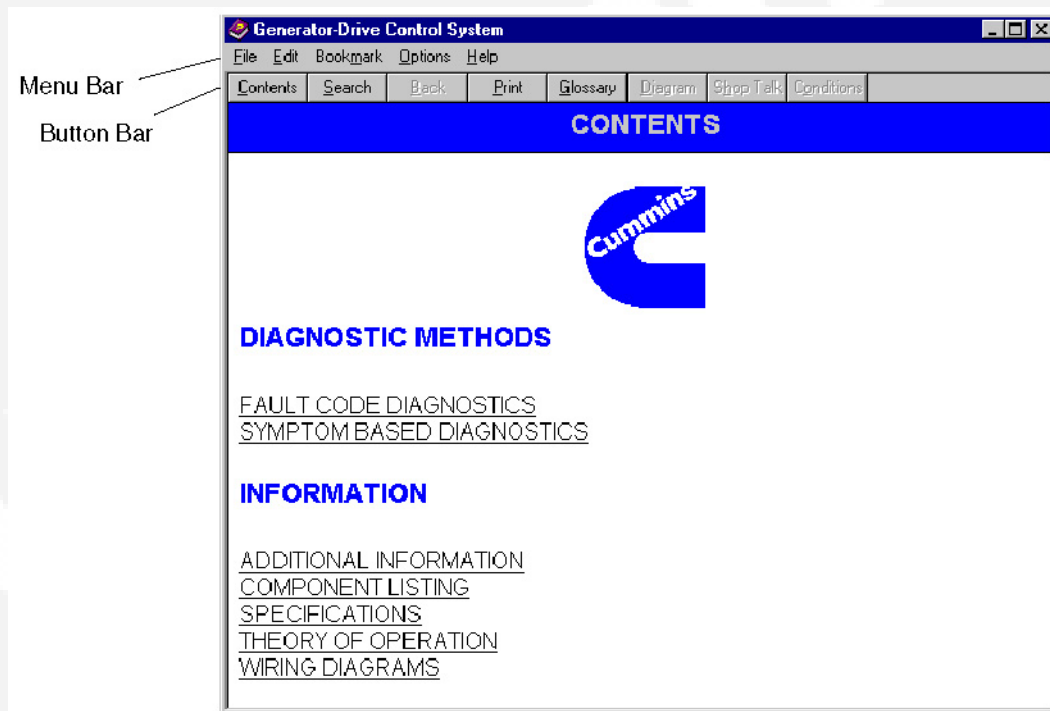
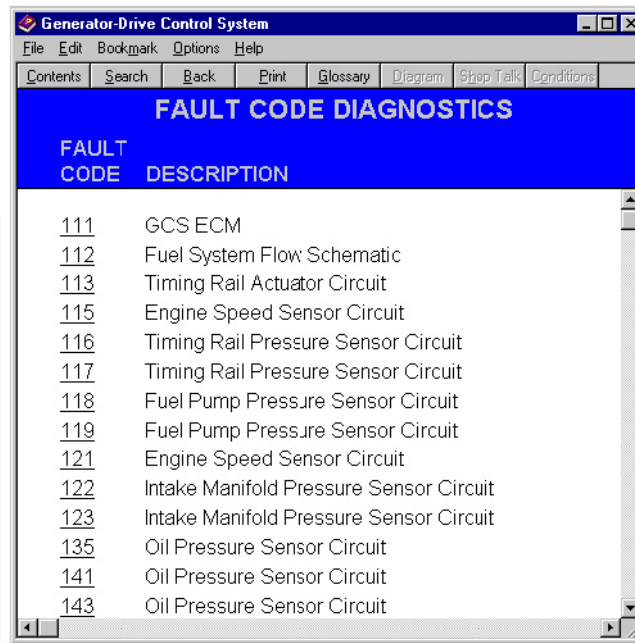


FIGURE 249. MAIN FAULT INFORMATION SYSTEM WINDOW

21.1.4.1 Fault Code Diagnostics

Use the Fault Code Diagnostics feature to display diagnostic and troubleshooting information for a specific fault code.

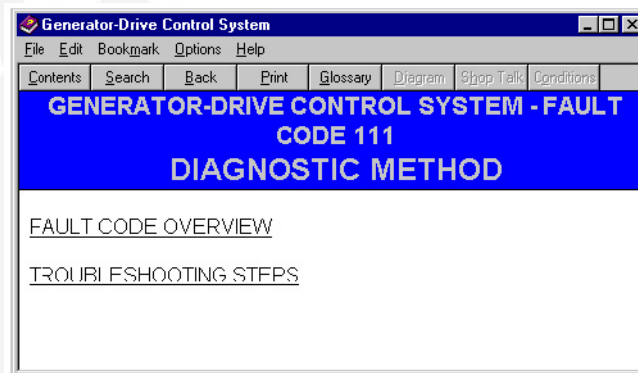
After selecting **Fault Code Diagnostics**, a list of fault codes is displayed ([Figure 250](#)). Click on a specific underlined fault code to display more information about troubleshooting the fault.



FAULT CODE	DESCRIPTION
111	GCS ECM
112	Fuel System Flow Schematic
113	Timing Rail Actuator Circuit
115	Engine Speed Sensor Circuit
116	Timing Rail Pressure Sensor Circuit
117	Timing Rail Pressure Sensor Circuit
118	Fuel Pump Pressure Sensor Circuit
119	Fuel Pump Pressure Sensor Circuit
121	Engine Speed Sensor Circuit
122	Intake Manifold Pressure Sensor Circuit
123	Intake Manifold Pressure Sensor Circuit
135	Oil Pressure Sensor Circuit
141	Oil Pressure Sensor Circuit
143	Oil Pressure Sensor Circuit

FIGURE 250. FAULT CODE DIAGNOSTICS

After clicking on a fault code, the **Diagnostic Method** window is displayed ([Figure 251](#)).



GENERATOR-DRIVE CONTROL SYSTEM - FAULT CODE 111 DIAGNOSTIC METHOD	
FAULT CODE OVERVIEW	
TROUBLESHOOTING STEPS	

FIGURE 251. DIAGNOSTIC METHOD

Two diagnostic methods are provided, choose one these options:

- Click on **Fault Code Overview** to display the fault code, the cause of the fault and the effect of the fault. This information will determine which fault to address first. You can display a variety of other information related to the fault including fault location, description and troubleshooting steps. (Refer to **Fault Overview**.)
- Click on **Troubleshooting Steps** to display a list of corrective actions to troubleshoot the fault. You can display various levels of detail for each troubleshooting step. (Refer to **Troubleshooting Steps**.)

21.1.4.2 Fault Code Overview

The Fault Code Overview feature is used to view summary information about the selected fault, including the fault code, reason for the fault, and possible effects of the fault.

To display the fault **Overview** window ([Figure 252](#)), click on the **Fault Code Overview** text in the **Diagnostic Method** window ([Figure 251](#)).

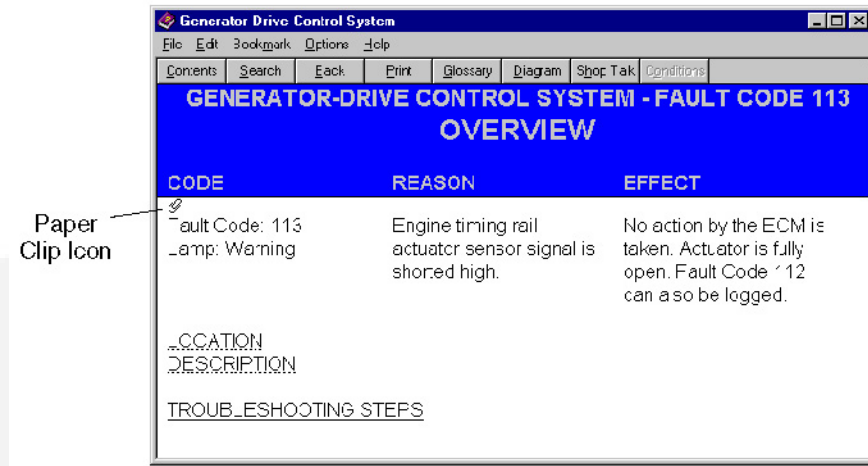


FIGURE 252. OVERVIEW

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

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

Use the **Annotate** command, from 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 the information was entered. Click once on the paper clip icon to display the note.

Use the **Search**, **Back** and **Glossary** buttons, on the button bar, to find more information about each fault and to navigate through the help system.

21.1.4.3 Troubleshooting Steps

Three levels of diagnostic help are available, depending on your needs and level of experience:

To display troubleshooting steps, click on **Troubleshooting Steps** from either the **Diagnostics Methods** window or the **Overview** window.

1. **Troubleshooting Steps** are designed for trained and experienced technicians needing a quick outline of the steps to take to correct the fault. This is the first screen that displays when opening the Troubleshooting Steps window.
2. **Summary Steps** are designed for the technician wanting a more detailed overview of the major troubleshooting steps required 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 technicians wanting the most detailed information about each step in the troubleshooting process. Guided steps provide a step-by-step path through the troubleshooting process. Simply click on an **OK** icon to proceed to the next step or click on the **Not OK** icon to receive summary information on how to correct the problem before proceeding.

This section covers each of these types of steps in detail.



WARNING: *Troubleshooting procedures present hazards that can result in severe personal injury or death. Only trained and experienced personnel, with knowledge of electricity and machinery hazards should perform service.*

The **Troubleshooting Steps** window ([Figure 253](#)) provides a button bar for quick access to other related information about the fault and its symptoms:

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

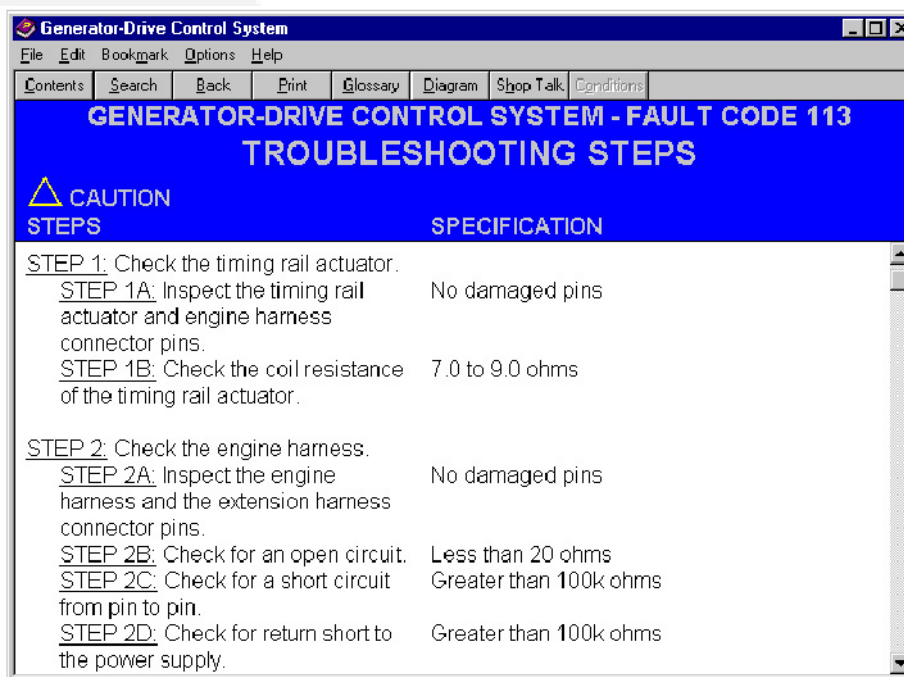


FIGURE 253. TROUBLESHOOTING STEPS

The Troubleshooting Steps list the steps in outline format. For example, Step 1, Step 1A, Step 1B, Step 2, Step 2A, Step 2B, and so on. 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 display and scroll through the window. You can re-display them at any time by clicking on the **Caution** or **Warning** icon.

To display summary steps:

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

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

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

After performing a step and receiving unsatisfactory results, click on the **Not OK** icon in the Actions column ([Figure 254](#)). A pop-up window will provide summary information on what to do to correct the problem.

After reviewing the information, click on **Summary Text**, to display the next summary step for this fault or click on **Troubleshooting Steps** to display the high-level summary of troubleshooting steps.

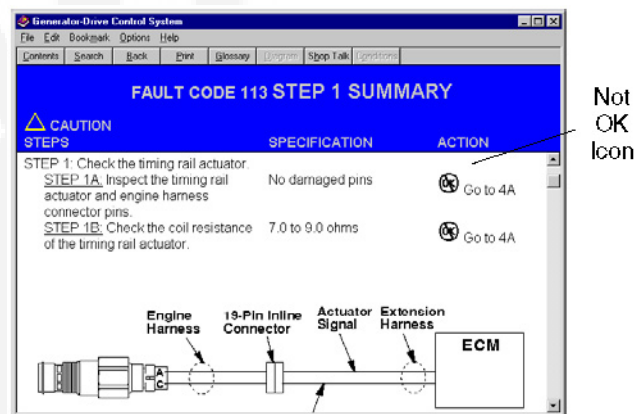


FIGURE 254. SUMMARY STEPS

To display guided steps:

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

The **Guided Step** window displays ([Figure 255](#)). It contains diagnostic information specific to this step.

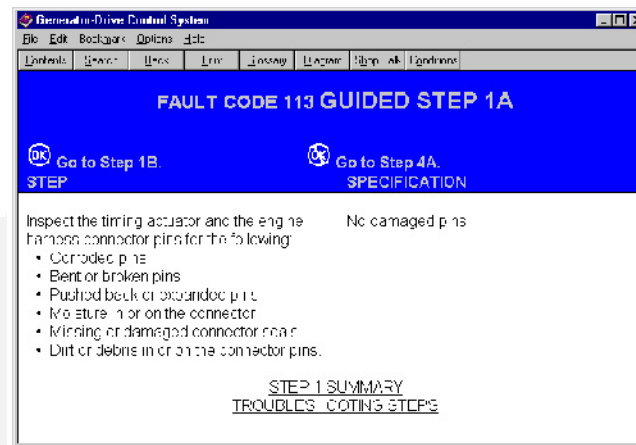


FIGURE 255. GUIDED STEPS

Any general conditions that should be met prior to performing the steps will display in a pop-up box. Click once to remove the pop-up window from the display, then scroll through the window. You can display these pop-up messages again by clicking on the **Conditions** button, on the button bar.

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

If unsatisfactory results are received, click on the **Not OK** icon. A pop-up window will provide summary information on how to correct the problem. Once the program is repaired, click on the **Repair Complete** text in the pop-up window to go to the next guided step.

Click on **Summary Text** to display the next summary step for this fault, or click on **Troubleshooting Steps** to display the high-level outline of troubleshooting steps.

21.1.4.4 Symptom Based Diagnostics

Use **Symptom Based Diagnostics** when the fault code is not known, but are aware of the symptom.

This feature displays a list of common symptoms ([Figure 256](#)). Click on a symptom to view a display of the possible cause of the symptom and a list of corrective actions ([Figure 257](#)).

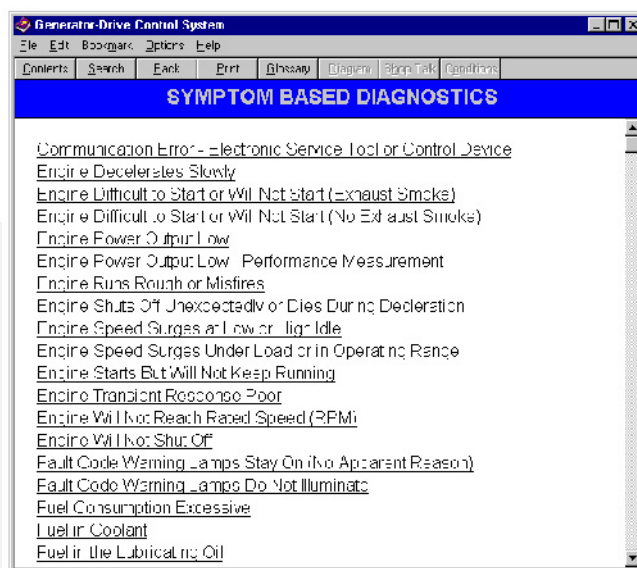


FIGURE 256. SYMPTOM BASED DIAGNOSTICS

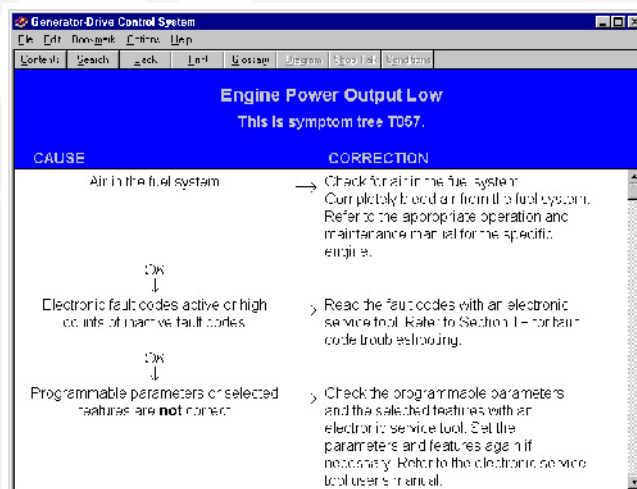


FIGURE 257. SYMPTOM BASED TROUBLESHOOTING

21.1.4.5 Additional Information

After clicking on **Additional Information**, a list of general service topics are displayed ([Figure 258](#)). These topics contain general information about troubleshooting and service. Click on an entry in the list to display more information about that topic. For example, click on **How to Use a Multimeter** for basic instructions on how to use a multimeter.

When you are finished, use the buttons on the toolbar (such as **Contents**) to navigate another part of the online manual. Close the Fault Tree window to return to InPower.

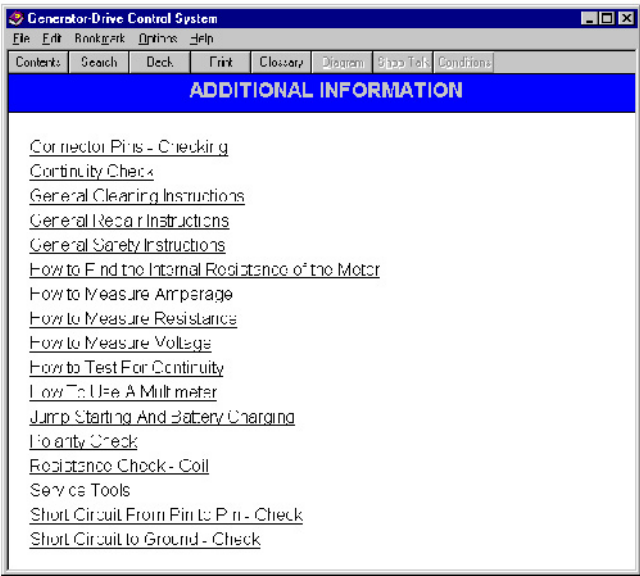


FIGURE 258. ADDITIONAL INFORMATION

21.1.4.6 Component Listing

The **Component Listing** feature provides details about engine and control component locations and descriptions. Click on the text in the **Location** column for a pop-up description of the components location. Click on the text in the **Description** column for a pop-up description of the component (**Figure 259**).

When finished, use the buttons on the toolbar (such as **Contents**) to navigate another part of the online manual. Close the Fault Tree window, to return to InPower.

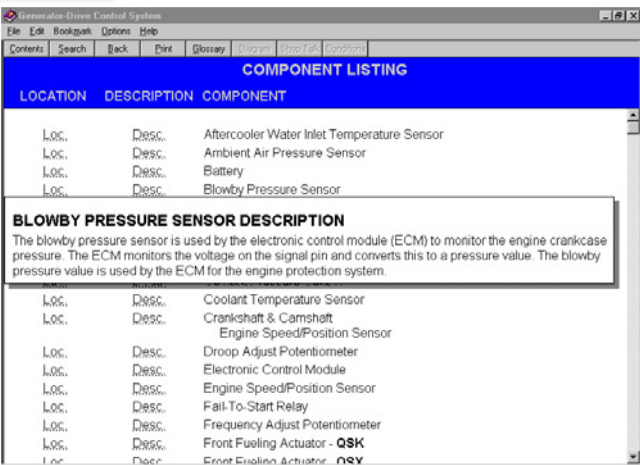


FIGURE 259. COMPONENT LISTING

21.1.4.7 Specifications

Click on **Specifications** to display a list of the selected specifications.

When finished viewing the specifications, use buttons on the toolbar (such as **Contents**) to navigate another part of the online manual. Close the Fault Tree window to return to InPower.

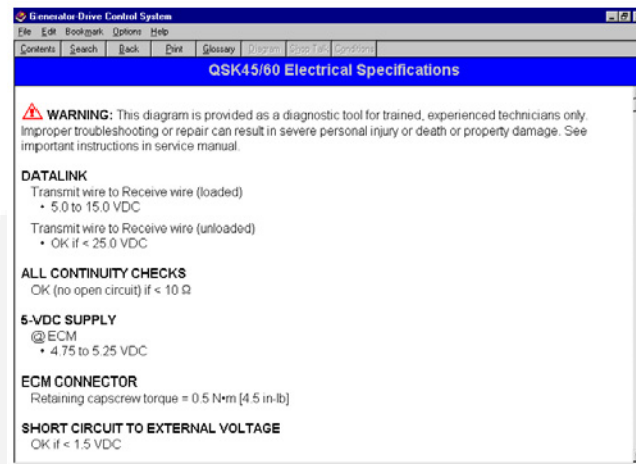


FIGURE 260. SPECIFICATIONS

21.1.4.8 Theory of Operation

The **Theory of Operation** feature describes operation of the selected component. Use the scroll bars to view the text.

When you are finished, use the buttons on the toolbar (such as **Contents**) to navigate another part of the online manual. Close the Fault Tree window to return to InPower.

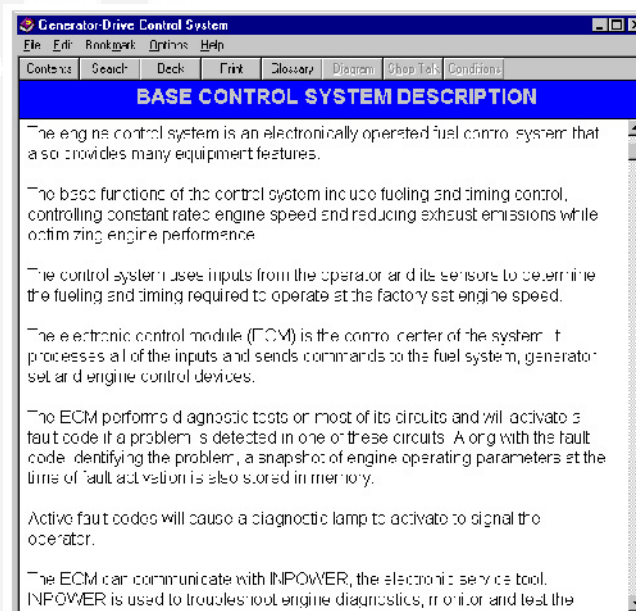


FIGURE 261. THEORY OF OPERATION

21.1.4.9 Wiring Diagrams

The **Wiring Diagrams** feature displays a list of engine system components ([Figure 263](#)). Click on one of the components to view a wiring diagram for that component.

When finished, use the buttons on the toolbar (such as **Contents**) to navigate another part of the online manual. Close the Fault Tree window to return to InPower.



CAUTION: *Wiring Diagrams are subject to change. Refer to the wiring diagram supplied with the equipment or in the manufacturer's service manual. Failure to use the correct wiring diagram can result in severe personal injury or equipment damage.*

21.1.4.10 Glossary

The **Glossary** contains an alphabetical listing of frequently used terms and their descriptions ([Figure 262](#)). Use the Search feature, or the scroll bar to locate the desired term.

When finished, use the buttons on the toolbar (such as **Contents**) to navigate another part of the online manual. Or close the Fault Tree window to return to InPower.

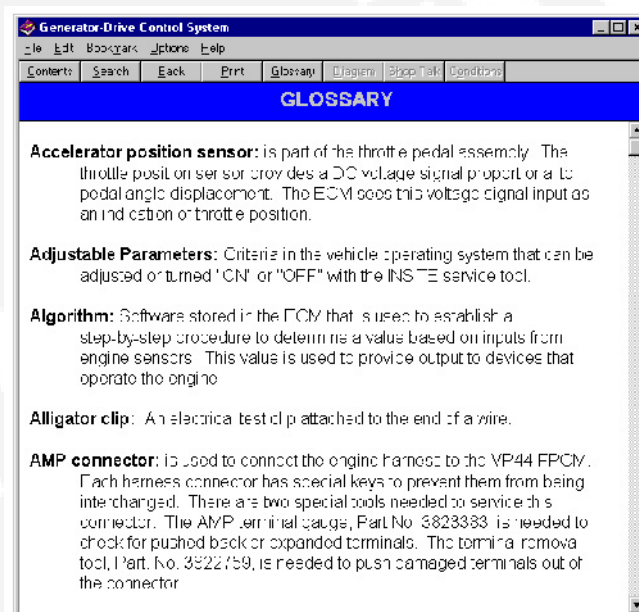


FIGURE 262. ONLINE GLOSSARY

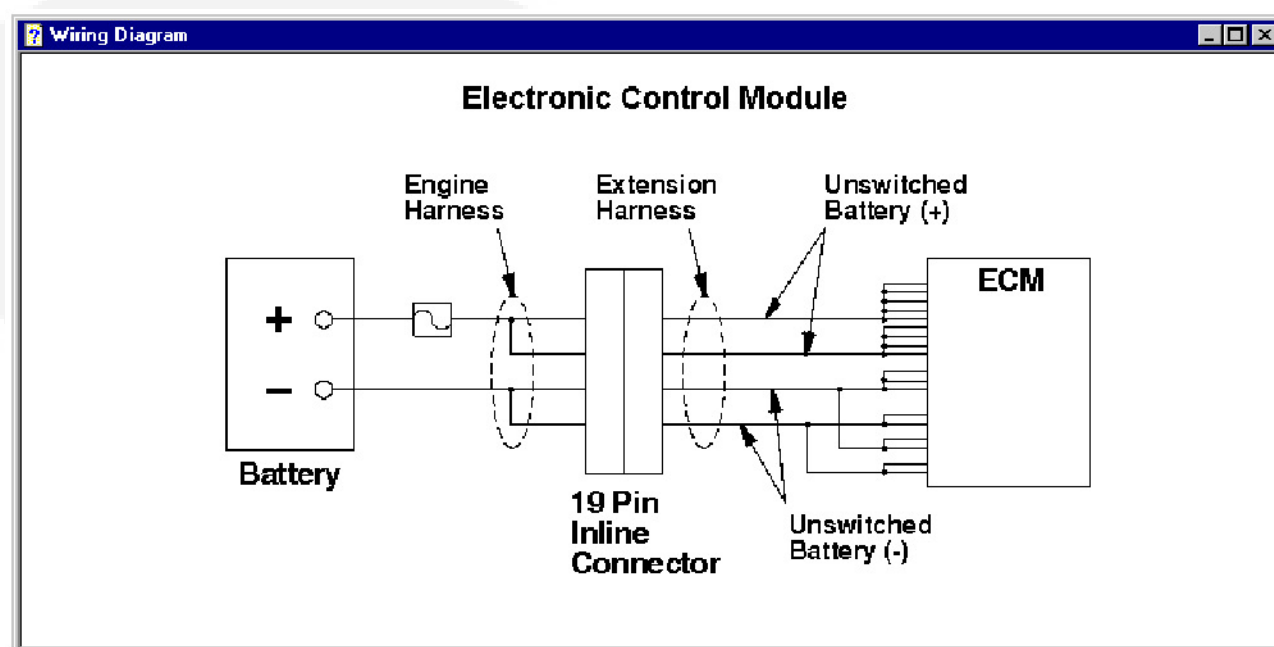


FIGURE 263. WIRING DIAGRAM WINDOW

21.2 Consumer Device Fault Information

Three categories of fault information are available with RV gensets: **Advanced Fault Info**, **Fault History**, and **Fault Occurrences**. Marine gensets include the same three categories of fault information plus an additional category, **Fault Bypass Info**.

The **Fault Information Window** displays detailed information for each of the parameters listed in each category.

21.2.1 Fault Information

Use the InPower Device Explorer to view **Faults** for a connected device. Current fault information for a device is only available when you are connected to the device.

To access the **Fault Information Window**, start InPower and connect to a port, then connect to a device. To view the fault categories, select the device name and either expand the device directory or else click on the View Faults shortcut button ([Figure 264](#)).

Each fault is represented by a fault code indicating a particular malfunction or abnormal condition within the device.

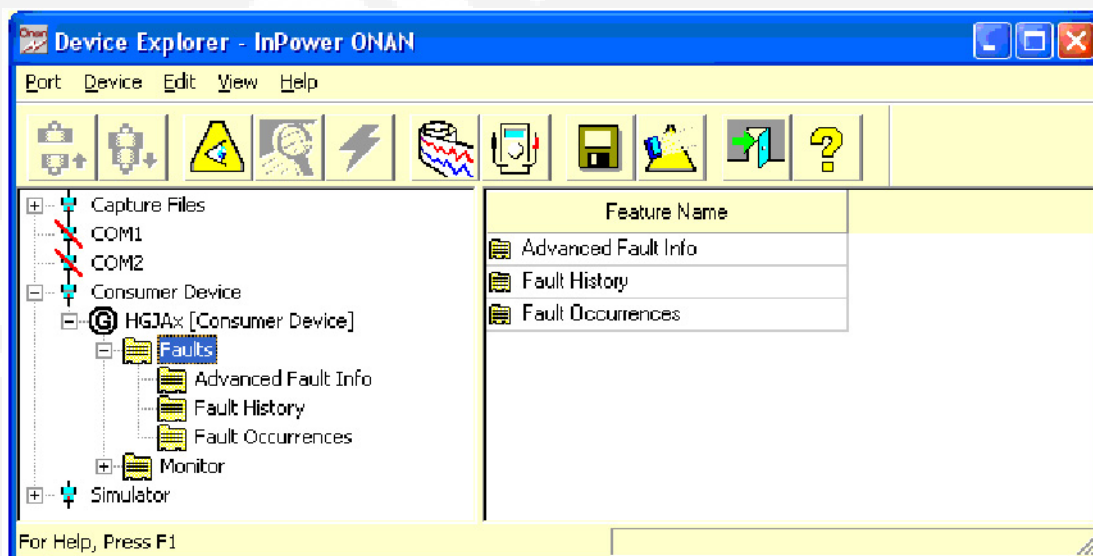


FIGURE 264. FAULT INFORMATION WINDOW FOR RV GENSET

21.2.2 Advanced Fault Information

The Advanced Fault Information window ([Figure 265](#)) is for factory use only. This window shows the number of faults enabled in the software. For some gensets, it also shows the number of fuel faults enabled in the software.



NOTE: The time listed in the Time Last Read column is the time that InPower last read the fault; it is not the actual time of occurrence.

21.2.3 Fault History

The Fault History window ([Figure 265](#)) lists all active fault codes for a connected device and the last recorded faults that occurred (some display the last five faults).

To find information about fault codes and how to correct faults, refer to the Fault Help menu. Use this information to match a specific fault to the symptoms observed by the operator. This information can help you determine which fault to address first.



NOTE: The time listed in the Time Last Read column is the time that InPower last read the fault; it is not the actual time of occurrence.

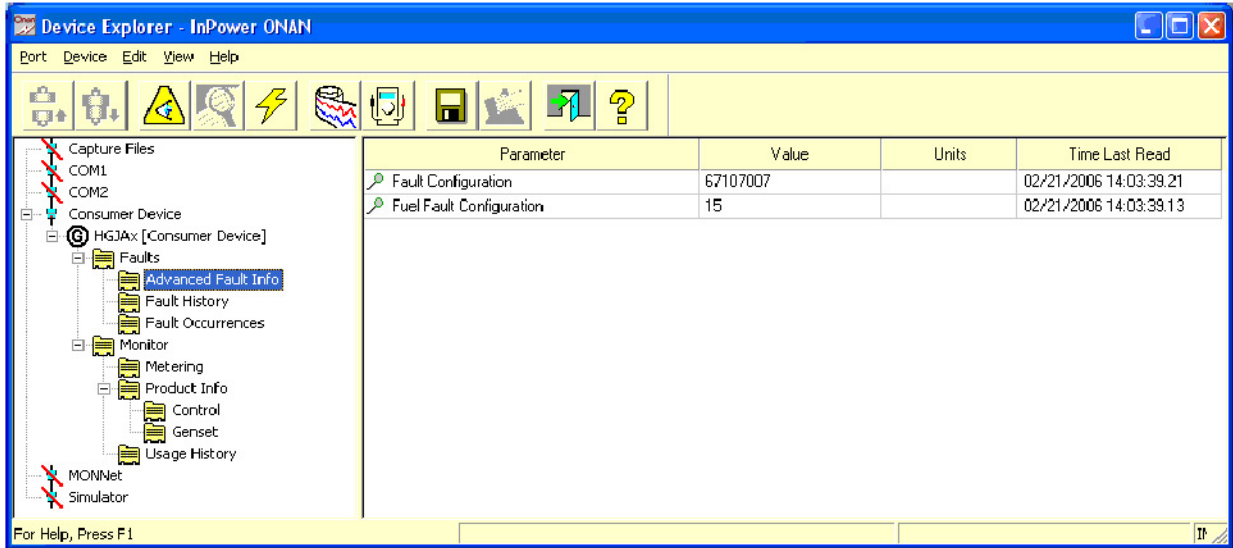


FIGURE 265. ADVANCED FAULT INFORMATION

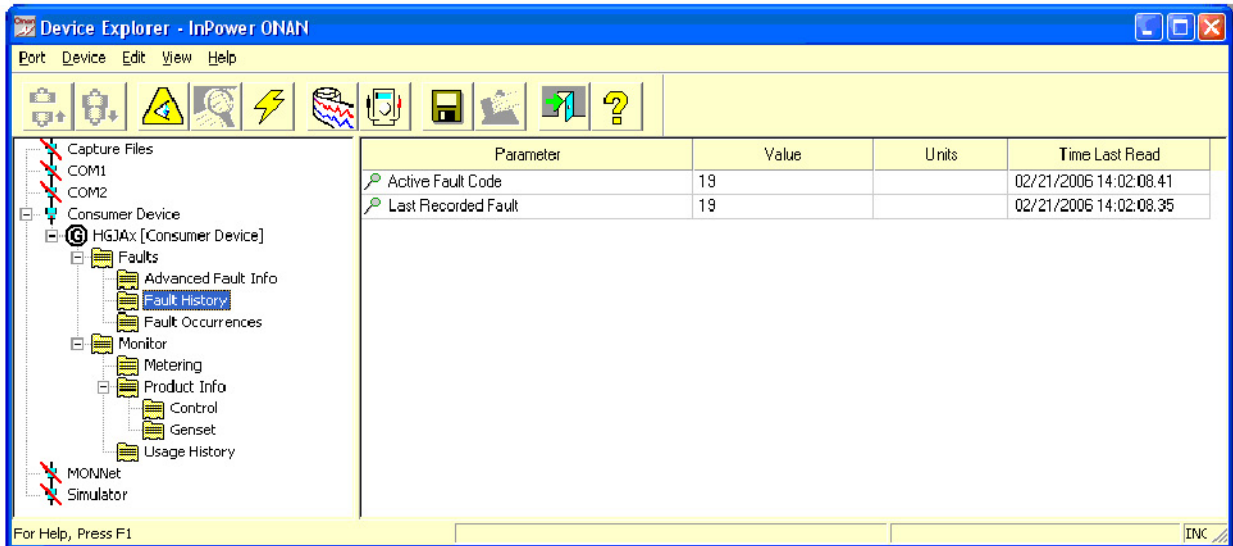


FIGURE 266. FAULT HISTORY

21.2.4 Fault Occurrences

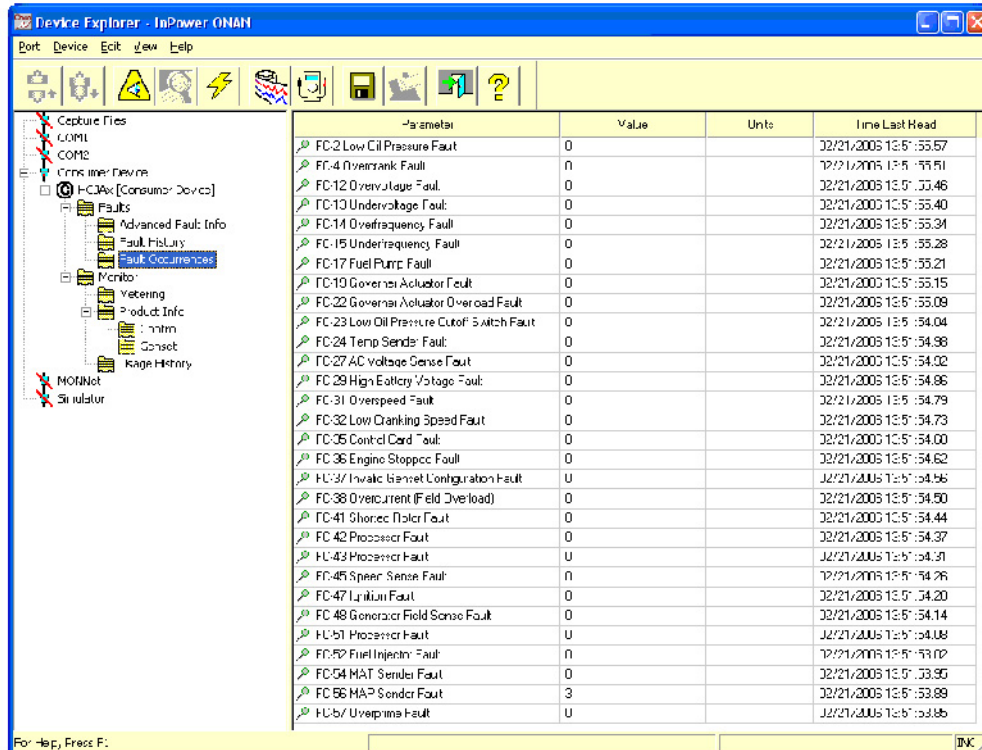
The Fault Occurrences window (Figure 267) lists all possible faults that are available with the device and the number of times each fault occurred.



NOTE: The time listed in the Time Last Read column is the time that InPower last read the fault; it is not the actual time of occurrence.

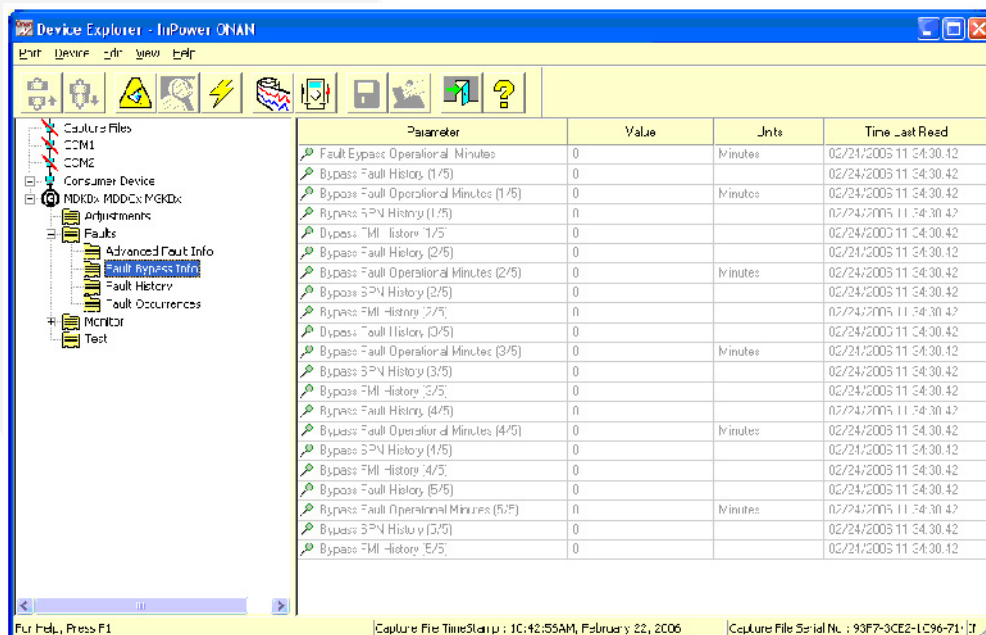
21.2.5 Fault Bypass Info

Fault Bypass Information ([Figure 268](#)) is only available with Marine MDDCx gensets. This screen displays the number of minutes the control was operated in fault bypass mode and other events that may have occurred while in fault bypass mode. If any of these events occur, a number is placed in the Value column.



