



User Manual

Software

InPower™ Pro

Table of Contents

| | |
|---|----|
| 1. INPOWER™ SOFTWARE LICENSE AGREEMENT | 1 |
| 2. INTRODUCTION..... | 5 |
| 2.1 Warning..... | 5 |
| 2.2 InPower..... | 5 |
| 2.2.1 Commercial Products..... | 5 |
| 2.2.2 Consumer Products | 6 |
| 2.2.3 Null Modem Cable Configuration | 9 |
| 2.3 About This User's Guide | 9 |
| 2.4 Supported Devices..... | 9 |
| 2.5 System Requirements..... | 11 |
| 2.5.1 Recommended PC..... | 11 |
| 2.5.2 Administrative Rights | 12 |
| 2.6 Program Directories Installed with InPower | 12 |
| 2.6.1 Monitor | 12 |
| 2.6.2 Strip Chart | 12 |
| 2.6.3 Data..... | 12 |
| 2.6.4 Captured Files..... | 12 |
| 2.6.5 Simulator | 13 |
| 2.7 Calibration Directories Installed with InPower | 13 |
| 2.8 Service File and Logical DFA Directories Installed with InPower | 15 |
| 2.9 Start Menu Group Shortcuts | 15 |
| 2.9.1 Readme File..... | 15 |
| 2.10 User Interface | 15 |
| 2.11 How to Get Service | 16 |
| 2.12 Notification of Tool Expiration | 16 |
| 3. SETUP | 19 |
| 3.1 General Setup..... | 19 |
| 3.2 Unit of Measurement..... | 19 |
| 3.3 User Setup - System Administration..... | 20 |
| 3.4 Capture File Options..... | 20 |
| 3.5 Site Setup | 21 |
| 4. INPOWER BASICS | 23 |
| 4.1 How to Start InPower..... | 23 |
| 4.2 The Main Window | 24 |
| 4.2.1 Main Window Example | 25 |
| 4.3 Menu Descriptions | 26 |
| 4.3.1 Port..... | 26 |
| 4.3.2 Device | 27 |
| 4.3.3 Edit..... | 27 |
| 4.3.4 Utilities..... | 27 |

| | |
|---|----|
| 4.3.5 View | 27 |
| 4.3.6 Help..... | 28 |
| 4.4 User Interface | 28 |
| 4.4.1 Keyboard Access | 28 |
| 4.4.2 Toolbar | 28 |
| 4.4.3 Dialog Boxes | 29 |
| 4.4.4 Mouse Menu Functions..... | 30 |
| 4.5 How to Terminate InPower | 30 |
| 5. GENERATOR SET SERVICE..... | 33 |
| 5.1 Commercial Generator Set Service | 33 |
| 5.1.1 Connecting to a Generator Set | 33 |
| 5.2 Consumer Generator Set Service..... | 44 |
| 5.2.1 Connecting to a Generator Set | 45 |
| 5.2.2 Connecting to an HQD Inverter/Charger, Transfer Switch, or Display and an RV Inverter and GSAA | 48 |
| 5.2.3 Connecting to Marine Devices | 50 |
| 5.3 Starting InPower | 54 |
| 5.4 Generator Set Adjustments..... | 56 |
| 5.4.1 Adjustment Basics..... | 56 |
| 5.4.2 Adjustment Features | 57 |
| 5.4.3 Making Adjustments..... | 58 |
| 5.4.4 Saving Adjustments | 59 |
| 5.5 Adjustment Examples | 59 |
| 5.6 Test..... | 68 |
| 5.6.1 Commercial Generator Sets | 68 |
| 5.6.2 Consumer Generator Sets | 69 |
| 5.6.3 Override Requests | 69 |
| 5.6.4 Override Commands | 70 |
| 5.6.5 Override Status | 70 |
| 5.6.6 Set High Idle | 70 |
| 5.6.7 Inputs | 71 |
| 5.6.8 Manual Operation..... | 71 |
| 5.6.9 Outputs..... | 71 |
| 5.6.10 Fault Simulation | 72 |
| 5.6.11 Self Test..... | 73 |
| 5.6.12 Speed Override | 74 |
| 5.6.13 Single Cylinder Cutout Test | 74 |
| 6. ATS SERVICE | 77 |
| 6.1 ATS Service | 77 |
| 6.1.1 Connecting to An ATS with the Original Digital Display | 77 |
| 6.1.2 Starting InPower..... | 78 |
| 6.2 ATS Adjustments | 79 |
| 6.2.1 Adjustment Basics..... | 79 |
| 6.2.2 Adjustment Features | 80 |
| 6.3 Service Replacement Controls | 81 |

| | |
|---|-----|
| 6.3.1 Making Adjustments..... | 82 |
| 6.3.2 Saving Adjustments | 83 |
| 6.4 Adjustment Examples | 84 |
| 6.4.1 Controller Mode..... | 84 |
| 6.4.2 List of Parameters Requiring the Refresh Controller Feature | 85 |
| 6.4.3 Exerciser Clock | 87 |
| 6.4.4 Exception Table | 87 |
| 6.4.5 Time Delays | 88 |
| 6.4.6 Voltage Adjustment - For Display | 89 |
| 6.4.7 Feature Enable..... | 91 |
| 6.4.8 PTC Settings..... | 92 |
| 6.5 Test..... | 93 |
| 6.5.1 Test - Remote Features | 93 |
| 6.5.2 Test - Setup Features | 94 |
| 6.5.3 Test - S1 Protection (PTC Test) | 95 |
| 7. MASTER CONTROL MODULE SERVICE | 97 |
| 7.1 Connecting an MCM3320 | 97 |
| 7.2 Configuring the MCM3320 | 98 |
| 8. G-DRIVE SERVICE | 99 |
| 8.1 G-Drive Service..... | 99 |
| 8.1.1 Connecting to an ECM..... | 99 |
| 8.1.2 Starting InPower..... | 99 |
| 8.2 ECM Adjustments | 100 |
| 8.2.1 Adjustment Basics..... | 100 |
| 8.2.2 Adjustment Features | 101 |
| 8.2.3 Making Adjustments..... | 103 |
| 8.2.4 Saving Adjustments | 104 |
| 8.3 Adjustment Examples | 104 |
| 8.4 Test..... | 111 |
| 8.4.1 Inputs - Oil Pressure | 111 |
| 8.4.2 Inputs - Switches..... | 112 |
| 8.4.3 Fault Simulation | 113 |
| 8.4.4 Self Test..... | 114 |
| 8.4.5 Speed Override | 115 |
| 8.4.6 Fuel Rack Position Test..... | 115 |
| 8.4.7 Single Cylinder Cutout Test | 116 |
| 9. INITIAL CALIBRATION FOR COMMERCIAL GENERATOR SETS..... | 119 |
| 9.1 About Initial Calibration | 119 |
| 9.2 Initial Calibration | 119 |
| 9.2.1 Selecting Calibration Part Number..... | 121 |
| 9.2.2 History | 122 |
| 9.2.3 Save and Restore Parameters..... | 123 |
| 9.2.4 Use Capture File Feature..... | 123 |
| 9.2.5 Feature List | 125 |

| | |
|---|-----|
| 9.2.6 Calibration Download | 127 |
| 9.2.7 Correcting a Corrupted Calibration of a Control | 128 |
| 9.3 Writing Adjustments From a Capture File..... | 130 |
| 9.4 Final Adjustments | 130 |
| 10. UPDATE CALIBRATION FOR COMMERCIAL GENERATOR SETS | 131 |
| 10.1 About Update Calibration..... | 131 |
| 10.2 Update Calibration | 131 |
| 10.2.1 History | 134 |
| 11. PCC OPERATOR PANEL UPDATES | 137 |
| 11.1 About Generator Set Operator Panel Updates..... | 137 |
| 11.2 Operator Panel Update | 137 |
| 11.2.1 Selecting Calibration Part Number..... | 137 |
| 11.2.2 History | 138 |
| 11.2.3 During Download..... | 139 |
| 11.3 Final Check | 139 |
| 12. INITIAL CALIBRATION FOR CONSUMER PRODUCTS..... | 141 |
| 12.1 About Initial Calibration | 141 |
| 12.2 Initial Calibration | 141 |
| 12.2.1 Selecting Calibration Part Number..... | 143 |
| 12.2.2 History | 144 |
| 12.2.3 Save and Restore Parameters..... | 145 |
| 12.2.4 Use Capture File Feature..... | 145 |
| 12.2.5 Calibration Download..... | 147 |
| 12.3 Writing Adjustments From a Capture File..... | 147 |
| 12.4 Final Adjustments | 147 |
| 13. UPDATE CALIBRATION FOR CONSUMER PRODUCTS | 149 |
| 13.1 About Update Calibration..... | 149 |
| 13.2 Update Calibration | 149 |
| 13.2.1 History | 150 |
| 14. INITIAL CALIBRATION FOR ATS..... | 153 |
| 14.1 About Initial Calibration | 153 |
| 14.2 Initial Calibration | 153 |
| 14.2.1 Selecting Calibration Part Number..... | 154 |
| 14.2.2 History | 154 |
| 14.2.3 Feature List | 156 |
| 14.2.4 Calibration Download..... | 159 |
| 14.3 Writing Adjustments From a Capture File..... | 160 |
| 14.4 Final Adjustments | 160 |
| 15. UPDATE CALIBRATION FOR ATS | 161 |
| 15.1 About Update Calibration..... | 161 |
| 15.2 Update Calibration | 161 |
| 15.2.1 History | 162 |

| | |
|---|-----|
| 16. INITIAL CALIBRATION FOR G-DRIVE | 165 |
| 16.1 About Initial Calibration | 165 |
| 16.2 Initial Calibration | 165 |
| 16.2.1 Selecting Calibration Part Number..... | 167 |
| 16.2.2 History | 168 |
| 16.2.3 Save and Restore Parameters..... | 169 |
| 16.2.4 Use Capture File Feature..... | 169 |
| 16.2.5 Feature List | 170 |
| 16.2.6 Calibration Download..... | 171 |
| 16.3 Writing Adjustments From a Capture File..... | 172 |
| 16.4 Final Adjustments | 172 |
| 17. UPDATE CALIBRATION FOR G-DRIVE | 173 |
| 17.1 About Update Calibration..... | 173 |
| 17.2 Update Calibration Setup..... | 173 |
| 17.2.1 Connecting to the Device..... | 173 |
| 17.3 Update Calibration | 174 |
| 17.3.1 History | 174 |
| 18. UPDATE FEATURES | 177 |
| 18.1 About Update Features..... | 177 |
| 18.2 Update Features Setup..... | 177 |
| 18.3 Update Features | 177 |
| 18.4 Changing a Feature Setting..... | 179 |
| 18.4.1 Feature Change Example:..... | 180 |
| 18.5 Enabling a Feature..... | 180 |
| 19. MONITOR..... | 183 |
| 19.1 Monitor and Datalog..... | 183 |
| 19.2 Monitor Dialog..... | 183 |
| 19.2.1 Monitor Dialog Features..... | 183 |
| 19.2.2 Report Generation..... | 186 |
| 19.2.3 Offline Report Generation | 187 |
| 19.2.4 Adding Parameters | 188 |
| 19.2.5 Saving Parameters..... | 188 |
| 19.2.6 Creation of TPL Using Capture / Simulator File Parameters..... | 191 |
| 20. FAULTS AND THE FAULT INFORMATION SYSTEM..... | 195 |
| 20.1 Commercial Device Fault Information..... | 195 |
| 20.1.1 Fault Information Window | 195 |
| 20.1.2 Clearing Inactive Faults | 196 |
| 20.1.3 Snapshot..... | 196 |
| 20.1.4 Fault Information System | 197 |
| 20.2 Consumer Device Fault Information | 207 |
| 20.2.1 Fault Information | 208 |
| 20.2.2 Advanced Fault Information | 208 |
| 20.2.3 Fault History | 208 |

| | |
|--|-----|
| 20.2.4 Fault Occurrences | 210 |
| 20.2.5 Fault Bypass Info | 210 |
| 20.2.6 Clearing Inactive Faults | 211 |
| 20.2.7 Consumer Device Fault Information | 212 |
| 20.3 ATS Faults | 212 |
| 20.3.1 Clear Faults | 212 |
| 20.3.2 Event History Log | 213 |
| 20.3.3 Event Records | 214 |
| 20.4 Description of Operator/Interface Modes | 215 |
| 21. EVENT HANDLER | 219 |
| 21.1 Receiving Events | 219 |
| 21.1.1 Devices That Cannot Receive Events | 219 |
| 21.2 Displaying Events | 219 |
| 21.2.1 Alarms Popup | 219 |
| 21.2.2 Event Detail | 220 |
| 22. STRIP CHART | 223 |
| 22.1 Strip Chart | 223 |
| 22.1.1 Example of a Strip Chart | 223 |
| 22.1.2 Starting the Strip Chart Feature | 223 |
| 22.2 Creating a Custom Strip Chart | 224 |
| 22.2.1 Adding Parameters | 224 |
| 22.2.2 Parameter Properties Dialog | 224 |
| 22.2.3 Sampling Rate Dialog | 225 |
| 22.2.4 Strip Chart Menu Bar Functions | 225 |
| 22.2.5 Context Menu Features | 227 |
| 22.2.6 Chart Customization Dialog | 228 |
| 22.2.7 Printing a Strip Chart | 229 |
| 22.2.8 Viewing Logged Data | 229 |
| 23. CAPTURE FILE | 231 |
| 23.1 PCC 1100 Limitation | 231 |
| 23.2 Capture File | 231 |
| 23.3 Creating a Capture File | 231 |
| 23.3.1 Creating a Capture File Automatically | 231 |
| 23.4 Viewing a Capture File | 231 |
| 23.5 Writing to a Device | 232 |
| 23.6 Importing a Capture File | 233 |
| 23.7 Capture File Manager Utility | 233 |
| 24. SIMULATOR | 235 |
| 25. REPORTS | 237 |
| 25.1 Creating a Report | 237 |
| 25.2 Support Reports | 238 |
| 26. EVENT CONFIGURATION | 243 |

| | |
|--|-----|
| 26.1 Devices That Do Not Support Event Configuration | 243 |
| 26.2 Fault Effect..... | 243 |
| 26.3 Event Configuration in the PowerCommand 2.x and 3.x..... | 244 |
| 26.4 Notification | 245 |
| 27. NETWORK APPLICATIONS | 247 |
| 27.1 Network Configuration | 247 |
| 27.2 PCC 2100 | 247 |
| 27.2.1 Custom Annunciation..... | 247 |
| 27.2.2 Custom Relay Events | 248 |
| 27.2.3 Device | 249 |
| 27.2.4 Dialout..... | 250 |
| 27.2.5 Fault Settings | 251 |
| 27.2.6 PCC 2100 Events and Faults Configuration | 252 |
| 27.3 PCC 3200 | 253 |
| 27.3.1 Custom Annunciation..... | 254 |
| 27.3.2 Custom Outputs | 255 |
| 27.3.3 Device | 256 |
| 27.3.4 Dialout..... | 257 |
| 27.3.5 Fault Settings | 258 |
| 27.3.6 PCC 3200 Events Configuration | 259 |
| 27.4 PCC ATS | 260 |
| 27.4.1 PCC ATS Event Configuration..... | 262 |
| 28. CORE II ECM ENGINE PROTECTION WITNESS TEST PROCEDURE | 263 |
| 28.1 Adding a Core II ECS Site from InPower..... | 263 |
| 28.1.1 Adding a Site Using the Port Menu..... | 263 |
| 28.1.2 Adding a Site Using the Setup Menu..... | 266 |
| 28.2 How to Start an Engine Protection Witness Test..... | 268 |
| 29. HELP | 273 |
| 29.1 Search for Help On..... | 273 |
| 29.2 Contents..... | 273 |
| 29.3 How to Use Help..... | 273 |
| 29.4 InPower Technical Support..... | 273 |
| 29.5 About InPower | 273 |
| 30. GLOSSARY | 275 |
| 31. ADJUSTMENT AND TEST DESCRIPTIONS..... | 277 |
| 31.1 Engine Protection Adjustments..... | 277 |
| 31.1.1 Feature Description..... | 277 |
| 31.1.2 Adjustable Parameters..... | 277 |
| 31.1.3 Interaction with other Features and Parameters..... | 280 |
| 31.1.4 Special Instructions..... | 280 |
| 31.1.5 Possible Customer Complaints..... | 280 |
| 31.1.6 Visual Aids | 280 |
| 31.2 Adjustments – Features - Centinel | 280 |

| | |
|--|-----|
| 31.2.1 Feature Description..... | 280 |
| 31.2.2 Adjustable Parameters..... | 280 |
| 31.2.3 Interaction with other Features and Parameters..... | 281 |
| 31.2.4 Special Instructions..... | 281 |
| 31.2.5 Possible Customer Complaints..... | 281 |
| 31.2.6 Visual Aids | 281 |
| 31.2.7 Product Coverage | 281 |
| 31.3 Adjustments – Features - CORS | 281 |
| 31.3.1 Feature Description..... | 281 |
| 31.3.2 Adjustable Parameters..... | 281 |
| 31.3.3 Interaction with other Features and Parameters..... | 282 |
| 31.3.4 Special Instructions..... | 282 |
| 31.3.5 Possible Customer Complaints..... | 282 |
| 31.3.6 Visual Aids | 282 |
| 31.3.7 Product Coverage | 282 |
| 31.4 Adjustments – Features – Fuel Lift Pump | 282 |
| 31.4.1 Feature Description..... | 282 |
| 31.4.2 Adjustable Parameters..... | 282 |
| 31.4.3 Interaction with other Features and Parameters..... | 283 |
| 31.4.4 Special Instructions..... | 283 |
| 31.4.5 Possible Customer Complaints..... | 283 |
| 31.4.6 Visual Aids | 283 |
| 31.4.7 Product Coverage | 283 |
| 31.5 Adjustments - Features - Inputs..... | 283 |
| 31.5.1 Feature Description..... | 283 |
| 31.5.2 Adjustable Parameters..... | 284 |
| 31.5.3 Interaction with other Features and Parameters..... | 285 |
| 31.5.4 Special Instructions..... | 285 |
| 31.5.5 Possible Customer Complaints..... | 286 |
| 31.5.6 Visual Aids | 286 |
| 31.5.7 Product Coverage | 286 |
| 31.6 Adjustments - Features – Meter Drivers..... | 286 |
| 31.6.1 Feature Description..... | 286 |
| 31.6.2 Adjustable Parameters..... | 286 |
| 31.6.3 Interaction with other Features and Parameters..... | 287 |
| 31.6.4 Special Instructions..... | 287 |
| 31.6.5 Possible Customer Complaints..... | 287 |
| 31.6.6 Visual Aids | 287 |
| 31.6.7 Product Coverage | 287 |
| 31.7 Adjustments – Features – Power Limiter..... | 288 |
| 31.7.1 Feature Description..... | 288 |
| 31.7.2 Adjustable Parameters..... | 288 |
| 31.7.3 Interaction with other Features and Parameters..... | 288 |
| 31.7.4 Special Instructions..... | 288 |
| 31.7.5 Possible Customer Complaints..... | 288 |
| 31.7.6 Visual Aids | 288 |

| | |
|---|-----|
| 31.7.7 Product Coverage | 289 |
| 31.8 Adjustments – Features – Relay Drivers | 289 |
| 31.8.1 Feature Description..... | 289 |
| 31.8.2 Adjustable Parameters..... | 289 |
| 31.8.3 Interaction with other Features and Parameters..... | 290 |
| 31.8.4 Special Instructions | 290 |
| 31.8.5 Possible Customer Complaints | 290 |
| 31.8.6 Visual Aids | 290 |
| 31.8.7 Product Coverage | 290 |
| 31.9 Adjustments – Features – Shutdown Override | 291 |
| 31.9.1 Feature Description..... | 291 |
| 31.9.2 Adjustable Parameters..... | 291 |
| 31.9.3 Interaction with other Features and Parameters..... | 291 |
| 31.9.4 Special Instructions | 291 |
| 31.9.5 Possible Customer Complaints | 291 |
| 31.9.6 Visual Aids | 291 |
| 31.9.7 Product Coverage | 291 |
| 31.10 Adjustments – Governor - Frequency..... | 292 |
| 31.10.1 Feature Description..... | 292 |
| 31.10.2 Adjustable Parameters..... | 292 |
| 31.10.3 Interaction with other Features and Parameters..... | 293 |
| 31.10.4 Special Instructions | 293 |
| 31.10.5 Possible Customer Complaints | 293 |
| 31.10.6 Visual Aids | 293 |
| 31.10.7 Product Coverage | 293 |
| 31.11 Adjustments – Governor – Gain and Droop | 294 |
| 31.11.1 Feature Description..... | 294 |
| 31.11.2 Adjustable Parameters..... | 294 |
| 31.11.3 Interaction with other Features and Parameters..... | 295 |
| 31.11.4 Special Instructions | 295 |
| 31.11.5 Possible Customer Complaints | 295 |
| 31.11.6 Visual Aids | 295 |
| 31.11.7 Product Coverage | 295 |
| 31.12 Adjustments – Governor – Idle and Ramping..... | 296 |
| 31.12.1 Feature Description..... | 296 |
| 31.12.2 Adjustable Parameters..... | 296 |
| 31.12.3 Interaction with other Features and Parameters..... | 296 |
| 31.12.4 Special Instructions | 296 |
| 31.12.5 Possible Customer Complaints | 297 |
| 31.12.6 Visual Aids | 297 |
| 31.12.7 Product Coverage | 297 |
| 31.13 Adjustments – Passwords – Change Passwords | 297 |
| 31.13.1 Feature Description..... | 297 |
| 31.13.2 Adjustable Parameters..... | 297 |
| 31.13.3 Interaction with other Features and Parameters..... | 297 |
| 31.13.4 Special Instructions | 297 |

| | |
|--|-----|
| 31.13.5 Possible Customer Complaints | 297 |
| 31.13.6 Visual Aids | 298 |
| 31.13.7 Product Coverage | 298 |
| 31.14 Adjustments – Passwords – Clear Passwords | 298 |
| 31.14.1 Feature Description | 298 |
| 31.14.2 Adjustable Parameters | 298 |
| 31.14.3 Interaction with other Features and Parameters | 298 |
| 31.14.4 Special Instructions | 298 |
| 31.14.5 Possible Customer Complaints | 298 |
| 31.14.6 Visual Aids | 298 |
| 31.14.7 Product Coverage | 299 |
| 31.15 Adjustments – Passwords – Enter Passwords | 299 |
| 31.15.1 Feature Description | 299 |
| 31.15.2 Adjustable Parameters | 299 |
| 31.15.3 Interaction with other Features and Parameters | 299 |
| 31.15.4 Special Instructions | 299 |
| 31.15.5 Possible Customer Complaints | 299 |
| 31.15.6 Visual Aids | 299 |
| 31.15.7 Product Coverage | 300 |
| 31.16 Adjustments – Reset History Counters – Fuel | 300 |
| 31.16.1 Feature Description | 300 |
| 31.16.2 Adjustable Parameters | 300 |
| 31.16.3 Interaction with other Features and Parameters | 301 |
| 31.16.4 Special Instructions | 301 |
| 31.16.5 Possible Customer Complaints | 301 |
| 31.16.6 Visual Aids | 301 |
| 31.16.7 Product Coverage | 301 |
| 31.17 Adjustments – Starting | 301 |
| 31.17.1 Feature Description | 301 |
| 31.17.2 Adjustable Parameters | 301 |
| 31.17.3 Interaction with other Features and Parameters | 302 |
| 31.17.4 Special Instructions | 302 |
| 31.17.5 Possible Customer Complaints | 302 |
| 31.17.6 Visual Aids | 302 |
| 31.17.7 Product Coverage | 303 |
| 31.18 Faults | 303 |
| 31.18.1 Feature Description | 303 |
| 31.18.2 Adjustable Parameters | 303 |
| 31.18.3 Interaction with other Features and Parameters | 303 |
| 31.18.4 Special Instructions | 303 |
| 31.18.5 Possible Customer Complaints | 303 |
| 31.18.6 Visual Aids | 303 |
| 31.18.7 Product Coverage | 303 |
| 31.19 Monitor - About | 304 |
| 31.19.1 Feature Description | 304 |
| 31.19.2 Adjustable Parameters | 304 |

| | |
|---|-----|
| 31.19.3 Interaction with other Features and Parameters None | 305 |
| 31.19.4 Special Instructions None | 305 |
| 31.19.5 Possible Customer Complaints None | 305 |
| 31.19.6 Visual Aids None | 305 |
| 31.19.7 Product Coverage | 305 |
| 31.20 Monitor – Control – Starting / Stopping | 306 |
| 31.20.1 Feature Description | 306 |
| 31.20.2 Adjustable Parameters | 306 |
| 31.20.3 Interaction with other Features and Parameters | 307 |
| 31.20.4 Special Instructions | 307 |
| 31.20.5 Possible Customer Complaints | 307 |
| 31.20.6 Visual Aids | 307 |
| 31.20.7 Product Coverage | 307 |
| 31.21 Monitor – Engine Data – Centinel | 307 |
| 31.21.1 Feature Description | 307 |
| 31.21.2 Adjustable Parameters | 307 |
| 31.21.3 Interaction with other Features and Parameters | 308 |
| 31.21.4 Special Instructions | 308 |
| 31.21.5 Possible Customer Complaints | 308 |
| 31.21.6 Visual Aids | 308 |
| 31.21.7 Product Coverage | 308 |
| 31.22 Monitor – Engine Data – Fuel Use | 309 |
| 31.22.1 Feature Description | 309 |
| 31.22.2 Adjustable Parameters | 309 |
| 31.22.3 Interaction with other Features and Parameters | 309 |
| 31.22.4 Special Instructions | 309 |
| 31.22.5 Possible Customer Complaints | 309 |
| 31.22.6 Visual Aids | 309 |
| 31.22.7 Product Coverage | 309 |
| 31.23 Monitor – Engine Data – Governing | 310 |
| 31.23.1 Feature Description | 310 |
| 31.23.2 Adjustable Parameters | 310 |
| 31.23.3 Interaction with other Features and Parameters | 311 |
| 31.23.4 Special Instructions | 311 |
| 31.23.5 Possible Customer Complaints | 311 |
| 31.23.6 Visual Aids | 312 |
| 31.23.7 Product Coverage | 312 |
| 31.24 Monitor – Engine Data – Priming | 312 |
| 31.24.1 Feature Description | 312 |
| 31.24.2 Adjustable Parameters | 312 |
| 31.24.3 Interaction with other Features and Parameters | 312 |
| 31.24.4 Special Instructions | 312 |
| 31.24.5 Possible Customer Complaints | 312 |
| 31.24.6 Visual Aids | 312 |
| 31.24.7 Product Coverage | 312 |
| 31.25 Monitor – Engine Data – Sensors / Actuators | 313 |

| | |
|---|-----|
| 31.25.1 Feature Description..... | 313 |
| 31.25.2 Adjustable Parameters..... | 313 |
| 31.25.3 Interaction with other Features and Parameters..... | 313 |
| 31.25.4 None..... | 313 |
| 31.25.5 Special Instructions..... | 313 |
| 31.25.6 Possible Customer Complaints..... | 313 |
| 31.25.7 Visual Aids | 313 |
| 31.25.8 Product Coverage | 313 |
| 31.26 Monitor – History – 50 Hz Duty Cycle Histogram | 314 |
| 31.26.1 Feature Description..... | 314 |
| 31.26.2 Adjustable Parameters..... | 314 |
| 31.26.3 Interaction with other Features and Parameters..... | 314 |
| 31.26.4 Special Instructions..... | 314 |
| 31.26.5 Possible Customer Complaints..... | 314 |
| 31.26.6 Visual Aids | 314 |
| 31.26.7 Product Coverage | 314 |
| 31.27 Monitor – History – 60 Hz Duty Cycle Histogram | 314 |
| 31.27.1 Feature Description..... | 314 |
| 31.27.2 Adjustable Parameters..... | 314 |
| 31.27.3 Interaction with other Features and Parameters..... | 315 |
| 31.27.4 Special Instructions..... | 315 |
| 31.27.5 Possible Customer Complaints..... | 315 |
| 31.27.6 Visual Aids | 315 |
| 31.27.7 Product Coverage | 315 |
| 31.28 Monitor – History – Audit Trail | 315 |
| 31.28.1 Feature Description..... | 315 |
| 31.28.2 Adjustable Parameters..... | 315 |
| 31.28.3 Interaction with other Features and Parameters..... | 316 |
| 31.28.4 Special Instructions..... | 316 |
| 31.28.5 Possible Customer Complaints..... | 316 |
| 31.28.6 Visual Aids | 316 |
| 31.28.7 Product Coverage | 316 |
| 31.29 Monitor – History – Engine Protection History..... | 316 |
| 31.29.1 Feature Description..... | 316 |
| 31.29.2 Adjustable Parameters..... | 316 |
| 31.29.3 Interaction with other Features and Parameters..... | 317 |
| 31.29.4 Special Instructions..... | 317 |
| 31.29.5 Possible Customer Complaints..... | 317 |
| 31.29.6 Visual Aids | 317 |
| 31.29.7 Product Coverage | 317 |
| 31.30 Monitor – History – Run History..... | 317 |
| 31.30.1 Feature Description..... | 317 |
| 31.30.2 Adjustable Parameters..... | 317 |
| 31.30.3 Interaction with other Features and Parameters..... | 318 |
| 31.30.4 Special Instructions..... | 318 |
| 31.30.5 Possible Customer Complaints..... | 318 |

| | |
|---|-----|
| 31.30.6 Visual Aids | 318 |
| 31.30.7 Product Coverage | 318 |
| 31.31 Monitor – OEM Connection – Analog Settings | 319 |
| 31.31.1 Feature Description | 319 |
| 31.31.2 Adjustable Parameters | 319 |
| 31.31.3 Interaction with other Features and Parameters | 319 |
| 31.31.4 Special Instructions | 320 |
| 31.31.5 Possible Customer Complaints | 320 |
| 31.31.6 Visual Aids | 320 |
| 31.31.7 Product Coverage | 320 |
| 31.32 Monitor – OEM Connections - Outputs | 320 |
| 31.32.1 Feature Description | 320 |
| 31.32.2 Adjustable Parameters | 320 |
| 31.32.3 Interaction with other Features and Parameters | 322 |
| 31.32.4 Special Instructions | 322 |
| 31.32.5 Possible Customer Complaints | 322 |
| 31.32.6 Visual Aids | 322 |
| 31.32.7 Product Coverage | 322 |
| 31.33 Monitor – OEM Connections – Switch Settings - Other | 322 |
| 31.33.1 Feature Description | 322 |
| 31.33.2 Adjustable Parameters | 322 |
| 31.33.3 Interaction with other Features and Parameters | 323 |
| 31.33.4 Special Instructions | 323 |
| 31.33.5 Possible Customer Complaints | 323 |
| 31.33.6 Visual Aids | 323 |
| 31.33.7 Product Coverage | 323 |
| 31.34 Monitor – OEM Connections – Switch Settings – Start/Stop | 324 |
| 31.34.1 Feature Description | 324 |
| 31.34.2 Adjustable Parameters | 324 |
| 31.34.3 Interaction with other Features and Parameters | 325 |
| 31.34.4 Special Instructions | 325 |
| 31.34.5 Possible Customer Complaints | 325 |
| 31.34.6 Visual Aids | 325 |
| 31.34.7 Product Coverage | 325 |
| 31.35 Test – Fault Simulation – Engine Protection Test – Aftercooler Water Temp | 325 |
| 31.35.1 How to Perform the Test - Option 1 | 325 |
| 31.35.2 How to Perform the Tests - Option 2 | 326 |
| 31.35.3 HAT Shutdown Threshold: High Aftercooler Water Temp | 327 |
| 31.36 Test – Fault Simulation – Engine Protection Test – Blowby Flow | 327 |
| 31.36.1 How to Perform the Test - Option 1 | 327 |
| 31.36.2 How to Perform the Tests - Option 2 | 328 |
| 31.37 Test – Fault Simulation – Engine Protection Test – Coolant Pressure | 329 |
| 31.37.1 How to Perform the Test | 329 |
| 31.37.2 How to Perform the Tests - Option 2 | 330 |
| 31.38 Test – Fault Simulation – Engine Protection Test – Coolant Temp | 331 |
| 31.38.1 How to Perform the Tests - Option 1 | 331 |

| | |
|---|-----|
| 31.38.2 How to Perform the Tests - Option 2 | 332 |
| 31.39 Test – Fault Simulation – Engine Protection Test – Fuel Temp | 332 |
| 31.39.1 How to Perform the Test - Option 1 | 333 |
| 31.39.2 How to Perform the Tests - Option 2 | 333 |
| 31.40 Test – Fault Simulation – Engine Protection Test – Intake Manifold Temp | 334 |
| 31.40.1 How to Perform the Tests - Option 1 | 334 |
| 31.40.2 How to Perform the Tests - Option 2 | 335 |
| 31.41 Test – Fault Simulation – Engine Protection Test – Oil Pressure | 336 |
| 31.41.1 How to Perform the Tests - Option 1 | 336 |
| 31.41.2 How to Perform the Tests - Option 2 | 337 |
| 31.42 Test – Fault Simulation – Engine Protection Test – Oil Temp..... | 338 |
| 31.42.1 How to Perform the Tests - Option 1 | 338 |
| 31.42.2 How to Perform the Tests - Option 2 | 339 |
| 31.43 Test – Fault Simulation – Engine Protection Test – Overspeeding..... | 340 |
| 31.43.1 How to Perform the Tests - Option 1 | 340 |
| 31.43.2 How to Perform the Tests - Option 2 | 340 |
| 31.44 Test – Fault Simulation – Engine Protection Test – Torque Input Command | 341 |
| 31.44.1 How to Perform the Tests | 341 |
| 31.45 Test – Fuel System Test..... | 342 |
| 31.45.1 Fuel Rack Position Test for G-Drive QST30 Engines..... | 342 |
| 31.45.2 How to Perform the Test..... | 342 |
| 31.45.3 Single Cylinder Cut Out Test for G-Drive QSX15 Engines..... | 342 |
| 31.45.4 How to Perform the Test..... | 343 |
| 31.46 Test – Inputs - Analog..... | 343 |
| 31.47 Test – Inputs – Engine Inputs | 343 |
| 31.48 Test – Inputs – Switches..... | 344 |
| 31.48.1 Feature Description..... | 344 |
| 31.48.2 Adjustable Parameters..... | 344 |
| 31.49 Test – Outputs - Centinel..... | 345 |
| 31.49.1 How to Perform the Tests | 345 |
| 31.50 Test – Outputs – Meter Drivers Test – Coolant Temp Test..... | 346 |
| 31.50.1 How to Perform the Test..... | 346 |
| 31.51 Test – Outputs – Fuel Shutoff..... | 346 |
| 31.52 Test – Outputs – Meter Drivers Test – Engine Speed Test..... | 346 |
| 31.52.1 How to Perform the Test..... | 347 |
| 31.53 Test – Outputs – Meter Drivers Test – Oil Pressure Test | 347 |
| 31.53.1 How to Perform the Test..... | 347 |
| 31.54 Test – Outputs – Relay Drivers – Common Shutdown..... | 348 |
| 31.54.1 How to Perform the Test..... | 348 |
| 31.55 Test – Outputs – Relay Drivers – Common Warning | 348 |
| 31.55.1 How to Perform the Test..... | 348 |
| 31.56 Test – Outputs – Relay Drivers – Crank Relay | 349 |
| 31.57 Test – Outputs – Relay Drivers – Fail to Start..... | 349 |
| 31.57.1 How to Perform the Test..... | 349 |
| 31.58 Test – Outputs – Relay Drivers – Fuel Lift Pump | 349 |
| 31.58.1 How to Perform the Test..... | 350 |

| | |
|--|-----|
| 31.59 Test – Outputs – Relay Drivers – HET Shutdown | 350 |
| 31.59.1 How to Perform the Test..... | 350 |
| 31.60 Test – Outputs – Relay Drivers – LOP Shutdown | 351 |
| 31.60.1 How to Perform the Test..... | 351 |
| 31.61 Test – Outputs – Relay Drivers – Overspeed Shutdown..... | 351 |
| 31.61.1 How to Perform the Test..... | 351 |
| 31.61.2 How to Perform the Test..... | 352 |
| 31.62 Test – Outputs – Relay Drivers – Pre-LOP (Low Oil Pressure) Warning..... | 352 |
| 31.62.1 How to Perform the Test..... | 353 |
| 31.63 Test – Self Test..... | 353 |
| 31.63.1 How to Perform the Test..... | 353 |
| 31.64 Test – Speed Override..... | 354 |
| 31.64.1 How to Perform the Tests - Option 1 | 354 |
| 31.64.2 How to Perform the Tests - Option 2 | 355 |

This page is intentionally blank.

1 InPower™ Software License Agreement

IMPORTANT NOTICE -- READ CAREFULLY: InPower software ("InPower") is owned by Cummins Inc. and is used to monitor and control power generation systems by authorized users. This License Agreement ("License") governs the use of InPower which may be provided via various mediums or in a downloadable form herefrom. By downloading, installing, copying, or otherwise using InPower, You ("Licensee") agree to be bound by the terms of this License. If you do not agree to the terms of this License, do not download, install, copy, or otherwise use InPower in any manner or form.

RECITALS:

WHEREAS, Cummins Inc. and Licensee desire to establish a relationship pursuant to which Licensee will obtain certain rights from Cummins Inc. with respect to InPower, and Cummins Inc. will provide certain information and updates to Licensee, all for the mutual benefit of Cummins Inc. and Licensee; THEREFORE, in consideration of the above premise and the mutual covenants contained herein, Cummins Inc. and Licensee agree as follows:

1. License Grant and Restrictions

- a. Cummins Inc. hereby grants to Licensee a non-exclusive, non-transferable and non-sublicensable license to use InPower to monitor and control power generation systems manufactured or sold by Cummins Inc. Each copy of InPower is specifically licensed for use in a single facility of Licensee for its intended purpose, and it may not be sublicensed, sold, or otherwise distributed.
- b. Licensee agrees to use InPower and any updates to InPower in strict accordance with Cummins Inc.'s published service practices and/or product warranty guidelines for the sole purpose of setting up, servicing and maintaining power generation systems manufactured or sold by Cummins Inc.
- c. Licensee acknowledges that Cummins Inc. may, at its option and at no cost to the Licensee, provide updates to InPower so that the most current version of InPower is used to monitor and control power generation systems. Cummins Inc. may also offer for sale upgrades of InPower which the Licensee is under no obligation to purchase.
- d. All rights relating to InPower not specifically granted to Licensee pursuant to this Agreement shall be retained by Cummins Inc.
- e. Licensee acknowledges that InPower may include software that Cummins Inc. has obtained or licensed from a third party, and Licensee agrees that the terms and conditions of this License shall be applicable to any such third party software. Licensee agrees to abide by any additional or modified terms and conditions with respect to such third party software if reasonably requested in writing by Cummins Inc. and/or the third party.

2. Markings

Licensee shall use its best efforts to preserve all copyright, trademark, ownership or other notices, legends or markings on InPower as originally provided by Cummins Inc. In the event InPower contains any copyright or other message imbedded therein, Licensee shall not modify or remove such embedded message.

3. Title

Title and full ownership rights to InPower and any updates thereto, including all copyrights therein, shall remain with Cummins Inc. and/or its subsidiaries. Cummins Inc. expressly retains all rights that it may have under U.S. or foreign laws or international treaties relating to InPower, except for those rights expressly granted to Licensee herein.

4. Licensee Expenses

Costs and expenses incurred by Licensee relating to any use of InPower, or any other costs not specifically agreed upon by the parties in writing, shall be responsibility of Licensee.

5. Payment

The Sales Price does not include any federal, state, local or other governmental taxes, or other tariffs which may be imposed on the sale, transportation, production, storage, or export of InPower. Any and all such taxes and costs shall be paid by Licensee and Cummins Inc. shall have no liability therefore.

6. Updates and Maintenance

- a. Cummins Inc. agrees to provide reasonable free support for the current version and the latest prior version of InPower at hours, and or terms and conditions, determined solely by Cummins Inc.
- b. In the event of an error or defect in InPower or periodic update thereto, Cummins Inc. agrees to repair or remedy such errors or effects which Cummins Inc. deems necessary. Licensee shall, promptly upon discovery thereof, notify Cummins Inc. in writing, of any errors or defects in InPower and/or periodic update thereto. Cummins Inc. shall use its best efforts to remedy or repair such errors or defects, devoting reasonable resources to such task in view of the particular business situation and customer need.

7. No Modification by Licensee

Licensee agrees not to reverse engineer, translate, reverse assemble, reverse compile, adapt, alter, modify or change in any way InPower, or any update thereto, without the prior written authorization of Cummins Inc.

8. Warranties

Cummins Inc. warrants that InPower shall be delivered free of any rightful claim of infringement of any copyright, trademark, trade secret or other proprietary right of any third party, provided that prompt notice of, and control over, such claim is provided to Cummins Inc. by Licensee. In the event of such claim, Cummins Inc. may, at its sole option, defend the claim, procure for Licensee the continued rights as described herein, modify InPower so the claim is avoided without reduced functionality, or refund Licensee's sales price paid. Cummins Inc's option shall be its sole obligation and Licensee's sole remedy in such event.

9. Warranty Disclaimer

InPower and any and all updates thereto are licensed "As Is" with the exception of the warranties specifically provided herein. Cummins Inc. does not claim and does not warrant that InPower will run error free. WITH THE EXCEPTION OF THE WARRANTIES PROVIDED HEREIN, CUMMINS INC. DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, REGARDING INPOWER, ITS MERCHANTABILITY OR ITS FITNESS FOR ANY PARTICULAR PURPOSE, AND CUMMINS INC WILL NOT OTHERWISE BE LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM LICENSEE'S USE OF INPOWER OR FOR ANY ERROR OR DEFECT IN INPOWER. CUMMINS INC'S NET LIABILITY TO LICENSEE SHALL NOT EXCEED THE TOTAL AGGREGATE PAYMENTS BY LICENSEE TO CUMMINS INC. WITH RESPECT TO INPOWER.

10. Government Licensee

If Licensee is acquiring InPower as, or on behalf of, a unit of the United States Government, the following provisions shall be applicable: The Government acknowledges and agrees that InPower and documentation relating thereto were developed at private expense and no part of InPower or documentation relating thereto is in the public domain. The Government acknowledges Cummins Inc's representation that InPower is "Restricted Computer Software" as that item is defined in Clause 52.227-19 of the Department of Federal Acquisition Regulation Supplement (DFARS). The Government agrees that:

- a. If InPower is supplied to the Department of Defense (DOD), InPower is classified as "Commercial Computer Software" and the Government is acquiring only "restricted rights" in InPower and documentation relating thereto as that term is defined in Clause 252.227-7202-3 of the DFARS, and
- b. If InPower is supplied to any unit or agency of the United States Government other than the Department of Defense, the Government's rights in InPower and documentation relating thereto will be defined in Clause 52.227-19(b)(2) of the FAR.

11. Confidentiality

- a. Licensee hereby acknowledges that InPower and periodic updates thereto contain valuable information belonging to Cummins Inc. that Cummins Inc. considers "confidential". Consistent with the purpose of this License, Licensee agrees to use its best efforts not to release, disclose or otherwise permit unauthorized access to such confidential information.
- b. Cummins Inc. and Licensee agree to clearly mark written materials as "confidential" if they are to be treated as confidential. Verbal communications that are confidential in nature will be identified as so before, during or immediately after the communication.
- c. Licensee agrees to ensure that all individuals who are provided access to InPower under this License are bound by this nondisclosure covenant.

12. Termination of Agreement

- a. Cummins Inc. may terminate this License at will for any reason whatsoever, furthermore this License will automatically terminate if Licensee fails to comply with any of the terms and conditions herein. In the event Licensee attempts to continue to use InPower after termination of this License, Cummins Inc. reserves the right to restrict, limit, and otherwise void warranty claims associated with any Cummins Inc. product associated therewith and reserves its rights to all other legal remedies.
- b. Defensive Suspension. If Licensee commences or participates in any legal proceeding against Cummins, then Cummins may, in its sole discretion, suspend or terminate all license grants and any other rights provided under this License during the pendency of such legal proceedings.
- c. In the event of termination of this License, all rights granted by this License shall revert to Cummins Inc. Upon termination of this License, Licensee will deliver to Cummins Inc. all material furnished by Cummins Inc. pertaining to InPower and will also warrant that all copies thereof have been returned to Cummins Inc. or destroyed.
- d. In the event of termination of this License, Licensee shall remain obligated with respect to the provisions of this License relating to confidentiality of information.

13. Completeness

Licensee and Cummins Inc. agree that this License constitutes the complete License and understanding between the parties relating to InPower and updates thereto. This License supersedes all prior agreements, understandings, and negotiations whether written or verbal with respect to the subject matter thereof. This License can only be modified by a written agreement signed by both parties.

14. Export Regulations

Licensee understands that the Export Administration Regulations of the Department of Commerce of the United States may prohibit the export of InPower to certain countries and agrees to conform to those regulations. Licensee shall indemnify Cummins Inc. against any loss related to Licensee's failure to conform to those regulations.

15. Governing Law

This Agreement shall be governed by and construed in accordance with the laws of the State of Indiana, United States of America and NOT the UNCISG. To the extent required in order to comply with the laws and regulations of any country in which InPower is distributed or used, the terms and conditions of this Agreement shall be construed to most nearly effectuate the purposes of the License as set forth herein. If any provision of this License shall be held to be unenforceable, such holding shall not affect the enforceability of any other provision hereof.

16. Attorney's Fee's

In the event of any legal action or other proceeding that is brought about to enforce this License, the prevailing or successful party shall be entitled to recover reasonable attorneys' fees as well as other costs incurred in that action or proceeding in addition to any compensation to which it may be entitled as a result.

17. Agreement Successors and Assigns

The terms and conditions of this License shall inure to the benefit of and enforceable by Cummins Inc. and the successors and assigns of Cummins Inc's interest in this License and/or Cummins Inc's ownership of InPower.

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.

NOTICE

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, 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 instructions when installing the 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® generator set control).* [Figure 1](#) illustrates the typical method used to connect a service PC to different device types.

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.

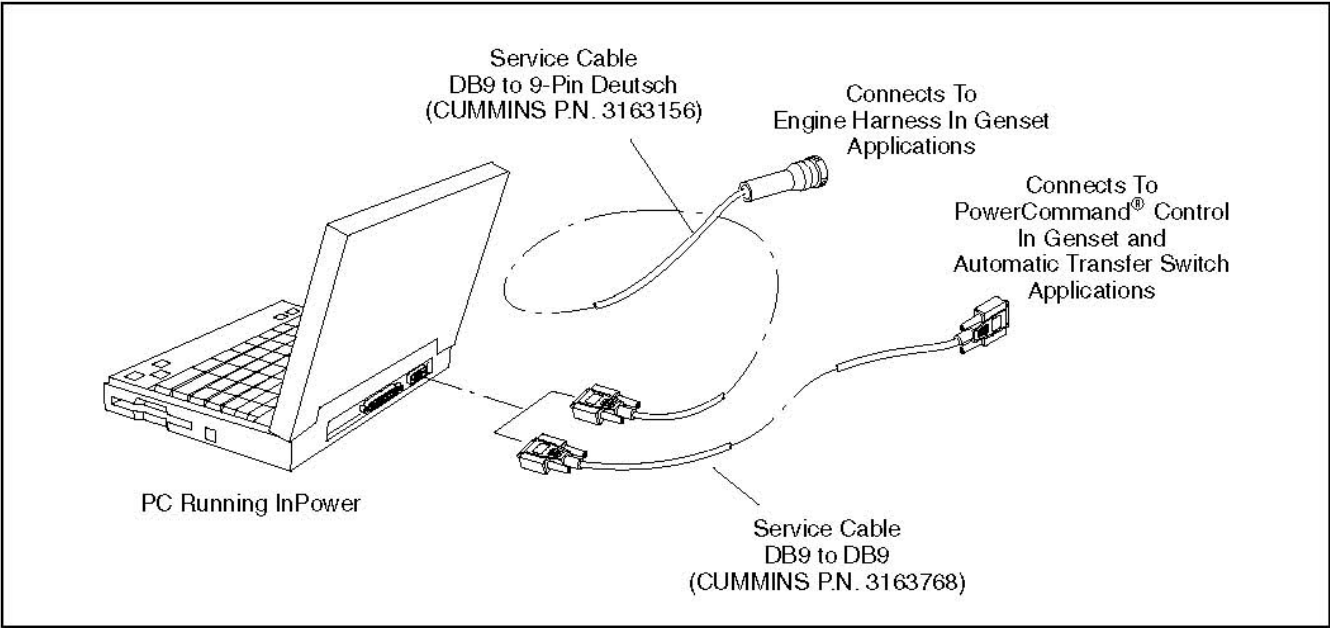


FIGURE 1. TYPICAL INPOWER SERIAL CONNECTION METHODS

2.2.1.1 Interface Harness Kits for Commercial Products

| Controller | Required Kit/Part |
|---|-------------------|
| PS 0500, PCC 1301, PCC 1302, PCC 2300V2, PCC 3300, MCM 3320 | 541-1199 |
| PCC 3100 | 3164721 |
| PCC 2100, PCC 3200 (DB9-to-DB9) | 3163768 |
| PCC 3200 (DB9-to-9-pin Deutsch) | 3163156 |

NOTICE

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 generator set control via an RS-232 serial communications harness. [Figure 2](#) illustrates a method used to connect a service PC to a RV generator set.

The harness is connected to the (COM) port on the PC with a DB9 connector. Some generator sets 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.

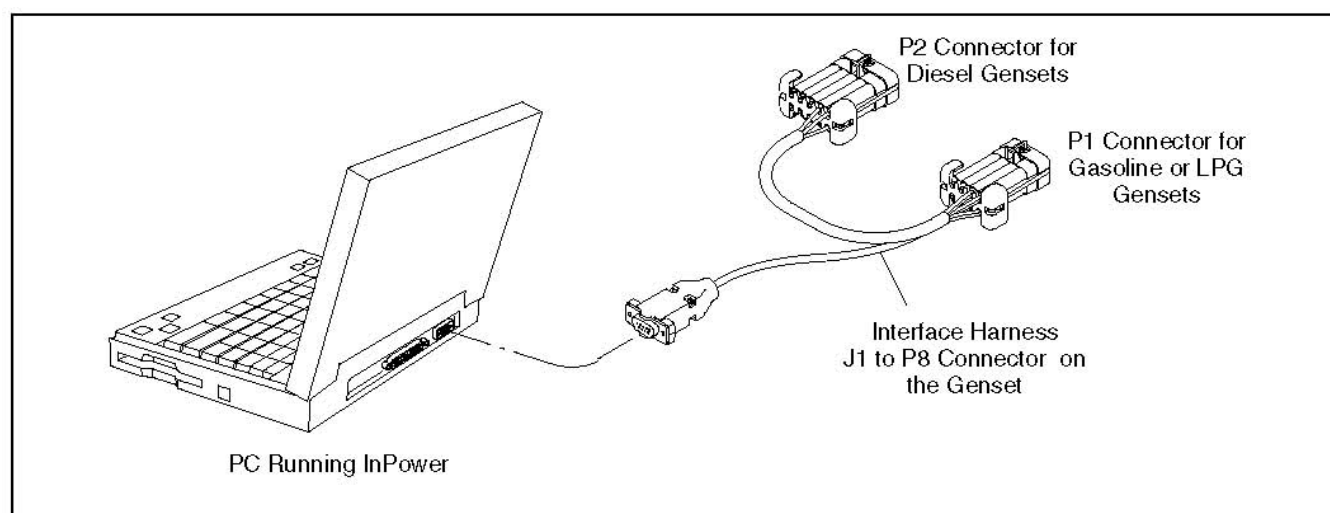


FIGURE 2. TYPICAL INPOWER SERIAL CONNECTION METHOD

2.2.2.1 Interface Harness Kits for Consumer Products

Refer to [Section 5.2.1 on page 45](#) for images of the harnesses included in the kits and their connections.

TABLE 1. HARNESSES INCLUDED IN KIT

| Kit Part Number | Harness Part Numbers | Description |
|-----------------|----------------------|-----------------------|
| 0541-1199 | 0338-5279 | HMI Extension Harness |
| | A044M377 | Interface Harness |
| | 0324-0021 | Network Converter |
| 0541-1287 | 0338-4731 | Interface Harness |
| 0541-1289 | A026D943 | Jumper Harness |
| | 0338-4732 | Interface Harness |
| | 0324-0021 | Network Converter |
| 0541-1374 | 0338-5288 | 8-pin Adapter Harness |
| | 0338-4840 | Interface Harness |
| | 0338-4850 | 6-pin Adapter Harness |
| | 0324-0021 | Network Converter |
| 0541-1389 | A026D943 | Jumper Harness |
| | 0338-5288 | 8-pin Adapter Harness |
| | 0338-4840 | Interface Harness |
| | 0338-4850 | 6-pin Adapter Harness |
| | 0338-4731 | Interface Harness |
| | 0338-4732 | Interface Harness |
| | 0324-0021 | Network Converter |

TABLE 2. INTERFACE HARNESS KITS FOR CONSUMER PRODUCTS

| Model/Device | Fuel Type | Required Kit | RS-232 to RS-485 Converter |
|--|---------------------|---------------------|-----------------------------------|
| HDKAx (Starting with Spec K), HDKBx, and HDKAW | Diesel | 541-1374 | Yes |
| 810HQD, 1215HQD, and 1218HQD | Diesel | 541-1374 | Yes |
| DKHA | Diesel | 541-1374 | Yes |
| HDKAx (Prior to Spec K) and HDKCx | Diesel | 541-1287 | No |
| HGJAA, HGJAB, HGJAC, HGJAD, HGJAE, and HGJAF (Units with controls built in 2005 or later, up to Spec E) | Gasoline/LPG | 541-1287 | No |
| HGJAA, HGJAB, HGJAD, HGJAE (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 |
| 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

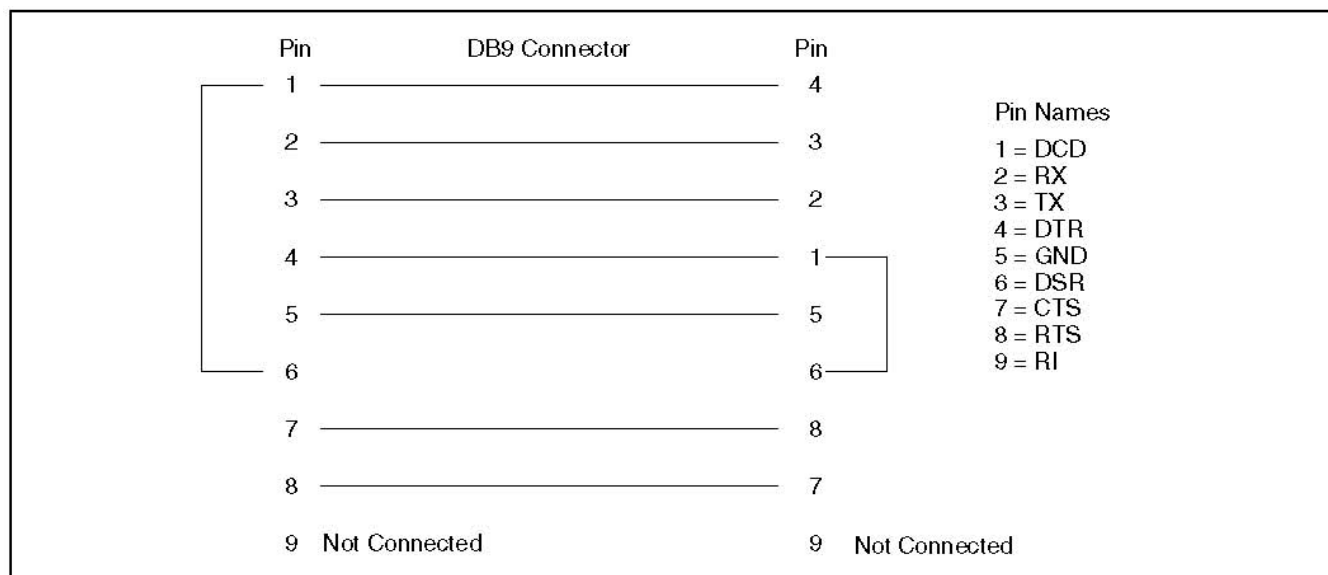


FIGURE 3. NULL MODEM CABLE CONFIGURATION

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
- Annunciator(HMI 113)
- HWSet_A(Generic)
- MCC3320
- PCC1301
- AUX101(Auxillary I/O Device)
- HMI 112
- PCC3300

-
- HMECM(AUX105)
 - 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)
 - 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
- 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 10 or Windows 11

TABLE 3. WINDOWS 10 OR 11 OPERATING SYSTEM

| | |
|-----------------------|--|
| Processor | 1 GHz |
| Memory | 1 GB (32-bit) or 2 GB (64-bit) |
| Graphics Card | Microsoft DirectX 9 graphics device with WDDM driver |
| Graphics Memory | Up to 1792 MB (1366 x 768 resolution) recommended |
| Hard Drive Capacity | 40 GB |
| Hard Drive Free Space | 15 GB |
| Other Drives | DVD-ROM |
| Audio | Audio output |

- 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)

NOTICE

Please note that InPower does not support the Windows 95, Windows 98, Windows 2000, Windows XP, Windows VISTA, Windows N, Windows 7, Windows 8, or Windows 8.1 operating systems.

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 4. DEFAULT LOCATIONS OF PROGRAM DIRECTORIES

| Description | Default Location |
|--|-------------------|
| Folder in which InPower is installed | C:\ETools |
| Folder in which strip chart and monitor files are stored | C:\ETools\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.

2.6.1 Monitor

The Monitor folder contains the Target Parameter List files (.TPL). This folder will contain one or more .TPL files by default. These default files contain design related information. 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.

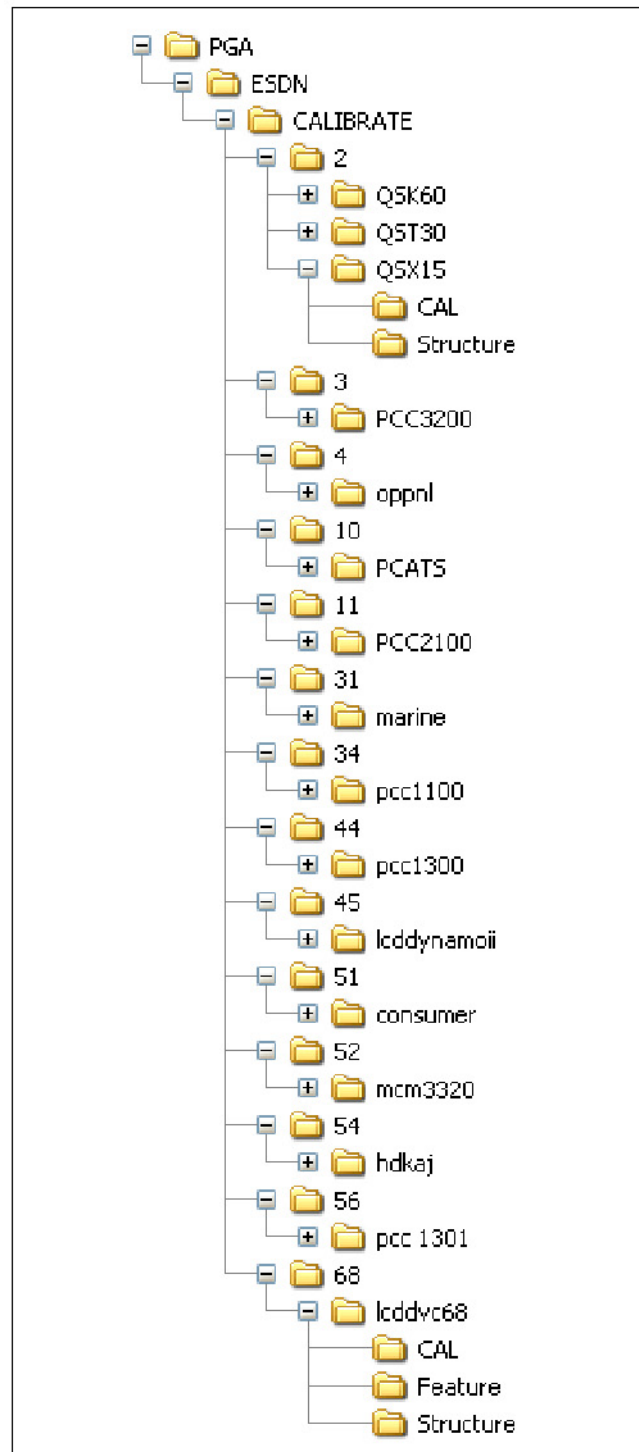
Example: The Captured file is from a Genset controller, this file can be written to another (connected) Genset controller.

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

An empty directory structure is created in the PGA directory during installation ([Figure 4](#)). This file structure is used for downloading calibration files from the InCal website.

**FIGURE 4. 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. The InCal Downloader & Extractor Utility downloads and places all relevant files at the required locations. It is recommended to always use this utility rather than manually downloading and placing the files on local drive folders.

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.

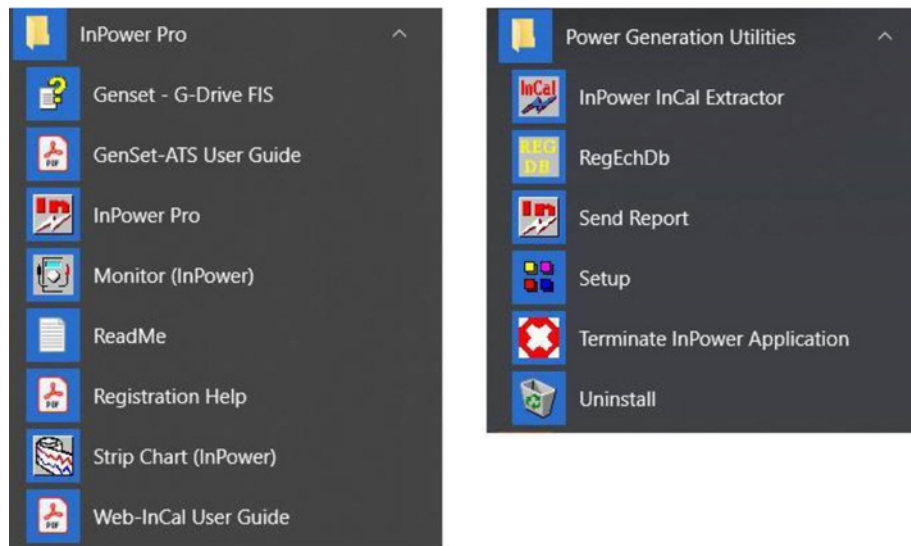


FIGURE 5. START MENU GROUP SHORTCUTS

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. Open InPower
2. Select the Go to Help -> Send Support Report menu.
3. Fill out all the required fields on the Support Report Utility GUI.
4. Click Send to send the error logs to InPower Support group.

If your copy of InPower is not working then please follow the below steps.

1. Write down what you can about the problem.
2. Send an email to InPower.Support@cummins.com.

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 Mmm dd, yyyy," 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.

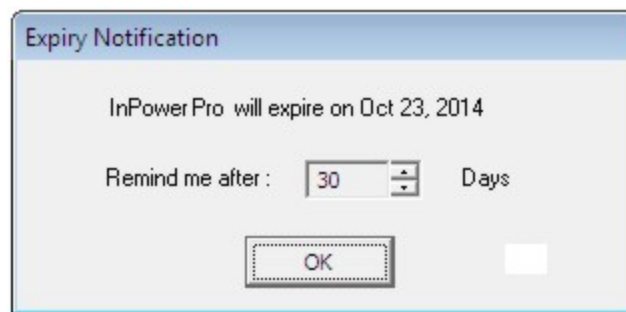


FIGURE 6. TOOL EXPIRY NOTIFICATION MESSAGE

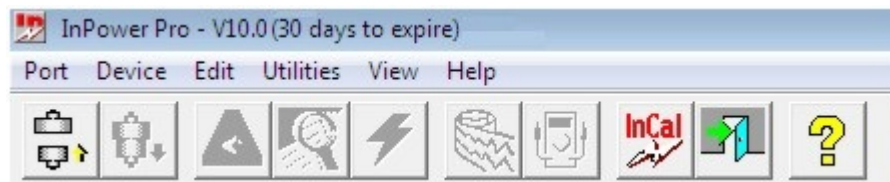


FIGURE 7. TOOL EXPIRY NOTIFICATION MESSAGE - 15 TO 30 DAYS

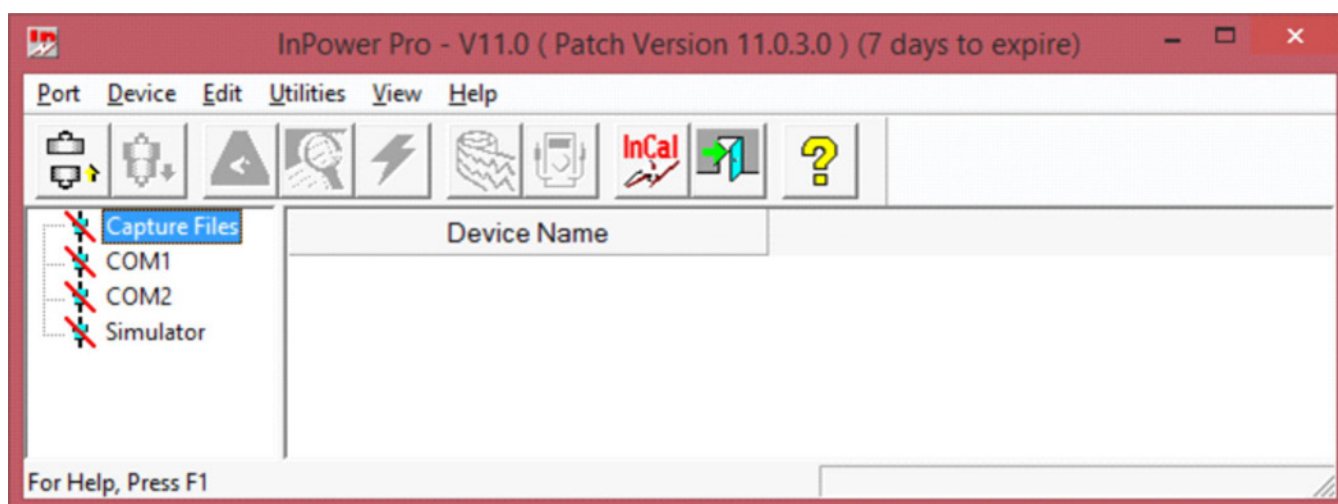


FIGURE 8. TOOL EXPIRY NOTIFICATION MESSAGE - 15 OR FEWER DAYS

NOTICE

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.

This page is intentionally blank.

3 Setup

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

NOTICE

If you attempt to access the Setup program while InPower is running, the message "InPower Pro or related utilities are already running" is displayed. This is because both the Service tool and its Setup cannot work simultaneously. Close InPower to continue to use Bravo Setup.

3.1 General Setup

Use Search Menu on the Home page and type "Setup" to get to the application.

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 generator set applications to configure the service PC for remote communications.

If you need to set up Sites, 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.

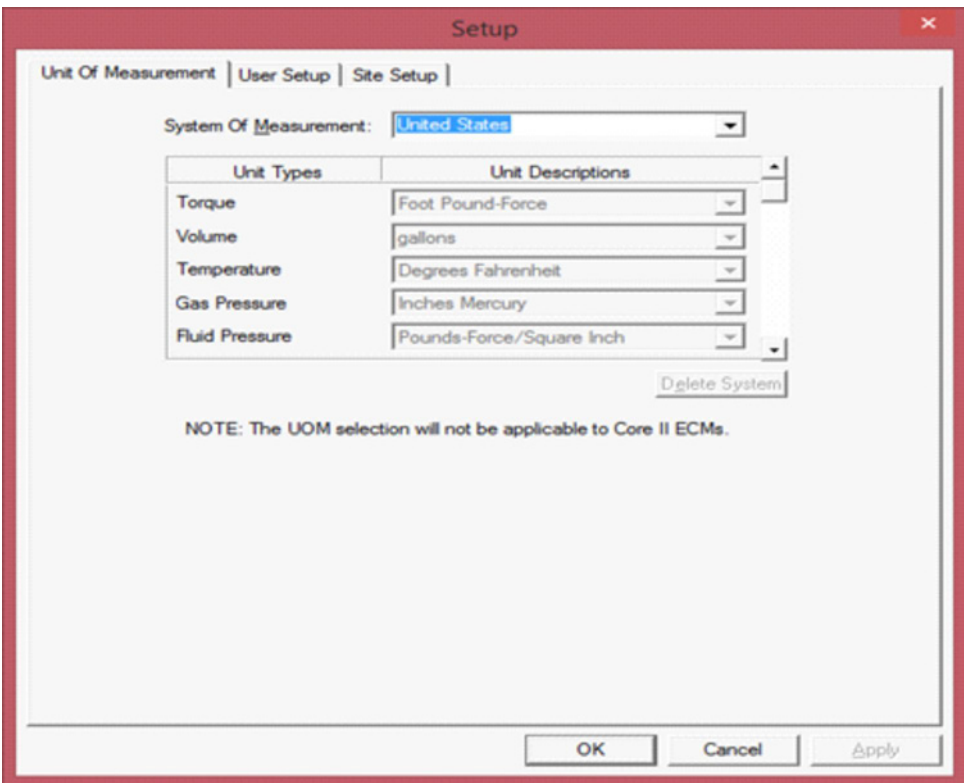


FIGURE 9. SETUP DIALOG - UNIT OF MEASURE

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.

| NOTICE |
|---|
| 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 10](#).

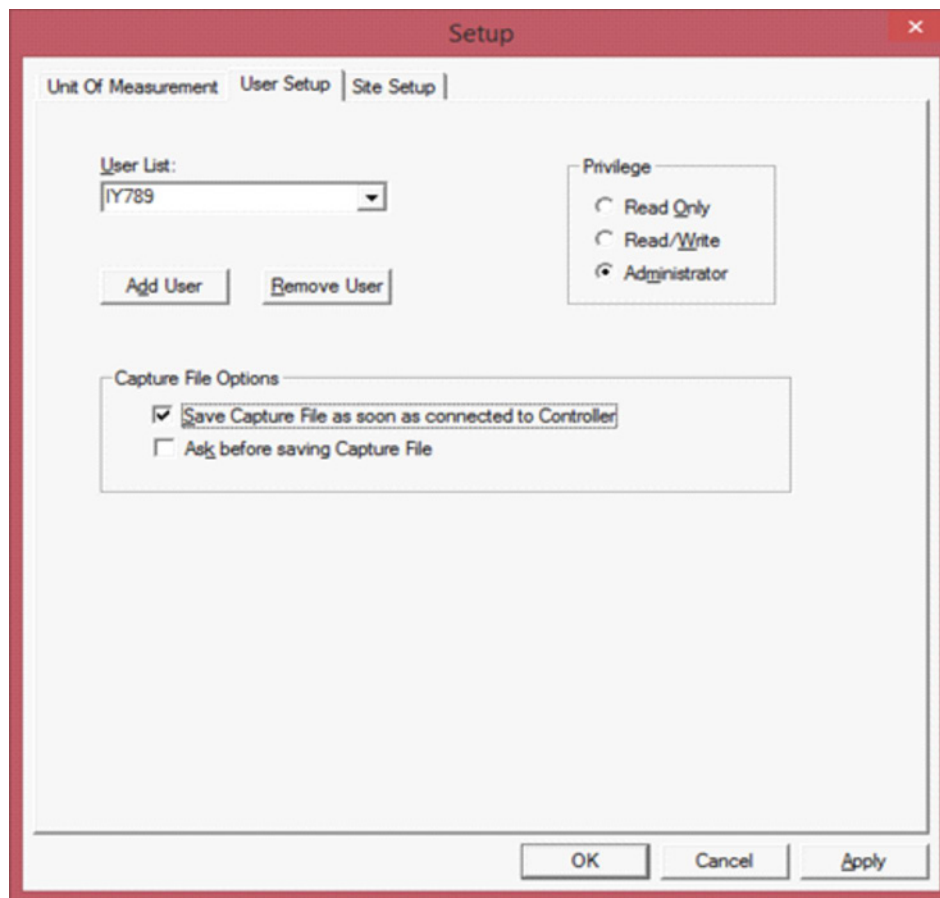


FIGURE 10. USER SETUP

3.5 Site Setup

NOTICE

It is highly recommended to use the “Port -> Add Site” menu available on InPower Home screen to create sites rather than using Bravo Setup. Bravo Setup was used previously and still available for backward compatibility. However, for creating Sites, there is no need to use Bravo Setup and make the site creation task a tedious one. Using the Port -> Add Site feature would create the sites for any of the supported devices easy and sets up the things for you faster automatically. InPower also provides an option of AutoConnect Site. All the controllers can be connected via this Site and the COM port is also detected automatically for ease of use.

This page is intentionally blank.

4 InPower Basics

This section describes InPower's user interface features.

4.1 How to Start InPower

Type InPower into Windows Search to get a list of all related utilities.

NOTICE

On a successful installation, a Shortcut is always created on the desktop or in the “Programs” folder on Desktop.

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.

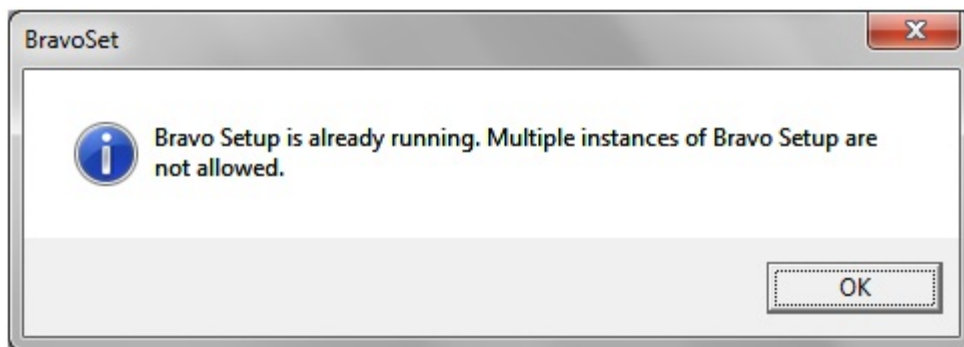


FIGURE 11. BRAVO SETUP MESSAGE FOR WHEN BRAVO SETUP IS ALREADY IN USE

- 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.

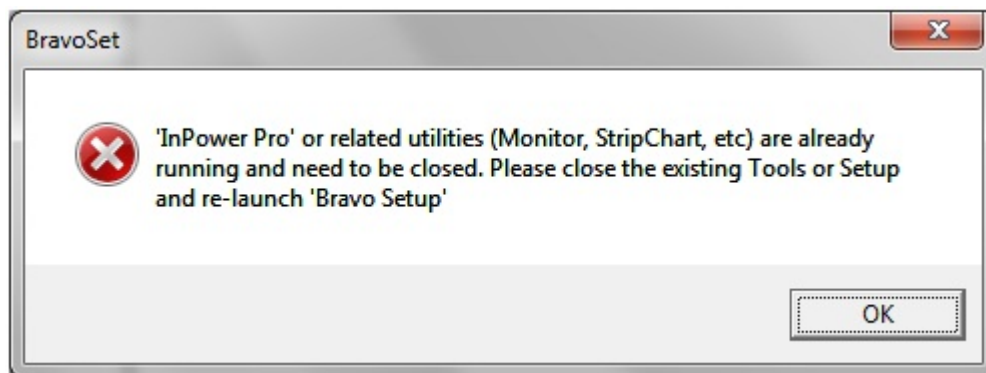


FIGURE 12. INPOWER IS RUNNING MESSAGE FOR WHEN ATTEMPTING TO USE BRAVO SETUP

- 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.

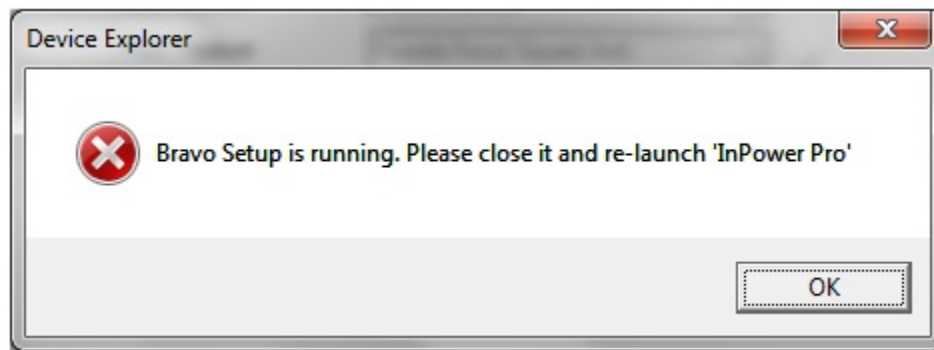


FIGURE 13. BRAVO SETUP IS RUNNING MESSAGE FOR WHEN ATTEMPTING TO USE INPOWER

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

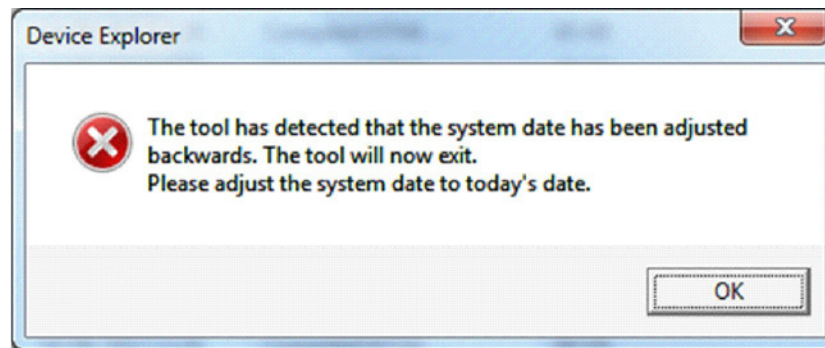


FIGURE 14. TOOL HAS DETECTED THAT THE SYSTEM DATE HAS BEEN ADJUSTED

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

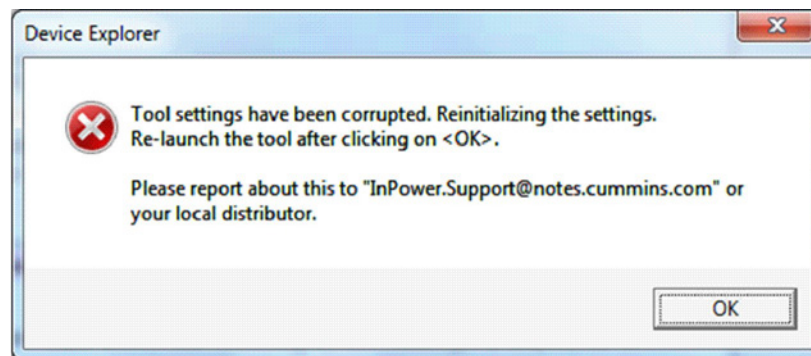


FIGURE 15. MESSAGE DISPLAYED FOR A CORRUPT FILE

4.2 The Main Window

The main window for InPower 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

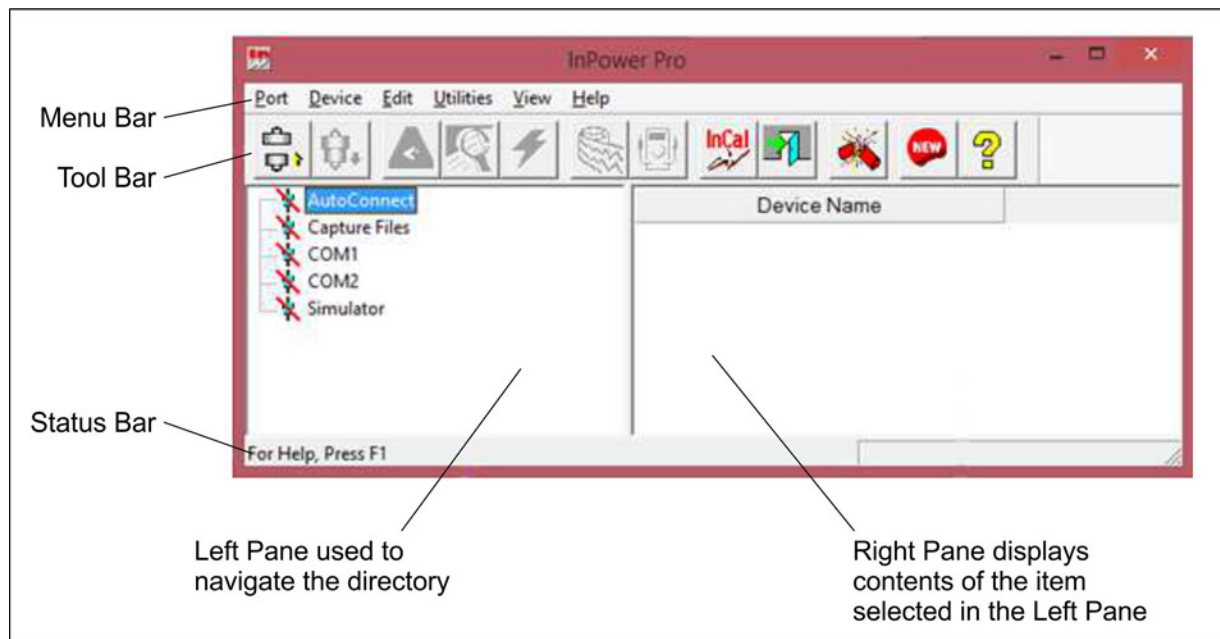


FIGURE 16. MAIN WINDOW

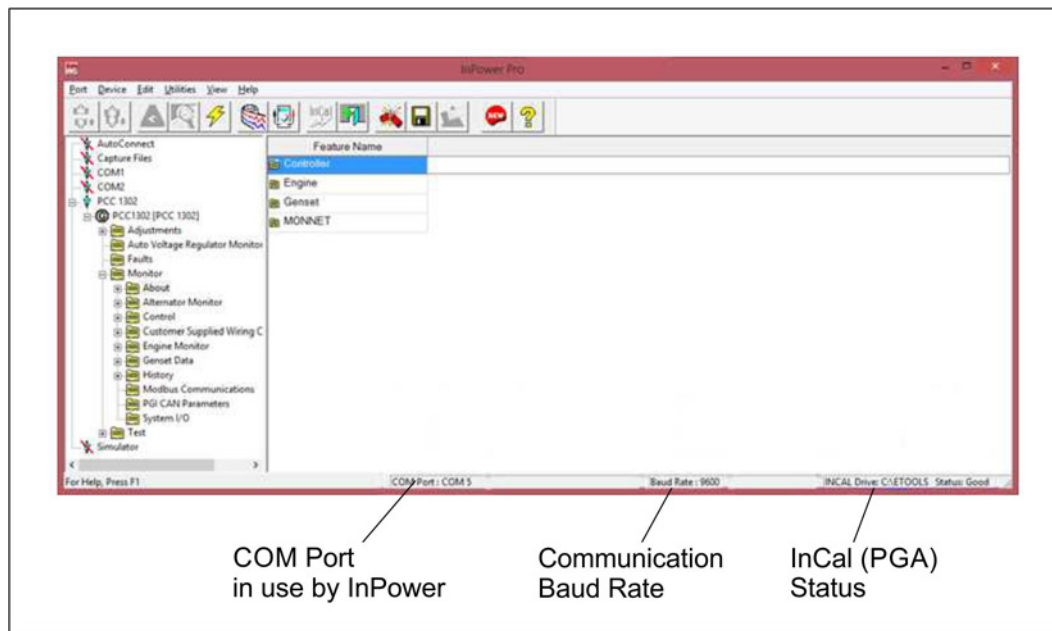


FIGURE 17. STATUS BAR DETAILS

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 Device/Controller or a Capture 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 Device Site or a .CAP(ture) File, including Simulator files.* The Port menu also allows the user to **Add** a local **Site**, **find InCAL** calibrations (i.e. Select InCal (PGA)). It also has an **Exit** selection to exit InPower.

