



INSITE™

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COURSE INTRODUCTION

This program is an introduction to navigating the INSITE™ software in an instructor led lab environment. We will be using lab computers with 8.0 or later INSITE™ in a simulator mode to follow along and practice accessing the many features of this diagnostic software.

INSITE™ is the diagnostic service tool developed by Cummins to aid in the troubleshooting and diagnosis of the Cummins Electronic Engine Control Systems. This PC based software allows the technician to monitor the engine in the stall or on the road with accurate information and procedures to ensure proper maintenance and repair of these high technology engines.

INSITE™ is available with four levels. However at the consumer level, we will generally work with the Basic and Lite versions. Basic is read only access while the Lite version has features such as erasing fault codes, resetting fuel tables and adjusting certain parameters. INSITE™ is a dynamic program with regular updates. Each new edition will have changes and improvements to the features; however, the basic functions will remain. The instructor will show you how to follow these changes.

This student lab guide contains the exercises we will be working on in class. The program is arranged with the instructor leading you through various features of the software while the student follows along and practices with directed lab exercises. On-engine practice is included when time and equipment availability allows.

For many, this is a first exposure to this diagnostic tool and further practice will improve proficiency. Additional training and practice with the specific engines that are present in your fleet will be beneficial. For reference, an electronic copy of the presentation providing step-by-step, on-screen instructions, is available for this program. It includes an index to the start page of the features presented during class. This will be a beneficial aid for use back at the shop to refresh your memory of the steps.



INSITE™ Activity 1.1 Fault Codes

Tools and equipment:

1. Lap-top with INSITE™ Software

Procedures:

1. Open Fault Codes on INSITE™ in the simulator mode

How many active codes are there? _____

How many inactive codes are there? _____

Can you clear them? _____ YES/NO _____

If not, why? _____

2. Look up Fault I45. Is it active or inactive? _____

It has been present for how many key cycles? _____

Is there a MIL lamp lit for this fault? Color? _____

Was the engine warm on the first occurrence of this fault? _____ YES/NO _____

Was the engine warm on the last occurrence of this fault? _____ YES/NO _____

What is the engine speed? _____

I am performing troubleshooting Step 2B and get 3.5K ohms during the 43rd key cycle.

Is this reading within specs? _____ YES/NO _____

3. Look up fault I22

Is the driver's foot on the brake? _____ YES/NO _____

Is the driver's foot on the gas? _____ YES/NO _____

Is the driver's foot on the clutch? _____ YES/NO _____

Is the engine idling? _____ YES/NO _____

Is the engine under a heavier load at first or last occurrence? _____

What parameters tell us this? _____

Does the Fuel Control Valve indicate a heavier load? _____ YES/NO _____

4. Look up fault 441

What is the description for this code? _____

What was the Battery Voltage on the first count? _____

What was Sensor Supply 1 Voltage? _____ What was Sensor Supply 2 Voltage? _____

What was Sensor Supply 3 Voltage? _____ What was Sensor Supply 5 Voltage? _____

What was Sensor Supply 6 Voltage? _____ What was the Battery Voltage? _____

Bonus Question: Is the vehicle in Park or Drive? _____



INSITE™ Activity 1.2 Custom Parameters Lab

Tools and equipment:

1. Lap-top with INSITE™ Software

Procedures:

1. Enter Data Monitor and Delete all existing custom groups
2. Create a Group Called Fuel Lists And Add The Following Parameters:
 - Engine Speed
 - Fuel Supply Pressure
 - Fuel Control Valve Intake Pressure
 - Mass Gas Flow
 - Mass Air Flow
 - Aftertreatment Catalyst Intake Oxygen Concentration
3. Create a Group Called Boost and add the Following Parameters:
 - Engine Speed
 - Intake Manifold Pressure
 - Percent Load
 - Throttle Plate Position Command
 - Turbocharger Compressor Intake Pressure
 - Turbocharger Compressor Outlet Pressure
 - Wastegate Control Valve Command
 - Misfire Percentage on Cylinder I
4. Rename the Group called Fuel Lists to Fuel List
 - Edit the Boost Group and remove “Misfire Percentage on Cylinder I” from the group list
5. Create a Group Called EGR Test And Add The Following Parameters:
 - EGR Cooler Efficiency
 - EGR Differential Pressure
 - EGR Differential Pressure Sensor Voltage
 - EGR Temperature
 - EGR Valve Position Command
 - EGR Valve Position Measured (Percent Open)



INSITE™

Activity 1.2.1

Data Logging Lab Exercise

Tools and equipment:

1. Lap-top with INSITE™ Software
2. Excel Software in your laptop

Step 1: Choose the ISL-G Simulator connection dropdown box and connect to ECM.

Step 2: Click on and open Data Monitor/Logger.

1. Select Custom Parameters
2. Choose your Fuel List

Step 3: Select the Sample Rate Option from the tool bar and change to “Real Time”.

Step 4: Click on the Log Icon in the tool bar - you should see the log indicator at the bottom right side of screen. On Simulator, record a log for 1 minute and then save log.

