ASAM3 MC Interface Setup

Version 9

November 16, 2023

Developed by TRP Laboratories

Version History

Version	Date	Revision Description
1	4/25/2016	Initial publication
2	8/23/2018	Format with SGS brand
3	4/7/2020	Retrofit to new template Consolidated executables and commands topics. Added note that up to 4 sections of 255 variables may be monitored within one `asam3_specs` file in Section 4.13 asam3_specs. Added Appendix D. Example Spec File with Multiple ECM Files
4	7/30/2020	Inserted new *Section 5 asam3_specs Specification File Format* on page 10
5	10/12/2020	Correct page numbering through Section 4
6	4/7/2021	Inserted new *Section 7 Calibrating an ECM with asam3cli* on page 16.
7	12/7/2021	Removed inline usage content from *Section 4 ASAM3 Executables and Commands* on page 7 and added hypertext linked cross-references to usage help on cyflex.com
8	6/8/2022	Updated all hypertext linked cross-references to cyflex.com usage help descriptions
9	11/16/2023	Added *Section 9 Using CSAR Variable Names* on page 19 Change brand to TRP Laboratories

Document Conventions

This document uses the following typographic and syntax conventions.

- Commands, command options, file names or any user-entered input appear in Courier type. Variables appear in Courier italic type.

  Example: Select the `cmdapp-`*`relVersion-buildVersion`*`.zip` file….

- User interface elements, such as field names, button names, menus, menu commands, and items in clickable dropdown lists, appear in Arial bold type.

  Example: **Type**: Click **Select Type** to display drop-down menu options.

- Cross-references are designated in Arial italics.

  Example: Refer to *Figure 1*…

- Click intra-document cross-references and page references to display the stated destination.

  Example: Refer to *Section 1 Overview* on page 1.

  The clickable cross-references in the preceding example are *1*, *Overview*, and on page 1.

CyFlex Documentation

CyFlex documentation is available at https://cyflex.com/. View **Help & Docs** topics or use the **Search** facility to find topics of interest.

Table of Contents

List of Figures

LIST OF TABLES

1 Overview

ASAM was formed to coordinate the development of technical standards, primarily in the automotive industry. ASAM defines protocols, data models, file formats and APIs for use in the development and testing of automotive Electronic Control Modules (ECMs).

Data is stored in a standardized format specified by the ASAM ODS workgroup. This format allows exchange of data across different systems and architectures.

An ASAM3 interface connected between a CyFlex test cell and a Measurement and Calibration (MC) system allows CyFlex software to remotely control ECMs for testing engines. CyFlex communicates over a network using TCP/IP. Typically, CyFlex acts as the client, and the MC system as the server.

This document explains how to configure a test cell computer running CyFlex for communicating with the Measurement and Calibration system.

Figure 1 illustrates an overview of the CyFlex ASAM3 MC network.

Figure 1: CyFlex ASAM3 MC Network Configuration and Flow

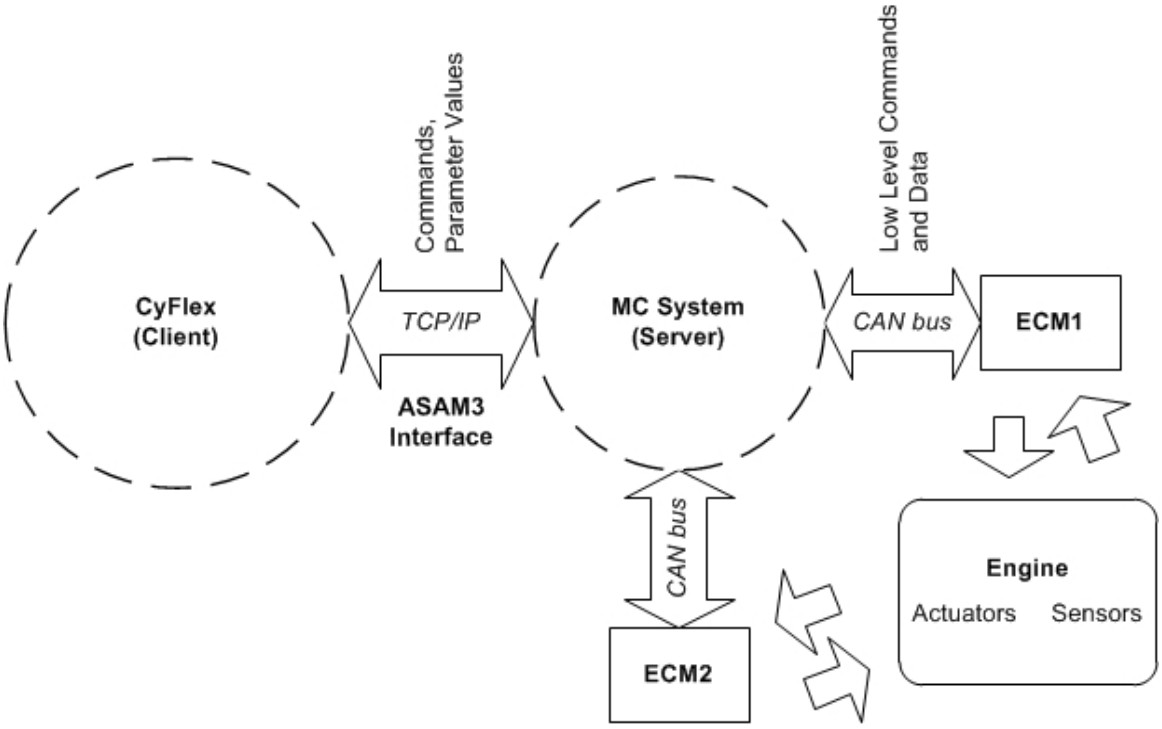
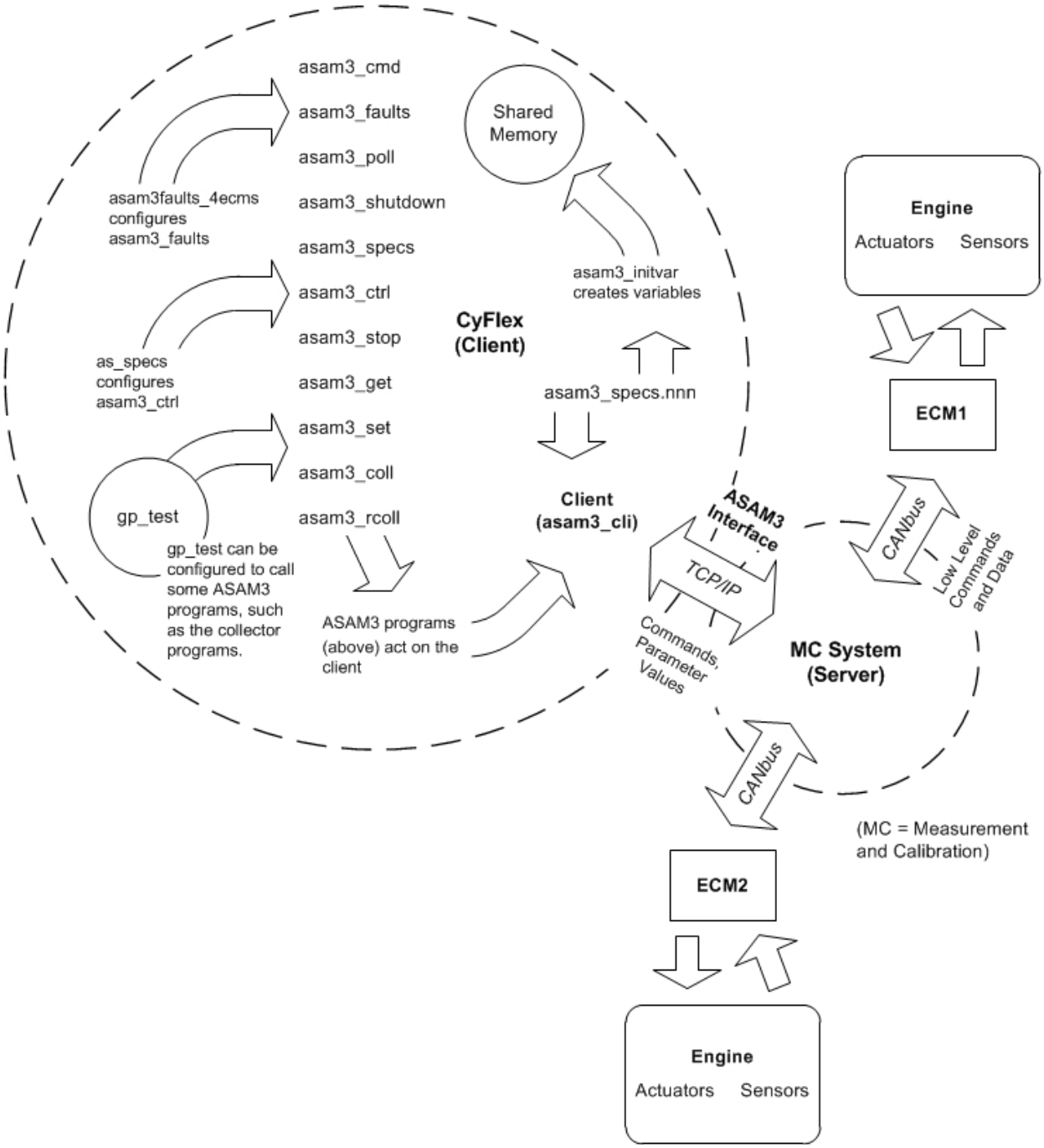


Figure 2 represents a CyFlex test cell controlling testing of engine components. CyFlex processes various tasks using the asam3 executables described *in Section 4 ASAM3 Executables and Commands* on page 7 and communicates with the MC system through the ASAM3 interface.

Figure 2: CyFlex Test Cell



1.1 Terminology

Table 1 describes terms used in this document.

Table 1: Terminology

Term	Definition
API	Application Programming Interface
ASAM	Association for Standardization of Automation and Measuring Systems
CAN bus	A Controller Area Network bus is a vehicle bus standard designed to allow microcontrollers and devices to communicate with each other in applications without a host computer.
ECM	Electronic Control Module
MC	Measurement and Calibration. An MC system is an electronic tool commonly used in automotive electronics for development, manufacturing, and service.
ODS	Open Data Services
TCP/IP	Transmission Control Protocol/Internet Protocol

2 Setup Requirements

The following are required to use the ASAM3-MC interface:

- Test cell computer running CyFlex version 3.5 or later
- Ethernet connection to the network
- ASAM3 executables
- ASAM3 specification files
- Go-script (`go.scp`); each test cell typically has a Go-script customized to launch the tasks the cell performs at start-up.
- Customer Measurement and Calibration (MC) system

The ASAM3 executables and specification files are installed as part of a CyFlex installation or upgrade. *Table 2* shows the files needed and their directory locations for setting up the ASAM3-MC interface on the test cell computer.

Users typically choose to copy and rename the `asam3_specs.`*nnn* specification file from another test cell that performs the same tasks to save time manually modifying the file.

Table 2: Files and Directories for Setup

File Type	Filename	Directory
Executables	Refer to *Section 4 ASAM3 Executables and Commands* on page 7.	`/cyflex/bin/`

Default (“template”) Specification Files	`asam3_specs.def`
	`asam3faults_4ecms.def`
	`as_specs.def`
		`/specs.def`

Working System Specification Files	`asam3_specs.`*nnn* `asam3faults_4ecms.`*nnn* `as_specs.`*nnn* *nnn* is the test cell number	`/specs`
Scripts to start ASAM3 executables	`go.scp`	`/cell`
	`afix` (optional and user-generated)	`/specs/cmds/`

Important:

CyFlex installations and upgrades (release 6.1.2 and higher) install the `asam3faults_4ecms` specification file. In earlier CyFlex versions, this file had a different name: `asam3faults_specs`. Only the spec filename changed. The executable filename did not change.

3 Launching ASAM3 Tasks at Start-up

After completion of setup requirements, configure either a `Go-script` or an optional `afix` script to launch the ASAM3 executables `asam3cli` and `asam3_initvar` at start-up.

An optional `afix` script can be helpful for more complicated sequences; containing multiple lines that otherwise might have "cluttered" the `Go-script`. The separate `afix` script must be listed in the `Go-script`, which then "calls" the programs and specification file in the `afix` script.