In order to connect to a Device/Controller, the PC must be physically connected to serial communication. Some devices require a 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.

When creating a Local SITE, if the COM port is Busy following error message is shown:

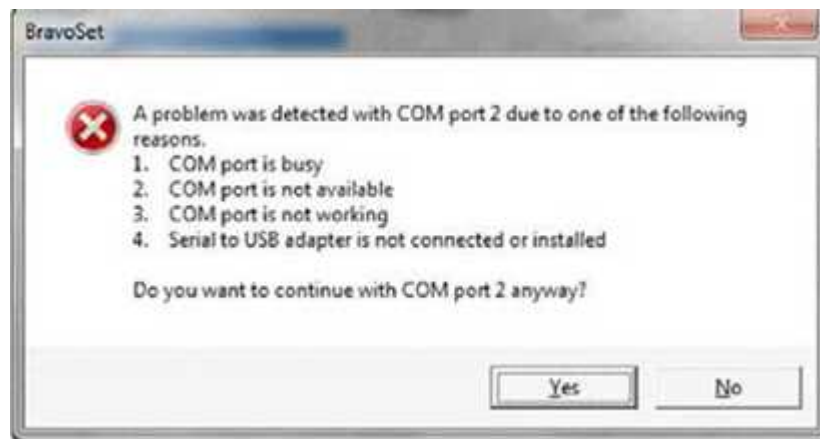


FIGURE 18. MESSAGE DISPLAYED FOR COM PORT

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**. The **Initiate Overlay** menu provides an easy way to Select a Capture file to be overlaid on to the connected device rather than dragging and dropping the file on to the Controller.

4.3.3 Edit

The **Edit** menu works within the directory of the connected device to **Find** a specified string of data. The Find Window has multiple options to search a particular parameter via Name, Logical Address, and Unit of Measurement. The **Edit** menu can also be used to **Copy** and **Paste** selected data.

4.3.4 Utilities

The **Utilities** menu provides a quick access to the Add-On utilities provided with InPower (e.g. Universal Simulator Download, InCal Downloader & Extractor, Capture File Manager & RTOP Delete Utility). On click of each of these Menu items the individual utilities (addon applications) are opened for further usage.

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.

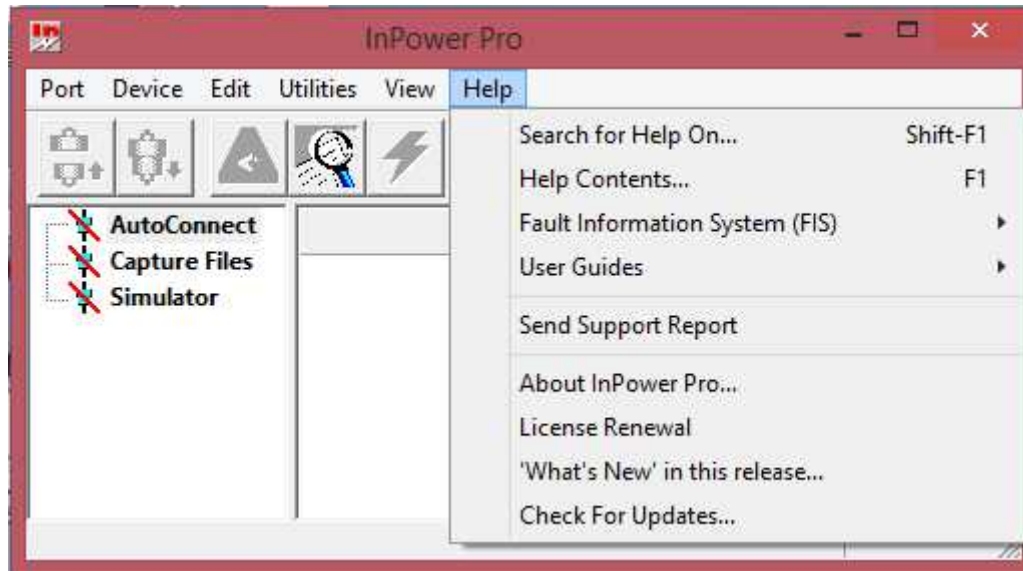


FIGURE 19. HELP MENU

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

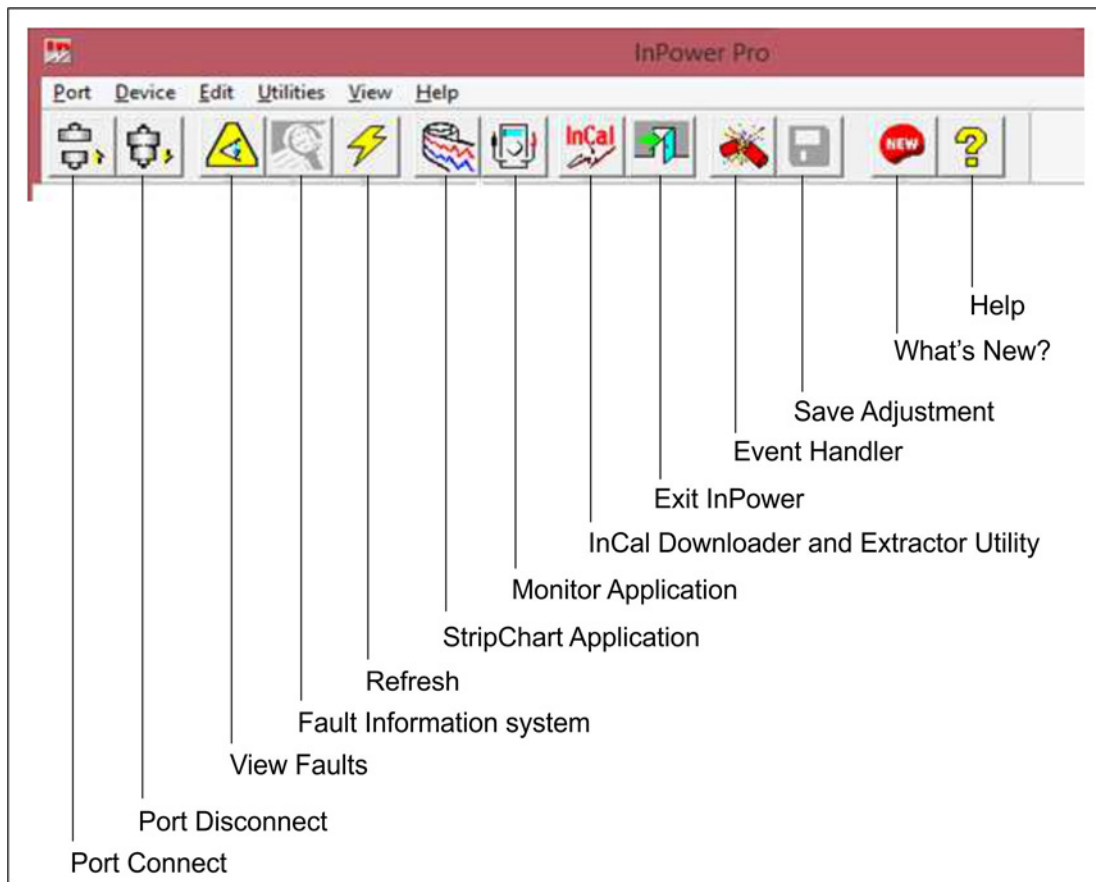


FIGURE 20. TOOLBAR

NOTICE

For the PCC3300 and PCC2300V2, the user may see few more Icons than the ones shown above. These controls support one of more Setup Screens which can be accessed via these special icons.

4.4.3 Dialog Boxes

A dialog box is a window that requires information or input 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 and all related applications/ processes applications. After the applications are closed, InPower can be re-launched and work can be resumed.

To use this feature, type Terminate InPower in Windows Search to launch the terminate application.

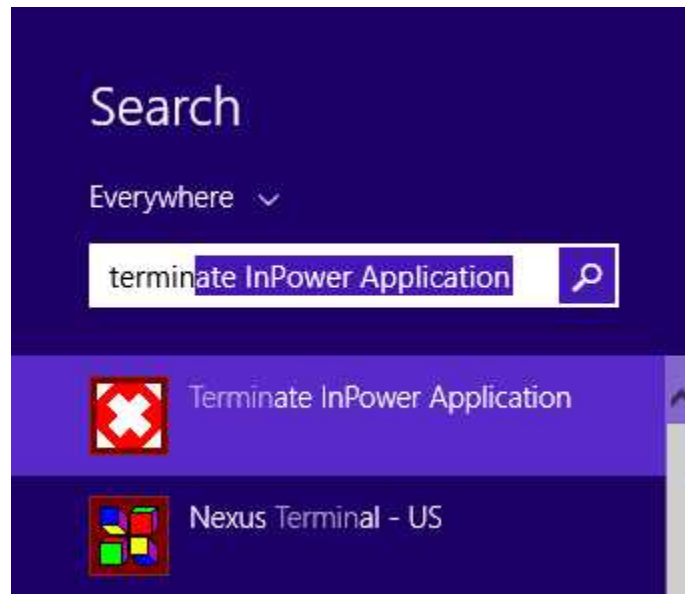


FIGURE 21. LAUNCHING THE TERMINATE INPOWER APPLICATION FEATURE

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

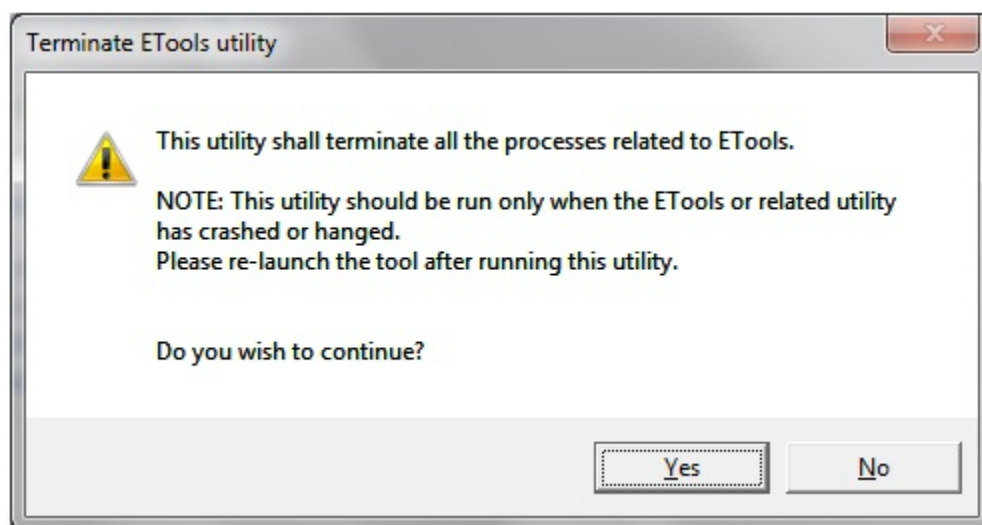


FIGURE 22. TERMINATING INPOWER APPLICATIONS MESSAGE

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

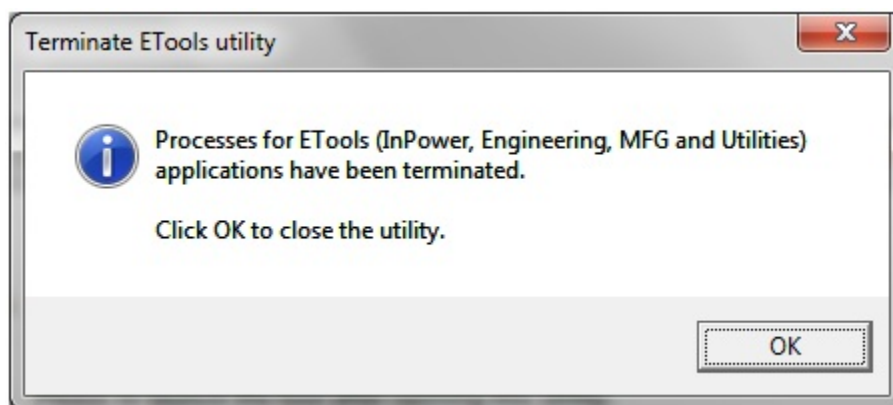


FIGURE 23. ETOOL TERMINATION MESSAGE

This page is intentionally blank.

5 Generator Set Service

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

5.1 Commercial Generator Set Service

InPower performs several functions including generator set service and diagnostics. 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 generator set in order to write adjustment trims and setting changes to the controller, and to temporary send test commands to the generator set controller. The features described may not apply to all control types.

5.1.1 Connecting to a Generator Set

Connection between the service PC and some generator sets 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 24](#) 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.

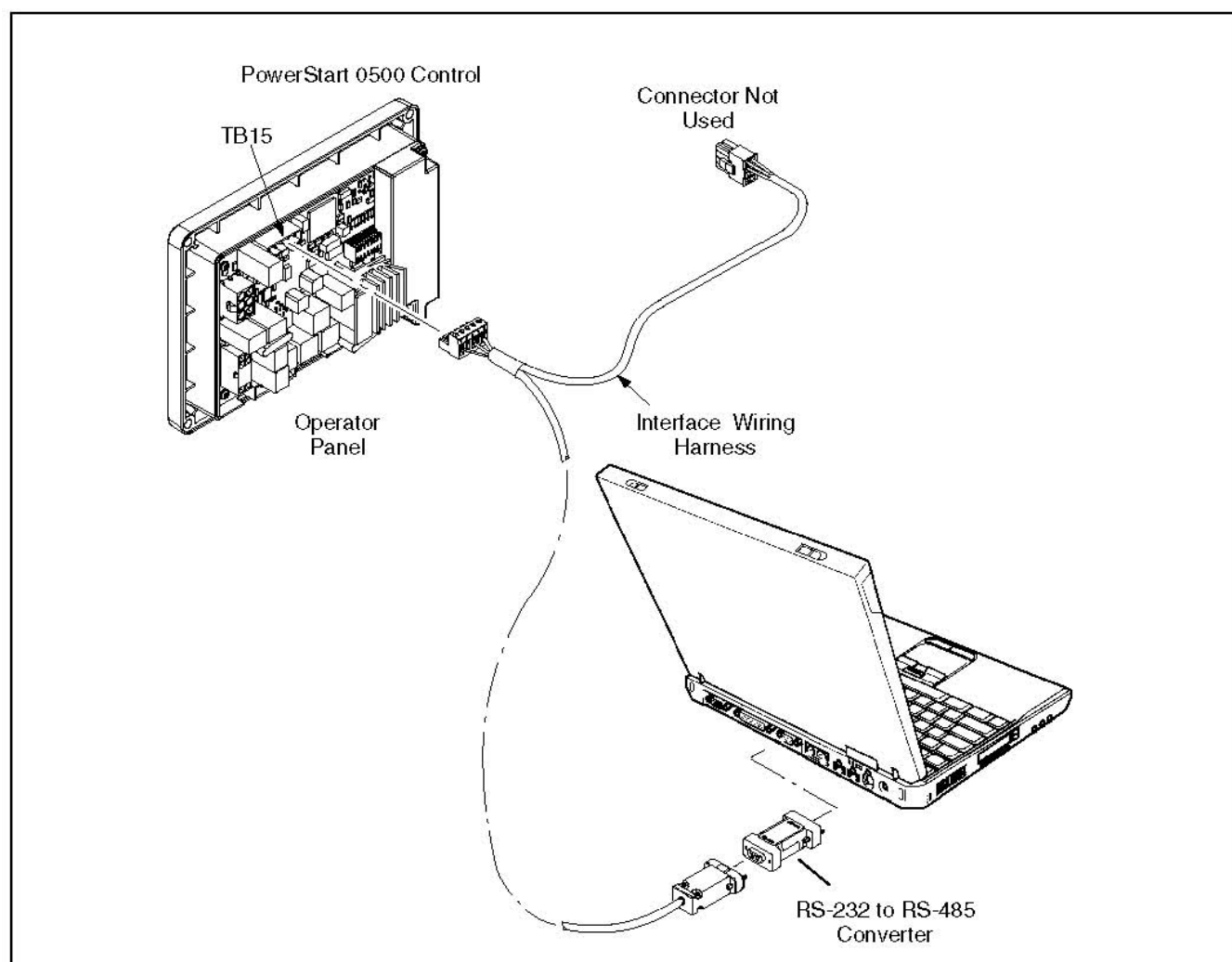


FIGURE 24. INPOWER SERIAL CONNECTION WITH POWERSTART 0500 CONTROL

5.1.1.2 Connecting to PCC 1100

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

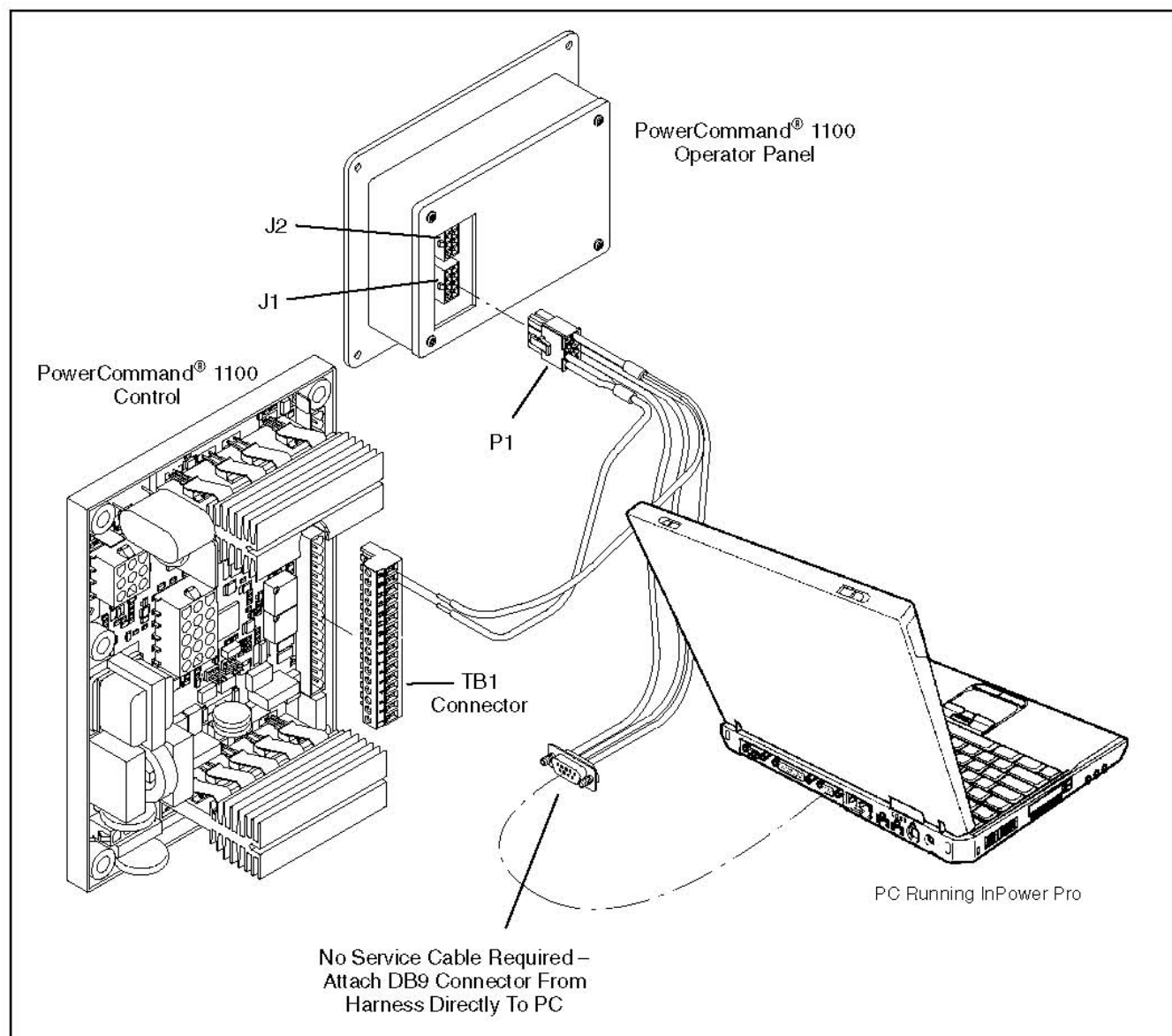


FIGURE 25. INPOWER PRO SERIAL CONNECTION PCC 1100

5.1.1.3 Connecting to a Generator Set with a PCC 1300 Control

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

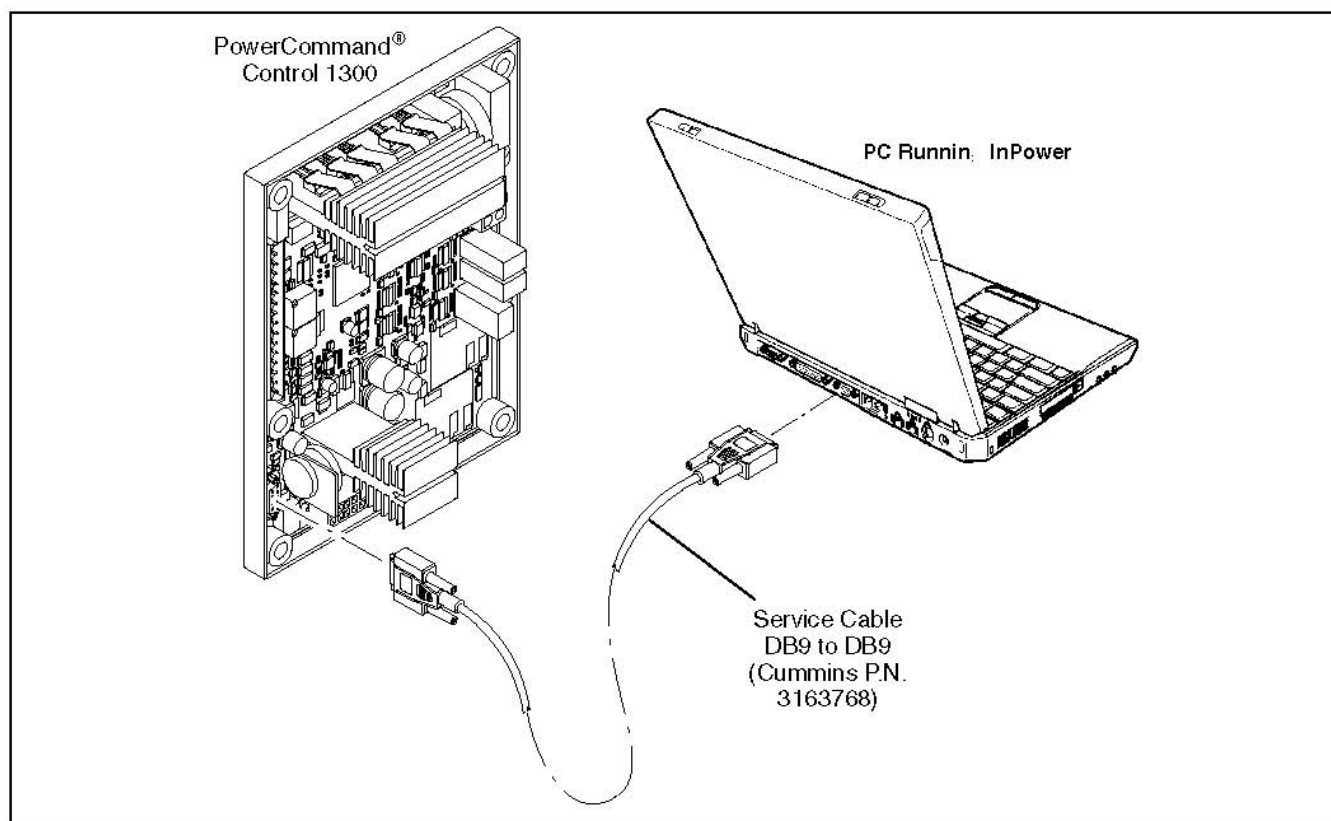


FIGURE 26. PCC 1300 INPOWER CONNECTION

5.1.1.4 Connecting to a Generator Set with a PCC 1301 Control

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

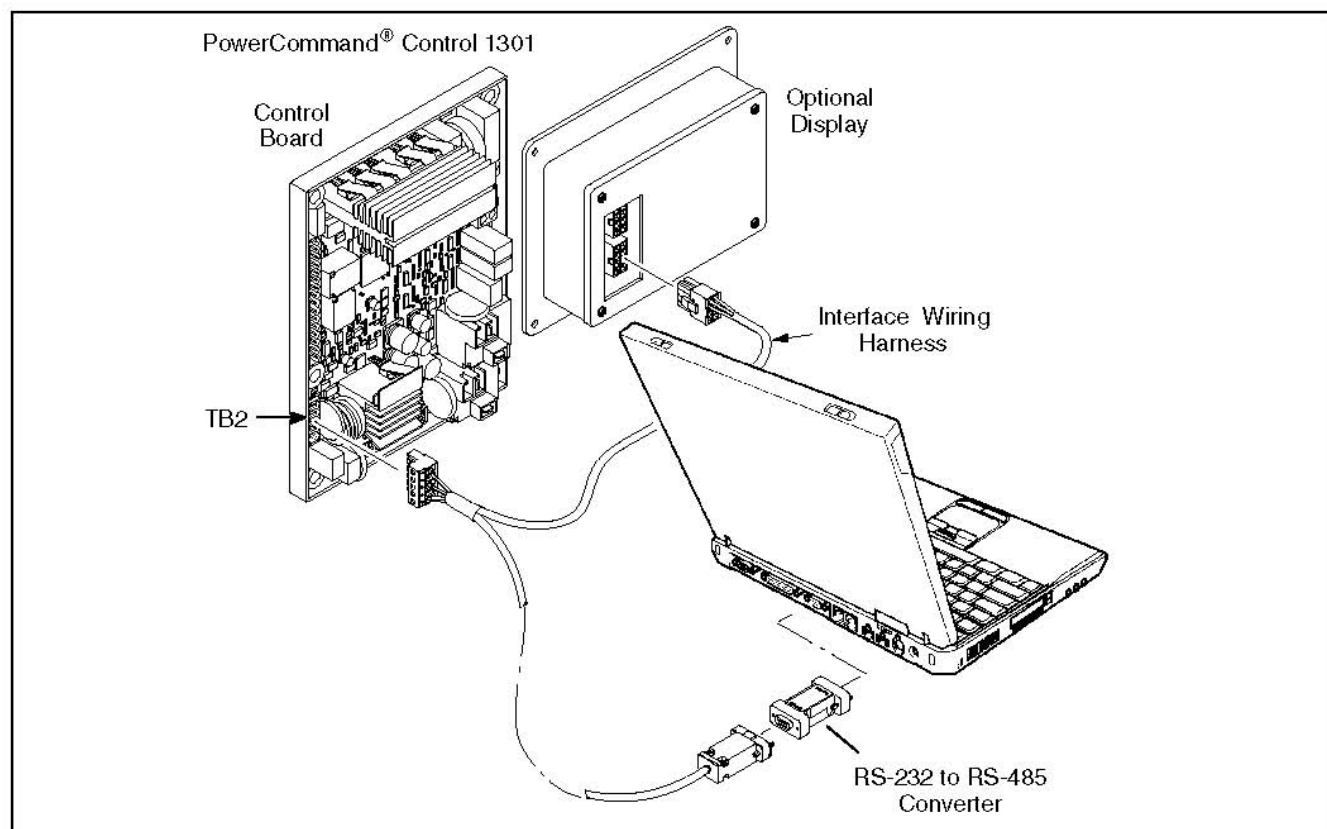


FIGURE 27. PCC 1301 INPOWER CONNECTION

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 28](#) shows the PCC 1302 InPower connection.

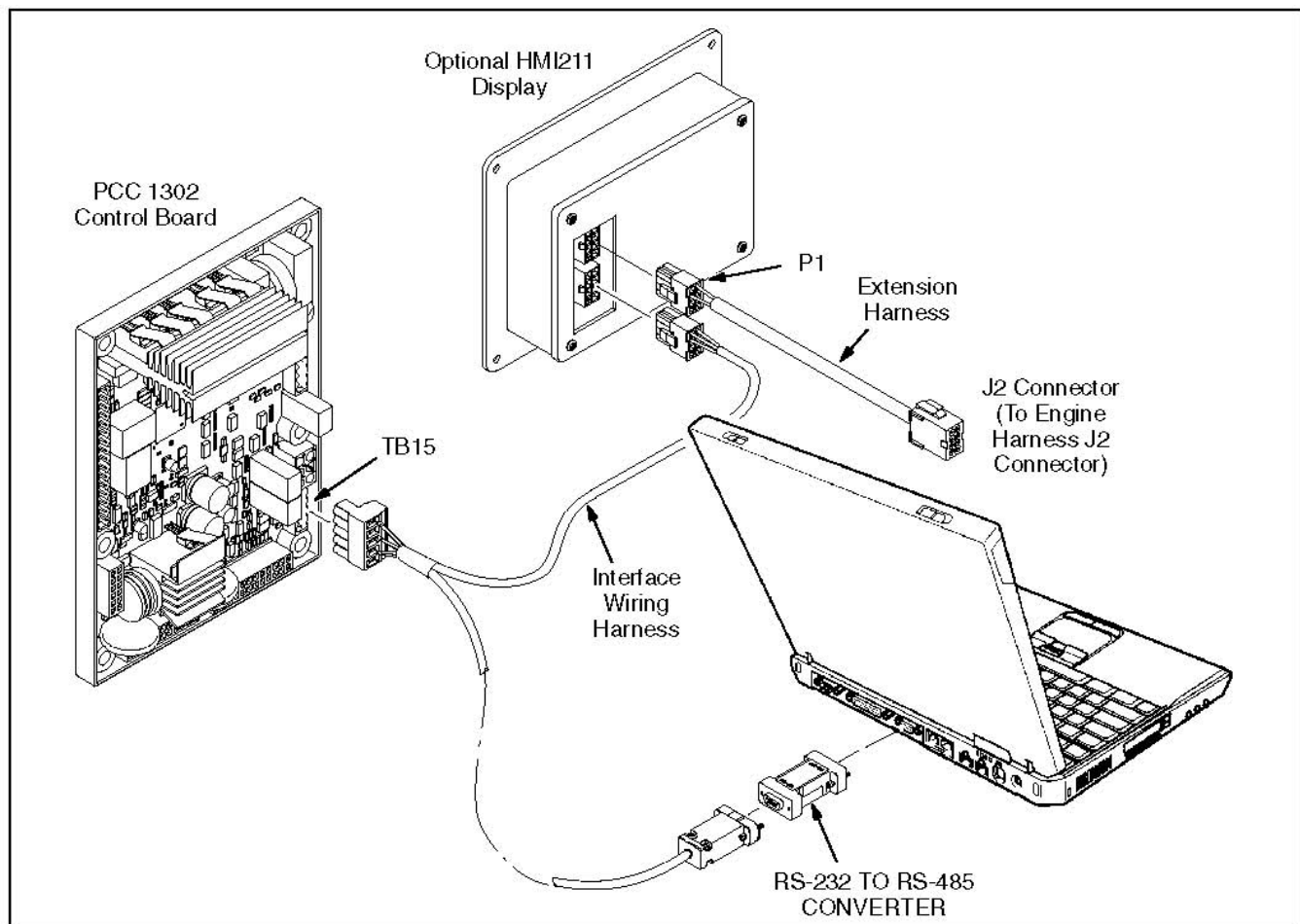


FIGURE 28. KIT INSTALLATION FOR POWERCOMMAND CONTROL 1302 WITH HMI211

5.1.1.6 Connecting to a Generator Set 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.

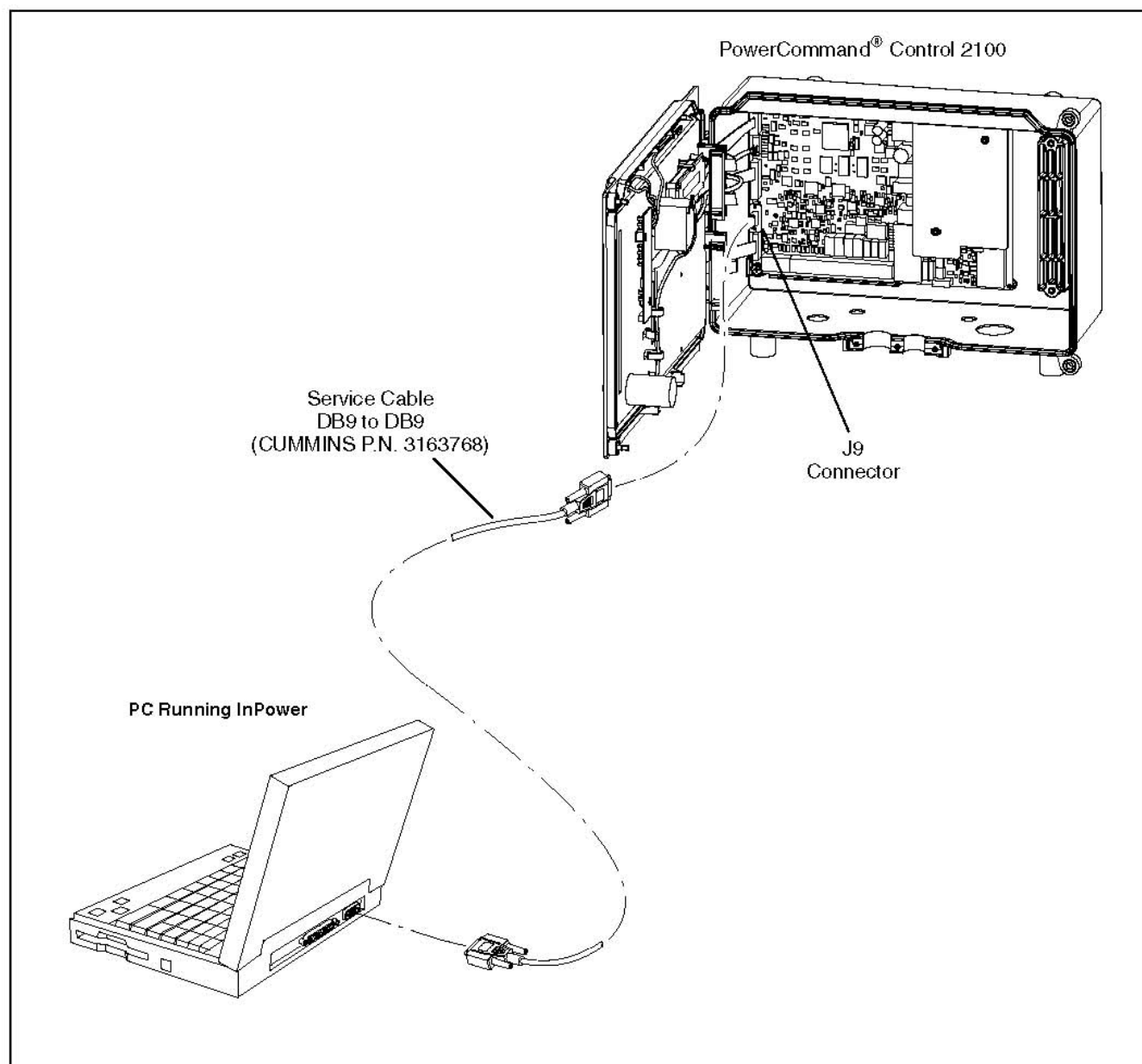


FIGURE 29. PCC 2100 INPOWER CONNECTION

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 30](#) shows the PCC2300 InPower connection and [Figure 31](#) 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.

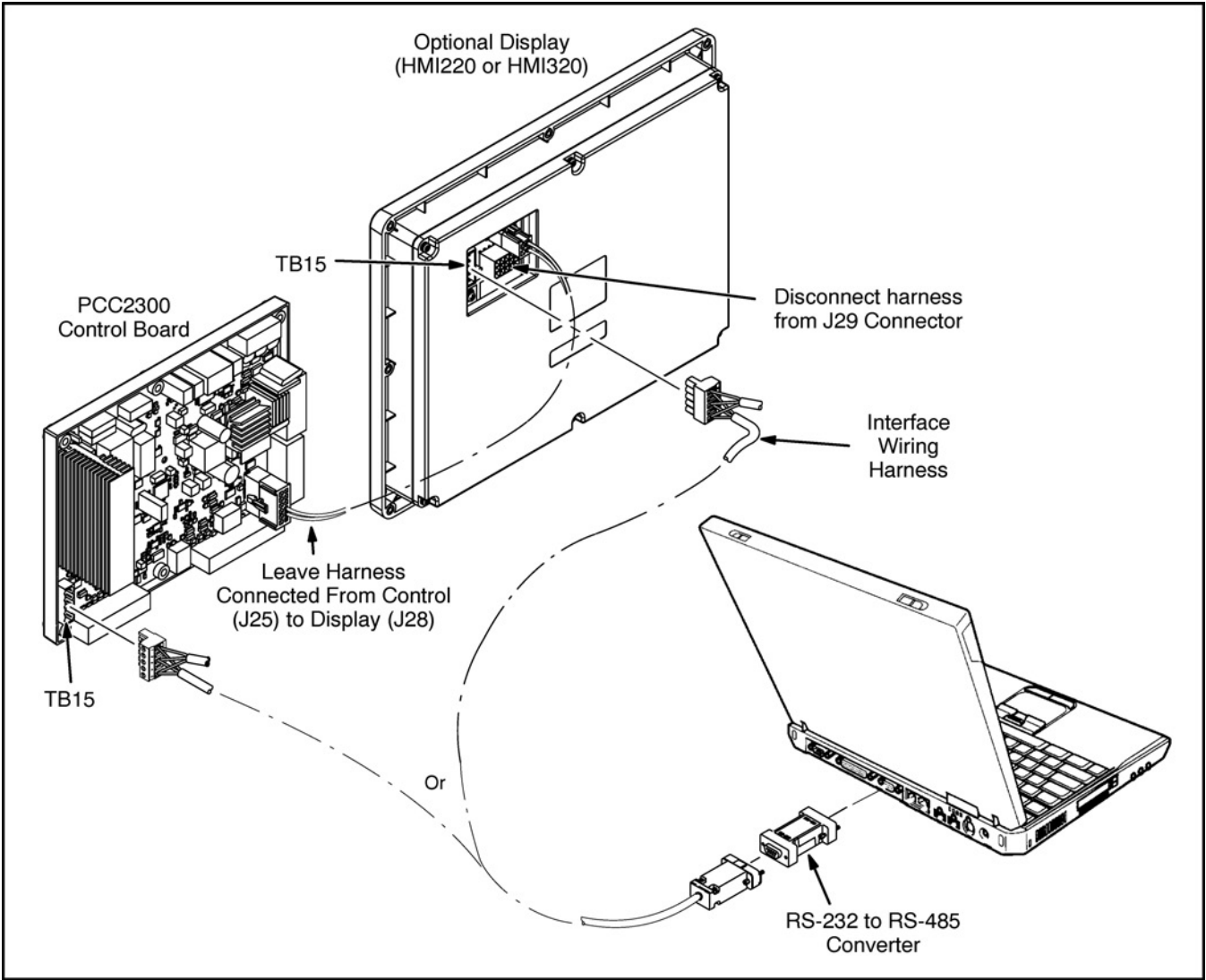


FIGURE 30. KIT INSTALLATION FOR PCC2300 WITH HMI220 OR HMI320 DISPLAY

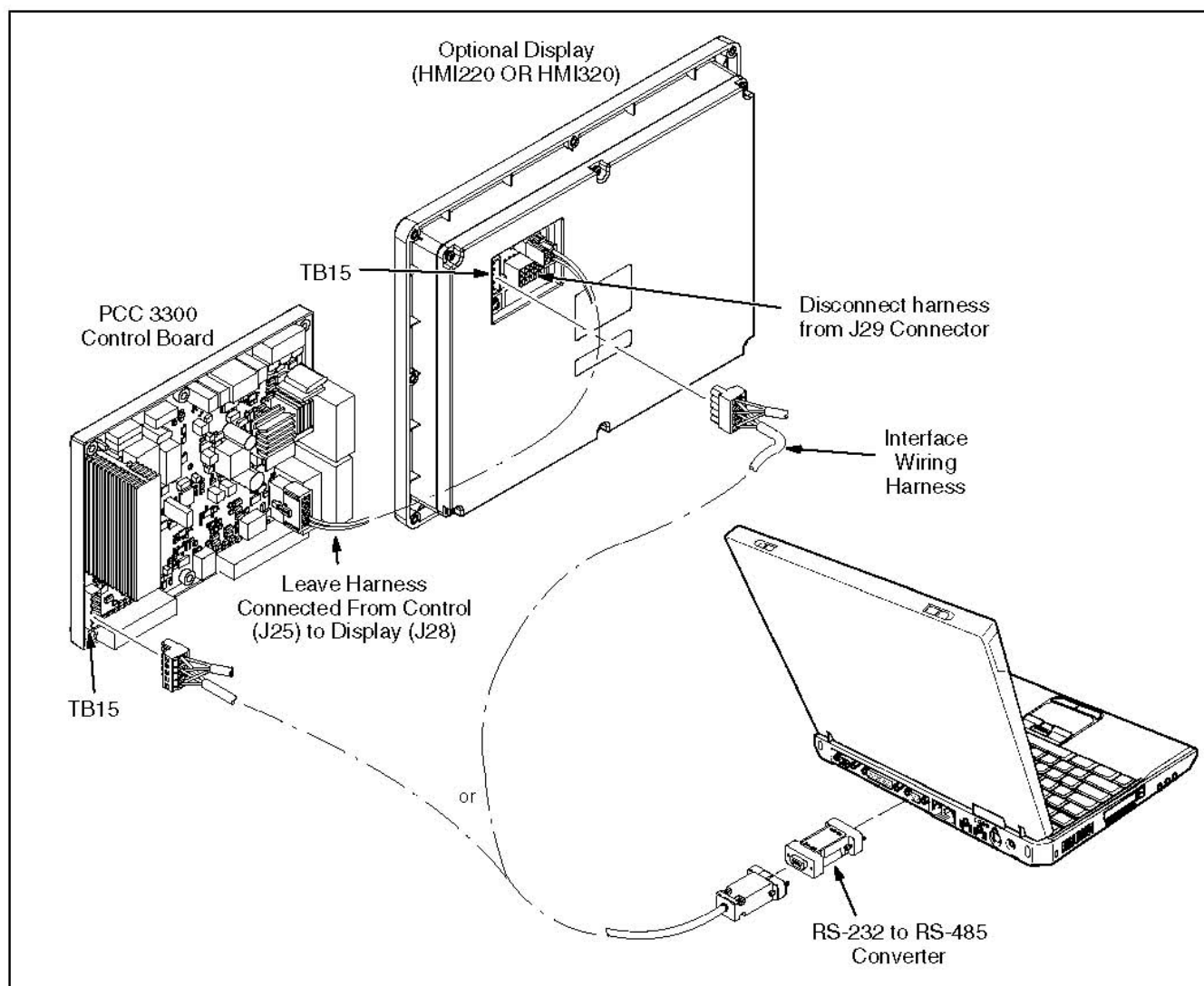


FIGURE 31. PCC3300 INPOWER CONNECTION

5.1.1.8 Connecting to a PCC 3100 Generator Set

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 32](#)).

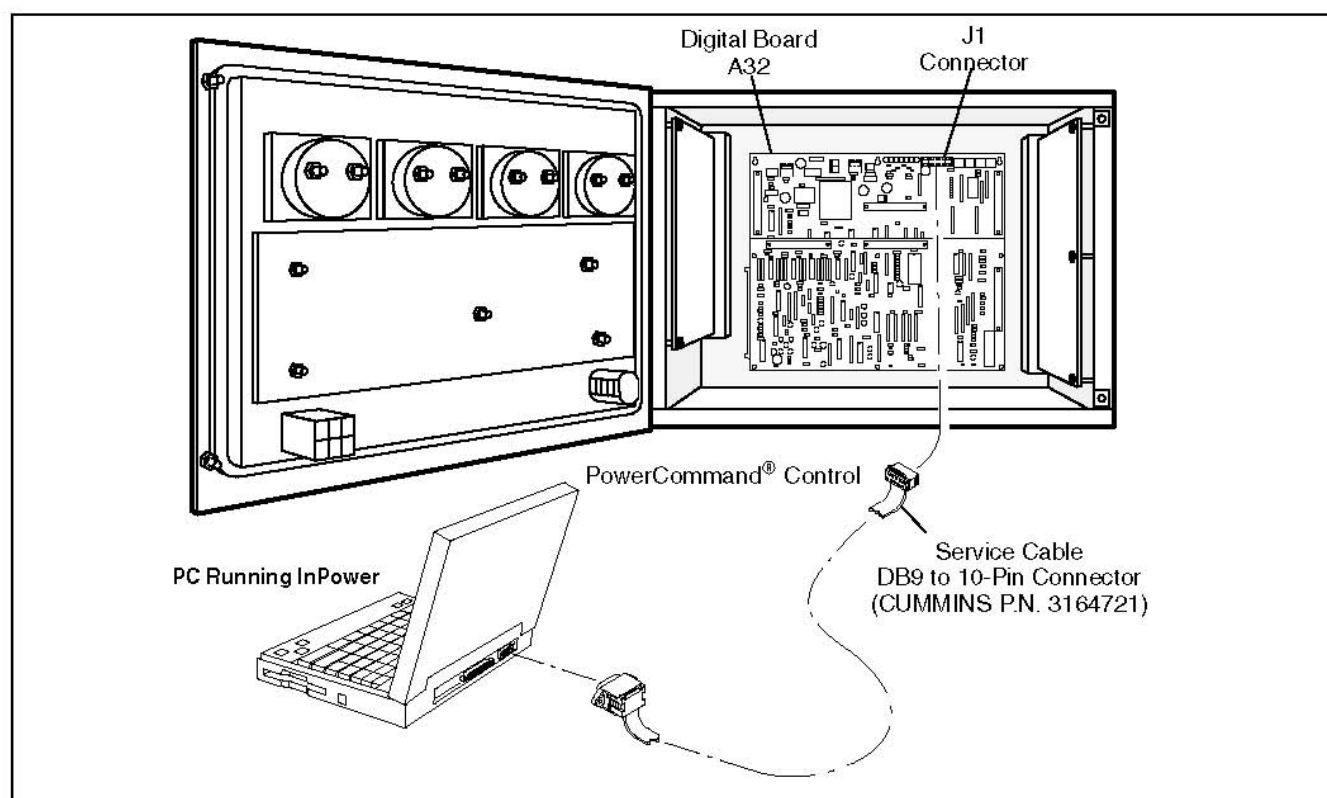


FIGURE 32. PCC 3100 INPOWER CONNECTION

5.1.1.9 Connecting to a PCC 3200 Generator Set

[Figure 33](#), [Figure 34](#), and [Figure 35](#) show three methods of connecting to a PCC 3200 generator set. 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.

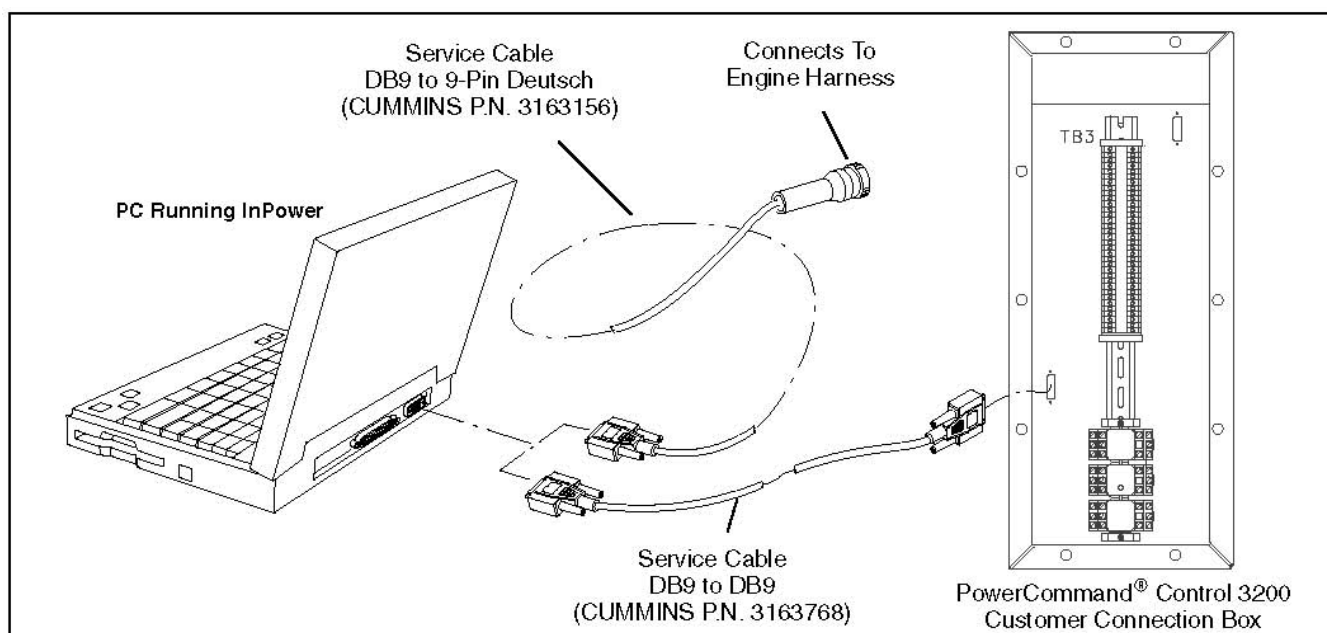


FIGURE 33. INPOWER CONNECTION (PCC 3200 TYPE 1 CONNECTION BOX)

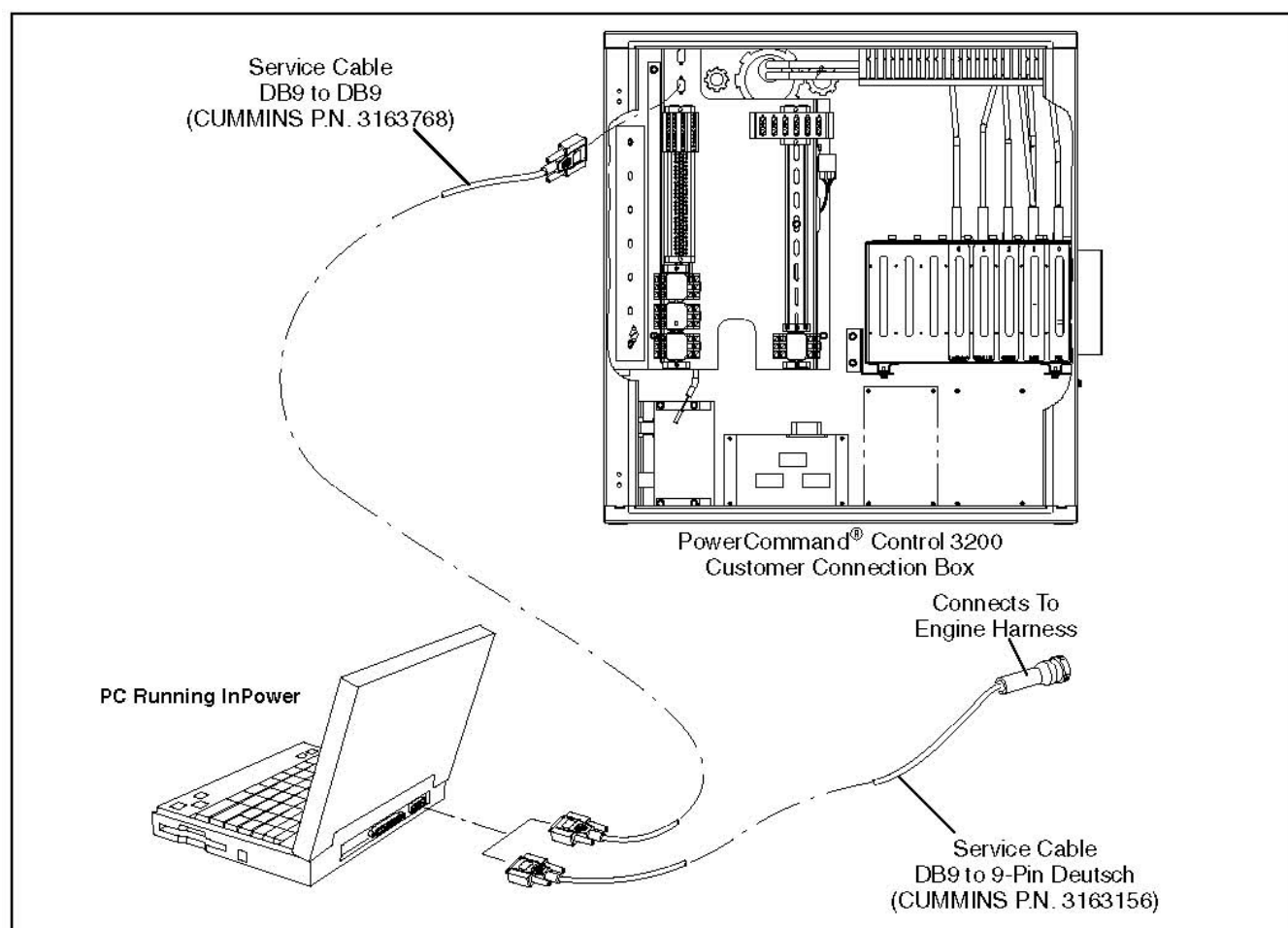


FIGURE 34. INPOWER CONNECTION (PCC 3200 TYPE 2 CONNECTION BOX)

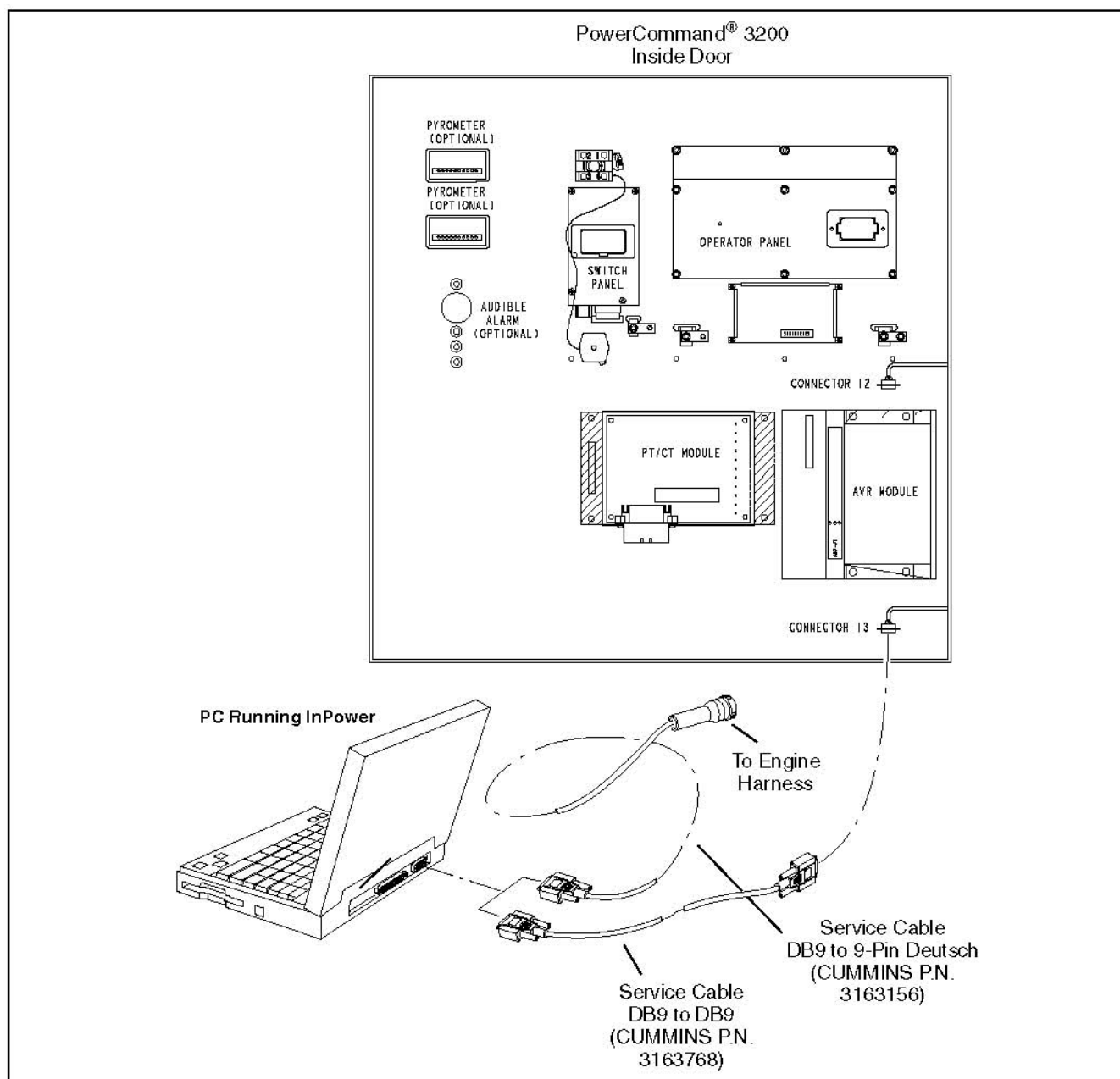


FIGURE 35. PCC 3200 SERIAL CONNECTION (TYPE 3, FOUR CARD CAGE STYLE)

5.2 Consumer Generator Set Service

InPower performs several functions including generator set 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 generator set in order to write adjustment trims and setting changes to the controller, and to temporarily send test commands to the generator set controller. The features described may not apply to all control types.

5.2.1 Connecting to a Generator Set

Connection between the service PC and the generator set 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 37](#) and [Figure 38](#) show two types of connections to a generator set in a recreational vehicle. [Figure 39](#) shows how to connect to a marine generator set. 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.

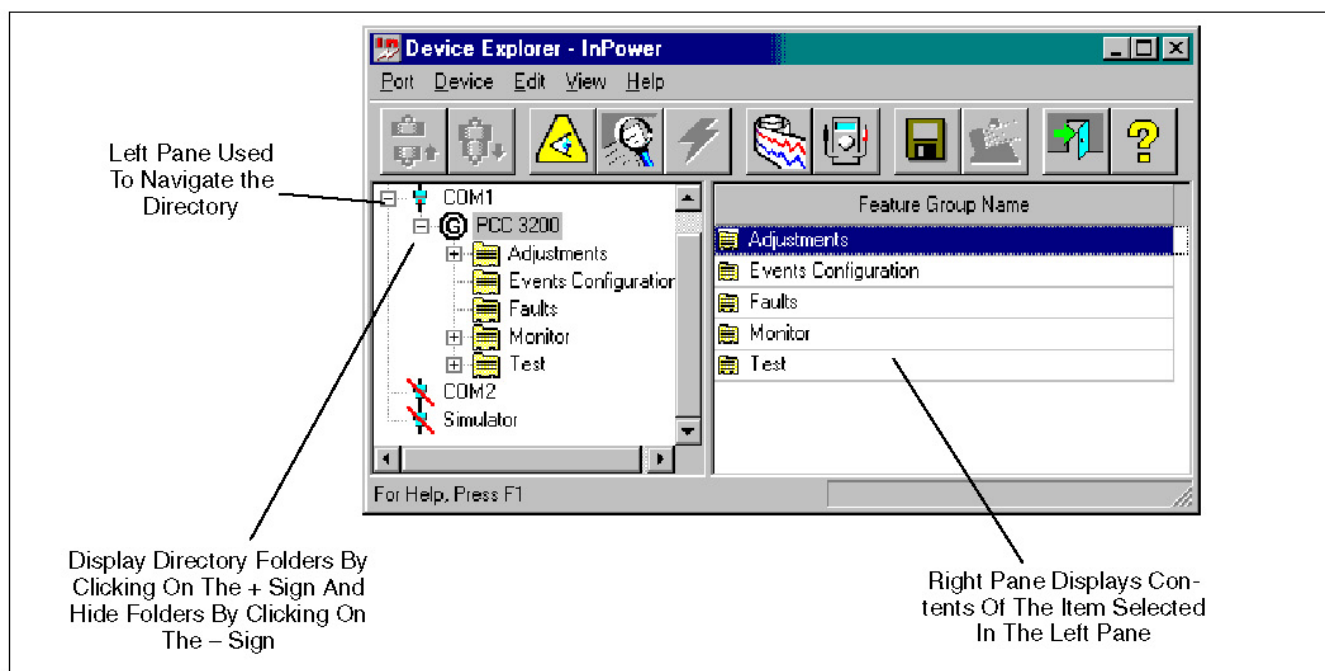


FIGURE 36. DEVICE EXPLORER - TYPICAL GENERATOR SET FEATURES

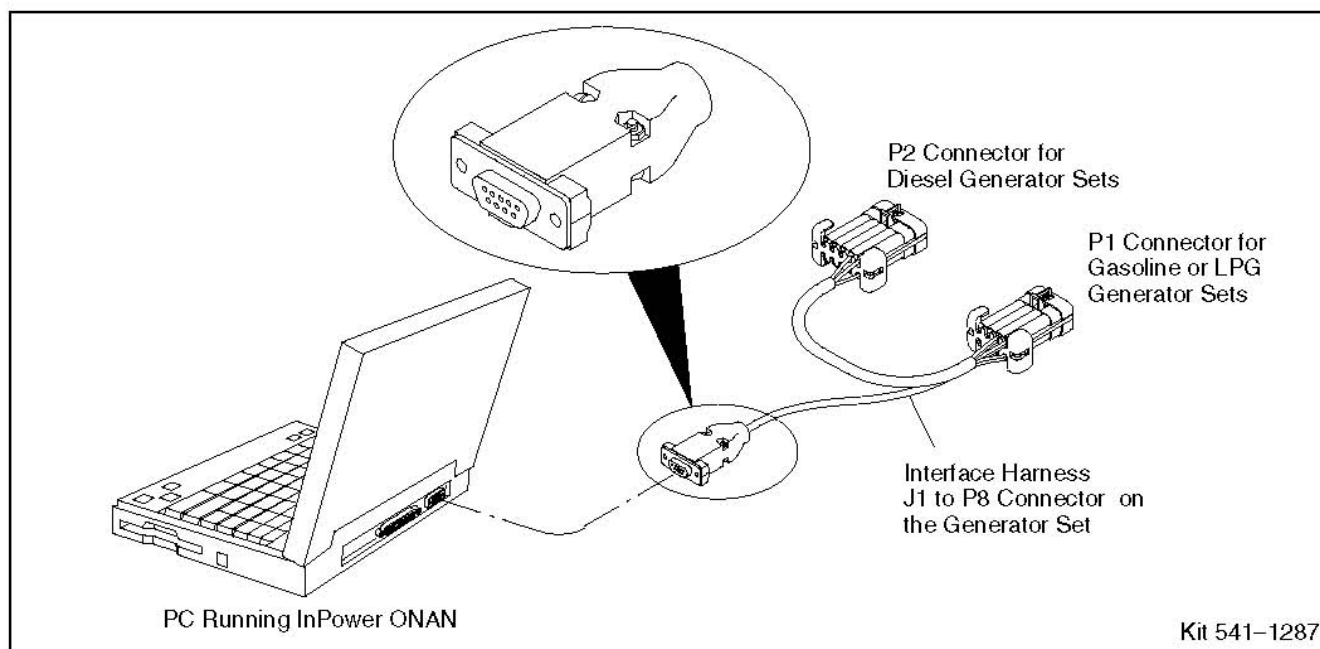


FIGURE 37. INPOWER SERIAL CONNECTION FOR HDKCX, HDKAX (PRIOR TO SPEC K, AND HDKBX DIESEL GENERATOR SETS AND HGJAA, HGJAD, HGJAB, HGJAC, HGJAE, HGJAF (UNITS WITH CONTROLS BUILT IN 2001 OR LATER, UP TO SPEC E), KY, AND MKY GASOLINE/LPG GENERATOR SETS

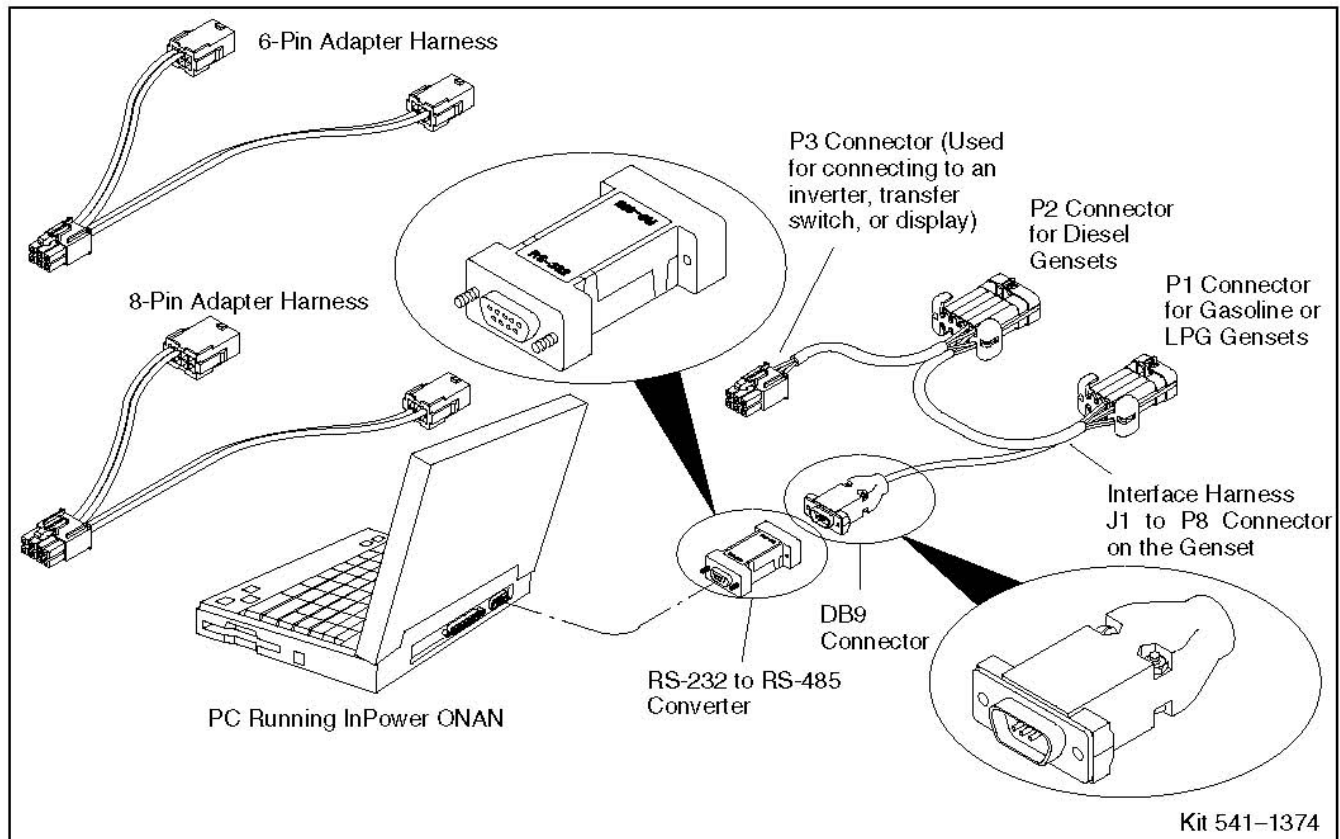


FIGURE 38. INPOWER SERIAL CONNECTION FOR HDKAX (STARTING WITH SPEC K), DKHA, HDKAW, 810HQD, 1215HQD, AND 1218HQD DIESEL GENERATOR SETS, HQGMX, HGJBB, HGJAA, HGJAB, HGJAD, HGJAE (STARTING WITH SPEC J) GASOLINE/LPG GENERATOR SETS, GSAAX NATURAL GAS/PROPANE GENERATOR SETS, AND HJBAAX AND RV/CM DISPLAYS

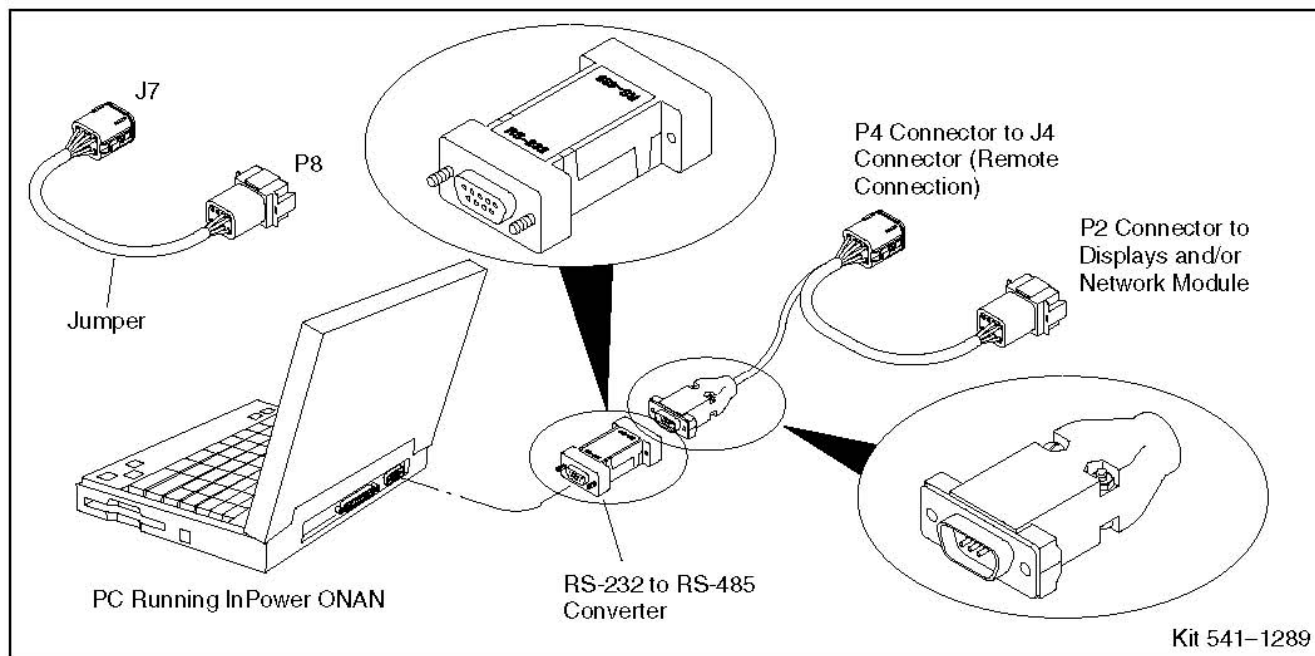


FIGURE 39. SHOWS HOW TO CONNECT TO A MARINE GENERATOR SET. THE INTERFACE HARNESS FROM THE SERVICE PC CAN BE CONNECTED

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 40](#) shows how to connect to an inverter/charger or a transfer switch. [Figure 41](#) and [Figure 42](#) 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.

NOTICE

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.

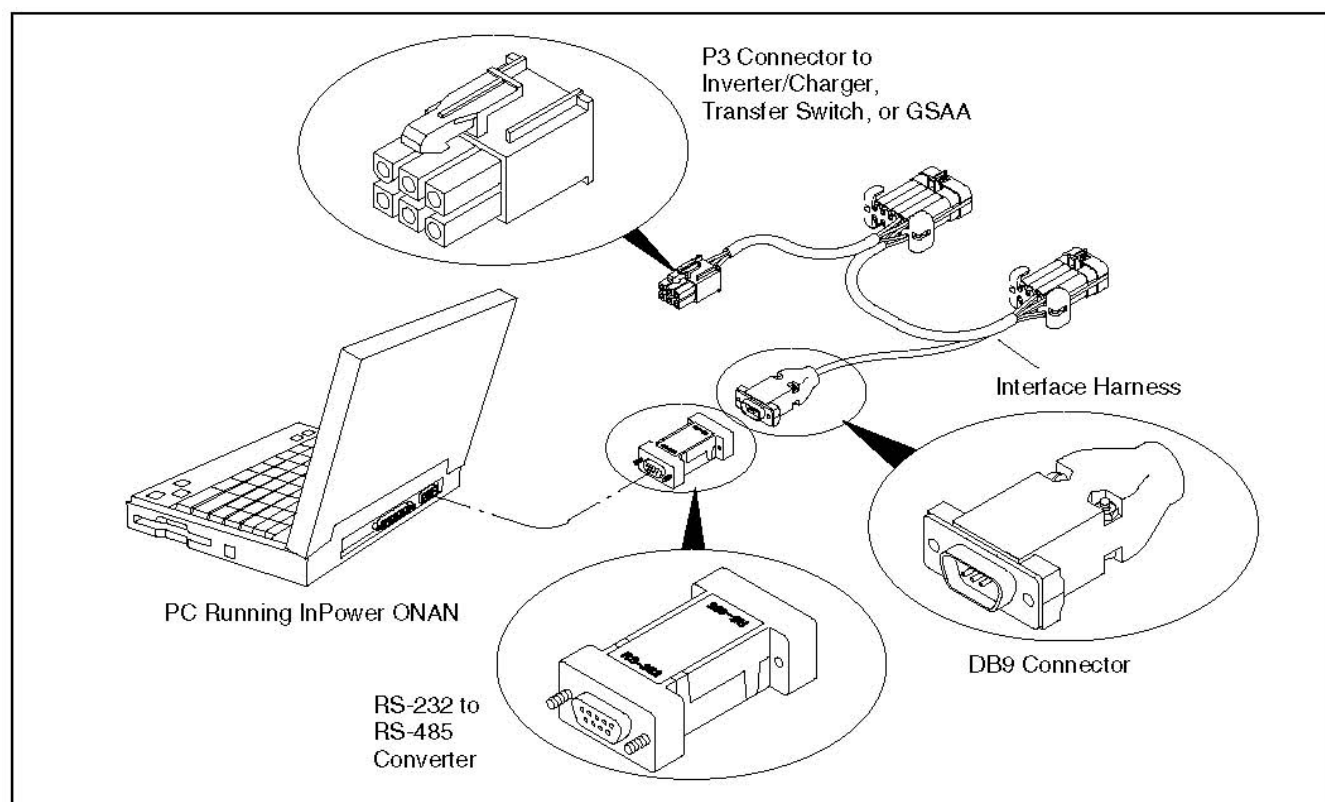


FIGURE 40. INPOWER SERIAL CONNECTION FOR AN HQD INVERTER/CHARGER OR TRANSFER SWITCH, RV INVERTER, AND GSAA

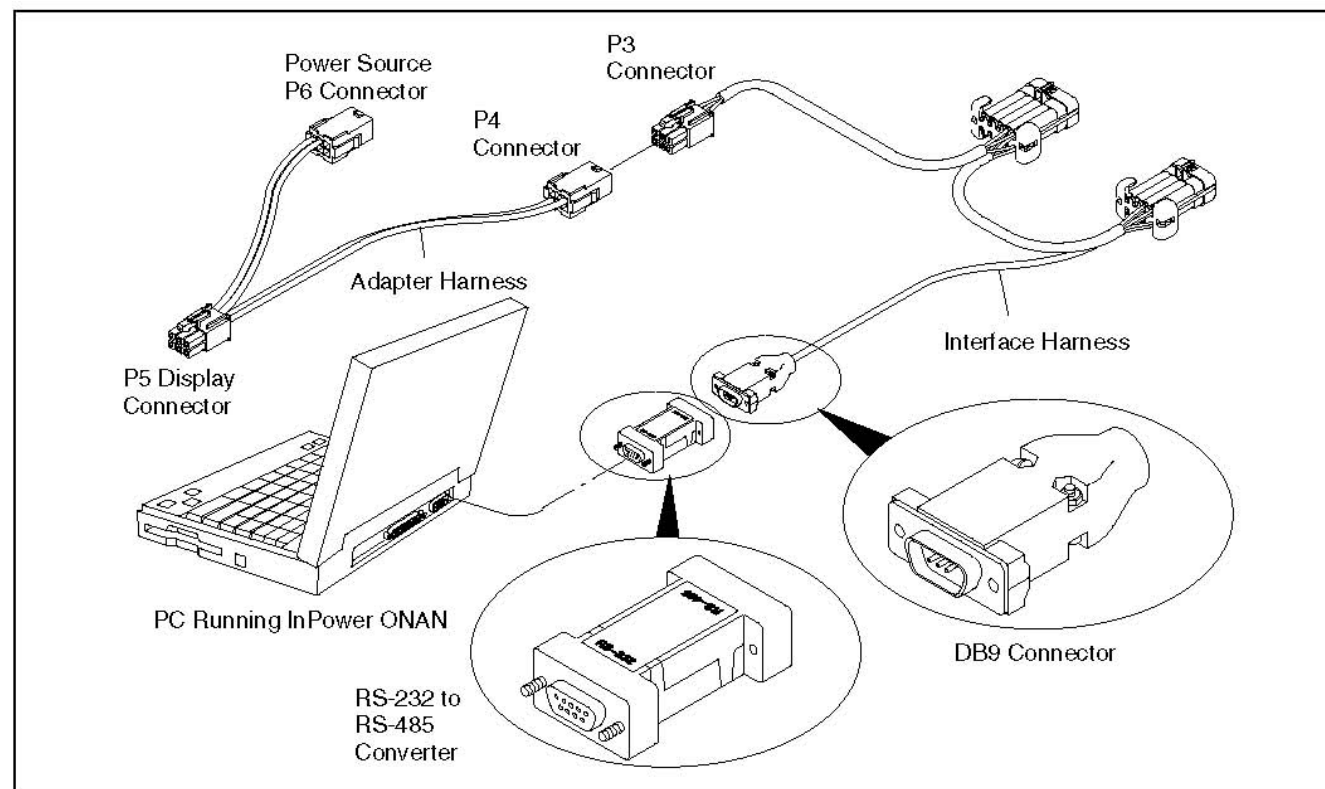


FIGURE 41. INPOWER SERIAL CONNECTION FOR 6-PIN RV/COMMERCIAL MOBILE DISPLAYS

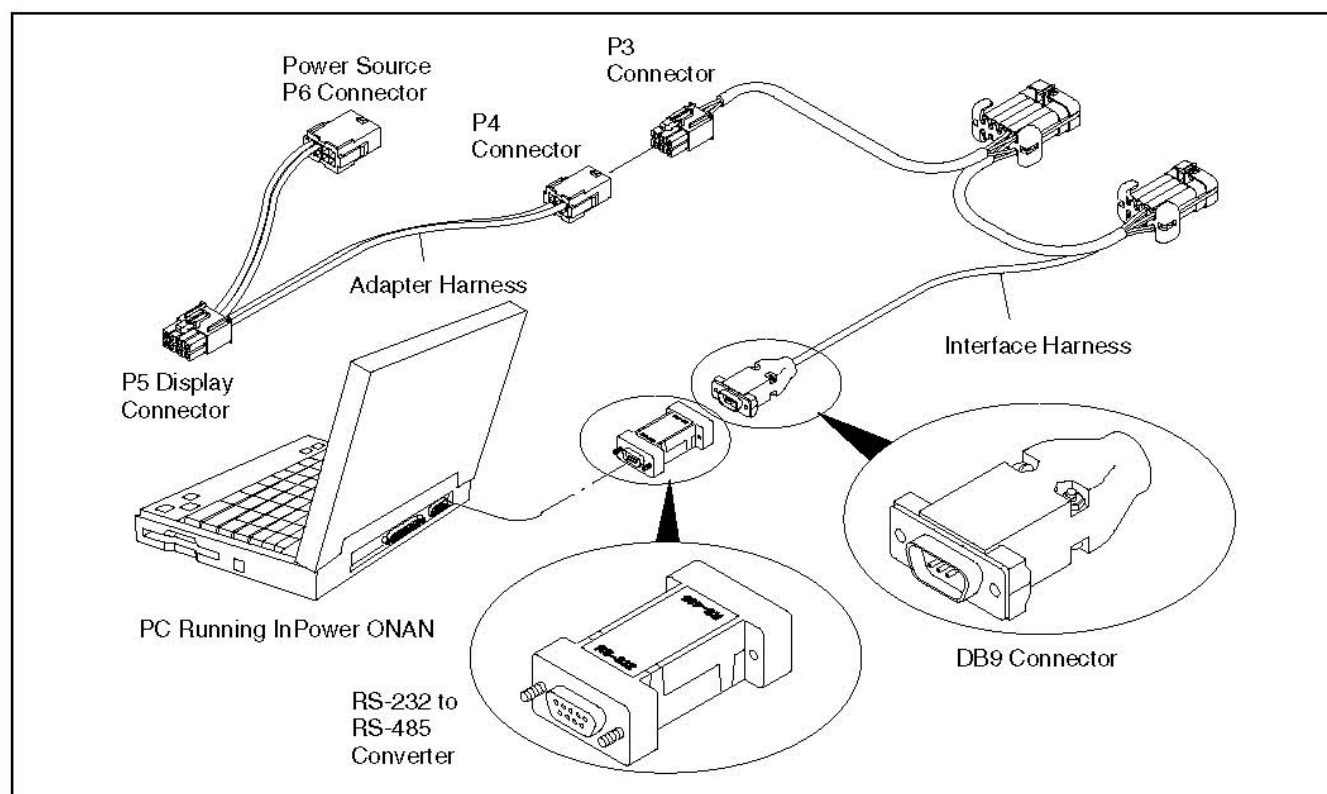


FIGURE 42. INPOWER SERIAL CONNECTION FOR 8-PIN RV/COMMERCIAL MOBILE DISPLAYS

5.2.3 Connecting to Marine Devices

5.2.3.1 Programming A Marine Control

To program a Marine control, refer to the connections shown in [Figure 43](#).

