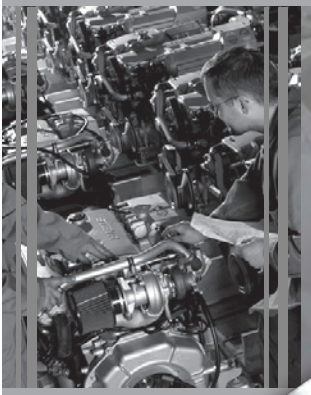
STEYRMOTORS
INNOVATION WITH LIGHTNESS

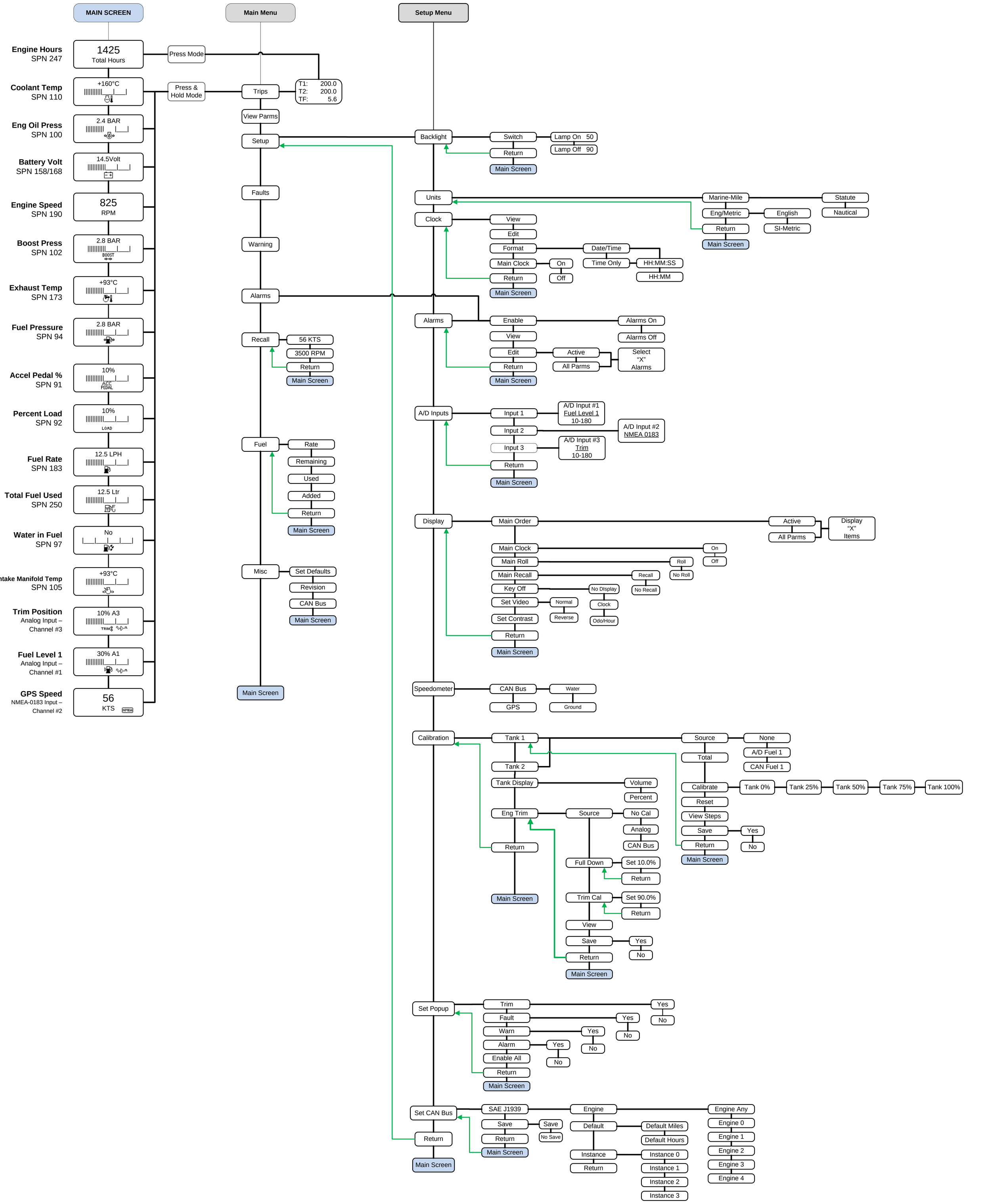


STEYR ENGINE INTERFACE SEI

OPERATION MANUAL

Z001083-0-00-130719

Steyr Engine Interface (SEI) - Menu Tree



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• About

Steyr Engine Interface (SEI) instrumentation system from Steyr Motors combines the best of analog and digital data display technologies.
SEI reads and displays vessel/vehicle performance data directly from CAN (Controller Area Network) equipped apparatus that support SAE J1939 protocol and supports a maximum of two analog sender inputs and one NMEA 0183 input. The system consists of a master instrument and optional complementary satellite instruments. This system eliminates the need for a translation "black box" between an ECM/ECU and the instruments themselves making wiring and installation simple and fast.

• Scope

This manual describes how to navigate the LCD interface and use the many features found in a SEI Master Tachometer Instrument. Although the interface is intuitive and easy to navigate, this operation manual provides users with a resource to realize the full potential and capabilities of SEI instrumentation.
Covered in this manual are display options, menu navigation and menu function usage.
Although some wiring connections are noted for easy reference, this manual does not cover complete installation mounting and wiring requirements. Please refer to the SEI installation instruction sheet for proper installation.

• Preconfigured Instruments

Some instruments are preconfigured at the factory to individual OEM specifications to best meet the need of the application and end user. Preconfigured features include but may not be limited to the type and quantity of Quick View Main Screens and alarm configuration(s). Preconfigured features are easily modified to satisfy personal preferences.

• Menu Navigation

Menu navigation requires the use of two externally mounted momentary switches connected to the master instrument. The switch functions are UP and DOWN.

• Up Switch

Pressing and releasing the Up switch scrolls up through parameter lists and menu choices or increases a value one item/unit at a time.
Pressing and holding the Up switch continuously scrolls up through parameter lists, menu choices or increases a value until the end of the parameter list, menu choices or maximum parameter value is reached.

• Down Switch

The Down switch functions identical to the Up switch with the exception that its direction for all displays, menu choices and values is down or decreasing.

• Menu/Mode/Enter/Reset Switch Function

As its name suggests, this switch function serves several purposes when navigating the SEI menus. This function is activated by simultaneously pressing the up and down switches. The function depends upon the context of the menu.

Menu Function: Pressing and holding the Up and Down switches for approximately three seconds while any of the Quick View Main Screens are displayed brings up the Main Menu.

Mode Function: Pressing and releasing the Up and Down switches while any of the Quick View Main Screens are displayed toggles the display mode between three-line and detailed bar graph formats.

Enter Function: Pressing and releasing the Up and Down switches provides enter functionality when SEI requires you to choose a menu item, parameter selection or value input.

Reset Function: Pressing and holding the Up and Down switches resets trip distance, maintenance hour values and fuel used to zero when either of those screens are displayed.

• Switch Icon Conventions

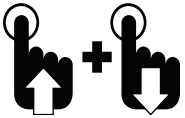
Throughout this manual icons are used to indicate actions required by the user to navigate the menus. Below are descriptions and the corresponding action to be taken when they appear.

Press Up switch icon.

The presence of this icon in the manual indicates when to press and release the Up switch. Users may also choose to press and hold the Up switch if necessary.

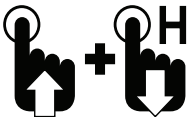
Press Down switch icon.

The presence of this icon in the manual indicates when to press and release the Down switch. Users may also choose to press and hold the Down switch if necessary.



Simultaneously press and release the Up and Down switches icon.

The presence of this icon in the manual indicates when to simultaneously press and release the Up and Down switches.



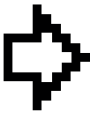
Simultaneously press and hold the Up and Down switches icon.

The presence of this icon in the manual indicates when to simultaneously press and hold the Up and Down switches for approximately three seconds.

• Menu Navigation (Continued)

SEI uses various icons and indicators to guide users for item selection and/or input while navigating the menus. The selection arrow and blinking bar cursors appear frequently throughout the menus.

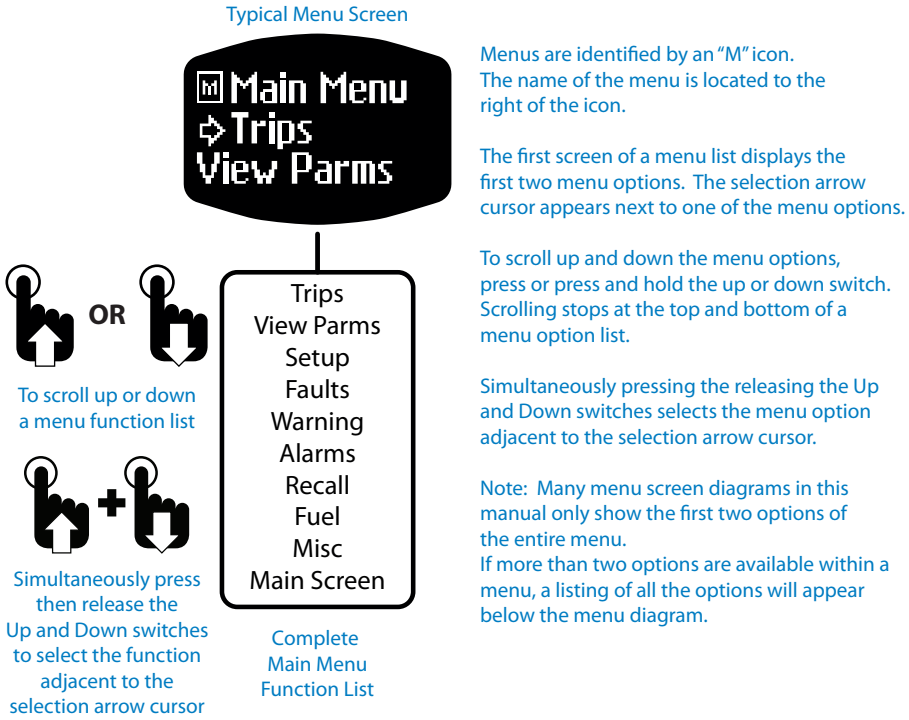
• Selection Arrow Cursor



The selection arrow cursor, shown at left, identifies adjacent menu items as the current selection. Simultaneously pressing then releasing the Up and Down switches selects the menu item/function or value adjacent to the arrow cursor.

Pressing and releasing an Up or Down switch moves the selection arrow up or down a menu list one item at a time until the beginning or end of the list is reached. Pressing and holding the Up or Down switch continuously moves the selection arrow up and down a menu list until the switch is released or the beginning or end of the list is reached.

Figure 1-1: Menu Scrolling and Option Selection



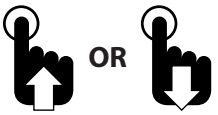
• Blinking Bar Cursor

A blinking bar cursor appearing beneath a numeric value or parameter indicates the item may be changed by pressing or pressing and holding the Up or Down switches.

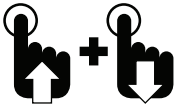
When a numeric value appears above a blinking bar cursor, pressing or pressing and holding the Up or Down switch increases or decreases the value until the maximum value limits are reached.

When a parameter or parameter option appears above a blinking bar cursor, pressing or pressing and holding the Up or Down switch scrolls through the list of parameters or parameter options until the end of the list is reached.

Figure 1-2: Blinking Bar Cursor



Pressing the Up or Down switch changes the value until the limits of the value range are reached.



Simultaneously pressing the Up and Down switches when the desired value or option is displayed accepts the value or option.

Blinking bar cursor located under numeric value.

Blinking bar cursor located under sender resistance range.

Blinking bar cursor located under tank source type.

• Start-up Screen

Upon Instrument start-up, the Steyr Motors logo followed by the Steyr "Bull's Eye" logo appear for approximately three seconds each.

• Default Quick View Main Screen

The default Quick View Main Screen screen appears after completion of the start-up routine and replaces the start-up logo. The first Quick View Main Screen display is factory set to show total hours.

• Quick View Main Screens

Quick View Main Screens allow for easy viewing of up to 20 commonly used vehicle operating parameters or functions by pressing the Up or Down switches. Users choose the quantity, order and type of parameters to include in the Quick View Main Screen list.

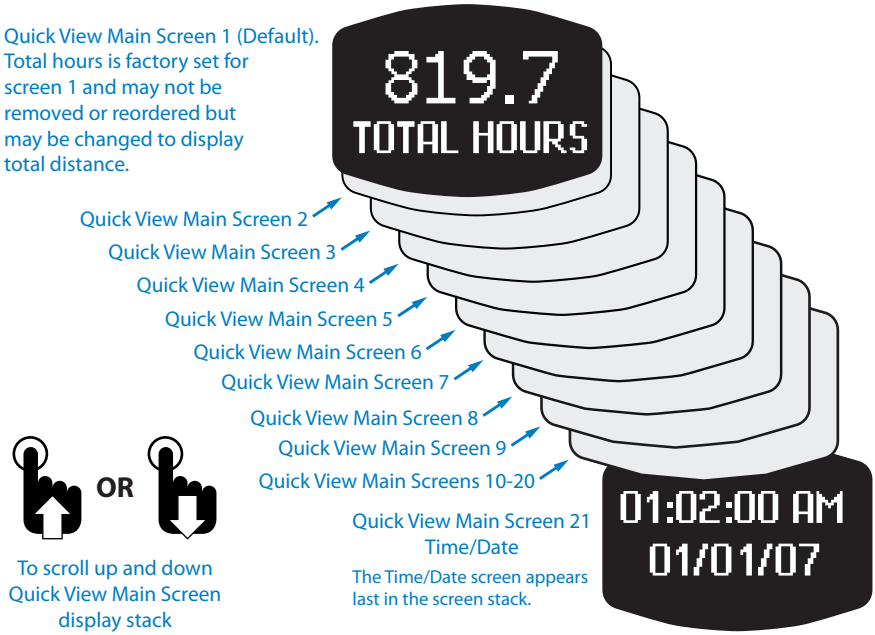
17 Quick View Main Screens are factory configured by Steyr Motors but are easily reconfigured to meet individual user preferences.

The first screen in the list of Quick View Main Screens is preset to total hours, however, it can be changed to total distance (See Set CAN Bus menu). The total hours or total distance screen may not be removed from or reordered in the screen list.

The time/date screen always appears last in the screen display stack if enabled for display.

See "Display" on page 35 for configuring Quick View Main Screens.