Parameter	Value	Units	Time Last Read
FC-2 Low Oil Pressure Fault	0		32/21/2005 12:51:55.57
FC-4 Overcrank Fault	0		32/21/2005 12:51:55.51
FC-12 Overvoltage Fault	0		32/21/2005 12:51:55.46
FC-13 Undervoltage Fault	0		32/21/2005 12:51:55.40
FC-14 Overfrequency Fault	0		32/21/2005 12:51:55.34
FC-15 Underfrequency Fault	0		32/21/2005 12:51:55.28
FC-17 Fuel Pump Fault	0		32/21/2005 12:51:55.21
FC-19 Governor Actuator Fault	0		32/21/2005 12:51:55.15
FC-22 Governor Actuator Overload Fault	0		32/21/2005 12:51:55.09
FC-23 Low Oil Pressure Cutoff Switch Fault	0		32/21/2005 12:51:54.04
FC-24 Temp Sensor Fault	0		32/21/2005 12:51:54.98
FC-27 AC Voltage Sense Fault	0		32/21/2005 12:51:54.92
FC-29 High Battery Voltage Fault	0		32/21/2005 12:51:54.86
FC-31 Overspeed Fault	0		32/21/2005 12:51:54.79
FC-32 Low Cranking Speed Fault	0		32/21/2005 12:51:54.73
FC-35 Control Card Fault	0		32/21/2005 12:51:54.00
FC-36 Engine Stoppage Fault	0		32/21/2005 12:51:54.62
HL-37 Invalid Genset Configuration Fault	U		32/21/2005 12:51:54.56
FC-38 Overcurrent (Field Overload)	0		32/21/2005 12:51:54.50
FC-41 Shorted Motor Fault	0		32/21/2005 12:51:54.44
FC-42 Processor Fault	0		32/21/2005 12:51:54.37
HL-43 Processor Fault	U		32/21/2005 12:51:54.31
FC-45 Speed Sensor Fault	0		32/21/2005 12:51:54.26
FC-47 Lubrication Fault	0		32/21/2005 12:51:54.20
FC-48 Generator Field Sensor Fault	0		32/21/2005 12:51:54.14
HL-51 Processor Fault	U		32/21/2005 12:51:54.08
FC-52 Fuel Injector Fault	0		32/21/2005 12:51:53.92
FC-54 MAT Sensor Fault	0		32/21/2005 12:51:53.86
FC-56 MAT Sensor Fault	3		32/21/2005 12:51:53.80
HL-57 Overvoltage Fault	U		32/21/2005 12:51:53.74

FIGURE 267. FAULT OCCURRENCES



Parameter	Value	Units	Time Last Read
Fault Bypass Operational Minutes	0	Minutes	02/24/2005 11:54:30.42
Bypass Fault History (1/5)	0		02/24/2005 11:54:30.42
Bypass Fault Operational Minutes (1/5)	0	Minutes	02/24/2005 11:54:30.42
Bypass SPN History (1/5)	0		02/24/2005 11:54:30.42
Bypass FMI History (1/5)	0		02/24/2005 11:54:30.42
Bypass Fault History (2/5)	0		02/24/2005 11:54:30.42
Bypass Fault Operational Minutes (2/5)	0	Minutes	02/24/2005 11:54:30.42
Bypass SPN History (2/5)	0		02/24/2005 11:54:30.42
Bypass FMI History (2/5)	0		02/24/2005 11:54:30.42
Bypass Fault History (3/5)	0		02/24/2005 11:54:30.42
Bypass Fault Operational Minutes (3/5)	0	Minutes	02/24/2005 11:54:30.42
Bypass SPN History (3/5)	0		02/24/2005 11:54:30.42
Bypass FMI History (3/5)	0		02/24/2005 11:54:30.42
Bypass Fault History (4/5)	0		02/24/2005 11:54:30.42
Bypass Fault Operational Minutes (4/5)	0	Minutes	02/24/2005 11:54:30.42
Bypass SPN History (4/5)	0		02/24/2005 11:54:30.42
Bypass FMI History (4/5)	0		02/24/2005 11:54:30.42
Bypass Fault History (5/5)	0		02/24/2005 11:54:30.42
Bypass Fault Operational Minutes (5/5)	0	Minutes	02/24/2005 11:54:30.42
Bypass SPN History (5/5)	0		02/24/2005 11:54:30.42
Bypass FMI History (5/5)	0		02/24/2005 11:54:30.42

FIGURE 268. FAULT BYPASS INFORMATION (FOR SELECT MARINE GENSETS ONLY)

21.2.6 Clearing Inactive Faults

InPower does not allow removal of an individual inactive fault. The **Clear Faults** button is disabled.

To clear faults, press the Stop or Start switch on the genset, as described in the genset Operator's Manual.

21.2.7 Consumer Device Fault Information

Consumer Device Fault information is available from the Help menu (Figure 269). It includes a list of possible faults that can occur with each genset model. Each individual fault includes a fault description, a list of possible causes, and diagnosis and repair procedures.

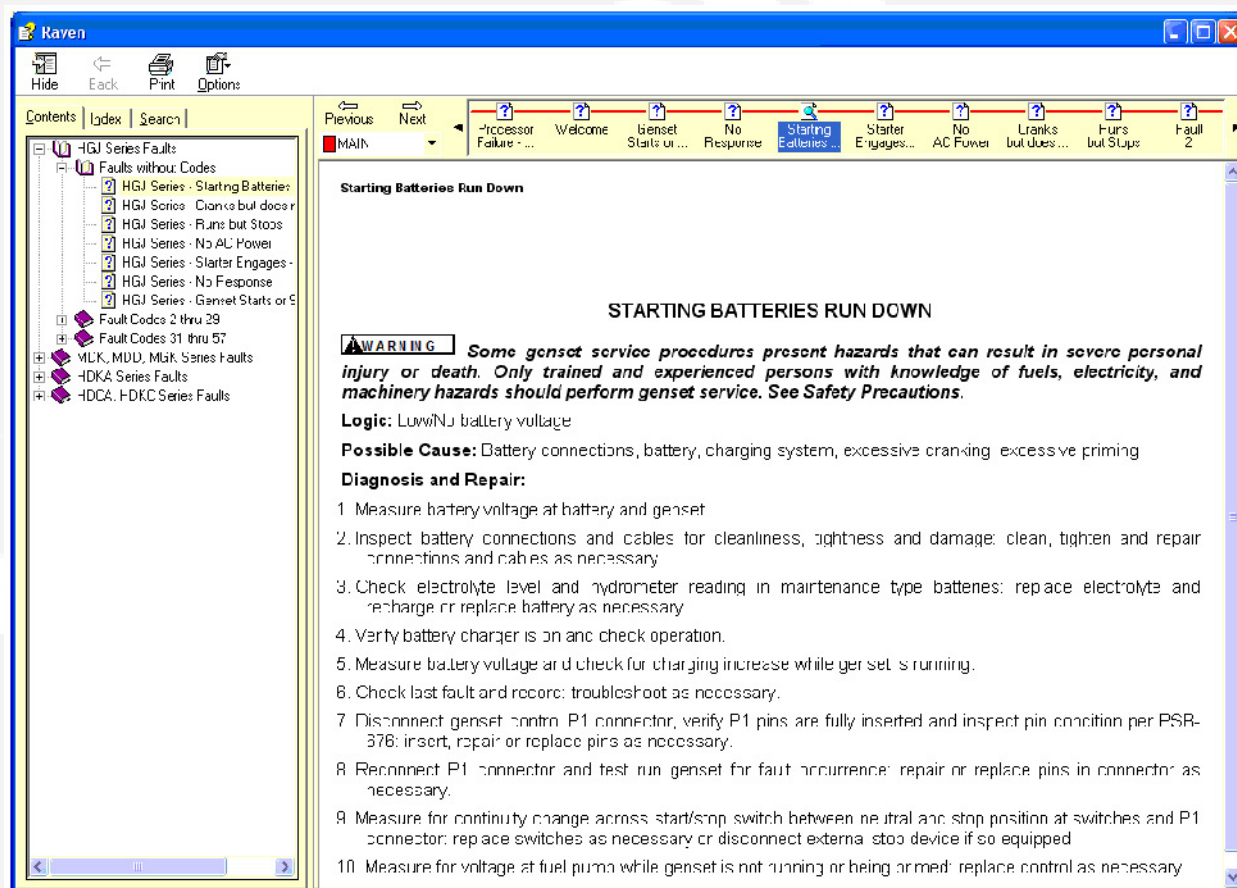


FIGURE 269. CONSUMER DEVICE FAULT INFORMATION HELP FILES

21.3 ATS Faults

The ATS Faults features are covered in this section because the fault features for this device are unique to transfer switches. The **Faults** directory for a typical transfer switch contains the following groups (folders):

- Clear Faults
- Event History Log
- Event Records

21.3.1 Clear Faults

This group allows the user to Acknowledge faults, clear all inactive faults, or clear a specific inactive fault. ([Figure 270](#).)

Inactive faults can be acknowledged by double clicking on the **Acknowledge Faults** Value cell and selecting **True** from the drop down list. Then click on the **Save Trims** button, on the tool bar, to acknowledge the faults.

Inactive faults can be acknowledged by double clicking on the **Acknowledge Faults** Value cell and selecting **True** from the drop down list. Then click on the **Save Trims** button, on the tool bar, to acknowledge the faults.

All inactive faults can be cleared by double clicking on the **Clear All Inactive Faults** Value cell. Then select **ON**, in the drop down list. Click on the **Save Trims** button, on the tool bar, to clear all inactive faults.

Clear a specific inactive fault by double clicking on the **Clear Specific Inactive Fault** Value cell and enter the fault code number. Then click on the **Save Trims** button, on the tool bar, to clear the inactive fault.

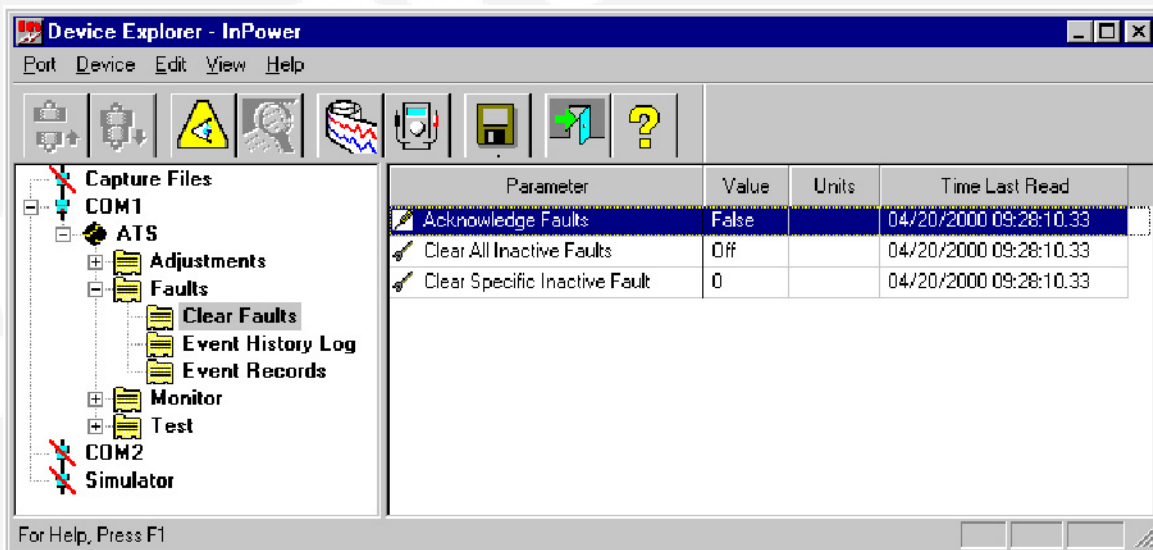


FIGURE 270. CLEAR FAULTS

21.3.2 Event History Log

The following information describes the titles in the Event History Log. Events include both events and warnings. ([Figure 271](#).) Refer to the ATS Operator's manual for a complete description of events.

Event Code: A numeric code that identifies the event.

Event Description: A brief description of the event.

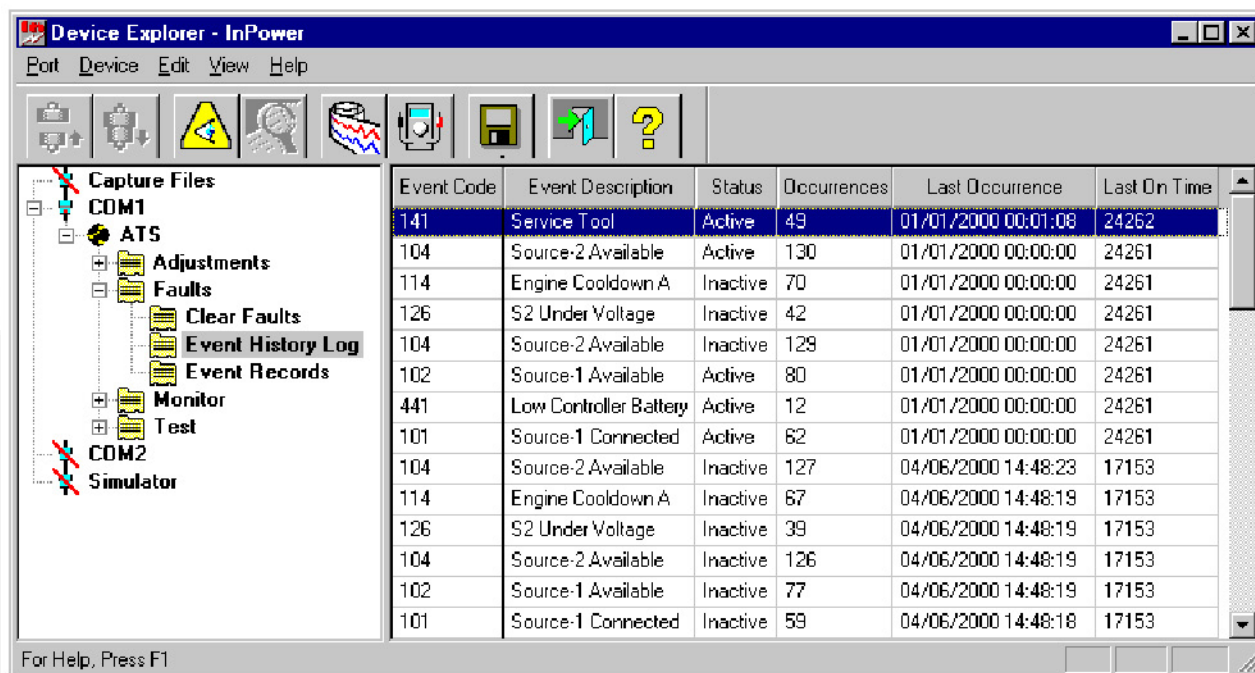
Status: Indicates whether the event is active or inactive, at this time.

Occurrences: Indicates the number of times that the event has occurred since the last time the event data was cleared.

Last Occurrence: Indicates the date and time of the most recent occurrence.

Last on Time: Controller on time in hours at time of last occurrence.

Use this information to match a specific fault to the symptoms observed by the operator. This information can help you determine which fault to address first.



Event Code	Event Description	Status	Occurrences	Last Occurrence	Last On Time
141	Service Tool	Active	49	01/01/2000 00:01:08	24262
104	Source-2 Available	Active	130	01/01/2000 00:00:00	24261
114	Engine Cooldown A	Inactive	70	01/01/2000 00:00:00	24261
126	S2 Under Voltage	Inactive	42	01/01/2000 00:00:00	24261
104	Source-2 Available	Inactive	129	01/01/2000 00:00:00	24261
102	Source-1 Available	Active	80	01/01/2000 00:00:00	24261
441	Low Controller Battery	Active	12	01/01/2000 00:00:00	24261
101	Source-1 Connected	Active	62	01/01/2000 00:00:00	24261
104	Source-2 Available	Inactive	127	04/06/2000 14:48:23	17153
114	Engine Cooldown A	Inactive	67	04/06/2000 14:48:19	17153
126	S2 Under Voltage	Inactive	39	04/06/2000 14:48:19	17153
104	Source-2 Available	Inactive	126	04/06/2000 14:48:19	17153
102	Source-1 Available	Inactive	77	04/06/2000 14:48:19	17153
101	Source-1 Connected	Inactive	59	04/06/2000 14:48:18	17153

FIGURE 271. EVENT HISTORY LOG

21.3.3 Event Records

This feature allows the user to view and configure each event.

The following information describes the titles in the Event Records dialog. ([Figure 272.](#))

Event Description: A brief description of the event.

Occurrences: Indicates the number of times that the event has occurred since the last time the event data was cleared.

Last Occurrence: Indicates the date and time of the most recent occurrence. If all zeros are displayed, there have been no occurrences of the event.

Last on Time: Controller on time in hours at time of last occurrence.

Event Type: Indicates if the event is an event or a warning. This value is pre-configured and it is not editable.

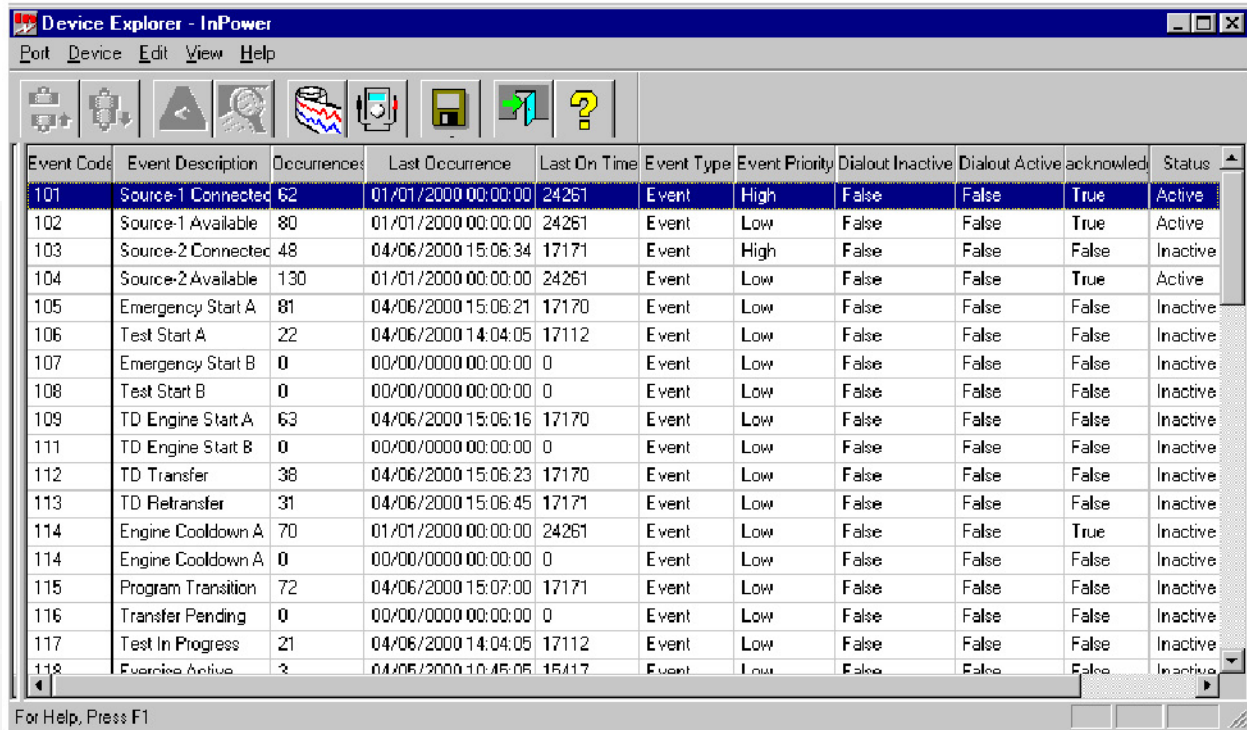
Event Priority: Events are pre-configured for high or low priority. When the ATS is connected in a network application, High Priority events are sent over the network immediately. Low Priority events are sent when polled.

Dialout Inactive: This value can be configured to send a dialout message whenever the selected event occurs. Double click on the parameters **Dialout Inactive** Value cell and select **True** from the drop down list. Click on the **Save Trims** button, on the tool bar, to save this setting.

Dialout Active: This value can be configured to send a dialout message whenever the selected event occurs. Double click on the parameters **Dialout Active** Value cell and select **True** from the drop down list. Click on the **Save Trims** button, on the tool bar, to save this setting.

Unacknowledged: This event status indicates when an event has not been acknowledged (unacknowledged). Typically used in network applications to communicate if an event that has occurred is unacknowledged (**True**). When the event is acknowledged, the Unacknowledged value changes to **False**.

Status: Indicates whether the fault is Active or Inactive, at this time.



The screenshot shows the 'Device Explorer - InPower' window. It contains a table with the following columns: Event Code, Event Description, Occurrences, Last Occurrence, Last On Time, Event Type, Event Priority, Dialout Inactive, Dialout Active, acknowledged, and Status. The table lists various events such as 'Source-1 Connected', 'Source-1 Available', 'Source-2 Connected', 'Source-2 Available', 'Emergency Start A', 'Test Start A', 'Emergency Start B', 'Test Start B', 'TD Engine Start A', 'TD Engine Start B', 'TD Transfer', 'TD Retransfer', 'Engine Cooldown A', 'Program Transition', 'Transfer Pending', 'Test In Progress', and 'Engine Active'.

Event Code	Event Description	Occurrences	Last Occurrence	Last On Time	Event Type	Event Priority	Dialout Inactive	Dialout Active	acknowledged	Status
101	Source-1 Connected	62	01/01/2000 00:00:00	24261	Event	High	False	False	True	Active
102	Source-1 Available	80	01/01/2000 00:00:00	24261	Event	Low	False	False	True	Active
103	Source-2 Connected	48	04/06/2000 15:06:34	17171	Event	High	False	False	False	Inactive
104	Source-2 Available	130	01/01/2000 00:00:00	24261	Event	Low	False	False	True	Active
105	Emergency Start A	81	04/06/2000 15:06:21	17170	Event	Low	False	False	False	Inactive
106	Test Start A	22	04/06/2000 14:04:05	17112	Event	Low	False	False	False	Inactive
107	Emergency Start B	0	00/00/0000 00:00:00	0	Event	Low	False	False	False	Inactive
108	Test Start B	0	00/00/0000 00:00:00	0	Event	Low	False	False	False	Inactive
109	TD Engine Start A	63	04/06/2000 15:06:16	17170	Event	Low	False	False	False	Inactive
111	TD Engine Start B	0	00/00/0000 00:00:00	0	Event	Low	False	False	False	Inactive
112	TD Transfer	38	04/06/2000 15:06:23	17170	Event	Low	False	False	False	Inactive
113	TD Retransfer	31	04/06/2000 15:06:45	17171	Event	Low	False	False	False	Inactive
114	Engine Cooldown A	70	01/01/2000 00:00:00	24261	Event	Low	False	False	True	Inactive
114	Engine Cooldown A	0	00/00/0000 00:00:00	0	Event	Low	False	False	False	Inactive
115	Program Transition	72	04/06/2000 15:07:00	17171	Event	Low	False	False	False	Inactive
116	Transfer Pending	0	00/00/0000 00:00:00	0	Event	Low	False	False	False	Inactive
117	Test In Progress	21	04/06/2000 14:04:05	17112	Event	Low	False	False	False	Inactive
118	Engine Active	3	04/06/2000 10:45:05	15417	Event	Low	False	False	False	Inactive

FIGURE 272. EVENT RECORDS

21.4 Description of Operator/Interface Modes

Serial No.	Mode	Mode Number (Displayed by InPower)	Valid state for Calibration	Mode Description	Steps/checks to bring controller to OFF or Ready mode
1	OFF	0	Valid for Calibration	Run/Stop Key Switch is in the Off position.	

Serial No.	Mode	Mode Number (Displayed by InPower)	Valid state for Calibration	Mode Description	Steps/checks to bring controller to OFF or Ready mode
2	Ready	1	Valid for Calibration	Run/Stop Key Switch is in the On position, controller is in ready state. The Ready mode is the mode the controller is in when running the real time operational code but not running the engine/generator set.	
3	Fault Flashout	2		In this sub-mode, the controller will be flashing fault code information to the operator through the common shutdown and common warning LEDs.	This mode is obsolete in newer controls. It has been replaced by the Panel Lamp/Lamp Test Switch. Fault flashout could be achieved by pressing the Fault Acknowledge/Reset button for more than ten seconds. It could be deactivated by pressing the Fault Acknowledge/Reset button again for less than ten seconds.
4	Non Running Test	3		In this sub-mode, the controller will be performing non-engine running built in tests to determine system health.	
5	Starting	4		Generator set/Controller in Starting Mode Cranking Cycle. This sub-mode is just a pass through mode primarily dependent upon actual engine speed.	

Serial No.	Mode	Mode Number (Displayed by InPower)	Valid state for Calibration	Mode Description	Steps/checks to bring controller to OFF or Ready mode
6	Idle	5		Generator set/Controller operating at idle. This sub-mode is an engine running condition where engine speed is commanded to the idle RPM value.	
7	Rated	6		Generator set/Controller operating at Rated. This sub-mode is an engine running condition where engine speed is commanded to the rated RPM value.	
8	Stop Normal	7		Generator Set/Controller Stopping normally. The controller enters this sub-mode when the engine has been running and the reason for the return to a non-running state is for normal conditions.	Run/Stop/Key switch. Switch is in Stop position.

Serial No.	Mode	Mode Number (Displayed by InPower)	Valid state for Calibration	Mode Description	Steps/checks to bring controller to OFF or Ready mode
9	Stop Emergency	8		Generator set/Emergency Stop is Active. The controller enters this sub-mode when the engine has been running and the reason for the return to a non-running state is for abnormal reasons such as either a local or remote e-stop actuation or an internally requested shutdown due to a fault condition. This mode may also be entered from a non-running state if a fault is detected which would result in a shutdown if the engine was running.	Ensure local or remote E-stop buttons are pulled out and E-stop is in the Off position.
10	Watchdog Test	9		This mode run some watchdog tests which are very critical.	This process is internal to the processor and the user has no control over this state. In this state the control briefly checks to ensure the software is operating properly and is not stuck in a loop.

22 Event Handler

22.1 Receiving Events

When connected to a device, InPower will receive events, and allow the user to acknowledge events.

It is important to note that InPower is a service tool. InPower will receive and display events, but it does not acknowledge events within the device. Monitoring should be performed with operating software that is specifically designed for monitoring and event acknowledgment.

The Event Handler feature launches when InPower is started, and it closes when the InPower session is ended.

Events are displayed in the **Alarm** dialog until InPower is closed, or the user clears (acknowledges) the events. The record of event announcements is not stored from one session of InPower to the next.

Acknowledging events removes the events displayed to the InPower user only. Acknowledgement with InPower will not remove the event from the control.

InPower displays an **Alarms** popup dialog to view event information as soon as the event is received. Users can clear events, view more information about an event, or simply close the **Alarm** popup until the next time the device announces an event.

Be aware that event announcement and fault code diagnostics are not the same function. InPower provides fault code and diagnostic information that is not related to event announcement.

22.1.1 Devices That Cannot Receive Events

This feature is not applicable to PCC 1100, PCC 1300, and PCC 1301.

22.2 Displaying Events

InPower will display all events that have been received in an Alarm dialog. When the **Auto-Announce** feature is enabled (default setting), the **Alarm** dialog pops up to displays of all the events it contains. Additional details about the events are available in the **Event Detail** dialog.

22.2.1 Alarms Popup

The Alarm Popup provides details about events. The **Alarms** popup dialog menu features can be used to view more details about an event, clear the event, or dock the Alarm Pop-up back to the Windows taskbar. To launch the **Alarms** pop-up from the taskbar, click on the **Alarms** button.

The Alarm Popup provides the following menu bar and button options.

View-Acknowledge All: Selects all displayed alarms and removes them from the Event popup view.

View-Detail: Displays the **Event Details** dialog of the selected event.

Options-AutoAnnounce: Displays a check box for displaying the **Alarms** Popup. If checked, (default setting) the **Alarms** popup displays each time a new event is received. If unchecked, the **Alarms** Popup will not open automatically to announce new events.

Help-Contents: Displays InPower help contents.

Help-Search: Used to searching for an InPower help topic.

Close Button: Used to dock the **Alarms** popup dialog to the Windows task bar.

Help Button: Used to access Event Announcement help.

The most recent event is added at the top of the list. One event will always be selected (highlighted). Events received while the Alarm dialog is displayed will appear in the dialog immediately.

22.2.1.1 Columns in the Alarms Popup

The **Alarms** popup provides the following columns:

Code: This displays the fault code associated with the event.

Description: This displays a textual description associated with the event. The description comes from the controller.

Level: This indicates the type of event that occurred; for example, shutdown, warning, or none. If this is not applicable to the controller (for example, a G-drive controller), the value is "None".

Status: This indicates whether the associated fault code became active or inactive in this event.

Site:

Module: This displays the type of device that reported the event.

Time: This displays the time at which the event occurred.

22.2.2 Event Detail

Events have additional detail associated with them. The user can view these details in the **Event Details** dialog by selecting an event, then selecting **View-Detail** from the **View** menu.

The **Event Details** dialog provides the following button options:

Close Button: Closes the **Event Details** dialog and returns the user to the Alarms dialog.

Navigation Buttons: The left arrow button changes the **Event Details** dialog to display the next event (down) on the Alarm dialog list. The right arrow changes the Event Detail dialog to display the previous event (up) on the Alarm dialog list.

Help Button: Used to access **Event Details** help.

22.2.2.1 Columns in the Event Details Dialog

The **Event Details** dialog provides the following fields:

In the **Alarms** section,

Description: This displays a textual description associated with the event. The description comes from the controller.

Status: This indicates whether the associated fault code became active or inactive in this event.

Level: This indicates the type of event that occurred; for example, shutdown, warning, or none. If this is not applicable to the controller (for example, a G-drive controller), the value is "None".

Code: This displays the fault code associated with the event.

Version:

Occurrences: This displays the number of times the event has occurred.

Last Occurrence: This field is blank.

Run Time Last: This displays the most recent time the event occurred.

First Occurrence: This field is blank.

Run Time First: This displays the first time the event occurred.

In the **Module** section,

Type: This displays the type of device that reported the event.

Address: This displays the network address of the device that reported the event.

In the **Site** section,

Site Id: This displays the name of the site; typically, the name of the COM port for devices or the file name type for files, such as capture files.



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23 Strip Chart

23.1 Strip Chart

The Strip Chart feature displays data in a graphical form on a real-time strip chart. Up to six parameters can be displayed in one chart. Data is scrolled from right to left, so the most recent data appears at the right.

Chart parameters can be saved to chart file (.TPL file), allowing the user to save custom parameter selections and settings. The chart file will store the charts graph settings (Y-axis limits, sampling rate, line styles, etc.) and port identification. A chart file can be used with other ports. Chart files are saved in the Strip Charts directory.

Data is not logged using the Strip Chart feature, in contrast to the Monitor feature.

23.1.1 Example of a Strip Chart

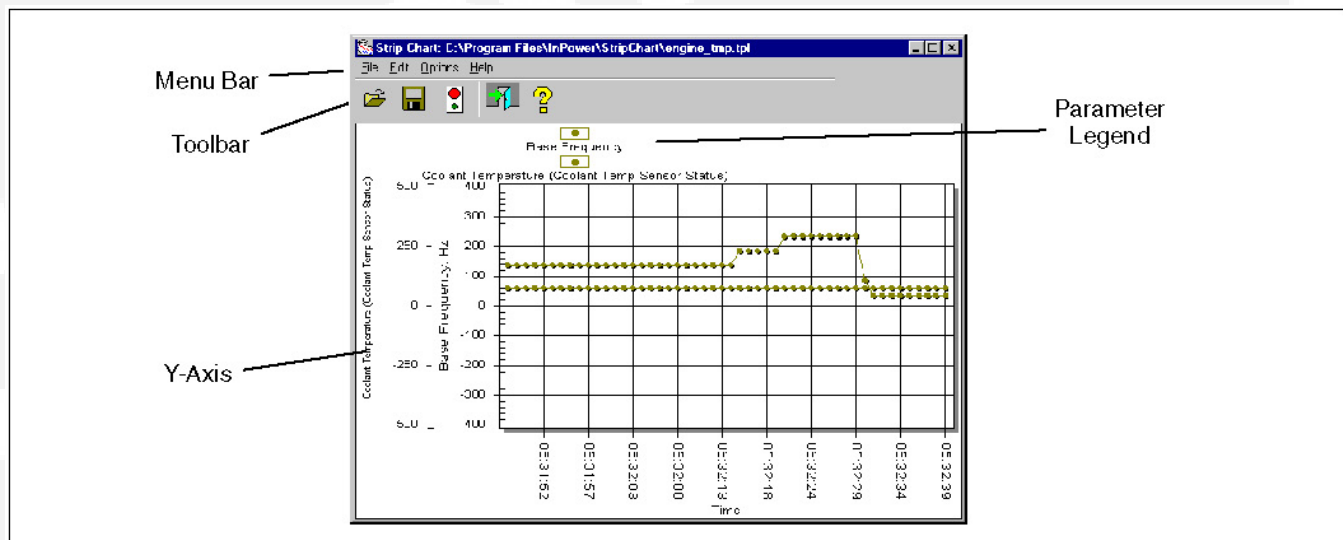


FIGURE 273. TYPICAL STRIP CHART

This example shows a typical strip chart. Each of the parameters contained in the chart are named in the legend at the top of the chart. The **Y-Axis** displays the range of each parameter value. The **Time** that the sample was taken for each interval is displayed at the bottom of the chart.

23.1.2 Starting the Strip Chart Feature

The Strip Chart feature can be launched in two ways:

1. Launch strip chart from the Start Menu group shortcut.
2. Start InPower, connect to a device, and then click on the **Strip Chart** button, on the InPower toolbar.

Starting a strip chart from InPower, while connected to a device, allows InPower to identify the device and display the correct strip chart file type. This prevents accidentally opening a strip chart file for the wrong device type.

If the chart file does not exist, Strip Chart will display the **File-Open** screen, with a listing of chart files in the **Strip Charts** directory.

23.2 Creating a Custom Strip Chart

Strip charts can be customized by adding or deleting parameters, adjusting the sampling rate, changing line styles, changing the Y-axis limits and making format changes.

The user can customize an existing strip chart, or create a new strip chart and define each of its properties. To create a new strip chart, launch the Strip Chart feature from the **Start -> All Programs** menu, without specifying any chart file to open.

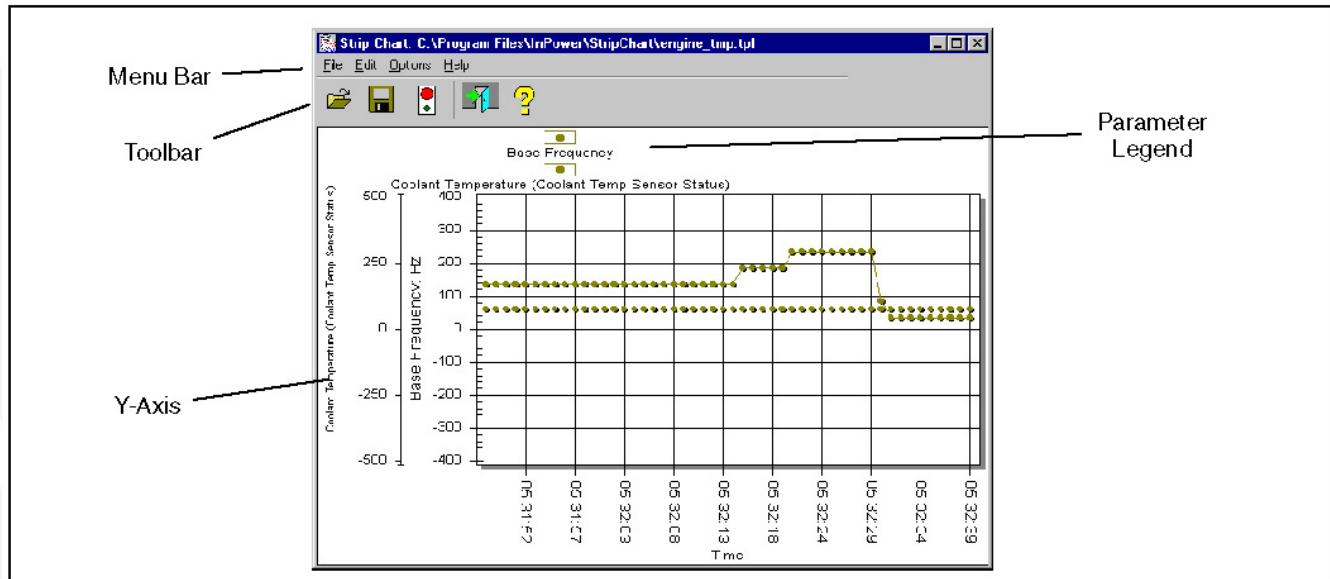


FIGURE 274. TYPICAL STRIP CHART

23.2.1 Adding Parameters

Click on **Add Parameters**, from the **Edit** menu, to launch InPower. To add parameters to the strip chart, drag individual parameters from InPower (right pane) and drop the parameter on the strip chart. Multiple parameter selections may be dragged and dropped on the Strip Chart, to add several parameters at once. Parameters can also be added by selecting a parameter and using the **Edit - Copy** command from InPower and the **Edit - Paste** command from the Strip Chart menu bar.

Since parameters with different units of measure may be added to the graph, a separate Y-axis will be displayed for each graphed parameter.

As parameters are added to the graph, an additional Y-axis will appear, indicating the parameter's description and unit of measure. A new legend item will appear at the top of the graph, indicating the point shape and color that will be used when plotting the parameter's values, and these values will automatically begin to be displayed.

Immediately after the first parameter is added to the Strip Chart graph, the applet automatically begins monitoring parameter values at half-second intervals. The sampling rate may be modified via the **Options** dialog.

23.2.2 Parameter Properties Dialog

The **Parameter Properties** dialog, shown in [Figure 275](#), is accessible from the **Edit-Properties** menu.

The **Name** combo box, at the top of the dialog, provides access to each of the parameters currently displayed on the Strip Chart. The user may delete the selected parameter from the strip chart by clicking on the **Delete** button.

The **Data Ranges** associated with the selected parameter may be modified by entering new values into the edit boxes. These new values will control the minimum and maximum data values displayed on the Y-axis of the graph.

The **Line Attributes** may also be modified by selecting a new line style from the **Style** combo box. A new line color may be selected by clicking on the **Color** button, which invokes the Windows common Color dialog. Current changes are applied after the user clicks on the **OK** button, to close the dialog.

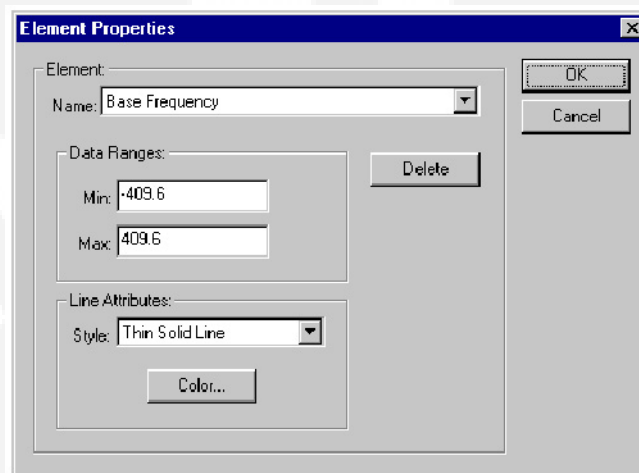


FIGURE 275. PARAMETER PROPERTIES

23.2.3 Sampling Rate Dialog

The Sampling rate feature is available from the Strip Chart - **Options** menu. The **Sampling Rate** dialog, shown in [Figure 276](#), allows the user to select the strip chart sampling rate. Sampling can be enabled or disabled using the **Sampling Enable** feature (see **Strip Chart Menu Bar Functions**).

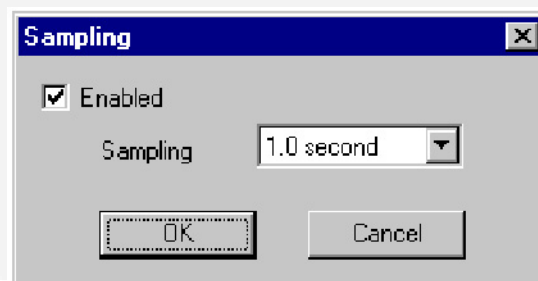


FIGURE 276. SAMPLING RATE DIALOG

When finished customizing the strip chart, choose the **File-Save As...** menu option. Name the file and save in the **Strip Charts** directory.



NOTE: Saving a Custom Strip Chart saves only the chart settings, it does not save (log) data.

See **Context Menu** for additional commands that are available for customizing strip charts.

23.2.4 Strip Chart Menu Bar Functions

This section describes each of the menu commands that are available from the Strip Chart menu bar.

File-Open: Allows the user to specify a particular chart (.TPL) file to load from the list of chart files, in the Strip Chart directory. Logged data (.LOG file) can also be opened and viewed with the Strip Chart feature.

After a .TPL file has been selected, the applet will open the file and load the parameters and settings from that file. Since parameter values will be graphed, only the first six parameters that have numeric values will be accepted.

File- Save: Allows saving the current selection of parameters to a chart file.

File - Save As: Allows saving the current set of parameters to a new chart file name and/or location.

File-Close: Closes the Strip Chart

Edit-Add Parameter: Allows adding parameters to the Strip Chart graph from InPower. This command opens InPower, allowing the user to select parameters to be added to the Strip Chart. Drag individual parameters from InPower and drop the parameter on the Strip Chart graph.

Edit-Paste: Allows pasting the parameter(s) from the Windows clipboard into the strip chart. The **Paste** menu option will remain disabled until one or more parameters have been cut or copied to the Windows Clipboard.

Edit-Properties: Opens the **Element Properties** dialog. (This feature can also be activated by double clicking on the parameter names in the strip chart's legend.) The **Element Properties** dialog allows the user to perform a variety of commands relating to the display properties of the Strip Chart.

Options-Sampling: This option displays the **Sampling Rate** dialog, which allows the user to change the strip chart sampling rate. The sample rate is adjustable from 0.05 seconds to 60 seconds.

Options-Sampling Enable: This option is used to enable or disable the collection of sample data. A check mark is displayed next to **Sampling Enable** on the **Options** drop down menu to indicate that the feature is enabled. Click once on **Sampling Enable** to stop collecting sample data. Click on it again to start collecting sample data again.

Options-Logging: This option provides you with a means to assign a location for storing strip log files. The default file location is listed on the menu ([Figure 277](#)). If necessary, select the **Browse** button to select another location. Logging can be enabled from this menu. When all adjustments are completed, click on the **OK** button.

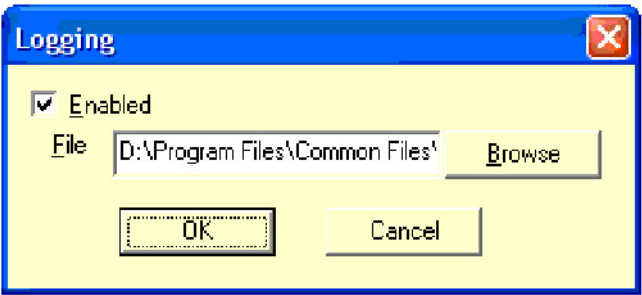


FIGURE 277. LOGGING DIALOG

Options-Logging Enabled: This option is used to enable the logging option to save a file at the location set up with the Logging dialog. If a strip chart log has already been created, the message shown in [Figure 278](#) is displayed.

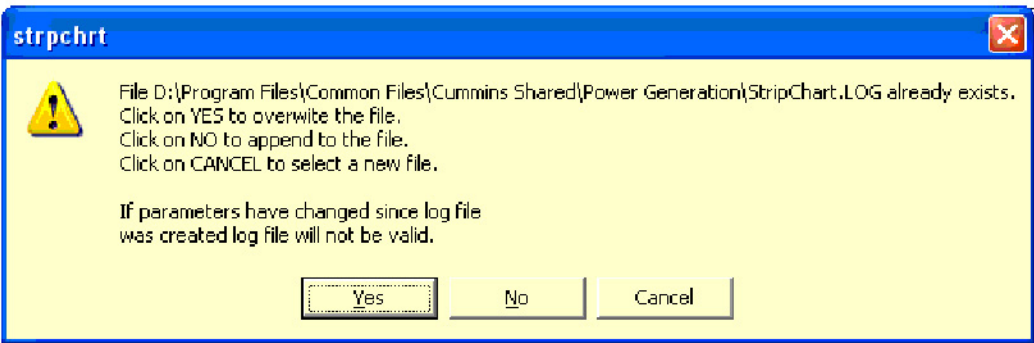


FIGURE 278. LOGGING MESSAGE

23.2.5 Context Menu Features

The **Context Menu**, shown in [Figure 279](#), may be accessed by clicking on the right mouse button (or equivalent pointing device button) while the cursor is inside the graph. This set of menu items provides the users with additional customization features.

