

5-2 Engine Messenger

5-2 Engine Messenger Display System

5-2.1 Introduction

This display is intended to allow the driver to monitor the vehicle and engine information while the vehicle is being operated. The display may also display stored trip information. When possible, the driver should select the proper display screen before operating the vehicle.

!!CAUTION: Select the desired display prior to moving the vehicle. Do not manipulate the display while the vehicle is moving. This could divert attention from driving efforts and result in personal injury or equipment damage.

Do not perform any procedure that is outlined in this manual until you have read the information and you understand the information.

5-2.2 Features of Messenger Display

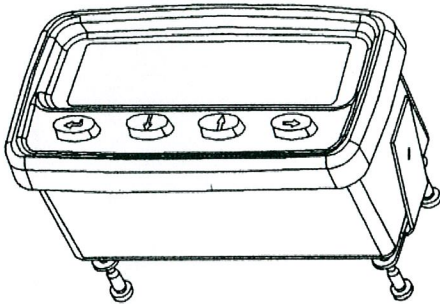


Figure 1 - Messenger Display

The Messenger display may show information for the engine and the vehicle. For detailed operating information, see the Operation Section later in this manual. The driver should review the information in this manual prior to driving. Before driving, the driver should review the Messenger Screen Map in order to select the most important information for the trip. This will avoid the entry of data during the operation of the vehicle.

NOTE: The electronic service tool may be used to make changes to the display. Power to the display must be cycled in order for the changes to be viewed. The display may be used to make changes to options of the display. Changes may be viewed on the screen after the display is returned to the title screen of each column.

5-2.2.1 Engine Operating Information

The Messenger display provides information on cruise control set speed, PTO engine rpm set speed, fuel temperature to the engine, boost and oil pressure, coolant temperature, and intake manifold temperature.

5-2.2.2 Vehicle Trip Information

The Messenger display provides information concerning the quantity of fuel that has been used, the fuel economy, the average vehicle speed, idle time, PTO time, percent idle hour, idle fuel, and PTO fuel. These parameters may relate to trip segments or to the engine history. A Driver and a Fleet Trip Segment is available for the C13 engine. For the Driver Trip Segment, the driver determines the start and stop points. For the Fleet Trip Segment, the vehicle owner determines the start and stop points. The vehicle may be operated in separate states. The Fleet Trip Segment may be tied to each of these states. The Fleet Trip Segment may be split between two drivers and two ID codes.

5-2.2.3 Maintenance Information

The last oil change may be entered. This allows the display to indicate when the next oil change is due.

5-2.2.4 Diagnostic Data

Engine diagnostic codes may be displayed for the driver. The Messenger display will automatically display potentially serious engine problems. When one of these codes appears, the driver should bring the vehicle to a safe stop. After the display of a serious diagnostic code, the engine may shut down within 20 seconds. Refer to the Diagnostic Codes Chart for a list of these codes.

5-2.2.5 Theft Deterrent

Messenger provides the capability to allow the engine to start or the capability to prevent the engine from starting. The Messenger display can shut down the engine after entering a password with four characters into the display when the engine is at idle.

5-2.2.6 Fuel Correction Adjustment

Messenger provides the capability to adjust the Fuel Correction Factor of the ECM.

5-2.2.7 Configuration of the Display

Messenger can provide information in either English, French or Spanish. Units of measure can be displayed in English (miles per hour, US gallons, psi, and °F), English (miles per hour, Imperial gallons, psi, and °F), or Metric units (kilometer per hour, liters, kPa, and °C). The French or Spanish manuals may be ordered by contacting a Caterpillar dealer.

Units		
Parameter Identifier	English Unit Abbreviation	Metric Unit Abbreviation
"Distance"	Miles - MI	Kilometers - KM
"English Speed"	Revolutions per minute - RPM	Revolutions per minute - RPM
"Fuel Economy"	Miles per gallon - MPG	Kilometers per liter ("KPL") Liters per 100 - KM
"Fuel Quantity"	Gallons (US or Imperial Gallons) - GAL	Liters - LTR
"Fuel Rate"	Gallons Per Hour - GPH	Liters per hour - LPH
"Pressure"	Pounds Per Square Inch - PSI	Kilopascals - kPa
"Speed"	Miles Per Hour - MPH	Kilometers Per Hour - KPH
"Temperature"	Degrees Fahrenheit - F	Degrees Celsius - C
"Time"	Hours - HR	Hours - HR

5-2.2.8 Driver ID Entry

The Messenger display provides the capability to enter the ID of multiple drivers. This allows the ECM to log information for multiple drivers. This is useful in driving applications that involve several drivers.

5-2.2.9 State Crossing

Messenger allows the driver to enter the current state.

5-2.2.10 Access to Parameters

The availability of parameters is determined by the engine manufacturer, the model year of the engine, and the ECM settings for the Customer Programmable Parameters.

Table 2

Parameter Programming by Engine Model	
Engine	Access
C13	All 3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15, C-15, and C-16 functions.

5-2.2.11 Display Functions

Functions of Buttons on the Display - Simultaneously pressing and releasing the two center buttons (Down and Up) will cause the display screen to return to the title screen (Instantaneous Data) of the display.

Adjusting the Brightness of the Display - The display will automatically be dimmed when the headlights are turned ON and the display is connected to the lighting circuit. The illumination of the display may be adjusted manually.

1. The contrast may be adjusted by pressing and releasing the Right arrow button and the Left arrow button from the Adjust Contrast screen. The characters may be lightened by pressing and releasing the Left arrow button until the illumination is satisfactory. The background may be darkened by pressing and releasing the Right arrow until the background is satisfactory.
2. The Down arrow button may be used in order to change the backlight. The backlight may be turned off by pressing and releasing the Left arrow button. The backlight may be turned on by pressing and releasing the Right arrow button.
3. The backlight may be adjusted by pressing the Down arrow button. Pressing and releasing the Left arrow button will decrease the backlight. Pressing and releasing the Right arrow button will increase the backlight.

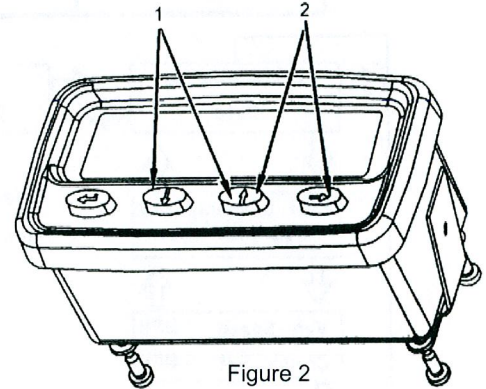


Figure 2
Front view of Messenger display
(1) Home buttons
(2) Display dimming buttons

NOTE: *The automatic dim feature will not function if the display has been placed in a manual dim mode. To reactivate the automatic dim feature, turn the power to the display OFF, then back ON.*

5-2.2.12 Additional Features

The Messenger display may be mounted in or on the dash.

The display allows an inside view of the engine's operation. The Messenger's display provides information to the driver from the engine's Electronic Control Module (ECM) through the J1708 Data Link.

The Messenger screen has a LCD display.

5-2.3 Messenger Display Screen Map

In order to view specific information, a Messenger Display Screen Map is provided in this manual. Arrows are attached to each block of the Screen Map. The arrows indicate the actual arrow buttons that are available with each screen. Pressing an arrow that is not shown will have no effect. The display will remain at the same screen.

The first row of the screen map indicates the title screen for each of the columns on the screen map. The farthest title screen to the right and the "INSTANTANEOUS DATA" title screen in column 1 are adjacent in operation. Pressing the right arrow button from the farthest right title screen moves to the "INSTANTANEOUS DATA" title screen in column 1.

Movement between the columns of information is permitted when the title screen can be viewed. The exception is movement between the "Fleet Trip", "Driver Trip", and "Lifetime Total" columns. These columns are available with 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, and 3406E engines.

The Up and Down arrow buttons allow movement up and down through the columns. When the bottom screen of a column is being viewed, press the Down arrow button in order to view the title screen at the top of the column. You cannot press the Up arrow button from the title screen to get to the bottom screen.

3176B, 3176C, C-10, C11, C-12, C13, C15,
C-15, C-16, and 3406E Engines

Expanded Messenger Screen Map (Column 1-4)

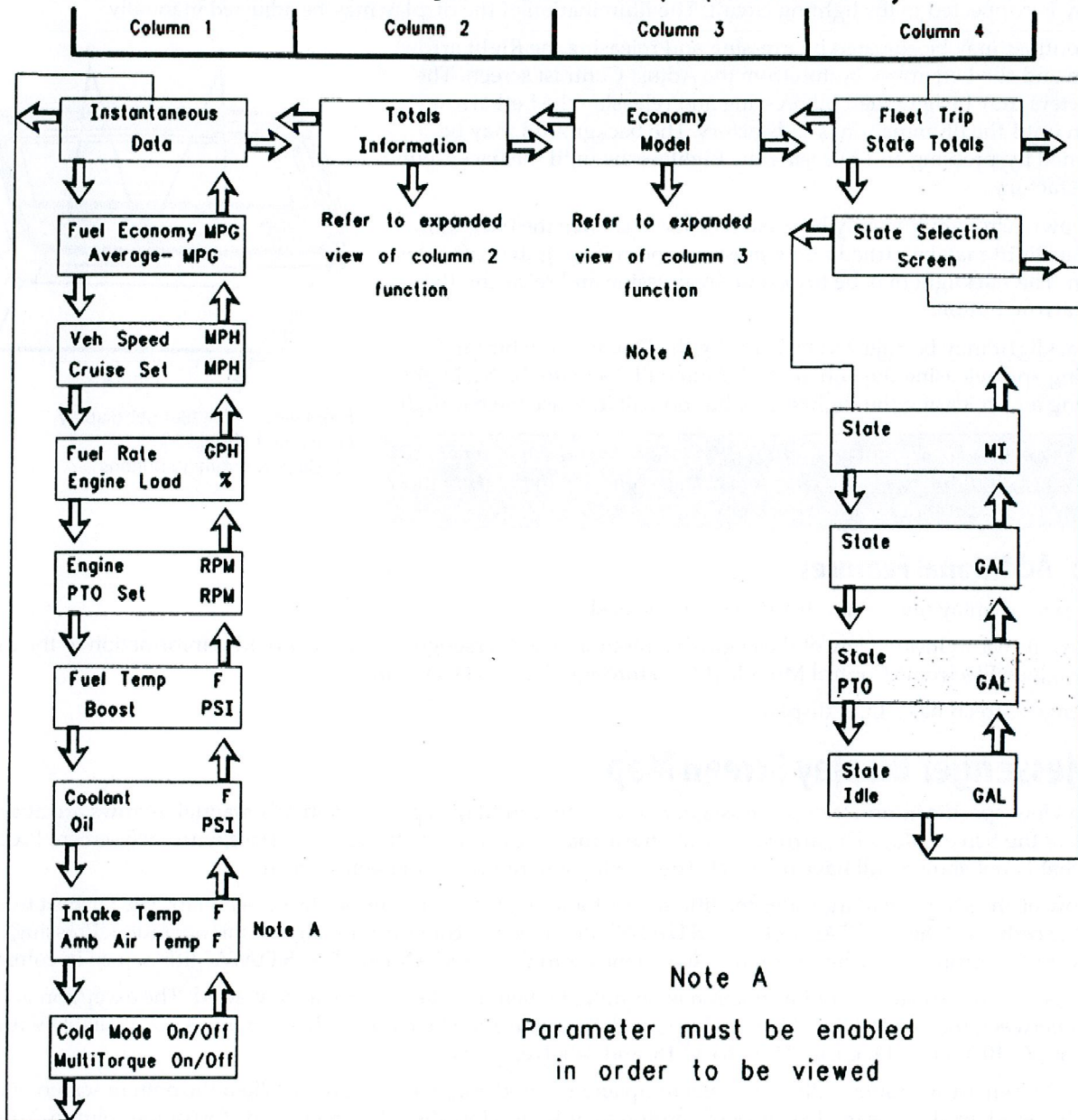


Figure 3 - "Screen maps for the heavy duty truck engine (columns 1-4)"

3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15,
C-15, and C-16 Engines

Expanded Messenger Screen Map for Totals
Column 2 - Driver - Fleet - Lifetime

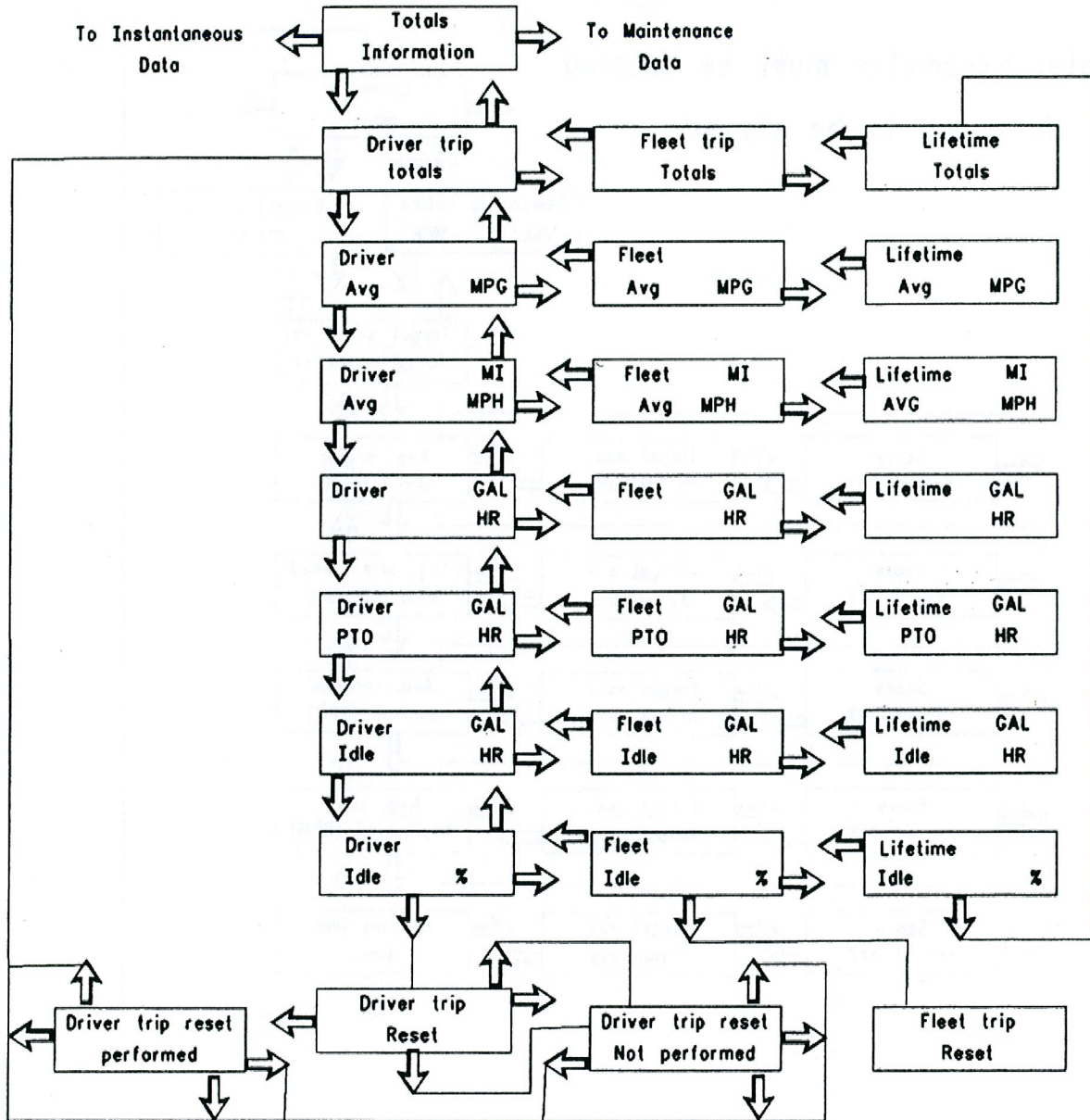


Figure 4 - "Screen map for the heavy duty truck engine (column 2-driver-fleet-lifetime)"

3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15,
C-15, and C-16 Engines

Expanded Messenger Screen Map
Column 3 - Driver Economy Reward

Note: Parameter must be enabled
in order to be viewed.