3.1 Editing the Go-script

Execute the following steps:

1. At the test cell computer, open the `go.scp` with a text editor.
2. Add the program `asam3_initvar`:
   a. In the `go.scp` file, locate the line:
      `gen_labels`
   b. Add the following line before the `gen_labels` line:
      `asam3_initvar &`
3. Add the ASAM3 client, `asam3cli`, after the `gen_labels` line:
   `asam3cli &`
4. Add the specification file after the `asam3cli` line:
   `asam3_specs /specs/asam3_specs.`*`nnn`*
   Replace *nnn* with your test cell number.
5. Save the `go.scp` file and exit.

3.2 Editing the afix Script

Execute the following steps.

1. At the test cell, open the `afix` script with a text editor.
2. Edit the `afix` script as needed for the current test setup. For example:
   - ASAM3 applications to be started (or terminated)
   - Sleep intervals (delays) in seconds before starting ASAM3 applications
   - Instances of the client (with optional arguments) to be run
   - Occurrences of other applications such as `gen_labels` and `pam_spec`

   Important:

   Update all filenames ending in a test cell number with the number of your cell.
3. When done editing, save and exit the `afix` file.

4. Add the `afix` script to the `go.scp` file:
   a. In the `go.scp` file, locate the line:
      ```
      gen_labels
      ```
   b. Add the following line, after the `gen_labels` line:
      ```
      afix &
      ```
   c. Save and exit the `go.scp` file.

Refer to *Appendix C. Example afix Files* on page 24.

4 ASAM3 Executables and Commands

This section describes commonly used engine testing ASAM3 executables, commands, and their usage.

4.1 asam3cli

Required.

Use this executable to establish a local client to communicate with the MC system.

Refer to cyflex.com usage help for `asam3cli` command syntax.

4.2 asam3_cmd

Optional.

Use this executable to send commands via the MC system to engine ECMs. Each time a program is run, it is an instance of that program

Refer to cyflex.com usage help for `asam3_cmd` command syntax.

4.3 asam3_coll

Optional.

This is a support task used by the Test Manager (`gp_test`) and is not run from the command line. It commands an ECM to provide parameter values automatically when triggered by an event recognized by the Test Manager.

If a `gp_test` procedure contains the @ASAM3 keyword, then `asam3_coll` is launched to handle communication for each test mode of the `gp_test` procedure where the @ASAM3 keyword is used.

4.4 asam3_ctrl

Optional.

Use this executable to set an ECM variable to a certain value and enable continuous updates of the value for CyFlex. The frequency of updates is controlled by specification file `as_specs.`*nnn*. The `asam3_ctrl` task is normally started by the *Go-script*.

Refer to cyflex.com usage help for `asam3_ctrl` command syntax.

4.4.1 Additional Reference

The `asam3_ctrl` application must be configured by a “translator” program called `as_specs`, with the `as_specs.def` specification file. The default spec file is located in the `/specs/specs.def` directory. Using the specs file, the translator prepares a “configuration event” to the `asam3_ctrl` application.

The common usage of this application is to continuously output the contents of a CyFlex variable to an ECM variable, where the CyFlex variable is the output command of a Proportional-Integral-Derivative (PID) control loop. The feedback for the control loop could be an engine parameter, such as peak cylinder pressure, exhaust temperature, or a gaseous emission level. The ECM variable value then should have a direct and linear effect on this feedback

variable, and consequently the engine parameter can be controlled to the desired level.

The `asam3_ctrl` program performs the equivalent of `asam3_set` but differs in that `asam3_ctrl` is used if the variable must be continuously updated.

Refer to cyflex.com usage help for `as_specs` command syntax.

4.5 asam3_faults

Optional.

Use this executable to poll the ASAM3 client (`asam3cli`) for the current ECM faults and view faults logged for data sources. The application holds information about faults that have been monitored and works with multiple data sources (ECMs).

Refer to cyflex.com usage help for `asam3_faults` command syntax.

4.6 asam3faults_specs

Optional.

Use this executable to process ASAM3 TCP monitoring of specifications to read fault codes to determine the cause of engine errors during testing. This reads faults, not variables.

Refer to cyflex.com usage help for `asam3faults_specs` command syntax.

Important:

CyFlex installations and upgrades (release 6.1.2 and higher) install the `asam3faults_4ecms` specification file. In earlier CyFlex versions, this file had a different name: `asam3faults_specs`. Only the spec filename changed. The executable filename did not change.

4.7 asam3_get

Optional.

Use this executable to obtain a value for a specific ECM variable.

Refer to cyflex.com usage help for `asam3_get` command syntax.

4.8 asam3_initvar

Required.

Use this executable to create variables in shared memory.

Refer to cyflex.com usage help for `asam3_initvar` command syntax.

4.9 asam3_poll

Optional.

Use this executable to send a request to the client for the latest values on systems which do not support User Datagram Protocol (UDP). Each time a program is run, it is an instance of that program.

Refer to cyflex.com usage help for `asam3_poll` command syntax.

4.10 asam3_rcoll

Optional.

`asam3_rcoll` is a support task for the Test Manager (`gp_test`) and is not run from the command line. It enables the Test Manager to send ECM commands to the `asam3cli` client application to set values of variables over a period of time.

4.11 asam3_set

Optional.

Use this executable to set parameters around a specific ECM variable.

Refer to cyflex.com usage help for `asam3_set` command syntax.

4.12 asam3_shutdown

Optional.

Use this executable to stop streaming and close all data connections. Enter the `asam3_shutdown` command for each running instance of the `asam3cli` client. There may be only one instance of the client listed in a specification file.

Refer to cyflex.com usage help for `asam3_shutdown` command syntax.

4.13 asam3_specs

Optional.

Use this executable to process ASAM3 TCP monitoring of specifications and list parameters or variables, showing how they are monitored and the sample rates.

Notes:

The terms `event` and `message` are sometimes used interchangeably when describing spec file configuration of a task or program.

Up to 4 sections of 255 variables may be monitored within one `asam3_specs` file. Refer to Appendix *D. Example Spec File with Multiple ECM Files* on page 27

Refer to cyflex.com usage help for `asam3_specs` command syntax.

4.14 asam3_stop

Optional.

Use this executable to stop streaming without closing data connections.

Refer to cyflex.com usage help for `asam3_stop` command syntax.

4.15 as_specs

Optional.

Use this executable to configure the `asam3_ctrl` program to set the process priority and interval.

Refer to cyflex.com usage help for `as_specs` command syntax.

5 asam3_specs Specification File Format

Refer to this section for guidance on `asam3_specs` specification file format requirements.

```
@REG_NAME
<REG_NAME>

#  Remote                                    Local
#HostName/IP:CommandPort                     IP Address
<SERVER_IP_ADDRESS>:57005                <CLIENT_IP_ADDRESS>

#Non-INCA Data Source Configuration ( Maximum of 4 )
#Data         Description            Binary/Calibration    Destination
#Source      Source Path & Filename    Path & FileName       Address
<ECM0>    <DESCRIPTION_FILE>     [BINARY_FILE]       [default=0]
[<ECM1>    <DESCRIPTION_FILE>     [BINARY_FILE]      [default=0]]
[<ECM2>    <DESCRIPTION_FILE>     [BINARY_FILE]      [default=0]]
[<ECM3>    <DESCRIPTION_FILE>     [BINARY_FILE]      [default=0]]
$

Example:
ECM0 “C:\EXAMPLE_PATH\FILENAME.ecfg” “C:\PATH_TO_FILE\CALFILE.xcal”    0

#INCA Data Source Configuration (Maximum of 4 )
#             Description File
#                 Name
#Data         Description       Program              Calibration                Destination
#Source   Path & Filename     Mode              Path & FileName            Address          Mode #
<ECM0>    <DESCRIPTION_FILE>  <PROGRAM_MODE>   <CALIBRATION_FILE>        [DEST_ADDR]     <MODE>
[<ECM1>    <DESCRIPTION_FILE>  <PROGRAM_MODE>   <CALIBRATION_FILE>        [DEST_ADDR]     <MODE>]
[<ECM2>    <DESCRIPTION_FILE>  <PROGRAM_MODE>   <CALIBRATION_FILE>        [DEST_ADDR]     <MODE>]
[<ECM3>    <DESCRIPTION_FILE>  <PROGRAM_MODE>   <CALIBRATION_FILE>        [DEST_ADDR]     <MODE>]

$
# Must end the list with a ‘$’
```

```
Example:
ECM0         “_AUXIN_”         “CAN_MONITORING”      “”                      0x8000              0

#Monitor List Configurations ( Maximum of 4 LISTS OF 255 PARAMETERS PER LIST)
#                              One data source can be with multiple monitor lists.
#                             But the <INTERVAL> and <METHOD> have to be identical.
#Methods: BAM, IDL_NOBAM, PROPRIETARY_REQUEST, PUBLIC_REQUEST, PUBLC_BROADCAST:
#         Only 1 BAM MONITOR LIST PER DATA SOURCE
#
#Label        Interval(ms)        Method
<ECM0>        <Interval>          <Method>

<ECM0>

#  Monitor List contains up 255 parameters per list.
# <UNITS_LABEL>   Any Units that are Compatible between ECM and CYFLEX no units conversion is
#performed.
#                  If no units are compatible then use “none”.
#                  If you specify “HEX” Integer variables will be displayed in Hex format.
#  ECM        ECM                 CYFLEX              Display
# VARIABLE   UNITS                VARIABLE            Resolution
<VAR0>        <UNITS_LABEL>       <CYFLEX_VARIABLE>     [DISPLAY_RES]

$

# Optional List

[<DATA1>     <Interval>          <Method>]
<VAR0>        <UNITS_LABEL>       <CYFLEX_VARIABLE>     [DISPLAY_RES]
              .
              .
              .
<VAR254>     <UNITS_LABEL>        <CYFLEX_VARIBLE>     [DIPLAY_RES]

$
# Must end the list with a ‘$’
```

```
# Optional List

[<DATA2>     <Interval>          <Method>]
<VAR0>        <UNITS_LABEL>       <CYFLEX_VARIABLE>     [DISPLAY_RES]
              .
              .
              .
<VAR254>     <UNITS_LABEL>        <CYFLEX_VARIBLE>     [DIPLAY_RES]


$
# Must end the list with a ‘$’

# Optional List
[<DATA3>     <Interval>          <Method>
<VAR0>        <UNITS_LABEL>       <CYFLEX_VARIABLE>     [DISPLAY_RES]
              .
              .
              .
<VAR254>     <UNITS_LABEL>        <CYFLEX_VARIBLE>     [DIPLAY_RES]
$
# Must end the list with a ‘$’
```

6 Modifying the asam3_specs Specification File

The specification file `asam3_specs` configures communication between the test cell and MC system (server), and indirectly with the engine ECM(s). This spec file can be edited to work with most Measurement and Calibration (MC) systems and must be configured for the particular test setup.

Multiple instances of the *asam3_specs* file may be created to configure communication with ECMs that perform different functions and consequently use different sets of variables. This can make it easier to manage variables for multiple ECMs.

Refer to *Appendix A. Example asam3_specs Specification File* on page 20 and Appendix *D. Example Spec File with Multiple ECM Files* on page 27.

Execute the following steps to modify the specification file:

1. At the test cell computer, open the file with a text editor.
2. Determine which information in the file needs updating.
3. Edit the specification file as needed for the test setup.
4. Save and exit the file.

Information in the specification file includes:

- Host IP (IP address of the MC system Windows machine)
- Host command port (MC system port to the ECM)
- Local IP (test cell computer)
- Data source (ECM)
    - Label: the ECM number
    - Location of the configuration file on the MC system used by the ECM
    - Location of the calibration file on the MC system used by the ECM

      Note:

      If the ECM does not require calibration, enter a null string: `""`
    - Destination: CAN address (value from `0x00` to `0xFF`)

      Note:

      To use a default destination address set by the MC system: `0xFF`
- Specifications for monitoring the data source (ECM) – intervals, collection method
- List of parameters for the data source (ECM)

Each time *`asam3cli`* is started an instance runs on the system. All instances are based on the same code but configured differently by the `asam3_specs` file. The specification file may be modified to contain instructions for one instance of the client or several instances. In order for a spec file to configure the client, the registered name of the client instance must be listed in the spec file.

Users typically choose to copy the `asam3_specs.`*`nnn`* specification file from another computer assigned to a similar role, to save time editing the file manually. Otherwise, this information can normally be found as shown in *Table 3* on page 14.