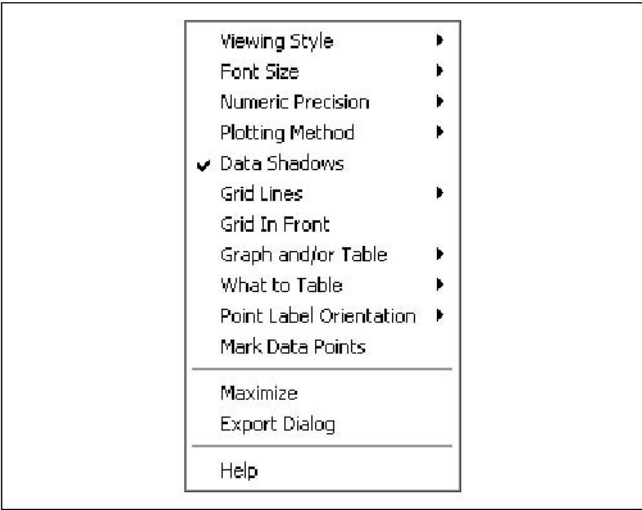


FIGURE 279. CONTEXT MENU FEATURES (RIGHT MENU BUTTON)

Viewing Style: This controls the viewing style of the object. Possible values include color, monochrome, or monochrome with symbols.

Font Size: This controls the font size used in the graph's image creation process. The font sizes available are large, medium, or small.



NOTE: It is recommended that the user change the Font Size to the Medium setting or Large setting if only a few parameters are being monitored. This selection will make it easier to read the parameter legends.

Numeric Precision: This controls the number of decimal places associated with the graph's data. Possible values include zero, one, two or three decimal places.

Data Shadows: This controls whether shadows will be placed behind plotting method graphics. The shadows add depth to the images; however, they will slow image creation significantly when graphing many subsets and/or points.

Grid Lines: This controls the horizontal and vertical lines that make up the graphs grid. Possible values include horizontal and vertical grid lines, horizontal grid lines only, vertical grid lines only, or no grid lines.

Grid In Front: This controls whether the graphs grid is placed behind or in front of the plotting method graphics.

Graph and/or Table: This controls what is displayed in the graph's area. Possible values include graph, table, or graph with table.

What to Table: This controls what information is included in the objects table. Possible values include tabling those subsets that are graphed or tabling all subsets.

Point Label Orientation: This controls the orientation of the point labels. Possible values include automatic, horizontal, or vertical.

Mark Data Points: This controls whether data-points are marked with a small circle.

Maximize: This function maximizes the graph display. To return to the default display size, click inside the solid bar at the top of the window or use the **Esc** key.

Customization Dialog: This function displays the chart Customization dialog.

Export Dialog: Graphs can be exported in the formats shown in [Table 4](#), for the listed destinations. This dialog allows the user to print a Strip Chart.

TABLE 4. GRAPH EXPORTABLE FORMATS

FORMAT	DESTINATIONS
Metafile	Clipboard, File, and Printer
Bitmap	Clipboard and File
OLE Object	Clipboard
Text / Data	Clipboard and File

Help: Displays graph-related help topics.

23.2.6 Chart Customization Dialog

An additional level of editing is available that allows the user to customize the chart dialog. To access this feature, double click within the chart to display the **Customization** dialog. This dialog has tabs for each of the editable features.

Click on the desired tab to view the available settings for that feature. These features can be used to enhance the chart by changing border colors, text size and colors, and many other chart display features.

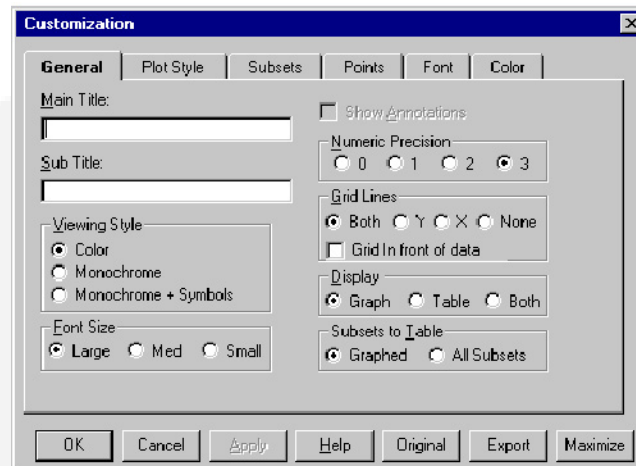


FIGURE 280. CHART CUSTOMIZATION DIALOG

23.2.7 Printing a Strip Chart

A Strip Chart can be printed by using the Export dialog (Figure 281). Use the right menu button to access the Export Dialog, then select the **Printer** radio button and select the **Print** button.

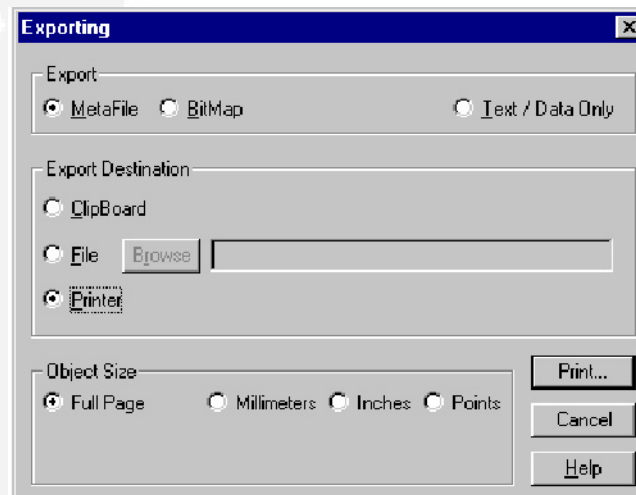


FIGURE 281. EXPORT - PRINT DIALOG

23.2.8 Viewing Logged Data

Logged data, created with the Monitor feature can be displayed with the Strip Chart feature. Select **Open** from the Strip Chart **File** menu. Enter the .LOG file location and name.

Strip Chart will display the logged data. Since the data is not being displayed on a realtime basis, the data is static. Use the left and right arrow buttons located on the keyboard to navigate the data within the .LOG file.



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24 Capture File

24.1 PCC 1100 Limitation

This feature is not applicable to PCC 1100.

24.2 Capture File

InPower provides a method of extracting (capturing) a device's parameter values. Capturing saves device information in a file that is identified with a .CAP extension. The files are saved in the **Capture Files** directory.

Capture files are used to store a copy of a device's parameter values, History and Faults. Capture files are read only files that can be viewed after disconnecting from the device. Capture files can also be used as a template to write the captured settings to another device of the same type.

24.3 Creating a Capture File

Capture files can be created by selecting the **Capture to File** command from the **Device** menu. This feature displays the **Capture File** dialog, which is similar to **Save As** dialog.

The user names the file, and InPower appends the file name with the .CAP extension. Capture files are not editable by InPower (read-only). A capture file can be overwritten, allowing the user to re-capture parameters and settings to the same file.

24.3.1 Creating a Capture File Automatically

A Capture files will be automatically captured each time you connect to a site or you will be prompted to create one, depending on your setup selection.

If **Capture to File** is selected, a default filename will be created. This filename can be changed.

24.4 Viewing a Capture File

To view a capture file, the user must connect to it using InPower. Double click on the Capture file name in the **Capture Files** directory structure. Capture file contents can be viewed, like devices, using Device Explorer.

In InPower, the capture file is compared with support files. If a parameter is found in Support files but not found in the capture file, the tool will give a warning message. If parameters which are not supported in the firmware are removed from Support file, the capture file will get connected without showing any warning message.

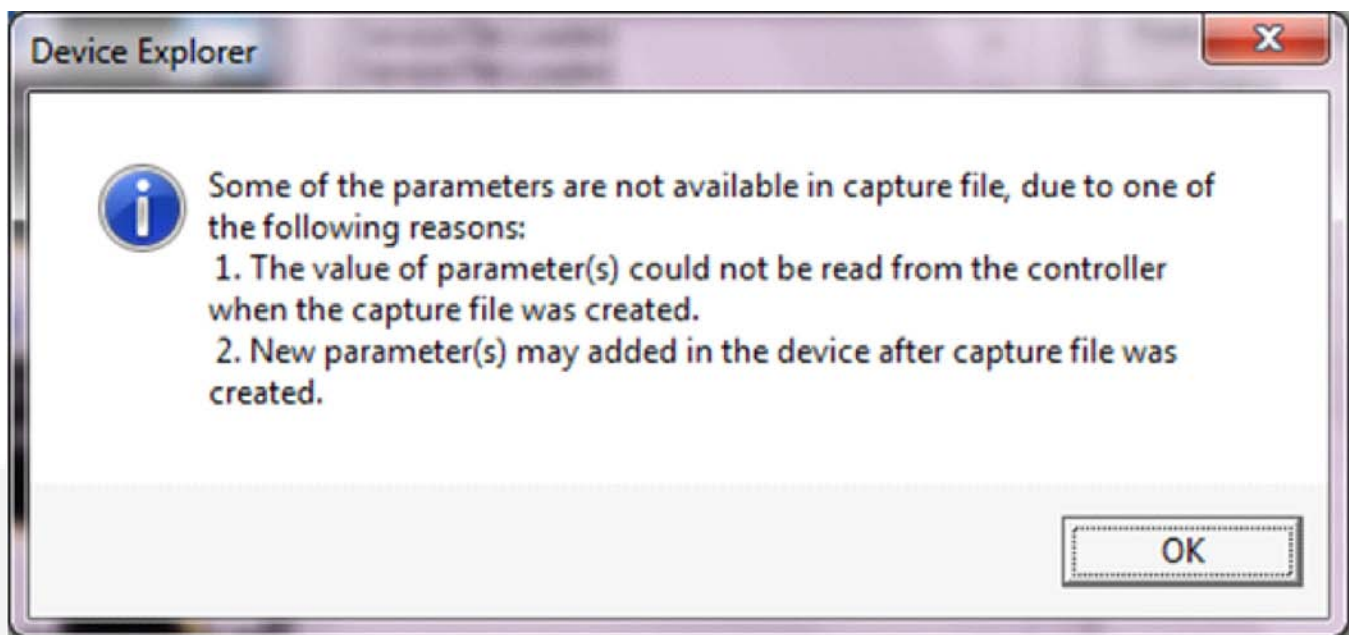


FIGURE 282. VIEW CAPTURE FILE WARNING MESSAGE

24.5 Writing to a Device

Capture files can be used to overwrite the parameter values of a connected device (of the same device type) with the parameter values from a capture file. One capture file can be used repeatedly (like a template) to configure many devices of the same type.

When a device has password protected parameters, the password protection applies when writing a Capture file to the device. The user must enter the required password(s) before the password protected parameters can be changed with the Capture file.

To write to a device you must have registered software of the correct device type.

To write from a Capture file, connect to the Capture file first, then click on the target device, and connect to it. Next, select the Capture file and drag-and-drop the Capture file onto the target device.

The **Edit - Copy** and **Edit - Paste** features can also be used to write parameter settings from a Capture file to a device. This feature can be used to copy the entire Capture file, or individual folders or parameters.

Start by connecting to the Capture file, Use **Edit - Copy** to copy the desired information from the Capture file. When copying a folder or individual parameters, use Device explorer to display the desired folder or parameters in the right pane. Hold down the Control key while selecting the desired folder (s) or parameter(s) then use the **Edit - Copy** command. Connect to the target device and use the **Edit - Paste** feature to overwrite the target device's parameters with the parameter settings from the Capture file.



NOTE: A capture file from a genset (for example) can be copied to another genset, but it cannot be copied to a transfer switch control, or any other device type.

25 Simulator

InPower provides a means of demonstrating the service tool without connecting to an actual device. A Capture file is used for simulation. This file contains most of the information that is normally displayed when you are connected to a device.

Any capture file(s) used for simulation are added during InPower installation. These files are device specific, for example, if you install a genset InPower product, you will only receive genset Simulator files.

Simulator files are read only, although during simulation, the user will be allowed to make editorial changes, to help demonstrate the tool. Any changes made during simulation will not be saved.

If an arrow is displayed, click on the arrow to view a drop-down list of the available settings. Click on the desired setting, and it will be entered into the Value cell.

The simulator file(s) are stored in the **Simulator** directory. To run an InPower simulation, double click on the **Simulator** directory and then double click on the desired simulator file (*.CAP file).



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26 Reports

This section describes how to create, save and print reports. Reports consist of parameter groups and their values at the time the report was created. Reports can be printed directly from InPower, or they can be saved to a file for use in a spreadsheet, database, or word processing program.

26.1 Creating a Report

Start InPower and connect to a port, then connect to a device (or file). Use the Device Explorer (tree view) to locate and select the information you wish to include in the report.



NOTE: When selecting parameters for a report, be careful to avoid selecting too many parameters. If a folder is selected that contains additional folders, the parameters of all of the folders in the group will be selected.

You can create a report from a single group of parameters or from several groups of parameters. A few smaller reports are generally more manageable than a very large report.

To create a report for a single group of parameters: Select the group folder, if it contains additional folders, double click on the folder to expand it. Select the desired folder and use the mouse or keyboard menu button to display the pop-up menu ([Figure 283](#)). Select **Print Feature** from the pop-up menu, to create a report for the selected folder and display the **Parameter List Report** window ([Figure 284](#)).

To create a report with more than one group of parameters: Select each folder individually, use the mouse or keyboard menu button to display the popup menu, click on **Select Feature**, in the popup menu. Each folder selected will be marked with a check mark, to indicate that it has been selected for use in the report ([Figure 283](#)).

After selecting the desired parameter groups, use the **Prepare CSV file with all Selected Features** menu pick from the InPower **Device** menu to create a report and display the **Parameter List Report** window ([Figure 284](#)).



NOTE: If you only want to create a report on one feature, select the feature, right-click and select the **Prepare CSV file for Feature** menu pick.

Selected folders can be deselected by clicking on a folder with a check mark, then use the mouse or keyboard menu button to display the pop-up menu, click on **Deselect Feature**, in the pop-up menu.

The **Parameter List Report** window allows viewing the report contents. Each selected parameter group is shown.

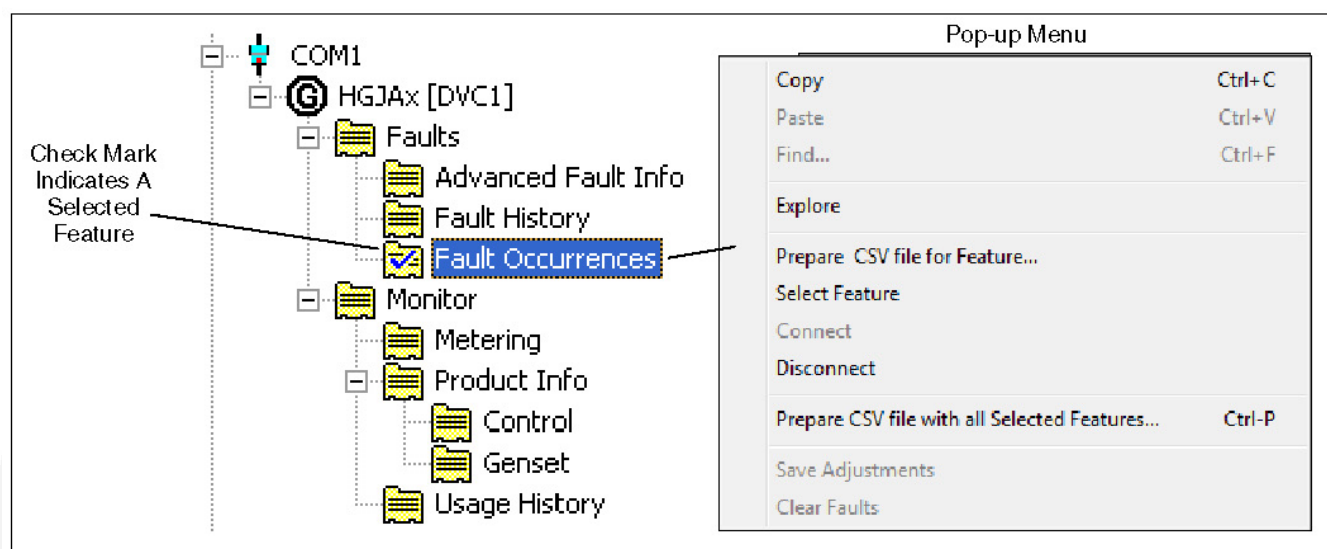


FIGURE 283. SELECTING FEATURES FOR A REPORT

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Seq	Param	Value	Units	Path												
2	0	Engine Cold Warning Threshold	"65.00"	degF	Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
3	1	LOP Warning Threshold Table	"<XYTable>														
4	rpm	psl#-4095.000000#4095.875000															
5	0		0														
6	300		25														
7	1200		33														
8	1700		44														
9	1800		45														
10	2200	15.00"			Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
11	2	LOP Shutdown Threshold Table	"<XYTable>														
12	rpm	psl#-4095.000000#4095.875000															
13	0		0														
14	800		20														
15	1200		23														
16	1700		30														
17	1900		40														
18	2200	40.00"			Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
19	3	HOT Warning Threshold	"190.00"	degF	Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
20	4	HOT Shutdown Threshold	"250.00"	degF	Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
21	5	LCL Warning Threshold	"15.0"	seconds	Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
22	6	LCL Shutdown Threshold	"15.0"	seconds	Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
23	7	LCL Fault Response	"Shutdown"		Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments												
24	8	LCP Warning Threshold Table	"<XYTable>														
25	rpm	psl#-4095.000000#4095.875000															
26	0		0														
27	1300		5														

FIGURE 284. PARAMETER LIST REPORT WINDOW

26.2 Support Reports

A Support Report can be created and Emailed.

To create a Support Report,

1. Select **Help > Send Support Report**.

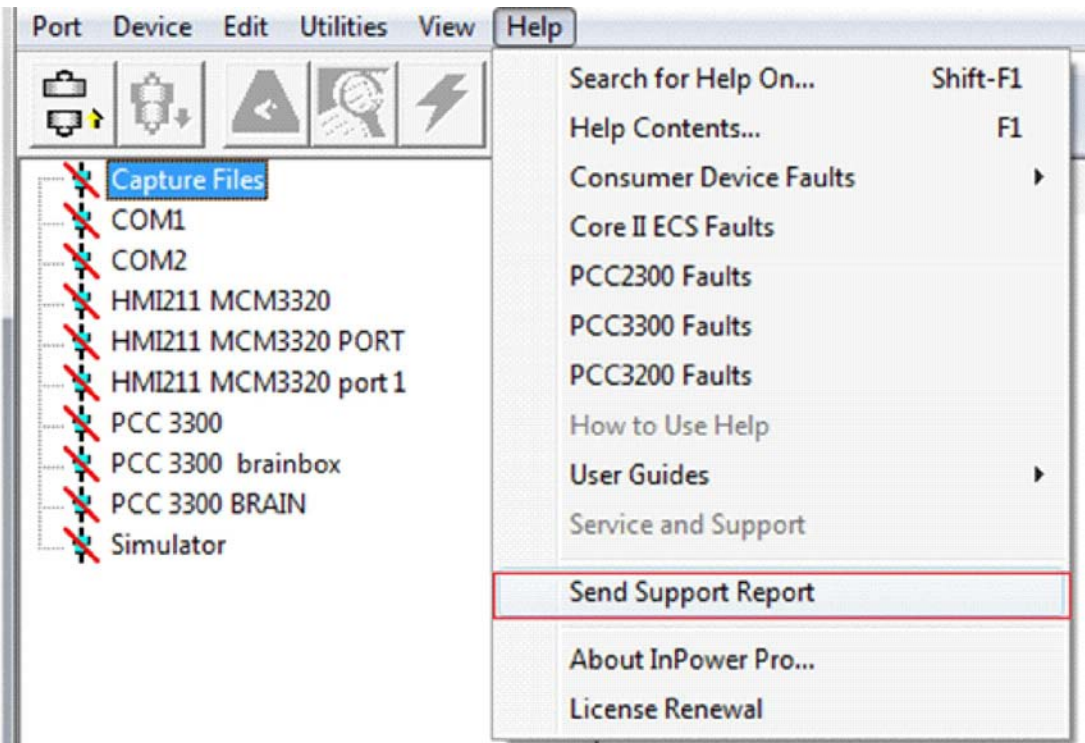


FIGURE 285. LAUNCHING THE SEND SUPPORT REPORT FEATURE

- 2. When the **ETools Support Report Utility** dialog is displayed, enter an Issue Title and Issue Description.

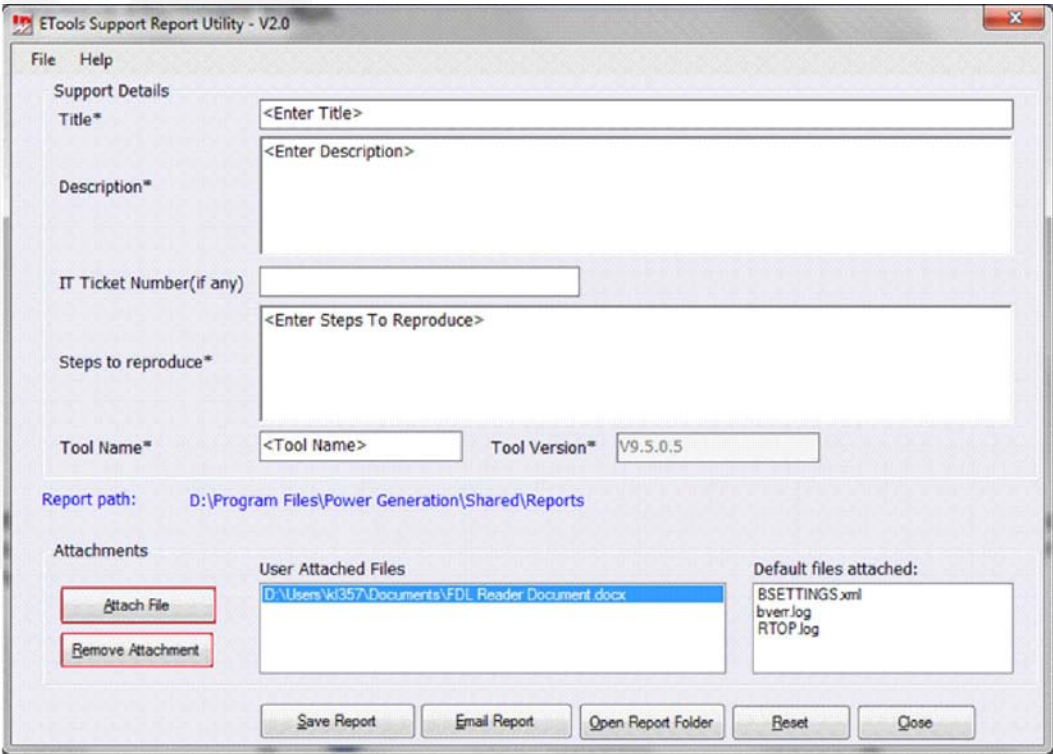


FIGURE 286. ETOOLS SUPPORT REPORT UTILITY DIALOG

If these fields are not filled in, the following error message is displayed when attempting to save the report.

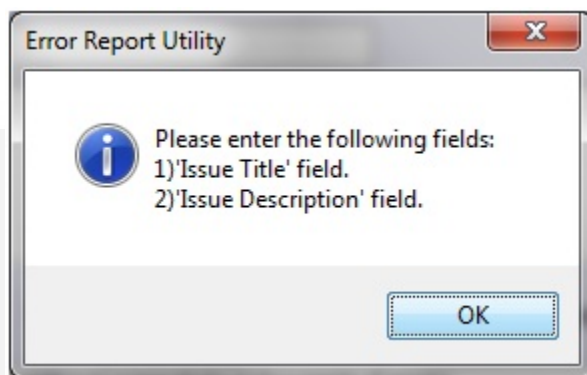


FIGURE 287. ERROR REPORT UTILITY MESSAGE

3. Click **Save Report**. The following message is displayed. Click **OK**.

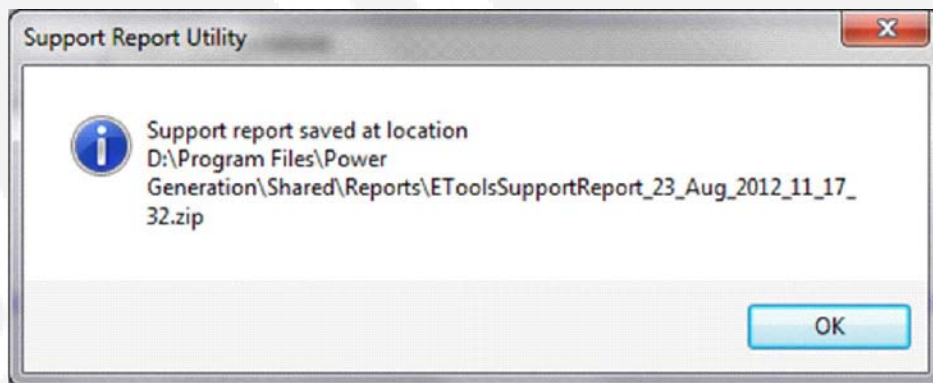


FIGURE 288. SAVED REPORT MESSAGE

4. If you wish to attach additional files, click **Attach File**. Navigate to the location the file is stored, select it, and click **OK**. The total attachment size cannot exceed 2MB. If this limit is exceeded, the following message is displayed.

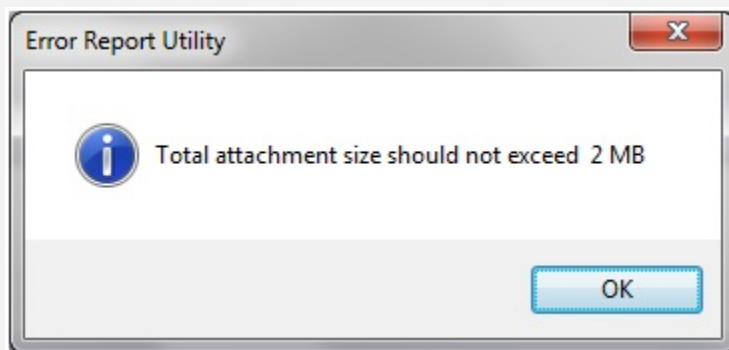


FIGURE 289. ATTACHMENT SIZE EXCEEDED MESSAGE



NOTE: A file can also be removed by using the Remove Attachment button.

If, after creating a Report, you wish to Email it,

1. Click **Email Report** on the ETools Support Report Utility dialog box. The report is saved in ZIP format at the default location.

2. Once the Report is saved, an Email message with the default mailbox location for Cummins InPower support is displayed. Click **Send**.

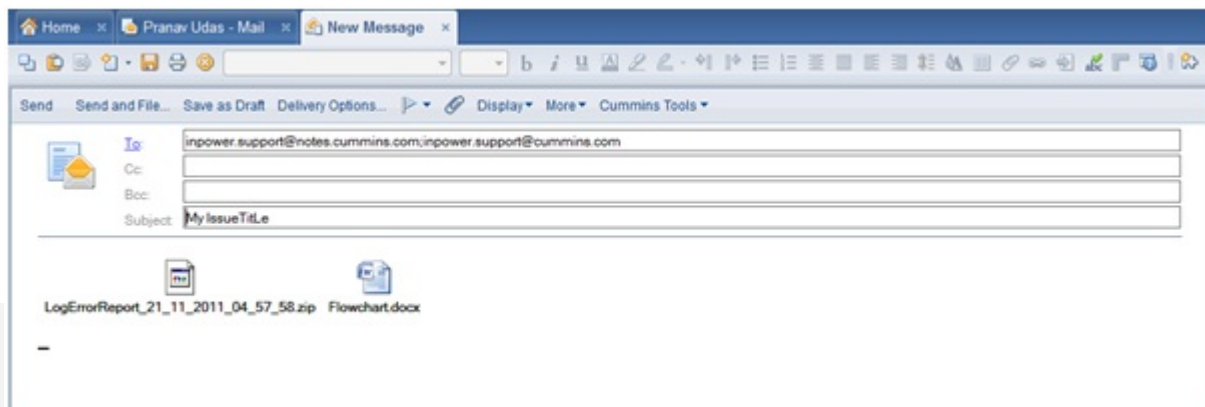


FIGURE 290. EMAIL FOR ERROR REPORT

If you wish to view an existing report, click **Open Report Folder** on the Error Report Utility dialog box. The default error report location (D:\Program Files\Power Generation\Shared\Reports) is displayed.

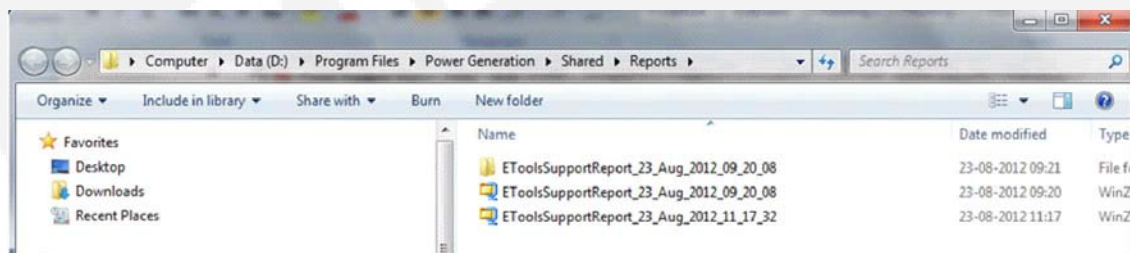


FIGURE 291. ERROR REPORT DEFAULT LOCATION



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27 Event Configuration

This section describes how to use the Events Configuration feature. This feature is only used with genset applications. Event Configuration allows the InPower user to configure both the Fault Effect and the Notification settings for Faults.

The term *events* refers to status changes that can be viewed on a control display or with InPower. There are two types of events, fault events and non-fault events. The Event Configuration feature is used to configure fault events (Faults). Faults represent genset operating conditions that are outside the normal operating range or setting.

Start InPower and connect to the port (COM1, COM2, etc.) being used for connection to the device.

Click on the **Events Configuration** folder to view the Events Configuration parameters ([Figure 292](#)). This group displays all of the genset Faults numerically, by Fault Code. Also displayed are the Fault Descriptions, current Fault Effect settings and current Notification settings.

27.1 Devices That Do Not Support Event Configuration

This feature is not applicable to PCC 1100, PCC 1300, PCC 1301, and MCC 3320.

27.2 Fault Effect

Fault Effect is used to configure the action taken when a fault becomes active. All faults are pre-configured with a fault effect.

The severity of the effect generally cannot be decreased. For example: Engine Overspeed cannot be changed from Shutdown to Warning.

In genset applications, there are five possible Fault Effect settings.

None: When a Fault Effect is set to None, there is no effect when the fault becomes active (including no dialout notification).

Warning: A warning message is delivered to the control display and to InPower when InPower is connected to the device.

Derate: Faults configured for Derate will act like a Warning when the fault is active. If a parameter has a factory set derate percentage the genset will derate to that setting when the fault is active.

Shutdown: Faults configured for Shutdown will cause the genset to shutdown immediately when the fault is active.

Shutdown Cooldown: Faults configured for Shutdown Cooldown will shed the load (if available) and shut the genset down after a cooldown period, when the fault is active.

To change the effect of a fault, double click on the **Fault Effects** value cell, for the desired fault. A drop-down arrow will be displayed. Click on the drop-down arrow to display the setting choices ([Figure 292](#)). Click on the desired effect, to select it.. Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

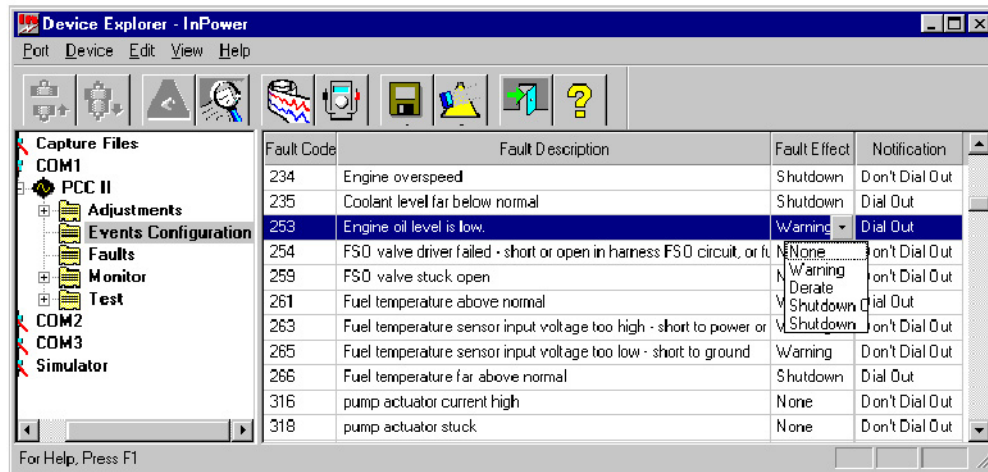


FIGURE 292. FAULT EFFECT

27.3 Event Configuration in the PowerCommand 2.x and 3.x

If *LBNG Genset Enable* is Disable, the Derate% column can be edited. If *LBNG Genset Enable* is Enable, the Derate% column is read-only.

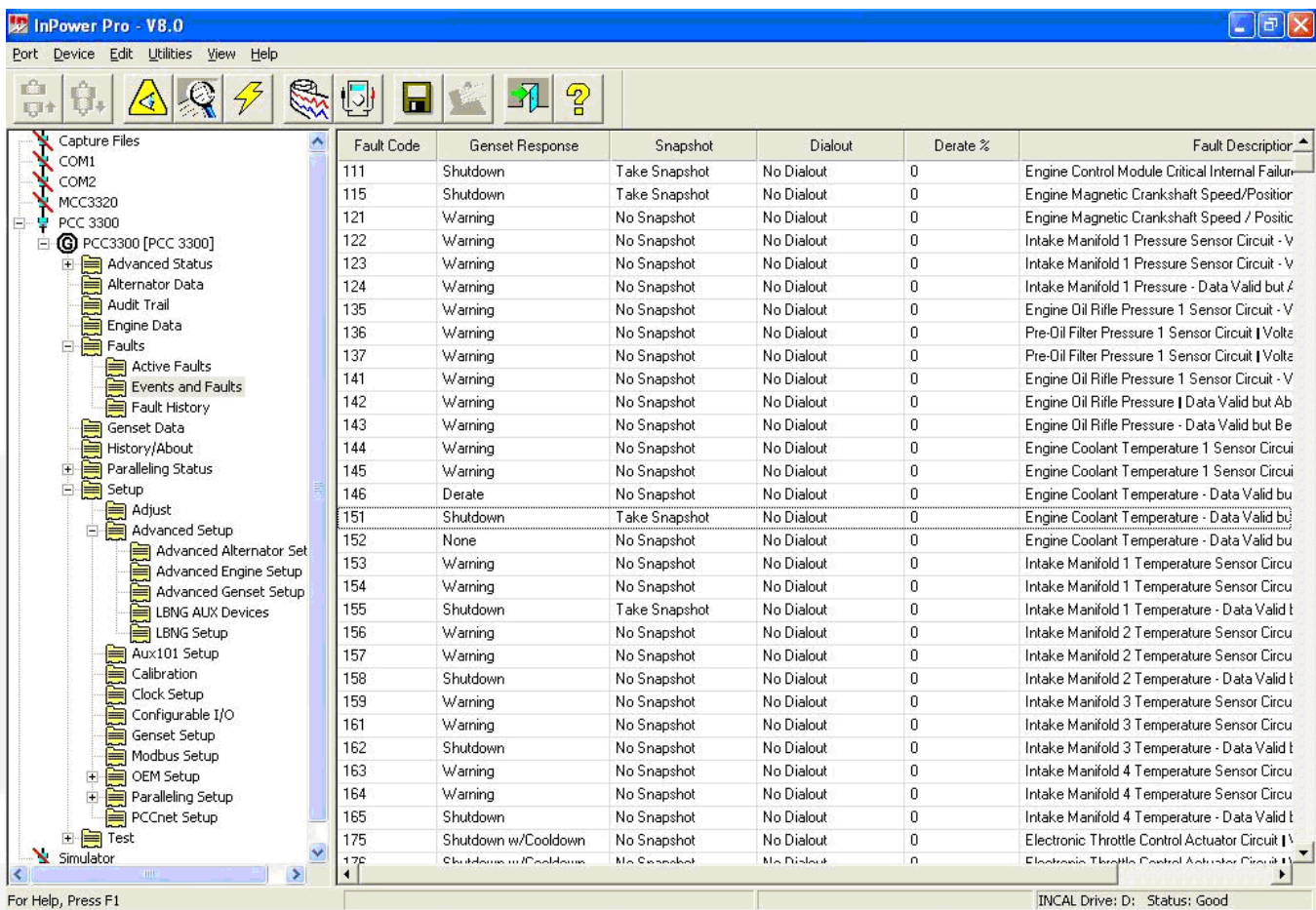


FIGURE 293. EVENT CONFIGURATION IN THE POWERCOMMAND 2.X AND 3.X

27.4 Notification

Notification refers to annunciation of the fault for remote monitoring. In order to remotely monitor genset faults, the Fault Notification setting must be set to **Dial Out**.

There are two possible settings for Notification as follows:

Don't Dial Out: When Notification is set to Don't Dial Out, the control will not attempt to dial out when the fault becomes active.

Dial Out: When Notification is set to Dial Out, and remote site(s) are configured, the control will attempt to dial out to annunciate the fault to one or more remote locations. The modem must be enabled, a valid dialout number must be entered, and the fault Effect must not be set to None.

To change the Notification setting for a Fault, double click on the **Notification** value cell, for the desired fault. A drop-down arrow will display, click on the drop-down arrow to display the setting choices ([Figure 294](#)). Click on the desired effect, to select it. Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

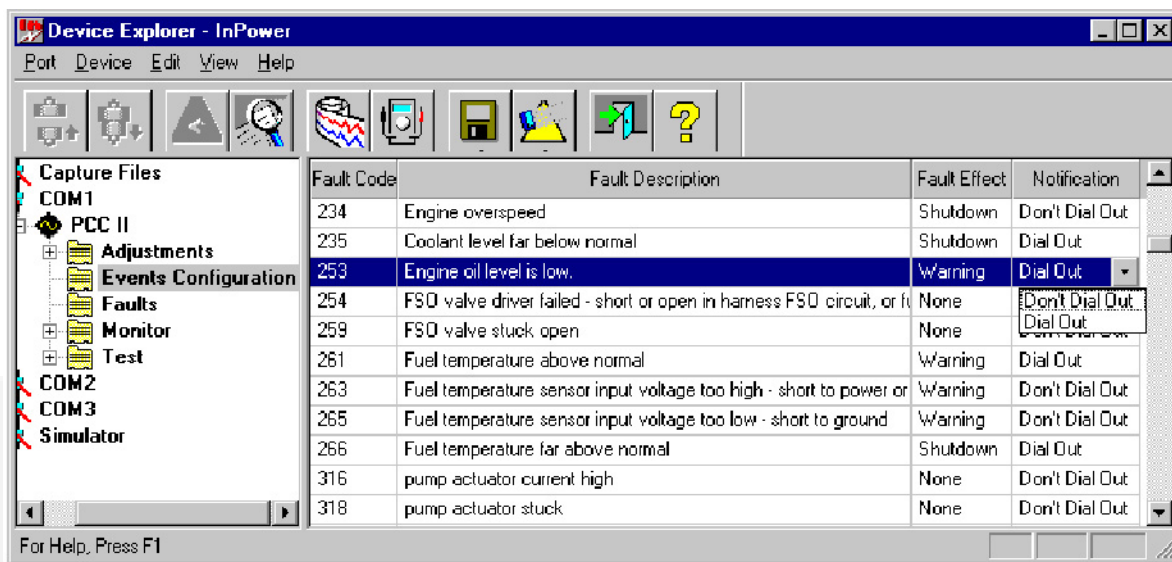


FIGURE 294. NOTIFICATION

28 Remote Communication

This section describes how to setup and use InPower for remote communication with a PowerCommand® controlled genset.

InPower cannot be used to remotely monitor Automatic Transfer Switches. Use the optional network module for remote communication with an Automatic Transfer Switch.



WARNING: *Electrical shock and moving parts can cause severe personal injury or death. Notify personnel before starting a generator set and before performing load transfer on a transfer switch. Refer to the equipment Operator's Manual for important safety precautions.*

InPower can also be used to configure a genset to dialout events for remote monitoring with monitoring software or with InPower.

Read through this entire section to become familiar with the remote communication features and uses before configuring a genset control for remote communications.

28.1 Remote Connections

[Figure 295](#) and [Figure 296](#) show typical remote connections. Two modems are available for use with InPower, a standard modem and one designed for mounting to a DIN rail.