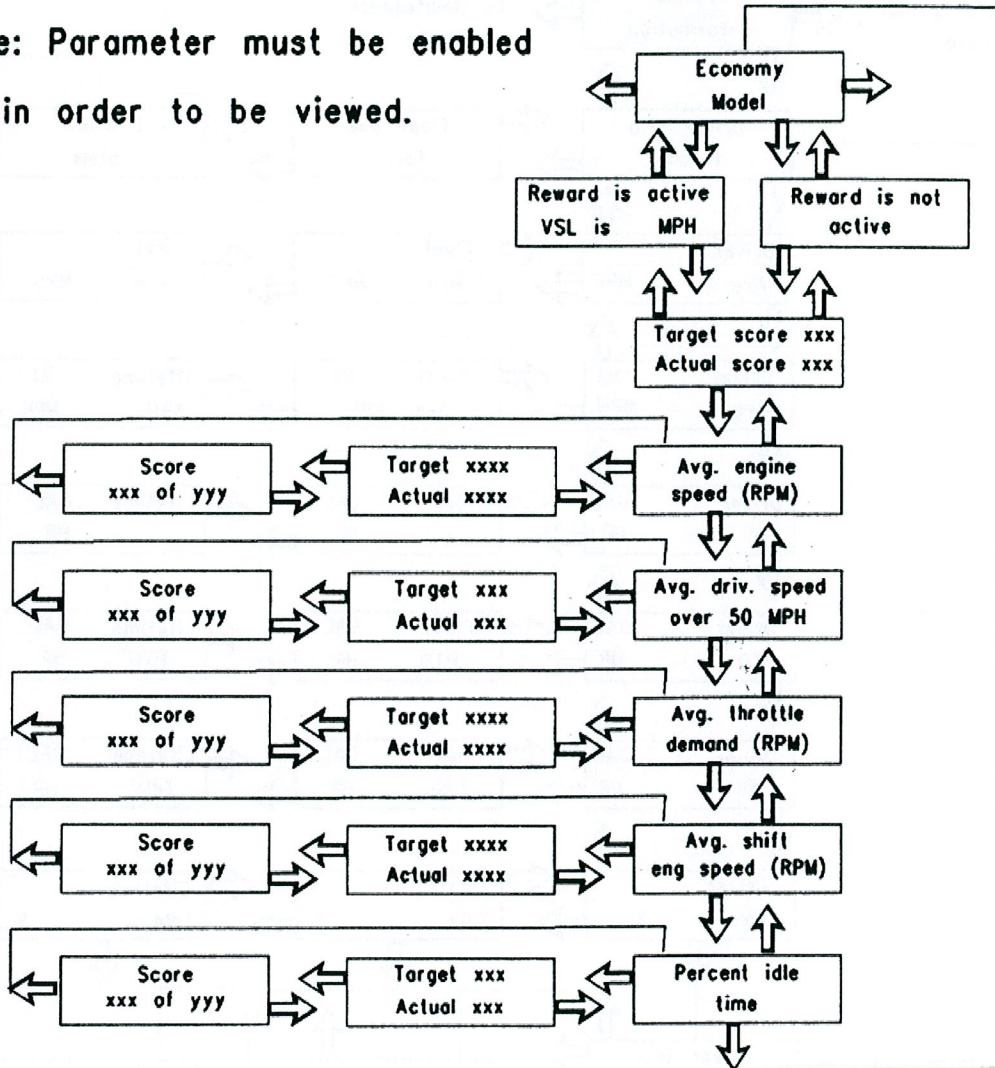


Figure 5 - "Screen map for the heavy duty truck engine screen map (column 3)"

3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15,
C-15, and C-16 Engines

Expanded Messenger Screen Map (Column 4)

Column 4

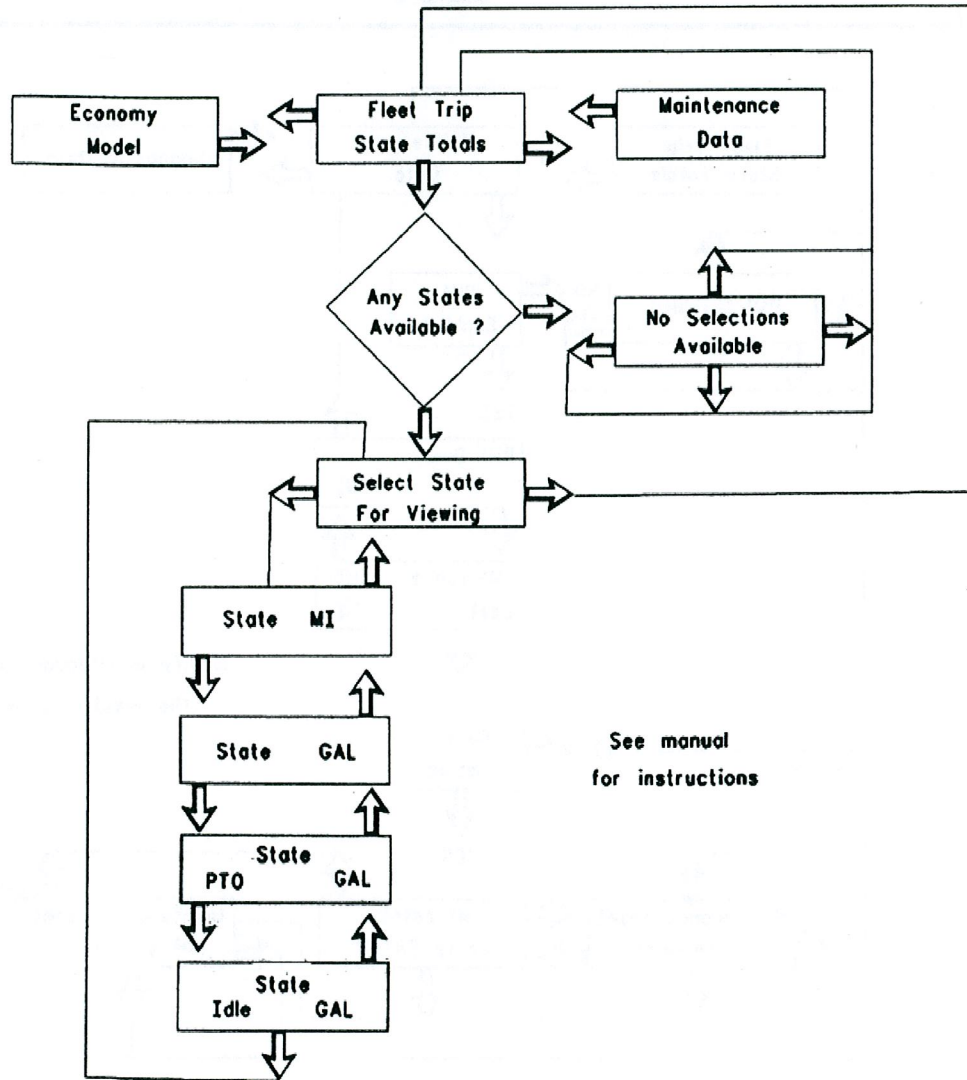


Figure 6 - "Screen map for the heavy duty truck engine (column 4)"

3176B, 3176C, 3406E, C-10, C11, C-12, C13
 C15, C-15, and C-16 Engines
 Expanded Messenger Screen Map (Column 5)

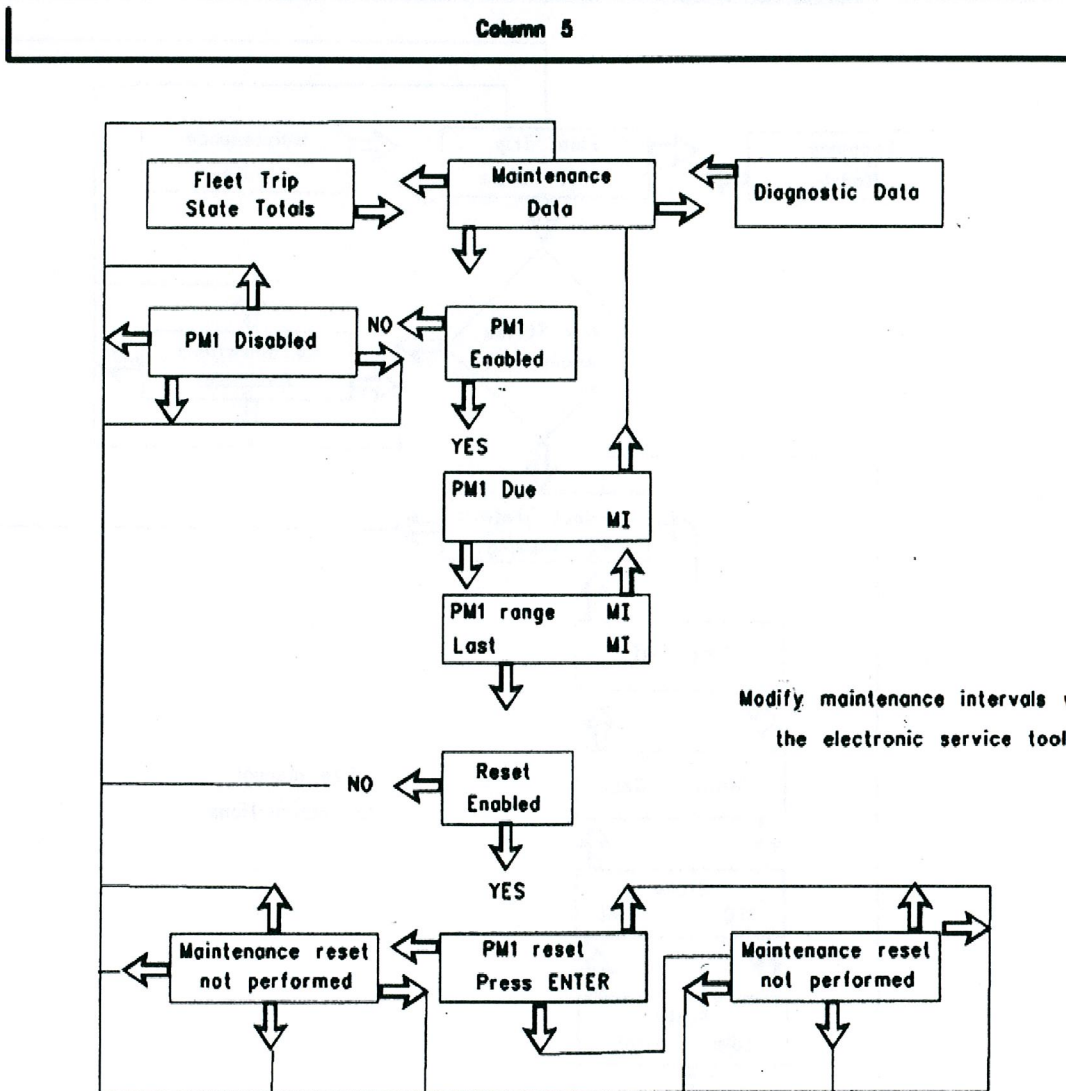


Figure 7 - "Screen map for the heavy duty truck engine (column 5)"

3176B, 3176C, 3406E, C-10, C11, C-12, C13
C15, C-15, and C-16 Engines
Expanded Messenger Screen Maps (Columns 6-7)

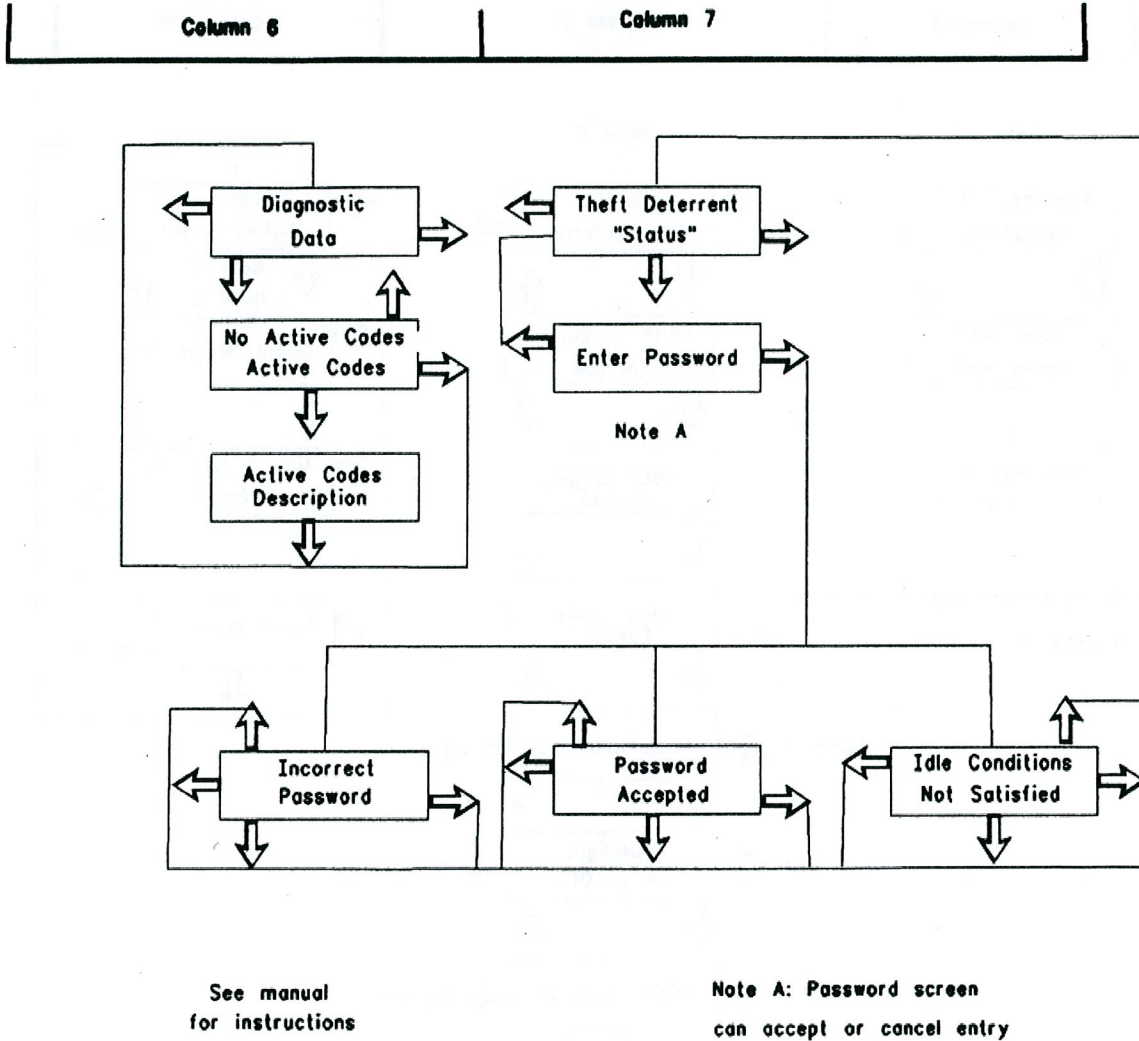


Figure 8 - "Screen maps for the heavy duty truck engine (columns 6-7)"

3176B, 3176C, 3406E, C-10, C11, C-12, C13,
C15, C-15, and C-16 Engines

Expanded Messenger Screen Map (Columns 8-10)

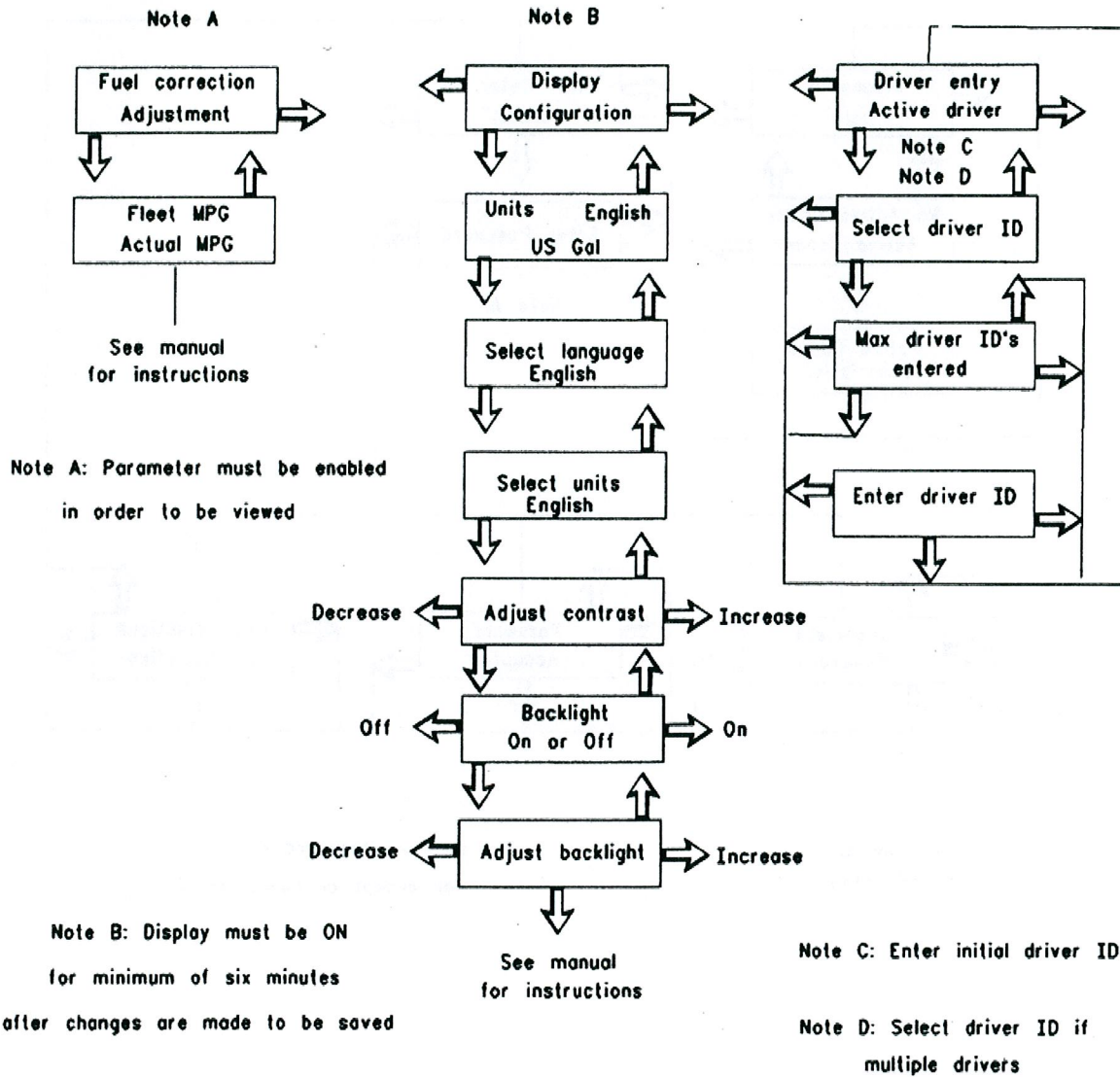
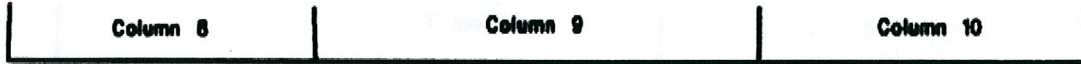
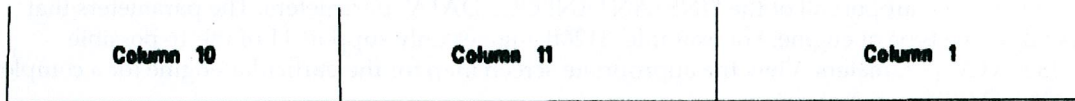