Step 5: Your Logged Data box should now have appeared on the desktop.

1. Choose desktop for your “save-as” location.
2. Put “Fuel Log” in the File Name.
3. Choose Comma Separated Files (CSV) in “File Type”.
4. In the Log File Comments Box enter “engine has low power”.

Step 6: Select the Sample Rate Option from the tool bar and change to 2 seconds.

Step 7: Go to to Custom Parameters again and this time choose your Boost Parameters and follow steps 4-5 using “Boost Log” as your file name.

Step 8: You should find the log files you created on the desktop of the computer you are using. They should have been saved in an Excel format “open files” to review data.

1. Click on number 21 in the right column of numbers to highlight.
2. Right click and from dropdown box, choose format cells.
3. On top of the box, choose Alignment.
4. Under Text Control, choose Wrap Text.
5. In the Orientation box to the right ,click on the end of the line and push it straight up, then click okay at the bottom.

Step 9: You can now read the heading of each column. You can now scroll through and review your log data. Double click on event markers to open and view comments made during your log sessions.

Note: The Instructor can show you how to set up your log data so you can scroll through while having the heading stay in a fixed location.



INSITE™ Activity 1.2.2 Data Logging Lab Exercise

Tools and equipment:

1. Lap-top with INSITE™ Software
2. Excel Software in your laptop

Procedure: Connect Data Link and cable to Engine/Vehicle to communicate to ECM and launch INSITE™.

Step 1: Choose correct adapter and protocol in the connection dropdown box and connect to ECM.

Step 2: Click on and open Data Monitor/Logger.

1. Select Custom Parameters
2. Choose your Fuel List

Step 3: Start engine if you are connected to the training engine or vehicle. Click on the Log Icon in the tool bar-you should see the log indicator at the bottom right side of screen. On Simulator record a log for 2 minutes and save log in step 5.

Step 4: Run a diagnostic sequence by recording a data log of your custom fuel list. While logging press the space bar to create an event marking the different stages in the drive cycle. Fill in the event marker boxes with different reason - bus or engine surging, engine hesitates, etc. when logging data. Record a drive cycle of the following sequence of events:

1. Idle for 1 minute
2. 1000 rpm for 10 seconds
3. Snap the throttle once
4. Idle for 10 seconds
5. 1500 rpm for 10 seconds
6. Drive cycle complete - click on the stop icon.

Step 5: Your Logged Data box should now have appeared.

1. Choose desktop for your “save-as” location.
2. Put “Fuel Log” in the File Name.
3. Choose Comma Separated Files (CSV) in “File Type”.
4. In the Log File Comments Box, enter “engine has low power”.

Step 6: Again, go to Custom Parameters and this time choose your Boost Parameters and follow steps 4-6

- Step 7:** You should find the log files you created on the desktop of the computer you are using. They should have been saved in an Excel format “open files” to review data.
1. Click on number 21 in the right column of numbers to highlight.
 2. Right click and from dropdown box, choose format cells.
 3. On top of the box, choose Alignment.
 4. Under Text Control, choose Wrap Text.
 5. In the Orientation box to the right, click on the end of the line and push it straight up, then click okay at the bottom.
- Step 8:** You can now read the heading of each column. You can now scroll through and review your log data. Double click on event markers to open and view comments made during your log sessions.
- Note:** The Instructor can show you how to set up your log data so you can scroll through while having the heading stay in a fixed location.



INSITE™ Activity 1.3 Graphical Monitoring Lab

Tools and equipment:

1. Lap-top with INSITE™ Software
2. Excel Software in your laptop

Procedure: Connect Data Link and cable to Engine/Vehicle to communicate with ECM and launch INSITE™.
Note: No changes will occur unless you are doing this on a live engine.

Step 1: Choose correct adapter and protocol in the connection drop down box and connect to ECM.

Step 2: Click on and open Data Monitor/Logger.
1. Select Custom Parameters
2. Choose your Fuel List

Step 3: Start engine if you are connected to the training engine or vehicle. Right click and choose Graphical Monitoring or use the Icon in the tool bar.

Step 4: Remove Fuel Supply Pressure from Fuel List.

Step 5: Add Accelerator Pedal Position Sensor Signal Voltage to the Fuel List.

Step 5: Change the sample rate to 500 ms.

Step 6: Begin your graphical monitoring and monitor it for exactly 18 seconds then PAUSE it.

Step 7: Save Graphic Monitoring as a picture (JPEG) (not a log file) on the Desktop.
1. Choose desktop for your “save-as” location.
2. Put “your first name” in the File Name.

Step 8: Close the Graphic Monitoring without saving the log file.

Step 9: Locate the JPEG Picture files you created on the desktop of the computer you are using. Open the file and look at the screen capture of the Graph. Note: You can't scroll through the graphs of a JPEG.

Step 10: Delete any and all custom groups from INSITE™.

Step 11: Delete any and all log and JPEG files from the desktop.