Table 3: Locating Specification File Elements

In the Spec File	How to Find
Host IP	At the MC system/Windows computer: 1. Open **Network Connections** by clicking **Start**. 2. Click **Control Panel**. 3. In the search box, type: `adapter` 4. Under **Network and Sharing Center**, click **View Network Connections**. 5. Select an active network connection. 6. In the toolbar, click **View Status of the Connection**. 7. Click **Details**. 8. The IP address appears in the **Value** Column next to **IPv4 Address**.
Host command port	The command port should be specified in the manufacturer's software documentation.

Local IP	At the test cell/Linux computer:
	1. Open a terminal window and enter:
	`hostname`
	This displays the hostname of the test cell computer.
	2. Enter:
	`nslookup <hostname>`
	Example:
	`nslookup CTC-TC1`
	This shows the IP address for test cell 1.
	Note: CyFlex systems usually contain more than one Network Interface Controller (NIC). For a multi-NIC system, each NIC has a unique address and the network connections must be configured.

Data source	Refer to customer procedures for finding or assigning the ECM number. **Note:** The number (label) assigned to each ECM is arbitrary but must be different from the number assigned to every other ECM.
Directory containing the ECM files on the MC system Windows machine	This is determined by the customer, with the directory typically being named, `c:\asam_files\` or similar.

In the Spec File	How to Find
Specifications for monitoring the data source	Refer to the customer process for how data from ECMs is monitored and collected. The MC system can use various methods to collect data: • `BAM` (Broadcast Announce Message) • `EDM` (Engineering Data Monitor) • `IDL_NOBAM` (`Internal Data Logger_ No Broadcast Announce Message`) • `PROPRIETARY_REQUEST` • `PUBLIC_BROADCAST` • `PUBLIC_REQUEST`
List of parameters for the data source	Consult the engineer running the test for the parameters to monitor.

7 Calibrating an ECM with asam3cli

Execute the following steps:

1. Create a small `asam3_specs.template` file per the information in the following example:

```
# asam3_specs.test
#=============================================================================
# Registered name should match the registered name of one of the instances
# of asap3cli started in go.scp
@REG_NAME
asam3_1

# hostIP is that of the remote (Windows) computer where CUTY is running.
# command port should match CUTY | Settings | Options | Startup | Port
# localIP is that of the local (CYFLEX) computer where asam3cli is
# running.
# hostIP:commandport    local IP to receive data stream
192.168.50.200:57005          192.168.50.201

# datasource   configuration_file  ECM_Calibration_File  ECM_ID_number
# (not optional!)
ECM0  "C:\Users\testbench\Desktop\my_test.ecfg"
"C:\Users\testbench\Desktop\my_test.xcal" 0

$
```

2. Create a script to start processing per the information in following example:

```
# Make sure nothing is talking to CutyService before starting the process
killall -9 asam3cli
killall -9 asam3_poll
killall -9 asam3_coll
killall -9 asam3_rcoll
killall -9 asam3_faults
killall -9 asam3_cmd
killall -9 asam3_ctrl
sleep 5
asam3cli asam3_1 18 UDP OFF &
sleep 5
asam3_specs /specs/asam3_specs.template

sleep 2
# Initialize the transfer
asam3_cmd COPY_BIN_FILE asam3_1 FILE FLASH
# Note there is now way to tell if the calibration process has finished
# quickly. You need check the status on the CutyServices system or wait
# and guess.
# In practice it used to take 20 minutes or more. Test the process and
# determine the appropriate amount of time to wait and attempt to restart
# communications with CutyServices after the time has expired.
# After the process is complete you want to run you normal afix to setup
#communication with CyFlex and CutyServices.
```

3. Run the script to completion.

8 Viewing Status Variables

Status variables provide the status of ECM processes to CyFlex. They do not control or change anything but are only informational. The variables are created by the ASAM3 programs and reside in shared memory. If an engine ECM produces a fault, the status variable returns an error.

To view the status of all variables during a test:

1. Open a terminal window.
2. Enter:

   ```
   $ dump_it asam3
   ```

   The display shows variables in CyFlex shared memory. Each part of the display is explained below.

```
General Use Logical Variables
index ` label     value  true_event  false event  history     owner
 550  asam3_1flag  OFF  CutyTCP-ON  CutyTCP-OFF    OFF    asam3_1X
 551  asam3_2flag  OFF  CutyTCP-ON CutyTCP-OFF    OFF    asam3_2X
 552  asam3_3flag  OFF  CutyTCP-ON CutyTCP-OFF    OFF    asam3_3X
 553  asam4_3flag  OFF    utyTCP-ON CutyTCP-OFF    OFF    asam3_4X
General Use String Variables
index      label       owner       value
 183    asam3_1stat  asam3_1X            No updates on list ECM0”
 184    asam3_2stat  asam3_2X            No updates on list ECM1”
 185    asam3_3stat  asam3_3X            No updates on list ECM2”
 186    asam3_4stat  asam3_4X            No updates on list ECM0”
[tc^@stcnode60 specs]$
```

   - Logical variables contain a single logical value (ON/OFF).
   - String variables contain a sequence of displayable characters.
   - `index` identifies position in the general use variables.
   - `label` is the variable name.
   - `true_event` is an event in which the state set by the CyFlex application (`false`) changes to `true`.
   - `false_event` is an event in which the state set by the CyFlex application (`true`) changes to `false`.

     Note:

     When the value of a variable changes, including logical and string variables, it is called a transition event. For a CyFlex logical variable, the value change may occur with a change in a digital input or output, for example. The transition event occurs when a value changes from the state (`true` or `false`) set by the CyFlex application. Conversely, if the value is set to `true`, and the value is currently `true`, no transition event occurs. For a string variable, a transition event occurs whenever the value of the variable changes.

   - `history` is the state of the variable previous to the current state.
   - `owner` is the instance (registered name) of the ASAM3 application.

- `value` under `Logical Labels` reflects the ON (true) / OFF (false) state of the variable.
- `Value` under `String Labels` is the value received from the data source. In the display explanation in Step 2 of on page 17, there are no updates to the values.

Note:

If a variable is not updating, communication with the ECM is not working or power is off.

Enter either of the following to view the value of a specific variable:

- For a logical variable, enter:
  `gvar <RegName>Flag`
  Example:
  `gvar asam3_1Flag`
- For a string variable, enter:
  `gvar <RegName>Stat`
  Example:
  `gvar asam3_1Stat`

9 Using CSAR Variable Names

CSAR variable strings with longer lengths and special characters not allowed in CyFlex variables can be used. Variables are created through `asam3_specs` and `asam3_initvar`.

It is possible to have duplicate CSAR variable names when using multiple ECMs. To keep unique names in the system, the mapping uses `ECM` as a prefix to each CSAR variable. If there is only one CSAR variable that is unique without the prefix, then the `ECM` prefix can be omitted when using it with CyFlex applications. If the variable name is duplicated across ECMs, then the `ECM` prefix must be included when referencing the CSAR variable. The prefix takes the form ECMxxx_ where xxx is the ECM number, i.e., ECM1_ to make `ECM1_`*`variable-long-csar-name`*.

Refer to cyflex.com usage for `asam3_specs` .for information on the relevant options.

Once created, the CSAR variable names can be used in place of CyFlex variable names in the following applications:n

- `floger`
- `svar`
- `gvar`
- `gval`
- `gvals`

Appendices

Appendix A. Example asam3_specs Specification File

The `asam3_specs` specification file configures communication between the test cell and MC system (server), and indirectly with the engine ECM(s).

Refer to *Section 6 Modifying the asam3_specs Specification File* on page 13 for details about elements of the spec file.

In the following example, the registered name of the client instance is `asam3_1`.

Note:

The example shows only a partial list of variables for the ECM data source

```
# asam3_specs.nnn
--------------------
# Registered name should match the registered name of one of the instances of
# asam3cli started in go.scp
@REG_NAME
asam3_1

# hostIP is that of the remote (Windows) computer
# command port should match:  Settings | Options | Startup | Port
# localIP is that of the local computer running asam3cli
# hostIP:commandport      local IP to receive data stream
10.10.112.1:57005         10.10.112.2

## data source is required (for CyFlex)
## configuration file is required
## calibration file is required or null (“”)
## destination addresses are required for multiple ECMs

# data source  configuration file [destination optional, unless multiple ECMs]
## 256 characters max

# The line below indicates in the following order: ECM label, configuration
file, calibration file, and destination address.
ECM0 "c:\asam_files\Q95T4_ECM1_4200@1800_R01_L_id97425_P32.04.02.05.ecfg"
"c:\asam_files\Q95T4_ECM1_4800@1890_R03_L_id97425_P32.04.02.05_r7” 0x00

# MUST end list with a $
$

# monitor list (repeat for each data source)
# data source (see above)        interval     collection method
# collection methods (BAM, EDM, IDL_NOBAM, PROPRIETARY_REQUEST,
# PUBLIC_REQUEST, PUBLIC_BROADCAST)
# NOTE:  Only one BAM monitor list per data source
# data source (see above)        interval[ ms]

# data source                   interval   collection method
ECM0                            1000       EDM
#
# 200 Parameters (MAX)
#
```

```
# ECM Parameter Name            Units    CyFlex Variable Name  Opt Display Res
ECM_Run_Time                    SEC      ECM_Run_Time_1
C_CBM_Indicated_Fuel_Ov_Value   MG       C_CBM_Indicated_Fuel_Ov_Value_1
C_CBM_Indicated_Fuel_Ov_Switch  NONE     C_CBM_Indicated_Fuel_Ov_Switch_1
Accumulator_Pressure            BAR      ECM_ACC_PRS
Ambient_Air_Press               PSI_A    ECM_ANAAP
Battery_Voltage                 VOLT     ECM_BATTERY_VOLTAGE
Boost_Pressure                  KPA_G    ECM_BSTPRS_P
Charge_Press_1                  KPA_A    ECM_ANMAP_A_1
Coolant_Pressure                PSI      ECM_ANHCP
Coolant_Temperature             DEG_C    ECM_ANCOT
Crankcase_Press                 KPA_G    ECM_CRNKCS_P
Engine_Speed                    RPM      ECM_ENGRPM_1
Fuel_Supply_Pressure            PSI_A    ECM_ADFTPMPR
Fuel_Temperature                DEG_C    ECM_EFTS_T
Oil_Pressure                    KPA_G    ECM_OIL_P
Oil_Temperature                 DEG_C    ECM_OIL_T
Charge_Flow                     KG/MIN   ECM_TBAM
CBP_Air_Fuel_Ratio              NONE     ECM_TBAFRT
EEM_OperatingRegion             NONE     EEM_OperatingRegion
T_GTIS_SystemSerialNumber       NONE     ECM_CAL_PARENT
Combustion_Control_Path_Owner   NONE     ECM_FSFNFLST
Engn_Control_Path_Owner         NONE     USER17_13
NDOT_PathOwner                  NONE     USER17_14
Mach_Control_Path_Owner         NONE     MACH_CONTROL_PATH_OWNER
H_CBM_Engn_Control_Path_Owner   NONE     USER17_16
Commanded_Accelerator_Position  %        ECM_THROTTLE
#H_APC_p_FcvCmdPWMDtyCycle      %        ECM_AF_PCTDC
H_APC_hp_Deviation              BAR      ECM_H_APC_HP_DEV
H_APC_qr_Fueling                NONE     H_APC_QR_FUELING
V_ATP_ppm_SCR_Out_NOx_Status    NONE     V_ATP_ppm_SCR_Out_NOx_Status

## MUST end list with a $
$
```

Appendix B. Example asam3faults_4ecms Specification File

The `asam3faults_4ecms` file lists the variable names to be read from the ECM and the CyFlex variable names where the values are placed.

Important:

CyFlex installations and upgrades (release 6.1.2 and higher) install the `asam3faults_4ecms` specification file. In earlier CyFlex versions, this file had a different name: `asam3faults_specs`. Only the spec filename changed. The executable filename did not change.

```
# 1st data source
asam3_1   ECM0
# most recent fault for 1st data source
   last_fault
# active faults list
   active_faults
# inactive faults list
   inactive_faults
# full path to log file, use - if none
   -
# 2nd data source
asam3_2   ECM1
##  most recent fault for 2nd data source
last_fault1
## active faults list for 2nd data source
active_faults1
## inactive faults for 2nd data source
inactive_faults1
#
# log path
 -
# 3rd data source
asam3_3   ECM2
##
##  most recent fault for 2nd data source
last_fault2
##
## active faults list for 2nd data source
##
active_faults2
##
## inactive faults for 2nd data source
inactive_faults2
#
# log path
 -
# 4th data source
asam3_4   ECM3
##
## most recent fault for 2nd data source
last_fault3
##
## active faults list for 2nd data source
active_faults3
```

```
## inactive faults for 2nd data source
inactive_faults3
# log path
 -
# NOTE: only 1 $ at endo of FILE, NOT AFTER EACH SOURCE!
# ALSO, need data source, last faults, active faults, inactive faults AND
# log path for each SOURCE, even if only a "-" for the log path
$
```

Appendix C. Example afix Files

Two example `afix` files appear below. The first starts a single copy of the client. The second is more complex, starting four instances of the client. Commented lines describe the processes.