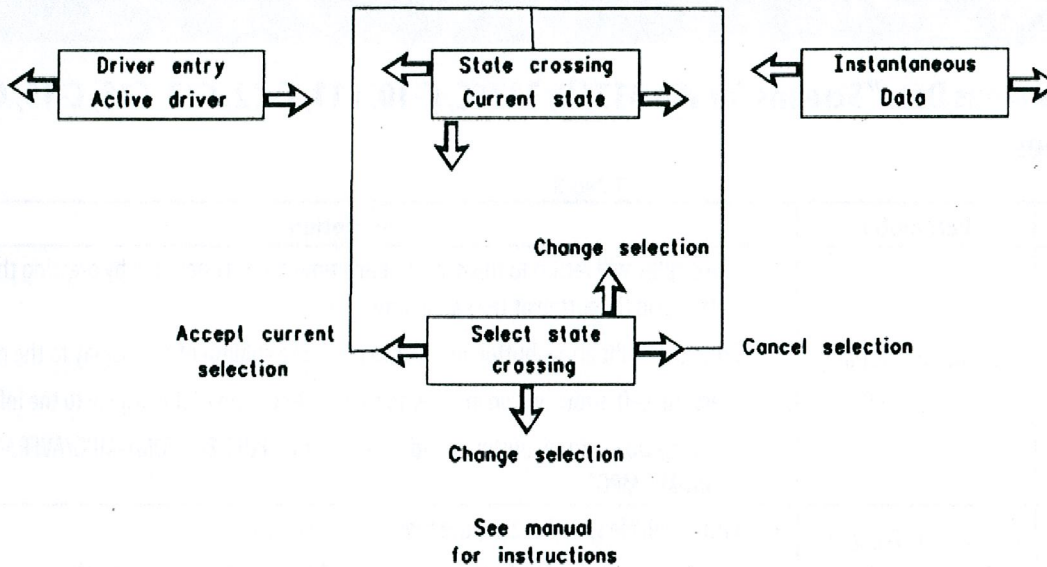
Figure 9 - "Screen maps for the heavy duty truck engine (columns 8-10)"

3176B, 3176C, 3406E, C-10, C11, C-12, C13,
C15, C-15, and C-16 Engines

Expanded Messenger Screen Map (Column 11)



Note A



States on the screen are listed alphabetically as follows:

Note: Parameter must be enabled
in order to be viewed

- 1) Current state
- 2) States adjacent to current state
- 3) All remaining states not listed in item 2

Figure 10 - "Screen maps for the heavy duty truck engine (column 11)"

5-2.4 “Instantaneous Data” Screens

The display can indicate the status of sixteen engine and vehicle operating conditions. The “INSTANTANEOUS DATA” can include “Current Fuel Economy”, “Fleet Trip Segment Fuel Economy”, “Vehicle Speed”, “Cruise Set Speed”, “Fuel Rate”, “Engine Load”, “Engine Speed”, “PTO Set Engine Speed”, “Fuel Temperature Boost Pressure”, “Coolant Temperature”, “Oil Pressure”, “Intake Manifold Temperature”, “Ambient Air Temperature”, “Cold Mode Status”, and “Multi-Torque Status”.

Remember that not all engines support all of the “INSTANTANEOUS DATA” parameters. The parameters that are supported depend on the type of engine. For example, 3126B engines only support 11 of the 16 possible “INSTANTANEOUS DATA” parameters. View the appropriate screen map for the particular engine for a complete listing of “INSTANTANEOUS DATA” parameters.

NOTE: The engine parameters use the EC as the source of information for the display. The Messenger display and the instrument panel gauges may indicate different values. The display may respond differently to changing conditions as the vehicle operates. The readings between the gauges and display may be different. This does not indicate that the components are faulty.

5-2.4.1 “Instantaneous Data” Screens for the 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, and 3406E Engines

Table 3

Screen	Parameter	Description
Instantaneous Data	Instantaneous Data Title Screen	<ul style="list-style-type: none"> – The display will return to this screen at any time during operation by pressing the Down button and Up button at the same time. – Press the Right arrow button in order to move the column of the display to the right. – Press the Left arrow button in order to move the column of the display to the left. – Press the Down arrow button in order to view the “FUEL ECONOMY-MPG/AVERAGE FUEL ECONOMY-MPG”.
Fuel Economy “MPG” Average MPG	Current Fuel Economy. The Average Fuel Economy of the Fleet Trip Segment	<ul style="list-style-type: none"> – With a vehicle speed of zero, the fuel economy is zero. – Data is available for 1994 or newer 3176B, 3176C, or 3406E engines only. – Press the Down arrow button to view “VEHICLE SPEED-MPH/CRUISE SET SPEED -MPH”. – Press the Up arrow button to view “INSTANTANEOUS DATA”.
Vehicle Speed MPH Cruise Set Speed MPH	Vehicle Speed Cruise Control Set Speed	<ul style="list-style-type: none"> – The screen shows the vehicle speed that the ECM is using for cruise control and PTO operation. – The screen shows the current cruise control speed that is set. The value will be zero if a cruise set speed has not been entered. – Press the Up arrow button in order to view “FUEL ECONOMY-MPG/AVERAGE-MPG”. – Press the Down arrow button in order to view “FUEL RATE/ENGINE LOAD”.
Fuel Rate GPH Engine Load %	Instantaneous Fuel Rate Percent Load on the Engine	<ul style="list-style-type: none"> – The fuel consumption per hour – This is a measure of the load demand on the engine. A higher value indicates that the engine is operating with a heavy load or the vehicle is being driven hard. – Press the Up arrow button in order to view “VEHICLE SPEED/CRUISE SET SPEED”. – Press the Down arrow button in order to view “/ENGINE SPEED/PTO SPEED”.

5-2.4.1 "Instantaneous Data" Screens for the 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, and 3406E Engines continued

Table 3 - Continued

Screen	Parameter	Description
Engine RPM PTO Set RPM	Engine Speed PTO Set RPM	<ul style="list-style-type: none"> - This screen displays the current engine speed and the engine speed is expressed in revolutions per minute (RPM). - This screen displays the engine speed set point while the engine is in PTO operation or extended idle. The value will be zero if a PTO set speed has not been entered. - Press the Up arrow button in order to view "FUEL RATE/ENGINE LOAD". - Press the Down arrow button in order to view "FUEL TEMP/BOOST PRESSURE".
"Fuel Temp" (F) Boost (PSI)	Fuel Temperature Boost Pressure	<ul style="list-style-type: none"> - Fuel Temperature - Intake Manifold Air Pressure - Press the Up arrow button in order to view "ENGINE RPM/PTO SET". - Press the Down arrow button in order to view "COOLANT TEMP/OIL PSI".
Coolant F Oil PSI	Coolant Temperature Oil Pressure	<ul style="list-style-type: none"> - Engine coolant temperature - Oil pressure - Press the Up arrow button in order to view "FUEL TEMP/BOOST PSI". - Press the Down arrow button in order to view "INTAKE AIR TEMP/AMB AIR TEMP".
"Intake Temp" (F) "Amb Air Temp" (F)	"Intake Air Temp" "Ambient Air Temp"	<ul style="list-style-type: none"> - Temperature of the air in intake manifold - Temperature of the ambient air - Press the Up arrow button in order to view "COOLANT TEMP/OIL PSI". - Press the Down arrow button in order to view "COLD MODE/MULTI-TORQUE".
"Cold Mode On/Off" "Multi-Torque" On/Off	Code Mode "Multi-Torque"	<ul style="list-style-type: none"> - The engine is operating in Cold Mode. - The engine is operating in "Multi-Torque" mode. - Press the Up arrow button in order to view "INTAKE TEMP/AMB AIR TEMP". - Press the Down arrow button in order to view "INSTANTANEOUS DATA".

5-2.5 Screen Display Information

5-2.5.1 Trip Segments

The Messenger display will provide operating data on the engine in a variety of ways. The Messenger display provides the method in order to label information for both driver and the vehicle owner. With the 3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15, C-15, and C-16 engines, the Messenger display records information in three separate ways. Lifetime Totals, a Fleet Trip Segment, and a Driver Trip Segment are recorded.

5-2.5.2 Lifetime Totals

Lifetime totals are permanently stored in the ECM on the engines. The information is recorded throughout the life of the engine. The Lifetime Totals cannot be reset under normal operation. The Lifetime Totals cannot be deleted under normal operation. The Lifetime Totals are shown on the screen map for the Messenger Display.

5-2.5.3 "Totals Information" (3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15, C-15, and C-16 Engines)

The "Total Information" column facilitates access to the "Driver Trip", "Fleet Trip", and "Lifetime Totals" columns. Press the Down arrow button on the "Totals Information" title screen in order to access the three totals.

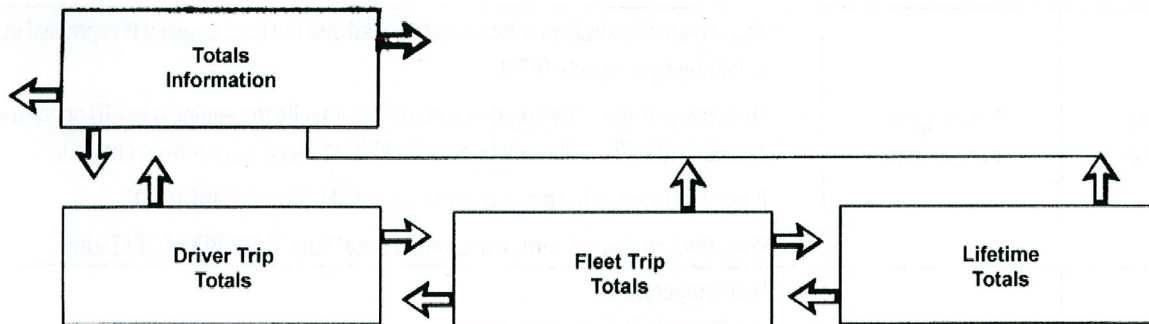


Figure 11 - "Totals Information Column"

5-2.5.4 Fleet Trip Segment

The information is intended for the fleet owner or owner driver. The ability to reset the information from the Messenger display depends on the software program. The Fleet Trip Segment may be reset with the electronic service tool and the appropriate passwords. Resetting the Fleet Trip Segment does not affect the Driver Trip Segment or the Lifetime Totals. The Fleet Trip Segment is shown on the Messenger screen map. The Messenger display provides the capability to enter the information for two drivers for the Fleet Trip Segment. The Messenger display provides the driver with the capability to enter the current state. The information on the state is part of the Fleet Trip Segment. The Messenger display provides the capability to enter the information for two drivers for the Fleet Trip Segment. The Fleet Trip Segment can be sorted for the two drivers by the Messenger software. The information on the state is shown on the screen map for the Messenger display. Entering the State Cross and DRIVER ID is explained further in this manual. Resetting the Fleet Trip Segment will clear the Fleet Trip DRIVER IDs. Resetting the Fleet Trip Segment will clear the Fleet Trip State Totals.

5-2.5.5 Driver Trip Segment

The Driver Trip Segment is intended for the driver and the Driver Trip segment is controlled by the driver. The Driver Trip Totals are shown on the screen map for the Messenger display in column 2. Resetting the Driver Trip Segment does not affect the Fleet Trip Segment or Lifetime Totals. Resetting the Driver Trip Segment does not affect the State Totals or the DRIVER IDs.

5-2.5.6 Example of Trip Segments and Lifetime Totals

The "Explanation of Trip Segment" shows the effect of entering the State Crossing, DRIVER ID, Fleet Trip Segment, and the Driver Trip Segment.

Table 4 - Example of the Trip Segment

Miles	Event	Driver Totals	Mileage Totals
0	New engine	"DRIVER ID1=0 miles" "DRIVER ID2=0 miles"	0
500	"State crossing entered"	"DRIVER ID1=500 miles" "DRIVER ID2=0 miles"	"State 1=500 miles"
1000	"DRIVER ID2 entered as driver"	"DRIVER ID1=1000 miles" "DRIVER ID2=0 miles"	"State 1=500 miles" "State 2=500 miles"
2000	"State crossing entered"	"DRIVER ID1=1000 miles" "DRIVER ID2=1000 miles"	"State 1=500 miles" "State 2=1500 miles" "State 3=0 miles"
2800	"Driver trip segment reset"	"DRIVER ID1=1000 miles" "DRIVER ID2=1800 miles"	"State 1=500 miles" "State 2=1500 miles" "State 3=800 miles"
3300	"DRIVER ID1 entered as driver"	"DRIVER ID1=1000 miles" "DRIVER ID2=2300 miles"	"State 1=500 miles" "State 2=1500 miles" "State 3=1300 miles"
3800	"State crossing entered"	"DRIVER ID1=1500 miles" "DRIVER ID2=2300 miles"	"State 1=500 miles" "State 2=1500 miles" "State 3=1800 miles"
5000	"Fleet trip segment reset" "DRIVER ID's cleared-must be re-entered."	"DRIVER ID1=2700 miles" "DRIVER ID2=2300 miles"	"State 1=500 miles" "State 2=2700 miles" "State 3=1800 miles"

Table 5 - Example of the Trip Segment

Miles	"Driver Trip Miles"	"Fleet Trip Miles"	"Lifetime Trip Miles"
0	0	0	0
500	500	500	500
1000	1000	1000	1000
2000	2000	2000	2000
2800	0	2800	2800
3300	500	3300	3300
3800	1000	3800	3800
5000	2200	0	5000

NOTE: The fleet trip segment includes State Information and DRIVER ID information.

Table 6 - "Trip Segment Example"

Miles	Description
500	A state crossing is entered and the vehicle operation is now recorded for State 2. The data for State 1 is stored.
1000	Driver 2 begins driving and the vehicle operation is now recorded for Driver 2. The data for Driver 1 is stored.
2000	A third state crossing is entered and the vehicle operation is now recorded for State 3. The data for State 1 and State 2 is stored.
2800	The Driver Trip Segment is reset. The Fleet and "Lifetime" information is not affected.
3300	Driver 1 returns as the driver. New information is now added to the previous Driver 1 records. The records for Driver 2 are stored.
3800	The vehicle has re-entered State 2. Operational information is now added to the State 2 records. The information for State 1 and State 3 are still stored.
5000	The Fleet Trip is reset. This clears the State and DRIVER ID records. Driver Trip and Lifetime Totals are unaffected.

5-2.6 The Driver Totals Information for the 3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15, C-15, and C-16 Engines

The Driver Trip Segment is set by the driver. The driver sets the point to begin and the driver sets the point to end. The procedure is similar to setting a trip odometer. The Driver Trip Segment Totals are independent of the DRIVER ID. If a new driver begins operating the vehicle, resetting the DRIVER ID will not reset the Driver Trip Segment. The screen for the Driver Trip segment has ten parameters. The parameters are "Average Fuel Economy", "Distance Traveled", "Average Speed", "Fuel Used", "Engine Run Hours", "PTO Fuel Used", "PTO Hours", "Idle Fuel Used", "Idle Hours", and "Percent Idle Time".