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 generator set data.
4. Program the control.
5. Remove the battery and reconnect the wiring to its original configuration.

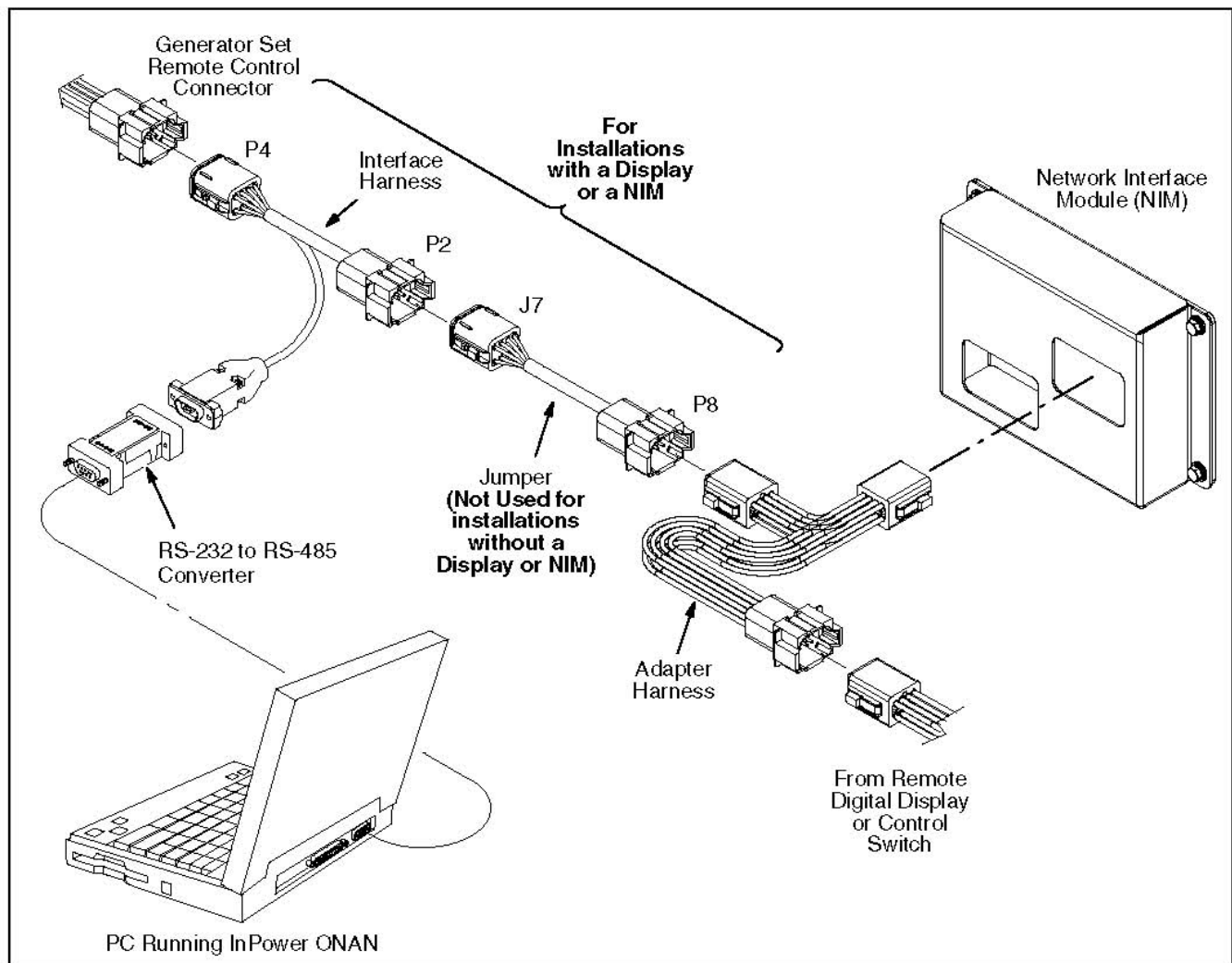


FIGURE 43. INPOWER SERIAL CONNECTION FOR MARINE CONTROLS

5.2.3.2 Programming A Marine Display

To program a Marine display, refer to the connections shown in [Figure 44](#).

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.

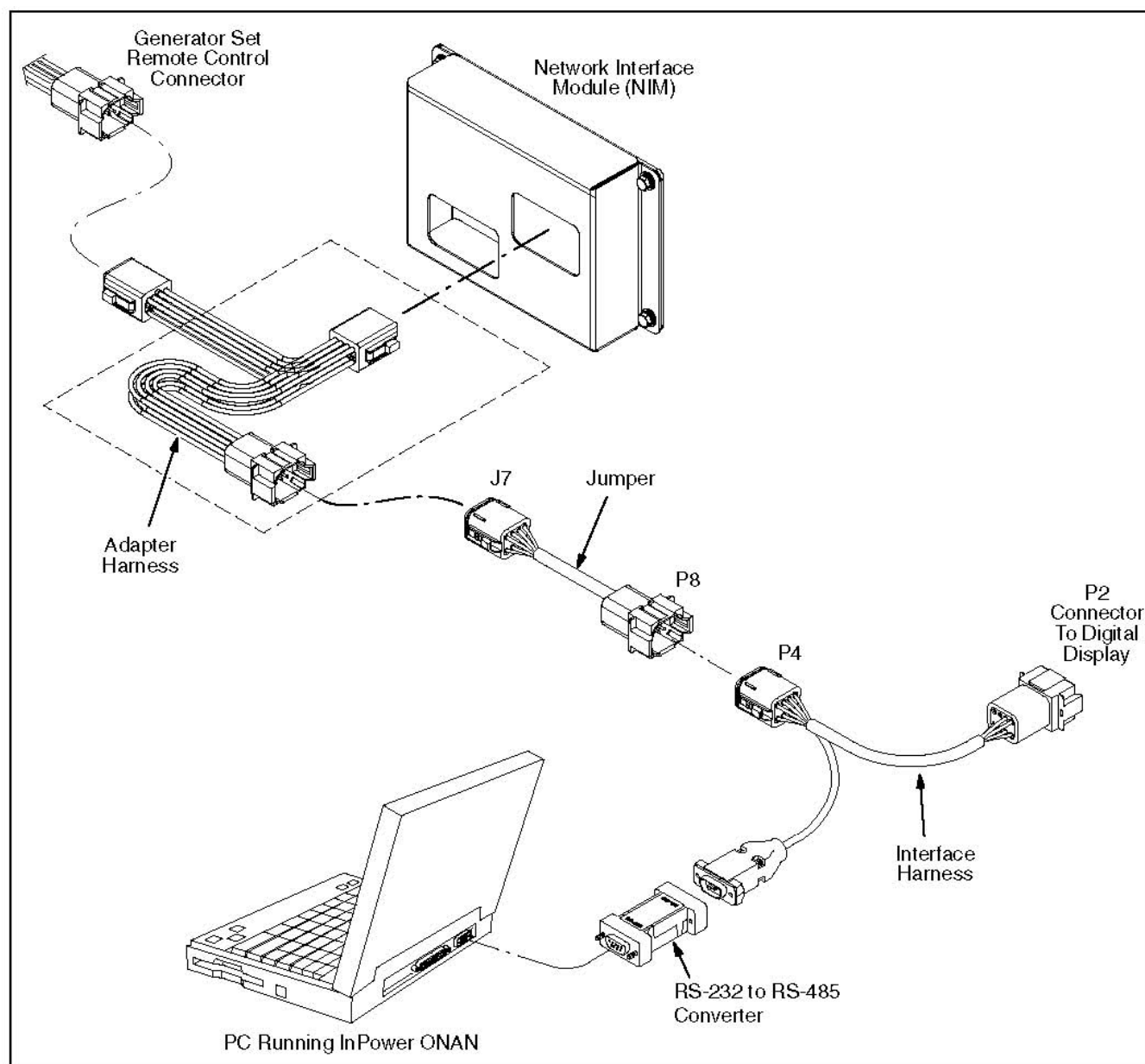


FIGURE 44. INPOWER SERIAL CONNECTION FOR MARINE DISPLAYS

5.2.3.3 Programming A Network Interface Module (NIM)

To program a Marine NIM, refer to the connections shown in [Figure 45](#).

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 generator set data.
9. Unplug the display.
10. Program the NIM.
11. Remove the battery and reconnect the wiring to its original configuration.

NOTICE

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

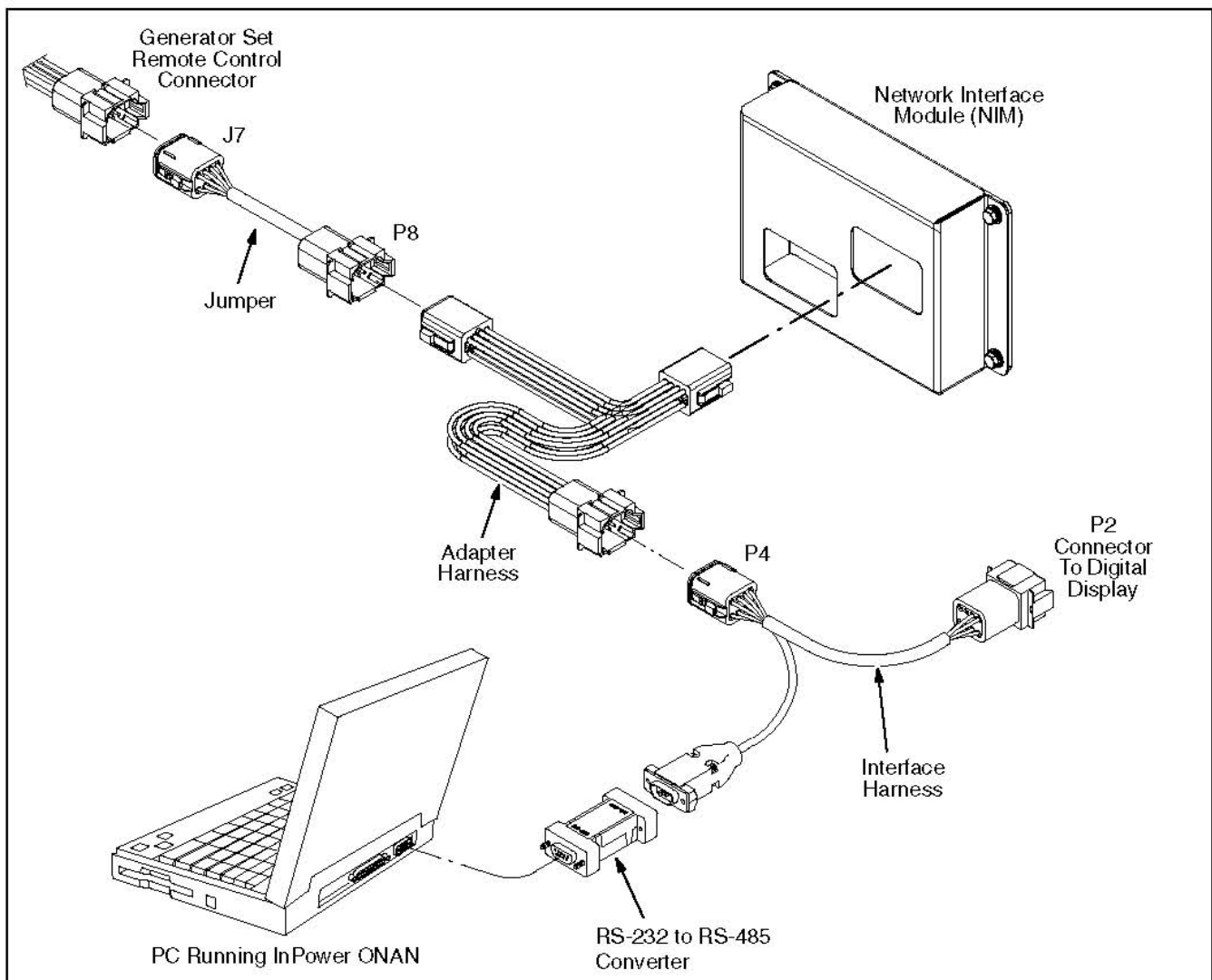


FIGURE 45. INPOWER SERIAL CONNECTION FOR PROGRAMMING A NIM

5.3 Starting InPower

Start InPower and connect to the Site of the generator set control to service that matches the COM port on the service. The available Sites are displayed in the Device Explorer directory (left pane). Double click on the Site (or click on the Site and then click on the **Connect** button, on the toolbar).

If InPower has problems connecting to a site, the message shown in [Figure 46](#) is displayed. If, after a few seconds, the program still cannot connect to the site, the connection failure message shown in [Figure 46](#) is displayed. If you get this message, click on **OK**, make sure the selected COM port is available, make sure the COM port is not being used, verify that the RS-485 adapter is correctly installed, make sure the generator set is powered and the control is awake, check all connections, and repeat the procedure for connecting to the Site.

NOTICE

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

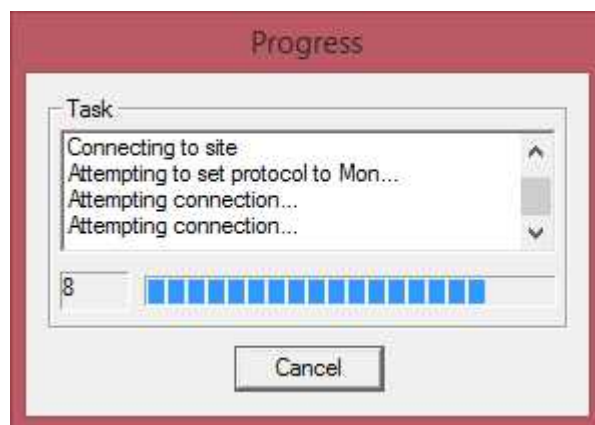


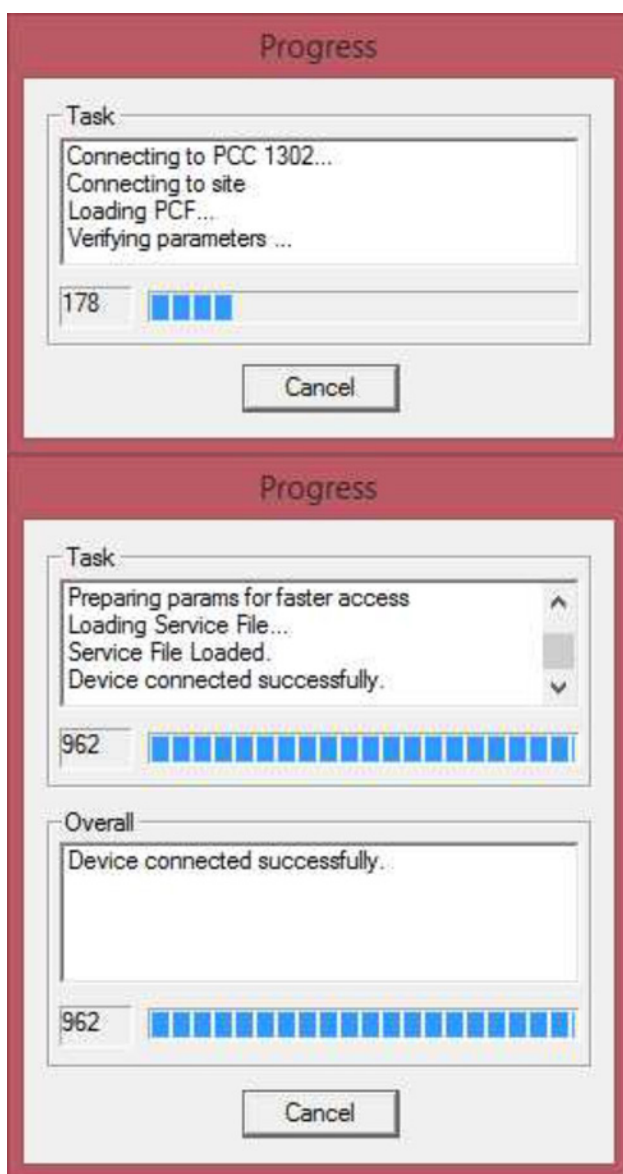
FIGURE 46. CONNECTION PROBLEM MESSAGE



FIGURE 47. CONNECTION FAILURE MESSAGE

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

When you double click on a site the first time after InPower is started, the Progress messages shown in [Figure 48](#) 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 49](#)). Click on **OK** to acknowledge the message.

**FIGURE 48. DEVICE PROGRESS MESSAGES****FIGURE 49. 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

NOTICE

The available features vary from generator set to generator set.

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

5.4 Generator Set Adjustments

This section describes how to make generator set parameter value adjustments for trims and settings. There are a large number of adjustable trims and settings available for generator sets. Not all generator set 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 50](#) 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.

NOTICE

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

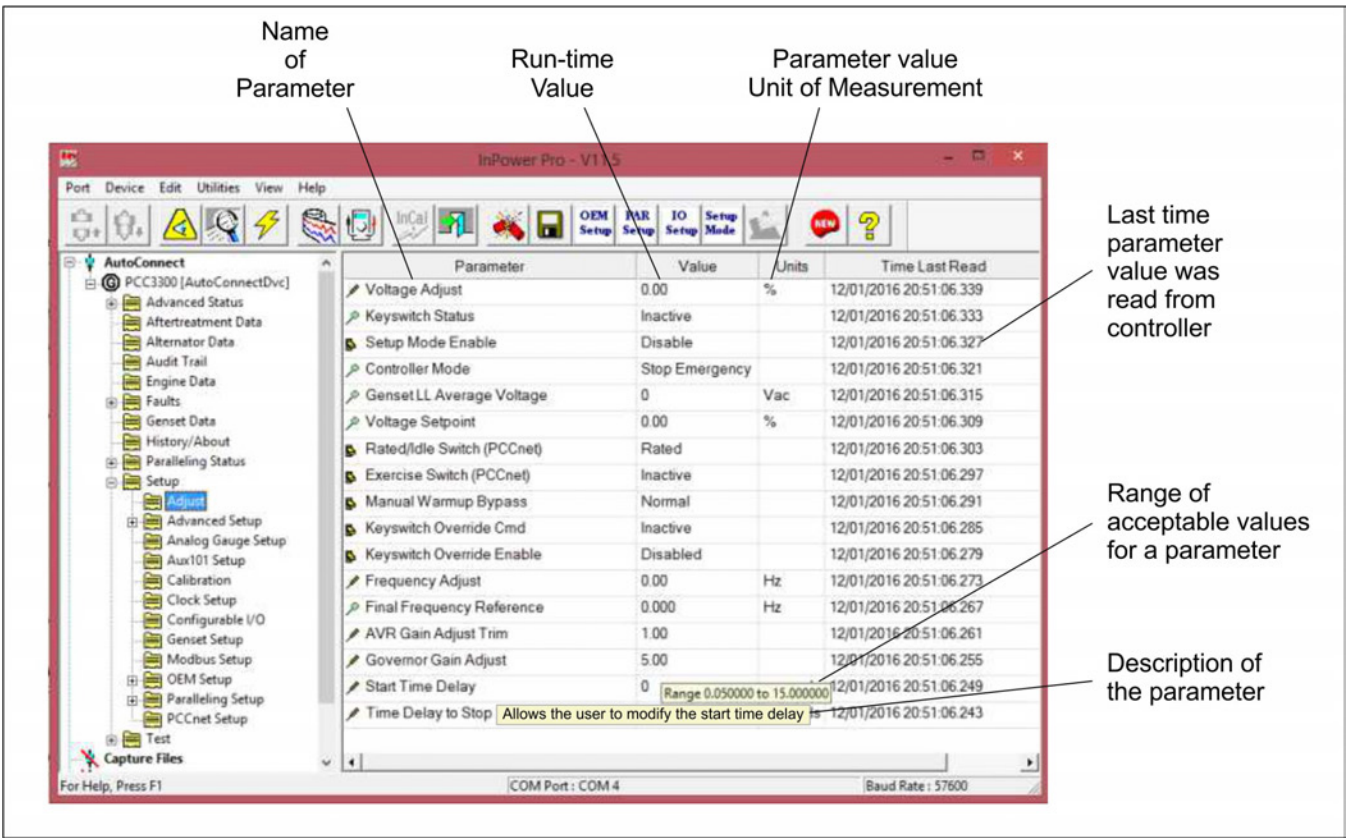


FIGURE 50. TYPICAL PARAMETER INFORMATION

5.4.2 Adjustment Features

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

The **Adjustments** directory for a typical generator set 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 generator set setup and feature settings. For example, the Exercise Setup parameter allows the user to set the generator set exercise duration, in hours.

Generator Set 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.

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.

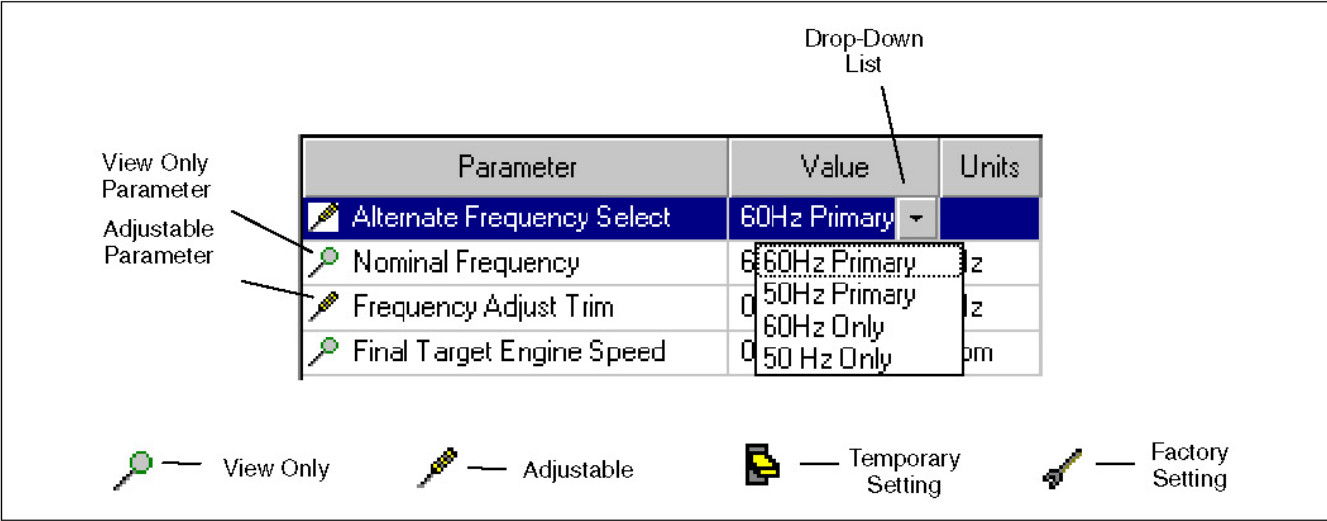


FIGURE 51. TYPICAL ADJUSTMENT FEATURES

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 51](#)).

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 adjusted, the range for the parameter is displayed ([Figure 52](#)). 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.

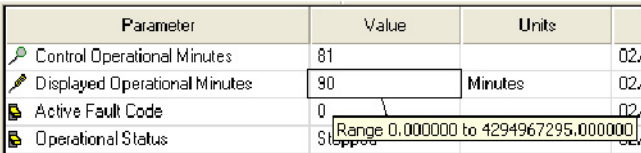


FIGURE 52. PARAMETER RANGE

NOTICE

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 53). Review the information in the dialog box to see the value limits, before clicking **OK**, to close the error message dialog box.

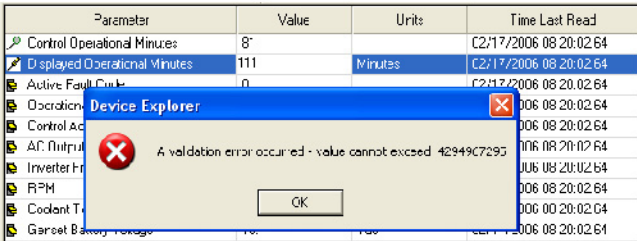


FIGURE 53. ADJUSTMENT ERROR

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 generator set is running. Do not attach or remove test meters while the generator set 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 54), 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 55). 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.

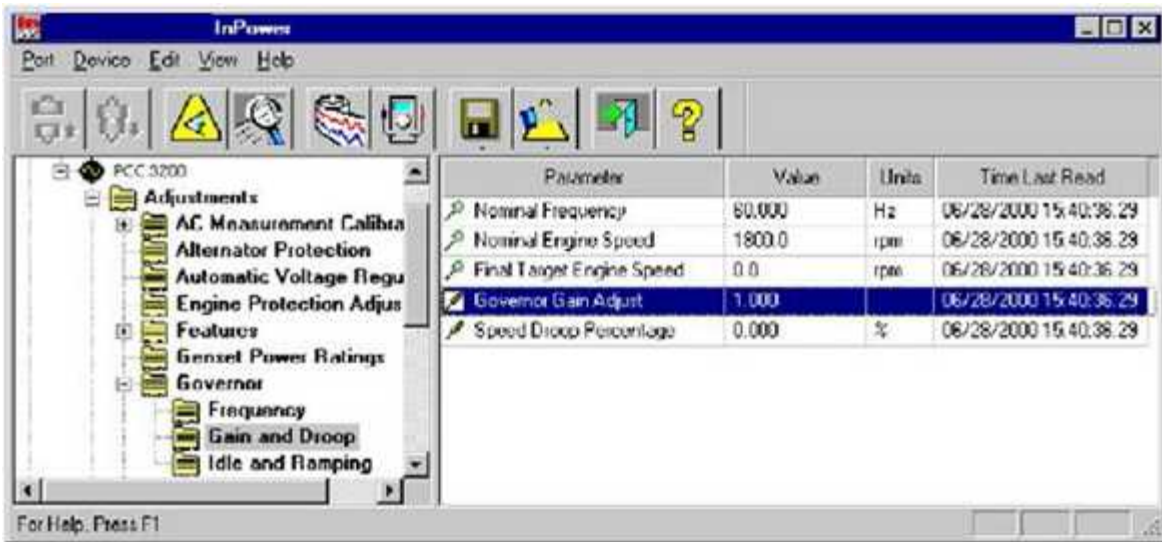


FIGURE 54. ADJUSTMENTS - GOVERNOR - GAIN AND DROOP

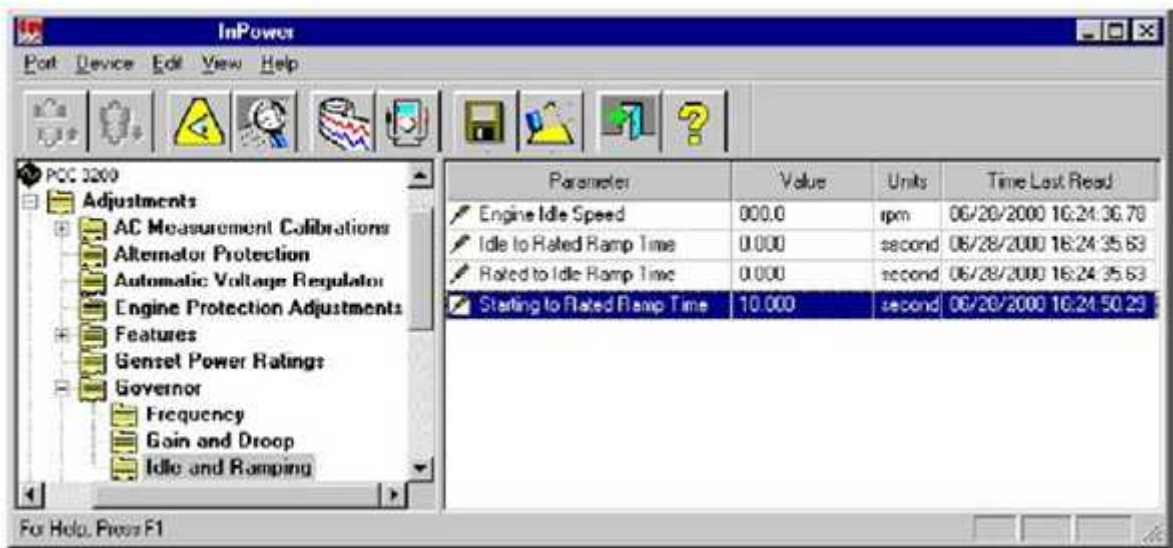


FIGURE 55. ADJUSTMENTS - GOVERNOR - IDLE AND RAMPING

Example: In this example (Figure 56), InPower is used to adjust the automatic voltage regulator to obtain the correct AVR gain setting.

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

Start the generator set and allow it to warm up. Apply and remove a load from the generator set 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 57). 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.

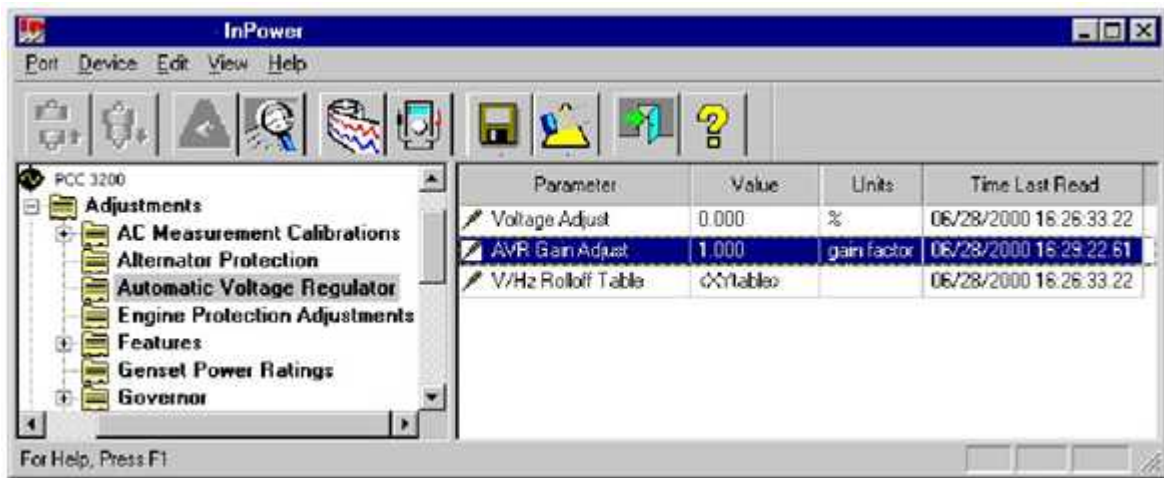


FIGURE 56. ADJUSTMENTS - AUTOMATIC VOLTAGE REGULATOR

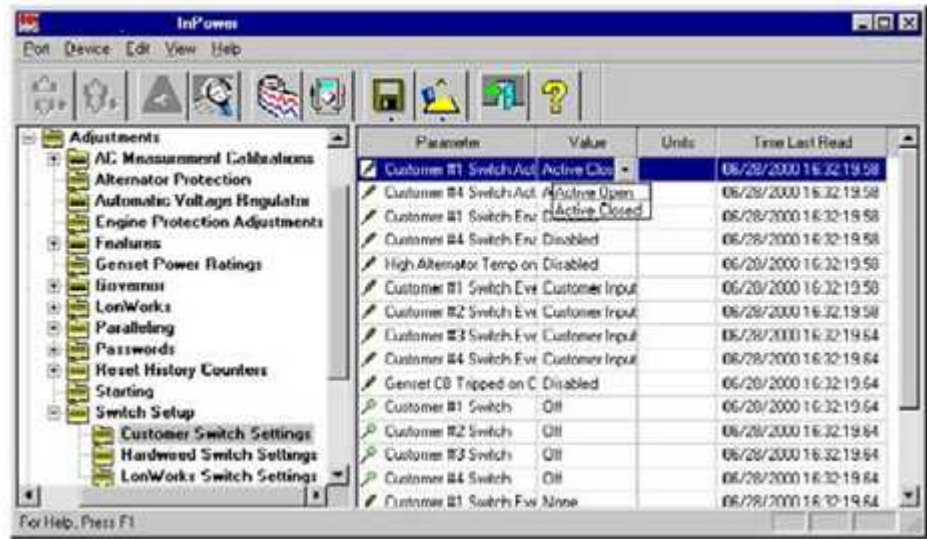


FIGURE 57. SWITCH SETUP - CUST. 1 SWITCH STATE

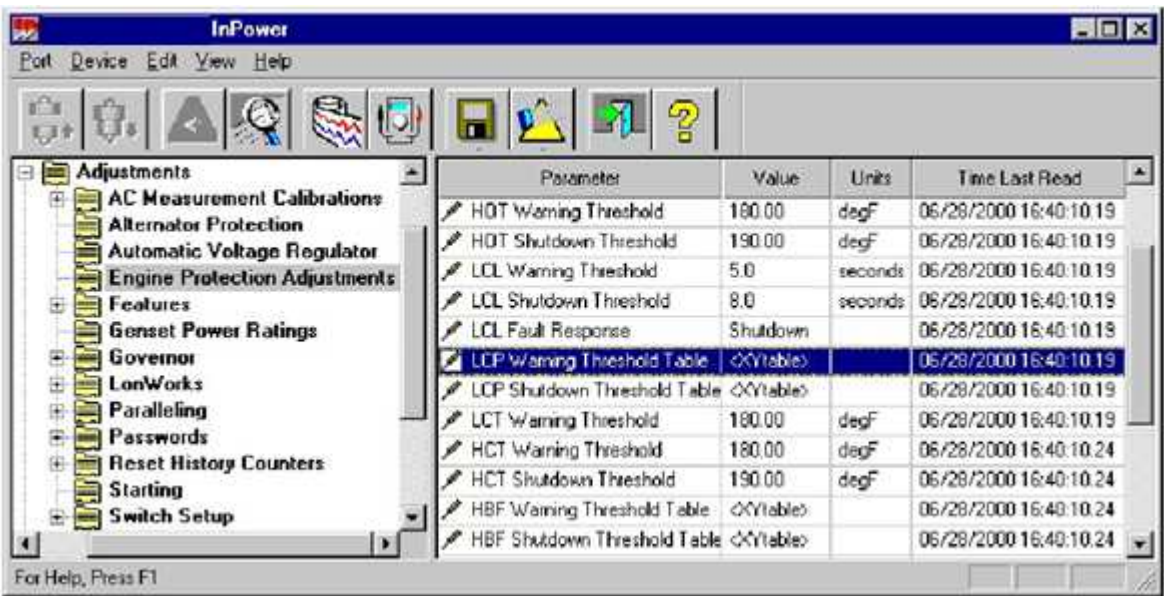


FIGURE 58. ENGINE PROTECTION ADJ. - LCP WARNING THRESHOLD

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

NOTICE

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 58). 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 59) or in the Spreadsheet Mode (Figure 60). 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.

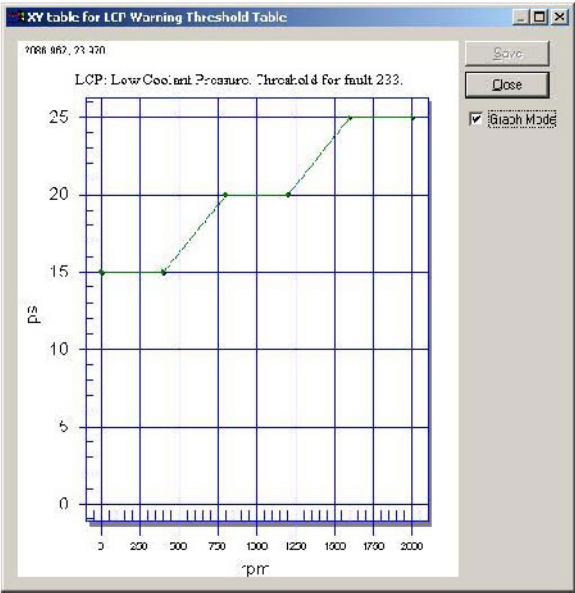


FIGURE 59. XY GRAPH

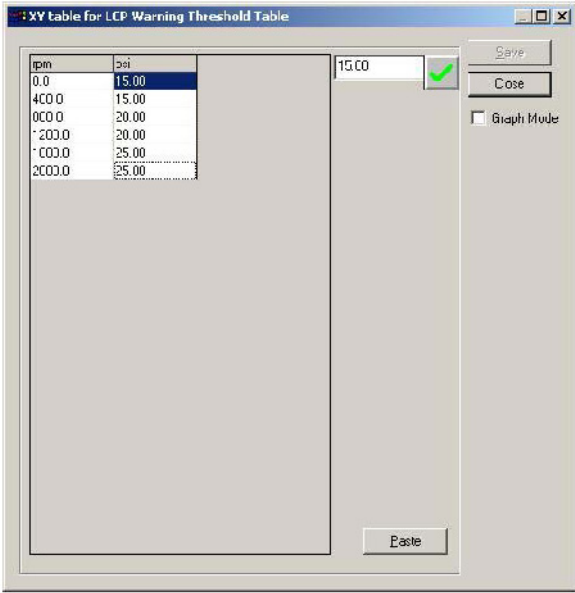


FIGURE 60. XY SPREADSHEET

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 60](#)) 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 61](#)), 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 61. CHANGE PASSWORDS

Password Example 2: In this example ([Figure 62](#)), 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.

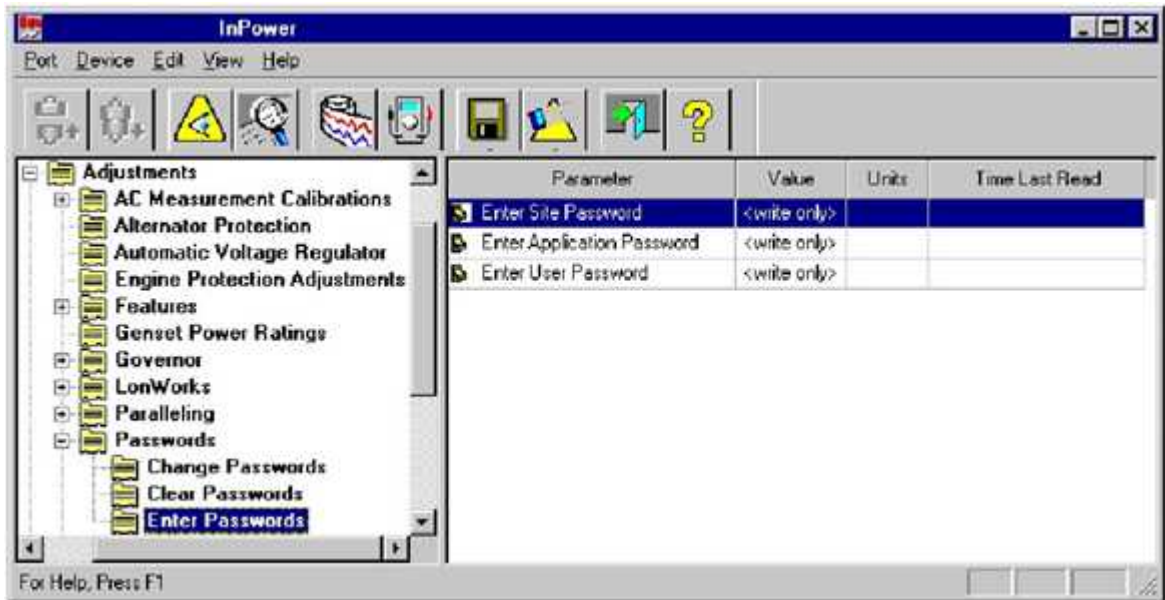


FIGURE 62. ENTER PASSWORDS

Password Example 3: In this example (Figure 63), 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 63. CLEAR PASSWORDS

Example: In this example (Figure 65), InPower is used to display a load profile for a PCC 3100 generator set.

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 for **Genset Load Profile** (Figure 64).

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.

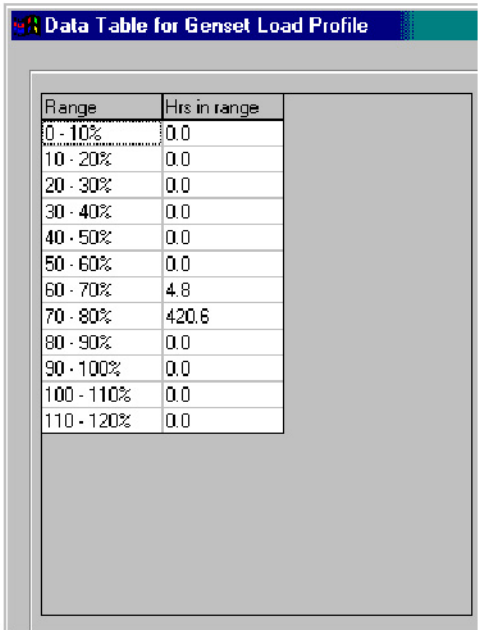


FIGURE 64. PCC 3100 LOAD PROFILE

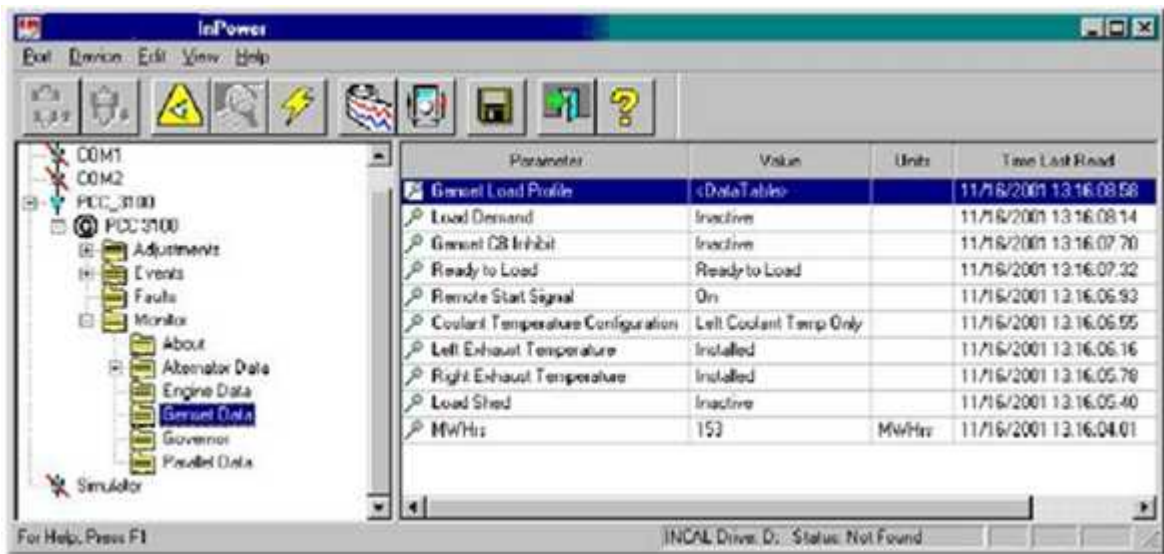


FIGURE 65. PCC 3100 GENSET LOAD PROFILE

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.

NOTICE

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 generator set 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. 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 Generator Sets

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

- Fault Simulation
- Inputs
- Manual Operation

- Outputs
- Self Test
- Speed Override
- Protection Verification
- Annunciator

5.6.2 Consumer Generator Sets

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

- 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 generator set command may result in damage to the generator set. Only trained and experienced personnel should override generator set 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 Output 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 66. 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 generator set 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 67](#) 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.

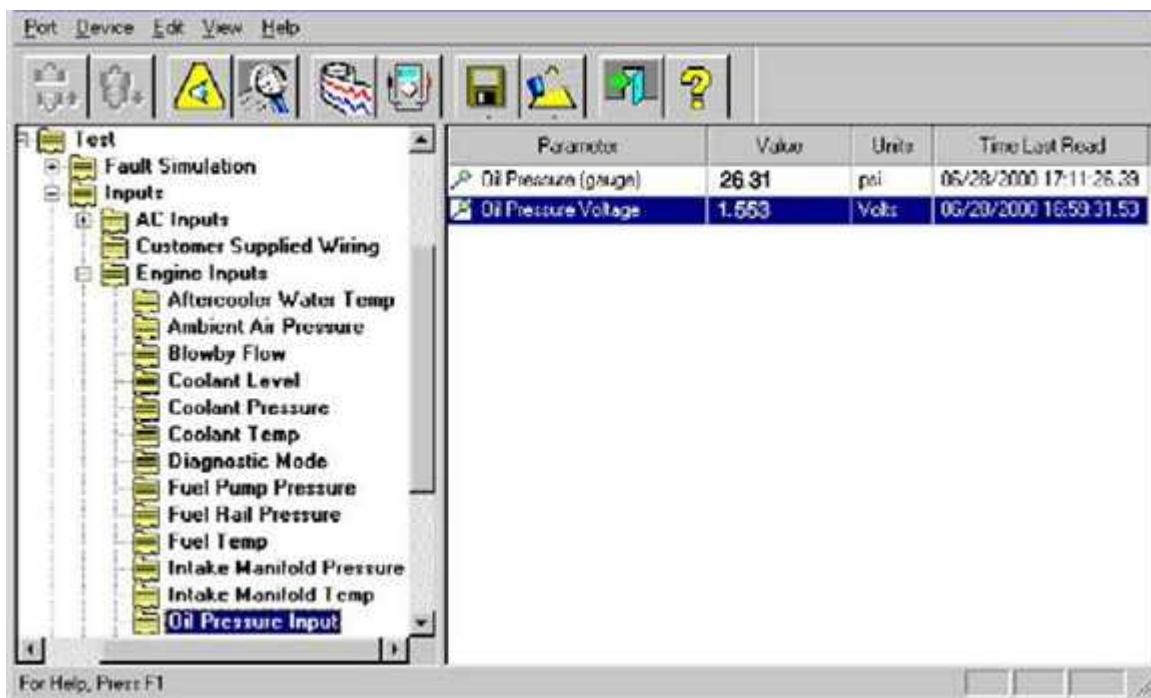


FIGURE 67. TEST - INPUTS - OIL PRESSURE

5.6.8 Manual Operation

This feature allows the user to perform generator set operations including exercising the generator set, stopping the generator set and bypassing the warm-up period (used if the generator set 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 generator set 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 68](#)). 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 generator set. 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 69](#)). 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.

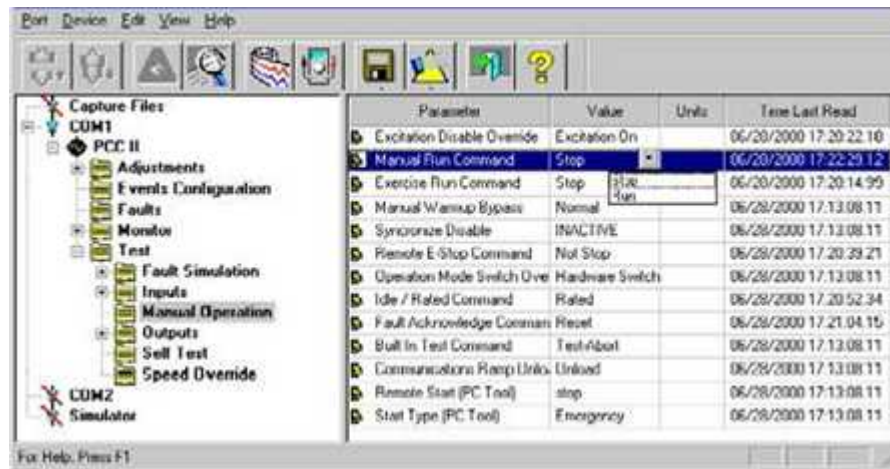


FIGURE 68. MANUAL OPERATION - MANUAL RUN COMMAND

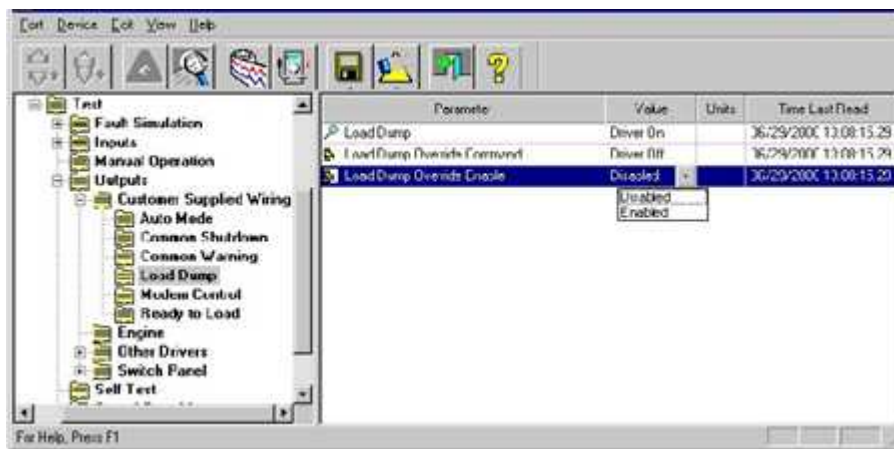


FIGURE 69. OUTPUTS - CUST. SUPPL. WIRING - LOAD DUMP

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 70](#)).

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 70).

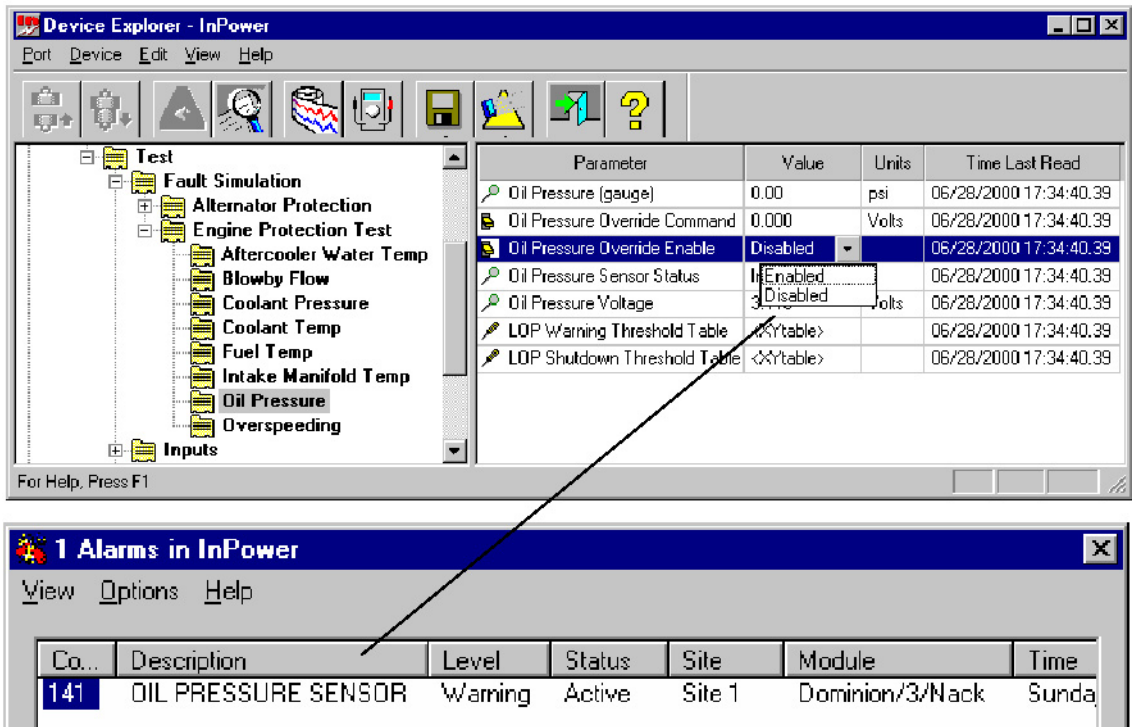


FIGURE 70. TEST - ENGINE PROTECTION -OIL PRESSURE TEST

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 71 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.

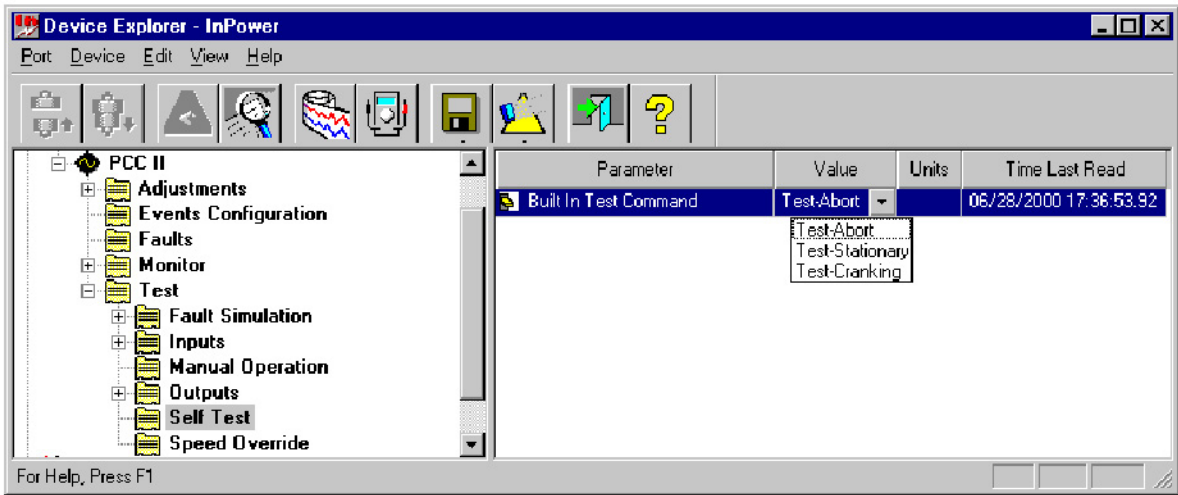


FIGURE 71. SELF TEST - TEST -BIT COMMAND

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 72). This test is used in generator set 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.

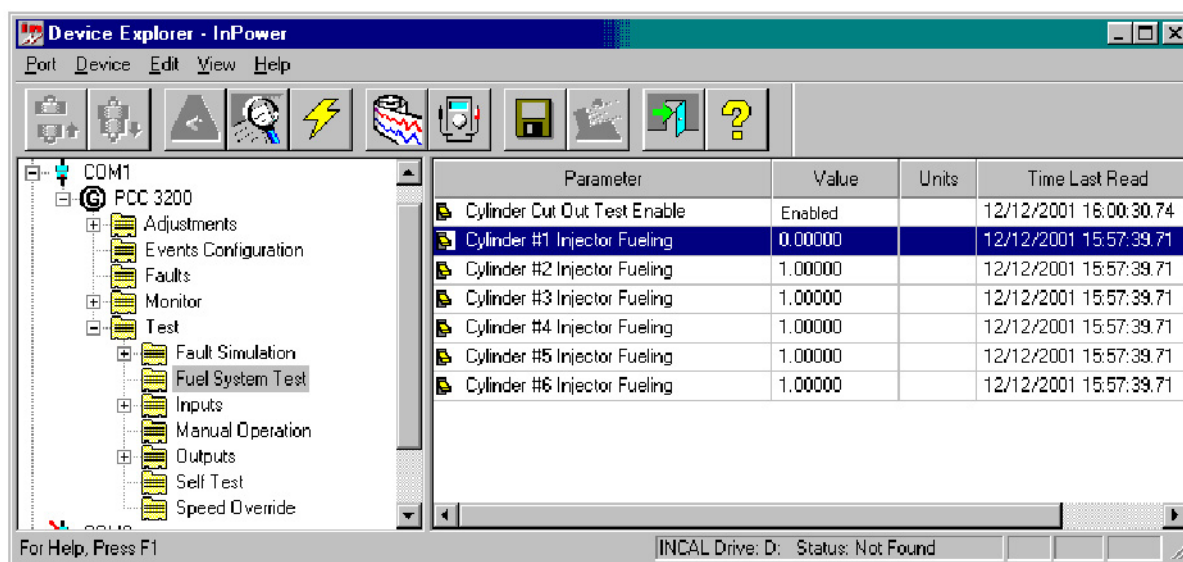
Connect the service PC to the generator set. Start the generator set and operate it at rated speed with no load.

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 72. SINGLE CYLINDER CUTOFF TEST**

This page is intentionally blank.

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 73](#)).

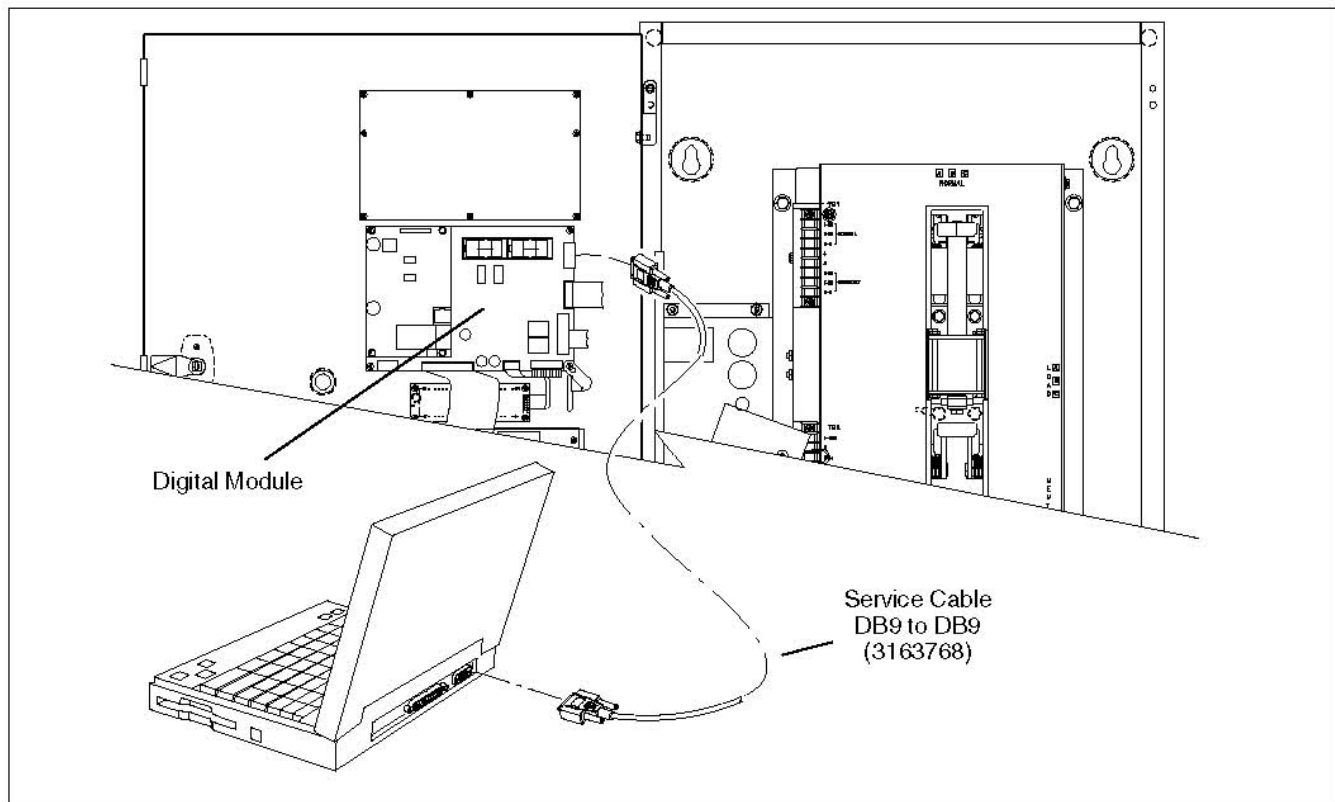


FIGURE 73. INPOWER SERVICE CONNECTION (ORIGINAL ATS APPLICATIONS)

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 74 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.**

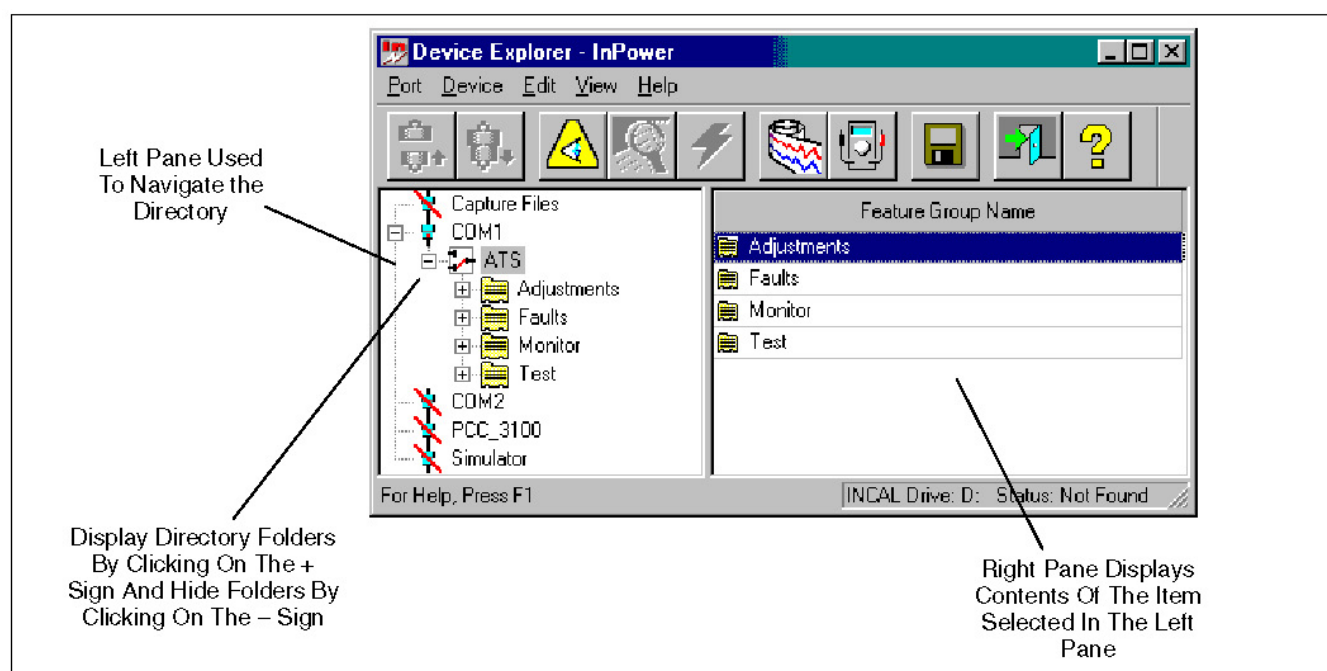


FIGURE 74. DEVICE EXPLORER - TYPICAL ATS FEATURES

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 75](#) 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.

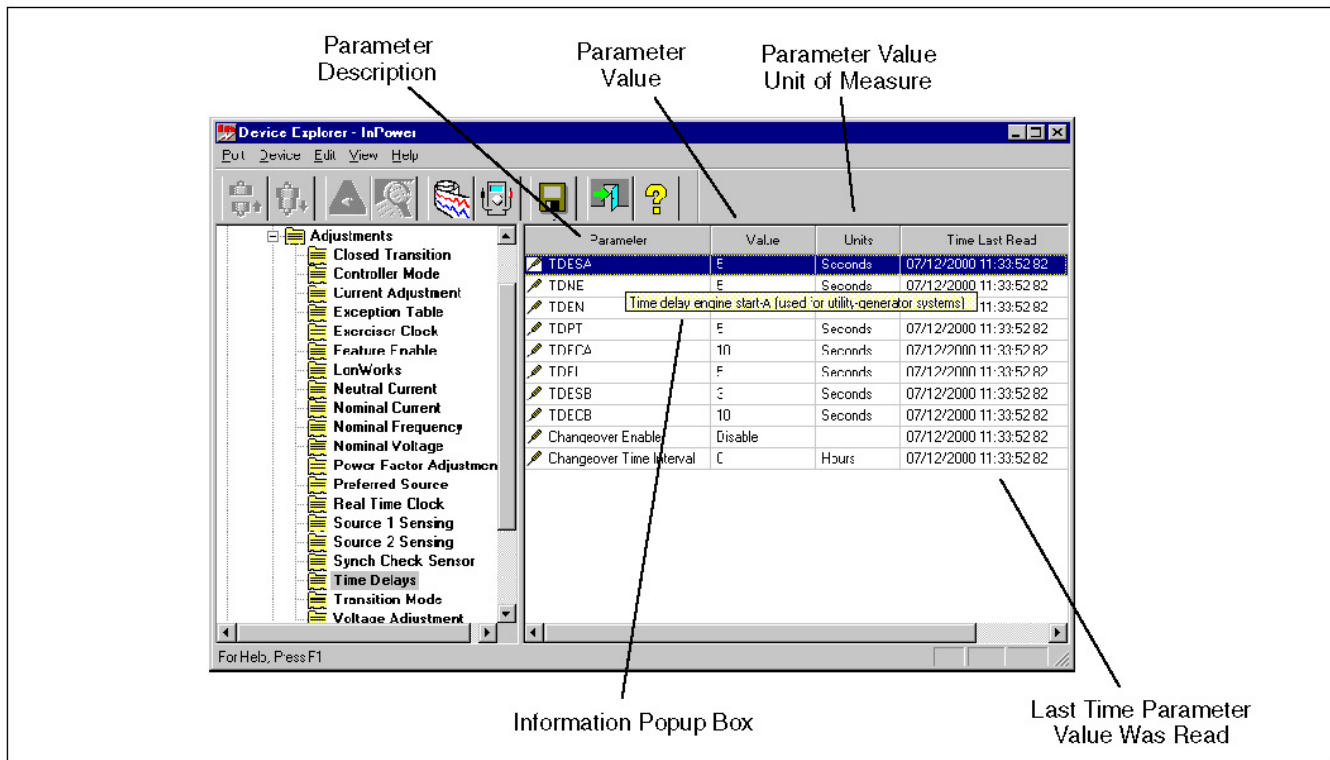


FIGURE 75. TYPICAL PARAMETER INFORMATION

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 generator set-to-generator set 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).

NOTICE

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 generator set-to-generator set 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-Generator set, 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.

| 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
 Adjustable
 Temporary Setting
 Factory Setting

FIGURE 76. TYPICAL ADJUSTMENT FEATURES

6.3.1 Making Adjustments

[Figure 76](#) 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.

NOTICE

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 77). Review the information in the error message box to see the value limits, before clicking **OK**.

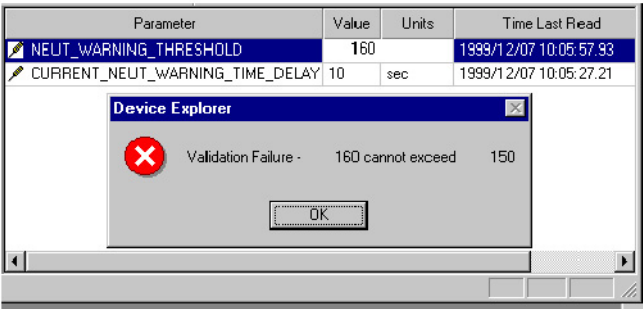


FIGURE 77. ADJUSTMENT ERROR

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**.

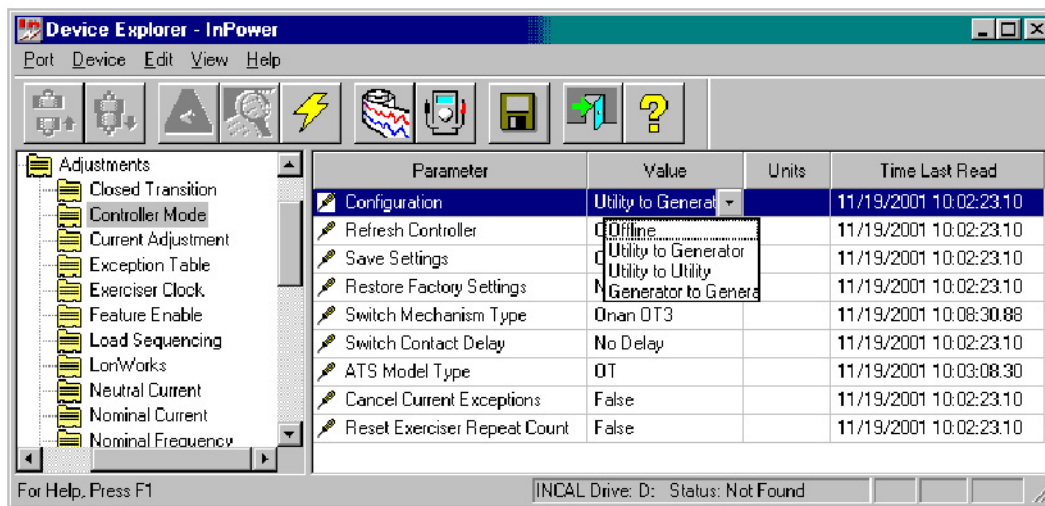


FIGURE 78. ADJUSTMENTS - CONTROLLER MODE

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 79](#), is set to begin every Monday evening at 22:00 hours and run for one hour, with load.

NOTICE

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.

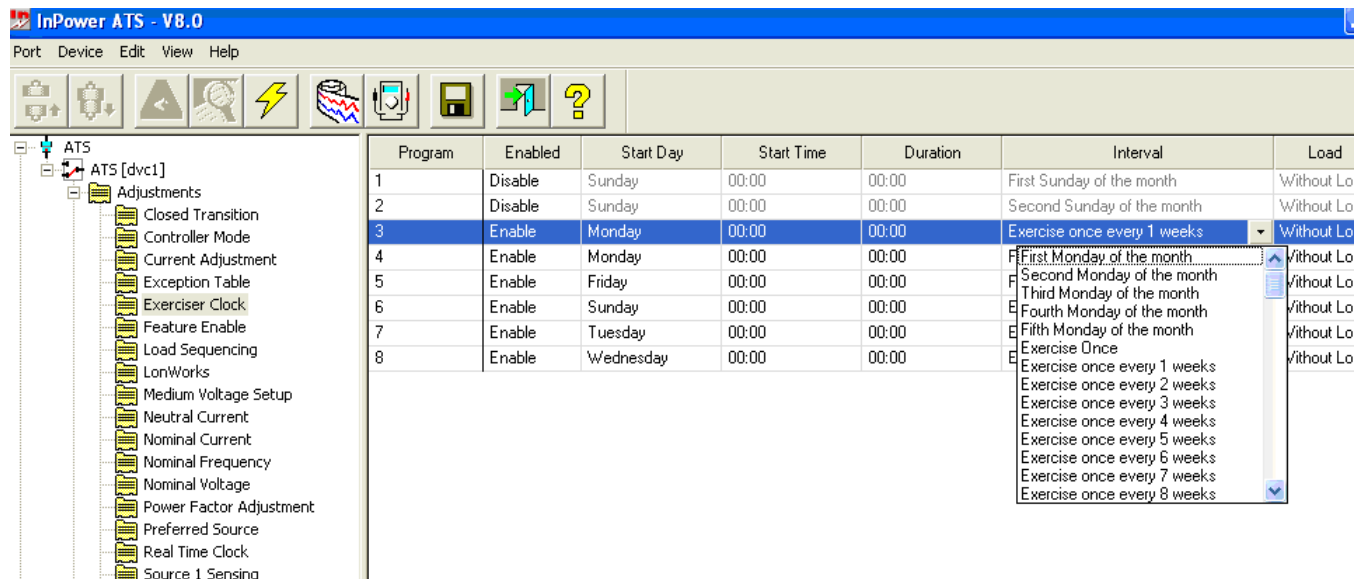


FIGURE 79. ADJUSTMENTS - EXERCISER CLOCK

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.

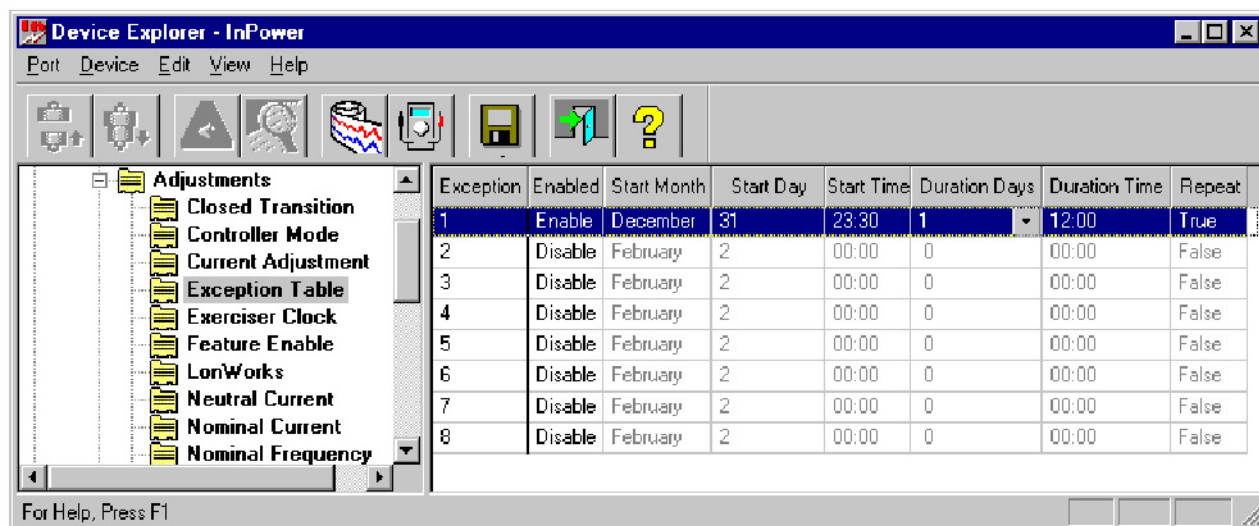


FIGURE 80. ADJUSTMENTS - EXCEPTION TABLE

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.

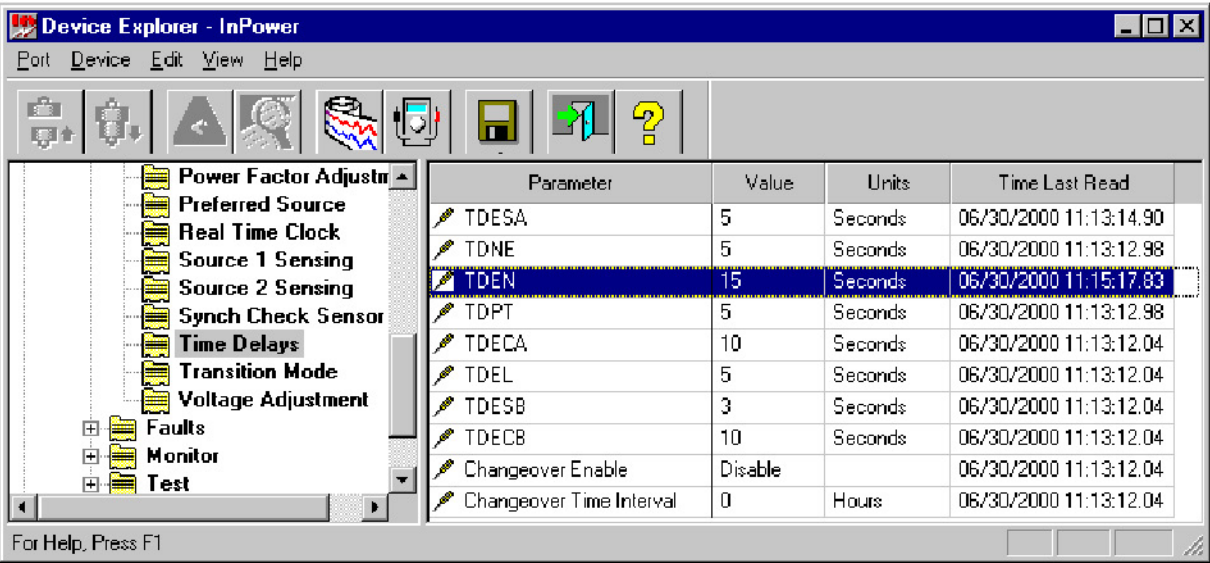


FIGURE 81. ADJUSTMENTS - TIME DELAYS

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.

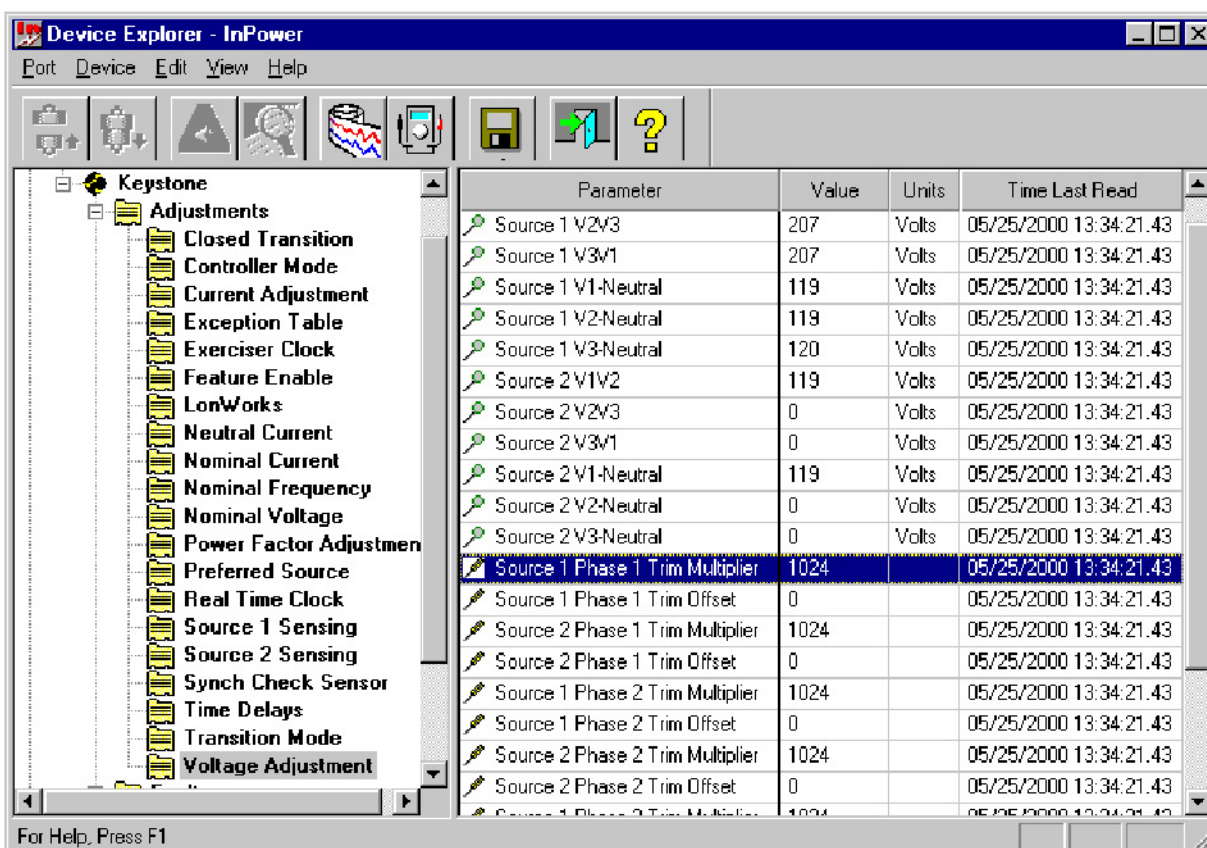


FIGURE 82. ADJUSTMENTS - DISPLAY VOLTAGE

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.