Figure 1-3: Quick View Main Screens



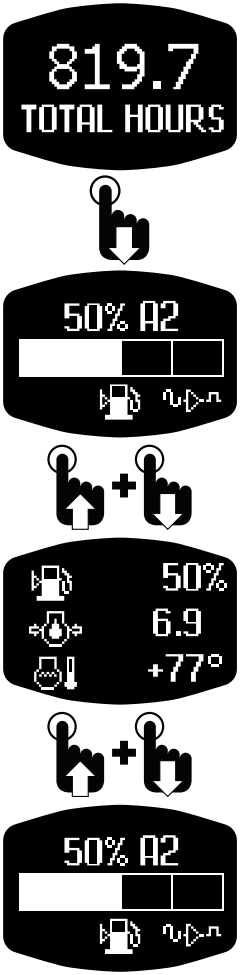
• Bar Graph & Three Line Format

SEI can display vessel/vehicle operating parameters on the Quick View Main Screens in two formats: single parameter bar graph or three-line. The default display format is single parameter bar graph which provides the most detail for a given parameter. The three-line display allows users to view three parameters concurrently but with less detail. Total Hours or Total Distance are not displayed in the three-line format.

Simultaneously pressing then releasing the Up and Down switches while any Quick View Main Screen except Total Hours, Total Distance or Main Clock is active toggles between single parameter bar graph and three-line display formats.

When using the three-line format, if more than three parameters are configured for Quick View Main Screen display, use the Up and Down switches to scroll through the display stack. If fewer than three parameters are configured for viewing then less than three parameters appear with the three-line format active.

Figure 1-4: Setting Parameter View Display Format



Quick View Main Screen 1

Note: Total Hours, Total Distance and Main Clock parameters do not display in three-line format.

Quick View Main Screen 2 appears in single function bar graph format (default setting).

Three-line display format appears.

Note: If less than three parameters are configured for Quick View Main Screen display, fewer than three lines appear.

Simultaneously pressing then releasing the Up and Down switches again toggles back to single function bar graph format.

• Trips (Hours) Screen

SEI offers two maintenance hour/distance and one fuel used logs or trips. To access the trips screen simultaneously press then release the Up and Down switches when the total hours Quick View Main Screen is active. Pressing and releasing the Up and Down switches a second time returns the total hours/fuel used screen.

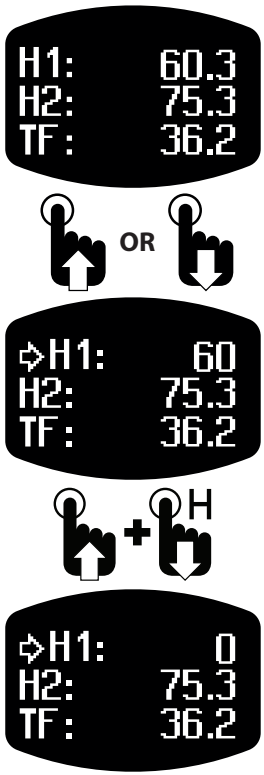
The trips screen is also accessed by selecting *Main Menu - Trips*. See "Trips" on page 9.

• Resetting Trips

To reset any of the three maintenance hour/distance/fuel used logs to zero, position the selection arrow cursor next to the trip hour log to be reset by using the Up or Down switch.

Once the selection arrow cursor is next to the log to reset, simultaneously press and hold the Up and Down switches until the value changes to zero.

Figure 1-5: Resetting Trip (Hours/Fuel Used) Logs



• Main Menu

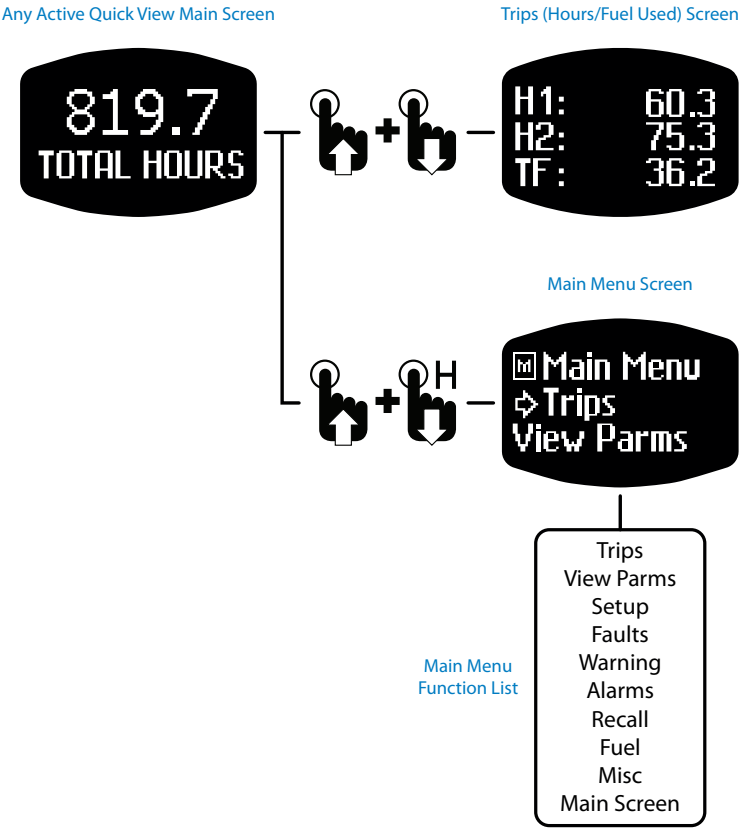
The Main Menu contains functions to configure the LCD (Liquid Crystal Display), set alarms or view ECM/ECU faults and warnings. Some frequently used Setup Menu functions are also located in the Main Menu to provide easier and faster access.

Access the Main Menu by simultaneously pressing and holding the Up and Down switches while any Quick View Main Screen is active.

Only the first two Main Menu options appear on the screen below the menu name. Access the other options by scrolling down the menu list using the Down switch. Use the Up switch to scroll back up the Main Menu function list.

The Main Menu and all the functions within it except View Parameters will display for approximately 30 seconds if no user activity is detected. The first (Default) Quick View Main Screen appears after 30 seconds of inactivity.

Figure 1-6: Accessing the Main Menu

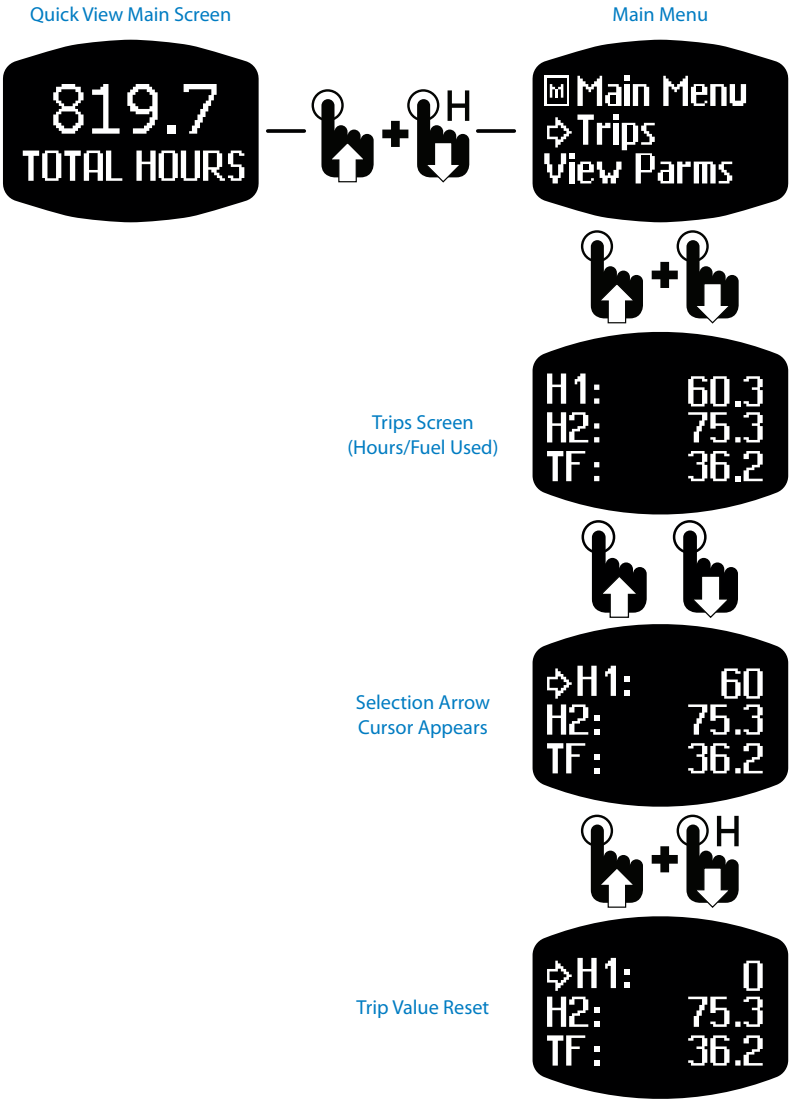


• Trips

Selecting the trips function in the Main Menu displays two separate maintenance hour/distance/fuel used logs. This is an alternate method to simultaneously pressing then releasing the Up and Down switches (Mode Function) with any Quick View Main Screen active.

Resetting any of the three trips/logs is described below and previously on page 7. The only difference from this method to the previously described method is the trips log is accessed using the Main Menu function Trips instead of using the Mode Function while a Quick View Main Screen is displayed.

Figure 1-7: Accessing Trip Logs from the Main Menu



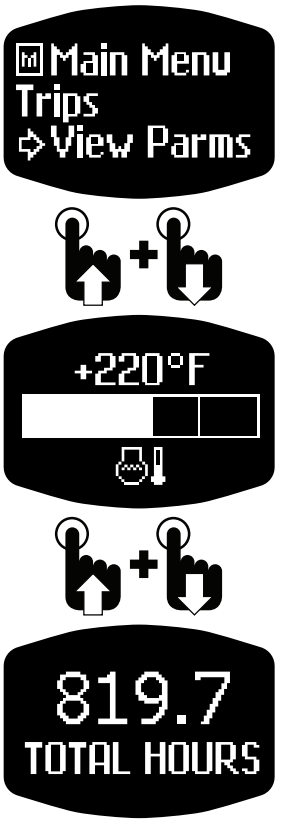
• View Parameters

View Parms is an abbreviation for viewing actively broadcast parameters and inputs. Parameter sources include analog and NMEA 0183 inputs. The quantity and type of parameters depends upon the sensors connected to the engine along with the configuration of analog inputs.

Parameters are displayed in single function bar graph format when viewed using View Parms. Use the Up or Down switches to scroll through the list of parameters. Analog input parameters display before CAN parameters. Since the Master Instrument is configured with a NMEA 0183 input, the NMEA 0183 parameters will display last in the parameter viewing list. If the NMEA 0183 input is not used, the display will indicate "Missing NMEA 0183 Data".

Unlike other Main Menu functions, the parameter display will not time-out after 30 seconds. Simultaneously press then release the Up and Down switches to exit viewing parameters and display the first (Default) Quick View Main Screen.

Figure 1-8: Viewing Parameters



Select View Parms from the Main Menu, *Main Menu-View Parms,* Simultaneously press then release the Up and Down switches to accept.

First actively broadcast parameter appears. Coolant temperature shown as an example only.

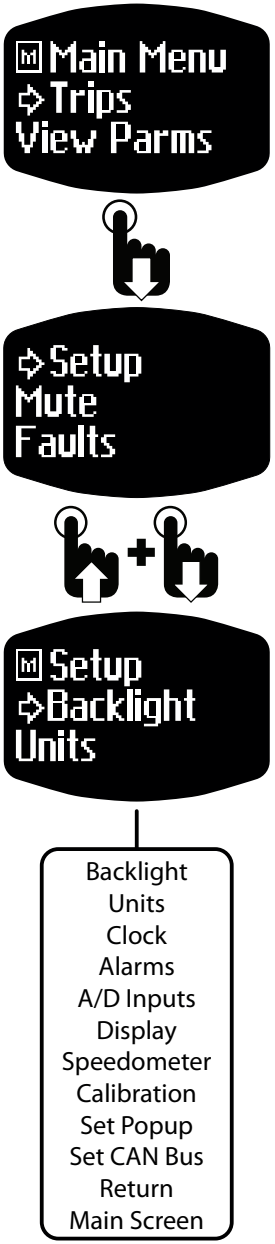
Use the Up or Down switches to scroll through the list of broadcast parameters. Parameter display will not time out.

Simultaneously pressing then releasing the Up and Down switches returns the first Quick View Main Screen.

• Setup

The Setup option in the Main Menu provides the functions necessary for configuring SEI to suit individual preferences or application requirements. Such functions range from backlight intensity to choosing and setting alarms. See page 18 for Setup Menu function descriptions.

Figure 1-9: Accessing the Setup Menu



Access the Main Menu by simultaneously pressing and holding the Up and Down switches.
Scroll down to the Setup option using the Down switch.

Second Main Menu screen appears with selection arrow cursor adjacent to the Setup option.

Setup Menu first screen appears showing first two setup functions.
Use the Up or Down switches to scroll through the menu functions.

Setup Menu Function List

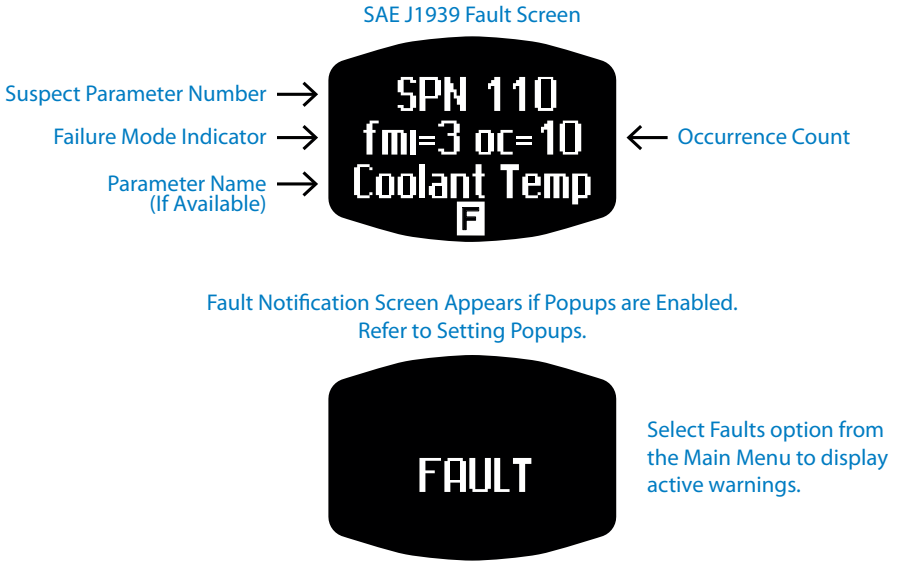
• Faults

Faults are an indicator of a severe problem as reported by the ECM/ECU that warrants stopping the engine/vessel/vehicle. Users should consult the owners manual or a service technician to correct the fault condition or conditions.

When a fault condition occurs, a blinking "F" icon appears at the bottom of the current Quick View Main Screen.

The *Main Menu-Faults* option allows users to view the parameter or parameters causing the fault. If popups for fault conditions is enabled, a fault notification screen appears. Refer to "Set Popup" on page 57.