5-2.6.1 Accessing the Driver Trip Screens

The display may be moved Up or Down from Column 2 of the screen map from any of the Driver Trip Screens. The "FLEET TRIP" screen may also be navigated in the same way as the "DRIVER TRIP" screen. The Down, Up, and Right arrow buttons are available from any of the "DRIVER TRIP DATA" screens. Moving to the corresponding "FLEET TRIP" information allows the driver to compare current "DRIVER TRIP" data to "FLEET TRIP" data. The desired screen should be selected prior to driving.

Table 7 - Driver Trip Screens

Screen	Parameter	Description
Driver Trip Totals	"Drive Trip Totals" Screen	<ul style="list-style-type: none"> - "Down arrow-View Driver Trip Data." - "Left arrow-Moves one column to the left." - "Right arrow-Moves one column to the right."
"DRV - AVG MPG"	"Driver Trip Segment" "Average Fuel Economy"	<ul style="list-style-type: none"> - "Shows Driver Trip Average Fuel Economy." - "Right arrow-Fleet Trip Average Fuel Economy." - "Down arrow-Driver Trip Distance Traveled and Average Vehicle Speed." - "Up arrow-DRIVER TRIP TOTALS title screen."
"DRV - MI" "AVG - MPH"	"Driver Trip Segment Distance Traveled" "Driver Trip Segment Average Vehicle Speed"	<ul style="list-style-type: none"> - "Shows Distance Traveled for the current Driver Trip Segment. Shows Average Vehicle Speed for the current Driver Trip Segment." - "Up arrow-Driver Trip Average Fuel Economy screen." - "Down button-Driver Trip Segment Fuel Used and Engine Hours." - "Right arrow-Fleet Trip Distance Traveled and Average Speed."
"DRV - GAL" "HR"	"Driver Trip Segment Fuel Used" "Driver Trip Segment Engine Hours"	<ul style="list-style-type: none"> - "Shows fuel used during the current Driver Trip Segment. Shows Driver Trip Segment Engine Hours." - "Up arrow-Driver Trip Segment Distance and Average Vehicle Speed." - "Down arrow-Driver Trip Segment PTO Fuel and PTO Time." - "Right arrow-Fleet Trip Fuel and Engine Hours."
"DRV - GAL" "PTO" "HR"	"Driver Trip Segment PTO Fuel Used" "Driver Trip Segment PTO Time"	<ul style="list-style-type: none"> - "Shows PTO fuel during the current Driver Trip Segment. Shows Driver Trip Segment PTO time." - "Up arrow-Driver Trip Segment Fuel Used and Engine Hours." - "Down arrow-Driver Trip Percent Idle Time." - "Right arrow-Fleet Trip Idle Fuel and Idle Hours."
"DRV - GAL" "IDLE" "HR"	"Driver Trip Segment Idle Fuel Used" "Driver Trip Segment Idle Time"	<ul style="list-style-type: none"> - "Shows Idle Fuel during the current Driver Trip Segment. Shows Driver Trip Segment Idle Time." - "Up arrow-Driver Trip Segment Fuel Used and Engine Hours." - "Down arrow-Driver Trip Segment Idle Fuel and Idle Time." - "Right arrow-Fleet Trip PTO Fuel and PTO Hours."
"DRV - IDLE" "%"	"Driver Percent Idle Time"	<ul style="list-style-type: none"> - "A value for the percent of time the driver was idling, calculated from: (Driver Idle Hours divided by Total Driver Hours)." - "Right arrow-Fleet Percent Idle Time." - "Up arrow-Driver Trip Segment Idle Fuel and Idle Time." - "Down arrow-Driver Trip Reset screen."
"DRV - RESET" "TRIP TOTALS"	"Driver Trip Reset"	<ul style="list-style-type: none"> - "To reset the Driver Trip Segment, press the Left arrow button." - "Up arrow-Driver Trip Percent Idle Time." - "Down arrow-Driver Trip Segment title screen."
"DRIVER TRIP" "RESET PERFORMED"	"Driver Trip Reset Completed"	<ul style="list-style-type: none"> - "Indicates the Driver Trip Segment has been reset." - "Pressing any button will return display to the Driver Trip Segment title screen."

5-2.6.2 "Fleet Trip Totals" Screens

The screen for the Fleet Trip Segment has ten parameters. The parameters are "Average Fuel Economy", "Distance Traveled", "Average Speed", "Fuel Used", "Engine Run Hours", "PTO Fuel Used", "PTO Hours", "Idle Fuel Used", "Idle Hours", and "Percent Idle Time". The information for the Fleet Trip Segment is controlled by the fleet owner. The information may be controlled by the driver if the ECM has been programmed to allow the driver to reset the display on the Fleet Trip Segment.

5-2.6.3 Accessing the "Fleet Trip" Screens

The display may be moved Up or Down from any of the "Fleet Trip" Screens. The "Driver Trip" screen and the "Lifetime Total" screen may also be navigated in the same way as the "Fleet Trip" screen. The Left Down, Up, and Right arrow buttons are available from any of the "Fleet Trip Data" screens. Moving to the corresponding "Driver Trip Segment" or "Lifetime Total" information allows the driver to compare current "Fleet Trip Data" to the "Driver Trip" data or "Lifetime Total" data. The desired screen should be selected prior to driving.

5-2.6.4 Reset Protection of Fleet Trip Totals

The "Fleet Trip Totals" may be reset with the Messenger display or the "Fleet Trip Totals" may be reset with an electronic service tool by the Fleet Owner. Resetting is controlled by a Customer Programmable Parameter that is programmed into the engine ECM by the Fleet Owner. The parameter must first be programmed into the ECM. The power to the display must be turned OFF and ON In order for the display to recognize the change.

Fleet Owner Control for Reset of the Fleet Trip Segment

The Fleet Trip Reset may be controlled by the Fleet Owner. The display may be reset with Caterpillar Fleet Information Software or with an electronic service tool.

ECM Allows the Messenger Display to Reset the Fleet Trip Segment

The Fleet Trip Reset may be controlled by the driver. The display is reset with the dash display, with Caterpillar Fleet Information Software, or with an electronic service tool.

All Data Has Been Cleared and the Fleet Trip Segment is Reset

A Fleet Trip Reset will clear all "Fleet Trip Totals", "Fleet Trip State Totals", "DRIVER ID", and "State Crossings". No other information is affected.

Table 8 - "Fleet Trip" Screens

Screen	Parameter	Description
"FLEET TRIP TOTALS"	"Fleet Trip Totals Title Screen"	<ul style="list-style-type: none"> - "Down arrow-View Fleet Trip Fuel Economy Data." - "Left arrow-Moves one column to the left." - "Right arrow-Moves one column to the right."
"FLT""AVG-MPG"	"Fleet Trip Segment Average Fuel Economy"	<ul style="list-style-type: none"> - "Shows average fuel economy and distance traveled during the current Fleet Trip Segment." - "Left arrow-Driver Trip Average Fuel Economy." - "Right arrow-Lifetime Average Fuel Economy." - "Down arrow-Fleet Trip Fuel Used and Gallons Used Per Hour." - "Up arrow-Fleet Trip Totals title screen."
"FLT" "AVG - MPH"	"Fleet Trip Segment Average Speed"	<ul style="list-style-type: none"> - "Shows average vehicle speed during the current Fleet Trip Segment." - "Left arrow-Driver Trip Average Speed." - "Right arrow-Lifetime Average Speed." - "Down arrow-Fleet Fuel Used and Engine Hours during current trip." - "Up arrow-Fleet Trip Fuel Economy title screen."

Table 8 - "Fleet Trip" Screens - Continued

Screen	Parameter	Description
"FLT - GAL - HR"	"Fleet Trip Segment Fuel Used" "Fleet Trip Segment Engine Hours"	<ul style="list-style-type: none"> - "Shows Fuel Used during the current Fleet Trip Segment. Shows Fleet Trip Segment Engine Hours." - "Left arrow-Driver Trip Segment Fuel Used and Engine Hours." - "Right arrow-Lifetime Fuel Used and Engine Hours." - "Up arrow-Fleet Trip Segment Fuel Used Per Hour." - "Down arrow-Fleet Trip Segment PTO Fuel and PTO Time."
"FLT - GAL" "PTO" "HR"	"Fleet Trip Segment PTO Fuel Used" "Fleet Trip Segment PTO Time"	<ul style="list-style-type: none"> - "Shows PTO fuel during the current Driver Trip Segment. Displays Fleet Trip Segment PTO time." - "Left arrow-Driver Trip Segment PTO Time and PTO Fuel Used." - "Right arrow-Lifetime PTO Time and PTO Fuel Used." - "Up arrow-Fleet Fuel Used and Engine Hours during current trip." - "Down arrow-Fleet Trip Segment Idle Fuel and Idle Time."
"FLT - GAL" "IDLE" "HR"	"Fleet Trip Segment Idle Fuel Used" "Fleet Trip Segment Idle Time"	<ul style="list-style-type: none"> - "Shows Idle Fuel Used during the current Fleet Trip Segment. Shows Fleet Trip Segment Idle Time." - "Left arrow-Driver Trip Segment Idle Time and Idle Fuel Used." - "Right arrow-Lifetime Idle Time and Idle Fuel Used." - "Up arrow-Fleet Trip Segment PTO Fuel and PTO Hours." - "Down arrow-Fleet Percent Idle Time."
"FLT - IDLE" "%"	"Fleet Percent Idle Time"	<ul style="list-style-type: none"> - "A value for the percent idle time of the fleet, calculated from: (Fleet Idle Hours divided by Total Fleet Hours)." - If the 3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15, C-15 and C-16 engine ECM has been programmed to allow the Fleet Trip Reset, the Down button displays the "Fleet Trip Reset" screen. If the Fleet Trip Reset has not been programmed, the Down button returns to the "Fleet Trip" title screen. - "Left arrow-Driver Percent Idle Time." - "Right arrow-Lifetime Percent Idle Time." - "Up arrow-Fleet Trip Segment Idle Fuel and Idle Time."
"FLT RESET" "TRIP TOTALS"	"Fleet Trip Reset"	<ul style="list-style-type: none"> - "To Reset the Fleet Trip Segment, press the Left arrow button." - "Up arrow-Fleet Trip Percent Idle Time." - "Down arrow-FLEET TRIP SEGMENT title screen." - (f the 3176B ECM, 3176C ECM, 3406E ECM, C-10 ECM, C11 ECM, C-12 ECM, C13 ECM, C15 ECM, C-15 ECM, or the C-16 ECM has not been programmed to allow the Fleet Trip Reset by the driver, this screen is not available.)
"FLEET TRIP" "RESET PERFORMED"	"Fleet Trip Reset Completed"	<ul style="list-style-type: none"> - "Indicates the Fleet Trip Segment has been reset. Pressing any button will return display to the FLEET TRIP SEGMENT title screen." (The 3176B ECM, 3176C ECM, 3406E ECM, C-10 ECM, C11 ECM, C-12 ECM, C13 ECM, C15 ECM, C-15 ECM, or the C-16 ECM must be programmed in order to allow the "Fleet Trip Reset" by the driver.)

5-2.6.5 "Lifetime Totals" Screens

The screen for the "Lifetime Totals" has ten parameters. The parameters are "Average Fuel Economy", "Distance Traveled", "Average Speed", "Fuel Used", "Engine Run Hours", "PTO Fuel Used", "PTO Hours", "Idle Fuel Used", "Idle Hours", and "Percent Idle Time". This information is maintained by the engine ECM for the life of the engine.

5-2.6.6 Accessing The Lifetime Totals Screens

The display may be moved Up or Down from Column 2 of the screen map from any of the Lifetime Totals Screens. The "Driver Trip" screen and the "Lifetime Total" screen may be navigated in the same way as the "Fleet Trip" screen when the vehicle has the 3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15, C-15, or C-16 engines. The Left, Down, Up, and Right arrow buttons are available from any of the "Lifetime Totals Data" screens. Moving to the corresponding "Fleet Trip" information allows the driver to compare current "Lifetime Totals" to the "Fleet Trip" data. The desired screen should be selected prior to driving.

Table 9 - "Lifetime" Screens

Screen	Parameter	Description
"LIFETIME TOTALS"	"Lifetime Totals Title Screen"	<ul style="list-style-type: none"> - "Down arrow-View Lifetime Totals Data." - "Left arrow-Moves one column to the left." - "Right arrow-Moves one column to the right."
"LFT" "AVG MPG"	"Lifetime Total Segment" "Average Fuel Economy"	<ul style="list-style-type: none"> - "Shows Lifetime Total Average Fuel Economy." - "Left arrow-Fleet Trip Average Fuel Economy." - "Down arrow-Lifetime Total Fuel Used and Engine Hours." - "Up arrow-Lifetime Totals title screen."
"LIF MI" "AVG MPH"	"Lifetime Mileage" "Lifetime Average Speed"	<ul style="list-style-type: none"> - "Shows Distance Traveled for the engine to date. Shows Average Vehicle Speed for the engine to date." - "Left arrow-Fleet Trip Segment Distance Traveled and Average Vehicle Speed." - "Up arrow-Lifetime total miles and average fuel economy screen." - "Down arrow-Lifetime Total Fuel Used and Gallons per Hour."
"LIF - GAL - HR"	"Lifetime Total Fuel Used" "Lifetime Total Segment Engine Hours"	<ul style="list-style-type: none"> - "Shows Fuel Used for the engine to date. Shows Engine Hours for the engine to date." - "Left arrow-Fleet Trip Segment Fuel Used and Engine Hours." - "Up arrow-Lifetime Total Fuel and Hours." - "Down arrow-Lifetime Total PTO Fuel and PTO Time."
"LIF PTO GAL" "PTO HR"	"Lifetime Total PTO Fuel Used" "Lifetime Total PTO Time"	<ul style="list-style-type: none"> - "Shows Fuel Used for the engine to date. Shows Engine Hours for the engine to date." - "Left arrow-Fleet Trip Segment Fuel Used and Engine Hours." - "Up arrow-Lifetime Total Distance and Average Vehicle Speed." - "Down arrow-Lifetime Total PTO Fuel and PTO Time."
"LIF IDLE GAL" "HR"	"Lifetime Total Idle Time" "Lifetime Total Idle Fuel Used"	<ul style="list-style-type: none"> - "Shows Idle Fuel Used for the engine to date. Shows Idle Time for the engine to date." - "Left arrow-Fleet Trip Segment Idle Time and Idle Fuel Used." - "Up arrow-Lifetime Total PTO Fuel Used and PTO Hours." - "Down arrow-Lifetime percent idle time screen."
"LIF IDLE""%"	"Lifetime Percent Idle Time"	<ul style="list-style-type: none"> - "Shows a value for the percent of total operating time idling, calculated from: (Lifetime Idle Hours divided by Total Lifetime Hours)." - "Left arrow-Fleet Percent Idle Time." - "Up arrow-Lifetime Total Idle Fuel and Idle Time." - "Down arrow-LIFETIME TOTALS title screen."

5-2.7 “Fleet Trip State Totals” Screens

5-2.7.1 The 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C16, and 3406E Engines only

The ECM for the Caterpillar 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16 and 3406E will store the data for the distance that is driven, the total fuel consumption number, the idle fuel that has been used, and the PTO fuel that has been used for each state. More than one state may be selected during a “Fleet Trip Segment” up to a maximum of 50 states. Before the data is stored, the current state must be entered into the display.

5-2.7.2 Accessing “Fleet Trip State Totals”

ECM Customer Programmable parameters determine the access to this function of the display. If the “State Information” is programmed OFF in the ECM, the entire “Fleet Trip State Totals” column will not be shown. Press the Right arrow button of the “LIFETIME TOTALS” screen. This will cause the display to skip the “FLEET TRIP STATE TOTALS” screen. Press the Left arrow button of the “MAINTENANCE DATA” title screen. This will cause the display to skip the “FLEET TRIP STATE TOTALS” title screen.

After programming the parameters in the ECM, the power must be turned OFF and the power turned ON again in order for the display to recognize the change.