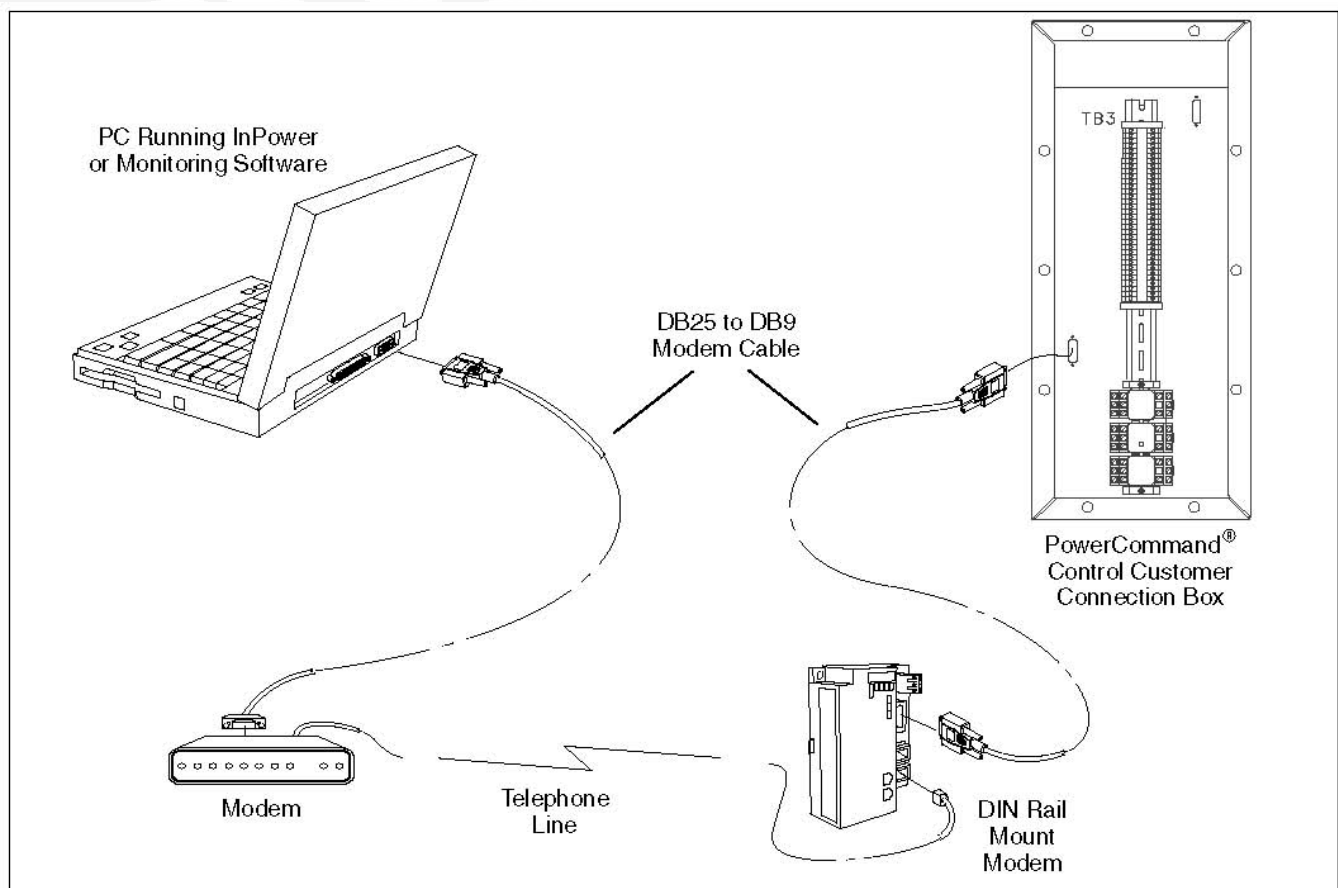


FIGURE 295. INPOWER SERIAL CONNECTION (TYPE 1 CONNECTION BOX)

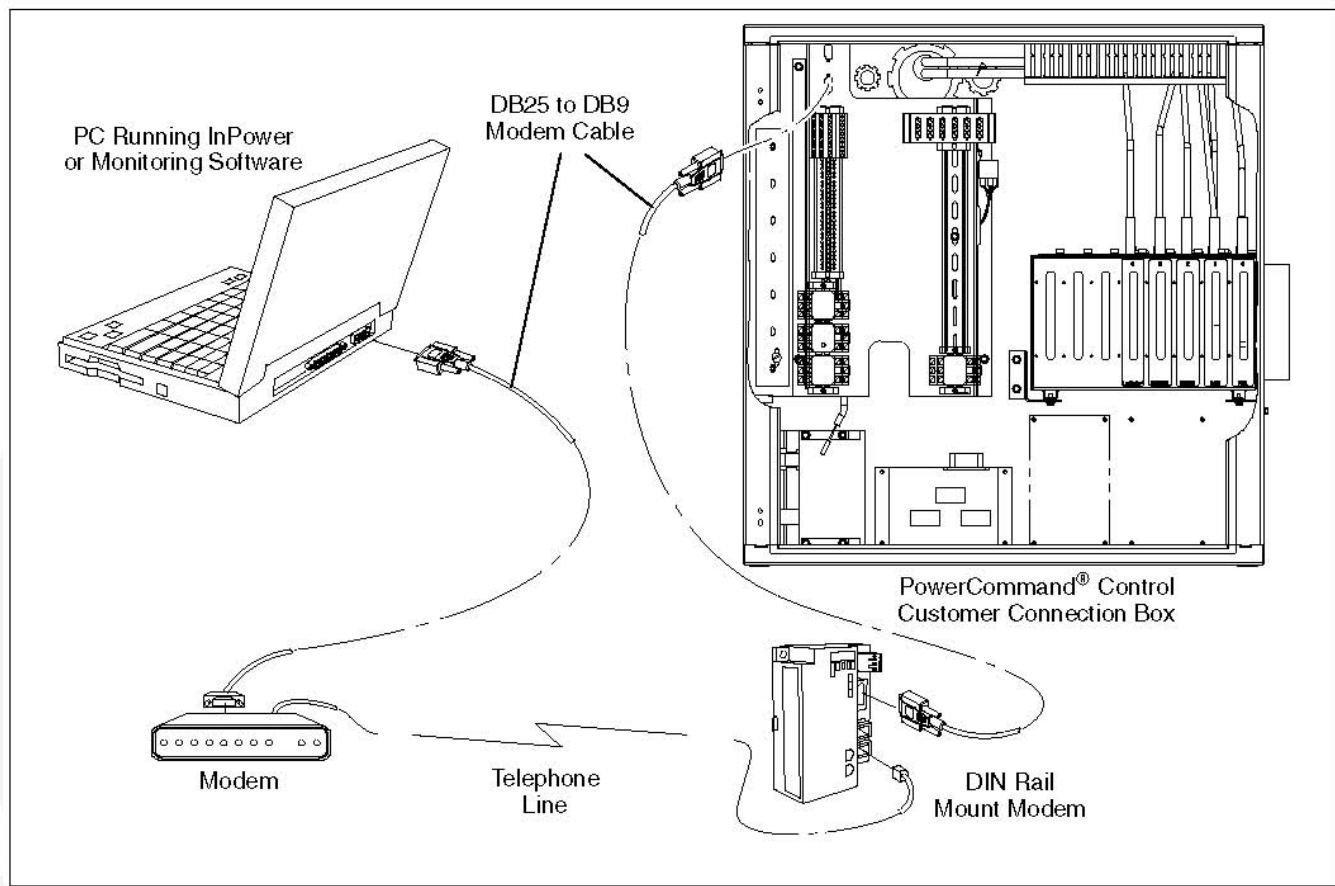


FIGURE 296. INPOWER SERIAL CONNECTION (TYPE 2 CONNECTION BOX)

28.2 Remote Site Setup

The following procedures describe how to setup InPower for remote communication.

The **Setup** feature is accessed from the **Start** menu by clicking on the **Power Generation - InPower** program group. Click on **Setup**, to launch the Setup dialog.

If a TAPI Error message appears, you may be using Windows 95 operating software. InPower does not support remote communications with Windows 95.

The user will need to define a new site, then add a device for that site and apply the changes.

28.2.1 Site Setup

Click on the **Site Setup** tab to access the **Site Setup** dialog ([Figure 297](#)). Click on the **Add** button, to display the **Create Site** dialog ([Figure 298](#)).

28.2.2 Create Site

Enter the following information in the dialog to create a new remote site:

Site Type - Select **Physical** from the drop down list.

Site ID - Enter a port name, use **Remote** in this example.

Protocol - Select **goal** as the protocol from the drop down list.

Location - Enter **Remote**, from the drop down list.

Telephone Number: Enter the telephone number of the phone line connected to the modem at the site location.

Click on the **OK** button to save the new site. This establishes the port, next, setup a device for this port.

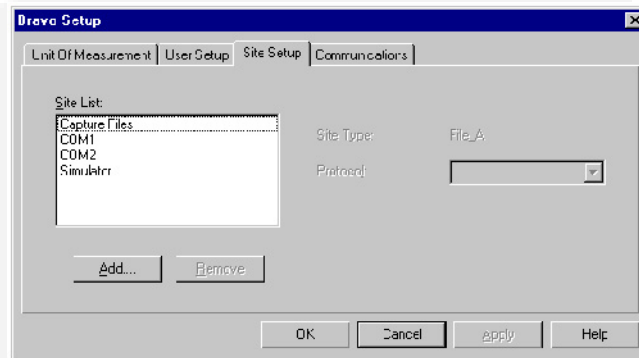


FIGURE 297. SITE SETUP DIALOG

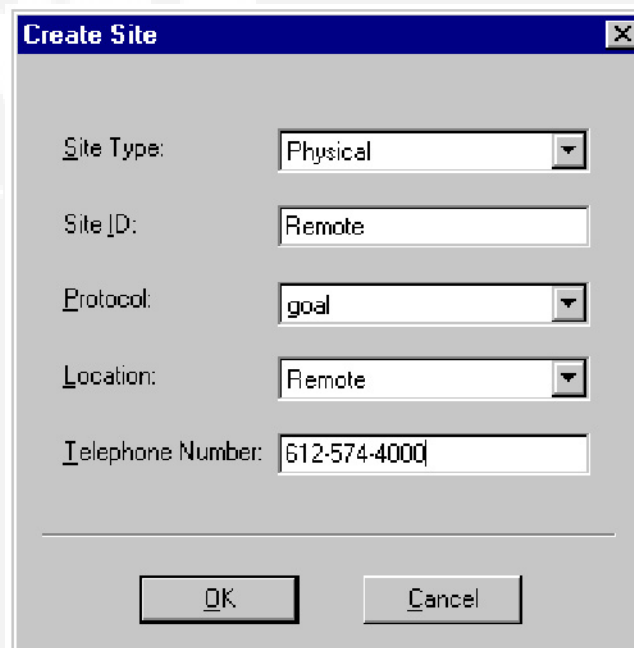


FIGURE 298. CREATE SITE DIALOG

28.2.3 Device Setup

Click on **Remote**, in the Site List, then click on the **Device Setup** button to access the Device Setup dialog. Click on the **Add** button to access the Create Device dialog ([Figure 300](#)). For remote communication, enter the following information in the **Create Device** dialog:

Device ID - Enter **Remote**.

Device Name - Enter **Genset**.

Device Type: Click on the drop-down arrow, then scroll to and select **pcf_dvc**.

Click on the **OK** buttons for the Create Device and Device Setup dialogs, then click on **Apply** to save the settings. Click on **OK** to complete the setup and close the **Site Setup** dialog.

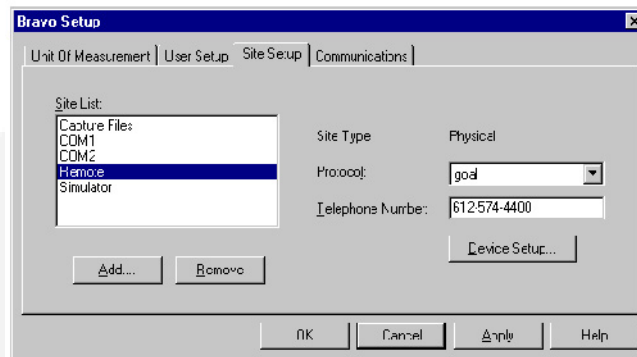


FIGURE 299. DEVICE SETUP



FIGURE 300. CREATE DEVICE DIALOG

28.2.4 Communications Setup

The **Communications** setup feature is used to enable incoming calls for remote InPower Users.

Enable this feature by clicking on the **Allow incoming calls** checkbox. (Check mark appears in checkbox when the feature is enabled.)

In the **Incoming Calls Use modem** combo box, select the desired modem. Only one modem can be selected.

In the **Remote Connections Use modem** combo box, select the modem to use for outgoing calls (for remote sites). The names of all modems currently installed on the system will be listed in the drop-down list. The **First Available** selection allows the Windows TAPI program to select an available modem.

When available, Local or Remote **LON Network Connections** can also be set.

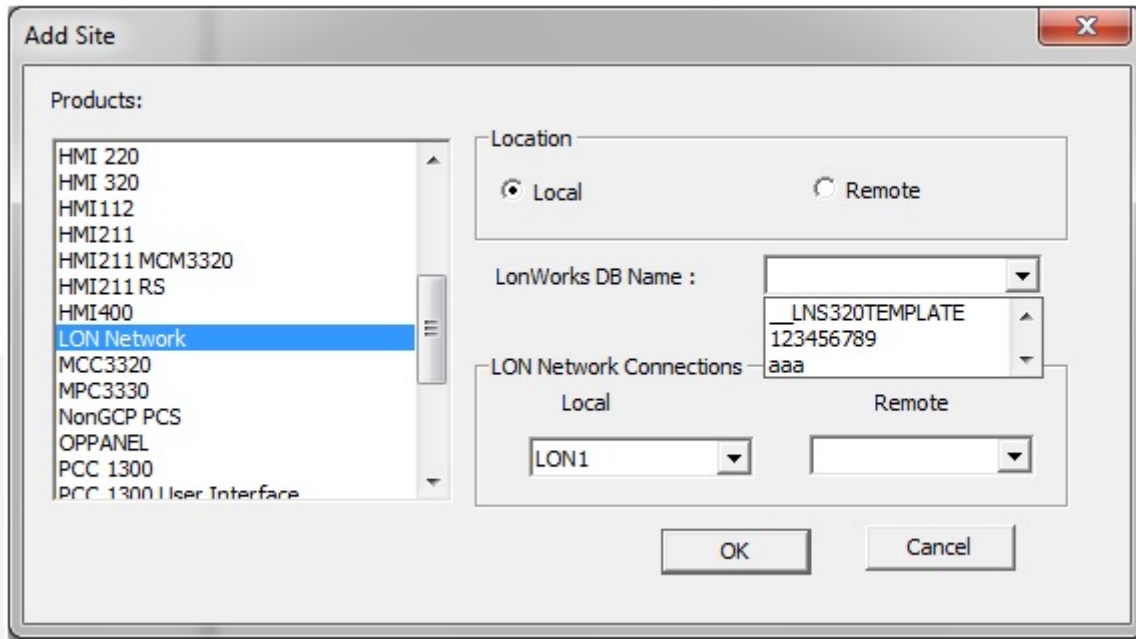


FIGURE 301. COMMUNICATIONS SETUP

28.3 Remote Connection with InPower

InPower can be used to remotely connect to a genset. Before attempting remote communication, perform the Remote Site Setup steps and make sure that the modem is enabled.

Start InPower and connect to the site that was used for remote connection (named *Remote* in this example).

A dialing status window is displayed during dialout. When connected to the device, InPower Device Explorer opens and displays the device the same way it does with a local connection ([Figure 302](#)).

To write to a device you must have registered software of the correct device type.

When a device has password protected parameters, the password protection applies when using a remote connection. The user must enter the required password(s) before the password protected parameters can be changed.

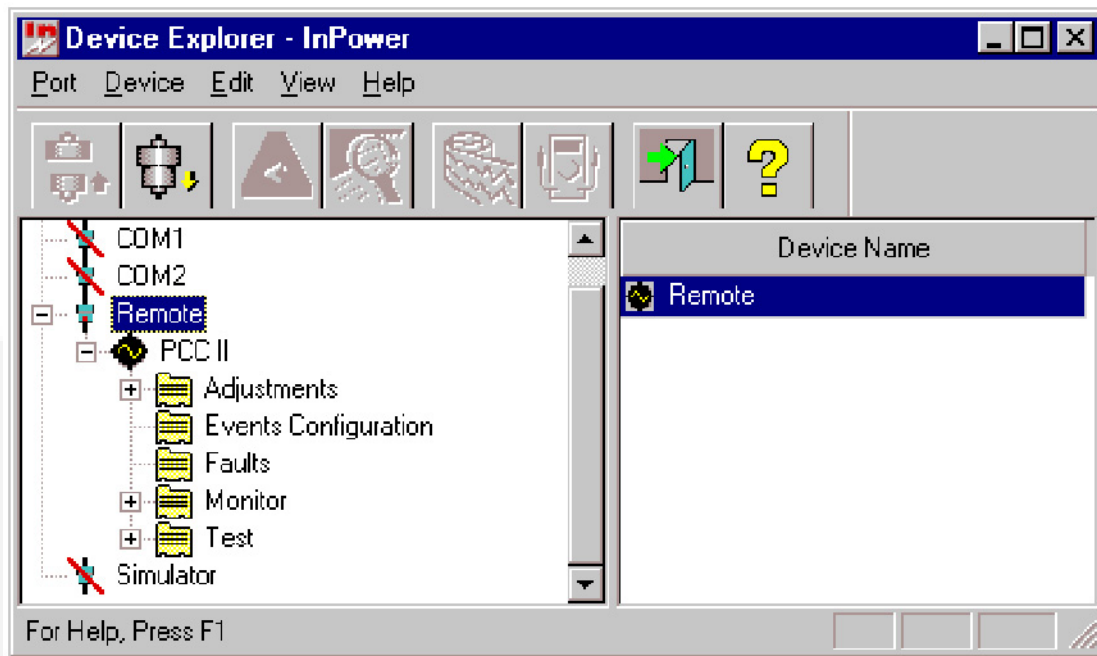


FIGURE 302. REMOTE CONNECTION

28.4 Dialout Configuration

This section describes the modem setup parameters used for dialing out. To configure the device for dialout, the service PC must be directly connected to the device (Dialout Configuration cannot be done remotely).

Start InPower and connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC, used for connection to the device. Double click on the COM port (or click on the COM port and then click on the **Connect** button, on the toolbar).

The modem setup parameters are located in the **Adjustments - Features** folder. Double click on these folders to display the **Direct Connect Modem Setup** folder. Click on this folder to view the modem setup parameters ([Figure 303](#)).

The following list describes the modem setup parameters:

Modem Hangup Delay: Enable this feature to remain connected for two minutes after delivering a dialout message.

Modem: This feature must be Enabled in order to use the modem.

Dial Out Attempts: Used to set the number of times a number will be dialed while attempting to deliver a dial out message. The default setting, zero, is equal to one attempt. (The recommend setting is 10.)

Modem Configuration String: Used to enter the modem configuration string for the specific modem in use. See [Section 28.5](#) for the modem init strings for each of the modems that are used with InPower.



NOTE: The modem configuration string is preconfigured when one of the optional modems is factory installed.

Dialout Numbers 1 through 4: These are the dialout numbers for the location(s) that are monitoring the device. Use a comma (,) to pause, and start with a P for pulse dialing.

Dial Out Retry Delay: Enter the time delay between dialout attempts (in minutes).

Clear Undelivered Events: This feature clears all pending dialouts.

Dialout Break: When enabled, this feature breaks the connection after two minutes in order to complete a dialout.

Set the modem parameters, then click on the **Save Trims** button, on the toolbar, to write modem setup values to the device.

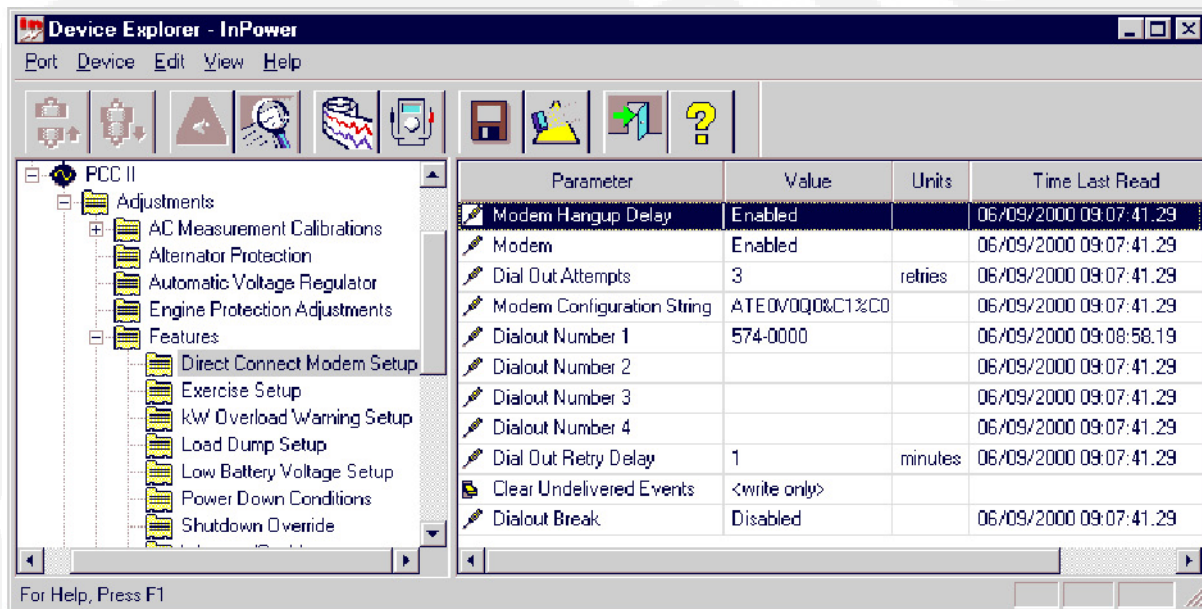


FIGURE 303. DIRECT CONNECT MODEM SETUP

28.5 Modems

There are two modems that can be used with InPower. The two modems each have a unique init string (Modem Configuration String). When a modem is installed in the field, it is important to identify the modem brand, and enter the proper init string using InPower.

Both of these modems can be powered with a DC power supply.

When using InPower locally, do not remove the modem connection from the serial port until after the modem power has been turned off. Do not re-apply power to the modem until after it has been reconnected to the device's serial port. Failure to follow this sequence can result in loss of the modem configuration string.



CAUTION: *The modem configuration string can be lost, preventing dialout of important messages if power to the modem is not turned off and on in the proper sequence. Whenever the dialout modem is disconnected for access to the device's serial port, the modem first must be turned off. The modem should not be turned on again until after it has been reconnected.*

The modem used for dialout should be connected through the normally closed contacts of the modem power relay. This is required because when the control is off (and the driver is off) the modem has to be able to receive dial-in calls, to wake up the controller.

28.5.1 Modem Configuration Strings

Use the following information for configuring one of the two available modems for use with InPower:

Multitech Model MT3334ZDX

Modem Configuration String:

ATE0V0Q0&C1%C0&D0&K0N0\N0\$SB9600S0=1S25=25S37=9&W0

Industrial Modem Model VT-Modem-1US by Sixnet.

Modem Configuration String:

ATE0V0Q0&C1%C0&D0&K0N0\N0S0=1S25=25S37=9&W0

28.6 Remote Monitoring

PowerCommand controlled Gensets can be monitored from a remote location. Use InPower to perform the Setup and Dialout Configuration. Make sure that the **Allow incoming calls** feature is enabled, in the Communication setup.

After making the necessary remote connections ([Figure 295](#) and [Figure 296](#)), the monitoring software is used to receive dialout events from the genset control.

Using InPower for remote monitoring:

Start InPower, but do not connect to a port. Double click on the Alarm Popup icon (exploding fire cracker icon) located on the Task Bar in the lower right corner of your monitor. Enable the **AutoAnnounce** feature in the Alarm Popup **Options** menu.

When enabled (checked), the **Alarms** Popup displays each time a new event is received. If unchecked, the **Alarms** Popup will not open automatically to announce new events. InPower must remain running when it is being used for monitoring a remote genset. The InPower program can be minimized to the Task Bar.

The most recent event is added at the top of the list. One event will always be selected (highlighted). Events received while the Alarm dialog is displayed will appear in the dialog immediately.

29 Network Applications

This section describes how to use InPower to configure network settings and how to configure devices over a commissioned network.

29.1 Network Configuration

A **LonWorks** folder has been added in the **Adjustments** directory for PCC 3200, PCC 2100 and PowerCommand transfer switch controls. This group of parameters is used to configure network settings. Each device type has a unique group of settings.

PCC 3100 controls use a GCM for network applications. Network settings for this device are available through a plug-in, used with LonMaker.

The service PC, with InPower version 3.0 or later, must be connected to the genset or ATS, in order to configure the network settings.

29.2 PCC 2100

Start InPower and connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC, that is being used for the PCC 2100 genset connection.

Open the **Adjustments** folder, and then the **LonWorks** folder ([Figure 304](#)). The following group of parameters are available for network configuration:

- Custom Annunciation
- Customer Outputs
- Device
- Dialout
- Fault Settings

This section describes how to use each of the parameter groups, in the PCC 2100 LonWorks directory. Press the **Reset** button on the NCM, after saving changes to the PCC 2100, to write the changes from the base board to the NCM.

29.2.1 Custom Annunciation

The Custom Annunciation feature allows the customer to select up to 16 different fault codes to be sent to an annunciator, when the fault becomes active. A listing of fault codes can be viewed with InPower, in the **Fault Settings** folder.

The desired fault codes are entered directly into a Data Table ([Figure 304](#)). Select the **Custom Annunciation** feature and double click on the **Data Table** Value cell. The Data Table will open in a new window.

To enter or edit data in the table, click on the first **Event Identifier** field, then enter the desired fault code number into the edit box, next to the check mark. Click on the check mark to enter the fault code number into the **Event Identifier** table. Repeat this process until all of the desired fault codes have been entered.

Click on the **Save** button, to update the **Data Table** changes. Click on **Close**, when you are finished adding fault codes or making changes.

Click on the **Save Trims** button, on the toolbar, to write the Custom Annunciation Data Table settings to the device. Press the **Reset** button, on the NCM, to download the new data table settings from the base board to the NCM.

The **Paste** button is used to import spreadsheet value data from an Excel spreadsheet. This feature is useful for configuring multiple devices with the same event fault codes.

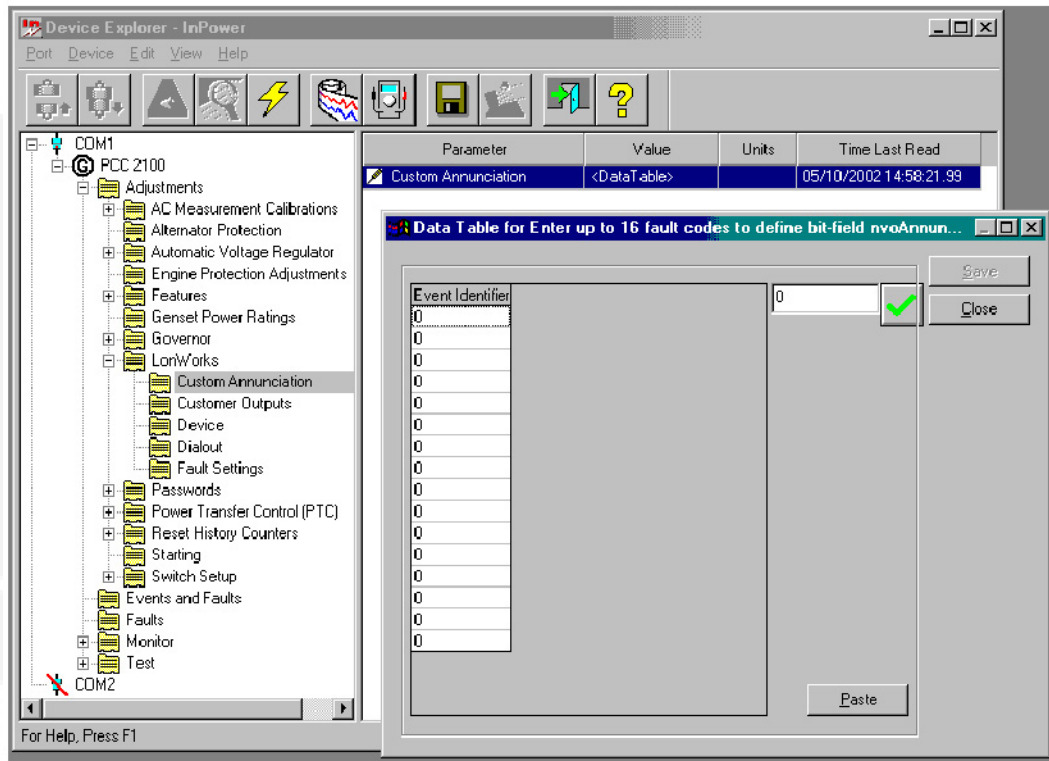


FIGURE 304. LONWORKS - PCC 2100 CUSTOM ANNUNCIATION

29.2.2 Custom Relay Events

The Custom Relay Events feature allows the customer to enter up to 16 fault codes that will actuate a corresponding relay on the optional Digital I/O Module. When the selected fault becomes active, the corresponding relay will energize, and remain energized until the fault becomes inactive.

A listing of fault codes can be viewed with InPower, in the **Fault Settings** folder.

The fault codes are entered directly into a Data Table (Figure 305). Select the **Custom Relay Events** feature and double click on the **Data Table** Value cell. The Data Table will open in a new window.

To enter or edit data in the table, click on the first **Event Identifier** field, then enter the desired fault code number into the edit box, next to the check mark. Click on the check mark to enter the fault code number into the **Event Identifier** table. Repeat this process until all of the desired fault codes have been entered.

Click on the **Save** button, to update the Data Table changes. Click on **Close**, when you are finished adding fault codes or making changes.

Click on the **Save Trims** button, on the toolbar, to write the Custom Annunciation Data Table settings to the device. Press the **Reset** button, on the NCM, to download the new data table settings from the base board to the NCM.

The **Paste** button is used to import spreadsheet value data from an Excel spreadsheet. This feature is useful for configuring multiple devices with the same event fault codes.

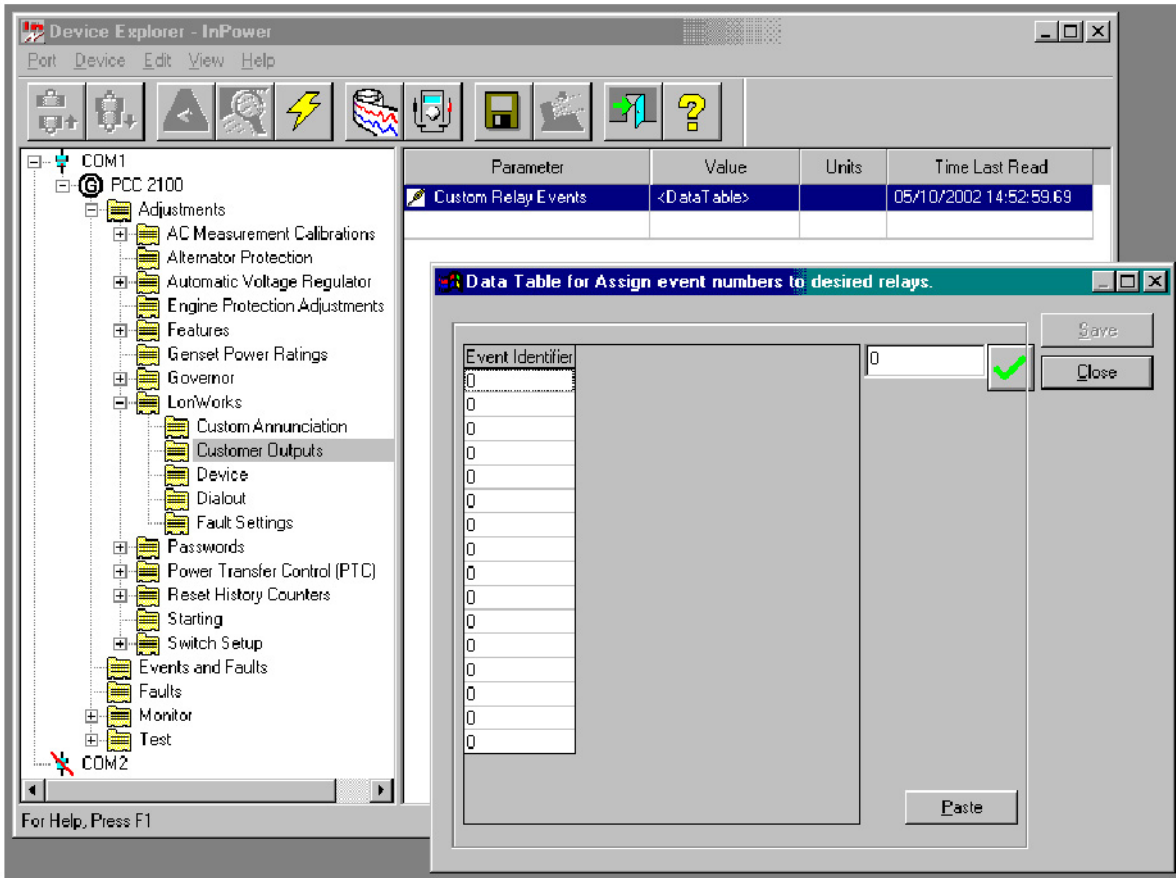


FIGURE 305. LONWORKS - PCC 2100 CUSTOM RELAY EVENTS

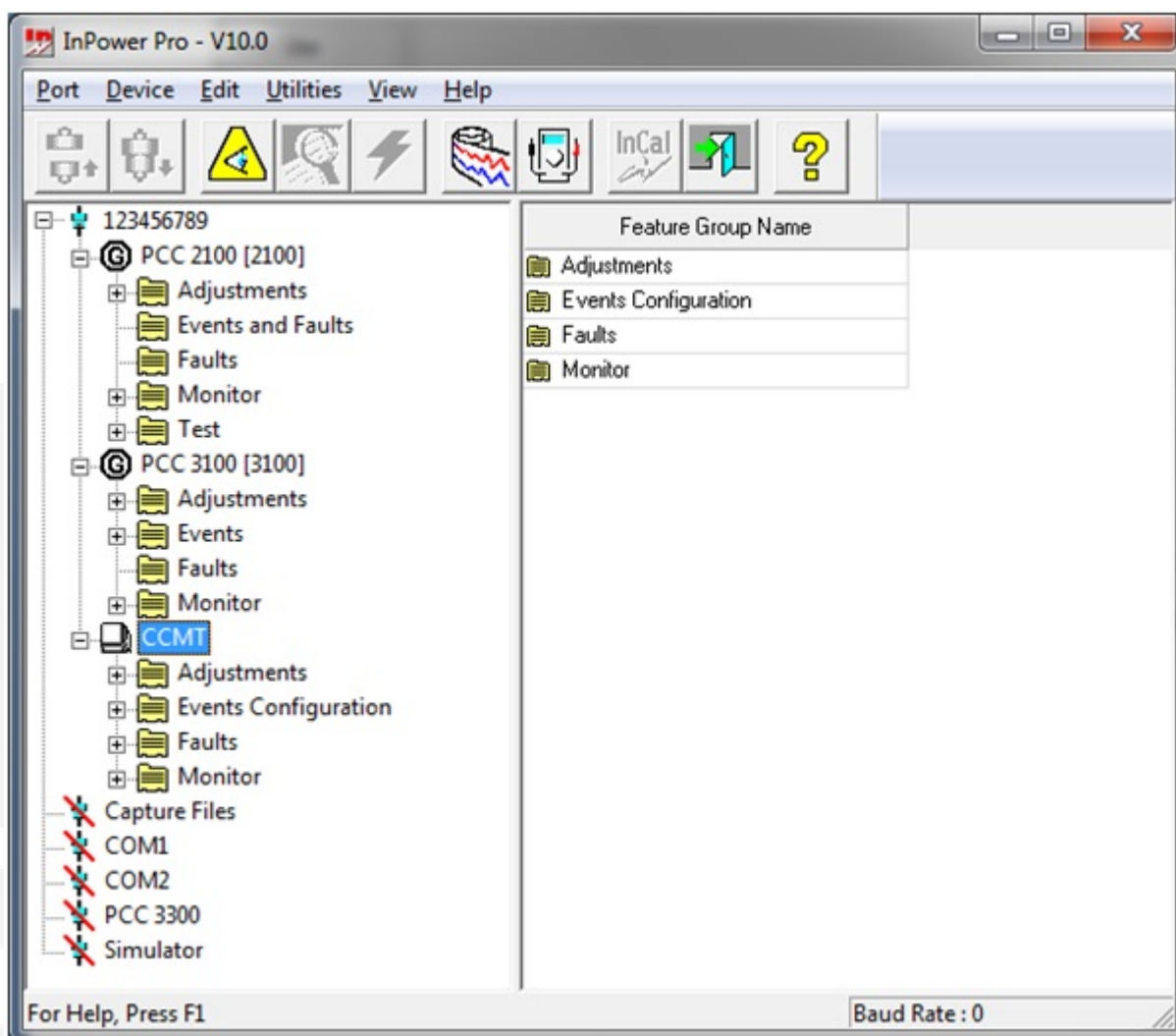


FIGURE 306. INPOWER CONNECTION TO DEVICES OVER LONWORKS SITE

29.2.3 Device

The Device group of parameters allows the user view and edit several parameters related to the network site, the device and network performance. Use these settings as follows:

Site ID: The **site ID** must consist of no more than seven characters. The characters can only be a combination of upper case letters, numbers and underscores. Do not use spaces, special characters, or lower case letters in the Site ID.

Location: Enter a description for the location of the unit (up to 16 characters).

Name: The device **Name** (tag) is used when sending system data. Provide a different name for each device on the network (up to 16 characters).

Terminated: Displays the network termination switch setting on the network module (the network module must be installed and enabled to be read).

Update Interval: Use to set the send time for analog network variables and the network status check. The default 2 second interval is recommended.

Test Interval: Use to set the send time for the network test interval. The default 10 second interval is recommended.

LonWorks Card: Use to disable the network feature after the network module has been removed.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the NCM, to download the new data from the base board to the NCM.

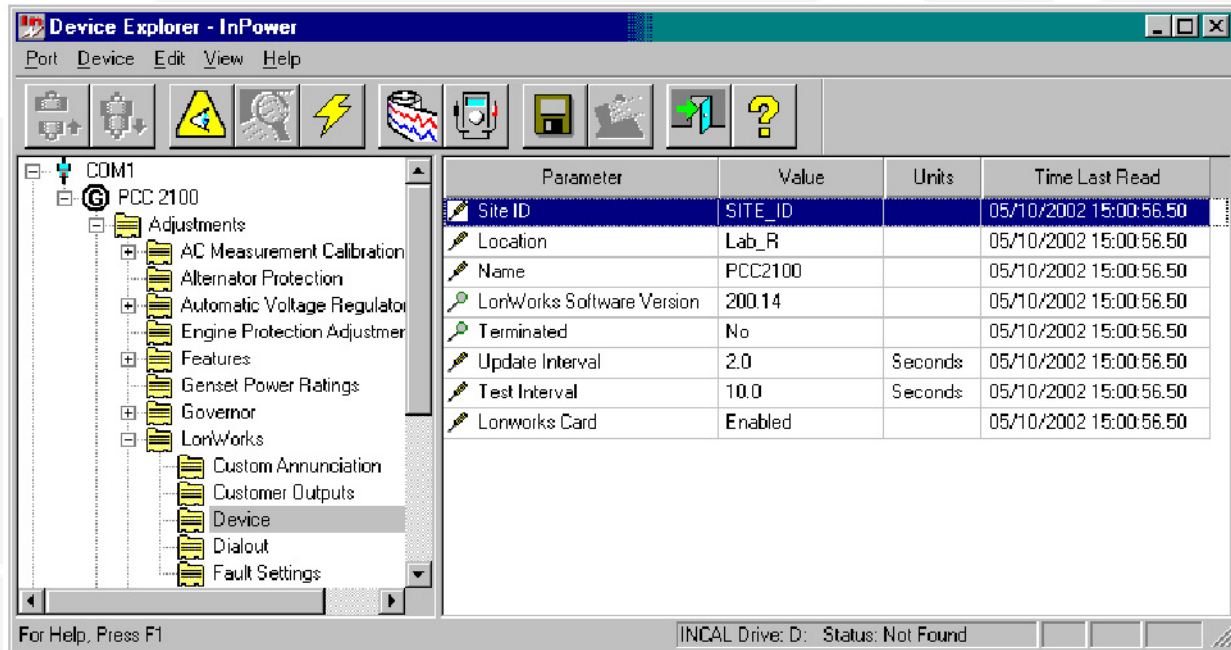


FIGURE 307. LONWORKS - PCC 2100 DEVICE

29.2.4 Dialout

The Dialout group of parameters allows the customer to configure the dialout settings for remote monitoring of devices on the network. Use these settings as follows:

Host 1 thru 5: Enable the number of remote monitoring sites (hosts) that you want to send alarm messages to. Click on the value cell and select **Enabled** from the drop-down list.

Dialout Retries: Used to set the number of dialout retries, if the first alarm dialout fails while attempting to deliver a dial out message. The default setting 10, is the recommended setting. A setting of zero, is equal to one attempt.

Retry Delay: Enter the time delay between dialout attempts. The recommended setting is 60 seconds.

Dialout Break: When enabled, this feature breaks a current connection after two minutes in order to complete a dialout.

Connection Timeout: After a dialout command has been sent to the modem, this feature specifies how long to wait for the site to connect to the remote monitoring location. The default setting is 60 seconds.

If the site does not connect with the remote monitoring location, it will dialout to Host 2, Host 3, etc. (if additional hosts are enabled) until it connects. If it still does not connect, it will repeat the process, beginning with Host 1, based on the number of retries that have been set.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the NCM, to download the new data from the base board to the NCM.

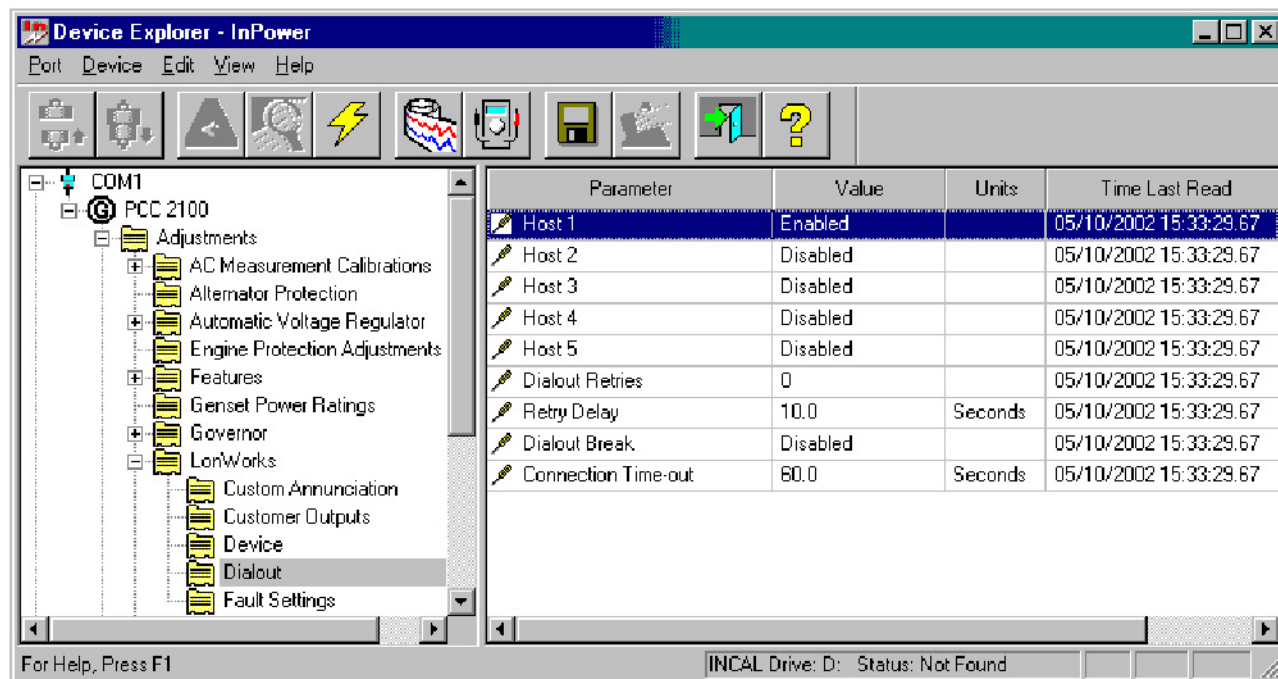


FIGURE 308. LONWORKS - PCC 2100 DIALOUT

29.2.5 Fault Settings

The Fault Settings group allows you to name the network input message (event name) for Network Inputs 1 through 8, and view their status. This feature also allows you to assign a fault code to the Battery Charger AC Failure and S1 Circuit Breaker Trip.