Figure 1-10: Fault Notification & Information Screens



• Warnings

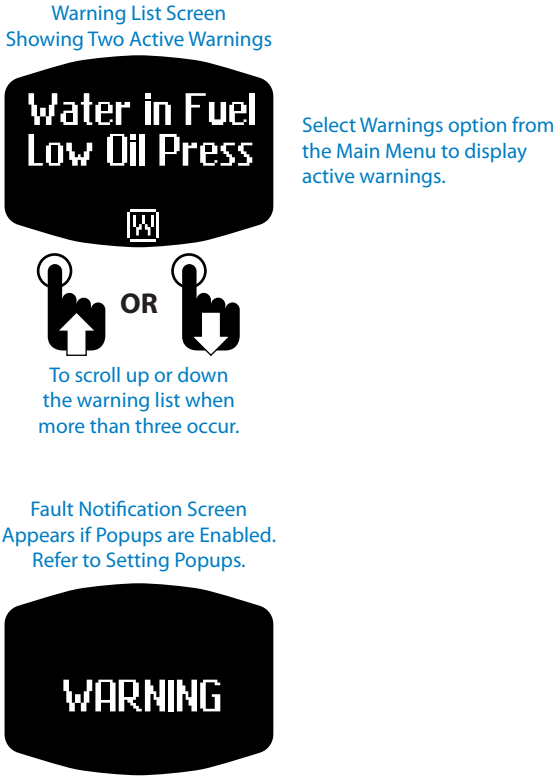
Warnings are an indicator of vessel/vehicle problem as reported by the ECM/ECU that does not warrant immediately stopping the vessel or vehicle. Users should consult the owners manual or a service technician to correct the warning condition or conditions.

When a warning condition occurs a blinking "W" icon appears at the bottom of the current Quick View Main Screen.

Figure 1-11: Quick View Main Screen with Warning "W" Icon

The Main Menu Warnings option allows users to view the parameter or parameters causing the warning. If popups for warning conditions is enabled, a warning notification screen appears. Refer to "Set Popup" on page 57.

Figure 1-12: Warning Notification and Information Screens



• Alarms

Alarms are user configured limits for CAN or analog parameters used to alert operators when the parameter or parameters exceed those limits. Alarms help users protect a vessel, vehicle or engine from damage by providing an option to set operating notification limits for parameters critical to the application.

The *Main Menu-Alarms* function allows users to view the parameter causing the alarm as well as provides all the functions necessary to configure alarms. The alarm function is also located in the Setup Menu. Refer to *Main Menu - Setup - Alarms* on page 24 for detailed descriptions of all the Alarm Menu features.

Note: Alarms are only a notification feature and does not disable or diminish the operation of a vessel, vehicle or engine.

SEI allows users to set up to 15 parameters for alarm notification.

Alarm settings are written to non-volatile memory and retained when power is removed from the instrument.

Once a parameter exceeds the set operating limits, a blinking "Bell" icon appears at the bottom of the current Quick View Main Screen.

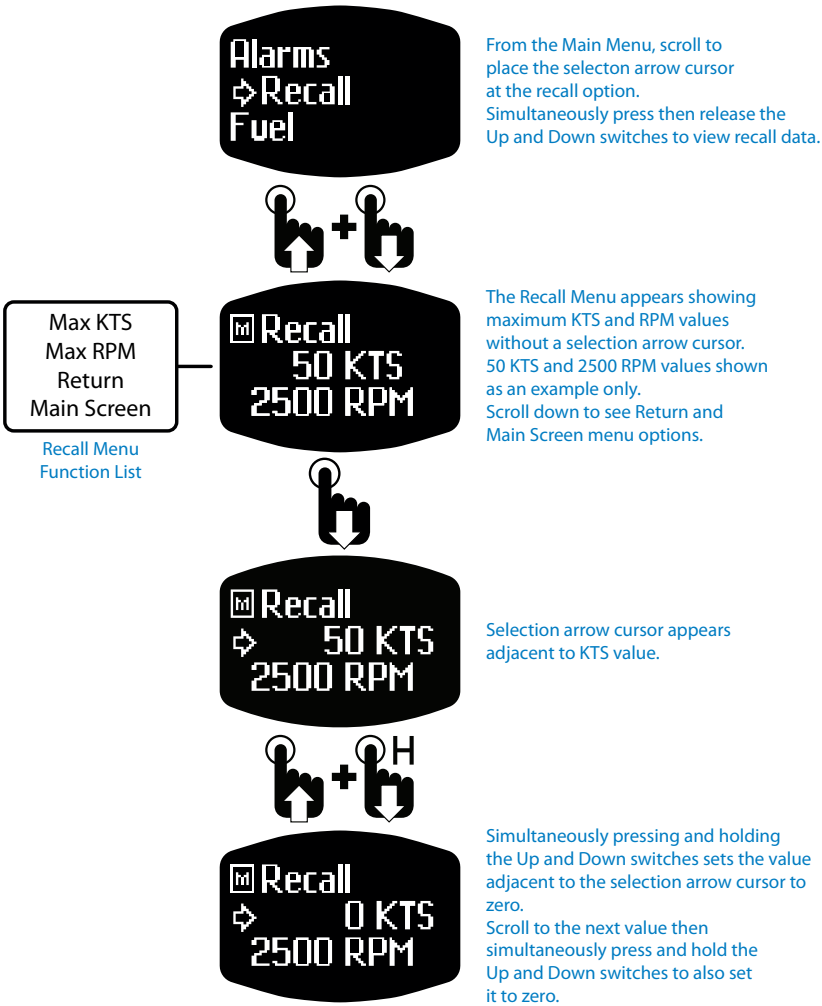
Figure 1-13: Quick View Main Screen with Alarm "Bell" Icon

• Recall

The recall function displays the maximum vessel/vehicle speed and engine RPM. The recall data is stored in non-volatile memory which retains the information until it is reset or overwritten by higher values.

To reset either recall value to zero, place the selection arrow cursor at the value to reset by using the Up or Down switches. Once the cursor is adjacent to the desired value, simultaneously press and hold the Up and Down switches until the value changes to zero.

Figure 1-14: Recall Function



• Fuel

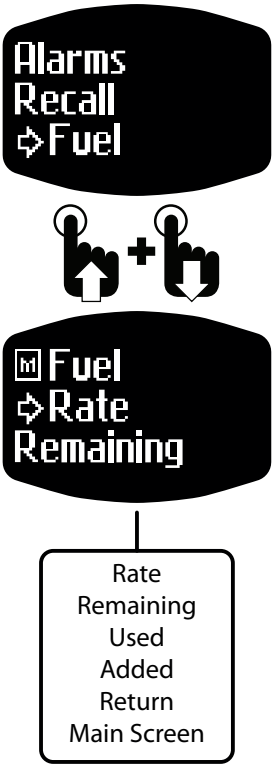
The fuel Main Menu function provides fuel management data such as consumption rate, amount remaining and amount used.

In order to see and use all the fuel management features, fuel tanks must be calibrated using *Main Menu-Setup-Calibration* function found on page 43.

If the fuel tanks are not calibrated using the calibration setup routine, only the fuel rate option appears.

In order to display fuel rate data, the engine/vessel/vehicle must be equipped with a fuel flow sensor.

Figure 1-15: Fuel Management Function



From the Main Menu, scroll to place the selection arrow cursor at the Fuel option. Simultaneously press then release the Up and Down switches to use fuel management tools.

Fuel menu appears with the selection arrow cursor located adjacent to Rate option.

Fuel Menu Function List.

Note: Only the rate option appears until the fuel tank level is calibrated using *Main Menu-Setup-Calibration*.

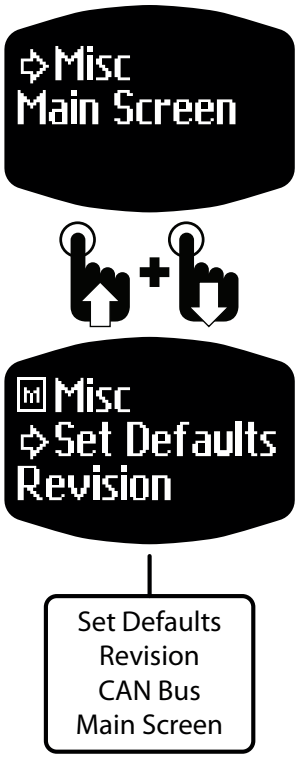
Fuel Menu function summary:

Rate - Displays fuel consumption per hour. Requires fuel flow sensor.
Used - Displays amount of fuel consumed.
Added - Tells SEI fuel was added to the tank so fuel management is recalculated.
Return - Brings users back to Fuel option in Setup Menu.
Main Screen - Brings users back to the default Quick View Main Screen.

• Miscellaneous

The Miscellaneous Menu contains functions for restoring factory default settings, viewing current firmware revision and active CAN Bus protocol.

Figure 1-16: Miscellaneous Functions Menu



Miscellaneous Menu Function summary:

Set Defaults - Restores all factory settings.
Revision - Displays SEI firmware revision.
CAN Bus - Displays current CAN protocol.
Main Screen - Brings users back to the default Quick View Main Screen.

• Restoring Factory Defaults

The *Main Menu-Misc-Set Defaults* function restores the Master Instrument to its factory configured settings except for main default screen (Total Hours/Distance).

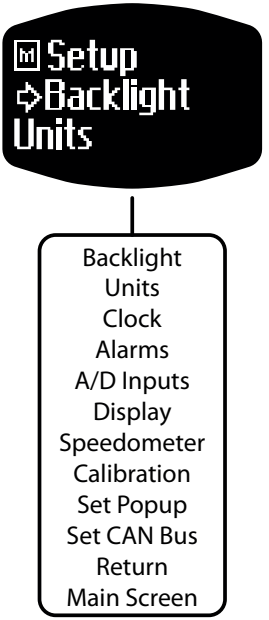
This function removes all user set Quick View Main Screen display parameters, alarms, A/D Inputs and all modified display and operating settings. Video settings are reset after instrument is powered off.

Users should note all custom settings, alarms, etc prior to restoring factory defaults to make it easier to reconfigure any or all of those settings.

• Setup Menu

The Setup Menu contains all the functions necessary to configure the Master Instrument to satisfy user preferences and application requirements. This section of the manual describes those functions.

Figure 1-17: Setup Menu Functions



To access the Setup Menu, *Main Menu-Setup*, simultaneously press and hold the Up and Down switches with any Quick View Main Screen displayed until the Main Menu appears.

Scroll to the Setup option using the Down Switch then simultaneously press and release the Up and Down switches.

Setup Menu Function List (Standard)

Setup Menu function summary:

Backlight - Sets intensity of instrument illumination.
Units - Sets display units to English or SI-Metric.
Clock - For enabling/disabling clock display, setting time and clock display format.
Alarms - For enabling/disabling, viewing and creating/editing parameter alarm notification.
A/D Inputs - For configuring analog and NMEA inputs to the Master Instrument.
Display - Use to add/delete Quick View Main Screens, set LCD key-off display, positive or negative image mode and adjust LCD contrast.
Speedometer - Use to set speedometer type, CAN or GPS
Calibration - Characterizes fuel senders to fuel tanks and trim senders to actual trim position.
Set Popup - Activates notification screen for faults, warnings and alarms.
Set CAN Bus - Sets the engine number, instance and Quick View Screen 1 default (Hours/Distance).
Return - Brings users back to *Main Menu-Setup*.
Main Screen - Brings users back to the default Quick View Main Screen.

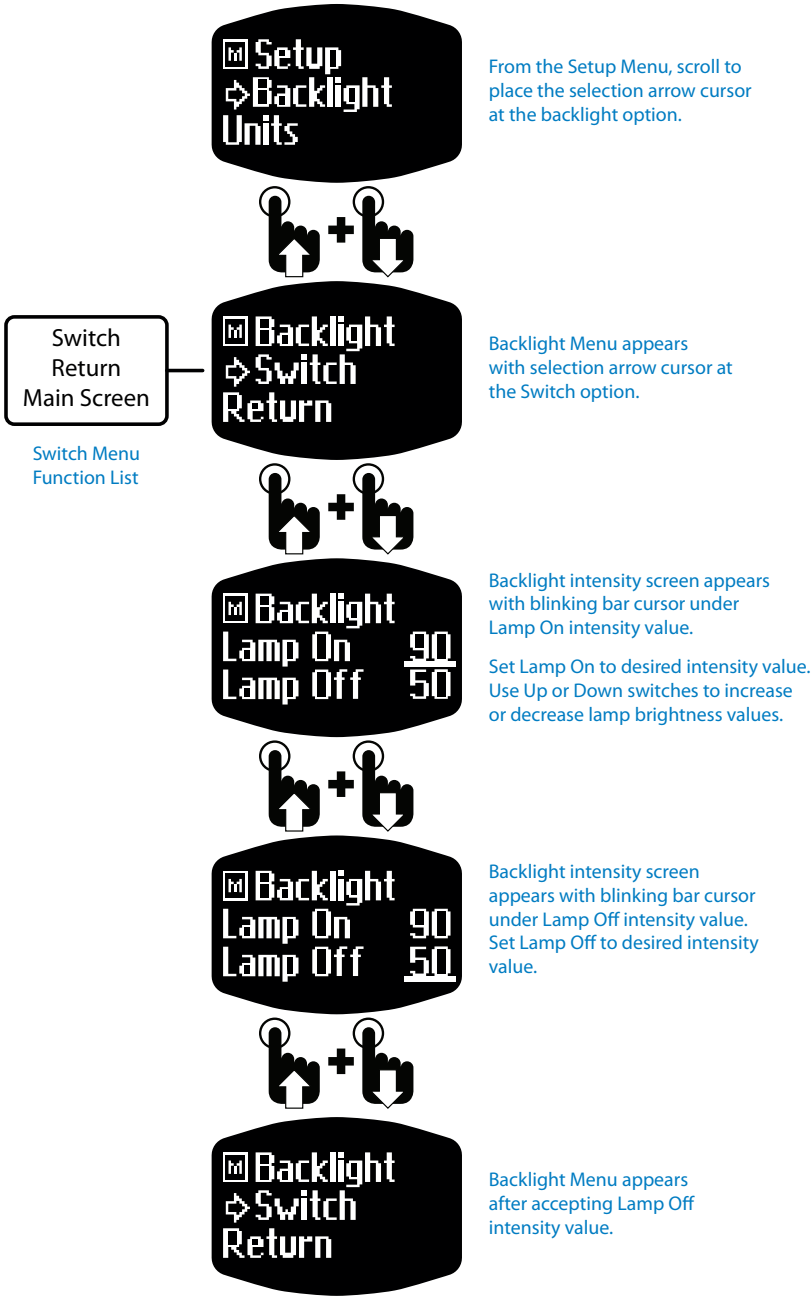
• Backlight

Backlight intensity is set using the Backlight option from the Setup Menu. Users can set backlight intensity for when the vessel/vehicle lamp switch is on (Lamp On option) or when the vessel/vehicle lamp switch is off (Lamp Off option).

The lamp off option allows users to turn on the instruments backlighting independent of the vessel's/ vehicle's light switch.

Backlight intensity values range from 0 (off) to 100 (Max) by increments of 10.