Table 10 - “Fleet Trip State Totals” Screens

Screen	Parameter	Description
“FLEET TRIP STATE TOTALS”	“Fleet Trip State Totals Title Screen”	<ul style="list-style-type: none"> – The Down arrow button selects a state and the data for that state. – If “State Crossing” has not been entered, the message “NO SELECTIONS AVAILABLE” will appear. – Press any button in order for the display to return to the “FLEET TRIP STATE TOTALS” title screen. – From the title screen, the Left arrow button moves to the “LIFETIME TOTALS” title screen. The Right arrow button moves to the “MAINTENANCE DATA” title screen.
“STATE 1”	“Select A State To View State Trip Data”	<ul style="list-style-type: none"> – Press the Left arrow button in order to begin viewing “Fleet Trip State” information. – Press the Down arrow button in order to view other states, if other states are available. – If more than one state is available, use the Down and Up arrow buttons to review the list of states with recorded data.
“STATE 1” “MI”	“Fleet Trip State Distance Traveled For Selected State”	<ul style="list-style-type: none"> – The display shows the distance that has been driven in the selected state for the current “Fleet Trip”. – The selected state will be shown as “State 1”. – The Up arrow button returns to “STATE SELECTION” screen. – The “Down” arrow button will display the fuel that has been used in the selected state.
“STATE 1” “GAL”	“Fleet Trip State Fuel Used For Selected State”	<ul style="list-style-type: none"> – The display shows the “Fuel Used” in a selected state for the current “Fleet Trip”. – The selected state will be shown as “State 1”. – The Up arrow button returns to “STATE DISTANCE TRAVELED” screen. – The Down arrow button displays “PTO Fuel Used” in the selected state.
“STATE 1” “PTO GAL”	“Fleet Trip State PTO Fuel Used For Selected State”	<ul style="list-style-type: none"> – The display shows the “PTO Fuel Used” in a selected state for the current “Fleet Trip”. – The selected state will be shown as “State 1”. – The Up arrow button returns to “Fuel Used” for this state. – The Down arrow button displays “Idle Fuel Used” in the state that is selected.
“STATE 1” “IDLE GAL”	“Fleet Trip State Idle Fuel Used For Selected State”	<ul style="list-style-type: none"> – The display shows the “Idle Fuel Used” in a selected state for current “Fleet Trip”. – The selected state will be shown as “State 1”. – The Up arrow button returns to the “PTO Fuel Used” for this state. – The Down arrow button returns the display to the screen that shows the state that is selected, in this example “State 1”.

5-2.8 "Economy Model" Screens

5-2.8.1 Information for the 3176B, 3176C, 3406E, C-10, C11, C-12, C13, C15, C-15, and C-16 Engines

The Messenger display can display information regarding the "Economy Model" feature of the ECM. This information includes the current "Driver Bonus" and this information includes the current "Target vs. Actual" totals. Refer to the "Screen Maps" of the Messenger display for additional information.

Table 11 - "Economy Model" Screens

Screen	Parameter	Description
THE REWARD IS ACTIVE OR THE REWARD IS NOT ACTIVE.	The Reward is not active. The Reward is active.	<ul style="list-style-type: none"> - This screen will indicate if the reward is active and the driver "VSL bonus" is active. The reward will be active if the overall Driver Incentive score is above the programmed threshold score. - If the reward is active, the second line of the display will indicate the current "Driver Bonus" reward that is available.
"TARGET SCORE XXX" "ACTUAL SCORE XXX"	"Target vs. Actual" "XXX"	<ul style="list-style-type: none"> - The screen will display the threshold score. This is referred to as the target score. This may be viewed on the top line. - The bottom line of the display will indicate the current overall "actual score". - If the "actual score" is higher than the target score, the reward will be active and the driver will receive a "Driver Bonus".
"AVG ENGINE SPEED (RPM)"	"Parameter Information Screens" "Average Engine Speed (RPM)" "Average Driving Speed Over 50 MPH" "Average Throttle Demand (RPM)" "Average Shift Engine Speed (RPM)" "Percent Idle Time"	<ul style="list-style-type: none"> - The driver can use the screens for parameter information to obtain information on each of the five parameters of the "Economy Model" feature. As an example, follow the steps in order to obtain information on "Percent Idle Time". <ol style="list-style-type: none"> a. Press the Down arrow button to the "PERCENT IDLE TIME" screen. b. Press the Left arrow button. c. View the specific information on "target vs. Actual Percent Idle Time Values". d. Press the Left arrow button in order to view the "SCORE" screen. <p>The "score" is shown on the screen as "XXX" of "YYY". "XXX" is the actual "score" and "YYY" is the maximum "score" for that parameter. The maximum "score" will depend on the parameter value in the ECM.</p>

5-2.9 "Maintenance Data" Screens

The display can indicate the service history for the maintenance that was performed on the oil and the oil filter (PM1). The display may indicate when the next scheduled PM 1 maintenance is due. The maintenance data is displayed in distance or hours. This is determined by the Customer Programmable Parameters that are programmed into the ECM. The ECM can be programmed to the OFF position, which will prevent the recording of maintenance data from the ECM. After programming the parameters in the ECM, the power must be turned OFF and the power turned ON again in order for the display to recognize the change.

Table 12 - "Maintenance" Screens

Screen	Parameter	Description
"MAINTENANCE DATA"	"Maintenance Data title screen" The Reward is active.	Press the Down arrow button in order to view maintenance data. Press the Left arrow button in order to move one column to the left. Press the Right arrow button in order to move one column to the right.
PM 1-DUE "MI or HR"	PM 1 "Maintenance Due Data"	The display shows when the PM 1 Maintenance should next be performed. This screen will be shown automatically when the display is first turned on and the PM 1 maintenance is due within 3000 miles or 60 hours. This screen will be viewed until an arrow button is pressed. Press the Down arrow button in order to view the maintenance interval and the last performed maintenance interval. Press the Up arrow button in order to view the "MAINTENANCE DATA" title screen. The display will show "PM 1 Disabled" on this screen if the ECM has not been programmed to record PM 1.
PM 1 "RANGE" "MI or HR" "LAST" "MI or HR"	PM 1 "Maintenance Due Data"	This screen shows the PM 1 Maintenance Interval. The screen also shows the previous PM 1 Maintenance that was performed. Press the Up arrow button in order to return to the screen that indicates when the next PM 1 Maintenance is due. This may be performed if the 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, or 3406E has been programmed to allow the PM 1 Maintenance Data to be reset from the display. Press the Down arrow button in order to display the "MAINTENANCE DATA RESET" screen. Press the Down arrow button in order to return to the "Maintenance Data" title screen. This may be performed if the 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16 or 3406E has been programmed to not allow the PM 1 Maintenance Data to be reset from the display.
PM 1 "RESET"	PM 1 "Maintenance"	Press the Left arrow button in order to reset the PM 1 Maintenance Data. Press the Up arrow button in order to view the PM 1 Maintenance Interval. Press the Up arrow button in order to view the PM 1 Maintenance screen. Press the Down arrow button in order to view the "Maintenance Data" title screen.
PM 1 "RESET PERFORMED"	PM 1 "Maintenance Reset Completed"	This screen indicates that PM 1 has been successfully reset. Press any button in order to return to the "MAINTENANCE DATA" title screen.
PM 1 "PAST DUE" "MI or HR"	PM 1 "Maintenance Overdue"	This screen indicates that the PM 1 maintenance interval has been exceeded without a reset. This message will be shown when the display is first turned On. This message will be shown when PM 1 is On. This message will be shown when PM 1 maintenance is due within 3000 miles or maintenance is due within 60 hours. This screen will also be shown if the maintenance interval has been exceeded.

5-2.10 Diagnostic Data" Screens

The display will automatically indicate certain diagnostic codes as the codes occur. The "DIAGNOSTIC DATA" screens provide the advantage of indicating the reason that the Check Engine lamp has come on. The codes will be displayed with the PID-FMI diagnostic code (Parameter Identifier and Failure Mode Identifier) and a brief text description. If more than one code is active, pressing the Down arrow button will scroll through the remaining codes. An active diagnostic code that becomes inactive will disappear from the screen. Press the Right arrow button in order to return to the title screen. The display will indicate other codes or "No Active Codes".

Table 13 - Automatically Displayed Diagnostic Codes

PID-FMI	"Code Description"
100-11	"Very Low Oil Pressure"
110-11	"Very High Coolant Temperature"
111-11	"Very Low Coolant Level"
100-01	"Low Oil Pressure Warning"
110-00	"High Coolant Temperature Warning"
111-01	"Low Coolant Level Warning"
105-00	"High Inlet Manifold Temp Warning"
105-11	"Very High Inlet Manifold Temp"

The diagnostic codes in the above table (table 13) will be displayed whenever the codes are active. The display will continue to show these codes until any button is pressed. The display will continue to show these codes until the diagnostic goes from an active state to an inactive state. If no other codes are active, the Messenger display will return to the screen that was displayed before the diagnostic event.

The diagnostic codes may alert the driver to conditions that may damage engine components. The diagnostic codes 100-11 "Very Low Oil Pressure", 111-11 "Very Low Coolant Level", and 110-11 "Very High Coolant Temperature" indicate that the engine is experiencing a serious problem.

NOTE: Depending on the engine configuration, the engine may shut down when a potentially serious engine problem diagnostic code becomes active. The driver will be provided a warning before engine shutdown.

5-2.10.1 Procedure to Address the Occurrence of Codes

Whenever a diagnostic code occurs, try to note all operating conditions of the vehicle. It is especially critical to take note of the operating conditions for intermittent codes. This information provides the technicians with the operating conditions at the time of the intermittent code. This will enhance the technician's ability to produce the code again. This will also enhance the technician's ability to diagnose the problem. The codes are recorded in the ECM and the codes may be recovered with the electronic service tool.

5-2.10.2 Diagnostic Code Chart

The following table (Table 14) is provided in order to help determine the action that should be taken if a particular diagnostic code is active. The chart is intended as a general guideline. The current operating conditions will determine the reaction of the driver to the codes. As an example, only intermittent service codes that are a persistent problem should be serviced.

Table 14 - "Suggested Driver Action for Diagnostic Codes
(3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, and the 3406E Engines)"

Code	Description	"Shutdown" "Vehicle" ⁽¹⁾	"Service ASAP" ⁽²⁾	"Schedule Service" ⁽³⁾
1-11	Cylinder 1 Fault		X	
2-11	Cylinder 2 Fault		X	
3-11	Cylinder 3 Fault		X	
4-11	Cylinder 4 Fault		X	
5-11	Cylinder 5 Fault		X	
6-11	Cylinder 6 Fault		X	
22-11	"Cam Sensor to Crank Sensor Calibration"			X
22-13	"Check Timing Sensor Calibration"			X
30-08	Invalid PTO Throttle Signal			X
30-13	"PTO Throttle Sensor Calibration"			X
32-05	"Turbo Wastegate Solenoid Output Open Circuit"		X	
32-06	"Turbo Wastegate Solenoid Short Circuit"		X	
32-11	"Turbo Wastegate Solenoid Output Short to +Batt"		X	
41-03	"8 Volt Supply Above Normal"		X	
41-04	"8 Volt Supply Below Normal"		X	
43-02	"Ignition Button Switch Fault"		X	
52-11	"Air Inlet Shutoff Shutdown"			X
54-05	"Output #6 Open Circuit"		X	
54-06	"Output #6 Short Circuit"		X	
55-05	"Output #7 Open Circuit"		X	
55-06	"Output #76 Short Circuit"		X	
64-12	"Loss of Engine Cam Sensor RPM Signal"			X
71-00	"Idle Shutdown Override" ⁽⁴⁾			
71-01	"Idle Shutdown Occurrence" ⁽⁴⁾			
71-14	"PTO Shutdown Timer Occurrence"			X
84-00	"Vehicle Over Speed Warning" ⁽⁴⁾			
84-01	"Loss of Vehicle Speed Signal"			X
84-02	"Invalid Vehicle Speed Signal"			X
84-08	"Vehicle Speed Out of Range"			X
84-01	"Vehicle Speed Rate of Change"			X

(1) The "Shutdown Vehicle" code indicates the presence of a condition that could potentially damage the engine. The driver should bring the vehicle to a stop off the road and out of traffic.

(2) The "Service ASAP" code indicates that the driver should go to the nearest qualified location for service if vehicle performance is adversely affected.

(3) The "Schedule Service" code should be addressed at the next convenient opportunity if vehicle operation is adversely affected.

(4) "No action required"

Table 14 - "Suggested Driver Action for Diagnostic Codes
(3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, and the 3406E Engines)" continued

Code	Description	"Shutdown" "Vehicle" ⁽¹⁾	"Service ASAP" ⁽²⁾	"Schedule Service" ⁽³⁾
84-14	"Quick Stop Occurrence:" ⁽⁴⁾			
91-08	"Invalid Throttle Signal"		X	
91-13	"Throttle Sensor Calibration"		X	
100-01	"Low Oil Pressure Warning"		X	
100-03	"Oil Pressure Sensor Open Circuit"			X
100-04	"Oil Pressure Sensor Short Circuit"			X
100-11	"Very Low Oil Pressure"	X		
102-00	"Boost Pressure Reading Stuck High" ⁽⁴⁾			X
102-01	"Boost Pressure Reading Stuck Low" ⁽⁴⁾			X
102-02	"Erratic Boost Pressure"		X	
102-03	"Boost Pressure Sensor Open Circuit"			X
102-04	"Boost Pressure Sensor Short Circuit"			X
102-07	"Excessive Boost Pressure"		X	
103-00	"High Turbo Speed Derate"		X	
103-11	"Very High Turbo Speed Derate"		X	
105-00	"High Intake Manifold Air Temperature Warning"		X	
105-03	"Intake Manifold Air Temperature Sensor" "Open Circuit"			X
105-04	"Intake Manifold Air Temperature Sensor" "Short Circuit"			X
105-11	"Very High Intake Manifold Air Temperature"		X	
108-03	"Atmospheric Pressure Sensor Open Circuit"			X
108-04	"Atmospheric Pressure Sensor Short Circuit"			X
110-00	"High Coolant Temperature Warning"		X	
110-03	"Coolant Temperature Sensor Open Circuit"			X
110-04	"Coolant Temperature Sensor Short Circuit"			X
110-11	"Very High Coolant Temperature"	X		
111-01	"Low Coolant Level Warning"		X	
111-02	"Coolant Level Sensor Fault"			X
111-03	"Coolant Level Sensor Open Circuit"			X
111-04	"Coolant Level Sensor Short Circuit"			X
111-11	"Very Low Coolant Level"	X		

(1) The "Shutdown Vehicle" code indicates the presence of a condition that could potentially damage the engine. The driver should bring the vehicle to a stop off the road and out of traffic.

(2) The "Service ASAP" code indicates that the driver should go to the nearest qualified location for service if vehicle performance is adversely affected.

(3) The "Schedule Service" code should be addressed at the next convenient opportunity if vehicle operation is adversely affected.

(4) "No action required"

Table 14 - "Suggested Driver Action for Diagnostic Codes
(3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, and the 3406E Engines)" continued

Code	Description	"Shutdown" "Vehicle" ⁽¹⁾	"Service ASAP" ⁽²⁾	"Schedule Service" ⁽³⁾
111-14	"Early Hour Low Coolant Level"			X
121-05	"Retarder Solenoid Low/High Open Circuit"			X
121-06	"Retarder Solenoid Low/High Short Circuit"			X
122-05	"Retarder Solenoid Med/High Open Circuit"			X
122-06	"Retarder Solenoid Med/High Short Circuit"			X
166-11	"Rated Engine Power Derate"			X
168-02	"Intermittent Battery"		X	
171-03	"Outside Air Temp Sensor Open Circuit"			X
171-04	"Outside Air Temp Sensor Short Circuit"			X
171-11	"No Ambient Air Temperature Data"			X
173-00	"High Exhaust Gas Temperature Derate"		X	
173-03	"Exhaust Gas Temperature Open Circuit"			X
173-04	"Exhaust Gas Temperature Short Circuit"			X
173-11	"Very High Exhaust Gas Temperature Derate"	X		
174-00	"High Fuel Temperature Warning"			X
174-03	"Fuel Temperature Sensor Open Circuit"			X
174-04	"Fuel Temperature Sensor Short Circuit"			X
190-00	"Engine Over Speed Warning" ⁽⁴⁾			
190-12	"Loss of Engine Crank Sensor RPM Signal"			X
191-07	"Transmission Not Responding"		X	
224-11	"Theft Deterrent Active" ⁽⁴⁾			
224-14	"Engine Cranking with Theft Deterrent Active" ⁽⁴⁾			
231-02	"J1939 Required Data Not Received"			X
231-12	"J1939 Device Not Responding"			X
232-03	"5 Volt Supply Above Normal"			X
232-04	"5 Volt Supply Below Normal"			X
246-11	"Brake Switch #1"			X
247-11	"Brake Switch #2"			X
249-11	"J1922 Data Link Fault"			X
252-11	"Incorrect Engine Software"		X	
253-02	"Check Customer or System Parameters"			X
253-11	"Check Transmission Customer Parameters"		X	

(1) The "Shutdown Vehicle" code indicates the presence of a condition that could potentially damage the engine. The driver should bring the vehicle to a stop off the road and out of traffic.

(2) The "Service ASAP" code indicates that the driver should go to the nearest qualified location for service if vehicle performance is adversely affected.

(3) The "Schedule Service" code should be addressed at the next convenient opportunity if vehicle operation is adversely affected.