Important:

CyFlex installations and upgrades (release 6.1.2 and higher) install the `asam3faults_4ecms` specification file. In earlier CyFlex versions, this file had a different name: `asam3faults_specs`. Only the spec filename changed. The executable filename did not change.

C.1. afix File Example with One Instance of the Client

```
# Terminate applications currently running.
killall -9 asam3cli
killall -9 asam3_poll
killall -9 asam3_coll
killall -9 asam3_rcoll
killall -9 asam3_faults

# Set the sleep interval before starting asam3_initvar.
sleep 2
# Create CyFlex variables, as defined in the specification file.
asam3_initvar /specs/asam3_specs.110
sleep 2
# Start the client. (For descriptions of the arguments, see
# Section 4 ASAM3 Executables and Commands)
asam3cli asam3_1 18 UDP OFF &
sleep 5
# Read the spec file.
/cyflex/bin/asam3_specs /specs/asam3_specs.110

sleep 15

# The echo command displays the value of environment variables.

echo list 1
# Start streaming data.
/cyflex/bin/asam3_cmd STARTSTREAM asam3_1
sleep 5

# Poll the client for ECM faults.
/cyflex/bin/asam3_faults 120 &
sleep 2
/cyflex/bin/asam3faults_specs /specs/asam3faults_4ecms.110

sleep 20
# Capture performance information as defined in the spec file and send it to
# the database.
pam_specs /specs/pam_specs.110
```

C.2. afix File Example With Four Instances of the Client

```
# !/bin/sh

killall -9 asam3cli
killall -9 asam3_poll
killall -9 asam3_coll
killall -9 asam3_rcoll
killall -9 asam3_faults

sleep 1
asam3cli asam3_1 18 UDP OFF &
sleep 1
asam3cli asam3_2 18 UDP OFF &
sleep 1
asam3cli asam3_3 18 UDP OFF &
sleep 1
asam3cli asam3_4 18 UDP OFF &
sleep 6
# The spec filenamed “parent” configures the first instance of asam3cli.
/cyflex/bin/asam3_specs /specs/asam3_specs_parent
sleep 1
# Each spec filenamed “child” configures a subsequent instance of asam3cli.
/cyflex/bin/asam3_specs /specs/asam3_specs_child1
sleep 1
/cyflex/bin/asam3_specs /specs/asam3_specs_child2
sleep 1
/cyflex/bin/asam3_specs /specs/asam3_specs_child3
sleep 1

echo list 1
/cyflex/bin/asam3_cmd STARTSTREAM asam3_1
sleep 5
echo list 2
/cyflex/bin/asam3_cmd STARTSTREAM asam3_2
sleep 3
echo list 3
/cyflex/bin/asam3_cmd STARTSTREAM asam3_3
sleep 3
echo list 4
/cyflex/bin/asam3_cmd STARTSTREAM asam3_4
sleep 3

/cyflex/bin/asam3_faults 120 &
sleep 5
/cyflex/bin/asam3faults_specs /specs/asam3faults_4ecms.1

sleep 2
pam_specs
sleep 10
# Process general usage variables as configured in the spec file.
gen_labels /specs/gen_labels.dwpt
sleep 5
# q78prestart
# Set H.FSI.ct.DisplayCylinder to 1 in 4 ECMs.
DSPCYL_on
```

```
sleep 5
# Run script in /specs/cmds to set C_ADD_s_MisfireFaultEnable to 1 in 4 ECMs.
HHmisfireck
sleep 2
# trbspd_OFF
# Set1810Brk1850IsoSPEEDS
# Set T_HSI_Isochronous_Speed to 1850 in ECM 1, 2 and 3
# Set T_HSI_BreakPoint_Speed to 1850 in ECM 1, 2 and 3

sleep 5

###
# Set CyFlex events for test cell, hh16.
setev rels_hh16
sleep 1
setev rels_prelube
sleep 1
setev rels_faults
sleep 1
# Start fast data logging operations, configured by the spec files for test
# cell, hh16.
floger logr_specs.hh16 &
sleep 3
floger logr_specs.prelube &
sleep 3
floger logr_specs.faults &
sleep 3
floger logr_specs.HHbreakin &
sleep 3
floger logr_specs.heater &
sleep 10
# Send a message to everyone logged in whose mesg(1) permission is set to
# “yes”.
wall 'Ok to start the engine'

# List ASAM processes currently running.
ps -ef |grep asam3
```

Appendix D. Example Spec File with Multiple ECM Files

```
@REG_NAME
asam3_1

# HostIP:commandPort      Local IP
Host IP:Port              Local IP Address

ECM0 "c:\test250k-protected-KF362-503.ecfg" " " 0
ECM1 "c:\test250k-protected-KF362-503-1.ecfg" " " 0
ECM2 "c:\test250k-protected-KF362-503-2.ecfg" " " 0
ECM3 "c:\test250k-protected-KF362-503-3.ecfg" " " 0

#:EDITOR_DO_NOT_EDIT ECM0 FILE=/home/tc1/test.ecfg

$

# Monitoring for this ECM
# ECM  Interval(ms) Collection Method

ECM0          1000  PROPRIETARY_REQUEST

# ECM parameters
# ECM parameter                                ECM Units        ASSET label
ECM_Run_Time                                   s                ECM_Run_Time
GTIS_ECM_Run_Time                              s                GTIS_ECM_Run_Time
T_VSP_RoadSpdUsrOvrdVal                        none             T_VSP_RoadSpdUsrOvrdVal
ACA_Torque                                     N_M              ACA_Torque
Accel_Position_Sensor_Volts                    V                Accel_Position_Sensor_Volts
Accelerator_Pedal_Position                     %                Accelerator_Pedal_Position
Accumulator_Pressure                           BAR_A            Accumulator_Pressure
Actual_Eng_Indicated_Perc_Trq                  %                Actual_Eng_Indicated_Perc_Trq
Actual_Gear_Ratio                              NONE             Actual_Gear_Ratio
AIP_WIF_Sensor_Voltage                         V                AIP_WIF_Sensor_Voltage
Air_Volumetric_Efficiency_Est                  NONE             Air_Volumetric_Efficiency_Est
Alpha                                          NONE             Alpha
Altitude                                       M                Altitude
Ambient_Air_Press                              KPA              Ambient_Air_Press
Ambient_Air_Tmptr                              DEG_C            Ambient_Air_Tmptr
```

APC_hp_Cmd	BAR	APC_hp_Cmd
APC_hp_Fdbk	BAR	APC_hp_Fdbk
APC_i_ImaCmd	A	APC_i_ImaCmd
APC_qr_Cmd	G/SEC	APC_qr_Cmd
APP2_Sensor_Voltage	V	APP2_Sensor_Voltage
Battery_Voltage	V	Battery_Voltage
Boost_Pressure	KPA_G	Boost_Pressure
C_ATD_bs_ProtMode_BySensor	NONE	C_ATD_bs_ProtMode_BySensor
C_ATD_bs_ProtMode_BySysPerf1	NONE	C_ATD_bs_ProtMode_BySysPerf1
C_ATD_bs_ProtMode_BySysPerf2	NONE	C_ATD_bs_ProtMode_BySysPerf2
C_ATD_bs_StopDosing_BySensor	NONE	C_ATD_bs_StopDosing_BySensor
C_ATD_bs_StopDosing_BySysPerf1	NONE	C_ATD_bs_StopDosing_BySysPerf1
C_ATD_bs_StopDosing_BySysPerf2	NONE	C_ATD_bs_StopDosing_BySysPerf2
C_ATR_fg_MissionRegenThd	G/SEC	C_ATR_fg_MissionRegenThd
C_CBL_EGX_Increment	NONE	C_CBL_EGX_Increment
C_CBL_MCF_Increment	KG/MIN	C_CBL_MCF_Increment
C_CBM_Indicated_Fuel_Ov_Switch	NONE	C_CBM_Indicated_Fuel_Ov_Switch
C_CBM_Indicated_Fuel_Ov_Value	MG/STROKE	C_CBM_Indicated_Fuel_Ov_Value
C_CBR_Fuelpr_Override_Value	BAR	C_CBR_Fuelpr_Override_Value
C_CBR_InCylDosing_UserOv_En	NONE	C_CBR_InCylDosing_UserOv_En
C_CBR_InCylDosing_UserOv_Val	MG/STROKE	C_CBR_InCylDosing_UserOv_Val
C_CBR_Indc_TrqFuel_Ov_En	NONE	C_CBR_Indc_TrqFuel_Ov_En
C_CBR_Indc_TrqFuel_Ov_Value	MG/STROKE	C_CBR_Indc_TrqFuel_Ov_Value
C_CBR_Main_Pulse	NONE	C_CBR_Main_Pulse
C_CBR_Main_SOI_Increment	DEG	C_CBR_Main_SOI_Increment
C_CBR_Main_SOI_Override_Val	DEG	C_CBR_Main_SOI_Override_Val
C_FSI_s_StopFuel	NONE	C_FSI_s_StopFuel
C_GTIS_EngineCPL	NONE	C_GTIS_EngineCPL
C_OCR_Nominal_Cntrl_Gain	NONE	C_OCR_Nominal_Cntrl_Gain
C_PME_PM_ClampFuelThd	MG/STROKE	C_PME_PM_ClampFuelThd
C_PME_PM_ClampSpeedThd	RPM	C_PME_PM_ClampSpeedThd
C_PME_PM_Rate_Idle_Max	G/HR	C_PME_PM_Rate_Idle_Max
C_PME_PM_Rate_Idle_Min	G/HR	C_PME_PM_Rate_Idle_Min
C_PME_PM_ZeroCutoffFuel	MG/STROKE	C_PME_PM_ZeroCutoffFuel
C_PME_PPC_En	NONE	C_PME_PPC_En
C_PME_SOI_FactorOffset	NONE	C_PME_SOI_FactorOffset
C_SFD_fv_RegenMinFlow	M3/S	C_SFD_fv_RegenMinFlow
C_SFR_tmh_CleaningRegenMaxThd	HR	C_SFR_tmh_CleaningRegenMaxThd
C_SFR_tmh_SinceActiveRegenThd	HR	C_SFR_tmh_SinceActiveRegenThd
C_SFR_tmh_SinceAnyRegenThd	HR	C_SFR_tmh_SinceAnyRegenThd