Use these settings as follows:

Network Input Status (1 - 8): Displays the current status of the fault (Active or Inactive) in the Value field for each of the eight network inputs. Use the **Refresh** button, on the toolbar, to update the value fields.

Network Input Event Name (1 - 8): Allows the user to enter a description for network input 1 through 8. Double click the value cell and enter the new description. The new name should define the customer network input such as *Open Louvre* or *Remote Cooling Fan On*. This event name will be displayed when the network input becomes active.

Battery Charger AC Failure Fault Code: Enter a fault code number for an event related to this fault. As an example for genset use fault code 1311 or 1312.

Refer to the Events and Faults folder for fault code descriptions.

Utility Circuit Breaker Trip Fault Code: Enter a fault code number for an event related to this fault. As an example for paralleling use fault code 1317 or 1318.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the NCM, to download the new data from the base board to the NCM.

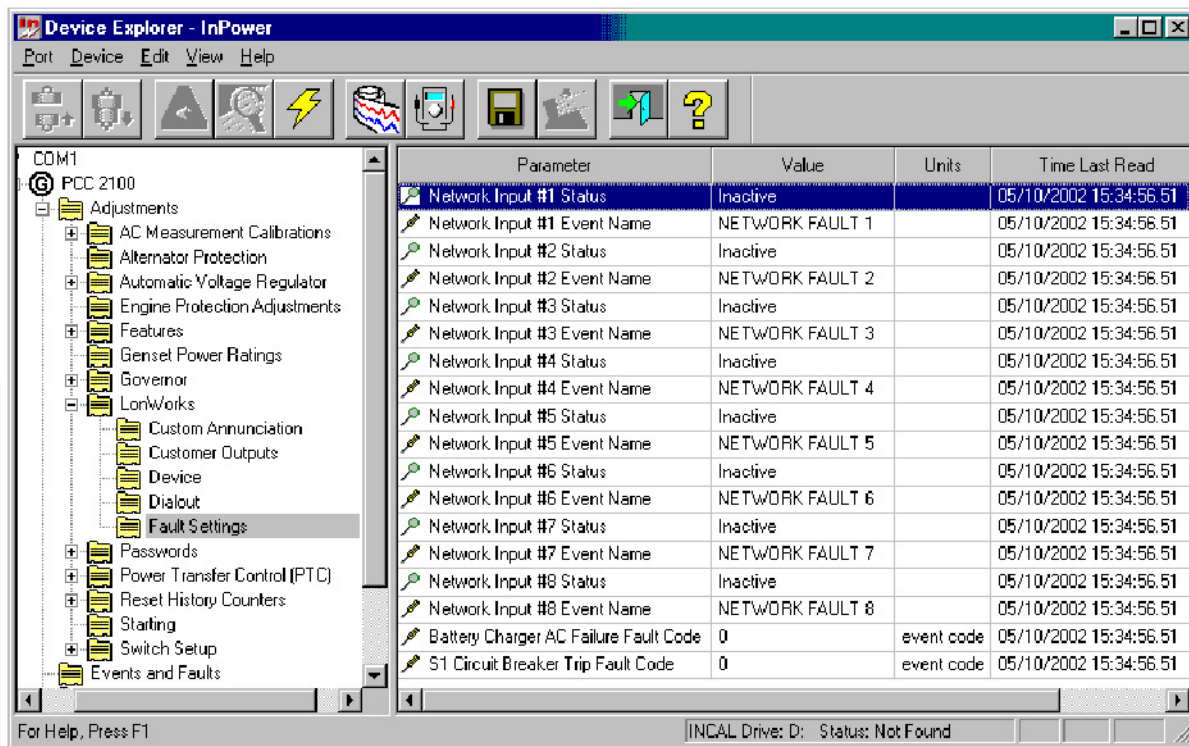


FIGURE 309. LONWORKS - PCC 2100 FAULT SETTINGS

29.2.6 PCC 2100 Events and Faults Configuration

When setting up the network settings for a PCC 2100 control, refer to the **Events and Faults** folder ([Figure 310](#)).

The last columns allow the user to Bypass (disable) the notification (Dial Out). This feature allows the user to eliminate nuisance event messages by setting the Bypass value to **Enabled**. Some events may not be bypassed, like Overspeed and Speed Governor Signal.

Review the settings in this parameter group to make sure the desired settings are configured.

To configure a fault to dial out for remote monitoring, go to the **Notification** value field for the fault and double click on the **Notification** value cell, select **Dial Out** from the drop-down list.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the NCM, to download the new data from the base board to the NCM.

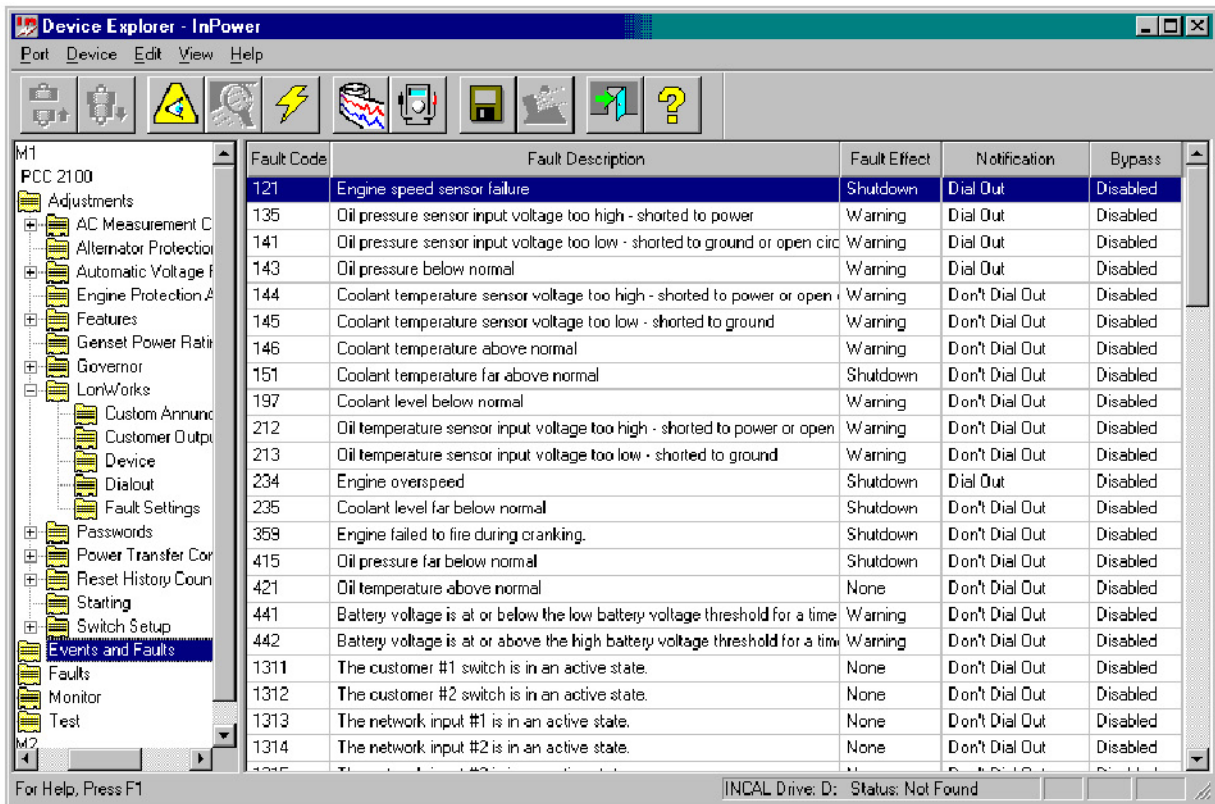


FIGURE 310. EVENTS AND FAULTS

29.3 PCC 3200

Start InPower and connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC, that is being used for the PCC 3200 genset connection.

Open the **Adjustments** folder, and then the **LonWorks** folder (Figure 311). The following parameter groups are available for network configuration:

- Custom Annunciation
- Customer Outputs
- Device
- Dialout
- Fault Settings

This section describes how to use each of the parameter groups, in the PCC 3200 LonWorks directory. Press the **Reset** button on the genset LonWorks card (GLC), after saving changes to the PCC 3200, to write the changes from the base board to the GLC.

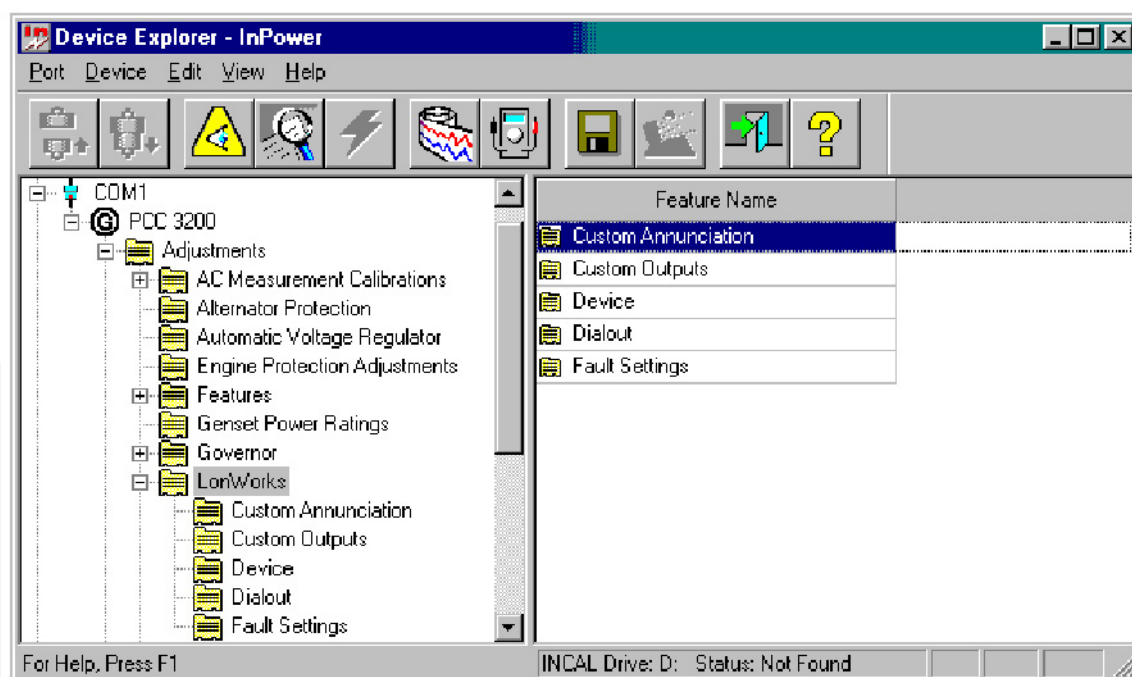


FIGURE 311. LONWORKS - PCC 3200

29.3.1 Custom Annunciation

The Custom Annunciation feature allows the customer to select up to 16 different fault code messages to be sent to an annunciator, when the fault becomes active. A listing of fault codes can be viewed with InPower, by opening the **Events Configuration** folder.

The desired fault codes are entered directly into a Data Table ([Figure 312](#)). Select the **Custom Annunciation** feature and double click on the **Data Table** Value cell. The Data Table will open in a new window.

To enter or edit data in the table, click on the first **Event Identifier** field, then enter the desired fault code number into the edit box, next to the check mark. Click on the check mark to enter the fault code number into the **Event Identifier** table. Repeat this process until all of the desired fault codes have been entered.

Click on the **Save** button, to update the **Data Table** changes. Click on **Close**, when you are finished adding fault codes or making changes.

Click on the **Save Trims** button, on the toolbar, to write the Custom Annunciation Data Table settings to the device. Press the **Reset** button, on the GLC, to download the new data table setting from the base board to the GLC.

The **Paste** button is used to import spreadsheet data from an Excel spreadsheet. This feature is useful for configuring multiple devices with the same event fault codes.

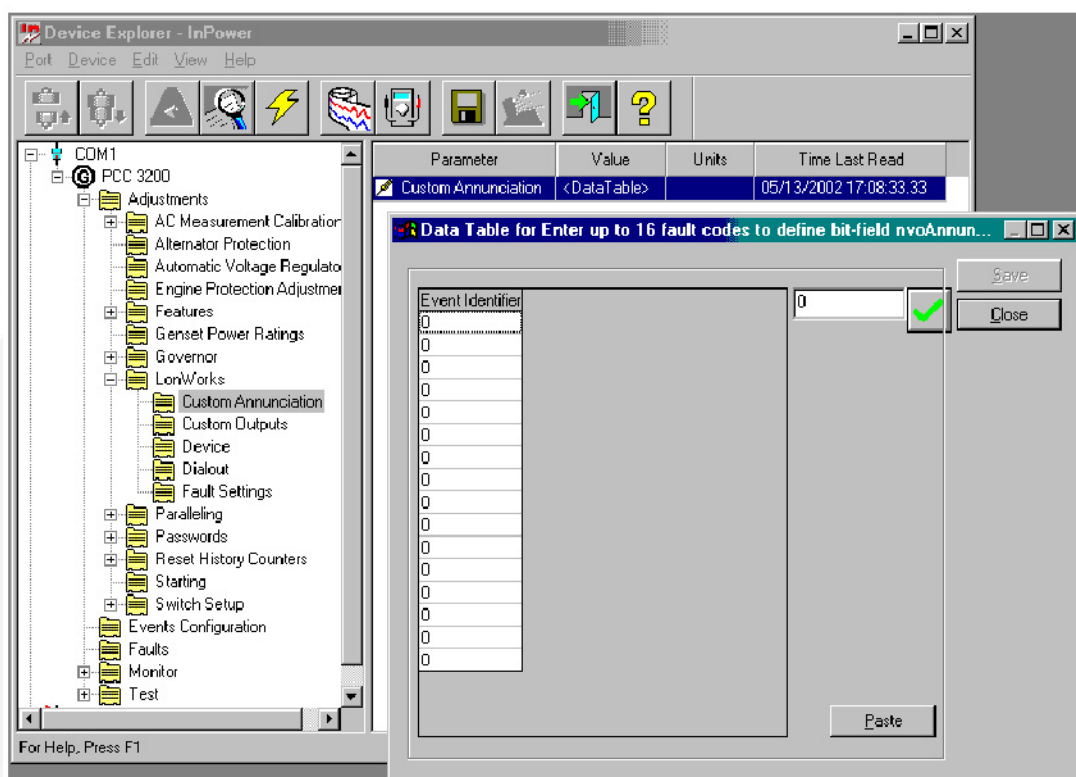


FIGURE 312. LONWORKS - PCC 3200 CUSTOM ANNUNCIATION

29.3.2 Custom Outputs

The Custom Outputs feature allows the customer to select up to 8 different fault codes to be sent to a Digital Master Control (DMC) or other third party monitoring device when the fault becomes active. (Custom Outputs are not read by PowerCommand for Windows monitoring software.) A listing of fault codes can be viewed with InPower, by opening the **Events Configuration** folder.

The desired fault codes are entered directly into a Data Table ([Figure 313](#)). Select the **Custom Outputs** feature and double click on the **Data Table** Value cell. The Data Table will open in a new window.

To enter or edit data in the table, click on the first **Event Identifier** field, then enter the desired fault code number into the edit box, next to the check mark. Click on the check mark to enter the fault code number into the **Event Identifier** table. Repeat this process until all of the desired fault codes have been entered.

Click on the **Save** button, to update the Data Table changes. Click on **Close**, when you are finished adding fault codes or making changes.

Click on the **Save Trims** button, on the toolbar, to write the Custom Annunciation Data Table settings to the device. Press the **Reset** button, on the GLC, to download the new data table settings from the base board to the GLC.

The **Paste** button is used to import spreadsheet value data from an Excel spreadsheet. This feature is useful for configuring multiple devices with the same event fault codes.

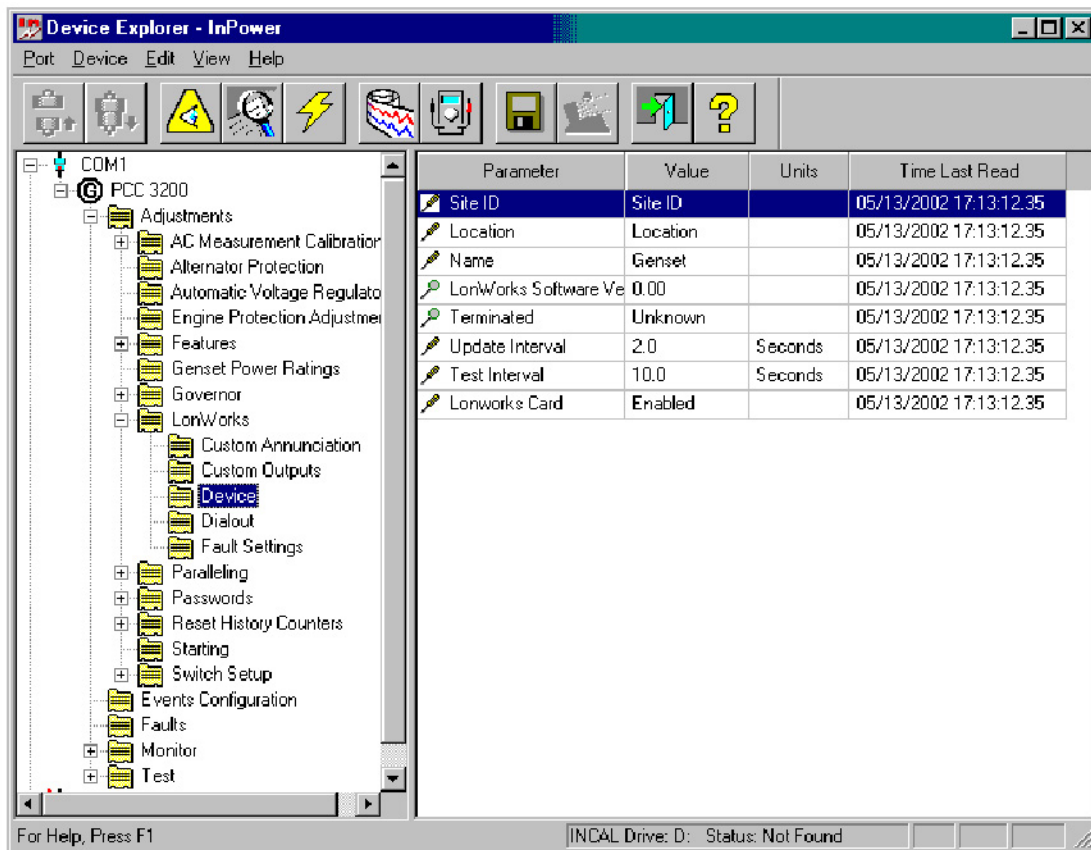


FIGURE 313. LONWORKS - PCC 3200 DEVICE

29.3.3 Device

The Device group of parameters allows the user to view and edit several parameters related to the network site, the device and network performance. Use these settings as follows:

Site ID: The **site ID** must consist of no more than seven characters. The characters can only be a combination of upper case letters, numbers and underscores. Do not use spaces, special characters or lower case letters in the Site ID.

Location: Enter a description for the location of the unit (up to 16 characters).

Name: The device **Name** (tag) is used when sending system data. Provide a different name for each device on the network (up to 16 characters).

LonWorks Software Version: Displays the current LonWorks network software version.

Terminated: Displays the network termination switch setting on the network module (the network module must be installed and enabled to be read).

Update Interval: Use to set the send time for analog network variables and the network status check. The default 2 second interval is recommended.

Test Interval: Use to set the send time for the network test interval. The default 10 second interval is recommended.

LonWorks Card: Use to enable the network module. (The network module must be physically installed before the feature can be enabled.)

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the GLC, to download the new settings from the base board to the GLC.

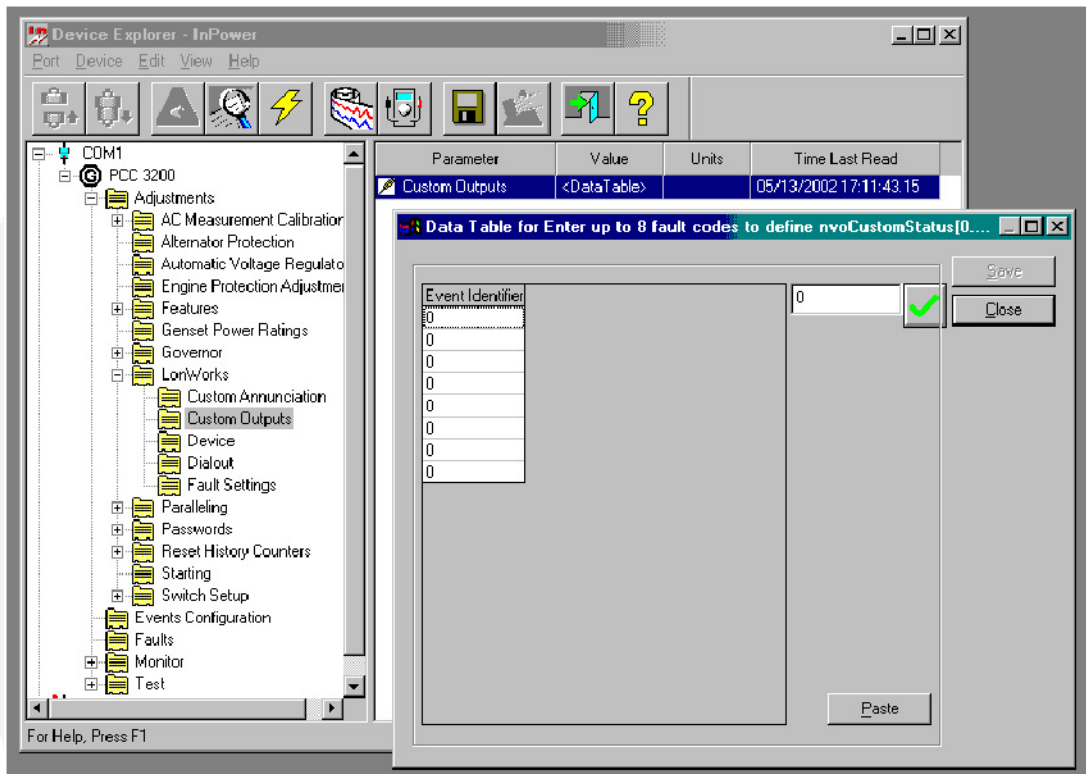


FIGURE 314. LONWORKS - PCC 3200 CUSTOM OUTPUTS

29.3.4 Dialout

The Dialout group of parameters allows the customer to configure the dialout settings for remote monitoring of devices on the network. Use these settings as follows:

Host 1 thru 5: Enable the number of remote monitoring sites (hosts) that you want to send alarm messages to. Click on the value cell and select **Enabled** from the drop-down list.

Dialout Retries: Used to set the number of dialout retries, if the first alarm dialout fails while attempting to deliver a dial out message. The default setting 10, is the recommended setting. A setting of zero, is equal to one attempt.

(Dialout) Retry Delay: Enter the time delay between dialout attempts. The recommended setting is 60 seconds.

Dialout Break: When enabled, this feature breaks a current connection after two minutes in order to complete a dialout.

Connection Timeout: After a dialout command has been sent to the modem, this feature specifies how long to wait for the site to connect to the remote monitoring location. The default setting is 60 seconds.

If the site does not connect with the remote monitoring location, it will dialout to Host 2, Host 3, etc. (if additional hosts are enabled) until it connects. If it still does not connect, it will repeat the process, beginning with Host 1, based on the number of retries that have been set.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the GLC, to download the new data from the base board to the GLC.

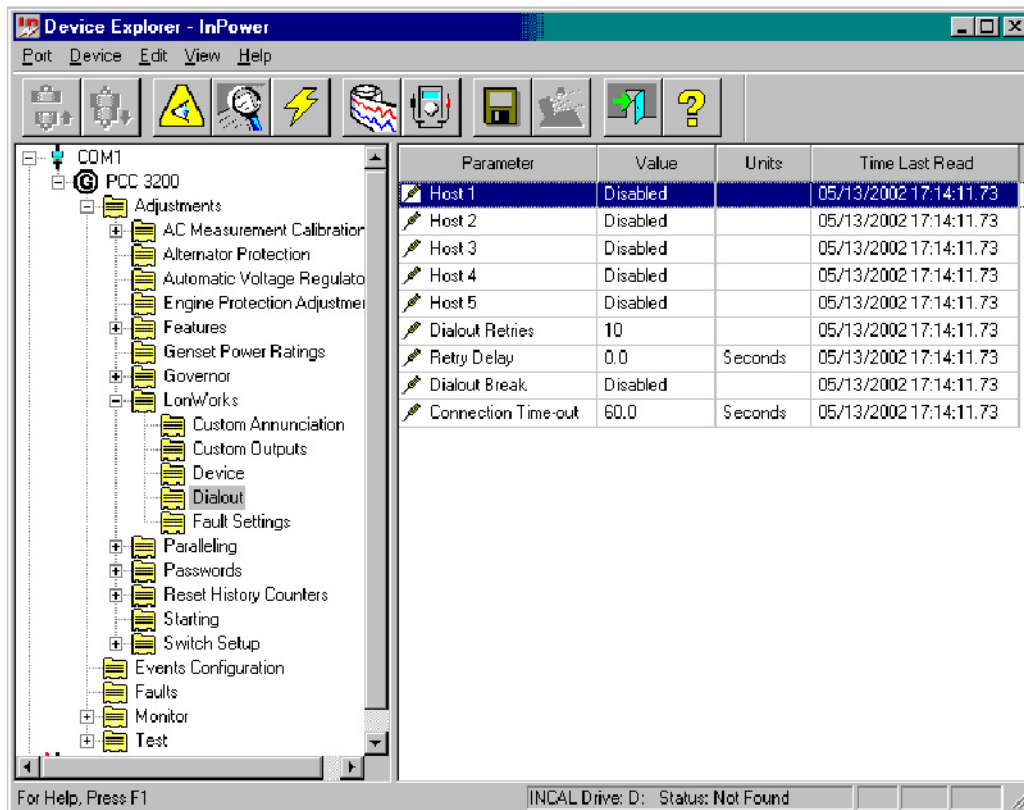


FIGURE 315. LONWORKS - PCC 3200 DIALOUT

29.3.5 Fault Settings

The Fault Settings group allows you to name the network message for Network Faults 1 through 4, and view their status. This feature also allows you to assign a fault code to the Battery Charger AC Failure and S1 Circuit Breaker Trip.

Use these settings as follows:

Network Fault Name 1 thru 4: Allows the user to enter a description for network input faults 1 through 4. Double click the value cell and enter the new description. The new name should define the customer network input such as *Open Louvre* or *Remote Cooling Fan On*. This fault name will be displayed when the network input becomes active.

Network Fault Status 1 thru 4: Displays the current status of the network input fault (Active or Inactive) for each of the four network faults. Use the Refresh button, on the toolbar, to update the value fields.

Battery Charger AC Failure Fault Code: Enter a fault code number for an event related to this fault. As an example, use fault code 1311 or 1312.

Refer to the Event Configuration folder for fault code descriptions.

Utility Circuit Breaker Trip Fault Code: Enter a fault code number for an event related to this fault. As an example, for paralleling applications, use fault code 1317 or 1318.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the GLC, to download the new data from the base board to the GLC.

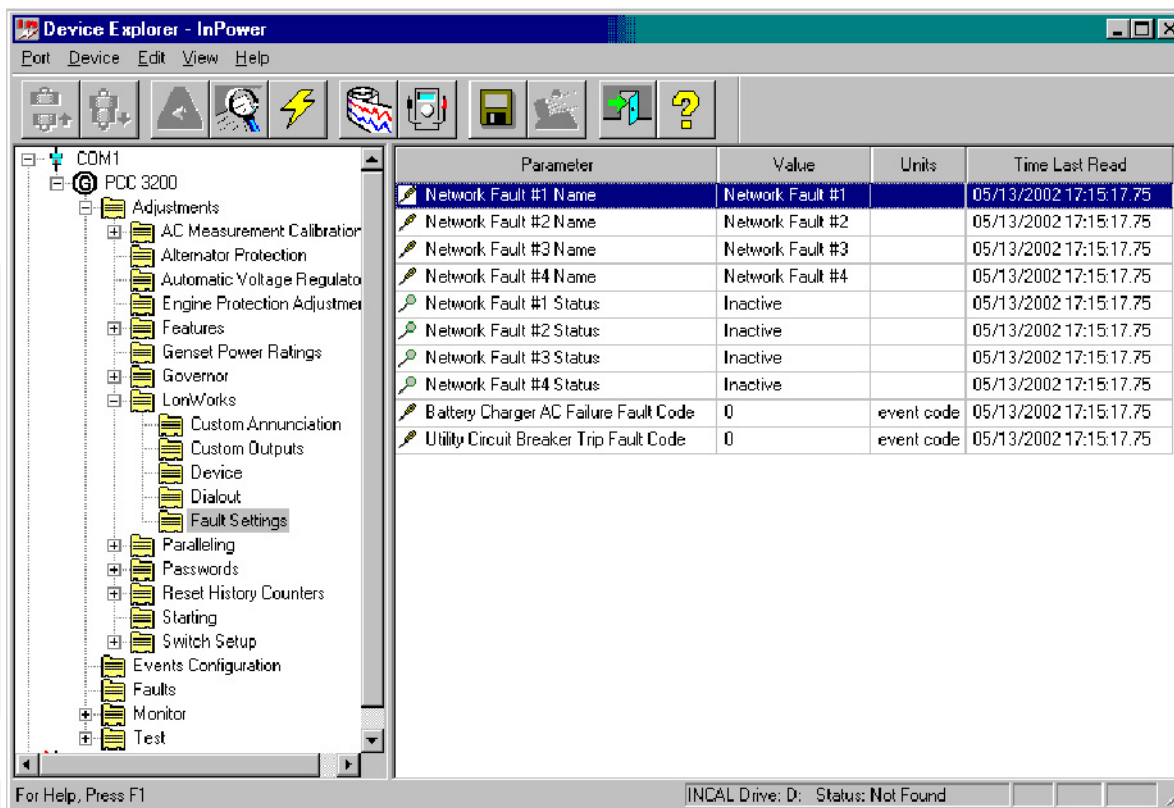


FIGURE 316. LONWORKS - PCC 3200 FAULT SETTINGS

29.3.6 PCC 3200 Events Configuration

When setting up the network settings for a PCC 3200 control, refer to the **Events Configuration** folder ([Figure 317](#)).

Review the settings in this parameter group to make sure the desired settings are configured.

To configure a fault to dial out for remote monitoring, go to the **Notification** value field for the fault and double click on the **Notification** value cell, select **Dial Out** from the drop-down list.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the GLC, to download the new data from the base board to the GLC.

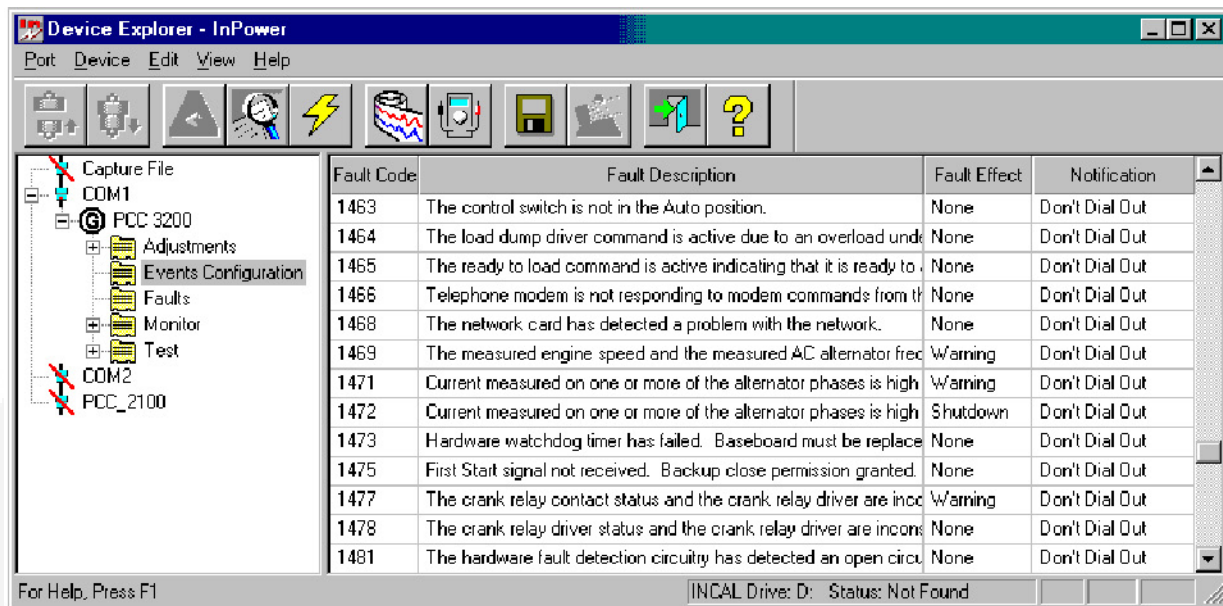


FIGURE 317. PCC 3200 - EVENT CONFIGURATION

29.4 PCC ATS

The **LonWorks** directory for a typical PowerCommand transfer switch (PCC ATS) contains all of the network settings within one folder. (To enable the network feature, use the **Feature Enable** folder, in the Adjustments directory.)

Press the **Reset** button on the NCM, after saving changes to the PCC 2100, to write the changes from the base board to the NCM.

Start InPower and connect to the port (COM1, COM2, etc.) that matches the COM port on the service PC, that is being used for the PCC ATS connection.

Open the **Adjustments** folder, and then the **LonWorks** folder ([Figure 318](#)). This section describes how to use each of the parameter groups, in the LonWorks directory.

Network Error: Displays the current status of the Network Error fault (Active or Inactive) in the Value field. The Network Error fault signifies that the network is not working when the fault is active. Use the **Refresh** button, on the toolbar, to update the value fields.

Network Wink: Use this feature to test a network module. Click on the Value cell and select **Active** to send a test signal to the device. The service led will wink when the message is received, indicating that the network connection and the network module are working.

Host 1 thru 5: Enable the number of remote monitoring sites (hosts) that you want to send alarm messages to. Click on the value cell and select **Enable** from the drop-down list.

Dialout Break: When enabled, this feature breaks the connection after two minutes in order to complete a dial out.

Dialout Retries: Used to set the number of dialout retries, if the first alarm dialout fails while attempting to deliver a dial out message. The default setting 10, is the recommended setting. A setting of zero, is equal to one attempt.

Dialout Retry Delay: Enter the time delay between dialout attempts. The recommended setting is 60 seconds.

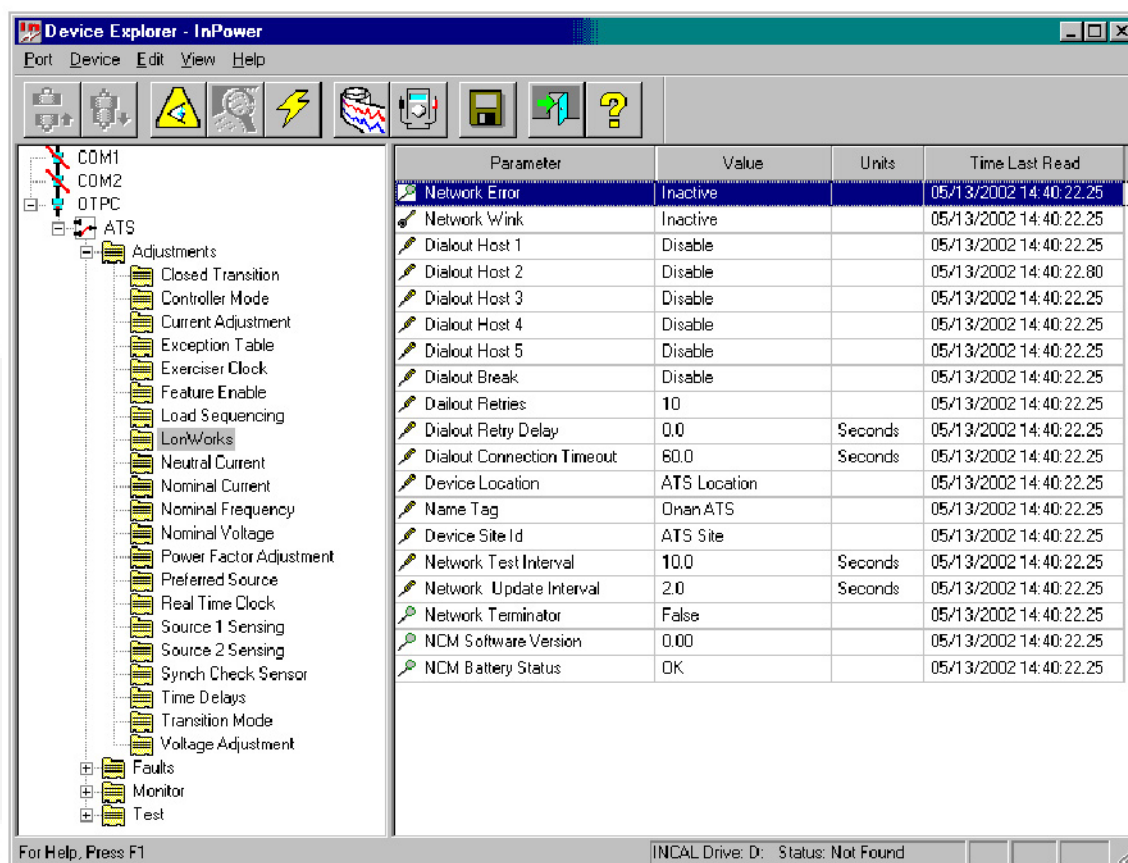


FIGURE 318. LONWORKS - PCC ATS

Connection Timeout: After a dialout command has been sent to the modem, this feature specifies how long to wait for the site to connect to the remote monitoring location. The default setting is 60 seconds.

If the site does not connect with the remote monitoring location, it will dialout to Host 2, Host 3, etc. (if additional hosts are enabled) until it connects. If it still does not connect, it will repeat the process, beginning with Host 1, based on the number of retries that have been set.

Device Location: Enter a description for the location of the unit (up to 16 characters).

NameTag: The device **Name Tag** is used when sending system data. Provide a different name for each device on the network (up to 16 characters).

Device Site ID: The **site ID** must consist of no more than seven characters. The characters can only be a combination of upper case letters, numbers and underscores. Do not use spaces, special characters, or lower case letters for the Device Site ID.

Network Test Interval: Use to set the send time for the network test interval. The default 10 second interval is recommended.

Network Update Interval: Use to set the send time for the network message updates. The default 2 second interval is recommended.

Network Terminator: Displays the network termination switch setting on the network module (the network module must be connected and enabled to be read).

NCM Software Version: Displays the current network software version installed in the network module (NCM).

NCM Battery Status: Displays the status (condition) of the batteries supplying voltage to the network module (NCM).

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device. Press the **Reset** button, on the NCM, to download the new data from the base board to the NCM.

29.4.1 PCC ATS Event Configuration

When setting up the network settings for a transfer switch, refer to the **Event Configuration** folder, in the **Faults** directory ([Figure 319](#)).

Review the last three columns of value settings. Dailout Active needs to be set to **True**, before an event will dial out when it goes active. The Dailout Inactive must be set to **True**, to dial out when the event goes Inactive.

Event Code	Event Description	Occurrences	Last Occurrence	Last Dial Time	Event Type	Event Priority	Dialout Inactive	Dialout Active	Unacknowledged	Status
101	Source-1 Connected	54	01/01/2000 00:06:33	228767	Event	High	False	False	True	Active
102	Source-1 Available	60	01/01/2000 00:06:33	228767	Event	Low	False	False	True	Active
103	Source-2 Connected	34	01/01/2000 00:01:16	228763	Event	High	False	False	False	Inactive
104	Source-2 Available	59	01/01/2000 00:06:33	228767	Event	Low	False	False	True	Active
105	Emergency Start A	63	01/01/2000 00:01:46	228767	Event	Low	False	False	False	Inactive
106	Test Start A	22	01/01/2000 00:37:41	222967	Event	Low	False	False	False	Inactive
107	Emergency Start B	0	01/01/1900 00:00:00	0	Event	Low	False	False	False	Inactive
108	Test Start B	0	01/01/1900 00:00:00	0	Event	Low	False	False	False	Inactive
109	TD Engine Start A	79	01/01/2000 00:01:46	228767	Event	Low	False	False	False	Inactive
111	TD Engine Start B	0	01/01/1900 00:00:00	0	Event	Low	False	False	False	Inactive
112	TD Transfer	39	01/01/2000 01:01:58	222992	Event	Low	False	False	False	Inactive
113	TD Retransfer	32	01/01/2000 02:10:31	223003	Event	Low	False	False	False	Inactive
114	Engine Cooldown A	60	01/01/2000 00:06:43	228767	Event	Low	False	False	True	Inactive
115	Program Transfer	18	01/01/2000 00:01:18	228767	Event	Low	False	False	False	Inactive
116	Transfer Pending	0	01/01/1900 00:00:00	0	Event	Low	False	False	False	Inactive
117	Test In Progress	23	01/01/2000 00:37:31	222967	Event	Low	False	False	False	Inactive
118	Exercise Active	2	09/14/2001 09:30:14	216133	Event	Low	False	False	False	Inactive
119	Snch Check Active	0	01/01/1900 00:00:00	0	Event	Low	False	False	False	Inactive
121	S1 Under Voltage	53	01/01/2000 00:01:43	228767	Event	Low	False	False	False	Inactive
122	S1 Over Voltage	0	01/01/1900 00:00:00	0	Event	Low	False	False	False	Inactive
123	S1 Frequency Fail	11	01/01/2000 00:01:47	228767	Event	Low	False	False	False	Inactive
124	S1 Loss Phase	0	01/01/1900 00:00:00	0	Event	Low	True	False	False	Inactive
125	S1 Imbalance Fail	0	01/01/1900 00:00:00	0	Event	Low	True	False	False	Inactive
126	S2 Under Voltage	17	01/01/2000 00:00:10	228763	Event	Low	False	False	False	Inactive

FIGURE 319. FAULTS - EVENT CONFIGURATION - PCC ATS

29.5 Network Connection Setup

InPower, beginning with version 3.0, can configure devices over an FT-10 network. The service PC must be setup for connecting to a network and the network must be commissioned and operating.