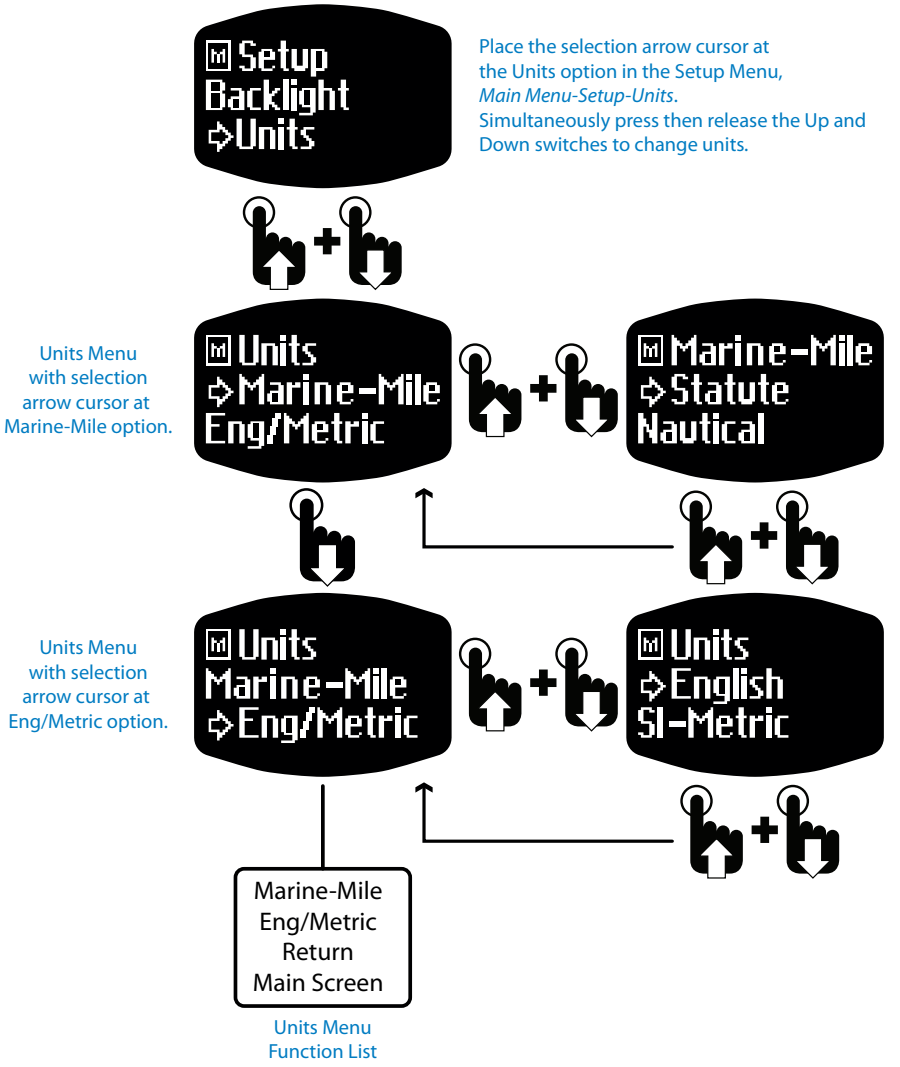
Figure 1-18: Setting Backlight Intensity



• Units

Users may choose between English and SI-Metric units for parameter display. Users may also select between statute and nautical mile for marine odometer units. If nautical mile units is chosen, the speed and distance will be shown in knots and nautical miles respectively. To view units in KMH or MPH, choose statute mile option.

Figure 1-19: Setting Units



• Clock Viewing & Setting

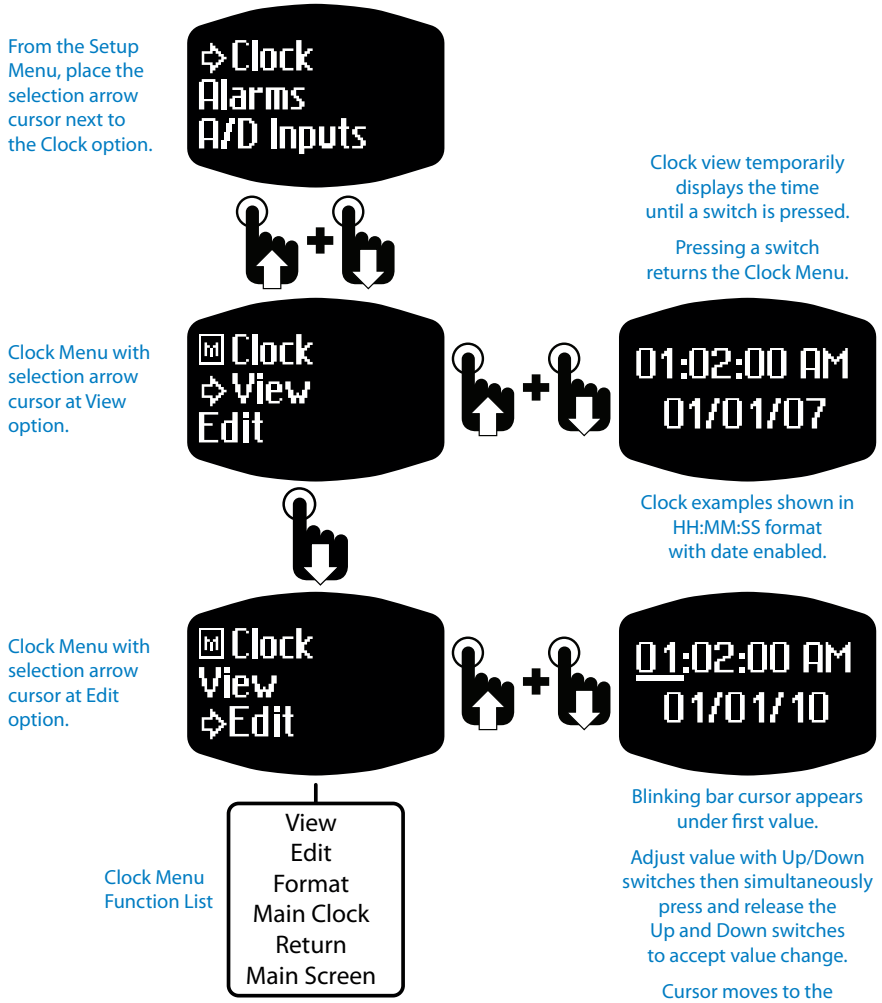
SEI offers a digital clock display screen. Users enable/disable clock display, set clock time/format and enable date display using the clock menu functions.

• Viewing & Setting

If clock display is enabled, it always appears as the last Quick View Main Screen. Refer to "Quick View Main Screens" on page 5.

Time formats include hours:minutes and hours:minutes:seconds.

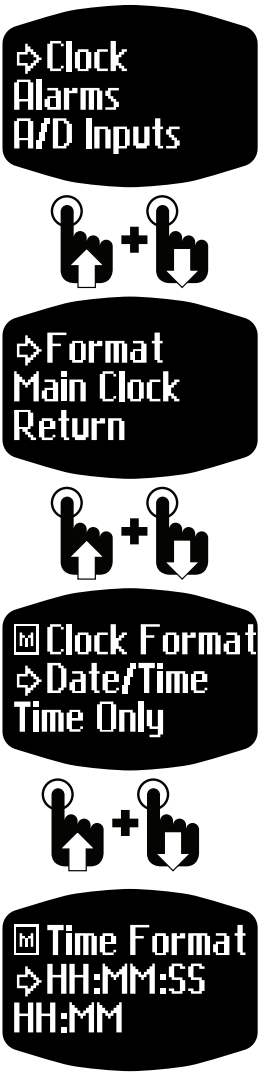
Figure 1-20: Clock Viewing and Time/Date Setting



• Clock Format

The clock display format can appear as either Hours:Minutes or Hours:Minutes:Seconds.
The date can be added to the clock display and appears as a second line below the time display in the format of MM/DD/YY.

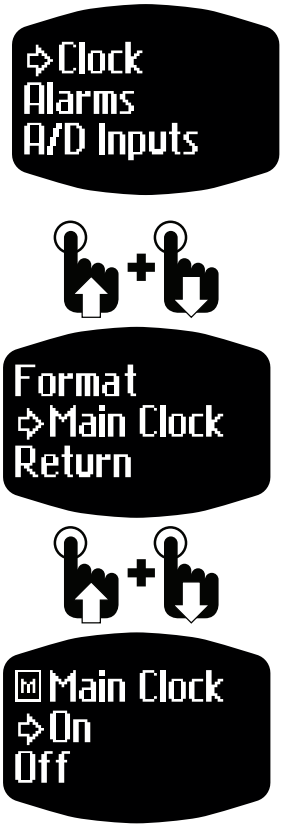
Figure 1-21: Setting Clock Format and Displaying Date



• Main Clock

The Main Clock function adds the clock as one of the Quick View Main Screens. The clock always appears as the last screen in the Quick View Main Screen list.

Figure 1-22: Enable Display of Main Clock



Place the selection arrow cursor at the Clock option in the Setup Menu. Simultaneously press then release the Up and Down switches to open the Clock Menu.

Scroll to place the selection arrow cursor at the Main Clock option in the Clock Menu. Simultaneously press then release the Up and Down switches to open the Main Clock Menu.

Select the "On" option to add the clock display to the Quick View Main Screens. Select "Off" to remove the clock display from the Quick View Main Screens.

• Alarms

See "Alarms" on page 14 for a description of the Alarm function. The *Setup-Alarm* function is identical to the *Main Menu-Alarm* function.

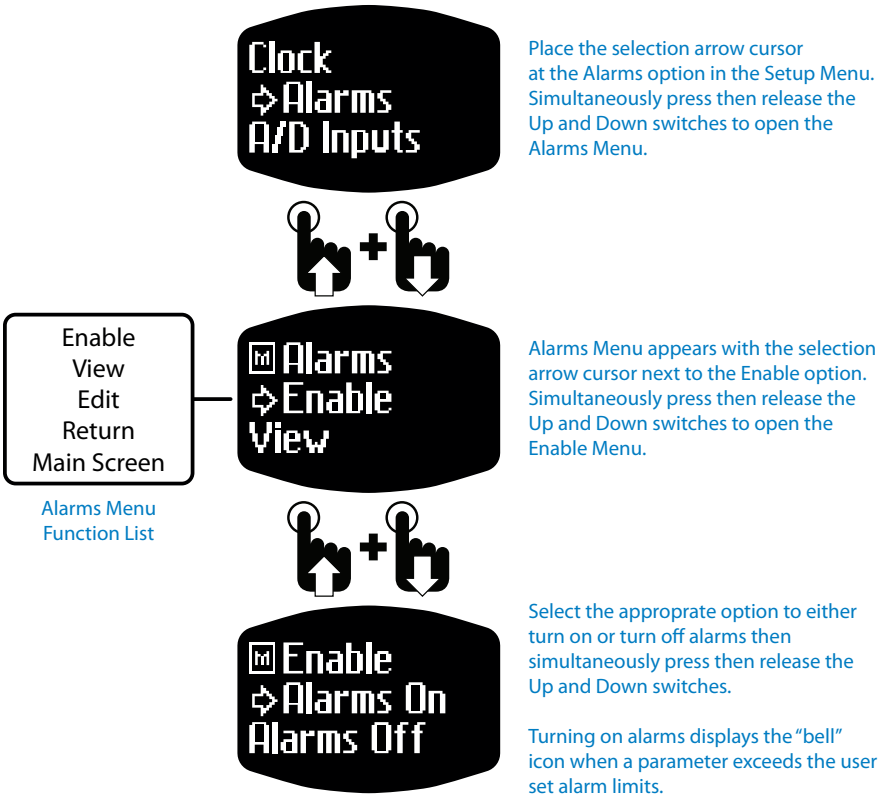
This section provides detailed descriptions of all the Alarm Menu functions

• Enabling Alarms

Alarm enable turns on or off notification when an alarm condition occurs. This function does not delete alarms or their settings from the alarm list.

To protect against operating the vessel/vehicle unaware of potentially damaging conditions, always use caution when deciding to turn off alarms.

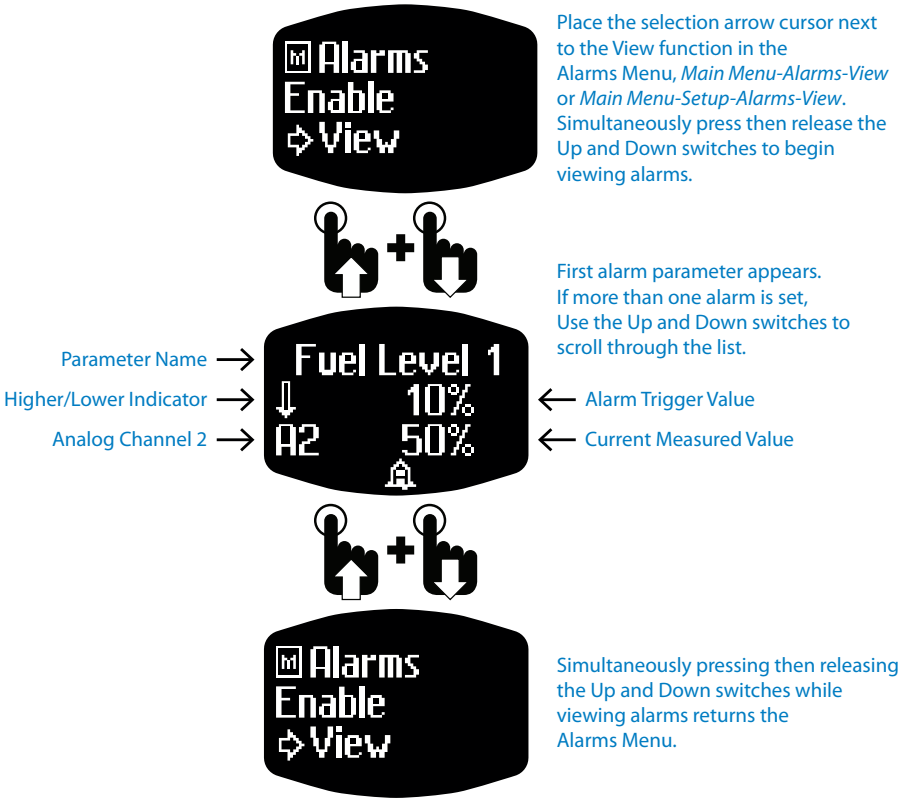
Figure 1-23: Enabling/Disabling Alarms



• Viewing Alarms

View Alarms allows users to scroll through all parameters causing the alarm condition or conditions. The parameter or parameters causing the alarm condition display the actual measured value blinking. To exit alarm review and return to the Quick View Main Screen, simultaneously press then release the Up and Down switches.