CAC_Outlet_Tmptr_Est	DEG_C	CAC_Outlet_Tmptr_Est
Calibration_Version_Number	NONE	Calibration_Version_Number
CBL_EGR_Frac_Cmd	NONE	CBL_EGR_Frac_Cmd
CBL_Fuel_Cmd	MG/STROKE	CBL_Fuel_Cmd
CBL_MCF_Cmd	KG/MIN	CBL_MCF_Cmd
CBL_MCF_Ref	KG/MIN	CBL_MCF_Ref
CBM_Chrg_Load_Ref	NONE	CBM_Chrg_Load_Ref
CBM_Comb_Load_Ref	NONE	CBM_Comb_Load_Ref
CBM_Fdbk_AccumulatorPress	BAR_A	CBM_Fdbk_AccumulatorPress
CBM_FdbkTorqueFuel	MG/STROKE	CBM_FdbkTorqueFuel
CBM_Indicated_Combustion_Torque	N_M	CBM_Indicated_Combustion_Torque
CBM_Indicated_Fuel	MG/STROKE	CBM_Indicated_Fuel
CBM_Indicated_Trq_Cmd	N_M	CBM_Indicated_Trq_Cmd
CBM_Indicated_Trq_Fuel	MG/STROKE	CBM_Indicated_Trq_Fuel
CBM_Indicated_Trq_Gain	NONE	CBM_Indicated_Trq_Gain
CBM_O2_Out_Frac	NONE	CBM_O2_Out_Frac
CBM_O2_Out_MoleFrac	none	CBM_O2_Out_MoleFrac
CBM_PM_Out_Frac	NONE	CBM_PM_Out_Frac
CBM_PM_Out_PPM	NONE	CBM_PM_Out_PPM
CBM_PM_Out_Rate	G/HR	CBM_PM_Out_Rate
CBM_Torque_Fuel	MG/STROKE	CBM_Torque_Fuel
CBP_Air_Fuel_Ratio	NONE	CBP_Air_Fuel_Ratio
CBP_Charge_Fuel_Ratio	NONE	CBP_Charge_Fuel_Ratio
CBP_Intake_O2_Concentration	NONE	CBP_Intake_O2_Concentration
CBP_O2_Frac_Residual_Bef_Delay	NONE	CBP_O2_Frac_Residual_Bef_Delay
CBR_Alpha	NONE	CBR_Alpha
CBR_Alpha_WT_Factor	NONE	CBR_Alpha_WT_Factor
CBR_Base_Chi_Mixing_Factor	NONE	CBR_Base_Chi_Mixing_Factor
CBR_Base_Chi_WT_Factor	NONE	CBR_Base_Chi_WT_Factor
CBR_Chi_Factor	NONE	CBR_Chi_Factor
CBR_Chi_Mode_Status	NONE	CBR_Chi_Mode_Status
CBR_Chi_Table_Mask	NONE	CBR_Chi_Table_Mask
CBR_Cold_Amb_Ref_Status	NONE	CBR_Cold_Amb_Ref_Status
CBR_Compressor_Inlet_Density	KG/M3	CBR_Compressor_Inlet_Density
CBR_EGR_Frac_Ref	NONE	CBR_EGR_Frac_Ref
CBR_FCLR_WT_Factor	NONE	CBR_FCLR_WT_Factor
CBR_Fuel_Ref	MG/STROKE	CBR_Fuel_Ref
CBR_Main_Fueling	MG/STROKE	CBR_Main_Fueling
CBR_Main_SOI	DEG	CBR_Main_SOI
CBR_Main_SOI_Ref	DEG	CBR_Main_SOI_Ref

CBR_MCF_Ref	KG/MIN	CBR_MCF_Ref
CBR_Pilot1_Fuel_Quantity_Final	MG/STROKE	CBR_Pilot1_Fuel_Quantity_Final
CBR_Pilot1_SOI	NONE	CBR_Pilot1_SOI
CBR_Pilot1_Torque_Fuel_Qty	MG/STROKE	CBR_Pilot1_Torque_Fuel_Qty
CBR_Pilot2_Fuel_Quantity_Final	MG/STROKE	CBR_Pilot2_Fuel_Quantity_Final
CBR_Pilot2_SOI	NONE	CBR_Pilot2_SOI
CBR_Pilot2_Torque_Fuel_Qty	MG/STROKE	CBR_Pilot2_Torque_Fuel_Qty
CBR_Post1_Fuel_Quantity_Final	MG/STROKE	CBR_Post1_Fuel_Quantity_Final
CBR_Post1_SOI	NONE	CBR_Post1_SOI
CBR_Post1_Torque_Fuel_Qty	MG/STROKE	CBR_Post1_Torque_Fuel_Qty
CBR_Post2_Fuel_Quantity_Final	MG/STROKE	CBR_Post2_Fuel_Quantity_Final
CBR_Post2_SOI	NONE	CBR_Post2_SOI
CBR_Post2_Torque_Fuel_Qty	MG/STROKE	CBR_Post2_Torque_Fuel_Qty
CBR_Post3_Fuel_Quantity_Final	MG/STROKE	CBR_Post3_Fuel_Quantity_Final
CBR_Prot_WT_Factor	NONE	CBR_Prot_WT_Factor
CBR_Protection_Mixing_Factor	NONE	CBR_Protection_Mixing_Factor
CBR_SCRTM_Mixing_Factor	NONE	CBR_SCRTM_Mixing_Factor
CBR_SCRTM_WT_Factor	NONE	CBR_SCRTM_WT_Factor
CBR_Thermal_Felix_Active	NONE	CBR_Thermal_Felix_Active
CBR_Thermal_Oscar_Active	NONE	CBR_Thermal_Oscar_Active
CBR_TM1_WT_Factor	NONE	CBR_TM1_WT_Factor
CBR_TM2_WT_Factor	NONE	CBR_TM2_WT_Factor
Charge_Flow	KG/MIN	Charge_Flow
Charge_Flow_Command_State	NONE	Charge_Flow_Command_State
Charge_Press	KPA	Charge_Press
Charge_Press_Est	KPA	Charge_Press_Est
Charge_Press_Est_Offset	KPA	Charge_Press_Est_Offset
Charge_Press_IR_Enable	NONE	Charge_Press_IR_Enable
Charge_Press_Sensor	KPA	Charge_Press_Sensor
Charge_Press_Tolerance	KPA	Charge_Press_Tolerance
Charge_Tmptr	DEG_C	Charge_Tmptr
Charge_Tmptr_Est	DEG_C	Charge_Tmptr_Est
Charge_Tmptr_Sensor	DEG_C	Charge_Tmptr_Sensor
ChargeTmptr_IRH_Enable	NONE	ChargeTmptr_IRH_Enable
ChargeTmptr_IRL_Enable	NONE	ChargeTmptr_IRL_Enable
CHL_COT_Drt_Active	NONE	CHL_COT_Drt_Active
CHL_Delta_P_Drt_Active	NONE	CHL_Delta_P_Drt_Active
CHL_EGR_Frac_Cmd	NONE	CHL_EGR_Frac_Cmd
CHL_MCF_Cmd	KG/MIN	CHL_MCF_Cmd
CHL_Turbo_Drt_Limit	KRPM	CHL_Turbo_Drt_Limit

CHL_Turbo_Speed_Drt_Active	NONE	CHL_Turbo_Speed_Drt_Active
CHM_Cusum_Reset_Flag	NONE	CHM_Cusum_Reset_Flag
CHP_EGR_Flow_Before_Delay	KG/MIN	CHP_EGR_Flow_Before_Delay
CHP_EGR_Flow_Delay	S	CHP_EGR_Flow_Delay
CHP_Intake_Manifold_Tmptr_K	DEG_K	CHP_Intake_Manifold_Tmptr_K
CHP_O2_Flow_Delay	S	CHP_O2_Flow_Delay
CHP_O2_Frac_EGR	NONE	CHP_O2_Frac_EGR
CHP_Predicted_IMT	DEG_C	CHP_Predicted_IMT
CHP_Pumping_Torque	N_M	CHP_Pumping_Torque
CHP_Pumping_Torque_Adj	N_M	CHP_Pumping_Torque_Adj
CHP_Volumetric_Efficiency	NONE	CHP_Volumetric_Efficiency
Combustion_Control_Path_Owner	NONE	Combustion_Control_Path_Owner
Commanded_Accelerator_Winner	NONE	Commanded_Accelerator_Winner
Comp_Efficiency_Est	NONE	Comp_Efficiency_Est
Compressor_Inlet_Density	KG/M3	Compressor_Inlet_Density
Compressor_Inlet_Press	KPA	Compressor_Inlet_Press
Compressor_Inlet_Tmptr	DEG_C	Compressor_Inlet_Tmptr
Compressor_Inlet_Tmptr_Rise	DEG_C	Compressor_Inlet_Tmptr_Rise
Compressor_Inlet_Tmptr_Sensor	DEG_C	Compressor_Inlet_Tmptr_Sensor
Compressor_Outlet_Press	KPA	Compressor_Outlet_Press
Compressor_Outlet_Tmptr	DEG_C	Compressor_Outlet_Tmptr
Controller_EGR_Flow_Cmd	KG/MIN	Controller_EGR_Flow_Cmd
Controller_EGR_Frac_Cmd	NONE	Controller_EGR_Frac_Cmd
Controller_FAF_Cmd	KG/MIN	Controller_FAF_Cmd
Controller_MCF_Cmd	KG/MIN	Controller_MCF_Cmd
Coolant_Temperature	DEG_C	Coolant_Temperature
Crankcase_Press	KPA_G	Crankcase_Press
Crankcase_Pressure	KPA_G	Crankcase_Pressure
Current_Engine_State	NONE	Current_Engine_State
DL_ShiftInProgress	NONE	DL_ShiftInProgress
DPWM_Acc1_Base_Frequency	HZ	DPWM_Acc1_Base_Frequency
DPWM_Acc1_Pedal_Pos_Sensor	%	DPWM_Acc1_Pedal_Pos_Sensor
DPWM_Acc2_Base_Frequency	HZ	DPWM_Acc2_Base_Frequency
DPWM_Acc2_Pedal_Pos_Sensor	%	DPWM_Acc2_Pedal_Pos_Sensor
EAC_EGR_Valve_Cmd	%	EAC_EGR_Valve_Cmd
EAC_EGR_Valve_Cmd_F	%	EAC_EGR_Valve_Cmd_F
EGA_Control_State	NONE	EGA_Control_State
EGA_Pos_Cir_Fault	NONE	EGA_Pos_Cir_Fault
EGA_Pos_Seq_Fault	NONE	EGA_Pos_Seq_Fault
EGA_Position_Cmd	%	EGA_Position_Cmd