(4) "No action required"

5-2.11 “Theft Deterrent” Screens

5-2.11.1 Theft Deterrent

The Messenger display provides the capability to allow the engine to start, the capability to prevent the engine from starting, or the capability to shut down the engine. This may be done by entering a customer password with four characters into the display when the engine is at idle.

In the powerup sequence, the display will indicate if the “Theft Deterrent System” is enabled, automatically enabled, or disabled. The “Theft Deterrent System” may be enabled or the system may be automatically enabled. The engine will not start until the customer password with four characters is successfully entered into the display. If the system is disabled, the engine will start without the password. To enable the system, the customer password must be successfully entered. The passwords that are entered will not be accepted if the engine is not at idle condition. In order to automatically enable the system, the vehicle needs to be shut off in a normal manner. The “Theft Deterrent” parameter needs to be programmed in order to be in the “Automatically Enable” mode.

5-2.11.2 “Accessing Theft Deterrent”

ECM Customer Programmable parameters determine the access to this function of the dash display and the Theft Deterrent password. The ECM must be programmed to allow access to this screen. The ECM must be programmed or the entire “Theft Deterrent” column of the screen map will not be shown. Pressing the Right arrow button on the “DIAGNOSTIC DATA” title screen will cause the display to pass over the “THEFT DETERRENT” title screen.

After the parameters are programmed in the ECM, the power must be turned OFF and the power turned ON again in order for the display to recognize the change.

Table 15 - “Theft Deterrent” Entry Screens

Screen	Parameter	Description
“Theft Deterrent Status”	“Theft Deterrent Title Screen”	<p>The screen shows the current status of the “Theft Deterrent” system when “STATUS” text is indicated. The system may be “ENABLED” and the engine will not start until the correct password is entered. The system may be “DISABLED” and the “Theft Deterrent” system is not active. The engine may be started if the “Theft Deterrent” system is “Disabled”.</p> <p>This screen is shown when the display is first powered up and the “Theft Deterrent” system is programmed to be active.</p> <p>Press the Left arrow button in order to move one column to the left.</p> <p>Press the Right arrow button in order to move one column to the right.</p> <p>Press the Down arrow button in order to move to the “ENTER PASSWORD” screen.</p>
“Enter Password” “4 Characters”	“Enter Theft Deterrent Password”	<p>Press the “Up” arrow button or the “Down” arrow button in order to scroll through numbers 0 to 9. Press the “Up” arrow button or the “Down” arrow button in order to scroll through letters A to Z.</p> <p>Press the Right arrow button and the Left arrow button in order to move between locations of the characters.</p>
“4 Characters If Correct”	“Accept Entered Password”	<p>This screen shows the password that has been entered. If the password is correct, the text message “PASSWORD ACCEPTED” will be displayed. The display will then return to the “THEFT DETERRENT” title screen in order to show the status.</p> <p>If the password is not accepted, the following message will be displayed “PASSWORD INCORRECT”.</p> <p>The display will then return to the “THEFT DETERRENT” title screen and the status will not have changed.</p> <p>Press the Left arrow button in order to enter the password.</p> <p>Press the Up, Down, and Right arrow button in order to return the display to the “THEFT DETERRENT” title screen. This will clear the password that was just entered.</p>

5-2.12 "Fuel Correction Adjustment" Screens

5-2.12.1 The 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, and 3406E Engines Only

The "Fuel Correction Adjustment" allows the fine tuning of data on future fuel usage that is based on the past differences of values. The values are stored in the ECM and the recorded fuel usage.

5-2.12.2 Accessing "Fuel Correction Adjustment"

An ECM Customer Programmable Parameter determines access to this function of the dash display. If the ECM is not programmed to allow access to this screen, the entire "Fuel Correction Adjustment" column of the "Screen Map" will not be shown. Press the Right arrow button from the "THEFT DETERRENT" title screen or press the Left arrow button from the "DISPLAY CONFIGURATION" title screen in order to pass over the "FUEL CORRECTION ADJUSTMENT" title screen. After the parameters are programmed in the ECM, power to the display must be turned OFF and the power turned ON again in order for the display to recognize the change.

"Fuel Correction Adjustments" should be made following extensive operation of the vehicle. During this period, the vehicle should be operated in the usual manner. The "Fuel Correction Adjustment" affects all future "Fuel Used" data, "Instantaneous", "Driver Trip", "Fleet Trip", and "Lifetime Totals". The "Fuel Correction Adjustment" should be made when the vehicle is not moving.

5-2.12.3 "Adjusting Fuel Correction"

Determining Actual Fuel Economy

The actual fuel usage and travel distance must be recorded in order to make an accurate adjustment. The display uses the "Fleet Trip Segment" as a basis for "fuel correction adjustment". The actual fuel usage and the travel distance should be recorded immediately after a "Fleet Trip Segment Reset". Calculate the "Actual Fuel Economy" after driving on a typical route for an extended period of time. Calculate the fuel economy from the "Fuel Used" and "Distance Traveled" per the following formula.

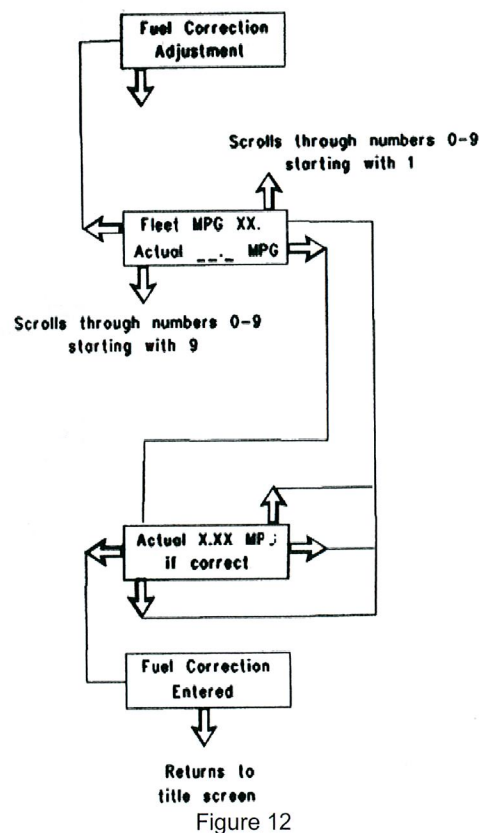
$$\frac{\text{Actual Distance Traveled}}{\text{Actual Fuel Used}}$$

Entering Actual Fuel Economy

- From the "FUEL CORRECTION ADJUSTMENT" title screen, press the Down arrow button. The display will show the current "Fleet Fuel Economy" on the top line. The display will show a flashing cursor near the left digit next to the word "ACTUAL" on the second line of the display.
- Pressing the Down arrow button scrolls through numbers 0 to 9 beginning with 9. Pressing the Up arrow button begins with the number 1. If the first position is not needed, press the Right arrow button. The space for the second digit will be highlighted. When the appropriate number is viewed, press the Right arrow button and select the digit after the decimal point. When the last digit is successfully selected, press the Right arrow button. The display will indicate the "Actual Fuel Economy" that was entered. If the number is correct, press the Left arrow button.
- If the "Actual Fuel Economy" is correct, press the Left arrow button. A message will appear to verify the "fuel correction adjustment". If the value for "Actual Fuel Economy" was entered incorrectly, press the Down, Up, or Right arrow button. The display will return to the "FUEL CORRECTION ADJUSTMENT ENTRY" screen. The numbers that were previously entered will be deleted from the screen. The display will allow the value for the "Actual Fuel Economy" to be re-entered on the screen.

"Fuel Correction Out-of-Range" Message

The "FUEL CORRECTION OUT OF RANGE" message will be displayed if the value for the "Fuel Rate Correction" exceeded the allowable limits. Press any button in order for the display to return to the "FUEL CORRECTION ADJUSTMENT" title screen.



5-2.13 "Display Configuration" Screens

The language for the display can be selected by the driver. The three languages are English, French, or Spanish. The units of measure for the display may be selected by the driver. There are four groups of units:

- English units ("miles", "US gallons", "psi", and "°F")
- English units ("miles", "Imperial gallons", "psi", and "°F")
- Metric units ("kilometers/liters", "kPa", and "°C")
- Metric units ("liters/100 kilometers", "liters", "kPa", and "°C")

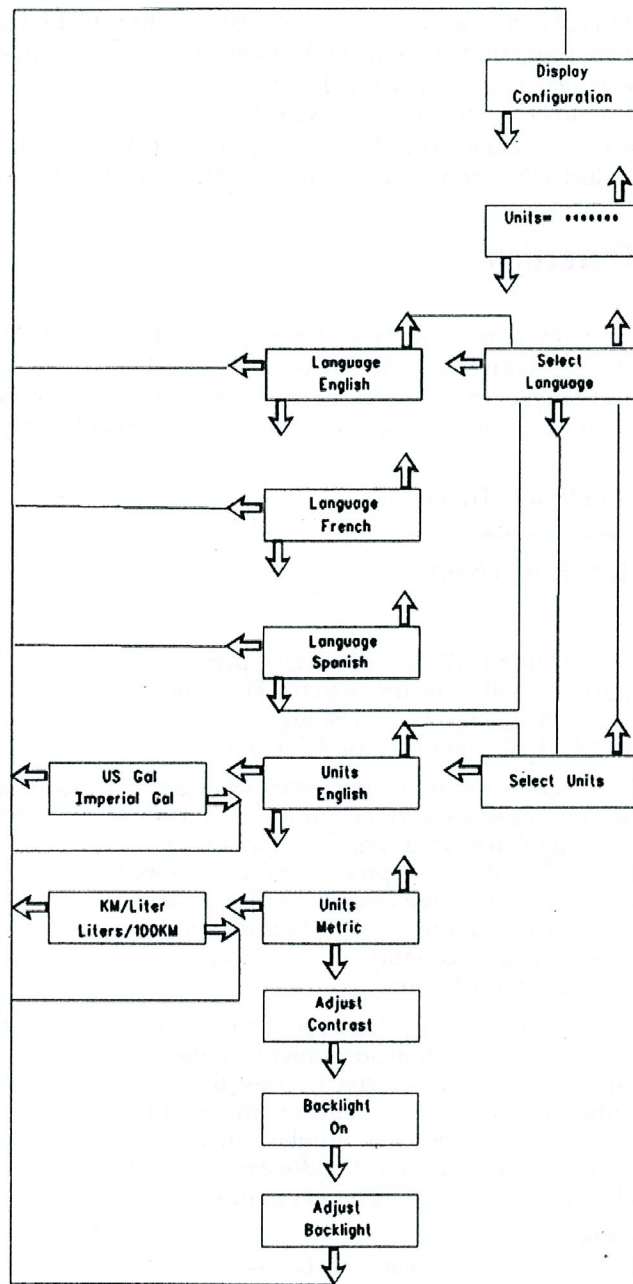


Figure 13 - Seeking Display Units

5-2.13.1 Units of Measure

From the "DISPLAY CONFIGURATION" title screen, press the Down arrow button. This screen displays the current units for the measurements.

Select the Display Language from the "DISPLAY CONFIGURATION" title screen. Press the Down arrow button two times. Once the "Select Language" screen appears, press the Left arrow button one time.

If the English language is desired, press the Left arrow button.

Press the Down arrow button from the "English" screen to go to the "French" screen. Now press the Left arrow button from this screen.

Press the Down arrow button twice from the "English" screen to go to the "Spanish" screen. Now press the Left arrow button from this screen.

5-2.13.2 Selecting the Display Units

From the "Display Configuration" title screen, press the Down arrow button three times. Once the "Select Units" screen appears, press the Left arrow button one time.

If English units are desired, press the Left arrow button and select the desired unit of measure ("US gallons" or "Imperial gallons"). If "Imperial Gallons" is selected, then an "IG" will be displayed to the driver. As an example, the display will show "MPIG", "IGAL", etc.

If Metric units are desired, press the Down arrow button from the "Units English" screen. Now, press the Left arrow button from this screen and select the desired units ("kilometers/liter" or "liters/100 kilometers").

5-2.13.3 Adjusting the Brightness of the Display

The contrast may be adjusted by pressing and releasing the Right arrow button or the Left arrow button from the Adjust Contrast screen. The characters may be lightened by pressing and releasing the Left arrow button until the illumination is satisfactory. The background may be darkened by pressing and releasing the Right arrow until the background is satisfactory.

The Down arrow button may be used in order to change the backlight. The backlight may be turned off by pressing and releasing the Left arrow button. The backlight may be turned on by pressing and releasing the Right arrow button.

The backlight may be adjusted by pressing and releasing the Right arrow button or the Left arrow button. Pressing and releasing the Left arrow button will decrease the backlight. Pressing the releasing the Right arrow button will increase the backlight.

NOTE: *The automatic dim feature will not function if the display has been placed in a manual dim mode. To reactivate the automatic dim feature, turn the power to the display OFF, then back ON.*

5-2.14 "Driver Entry" Screens for the 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, and 3406E Engines Only

5-2.14.1 Two Different DRIVER IDs

The Caterpillar 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, and 3406E ECM can maintain information for two different DRIVER IDs at the same time. The ECM will separately store "Fleet Trip" information for each of the two drivers. This function is especially suited for slip seat or more than one driver per the vehicle. This function could also be used by the same driver to record vehicle operation over two legs of a trip. A single driver would use two different DRIVER IDs to identify each different leg of the trip. The DRIVER IDs should be chosen prior and entered into the display prior to operating the vehicle.

The Messenger display will indicate the last driver as the active driver in the system. If the Fleet Trip Segment has been reset, the display will indicate "NO ACTIVE DRIVER". Press any button in order to continue.

The "Fleet Trip" information is unavailable for display on the Messenger display to either driver. This information is only available through use of the "Caterpillar Fleet Information Software" program.

5-2.14.2 Entering a New Driver ID

A maximum of two different DRIVER IDs may be used for each "Fleet Trip Segment". If a third DRIVER ID is desired, the "Fleet Trip Segment" must be reset. After the "Fleet Trip Segment" has been reset, the previous DRIVER IDs are cleared. The two new DRIVER IDs may now be added to the next "Fleet Trip Segment". Press the Up arrow button or press the Down arrow button in order to scroll through the letters A to Z. Press the Right arrow button and the Left arrow button in order to move between locations of the characters. Press the Up arrow button or the Down arrow button in order to scroll through numbers 0 to 9.

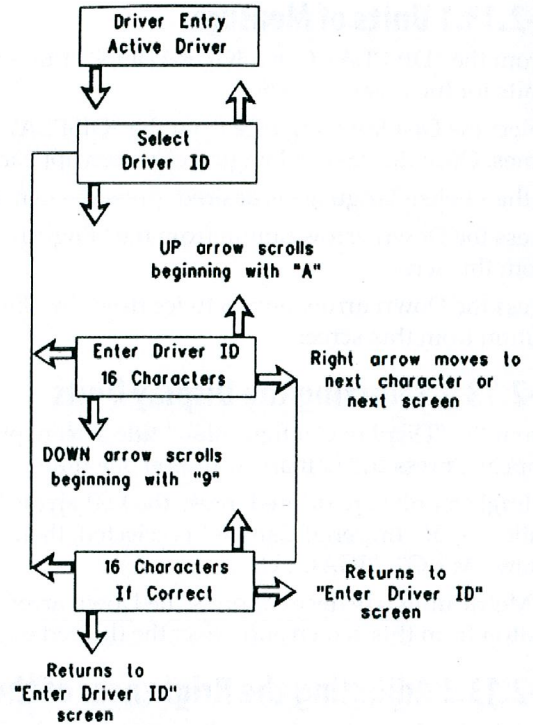


Figure 14 - Enter Identification of the driver.

5-2.14.2 "Selecting a Previously Entered DRIVER ID"

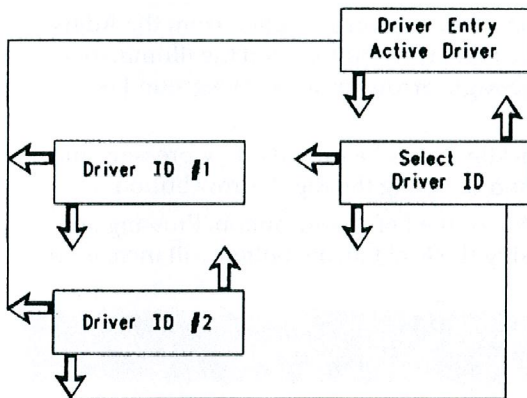


Figure 15 - Select the driver.

Only the DRIVER IDs that have been entered during the current "Fleet Trip Segment" may be viewed. The DRIVER ID may be toggles between drivers per the following instructions. Press the Down arrow button from the "Driver Entry" screen. The "SELECT DRIVER ID" screen will be shown. Press the Left arrow button. One of the two DRIVER IDs that were previously entered will be shown. A "NO DRIVER ID ENTERED!" message will appear if a DRIVER ID has not been entered. Pressing and releasing the Down arrow button will show any other DRIVER ID. Press and release the Left arrow button in order to select a DRIVER ID as the active driver.