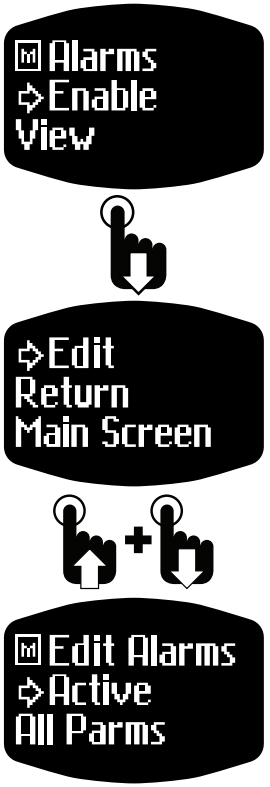
Figure 1-24: Viewing Alarms



• Editing Alarms

The edit alarm function is how users add, delete and configure limits of selected CAN parameters or configured analog inputs for alarm notification. If alarms were previously set, users should view and note the current alarm parameter type, order and settings before editing.

Figure 1-25: Edit Alarms Function



Alarms Menu first screen, *Main Menu-Alarms* or *Main Menu-Setup-Alarms*.

Scroll to place the selection arrow cursor next to the Edit function within the Alarms Menu then simultaneously press then release the Up and Down switches to open the Edit Alarms menu.

Edit Alarms Menu appears with selection arrow cursor next to the Active parameters option.

• Active & All Parameters Selection Sets

When selecting parameters for alarm notification, users can choose from the actively broadcast parameters or all parameters defined by the CAN protocol.

The active CAN parameters selection set includes those parameters that are currently or "actively" broadcast on the CAN network and read by SEI. Active parameters also include any analog inputs configured using the A/D Input function. Active CAN parameters are, in most cases, a subset of the all CAN parameters set.

All CAN parameters or "All Parms" selection set contains all parameters defined by a specific CAN protocol standard whether or not it is currently broadcast on the CAN network and all analog inputs SEI is capable of reading.

Figure 1-26: Selecting Active or All Parameters

Edit Alarms Menu Showing Active/All Parms Selection Options

Place the selection arrow cursor next to the desired option then simultaneously press then release the Up and Down switches to begin selecting parameters for alarm notification.

Active selection set includes all currently broadcast parameters and analog inputs.
All Parms selection set includes all parameters defined by the CAN protocol and analog inputs.

It is not recommended to select parameters from the "All Parms" list since the parameter may never broadcast over the CAN network and, as a result, trigger an alarm notification. Users that select parameters from the "All Parms" list should do so knowing the parameter or parameters will be broadcast on the CAN network to which SEI instruments are connected.

• Setting Quantity of Alarms

Users can set a maximum of 15 alarms. Simply increase or decrease the alarms value in the Select Alarms screen with the Up or Down switch. Simultaneously pressing then releasing the Up and Down switches accepts the displayed value.

Figure 1-27: Selecting Alarm Quantity

Select Alarm Quantity Screen

Blinking bar cursor appears under select alarm quantity value. Use Up and Down switches to set desired value then simultaneously press then release the Up and Down switches to accept.

When no alarms are set, the alarm quantity will appear as zero (0).
If alarms are set, the alarm quantity will indicate the current number of set alarms.
Regardless of the quantity displayed, increasing the value adds a new or additional alarm to the alarm list and decreasing the value removes alarms from the list.
Changing the alarm quantity to zero (0) deletes all set alarms.

• Alarm Configuration

After setting the alarm quantity, the alarm configuration screen appears with the blinking bar cursor below the first available parameter to include as an alarm parameter.

When configuring an alarm, users must tell SEI the following:

1. The parameter to use.
2. The trigger threshold direction (Higher or Lower than alarm trigger value).
3. The alarm trigger value.

Figure 1-28: Analog Parameter Alarm Configuration Screen Detail

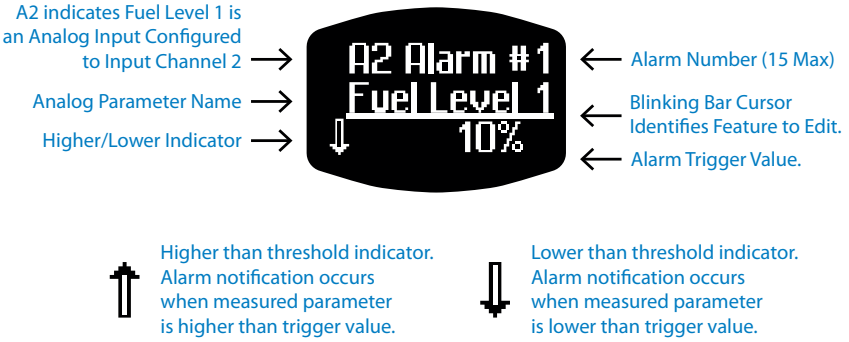


Figure 1-29: CAN Parameter Alarm Configuration Screen Detail

The analog input parameters for selection and inclusion in the alarm list appear in random order whereas the CAN parameters appear in alphabetical order. All analog input parameters appear before CAN parameters. Scroll through the parameter list with the Up or Down switches until the desired parameter appears. Simultaneously press then release the Up and Down switches to add the parameter to the alarm list.

After selecting a parameter, the blinking bar cursor appears under the Higher/Lower than arrow icon. Users must choose if the alarm notification will occur when the actual parameter value is either higher or lower than the desired trigger value. Pressing either the Up or Down switch toggles the indicator between the higher than arrow (pointing up) and lower than arrow (pointing down). Simultaneously press then release the Up and Down switches to accept direction of the arrow icon.

Once higher or lower is chosen, the blinking bar cursor moves to the alarm notification or trigger value. The units of this value change depending on the type of parameter chosen. Use the Up or Down switches to change the value then simultaneously press then release the Up and Down switches to accept the displayed value.

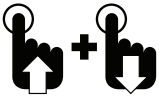
If only one alarm was entered in the Select Alarms Screen, the Edit Alarms Menu reappears after setting the first alarm. If two or more alarms were entered in the Set Alarms Screen, the alarm configuration screen reappears with the blinking bar cursor beneath the parameter name awaiting selection of the next parameter to add to the alarm list. Repeat the process to add subsequent alarms if required.

Figure 1-30: Alarm Configuration

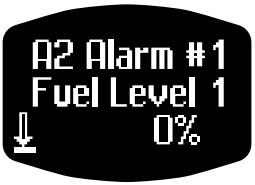
Alarm #1 Configuration Screen

Navigate to the Edit Alarms screen, *Main Menu-Alarms-Edit* or *Main Menu-Setup-Alarms-Edit*, select a parameter list and alarm quantity to bring up Alarm #1 configuration screen.

The blinking bar cursor appears under a parameter name. Use the Up and Down switches to scroll to desired parameter then press then simultaneously press then release the Up and Down switches to accept.

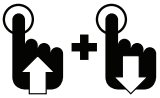


Higher/Lower Option Screen Setting Screen



After selecting a parameter, the blinking bar cursor appears under the higher/lower than indicator.

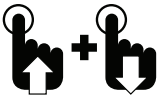
Press either the Up or Down switch to toggle arrow direction then simultaneously press then release the Up and Down switches to accept direction.



Alarm Value Setting Screen

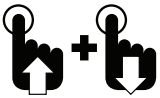
After setting higher/lower indicator, the blinking bar cursor appears under alarm indication value.

Use the Up and Down switches to set value then simultaneously press then release the Up and Down switches to accept.



Alarm #2 Configuration Screen

Alarm #2 configuration screen appears when setting more than one alarm. Repeat the process above to configure the alarm and all other alarms when required.



Alarms Menu

Simultaneously pressing then releasing the Up and Down switches when only one or the last alarm is set returns the Alarm Menu with the selection arrow cursor next to the Edit option.

• Adding Additional Alarms

Repeat the edit alarm process to add additional alarms. When prompted for the alarm quantity, increase it by the desired number of additional alarms. Once the alarm quantity increase is accepted, the first of all previously configured alarms appear.

Bringing up previously configured alarms gives users the opportunity to review, edit or completely change the current alarm parameters and configurations. If no changes are desired for previously configured alarms, users simply "step through" them by simultaneously pressing then releasing the Up and Down switches to accept existing settings. If many alarms were set prior to adding additional alarms, users will need to simultaneously press then release the Up and Down switches many times to leave current alarms unchanged before adding the new parameter to the alarm list.

The new alarm parameter is added to the end of the existing alarm list.

Figure 1-31: Adding Additional Alarms

Navigate to the Select Alarms Quantity screen, *Main Menu-Alarms-Edit-Active or All Parms*.

Two previously set alarms shown as an example.

Press the Up switch to increase the alarm quantity by the desired amount.

This example increases the alarm quantity to three. Simultaneously press then release the Up and Down switches to accept the quantity shown.

Alarm #1 screen, the first of all the previously configured alarms, appears with the blinking bar cursor beneath the parameter name.

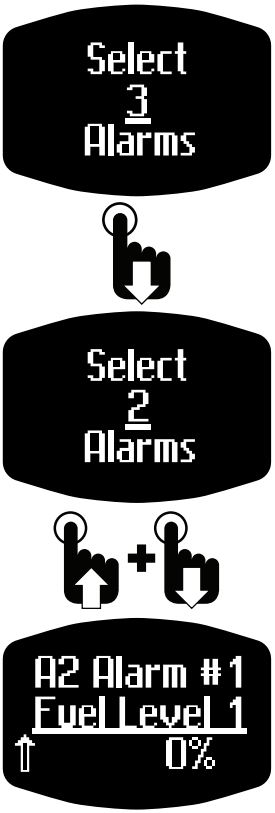
Users may change the settings for any previously configured alarms, two in this example, or "step through" them to accept current settings by simultaneously pressing then releasing the Up and Down switches.

The new alarm, Alarm #3 screen, appears once "stepping through" or editing of all previous alarms is complete. Select the parameter and settings for the new alarm.

• Deleting an Alarm

Repeat the edit alarm process to delete an alarm. When prompted for the alarm quantity, decrease it by the number of alarms to be removed. SEI uses a last in, first out (LIFO) algorithm. Therefore, decreasing the alarm quantity deletes the last alarm entered. If users wish to delete the first alarm, all alarms must be deleted and the alarms to be retained must be re-entered using the edit alarm function.

Figure 1-32: Deleting Alarm(s)



Navigate to the Select Alarms Quantity screen, *Main Menu-Alarms-Edit-Active or All Parms*.

Three previously set alarms shown as an example.

Press the Down switch to decrease the alarm quantity by the desired amount.

This example decreases the alarm quantity to two. Simultaneously press then release the Up and Down switches to accept the quantity shown.

Alarm #1 screen, the first of all the previously configured alarms, appears with the blinking bar cursor beneath the parameter name.

Users may change the settings for any previously configured alarms, two in this example, or "step through" them to accept current settings by simultaneously pressing then releasing the Up and Down switches.

Once "stepping through" or editing of all previous alarms is complete, the selection arrow cursor appears at the Edit option in the Alarms Menu.

When deleting alarms, the last alarms entered are the first to be deleted (LIFO).

Setting alarm quantity to zero deletes all alarms.

• A/D (Analog/Digital) Inputs

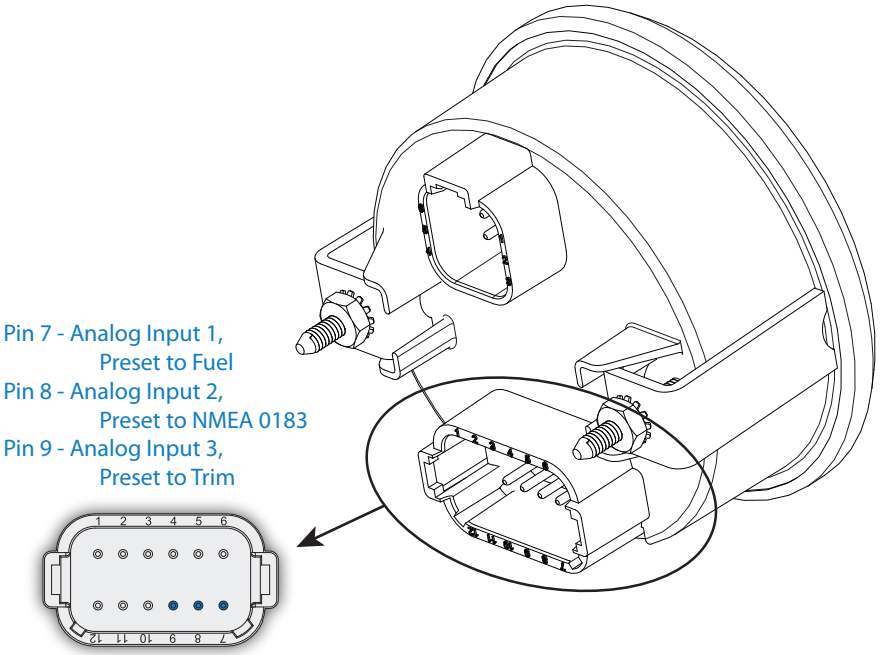
Analog sender or A/D inputs are used to connect discrete non-CAN senders such as fuel level and trim. SEI reads the analog signal and converts it to a digital signal for processing.

Users may connect up to two analog senders to Pins 7 & 9. Analog inputs 1 & 3 are preset to fuel and trim respectively. Inputs 1 & 3 can be changed if not being used for fuel and trim.

Configuring A/D inputs "tells" the SEI Master Instrument the type of sender used and to what analog input pin the sender is connected. Users must know this combination before configuring A/D inputs. It does not matter which analog input pin (7 or 9) is used as long as the A/D input is configured to match the physical hardware connections.

Example: If a 10-180 ohm water level sender is wired to pin 7 (analog input 1), then users should set analog input 1 to a Water Level parameter with a resistance range of 10-180 ohms.

Figure 1-33: Connector Analog Input Pins



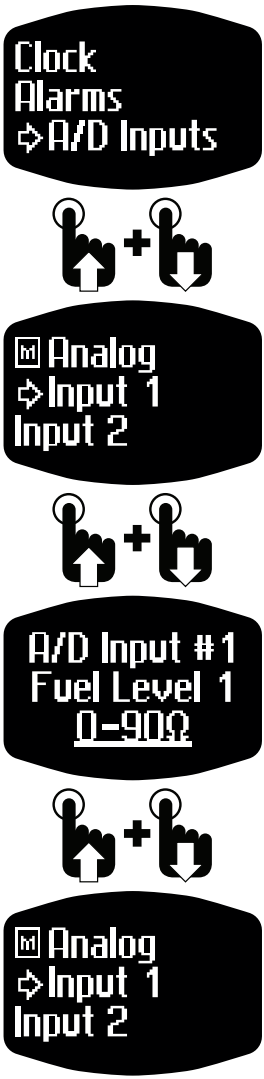
See the following page for A/D input setup display screens.

• NMEA 0183 Input

Analog input 2 is preset to read NMEA 0183 data from compliant devices such as GPS receivers and smart transducers.

Since analog input 2 is factory configured for NMEA 0183, the only parameter options for the input are None and NMEA 0183.

Figure 1-34: A/D Input Setup



Place the selection arrow cursor at the A/D Inputs option in the Setup Menu, *Main Menu-Setup-A/D Inputs*.

The Analog Menu appears.
Select the appropriate analog input.
A maximum of three inputs are available.

Select the appropriate sender type and range for the input pin.
This combination configures analog input 1 (connector pin 7) to a 0-90 ohm fuel sender.

Simultaneously pressing then releasing the Up and Down switches returns the Analog Menu to configure additional inputs if required.