EGA_Position_Fault	NONE	EGA_Position_Fault
EGA_Position_Ref_Unfiltered	%	EGA_Position_Ref_Unfiltered
EGA_PWM_Abs_Duty_Cycle	%	EGA_PWM_Abs_Duty_Cycle
EGA_PWM_Clamped	%	EGA_PWM_Clamped
EGR_Actuator_EFA	CM2	EGR_Actuator_EFA
EGR_Delta_Press_Sensor	KPA	EGR_Delta_Press_Sensor
EGR_Flow	KG/MIN	EGR_Flow
EGR_Flow_Unlimited	KG/MIN	EGR_Flow_Unlimited
EGR_Fraction	NONE	EGR_Fraction
EGR_Fraction_Command_State	NONE	EGR_Fraction_Command_State
EGR_Orifice_Delta_Press	KPA	EGR_Orifice_Delta_Press
EGR_Orifice_Tmptr	DEG_C	EGR_Orifice_Tmptr
EGR_Orifice_Tmptr_Sensor	DEG_C	EGR_Orifice_Tmptr_Sensor
EGR_Position	%	EGR_Position
EGR_Position_Cmd_Final	%	EGR_Position_Cmd_Final
EGR_Position_Percent	%	EGR_Position_Percent
EGR_Position_Sensor_Volts	V	EGR_Position_Sensor_Volts
EGR_Position_Status	NONE	EGR_Position_Status
EGR_Valve_Delta_Press	KPA	EGR_Valve_Delta_Press
EGR_Valve_Is_Closed	NONE	EGR_Valve_Is_Closed
EGRT_IR_Enable	NONE	EGRT_IR_Enable
EGRT_IR_Stuck_En	NONE	EGRT_IR_Stuck_En
EMM_Active_State_1	NONE	EMM_Active_State_1
EMM_Active_State_2	NONE	EMM_Active_State_2
EMM_AECD_State	NONE	EMM_AECD_State
EMM_Derate_State_1	NONE	EMM_Derate_State_1
EMM_Derate_State_2	NONE	EMM_Derate_State_2
EMM_NTE_Map_State	NONE	EMM_NTE_Map_State
EMM_Protection_Flag	NONE	EMM_Protection_Flag
EMM_Protection_State_1	NONE	EMM_Protection_State_1
EMM_Protection_State_2	NONE	EMM_Protection_State_2
Engine_No_Load_Torque	N_M	Engine_No_Load_Torque
Engine_Run_Time	S	Engine_Run_Time
Engine_Speed	RPM	Engine_Speed
Engine_Torque_Mode	NONE	Engine_Torque_Mode
Engn_Control_Path_Owner	NONE	Engn_Control_Path_Owner
ENGN_Final_Torque_Cmd	N_M	ENGN_Final_Torque_Cmd
EONOx_Comp_Per_O2	%	EONOx_Comp_Per_O2
EONOx_Comp_Value	PPM	EONOx_Comp_Value
EONOx_Dew_Point_State	NONE	EONOx_Dew_Point_State

```
EONOx_DewPtExceeded                S                EONOx_DewPtExceeded
EONOx_Diag_Mot_Enbl                NONE             EONOx_Diag_Mot_Enbl
EONOx_FirstCatIn_Press             KPA              EONOx_FirstCatIn_Press
EONOx_IR_Mot_Cusum_Timer           S                EONOx_IR_Mot_Cusum_Timer
EONOx_IR_Mot_State                 NONE             EONOx_IR_Mot_State
EONOx_IRH_Mot_Cusum_Value          PPM              EONOx_IRH_Mot_Cusum_Value
EONOx_IRL_Mot_Cusum_Value          PPM              EONOx_IRL_Mot_Cusum_Value
EONOx_NotValid_Abort_Flag          NONE             EONOx_NotValid_Abort_Flag
EONOx_Power_Not_InRange_Flag       NONE             EONOx_Power_Not_InRange_Flag
EONOx_Sensor_Status                NONE             EONOx_Sensor_Status
EPD_Torque_Derate_Value_id         NONE             EPD_Torque_Derate_Value_id
EPD_TorqueDerateValue              N_M              EPD_TorqueDerateValue
EPS_s_Error                        NONE             EPS_s_Error
EPS_ti_BkupGlitch                  S                EPS_ti_BkupGlitch
EPS_ti_MainGlitch                  S                EPS_ti_MainGlitch
Exhaust_Flow                       KG/MIN           Exhaust_Flow
Exhaust_Metal_Tmptr                DEG_C            Exhaust_Metal_Tmptr
Exhaust_Press                      KPA              Exhaust_Press
Exhaust_Press_Sensor               KPA              Exhaust_Press_Sensor
Exhaust_Press_Sensor_Status        NONE             Exhaust_Press_Sensor_Status
Exhaust_Press_Sensor_Volts         V                Exhaust_Press_Sensor_Volts
Exhaust_Press_Status               NONE             Exhaust_Press_Status
Exhaust_Tmptr                      DEG_C            Exhaust_Tmptr
EXM_ATM_Oper_Mode_Rqst             NONE             EXM_ATM_Oper_Mode_Rqst
EXM_SCR_Warmup_Active              NONE             EXM_SCR_Warmup_Active
EXM_TMMode                         NONE             EXM_TMMode
Fan_Drive_State                    NONE             Fan_Drive_State
FCC_Fan_Clutch_PWM_Duty_Cycle      %                FCC_Fan_Clutch_PWM_Duty_Cycle
FCR_Instantaneous_Fuel_Rate        L/HR             FCR_Instantaneous_Fuel_Rate
Filtered_Turbo_Speed               KRPM             Filtered_Turbo_Speed
Final_Timing                       DEG              Final_Timing
Fresh_Air_Flow                     KG/MIN           Fresh_Air_Flow
Friction_Torque                    N_M              Friction_Torque
FSI_hp_Cmd                         BAR              FSI_hp_Cmd
FSI_q_TotalFueling                 MG/STROKE        FSI_q_TotalFueling
FSI_v_Batt                         V                FSI_v_Batt
Fuel_Delivery_Rate_Per_Min         KG/MIN           Fuel_Delivery_Rate_Per_Min
H_APC_hp_Deviation                 BAR              H_APC_hp_Deviation
H_APC_hp_Error                     BAR              H_APC_hp_Error
$
```

```
#ECM parameters
#ECM parameter                                ECM Units        ASSET label

ECM1          2000  PROPRIETARY_REQUEST

#ECM_Run_Time                                  s                ECM_Run_Time_1
H_APC_hp_MdvPeak                              BAR              H_APC_hp_MdvPeak
H_APC_qr_KiTerm                               G/SEC            H_APC_qr_KiTerm
H_APM_t_Temperature                           DEG_C            H_APM_t_Temperature
H_CBM_NOx_Out_PPM_Status                      NONE             H_CBM_NOx_Out_PPM_Status
H_CCP_Dither_Err_Differential                 KPA_G            H_CCP_Dither_Err_Differential
H_CCP_Idle_Thd_Differential                   KPA_G            H_CCP_Idle_Thd_Differential
H_CCP_Mod_High_Thd                            KPA_G            H_CCP_Mod_High_Thd
H_CCP_Sev_High_Thd                            KPA_G            H_CCP_Sev_High_Thd
H_DL_EDT_Bcst                                 N_M              H_DL_EDT_Bcst
H_EGA_BM_Motor_Current                        A                H_EGA_BM_Motor_Current
H_EGA_Pos_Count_Status                        NONE             H_EGA_Pos_Count_Status
H_EMP_Enabled                                 NONE             H_EMP_Enabled
H_EPD_Latest_Derate_ID                        NONE             H_EPD_Latest_Derate_ID
H_EPD_SpeedDerateValueId                      NONE             H_EPD_SpeedDerateValueId
H_EPS_ca_BkupPhase                            DEG              H_EPS_ca_BkupPhase
H_FSI_ct_DisplayCylinder                      NONE             H_FSI_ct_DisplayCylinder
H_FSI_q_TotalFueling                          MG/STROKE        H_FSI_q_TotalFueling
H_IAT_Control_State                           NONE             H_IAT_Control_State
H_IAT_HB_AZ_Error                             NONE             H_IAT_HB_AZ_Error
H_IAT_HB_AZ_Offset                            %                H_IAT_HB_AZ_Offset
H_IAT_HB_Driver_Over_Current                  NONE             H_IAT_HB_Driver_Over_Current
H_IAT_HB_Motor_Current                        A                H_IAT_HB_Motor_Current
H_IAT_HB_Motor_Current_Ave                    A                H_IAT_HB_Motor_Current_Ave
H_IAT_HB_Over_Cur_Ave                         NONE             H_IAT_HB_Over_Cur_Ave
H_IAT_HB_Pos_Cusum_IRH_Value                  NONE             H_IAT_HB_Pos_Cusum_IRH_Value
H_IAT_HB_Pos_Cusum_IRL_Value                  NONE             H_IAT_HB_Pos_Cusum_IRL_Value
H_IAT_Position_Cmd                            %                H_IAT_Position_Cmd
H_IAT_Position_Percent                        %                H_IAT_Position_Percent
H_IAT_Position_Ref_Unfiltered                 %                H_IAT_Position_Ref_Unfiltered
H_IAT_Position_Sensor                         %                H_IAT_Position_Sensor
H_IAT_PWM_Abs_Duty_Cycle                      %                H_IAT_PWM_Abs_Duty_Cycle
H_IAT_PWM_Clamped                             %                H_IAT_PWM_Clamped
H_IFC_ca_SOTTL                                DEG              H_IFC_ca_SOTTL
```

H_IFC_q_TotalFueling	MG/STROKE	H_IFC_q_TotalFueling
H_IMA_i_Cmd	A	H_IMA_i_Cmd
H_IMA_i_Fltr	A	H_IMA_i_Fltr
H_MACH_NetTorqueCmd	N_M	H_MACH_NetTorqueCmd
H_PME_PM_Factor_PRSPIF	NONE	H_PME_PM_Factor_PRSPIF
H_PME_PMFuel	MG/STROKE	H_PME_PMFuel
H_PME_SootRateClamped	G/HR	H_PME_SootRateClamped
H_PME_SootRateUnclamped	G/HR	H_PME_SootRateUnclamped
#H_PRD_ct_HighDecisionPerCycle	COUNTS	H_PRD_ct_HighDecisionPerCycle
#H_PRD_ct_LowDecisionPerCycle	COUNTS	H_PRD_ct_LowDecisionPerCycle
H_PRD_ct_HighDecisionPerCycle	NONE	H_PRD_ct_HighDecisionPerCycle
H_PRD_ct_LowDecisionPerCycle	NONE	H_PRD_ct_LowDecisionPerCycle
H_PRD_s_PressStable	NONE	H_PRD_s_PressStable
H_SFP_DPTrust_Fctr_Adjusted	NONE	H_SFP_DPTrust_Fctr_Adjusted
H_SFP_gpl_DPUSLE_STD	G/L	H_SFP_gpl_DPUSLE_STD
H_SFP_gpl_Soot_Load	G/L	H_SFP_gpl_Soot_Load
H_TRM_ti_PulseTotOntimeTrim	MSEC	H_TRM_ti_PulseTotOntimeTrim
H_UFM_Charge_HiFlow_Cusum_Timer	S	H_UFM_Charge_HiFlow_Cusum_Timer
H_UFM_Charge_HiFlow_Cusum_Value	KG/MIN	H_UFM_Charge_HiFlow_Cusum_Value
H_UFM_Charge_LoFlow_Cusum_Timer	S	H_UFM_Charge_LoFlow_Cusum_Timer
H_UFM_Charge_LoFlow_Cusum_Value	KG/MIN	H_UFM_Charge_LoFlow_Cusum_Value
H_UFM_EGR_HiFlow_Cusum_Timer	S	H_UFM_EGR_HiFlow_Cusum_Timer
H_UFM_EGR_HiFlow_Cusum_Value	KG/MIN	H_UFM_EGR_HiFlow_Cusum_Value
H_UFM_EGR_LoFlow_Cusum_Timer	S	H_UFM_EGR_LoFlow_Cusum_Timer
H_UFM_EGR_LoFlow_Cusum_Value	KG/MIN	H_UFM_EGR_LoFlow_Cusum_Value
IAT_Actuator_EFA	CM2	IAT_Actuator_EFA
IAT_Driver_Failure	NONE	IAT_Driver_Failure
IAT_HB_AZ_Offset	%	IAT_HB_AZ_Offset
IAT_Position	%	IAT_Position
IAT_Position_Percent	%	IAT_Position_Percent
IAT_Position_Percent_Cmd	%	IAT_Position_Percent_Cmd
IAT_Position_Sensor_Volts	V	IAT_Position_Sensor_Volts
INDM_DerateState	NONE	INDM_DerateState
INDM_Lamp_State	NONE	INDM_Lamp_State
INDM_SevDerateRequest	NONE	INDM_SevDerateRequest
INDM_Trq1DerateRequest	NONE	INDM_Trq1DerateRequest
INDM_Trq2DerateRequest	NONE	INDM_Trq2DerateRequest
Inertia_Index	NONE	Inertia_Index
Intake_Manifold_Temperature	DEG_C	Intake_Manifold_Temperature
J39_AFT_Intake_NOx	PPM	J39_AFT_Intake_NOx

J39_AFT_Intake_Per_O2	%	J39_AFT_Intake_Per_O2
J39_AFT_Outlet_NOx	PPM	J39_AFT_Outlet_NOx
J39_AFT_Outlet_NOx_Read_Stbl	NONE	J39_AFT_Outlet_NOx_Read_Stbl
J39_AFT_Outlet_O2_Read_Stbl	NONE	J39_AFT_Outlet_O2_Read_Stbl
J39_AFT_Outlet_Per_O2	%	J39_AFT_Outlet_Per_O2
J39_AFT_Outlet_Self_Diag_Feedback_Status	NONE	J39_AFT_Outlet_Self_Diag_Feedback_Status
J39_CurrentGear	NONE	J39_CurrentGear
J39_UQS_Cat_Reag_Conc	%	J39_UQS_Cat_Reag_Conc
J39_UQS_Cat_Reag_Prop_FMI	NONE	J39_UQS_Cat_Reag_Prop_FMI
J39_UQS_Cat_Reag_Temp2_FMI	NONE	J39_UQS_Cat_Reag_Temp2_FMI
J39_UQS_Cat_Reag_Type	NONE	J39_UQS_Cat_Reag_Type
J39_VGT_Actuator_Position	%	J39_VGT_Actuator_Position
J39_VGT_Motor_Effort	NONE	J39_VGT_Motor_Effort
J39_VGT_Target_Position	%	J39_VGT_Target_Position
J39_VGT_Temperature	DEG_C	J39_VGT_Temperature
Jcomm_Derate_Torque	%	Jcomm_Derate_Torque
Jcomm_Engine_Torque_Command	%	Jcomm_Engine_Torque_Command
#Key_Off_Count	COUNTS	Key_Off_Count
Key_Off_Count	NONE	Key_Off_Count
Key_Switch	NONE	Key_Switch
LCE_CLS_AIP_Raw_Voltage	VOLT	LCE_CLS_AIP_Raw_Voltage
Mach_Control_Path_Owner	NONE	Mach_Control_Path_Owner
MIL_Status	NONE	MIL_Status
Module_Off_Time	S	Module_Off_Time
Net_Brake_Torque	N_M	Net_Brake_Torque
Net_Engine_Torque	N_M	Net_Engine_Torque
O_ATR_Oper_Mode_Enbl	NONE	O_ATR_Oper_Mode_Enbl
O_ATR_Oper_Mode_Val	NONE	O_ATR_Oper_Mode_Val
O_SFP_gpl_Soot_Load_Reset_En	NONE	O_SFP_gpl_Soot_Load_Reset_En
O_SFP_gpl_Soot_Load_Reset_Val	G/L	O_SFP_gpl_Soot_Load_Reset_Val
O_SFR_trc_RegenTrgt_Enbl	NONE	O_SFR_trc_RegenTrgt_Enbl
O_SFR_trc_RegenTrgt_Val	DEG_C	O_SFR_trc_RegenTrgt_Val
OBD_Number_Of_Operation_Cycles	NONE	OBD_Number_Of_Operation_Cycles
OBDAD_Intrude_Ctrl_Path_Owner	NONE	OBDAD_Intrude_Ctrl_Path_Owner
OFC_Fuel_Limit	MG/STROKE	OFC_Fuel_Limit
Oil_Pressure	KPA_G	Oil_Pressure
Oil_Pressure_Absolute	KPA	Oil_Pressure_Absolute
P_APC_ct_TotalMdvPeakCounts	NONE	P_APC_ct_TotalMdvPeakCounts
P_APC_hp_MdvDrivePeak	BAR	P_APC_hp_MdvDrivePeak
P_ATR_SFM_OperModeRqst	NONE	P_ATR_SFM_OperModeRqst