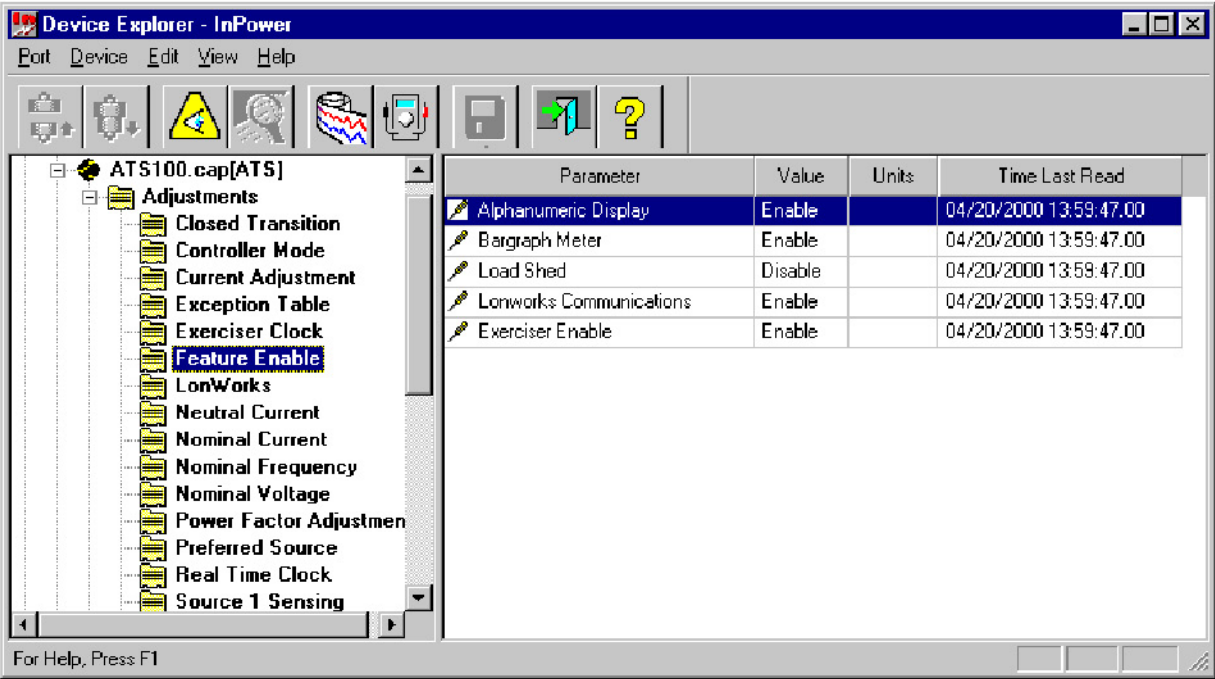


FIGURE 83. FEATURE ENABLE

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-generator set 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.

NOTICE

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.

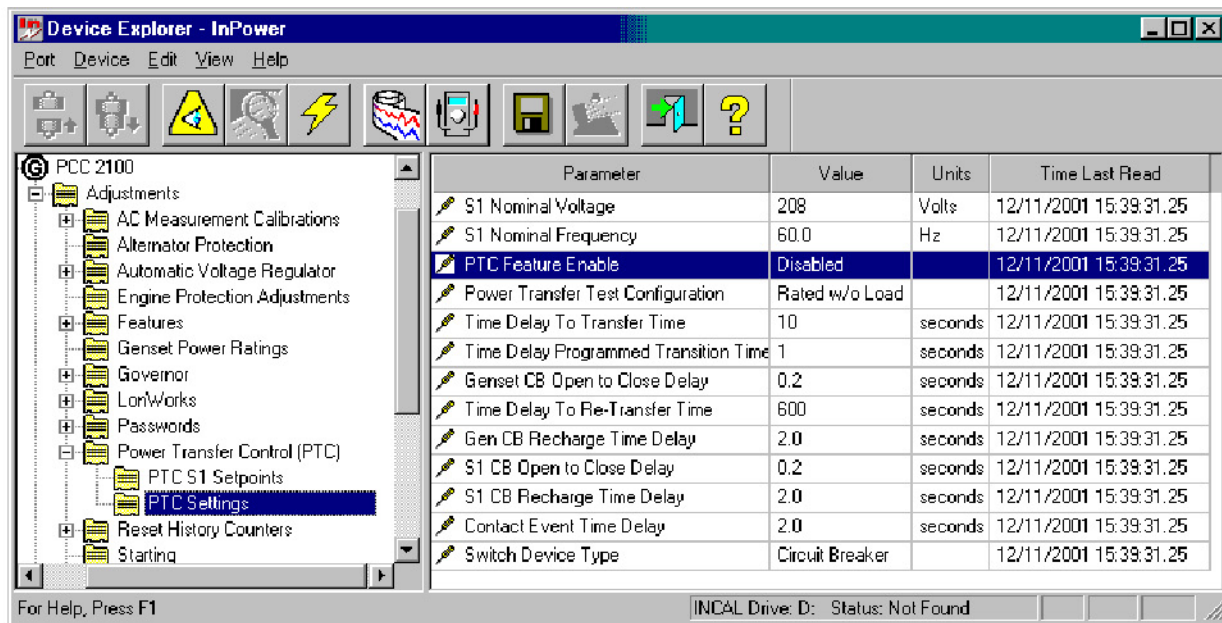


FIGURE 84. PCC 2100 POWER TRANSFER CONTROL (PTC) SETUP

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 generator set 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.

NOTICE

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.

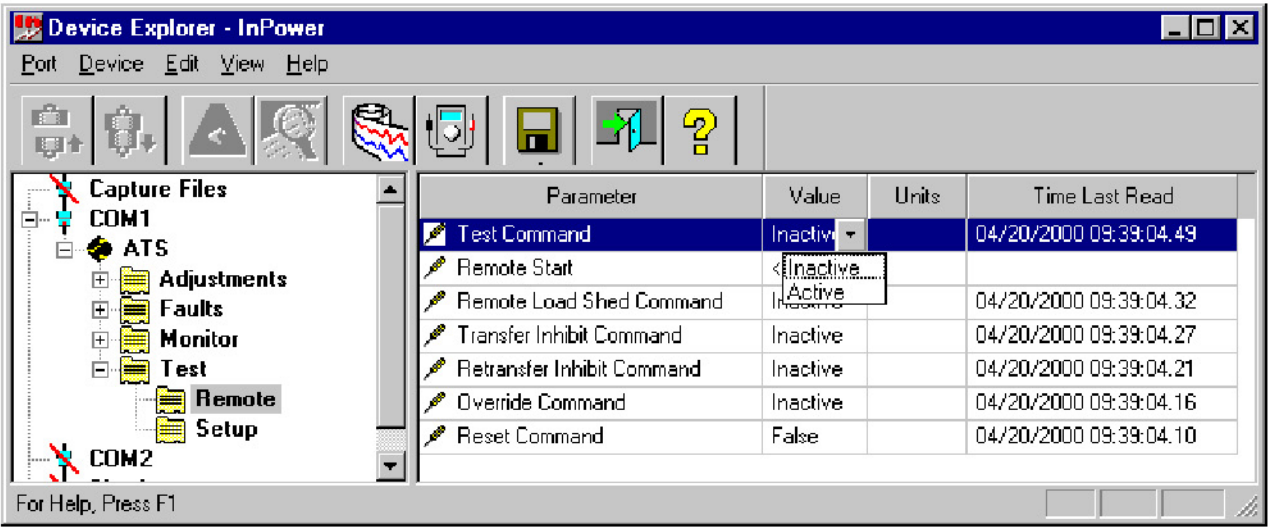
Features can vary by transfer switch model. The **Test - Remote** directory for a typical transfer switch contains the following features:

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-generator set applications, the Test Command sends a start signal to the generator set designated as Source 2.

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

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 (generator set) to neutral. This will remove the load from the generator set.

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 generator set.



| Parameter | Value | Units | Time Last Read |
|----------------------------|------------|-------|------------------------|
| Test Command | Inactive | | 04/20/2000 09:39:04.49 |
| Remote Start | <Inactive> | | |
| Remote Load Shed Command | Inactive | | 04/20/2000 09:39:04.32 |
| Transfer Inhibit Command | Inactive | | 04/20/2000 09:39:04.27 |
| Retransfer Inhibit Command | Inactive | | 04/20/2000 09:39:04.21 |
| Override Command | Inactive | | 04/20/2000 09:39:04.16 |
| Reset Command | False | | 04/20/2000 09:39:04.10 |

FIGURE 85. 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 Cooldown 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.

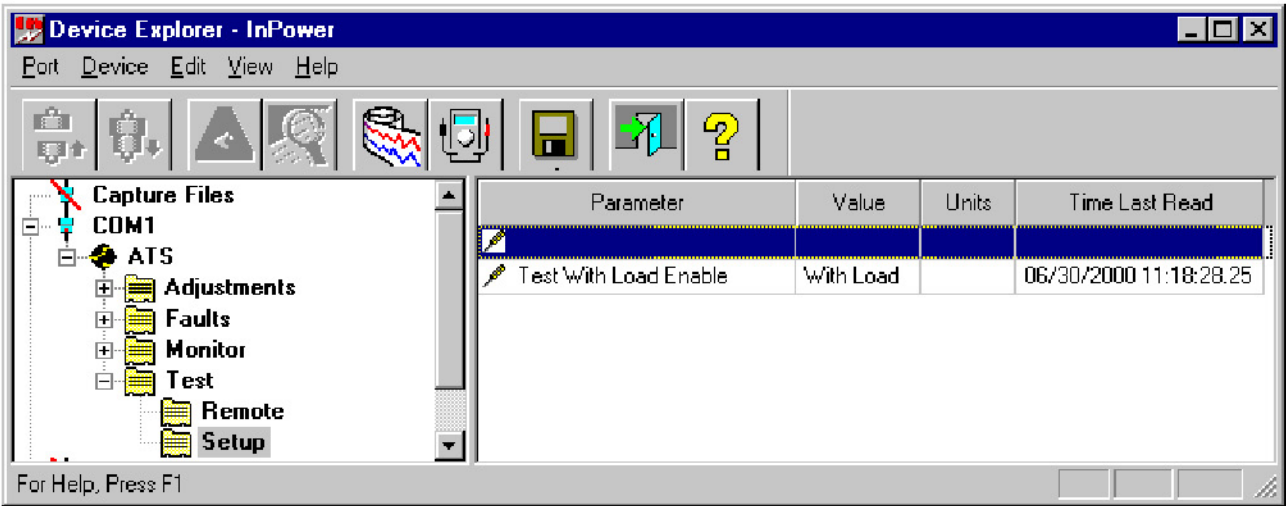


FIGURE 86. TEST - SETUP

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 generator set 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 generator set and transfer the load to the generator set.

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.

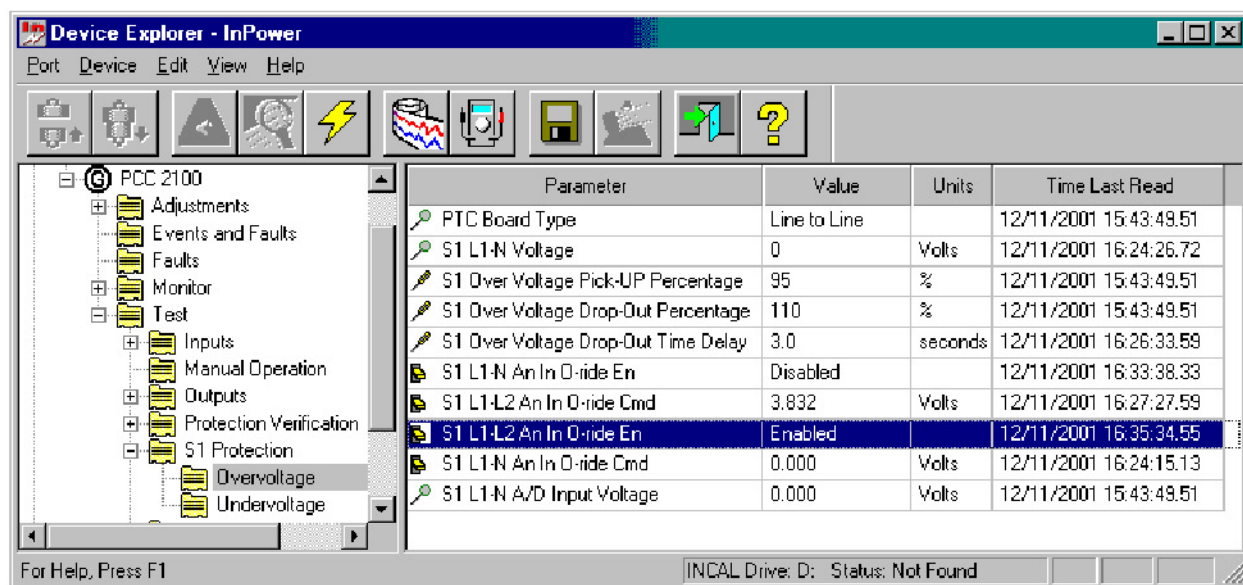


FIGURE 87. PCC 2100 POWER TRANSFER CONTROL (PTC) TEST

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 88](#) 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.

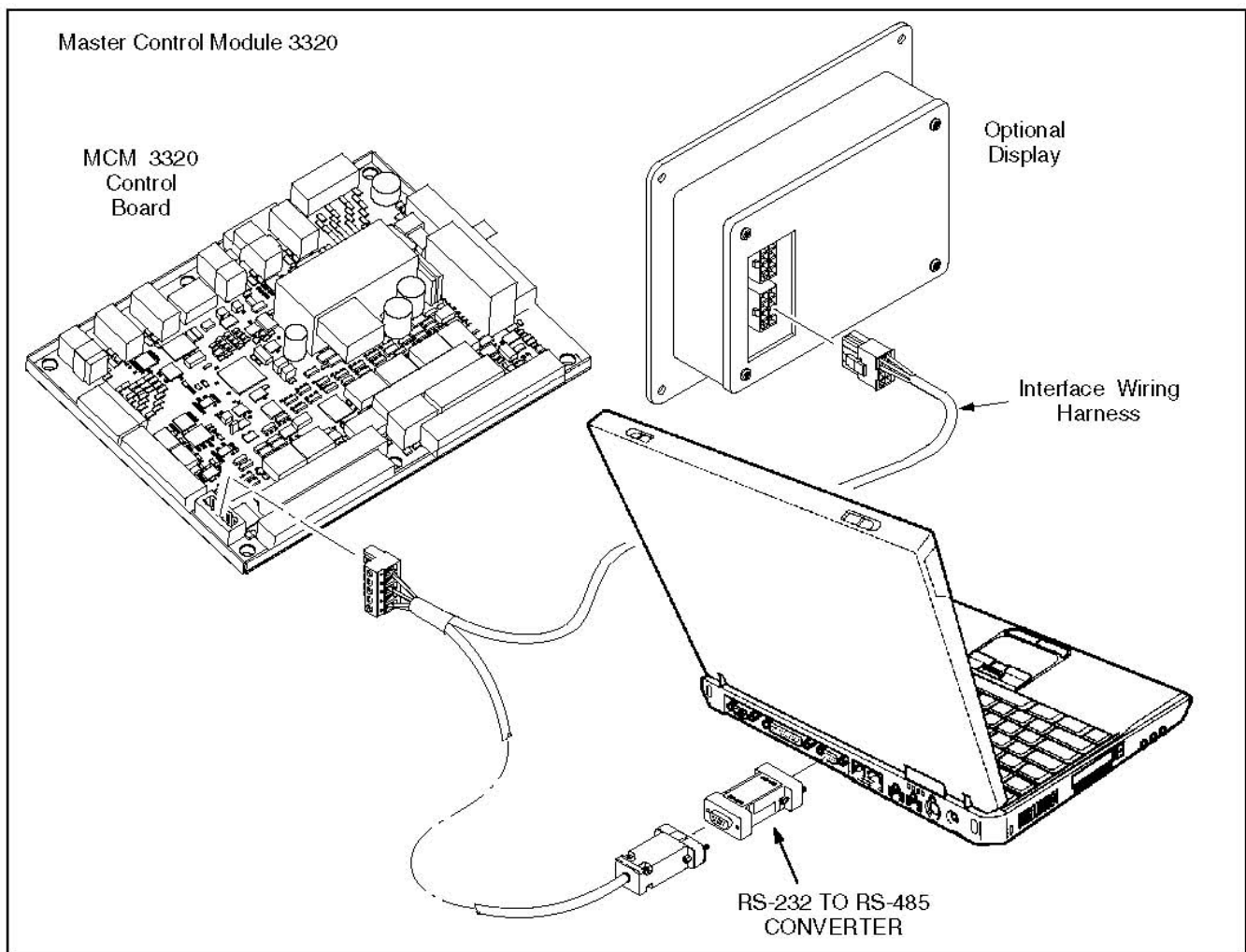


FIGURE 88. INPOWER SERIAL CONNECTION WITH MCM3320 CONTROL

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 89](#) 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 89](#).

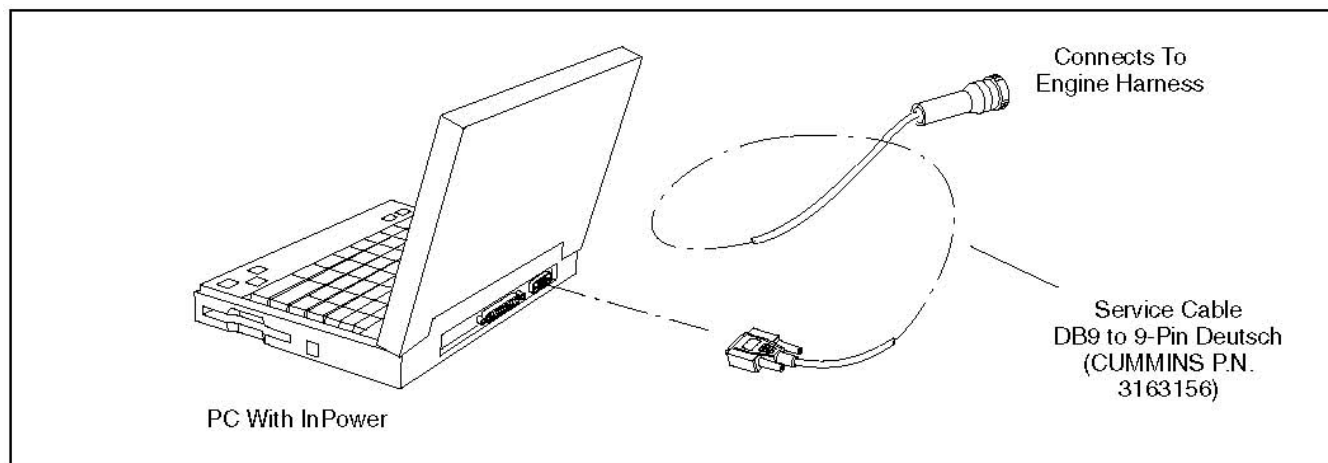


FIGURE 89. INPOWER SERIAL CONNECTION

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 90 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.**

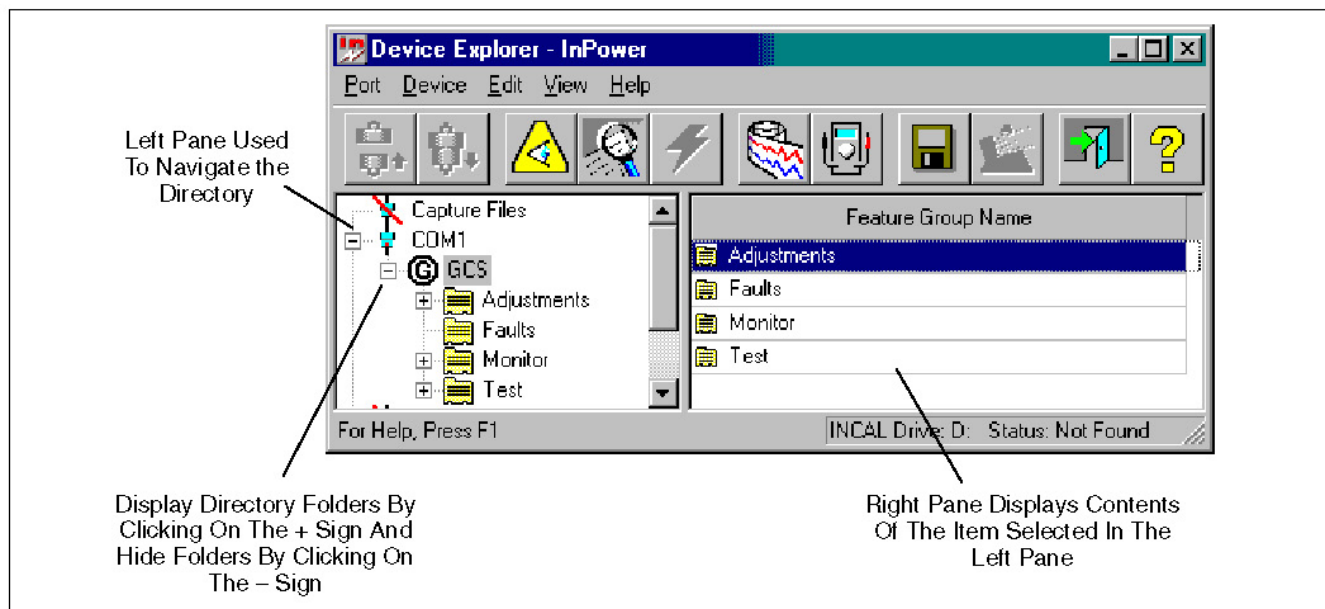


FIGURE 90. DEVICE EXPLORER - TYPICAL GCS FEATURES

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 91** 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.

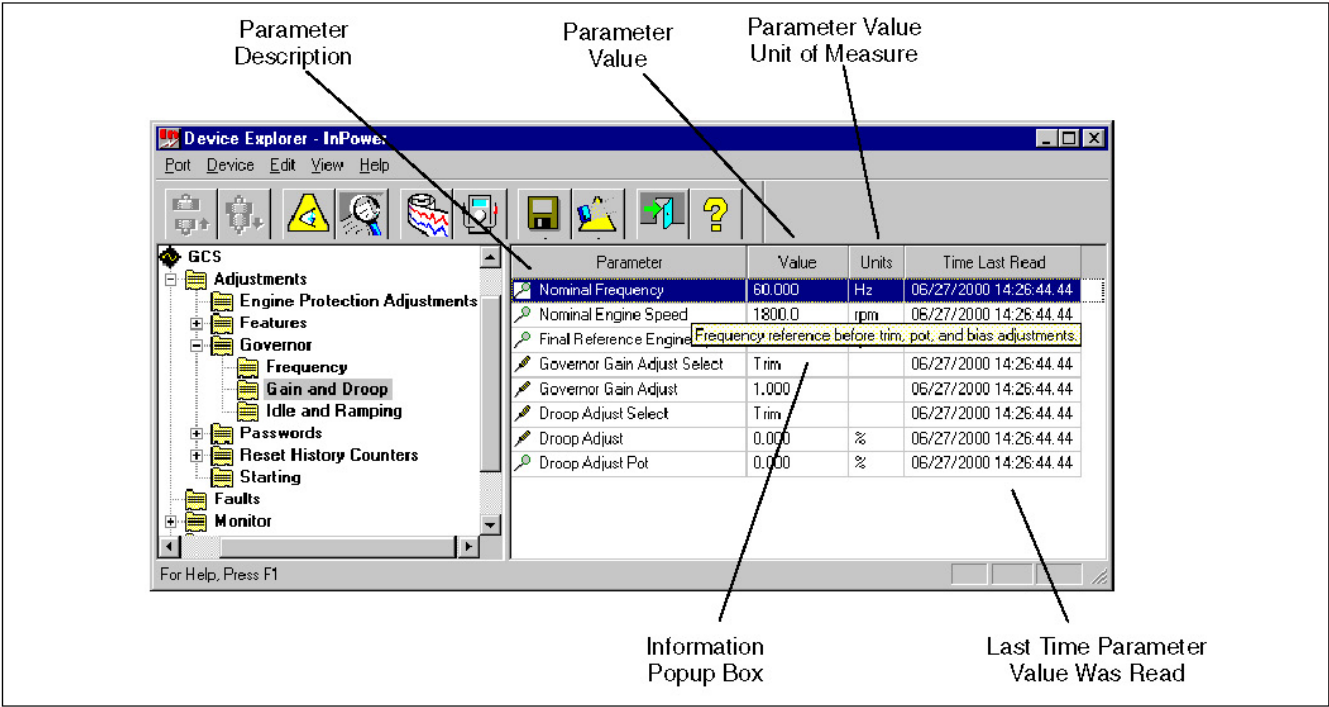


FIGURE 91. TYPICAL PARAMETER INFORMATION

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.

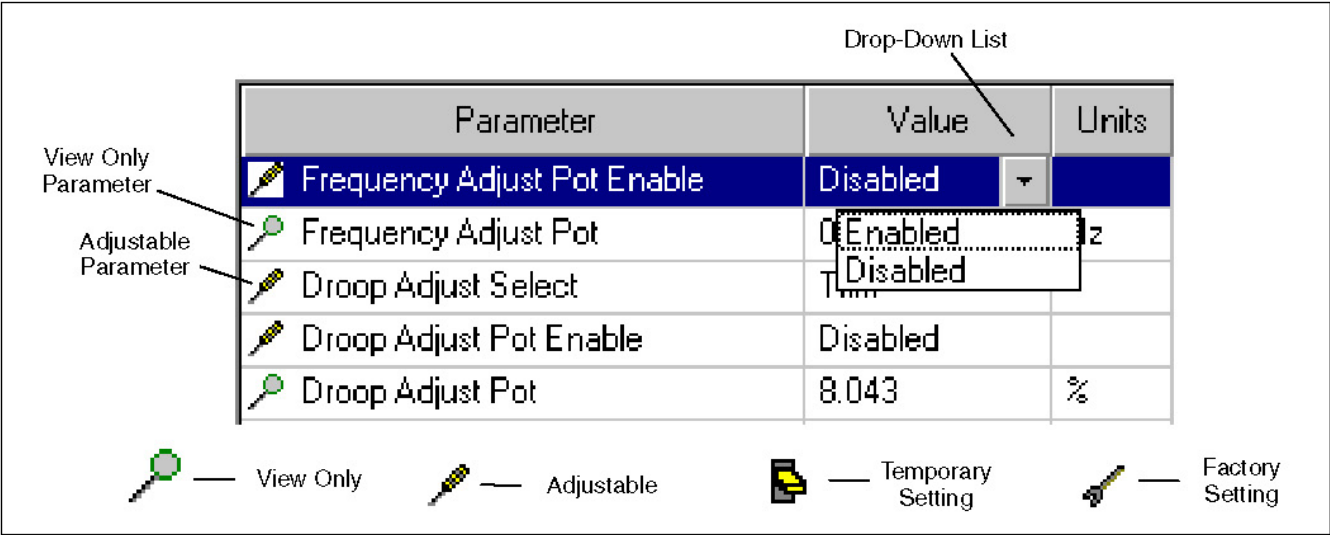


FIGURE 92. TYPICAL ADJUSTMENT FEATURES

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 92](#)).

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.

NOTICE

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 93](#)). Review the information in the dialog box to see the value limits, before clicking **OK**, to close the error message dialog box.

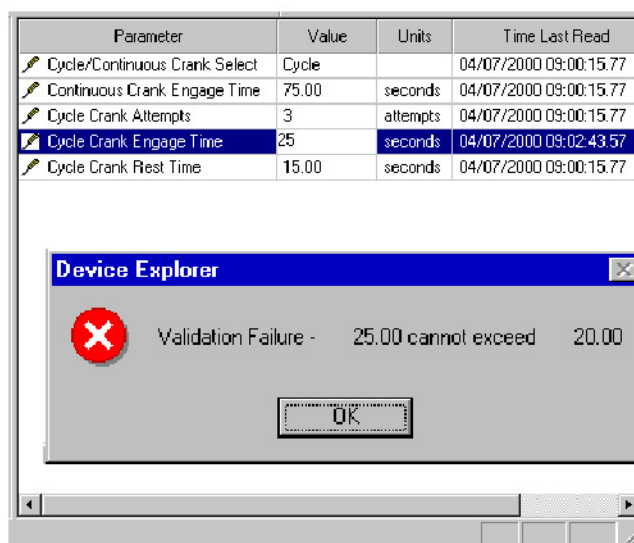


FIGURE 93. ADJUSTMENT ERROR

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.

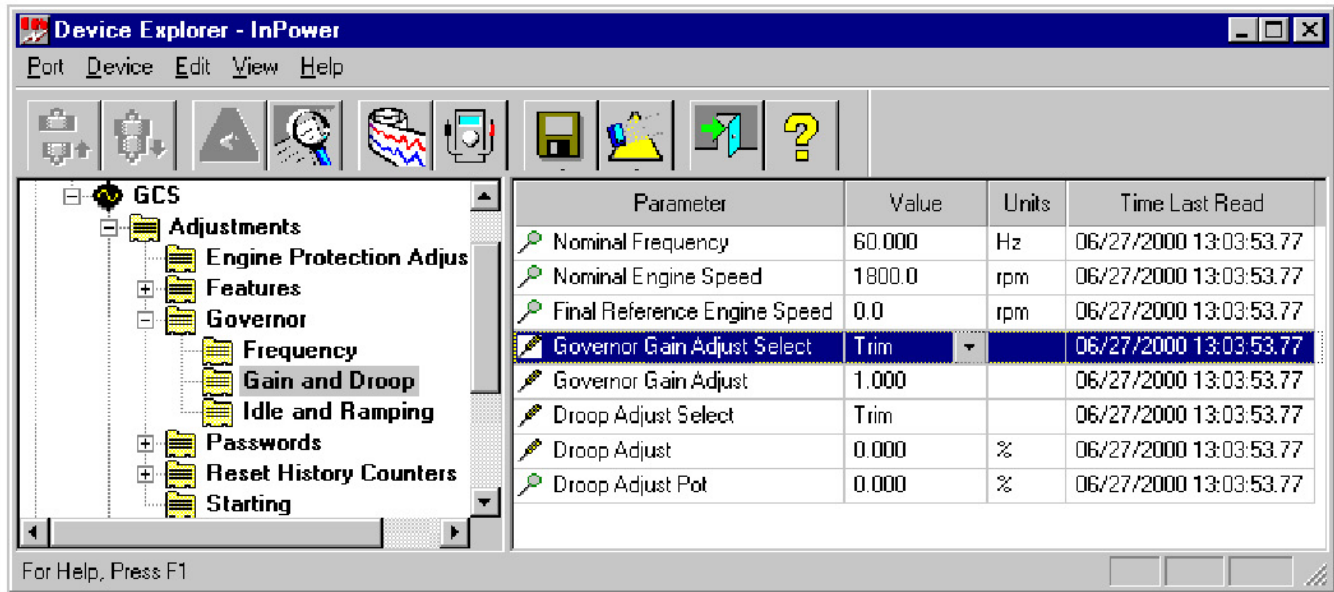


FIGURE 94. ADJUSTMENTS - GOVERNOR - GAIN AND DROOP

Example: In this example, InPower is used to increase the **Starting to Rated Ramp Time** (refer to [Figure 95](#)). 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.

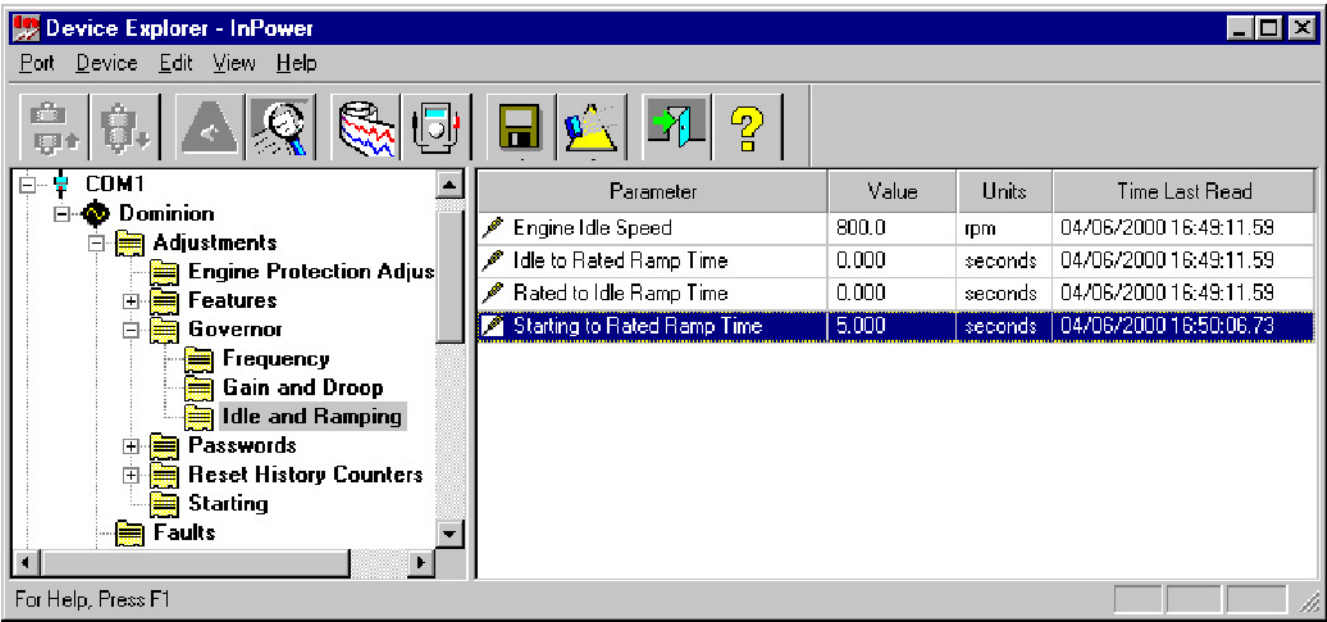


FIGURE 95. ADJUSTMENTS - GOVERNOR - IDLE AND RAMPING

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

NOTICE

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 97](#)) or in the Spreadsheet Mode ([Figure 98](#)). 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.

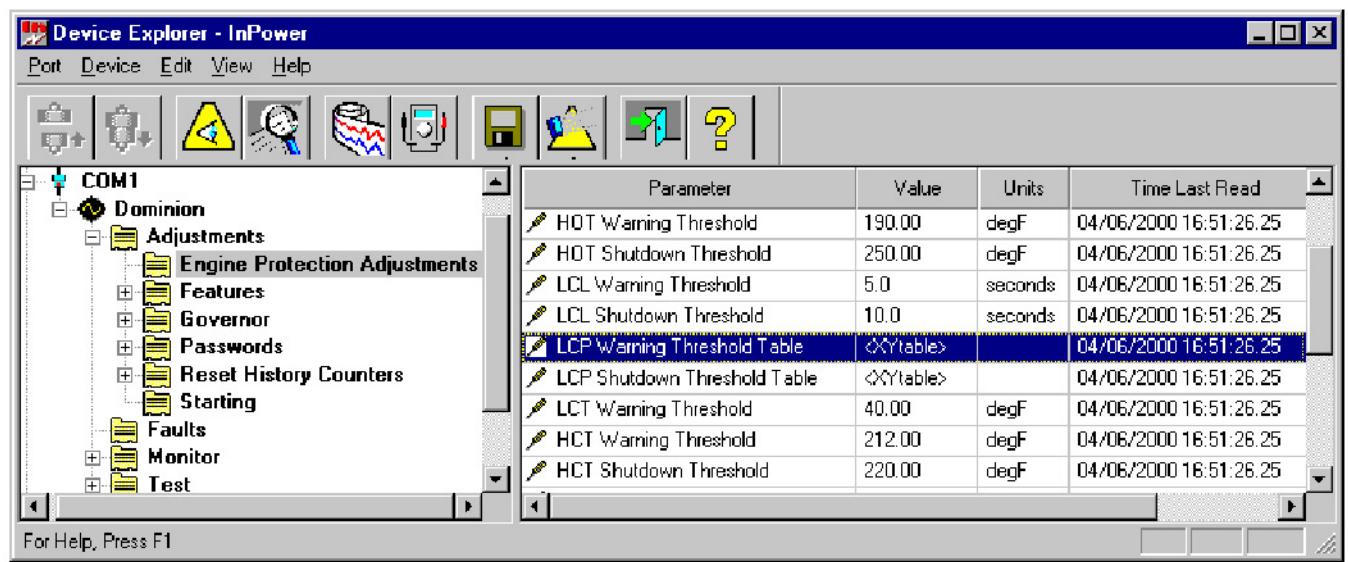


FIGURE 96. ENGINE PROTECTION ADJ. - LCP WARNING THRESHOLD

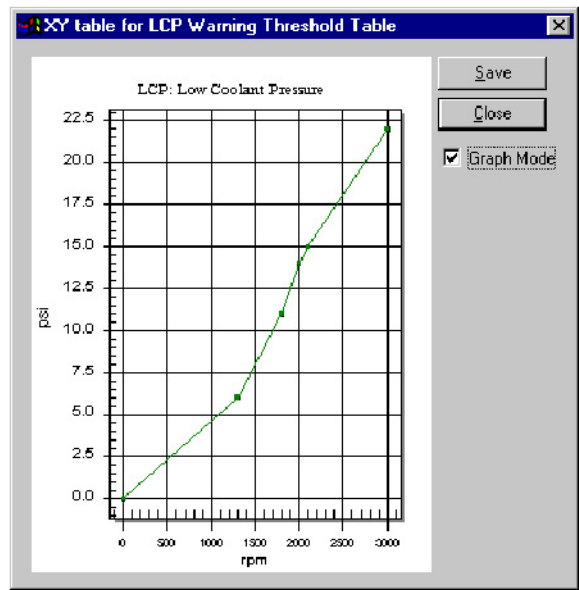


FIGURE 97. XY GRAPH

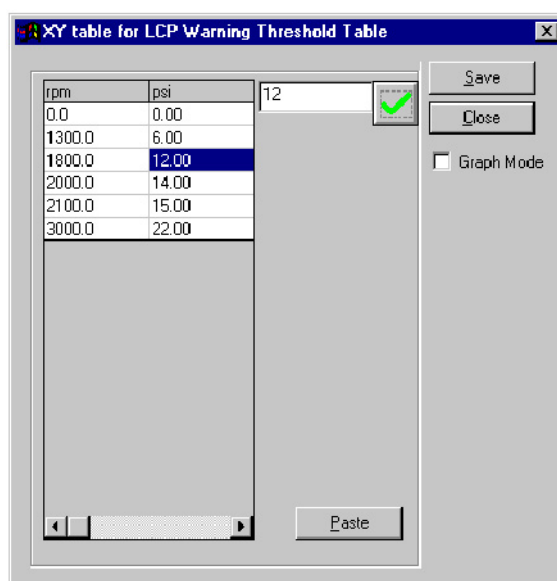


FIGURE 98. XY SPREADSHEET

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.**

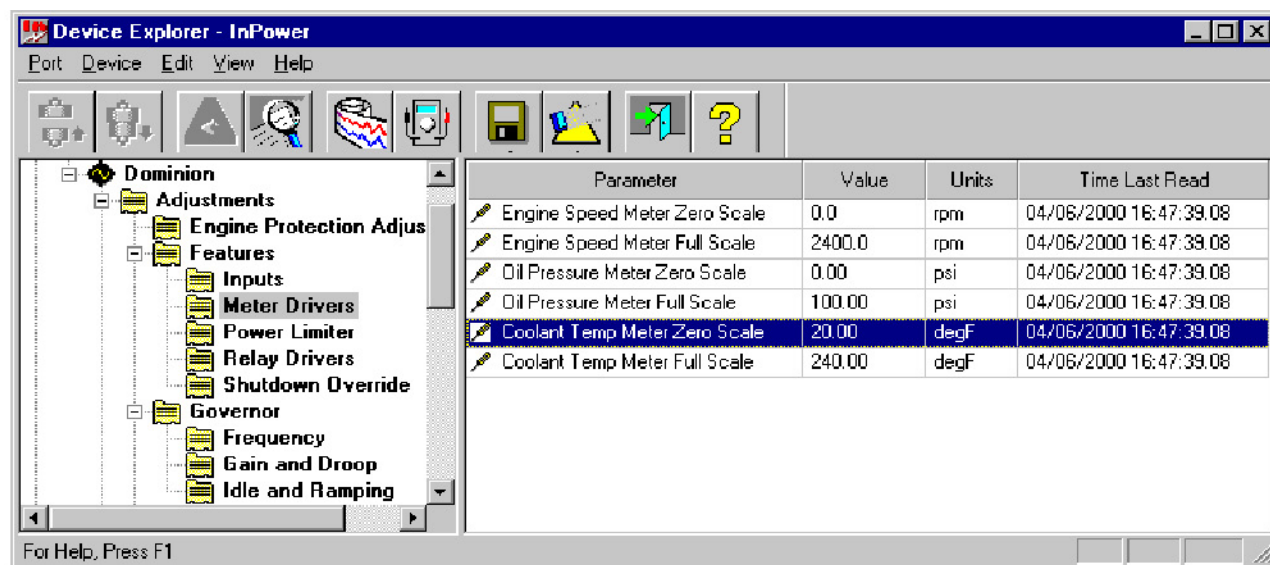


FIGURE 99. ADJUSTMENTS - FEATURES - METER DRIVERS

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 100](#) shows the customer connections for the meter drivers.

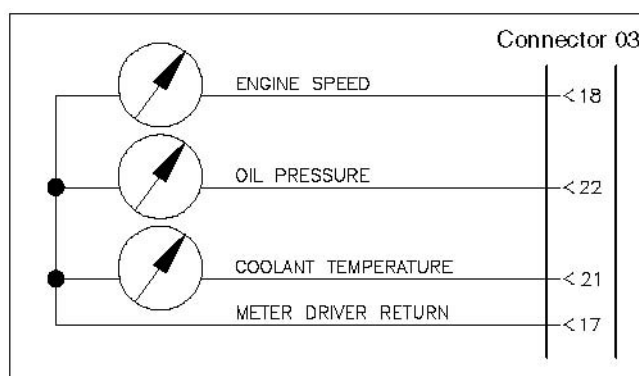


FIGURE 100. METER DRIVERS

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.

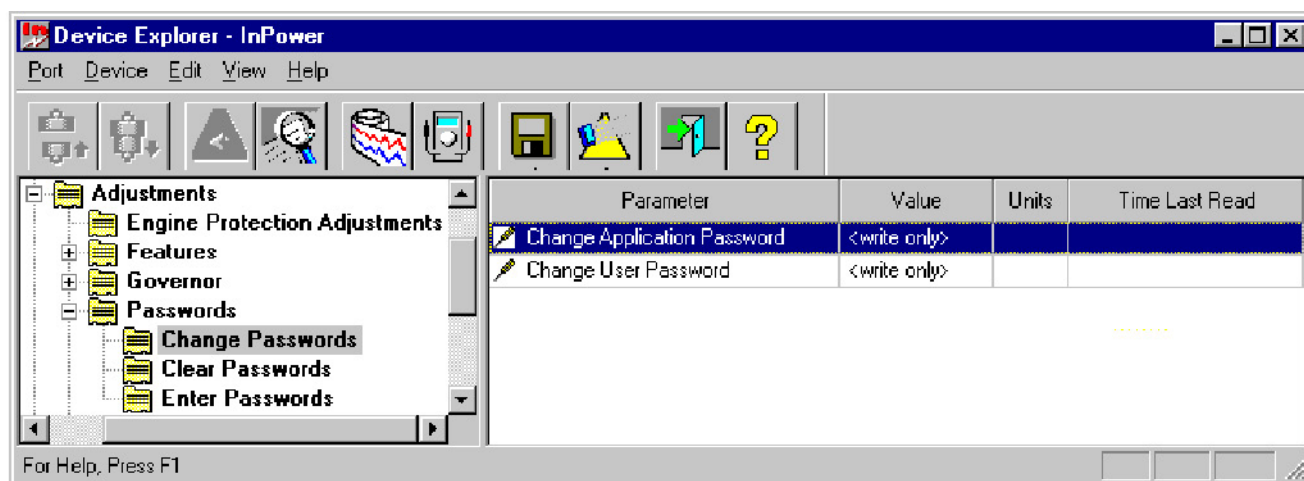


FIGURE 101. CHANGE PASSWORDS

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.

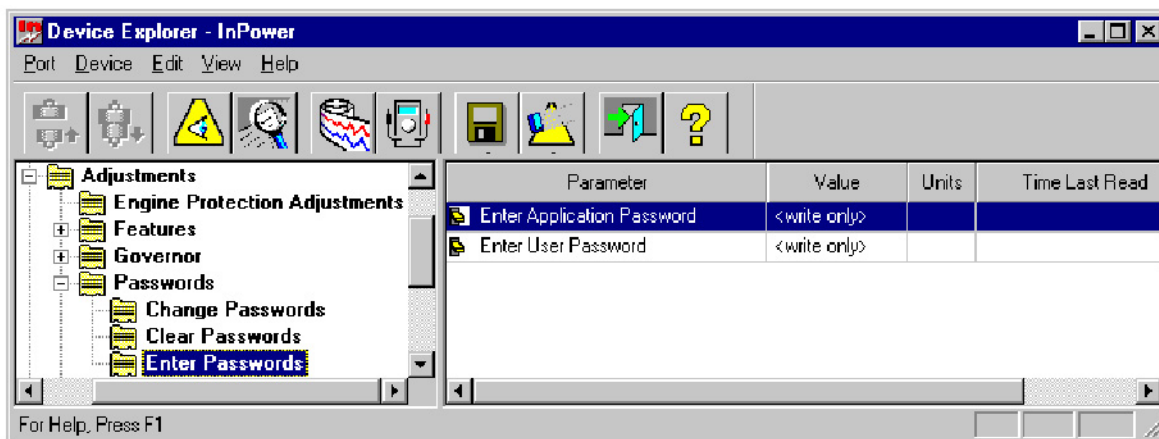


FIGURE 102. ENTER PASSWORDS

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.

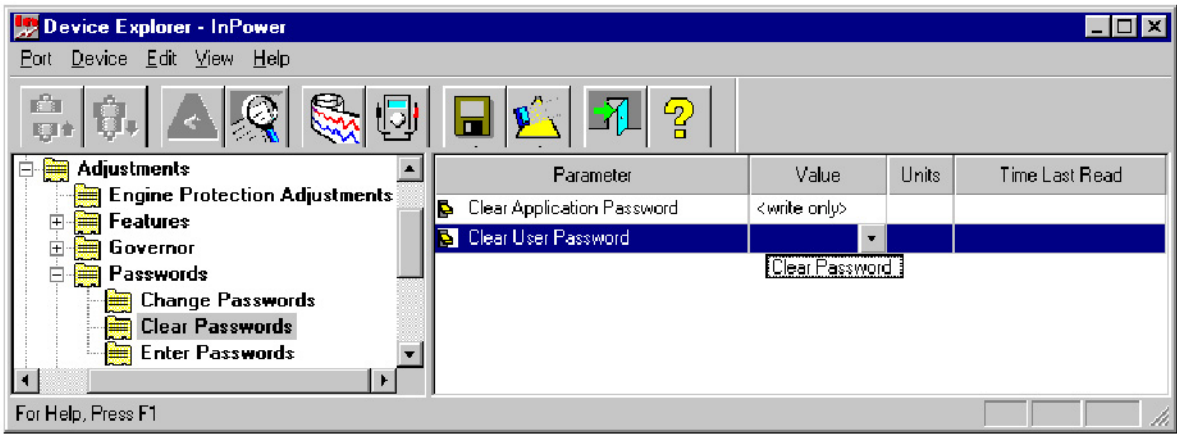


FIGURE 103. CLEAR PASSWORDS

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 104 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).

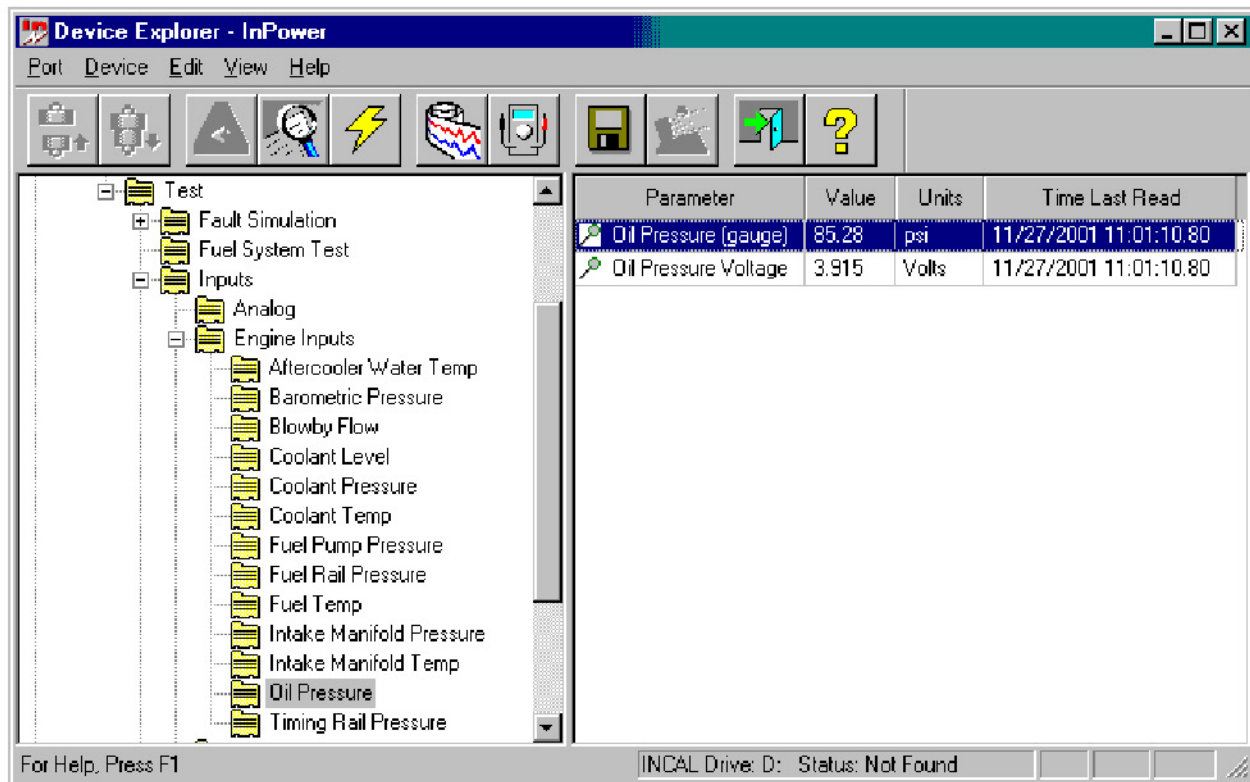


FIGURE 104. TEST - INPUTS - ENGINE INPUTS - OIL PRESSURE

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 105](#)). 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.

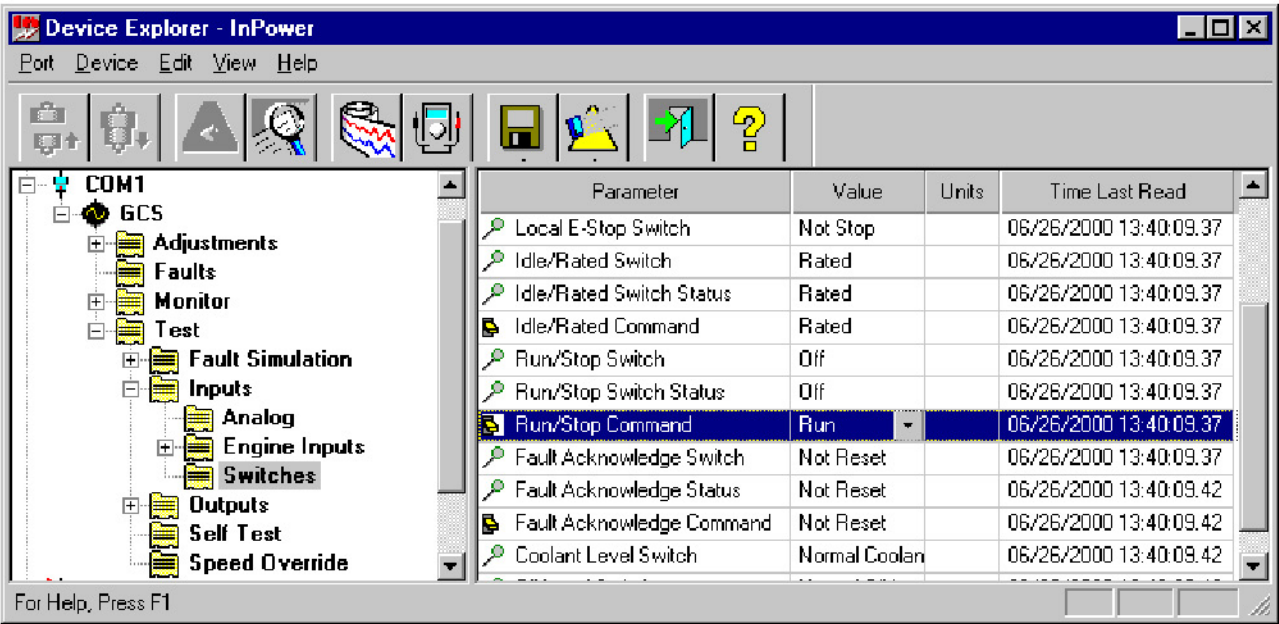


FIGURE 105. TEST -INPUTS - SWITCHES - RUN/STOP COMMAND

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 106](#)).

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 106](#)).

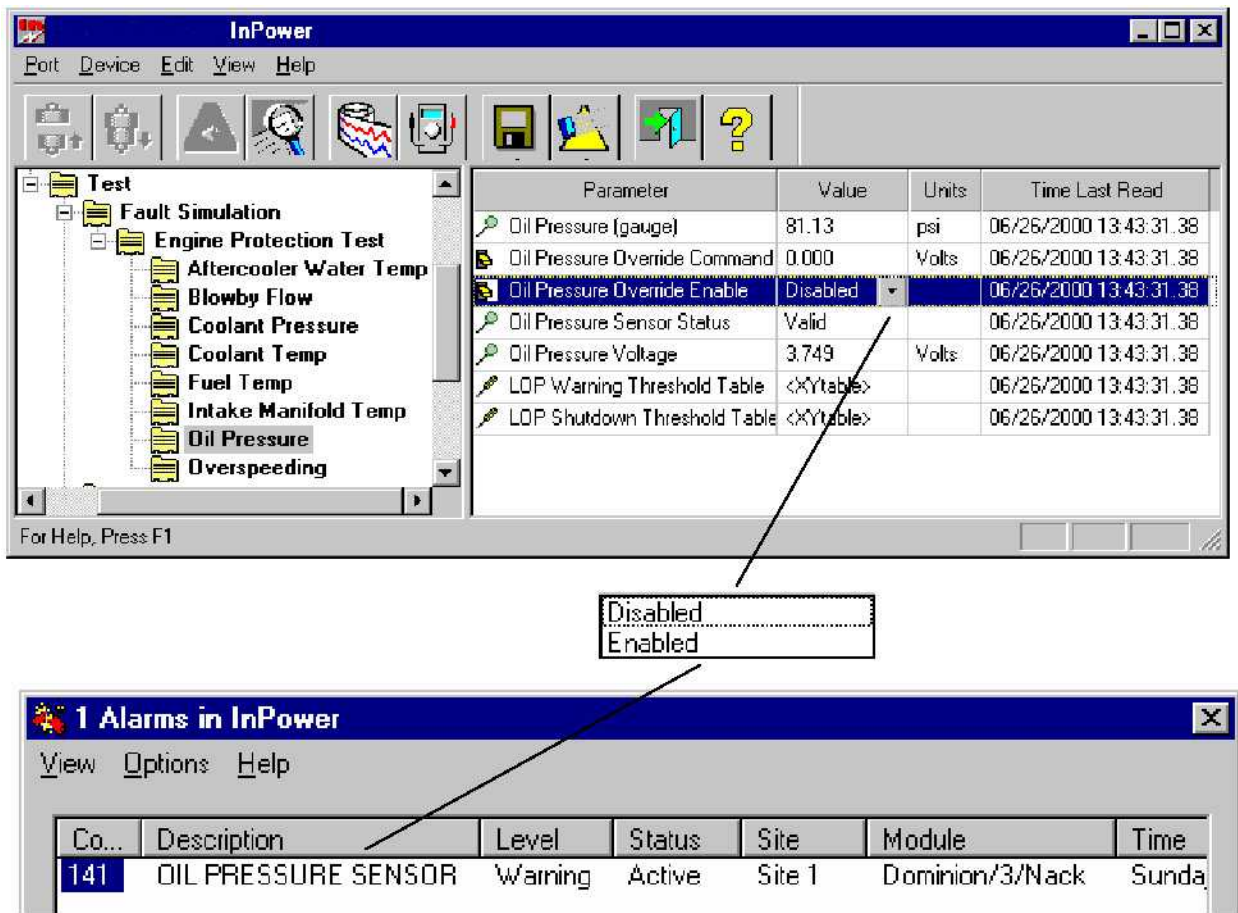


FIGURE 106. TEST - ENGINE PROTECTION - OIL PRESSURE TEST

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 107](#) 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.

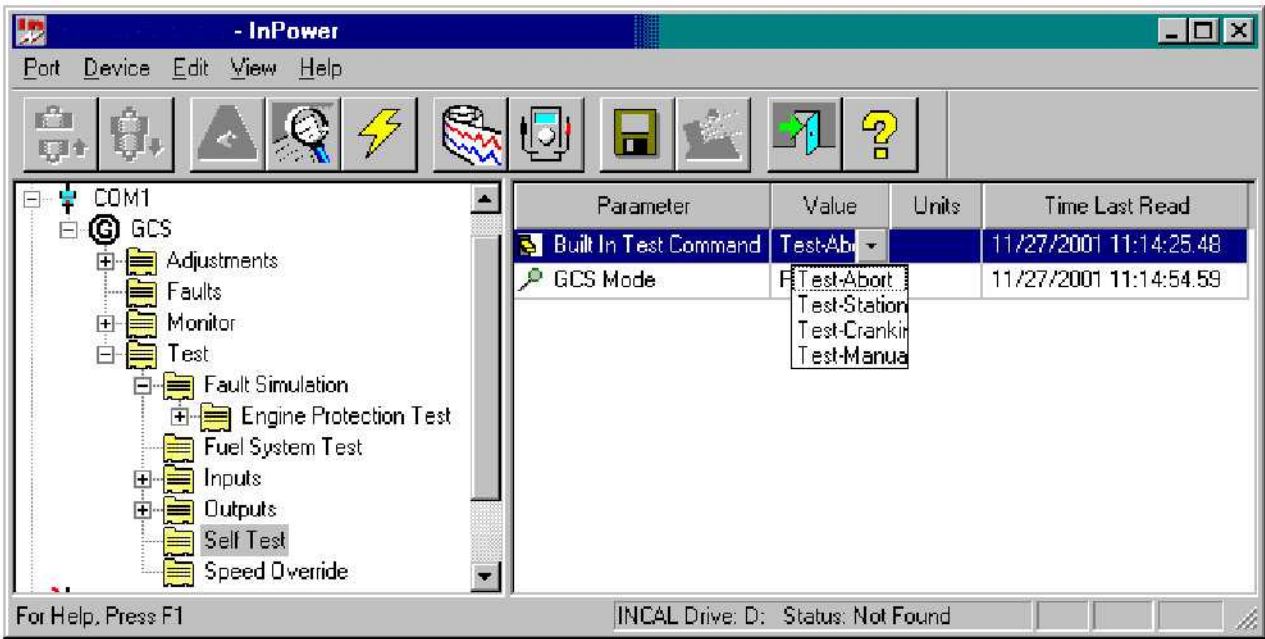


FIGURE 107. SELF TEST - TEST -BIT COMMAND

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.

NOTICE

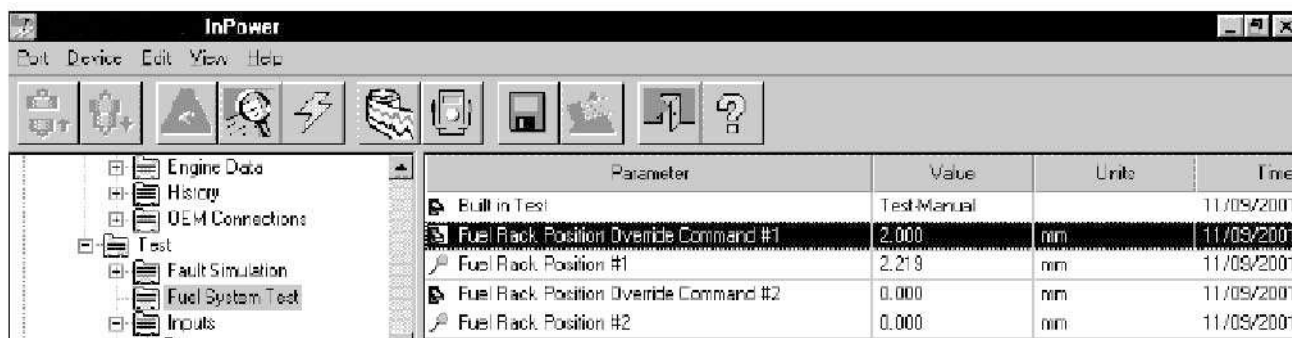
Fuel pump faults are suppressed in the Test-Manual mode.

Open the **TestFuel 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 InPower software window with a menu bar (Edit, Device, Edit, View, Help) and a toolbar with various icons. On the left is a tree view with categories like Engine Data, History, OEM Connections, Test, Fault Simulation, Fuel System Test, and Inputs. The main area 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 108. 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.

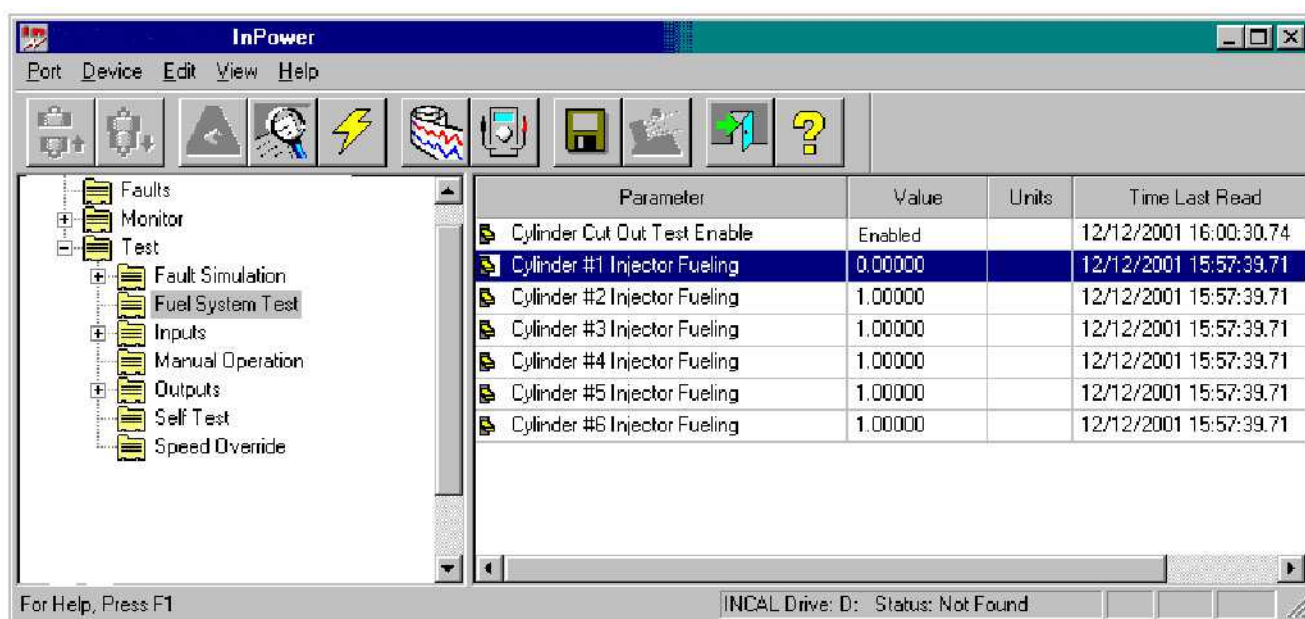
Connect the service PC to the generator set. Start the generator set and operate it at rated speed with no load.

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 109. SINGLE CYLINDER CUTOOUT TEST**

This page is intentionally blank.

9 Initial Calibration for Commercial Generator Sets

9.1 About Initial Calibration

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

WebInCal can be downloaded using **InCal Downloader & Extractor Utility** accessible from InPower -> Utilities -> InCal Downloader & Extractor.

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 generator set 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 or by clicking on the Event Handler Icon on the Toolbar. 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 Site by double clicking on the port that matches controller Site. The available Sites are displayed in the Device Explorer directory (left pane).

NOTICE

The Following screenshots have been taken with reference to PCC3300 controller. The same sequence is applicable to most of the commercial devices unless otherwise specified.

Select the device **PC3300** site by clicking on it ([Figure 110](#)).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration**. You can also right click on the connected device to view the list of functions supported.

Refer to the generator set calibration label, located inside the control housing, for the calibration part number.

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

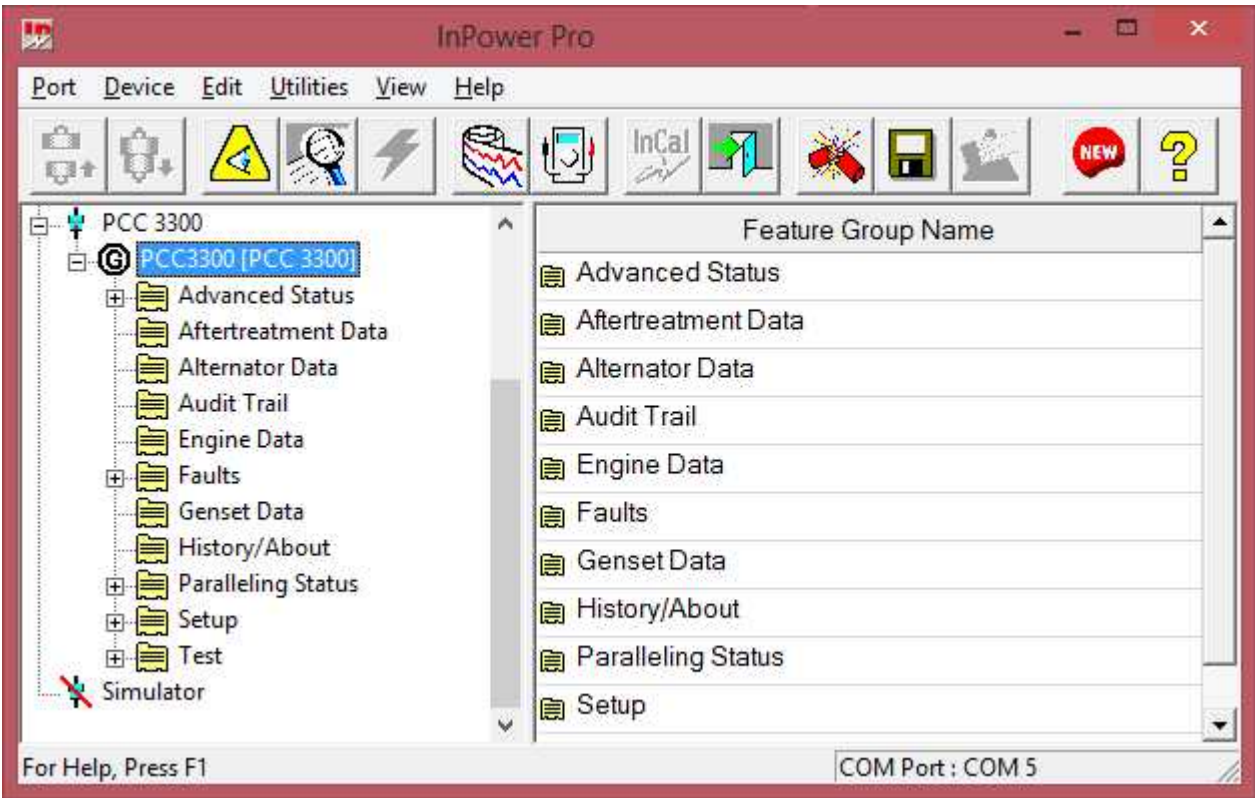


FIGURE 110. MAIN WINDOW

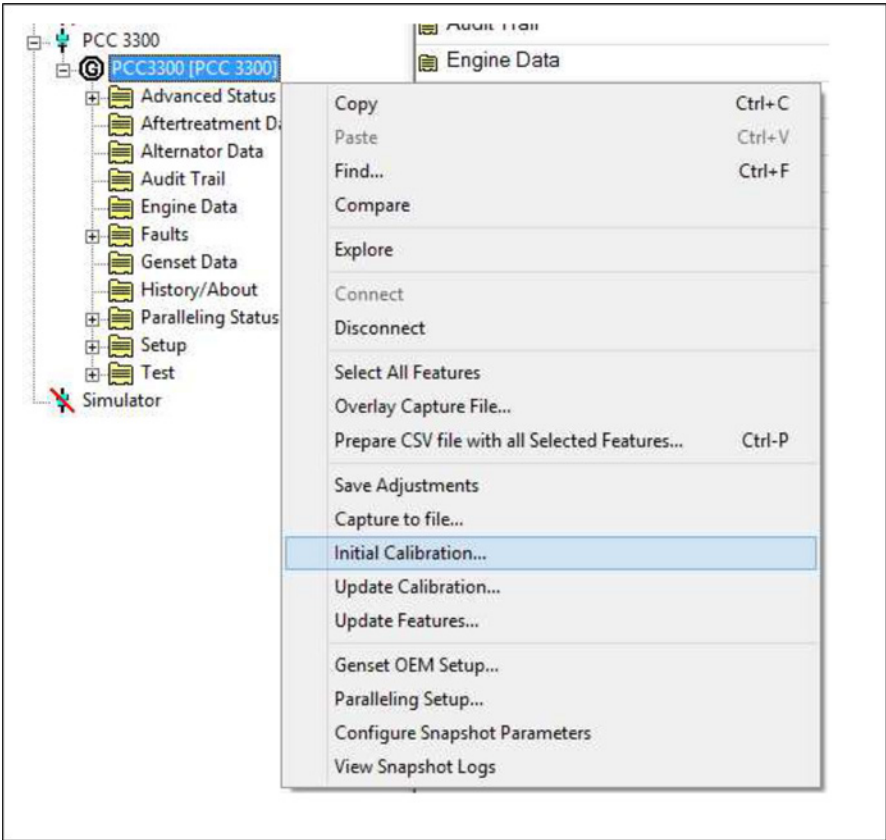


FIGURE 111. MAIN WINDOW

If a pop-up message indicates that there is an error loading from the INCAL CD, either the PGA drive letter was not correctly specified during InPower installation, or the PGA structure is corrupt.

The INCAL CD location can be verified by clicking on the **Port** menu and clicking on **Select InCal (PGA)** (Figure 113). Browse the InCal (PGA) folder, then click on **Verify INCAL Structure**. A popup message will verify the INCAL location (Figure 114).

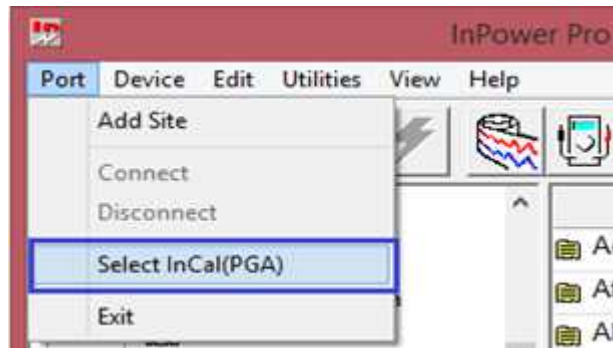


FIGURE 112. SELECT INCAL

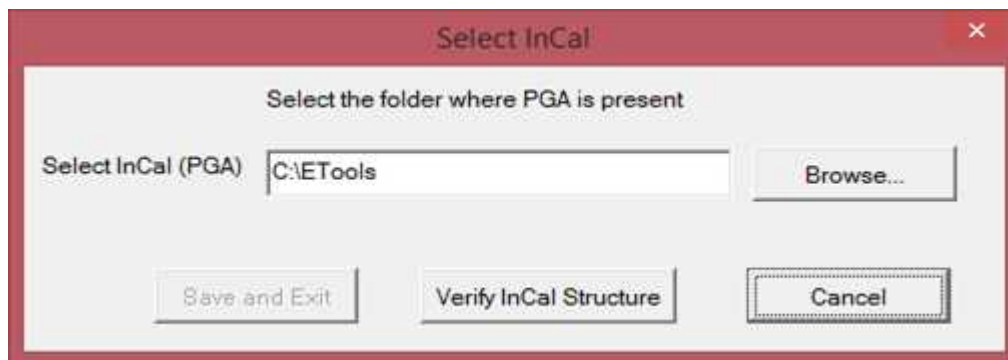


FIGURE 113. FIND INCAL



FIGURE 114. INCAL LOCATION FOUND

9.2.1 Selecting Calibration Part Number

The Select Calibration window (Figure 115) lists all of the calibration files that are available from the Power Generation INCAL CD for the connected controller.

If there is more than one listed calibration part number, use the scroll bar to locate the Calibration Part Number that matches the calibration part number shown on the generator set Calibration Label. The PCC3300 control has only 1 calibration part number as of September 2016.

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

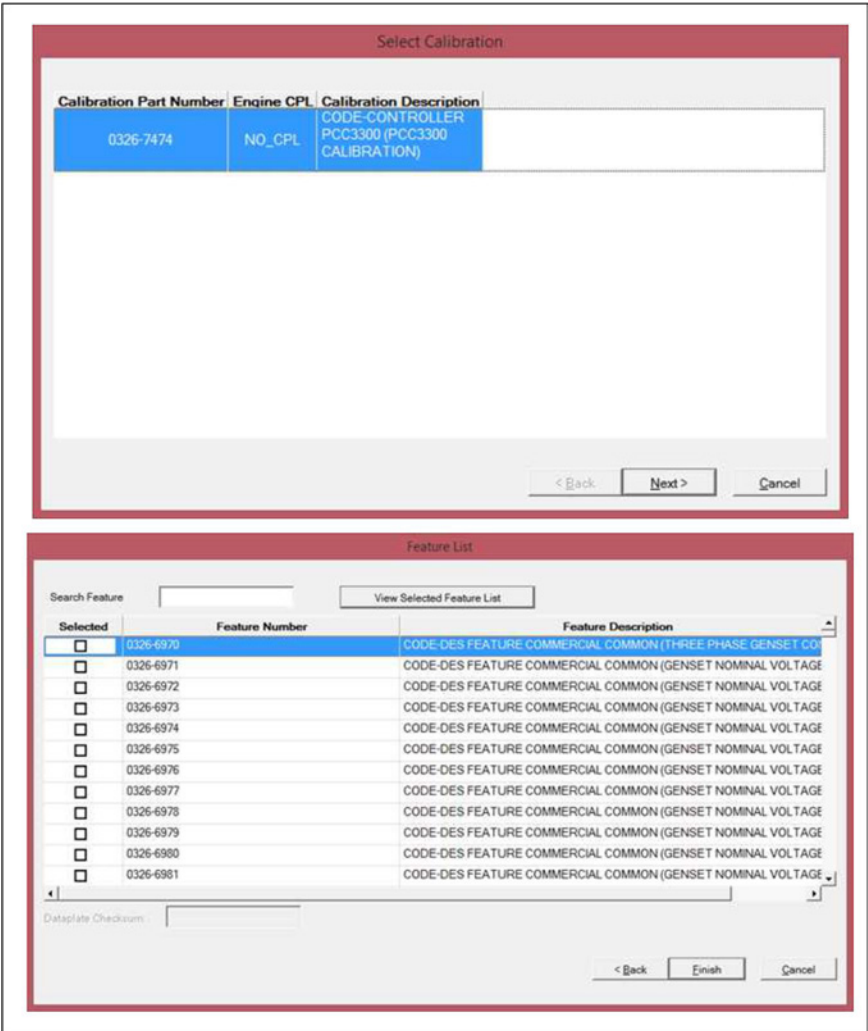


FIGURE 115. SELECT CALIBRATION

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.

History

Calibration Part Number: 0326-7474 Current Calibration Revision:

Description: CODE-CONTROLLER PCC3300 (PCC3300 CALIBRATION) CD Calibration Revision:

| Revision History | Calibration File | Revision Description |
|------------------|------------------|----------------------------|
| 030ct2011 | 0326-7474 | PCC3300 Calibration-V3.040 |
| 17Feb2012 | 0326-7474 | PCC3300 Calibration-V3.060 |
| 15May2012 | 0326-7474 | PCC3300 Calibration-V3.080 |
| 22Aug2012 | 0326-7474 | PCC3300 Calibration-V3.090 |
| 18Oct2012 | 0326-7474 | PCC3300 Calibration-V3.100 |
| 22Nov2012 | 0326-7474 | PCC3300 Calibration-V3.110 |
| 24Jan2013 | 0326-7474 | PCC3300 Calibration-V3.130 |
| 30Apr2013 | 0326-7474 | PCC3300 Calibration-V3.160 |
| 02Sep2013 | 0326-7474 | PCC3300 Calibration-V3.170 |
| 28Nov2013 | 0326-7474 | PCC3300 Calibration-V3.180 |
| 05MAR2014 | 0326-7474 | PCC3300 Calibration-V3.200 |
| 03APR2014 | 0326-7474 | PCC3300 Calibration-V3.210 |
| 20AUG2014 | 0326-7474 | PCC3300 Calibration-V3.230 |
| 29JAN2015 | 0326-7474 | PCC3300 Calibration-V3.250 |
| 17AUG2015 | 0326-7474 | PCC3300 Calibration-V3.260 |
| 16Oct2015 | 0326-7474 | PCC3300 Calibration-V3.270 |
| 12FEB2016 | 0326-7474 | PCC3300 Calibration-V3.280 |
| 26April2016 | 0326-7474 | PCC3300 Calibration-V3.290 |
| 14Sep2016 | 0326-7474 | PCC3300 Calibration-V3.300 |

< Back Next > Cancel

FIGURE 116. HISTORY

9.2.3 Save and Restore Parameters

The Save and Restore Parameters window displays the Parameter Descriptions, Value, and Units of measure information.

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).

After clicking the Set Data Plate From Capture File button, the **Capture Files** window shows (Figure 117). Select the Capture file to overlay and click the **OK** button. 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.

For legacy controllers like the PCC3200 or PCC2100, the Save and Restore window will display the capture file name selected (Figure 118).

Verify that the information displayed in the parameter list matches the information shown on the generator set, 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.

NOTICE

If a capture file is not being used, the generator set 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.

For the PCC3300 controller, a window similar to shown [Figure 119](#) is shown.