Scroll down to see Input 3 (if available), Return and Main Screen options.

• A/D Pressure Sender Inputs

Configuring an analog pressure sender input differs slightly from other analog inputs. With pressure senders, users must tell SEI the pressure range for the sender by inputting the pressure at 0% and 100% of full scale. This is in addition to setting the sender resistance range.

See the following diagram for configuring an analog pressure sender.

Figure 1-35: A/D Pressure Sender Input Configuration

From the Analog Menu,
Main Menu-Setup-A/D Inputs,
select the desired analog input channel (1 or 3)
and simultaneously press then release the
Up and Down switches to accept.

Blinking bar cursor appears under parameter
name. Use the Up or Down switches to
scroll to desired parameter.
Simultaneously press then release the
Up and Down switches to accept.

After selecting a parameter, blinking bar
cursor appears under resistance range option.
Use the Up or Down switches to select
desired resistance range.
Simultaneously press then release the
Up and Down switches to accept.

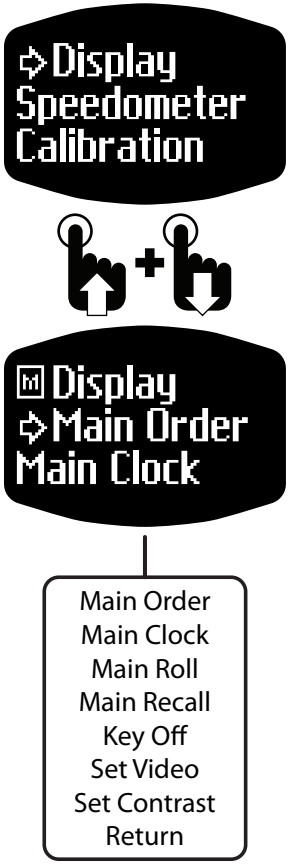
For pressure sender inputs, users must set
the pressure range at 0 and 100% of
full scale (FS).
Enter a pressure for 0% of full scale
using the Up or Down switches then
simultaneously press then release the
Up and Down switches to accept.

Finally, enter a pressure for 100% of full scale
using the Up or Down switches then
simultaneously press then release the
Up and Down switches to accept.
This configuration is for an 80 psi sender.

• Display

The Display Menu functions give users the ability to configure the LCD. Options for configuring the display include brightness, contrast, viewing mode and which parameters to include in the Quick View Main Screen stack. Each function is detailed in the following pages.

Figure 1-36: Display Menu



Place the selection arrow cursor at the Display option in Setup Menu, *Main Menu-Setup-Display*.

The Display Menu appears with the selection arrow cursor at the Main Order option.

Display Menu Function List

• Main Order

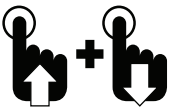
The Main Order function is used to select the quantity of parameters and order in which they will display when scrolling through the Quick View Main Screens.

See following page for detailed instructions.

Figure 1-37: Quick View Main Screen Parameter Selection

Display Menu

From the Display Menu, *Main Menu-Setup-Display*, place the selection arrow cursor next to the Main Order option and simultaneously press then release the Up and Down switches.



Main Order Menu

The *Active* option includes configured analog signal inputs and CAN parameters "actively" broadcast over the CAN network.

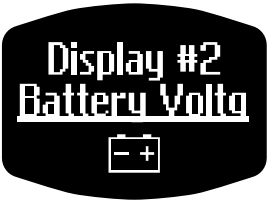
The *All Parms* option includes all possible analog and CAN parameters defined by the J1939 protocol read by the Master Instrument.

Select an option and simultaneously press then release the Up and Down switches.

Select Display Quantity Screen

Choose a quantity from 1-20 of parameters to include in the Quick View Main Screen list. If 1 item is entered, no choice of parameters is offered and the default Total Hours parameter appears. Entering 1 deletes all parameters for Quick View Main Screen display except total hours.

Select Parameter Screen



If 2 or more items are chosen for display, Display #2 screen appears. Use the Up or Down switches to scroll through the parameter selection list. Analog input parameters appear in random order and are listed before CAN parameters. CAN parameters appear after the analog inputs and in alphabetical order.
Simultaneously press then release the Up and Down switches to add the parameter.
The process repeats for display 3-20.

Main Order Menu

Simultaneously pressing then releasing the Up and Down switches when only one or the last parameter is set for display returns the Display Menu with the selection cursor next to the Main Order option.

• Main Clock

Main Clock function adds a clock display to the Quick View Main Screens. The clock can also be added or removed from the Quick View Main Screens by using *Main Menu-Setup-Clock-Main Clock-On* or *Off*. The clock always appears as the last Quick View Main Screen and may not be reordered in the screen list.

Figure 1-38: Adding Clock Display to Quick View Main Screen List

Select Main Clock from the Display Menu, *Main Menu-Setup-Display-Main Clock*. The On option adds clock display to the Quick View Main Screens while off removes it. Place the selection arrow cursor next to the desired option then simultaneously press then release the Up and Down switches to accept.

• Main Roll

Main Roll sets the style of scrolling through the Quick View Main Screens. With Main Roll set to Roll, pressing the Up or Down switches continuously loops through the Quick View Main Screens such that when the last screen is reached pressing the Down switch displays the first screen. With Main Roll set to No Roll, scrolling stops at the first or last Quick View Main Screen. This setting requires users to press the Up switch to scroll back up the through when the last screen is reached or press the Down switch when the first screen is displayed.

Figure 1-39: Quick View Main Screen Scrolling Style

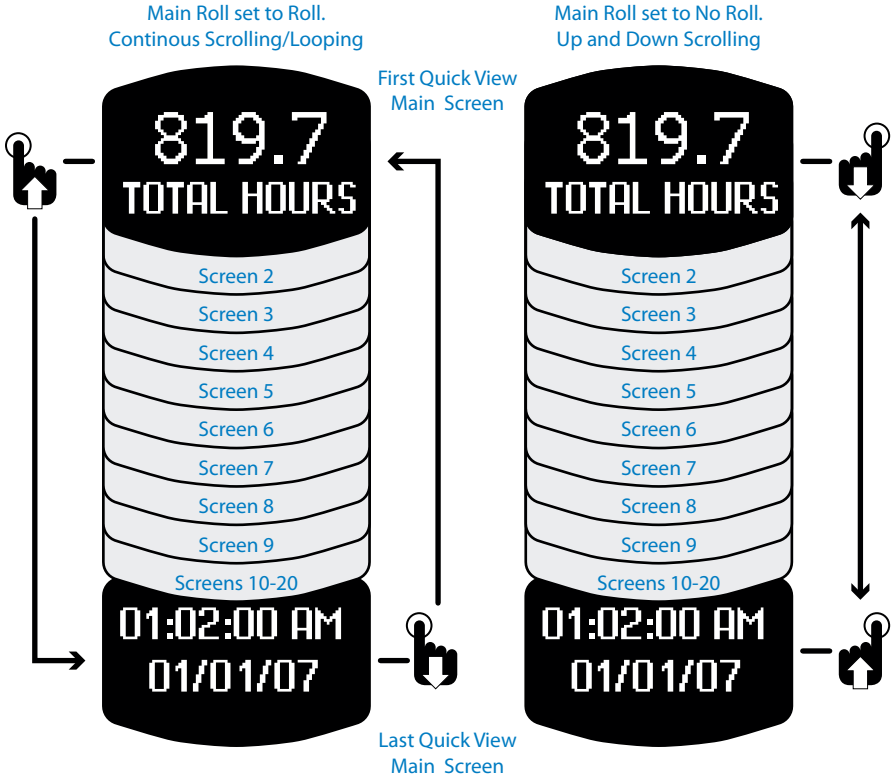
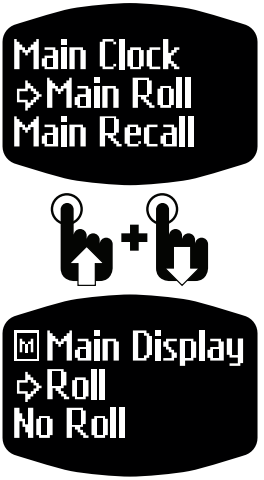


Figure 1-40: Setting Quick View Main Screen Scrolling Style



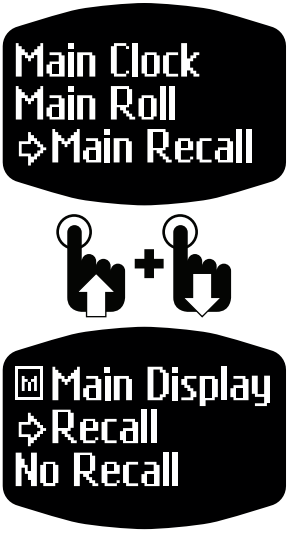
Select Main Roll from the Display Menu, *Main Menu-Setup-Display-Main Roll*. Simultaneously press then release the Up and Down switches to accept.

The Main Roll Menu appears. The Roll option enables continuous scrolling/looping of Quick View Main Screens. No Roll stops screen scrolling when the top or bottom of the screen list is reached. Place the selection arrow cursor next to the desired option then simultaneously press then release the Up and Down switches to accept.

• Main Recall

Recall enables SEI to remember the last Quick View Main Screen displayed when the ignition key is turned off so that screen will appear when the key is turned back on. This features eliminates the need to scroll through the Quick View Main Screens to display a preferred parameter every time the vessel/vehicle is turned off. The No Recall option returns the default Quick View Main Screen (Total Hours) when the ignition key is turned off and then back on regardless of the last screen displayed.

Figure 1-41: Setting Quick View Main Screen Recall



Select Main Recall from the Display Menu, *Main Menu-Setup-Display-Main Recall*. Simultaneously press then release the Up and Down switches to accept.

The Recall option remembers the last Quick View Main Screen displayed when the ignition key is turned off so that screen will appear when the key is turned back on.

No Recall ignores the last Quick View Main Screen displayed when the ignition key is turned off.

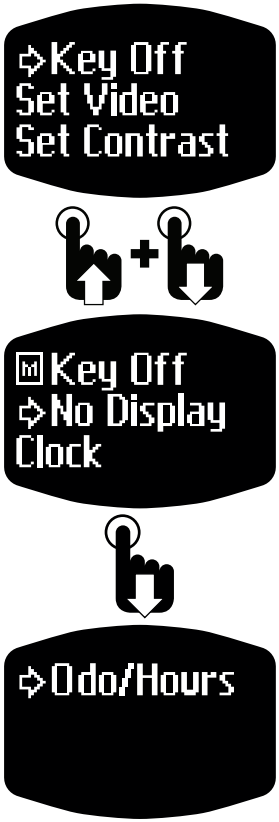
Place selection arrow cursor next to the desired option then simultaneously press then release the Up and Down switches to accept.

• Key Off

Users can choose to retain the clock or Odo/Hours displays when the ignition key is turned off.

Note: This feature turns on the LCD and not the LCD backlight. The transflective nature of the LCD will allow for viewing in low ambient lighting conditions. For optimum viewing, turn the ignition key on to enable the LCD backlight. Refer to "Backlight" on page 18 for instrument illumination setup.

Figure 1-42: Setting Key Off Display Options



Select the Key Off option from the Display Menu, *Main Menu-Setup-Display-Key Off*. Simultaneously press then release the Up and Down switches to accept.

When the ignition key is turned off, the No Display option blanks or turns off the LCD.

The Clock option retains a clock display while Odo/Hours retains either the total hours or total distance display when the ignition key is turned off.

Place the selection arrow cursor next to the desired option then simultaneously press then release the Up and Down switches to accept.

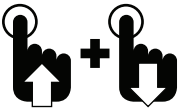
Pressing the Down switch scrolls to the remainder of the Key Off Menu options.

• Set Video

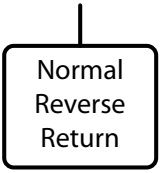
Setting video changes the color scheme of the LCD from white graphics on a black background (Normal) to black graphics on a white background (Reverse).

Figure 1-43: Setting LCD Background Color Scheme

Select Set Video from the Display Menu, *Main Menu-Setup-Display-Set Video*. Simultaneously press then release the Up and Down switches to accept.



From the Video Mode Menu, users can choose Normal (white text on black background) or Reverse (Black text on white background). Place the selection arrow cursor next to the desired option then simultaneously press then release the Up and Down switches to accept.



Video Mode Function List

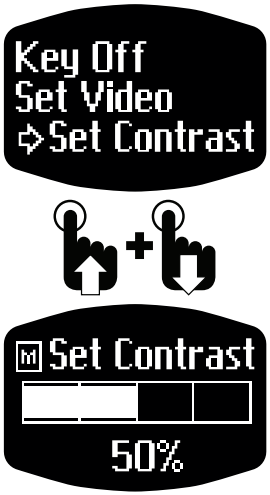
Set Video = Normal

Set Video = Reverse

• Set Contrast

Contrast sets the difference between the white and black colors of the LCD.

Figure 1-44: Setting LCD Contrast



Select Set Contrast from the Display Menu, *Main Menu-Setup-Display-Set Contrast*. Simultaneously press then release the Up and Down switches to accept.

Use the Up and Down switches to increase or decrease contrast. Simultaneously press then release the Up and Down switches to accept contrast setting.

• Speedometer

SEI reads both CAN and GPS based speed inputs. This function tells SEI what speed source to use to drive the speedometer pointer in the Satellite Instrument. Should more than one speed source exist, users can view all speed data on the LCD by selecting View Parms from the Main Menu. It is not necessary to set the speedometer source if the vessel/vehicle's instrument set does not contain a speedometer.

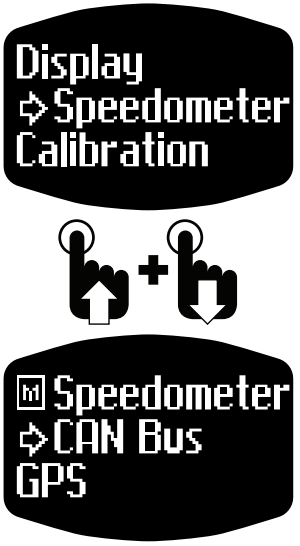
• CAN Speedometer

The CAN speed drives the pointer in the Satellite Instrument from a CAN source.

• GPS (NMEA 0183) Speedometer

The GPS option drives the pointer in the Satellite Instrument from NMEA 0183 compliant GPS speed sources. Since analog input 2 is NMEA 0183 configured, the speedometer source is preset to GPS. Refer to page 32, setting A/D inputs.

Figure 1-45: Setting Speedometer Source



Select Speedometer from the Display Menu, *Main Menu-Setup-Display-Speedometer.* Simultaneously press then release the Up and Down switches to accept.

The Speedometer Menu appears, select CAN Bus or GPS (NMEA 0183) speed source.

• Calibration - Fuel Tank

The calibration function helps insure accuracy of fuel tank levels.

Calibration is a multi-step process requiring users to characterize the fuel sender to the amount of fuel in the tank. Up to two fuel tanks can be calibrated. The process for calibrating tank 1 or tank 2 is identical.