P_INDM_Trq1_Drt_Idx	NONE	P_INDM_Trq1_Drt_Idx
P_INDM_Trq2_Drt_Idx	NONE	P_INDM_Trq2_Drt_Idx
P_OCL_tm_FacePlug_Count	S	P_OCL_tm_FacePlug_Count
#P_SCD_ct_NOxOff_RRTestCompl_Hi	COUNTS	P_SCD_ct_NOxOff_RRTestCompl_Hi
#P_SCD_ct_NOxOff_RRTestCompl_Lo	COUNTS	P_SCD_ct_NOxOff_RRTestCompl_Lo
#P_SCD_NOxOff_FIR_TestCmplt_Hi	COUNTS	P_SCD_NOxOff_FIR_TestCmplt_Hi
#P_SCD_NOxOff_FIR_TestCmplt_Lo	COUNTS	P_SCD_NOxOff_FIR_TestCmplt_Lo
P_SCD_ct_NOxOff_RRTestCompl_Hi	NONE	P_SCD_ct_NOxOff_RRTestCompl_Hi
P_SCD_ct_NOxOff_RRTestCompl_Lo	NONE	P_SCD_ct_NOxOff_RRTestCompl_Lo
P_SCD_NOxOff_FIR_TestCmplt_Hi	NONE	P_SCD_NOxOff_FIR_TestCmplt_Hi
P_SCD_NOxOff_FIR_TestCmplt_Lo	NONE	P_SCD_NOxOff_FIR_TestCmplt_Lo
P_SCD_ppm_NOxOff_FiltTestResult_Hi	PPM	P_SCD_ppm_NOxOff_FiltTestResult_Hi
P_SCD_ppm_NOxOff_FiltTestResult_Lo	PPM	P_SCD_ppm_NOxOff_FiltTestResult_Lo
P_SCD3_tm_UsedUp_StrgLvl	S	P_SCD3_tm_UsedUp_StrgLvl
#P_SCDE_CE2_ct_EWMA_FIR_Compl	COUNTS	P_SCDE_CE2_ct_EWMA_FIR_Compl
#P_SCDE_CE2_ct_EWMA_RR_Compl	COUNTS	P_SCDE_CE2_ct_EWMA_RR_Compl
P_SCDE_CE2_ct_EWMA_FIR_Compl	NONE	P_SCDE_CE2_ct_EWMA_FIR_Compl
P_SCDE_CE2_ct_EWMA_RR_Compl	NONE	P_SCDE_CE2_ct_EWMA_RR_Compl
P_SCDE_CE2_pc_ACIE	%	P_SCDE_CE2_pc_ACIE
#P_SCDE_CM_ct_NormEff_FIR_Compl	COUNTS	P_SCDE_CM_ct_NormEff_FIR_Compl
#P_SCDE_CM_ct_NormEff_RR_Compl	COUNTS	P_SCDE_CM_ct_NormEff_RR_Compl
P_SCDE_CM_ct_NormEff_FIR_Compl	NONE	P_SCDE_CM_ct_NormEff_FIR_Compl
P_SCDE_CM_ct_NormEff_RR_Compl	NONE	P_SCDE_CM_ct_NormEff_RR_Compl
P_SCR_Ctrl3_pc_CEVariation	%	P_SCR_Ctrl3_pc_CEVariation
P_SCR3_vm_ml_DosErr_Intg	ML	P_SCR3_vm_ml_DosErr_Intg
P_SFD_tmh_TFR_ActualTime	HR	P_SFD_tmh_TFR_ActualTime
P_SFP_gpl_DPSLE_Adj	G/L	P_SFP_gpl_DPSLE_Adj
P_SFP_gpl_Soot_Load_MB	G/L	P_SFP_gpl_Soot_Load_MB
P_SFR_Regen_Trigger_State	NONE	P_SFR_Regen_Trigger_State
P_SFR_tmh_ElapsedCleaningTime	HR	P_SFR_tmh_ElapsedCleaningTime
P_SFR_tmh_SinceActiveRegen	HR	P_SFR_tmh_SinceActiveRegen
PME_M270_SootRate_Ref	G/HR	PME_M270_SootRate_Ref
PTM_Final_Oper_Mode	NONE	PTM_Final_Oper_Mode
Raw_Turbo_Speed	HZ	Raw_Turbo_Speed
#Reset_Count	COUNTS	Reset_Count
Reset_Count	NONE	Reset_Count
RSC_ReferenceSpeed	KM/HR	RSC_ReferenceSpeed
Sensor_Supply_1_Voltage	V	Sensor_Supply_1_Voltage
Sensor_Supply_2_Voltage	V	Sensor_Supply_2_Voltage
Sensor_Supply_3_Voltage	V	Sensor_Supply_3_Voltage

Sensor_Supply_4_Voltage	V	Sensor_Supply_4_Voltage
Sensor_Supply_5_Voltage	V	Sensor_Supply_5_Voltage
Service_Brake_Switch	NONE	Service_Brake_Switch
Surge_Corr_Active	NONE	Surge_Corr_Active
Surge_Margin	%	Surge_Margin
T_AIM_DOC_In_RLOC	NONE	T_AIM_DOC_In_RLOC
T_AIM_DOC_Out_RLOC	NONE	T_AIM_DOC_Out_RLOC
T_AIM_DPF_DeltaP_RLOC	NONE	T_AIM_DPF_DeltaP_RLOC
T_AIM_DPF_Out_RLOC	NONE	T_AIM_DPF_Out_RLOC
T_AIM_DPF_OutP_RLOC	NONE	T_AIM_DPF_OutP_RLOC
TAHR_dP_over_P	NONE	TAHR_dP_over_P
TAHR_dP_over_P_Limit	NONE	TAHR_dP_over_P_Limit
TAHR_EGR_Flow_Error_Normalized	NONE	TAHR_EGR_Flow_Error_Normalized
TAHR_EGR_Frac_O2_Adj	NONE	TAHR_EGR_Frac_O2_Adj
TAHR_EGR_Valve_Full_Open	NONE	TAHR_EGR_Valve_Full_Open
TAHR_EMP_Cmd_Final	KPA	TAHR_EMP_Cmd_Final
TAHR_EMP_Controller_Error	NONE	TAHR_EMP_Controller_Error
TAHR_EMP_Fdbk_Cmd	KPA	TAHR_EMP_Fdbk_Cmd
TAHR_EMP_Feed_Fwd_Cmd	KPA	TAHR_EMP_Feed_Fwd_Cmd
TAHR_MCF_Error	KG/MIN	TAHR_MCF_Error
TAHR_MCF_Fdbk_ULim	KPA	TAHR_MCF_Fdbk_ULim
TAHR_OSR_dPoP_Final_Cmd	NONE	TAHR_OSR_dPoP_Final_Cmd
TAHR_TGC_Is_Active	NONE	TAHR_TGC_Is_Active
TAHR_VGT_Full_Closed	NONE	TAHR_VGT_Full_Closed
TAHR_VGT_Full_Open	NONE	TAHR_VGT_Full_Open
TAHR_VGT_LLim	%	TAHR_VGT_LLim
TAHR_VGT_ULim	%	TAHR_VGT_ULim
TGC_VT_Cmd	%	TGC_VT_Cmd
Torque_Limit_At_Current_Speed	N_M	Torque_Limit_At_Current_Speed
Total_Fueling	MG/STROKE	Total_Fueling
Total_O2_in_Cylinder	MG/STROKE	Total_O2_in_Cylinder
TPE_CIT_Sqrt	NONE	TPE_CIT_Sqrt
TPE_Corrected_Air_Flow	KG/S	TPE_Corrected_Air_Flow
TPE_Corrected_Engine_Speed	NONE	TPE_Corrected_Engine_Speed
TPE_Corrected_Turbo_Speed	RPM	TPE_Corrected_Turbo_Speed
TPE_Energy_Fraction	DEG_C	TPE_Energy_Fraction
TPE_Turbine_Press_Ratio	NONE	TPE_Turbine_Press_Ratio
TPE_Turbine_Pressure_Ratio_Term	%	TPE_Turbine_Pressure_Ratio_Term
Turbine_Out_Tmptr	DEG_C	Turbine_Out_Tmptr
Turbo_Speed_Est	KRPM	Turbo_Speed_Est

```
Turbo_Speed_Sensor                                KRPM            Turbo_Speed_Sensor
Turbo_Speed_Sensor_Status                         NONE            Turbo_Speed_Sensor_Status
UFM_Charge_Flow_Shift_Est                         KG/MIN          UFM_Charge_Flow_Shift_Est
UFM_Charge_Press_Est                              KPA             UFM_Charge_Press_Est
UFM_Corr_Engine_Speed                             NONE            UFM_Corr_Engine_Speed
UFM_EGR_Flow_Shift_Est                            KG/MIN          UFM_EGR_Flow_Shift_Est
_AC_Pressure_Switch_Mux_Address                   none           _AC_Pressure_Switch_Mux_Address
_AC_Pressure_Switch_Mux_Enable                    none           _AC_Pressure_Switch_Mux_Enable
_AC_Pressure_Switch_Mux_User_Selectable           none           _AC_Pressure_Switch_Mux_User_Selectable
_Accelerator_Base_Enable                          none           _Accelerator_Base_Enable
_Accelerator_Base_User_Selectable                 none           _Accelerator_Base_User_Selectable
_Accelerator_Brake_Overide_Enable                 none           _Accelerator_Brake_Overide_Enable
_Accelerator_Brake_Override_User_Selectable       none           _Accelerator_Brake_Override_User_Selectable
_Accelerator_Interlock_Enable                     none           _Accelerator_Interlock_Enable
_Accelerator_Interlock_State                      none           _Accelerator_Interlock_State
_Accelerator_Interlock_Switch_Logic               none           _Accelerator_Interlock_Switch_Logic
_Accelerator_Interlock_Switch_Mux_Address         none           _Accelerator_Interlock_Switch_Mux_Address
_Accelerator_Interlock_Switch_Mux_Enable          none           _Accelerator_Interlock_Switch_Mux_Enable
_Accelerator_Interlock_Switch_Mux_User_Selectable  none          _Accelerator_Interlock_Switch_Mux_User_Selectable
_Accelerator_Interlock_User_Selectable            none           _Accelerator_Interlock_User_Selectable
_Accelerator_Pedal_Mux_Address                    none           _Accelerator_Pedal_Mux_Address
_Accelerator_Pedal_Mux_Enable                     none           _Accelerator_Pedal_Mux_Enable
_AFT_DPF_Outlet_Pressure_Sensor                   kPa_G          _AFT_DPF_Outlet_Pressure_Sensor
_AFT_DPF_Outlet_Pressure_Sensor_Enable            none           _AFT_DPF_Outlet_Pressure_Sensor_Enable
_AFT_DPF_Outlet_Pressure_Sensor_User_Selectable   none           _AFT_DPF_Outlet_Pressure_Sensor_User_Selectable
_AFT_DPF_Outlet_Pressure_Sensor_Voltage           V              _AFT_DPF_Outlet_Pressure_Sensor_Voltage
_AFT_Filter_Installation_DeGreening_Status        none           _AFT_Filter_Installation_DeGreening_Status
_AFT_Filter_Installation_Enable                   none           _AFT_Filter_Installation_Enable
_AFT_Filter_Installation_User_Selectable          none           _AFT_Filter_Installation_User_Selectable
_AFT_Forced_DPF_Regeneration_Inhibit_Switch       none           _AFT_Forced_DPF_Regeneration_Inhibit_Switch
_AFT_Forced_DPF_Regeneration_Inhibit_Switch_Enable  none         _AFT_Forced_DPF_Regeneration_Inhibit_Switch_Enable
$


# Monitoring for this ECM
# ECM  Interval(ms) Collection Method
```

```
ECM2          2000  PROPRIETARY_REQUEST

# ECM parameter                                          ECM Units             ASSET label


_
_AFT_HEST_Lamp_Setup_DPF_High_Threshold                  Deg_C                  AFT_HEST_Lamp_Setup_DPF_High_Threshold
_AFT_HEST_Lamp_Setup_DPF_High_Threshold_Upper_Limit  Deg_C                  _AFT_HEST_Lamp_Setup_DPF_High_Threshold_Upper_Limit
_AFT_HEST_Lamp_Setup_DPF_Low_Threshold                   Deg_C                  _AFT_HEST_Lamp_Setup_DPF_Low_Threshold
_AFT_HEST_Lamp_Setup_DPF_Low_Threshold_Lower_Limit  Deg_C                  _AFT_HEST_Lamp_Setup_DPF_Low_Threshold_Lower_Limit
_AFT_HEST_Lamp_Setup_Enable                              none                   _AFT_HEST_Lamp_Setup_Enable
_AFT_HEST_Lamp_Setup_Regen_In_Progress_Enable  none                   _AFT_HEST_Lamp_Setup_Regen_In_Progress_Enable
_AFT_HEST_Lamp_Setup_Status                              none                   _AFT_HEST_Lamp_Setup_Status
_AFT_SCR_Performance_Test_Ambient_Pressure_Max  kPa                    _AFT_SCR_Performance_Test_Ambient_Pressure_Max
_AFT_SCR_Performance_Test_Ambient_Pressure_Min  kPa                    _AFT_SCR_Performance_Test_Ambient_Pressure_Min
_AFT_SCR_Performance_Test_Ambient_Temperature_Min  Deg_C               _AFT_SCR_Performance_Test_Ambient_Temperature_Min
_AFT_SCR_Performance_Test_Bed_Temperature_Max  Deg_C                   _AFT_SCR_Performance_Test_Bed_Temperature_Max
_AFT_SCR_Performance_Test_Bed_Temperature_Min  Deg_C                   _AFT_SCR_Performance_Test_Bed_Temperature_Min
_AFT_SCR_Performance_Test_Dosing_Rate_Min      ml/sec                  _AFT_SCR_Performance_Test_Dosing_Rate_Min
_AFT_SCR_Performance_Test_Enable               none                    _AFT_SCR_Performance_Test_Enable
_AFT_SCR_Performance_Test_EngineOut_NOx_Max    ppm                     _AFT_SCR_Performance_Test_EngineOut_NOx_Max
_AFT_SCR_Performance_Test_EngineOut_NOx_Min    ppm                     _AFT_SCR_Performance_Test_EngineOut_NOx_Min
_AFT_SCR_Performance_Test_Exhaust_Mass_Flow_Max  g/sec                 _AFT_SCR_Performance_Test_Exhaust_Mass_Flow_Max
_AFT_SCR_Performance_Test_Exhaust_Mass_Flow_Min  g/sec                 _AFT_SCR_Performance_Test_Exhaust_Mass_Flow_Min
_AFT_SCR_Performance_Test_User_Selectable      none                    _AFT_SCR_Performance_Test_User_Selectable
_AFT_Soot_Fill_Monitor_Ash                               gm                     _AFT_Soot_Fill_Monitor_Ash
_AFT_Soot_Fill_Monitor_Ash_Since_Last_Reset    gm                      _AFT_Soot_Fill_Monitor_Ash_Since_Last_Reset
_AFT_Soot_Fill_Monitor_Enable                            none                   _AFT_Soot_Fill_Monitor_Enable
_AFT_Soot_Fill_Monitor_Soot_Load_DP                      gm                     _AFT_Soot_Fill_Monitor_Soot_Load_DP
_AFT_Soot_Fill_Monitor_Status                            none                   _AFT_Soot_Fill_Monitor_Status
_AFT_Soot_Fill_Monitor_Uniform_Dist_Factor     Frac                    _AFT_Soot_Fill_Monitor_Uniform_Dist_Factor
_AFT_Soot_Fill_Monitor_User_Selectable                   none                   _AFT_Soot_Fill_Monitor_User_Selectable
_Aftertreatment_History_Enable                           none                   _Aftertreatment_History_Enable
_Aftertreatment_History_User_Selectable                  none                   _Aftertreatment_History_User_Selectable
ADD_s_Misfire                                            NONE                    ADD_s_Misfire
AIF_FuelRate                                             kg/hr                   AIF_FuelRate
C_CBR_Alpha_Override_Value                               None                    C_CBR_Alpha_Override_Value
C_CBR_Fuelpr_User_Override_En                            None                    C_CBR_Fuelpr_User_Override_En
C_CBR_Main_SOI_User_Override_En                          None                    C_CBR_Main_SOI_User_Override_En
C_CBR_Pilot2_Fuel_User_Override_En                       None                    C_CBR_Pilot2_Fuel_User_Override_En
C_CBR_Pilot2_SOI_User_Override_En                        None                    C_CBR_Pilot2_SOI_User_Override_En
```