Table 16 - "Driver Entry Screens Table"

Screen	Parameter	Description
"Driver Entry" "Active Driver"	"Driver Entry Title Screen"	This screen shows the current DRIVER IDs whenever the text for "ACTIVE DRIVER" is indicated. This is the second screen after the display is first powered up. This is shown automatically. Pressing any button will display the next screen in the power up sequence. Press the Left arrow button in order to move one column to the Left. Press the Down arrow button in order to select the DRIVER ID screen. If the "Fleet Trip" has been reset, the screen will indicate "NO ACTIVE DRIVER" when the "ACTIVE DRIVER" text is indicated.
"Select" "DRIVER ID"	"Select Previously Entered DRIVER ID"	Press the Left arrow button in order to select one of the two DRIVER IDs. The first DRIVER ID will be shown. If no DRIVER IDs have been entered, a message "NO DRIVER IDs ENTERED!" will appear. Press any button to go back to the "DRIVER ENTRY" title screen.
"DRIVER ID" #1	"Select DRIVER ID #1"	This screen shows the first DRIVER ID. The screen will indicate "DRIVER ID 1". Press the Left arrow button in order to enter the ID code as the current driver. The display will begin recording information for this driver. Display returns to "DRIVER ENTRY" title screen.
"DRIVER ID" #2	"Select DRIVER ID #2"	This screen shows the second DRIVER ID that was entered. Press the Left arrow button in order to enter this ID code as the current driver. The display will begin to record information on the second driver. Display returns to "DRIVER ENTRY" title screen.
"Enter DRIVER ID"	"Enter New DRIVER ID"	Press the Down arrow button or the Up arrow button in order to scroll through numbers 0 to 9. Press the Down arrow button or the Up arrow button in order to scroll through letters A to Z. The Right arrow button and Left arrow button move between locations for the characters. A space may be entered by moving through a space for a character without selecting a character. Press the Down arrow button and release the Down arrow button in order to scroll through the available characters. Press the Up arrow button and release the Up arrow button in order to scroll through the available characters. If two DRIVER IDs have been entered, a "MAX DRIVER IDs ENTERED!" message will appear. Press any button in order to return to the "DRIVER ENTRY" title screen. If no characters have been entered a message will appear. The display will show "A CHARACTER MUST BE ENTERED!" on the screen.
"If DRIVER ID Correct"	"Accept New DRIVER ID"	This screen shows the DRIVER ID that was entered. Press the Left arrow button in order to enter this DRIVER ID and return the display to the "DRIVER ENTRY" title screen. This ID code will be shown as the "Current Driver". All vehicle data will be recorded to this driver. Press the Up, Down, or Right arrow button in order to return the display to the "ENTER NEW DRIVER ID" screen. This may be done in order to clear the DRIVER ID that was just entered.

5-2-15 State Crossing Screens

5-2.15.1 The 3176B, 3176C, C-10, C11, C-12, C13, C15, C-15, C-16, and 3406E Engines Only

The Messenger display will record information for the "Distance Traveled", "Fuel Used", "PTO Fuel Used", and "Idle Fuel Used" in the United States or in Canada. The state must be entered in order for the display to record the information for the vehicle. The screen will show the last state that was entered into the display. This information is reset with the "Fleet Trip Segment". The state selection should be performed when the vehicle is not moving. All fifty US states and twelve Canadian provinces are provided in this display.

5-2.15.2 Accessing State Crossings

“ECM Customer Programmable Parameters” determine the access to this function of the dash display. If information for the state is programmed OFF, the entire “State Crossing” column will not be shown. Press the Right arrow button from the “DRIVER ENTRY” title screen. Press the Left from the “INSTANTANEOUS DATA” title screen. This will cause the display to skip the STATE CROSSING screen.

After programming the parameters in the ECM, the power must be turned OFF and the power turned ON again in order for the display to recognize the change.

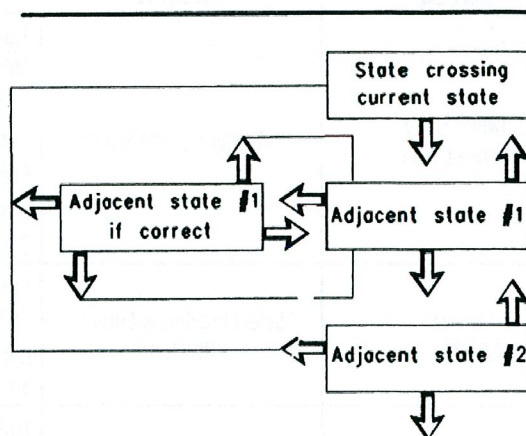
5-2.15.3 Selecting a State

The STATE CROSSING title screen displays the currently selected state. This is illustrated as the “CURRENT STATE” in Figure 16. Press the Down arrow button in order to show more states. The display will list all adjacent states to the current state first. The display will list all adjacent states in an alphabetical order to the current state. Press the Up and Down arrow buttons in order to scroll through the list.

Continue to scroll through the list of adjacent states in order to select a state that is not adjacent to the current state. The list will start with a full alphabetical list of all available states and provinces.

When the desired state is displayed, press the Left arrow button. The display will again show the selected state. Press the Left arrow button in order to enter the displayed state as the current state. Press any other button in order to select a different state.

State Crossing Screen



Available states are listed alphabetically
Figure 16

Table 17 - “State Entry Screens”

Screen	Parameter	Description
“State Crossing” “Current State”	State Crossing “Title Screen	This screen shows the “Current State” of operation. If a state has not been entered, the message “No Active State” will appear. The “No Active State” will occur only with a new display until one state is entered. The screen will be automatically shown when the display is first powered up. This screen will be shown after the “Active Driver” screen. Press any button in order to show the next screen in the power up sequence. If the “Fleet Trip” information has been reset, the current state is maintained. Press the Left arrow button in order to move one column to the Left. Press the Right arrow button in order to move one column to the Right. Press the Down arrow button in order to select another state. Fifty entries for “State Crossing” are the maximum number that is allowed until the display is reset. A “STATES ALLOWED EXCEEDED!” message will appear after the entry of fifty. Press any button in order to return to the STATE CROSSING title screen. The display will not allow the addition of any additional “State Crossings” until the “Fleet Trip” has been reset.
“Adjacent State #1”	“Select a different state”	Press the Up arrow button or press the Down arrow button in order to scroll through the list of states. The display will list all adjacent states to the current state first. The display will list all adjacent states in an alphabetical order to the current state. When adjacent states are exhausted, the display begins listing all states in alphabetical order. Press the Left arrow button in order to select the desired state. The Up and Down arrow buttons will scroll forward and backward through the list.
“Adjacent State #1 if Correct”	“Enter selected state”	This screen shows the state that was just selected. If this state is desired, press the Left arrow button and display returns to STATE CROSSING title screen with this state as the “Current State”. If this state is incorrect, press any arrow button in order to return to the list of states.

5-2.16 Troubleshooting

The following is a list of possible problems that may occur.

1. *Unable to Read Characters on the Display*

Probable Cause

- Portions of the display may not light. Part of a character is missing, etc. The unit must be replaced.

2. *The Display May Not Have Power*

Probable Cause

- Make sure that the ON button has been pressed.
- Loose power or loose ground connections to the display.
- The vehicle battery is dead.
- After checking the above items, if condition still exists refer to Step 1 of Diagnostic Test.

3. *No Data Link Communication*

Probable Cause

- No connection or an intermittent connection in one of the two Data Link lines to the engine ECM
- Connection to the J1922 Data Link or the J1939 Data Link instead of the J1708 ATA Data Link
- The data link lines must be the twisted pair.
- The engine has no power, intermittent power, or poor ground connections to the engine ECM. After checking the above items, if a condition still exists refer to Step 4 of the Diagnostic Test.

4. *All Data Except Lifetime Totals Has Been Reset*

Probable Cause

- The unswitched battery connection to the engine ECM is disconnected. This is possibly due to vehicle service or a battery disconnect switch.
- The data has been intentionally reset with the display. "Caterpillar Fleet Information Software", or the electronic service tool. Determine the reason for the reset and avoid the conditions that caused this event. If a different system problem is suspected, consult a qualified service center.

5. *The Fleet, Driver Trip Data, and Lifetime Totals Have Been Reset*

Probable Cause

- The engine ECM was recently replaced. Determine the reason for the reset and avoid the conditions that caused this event. If a different system problem is suspected, consult a qualified service center.

6. *The Driver is unable to adjust the Fleet Trip or unable to reset the maintenance. The driver is unable to reset the "Fuel Correction".*

Probable Cause

- The ECM parameters are programmed to prevent the reset of these parameters by the customer. The electronic service tool and authorization from the owner will be necessary to reset the ECM. This will allow access to these functions from the display.
- The power to the display was turned OFF and the power was turned ON in order for the display to recognize the charge.

7. *The Driver is unable to access the "Fleet Trip State Totals" and "State Crossing" Information.*

Probable Cause

- The ECM parameters are programmed OFF in order to prevent access to this information. The electronic service tool and authorization from the owner will be necessary to reset the ECM. This will allow access to this information.
- The power must be turned OFF and the power turned ON in order for the display to recognize any changes to the ECM.

8. *Certain "Instantaneous Data" Parameters Appear to be Unavailable.*

- This information is not available on the data link. Verify that the appropriate sensors are installed. For example, if Ambient Air Temperature is not shown by the display, verify that an Ambient Air Sensor is installed on the vehicle.

9. *The Display Will Not Become Dim on the Circuit for the Panel Dimmer*

- The dimmer circuit on the vehicle is not a Pulse Width Modulated (PWM) circuit. Contact the vehicle manufacturer in order to determine if the vehicle has a PWM dimmer circuit.

Table 18

"Parameter"	Available Range or Options	Default
"SELECTED ENGINE RATING"		
"Rating Number"	Dependent on engine power	
"Multitorque Ratio"	Unavailable (Standard Ratings) "MT-A" "MT-B" "MT-C"	Unavailable (Standard Ratings) "MT-A" (Multitorque Ratings)
"ECM IDENTIFICATION PARAMETERS"		
"Vehicle ID"	17 Digits Available characters are dependent on the service tools	all zeroes
"SECURITY ACCESS PARAMETERS"		
"ECM Wireless Communication Enable"	"No" "Yes"	"No"
"SECURITY ACCESS PARAMETERS"		
"Vehicle Speed Calibration"	2485 to 93226 PPKM (4000 to 150000 PPM)	Not Programmed
"Vehicle Speed Cal (J1939 - Trans)"	0 to 430000 revolutions per km (0 to 65000 revolutions per mile)	Not Programmed
"Vehicle Speed Cal (J1939 - ABS)"	0 to 6.550	Not Programmed
"Vehicle Speed Limit"	48 to 204 km/h (30 to 127 mph)	204 km/h (127 mph)
"VSL Protection"	1000 to TEL rpm	TEL rpm
"Tachometer Calibration"	12.0 to 500.0 pulses per revolution	113.0 pulses per revolution
"Soft Vehicle Speed Limit"	"No" "Yes"	"No"
"Two Speed Axle - Low Speed Range Axle Ratio"	1.00 to 19.99	1.00
"Nominal Axle Ratio - High Speed Range Axle Ratio"	1.0 to 9.99	1.00
"CRUISE CONTROL PARAMETERS"		
"Low Cruise Control Speed Set Limit"	24 to 204 km/h (15 to 127 mph)	204 km/h (127 mph)
"High Cruise Control Speed Set Limit"	48 to 204 km/h (30 to 127 mph)	204 km/h (127 mph)
"Engine Retarder Mode"	"Coast" "Latch" "Manual"	"Manual"
"Engine Retarder Minimum VSL Type"	"Hard Limit" "Soft Limit"	"Hard Limit"
"Engine Retarder Minimum Vehicle Speed"	0 to 204 km/h (0 to 127 mph)	0 km/h (0 mph)
"Auto Retarder in Cruise (0 - Off)"	0 to 16 km/h (0 to 10 mph)	0 km/h (0 mph)
"Auto Retarder in Cruise Increment"	0 to 8 km/h (0 to 5 mph)	3 km/h (2 mph)
"Cruise/ Idle/PTO Switch Configuration"	"Set/Accel-Res/Decel" "Set/Decel-Res/Accel"	"Set/Accel-Res/Decel"
"Soft Cruise Control"	"No" "Yes"	"Yes"
"Adaptive Cruise Control Enable"	"Disabled" "Enabled"	"Disabled"

Table 18 - Continued

"Parameter"	Available Range or Options	Default
"IDLE PARAMETERS"		
"Idle Vehicle Speed Limit"	2 to 24 km/h (1 to 15 mph)	2 km/h (1 mph)
"Idle RPM Limit"	Low Idle to 2120 rpm	2120 rpm
"Idle/PTO RPM Ramp Rate"	5 to 1000 rpm/sec	50 rpm/sec
"Idle/PTO Bump RPM"	5 to 500 rpm	20 rpm
"DEDICATED PTO PARAMETERS"		
"PTO Configuration"	"Cab Switches" "Off" "Remote Switches" "Remote Throttle"	"Off"
"PTO Top Engine Limit"	Low Idle to 2120 rpm	2120 rpm
"PTO Engine RPM Set Speed (0 - Off)"	Low Idle to PTO TEL rpm	0
"PTO Engine RPM Set Speed A"	Low Idle to PTO TEL rpm	0
"PTO Engine RPM Set Speed B"	Low Idle to PTO TEL rpm	0
"PTO to Set Speed"	"No" "Yes"	"No"
"Maximum PTO Enable Speed"	Low Idle to PTO TEL rpm	PTO TEL rpm
"PTO Cab Controls RPM Limit"	"Low Idle" "TEL" "PTO TEL"	"TEL"
"PTO Kickout Vehicle Speed Limit"	2 to 204 km/h (1 to 127 mph)	2 km/h (1 mph)
"Max PTO Vehicle Speed"	24 to 204 km/h (15 to 127 mph)	204 km/h (127 mph)
"Torque Limit"	270 N·m (200 lb ft) to Rated Torque	3400 N·m (2500 lb ft)
"PTO Shutdown Time (0 - Off)"	3 to 1440 minutes	0
"PTO Shutdown Timer Maximum RPM"	600 to PTO TEL rpm	PTO TEL rpm
"PTO Activates Cooling Fan"	"Continuous" "Normal"	"Normal"
"ENGINE/GEAR PARAMETERS"		
"Lower Gears Engine RPM Limit"	1100 to TEL rpm	TEL rpm
"Lower Gears Turn Off Speed"	5 to 48 km/h (3 to 30 mph)	5 km/h (3 mph)
"Intermediate Gears Engine RPM Limit"	1100 to TEL rpm	TEL rpm
"Intermediate Gears Turn Off Speed"	8 to 80 km/h (5 to 50 mph)	8 km/h (5 mph)
"Gear Down Protection RPM Limit"	1300 to TEL rpm	TEL rpm
"Gear Down Protection Turn On Speed"	48 to 204 km/h (30 to 127 mph)	204 km/h (127 mph)
"Low Idle Engine RPM"	600 to 750 rpm	600 rpm
"Transmission Style"	"Automatic Option 1" "Automatic Option 2" "Automatic Option 3" "Automatic Option 4" "Eaton Top 2" "Manual Option 1"	"Manual Option 1"

Table 18 - Continued

"Parameter"	Available Range or Options	Default
"ENGINE/GEAR PARAMETERS" - Continued		
"Eaton Top 2 Override with Cruise Switch"	"No" "Yes"	"No"
"Top Gear Ratio"	0.000 to 3.750	0.000
"Top Gear Minus One Ratio"	0.000 to 3.750	0.000
"Top Gear Minus Two Ratio"	0.000 to 3.750	0.000
"Governor Type"	"Full Range" "Min/Max" "Min/Max with Speed Control"	"Full Range"
"TIMER PARAMETERS"		
"Idle Shutdown Time (0 - Off)"	3 to 1440 minutes	0 minutes
"Idle Shutdown Timer Maximum RPM"	Low Idle to 2120 rpm	2120 rpm
"Allow Idle Shutdown Override"	"J1587 Outside Temp Based" "No" "Outside Temperature Based" "Yes"	"Yes"
"Minimum Idle Shutdown Outside Temp"	-40° to 49°C (-40° to 120°F)	49°C (120°F)
"Maximum Idle Shutdown Outside Temp"	-40° to 49°C (-40° to 120°F)	49°C (120°F)
"A/C Switch Fan On - Time (0 - Off)"	1 to 600 seconds	0 seconds
"Fan with Engine Retarder in High Mode"	"No" "Yes"	"No"
"Engine Retarder Only"	0.0 to 3.0 seconds	0.0 seconds
"SMART IDLE PARAMETERS"		
"Battery Monitor and Engine Control Voltages"	0 to 25.5 volts	0.0 volts
"ENGINE MONITORING PARAMETERS"		
"Engine Monitoring Mode"	"Derate" "Shutdown" "Warning"	"Warning"
"Engine Monitoring Lamps"	"Option 1" "Warning Lamp"	"Warning Lamp"
"Coolant Level Sensor"	"2-wire Float Sensor" "4-pin" "No"	"No"
"Engine Coolant Temperature Derate Enable Status"	"Disabled" "Enabled"	"Disabled"