The service PC must have LonMaker for Windows version 3.1 installed. This program is available from Echelon. The service PC will need a gateway driver (either PCC-10 or SLTA-10, depending on the device being used). Also, a copy of the network site database must be obtained from the network, and installed on the service PC.

This section covers the required service PC setup steps for local and remote network connections.

Familiarity with LonMaker for Windows and the SLTA Link Manager program would be helpful for creating a backup of the network site database and for troubleshooting connection problems. This experience can be gained thorough LonMaker for Windows training and from PGA FT-10 Networks training.

Install LonMaker for Windows software on the service PC following the instructions provided by Echelon.

- Gateway Driver Installation and Setup

If the network gateway driver, has not already been installed, follow these instructions:

A copy of the SLTA-10 gateway driver is included on the LonMaker for Windows CD. Gateway drivers are also available from the Echelon web site at (www.echelon.com). Install the driver that matches the gateway device type that will be used to connect to the network.

Most applications will use either an SLTA-10 external gateway, or a PCC-10 gateway card, in the service PC.

In this example the SLTA-10 installation and setup will be described.

1. Locate the SLTA-10 gateway driver on the CD, double click on the **slta10....exe** file to begin the driver installation.
2. From the Setup window, select **Next** to view the license agreement.
3. Review the license agreement and select **Yes**, to accept the terms of the agreement.
4. In the Choose Destination Location window, select **Next**, to use the default destination (recommended).
5. In the Select Program Folder window, select **Next**, to create the program folder.
6. Select **No** to the option of accessing the file from DOS.
7. Click on the **Finish** button to complete the installation setup.

29.5.1 Gateway Settings

Launch the SLTALink Manager from the **Start** menu (or the taskbar icon). Click on the Link menu and select **New**. To operate correctly, the name must be entered exactly as shown.

Local Setup: For a local network application, enter a name and type for the link, **Name:** **LocalSLTALON1** and click on the **Local** button, click on the **Update Identifier** box to select it, then click on **Next** ([Figure 321](#)).

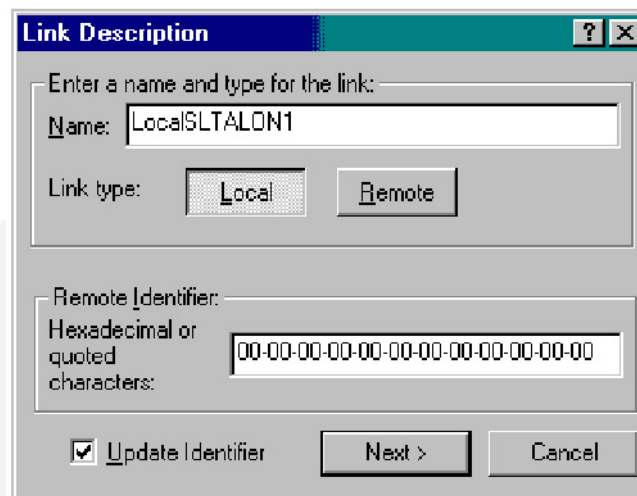


FIGURE 320. SLTA LOCAL SETUP

Use the **Serial Port** drop-down arrow to select the serial port that the SLTA is attached to on the monitoring PC. Use the **Speed** drop-down arrow to select **38400** as the communication speed, click on **Next** to continue.

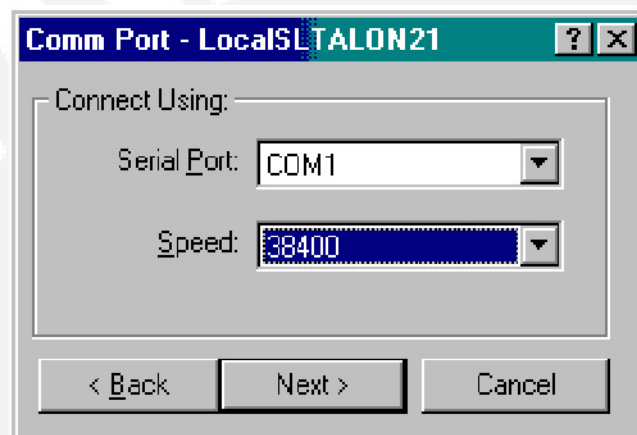
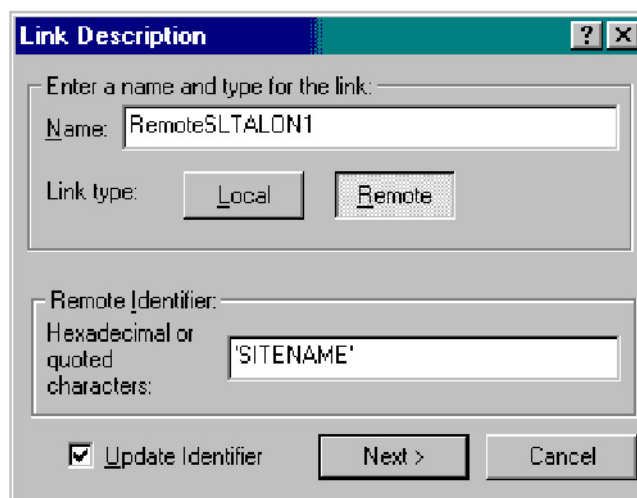
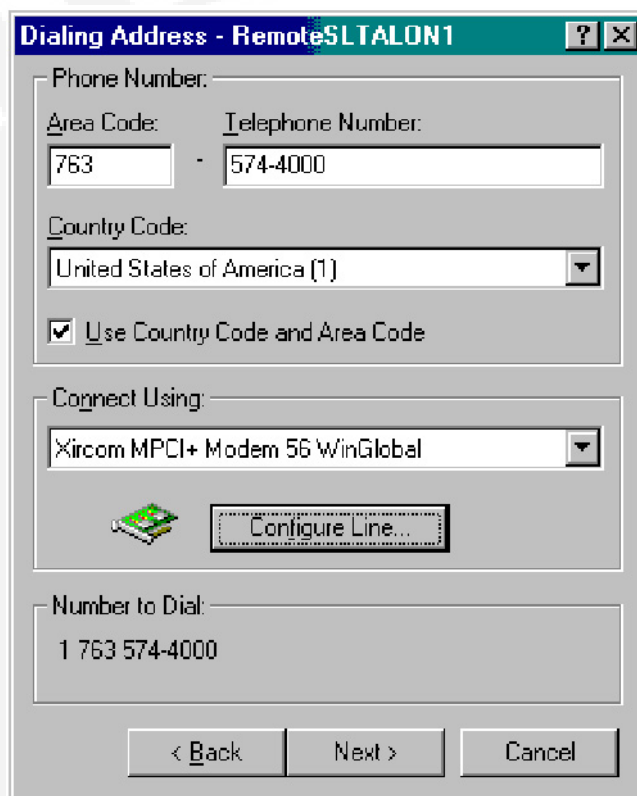


FIGURE 321. SLTA SETUP SPEED

Remote Setup: For a remote network application, enter a name and type for the link, **Name:** **RemoteSLTALON1** and click on the **Remote** button. Enter the network site name in single quotes. Click on the **Update Identifier** box to select it, then click on **Next** ([Figure 322](#)).

**FIGURE 322. SLTA REMOTE SETUP**

Use the Dialing Address dialog to enter the area code (if applicable) and phone number of the phone line that is connected to the modem at the remote site. Skip the Configure Line setting, connection speed will be set automatically. Click on the **Next** button and then the **Finish** button to complete the setup.

**FIGURE 323. SLTA REMOTE DIALING ADDRESS**

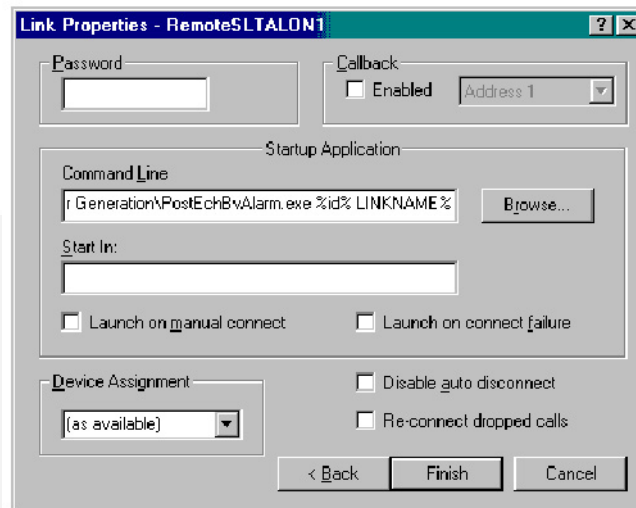


FIGURE 324. SLTA LINK PROPERTIES

29.5.2 Alarm Settings

After making the initial local or remote gateway settings, a Link Properties dialog box is displayed. This feature is used to setup the gateway for delivering alarms.

Setup the Command Line by clicking on the **Browse** button. Navigate to and select the a file named **PostEchBvAlarm.exe**. This file is located in the following directory:

C:\Program files\common files \cummins shared\power generation

Double click on each folder, beginning with the Program Files folder, until you reach the **PostEchBvAlarm.exe** file. Double click on this file, and the directory path and file will be added to the **Command Line**.

The **Command Line** needs to be appended with additional instructions. Refer to [Figure 324](#). Click inside the **Command Line** and use the right arrow key, to reach the end of the Command Line. Enter the following text, including spaces, enter a space before the first percent symbol:

%id% %LINKNAME%

Click on **Finish** to complete the Link Properties settings.

29.5.3 Importing the Network Site Database

The network site database is created by the network installer. A backup copy of the database can be created from the PC used to install the network. Use the LonMaker for Windows Backup feature, with the **Backup Database** selection. LonMaker for Windows creates the backup copy of the network site, as a compressed (ZIP) file.



NOTE: The network name (site ID) must consist of no more than seven characters. The characters can only be upper case letters, numbers and underscores. Make sure the network installer does not use lower case letters, special characters, or spaces for the network name.

Obtain the network site database from the network installer. If the site database is not available, and you are able to connect to the network site with Lonmaker for Windows, use the **Recover Database from Network** selection, displayed after selecting **New Network**.

The site backup database file is usually small enough to be transferred to a floppy disk. Locate the site backup file (**sitename.zip**) using Windows Explorer. Double click on the file to launch the **WinZip** utility.

Extract the file to the root directory where LonMaker for Windows is installed (typically C:/.). When finished extracting the file, close the WinZip program and close Windows Explorer.

29.5.4 Local Network Site Setup

The following procedures describe how to setup InPower for local communication.

The **Setup** feature is accessed from the **Start** menu by clicking on the **Power Generation -> InPower** program group. Click on **Setup**, to launch the Setup dialog.

In this example the user will define a new site for a local network application.

29.5.5 Site Setup

Click on the **Site Setup** tab to access the **Site Setup** dialog. Click on the **Add** button, to display the **Create Site** dialog ([Figure 325](#)).

29.5.6 Create Site

Enter the following information in the dialog to create a new local site:

Site Type - Select **Network** from the drop down list.

Network - Use the drop-down list and select the name for the network you want to connect to. (If the network name is not present in the drop-down list, cancel the setup and import the network site database first.)

Site Name - Enter the name as it appears in the preceding **Network** name.

Location - Enter **Local**, from the drop-down list.

SLTA Password: This feature is typically not used. If the SLTA has a password, enter it here.

Click on the **OK** button to save the new site. This establishes the site, in network applications it is not necessary to create devices for the site because the devices that are at the site are imported from the network database.

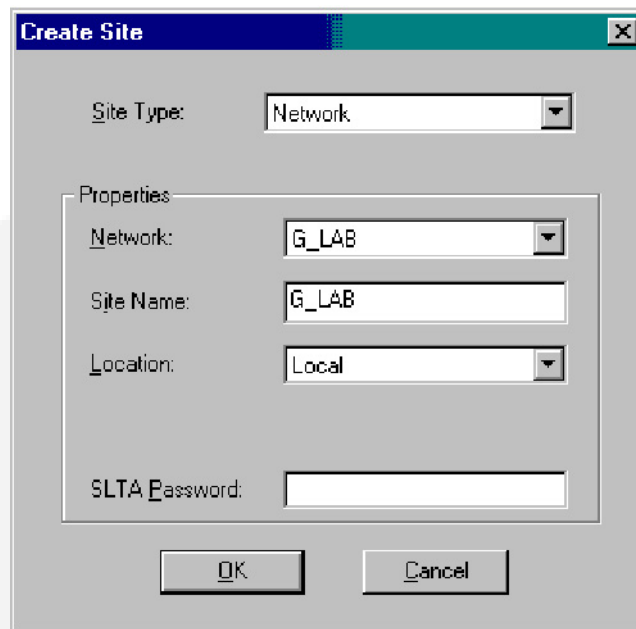


FIGURE 325. CREATE SITE DIALOG

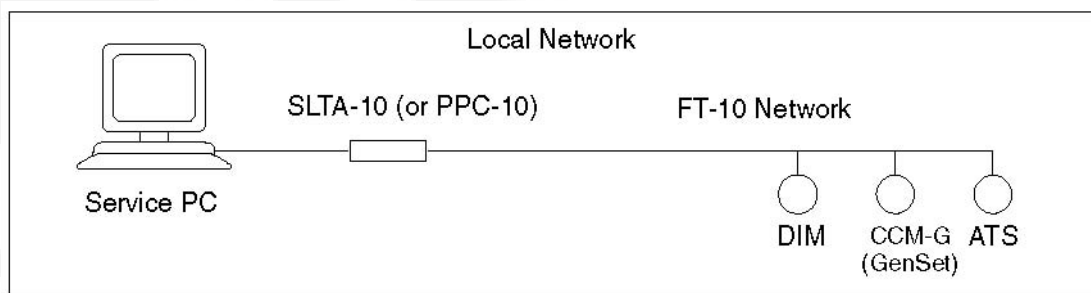


FIGURE 326. TYPICAL LOCAL NETWORK CONNECTION SETUP

29.5.7 Remote Network Site Setup

The following procedures describe how to setup InPower for remote communication.

The **Setup** feature is accessed from the **Start** menu by clicking on the **Power Generation - InPower** program group. Click on **Setup**, to launch the Setup dialog.

In this example the user will define a new site for a remote network application.

29.5.8 Site Setup

Click on the **Site Setup** tab to access the **Site Setup** dialog. Click on the **Add** button, to display the **Create Site** dialog ([Figure 327](#)).

29.5.9 Create Site

Enter the following information in the dialog to create a new remote site:

Site Type - Select **Network** from the drop down list.

Network - Use the drop-down list and select the name for the network you want to connect to. (IF the network name is not present in the drop-down list, cancel the setup and import the network site database first.)

Site Name - Enter the name as it appears in the preceding **Network** name.

Location - Enter **Remote**, from the drop-down list.

Telephone Number: Enter the telephone number of the phone line connected to the modem at the site location.

SLTA Password: This feature is typically not used. If the SLTA has a password, enter it here.

Click on the **OK** button to save the new site. This establishes the site, in network applications it is not necessary to create devices for the site because the devices that are at the site are imported from the network database.

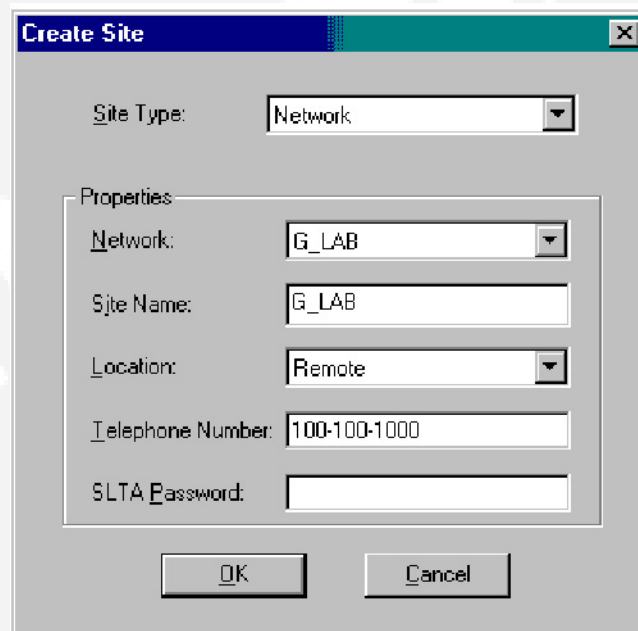


FIGURE 327. CREATE SITE DIALOG

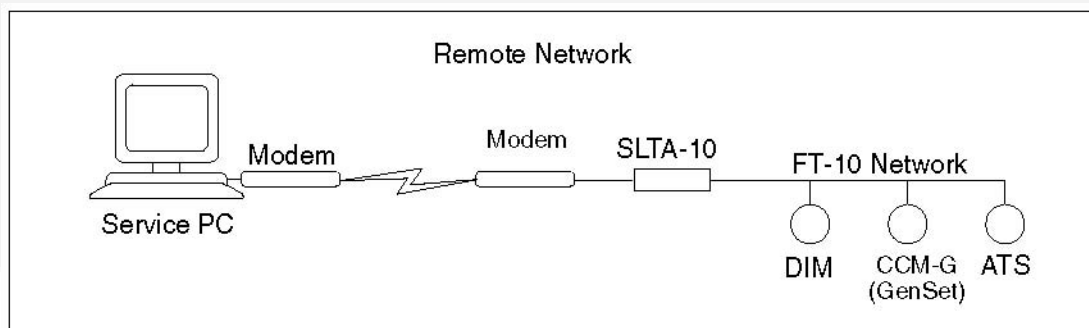


FIGURE 328. TYPICAL REMOTE NETWORK CONNECTION SETUP

29.5.10 InPower Communications Setup

After setting up InPower for either a local or remote network site, the Communications setup needs to be completed.

Click on the **Communications** setup tab, then establish a Lon Network Connection for Local or Remote, or both if you plan to make local and remote network connections.

Local: Click on the drop-down arrow and select **SLTALON1** from the list (or use **PCCLON1** if using PCC-10 card). Click on the **Apply** button ([Figure 329](#)).

Remote: Click on the drop-down arrow and select **SLTALON1** from the list (or use **PCCLON1** if using PCC-10 card). Click on the **Apply** button.

Click on the **OK** button when finished.

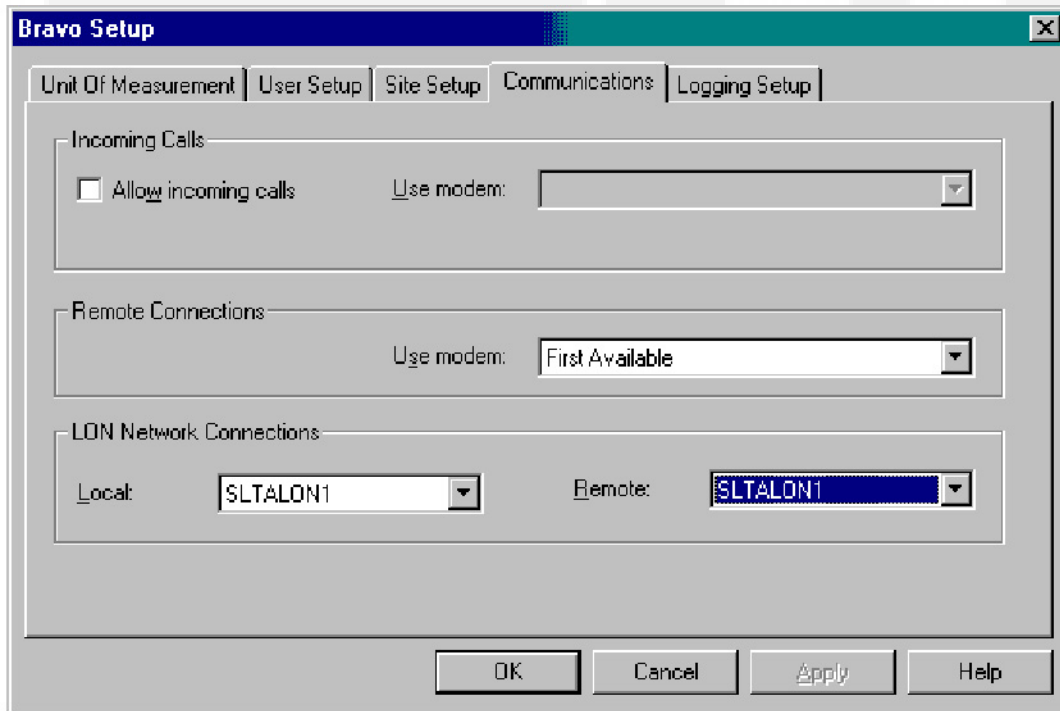


FIGURE 329. NETWORK COMMUNICATION SETUP

29.6 Network Connection Example

Start InPower and connect to the port (typically the site name created in Site Setup). All of the devices on the network will be displayed in the Device Explorer directory ([Figure 330](#)).

If the connection is not made, check the SLTALink Manager, to view the status of the connection of the service PC to the gateway. Launch the **SLTALink Manager** from the **Echelon** folder in the **Start - Programs** menu, or from the Taskbar.

If the service PC is not connected to the gateway, select the gateway device from the **Select/Action** menu pick, in the **Link** menu, and click on the **Connect Now** button.

If the gateway is connected, and the network site still does not open, make sure the network is operating. It may be necessary to resynchronize the network using LonMaker for Windows.

In this example, the network settings for the Controls Communication Module - Genset (CCM-G) are accessed over the network. Open the **Adjustments** folder, and then open the **Network** folder ([Figure 331](#)).

This section describes how to use each of the adjustable parameters, in the CCM-G Network directory.

Network Wink: Use this feature to test a network module. Click on the **Value** cell and select **Active** to send a test signal to the device. The service led will wink when the message is received, indicating that the network connection and the network module are working.

InPower Timeout: If displayed, do not adjust, this parameter will be removed.

Site ID: The **site ID** must consist of no more than seven characters. The characters can only be a combination of upper case letters, numbers and underscores. Do not use spaces, special characters, or lower case letters for the Device Site ID.

Device Name Tag: The **Device Name Tag** is used when sending system data. Provide a different name for each device on the network (up to 16 characters).

(Network) Test Interval: Use to set the send time for the network test interval. The default 10 second interval is recommended.

Minimum Send Time: Use to set the send time for the analog data network variables. The default 2 second interval is recommended.

Network Configuration: Displays the device network application. Self installed devices read **Local** (factory default) and are not available to InPower for adjustment or monitoring. Devices that are self installed are configured using the dip switches on the device.

When the self-installed feature is not used, the configuration is **External** and the device is available to InPower.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device.

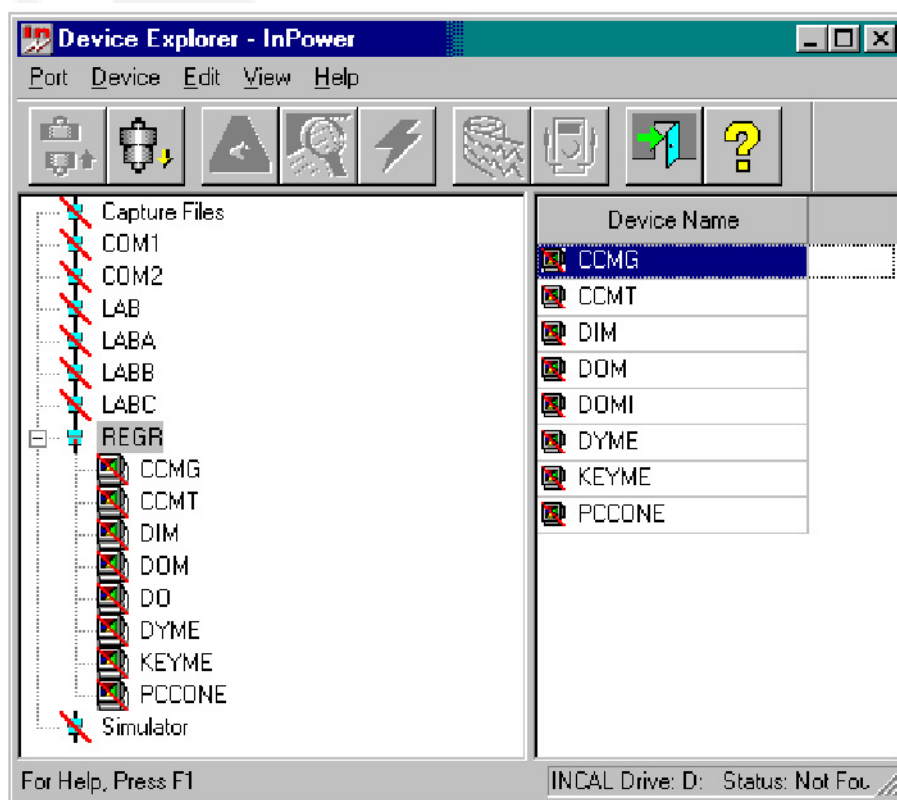


FIGURE 330. NETWORK CONNECTION

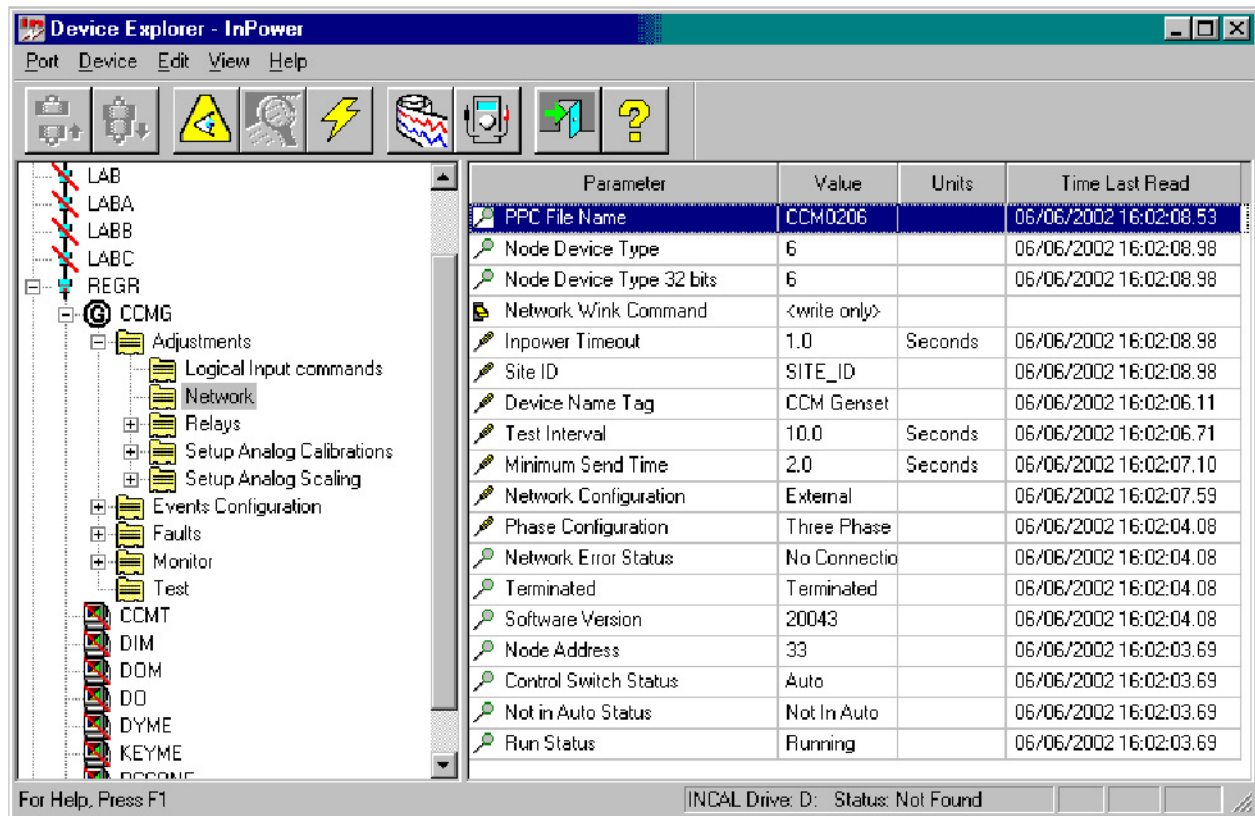


FIGURE 331. CCM-G - NETWORK FOLDER

29.6.1 Setup Dialout

The Dialout group of parameters allows the customer to configure the dialout settings for remote monitoring of devices on the network. Use these settings as follows:

Redial Attempts: Used to set the number of dialout retries, if the first alarm dialout fails while attempting to deliver a dial out message. The default setting 10, is the recommended setting. A setting of zero, is equal to one attempt.

Redial Delay: Enter the time delay between dialout attempts. The default, 60 seconds, is the recommended setting.

Dialout Site 1 thru 5: Enable the number of remote monitoring sites (hosts) that you want to send alarm messages to. Click on the value cell and select **Enabled** from the drop-down list.

Dialout Break: When enabled, this feature breaks a current connection after two minutes in order to complete a dialout.

Connection Timeout: After a dialout command has been sent to the modem, this feature specifies how long to wait for the site to connect to the remote monitoring location. The default setting is 60 seconds.

If the site does not connect with the remote monitoring location, it will dialout to Host 2, Host 3, etc. (if additional hosts are enabled) until it connects. If it still does not connect, it will repeat the process, beginning with Host 1, based on the number of retries that have been set.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device.

In this example, InPower is connected to an Annunciator over the network. Open the **Adjustments** folder, and then open the **Setup LED's and Horn** folder ([Figure 333](#)).

The **LED Index** (number) for each LED is listed in the first column. The **Color**, **Horn** and **Flash** columns are all adjustable to the desired type of annunciation. The Status column indicates if the input is active.

To change the setting for the color, the horn or to enable the LED flash setting, Click on the value cell for the desired item. The item selected will be displayed in the edit box, in the upper right of the dialog. Click on the drop-down arrow and a list of the choices will be displayed. Click on the desired option. Click on the check mark to enter the selection in the Data Table. Repeat this process until all of the desired settings have been chosen.

Click on the **Save** button, to update the Data Table changes. Click on **Close**, when you are finished adding fault codes or making changes.

After making any necessary adjustments, click on the **Save Trims** button, on the toolbar, to write the settings to the device.

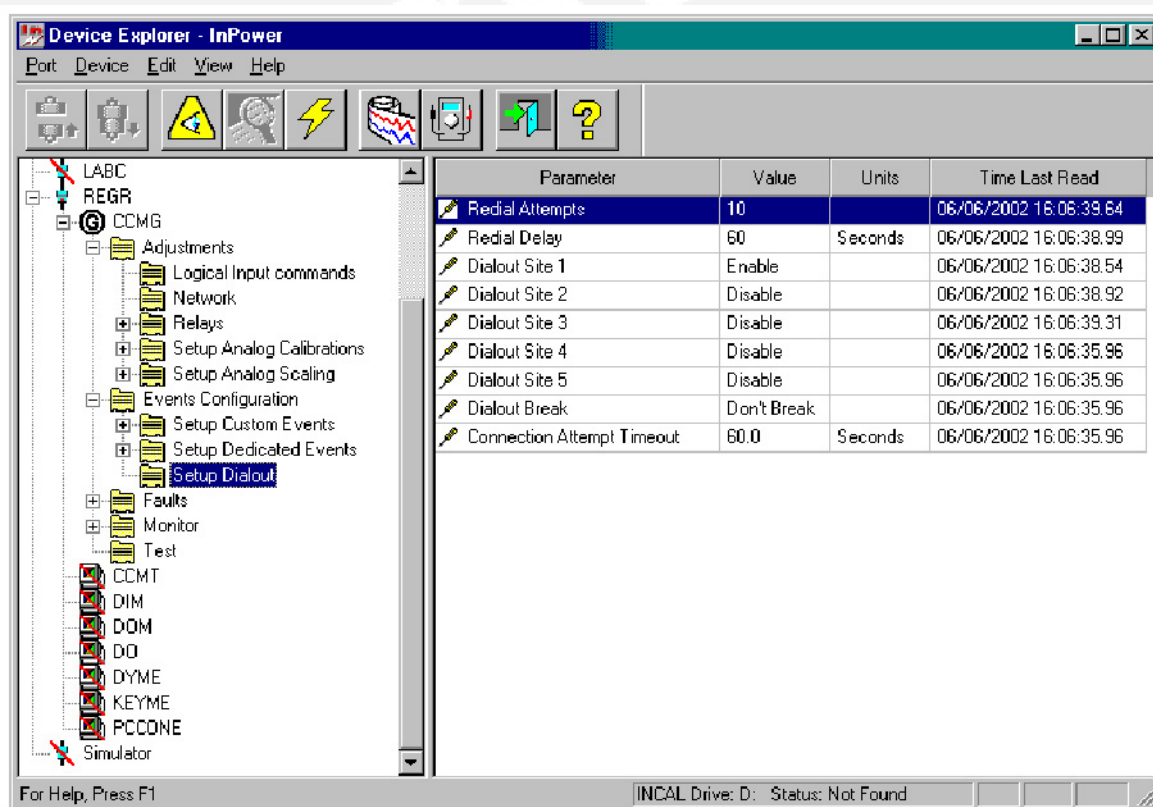


FIGURE 332. CCM-G - SETUP DIALOUT

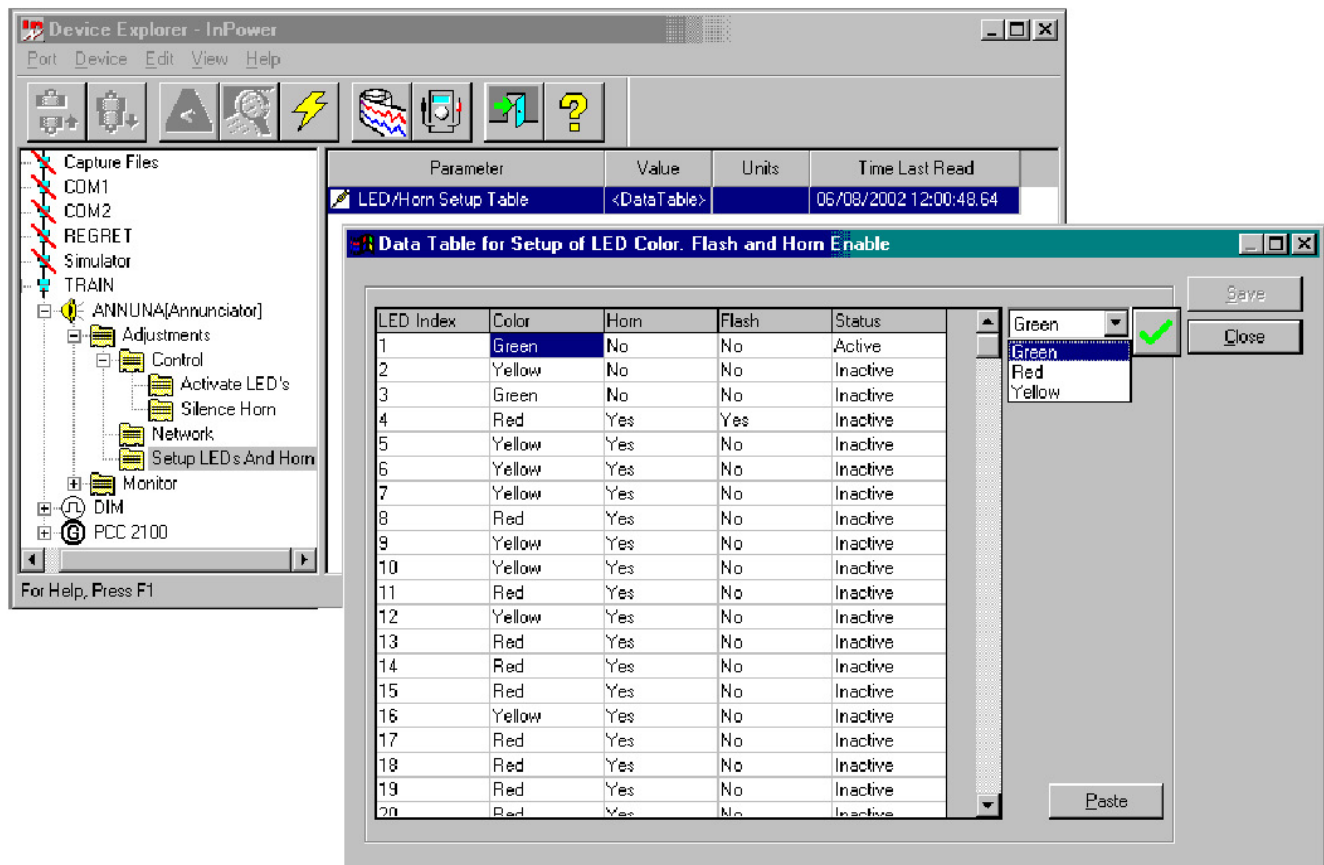


FIGURE 333. ANNUNCIATOR - SETUP LED'S AND HORN

In this example, InPower is connected to a DIM module, with an expansion board, over the network. Open the **Adjustments** folder, and then open the **Activate Delays** folder (Figure 334).

The first column displays the first eight relays from the DIM and the second eight relays (9 through 16) on the expansion board. This feature adds a delay between the time the input becomes active and when the relay is energized. Entering a delay time (in seconds) into the value cell for the relay, and saving the change, activates the delay.

To activate or change a delay, double click on the **Value** cell for the desired relay, the current value will be highlighted. Enter the desired delay time in seconds.

Click on the **Save Trims** button, on the toolbar, to write the new value to the device.

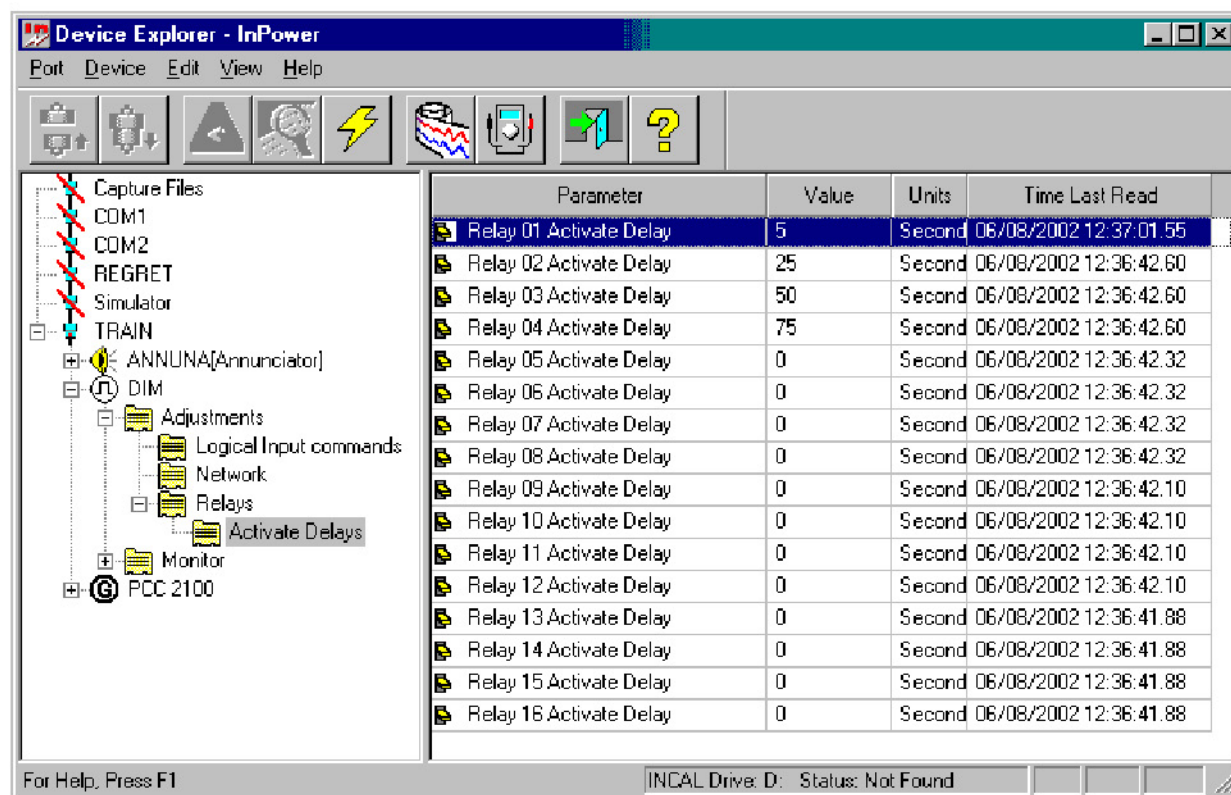


FIGURE 334. DIM - ACTIVATE DELAYS

30 Help

Use the Help menu to find information about using InPower, to find Service and Support information, and to find out about the installed InPower product type and software version.

30.1 Search for Help On...

The Help - Search for Help On... feature allows searching for help on a specific topic or keyword (standard Windows Help format). Access this feature by clicking on the Help menu, then click on Search for Help On... .

30.2 Contents

The Help - Contents feature provides access to the list of subjects in the InPower help file (standard Windows Help format). Access this information by clicking on the Help menu and then clicking on Contents.

30.3 How to Use Help

The Help - How to Use Help feature displays the standard Windows Help Topics dialog. Use this feature to find answers to basic Windows operation questions. Access this information by clicking on the Help menu, and then click on How to Use Help.

30.4 Service and Support

The Help - Service and Support feature lists information about where to call for InPower product support. To view this information, click on the Help menu, then click on Service and Support.

30.5 About Device Explorer

The Help - About... feature initiates the About Device Explorer box. This box displays the product type and software version. The expiration date for the software is also shown. To view this information, click on the Help menu, and then click on About....



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31 Glossary

Applet - A sub-set of software functions that may be included in one or more Tools. They provide the building-blocks from which the Tools are constructed.

ATS - Acronym for Automatic Transfer Switch.

Automatic Voltage Regulator (AVR) - An electronic unit used to control the output voltage of a genset.

BIT - Acronym for Built-in Test.

Calibrating - The process of reprogramming a device. This requires the ESDN version of InPower.

Calibration - Term used to describe the program and factory settings for a device.

Calibration Table - Name used to refer to a Data Table, XY Table, or XYZ Table that contains one or more calibration variables.

Calibration Variable - Data that is stored in the controller's non-volatile memory, and which may not be altered after sale by either a customer or service technician.

Capture File - A capture (.cap) file contains all of the trim values, monitor values, and table values of a given device (e.g. Generator set). This file can be thought of as a "template" for configuring other devices of the same type, or it can be used as a backup file.