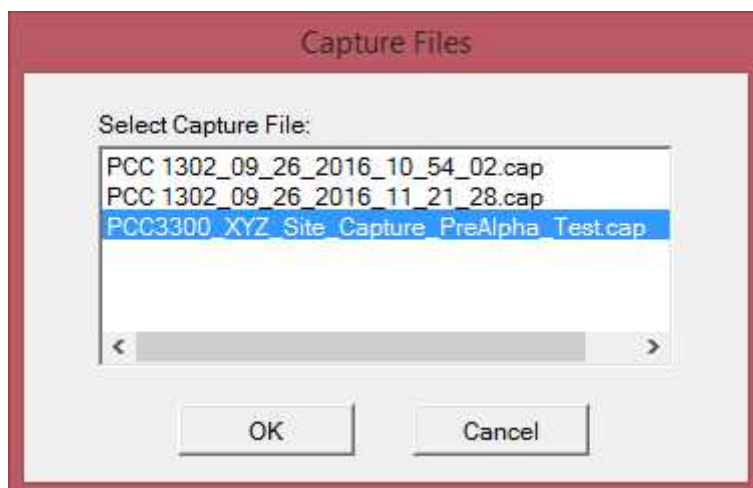


FIGURE 117. MAIN WINDOW

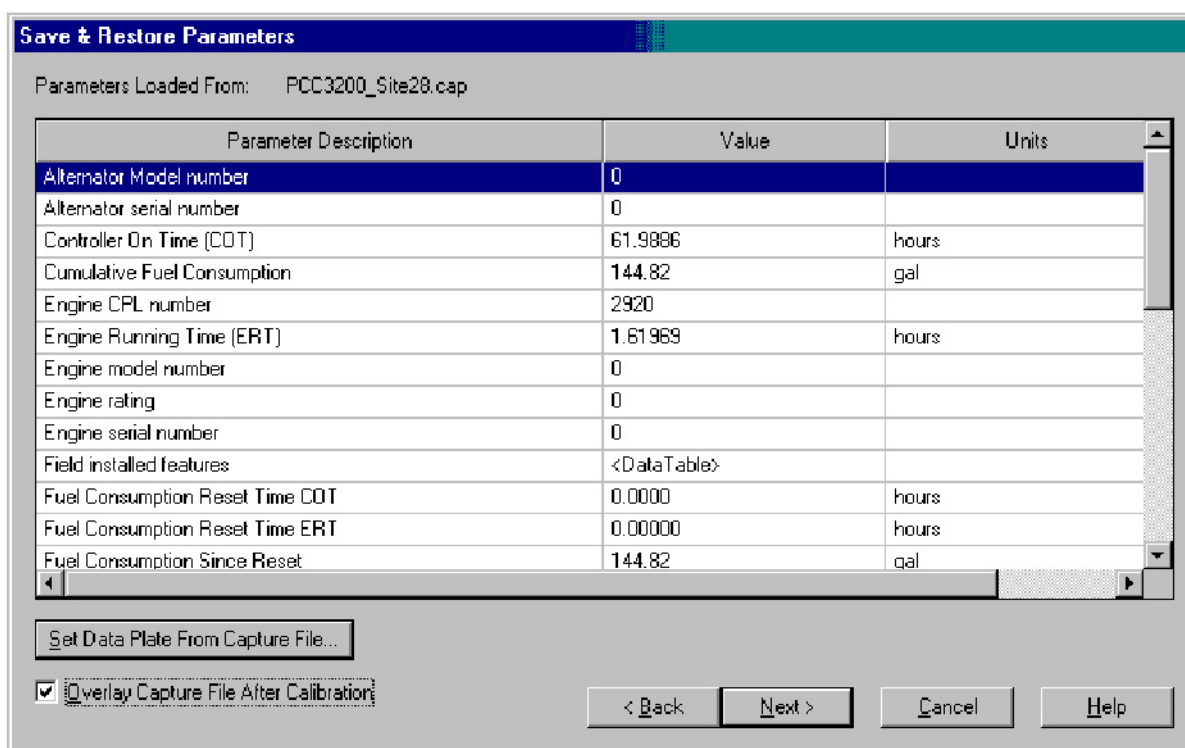


FIGURE 118. CAPTURE FILE SELECTED

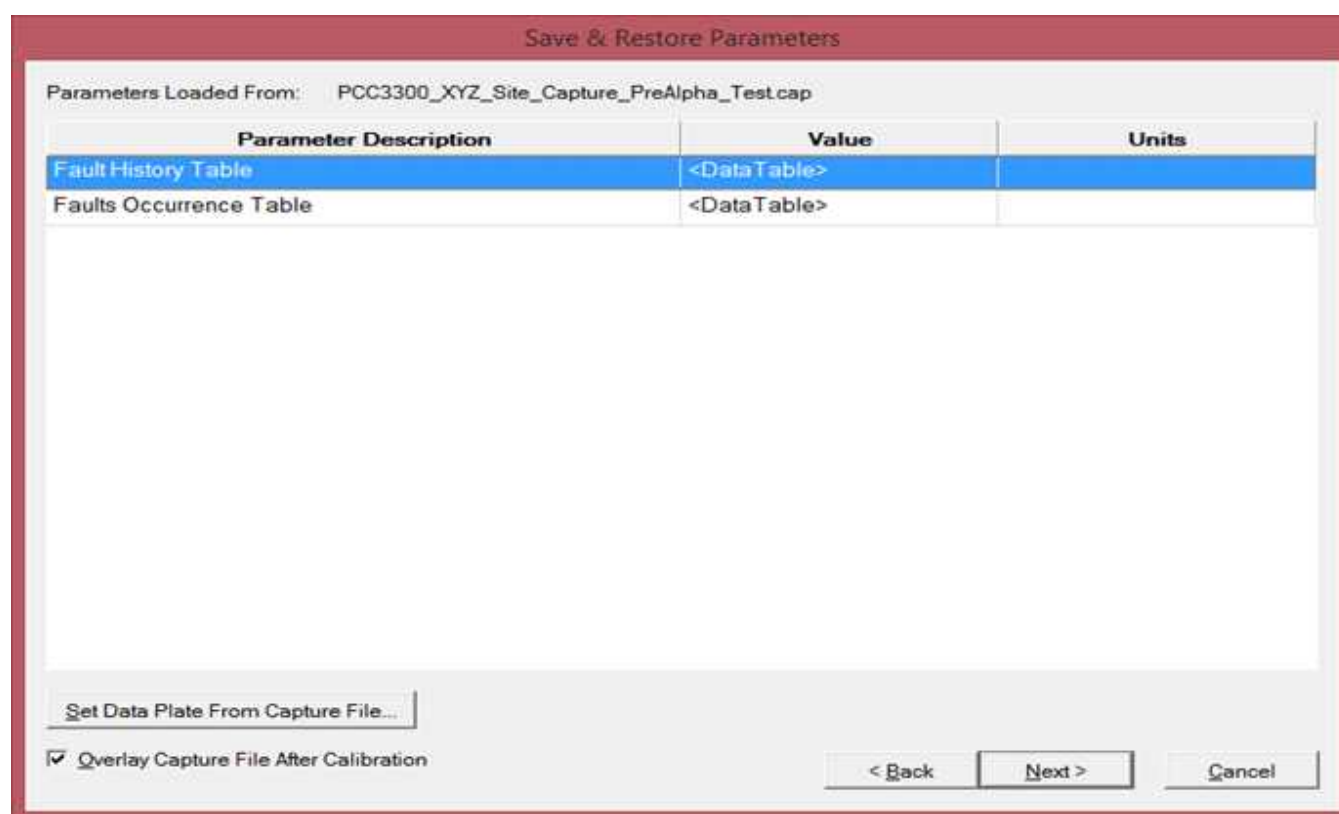


FIGURE 119. CAPTURE FILE SELECTED - PC3300 CONTROLLER

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 120](#)). For legacy controllers like the PCC3200 or PCC3201, this screen also displays the feature descriptions and a dialog for entering the dataplate checksum data from the calibration label. For new controllers which do not need the Checksum to be entered, the user will see a screen shown in [Figure 121](#).

| 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) |

Dataplate Checksum:

< Back Finish Cancel Help

FIGURE 120. FEATURE LIST - LEGACY CONTROLLERS

Search Feature View Selected Feature List

| Selected | Feature Number | Feature Description |
|--------------------------|----------------|--|
| <input type="checkbox"/> | 0326-7942 | CODE-DES FEATURE COMMERCIAL COMMON (Voltage Range 12470V 3Phase) |
| <input type="checkbox"/> | 0326-7943 | CODE-DES FEATURE COMMERCIAL COMMON (Voltage Range 12470-13800V 3Phase) |
| <input type="checkbox"/> | 0326-7944 | CODE-DES FEATURE COMMERCIAL COMMON (Voltage Range 13200V 3Phase) |
| <input type="checkbox"/> | 0326-7945 | CODE-DES FEATURE COMMERCIAL COMMON (Voltage Range 13800V 3Phase) |
| <input type="checkbox"/> | 0326-7946 | CODE-DES FEATURE COMMERCIAL COMMON (Voltage Range 13200-13800V 3Phase) |
| <input type="checkbox"/> | A026C716 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 500V) |
| <input type="checkbox"/> | A026C717 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 525V) |
| <input type="checkbox"/> | A026C718 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 550V) |
| <input type="checkbox"/> | A026C719 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 600V) |
| <input type="checkbox"/> | A026C720 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 690V) |
| <input type="checkbox"/> | A026C721 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 3300V) |
| <input type="checkbox"/> | A026C722 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 4160V) |
| <input type="checkbox"/> | A026C723 | CODE-DES FEATURE COMMERCIAL COMMON (GENSET NOMINAL VOLTAGE: 4800V) |

Dataplate Checksum:

< Back Finish Cancel

FIGURE 121. FEATURE LIST - NON-LEGACY CONTROLLERS

Refer to the calibration label, located inside the control housing, for the list of features that were factory installed on this generator set.

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. 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 122](#)). Click on the **Yes** button to continue.

For PCC3200/PCC3201, 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.

| NOTICE |
|---|
| The generator set serial number and the checksum are case sensitive. |

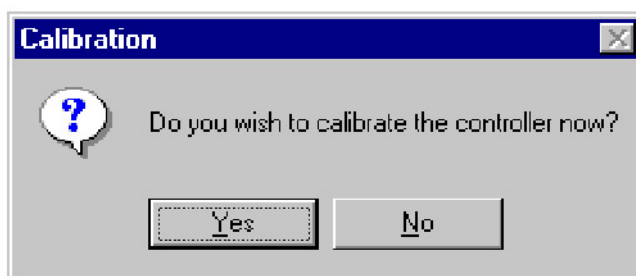


FIGURE 122. CALIBRATION POPUP

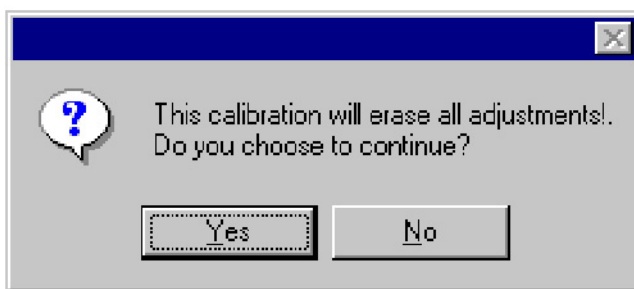


FIGURE 123. FEATURE LIST

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 123](#)). Click on the **Yes** button, to begin the initial calibration download.

| NOTICE |
|---|
| 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 several minutes, depending on the service PC and the communication port.

During the download, it is normal operation for the generator set 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. The message also shows the list of Feature Codes successfully downloaded to the controller. If the download completed successfully, click on the **OK** button to close the popup message. (Figure 124).

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. You can also send error logs to the InPower Support team using the Send Support Report Utility accessible from Help -> Send Support Report menu.

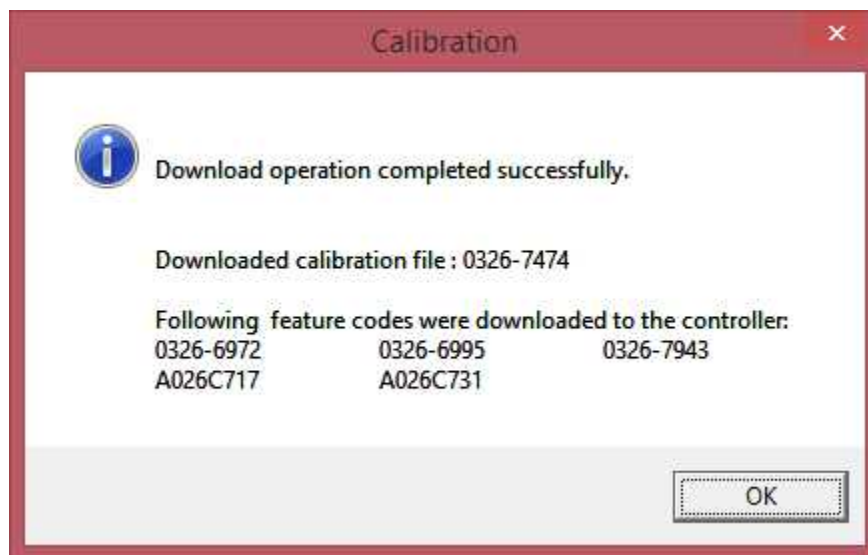


FIGURE 124. FEATURE LIST

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 generator set 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.

NOTICE

Below is the connection error message that is displayed for a PCC3300. A similar error messages is displayed for all controlsthat support this feature, including: PCC1302, PCC2100, PCC3200, PCC3201, PCC2300, PS0500, PS0600, MCM3320, MPC3300, HMI112,HMI114, HMI211, HMI211R,HMI211RS, HMI220, HMI320, HMI321, HMI400, HMI3320,HMECM, AUX107, and AUX101LBNG. The recovery mechanism mentioned for PCC3300 is applicable to all above listed devices.



FIGURE 125. CONNECTION ERROR MESSAGE

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

NOTICE

The following figure shows the Initial Calibration and Connect commands for the PCC3300. These commands are also available for the other controls that support Corrupt Calibration Recovery feature.

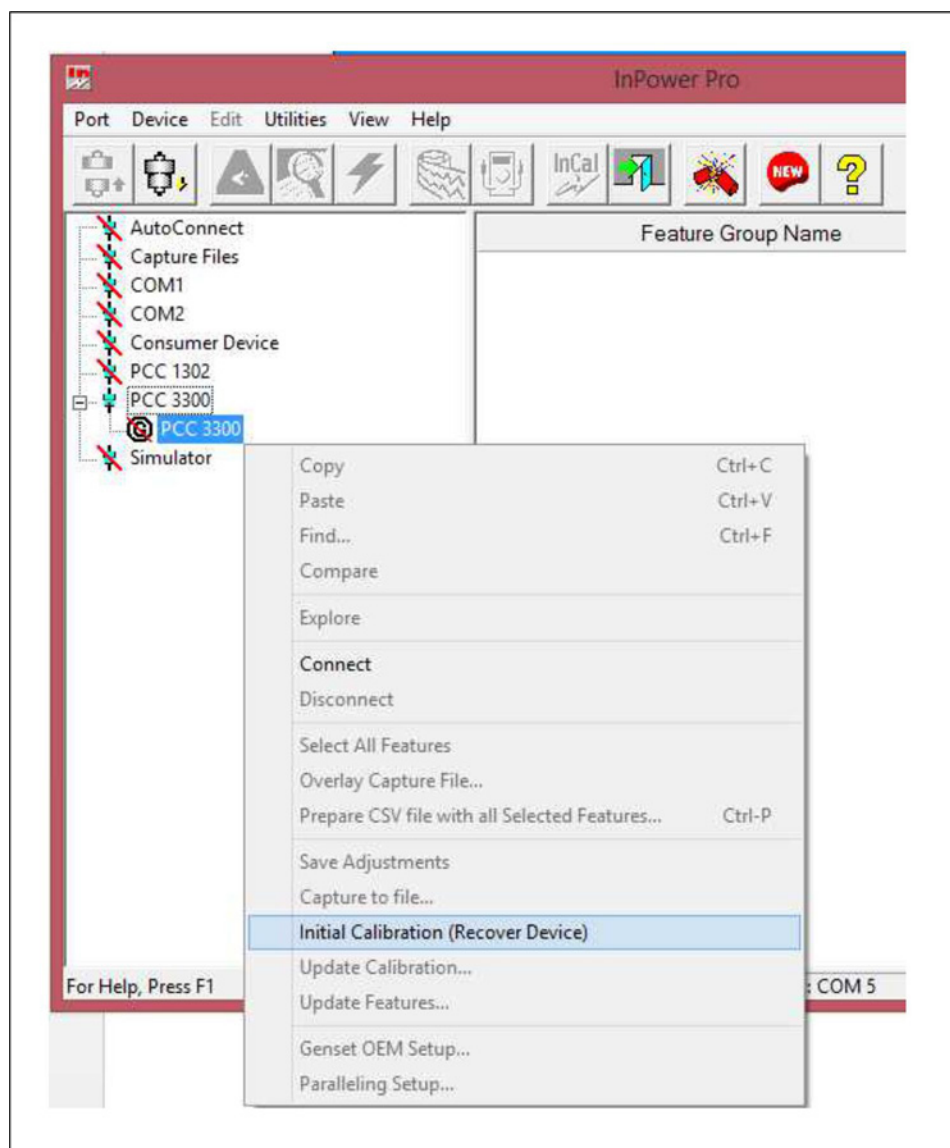


FIGURE 126. INITIAL CALIBRATION MENU SELECTION

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).

9.4 Final Adjustments

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

10.1 About Update Calibration

The Update Calibration feature is used to replace a current calibration file with a newer version from the WebInCal website. The new calibration file is written over the current calibration file in the generator set controller.

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

InPower calibration files for commercial and consumer controllers can be downloaded from the WebInCal Website, or the easier way is to use **"InCal Downloader & Extractor Utility"** to download the latest calibration files.

10.2 Update Calibration

After connecting to the device, click on the **Device** menu and click on **Update Calibration** ([Figure 127](#)). The menu can also be accessed with a right click on the connected device ([Figure 128](#)).

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.

NOTICE

The screenshots below are taken with reference to PCC3300. The same procedure is applicable to all commercial devices.

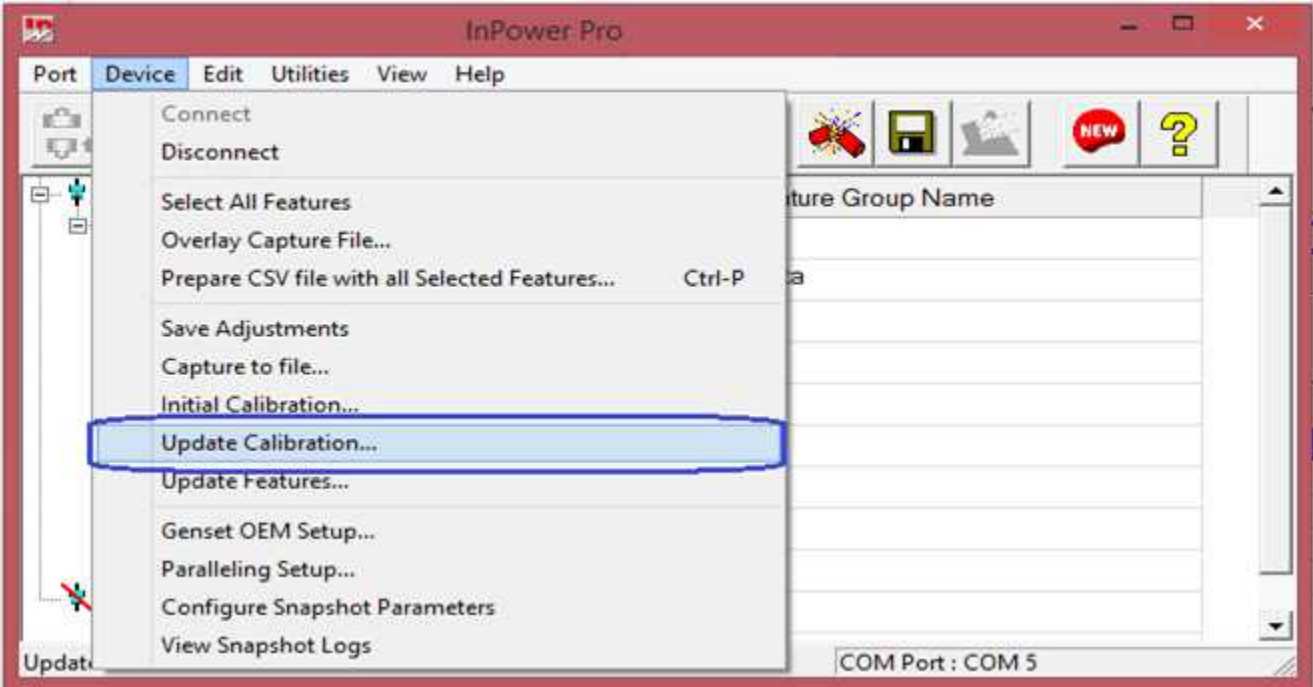
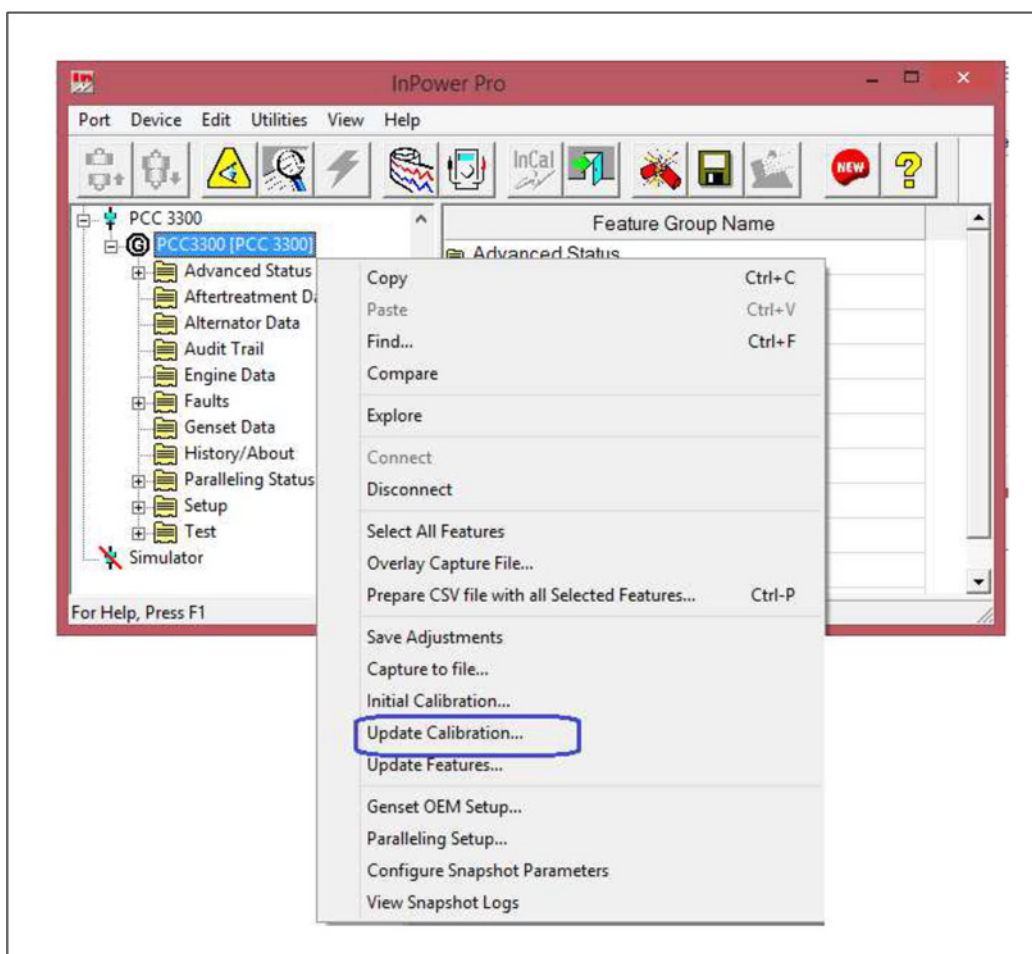


FIGURE 127. UPDATE CALIBRATION SELECTION

**FIGURE 128. UPDATE CALIBRATION MENU**

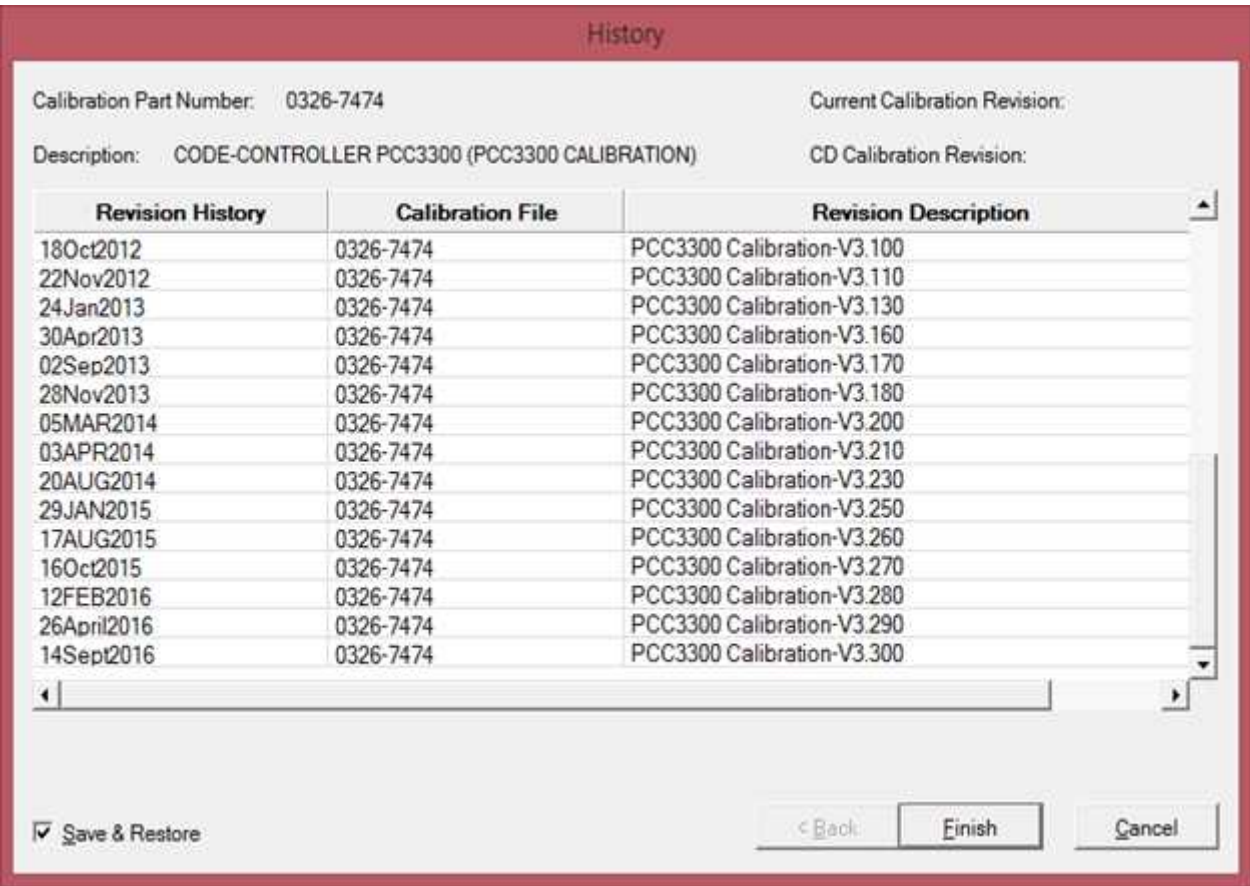


FIGURE 129. HISTORY

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 129](#)).

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.

A popup window prompts the user with the question "Do you wish to calibrate the controller now?" ([Figure 130](#)). Click on the **Yes** button to continue.

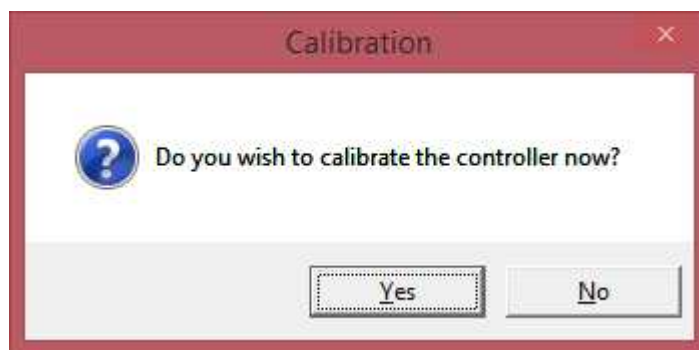


FIGURE 130. UPDATE NOW

When the download is complete, a popup message informs the user if the download completed successfully ([Figure 131](#)). Click on the **OK** button to acknowledge.

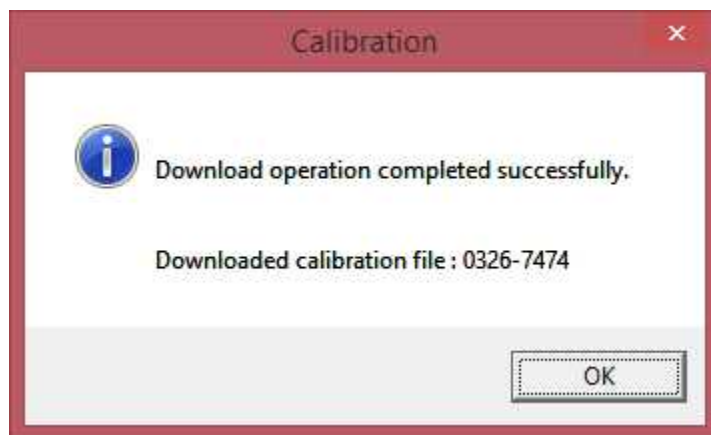


FIGURE 131. COMPLETED

This page is intentionally blank.

11 PCC Operator Panel Updates

11.1 About Generator Set 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 generator sets [Figure 132](#).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration** ([Figure 133](#)).

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



FIGURE 132. MAIN WINDOW

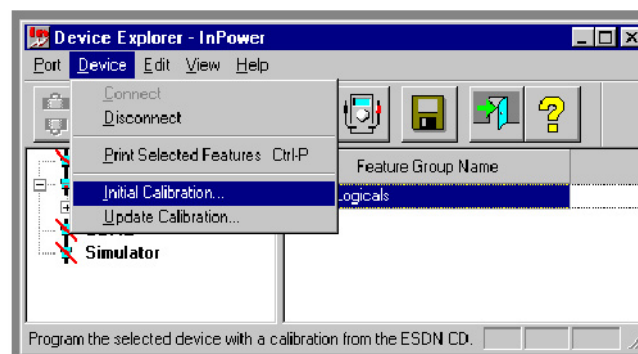


FIGURE 133. OPERATOR PANEL

11.2.1 Selecting Calibration Part Number

The Select Calibration window ([Figure 134](#)) 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.

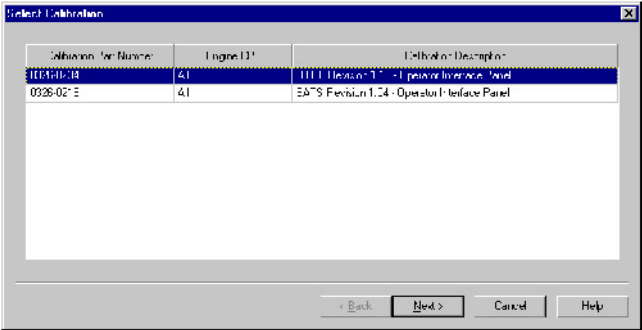


FIGURE 134. SELECT CALIBRATION

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 135).

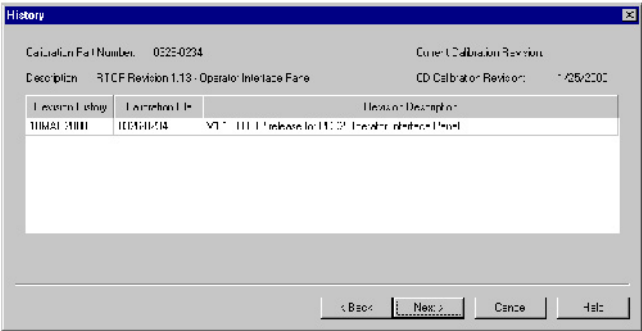


FIGURE 135. HISTORY WINDOW

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.

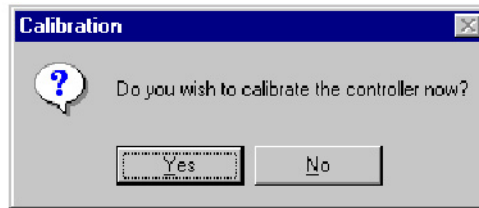
The Save and Restore window is displayed next. This feature is not used, click on the **Next** button to proceed.

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 136). Click on the **Yes** button to continue.

NOTICE

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 136. UPDATE NOW**

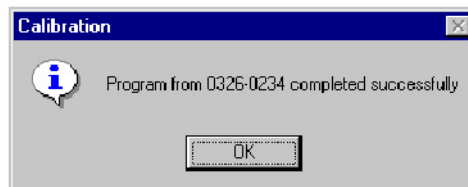
11.2.3 During Download

During the download procedure, the current BATS file software version is displayed in the generator set 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 137](#)). Click on the **OK** button to acknowledge.

**FIGURE 137. COMPLETED FROM INCAL PATH**

A second pop-up message confirms that the download completed successfully ([Figure 138](#)). Click on the **OK** button to acknowledge.

**FIGURE 138. 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 generator set operator display panel (if equipped). View the History - About screen, to see the currently installed RTOP software version.

This page is intentionally blank.

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 ConsumerDevice Site or AutoConnect site.

Select the device by clicking on it ([Figure 139](#)).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration** ([Figure 140](#)).

InCal calibration files can be downloaded using "InCal Downloader & Extractor Utility" accessible from **InPower** -> **Utilities** menu.

Refer to the generator set engine label for the calibration part number ([Figure 141](#)). 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.

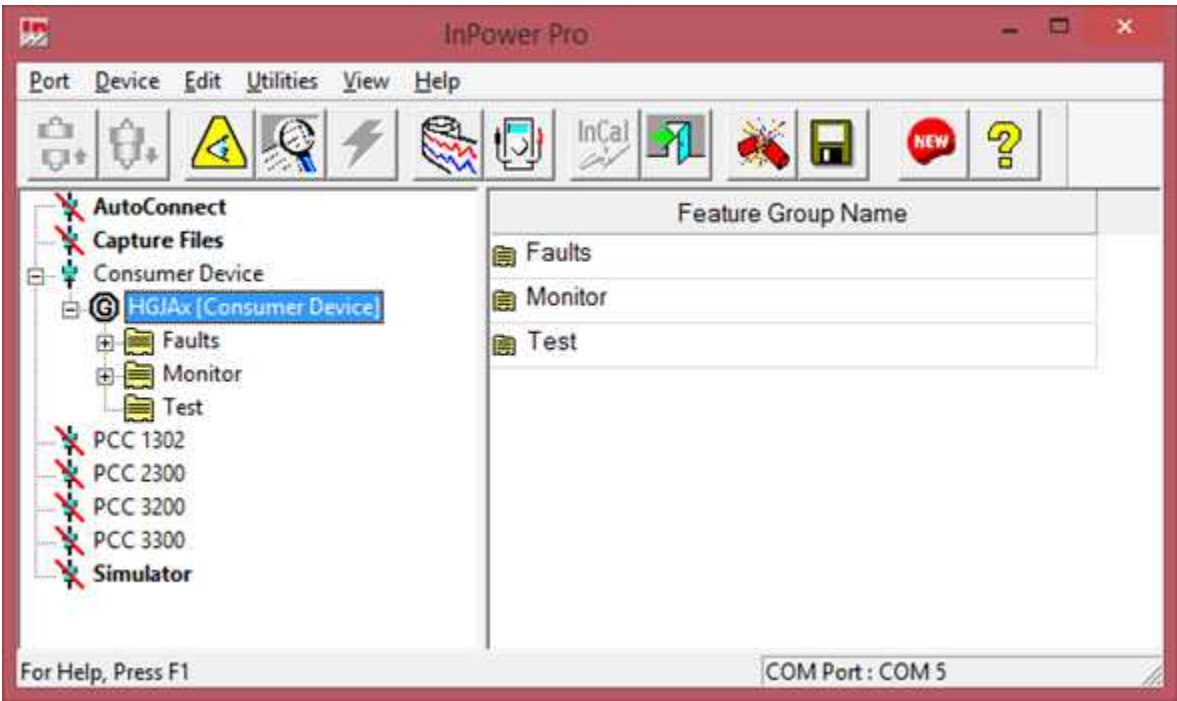


FIGURE 139. MAIN WINDOW

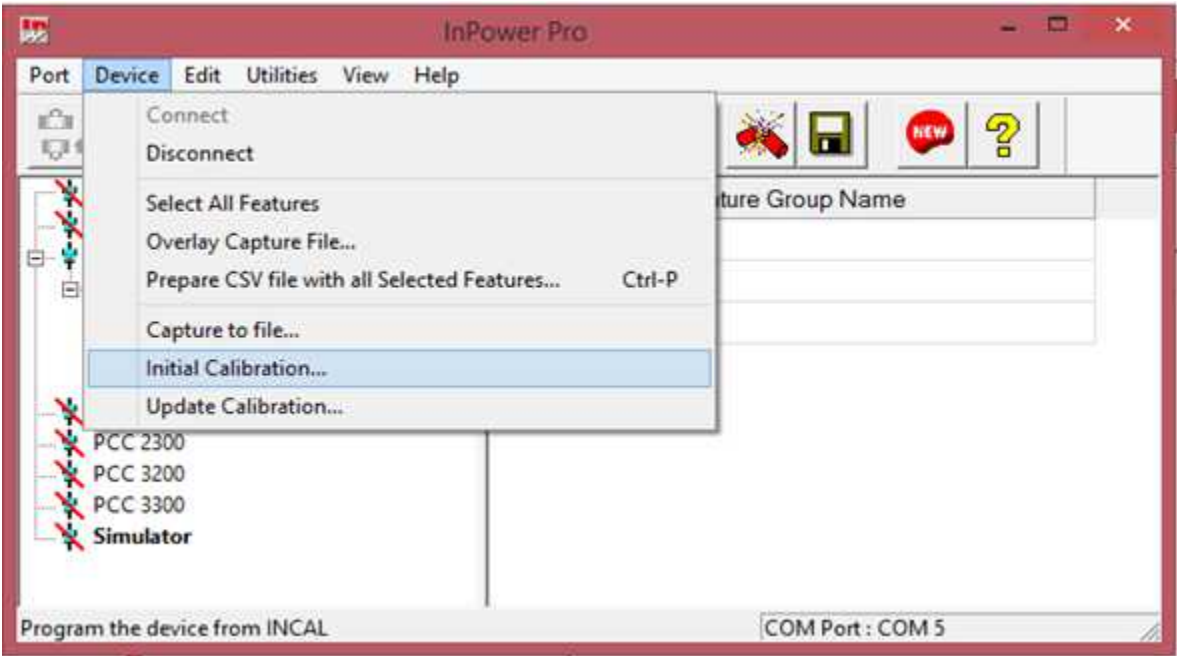


FIGURE 140. MAIN WINDOW

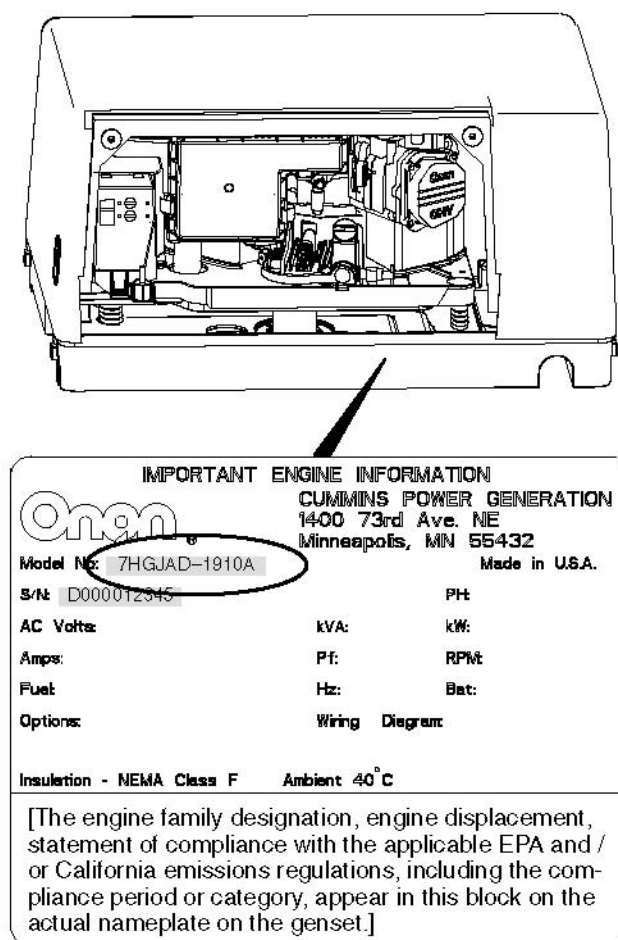


FIGURE 141. GENERATOR SET DATAPLATE AND CALIBRATION LABEL

12.2.1 Selecting Calibration Part Number

The Select Calibration window ([Figure 142](#)) lists all of the calibration files that are available from the PGA folder for the connected device.

Use the scroll bar to locate the Calibration model that matches the model shown on the generator set engine label ([Figure 141](#)).

The data, displayed in each column, can be sorted in ascending or descending order by clicking on the column heading. Feature code can be searched by clicking **View Selected Feature List**.

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

| Calibration Part Number | Engine CPL | Calibration Description |
|-------------------------|------------|------------------------------------|
| 0326-7151 | NO_CPL | DKHax CONSUMER GENSET CALIBRATION |
| A026L104 | NO_CPL | CODE-CONTROLLER (CONSUMER APU) |
| A030G041 | NO_CPL | CODE-DES CONTROLLER (CONSUMER APU) |
| A041X683 | NO_CPL | DIESEL RANGER RS485 CALIBRATION |

FIGURE 142. SELECT CALIBRATION

12.2.2 History

The History window is displayed when the **NEXT** button is selected ([Figure 143](#)). 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 generator set 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.

History

Calibration Part Number: A030G041 Current Calibration Revision:

Description: CODE-DES CONTROLLER (CONSUMER APU) CD Calibration Revision:

| Revision History | Calibration File | Revision Description |
|------------------|------------------|----------------------|
| 03MAR2013 | A030G041 | V4.12 release |

< Back Next > Cancel

FIGURE 143. HISTORY

12.2.3 Save and Restore Parameters

The Save and Restore Parameters window displays the Parameter Descriptions, Values, and Units of measure information.

Save & Restore Parameters

Parameters Loaded From: Connected Device

| Parameter Description | Value | Units |
|----------------------------------|-------|-------|
| FC-12 Overvoltage Fault | 0 | |
| FC-13 Undervoltage Fault | 0 | |
| FC-14 Overfrequency Fault | 0 | |
| FC-15 Underfrequency Fault | 0 | |
| FC-19 Governor Actuator Fault | 0 | |
| FC-2 Low Oil Pressure Fault | 0 | |
| FC-27 AC Voltage Sense Fault | 0 | |
| FC-29 High Battery Voltage Fault | 0 | |
| FC-32 Low Cranking Speed Fault | 0 | |
| FC-35 Control Card Fault | 0 | |
| FC-36 Engine Stopped Fault | 0 | |

Set Data Plate From Capture File...

☐ Overlay Capture File After Calibration

< Back Next > Cancel

FIGURE 144. SAVE AND RESTORE PARAMETERS

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 145). 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.

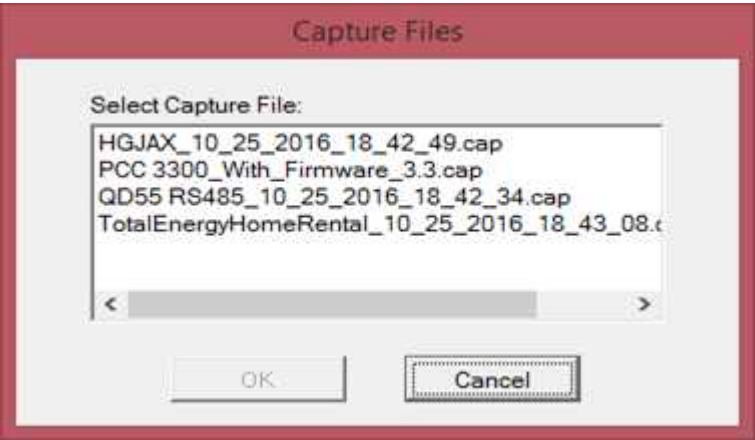


FIGURE 145. SELECTING A CAPTURE FILE

The Save and Restore window will display the capture file name selected (Figure 146).

Verify that the information displayed in the parameter list matches the information shown on the generator set, 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.

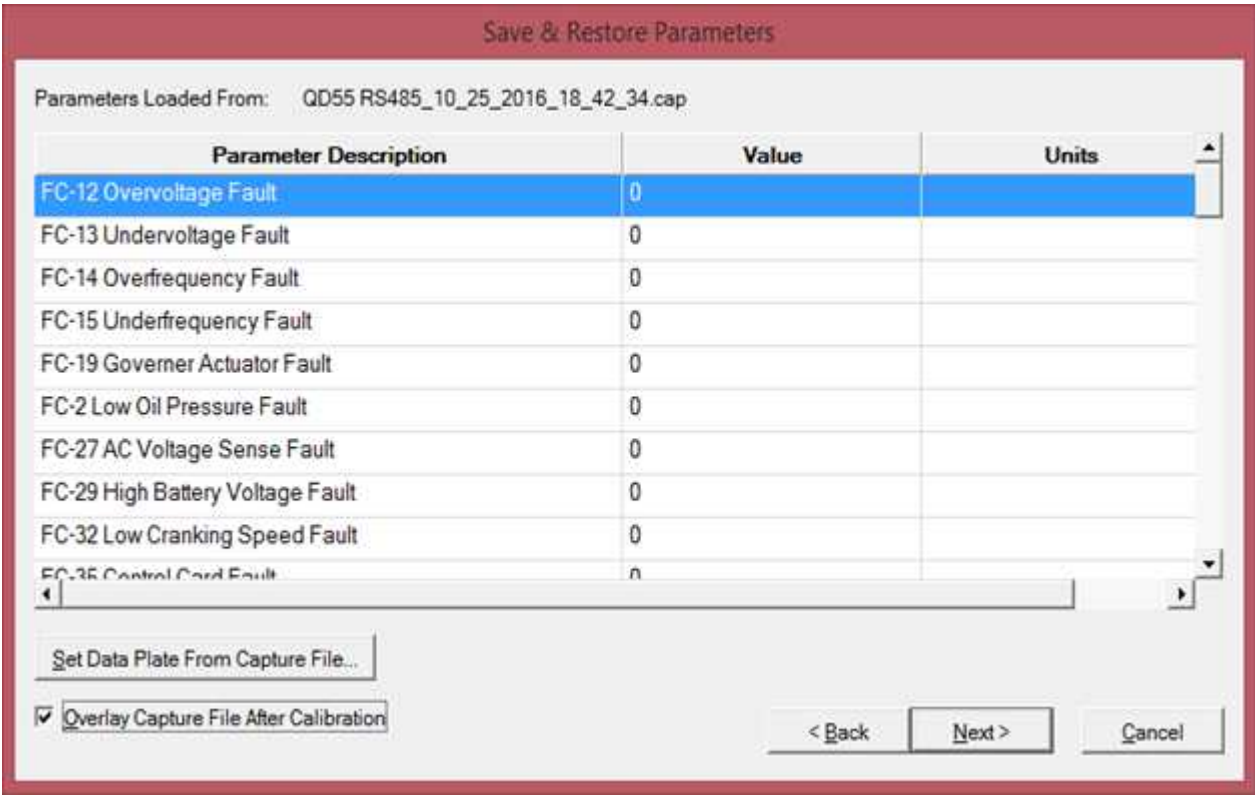


FIGURE 146. CAPTURE FILE SELECTED

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 147).

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 or InPower Support team for help.

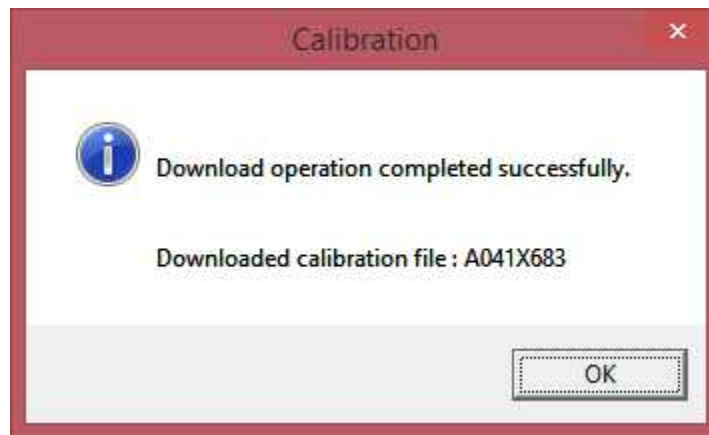


FIGURE 147. SUCCESSFUL DOWNLOAD

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).

NOTICE

Read only information cannot be written to when overlaying a capture file.

12.4 Final Adjustments

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

This page is intentionally blank.

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 WebInCal web site. The new calibration file is written over the current calibration file in the generator set baseboard. This section covers the procedures for performing Update Calibration for consumer products.

NOTICE

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.

NOTICE

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 148](#)).

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.

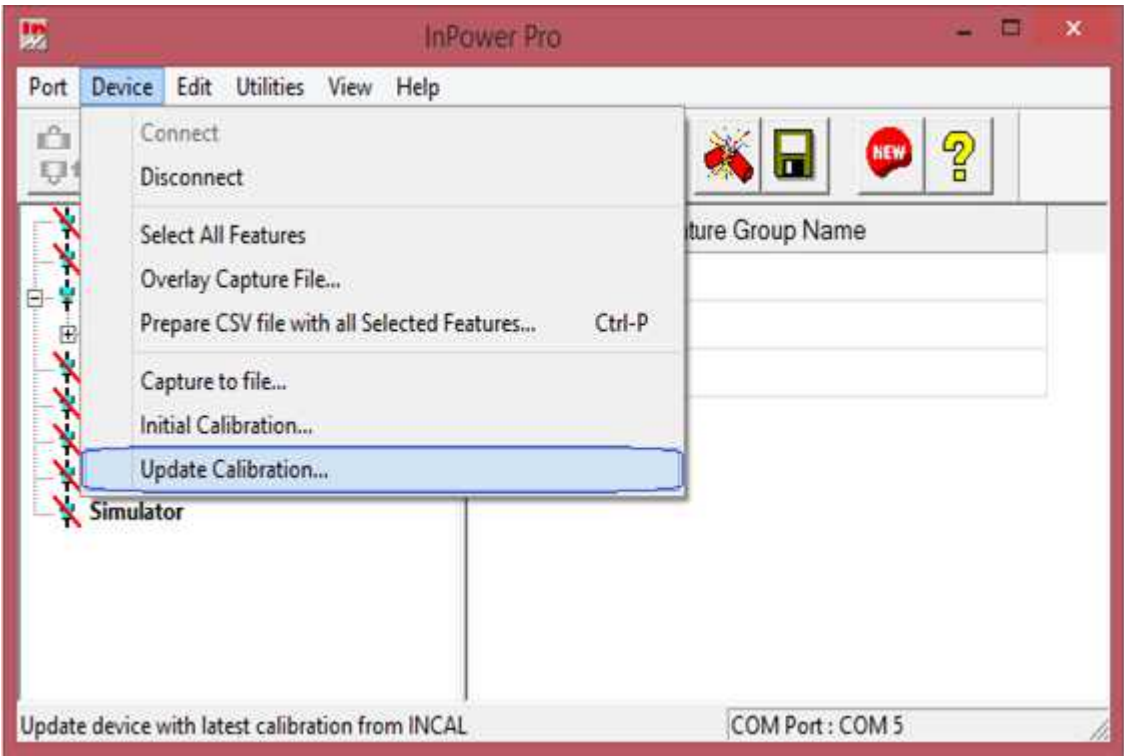


FIGURE 148. UPDATE - DEVICE MENU

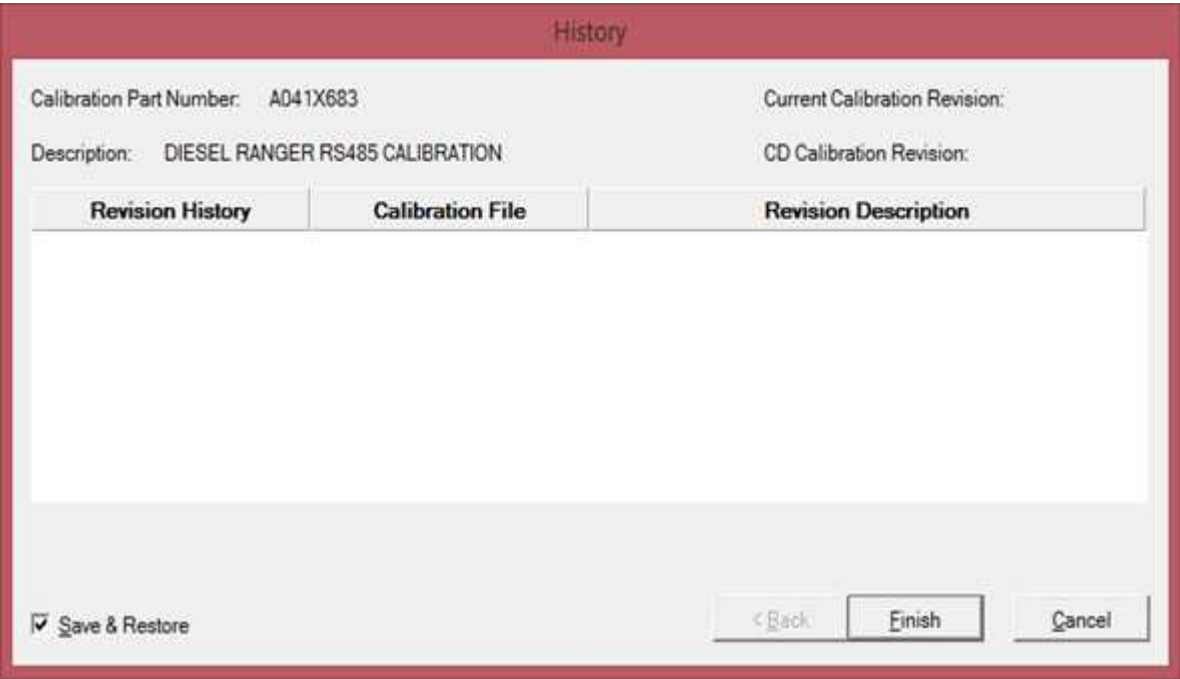


FIGURE 149. HISTORY

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 149](#)).

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 150). Click on the **Yes** button to continue.

| NOTICE |
|---|
| 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. |

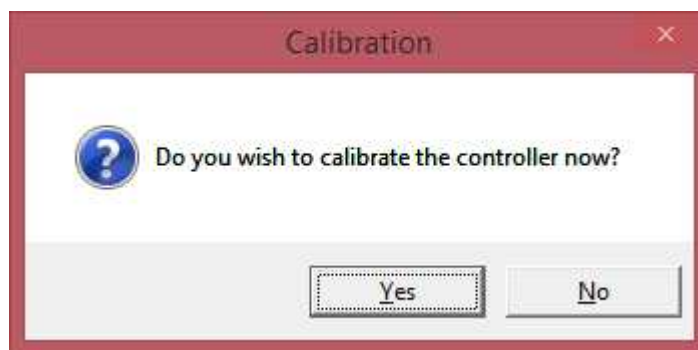


FIGURE 150. UPDATE NOW

When the download is complete, a popup message informs the user if the download completed successfully (Figure 151). Click on the **OK** button to acknowledge.

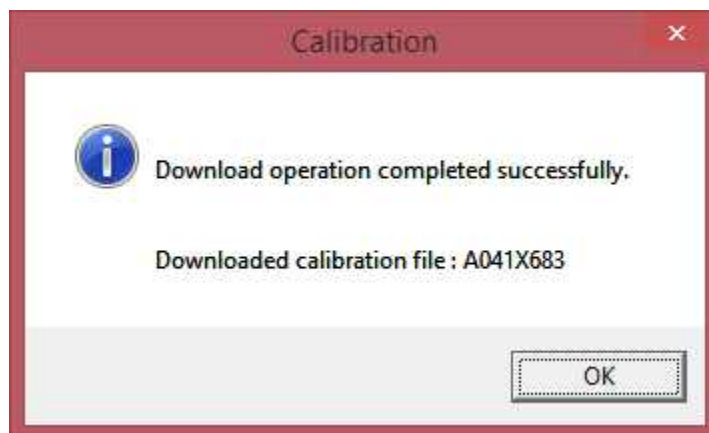


FIGURE 151. COMPLETED

This page is intentionally blank.

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 152](#)).

After connecting to the device, click on the **Device** menu and click on **Initial Calibration** ([Figure 153](#)).

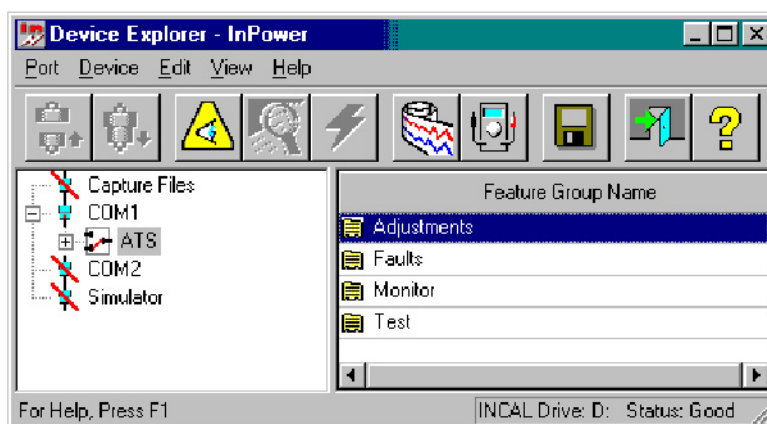


FIGURE 152. MAIN WINDOW

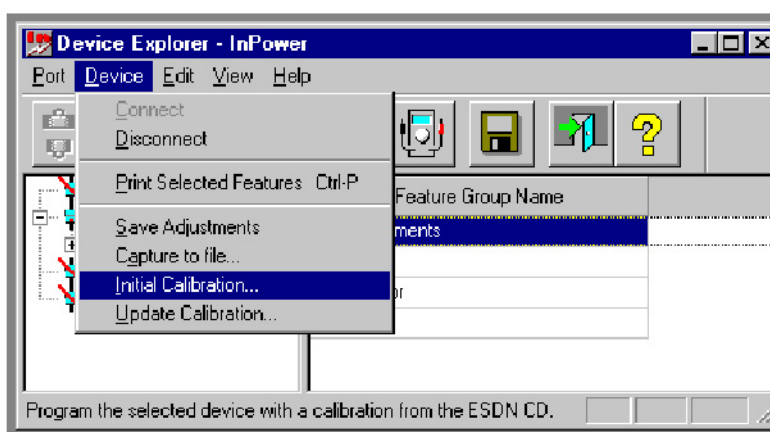


FIGURE 153. MAIN WINDOW

14.2.1 Selecting Calibration Part Number

The Select Calibration window is displayed (Figure 154). 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 155). 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.

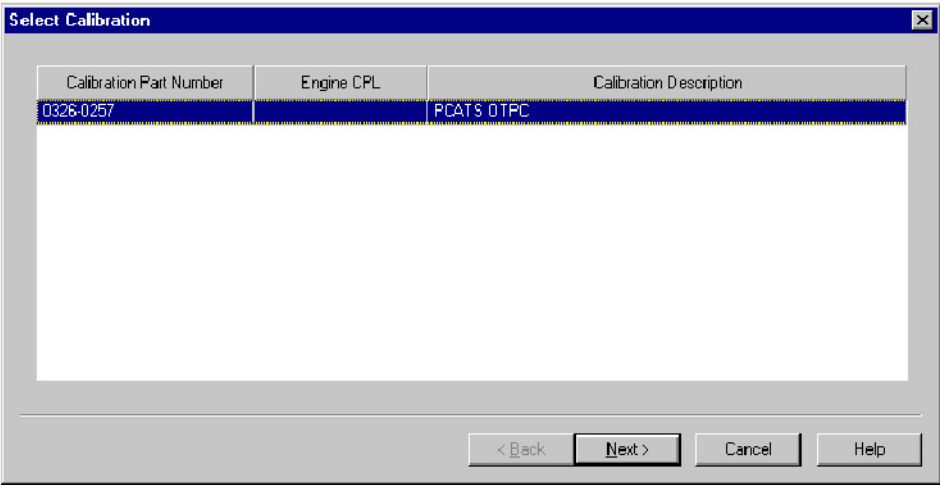


FIGURE 154. SELECT CALIBRATION

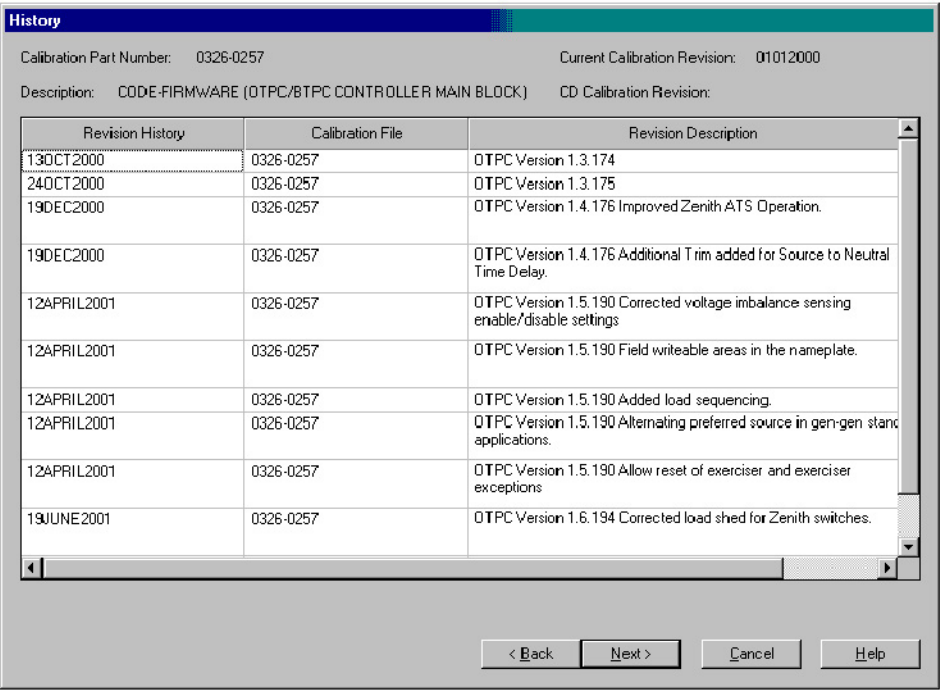


FIGURE 155. HISTORY

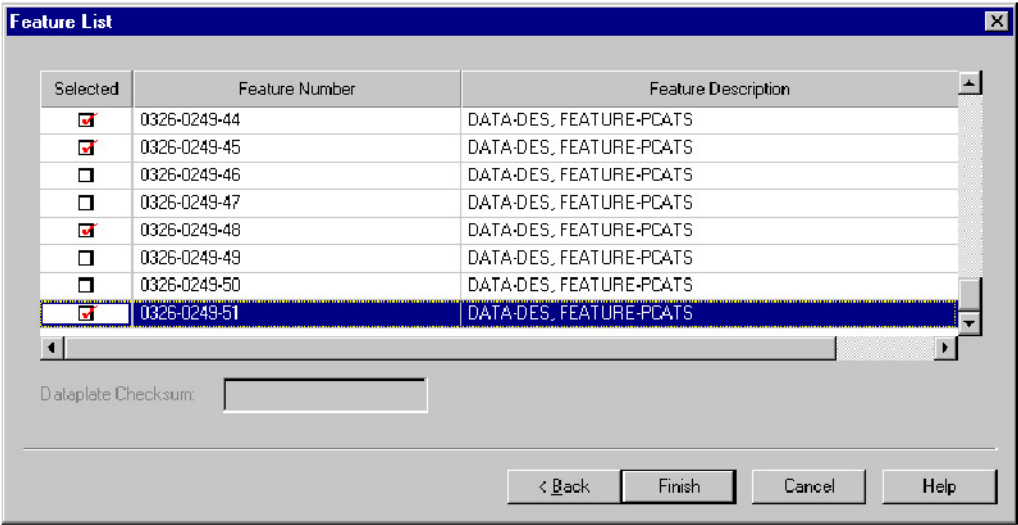


FIGURE 156. FEATURE LIST

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 156). This screen also displays the feature descriptions.

Refer to the calibration label, located inside the door on the ATS (Figure 157), for the list of Features (listed by Feature Code) that were originally installed on this ATS.

Refer to Figure 158 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 157. DATAPLATE

Data From Drawing
0326-0249 (Rev. A)

| Feature Part Num- bers | Feature Codes | | | |
|------------------------------|------------------|---------------|---------------------------------|---------------------------------|
| Software P/N | ECO Number | Feature Codes | Software Feature Description | |
| 0326-0249-01 | FRD1824 | S046 | OTPC40 | 40 Amps |
| 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 |
| 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 | |
| 0326-0249-21 | FRD1824 | R020 | C023 | Level-1, 120V |
| 0326-0249-22 | FRD1824 | R036 | 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 |
| 0326-0249-31 | FRD1824 | R020 | C024 | Level-2, 120V |
| 0326-0249-32 | FRD1824 | R036 | 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 |
| 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 | |

Must Select One

Note1: Newer Models Use Model Letters and Amperage For The Feature Code.

Note2: Amperage of ATS Automatically Selects the Mechanism Type.

Level 1 Control Voltage Selection Only

Level 2 Control Voltage Selection Only

Must Select One

FIGURE 158. 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 159). Click on the **Yes** button to continue.

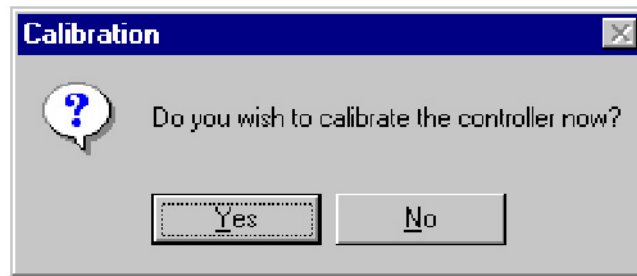


FIGURE 159. CALIBRATION POP-UP

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.

| NOTICE |
|---|
| <p>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.</p> |

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 160](#)). Click on the **OK** button to acknowledge.



FIGURE 160. COMPLETED FROM INCAL PATH

A second pop-up message confirms that the download completed successfully ([Figure 161](#)). 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.

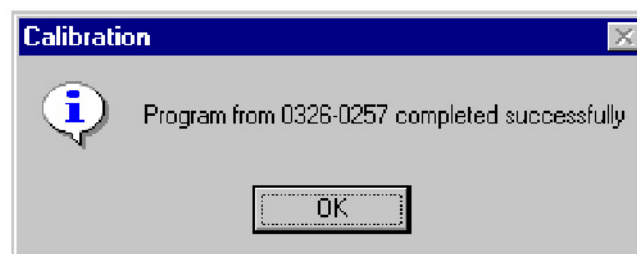


FIGURE 161. DOWNLOAD COMPLETED

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 163](#)).

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



FIGURE 162. MAIN WINDOW

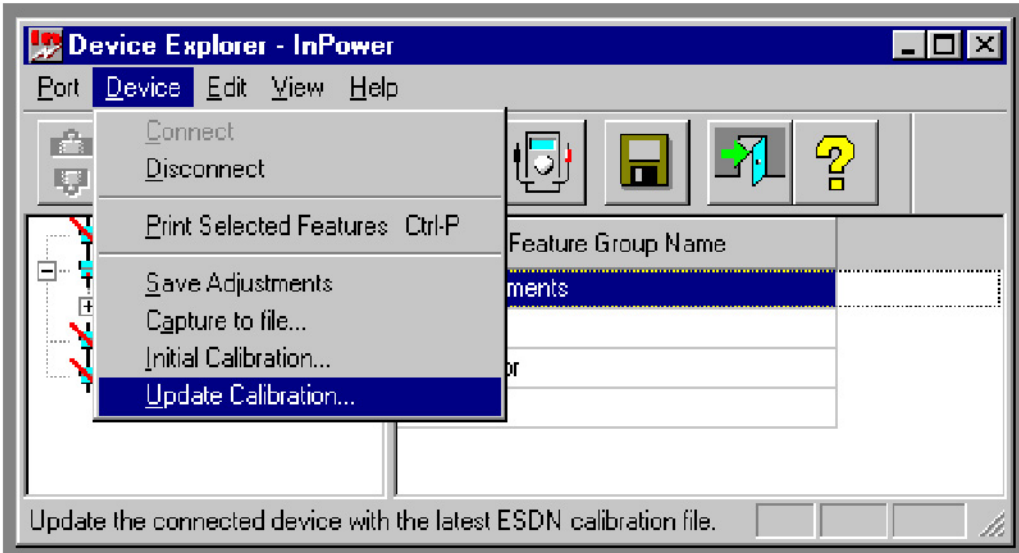


FIGURE 163. UPDATE - DEVICE MENU

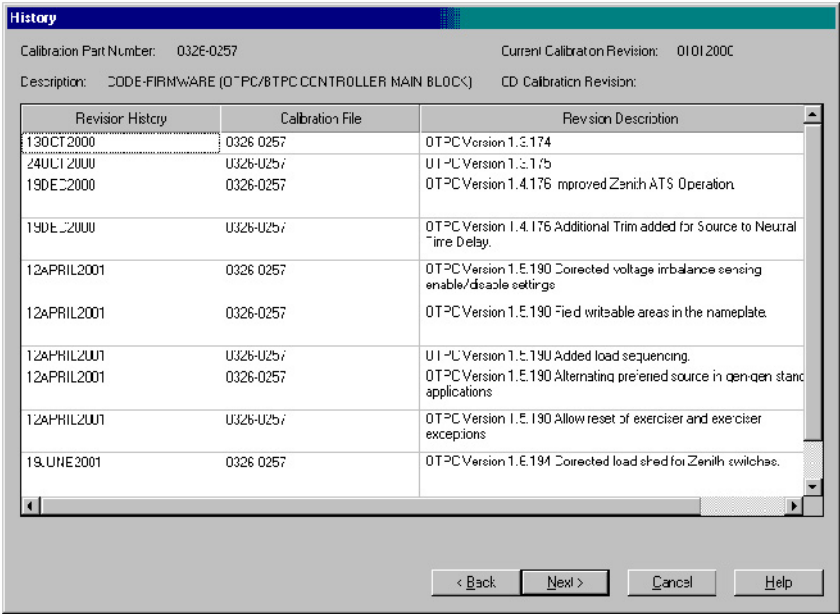


FIGURE 164. HISTORY

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 164).

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 165). Click on the **Yes** button to continue.

NOTICE

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 166](#)). Click on the **OK** button to acknowledge.

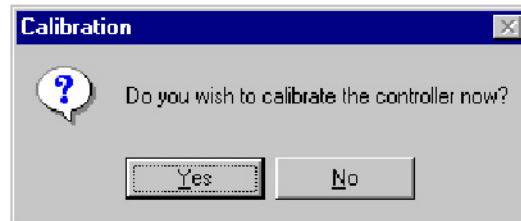


FIGURE 165. UPDATE NOW



FIGURE 166. COMPLETED FROM INCAL PATH

A second popup message confirms that the download completed successfully ([Figure 167](#)). 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.

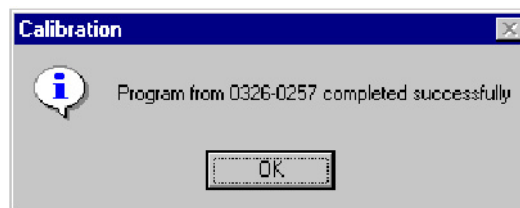


FIGURE 167. DOWNLOAD COMPLETED

This page is intentionally blank.

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 168](#)).

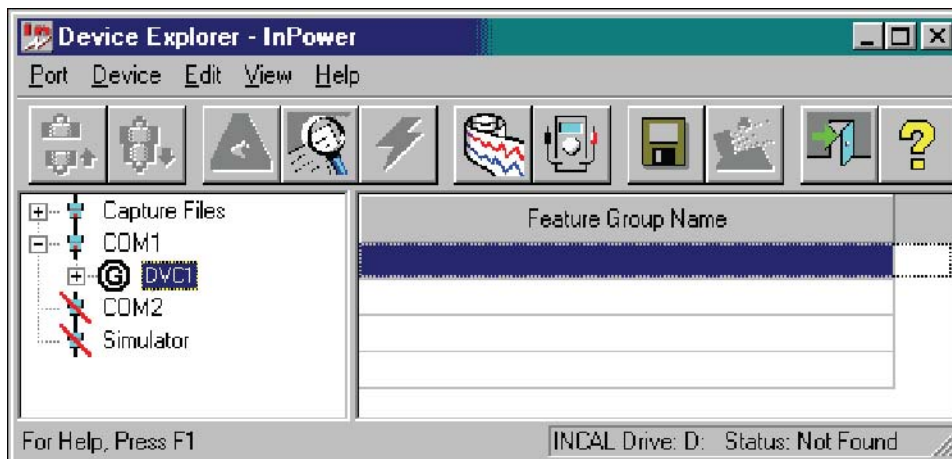


FIGURE 168. MAIN WINDOW

After connecting to the device, click on the Device menu and click on Initial Calibration ([Figure 169](#)).

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 170](#).

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.

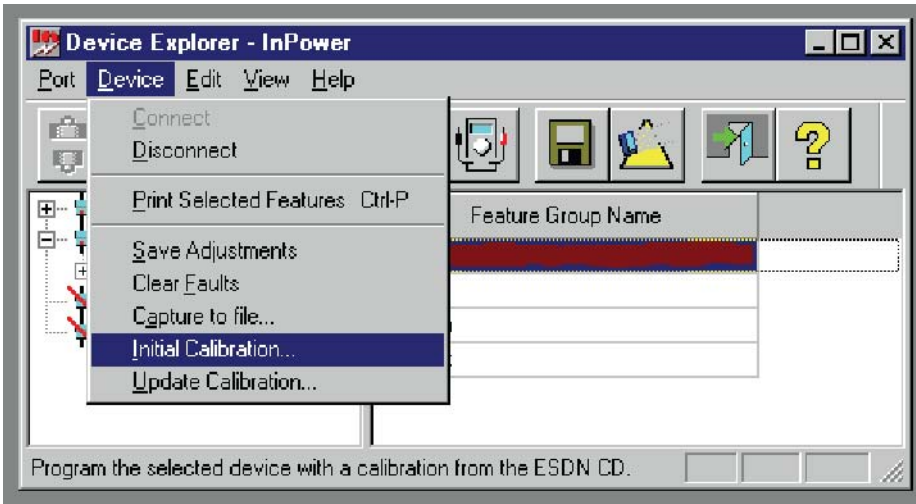


FIGURE 169. MAIN WINDOW

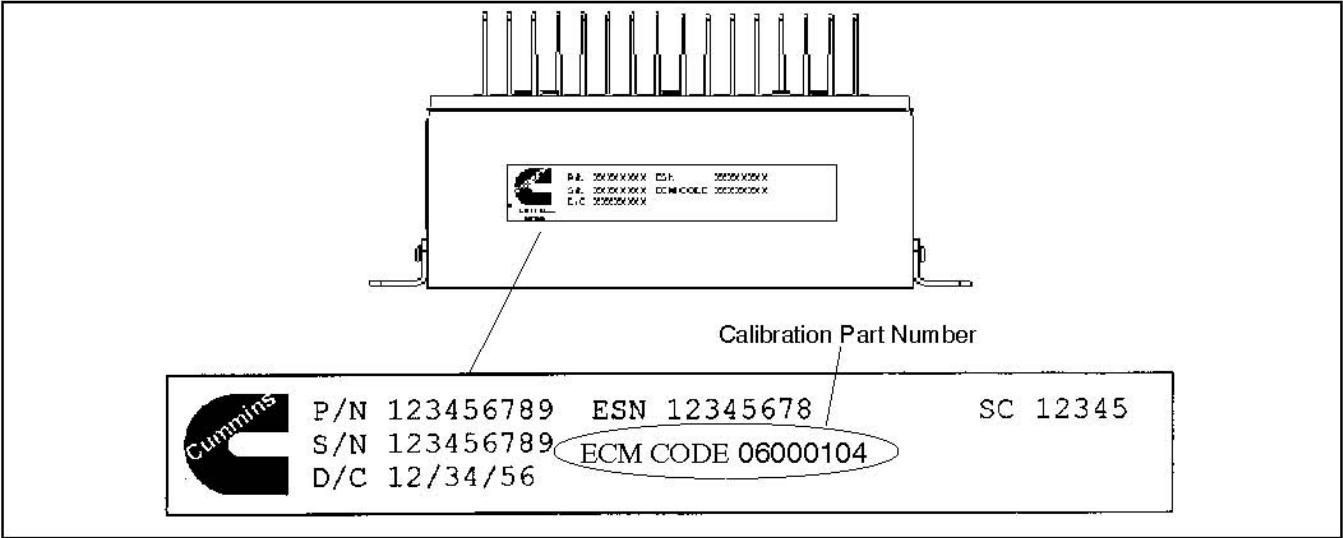
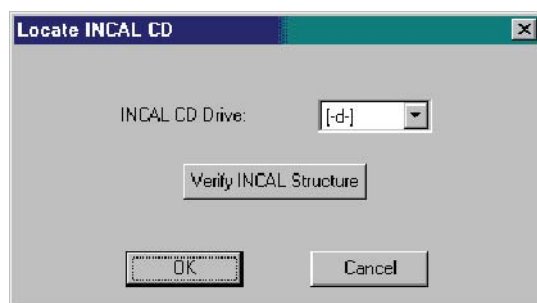


FIGURE 170. DATAPLATE

The INCAL CD location can be verified by clicking on the Port menu and clicking on Find InCal ([Figure 171](#)). 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 172](#)).

**FIGURE 171. FIND INCAL****FIGURE 172. INCAL LOCATION FOUND**

16.2.1 Selecting Calibration Part Number

After clicking on Initial Calibration, the Select Calibration window is displayed ([Figure 173](#)). 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 170](#).

Use the scroll bar to locate the ECM Code that matches the number shown on the Dataplate ([Figure 170](#)). 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.

| 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 | 0563 EHP @ 1800 RPM 0505 3HP @ 1500 RPM | EPA, CARB, ... | | STANDEY | NA | RS232 | CENTINEL - NO. |
| AC1C01605 | SC10793 | 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 173. SELECT CALIBRATION

16.2.2 History

The History window ([Figure 174](#)) 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.

| 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 174. 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 175](#)).

| Parameter Description | Value | Units |
|---------------------------------|-------------|-------|
| Controller On Time | 6.0542 | hours |
| Cumulative Fuel Consumption | 0.78 | gal |
| Engine CPL number | | |
| Engine Running Time | 0.26464 | 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 175. 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 176](#)). 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 177](#)).

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.

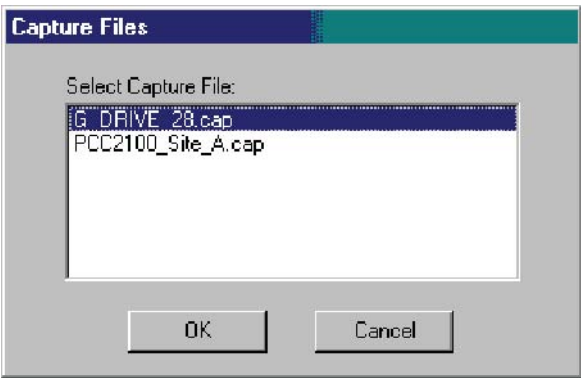


FIGURE 176. MAIN WINDOW

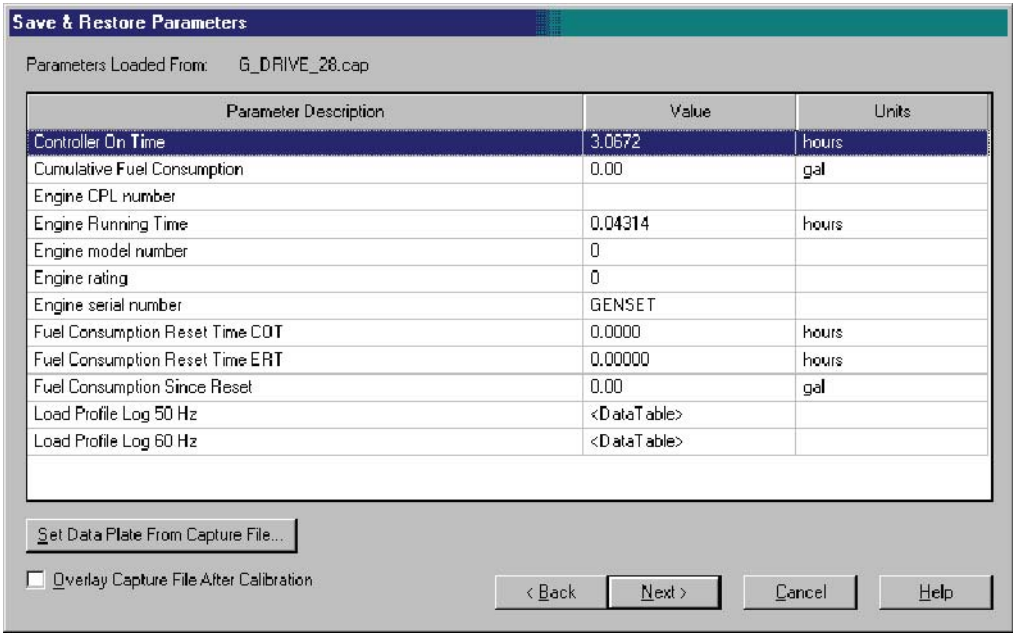


FIGURE 177. CAPTURE FILE SELECTED

16.2.5 Feature List

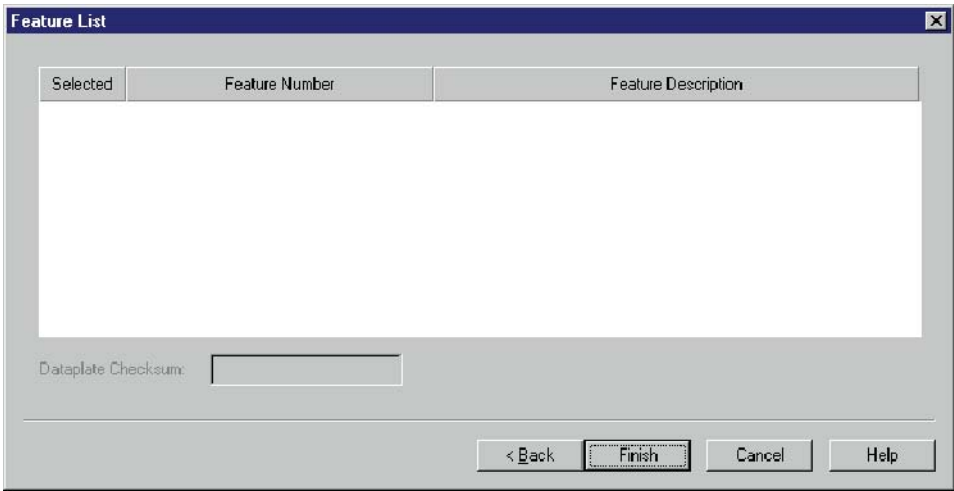


FIGURE 178. FEATURE LIST

The Feature List window is displayed ([Figure 178](#)) 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 179](#)). Click on the Yes button to continue.