Figure 1-46: Calibration Menu

Select Calibration from the Display Menu, *Main Menu-Setup-Display-Calibration*. Simultaneously press then release the Up and Down switches to accept.

The calibration Menu appears. Place the selection arrow cursor next to the desired option and press then simultaneously press then release the Up and Down switches to accept.

Calibration Menu Function List

Calibration Menu function summary:

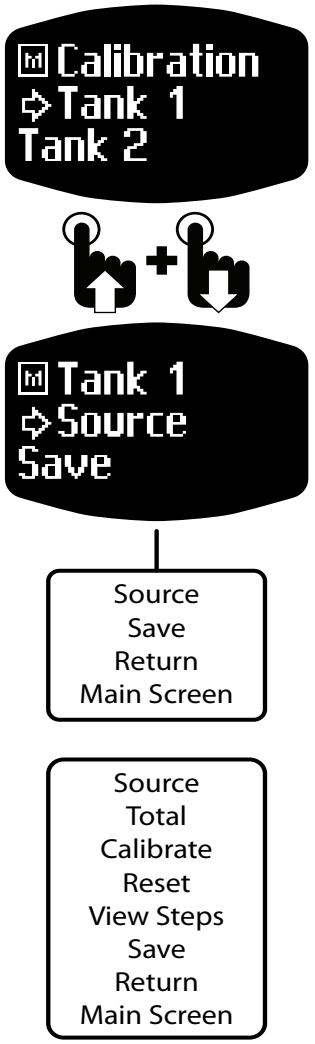
Tank 1 - Configures and calibrates fuel tank 1
Tank 2 - Configures and calibrates fuel tank 2 if necessary.
Tank Display - Sets display format of fuel remaining as a volume or percent of full when selecting *Main Menu-Fuel-Remaining*.
Return - Brings users back to calibration option on Display Menu.
Main Screen - Brings users back to the default Quick View Main Screen.

• Calibration Tank 1 or 2

The process calibrating a fuel tank requires entering a source for the fuel data, setting fuel tank capacity and calibrating the fuel tank level. The next several pages detail each step of the process. Calibrate, Reset and View Steps Menu options do not appear until source and capacity information is entered.

Note: Original equipment manufacturers may precalibrate tank/sender combinations.

Figure 1-47: Selecting a Fuel Tank to Configure.



Select Calibration from the Setup Menu, *Main Menu-Setup-Calibration*. Choose a tank to configure (1 or 2) then simultaneously press then release the Up and Down switches to accept.

Tank 1 Menu appears. To begin fuel tank setup, simultaneously press then release the Up and Down switches to accept source option.

The options for Tank 1 Menu are limited to those at left until the fuel data source, total tank capacity and calibration steps are complete.

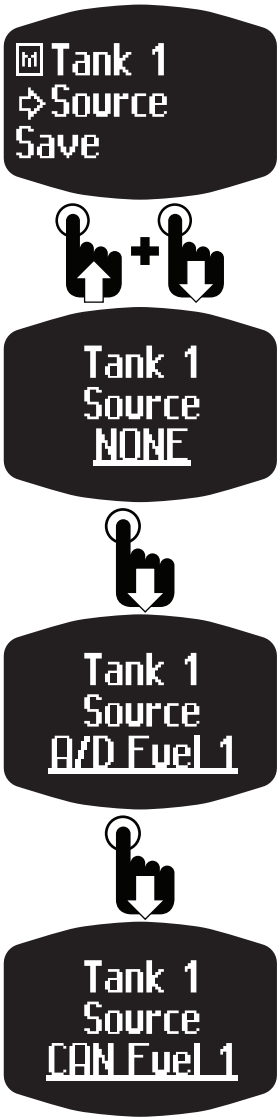
Tank 1 complete menu option list. All functions appear after setting a source, total volume and calibrating the tank.

• Setting Fuel Tank Data Source

After deciding which tank to calibrate, users must choose a source for the fuel data.
The source can be a CAN parameter, A/D input (analog discrete fuel sender) or None. Selecting the None option still provides fuel level information but disables fuel management data for the tank.

If A/D input is chosen, users must first configure an analog input using the A/D Inputs setup function. Refer to "A/D (Analog/Digital) Inputs" on page 32 for configuring fuel as an A/D input.

Figure 1-48: Selecting Fuel Tank Data Source



Select source from the Tank 1 Menu, *Main Menu-Setup-Display-Calibration-Tank 1*. Simultaneously press then release the Up and Down switches to accept.

Simultaneously pressing then releasing the Up and Down switches brings up the first fuel tank data source of "NONE". This option still provides fuel level information but disables fuel management data for the tank.

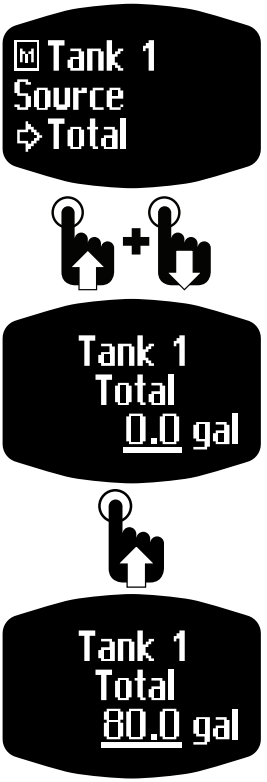
Pressing the Down switch scrolls to the next fuel tank data source "A/D Fuel 1", This option tells SEI to use an analog input configured sender as a fuel level data source. Refer to the section on configuring A/D Inputs, *Main Menu-Setup-A/D Inputs*.

Pressing the Down switch again scrolls to the third and final fuel tank source option, CAN Fuel 1.
This option tells SEI to use CAN data as a fuel level data source.

• Setting Fuel Tank Total Capacity

Setting tank capacity is the second step in the calibration process.
It is important to enter an accurate capacity amount for the fuel tank since accurate fuel sender calibration relies on this information.

Figure 1-49: Setting Fuel Tank Capacity.



Select Total from the Tank 1 Menu,
Main Menu-Setup-Display-Calibration-Tank 1.
Simultaneously press then release the Up and Down switches to accept.

The total tank capacity screen appears.
Use the Up and Down switches to change the capacity.

Simultaneously press then release the Up and Down switches once the desired capacity is displayed.

Press or press and hold the Up switch to set the tank capacity.

This example shows the tank capacity set to 80 gallons.

Simultaneously pressing then releasing the Up and Down switches accepts the displayed value and returns the Tank 1 Menu.

• Calibrating Fuel Tank Level

The final step for calibrating fuel level indication requires characterizing the sender to the actual fuel tank level. Manually characterizing a fuel sender to the fuel tank accounts for possible fuel level errors due to complex shaped tanks and fuel sender mounting location.

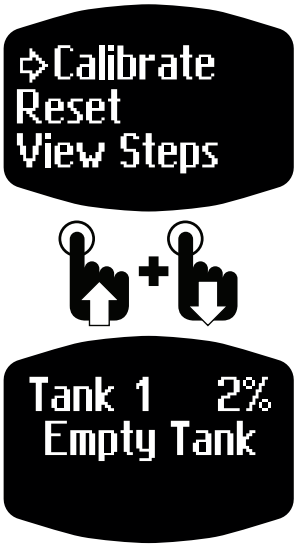
A properly calibrated fuel tank is necessary to calculate accurate fuel consumption rates.

Calibrating the fuel tank level requires starting with an empty fuel tank and then filling the tank with fuel in intervals or "steps" of 25%, 50%, 75% and 100% of tank capacity by volume. At each step SEI displays the current percentage of the senders full-scale range and the amount of fuel to be put in the tank. When the required amount of fuel for a calibration step is placed in the tank, simultaneously pressing then releasing the Up and Down switches sets the current sender resistance to that amount of fuel in the tank.

Example: Calibrating an 80 gallon fuel tank requires users to set the sender resistance when the tank is empty and after placing 20, 40, 60 and 80 gallons of fuel in the tank. The following figures show each step in the process of calibrating a sample 80 gallon tank.

• Calibrating Fuel Tank Level Step 1 - Empty Tank

Figure 1-50: Setting Empty Tank Calibration Point



Select Calibrate from the Tank 1 Menu, *Main Menu-Setup-Calibration-Tank 1-Calibrate*. Simultaneously press then release the Up and Down switches to begin tank level calibration.

The first calibration point appears for empty tank.

The percent value shown represents the amount of fuel currently in the tank as a percentage of the senders full-scale range.

At empty, this percentage may indicate the tank is not actually empty, an improperly adjusted float arm or simply within the tolerance of the sender.

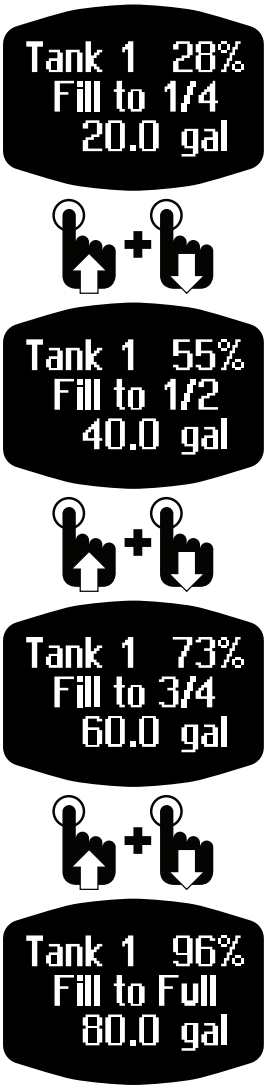
Make adjustments to the fuel level or sender otherwise simultaneously press then release the Up and Down switches to move to the second calibration point.

• Calibrating Fuel Tank Level Steps 2 thru 5

Setting the remaining calibration points for 25-100% of tank capacity is identical to setting the empty tank calibration point except for the required amount of fuel at each calibration point. The amount of fuel needed in the tank is displayed on the LCD and is based upon the total tank capacity set earlier.

The diagram below continues the process of calibrating the sample 80 gallon fuel tank.
The percentages shown are used as an example only and will vary depending upon the sender characteristics.

Figure 1-51: Setting Tank Calibration Points for 25-100%



Step 2 - 25% of tank capacity.

Fill the tank with 20 gallons of fuel or 25% (1/4) of the 80 gallon total tank capacity.

28% indicates the percentage of full-scale sender range with 20 gallons of fuel in the tank.

Simultaneously press then release the Up and Down switches to set the calibration point.

Step 3 - 50% of tank capacity.

Add fuel until the tank contains 40 gallons of fuel or 50% (1/2) of the 80 gallon total tank capacity.

55% indicates the percentage of full-scale sender range with 40 gallons of fuel in the tank.

Simultaneously press then release the Up and Down switches to set the calibration point.

Step 4 - 75% of tank capacity.

Add fuel until the tank contains 60 gallons of fuel or 75% (3/4) of the 80 gallon total tank capacity.

73% indicates the percentage of full-scale sender range with 60 gallons of fuel in the tank.

Simultaneously press then release the Up and Down switches to set the calibration point.

Step 5 - 100% of tank capacity.

Add fuel until the tank contains 80 gallons of fuel or 100% (Full) of the 80 gallon total tank capacity.

96% indicates the percentage of full-scale sender range with 80 gallons of fuel in the tank.

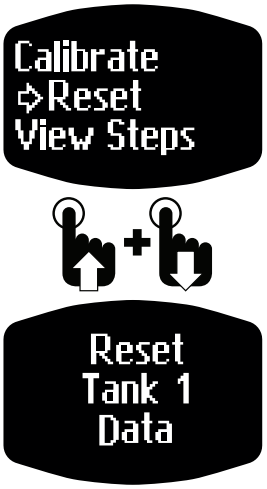
Simultaneously press then release the Up and Down switches to set the calibration point.

It is recommended users save calibration settings after completing step 5. See "Saving Fuel Tank Calibration Data" on page 51.

• Resetting Fuel Tank Calibration

The calibration points for a fuel tank can be reset by using the reset option found in either the Tank 1 or Tank 2 menus. This option only appears if calibration data was entered for a tank.

Figure 1-52: Resetting Fuel Tank Calibration Data Points



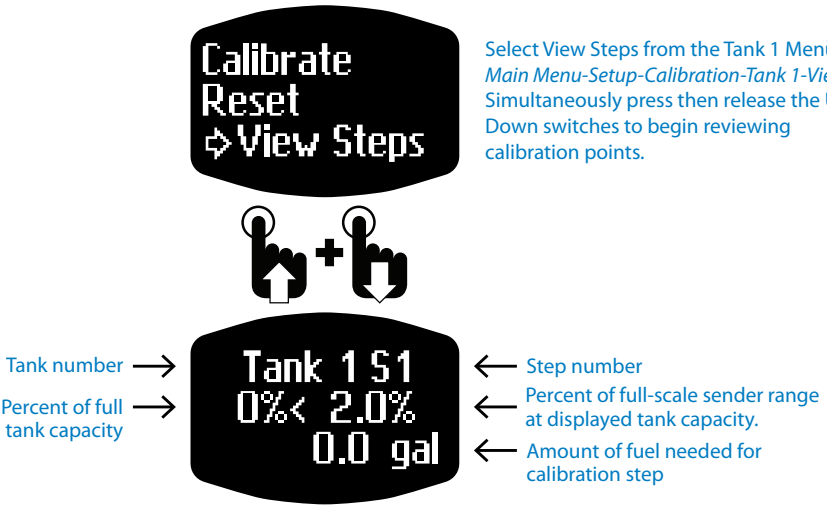
Select Reset from the Tank 1 Menu, *Main Menu-Setup-Calibration-Tank 1-Reset*. Simultaneously press then release the Up and Down switches to begin the calibration reset process.

The Reset Tank 1 Data screen appears. Simultaneously press then release the Up and Down switches to reset the tank calibration. Tank 1 Menu then reappears.

• Viewing Calibration Steps

Users can view/review all five calibration steps and the percent of full-scale sender range for those steps.

Figure 1-53: Viewing Fuel Tank Calibration Step 1



Select View Steps from the Tank 1 Menu, *Main Menu-Setup-Calibration-Tank 1-View Steps*. Simultaneously press then release the Up and Down switches to begin reviewing calibration points.

Screen interpretation summary:
Calibration Step 1 for Tank 1 at empty or 0% of full-tank capacity was set at 2% of the full-scale sender range

• Viewing Calibration Steps 2 thru 5

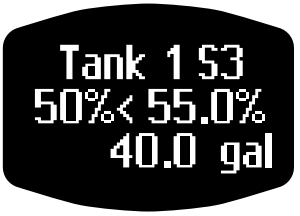
Pressing the Down switch after the first calibration step is displayed scrolls through the remaining calibration steps 2 thru 5.

The values shown in the figure below are from the 80 gallon tank example shown earlier. Values shown will vary for each user.

Figure 1-54: Viewing Fuel Tank Calibration Steps 2 thru 5

View Step 2:

At 25% of tank capacity or with 20 gallons of fuel in the tank the calibration point was set at 28% of the full-scale sender range.