Channel - A channel is the physical communication media that connects the devices and the properties of these media (such as transmission speed).

CSV File - Comma Separated Value file (same as a comma delimited file). The file format used by InPower to save datalog information. Allows the file to be imported into Microsoft Excel.

Data Table - Data table is a structure containing a variable in each of the columns. The data cells are viewed and edited in spreadsheet format.

Device - As used in InPower, refers to any one of a series of application controllers used in Power Generation applications. These include: Generator-drive engine controllers, Genset controllers and Automatic Transfer Switch controllers.

Electronic Control Module (ECM) - The hardware residing on an engine which carries out all the engine management functions (e.g. timing, fueling).

Electronic Software Database & Network (ESDN) - A worldwide Cummins corporate database of released electronic software. It provides calibration files for reprogramming devices.

Genset Open Architecture Link (GOAL) - A proprietary protocol developed by PGG to support the communications functions of Power Generation Group controls.

Graphical User Interface (GUI) - A term used to describe the way in which a user interacts with the software program.

HBF - Acronym for High Blowby Flow.

Initial Calibration - Manually select software to download.

InPower - Name given to the Power Generation Products based service tool. This tool is similar to INSITE in function, but it has a significantly different architecture.

MON - A communications protocol for one device connected to the service tool using RS-485 and RS-232 serial communications. All devices can communicate with the service tool.

MONNet - A communications protocol for more than one device connected to the service tool using RS-485 communications only.

Network Connection - This term is used to describe a connection using the MONNet protocol and an RS-485 adapter.

Parameter - This term is used with InPower to refer to properties whose *values* determine the behavior of a *device*. With InPower there are two main types of properties; trims that have a range of numeric values, and settings that consist of a small number of predefined values such as On or Off.

Physical Connection - This term is used to describe a connection using the MON protocol and no RS-485 adapter.

Port - As used in InPower, it refers to the channel by which a connection can occur. Port connections can occur with COM ports, or with Simulator or Capture files in the InPower directory structure.

PowerCommand® Control (PCC) - A microprocessor based genset monitoring, metering and control system with integrated AVR and engine governing.

Protocol - Protocol is a language that each node on a network knows how to speak and interpret. The protocol is what allows devices to exchange messages with one another.

Save Trims - Term used with InPower to indicate the process of permanently storing parameter changes to a device.

Site - The name of a connection setup (COM1, COM2, etc).

TAPI (Telephony API) - A programming interface that allows Windows client applications to access voice services on a server. Designed to provide interoperability between PCs and telephone equipment.

Template - 1. View template in InPower describes how to display data table information. 2. Template can also describe the Capture (.CAP) file that contains trim values that can be used to configure multiple-devices (e.g. genset controllers).

Tool - A set (or bundle) of software applets that are targeted at a specific customer or end-user function.

Trim - Data that is stored in the controller's non-volatile memory, but which may be altered after sale by either a customer or service technician.

Update Calibration - Automatically updates software, saves user information, and transfers to a new control.

Volatile/Non-volatile Memory - The contents of volatile memory is lost following a loss of power to the controller. Data stored in non-volatile memory is retained.

32 Adjustment and Test Descriptions

This section describes the engine adjustment features followed by the engine test and fault simulation features.

32.1 Engine Protection Adjustments

32.1.1 Feature Description

This feature allows the user to configure engine protection thresholds within pre-programmed limits. The tool will only allow for adjustments that result in increased engine protection.

The engine protections designated with a single asterisk (*) are not available on QSX15 model engines. The engine protections designated with a double asterisk (**) are not available on the QSX15, QSK23 or QST30 model engines.

32.1.2 Adjustable Parameters

Name: Engine Cold Warning Threshold

Range: Degrees

Description: The tool allows the user to increase the threshold for Low Engine Coolant Temperature Warning for when the engine is not running. This threshold is used to activate fault code 1435.

Name: LOP Warning Threshold Table

Range: PSI Table

Description: The tool allows the user to increase the threshold for Low Oil Pressure Warning. This threshold is used to activate fault code 143.

Name: LOP Shutdown Threshold Table

Range: PSI Table

Description: The tool allows the user to increase the threshold for Low Oil Pressure Shutdown. This threshold is used to activate fault code 415.

Name: HOT Warning Threshold

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Oil Temperature Warning. This threshold is used to activate fault code 421.

Name: HOT Shutdown Threshold

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Oil Temperature Shutdown. This threshold is used to activate fault code 214.

Name: LCL Warning Threshold

Range: Seconds

Description: The tool allows the user to decrease the time threshold for Low Coolant Level Warning. This threshold is used to activate fault code 197.

Name: LCL Shutdown Threshold

Range: Seconds

Description: The tool allows the user to decrease the time threshold for Low Coolant Level Shutdown. This threshold is used to activate fault code 235.

Name: LCL Fault Response

Range: Shutdown/Warning

Description: This parameter allows the user to change the response to the Low Coolant Level switch.

Name: LCP Warning Threshold Table *

Range: PSI Table

Description: The tool allows the user to increase the threshold for Low Coolant Pressure Warning. This threshold is used to activate fault code 233.

Name: LCP Shutdown Threshold Table *

Range: PSI Table

Description: The tool allows the user to increase the threshold for Low Coolant Pressure Shutdown. This threshold is used to activate fault code 228.

Name: LCT Warning Threshold

Range: Degrees

Description: The tool allows the user to increase the threshold for Low Engine Coolant Temperature Warning for when the engine is running. This threshold is used to activate fault code 152.

Name: HCT Warning Threshold

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Coolant Temperature Warning. This threshold is used to activate fault code 146.

Name: HCT Shutdown Threshold

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Coolant Temperature Shutdown. This threshold is used to activate fault code 151.

Name: HBF Warning Threshold Table **

Range: CFM Table

Description: The tool allows the user to decrease the threshold for High Crankcase Blowby Flow Warning. This threshold is used to activate fault code 555.

Name: HBF Shutdown Threshold Table **

Range: CFM Table

Description: The tool allows the user to decrease the threshold for High Crankcase Blowby Flow Shutdown. This threshold is used to activate fault code 556.

Name: HFT Warning Threshold *

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Fuel Temperature Warning. This threshold is used to activate fault code 261.

Name: HFT Shutdown Threshold *

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Fuel Temperature Shutdown. This threshold is used to activate fault code 266.

Name: HAT Warning Threshold **

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Aftercooler Water Temperature Warning. This threshold is used to activate fault code 2113.

Name: HAT Shutdown Threshold**

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Aftercooler Water Temperature Shutdown. This threshold is used to activate fault code 2114.

Name: HIT Warning Threshold

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Intake Manifold Temperature Warning. This threshold is used to activate fault code 488.

Name: HIT Shutdown Threshold

Range: Degrees

Description: The tool allows the user to decrease the threshold for High Intake Manifold Temperature Shutdown. This threshold is used to activate fault code 155.

Name: Overspeed Shutdown Threshold

Range: RPM

Description: The tool allows the user to decrease the Engine Overspeed Threshold Shutdown. This threshold is used to activate fault code 234.

Name: Overspeed Shutdown Threshold (50Hz) (QSK50 and QSK60)

Range: RPM

Description: The tool allows the user to decrease the Engine Overspeed Threshold Shutdown. This threshold is used to activate fault code 234.

Name: Overspeed Shutdown Threshold (60Hz) (QSK50 and QSK60)

Range: RPM

Description: The tool allows the user to decrease the Engine Overspeed Threshold Shutdown. This threshold is used to activate fault code 234.

32.1.3 Interaction with other Features and Parameters

The Engine Protection Adjustments can also be viewed and adjusted using the **Test – Fault Simulation – Engine Protection Test** feature.

32.1.4 Special Instructions

When the engine coolant temperature is less than the LCT Warning Threshold when the engine is running, a Common Warning will be activated to signal that a Low Coolant Temperature condition exists.

The Engine Cold Warning Threshold is intended for use when block heaters are installed. When the engine coolant temperature is less than the Engine Cold Warning Threshold prior to starting the engine, a Common Warning will be activated to signal that an Engine Cold Warning condition exists.

32.1.5 Possible Customer Complaints

Setting the Engine Cold Warning Threshold at too high a level can cause nuisance Engine Cold Warning faults. The customer is responsible for properly setting the Engine Cold Warning Threshold at the proper level, dependent upon whether block heaters are used.

32.1.6 Visual Aids

None

32.2 Adjustments – Features - Centinel

32.2.1 Feature Description

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

32.2.2 Adjustable Parameters

Name: Centinel User Enable

Range: Enable/Disable

Description: Allows the tool user to enable the Centinel feature.

Name: Centinel Enable Status

Range: Enable/Disable

Description: Displays the Centinel Enable status.

32.2.3 Interaction with other Features and Parameters

This feature is used in conjunction with the **Adjustments – Features – CORS** feature.

32.2.4 Special Instructions

None

32.2.5 Possible Customer Complaints

None

32.2.6 Visual Aids

None

32.2.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes

Product	Feature Available
QSK60	Yes
QSK78	Yes

32.3 Adjustments – Features - CORS

32.3.1 Feature Description

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

32.3.2 Adjustable Parameters

Name: CORS User Trim Enable:

Range: Enable/Disable

Description: Enables or disables the Continuous Oil Replacement System makeup/burn cycle.

Name: Oil Changed

Range: Counts

Description: Allows the user to inform the ECM that engine lubricating oil and filter have been changed. This parameter is used to clear fault code 649.

32.3.3 Interaction with other Features and Parameters

This feature is used in conjunction with the **Adjustments – Features – Centinel** feature.

32.3.4 Special Instructions

None

32.3.5 Possible Customer Complaints

None

32.3.6 Visual Aids

None

32.3.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes

Product	Feature Available
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.4 Adjustments – Features – Fuel Lift Pump

32.4.1 Feature Description

The fuel lift pump is an electric pump that is controlled by the ECM. The Pre-Start Priming feature of the GCS provides a means to prime the fuel system prior to starting the engine. When the Pre-Start Priming feature is enabled, the fuel lift pump will start the priming cycle. It begins to pump fuel when either the Run/Stop switch changes from "Stop" to "Run" or when the Crank switch input becomes active, and runs for a specified period of time prior to engaging the starting system.

32.4.2 Adjustable Parameters

Name: Pre-start priming enable

Range: Enable/Disable

Description: The tool allows the user to Enable or Disable the Pre-Start priming pump.

Name: Pre-Start Priming Function Complete

Range: True/False

Description: The tool allows the user to monitor the Pre-Start Priming function state.

Name: Pre-Start Fuel Priming Time

Range: Seconds

Description: The tool allows the user to set the amount of time that the fuel lift pump will run prior to the starting system engagement.

Name: Fuel Lift Pump Relay Driver Command

Range: On/Off

Description: The tool allows the user to monitor the electric lift pump driver command.

32.4.3 Interaction with other Features and Parameters

None

32.4.4 Special Instructions

None

32.4.5 Possible Customer Complaints

None

32.4.6 Visual Aids

None

32.4.7 Product Coverage

Product	Feature Available
QSX15	No
QST30	Yes
QSK23	No
QSK50	No
QSK60	No
QSK78	No

32.5 Adjustments - Features - Inputs

32.5.1 Feature Description

This feature allows the tool user to enable/disable and monitor OEM inputs to the ECM.

32.5.2 Adjustable Parameters

Name: Frequency Adjust Pot Enable

Range: Enable/Disable

Description: When enabled, the ECM is looking for the potentiometers input for frequency adjust. If this parameter is enabled and no potentiometer is connected to the ECM then fault code 1411 will become active.

Name: Frequency Adjust Pot

Range: Hertz

Description: The tool displays the position of the Frequency Adjust potentiometer in Hertz.

Name: Droop Adjust Select

Range: Trim/Pot

Description: The tool allows the user to select between the service tool Trim or the potentiometer. If a potentiometer is used, the signal input must be enabled after the "Pot" selection is set-up.

Name: Droop Adjust Pot Enable

Range: Enable/Disable

Description: When enabled the ECM is looking for potentiometer input for Droop Adjust. If this parameter is enabled and no potentiometer is connected to the ECM then fault code 1412 will become active.

Name: Droop Adjust Pot

Range: Percent

Description: The tool displays the position of the Droop Adjust potentiometer in Percent.

Name: Frequency Bias Select

Range: None/Woodward/Barber Colman

Description: The tool allows the user to select the frequency bias input option between none, Woodward and Barber Colman.

Name: Barber Colman Frequency Bias Enable

Range: Enable/Disable

Description: The tool allows user to set the ECM to look at the Barber Colman input.

Name: Barber Colman Frequency Bias

Range: Hertz

Description: The tool allows the user to view the input from the Barber Colman controller.

Name: Woodward Frequency Bias Enable

Range: Enable/Disable

Description: The tool allows the user to set the ECM to look at the Woodward input.

Name: Woodward Frequency Bias

Range: Hertz

Description: The tool allows the user to view the input from the Woodward controller.

Name: Governor Gain Adjust Select

Range: Trim/Pot

Description: The tool allows the user to select between the service tool Trim or the potentiometer. If a potentiometer is used, the signal input must be enabled after the "Pot" selection is set-up.

Name: Governor Gain Adjust Pot Enable

Range: Enable/Disable

Description: When enabled the ECM is looking for potentiometer input for Governor Gain Adjust. If this parameter is enabled and no potentiometer is connected to the ECM then fault code 1418 will become active.

Name: Governor Gain Adjust Pot

Range: Engineering Units

Description: The tool displays the position of the Governor Gain Adjust potentiometer in Engineering units.

Name: Alternate Frequency Select

Range: 60Hz Primary/50Hz Primary/60Hz Only/50Hz Only

Description: Allow the user to choose the default frequency. This may be set to allow the engine to only run at one frequency.

Name: Alternate Frequency Switch

Range: None

Description: The tool is displaying the value of the input switch.

32.5.3 Interaction with other Features and Parameters

The governor gain and droop setting can also be configured using the **Adjustments – Features – Governor – Gain and Droop** or the **Monitor – Engine Data – Governing** feature.

32.5.4 Special Instructions

None

32.5.5 Possible Customer Complaints

Improper configuration or adjustment of the Governor Gain feature can cause unstable engine operation. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

Improper configuration or adjustment of the Droop feature can cause undesirable engine speed variation. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

Improper configuration or adjustment of the frequency adjust feature can cause the engine to operate at the incorrect speed. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

32.5.6 Visual Aids

None

32.5.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.6 Adjustments - Features – Meter Drivers

32.6.1 Feature Description

The meter drivers are configured to set parameter trim values for the lower and upper parameter limits corresponding to 0 and 1 mA driver current levels.

32.6.2 Adjustable Parameters

Name: Engine Speed Meter Zero Scale

Range: RPM

Description: This parameter is used to calibrate the gauge for 0.

Name: Engine Speed Meter Full Scale

Range: RPM

Description: This parameter is used to calibrate the gauge for full scale.

Name: Oil Pressure Meter Zero Scale

Range: PSI

Description: This parameter is used to calibrate the gauge for 0.

Name: Oil Pressure Meter Full Scale

Range: PSI

Description: This parameter is used to calibrate the gauge for full scale.

Name: Coolant Temp Meter Zero Scale

Range: Degrees

Description: This parameter is used to calibrate the gauge for 0.

Name: Coolant Temp Meter Full Scale

Range: Degrees

Description: This parameter is used to calibrate the gauge for full scale.

32.6.3 Interaction with other Features and Parameters

None

32.6.4 Special Instructions

None

32.6.5 Possible Customer Complaints

None

32.6.6 Visual Aids

32.6.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.7 Adjustments – Features – Power Limiter

32.7.1 Feature Description

This feature allows the user to select a power limit best suited for the specific application in which the engine is being used (i.e. standby, prime or continuous power applications). This is accomplished by setting the Power Limiter State parameter to the desired selection (Standby, Limited Time Prime, Unlimited Time Prime or Continuous) using InPower.

The Power Limiter feature must be enabled in order to make this feature operational. This is accomplished by setting the Power Limiter Enable parameter to "Enabled". Once enabled, the engine power is limited by the maximum fueling that the fuel system is commanded to deliver to the engine based on limits which are pre-programmed in the ECM.

32.7.2 Adjustable Parameters

Name: Power Limiter State

Range: Standby/Limited Time Prime/Unlimited Time Prime/Continuous

Description: The tool allows the user to set the rating to limit the power output.

Name: Power Limiter Enable

Range: Enable/Disable

Description: The Power Limiter feature must be Enabled in order to make the feature operational.

Name: Continuous Scale Factor

Range: None

Description: When the Power Limiter State is set to Continuous the Continuous Scale Factor parameter can be used to control the maximum amount of continuous power the engine is capable of providing. This is accomplished by setting the Continuous Scale Factor to a value between 0 and 1, representing the percentage (between 0 and 100 %) of the total engine continuous rated power capability.

32.7.3 Interaction with other Features and Parameters

None

32.7.4 Special Instructions

There is only a scale factor for use with continuous power applications. For engines used in standby or prime applications, the Power Limiter feature uses pre-programmed fueling limits and the Continuous Scale Factor parameter setting has no effect.

32.7.5 Possible Customer Complaints

None

32.7.6 Visual Aids

None

32.7.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.8 Adjustments – Features – Relay Drivers

32.8.1 Feature Description

Eight output drivers are provided to annunciate that specific engine protection alarm conditions have occurred. Each output can be used to drive either a lamp or a relay.

32.8.2 Adjustable Parameters

Name: Relay Driver Supply Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1424 to be used to determine if a problem exists with the relay supply circuit.

Name: Fail to Start Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1479 to be used to determine if a problem exists with the failed to start relay driver circuit.

Name: Common Warning Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1426 to be used to determine if a problem exists with the common warning relay driver circuit.

Name: Common Shutdown Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1425 to be used to determine if a problem exists with the common shutdown relay driver circuit.

Name: HET Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1429 to be used to determine if a problem exists with the High Engine Temperature relay driver circuit.

Name: LOP Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1428 to be used to determine if a problem exists with the Low Oil Pressure relay driver circuit.

Name: Overspeed Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1427 to be used to determine if a problem exists with the Overspeed Driver relay driver circuit.

Name: Pre-HET Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1432 to be used to determine if a problem exists with the Pre-High Engine Temperature relay driver circuit.

Name: Pre-LOP Driver Diagnostic Enable

Range: Enable/Disable

Description: The tool allows the user to enable fault code 1431 to be used to determine if a problem exists with the Pre-Low Oil Pressure relay driver circuit.

32.8.3 Interaction with other Features and Parameters

None

32.8.4 Special Instructions

None

32.8.5 Possible Customer Complaints

None

32.8.6 Visual Aids

None

32.8.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.9 Adjustments – Features – Shutdown Override

32.9.1 Feature Description

The ECM can be configured to allow continued engine operation while most shutdown faults are active. When Enabled, the Shutdown Override feature does not allow engine operation while overspeed or loss of engine speed faults are active, or while the ECM detects that the Local E-Stop, Remote E-Stop or Backup Start Disconnect switches are in an open state. All other shutdown faults are overridden when this feature is Enabled.

32.9.2 Adjustable Parameters

Name: Shutdown Override Enable

Range: False/True

Description: When set to True, this feature allows the user to have the engine ECM ignore all engine protection shutdown faults. If an engine protection fault code becomes active, fault code 1416 will also become active indicating that the engine has failed to shutdown due to the user engaged engine shutdown override feature.

32.9.3 Interaction with other Features and Parameters

None

32.9.4 Special Instructions

The Shutdown Override feature prevents the ECM from shutting down the engine, even when engine-damaging conditions are present. Damage done to the engine or GCS while in Shutdown Override mode is **NOT** covered by the engine warranty.

This feature should only be used in applications where engine damage is an acceptable trade-off for keeping the engine running.

32.9.5 Possible Customer Complaints

None

32.9.6 Visual Aids

None

32.9.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.10 Adjustments – Governor - Frequency

32.10.1 Feature Description

This feature allows the tool user to monitor and adjust frequency inputs. The governor frequency is adjustable by +/-9Hz using a combination of both a remote mounted potentiometer and the Frequency Adjustment Trim.

The potentiometer allows an adjustment range of +/-3Hz, while the Frequency Adjustment Trim allows an additional adjustment range of +/-6Hz.

The alternate frequency selection feature is only enabled for engines that have been rated for dual speed operation. For engines rated for single operating speed, the Alternate Frequency input is non-operational and no connection needs to be made to this input.

32.10.2 Adjustable Parameters

Name: Alternate Frequency Select

Range: 60Hz Primary/50Hz Primary/60Hz Only/50Hz Only

Description: The frequency setting for the Primary/Secondary states of the Alternate Frequency input can be reversed (e.g. Primary = 50Hz / Secondary = 60Hz changed to Primary 60Hz / Secondary 50Hz) using InPower. This is accomplished by setting the Alternate Frequency Select parameter to either 60Hz Primary or 50Hz Primary. Any change made to the Alternate Frequency Select state while the engine is running will not take effect until the engine is shut down and re-started.

The Alternate Frequency setting can also be controlled electronically using InPower. This is accomplished by setting the Alternate Frequency Select parameter to either 60Hz Only or 50Hz only. These settings effectively disable the Alternate Frequency switch input, by overriding the switch setting.

Name: Nominal Frequency

Range: Hertz

Description: Displays to the user the default frequency before trim, pot and bias adjustments.

Name: Frequency Adjust Trim

Range: Hertz

Description: Allows the user to input the frequency adjustment.

Name: Frequency Adjust Pot

Range: Hertz

Description: The tool displays the position of the Frequency Adjust potentiometer in Hertz.

Name: Final Reference Engine Speed

Range: RPM

Description: The tool displays the engine speed.

Name: Frequency Bias Select

Range: None/Woodward/Barber Colman

Description: The tool allows the user to select the frequency bias input option between none, Woodward and Barber Colman.

Name: Woodward Frequency Bias

Range: Hertz

Description: The tool allows the user to view the input from the Woodward type controller.

Name: Barber Colman Frequency Bias

Range: Hertz

Description: The tool allows the user to view the input from the Barber Colman type controller.

32.10.3 Interaction with other Features and Parameters

None

32.10.4 Special Instructions

The Frequency Adjust feature is different from the Droop Adjust and Governor Gain Adjust features in that both the potentiometer and trim can be used simultaneously. The effect of the potentiometer setting and the electronic trim setting is additive. For example, if the potentiometer was set to provide a +3Hz adjustment and the electronic trim was set to +4Hz, the overall frequency adjustment would be equal to +7Hz. Using another example, if the potentiometer was set to provide -1Hz adjustment and the electronic trim was set to +6Hz, the overall frequency adjustment would be equal to +5Hz.

32.10.5 Possible Customer Complaints

Improper configuration or adjustment of the Frequency Adjust feature can cause the engine to operate at the incorrect speed. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

32.10.6 Visual Aids

None

32.10.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes

Product	Feature Available
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.11 Adjustments – Governor – Gain and Droop

32.11.1 Feature Description

This feature allows the tool user to monitor and adjust governor gain and droop settings. Either a potentiometer or the electronic trim can be used to determine the speed droop, but not both simultaneously.

32.11.2 Adjustable Parameters

Name: Nominal Frequency

Range: Hertz

Description: Displays to the user the selected frequency. This is the frequency before trim, pot and bias adjustments.

Name: Nominal Engine Speed

Range: RPM

Description: The tool displays the selected engine speed. This speed is before trim, pot and bias adjustments.

Name: Final Reference Engine Speed

Range: RPM

Description: The tool displays the current governor target engine speed.

Name: Governor Gain Adjust Select

Range: Trim/Pot

Description: The tool allows the user to select the service tool Trim or the potentiometer input.

Name: Governor Gain Adjust

Range: 0.05 – 10.0

Description: The tool allows the user to manually adjust the governor gain. Governor Gain Adjust Select must be set to Trim for this feature to work.

Name: Governor Gain Adjust Pot

Range: 0.05 – 10.0

Description: The tool displays the actual gain value based on the Gain Adjust Potentiometer setting.

Name: Droop Adjust Select

Range: Trim/Pot

Description: The tool allows the user to select between the service tool Trim or the potentiometer. If a potentiometer is used, the signal input must be enabled after the "Pot" selection is set-up.

Name: Droop Adjust

Range: 0 – 10 Percent

Description: The tool allows the user to manually adjust the Droop Adjust. Droop Adjust Select must be set to Trim for this feature to work.

Name: Droop Adjust Pot

Range: 0 – 10 Percent

Description: The tool displays the percentage of droop selected based on the position of the Droop Adjust potentiometer.

32.11.3 Interaction with other Features and Parameters

The governor gain and droop setting can also be configured using the **Adjustments – Features – Inputs** or the **Monitor – Engine Data – Governing** feature.

32.11.4 Special Instructions

None

32.11.5 Possible Customer Complaints

Improper configuration or adjustment of the Governor Gain feature can cause unstable engine operation. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

Improper configuration or adjustment of the Droop feature can cause undesirable engine speed variation. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

Improper configuration or adjustment of the frequency adjust feature can cause the engine to operate at the incorrect speed. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

32.11.6 Visual Aids

None

32.11.7 Product Coverage

Product	Feature Available
Qsx15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.12 Adjustments – Governor – Idle and Ramping

32.12.1 Feature Description

This feature allows the tool user to set engine idle speed and ramp times for transition between starting, idle and rated speeds.

32.12.2 Adjustable Parameters

Name: Engine Idle Speed

Range: RPM

Description: The engine idle speed can be set between a minimum and maximum limit pre-programmed in the ECM. This is accomplished by setting this parameter to the desired idle speed.

Name: Idle to Rated Ramp Time

Range: 0 – 30 Seconds

Description: This parameter allows the user to manually adjust the time it takes for the engine to go from idle speed to rated engine speed.

Name: Rated to Idle Ramp Time

Range: 0 – 30 Seconds

Description: This parameter allows the user to manually adjust the time it takes for the engine to go from rated engine speed to idle speed.

Name: Starting to Rated Ramp Time

Range: 0 – 30 Seconds

Description: This parameter allows the user to manually adjust the time it takes for the engine to go from cranking speed to rated engine speed.

32.12.3 Interaction with other Features and Parameters

None

32.12.4 Special Instructions

If the ramp rate is set at 0 seconds, the engine speed will accelerate or decelerate to achieve the desired target speed as quickly as possible based upon the governor gain settings and the generator set performance.

32.12.5 Possible Customer Complaints

None

32.12.6 Visual Aids

None

32.12.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.13 Adjustments – Passwords – Change Passwords

32.13.1 Feature Description

This feature allows the user to change the application and user passwords stored in the ECM. Before the ECM will allow this, the user will have to enter the passwords. Passwords must be 5 to 8 characters in length and may consist of any combination of alpha or numeric characters. Do not use special characters.

32.13.2 Adjustable Parameters

Name: Change Application Password

Range: None

Description: The tool allows the user to change the Application Password.

Name: Change User Password

Range: None

Description: The tool allows the user to change the User Password.

32.13.3 Interaction with other Features and Parameters

None

32.13.4 Special Instructions

None

32.13.5 Possible Customer Complaints

None

32.13.6 Visual Aids

None

32.13.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.14 Adjustments – Passwords – Clear Passwords

32.14.1 Feature Description

This feature allows the user, with a password, to clear the password. This is typically used if you wish to permanently remove the password.

32.14.2 Adjustable Parameters

Name: Clear Application Password

Range: None

Description: The tool allows the user to clear the application password.

Name: Clear User Password

Range: None

Description: The tool allows the user to clear the user password.

32.14.3 Interaction with other Features and Parameters

None

32.14.4 Special Instructions

None

32.14.5 Possible Customer Complaints

None

32.14.6 Visual Aids

None

32.14.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.15 Adjustments – Passwords – Enter Passwords

32.15.1 Feature Description

There are two predefined groups of parameters that can be protected by passwords, these are named User and Application. When a password is established for either of these groups, access becomes password protected. Users can view password protected parameters, but they cannot write changes to them without entering the password first.

32.15.2 Adjustable Parameters

Name: Enter Application Password

Range: None

Description: The tool allows the user to enter the application password. This is not required unless the password is changed from the factory default.

Name: Enter User Password

Range: None

Description: The tool allows the user to enter the user password. This is not required unless the password is changed from the factory default.

32.15.3 Interaction with other Features and Parameters

None

32.15.4 Special Instructions

Loss of battery power will cause the need for these passwords to be re-entered.

32.15.5 Possible Customer Complaints

None

32.15.6 Visual Aids

None

32.15.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.16 Adjustments – Reset History Counters – Fuel

32.16.1 Feature Description

This feature allows the user to reset and monitor various engine history timers.

32.16.2 Adjustable Parameters

Name: Cumulative Fuel Consumption

Range: Gallons

Description: Total fuel consumed over the life of the engine. This parameter can not be reset.

Name: Fuel Consumption Since Reset

Range: Gallons

Description: The tool displays the total fuel consumption since last fuel consumption reset.

Name: Fuel Consumption Reset Time COT (Controller On Time)

Range: Hours

Description: The tool displays the controller on time of the last fuel consumption reset.

Name: Fuel Consumption Reset Time ERT (Engine Run Time)

Range: Hours

Description: The tool displays the engine run time of the last fuel consumption reset.

Name: Reset Fuel Consumption

Range: Reset

Description: The tool allows the user to reset the Fuel Consumption Since Reset parameter.

Name: Controller On Time

Range: Hours

Description: The tool displays the current controller power on time since controller hour 0.

Name: Engine Running Time

Range: Hours

Description: Amount of time the engine has been running.

32.16.3 Interaction with other Features and Parameters

The ECM and fuel history data can also be viewed in the **Monitor – History – Run History** feature.

32.16.4 Special Instructions

None

32.16.5 Possible Customer Complaints

None

32.16.6 Visual Aids

None

32.16.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.17 Adjustments – Starting

32.17.1 Feature Description

This feature allows the user to setup engine starting features. The starter control feature allows the use of either cycle or continuous cranking routines.

32.17.2 Adjustable Parameters

Name: Crank Switch Enable

Range: Enable/Disable

Description: Allows the user to enable the ECM controlled cranking feature.

Name: Cycle/Continuous Crank Select

Range: Cycle/Continuous

Description: Allows the user to select between a Continuous Cranking or Cycle Cranking. The Continuous Cranking routine provides the capability to engage the starter once for a configurable length of time. The Cycle Cranking provides the capability to perform a maximum of seven starting attempts with configurable starter engage and rest times.

Name: Continuous Crank Engage Time

Range: Seconds

Description: Allows the user to set the maximum amount of time the ECM will continuously crank the starters until fault code 1438 becomes active. This parameter is used when Continuous Cranking is selected.

Name: Cycle Crank Attempts

Range: 1 – 7 Attempts

Description: Allows the user to set the maximum number (up to 7) of crank cycle attempts before it would log fault code 1438. This parameter is used when Cycle Cranking is selected.

Name: Cycle Crank Engage Time

Range: Seconds

Description: Allows the user to set the maximum amount time cranking while cycle cranking is engaged. This parameter is used when Cycle Cranking is selected.

Name: Cycle Crank Rest Time

Range: Seconds

Description: Allows the user to set the time between crank attempts while cyclic cranking is engaged. This parameter is used when Cycle Cranking is selected.

32.17.3 Interaction with other Features and Parameters

None

32.17.4 Special Instructions

None

32.17.5 Possible Customer Complaints

None

32.17.6 Visual Aids

None

32.17.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.18 Faults

32.18.1 Feature Description

This is a fault information window, which can be viewed when connected to a device. This window displays active and inactive fault codes. Each fault code represents a particular malfunction or abnormal condition with the device. The Service Manual and Fault Information System (FIS) reference this fault code to identify the fault condition and facilitate diagnosis and repair.

32.18.2 Adjustable Parameters

None

32.18.3 Interaction with other Features and Parameters

None

32.18.4 Special Instructions

Faults can be active or inactive. Active faults indicate that the fault condition is present now. Inactive faults indicate a condition that is no longer active.

32.18.5 Possible Customer Complaints

None

32.18.6 Visual Aids

None

32.18.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.19 Monitor - About

32.19.1 Feature Description

This feature allows the user to view the Engine and calibration specifications as programmed at the factory.

32.19.2 Adjustable Parameters

Name: Nominal Frequency

Range: Hertz

Description: Displays to the user the default frequency before trim, pot and bias adjustments.

Name: ECM Code

Range: None

Description: ECM Calibration top level identifier. XXYYYYYYZZ. XX identifies the product type, YYYYYY identifies the calibration number and ZZ identifies the calibration revision.

Name: Controller Part and Revision

Range: None

Description: Identifies the ECM part number.

Name: Controller Serial Number

Range: None

Description: Identifies the ECM unique serial number.

Name: Controller Manufacturing Date

Range: None

Description: Identifies the ECM manufacture date.

Name: Controller Manufacturing Location

Range: None

Description: Identifies the location of the ECM manufacturer.

Name: Controller Bootloader Version

Range: None

Description: Firmware date that is loaded in the ECM.

Name: Controller Software Version

Range: None

Description: Software firmware that was used to create the ECM calibration.

Name: Engine Model Number

Range: None

Description: Number describing the type of Engine.

Name: Engine Rating

Range: None

Description: Rating for which the engine was manufactured.

Name: Engine Serial Number

Range: None

Description: Serial number of the engine.

Name: Engine CPL Number

Range: None

Description: Critical parts list.

Name: G-Drive Build Date

Range: None

Description: Date the engine was manufactured.

32.19.3 Interaction with other Features and Parameters None

32.19.4 Special Instructions None

32.19.5 Possible Customer Complaints None

32.19.6 Visual Aids None

32.19.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.20 Monitor – Control – Starting / Stopping

32.20.1 Feature Description

This feature group displays the current settings related to engine starting, stopping and status of the current run command.

32.20.2 Adjustable Parameters

Name: Fault Acknowledge Command

Range: Not Reset / Reset

Description: Toggle this command to acknowledge faults. This command will automatically return to Not Reset.

Name: Idle / Rated Command

Range: Idle / Rated

Description: Set this parameter to idle to run the engine at idle.

Name: Run / Stop Command

Range: Off / Run

Description: Use this command to stop the engine using InPower.

Name: Remote E-Stop Command

Range: Not Stop / Stop

Description: Use this command to remotely E-Stop the engine.

Name: Crank Switch

Range: No Crank / Crank

Description: Displays the current status of the crank switch.

Name: Crank Relay Driver Command

Range: On / Off

Description: Displays the current status of the crank relay driver.

Name: GCS Mode

Range: None

Description: Displays the current run state of the GCS controller.

32.20.3 Interaction with other Features and Parameters

None

32.20.4 Special Instructions

None

32.20.5 Possible Customer Complaints

None

32.20.6 Visual Aids

None

32.20.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.21 Monitor – Engine Data – Centinel

32.21.1 Feature Description

This feature is used to monitor those parameters associated with Centinel. These parameters are only available on engines with the Centinel feature enabled in the calibration and the Centinel hardware is present.

32.21.2 Adjustable Parameters

Name: Centinel Oil Makeup Tank Level Switch

Range: Low Oil Level

Description: State of the level switch in the makeup oil tank.

Name: Centinel Valve Driver

Range: Driver Off / Driver On

Description: State of the Centinel Valve Driver.

Name: Centinel Missed Pulse Count

Range: Counts

Description: The number of missed valve cycles.

Name: Centinel Enable Status

Range: Enable / Disable

Description: Indicates if the Centinel function is Enabled or not.

Name: Centinel Operating Status

Range: Enable / Disable

Description: Indicates if Centinel is running or not.

32.21.3 Interaction with other Features and Parameters

None

32.21.4 Special Instructions

None

32.21.5 Possible Customer Complaints

None

32.21.6 Visual Aids

None

32.21.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.22 Monitor – Engine Data – Fuel Use

32.22.1 Feature Description

This feature will display the parameters associated with fuel consumption.

32.22.2 Adjustable Parameters

Name: Cumulative Fuel Consumption

Range: Gallons

Description: Total fuel consumed over the life of the engine. This parameter can not be reset.

Name: Fuel Consumption Since Reset

Range: Gallons

Description: The tool displays the total fuel consumption since last fuel consumption reset.

Name: Fuel Consumption Reset Time COT (Controller On Time)

Range: Hours

Description: Displays the controller on time of the last fuel consumption reset.

Name: Fuel Consumption Reset Time ERT (Engine Run Time)

Range: Hours

Description: Displays the engine run time of the last fuel consumption reset.

32.22.3 Interaction with other Features and Parameters

None

32.22.4 Special Instructions

None

32.22.5 Possible Customer Complaints

None

32.22.6 Visual Aids

None

32.22.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.23 Monitor – Engine Data – Governing

32.23.1 Feature Description

This feature will display the parameters associated with engine speed governing.

32.23.2 Adjustable Parameters

Name: Engine Speed

Range: RPM

Description: Displays the measured engine speed.

Name: Final Reference Engine Speed

Range: RPM

Description: Displays the current desired engine speed.

Name: Desired Engine Torque

Range: Ft-Lb

Description: Displays the current desired engine torque.

Name: Engine Torque

Range: Ft-Lb

Description: Displays the limited governor command.

Name: Engine Timing

Range: Degrees Before Top Dead Center

Description: Timing of engine fuel injection.

Name: Engine Fueling

Range: mm3

Description: Engine fuel delivered per stroke.

Name: Governor Gain Adjust Select

Range: Trim/Pot

Description: Allows the user to select the service tool Trim or the potentiometer input.

Name: Governor Gain Adjust

Range: 0.05 – 10

Description: Allows the user to manually adjust the governor gain. Governor Gain Adjust Select must be set to Trim for this feature to work.

Name: Governor Gain Adjust Pot

Range: 0.05 – 10

Description: The tool displays the actual gain value based on the Gain Adjust Potentiometer setting.

Name: Droop Adjust Select

Range: Trim/Pot

Description: Allows the user to select between the service tool Trim or the potentiometer.

Name: Droop Adjust

Range: 0 – 10 Percent

Description: Allows the user to manually adjust the Droop Adjust.

Name: Droop Adjust Pot

Range: 0 – 10 Percent

Description: The tool displays the percentage of droop selected based on the position of the Droop Adjust potentiometer setting.

32.23.3 Interaction with other Features and Parameters

The governor gain and droop setting can also be configured using the **Adjustments – Features – Inputs** or the **Adjustments – Features – Governor – Gain and Droop** feature.

32.23.4 Special Instructions

None

32.23.5 Possible Customer Complaints

Improper configuration or adjustment of the Governor Gain feature can cause unstable engine operation. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

Improper configuration or adjustment of the Droop feature can cause undesirable engine speed variation. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

Improper configuration or adjustment of the frequency adjust feature can cause the engine to operate at the incorrect speed. The customer is responsible for performing any necessary system and generator set tests to ensure that this feature has been properly set-up.

32.23.6 Visual Aids

None

32.23.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.24 Monitor – Engine Data – Priming

32.24.1 Feature Description

This feature is used to monitor the status of the priming pump driver.

32.24.2 Adjustable Parameters

Name: Priming Pump Driver

Range: On / Off

Description: Displays the status of the Priming Pump Driver.

32.24.3 Interaction with other Features and Parameters

None

32.24.4 Special Instructions

None

32.24.5 Possible Customer Complaints

None

32.24.6 Visual Aids

None

32.24.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	No
QSK23	No
QSK50	No
QSK60	No
QSK78	No

32.25 Monitor – Engine Data – Sensors / Actuators

32.25.1 Feature Description

The tool allows the user to view all the engine sensor data. The sensor data displayed is application dependent. Consult the engine application manual or engine wiring diagram for specific engine sensors supported.

32.25.2 Adjustable Parameters

None

32.25.3 Interaction with other Features and Parameters

32.25.4 None

32.25.5 Special Instructions

None

32.25.6 Possible Customer Complaints

None

32.25.7 Visual Aids

None

32.25.8 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.26 Monitor – History – 50 Hz Duty Cycle Histogram

32.26.1 Feature Description

This feature displays the amount of time in hours spent at various load points.

32.26.2 Adjustable Parameters

None

32.26.3 Interaction with other Features and Parameters

The 100% reference point is directly linked to the Power Limiter function. (See **Adjustments – Features – Power Limiter**)

32.26.4 Special Instructions

None

32.26.5 Possible Customer Complaints

None

32.26.6 Visual Aids

None

32.26.7 Product Coverage

Product	Feature Available
QSX15	Yes

Product	Feature Available
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.27 Monitor – History – 60 Hz Duty Cycle Histogram

32.27.1 Feature Description

This feature displays the amount of time spent in hours at various load points.

32.27.2 Adjustable Parameters

None

32.27.3 Interaction with other Features and Parameters

The 100% reference point is directly linked to the Power Limiter function. (See **Adjustments – Features – Power Limiter**)

32.27.4 Special Instructions

None

32.27.5 Possible Customer Complaints

None

32.27.6 Visual Aids

None

32.27.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.28 Monitor – History – Audit Trail

32.28.1 Feature Description

The Audit Trail information provides a history of changes made to a device. The Audit Trail information is written to the device, by the tool, whenever changes are saved, faults are cleared, or the ECM is re-programmed.

The Audit Trail consists of records, each of which contains the following fields:

- Audit Type Codes
- Parameter Group Description
- Date/Time
- ECM Time
- Tool Serial Number

32.28.2 Adjustable Parameters

None

32.28.3 Interaction with other Features and Parameters

None

32.28.4 Special Instructions

None

32.28.5 Possible Customer Complaints

None

32.28.6 Visual Aids

None

32.28.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.29 Monitor – History – Engine Protection History

32.29.1 Feature Description

This feature allows the user to view the Engine Protection History data for service use. Engine Protection is a control feature that protects the engine from severe operating conditions by monitoring key sensor inputs and issuing a derate or shutdown condition.

The display shows the following parameters:

- Parameter
- Fault Code
- Parameter Value
- Units
- Duration
- Device Time
- Real Time

32.29.2 Adjustable Parameters

None

32.29.3 Interaction with other Features and Parameters

None

32.29.4 Special Instructions

None

32.29.5 Possible Customer Complaints

None

32.29.6 Visual Aids

None

32.29.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.30 Monitor – History – Run History

32.30.1 Feature Description

The feature allows the user to view the Run History data for service use.

32.30.2 Adjustable Parameters

Name: Cumulative Fuel Consumption

Range: Gallons

Description: Total fuel consumed over the life of the engine. This parameter can not be reset.

Name: Fuel Consumption Since Reset

Range: Gallons

Description: The total fuel consumption since last fuel consumption reset.

Name: Fuel Consumption Reset Time COT (Controller On Time)

Range: Hours

Description: The Controller On Time of the last fuel consumption reset.

Name: Fuel Consumption Reset Time ERT (Engine Run Time)

Range: Hours

Description: The Engine Run Time of the last fuel consumption reset.