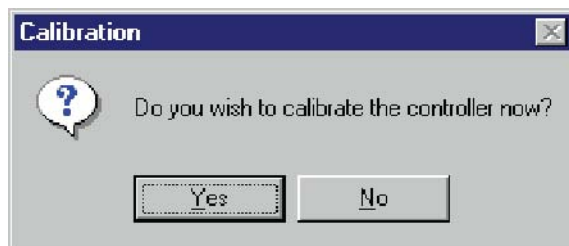


FIGURE 179. CALIBRATION POPUP

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 180](#)). Click on the Yes button, to begin the initial calibration download.

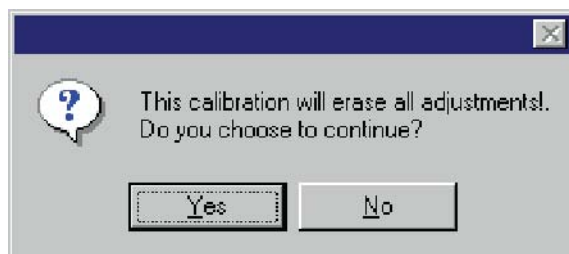


FIGURE 180. FEATURE LIST

NOTICE

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 181](#)). If the download completed successfully, click on the OK button to close the popup message.

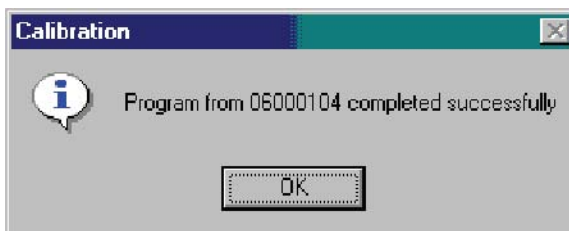


FIGURE 181. DOWNLOAD STATUS

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 generator set 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 182](#).

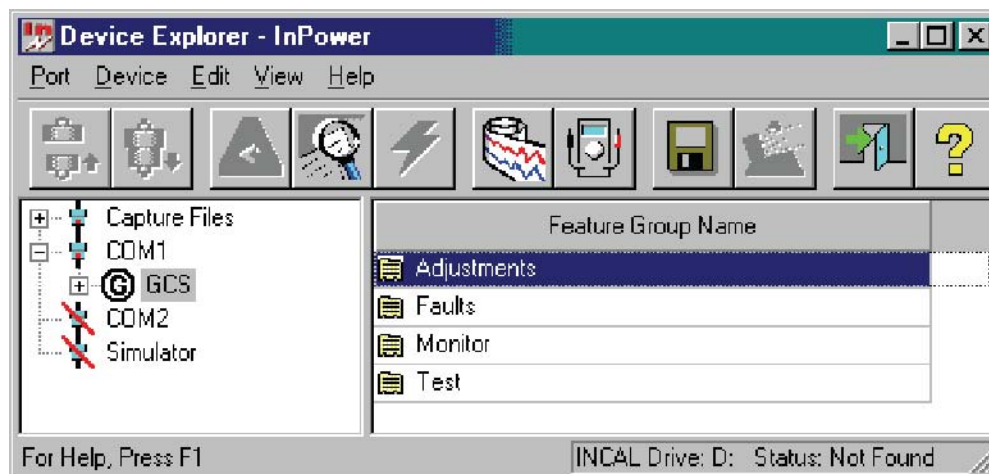


FIGURE 182. MAIN WINDOW

17.3 Update Calibration

After connecting to the device, click on the Device menu and click on Update Calibration (Figure 183). 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.

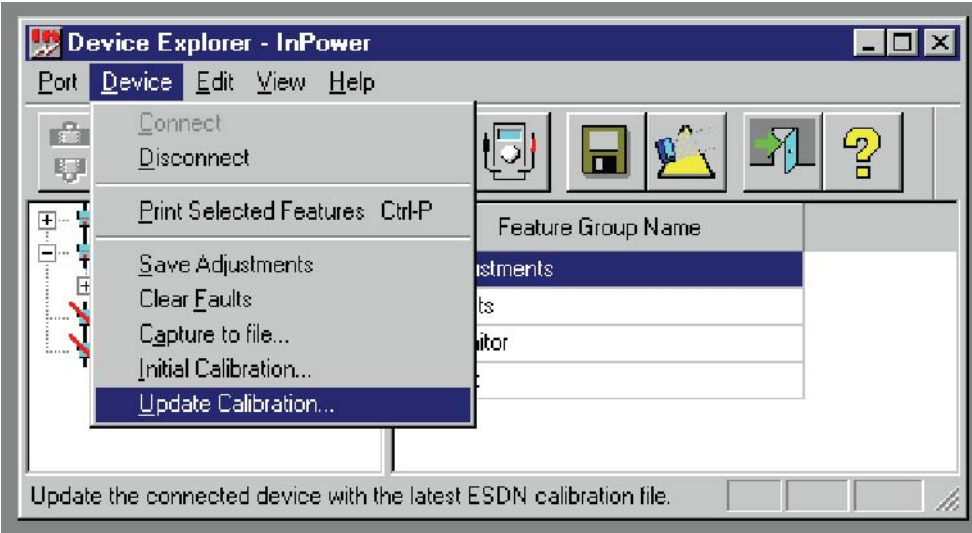


FIGURE 183. UPDATE - DEVICE MENU

17.3.1 History

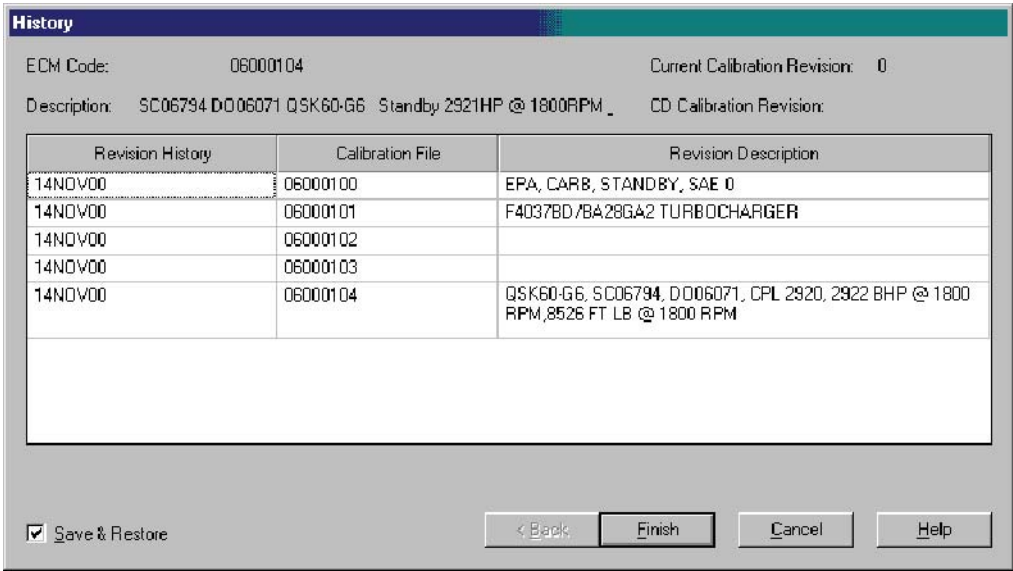


FIGURE 184. HISTORY

The History window displays information about the currently installed calibration part number and calibration revision across the top of the window (Figure 184).

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 185](#)). Click on the Yes button to continue.

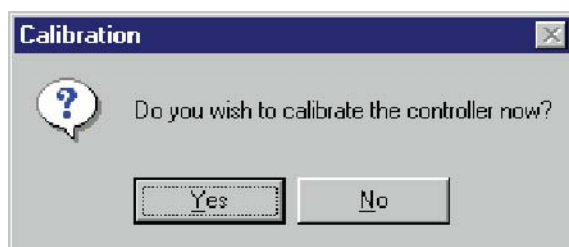
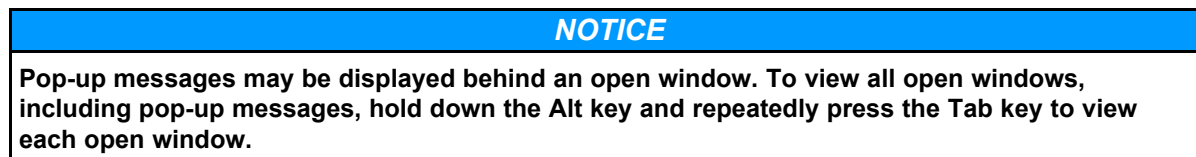


FIGURE 185. UPDATE NOW

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 186](#)).

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.

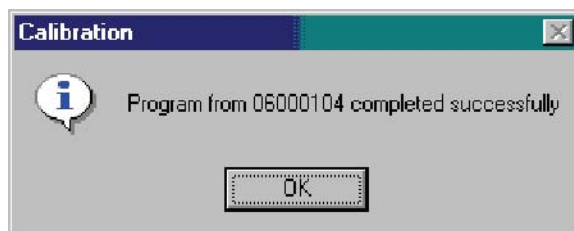


FIGURE 186. COMPLETED

This page is intentionally blank.

18 Update Features

18.1 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.

18.2 Update Features Setup

The service PC must be connected to the generator set in order to perform the Feature Update procedure. Connection between the service PC and the generator set 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 or by clicking on the Event Handler Icon on the Toolbar. Click on the Alarm Popup **Options** menu, then click on **AutoAnnounce** to deselect (uncheck) it. Disabling this feature prevents nuisance alarms during feature updates.

18.3 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.

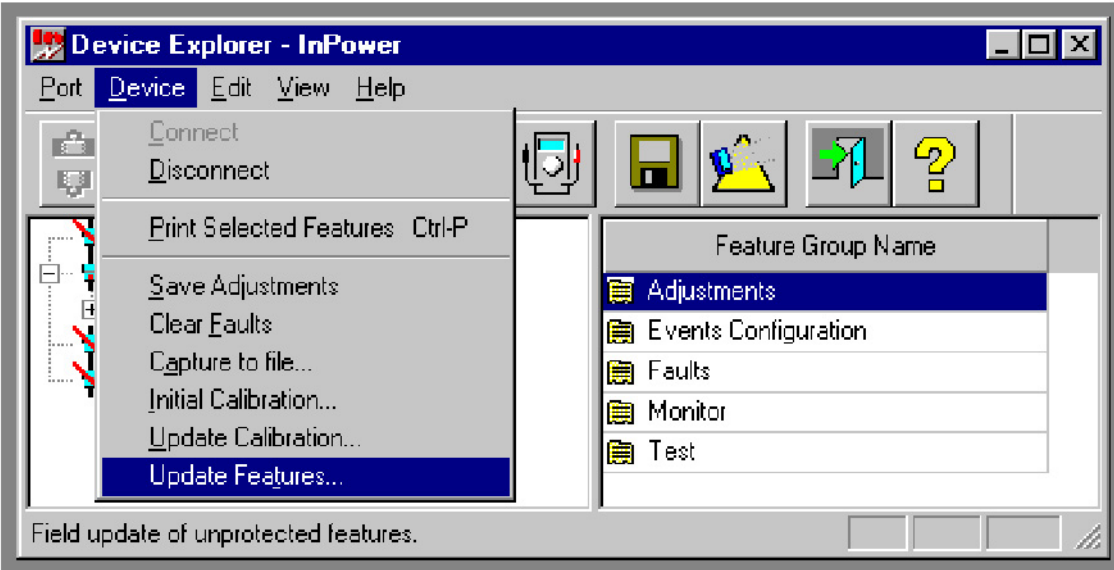


FIGURE 187. UPDATE FEATURES IN DEVICE MENU

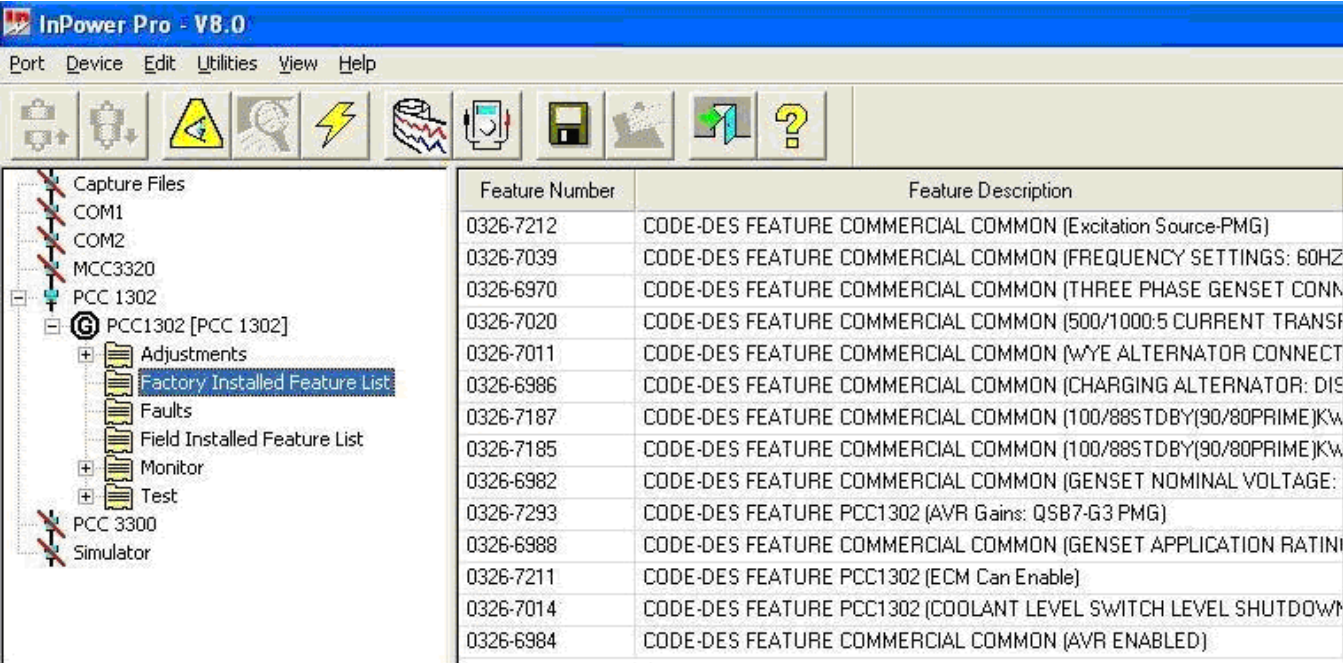


FIGURE 188. FACTORY-INSTALLED FEATURE LIST

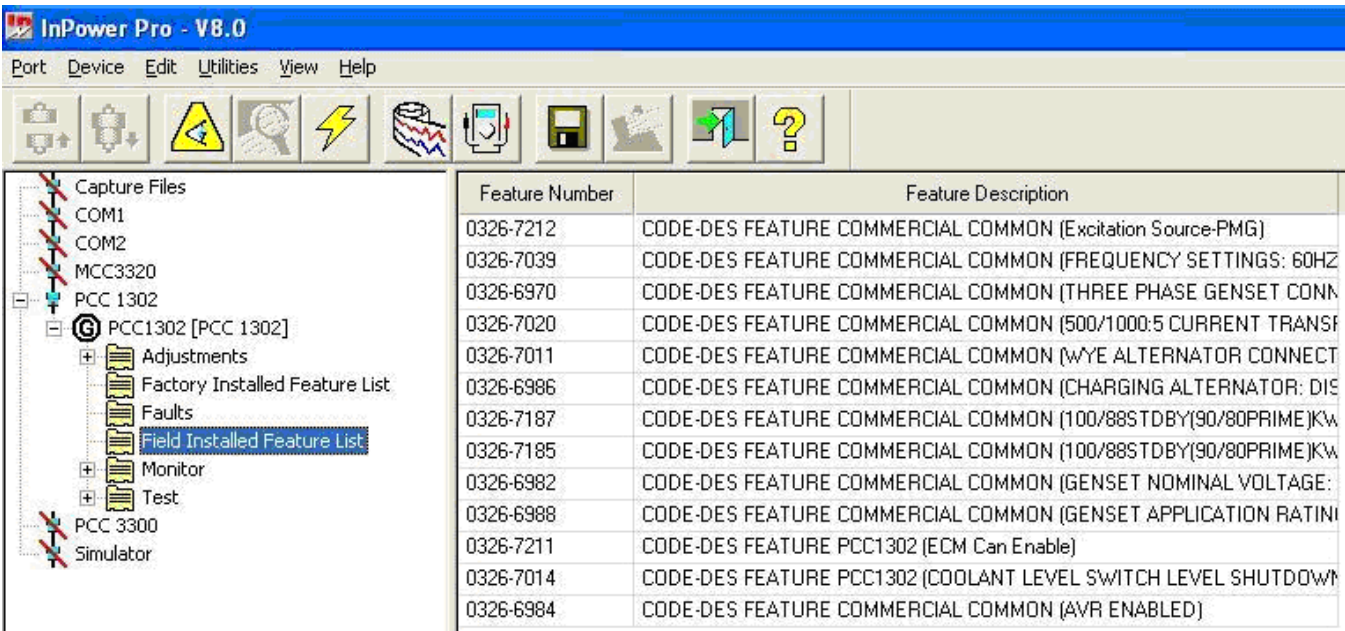


FIGURE 189. FIELD-INSTALLED FEATURE LIST

18.4 Changing a Feature Setting

The Feature List window (Figure 190) 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.

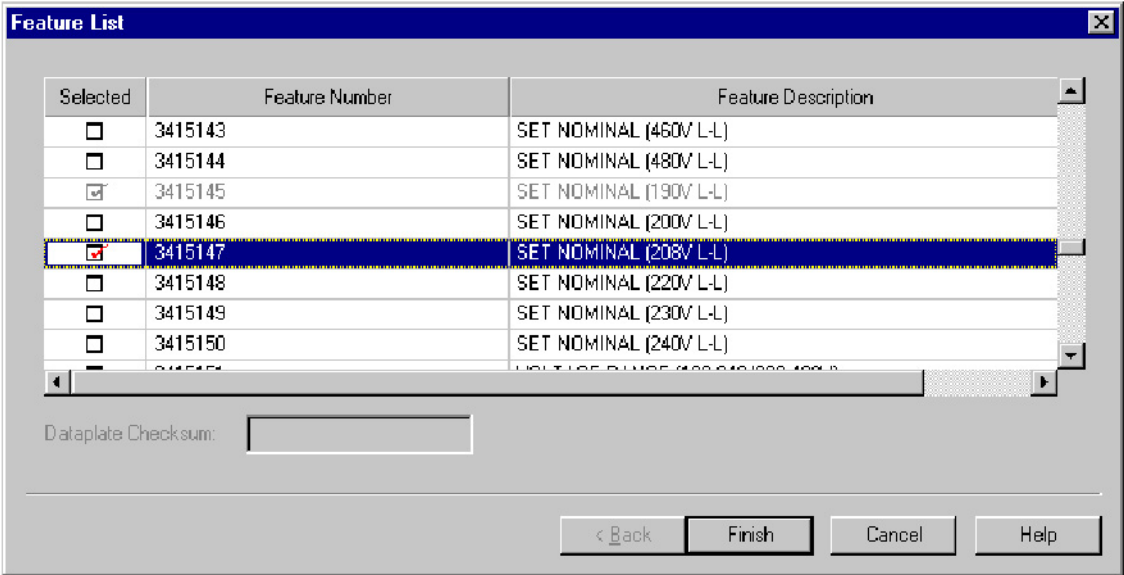


FIGURE 190. FEATURE LIST

18.4.1 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.

| NOTICE |
|---|
| <p>On reconnectable generator sets, 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.</p> |

| ⚠ CAUTION |
|--|
| <p><i>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 generator set reconnection diagram.</i></p> |

If a feature was selected that is not allowed, the pop-up shown in [Figure 191](#) is displayed, indicating that the feature could not be written (changed or enabled).



FIGURE 191. 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 192](#). 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.

18.5 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.

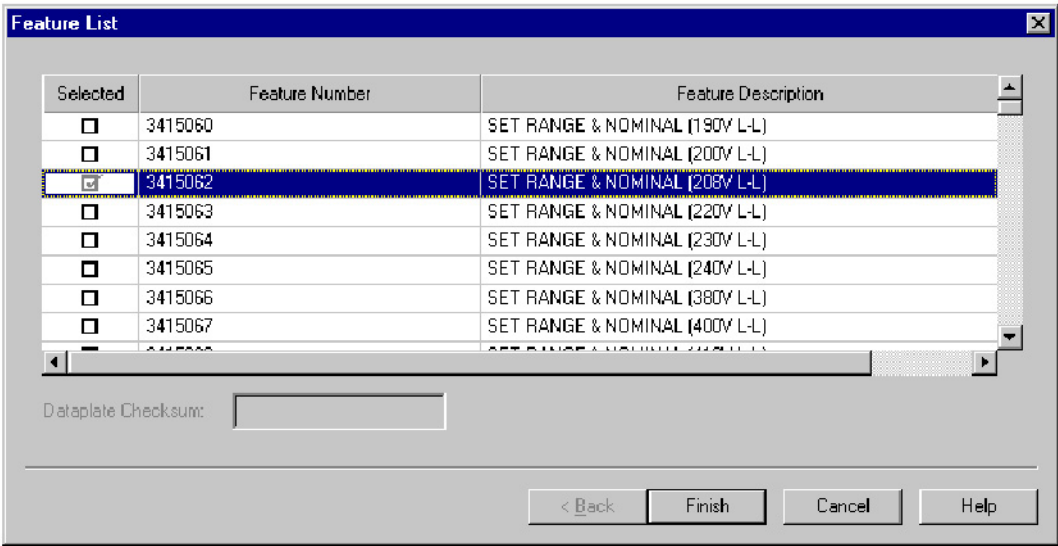


FIGURE 192. FEATURE LIST - AFTER UPDATE

This page is intentionally blank.

19 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.

19.1 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.

19.2 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.

19.2.1 Monitor Dialog Features

The Monitor Dialog is shown in [Figure 193](#). 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.

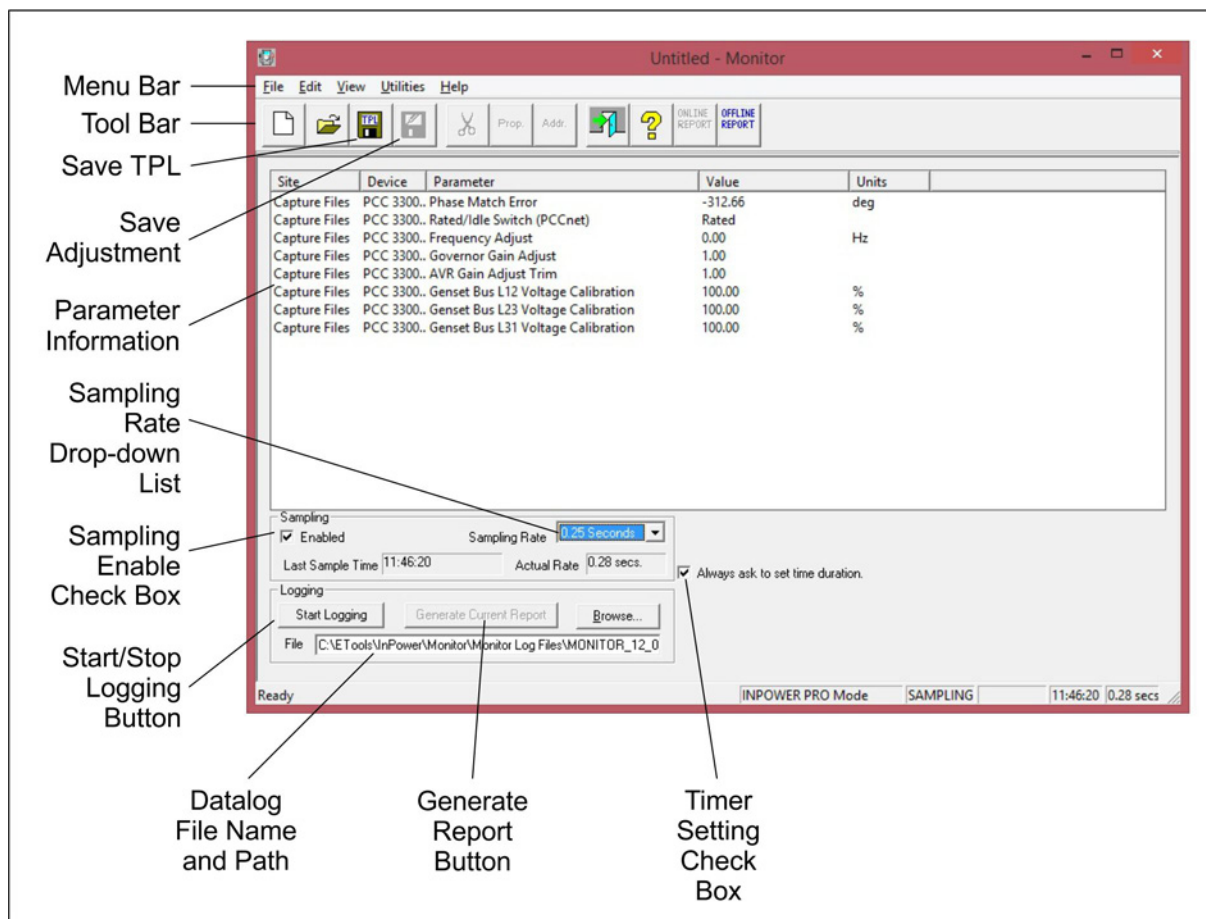


FIGURE 193. MONITOR DIALOG FEATURES

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 .CSV 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.csv) file where the time stamp is "MM_DD_YYYY_HH_MM_SS" (for example, Monitor_12_22_2011_13_46_10.001.csv). 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.csv).

NOTICE

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.

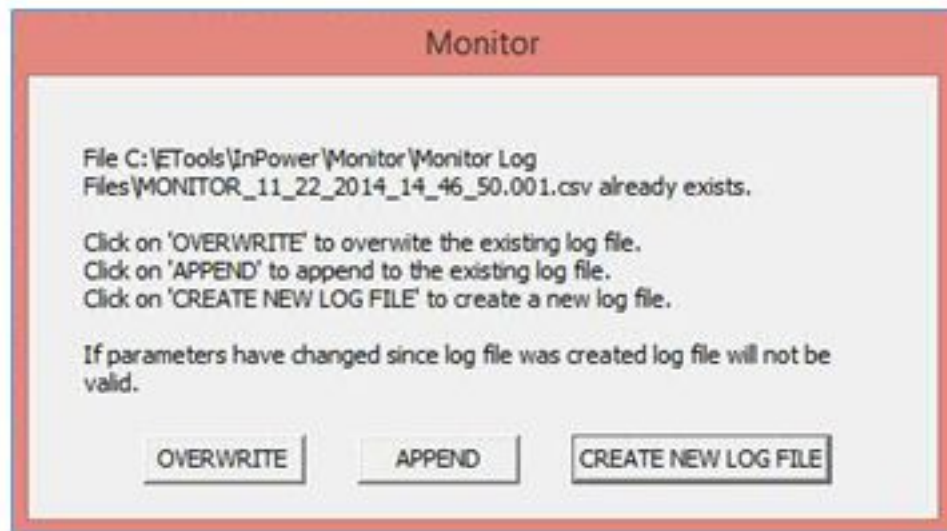


FIGURE 194. LOG FILE (.CSV)ALREADY EXISTS MESSAGE

Three buttons are available.

- Click the **OVERWRITE** button if the existing log file is to be overwritten.

| NOTICE |
|--|
| 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.

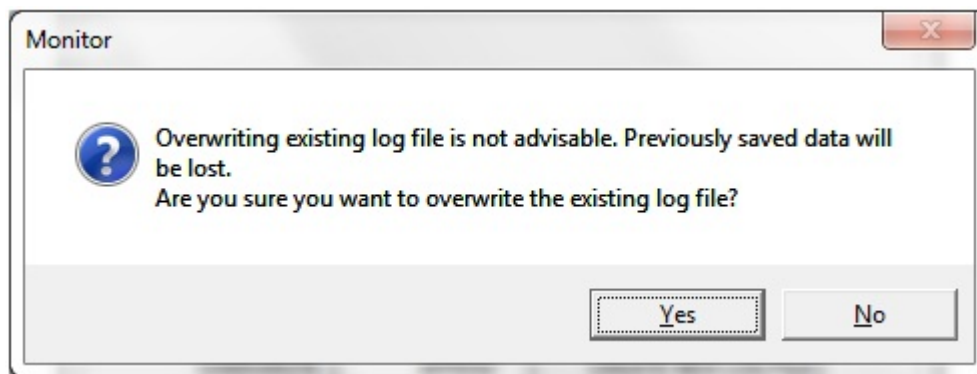


FIGURE 195. OVERWRITE CONFIGURATION MESSAGE

- 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.

19.2.2 Report Generation

A report can be generated if you click on the **Generate Report** button. The **Browse** button allows the user to locate and overwrite a .csv file in another directory. The Monitor utility displays reports correctly when parameters from multiple sites are being logged.

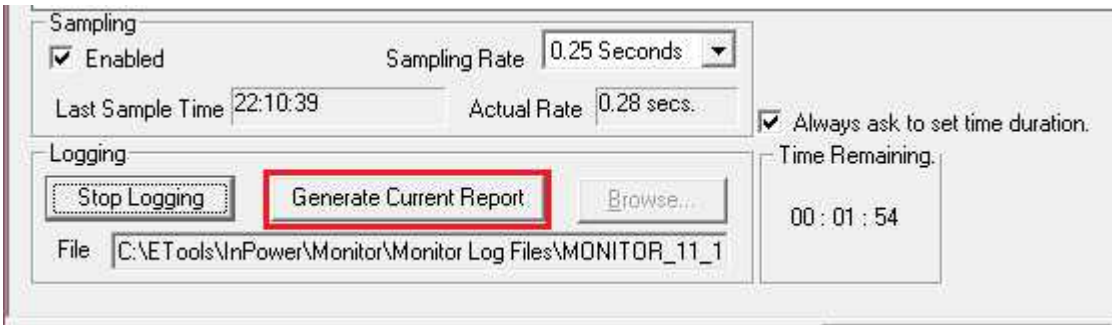


FIGURE 196. GENERATE REPORT BUTTON

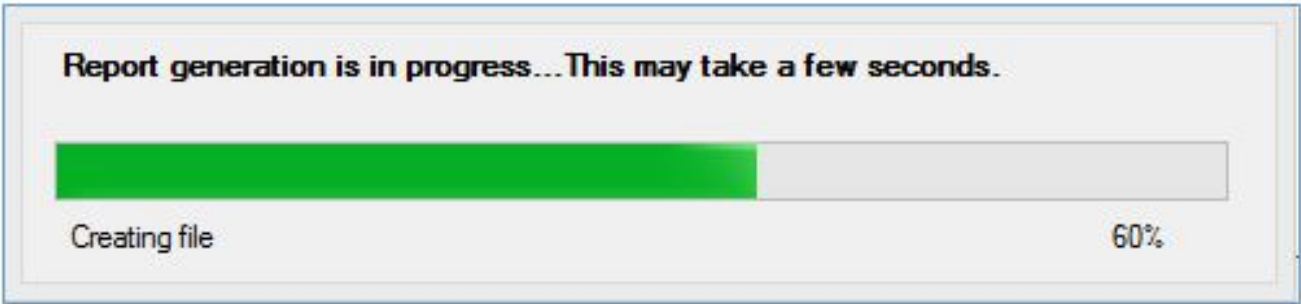


FIGURE 197. REPORT GENERATION IN PROGRESS

If report is already present, the following message will be displayed for overwriting report.

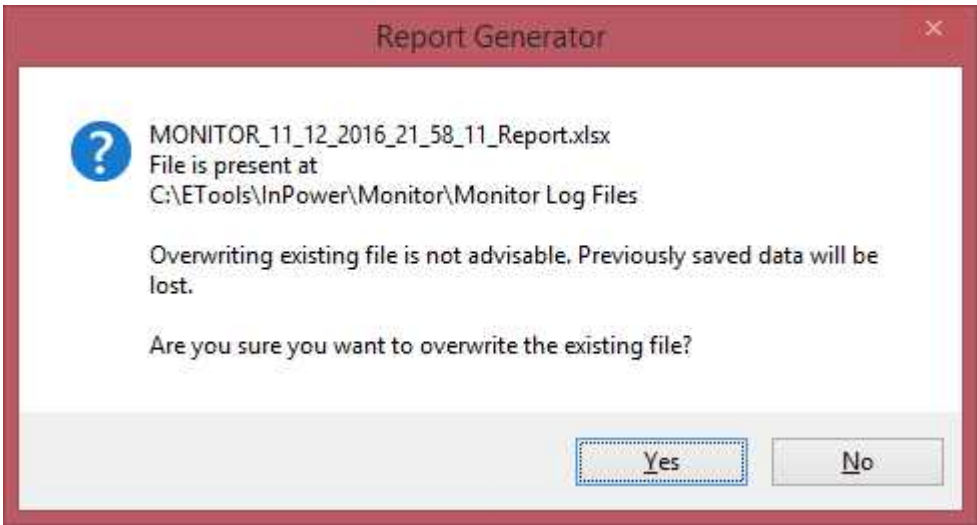


FIGURE 198. OVERWRITE EXISTING REPORT FILE MESSAGE

Final report is generated with information like log file details, date, time, device name, site name etc.

| | | | | |
|------------------------------|-----------------------------|---|---|---|
| Monitor logging Report | | | | |
| Number of log files: | 1 | | | |
| Log file name: | MONITOR_11_12_2016_21_58_11 | | | |
| Number of Parameters logged: | 3 | | | |
| Logging date: | (DD-MM-YYYY) 12-11-2016 | | | |
| Logging start time: | (HH:MM:SS) 22:10:32 | | | |
| | | | | |
| Date (DD-MM-YYYY) | Time (HH:MM:SS.fff) | Site:Capture Files Device:PCC 3300_With_Firmware_3.3.cap Genset Bus L12 Voltage Calibration (%) | Site:Capture Files Device:PCC 3300_With_Firmware_3.3.cap Genset Bus L23 Voltage Calibration (%) | Site:Capture Files Device:PCC 3300_With_Firmware_3.3.cap Genset Bus L31 Voltage Calibration (%) |
| 12-11-2016 | 22:10:32.604 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:32.886 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:33.167 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:33.448 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:33.729 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:34.011 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:34.292 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:34.573 | 100 | 100 | 100 |
| 12-11-2016 | 22:10:34.854 | 100 | 100 | 100 |

FIGURE 199. MONITOR LOGGING REPORT

19.2.3 Offline Report Generation

User has facility to generate report when logging / sampling is not active.

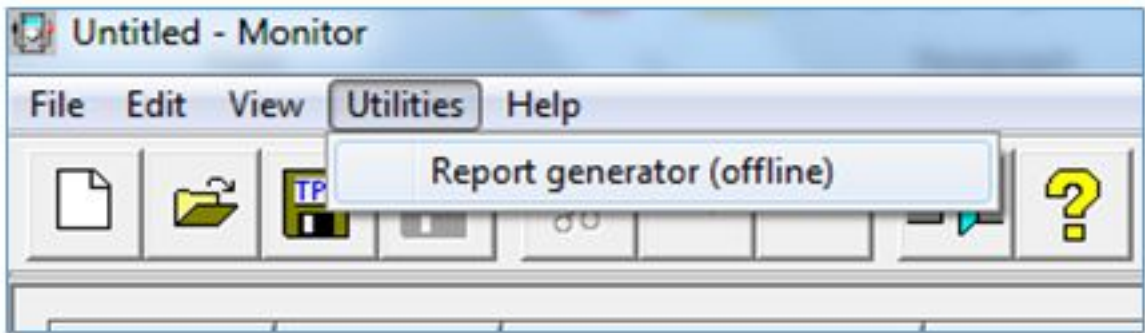


FIGURE 200. OFFLINE REPORT GENERATOR MENU

Following screen is displayed for selecting the log / CSV file to generate the report.

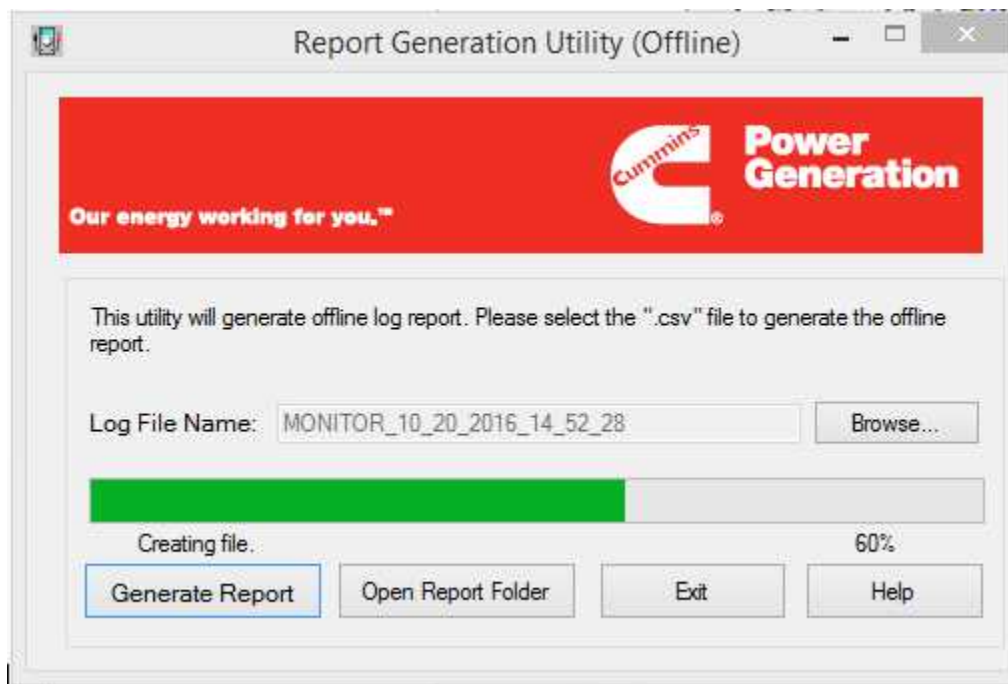


FIGURE 201. LOG / CSV FILE SELECTION

19.2.4 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.

19.2.5 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.

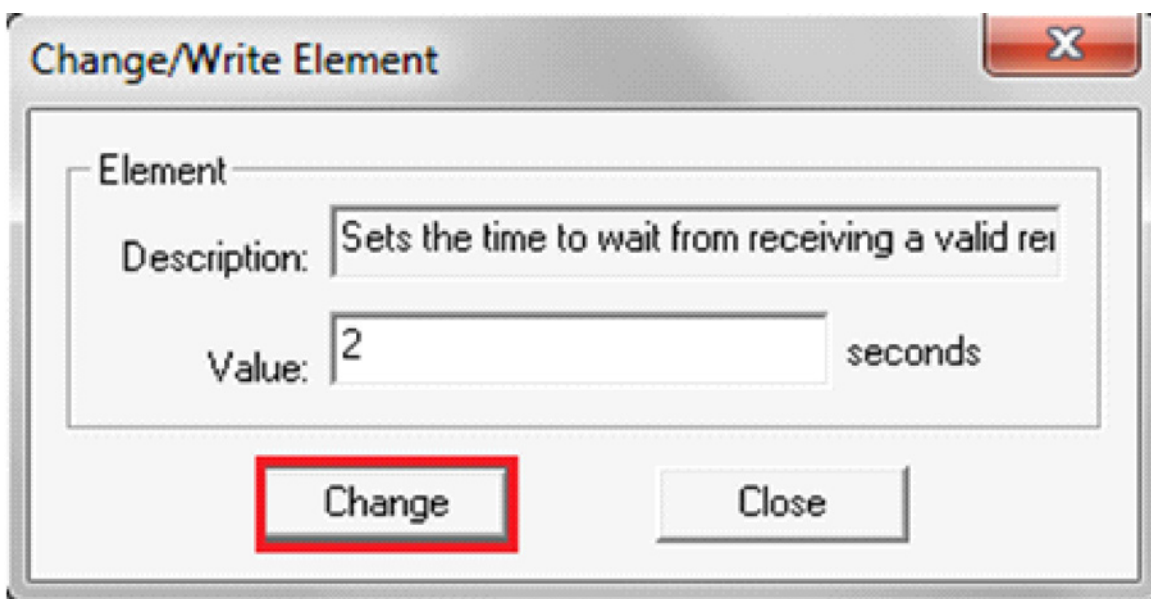


FIGURE 202. CHANGE/WRITE ELEMENT DIALOG

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.

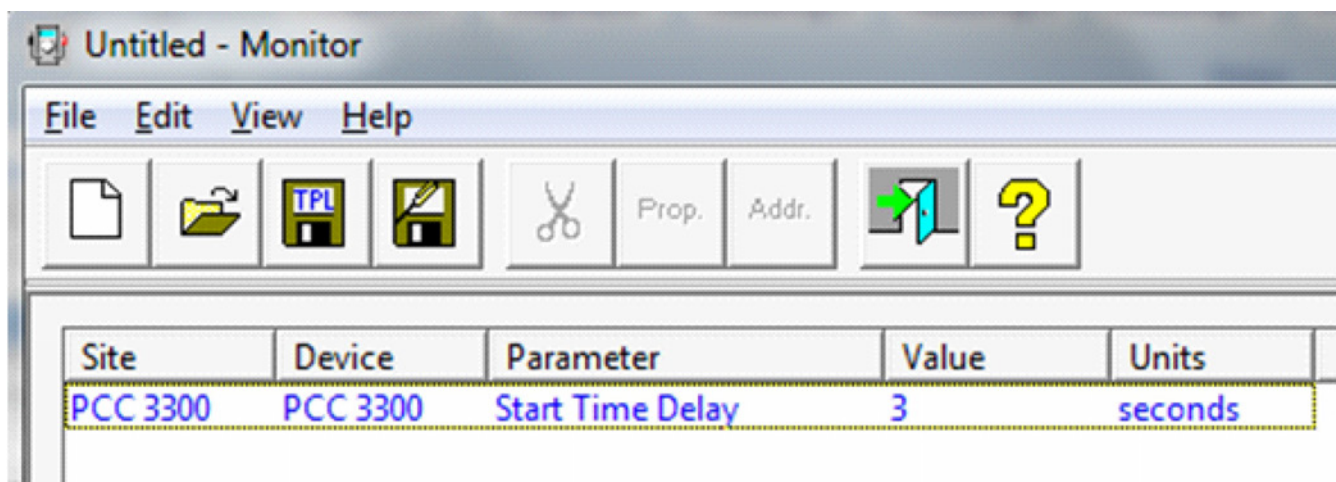


FIGURE 203. CHANGED VALUE SHOWN IN BLUE

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.

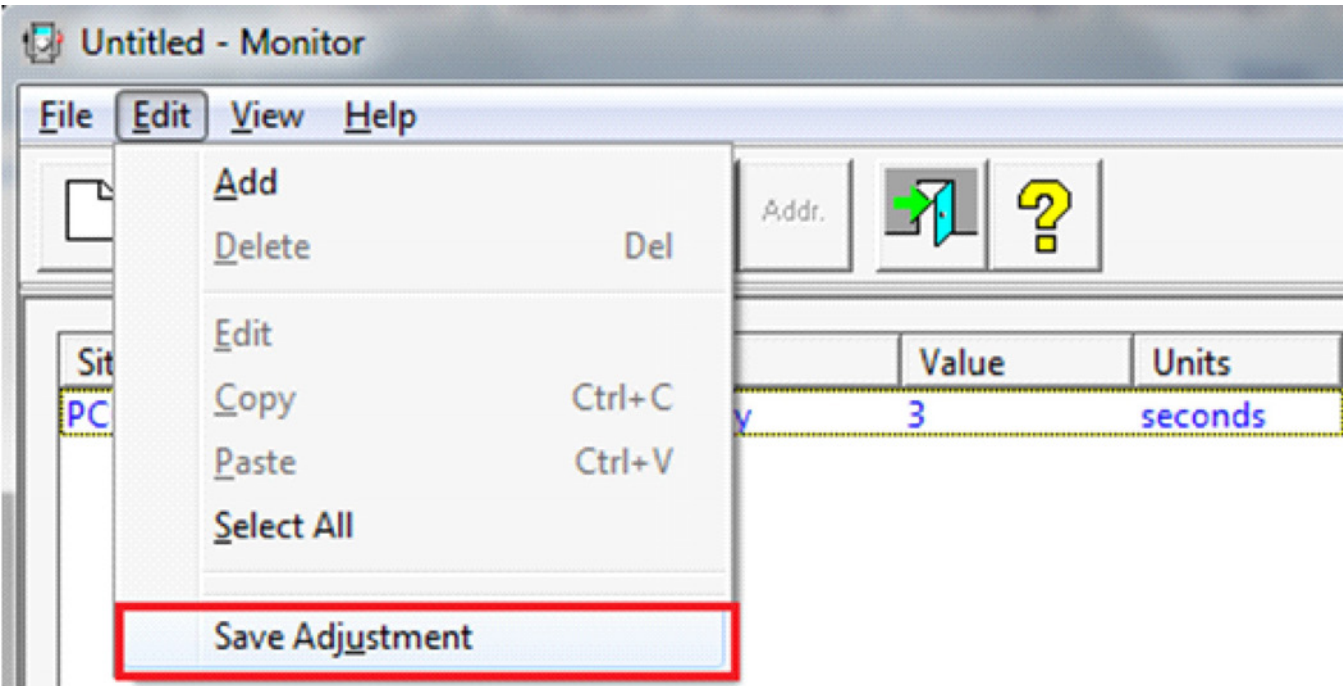


FIGURE 204. SAVE ADJUSTMENT MENU ITEM

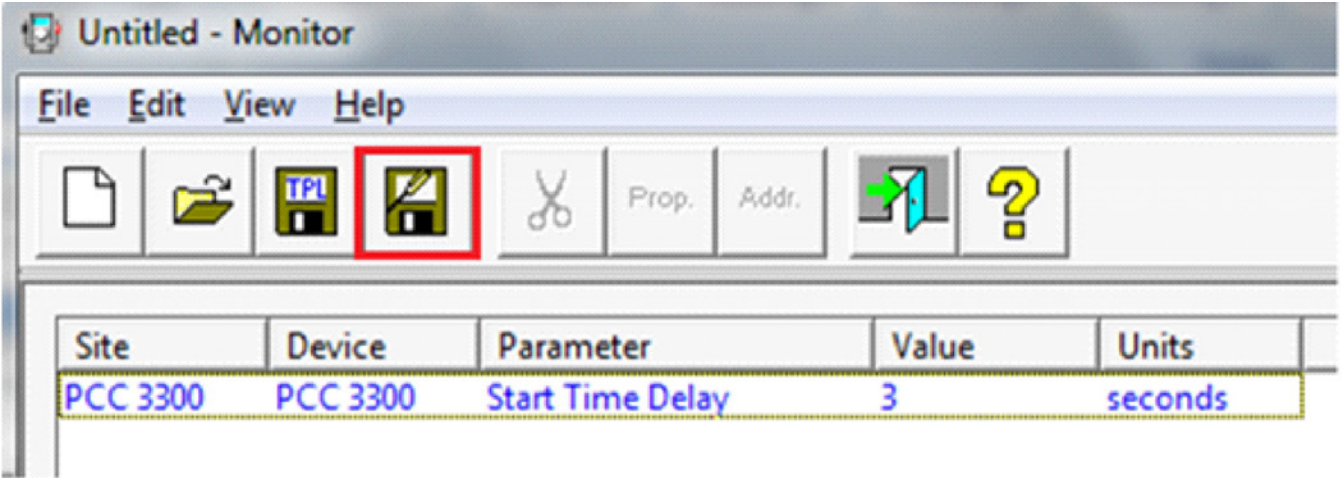


FIGURE 205. SAVE ADJUSTMENT TOOL BAR ICON

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".

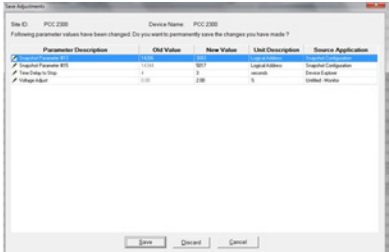
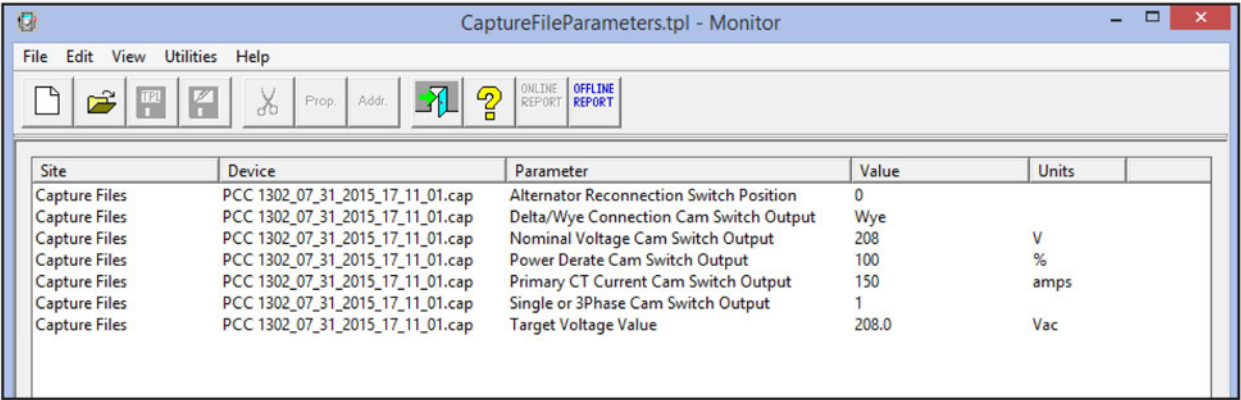


FIGURE 206. SAVE ADJUSTMENTS DIALOG

19.2.6 Creation of TPL Using Capture / Simulator File Parameters

From V11.0 and onwards, TPL files can be created using the parameters from capture/simulator files and can be used with the connected device. (For example, if the TPL file is created using the parameters from the capture file of PCC1302, then this file can be used with the connected PCC1302 device). This feature gives users the flexibility to use TPL files created by capture/simulator files created by other users.



The screenshot shows a software window titled "CaptureFileParameters.tpl - Monitor". It has a menu bar with "File", "Edit", "View", "Utilities", and "Help". Below the menu is a toolbar with icons for file operations and a "Prop." button. The main area contains a table with the following data:

| Site | Device | Parameter | Value | Units |
|---------------|----------------------------------|---|-------|-------|
| Capture Files | PCC 1302_07_31_2015_17_11_01.cap | Alternator Reconnection Switch Position | 0 | |
| Capture Files | PCC 1302_07_31_2015_17_11_01.cap | Delta/Wye Connection Cam Switch Output | Wye | |
| Capture Files | PCC 1302_07_31_2015_17_11_01.cap | Nominal Voltage Cam Switch Output | 208 | V |
| Capture Files | PCC 1302_07_31_2015_17_11_01.cap | Power Derate Cam Switch Output | 100 | % |
| Capture Files | PCC 1302_07_31_2015_17_11_01.cap | Primary CT Current Cam Switch Output | 150 | amps |
| Capture Files | PCC 1302_07_31_2015_17_11_01.cap | Single or 3Phase Cam Switch Output | 1 | |
| Capture Files | PCC 1302_07_31_2015_17_11_01.cap | Target Voltage Value | 208.0 | Vac |

FIGURE 207. TPL USING CAPTURE FILE PARAMETERS

The user can select the TPL file with the connected device or existing capture file or Simulator site.

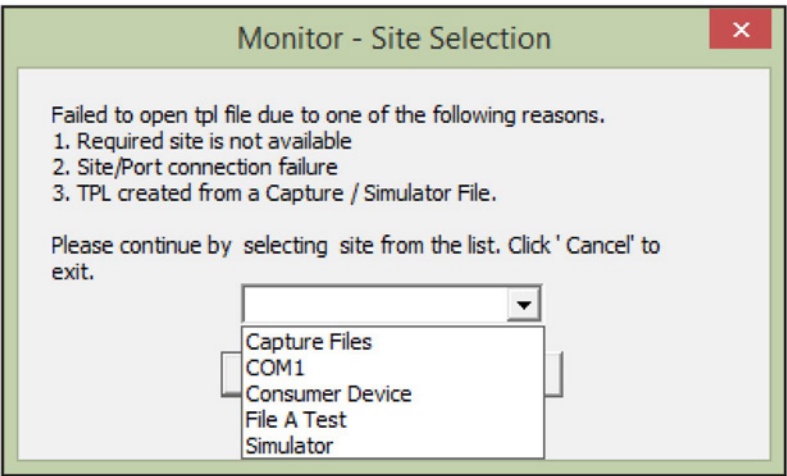


FIGURE 208. SELECT SITE WHILE OPENING CAPTURE FILE TPL

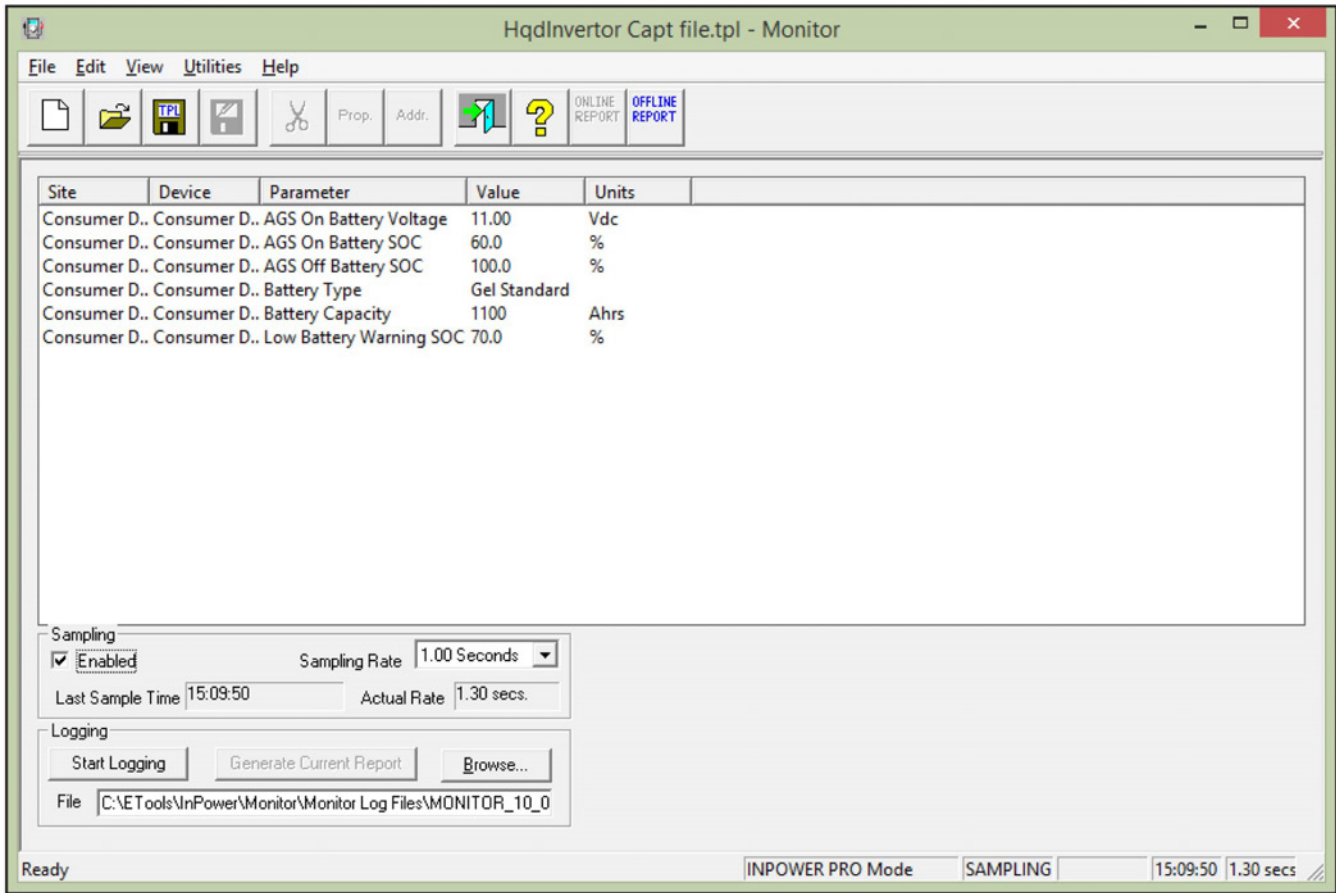


FIGURE 209. TPL FILE SELECTED WITH THE CONNECTED DEVICE

The user can select the capture file or simulator file for opening the TPL file. The user will be able to edit the TPL file and use it again.

NOTICE

Sampling is not allowed in case of TPL opened with capture / simulator file site.

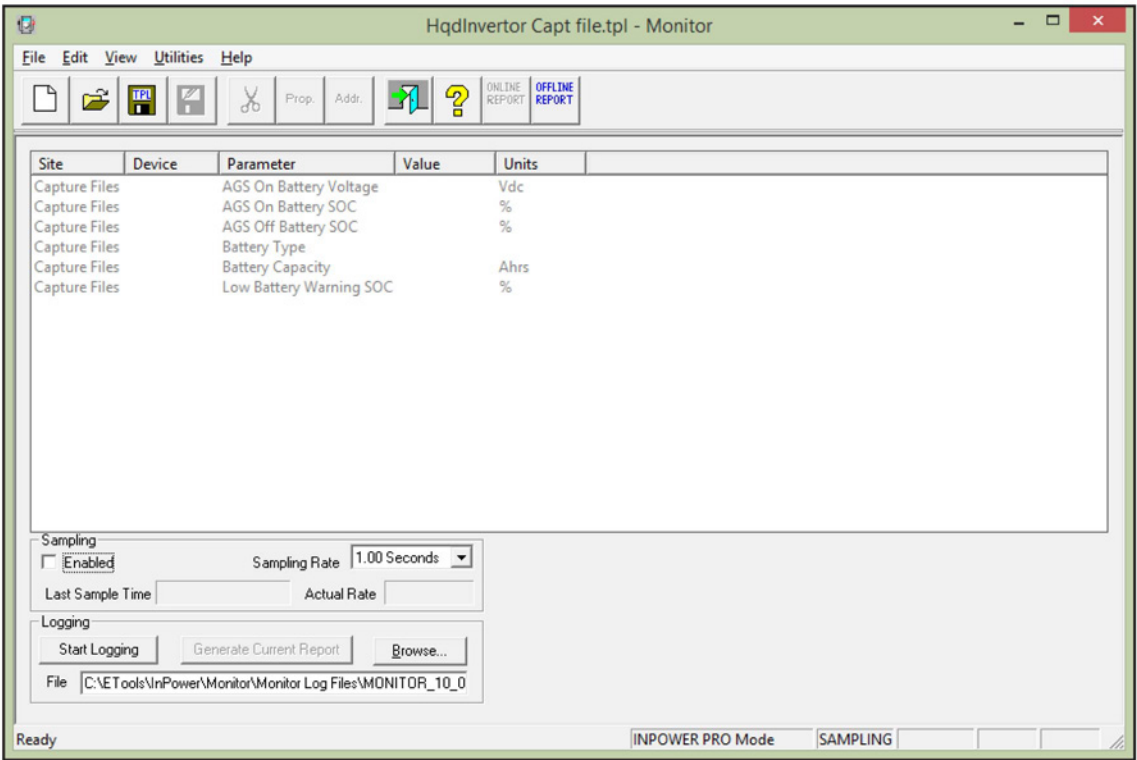


FIGURE 210. OPENING TPL FILE WITH CAPTURE FILE SITE

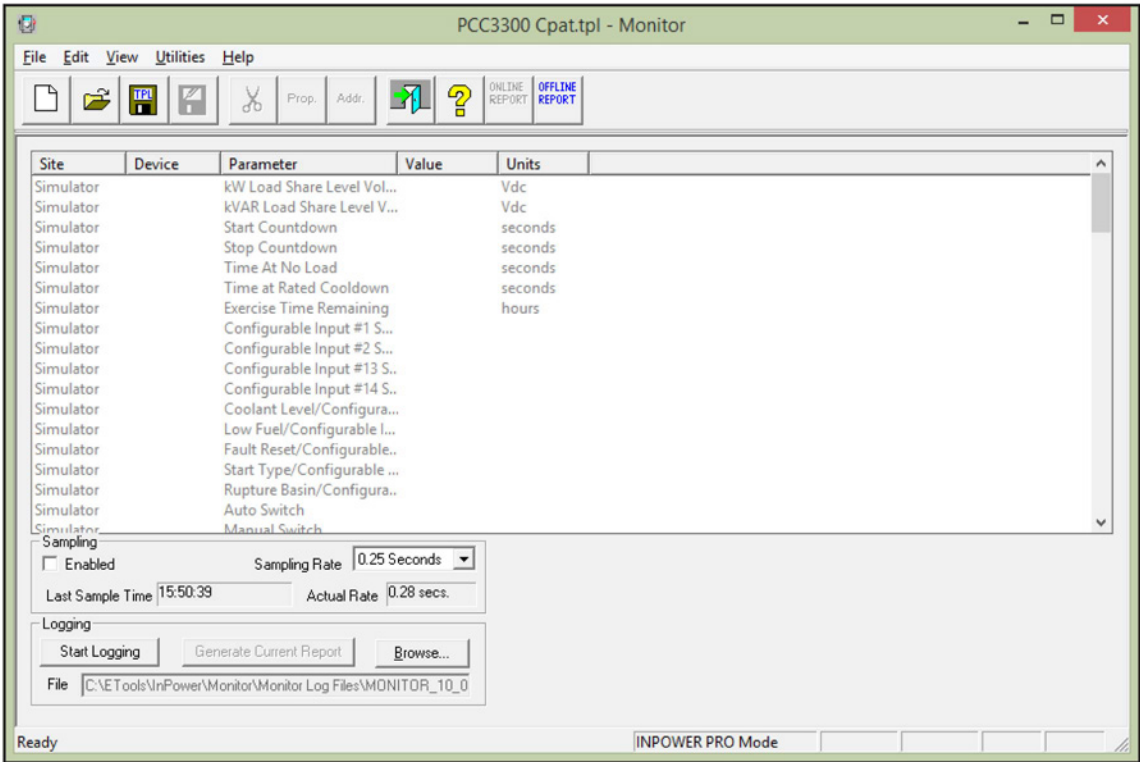


FIGURE 211. OPENING TPL FILE WITH SIMULATOR FILE SITE

This page is intentionally blank.

20 Faults and the Fault Information System

This section describes the fault information features available for various types of devices.

20.1 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.

20.1.1 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.

20.1.2 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.

20.1.3 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.

A Snapshot log report can be generated by clicking on "Export To .xls file." The report contains all of the information about faults and a summary page which will have generator set details and all links to the Snapshot faults.

NOTICE

COT is Controller on Time and ERT stands for Engine Run Time.

The screenshot shows the 'Snapshot Information' dialog box. At the top, it displays 'FAULT' information: Fault Code 1445, Time Stamp 04/30/2015 02:40:00, Fault Description Short Circuit, Occurrence Count 6, and Battle Short Status Inactive. Below this is a table titled 'Parameter Information' with three columns: Parameter Name, Parameter Value, and Unit. The table lists various engine and generator parameters, with 'Intake Manifold Pressure 1' highlighted in blue. At the bottom, there are navigation buttons: '<< Previous', 'Snapshot: 1 of 12', 'Next >>', 'Close', and 'Export To .xls file'.

| Parameter Name | Parameter Value | Unit |
|-------------------------------|------------------------|------|
| Controller Mode | Stop Emergency | |
| Battery Voltage | 17.281 | Vdc |
| Genset Run Sequence State | Stop | |
| Genset Run Command | Emergency Stop | |
| Genset Run Type | Emergency Remote Start | |
| Coolant Temperature | Not Available | degF |
| Oil Pressure | Not Available | psi |
| Aftercooler Temperature | Not Available | degF |
| Intake Manifold Pressure 1 | Not Available | psi |
| Genset % Application Total kW | 0.0 | % |
| Genset L1 Power Factor | 1.00 | PF |
| Genset L2 Power Factor | 1.00 | PF |
| Genset L3 Power Factor | 1.00 | PF |
| Genset Total kVA | 0 | kVA |
| Genset Total kVAR | 0 | kVAR |
| Genset Frequency | 0.000 | Hz |
| AVR PWM Command | 0.00 | % |
| Genset L1L2 Voltage% | 0.00 | % |

FIGURE 212. EXPORT SNAPSHOT LOGS TO EXCEL REPORT

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|----|---|--|------------------|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Snapshot Log Report | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | |
| 3 | | Genset Details | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | |
| 5 | | Genset Serial Number | 123 | | | | | | | | | | | |
| 6 | | Genset model Number | 234 | | | | | | | | | | | |
| 7 | | Engine serial Number | A123B456 | | | | | | | | | | | |
| 8 | | Engine model Number | 0 | | | | | | | | | | | |
| 9 | | Alternator serial Number | 7890 | | | | | | | | | | | |
| 10 | | Alternator model Number | 123456 | | | | | | | | | | | |
| 11 | | Calibration Part Number | 0326-7474 | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |
| 13 | | Snapshot Details | | | | | | | | | | | | |
| 14 | | Snapshot report generated on | 22-06-2015 18:13 | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | |
| 16 | | Click on below Hyperlinks to navigate to the corresponding sheet | | | | | | | | | | | | |
| 17 | | Fault Snapshot(1 of 12) | | | | | | | | | | | | |
| 18 | | Fault Snapshot(2 of 12) | | | | | | | | | | | | |
| 19 | | Fault Snapshot(3 of 12) | | | | | | | | | | | | |
| 20 | | Fault Snapshot(4 of 12) | | | | | | | | | | | | |
| 21 | | Fault Snapshot(5 of 12) | | | | | | | | | | | | |
| 22 | | Fault Snapshot(6 of 12) | | | | | | | | | | | | |
| 23 | | Fault Snapshot(7 of 12) | | | | | | | | | | | | |
| 24 | | Fault Snapshot(8 of 12) | | | | | | | | | | | | |
| 25 | | Fault Snapshot(9 of 12) | | | | | | | | | | | | |
| 26 | | Fault Snapshot(10 of 12) | | | | | | | | | | | | |
| 27 | | Fault Snapshot(11 of 12) | | | | | | | | | | | | |
| 28 | | Fault Snapshot(12 of 12) | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | |

FIGURE 213. SNAPSHOT LOG REPORT

20.1.3.1 Devices That Do Not Support Snapshot

Snapshot is not available with the PCC 1100, PCC 1300, PCC 1301, and PCC 1302.

20.1.4 Fault Information System

The Fault Information System (FIS) contains an online manual that displays troubleshooting and repair (help) files for commercial generator sets.

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 214](#)).

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.

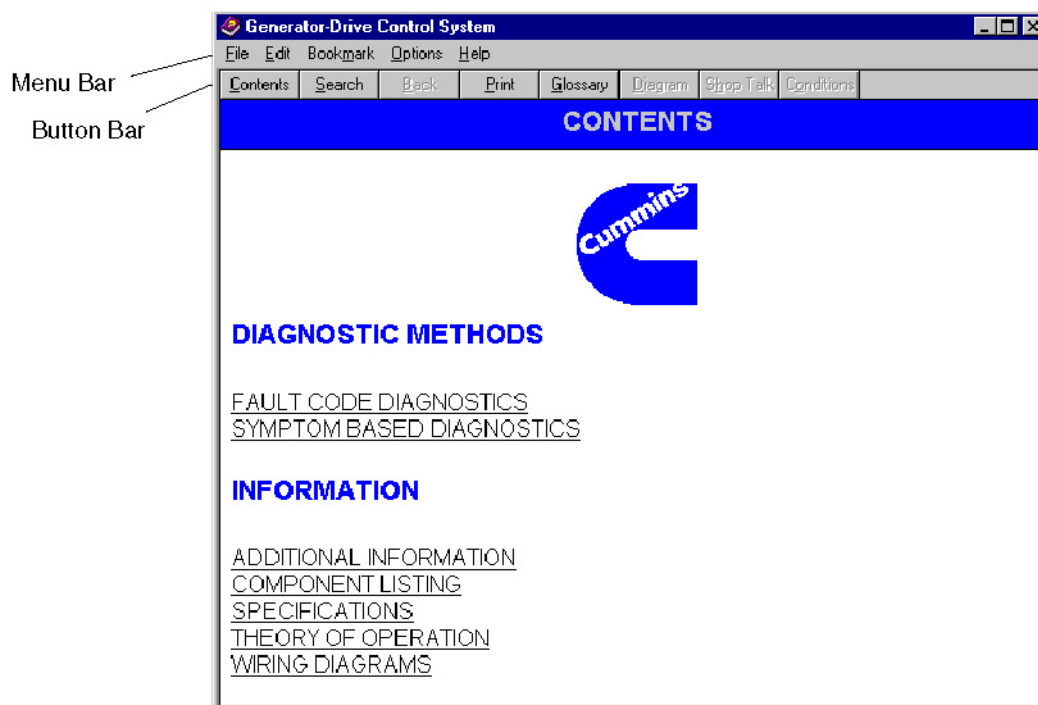
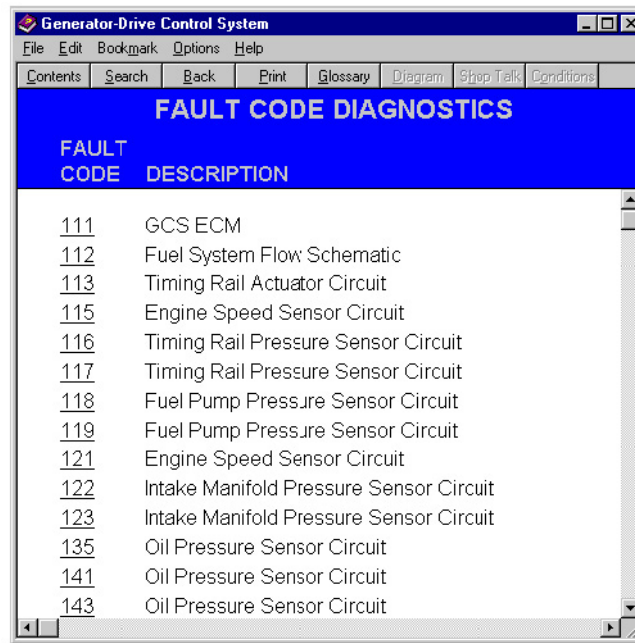


FIGURE 214. MAIN FAULT INFORMATION SYSTEM WINDOW

20.1.4.1 Fault Code Diagnostics

Use the Fault Code Diagnostics feature to display diagnostic and troubleshooting information for a specific fault code.

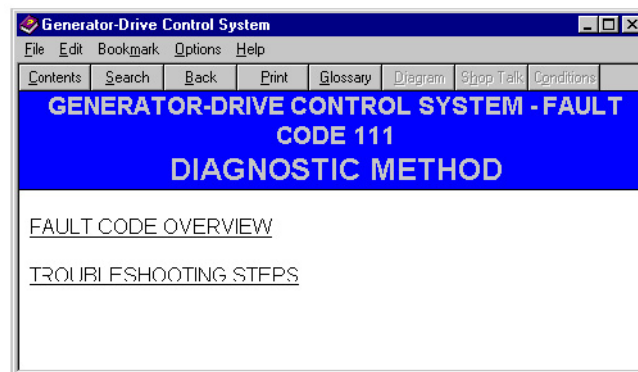
After selecting **Fault Code Diagnostics**, a list of fault codes is displayed ([Figure 215](#)). Click on a specific underlined fault code to display more information about troubleshooting the fault.



| 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 215. FAULT CODE DIAGNOSTICS

After clicking on a fault code, the **Diagnostic Method** window is displayed ([Figure 216](#)).

**FIGURE 216. 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**.)

20.1.4.2 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 217](#)), click on the **Fault Code Overview** text in the **Diagnostic Method** window ([Figure 216](#)).

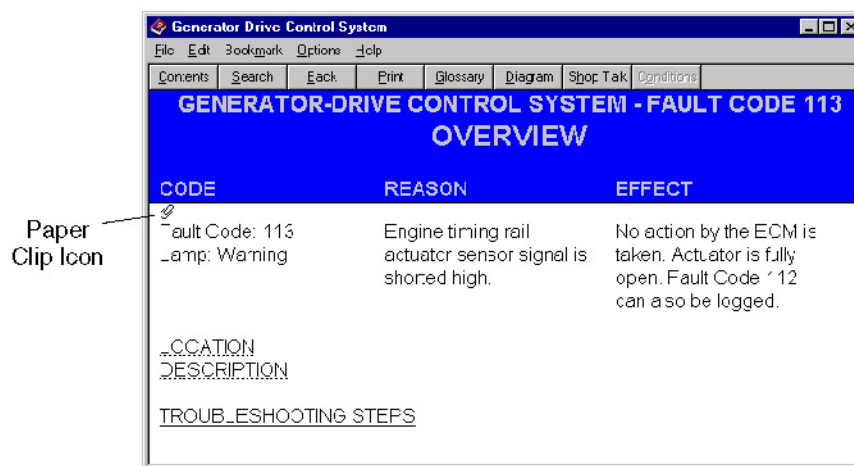


FIGURE 217. OVERVIEW

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.

20.1.4.3 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 |
| <i>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.</i> |

The **Troubleshooting Steps** window ([Figure 218](#)) 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.

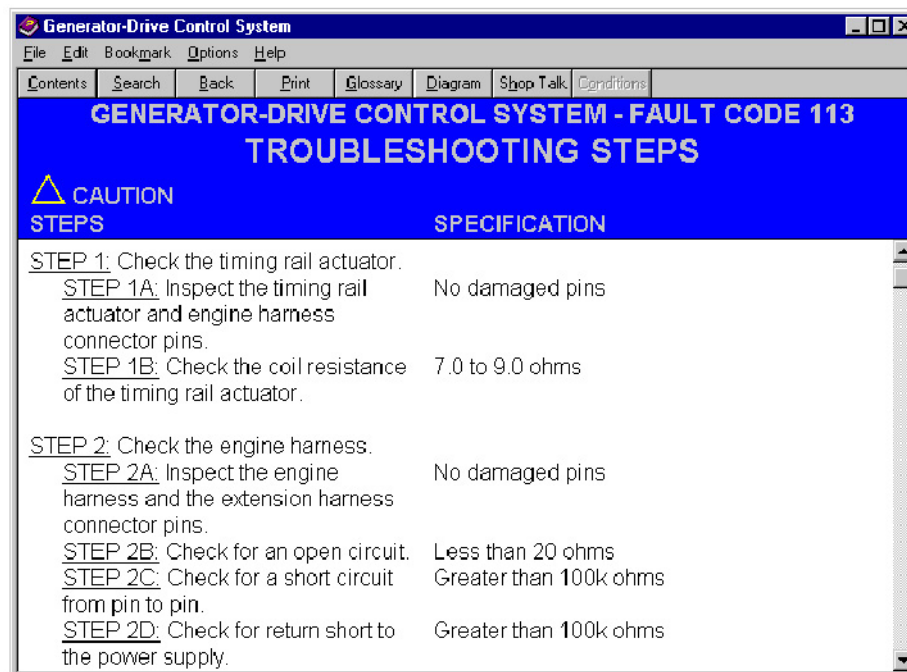


FIGURE 218. TROUBLESHOOTING STEPS

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 219](#)). 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.

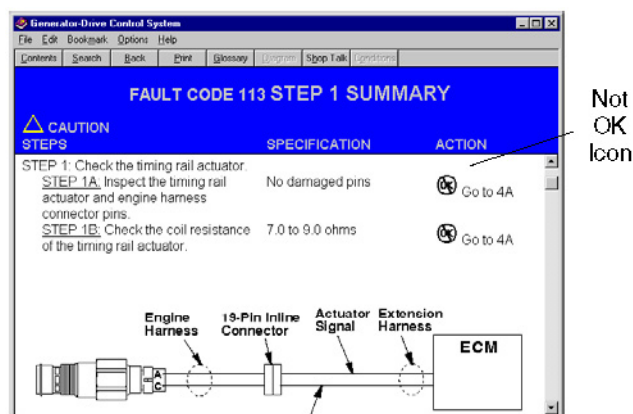


FIGURE 219. SUMMARY STEPS

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 220](#)). It contains diagnostic information specific to this step.

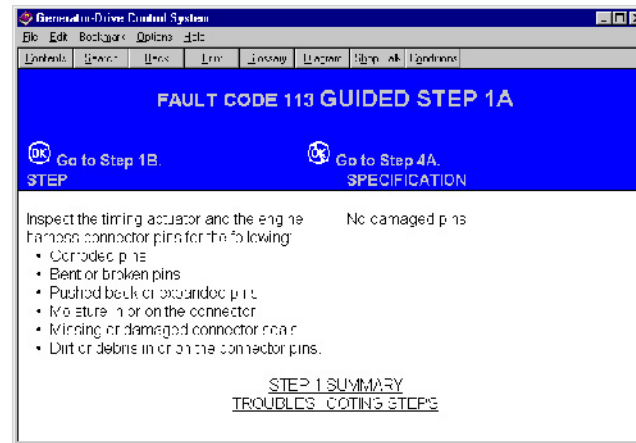


FIGURE 220. GUIDED STEPS

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.

20.1.4.4 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 221](#)). Click on a symptom to view a display of the possible cause of the symptom and a list of corrective actions ([Figure 222](#)).

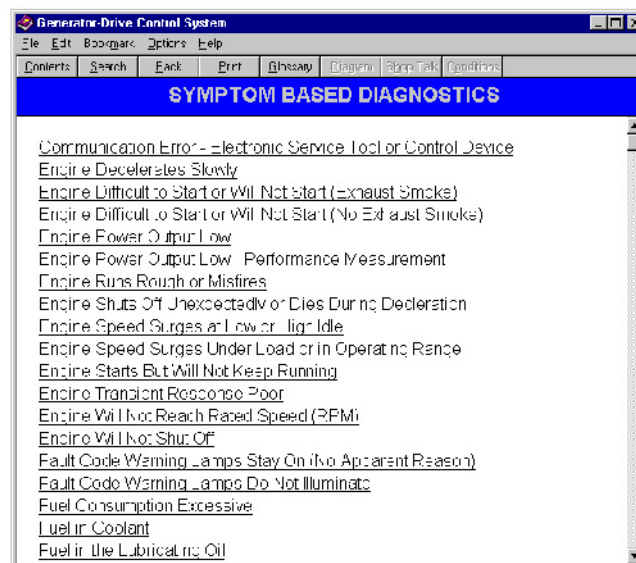


FIGURE 221. SYMPTOM BASED DIAGNOSTICS

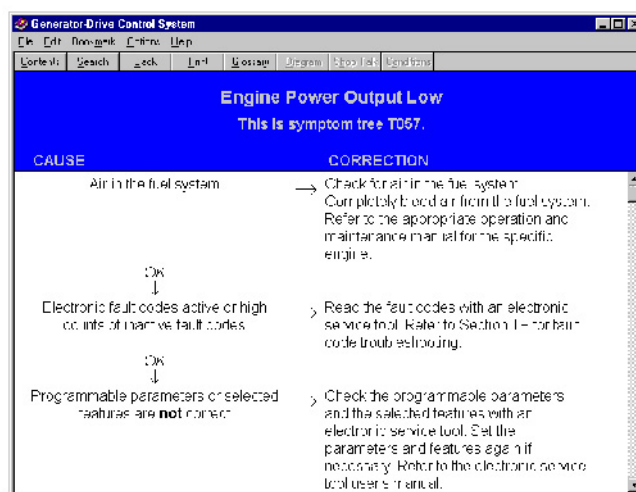


FIGURE 222. SYMPTOM BASED TROUBLESHOOTING

20.1.4.5 Additional Information

After clicking on **Additional Information**, a list of general service topics are displayed ([Figure 223](#)). 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.

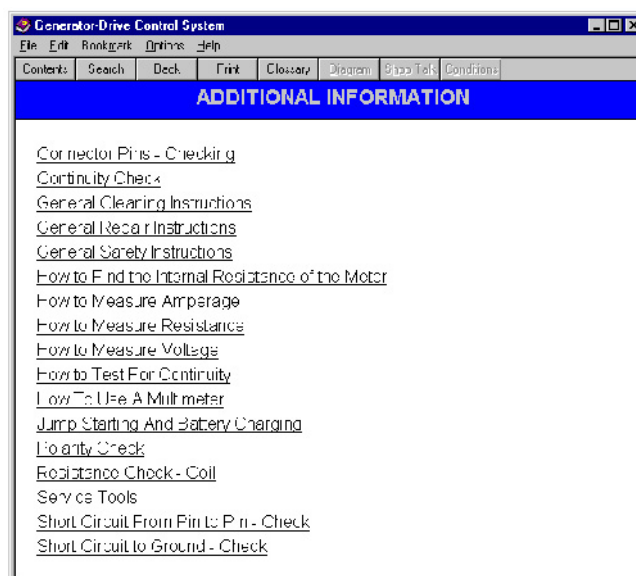


FIGURE 223. ADDITIONAL INFORMATION

20.1.4.6 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 224](#)).