C_CBR_Post1_Fuel_User_Override_En	None	C_CBR_Post1_Fuel_User_Override_En
C_CBR_Post1_SOI_User_Override_En	None	C_CBR_Post1_SOI_User_Override_En
C_CBR_Post2_Fuel_User_Override_En	None	C_CBR_Post2_Fuel_User_Override_En
C_CBR_Post2_SOI_User_Override_En	None	C_CBR_Post2_SOI_User_Override_En
C_EXM_Thermal_Mgt_Ovrd_Val	None	C_EXM_Thermal_Mgt_Ovrd_Val
C_EXM_Thermal_Mgt_User_Ovrd	None	C_EXM_Thermal_Mgt_User_Ovrd
CBM_FdbkTotalFuel	mg/stroke	CBM_FdbkTotalFuel
CBR_FCLR_Off	None	CBR_FCLR_Off
CBR_FCLR_On	None	CBR_FCLR_On
CBR_FCLR_Ref	None	CBR_FCLR_Ref
CBR_Heat_Post2_Torque_Fuel	mg/stroke	CBR_Heat_Post2_Torque_Fuel
CBR_Indicated_Torque_Fuel	mg/stroke	CBR_Indicated_Torque_Fuel
CBR_OFC_Detected	None	CBR_OFC_Detected
CBR_Post1_SOI_Event_Adj	None	CBR_Post1_SOI_Event_Adj
CBR_Post1_SOI_Ref	None	CBR_Post1_SOI_Ref
EGR_Frac_Surge_Corr	None	EGR_Frac_Surge_Corr
Fresh_Air_Flow_Status	None	Fresh_Air_Flow_Status
H_CHL_COT_Drt_Error	Deg_C	H_CHL_COT_Drt_Error
H_ERC_ActualGrossTrq	None	H_ERC_ActualGrossTrq
H_NDOT_Gov_Torque	N_m	H_NDOT_Gov_Torque
H_OCD_DOCD_Det_Flag	None	H_OCD_DOCD_Det_Flag
H_OCL_HC_Adsorb_Rate	None	H_OCL_HC_Adsorb_Rate
H_OCL_tm_FacePlug_Cls_Rt	None	H_OCL_tm_FacePlug_Cls_Rt
H_OCL_tm_FacePlug_Dep_Rt	None	H_OCL_tm_FacePlug_Dep_Rt
H_SFP_gph_Noxid_Rate	g/hr	H_SFP_gph_Noxid_Rate
H_SFP_gph_Oxid_Rate	g/hr	H_SFP_gph_Oxid_Rate
H_SFR_Regen_Tactic	None	H_SFR_Regen_Tactic
HDR_EGR_Delta_Press	kPa	HDR_EGR_Delta_Press
HDR_EGR_Delta_Press_Sensor	kPa	HDR_EGR_Delta_Press_Sensor
LSI_ReferenceSpd	RPM	LSI_ReferenceSpd
MCF_Surge_Corr	None	MCF_Surge_Corr
OFC_Density_Gain_Adjustment	mg/stroke	OFC_Density_Gain_Adjustment
OFC_Equiv_Ratio_Limit	None	OFC_Equiv_Ratio_Limit
OFC_Fuel_LLim	mg/stroke	OFC_Fuel_LLim
P_ATD_ct_DPFOut_HiTmptr_Persist	NONE	P_ATD_ct_DPFOut_HiTmptr_Persist
P_ATD_tmh_TimerRegenRqstActive	hr	P_ATD_tmh_TimerRegenRqstActive
P_FIR_qr_MaxDslDmd	GM/SEC	P_FIR_qr_MaxDslDmd
P_OCD_ct_DOCD_Lo_Eff_Count	NONE	P_OCD_ct_DOCD_Lo_Eff_Count
P_OCD_fn_DOCD_Eff	None	P_OCD_fn_DOCD_Eff
P_OCL_DOC_Face_Plug_Active	None	P_OCL_DOC_Face_Plug_Active

```
P_SFP_mg_Soot_Load_DP                       gm              P_SFP_mg_Soot_Load_DP
P_SFP_Soot_Stage                            None            P_SFP_Soot_Stage
P_SFR_ct_Ineff_Regen_Occr                   NONE            P_SFR_ct_Ineff_Regen_Occr
V_AIM_prg_UreaPumpP                         Kpa             V_AIM_prg_UreaPumpP
T_Electrical_System_Voltage                 None            T_Electrical_System_Voltage
V_ATD_bs_NOx_Out_Errs                       HEX           V_ATD_bs_NOx_Out_Errs
V_ATD_bs_PFS_EngOut_Status                  HEX           V_ATD_bs_PFS_EngOut_Status
V_ATD_bs_PFS_Sensor_Status                  HEX           V_ATD_bs_PFS_Sensor_Status
V_ATD_bs_PFS_SysIO_Errs                     HEX           V_ATD_bs_PFS_SysIO_Errs
V_ATD_bs_PFS_SysIO2_Errs                    HEX           V_ATD_bs_PFS_SysIO2_Errs
V_ATD_bs_PFS_SysIO3_Errs                    HEX           V_ATD_bs_PFS_SysIO3_Errs
V_ATD_bs_PFS_SysPerf1_Errs                  HEX           V_ATD_bs_PFS_SysPerf1_Errs
V_ATD_bs_PFS_SysPerf2_Errs                  HEX           V_ATD_bs_PFS_SysPerf2_Errs
V_ATD_bs_SCR_ExtInput_Status                HEX           V_ATD_bs_SCR_ExtInput_Status
V_ATD_bs_SCR_Sensor_Status                  HEX           V_ATD_bs_SCR_Sensor_Status
V_ATD_bs_SCR_SysIO1_Errs                    HEX           V_ATD_bs_SCR_SysIO1_Errs
V_ATD_bs_SCR_SysIO2_Errs                    HEX           V_ATD_bs_SCR_SysIO2_Errs
V_ATD_bs_SCR_SysPerf_Errs                   HEX           V_ATD_bs_SCR_SysPerf_Errs
T_VSP_RoadSpdUsrOvrdEn                      none          T_VSP_RoadSpdUsrOvrdEn
$

ECM3          1000  PROPRIETARY_REQUEST
#
## ECM parameters
## ECM parameter                    ECM Units        ASSET label
V_ATD_bs_SCR_SysPerf2_Enbled        HEX              V_ATD_bs_SCR_SysPerf2_Enbled
V_ATD_bs_SCR_SysPerf2_Errs          HEX              V_ATD_bs_SCR_SysPerf2_Errs
#T_AIP_Battery_Tmptr_RLOC           None             T_AIP_Battery_Tmptr_RLOC
#T_AIP_Battery_Voltage_Ovrd_En      None             T_AIP_Battery_Voltage_Ovrd_En
#T_AIP_BattTmptrUserOvrdEn          None             T_AIP_BattTmptrUserOvrdEn
#T_AIP_BattVolt_Count_OOR_Err_En    None             T_AIP_BattVolt_Count_OOR_Err_En
#T_AIP_InternalTmptr_Ovrd_En        None             T_AIP_InternalTmptr_Ovrd_En
#T_Battery_Voltage_RLOC             None             T_Battery_Voltage_RLOC
##T_Battery_Voltage_RLOC            None             T_Battery_Voltage
#ECM_ACTIVE_FAULTS                  NONE             active_faults
#ECM_INACTIVE_FAULTS                NONE             inactive_faults

$
```