Name: Controller On Time

Range: Hours

Description: The current Controller On Time since controller hour 0.

Name: Engine Running Time

Range: Hours

Description: Amount of time the engine has been running.

32.30.3 Interaction with other Features and Parameters

The ECM and fuel history can also be monitored in the **Adjustments – Reset History Counters – Fuel** feature.

The Fuel Consumption Since Reset parameter can be reset by using the **Adjustment – Reset History Counters – Fuel** feature.

32.30.4 Special Instructions

None

32.30.5 Possible Customer Complaints

None

32.30.6 Visual Aids

None

32.30.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.31 Monitor – OEM Connection – Analog Settings

32.31.1 Feature Description

This feature allows the user to view the analog settings.

32.31.2 Adjustable Parameters

Name: Frequency Bias Input

Range: +/- 7.38 Hertz

Description: The value of the selected frequency bias input.

Name: Frequency Adjust Pot

Range: +/- 3 Hertz

Description: The tool displays the frequency offset based on the position of the Frequency Adjust potentiometer.

Name: Droop Adjust Pot

Range: 0 – 10 Percent

Description: The tool displays the percentage of droop selected based on the position of the Droop Adjust potentiometer.

Name: Barber Colman Frequency Bias

Range: +/- 7.38 Hertz

Description: The value of the hardware input if enabled.

Name: Woodward Frequency Bias

Range: +/- 3 Hertz

Description: The value of the hardware input if enabled.

Name: Final Frequency Bias

Range: +/- 7.38 Hertz

Description: The filtered final frequency.

Name: Governor Gain Adjust Pot

Range: 0.05 - 10

Description: The tool displays the actual gain value based on the Gain Adjust potentiometer setting.

32.31.3 Interaction with other Features and Parameters

Potentiometer and Frequency bias inputs must be enabled before use. (See **Adjustments – Features – Inputs**)

32.31.4 Special Instructions

None

32.31.5 Possible Customer Complaints

None

32.31.6 Visual Aids

None

32.31.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.32 Monitor – OEM Connections - Outputs

32.32.1 Feature Description

The tool displays the status of the hardware outputs and LEDs. If configured these outputs can drive a lamp or relay.

32.32.2 Adjustable Parameters

Name: Fail to Start Driver Command

Range: Output Off / Output On

Description: This output activates when the engine fails to start after the number of start attempts, configured using the Cycle/Continuous Cranking feature, have expired without successfully starting the engine.

Name: Common Warning Driver Command

Range: Driver On / Driver Off

Description: This output is activated when any engine warning alarm condition is active.

Name: Common Shutdown Driver Command

Range: Driver On / Driver Off

Description: This output is activated when any engine shutdown alarm condition is active. It also activates when the local or remote emergency stop input is activated.

Name: Warning LED Command

Range: LED On / LED Off

Description: There are five diagnostic LEDs located on the side of the ECM that are visible through the display window. This YELLOW LED indicates that a warning fault has occurred.

Name: Shutdown LED Command

Range: LED On / LED Off

Description: There are five diagnostic LEDs located on the side of the ECM that are visible through the display window. This RED LED indicates that a shutdown fault, other than and Overspeed, Low Oil Pressure and High Engine Temperature has occurred.

Name: HET (High Engine Temperature) Driver / LED Command

Range: LED On/LED Off

Description: There are five diagnostic LEDs located on the side of the ECM that are visible through the display window. This RED LED indicates that a High Coolant Temperature or a High Intake Manifold Temperature shutdown fault has occurred.

Name: LOP (Low Oil Pressure) Driver / LED Command

Range: LED On / LED Off

Description: There are five diagnostic LEDs located on the side of the ECM that are visible through the display window. This RED LED indicates that a Low Oil Pressure shutdown fault has occurred.

Name: Overspeed Driver/LED Command

Range: LED On / LED Off

Description: There are five diagnostic LEDs located on the side of the ECM that are visible through the display window. This RED LED indicates that an Overspeed shutdown fault has occurred.

Name: Pre-HET (High Engine Temperature) Driver Command

Range: Driver On / Driver Off

Description: The status of the Pre-High Engine Temperature engine warning alarm driver.

Name: Pre-LOP (Low Oil Pressure) Driver Command

Range: Driver On / Driver Off

Description: The status of the Pre-Low Oil Pressure engine warning alarm driver.

Name: Relay Driver Supply Command

Range: Driver On / Driver Off

Description: The status of the Relay Driver supply.

Name: Crank Relay Driver Command

Range: On / Off

Description: The status of the crank relay driver.

Name: Fuel Lift Pump Driver Command

Range: Driver On / Driver Off

Description: The status of the Fuel Lift Pump driver. This parameter is available only on QST30 engines.

32.32.3 Interaction with other Features and Parameters

None

32.32.4 Special Instructions

None

32.32.5 Possible Customer Complaints

None

32.32.6 Visual Aids

None

32.32.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.33 Monitor – OEM Connections – Switch Settings - Other

32.33.1 Feature Description

These parameters allow the user to enable controller diagnostics, reset faults and change engine operating conditions.

32.33.2 Adjustable Parameters

Name: Fault Acknowledge Command

Range: Not Reset/Reset

Description: Set to reset to acknowledge faults. This variable will return to Not Reset automatically.

Name: Idle/Rated Command

Range: Idle/Rated

Description: Tool command to run the engine at Idle or at rated.

Name: Idle/Rated Switch

Range: Idle/Rated

Description: The tool displays the status of the hardwired Idle/Rated switch.

Name: Diagnostic Mode Switch

Range: Fault Flashout/Not Fault Flashout

Description: Measured state of the hardware diagnostic mode switch.

Name: Alternate Frequency Switch

Range: 50Hz/60Hz

Description: The tool displays the current state of the hardwired Alternate Frequency Switch. This input will not change state while the engine is running.

Name: Fault Acknowledge Switch

Range: Not Reset/Reset

Description: Current state of the Fault Acknowledge Switch.

32.33.3 Interaction with other Features and Parameters

None

32.33.4 Special Instructions

None

32.33.5 Possible Customer Complaints

None

32.33.6 Visual Aids

None

32.33.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.34 Monitor – OEM Connections – Switch Settings – Start/Stop

32.34.1 Feature Description

This feature provides the capability for the user to use the tool to remotely start and stop the engine.

32.34.2 Adjustable Parameters

Name: Remote E-Stop Command

Range: Not Stop/Stop

Description: The tool allows the user to command the engine E-Stop with a remote command.

Name: Local E-Stop Switch

Range: Not Stop/Stop

Description: The tool displays the status of the hardwired local E-Stop

Name: Remote E-Stop Switch

Range: Not Stop/Stop

Description: The tool displays the status of the remote E-Stop switch.

Name: Crank Switch

Range: No Crank/Crank

Description: The tool displays the status of the Crank Switch hardware input.

Name: Run/Stop Switch

Range: Run/Off

Description: The tool displays the status of the hardware run switch and the tool run enable.

Name: Run/Stop Command

Range: Run/Off

Description: When the Run/Stop hardware input is in the Run position, this command can be used to start and stop the engine.

32.34.3 Interaction with other Features and Parameters

None

32.34.4 Special Instructions

None

32.34.5 Possible Customer Complaints

None

32.34.6 Visual Aids

None

32.34.7 Product Coverage

Product	Feature Available
QSX15	Yes
QST30	Yes
QSK23	Yes
QSK50	Yes
QSK60	Yes
QSK78	Yes

32.35 Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed. This feature is only available on QSK23, QSK50, QSK60, and QSK78 model engines.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.35.1 How to Perform the Test - Option 1

HAT Warning Threshold High Aftercooler Water Inlet Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp - HAT Warning Threshold** and make a note of the current setting.
3. Double click on the value field for **HAT Warning Threshold**.
4. Edit the field and set to a value that is below the current Aftercooler Water Inlet Temperature. The current Aftercooler Water Inlet Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp – Aftercooler Water Temp**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 2113 fault.
7. Double click on the value field for **HAT Warning Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HAT Shutdown Threshold High Aftercooler Water Inlet Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp - HAT Shutdown Threshold** and make a note of the current setting.
3. Double click on the value field for **HAT Shutdown Threshold**.
4. Edit the field and set to a value that is below the current Aftercooler Water Inlet Temperature. The current Aftercooler Water Inlet Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp – Aftercooler Water Temp**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 2114 will go active and the engine will proceed to shutdown.
7. Double click on the value field for **HAT Shutdown Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.35.2 How to Perform the Tests - Option 2

HAT Warning Threshold High Aftercooler Water Temp

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp - HAT Warning Threshold**. Make a note of the current setting.
3. Double click on the **Aftercooler Water Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the warning. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Aftercooler Water Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 2113 fault.
7. Double click on the **Aftercooler Water Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

32.35.3 HAT Shutdown Threshold: High Aftercooler Water Temp

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp - HAT Shutdown Threshold**. Make a note of the current setting.

3. Double click on the **Aftercooler Water Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the shutdown. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Aftercooler Water Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 2114 will go active and the engine will proceed to shutdown.
7. Double click on the **Aftercooler Water Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.36 Test – Fault Simulation – Engine Protection Test – Blowby Flow

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed. This feature is only available on the QSK23, QSK50, QSK60 and QSK78 engine models.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.36.1 How to Perform the Test - Option 1

HBF Warning Threshold Table High Blowby Flow

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Blowby Flow - HBF Warning Threshold Table** and make a note of the current setting.
3. Double click on the value field for **HBF Warning Threshold Table**.
4. Edit the table and set to a value that is below the current Blowby Flow. The current Blowby Flow value can be obtained from **Test – Fault Simulation – Engine Protection Test – Blowby Flow – Blowby Flow**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 555 fault.
7. Double click on the value field for **HBF Warning Threshold Table** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HBF Shutdown Threshold Table High Blowby Flow

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Blowby Flow - HBF Shutdown Threshold Table** and make a note of the current setting.
3. Double click on the value field for **HBF Shutdown Threshold Table**.
4. Edit the table and set to a value that is below the current Blowby Flow. The current Blowby Flow value can be obtained from **Test – Fault Simulation – Engine Protection Test – Blowby Flow – Blowby Flow**
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 556 will go active and the engine will proceed to shutdown.
7. Double click on the value field for **HBF Shutdown Threshold Table** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.36.2 How to Perform the Tests - Option 2

HBF Warning Threshold Table High Blowby Flow

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Blowby Flow - HBF Warning Threshold Table**. Make a note of the current settings.
3. Double click on the **Blowby Flow Override Command** value cell and enter a voltage amount that will be high enough to trigger the warning. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Blowby Flow Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 555 fault.
7. Double click on the **Blowby Flow Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HBF Shutdown Threshold Table High Blowby Flow

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Blowby Flow - HBF Shutdown Threshold Table**. Make a note of the current setting.

3. Double click on the **Blowby Flow Override Command** value cell and enter a voltage amount that will be high enough to trigger the shutdown. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Blowby Flow Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 556 will go active and the engine will proceed to shutdown.
7. Double click on the **Blowby Flow Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.37 Test – Fault Simulation – Engine Protection Test – Coolant Pressure

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed. This feature is not available on QSX15 engines.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.37.1 How to Perform the Test

LCP Warning Threshold Table Low Coolant Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Pressure - LCP Warning Threshold Table** and make a note of the current settings.
3. Double click on the value field for **LCP Warning Threshold Table**.
4. Edit the table and set to a value that is above the current Coolant Pressure. The current Coolant Pressure value can be obtained from **Test – Fault Simulation – Engine Protection Test – Coolant Pressure – Coolant Pressure**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 233 fault.
7. Double click on the value field for **LCP Warning Threshold Table** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

LCP Shutdown Threshold Table Low Coolant Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Pressure – LCP Shutdown Threshold Table** and make a note of the current settings.
3. Double click on the value field for **LCP Shutdown Threshold Table**.
4. Edit the table and set to a value that is above the current Coolant Pressure. The current Coolant Pressure value can be obtained from **Test – Fault Simulation – Engine Protection Test – Coolant Pressure – Coolant Pressure**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 228 will go active and the engine will proceed to shutdown.
7. Double click on the value field for **LCP Shutdown Threshold Table** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.37.2 How to Perform the Tests - Option 2

LCP Warning Threshold Table Low Coolant Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Pressure - LCP Warning Threshold Table**. Make a note of the current settings.
3. Double click on the **Coolant Pressure Override Command** value cell and enter a voltage amount that will be low enough to trigger the warning. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Coolant Pressure Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 223 fault.
7. Double click on the **Coolant Pressure Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

LCP Shutdown Threshold Table Low Coolant Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Pressure - LCP Shutdown Threshold Table**. Make a note of the current setting.

3. Double click on the **Coolant Pressure Override Command** value cell and enter a voltage amount that will be low enough to trigger the shutdown. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Coolant Pressure Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 228 will go active and the engine will proceed to shutdown.
7. Double click on the **Coolant Pressure Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.38 Test – Fault Simulation – Engine Protection Test – Coolant Temp

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.38.1 How to Perform the Tests - Option 1

HCT Warning Threshold High Coolant Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Temp - HCT Warning Threshold** and make a note of the current setting.
3. Double click on the value field for **HCT Warning Threshold**.
4. Edit the field and set to a value that is below the current Coolant Temperature. The current Coolant Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Coolant Temp – Coolant Temp**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 146 fault.
7. Double click on the value field for **HCT Warning Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HCT Shutdown Threshold High Coolant Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Temp - HCT Shutdown Threshold** and make a note of the current setting.
3. Double click on the value field for **HCT Shutdown Threshold**.
4. Edit the field and set to a value that is below the current Coolant Temperature. The current Coolant Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Coolant Temp – Coolant Temp**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 151 will go active and the engine will proceed to shutdown.
7. Double click on the value field for **HCT Shutdown Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.38.2 How to Perform the Tests - Option 2

HCT Warning Threshold High Coolant Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Temp - HCT Warning Threshold**. Make a note of the current setting.
3. Double click on the **Coolant Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the warning.
4. Double click on the **Coolant Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 146 fault.
7. Double click on the **Coolant Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HCT Shutdown Threshold High Coolant Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Coolant Temp - HCT Shutdown Threshold**. Make a note of the current setting.
3. Double click on the **Coolant Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the shutdown.

4. Double click on the **Coolant Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 151 will go active and the engine will proceed to shutdown.
7. Double click on the **Coolant Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.39 Test – Fault Simulation – Engine Protection Test – Fuel Temp

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed. This feature is not available on QSX15 model engines.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.39.1 How to Perform the Test - Option 1

HFT Warning Threshold High Fuel Temp

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Fuel Temp - HFT Warning Threshold** and make a note of the current setting.
3. Double click on the value field for **HFT Warning Threshold**.
4. Edit the table and set to a value that is below the current Fuel Temp. The current Fuel Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Fuel Temp – Fuel Temperature**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 261 fault.
7. Double click on the value field for **HFT Warning Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HFT Shutdown Threshold High Fuel Temp

1. Attach the InPower PC to a running engine and connect to the controller.

2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Fuel Temp - HFT Shutdown Threshold** and make a note of the current setting.
3. Double click on the value field for **HFT Shutdown Threshold**.
4. Edit the table and set to a value that is below the current Fuel Temp. The current Fuel Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Fuel Temp – Fuel Temperature**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 266 will go active and the engine will proceed to shutdown.
7. Double click on the value field for **HFT Shutdown Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.39.2 How to Perform the Tests - Option 2

HFT Warning Threshold High Fuel Temperature

1. Attach the InPower PC to a running engine and
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Fuel Temp - HFT Warning Threshold**. Make a note of the current setting.
3. Double click on the **Fuel Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the warning. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Fuel Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 261 fault.
7. Double click on the **Fuel Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HFT Shutdown Threshold High Fuel Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Fuel Temp - HFT Shutdown Threshold**. Make a note of the current setting.
3. Double click on the **Fuel Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the shutdown. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Fuel Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.

5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 266 will go active and the engine will proceed to shutdown.
7. Double click on the **Fuel Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.40 Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed. This feature is available on all engine models. For the QST30 this can be applied for both intake manifold temperature #1 and #2.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.40.1 How to Perform the Tests - Option 1

IMT Warning Threshold Intake Manifold Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp - IMT Warning Threshold** and make a note of the current setting.
3. Double click on the value field for **IMT Warning Threshold**.
4. Edit the field and set to a value that is below the current Intake Manifold Temperature. The current Intake Manifold Temp value can be obtained from **Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp – Intake Manifold Temp**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 488 fault.
7. Double click on the value field for **IMT Warning Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

IMT Shutdown Threshold Intake Manifold Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp - IMT Shutdown Threshold** and make a note of the current setting.

3. Double click on the value field for **IMT Shutdown Threshold**.
4. Edit the field and set to a value that is below the current Intake Manifold Temperature. The current Intake Manifold Temp value can be obtained from **Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp – Intake Manifold Temp**.
5. To temporarily write these values to the device, click on the Save Adjustments button on the tool bar.
6. Fault code 155 will go active and the engine will pr
7. Double click on the value field for IMT Shutdown Threshold and restore the value to its original setting.
8. Click on the Save Adjustments button on the tool bar and the fault will go inactive.
9. Click on the Clear Faults button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.40.2 How to Perform the Tests - Option 2

IMT Warning Threshold Intake Manifold Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp - IMT Warning Threshold**. Make a note of the current setting.
3. Double click on the **Intake Manifold Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the warning.
4. Double click on the **Intake Manifold Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 488 fault.
7. Double click on the **Intake Manifold Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

IMT Shutdown Threshold Intake Manifold Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp - IMT Shutdown Threshold**. Make a note of the current setting.
3. Double click on the **Intake Manifold Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the shutdown.
4. Double click on the **Intake Manifold Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 155 will go active and the engine will proceed to shutdown.

7. Double click on the **Intake Manifold Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.41 Test – Fault Simulation – Engine Protection Test – Oil Pressure

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.41.1 How to Perform the Tests - Option 1

LOP Warning Threshold Table Low Oil Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Pressure - LOP Warning Threshold Table** and make a note of the current setting.
3. Double click on the value field for **LOP Warning Threshold Table**.
4. Edit the table and set to a value that is above the current Oil Pressure. The current Oil Pressure value can be obtained from **Test – Fault Simulation – Engine Protection Test – Oil Pressure**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 144 fault.
7. Double click on the value field for **LOP Warning Threshold Table** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

LOP Shutdown Threshold Table Low Oil Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Pressure - LOP Shutdown Threshold Table** and make a note of the current setting.
3. Double click on the value field for **LOP Shutdown Threshold Table**.
4. Edit the table and set to a value that is above the current Oil Pressure. The current Oil Pressure value can be obtained from **Test – Fault Simulation – Engine Protection Test – Oil Pressure**.
5. To temporarily write these values to the device, click on the **Save Adjustments** b

6. Fault code 415 will go active and the engine will proceed to shutdown.
7. Double click on the value field for **LOP Shutdown Threshold Table** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.41.2 How to Perform the Tests - Option 2

LOP Warning Threshold Table Low Oil Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Pressure - LOP Warning Threshold Table**. Make a note of the current setting.
3. Double click on the **Oil Pressure Override Command** value cell and enter a voltage amount that will be low enough to trigger the warning. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Oil Pressure Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 144 fault.
7. Double click on the **Oil Pressure Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

LOP Shutdown Threshold Table Low Oil Pressure

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Pressure - LOP Shutdown Threshold Table**. Make a note of the current setting.
3. Double click on the **Oil Pressure Override Command** value cell and enter a voltage amount that will be low enough to trigger the shutdown. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Oil Pressure Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 415 will go active and the engine will proceed to shutdown.
7. Double click on the **Oil Pressure Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

10. Restart the engine.

32.42 Test – Fault Simulation – Engine Protection Test – Oil Temp

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.42.1 How to Perform the Tests - Option 1

HOT Warning Threshold High Oil Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Temp - HOT Warning Threshold**.
3. Double click on the value field for **HOT Warning Threshold** and make a note of the current setting.
4. Edit the field and set to a value that is below the current Oil Temperature. The current Oil Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Oil Temp – Oil Temperature**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 421 fault.
7. Double click on the value field for **HOT Warning Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HOT Shutdown Threshold Low Oil Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Temp - HOT Shutdown Threshold**.
3. Double click on the value field for **HOT Shutdown Threshold** and make a note of the current setting.
4. Edit the field and set to a value that is below the current Oil Temperature. The current Oil Temperature value can be obtained from **Test – Fault Simulation – Engine Protection Test – Oil Temp – Oil Temperature**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 214 will go active and the engine will proceed to shutdown.

7. Double click on the value field for **HOT Shutdown Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.42.2 How to Perform the Tests - Option 2

HOT Warning Threshold Low Oil Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Temp - HOT Warning Threshold**. Make a note of the current setting.
3. Double click on the **Oil Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the warning. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Oil Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. The alarm popup will display an active 421 fault.
7. Double click on the **Oil Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HOT Shutdown Threshold Low Oil Temperature

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Oil Temp - HOT Shutdown Threshold**. Make a note of the current setting.
3. Double click on the **Oil Temp Override Command** value cell and enter a voltage amount that will be high enough to trigger the shutdown. The appropriate voltage amount can be found on the engine wiring diagram.
4. Double click on the **Oil Temp Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Fault code 214 will go active and the engine will proceed to shutdown.
7. Double click on the **Oil Temp Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
8. Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
9. Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
10. Restart the engine.

32.43 Test – Fault Simulation – Engine Protection Test – Overspeeding

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

Use caution when using this test feature and do not command the engine speed above 1800 RPM for a 60Hz application and 1500 RPM for a 50Hz application.

32.43.1 How to Perform the Tests - Option 1

Overspeed Shutdown Threshold (50Hz) or (60Hz)

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Overspeeding – Overspeed Shutdown Threshold**.
3. Double click on the value field for **Overspeed Shutdown Threshold** and make a note of the current setting.
4. Edit the field and set to a value that is below the current Engine Speed. The current Engine Speed value can be obtained from **Test – Fault Simulation – Engine Protection Test – Overspeeding – Engine Speed**.
5. To write this value to the device, click on the **Save Adjustments** button on the tool bar.
6. The overspeed detector will trip and the engine will shutdown.
7. Double click on the value field for **Overspeed Shutdown Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar.
9. Restart the engine.

32.43.2 How to Perform the Tests - Option 2

Overspeed Shutdown Threshold (50Hz) or (60Hz)



NOTE: The example shown here is for a 60Hz, 1800 RPM application. The RPM must be adjusted accordingly for a 50Hz, 1500 RPM application.

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Overspeeding – Engine Speed Reference Override Command**. Make a note of the current s
3. Double click on the **Engine Speed Reference Override Command** value cell and enter 1700RPM.
4. Double click on the **Engine Speed Reference Override Enable** value cell. . Click on the drop down list arrow and select **Enabled**.

5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar. The engine should start running at 1700 RPM.
6. Double click on the value field for **Overspeed Shutdown Threshold** and make a note of the current setting.
7. Edit the **Overspeed Shutdown Threshold** value field and set it to 1750RPM.
8. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
9. Double click on the **Engine Speed Reference Override Command** value cell and enter 1800RPM.
10. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar. The engine should attempt to ramp up to 1800RPM.
11. The overspeed detector will trip once it crosses the 1750RPM value and the engine will shutdown.
12. Double click on the **Engine Speed Reference Override Enable** value cell. . Click on the drop down list arrow and select **Disable**.
13. Double click on the **Overspeed Shutdown Threshold** value cell and restore to the original value.
14. Double click on the **Engine Speed Reference Override Command** value cell and restore to the original value.
15. Click on the **Save Adjustments** button on the tool bar.
16. Restart the engine.



NOTE: The Accel Ramp for Engine Speed Override and Decel Ramp for Engine Speed Override can be used to adjust the time it takes to reach the desired override speed.

32.44 Test – Fault Simulation – Engine Protection Test – Torque Input Command

This feature can be used as an alternative means to control engine fueling, effectively bypassing the control system governor functions. This is used where more flexibility is required over what the integrated control system governor provides. This feature has been applied on Dynamic Un-interruptible Power Supply applications.

Perform this test when you want to confirm that the fuel system is responding accordingly to the torque input command.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

32.44.1 How to Perform the Tests

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Fault Simulation – Engine Protection Test – Torque Input Command - Torque Input Override Command**.

3. Double click on the value field for **Torque Input Override Command** and make a note of the current setting.
4. Edit the field and set to the desired torque input value.
5. Double click on the **Torque Input Override Enable** value cell. . Click on the drop down list arrow and select **Enabled**.
6. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
7. The engine torque should adjust accordingly.



NOTE: The Torque Input Command will not bypass the governor control to effect fueling unless the torque command is greater than the Desired Engine Torque commanded by the governor. The Desired Engine Torque is displayed on the Monitor - Engine Data - Governing INPOWER display screen.

8. Double click on the **Torque Input Override Enable** value cell. . Click on the d
9. Double click on the **Torque Input Override Command** value cell and restore to the original value.
10. Click on the **Save Adjustments** button on the tool bar.

32.45 Test – Fuel System Test

32.45.1 Fuel Rack Position Test for G-Drive QST30 Engines

This test is used to check the fuel rack driver, rack position sensor, and rack position feedback input. InPower can be used to move the fuel rack position, and the results can be measured.



NOTE: Fuel pump faults are suppressed in the Test – Manual mode

32.45.2 How to Perform the Test

1. Attach the InPower PC to a non-running engine and connect to the controller.
2. From the device explorer select **Test – Fuel System Test**.
3. Double click on the **Built in Test** value field and select **Test-Manual**.
4. Double click on the value field for **Fuel Rack Position Override Command #1** to change the position on the left bank fuel pump (as viewed from the flywheel end).
5. Edit the field and set to the desired rack position in millimeters. The allowable range is 0 to 15 millimeters.
6. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
7. Click on the refresh button on the tool bar and read the Fuel Rack Position #1. The result is typically within +/- 0.5 millimeters.
8. Double click on the **Built in Test** value field and select **Test-Abort** to stop the test.

32.45.3 Single Cylinder Cut Out Test for G-Drive QSX15 Engines

This test is used to cut out fueling to one cylinder at a time. The test can be used to help isolate a cylinder with fueling or combustion problems.



CAUTION: *Do not cut out fueling to more than one cylinder at a time or engine damage can result. Always change the Cylinder Cut Out Test Enable to Disabled when finished testing. Follow these steps carefully and refer to the equipment operator's manual for important safety precautions.*

32.45.4 How to Perform the Test

1. Attach the InPower PC to a running engine and connect to the controller. Operate the engine at rated speed with no load.
2. From the device explorer select **Test – Fuel System Test**. Make sure that each of the six cylinder parameter values are set at 1 (enabled).
3. Double click on the **Cylinder Cut Out Enable** value field and select **Enabled**.
4. Double click on the value field of the desired cylinder for testing and enter 0 (disabled).
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. To restore the cylinder, double click on the value field of the cylinder selected above and restore the value to 1 (enabled).
7. Click on the **Save Adjustments** button on the tool bar.
8. Repeat steps 4-7 for each cylinder to be tested.
9. When finished testing always remember to return the **Cylinder Cut Out Test Enable** to **Disabled**.
10. Click on the **Save Adjustments** button on the tool bar.

32.46 Test – Inputs - Analog

This test screen allows the user to view all the OEM analog inputs. The input values can be viewed in both engineering units and voltage. The following inputs can be monitored:

- Frequency Bias Input
- Barber Colman Frequency Bias
- Woodward Frequency Bias
- Barber Colman Frequency Bias Voltage
- Woodward Frequency Bias Voltage
- Droop Adjust Pot
- Droop Adjust Pot Voltage
- Frequency Adjust Pot
- Frequency Adjust Pot Voltage
- Governor Gain Adjust Pot
- Governor Gain Adjust Pot Voltage

32.47 Test – Inputs – Engine Inputs

This feature is used to monitor engine sensor input values. The values are displayed in engineering units and in voltages.

32.48 Test – Inputs – Switches

32.48.1 Feature Description

This test feature allows the user to view the state of hardware switches. It also allows the user the ability to change PC tool inputs.

32.48.2 Adjustable Parameters

Name: Alternate Frequency Switch

Range: None

Description: The tool is displaying the value of the input switch.

Name: Alternate Frequency Select

Range: 60Hz Primary/50Hz Primary/60Hz Only/50Hz Only

Description: Allow the user to choose the default frequency. This may be set to allow the engine to only run at one frequency.

Name: Remote E-Stop Switch:

Range: Not Stop/Stop

Description: The tool displays the status of the remote E-Stop switch.

Name: Remote E-Stop Command

Range: Not Stop/Stop

Description: Use this command to remotely E-Stop the engine.

Name: Diagnostic Mode Switch

Range: Fault Flashout/Not Fault Flashout

Description: Measured state of the hardware diagnostic mode switch.

Name: Local E-Stop Switch

Range: Not Stop/Stop

Description: The tool displays the status of the hardwired local E-Stop

Name: Idle/Rated Switch

Range: Idle/Rated

Description: The tool displays the status of the hardwired Idle/Rated switch.

Name: Idle/Rated Command

Range: Idle/Rated

Description: Tool command to run the engine at Idle or at rated.

Name: Run/Stop Switch

Range: Run/Off

Description: The tool displays the status of the hardware run switch and the tool run enable.

Name: Run/Stop Command

Range: Run/Off

Description: When the Run/Stop hardware input is in the Run position, this command can be used to start and stop the engine.

Name: Crank Switch

Range: No Crank/Crank

Description: The tool displays the status of the Crank Switch hardware input.

Name: Fault Acknowledge Switch

Range: Not Reset/Reset

Description: Current state of the Fault Acknowledge Switch.

Name: Fault Acknowledge Command

Range: Not Reset/Reset

Description: Set to reset to acknowledge faults. This variable will return to Not Reset automatically.

Name: Coolant Level Switch

Range: Valid/Invalid

Description: The tool displays the current state of the hardware input.

32.49 Test – Outputs - Centinel

This test feature allows the user to test the output driver for Centinel. This is accomplished by using the tool to manually command the ECM driver on.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.49.1 How to Perform the Tests

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Outputs - Centinel**.
3. Double click on the value field for **Centinel Valve Driver Override Command**. Click on the drop down arrow and select **Driver On**.
4. Double click on the **Centinel Valve Driver Override Enable** value cell. . Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the Centinel valve is open.
7. Double click on the **Centinel Valve Driver Override Enable** value cell. Click on the drop down list arrow and select **Disable**.

32.50 Test – Outputs – Meter Drivers Test – Coolant Temp Test

The Coolant Temperature analog meter driver output can be overridden to command a specified test output level. This is accomplished by setting the meter override enable command to "Enabled" and setting the override value to the desired meter output driver current.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.50.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Meter Driver Test – Coolant Temp Test**.
3. Double click on the value field for **Coolant Temp Meter Override** and enter the test value
4. Double click on the **Coolant Temp Meter Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Check the operator panel and verify the proper value is displayed.
7. Double click on the **Coolant Temp Meter Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
8. Click on the **Save Adjustments** button on the tool bar.
9. Double click on the **Centinel Valve Driver Override Command** value cell. Click on the drop down list arrow and select **Driver Off**.

10. Click on the **Save Adjustments** button on the tool bar.

32.51 Test – Outputs – Fuel Shutoff

This test feature allows the user to view the state of the Fuel Shutoff Valve Driver output.

32.52 Test – Outputs – Meter Drivers Test – Engine Speed Test

The Engine Speed analog meter driver output can be overridden to command a specified test output level. This is accomplished by setting the meter override enable command to "Enabled" and setting the override value to the desired meter output driver current.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.52.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Meter Driver Test – Engine Speed Test**.
3. Double click on the value field for **Engine Speed Meter Override** and enter the test value
4. Double click on the **Engine Speed Meter Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Check the operator panel and verify the proper value is displayed.
7. Double click on the **Engine Speed Meter Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
8. Click on the **Save Adjustments** button on the tool bar.

32.53 Test – Outputs – Meter Drivers Test – Oil Pressure Test

The Oil Pressure analog meter driver output can be overridden to command a specified test output level. This is accomplished by setting the meter override enable command to "Enabled" and setting the override value to the desired meter output driver current.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.53.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Meter Driver Test – Oil Pressure Test**.

3. Double click on the value field for **Oil Pressure Meter Override** and enter the test value
4. Double click on the **Oil Pressure Meter Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Check the operator panel and verify the proper value is displayed.
7. Double click on the **Oil Pressure Meter Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
8. Click on the **Save Adjustments** button on the tool bar.

32.54 Test – Outputs – Relay Drivers – Common Shutdown

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.54.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – Common Shutdown**.
3. Double click on the **Common Shutdown Driver Override Command** value cell. Click on the drop down list arrow and select **Driver On**.
4. Double click on the **Common Shutdown Driver Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **Common Shutdown Driver Override Command** value cell. Click on the drop down list arrow and select **Driver Off**.
8. Double click on the **Common Shutdown Driver Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.

32.55 Test – Outputs – Relay Drivers – Common Warning

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.55.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – Common Warning**.
3. Double click on the **Common Warning Driver Override Command** value cell. Click on the drop down list arrow and select **Driver On**.
4. Double click on the **Common Warning Driver Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **Common Warning Driver Override Command** value cell. Click on the drop down list arrow and select **Driver Off**.
8. Double click on the **Common Warning Driver Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.

32.56 Test – Outputs – Relay Drivers – Crank Relay

Use this test to verify the Crank Relay Driver Command state.

Name: Crank Relay Driver Command

Range: On/Off

Description: The tool displays the status of the crank relay driver command.

32.57 Test – Outputs – Relay Drivers – Fail to Start

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.57.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – Fail to Start**.

3. Double click on the **Fail to Start Driver Override Command** value cell. Click on the drop down list arrow and select **Driver On**.
4. Double click on the **Fail to Start Driver Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **Fail to Start Driver Override Command** value cell. Click on the drop down list arrow and select **Driver Off**.
8. Double click on the **Fail to Start Driver Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.

32.58 Test – Outputs – Relay Drivers – Fuel Lift Pump

This test is for QST30 G-Drive engines only.

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test when you want to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.58.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – Fuel Lift Pump**.
3. Double click on the **Fuel Lift Pump Relay Driver Override Command** value cell. Click on the drop down list arrow and select **Driver On**.
4. Double click on the **Fuel Lift Pump Relay Driver Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **Fuel Lift Pump Relay Driver Override Command** value cell. Click on the drop down list arrow and select **Driver Off**.
8. Double click on the **Fuel Lift Pump Relay Driver Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.

32.59 Test – Outputs – Relay Drivers – HET Shutdown

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.59.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – HET Shutdown**.
3. Double click on the **HET Driver/LED Override Command** value cell. Click on the drop down list arrow and select **Driver/LED On**.
4. Double click on the **HET Driver/LED Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **HET Driver/LED Override Command** value cell. Click on the drop down list arrow and select **Driver/LED Off**.
8. Double click on the **HET Driver/LED Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.

32.60 Test – Outputs – Relay Drivers – LOP Shutdown

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.60.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – LOP Shutdown**.
3. Double click on the **LOP Driver/LED Override Command** value cell. Click on the drop down list arrow and select **Driver/LED On**.
4. Double click on the **LOP Driver/LED Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.

5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **LOP Driver/LED Override Command** value cell. Click on the drop down list arrow and select **Driver/LED Off**.
8. Double click on the **LOP Driver/LED Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.

32.61 Test – Outputs – Relay Drivers – Overspeed Shutdown

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.61.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – Overspeed Shutdown**.
3. Double click on the **Overspeed Driver/LED Override Command** value cell. Click on the drop down list arrow and select **Driver/LED On**.
4. Double click on the **Overspeed Driver/LED Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **Overspeed Driver/LED Override Command** value cell. Click on the drop down list arrow and select **Driver/LED Off**.
8. Double click on the **Overspeed Driver/LED Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.
 - Test – Outputs – Relay Drivers – Pre-HET (High Engine Temperature) Warning

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.61.2 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – Pre-HET Warning**.
3. Double click on the **Pre-HET Warning Override Command** value cell. Click on the drop down list arrow and select **Driver On**.
4. Double click on the **Pre-HET Warning Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **Pre-HET Warning Override Command** value cell. Click on the drop down list arrow and select **Driver Off**.
8. Double click on the **Pre-HET Warning Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
9. Click on the **Save Adjustments** button on the tool bar.

32.62 Test – Outputs – Relay Drivers – Pre-LOP (Low Oil Pressure) Warning

The state of each alarm lamp/relay driver output can be overridden individually. This is accomplished by setting the respective driver override enable command to "Enabled" and setting the override value to the desired driver output state. Perform this test when you want to confirm that the ECM can turn on the output lamps/relays.

Changes made to test parameter values are retained until they are changed with InPower, or until power is removed from the controller. When finished with a test, return the parameters to their original setting. To permanently write changes to the controller, use the Adjustment feature.

32.62.1 How to Perform the Test

1. Attach the InPower PC to the controller.
2. From the device explorer select **Test – Outputs – Relay Drivers – Pre-LOP Warning**.
3. Double click on the **Pre-LOP Warning Override Command** value cell. Click on the drop down list arrow and select **Driver On**.
4. Double click on the **Pre-LOP Warning Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
6. Verify that the output lamp or relay is turned on.
7. Double click on the **Pre-LOP Warning Override Command** value cell. Click on the drop down list arrow and select **Driver Off**.
8. Double click on the **Pre-LOP Warning Override Enable** value cell. Click on the drop down list arrow and select **Disable**.

9. Click on the **Save Adjustments** button on the tool bar.

32.63 Test – Self Test

The following Built-In Tests are provided for the purpose of checking specific ECM electronic features:

- Lamp/Relay Driver Start-Up Test
- Test-Stationary
- Test-Cranking
- Test-Manual

These tests allow the user to test ECM outputs while stationary and cranking. While conducting each test, the standard ECM diagnostic routines are performed. If any faults are detected during this time, the faults are reported in the InPower alarms window. Consult your engine Troubleshooting and Repair manual for fault code descriptions and troubleshooting steps.

The Lamp/Relay Driver Start-Up Test is automatically performed whenever the engine is started. It is also the first test conducted in the sequence of tests performed during the Stationary and Cranking Tests.

When the Test-Stationary is initiated the Outputs Tests and Fuel Shut-Off Test, as describe below, will be performed sequentially. The Built-In Test Command toggle parameter will automatically reset to Test-Abort once the test is completed.

When the Test-Cranking is initiated the Outputs Tests, Fuel Shut-Off Test and Starter Test, as described below, will be performed sequentially. The Built-In Test Command toggle parameter will automatically reset to Test-Abort once the test is completed.

For the Test-Manual test see the **Test – Fuel System Test** description.

32.63.1 How to Perform the Test

1. Attach the InPower PC to a non-running engine and connect to the controller.
2. From the device explorer select **Test – Self Test**.
3. Double click on the **Built In Test Command** value cell. Click on the drop down list arrow and select **Test-Stationary**.
4. Click on the **Save Adjustments** button on the tool bar.
5. The test will be performed and the Built-In Test Command will reset to **Test-Abort**.
6. Repeat this test for the **Test-Cranking** if necessary.

Lamp/Relay Driver Start-Up Test The Lamp/Relay Driver supply voltage at connector 03 is normally on when the ECM is powered. During engine start-up the ECM will turn this supply voltage off for a 1.5 second interval as a means of testing the lamps/relays driven by the supply. Any Lamp/Relay Driver output that is active during this test will extinguish/de-energize during the 1.5 second test duration.

Outputs Test During the Outputs test all meter drivers, lamp/relay drivers and diagnostic LED's will be exercised. The Outputs Test for the lamps/relay drivers and the LED's are performed first, followed by the meter driver test. The Analog out test will ramp from 1ma to 0ma in 2 seconds then ramp from 0ma to 1ma in 2 additional seconds.

Fuel Shut-Off Test Immediately following the Output Tests, the Fuel Shut-Off Test will be initiated. During this test, the FSO driver will be activated/opened for 2 seconds, and then it will go inactive/closed.

Starter Test The Starter Test will be performed immediately following the Fuel Shut-Off test, only when the Cranking Test is being performed. For this test, the Crank Relay driver output will be activated for 2 seconds then it will go inactive.

32.64 Test – Speed Override

This feature allows the user to test engine protection devices by temporarily overriding the sensor inputs and verifying that the engine warning or shutdown is completed.

Changes made to test parameter values are retained until they are changed back, using InPower, or until power is removed from the controller. When finished with a test, make sure that you return the parameters to their original setting. To permanently write changes to the controller, you must use the Adjustment feature.

Use caution when using this test feature and do not command the engine speed above 1800 RPM for a 60Hz application and 1500 RPM for a 50Hz application.

32.64.1 How to Perform the Tests - Option 1

Overspeed Shutdown Threshold (50Hz) or (60Hz)



NOTE: The example shown here is for a 60Hz, 1800 RPM application. The RPM must be adjusted accordingly for a 50Hz, 1500 RPM application.

1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Speed Override**.
3. Double click on the value field for **Overspeed Shutdown Threshold** and make a note of the current setting.
4. Edit the field and set to a value that is below the current Engine Speed. The current Engine Speed value can be obtained from **Test – Speed Override – Engine Speed**.
5. To write this value to the device, click on the **Save Adjustments** button on the tool bar.
6. The overspeed detector will trip and the engine will shutdown. Fault code 234 will be activated.
7. Double click on the value field for **Overspeed Shutdown Threshold** and restore the value to its original setting.
8. Click on the **Save Adjustments** button on the tool bar.
9. Restart the engine and acknowledge the fault.

32.64.2 How to Perform the Tests - Option 2

Overspeed Shutdown Threshold (50Hz) or (60Hz)


1. Attach the InPower PC to a running engine and connect to the controller.
2. From the device explorer select **Test – Speed Override – Engine Speed Reference Override Command**. Make a note of the current setting.

3. Double click on the **Engine Speed Reference Override Command** value cell and enter 1700RPM.
4. Double click on the **Engine Speed Reference Override Enable** value cell. . Click on the drop down list arrow and select **Enabled**.
5. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar. The engine should start running at 1700 RPM.
6. Double click on the value field for **Overspeed Shutdown Threshold** and make a note of the current setting.
7. Edit the **Overspeed Shutdown Threshold** value field and set it to 1750RPM.
8. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
9. Double click on the **Engine Speed Reference Override Command** value cell and enter 1800RPM.
10. To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar. The engine should attempt to ramp up to 1800RPM.
11. The overspeed detector will trip once it crosses the 1750RPM value and the engine will shutdown.
12. Double click on the **Engine Speed Reference Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
13. Double click on the **Overspeed Shutdown Threshold** value cell and restore to the original value.
14. Double click on the **Engine Speed Reference Override Command** value cell and restore to the original value.
15. Click on the **Save Adjustments** button on the tool bar.
16. Restart the engine and acknowledge the fault.

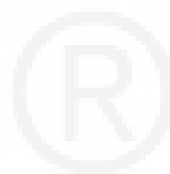


NOTE: The Accel Ramp for Engine Speed Override and Decel Ramp for Engine Speed Override can be used to adjust the time it takes to reach the desired override speed.





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