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.

| LOCATION | DESCRIPTION | COMPONENT |
|----------|-------------|--|
| Loc. | Desc. | Aftercooler Water Inlet Temperature Sensor |
| Loc. | Desc. | Ambient Air Pressure Sensor |
| Loc. | Desc. | Battery |
| Loc. | Desc. | Blowby Pressure Sensor |

BLOWBY PRESSURE SENSOR DESCRIPTION
The blowby pressure sensor is used by the electronic control module (ECM) to monitor the engine crankcase pressure. The ECM monitors the voltage on the signal pin and converts this to a pressure value. The blowby pressure value is used by the ECM for the engine protection system.

| | | |
|------|-------|--------------------------------|
| Loc. | Desc. | Coolant Temperature Sensor |
| Loc. | Desc. | Crankshaft & Camshaft |
| Loc. | Desc. | Engine Speed/Position Sensor |
| Loc. | Desc. | Droop Adjust Potentiometer |
| Loc. | Desc. | Electronic Control Module |
| Loc. | Desc. | Engine Speed/Position Sensor |
| Loc. | Desc. | Fail-To-Start Relay |
| Loc. | Desc. | Frequency Adjust Potentiometer |
| Loc. | Desc. | Front Fueling Actuator - QSK |
| Loc. | Desc. | Front Fueling Actuator - QSK |

FIGURE 224. COMPONENT LISTING

20.1.4.7 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.

QSK45/60 Electrical Specifications

WARNING: This diagram is provided as a diagnostic tool for trained, experienced technicians only. Improper troubleshooting or repair can result in severe personal injury or death or property damage. See important instructions in service manual.

DATALINK
Transmit wire to Receive wire (loaded)
• 5.0 to 15.0 VDC
Transmit wire to Receive wire (unloaded)
• OK if < 25.0 VDC

ALL CONTINUITY CHECKS
OK (no open circuit) if < 10 Ω

5-VDC SUPPLY
@ ECM
• 4.75 to 5.25 VDC

ECM CONNECTOR
Retaining capscrew torque = 0.5 N·m [4.5 in·lb]

SHORT CIRCUIT TO EXTERNAL VOLTAGE
OK if < 1.5 VDC

FIGURE 225. SPECIFICATIONS

20.1.4.8 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.

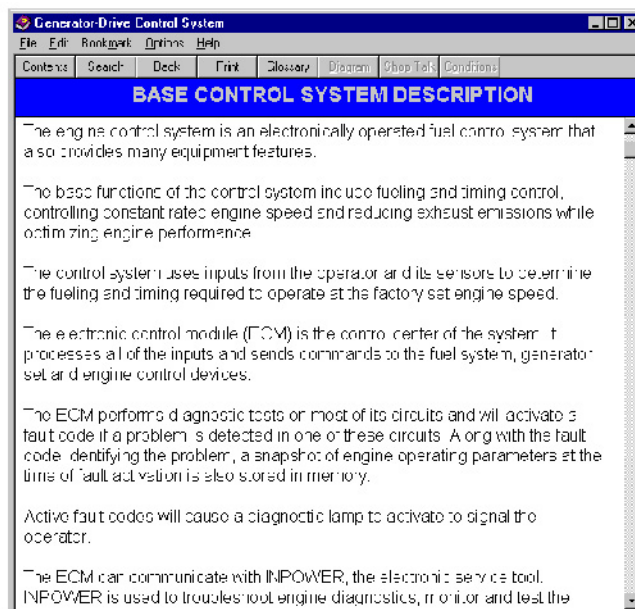


FIGURE 226. THEORY OF OPERATION

20.1.4.9 Wiring Diagrams

The **Wiring Diagrams** feature displays a list of engine system components ([Figure 228](#)). 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.

20.1.4.10 Glossary

The **Glossary** contains an alphabetical listing of frequently used terms and their descriptions ([Figure 227](#)). 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.

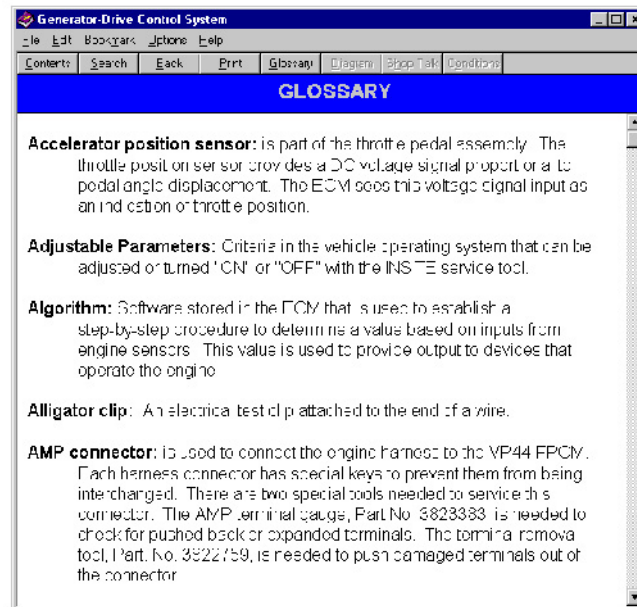


FIGURE 227. ONLINE GLOSSARY

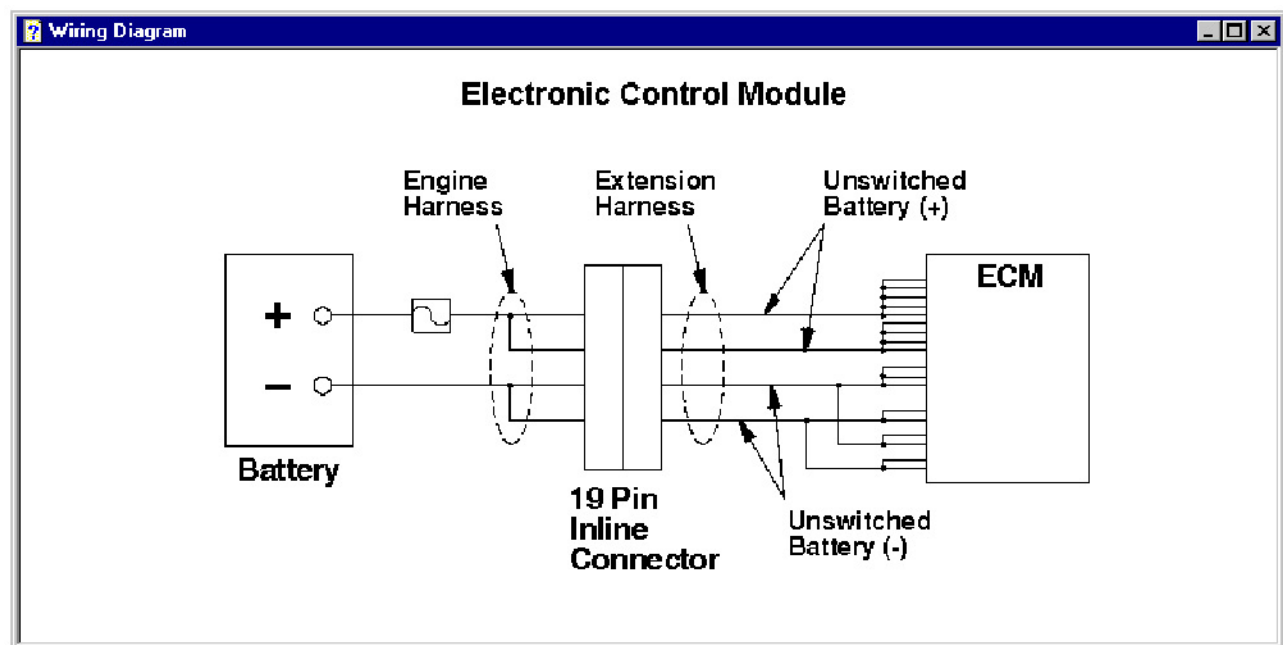


FIGURE 228. WIRING DIAGRAM WINDOW

20.2 Consumer Device Fault Information

Three categories of fault information are available with RV generator sets: **Advanced Fault Info**, **Fault History**, and **Fault Occurrences**. Marine generator sets 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.

20.2.1 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 229](#)).

Each fault is represented by a fault code indicating a particular malfunction or abnormal condition within the device.



FIGURE 229. FAULT INFORMATION WINDOW FOR RV GENERATOR SET

20.2.2 Advanced Fault Information

The Advanced Fault Information window ([Figure 230](#)) is for factory use only. This window shows the number of faults enabled in the software. For some generator sets, it also shows the number of fuel faults enabled in the software.

NOTICE

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.

20.2.3 Fault History

The Fault History window ([Figure 230](#)) 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.

NOTICE

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 230. ADVANCED FAULT INFORMATION

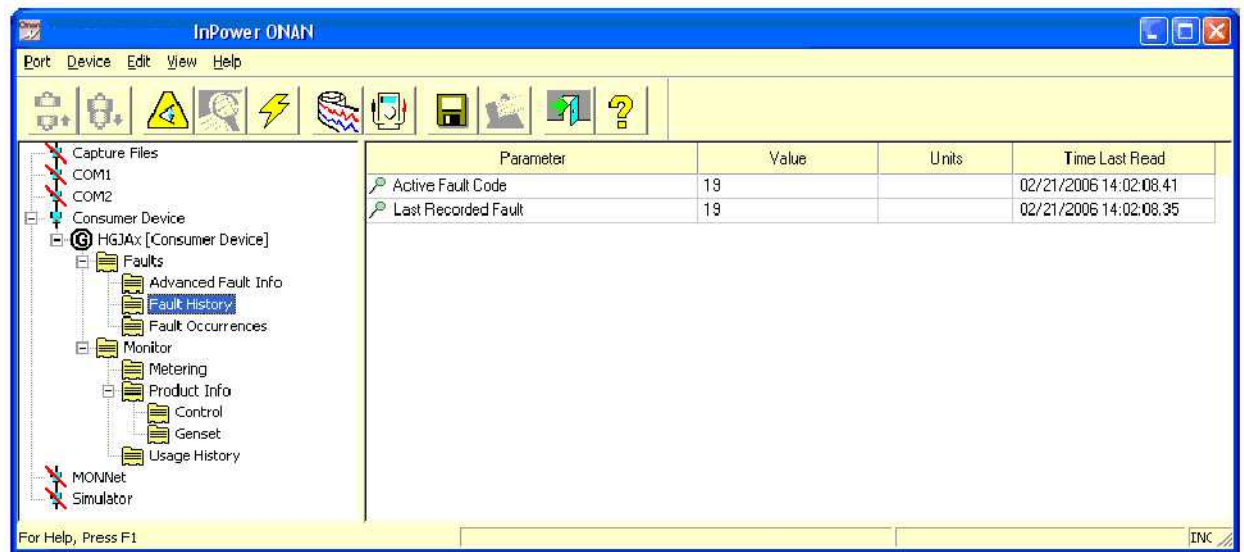


FIGURE 231. FAULT HISTORY



| Fault Code | Fault Description | Source Address | Real Time Clock | Engine Run Time | Fault Occur |
|------------|---|----------------|------------------|-----------------|-------------|
| 143 | Engine Oil Rifle Pressure - Data Valid but Below Normal Operational Range - Moderately Severe Lev 0 | 0 | 01/04/00 22:03.4 | 14.95 | |
| 146 | Engine Coolant Temperature - Data Valid but Above Normal Operational Range - Moderately Severe 0 | 0 | 01/04/00 21:38.1 | 14.90 | |
| 151 | Engine Coolant Temperature - Data Valid but Above Normal Operational Range - Most Severe Level 0 | 0 | 01/04/00 21:38.1 | 14.90 | |
| 415 | Engine Oil Rifle Pressure - Data Valid but Below Normal Operational Range - Most Severe Level 0 | 0 | 01/04/00 22:03.4 | 14.95 | |
| 427 | The J1939 CAN datalink has lost some important messages | 220 | 01/02/00 00:09.3 | 18.80 | |
| 441 | Battery 1 Voltage - Data Valid but Below Normal Operational Range - Moderately Severe Level | 220 | 01/02/00 00:38.4 | 18.80 | |
| 442 | Battery 1 Voltage - Data Valid but Above Normal Operational Range - Moderately Severe Level | 220 | 01/02/00 00:36.5 | 18.80 | |
| 1117 | Power Lost With Ignition On - Data Erratic, Intermittent, or Incorrect | 0 | 01/02/00 00:04.2 | 18.80 | |
| 1131 | Battle Short Mode Active | 220 | 01/04/00 05:10.1 | 14.35 | |
| 1248 | An engine warning fault has occurred | 220 | 01/04/00 21:32.4 | 14.90 | |
| 1433 | Local E-Stop | 220 | 01/04/00 02:12.0 | 18.80 | |
| 1434 | Remote E-Stop Activated | 220 | 01/02/00 00:20.0 | 8.35 | |
| 1435 | Engine Cold - Potential Starting Problem - Condition Exists | 220 | 01/02/00 00:13.3 | 18.80 | |
| 1573 | Fault due to configurable input #1 being active | 220 | 01/04/00 04:57.0 | 14.35 | |
| 1689 | Indicates that power to the RTC chip has been lost and the clock is no longer accurate | 220 | 00/00/00 00:00.0 | 0.00 | |
| 1992 | Engine Crankshaft Speed/Position - Data Valid but Above Normal Operational Range - Moderately S 0 | 0 | 01/04/00 21:41.3 | 14.90 | |
| 2814 | The Gensef's CT ratio must be large enough for at least 400% Standby Nominal Current | 220 | 01/01/00 00:04.0 | 0.00 | |
| 2815 | The Gensef's CT ratio must be small enough for 100% Application Nominal Current | 220 | 01/04/00 02:12.0 | 18.80 | |
| 2945 | Fault due to rupture basin switch being active | 220 | 01/04/00 02:12.4 | 18.80 | |

FIGURE 232. FAULT HISTORY IN COMMERCIAL DEVICES

20.2.4 Fault Occurrences

The Fault Occurrences window ([Figure 233](#)) lists all possible faults that are available with the device and the number of times each fault occurred.

NOTICE

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.

20.2.5 Fault Bypass Info

Fault Bypass Information ([Figure 234](#)) is only available with Marine MDDCx generator sets. 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.

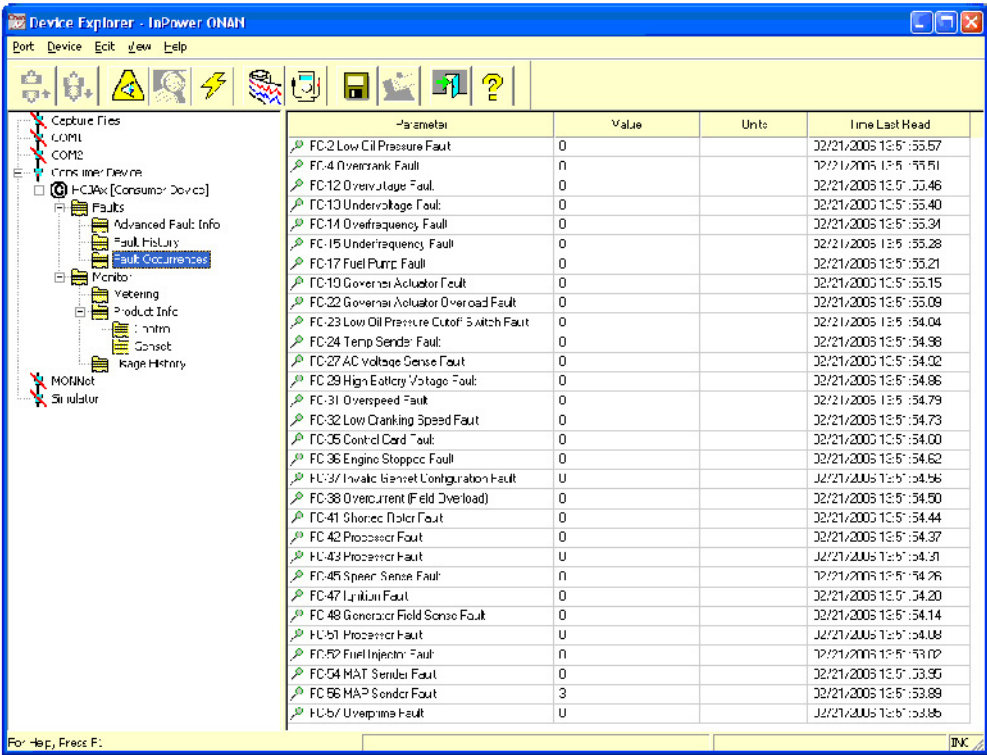


FIGURE 233. FAULT OCCURRENCES

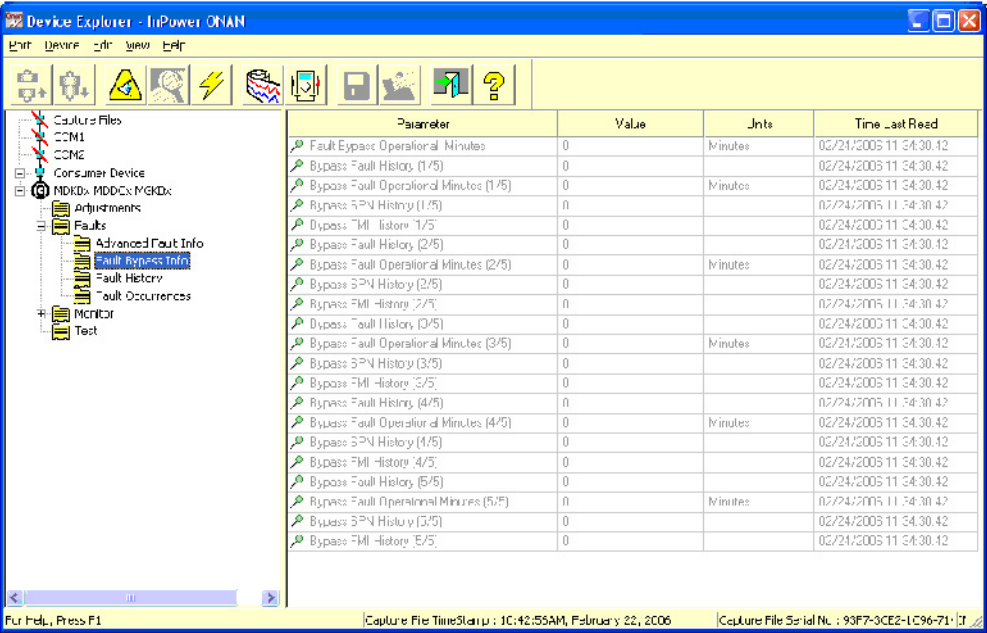


FIGURE 234. FAULT BYPASS INFORMATION (FOR SELECT MARINE GENERATOR SETS ONLY)

20.2.6 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 generator set, as described in the generator set Operator's Manual.

20.2.7 Consumer Device Fault Information

Consumer Device Fault information is available from the Help menu (Figure 235). It includes a list of possible faults that can occur with each generator set model. Each individual fault includes a fault description, a list of possible causes, and diagnosis and repair procedures.

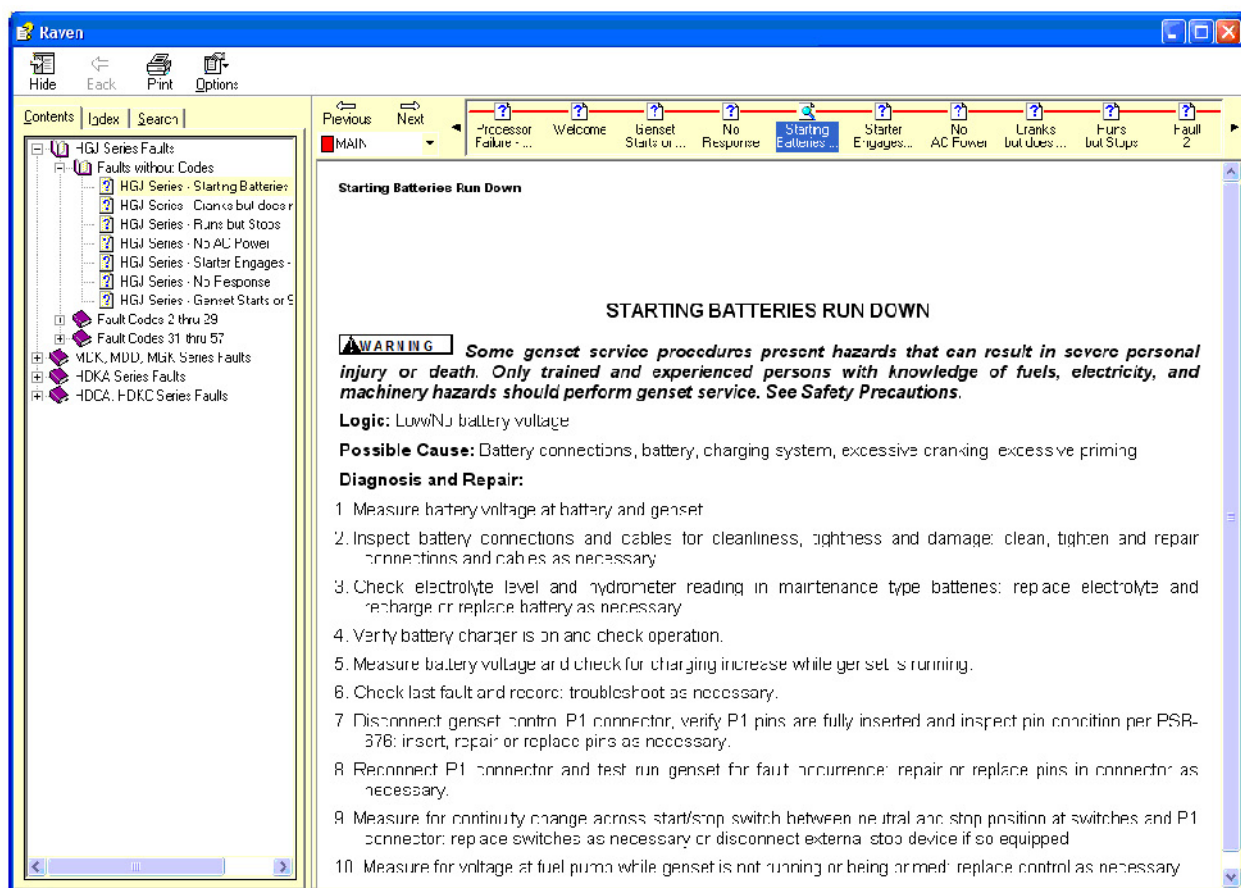


FIGURE 235. CONSUMER DEVICE FAULT INFORMATION HELP FILES

20.3 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

20.3.1 Clear Faults

This group allows the user to Acknowledge faults, clear all inactive faults, or clear a specific inactive fault. (Figure 236.)

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.

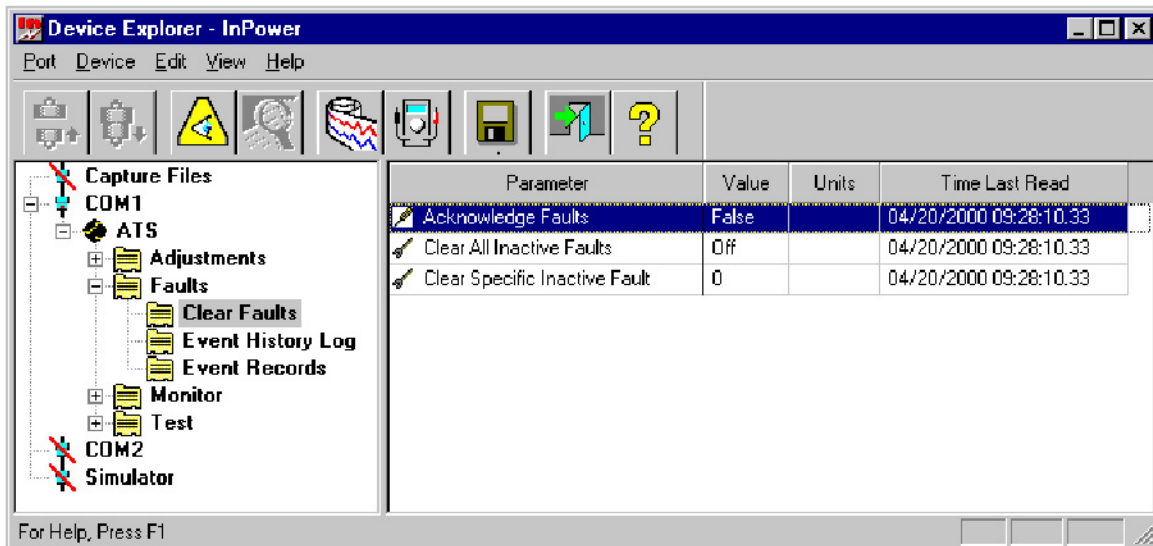


FIGURE 236. CLEAR FAULTS

20.3.2 Event History Log

The following information describes the titles in the Event History Log. Events include both events and warnings. (Figure 237.) 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 237. EVENT HISTORY LOG

20.3.3 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 238.)

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.

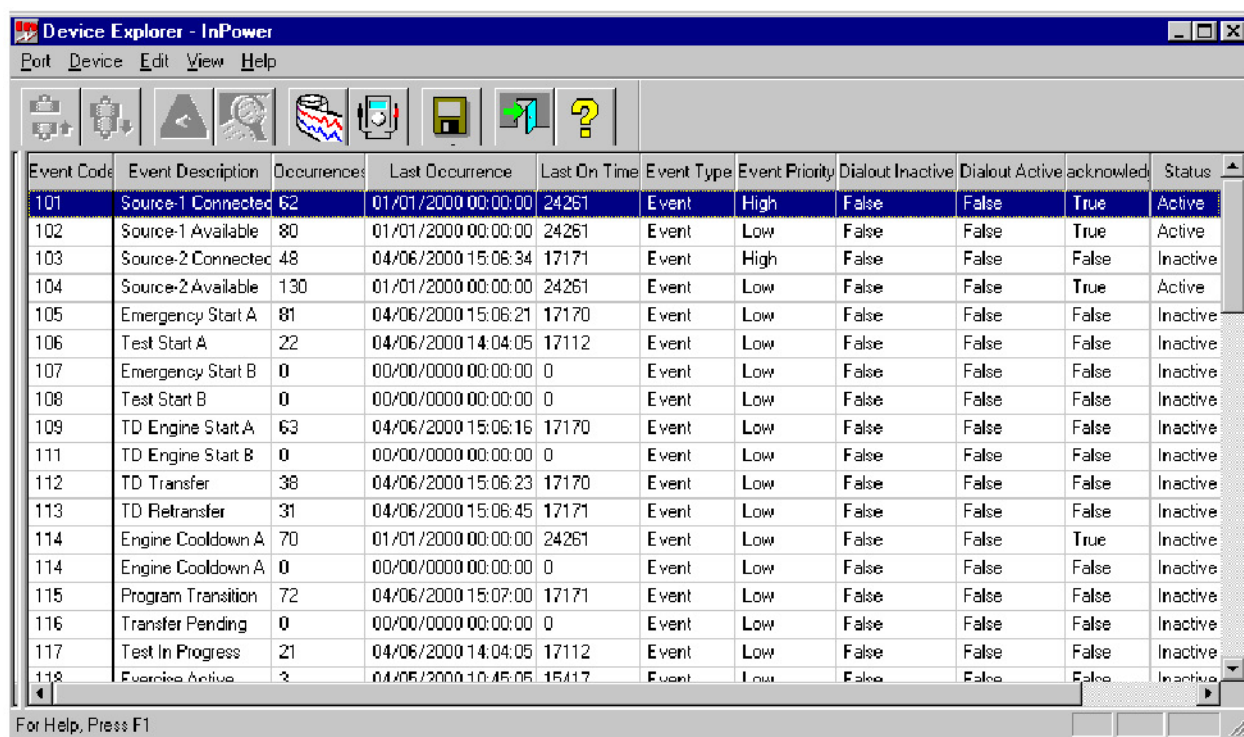
Event Priority: Events are pre-configured for high or low priority. When the ATS is connected in a network application, High Priority events are sent over the network immediately. Low Priority events are sent when polled.

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 features a menu bar (Port, Device, Edit, View, Help) and a toolbar with icons for various functions. Below the toolbar is a table of event records. The table has columns for Event Code, Event Description, Occurrences, Last Occurrence, Last On Time, Event Type, Event Priority, Dialout Inactive, Dialout Active, acknowledged, and Status. The records list 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', 'Engine Cooldown B', 'Program Transition', 'Transfer Pending', 'Test In Progress', and 'Exercise 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 B | 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 | Exercise Active | 3 | 04/06/2000 10:45:05 | 15417 | Event | Low | False | False | False | Inactive |

FIGURE 238. EVENT RECORDS

20.4 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. | |
| 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. | |

| Serial No. | Mode | Mode Number (Displayed by InPower) | Valid state for Calibration | Mode Description | Steps/checks to bring controller to OFF or Ready mode |
|------------|------------------|--|--------------------------------|---|--|
| 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. | |
| 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. | |

| Serial No. | Mode | Mode Number (Displayed by InPower) | Valid state for Calibration | Mode Description | Steps/checks to bring controller to OFF or Ready mode |
|------------|-------------|--|--------------------------------|---|--|
| 7 | Rated | 6 | | Generator set/Conmtroller 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. |

21 Event Handler

21.1 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.

21.1.1 Devices That Cannot Receive Events

This feature is not applicable to PCC 1100, PCC 1300, and PCC 1301.

21.2 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.

21.2.1 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.

21.2.1.1 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.

21.2.2 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.

21.2.2.1 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.

This page is intentionally blank.

22 Strip Chart

22.1 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.

22.1.1 Example of a Strip Chart

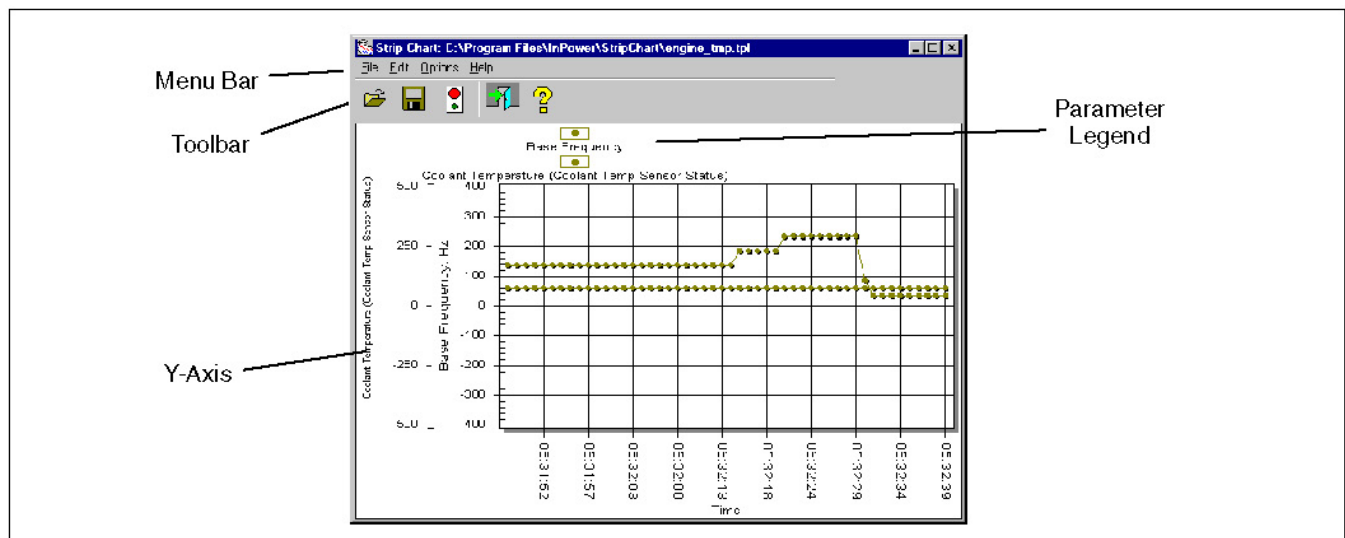


FIGURE 239. TYPICAL STRIP CHART

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.

22.1.2 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.

22.2 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.

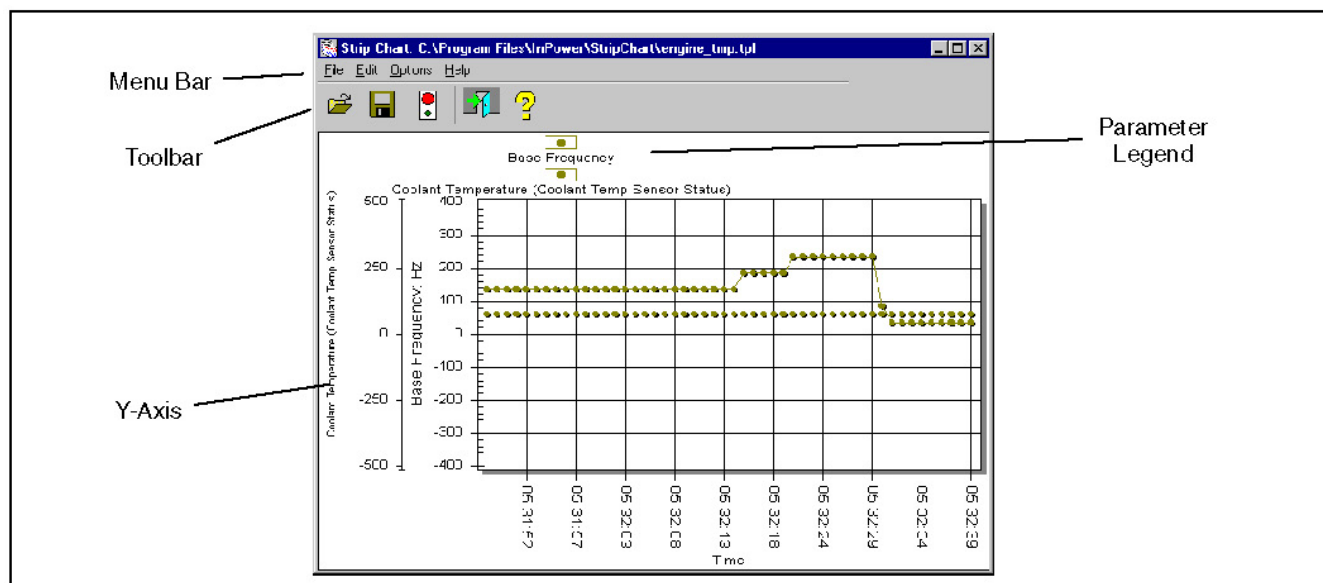


FIGURE 240. TYPICAL STRIP CHART

22.2.1 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.

22.2.2 Parameter Properties Dialog

The **Parameter Properties** dialog, shown in [Figure 241](#), 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.

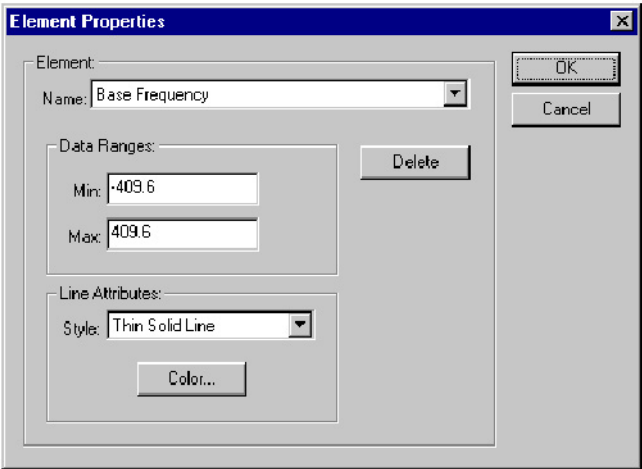


FIGURE 241. PARAMETER PROPERTIES

22.2.3 Sampling Rate Dialog

The Sampling rate feature is available from the Strip Chart - **Options** menu. The **Sampling Rate** dialog, shown in [Figure 242](#), 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**).

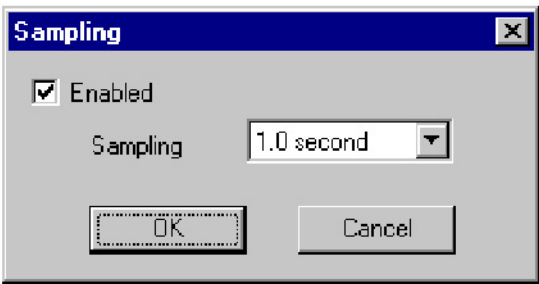


FIGURE 242. SAMPLING RATE DIALOG

When finished customizing the strip chart, choose the **File-Save As...** menu option. Name the file and save in the **Strip Charts** directory.

NOTICE

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.

22.2.4 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 243](#)). 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.

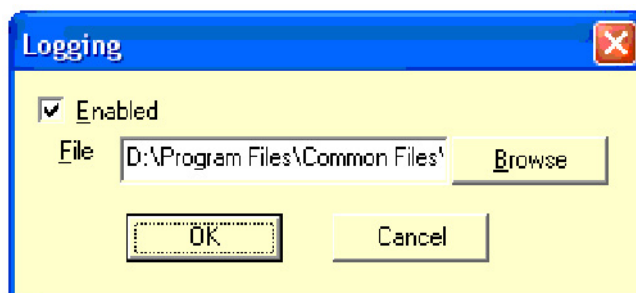


FIGURE 243. LOGGING DIALOG

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 244](#) is displayed.

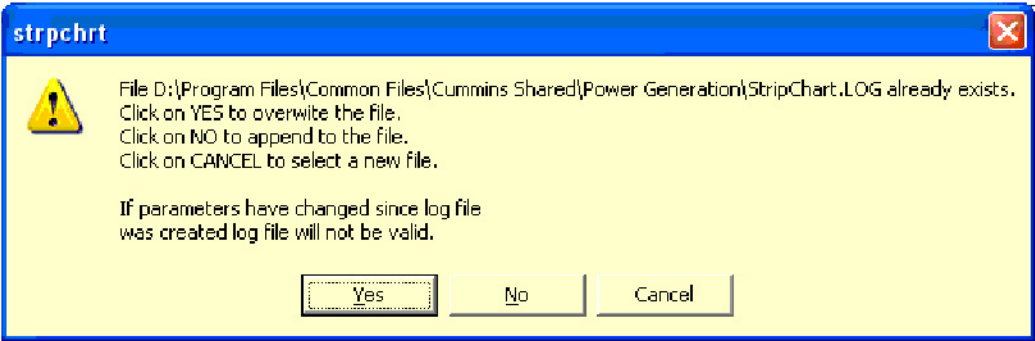


FIGURE 244. LOGGING MESSAGE

22.2.5 Context Menu Features

The **Context Menu**, shown in [Figure 245](#), 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.

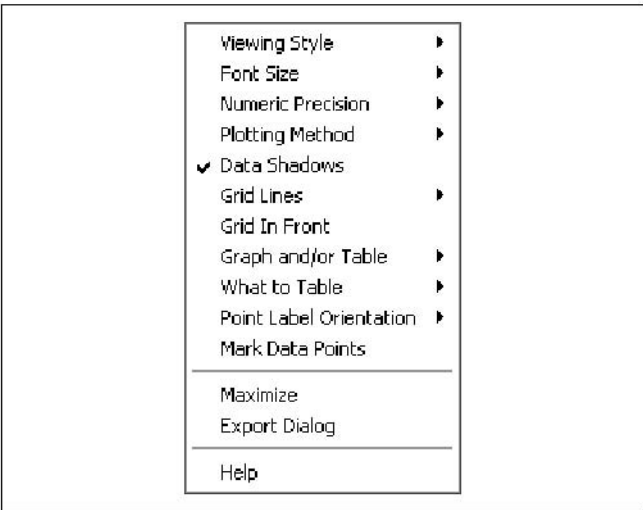


FIGURE 245. CONTEXT MENU FEATURES (RIGHT MENU BUTTON)

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.

NOTICE

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 5](#), for the listed destinations. This dialog allows the user to print a Strip Chart.

TABLE 5. 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.

22.2.6 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.

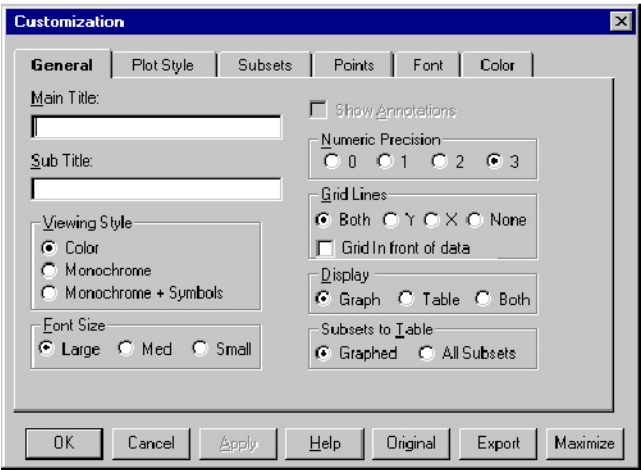


FIGURE 246. CHART CUSTOMIZATION DIALOG

22.2.7 Printing a Strip Chart

A Strip Chart can be printed by using the Export dialog (Figure 247). Use the right menu button to access the Export Dialog, then select the **Printer** radio button and select the **Print** button.

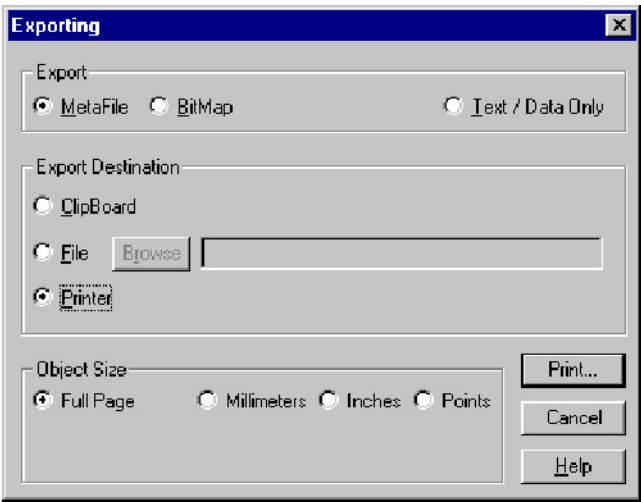


FIGURE 247. EXPORT - PRINT DIALOG

22.2.8 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.

This page is intentionally blank.

23 Capture File

23.1 PCC 1100 Limitation

This feature is not applicable to PCC 1100.

23.2 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.

23.3 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.

23.3.1 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 later using the Capture File Manager Utility.

23.4 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.

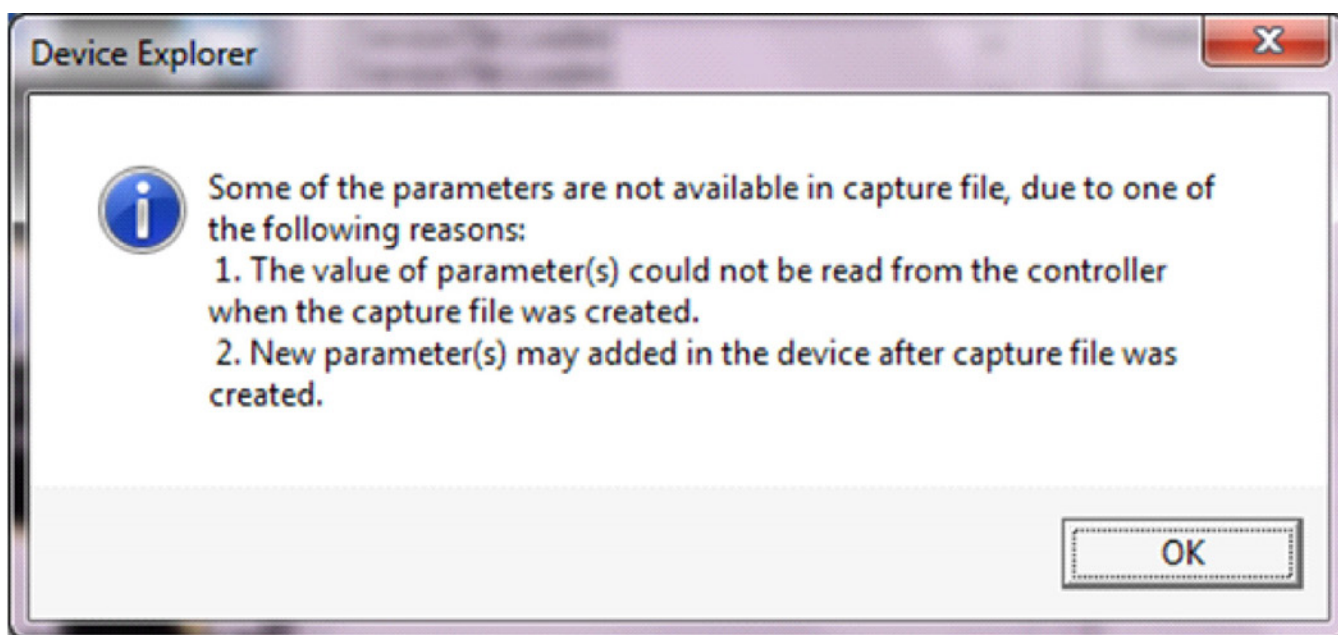


FIGURE 248. VIEW CAPTURE FILE WARNING MESSAGE

23.5 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.

NOTICE

A capture file from a generator set (for example) can be copied to another generator set, but it cannot be copied to a transfer switch control, or any other device type.

23.6 Importing a Capture File

Capture files can be imported into InPower from a user selected location. Clicking on the "Import Capture File" menu item will launch a file dialog box used to select the capture files to be imported.

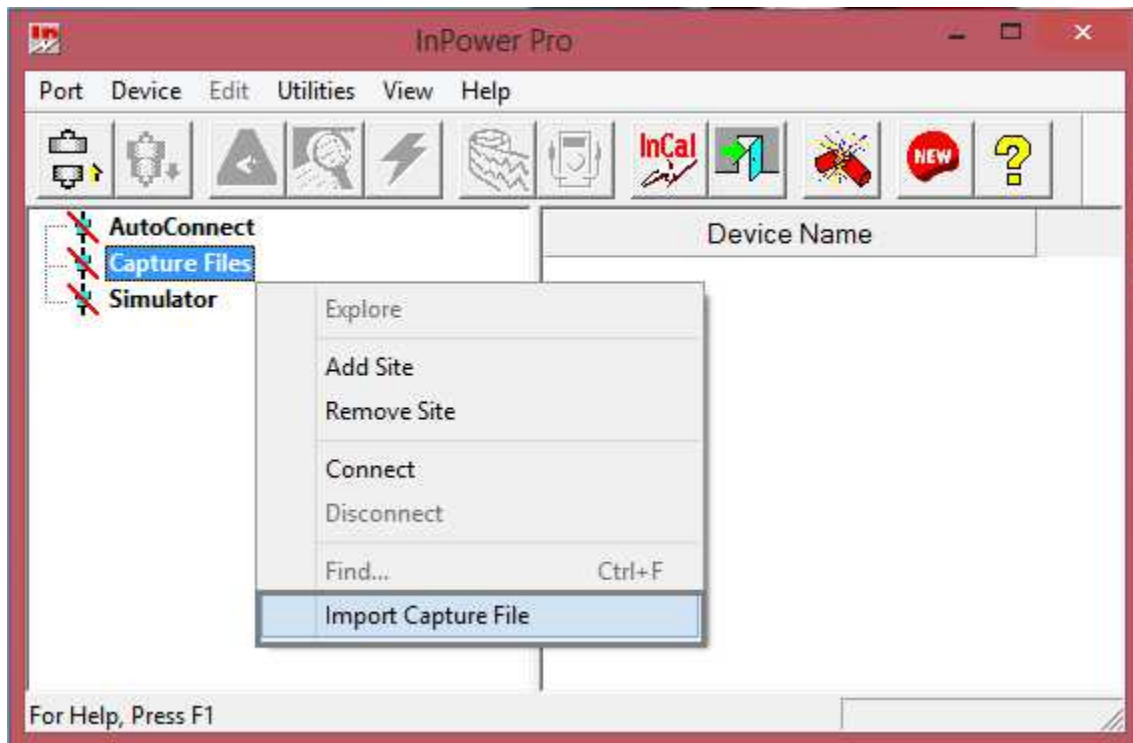


FIGURE 249. IMPORT CAPTURE FILE

23.7 Capture File Manager Utility

InPower V11.5 and above has an add-on utility called Capture File Manager. This application is accessed from Utilities Menu within InPower.

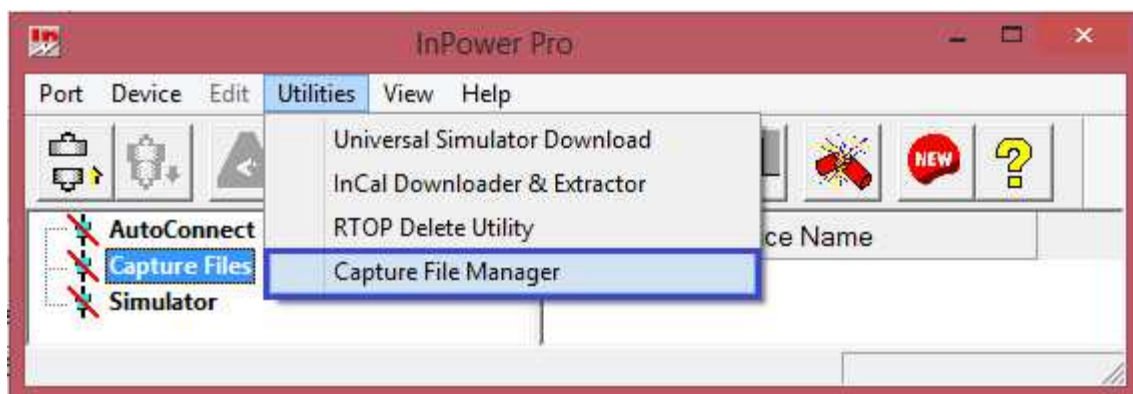


FIGURE 250. CAPTURE FILE MANAGER UTILITY

This utility provides options to move the capture file to archive folder or to move the archived files to the main folder.

The user can delete the capture files from the archive folder. They will be removed from the system as well.

Renaming of capture file is also possible using this Utility.

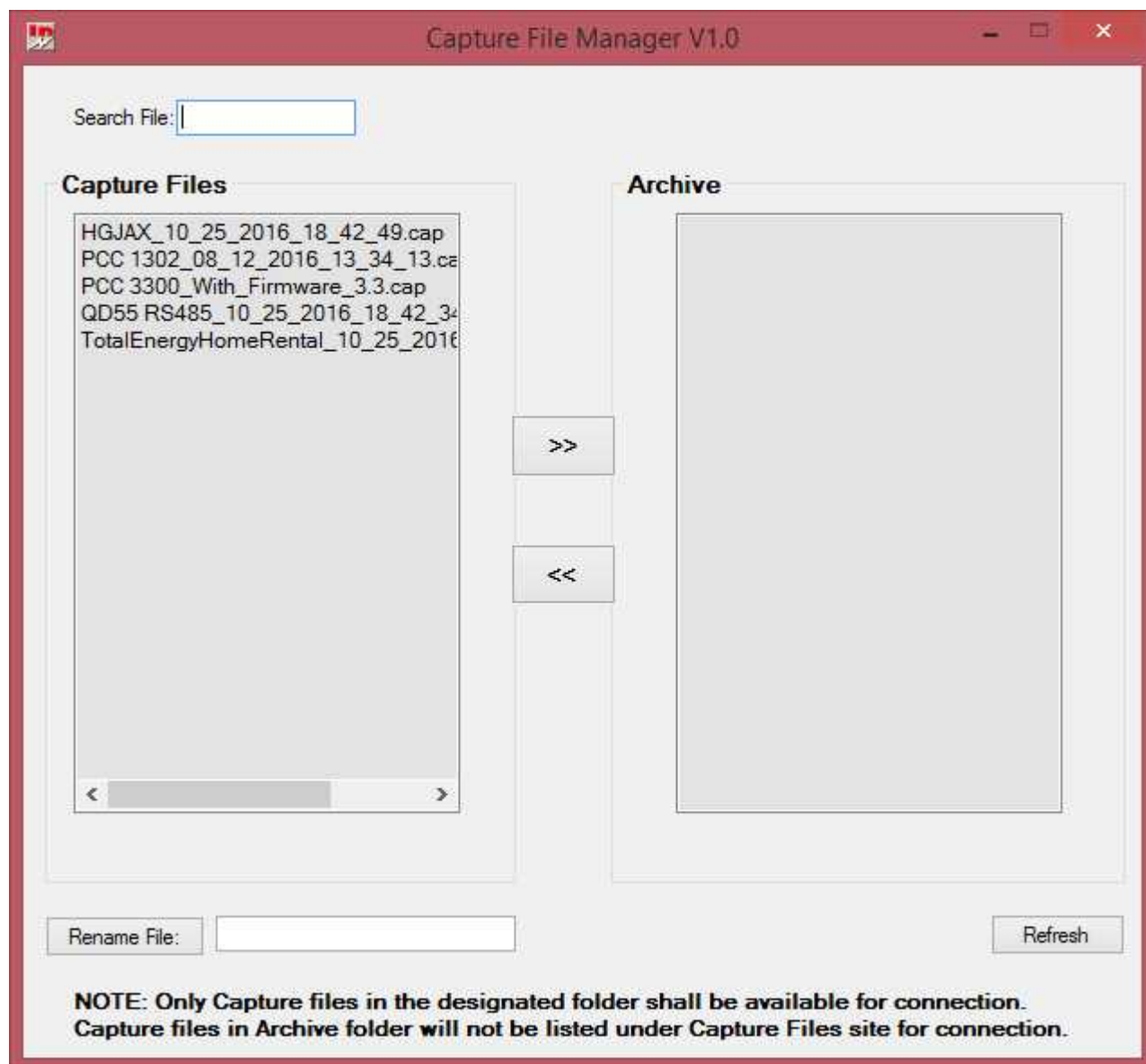


FIGURE 251. CAPTURE FILE ARCHIVE

24 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 generator set InPower product, you will only receive generator set 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).

This page is intentionally blank.

25 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.

25.1 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.

NOTICE

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 252](#)). Select **Print Feature** from the pop-up menu, to create a report for the selected folder and display the **Parameter List Report** window ([Figure 253](#)).

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 252](#)).

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 253](#)).

NOTICE

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.

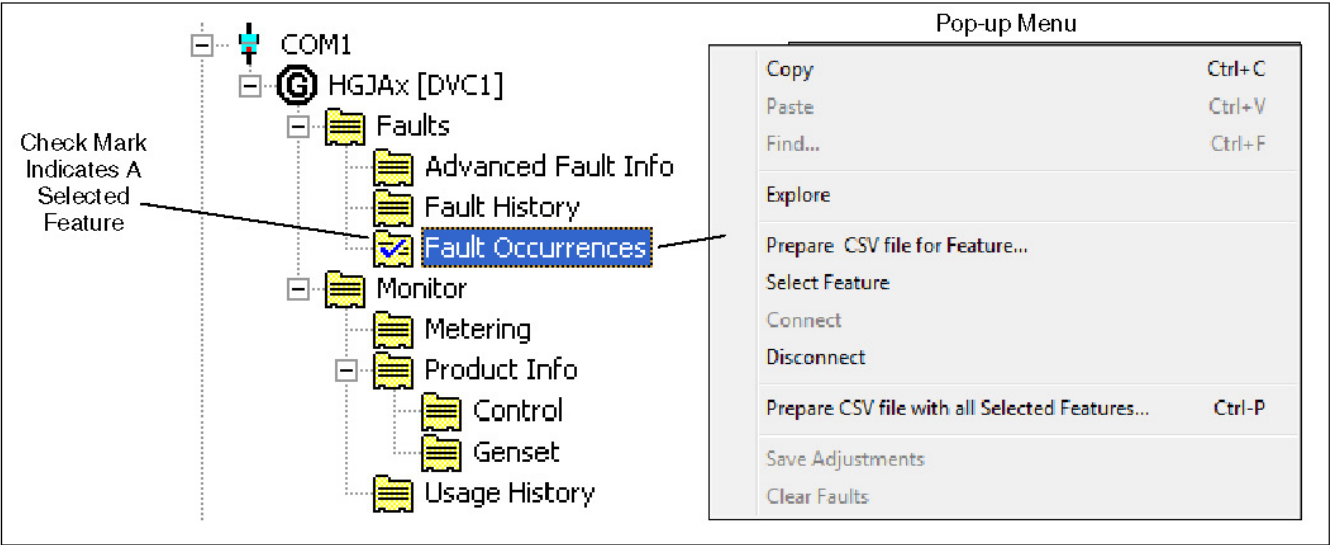


FIGURE 252. SELECTING FEATURES FOR A REPORT

| Param | Value | Units | Path |
|----------------------------------|------------|---------|---|
| 0 Engine Cold Warning Threshold | "65.00" | degF | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 1 LOP Warning Threshold Table | "<XYtable> | | |
| rpm psi#-4095.000000#4095.875000 | | | |
| 0 | 0 | | |
| 800 | 25 | | |
| 1200 | 33 | | |
| 1700 | 44 | | |
| 1800 | 45 | | |
| 2200 15.00" | | | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 2 LOP Shutdown threshold table | "<XYtable> | | |
| rpm psi# 4095.000000#4095.875000 | | | |
| 0 | 0 | | |
| 800 | 20 | | |
| 1200 | 23 | | |
| 1700 | 30 | | |
| 1800 | 40 | | |
| 2200 40.00" | | | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 3 HOT Warning Threshold | "190.00" | degF | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 4 HOT Shutdown Threshold | "220.00" | degF | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 5 LCL Warning Threshold | "15.0" | seconds | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 6 LCL Shutdown Threshold | "15.0" | seconds | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 7 LCL Fault Response | "Shutdown" | | Simulator\GCS [QSK60.cap]\Adjustments\Engine Protection Adjustments |
| 8 LCP Warning Threshold Table | "<XYtable> | | |
| rpm psi#-4095.000000#4095.875000 | | | |
| 0 | 0 | | |
| 1300 | 5 | | |

FIGURE 253. PARAMETER LIST REPORT WINDOW

25.2 Support Reports

A Support Report can be created and Emailed.

To create a Support Report,

1. Select **Help > Send Support Report**.

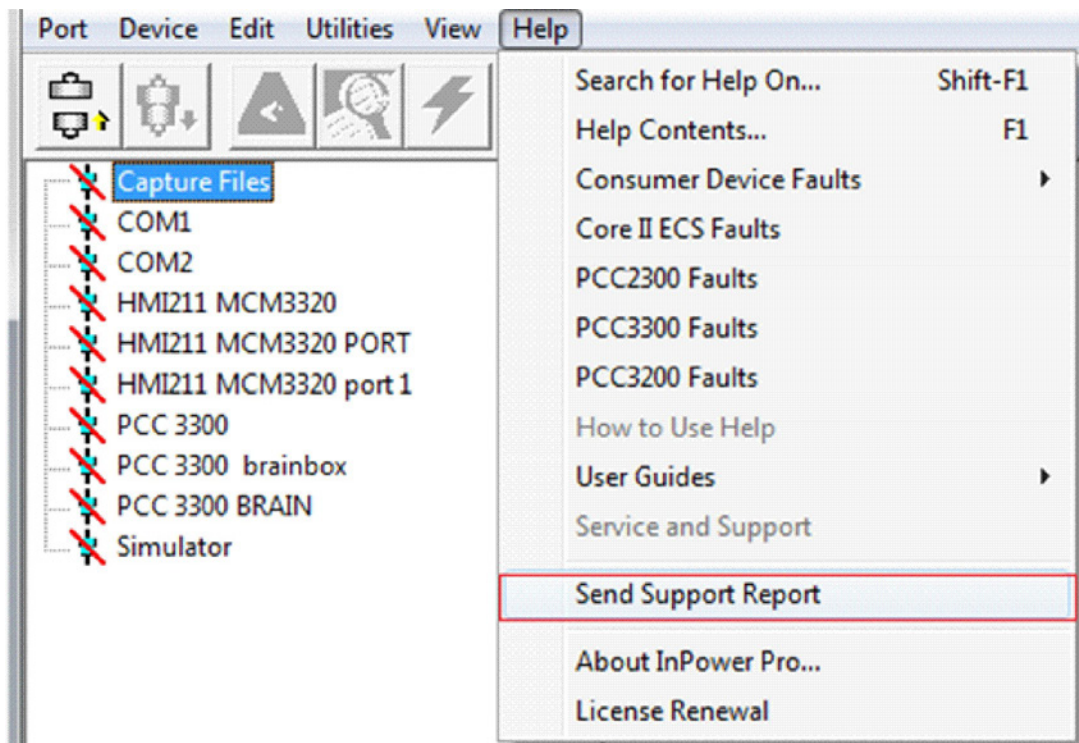


FIGURE 254. LAUNCHING THE SEND SUPPORT REPORT FEATURE

- When the **ETools Support Report Utility** dialog is displayed, enter an Issue Title and Issue Description.

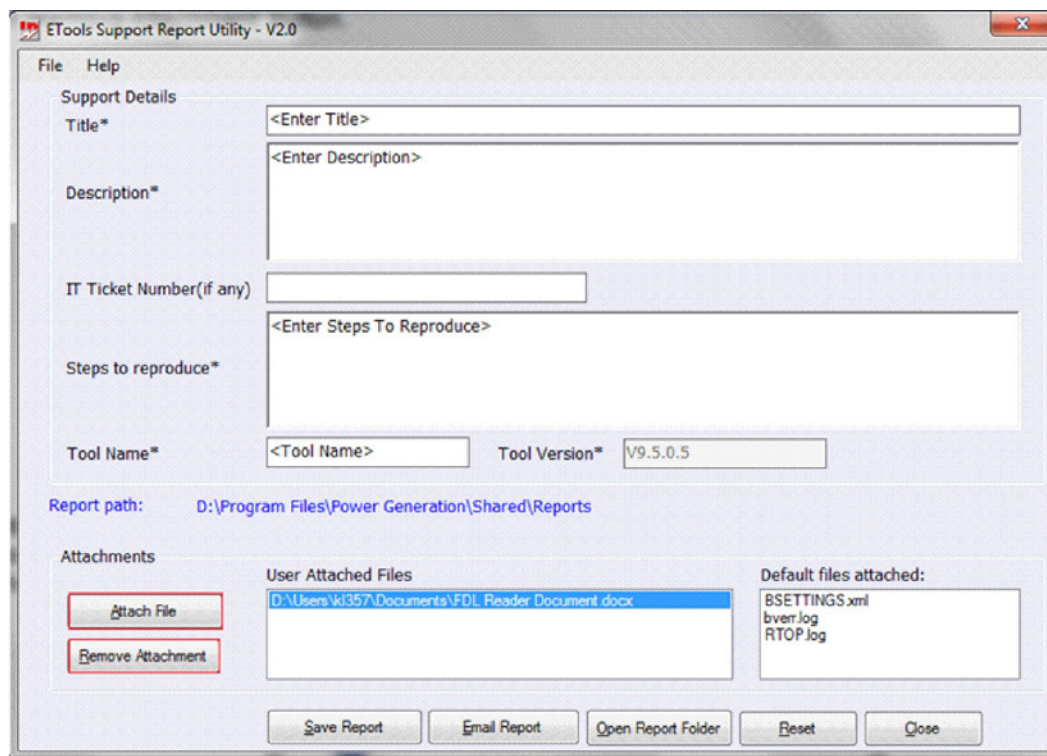


FIGURE 255. ETOOLS SUPPORT REPORT UTILITY DIALOG

If these fields are not filled in, the following error message is displayed when attempting to save the report.

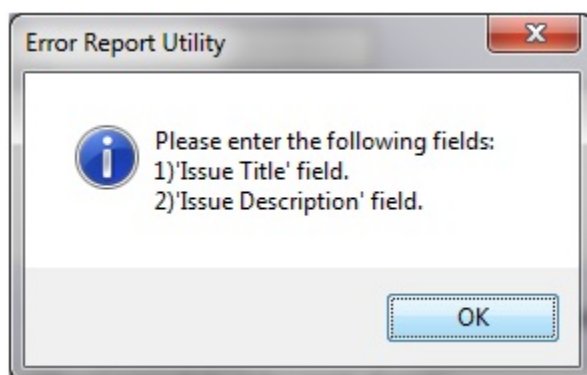


FIGURE 256. ERROR REPORT UTILITY MESSAGE

3. Click **Save Report**. The following message is displayed. Click **OK**.

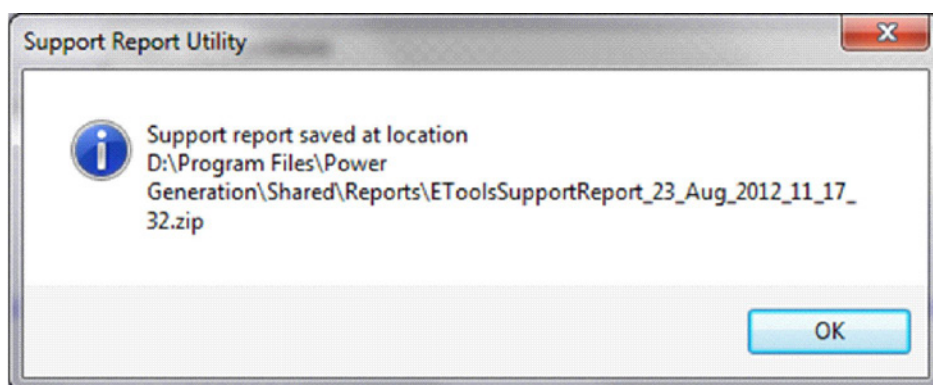


FIGURE 257. SAVED REPORT MESSAGE

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.

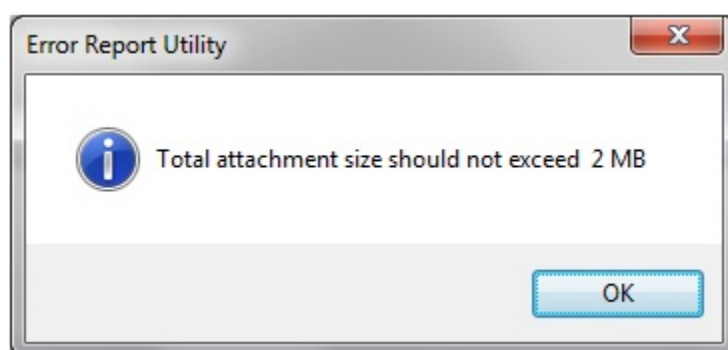


FIGURE 258. ATTACHMENT SIZE EXCEEDED MESSAGE

NOTICE

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**.

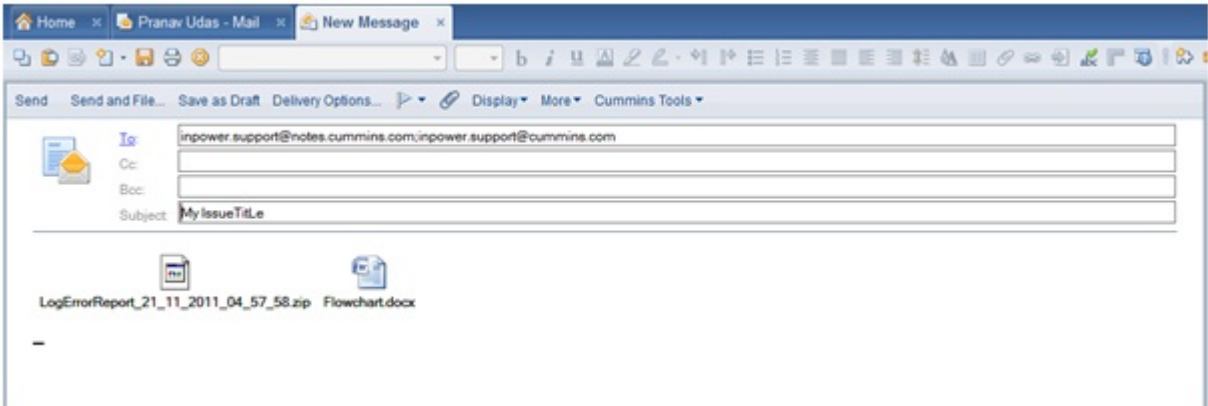


FIGURE 259. EMAIL FOR ERROR REPORT

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.

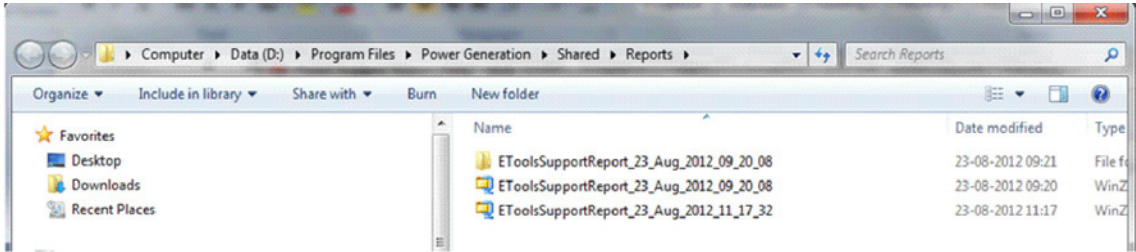


FIGURE 260. ERROR REPORT DEFAULT LOCATION

This page is intentionally blank.

26 Event Configuration

This section describes how to use the Events Configuration feature. This feature is only used with generator set 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 generator set 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 261](#)). This group displays all of the generator set Faults numerically, by Fault Code. Also displayed are the Fault Descriptions, current Fault Effect settings and current Notification settings.

26.1 Devices That Do Not Support Event Configuration

This feature is not applicable to PCC 1100, PCC 1300, PCC 1301, and MCC 3320.

26.2 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 generator set 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 generator set will derate to that setting when the fault is active.

Shutdown: Faults configured for Shutdown will cause the generator set to shutdown immediately when the fault is active.

Shutdown Cooldown: Faults configured for Shutdown Cooldown will shed the load (if available) and shut the generator set 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 261](#)). 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.

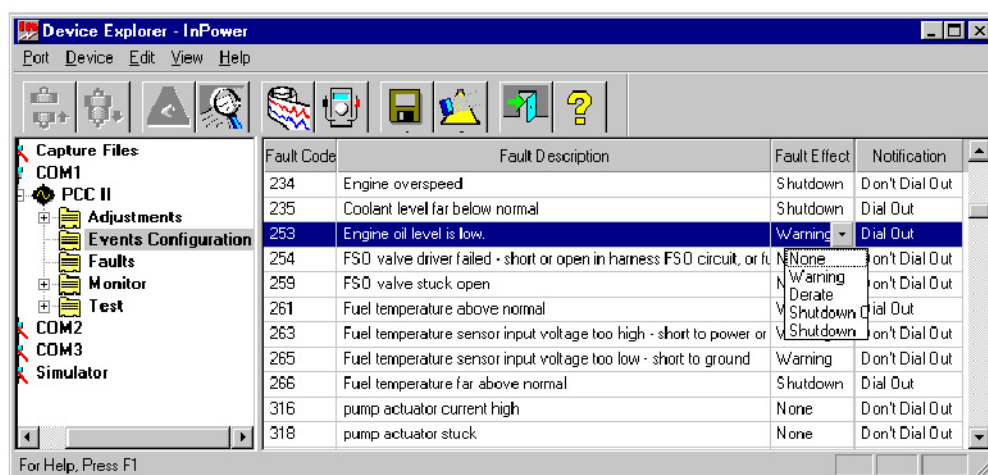


FIGURE 261. FAULT EFFECT

26.3 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.

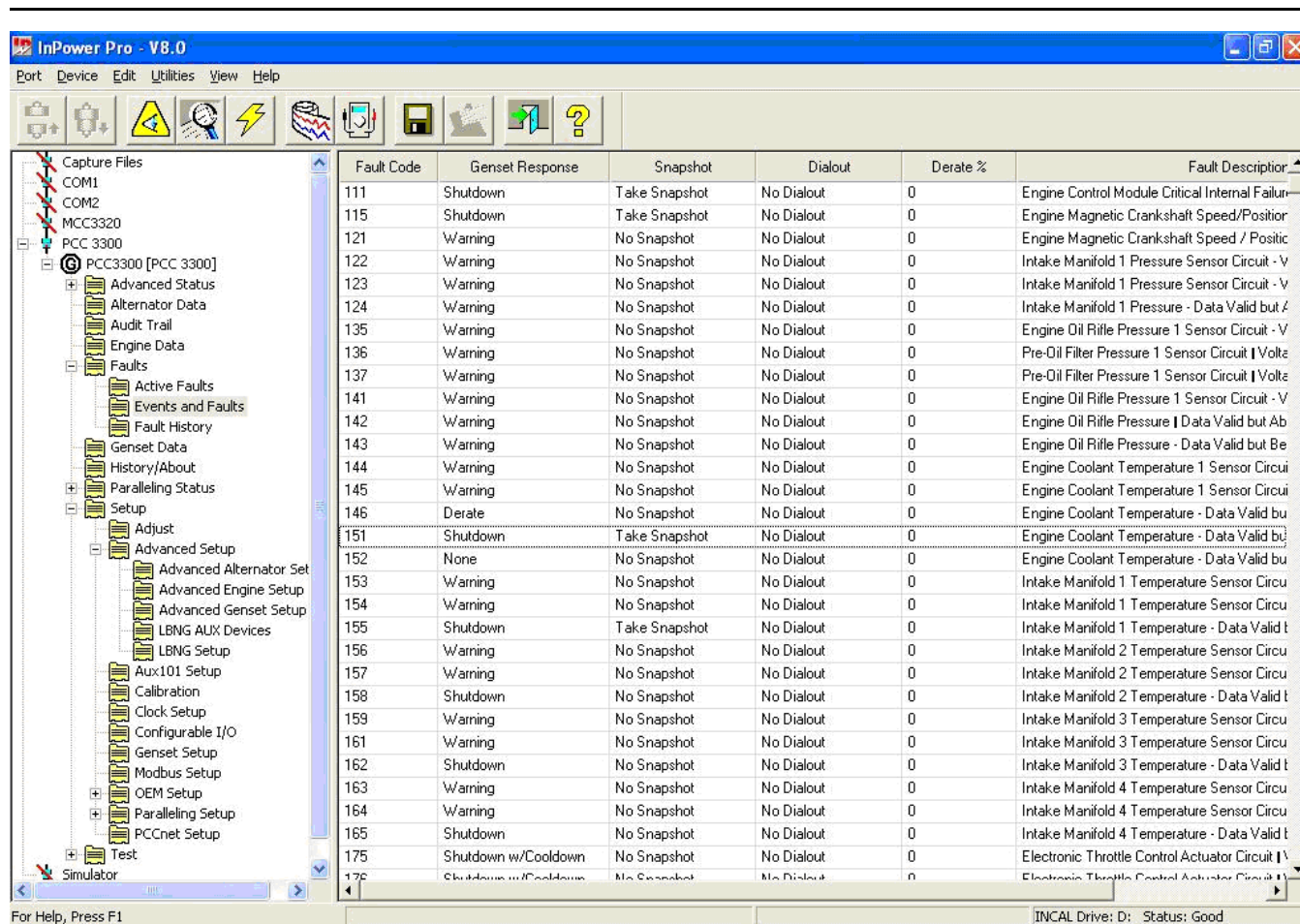


FIGURE 262. EVENT CONFIGURATION IN THE POWERCOMMAND 2.X AND 3.X

26.4 Notification

Notification refers to annunciation of the fault for remote monitoring. In order to remotely monitor generator set 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 263](#)). 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.

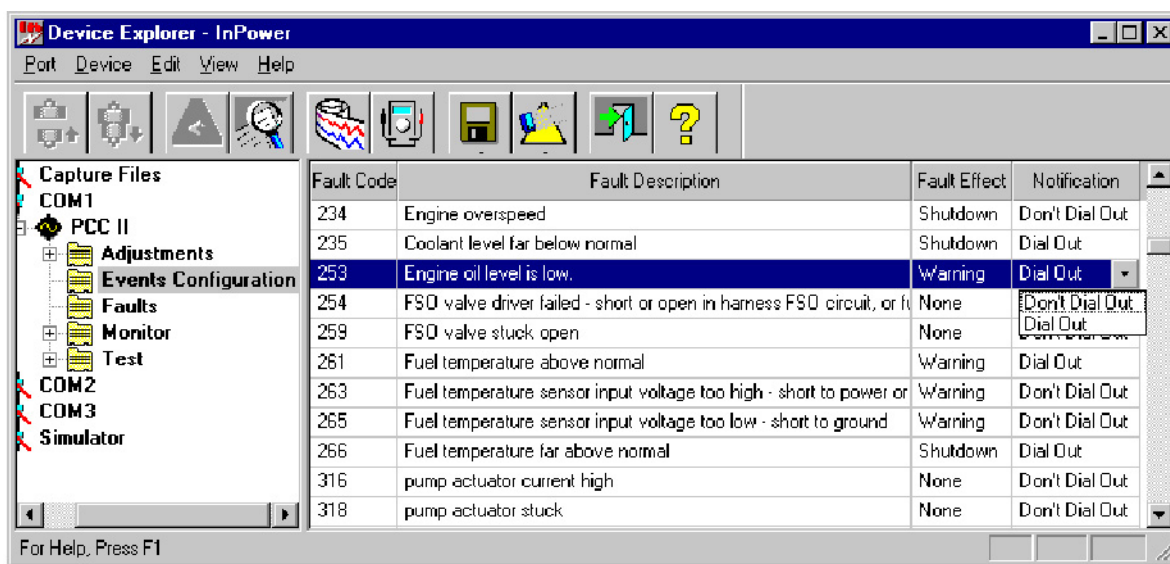


FIGURE 263. NOTIFICATION

27 Network Applications

This section describes how to use InPower to configure network settings and how to configure devices over a commissioned network.

27.1 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 generator set or ATS, in order to configure the network settings.

27.2 PCC 2100

Start InPower and connect to the PCC2100 Site by double clicking on the site. Make sure the COM port used during Site addition is still valid. Otherwise, you can remove the existing Site using the **Remove Site** menu on the right click of the **Site** and then add a new site.

Open the **Adjustments** folder, and then the **LonWorks** folder ([Figure 264](#)). 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.

27.2.1 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 264](#)). 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.

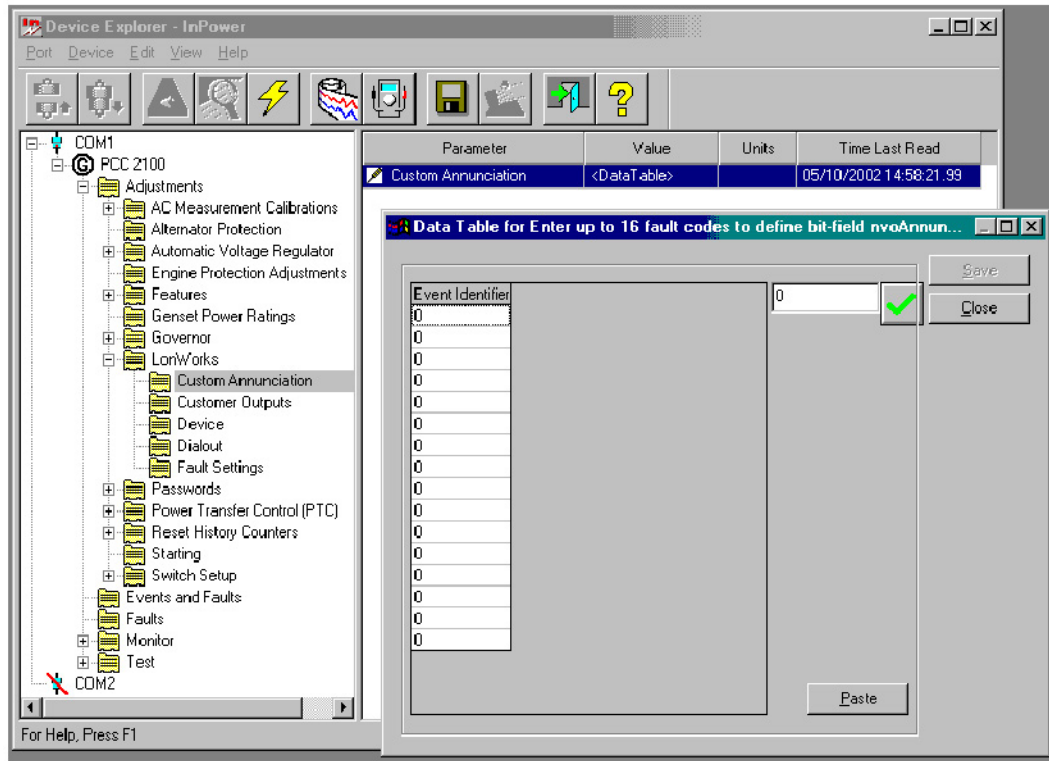


FIGURE 264. LONWORKS - PCC 2100 CUSTOM ANNUNCIATION

27.2.2 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 265). 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.