Table 18 - Continued

"Parameter"	Available Range or Options	Default
"MAINTENANCE PARAMETERS"		
"Maintenance Indicator Mode"	"Automatic Distance" "Automatic Hours" "Manual Distance" "Manual Hours" "Off"	"Off"
"PM 1 Interval (Manual Maintenance Indicator Mode)"	8050 to 56325 km (5000 to 35000 miles) 100 to 750 hours	2140 km (15000 miles) 250 hours
"Engine Oil Capacity"	19 to 57 L (20 to 60 qt)	C11, C13, 34 L (36 qt)
"TRIP PARAMETERS"		
"Fuel Correction Factor"	-63 to 63.5%	0%
"Dash-Change Fuel Correction Factor"	"No" "Yes"	"No"
"Dash-PM 1 Reset"	"No" "Yes"	"No"
"Dash-Fleet Trip Reset"	"No" "Yes"	"No"
"Dash-State Selection"	"No" "Yes"	"Yes"
"Theft Deterrent System Control"	"Auto-Enable" "No" "Yes"	"No"
"Theft Deterrent Password"	Four Characters	0000
"Quick Stop Rate"	5 to 24 km/h per sec (3 to 15 mph per sec)	0 km/h per sec (0 mph per sec)
"Vehicle Overspeed Threshold"	48 to 204 km/h (30 to 127 mph)	204 km/h (127 mph)
"VEHICLE ACTIVITY REPORT PARAMETERS"		
"Minimum Idle Time (0 - Off)"	0 to 1440 minutes	0 minutes
"DRIVER REWARD"		
"Driver Reward Enable"	"Disabled" "Enabled"	"Enabled"
"INPUT SELECTIONS"		
"Fan Override Switch"	"J1/P1:46" "J1/P1:47" "J1/P1:6" "J1/P1:7" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster" "None"	"None"
"Transmission Neutral Switch"	"None" "J1939" "J1/P1:62"	"None"
"Ignore Brake/Clutch Switch"	"J1/P1:7" "None"	"None"

Table 18 - Continued

"Parameter"	Available Range or Options	Default
"INPUT SELECTIONS" - Continued		
"Torque Limit Switch"	"J1/P1:7" "None"	"None"
"Diagnostic Enable"	"J1/P1:7" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster" "None"	"None"
"PTO On/Off Switch"	"J1/P1:56" "J1939 - Cab Controller" "J1939 - Body Controller" "J1939 - Instrument Cluster" "None"	"J1/P1:56"
"Remote PTO Set Switch"	"J1/P1:58" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster" "None"	"J1/P1:58"
"Remove PTO Resume Switch"	"J1/P1:60" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster" "None"	"J1/P1:60"
"PTO Engine RPM Set Speed Input A"	"J1/P1:46" "J1/P1:58" "J1/P1:6" "J1/P1:60" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster" "None"	"None"
"PTO Engine RPM Set Speed Input B"	"J1/P1:46" "J1/P1:58" "J1/P1:6" "J1/P1:60" "None"	"None"
"Starting Aid On/Off Switch"	"J1/P1:46" "J1/P1:47" "J1/P1:6" "J1/P1:7" "None"	"None"
"Two-Speed Axle Switch"	"J1/P1:6" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster" "None"	"None"
"Cruise Control On/Off Switch"	"J1/P1:59" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster"	"J1/P1:59"

Table 18 - Continued

"Parameter"	Available Range or Options	Default
"INPUT SELECTIONS" - Continued		
"Cruise Control Set/Resume/Accel/Decel Switch"	"J1/P1:35 & 44" "J1939 - Cab Controller" "J1939 - Body Controller" "J1939 - Instrument Cluster"	"J1/P1:35 & 44"
"Cruise Control Pause Switch"	"J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster" "None"	"None"
"Clutch Pedal Position Switch"	"J1/P1:22" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster"	"J1/P1:22"
"Retarder Off/Low/Medium/High Switch"	"J1/P1:23 & 40" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster"	"J1/P1:23 & 40"
"Service Brake Pedal Position Switch #1"	"J1/P1:45" "J1939 - Body Controller" "J1939 - Cab Controller" "J1939 - Instrument Cluster"	"J1/P1:45"
"Accelerator Pedal Position"	"J1/P1:66"	"J1/P1:66"
"Vehicle Speed Input"	"J1/P1:32 & 33" "J1939 - ABS" "J1939 - Trans"	"J1/P1:32 & 33"
"OUTPUT SELECTIONS"		
"Engine Running Output"	"J1/P1:10" "J1/P1:12" "J1/P1:13" "None"	"None"
"Engine Shutdown Output"	"J1/P1:10" "J1/P1:12" "J1/P1:13" "None"	"None"
"Auxiliary Brake"	"J1/P1:12" "None"	"None"
"Starting Aid Output"	"J1/P1:10" "J1/P1:12" "J1/P1:13" "None"	"None"
"Air Inlet Shutoff Relay Control"	"J2/P2:13" "None"	"None"

Table 18 - Continued

"Parameter"	Available Range or Options	Default
"OUTPUT SELECTIONS" - Continued		
"Fan Control Type"	"None" "On/Off PWM" "On/Off DC" "Three-Speed Fan PWM" "Three-Speed Fan DC" "Variable Speed Fan Option S"	"None"
"PTO Active Output"	"J1/P1:19" "None"	"None"
"CUSTOMER PASSWORDS"		
"Customer Password #1"	8 Digits	Not Programmed
"Customer Password #2"	Available characters are dependent on the service tools.	
"DATA LINK PARAMETERS"		
"Power Train Data Link"	"J1939" "None"	"J1939"

Customer Specified Parameters Worksheet

Table 19

"SELECTED ENGINE RATING"	
"Rating Number"	
"Rating Type"	
"Multitorque Ratio"	
"Advertised Power"	
"Governed Speed"	
"Rated Peak Torque"	
"Top Engine Speed Range"	
"Test Spec"	

Table 20

"ECM IDENTIFICATION PARAMETERS"	
"Vehicle ID"	
"Engine Serial Number"	
"ECM Serial Number"	
"Personality Module Part Number"	
"Personality Module Release Date"	

Table 21

"SECURITY ACCESS PARAMETERS"	
"Total Tattletale"	
"Last Tool to change Customer Parameters"	
"Last Tool to change System Parameters"	
"ECM Wireless Communication Enable"	

Table 22

"SECURITY ACCESS PARAMETERS"	
"Vehicle Speed Calibration"	
"Vehicle Speed Cal (J1939) - Trans"	
"Vehicle Speed Cal (J1939) - ABS"	
"Vehicle Speed Limit" (VSL)	
"VSL Protection"	
"Tachometer Calibration"	
"Soft Vehicle Speed Limit"	
"Two Speed Axle - Low Speed Range Axle Ratio"	
"Nominal Axle Ratio - High Speed Range Axle Ratio"	

Table 23

"CRUISE CONTROL PARAMETERS"	
"Low Cruise Control Speed Set Limit"	
"High Cruise Control Speed Set Limit"	
"Engine Retarder Mode"	
"Engine Retarder Minimum VSL Type"	
"Engine Retarder Minimum Vehicle Speed"	
"Auto Retarder in Cruise (0 - Off)"	
"Auto Retarder in Cruise Increment"	
"Cruise/Idle/PTO Switch Configuration"	
"Soft Cruise Control"	
"Adaptive Cruise Control Enable"	

Table 24

"IDLE PARAMETERS"	
"Idle Vehicle Speed Limit"	
"Idle RPM Limit"	
"Idle/PTO RPM Ramp Rate"	
"Idle/PTO Bump RPM"	

Table 25

"DEDICATED PTO PARAMETERS"	
"PTO Configuration"	
"PTO Top Engine Limit"	
"PTO Engine RPM Set Speed (0 - Off)"	
"PTO Engine RPM Set Speed"	
"PTO Engine RPM Set Speed A"	
"PTO Engine RPM Set Speed B"	
"PTO to Set Speed"	
"Maximum PTO Enable Speed"	
"PTO Cab Controls RPM Limit"	
"PTO Kickout Vehicle Speed Limit"	
"Max PTO Vehicle Speed"	
"Torque Limit"	
"PTO Shutdown Time (0 - Off)"	
"PTO Shutdown Timer Maximum RPM"	
"PTO Activates Cooling Fan"	

Table 26

"ENGINE/GEAR PARAMETERS"	
"Lower Gears Engine RPM Limit"	
"Lower Gears Turn Off Speed"	
"Intermediate Gears Engine RPM Limit"	
"Intermediate Gears Turn Off Speed"	
"Gear Down Protection RPM Limit"	
"Gear Down Protection Turn On Speed"	
"Low Idle Engine RPM"	
"Transmission Style"	
Eaton Top 2 Override with Cruise Switch	
"Top Gear Ratio"	
"Top Gear Minus One Ratio"	
"Top Gear Minus Two Ratio"	
"Governor Type"	

Table 27

"TIMER PARAMETERS"	
"Idle Shutdown Time (0 = Off)"	
"Idle Shutdown Timer Maximum RPM"	
"Allow Idle Shutdown Override"	
"Minimum Idle Shutdown Outside Temp"	
"Maximum Idle Shutdown Outside Temp"	
"A/C Switch Fan On-Time (0 = Off)"	
"Fan with Engine Retarder in High Mode"	
"Engine Retarder Delay"	

Table 28

"SMART IDLE PARAMETERS"	
"Battery Monitor and Engine Control Voltage"	

Table 29

"ENGINE MONITORING PARAMETERS"	
"Engine Monitoring Mode"	
"Engine Monitoring Lamps"	
"Coolant Level Sensor"	
"Engine Coolant Temperature Derate Enable Status"	

Table 30

"MAINTENANCE PARAMETERS"	
"Maintenance Indicator Mode"	
"PM 1 Interval"	
"Engine Oil Capacity"	

Table 31

"TRIP PARAMETERS"	
"Fuel Correction Factor"	
"Dash - Change Fuel Correction Factor"	
"Dash - PM 1 Reset"	
"Dash - Fleet Trip Reset"	
"Dash - State Selection"	
"Theft Deterrent System Control"	
"Theft Deterrent Password"	
"Quick Stop Rate"	
"Vehicle Overspeed Threshold"	

Table 32

"VEHICLE ACTIVITY REPORT PARAMETERS"	
"Minimum Idle Time (0 = Off)"	

Table 33

"DRIVER REWARD"	
"Driver Reward Enable"	

Table 34

"INPUT SELECTIONS"	
"Fan Override Switch"	
"Transmission Neutral Switch"	
"Ignore Brake/Clutch Switch"	
"Torque Limit Switch"	
"Diagnostic Enable"	
"PTO On/Off Switch"	
"Remote PTO Set Switch"	
"Remote PTO Resume Switch"	
"PTO Engine RPM Set Speed Input A"	
"PTO Engine RPM Set Speed Input B"	
"Starting Aid On/Off Switch"	
"Two Speed Axle Switch"	
"Cruise Control On/Off Switch"	
"Cruise Control Set/Resume/Accel/ Decel Switch"	
"Cruise Control Pause Switch"	
"Clutch Pedal Position Switch"	
"Retarder Off/Low/Medium/High Switch"	
"Service Brake Pedal Position Switch #1"	
"Accelerator Pedal Position"	
"Vehicle Speed Input"	

Table 35

"OUTPUT SELECTIONS"	
"Engine Running Output"	
"Engine Shutdown Output"	
"Auxiliary Brake"	
"Starting Aid Output"	
"Air Inlet Shutoff Relay Control"	
"Fan Control Type"	
"PTO Active Output"	

Table 36

"CUSTOMER PASSWORDS"	
"Customer Password #1"	
"Customer Password #2"	

Table 37

"DATA LINK PARAMETERS"	
"Powertrain Data Link"	

Lifetime Totals Worksheet

Table 38

"LIFETIME TOTALS WORKSHEET"	
Total Time	
Total PTO Time	
Total Idle Time	
Total Distance	
Total Fuel	
Total PTO Fuel	
Total Idle Fuel	
Total Maximum Fuel	
Average Load Factor	

5-2.17 Diagnostic Test

Table 39

"Test"	"Result"	"Action"
<p>"Check Electrical Connectors and Wiring" Follow the wiring harness for the display and locate the connector from the display to the vehicle. Inspect the wiring harness for evidence of wear through the harness bundle. Check the harness connector. Ensure that the connector is properly locked. Pull on each of the wires in the connector. Refer to Troubleshooting "<i>Electrical Connectors-Inspect</i>" for additional information.</p>	"OK"	"Proceed to next step."
	"Not OK"	Repair the problem. If conditions are not resolved then proceed to next step.
<p>"Check Battery Voltage at Vehicle Connector" Turn the ignition key OFF and disconnect the dash display connector. Turn the ignition key ON and measure the DC voltage. Use a voltmeter in order to measure the DC voltage from pin 3 (red wire from display) to pin 4 (black wire from display) of the vehicle connector. The battery voltage should be 11 to 13.5 Volts DC. Pull on each of the wires in the connector. Inspect batteries, wiring, and connectors.</p>	"OK"	"Proceed to next step."
	"Not OK"	Repair the problem. If conditions are not resolved then proceed to next step.
<p>"Connect Display to 12 Volt Power Source" Disconnect display from vehicle wiring and connect to another 12 Volt DC power source. Connect pin 3 (red wire from display) to the positive terminal (+ Battery) of the power source. Connect pin 4 (black wire from display) to the negative terminal "(-Battery)" of the power source. The display should illuminate. The display will not communicate until the display is connected to the data link. Check wiring, connectors, or the vehicle battery for damage.</p>	"OK"	Repair the components or replace the components, as required, proceed to next step.
	"Not OK"	<i>Display is fault.</i>
<p>"Connect Display to Another Data Link Connector" Disconnect display from the vehicle wiring harness. Connect the display to the other data link connector. The display will activate when the display is connected to the proper data link. The display will communicate when the display is connected to the proper data link. Connect the electronic service tool to the cab Data Link connector. Turn the ignition key ON in order to verify that the data link is functional. . . Verify that the connections to the display are not connected to the J1922 Data Link or the J1939 Data Link. If a cab data link connector is not available, connect the electronic service tool directly to the engine ECM. Verify that the electronic service tool functions. Configure a harness adapter to go from the Data Link connector for the display to the appropriate data link connector. Refer to the "Harness Adapter Diagrams" in order to view the pin-out for some common Data Link connectors. Check the display's wiring or connectors for damage.</p>	"OK"	Repair the components or replace the components, as required.
	"Not OK"	Proceed to the next step.

5-2.18 General Information

5-2.18.1 Components for the Messenger Display

Table 40

Callout	Description	Quantity
1	Messenger Display	1
2	Buttons	1
3	Mounting Bracket	2
4	#6 Pan Head Screw	4
5	Gimbal Mounting Bracket	1

Connector A

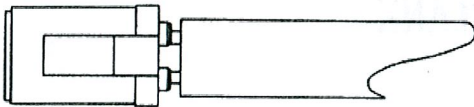
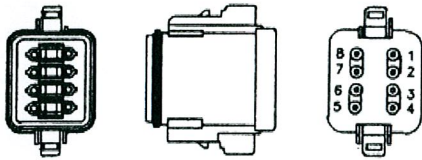


Figure 18

Table 41

"CONNECTOR A WIRE TABLE"		
"Signal ID"	Pin #	Color
CDL/ATA+	1	Yellow
CDL/ATA-	2	Lt. Blue
+Battery	3	Red
Battery Ground	4	Black
Dimmer	5	Purple
Plugged	6	*

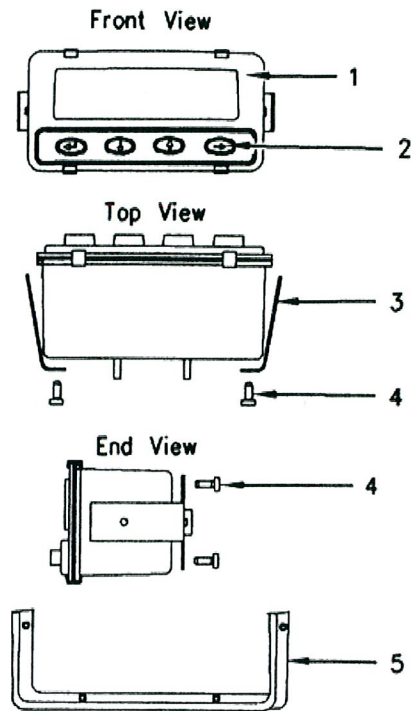


Figure 17

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