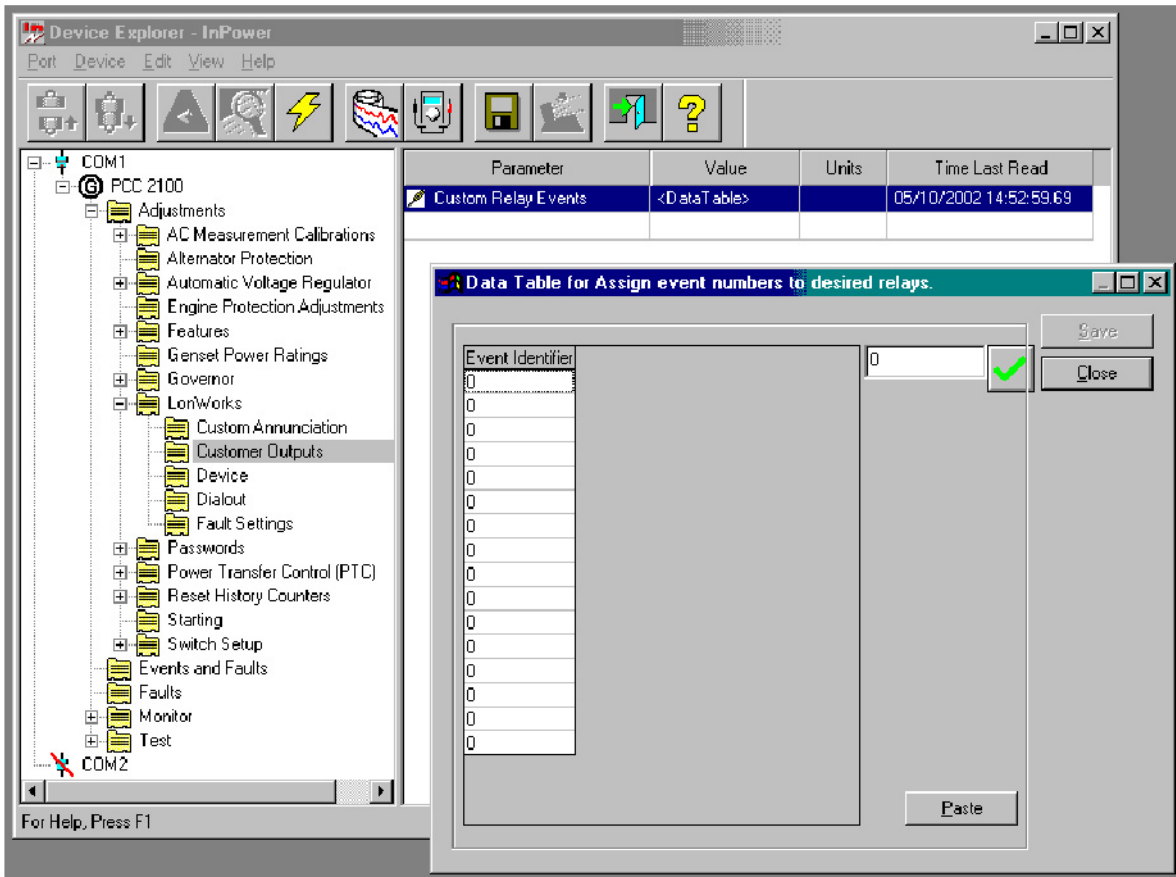


FIGURE 265. LONWORKS - PCC 2100 CUSTOM RELAY EVENTS

27.2.3 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.

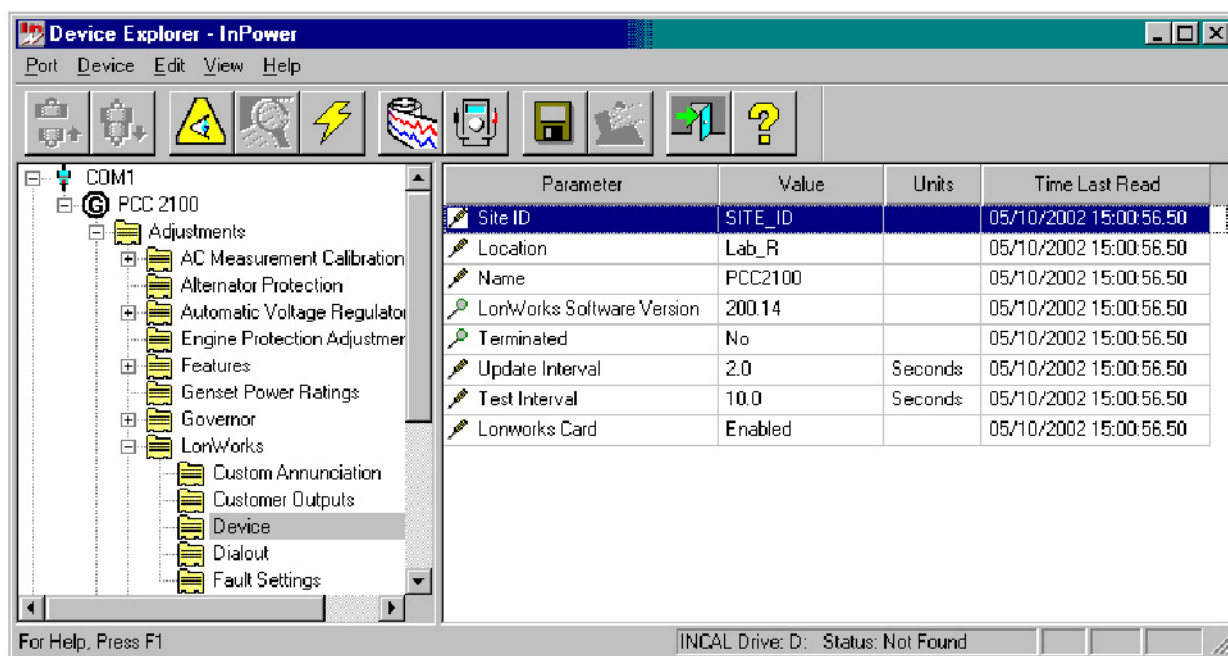


FIGURE 266. LONWORKS - PCC 2100 DEVICE

27.2.4 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.

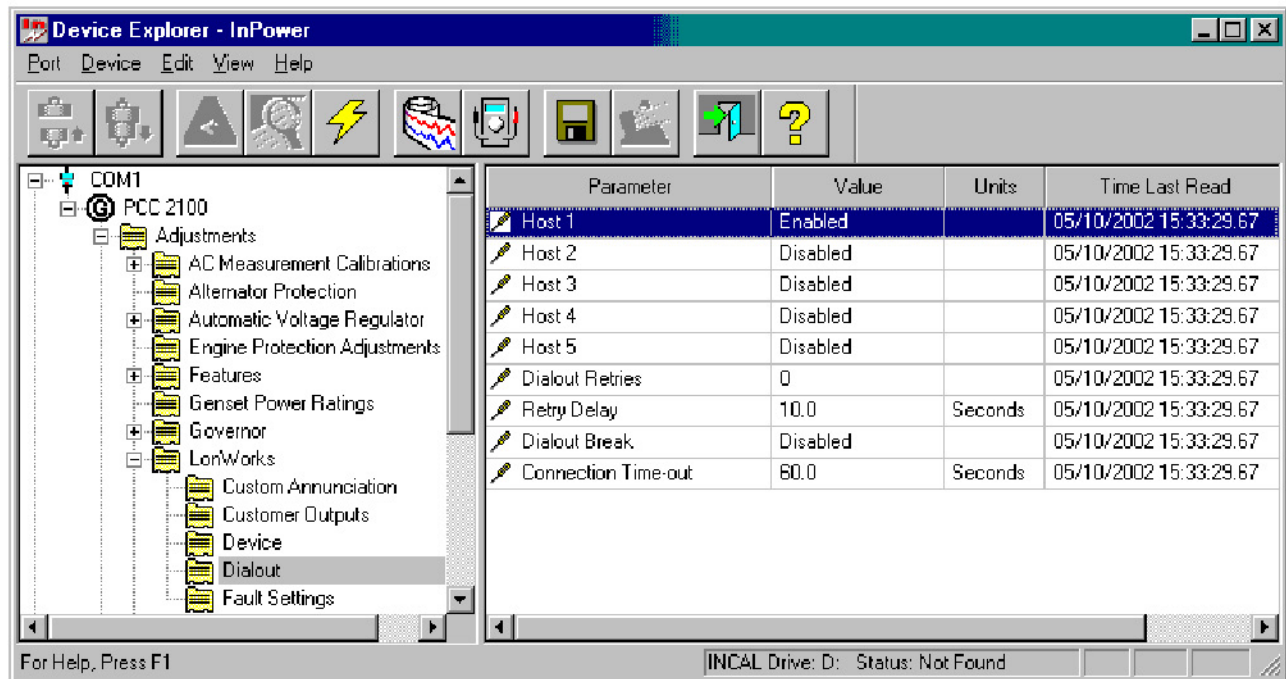


FIGURE 267. LONWORKS - PCC 2100 DIALOUT

27.2.5 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 generator set 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.

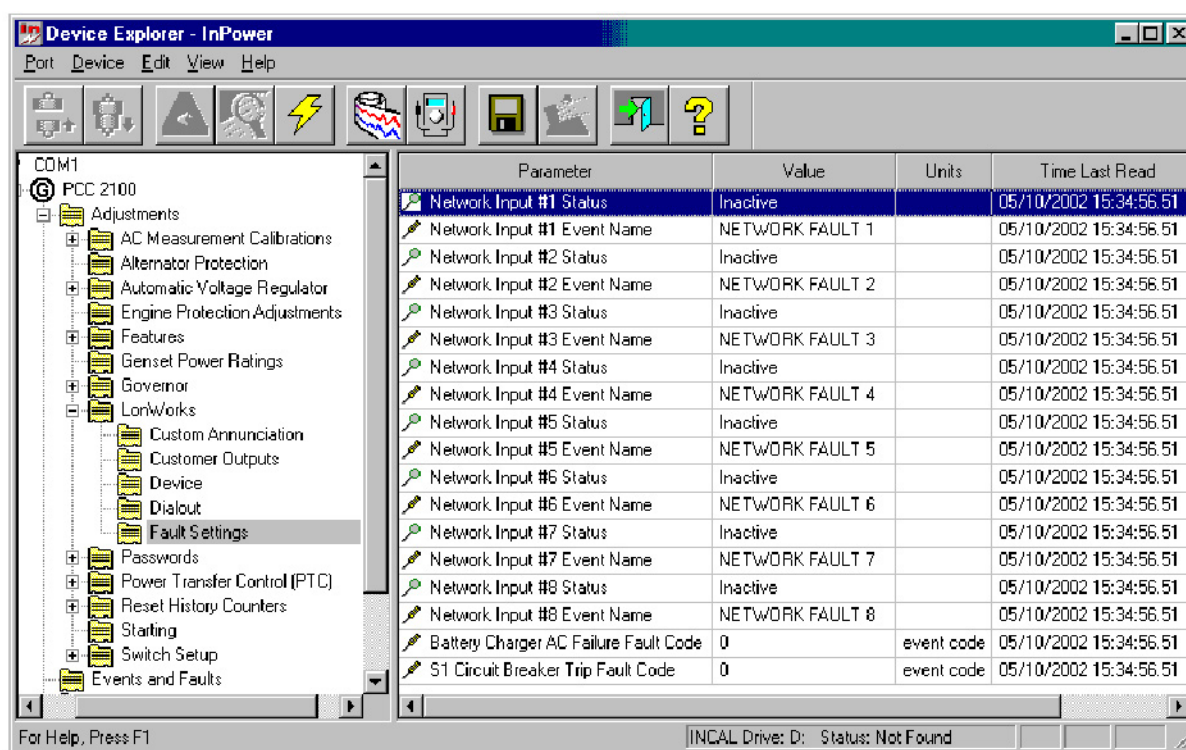


FIGURE 268. LONWORKS - PCC 2100 FAULT SETTINGS

27.2.6 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 269).

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.

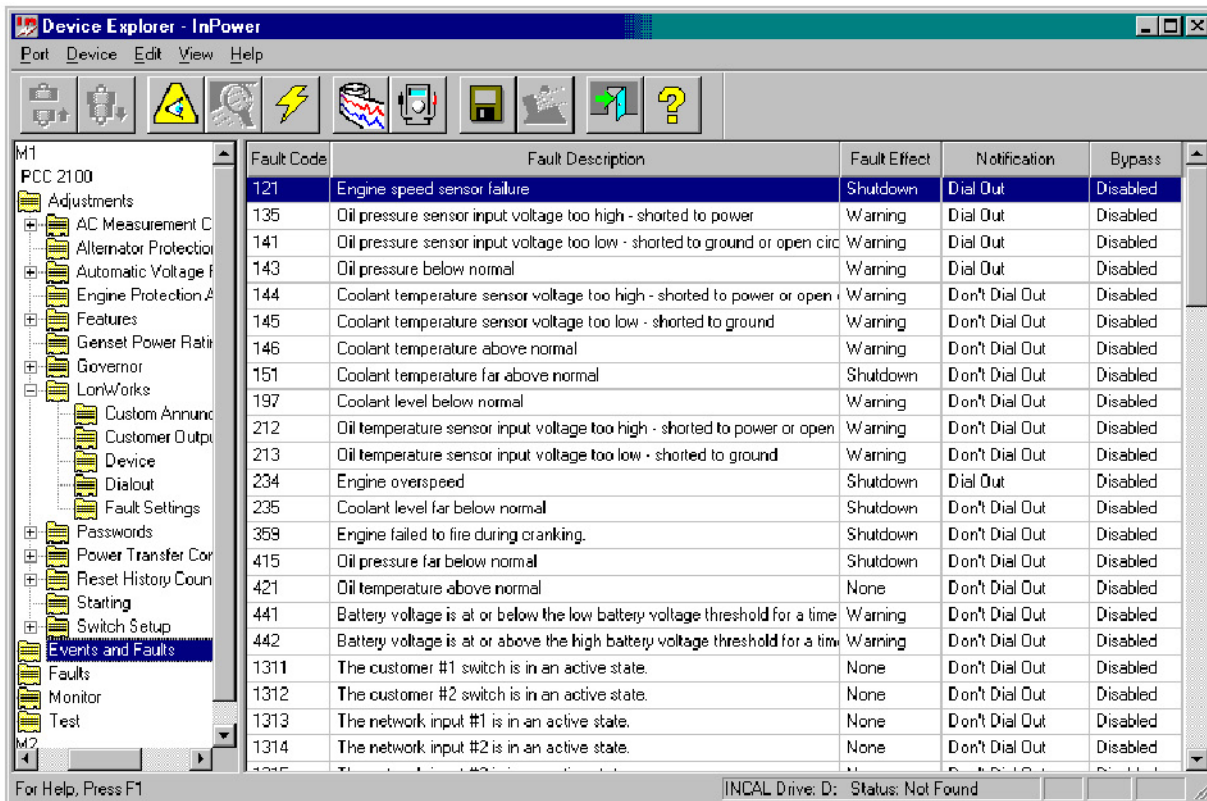


FIGURE 269. EVENTS AND FAULTS

27.3 PCC 3200

Start InPower and connect to the PCC3200 Site by double clicking on the site. Make sure the COM port used during Site Addition is still valid. Otherwise, you can remove the existing Site using the **Remove Site** menu on the Right click of the Site and then add a new site.

Open the **Adjustments** folder, and then the **LonWorks** folder ([Figure 270](#)). 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 generator set LonWorks card (GLC), after saving changes to the PCC 3200, to write the changes from the base board to the GLC.

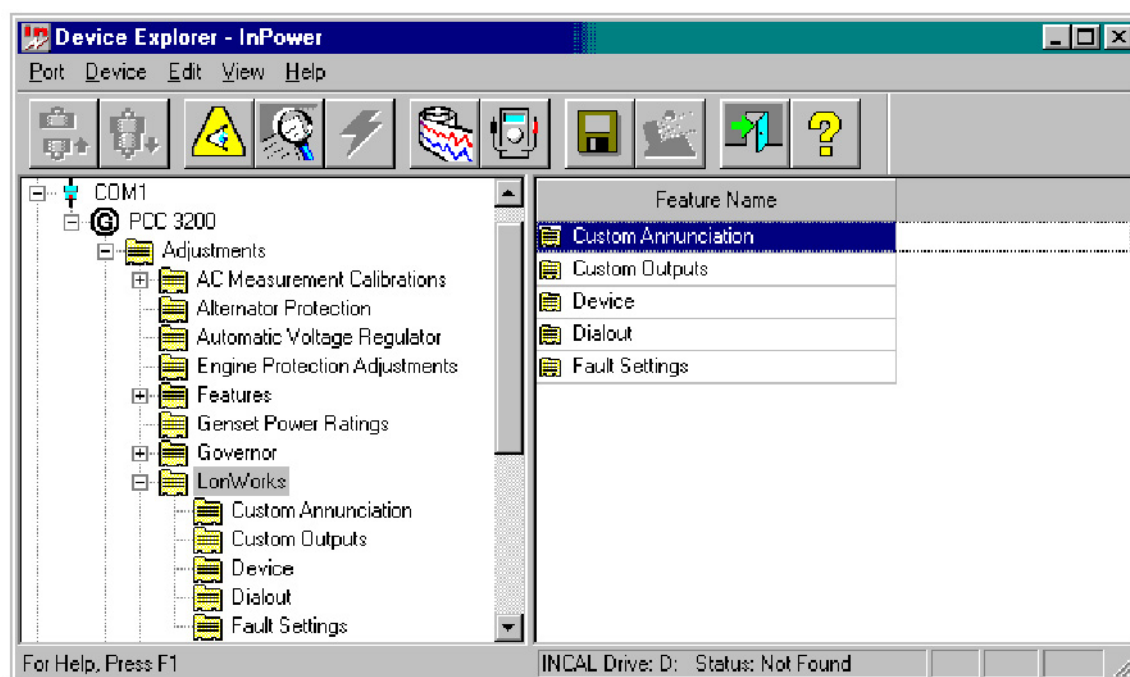


FIGURE 270. LONWORKS - PCC 3200

27.3.1 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 271](#)). 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.

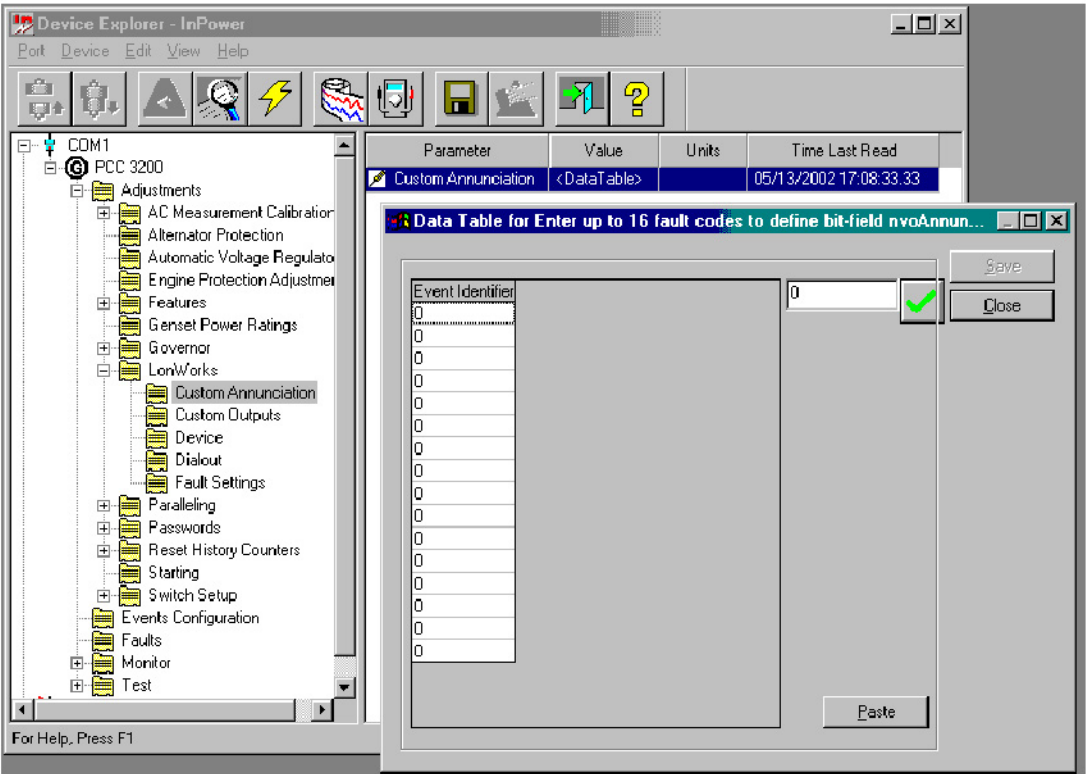


FIGURE 271. LONWORKS - PCC 3200 CUSTOM ANNUNCIATION

27.3.2 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. 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.

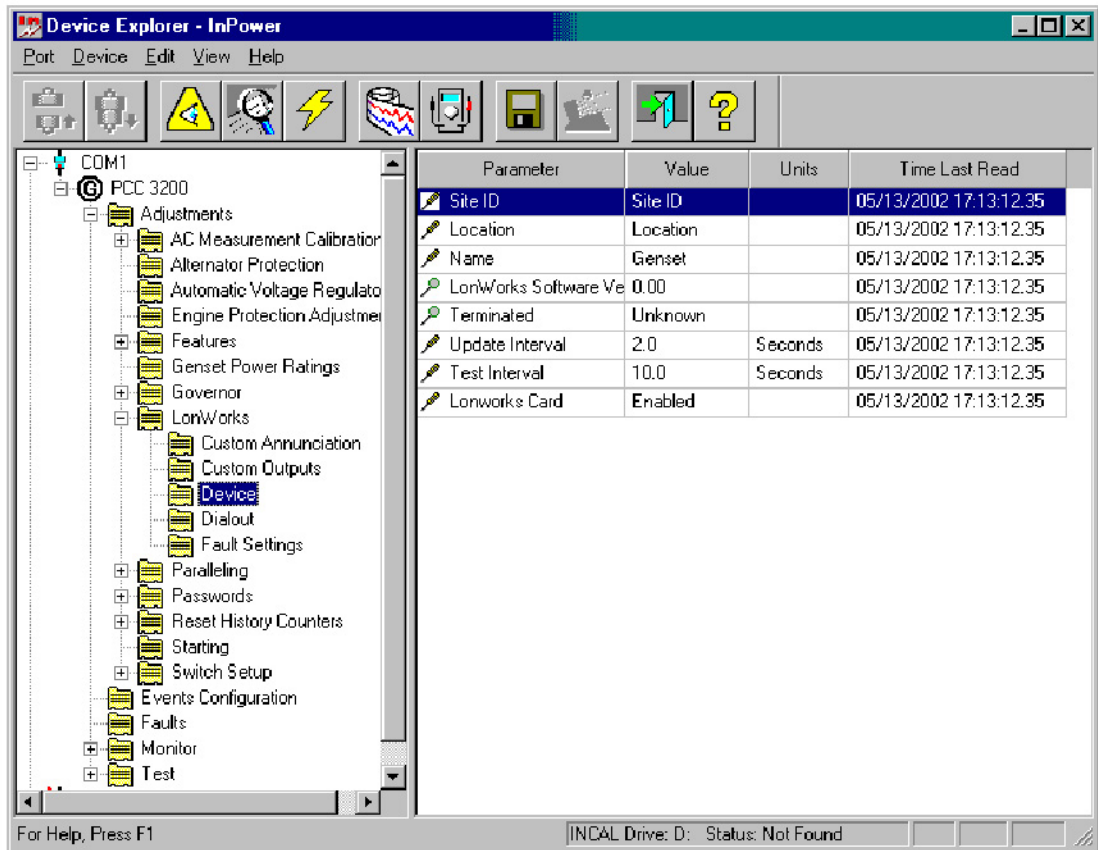


FIGURE 272. LONWORKS - PCC 3200 DEVICE

27.3.3 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.

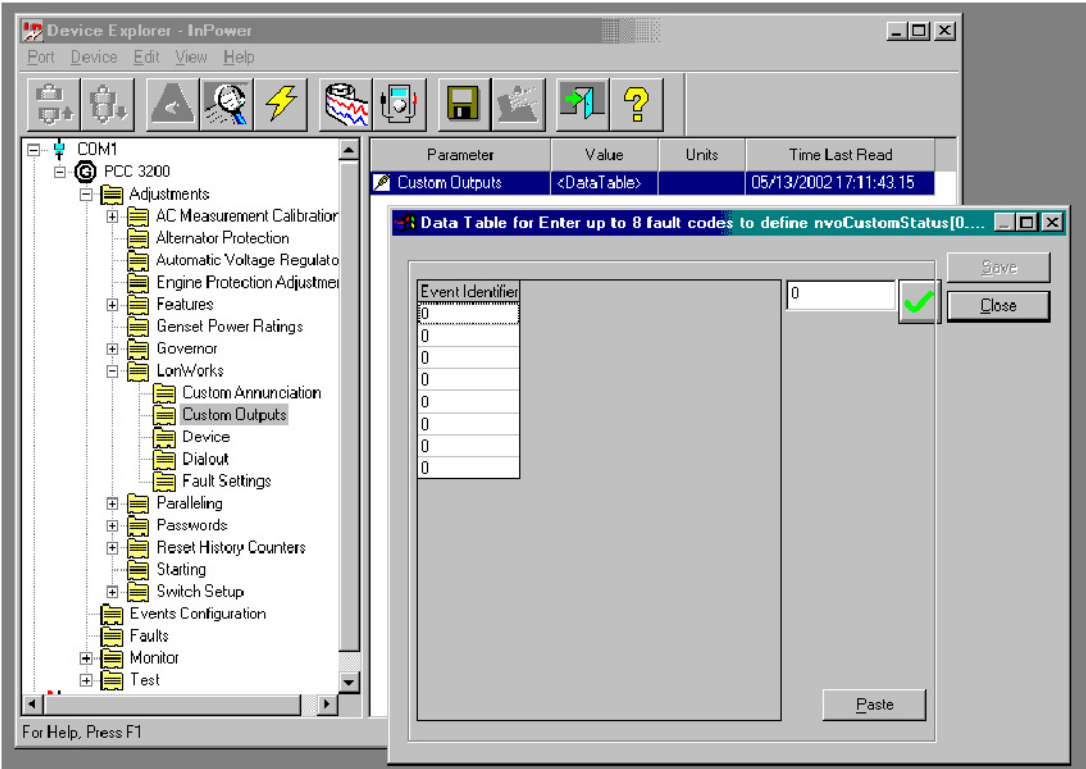


FIGURE 273. LONWORKS - PCC 3200 CUSTOM OUTPUTS

27.3.4 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.

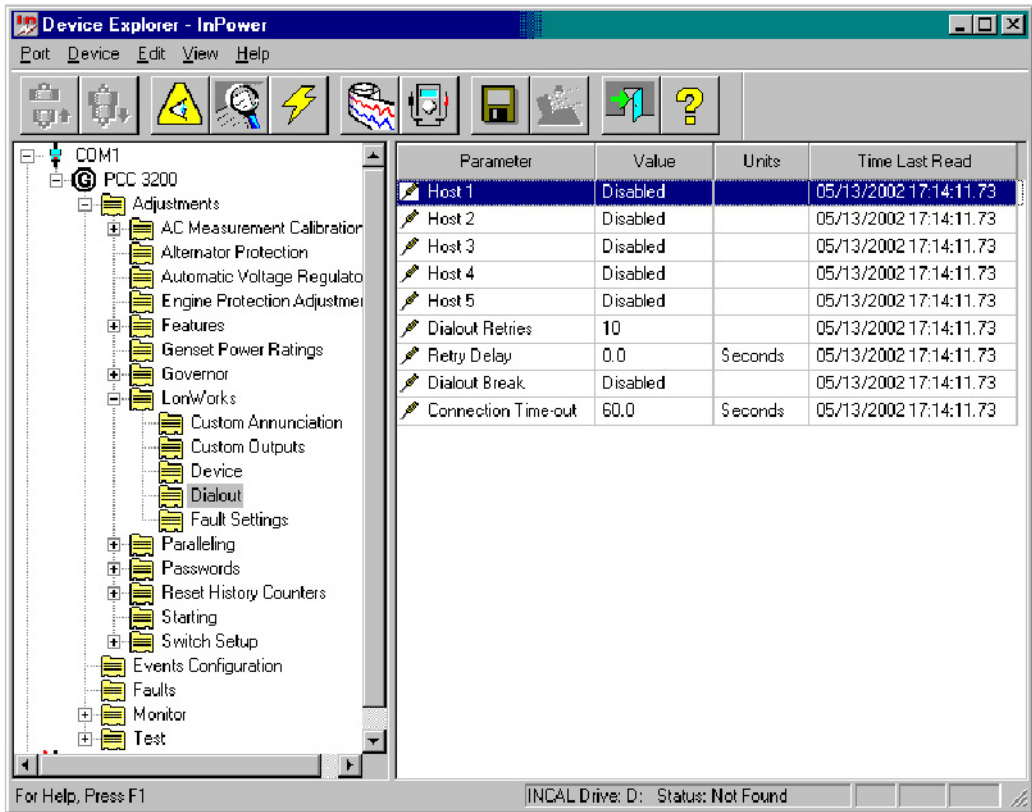


FIGURE 274. LONWORKS - PCC 3200 DIALOUT

27.3.5 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.

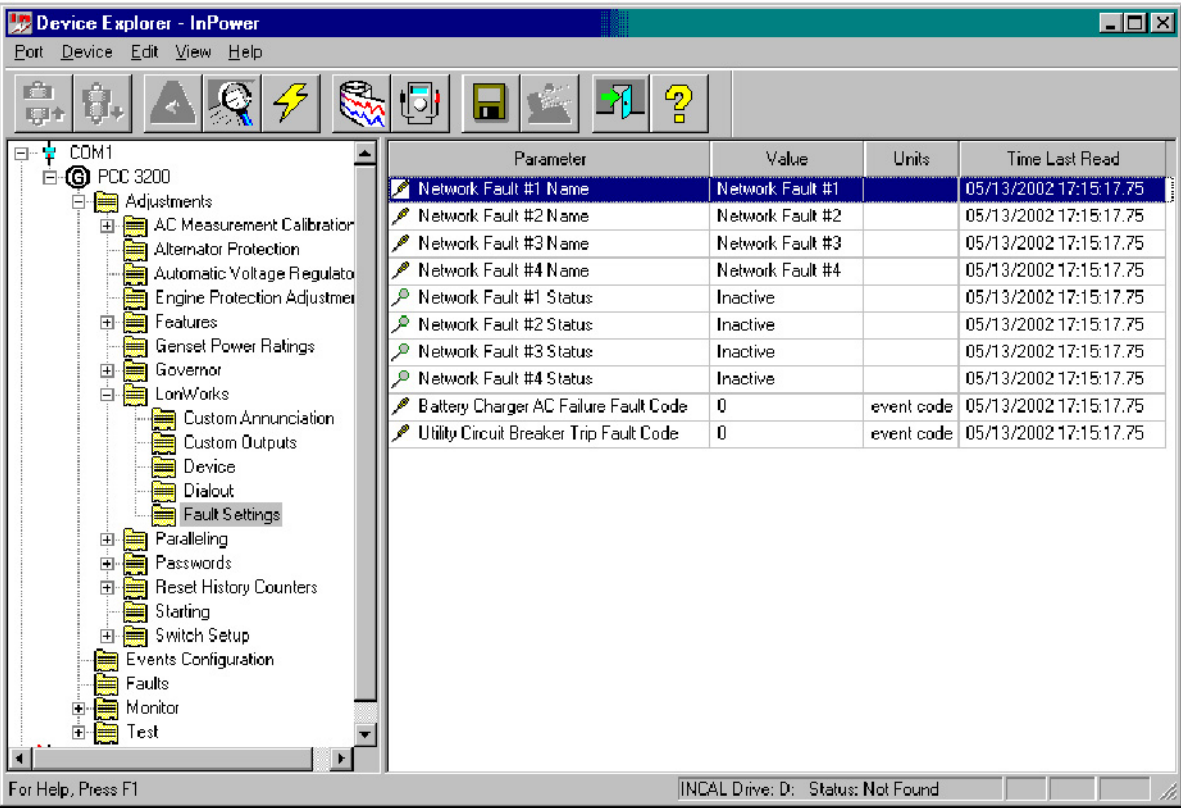


FIGURE 275. LONWORKS - PCC 3200 FAULT SETTINGS

27.3.6 PCC 3200 Events Configuration

When setting up the network settings for a PCC 3200 control, refer to the **Events Configuration** folder (Figure 276).

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.

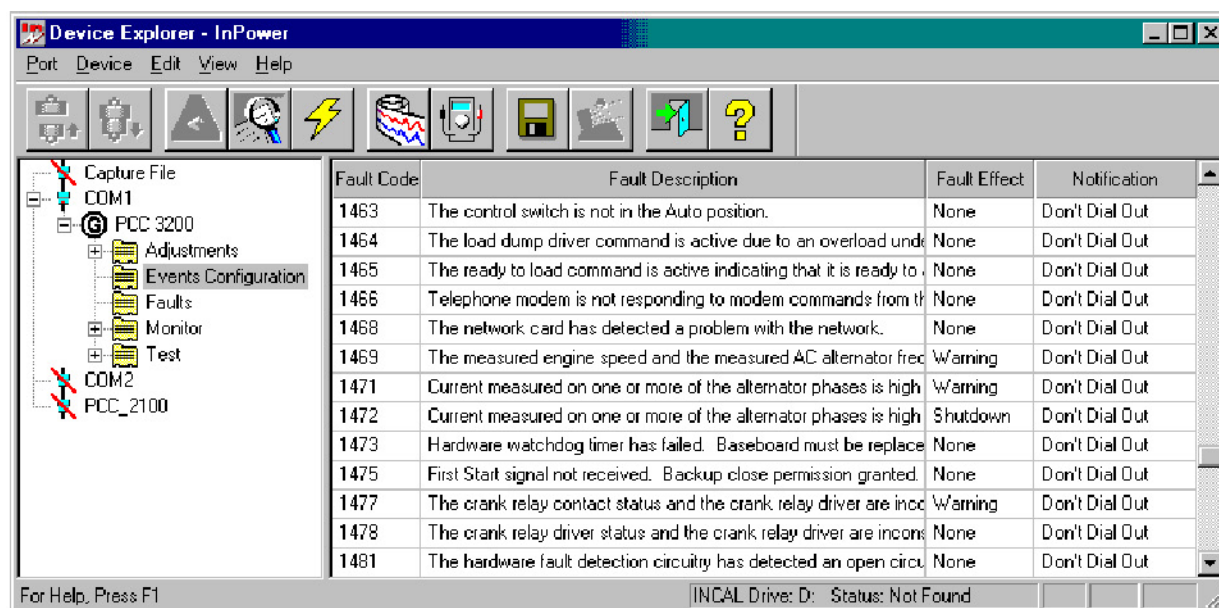


FIGURE 276. PCC 3200 - EVENT CONFIGURATION

27.4 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 ATS Site by double clicking on the site. Make sure the COM port used during Site Addition is still valid. Otherwise, you can remove the existing Site using the **Remove Site** menu on the Right click of the Site and then add a fresh site.

Open the **Adjustments** folder, and then the **LonWorks** folder (Figure 277). 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.

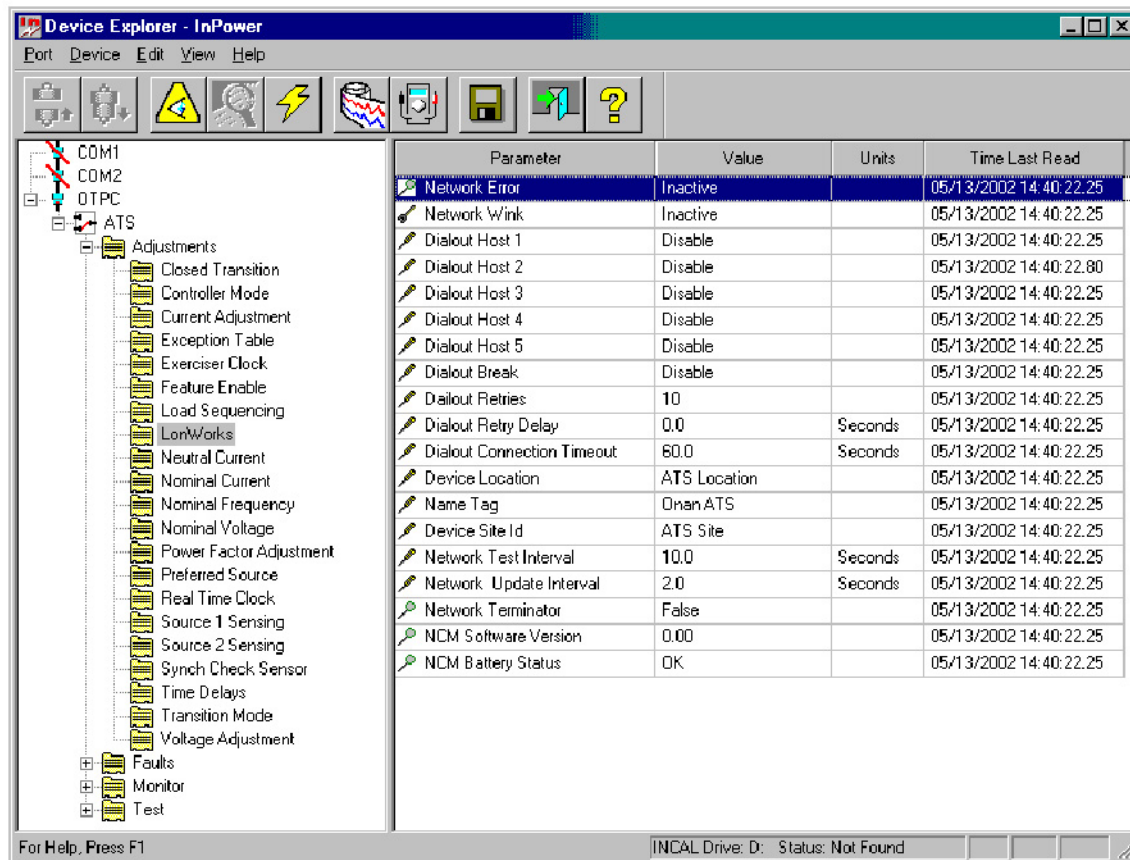


FIGURE 277. LONWORKS - PCC ATS

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.

27.4.1 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 278](#)).

Review the last three columns of value settings. Dialout Active needs to be set to **True**, before an event will dial out when it goes active. The Dialout Inactive must be set to **True**, to dial out when the event goes Inactive.

| Event Code | Event Description | Occurrences | Last Occurrence | Last On 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 | 228765 | Event | High | False | False | False | Active |
| 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 | Active |
| 106 | Test Start A | 22 | 01/01/2000 00:37:41 | 222967 | Event | Low | False | False | False | Active |
| 107 | Emergency Start B | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | False | False | False | Active |
| 108 | Test Start B | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | False | False | False | Active |
| 109 | TD Engine Start A | 79 | 01/01/2000 00:01:46 | 228767 | Event | Low | False | False | False | Active |
| 111 | TD Engine Start B | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | False | False | False | Active |
| 112 | TD Transfer | 39 | 01/01/2000 01:01:58 | 222992 | Event | Low | False | False | False | Active |
| 113 | TD Retransfer | 32 | 01/01/2000 02:10:31 | 223000 | Event | Low | False | False | False | Active |
| 114 | Engine CoolDown A | 60 | 01/01/2000 00:06:43 | 228767 | Event | Low | False | False | True | Active |
| 115 | Program Transition | 18 | 01/01/2000 00:01:18 | 228767 | Event | Low | False | False | False | Active |
| 116 | Transfer Pending | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | False | False | False | Active |
| 117 | Test In Progress | 23 | 01/01/2000 00:37:31 | 222967 | Event | Low | False | False | False | Active |
| 118 | Exercise Active | 2 | 09/14/2001 09:30:14 | 216133 | Event | Low | False | False | False | Active |
| 119 | Snch Check Active | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | False | False | False | Active |
| 121 | S1 Under Voltage | 53 | 01/01/2000 00:01:43 | 228767 | Event | Low | False | False | False | Active |
| 122 | S1 Over Voltage | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | False | False | False | Active |
| 123 | S1 Frequency Fail | 11 | 01/01/2000 00:01:47 | 228767 | Event | Low | False | False | False | Active |
| 124 | S1 Loss Phase | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | True | False | False | Active |
| 125 | S1 Imbalance Fail | 0 | 01/01/1900 00:00:00 | 0 | Event | Low | True | False | False | Active |
| 126 | S2 Under Voltage | 17 | 01/01/2000 00:00:10 | 228765 | Event | Low | False | False | False | Active |

FIGURE 278. FAULTS - EVENT CONFIGURATION - PCC ATS

28 Core II ECM Engine Protection Witness Test Procedure

28.1 Adding a Core II ECS Site from InPower

28.1.1 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 279](#)).
2. From the **Products** list, select *CORE II ECS* ([Figure 280](#)). 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 281](#)).
4. Select the *Adapter* to be used ([Figure 282](#)).
5. Select the COM port to be used ([Figure 283](#)).

NOTICE

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 284](#)).
7. Select **OK** to Add the site. The site will be added to the list of devices/ports ([Figure 285](#)).

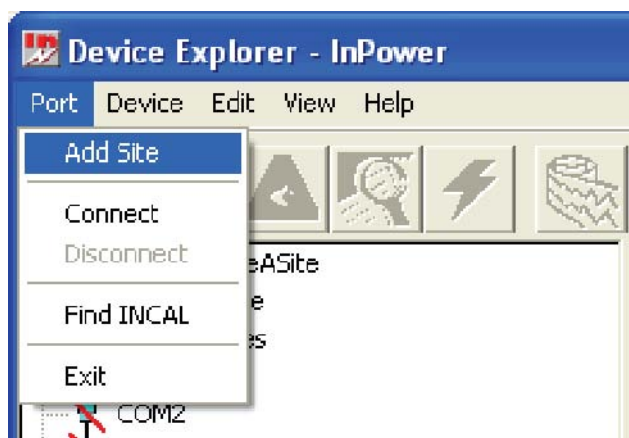
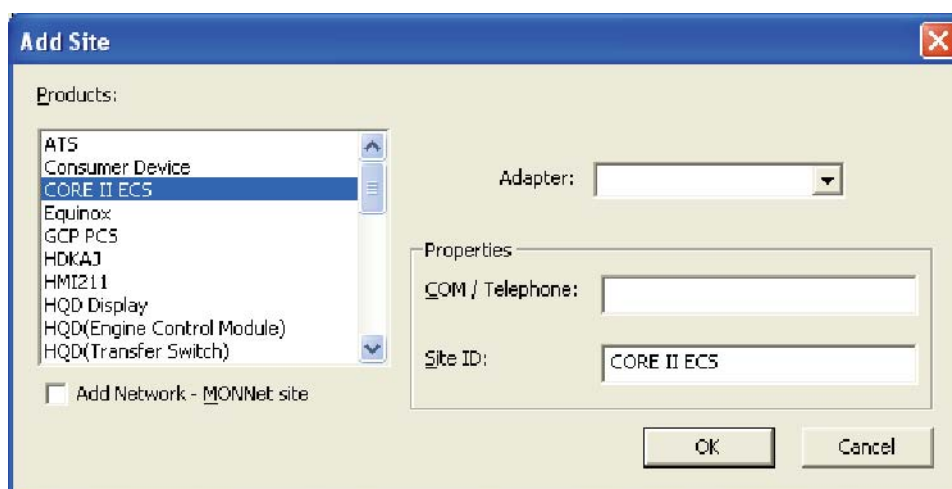
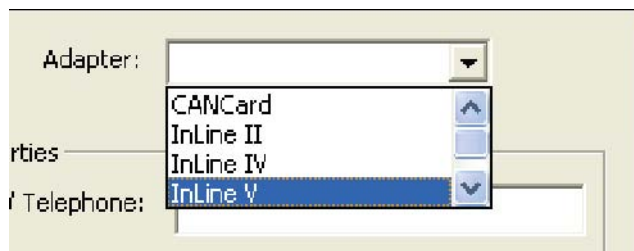
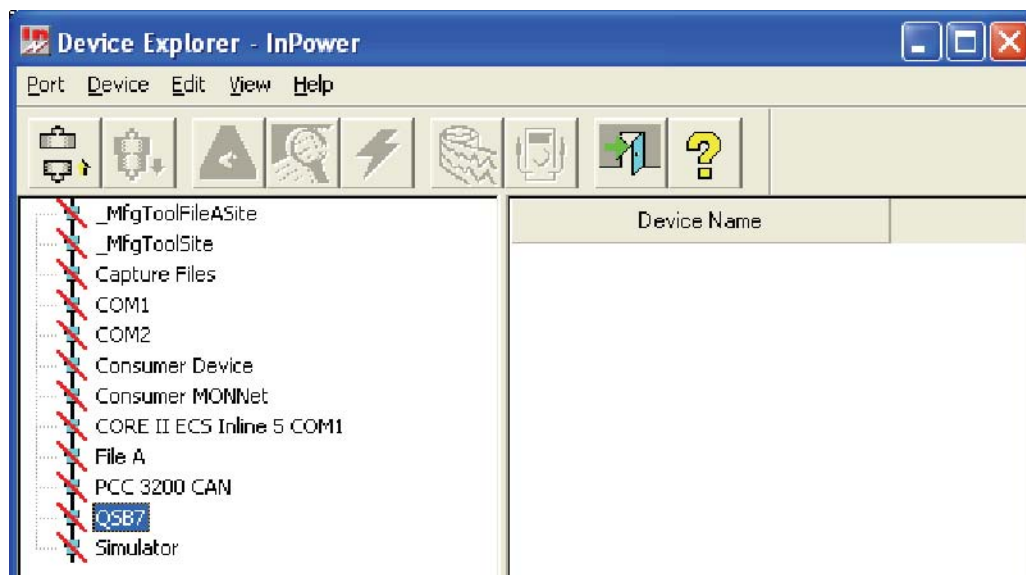


FIGURE 279. ADDING A SITE

**FIGURE 280. SELECTING A PRODUCT****FIGURE 281. INSTALLATION OF DRIVERS REMINDER****FIGURE 282. SELECTING AN ADAPTER****FIGURE 283. SELECTING A COM PORT**

**FIGURE 284. NAMING THE SITE ID****FIGURE 285. ADDED SITE**

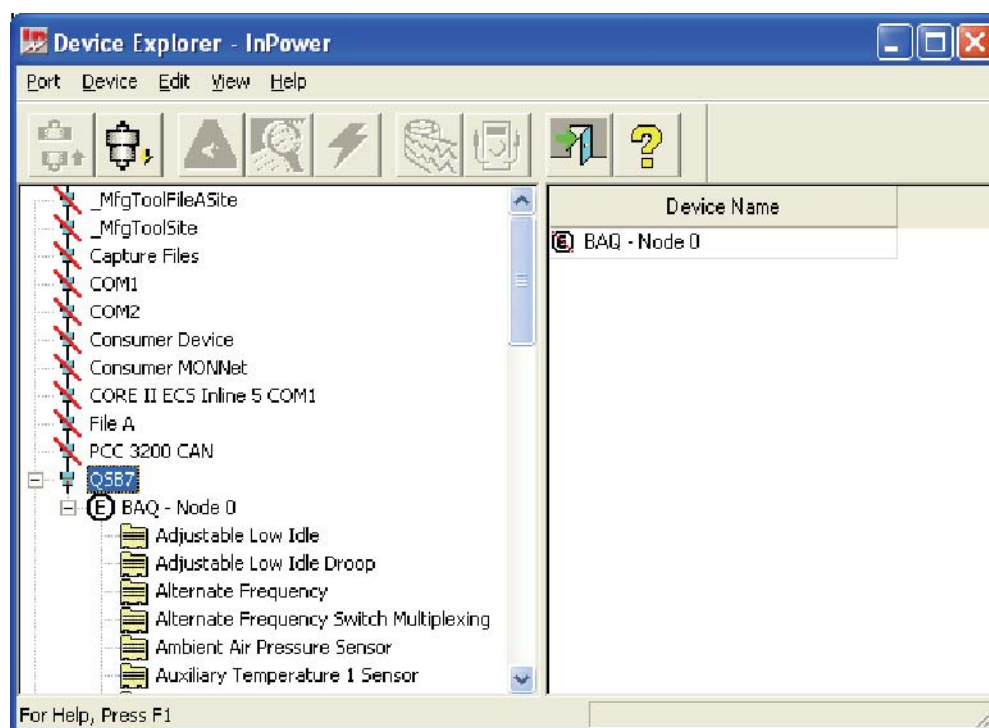


FIGURE 286. CONNECTING TO THE QSB7 SITE

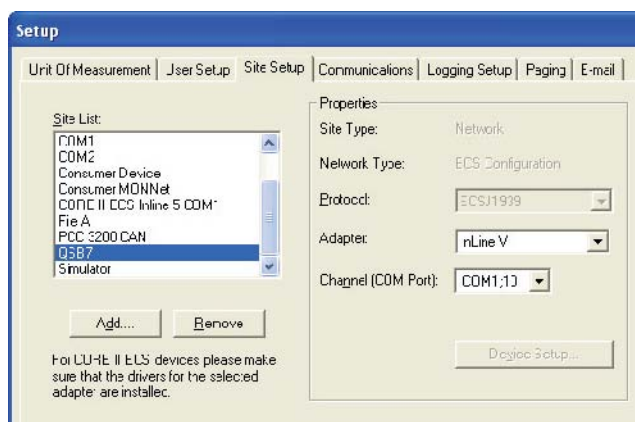
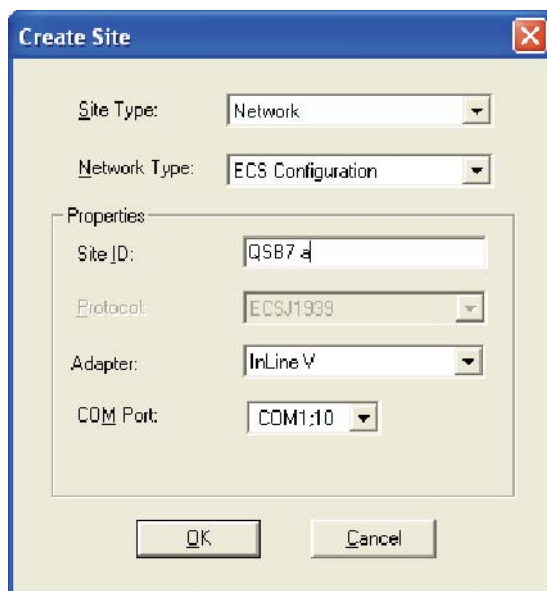
28.1.2 Adding a Site Using the Setup Menu

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 287](#)).
2. Select a site from the Site List and click on **Add**.
3. The Create Site window is displayed ([Figure 288](#)). 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 289](#)).

NOTICE

If there is only one ECM it will be connected by default.

**FIGURE 287. THE SETUP WINDOW****FIGURE 288. ADDING SITE INFORMATION**

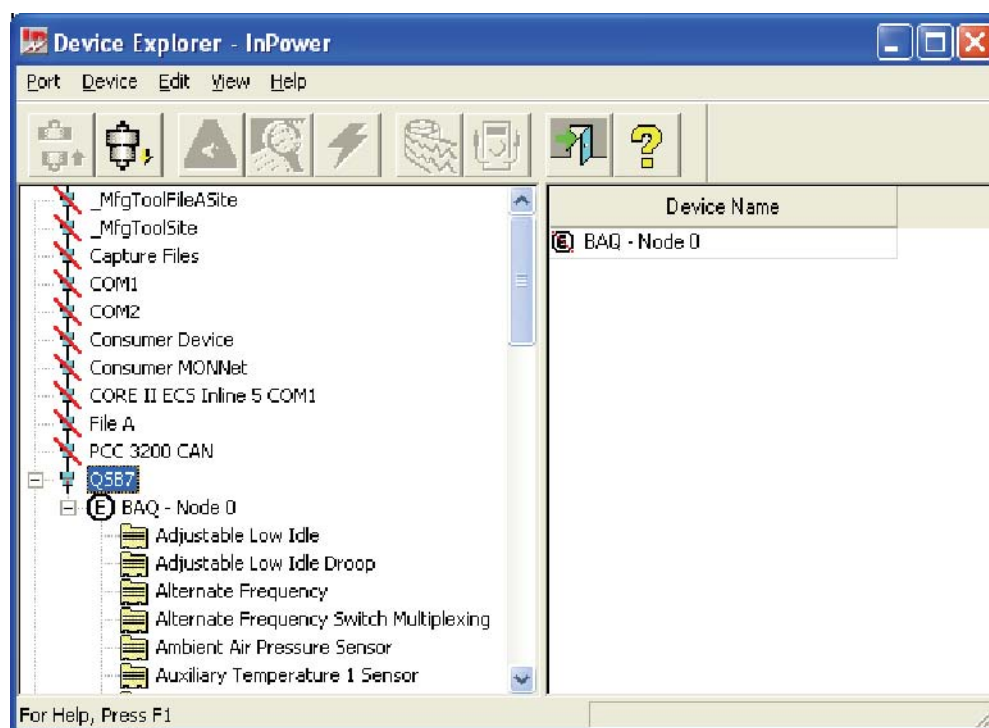


FIGURE 289. CONNECTING TO THE QSB7 SITE

28.2 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**.

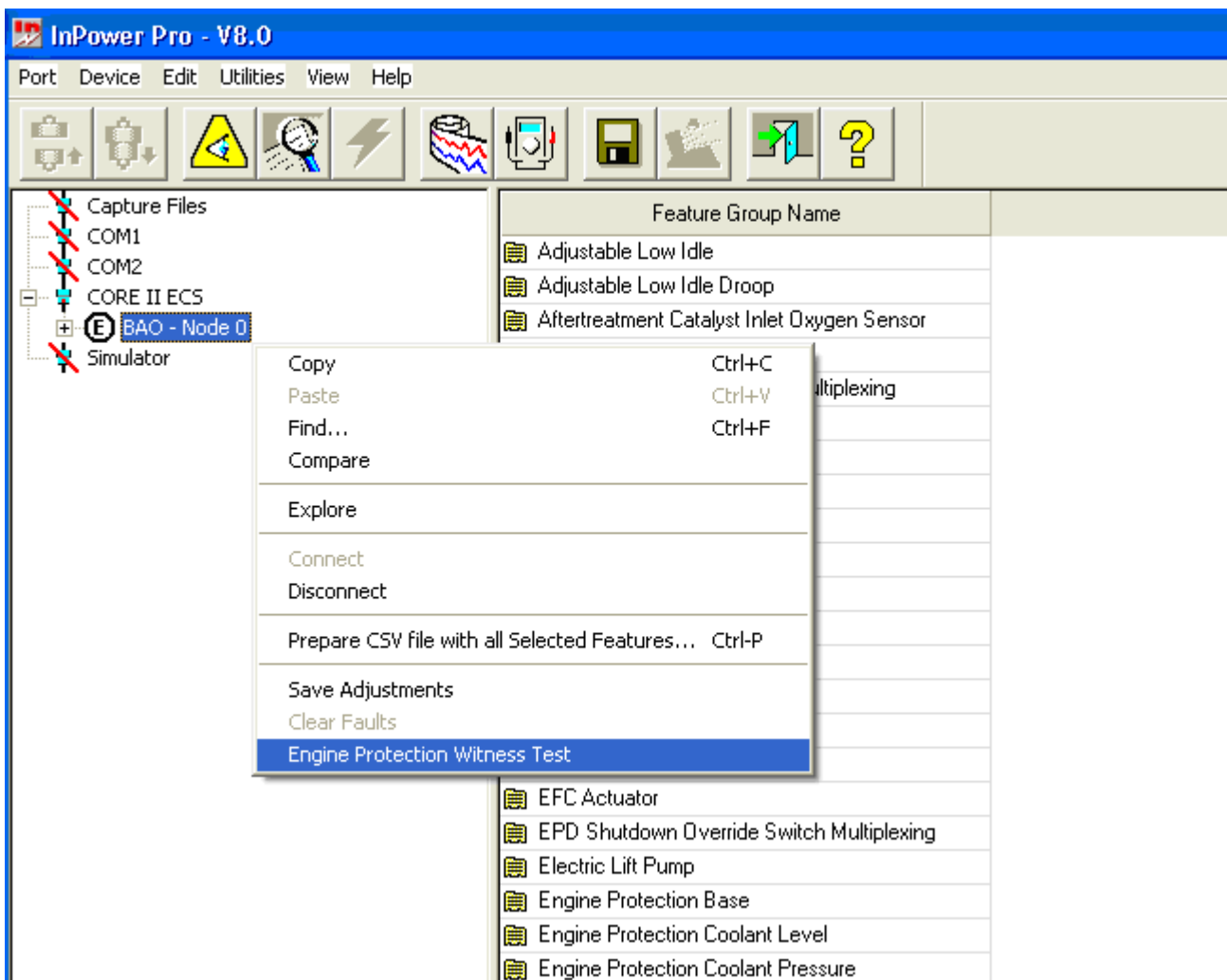


FIGURE 290. STARTING AN ENGINE PROTECTION WITNESS TEST BY RIGHT-CLICKING

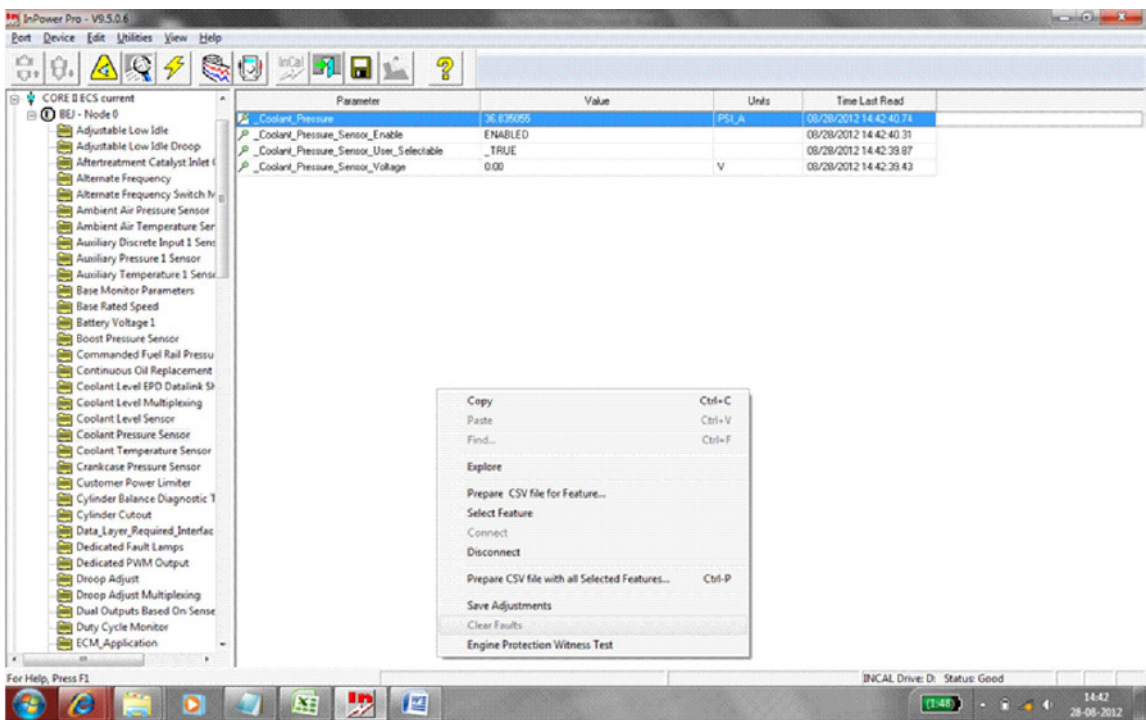


FIGURE 291. STARTING AN ENGINE PROTECTION WITNESS TEST USING THE DEVICE MENU

Use the **Engine Protection Witness Test** dialog to execute the witness test.

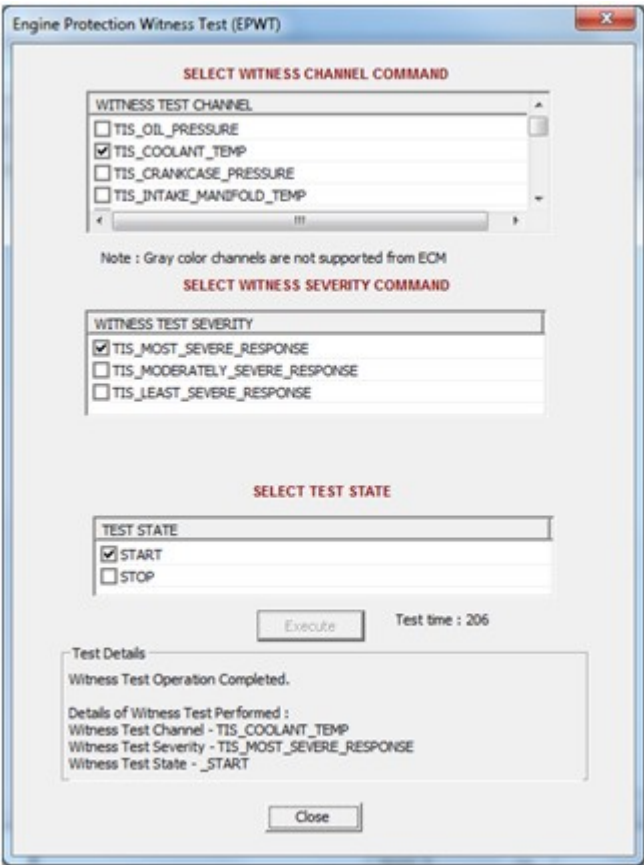


FIGURE 292. ENGINE PROTECTION WITNESS TEST

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.

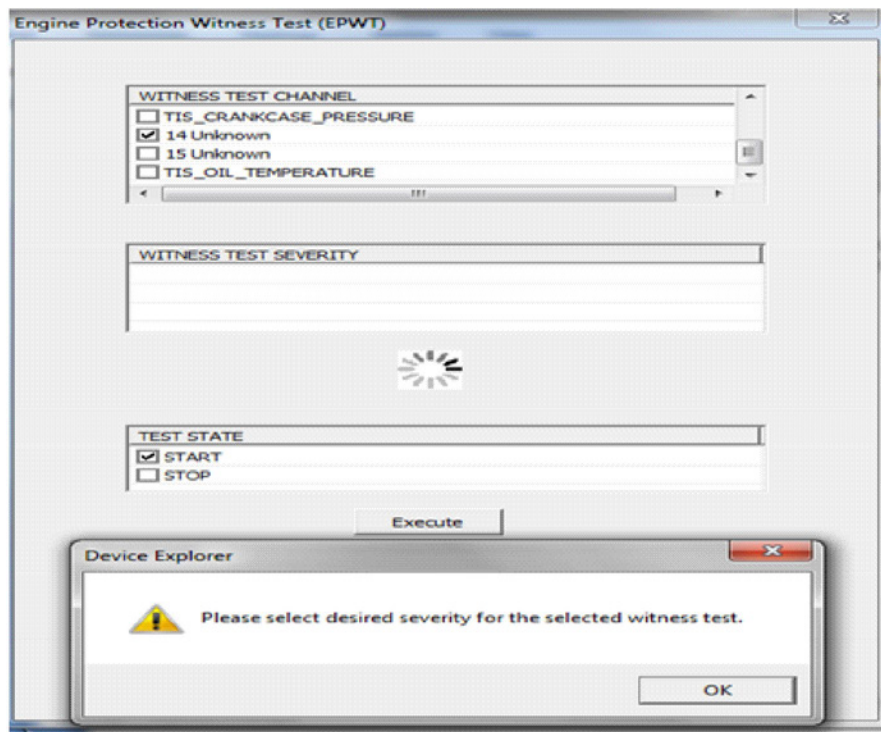


FIGURE 293. ENGINE PROTECTION WITNESS TEST FOR UNKNOWN OR UNDEFINED CHANNELS

This page is intentionally blank.

29 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.

29.1 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... .

29.2 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.

29.3 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.

29.4 InPower Technical Support

The InPower Support team is available for InPower technical support and assistance. One can reach InPower Support group by sending an email to InPower.Support@cummins.com for faster assistance. The support group can help you with the following:

- Authorization of InPower Code
- Payment related queries if any for order processing
- Download of Installation media
- Installation of InPower
- Any issue with usage of the software and all related utilities
- License related issues or queries

Note that, the InPower team may not be able to give you quick answers on System level queries. However, these requests are forwarded to the right point of contact within the Cummins Systems & Software Engineering Group.

29.5 About InPower

The Help - About InPowerPro feature initiates the About InPower Dialog 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....

This page is intentionally blank.

30 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 generator set.

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, Generator set 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 generator set 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. generator set 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.

31 Adjustment and Test Descriptions

This section describes the engine adjustment features followed by the engine test and fault simulation features.

31.1 Engine Protection Adjustments

31.1.1 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.

31.1.2 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.

31.1.3 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.

31.1.4 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.

31.1.5 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.

31.1.6 Visual Aids

None

31.2 Adjustments – Features - Centinel

31.2.1 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.

31.2.2 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.

31.2.3 Interaction with other Features and Parameters

This feature is used in conjunction with the **Adjustments – Features – CORS** feature.

31.2.4 Special Instructions

None

31.2.5 Possible Customer Complaints

None

31.2.6 Visual Aids

None

31.2.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.3 Adjustments – Features - CORS

31.3.1 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.

31.3.2 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.

31.3.3 Interaction with other Features and Parameters

This feature is used in conjunction with the **Adjustments – Features – Centinel** feature.

31.3.4 Special Instructions

None

31.3.5 Possible Customer Complaints

None

31.3.6 Visual Aids

None

31.3.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.4 Adjustments – Features – Fuel Lift Pump

31.4.1 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.

31.4.2 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.

31.4.3 Interaction with other Features and Parameters

None

31.4.4 Special Instructions

None

31.4.5 Possible Customer Complaints

None

31.4.6 Visual Aids

None

31.4.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | No |
| QST30 | Yes |
| QSK23 | No |
| QSK50 | No |
| QSK60 | No |
| QSK78 | No |

31.5 Adjustments - Features - Inputs

31.5.1 Feature Description

This feature allows the tool user to enable/disable and monitor OEM inputs to the ECM.

31.5.2 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.

31.5.3 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.

31.5.4 Special Instructions

None

31.5.5 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.

31.5.6 Visual Aids

None

31.5.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.6 Adjustments - Features – Meter Drivers

31.6.1 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.

31.6.2 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.

31.6.3 Interaction with other Features and Parameters

None

31.6.4 Special Instructions

None

31.6.5 Possible Customer Complaints

None

31.6.6 Visual Aids

31.6.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.7 Adjustments – Features – Power Limiter

31.7.1 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.

31.7.2 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.

31.7.3 Interaction with other Features and Parameters

None

31.7.4 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.

31.7.5 Possible Customer Complaints

None

31.7.6 Visual Aids

None

31.7.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.8 Adjustments – Features – Relay Drivers

31.8.1 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.

31.8.2 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.

31.8.3 Interaction with other Features and Parameters

None

31.8.4 Special Instructions

None

31.8.5 Possible Customer Complaints

None

31.8.6 Visual Aids

None

31.8.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.9 Adjustments – Features – Shutdown Override

31.9.1 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.

31.9.2 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.

31.9.3 Interaction with other Features and Parameters

None

31.9.4 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.

31.9.5 Possible Customer Complaints

None

31.9.6 Visual Aids

None

31.9.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.10 Adjustments – Governor - Frequency

31.10.1 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.

31.10.2 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.

31.10.3 Interaction with other Features and Parameters

None

31.10.4 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.

31.10.5 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.

31.10.6 Visual Aids

None

31.10.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.11 Adjustments – Governor – Gain and Droop

31.11.1 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.

31.11.2 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.

31.11.3 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.

31.11.4 Special Instructions

None

31.11.5 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.

31.11.6 Visual Aids

None

31.11.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.12 Adjustments – Governor – Idle and Ramping

31.12.1 Feature Description

This feature allows the tool user to set engine idle speed and ramp times for transition between starting, idle and rated speeds.

31.12.2 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.

31.12.3 Interaction with other Features and Parameters

None

31.12.4 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.

31.12.5 Possible Customer Complaints

None

31.12.6 Visual Aids

None

31.12.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.13 Adjustments – Passwords – Change Passwords

31.13.1 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.

31.13.2 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.

31.13.3 Interaction with other Features and Parameters

None

31.13.4 Special Instructions

None

31.13.5 Possible Customer Complaints

None

31.13.6 Visual Aids

None

31.13.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.14 Adjustments – Passwords – Clear Passwords

31.14.1 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.

31.14.2 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.

31.14.3 Interaction with other Features and Parameters

None

31.14.4 Special Instructions

None

31.14.5 Possible Customer Complaints

None

31.14.6 Visual Aids

None

31.14.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.15 Adjustments – Passwords – Enter Passwords

31.15.1 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.

31.15.2 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.

31.15.3 Interaction with other Features and Parameters

None

31.15.4 Special Instructions

Loss of battery power will cause the need for these passwords to be re-entered.

31.15.5 Possible Customer Complaints

None

31.15.6 Visual Aids

None

31.15.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.16 Adjustments – Reset History Counters – Fuel

31.16.1 Feature Description

This feature allows the user to reset and monitor various engine history timers.

31.16.2 Adjustable Parameters

Name: Cumulative Fuel Consumption

Range: Gallons

Description: Total fuel consumed over the life of the engine. This parameter cannot 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.

31.16.3 Interaction with other Features and Parameters

The ECM and fuel history data can also be viewed in the **Monitor – History – Run History** feature.

31.16.4 Special Instructions

None

31.16.5 Possible Customer Complaints

None

31.16.6 Visual Aids

None

31.16.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.17 Adjustments – Starting

31.17.1 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.

31.17.2 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.

31.17.3 Interaction with other Features and Parameters

None

31.17.4 Special Instructions

None

31.17.5 Possible Customer Complaints

None

31.17.6 Visual Aids

None

31.17.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.18 Faults

31.18.1 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.

31.18.2 Adjustable Parameters

None

31.18.3 Interaction with other Features and Parameters

None

31.18.4 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.

31.18.5 Possible Customer Complaints

None

31.18.6 Visual Aids

None

31.18.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK60 | Yes |
| QSK78 | Yes |

31.19 Monitor - About

31.19.1 Feature Description

This feature allows the user to view the Engine and calibration specifications as programmed at the factory.

31.19.2 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.

31.19.3 Interaction with other Features and Parameters None

31.19.4 Special Instructions None

31.19.5 Possible Customer Complaints None

31.19.6 Visual Aids None

31.19.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.20 Monitor – Control – Starting / Stopping

31.20.1 Feature Description

This feature group displays the current settings related to engine starting, stopping and status of the current run command.

31.20.2 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.

31.20.3 Interaction with other Features and Parameters

None

31.20.4 Special Instructions

None

31.20.5 Possible Customer Complaints

None

31.20.6 Visual Aids

None

31.20.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.21 Monitor – Engine Data – Centinel

31.21.1 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.

31.21.2 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.

31.21.3 Interaction with other Features and Parameters

None

31.21.4 Special Instructions

None

31.21.5 Possible Customer Complaints

None

31.21.6 Visual Aids

None

31.21.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.22 Monitor – Engine Data – Fuel Use

31.22.1 Feature Description

This feature will display the parameters associated with fuel consumption.

31.22.2 Adjustable Parameters

Name: Cumulative Fuel Consumption

Range: Gallons

Description: Total fuel consumed over the life of the engine. This parameter cannot 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.

31.22.3 Interaction with other Features and Parameters

None

31.22.4 Special Instructions

None

31.22.5 Possible Customer Complaints

None

31.22.6 Visual Aids

None

31.22.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.23 Monitor – Engine Data – Governing

31.23.1 Feature Description

This feature will display the parameters associated with engine speed governing.

31.23.2 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.

31.23.3 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.

31.23.4 Special Instructions

None

31.23.5 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.

31.23.6 Visual Aids

None

31.23.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.24 Monitor – Engine Data – Priming

31.24.1 Feature Description

This feature is used to monitor the status of the priming pump driver.

31.24.2 Adjustable Parameters

Name: Priming Pump Driver

Range: On / Off

Description: Displays the status of the Priming Pump Driver.

31.24.3 Interaction with other Features and Parameters

None

31.24.4 Special Instructions

None

31.24.5 Possible Customer Complaints

None

31.24.6 Visual Aids

None

31.24.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | No |

| Product | Feature Available |
|---------|-------------------|
| QSK23 | No |
| QSK50 | No |
| QSK60 | No |
| QSK78 | No |

31.25 Monitor – Engine Data – Sensors / Actuators

31.25.1 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.

31.25.2 Adjustable Parameters

None

31.25.3 Interaction with other Features and Parameters

31.25.4 None

31.25.5 Special Instructions

None

31.25.6 Possible Customer Complaints

None

31.25.7 Visual Aids

None

31.25.8 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.26 Monitor – History – 50 Hz Duty Cycle Histogram

31.26.1 Feature Description

This feature displays the amount of time in hours spent at various load points.

31.26.2 Adjustable Parameters

None

31.26.3 Interaction with other Features and Parameters

The 100% reference point is directly linked to the Power Limiter function. (See **Adjustments – Features – Power Limiter**)

31.26.4 Special Instructions

None

31.26.5 Possible Customer Complaints

None

31.26.6 Visual Aids

None

31.26.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.27 Monitor – History – 60 Hz Duty Cycle Histogram

31.27.1 Feature Description

This feature displays the amount of time spent in hours at various load points.

31.27.2 Adjustable Parameters

None

31.27.3 Interaction with other Features and Parameters

The 100% reference point is directly linked to the Power Limiter function. (See **Adjustments – Features – Power Limiter**)

31.27.4 Special Instructions

None

31.27.5 Possible Customer Complaints

None

31.27.6 Visual Aids

None

31.27.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.28 Monitor – History – Audit Trail

31.28.1 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

31.28.2 Adjustable Parameters

None

31.28.3 Interaction with other Features and Parameters

None

31.28.4 Special Instructions

None

31.28.5 Possible Customer Complaints

None

31.28.6 Visual Aids

None

31.28.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.29 Monitor – History – Engine Protection History

31.29.1 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

31.29.2 Adjustable Parameters

None

31.29.3 Interaction with other Features and Parameters

None

31.29.4 Special Instructions

None

31.29.5 Possible Customer Complaints

None

31.29.6 Visual Aids

None

31.29.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.30 Monitor – History – Run History

31.30.1 Feature Description

The feature allows the user to view the Run History data for service use.

31.30.2 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.

31.30.3 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.

31.30.4 Special Instructions

None

31.30.5 Possible Customer Complaints

None

31.30.6 Visual Aids

None

31.30.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.31 Monitor – OEM Connection – Analog Settings

31.31.1 Feature Description

This feature allows the user to view the analog settings.

31.31.2 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.

31.31.3 Interaction with other Features and Parameters

Potentiometer and Frequency bias inputs must be enabled before use. (See **Adjustments – Features – Inputs**)

31.31.4 Special Instructions

None

31.31.5 Possible Customer Complaints

None

31.31.6 Visual Aids

None

31.31.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.32 Monitor – OEM Connections - Outputs

31.32.1 Feature Description

The tool displays the status of the hardware outputs and LEDs. If configured these outputs can drive a lamp or relay.

31.32.2 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.

31.32.3 Interaction with other Features and Parameters

None

31.32.4 Special Instructions

None

31.32.5 Possible Customer Complaints

None

31.32.6 Visual Aids

None

31.32.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.33 Monitor – OEM Connections – Switch Settings - Other

31.33.1 Feature Description

These parameters allow the user to enable controller diagnostics, reset faults and change engine operating conditions.

31.33.2 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.

31.33.3 Interaction with other Features and Parameters

None

31.33.4 Special Instructions

None

31.33.5 Possible Customer Complaints

None

31.33.6 Visual Aids

None

31.33.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |

| Product | Feature Available |
|---------|-------------------|
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.34 Monitor – OEM Connections – Switch Settings – Start/Stop

31.34.1 Feature Description

This feature provides the capability for the user to use the tool to remotely start and stop the engine.

31.34.2 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.

31.34.3 Interaction with other Features and Parameters

None

31.34.4 Special Instructions

None

31.34.5 Possible Customer Complaints

None

31.34.6 Visual Aids

None

31.34.7 Product Coverage

| Product | Feature Available |
|---------|-------------------|
| QSX15 | Yes |
| QST30 | Yes |
| QSK23 | Yes |
| QSK50 | Yes |
| QSK60 | Yes |
| QSK78 | Yes |

31.35 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.

31.35.1 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.

31.35.2 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.

31.35.3 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.

31.36 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.

31.36.1 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.

- Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HBF Shutdown Threshold Table High Blowby Flow

- Attach the InPower PC to a running engine and connect to the controller.
- 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.
- Double click on the value field for **HBF Shutdown Threshold Table**.
- 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**
- To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
- Fault code 556 will go active and the engine will proceed to shutdown.
- Double click on the value field for **HBF Shutdown Threshold Table** and restore the value to its original setting.
- Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
- Click on the **Clear Faults** button on the tool bar to clear the inactive fault.
- Restart the engine.

31.36.2 How to Perform the Tests - Option 2

HBF Warning Threshold Table High Blowby Flow

- Attach the InPower PC to a running engine and connect to the controller.
- From the device explorer select **Test – Fault Simulation – Engine Protection Test – Blowby Flow - HBF Warning Threshold Table**. Make a note of the current settings.
- 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.
- Double click on the **Blowby Flow Override Enable** value cell. Click on the drop down list arrow and select **Enabled**.
- To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
- The alarm popup will display an active 555 fault.
- Double click on the **Blowby Flow Override Enable** value cell. Click on the drop down list arrow and select **Disabled**.
- Click on the **Save Adjustments** button on the tool bar and the fault will go inactive.
- Click on the **Clear Faults** button on the tool bar to clear the inactive fault.

HBF Shutdown Threshold Table High Blowby Flow

- Attach the InPower PC to a running engine and connect to the controller.
- From the device explorer select **Test – Fault Simulation – Engine Protection Test – Blowby Flow - HBF Shutdown Threshold Table**. Make a note of the current setting.
- 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.

31.37 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.

31.37.1 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.

31.37.2 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.

31.38 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.

31.38.1 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.

31.38.2 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.

31.39 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.

31.39.1 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.

31.39.2 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.

31.40 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.

31.40.1 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 proceed to shutdown.
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.

31.40.2 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.

31.41 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.

31.41.1 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** button.
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.

31.41.2 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.

31.42 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.

31.42.1 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.

31.42.2 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.

31.43 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.

31.43.1 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.

31.43.2 How to Perform the Tests - Option 2

Overspeed Shutdown Threshold (50Hz) or (60Hz)

NOTICE

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.

NOTICE

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.

31.44 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.

31.44.1 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.

NOTICE

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.

31.45 Test – Fuel System Test

31.45.1 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.

NOTICE

Fuel pump faults are suppressed in the Test – Manual mode

31.45.2 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.

31.45.3 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.

31.45.4 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.

31.46 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

31.47 Test – Inputs – Engine Inputs

This feature is used to monitor engine sensor input values. The values are displayed in engineering units and in voltages.

31.48 Test – Inputs – Switches

31.48.1 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.

31.48.2 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.

31.49 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.

31.49.1 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**.

31.50 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.

31.50.1 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.

31.51 Test – Outputs – Fuel Shutoff

This test feature allows the user to view the state of the Fuel Shutoff Valve Driver output.

31.52 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.

31.52.1 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.

31.53 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.

31.53.1 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.

31.54 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.

31.54.1 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.

31.55 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.

31.55.1 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.

31.56 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.

31.57 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.

31.57.1 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.

31.58 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.

31.58.1 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.

31.59 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.

31.59.1 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.

31.60 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.

31.60.1 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.

31.61 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.

31.61.1 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.

31.61.2 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.

31.62 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.

31.62.1 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.

31.63 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.

31.63.1 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.

31.64 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.

31.64.1 How to Perform the Tests - Option 1

Overspeed Shutdown Threshold (50Hz) or (60Hz)

NOTICE

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.

- Restart the engine and acknowledge the fault.

31.64.2 How to Perform the Tests - Option 2

Overspeed Shutdown Threshold (50Hz) or (60Hz)

- Attach the InPower PC to a running engine and connect to the controller.
- From the device explorer select **Test – Speed Override – Engine Speed Reference Override Command**. Make a note of the current setting.
- Double click on the **Engine Speed Reference Override Command** value cell and enter 1700RPM.
- Double click on the **Engine Speed Reference Override Enable** value cell. . Click on the drop down list arrow and select **Enabled**.
- 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.
- Double click on the value field for **Overspeed Shutdown Threshold** and make a note of the current setting.
- Edit the **Overspeed Shutdown Threshold** value field and set it to 1750RPM.
- To temporarily write these values to the device, click on the **Save Adjustments** button on the tool bar.
- Double click on the **Engine Speed Reference Override Command** value cell and enter 1800RPM.
- 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.
- The overspeed detector will trip once it crosses the 1750RPM value and the engine will shutdown.
- Double click on the **Engine Speed Reference Override Enable** value cell. Click on the drop down list arrow and select **Disable**.
- Double click on the **Overspeed Shutdown Threshold** value cell and restore to the original value.
- Double click on the **Engine Speed Reference Override Command** value cell and restore to the original value.
- Click on the **Save Adjustments** button on the tool bar.
- Restart the engine and acknowledge the fault.

NOTICE

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.

This page is intentionally blank.

power.cummins.com

Copyright © 2023 Cummins Inc. All rights reserved.

Cummins, Onan, and the "C" logo are registered trademarks of Cummins Inc. and its subsidiaries.

Other company, product, or service names may be trademarks or service marks of others.

Specifications are subject to change without notice.