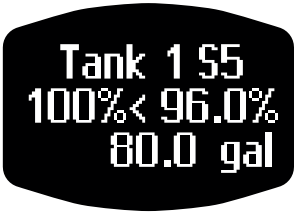


View Step 3:

At 50% of tank capacity or with 40 gallons of fuel in the tank the calibration point was set at 55% of the full-scale sender range.

View Step 4:

At 75% of tank capacity or with 60 gallons of fuel in the tank the calibration point was set at 73% of the full-scale sender range.



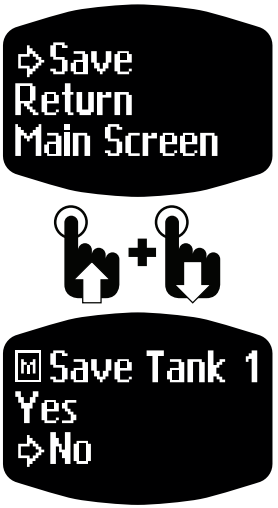
View Step 5:

At 100% of tank capacity or with 80 gallons of fuel in the tank the calibration point was set at 96% of the full scale sender range.

• Saving Fuel Tank Calibration Data

After making fuel tank source, capacity or calibration changes, users must save the changes for SEI to retain the information.

Figure 1-55: Saving Fuel Tank Data & Calibration Steps



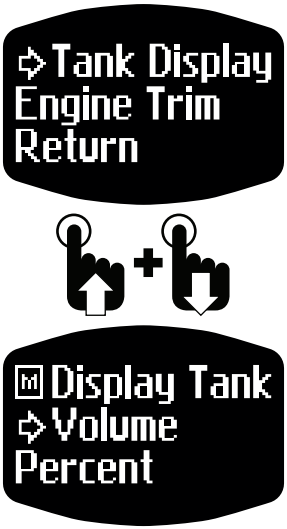
Select Save from the Tank 1 Menu, *Main Menu-Setup-Calibration-Tank 1-Save*. Simultaneously press then release the Up and Down switches to open Save Tank 1 Menu.

The selection arrow cursor appears at the "No" option to prevent accidental replacement of existing data.

Move the selection arrow cursor next to the "Yes" option using the Up switch then simultaneously press then release the Up and Down switches to save the calibration data.

• Tank Display

Users may select to view fuel remaining as either a volume or percent of full with the Tank Display function. This setting does not effect the fuel consumption rate display unit which remains volume per unit time such as gallons per hour (GPH).



Select Tank Display from the Calibration Menu, *Main Menu-Setup-Calibration-Tank Display*.

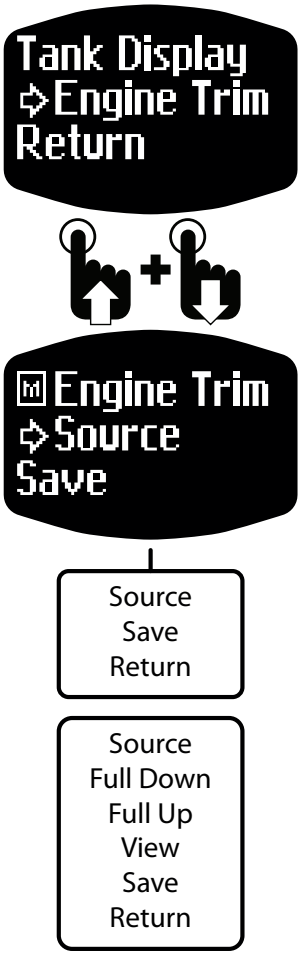
The Display Tank Menu appears with the selection arrow cursor next to the volume option. Select Volume or Percent then simultaneously press then release the Up and Down switches to accept.

• Calibration - Engine Trim

The implementation and accuracy of trim senders may vary greatly on a vessel. The engine trim calibration feature allows users to characterize the engine trim position to better match the sender, satisfy personal preferences or set a safety margin to the full-up or down positions.

Engine trim calibration is a three-step process requiring users to input trim source along with full-up and full-down calibration points.

Figure 1-56: Engine Trim Calibration Menu



Select Engine Trim from the Calibration Menu, *Main Menu-Setup-Calibration-Engine Trim*, then simultaneously press then release the Up and Down switches to accept.

Engine Trim Menu appears with the selection arrow cursor next to the source option. Before calibrating a trim sender, a source input must be selected. Simultaneously press then release the Up and Down switches to select a source.

Options for the Engine Trim Menu are limited to those at left until a trim data source other than the No Cal option is selected.

Engine Trim Menu complete option list. These functions appear after setting the engine trim data source to Analog or CAN Bus.

Engine Trim Calibration Menu function summary:

Source - Provides options for analog, CAN Bus or No calibration (None) trim data sources.
Full Down - Sets calibration point for full-down engine trim position.
Full Up - Sets calibration point for full-up engine trim position.
View -Shows previously set engine trim calibration points.
Save - Saves any changes to engine trim calibration options.
Return - Brings users back to the engine trim option, *Main Menu-Setup-Calibration-Engine Trim*.

• Selecting Engine Trim Sender Type for Calibration

Users may choose to calibrate either analog or CAN Bus trim sender types. A "No Cal" option permits the use of OEM sender calibration or setup. Trim senders are still read by SEI when No Cal is chosen but this may result in the physical full-up or down engine trim positions not matching the full scale display on the Master Instrument LCD or pointer position of a Satellite trim gauge connected to the Master Instrument.

Whether or not a trim sender is calibrated, analog trim senders must first be configured as an analog input using the A/D Inputs setup function in order to read the analog trim sender. Refer to "A/D (Analog/Digital) Inputs" on page 32 for configuring trim as an A/D input. CAN Bus trim senders are automatically read by SEI.

Figure 1-57: Engine Trim Calibration Menu

Select Engine Trim from the Calibration Menu, *Main Menu-Setup-Calibration-Engine Trim*. The selection arrow cursor appears next to the source option.

Simultaneously press then release the Up and Down switches to select a trim sender signal source for calibration.

The Engine Trim Menu appears with the selection arrow cursor next to the No Cal option. Select this option to use the OEM calibration or sender setup.

Move the selection arrow cursor next to Analog then simultaneously press then release the Up and Down switches to select an analog type trim sender for calibration.

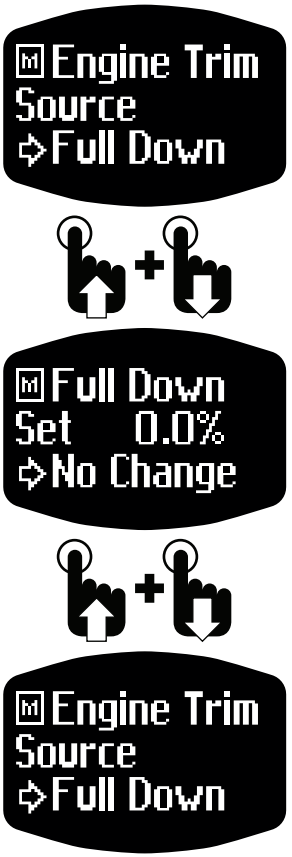
Scroll down farther to place the selection arrow cursor next to the CAN Bus option then simultaneously press then release the Up and Down switches to select a CAN compatible trim sender for calibration.

• Calibrating Full-Down & Full-Up Trim Sender Positions

Once a trim sender source is selected, the options for calibrating the full-down and up trim positions appear. Setting full-down and up positions allows users to maximize the full trim sender range or set an offset for either or both the up or down positions.

As an example, setting the full-up position at 80% of the full sender range creates an offset. This type of offset could be used to identify the ideal trim position for operation yet leaves room for trimming the engine higher for trailering.

Figure 1-58: Setting Full-Down Trim Position



After selecting a trim sender source, select Full Down from the Engine Trim Menu, *Main Menu-Setup-Calibration-Engine Trim-Full Down*. Simultaneously press then release the Up and Down switches to begin setting full-down position.

The engine trim Full Down Menu appears with the selection arrow cursor next to the No Change option.

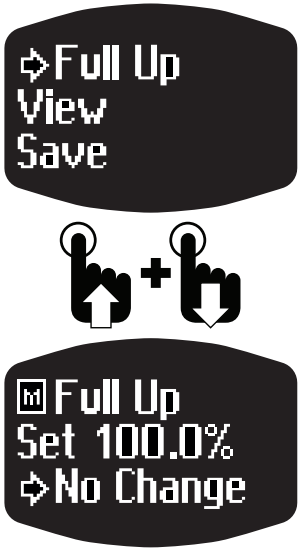
Move the selection arrow cursor to the Set option and trim the engine to the desired down position.

As the engine is trimmed, the percent of full-scale trim value changes. If an offset for the down position is desired, trim the engine to a percent value greater than zero otherwise trim to 0%.

Once the desired percent value is reached, simultaneoulsy press then release the Up and Down switches to set the calibration point.

After setting the full-down position and simultaneoulsy pressing then releasing the Up and Down switches, the Engine Trim Menu appears with the selection arrow cursor next to the Full Down option.

Figure 1-59: Setting Full Up Trim Position



Place the selection arrow cursor next to the Full Up option in the Engine Trim Menu, *Main Menu-Setup-Calibration-Engine Trim-Full Up*. Simultaneously press then release the Up and Down switches to begin setting full-up position.

The engine trim Full Up Menu appears with the selection arrow cursor at the No Change option.

Move the selection arrow cursor to the Set option and trim the engine to the desired up position.

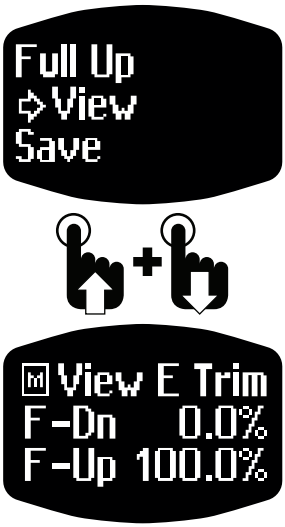
As the engine is trimmed, the percent of full-scale trim value changes. If an offset for the up position is desired, trim the engine to a percent value less than 100%, otherwise trim to 100%.

Once the desired percent value is reached, simultaneously press then release the Up and Down switches to set the calibration point.

• Viewing Trim Calibration Settings

The view option provides an easy method to simultaneously review the trim settings for both up and down positions.

Figure 1-60: Viewing Engine Trim Settings



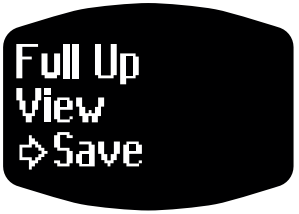
Place the selection arrow cursor next to the View option in the Engine Trim Menu, *Main Menu-Setup-Calibration-Engine Trim-View*. Simultaneously press then release the Up and Down switches to view trim calibration settings.

The View E Trim screen displays the calibration settings for both the up and down positions.

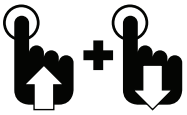
• Saving Trim Calibration Settings

To retain any changes to engine trim source or calibration settings, users must save them before exiting the Engine Trim Menu.

Figure 1-61: Saving Engine Trim Settings



Place the selection arrow cursor next to the Save option in the Engine Trim Menu, *Main Menu-Setup-Calibration-Engine Trim-Save*. Simultaneously press then release the Up and Down switches to open Save E Trim Menu.



If changes were made to either the source or calibration points, the Yes/No save options appear.

The selection arrow cursor appears next to the No option to protect against accidentally replacing existing settings.

Move the selection arrow cursor to the Yes option then simultaneously press then release the Up and Down switches to save changes or settings.

Or

If no changes were made to either the source or calibration points, the Save E Trim Menu appears displaying No Change.
Simultaneously press then release the Up and Down switches to return to the Engine Trim Menu.

• Set Popup

Turning on popups provide a highly visible alert screen when a system fault, warning or alarm occurs.

Figure 1-62: Popup Fault, Warning & Alarm Screens

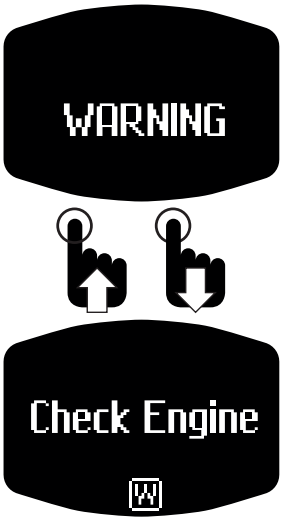
When popups are enabled, the following screens appear if a fault, warning or alarm occurs.

Fault, warning and alarm popup screens remain displayed until acknowledged by pressing either the Up or Down switches. Simultaneously pressing then releasing the Up and Down switches returns the screen that was active when the fault, warning or alarm condition occurred but a blinking icon appears at the bottom of the screen to indicate a fault, warning or alarm condition exists. Pressing the Up or Down switch brings up the detail screen for the alarm condition.

Note: If the condition that caused the fault, warning or alarm clears, the notification screens and icons will disappear as well.

Figure 1-63: Acknowledging Fault, Warning or Alarm Notification

Simultaneously pressing then releasing the Up and Down switches returns the screen displayed prior to the fault, warning or alarm with a blinking icon appropriate to the condition. (Total hours shown as an Example)

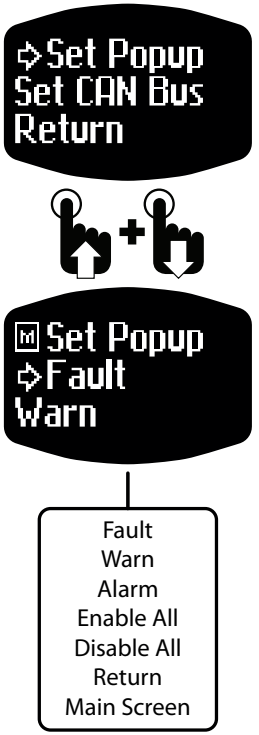


Pressing the Up or Down switches displays a screen with details about the fault, warning or alarm. (Check engine shown as an Example)

• Popup Menu

The Popup Menu is found in the setup section of the Main Menu and provides all the options for enabling/disabling popup screens. Users can turn on popups for each feature individually or use the Enable/Disable All function to turn on popups for all features in one step.

Figure 1-64: Popup Menu



Select Set Popup from the Setup Menu, *Main Menu-Setup-Set Popup*. Simultaneously press then release the Up and Down switches to accept.

Set Popup Menu appears with the selection arrow cursor next to the Fault option. Move the selection arrow cursor to desired Set Popup option then simultaneously press then release the Up and Down switches to set popup state.

Set Popup Menu function list.

The Enable All and Disable All options will not appear if all popups are already set to on or off, respectively.

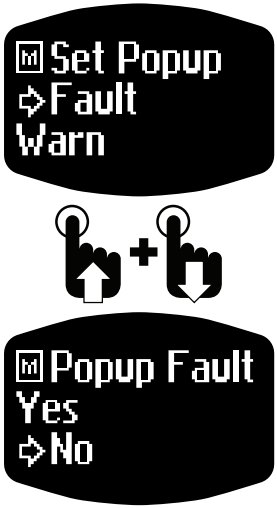
• Enabling/Disabling Popup Features

Enabling or disabling the popup feature for fault, warning and alarm functions requires navigating to the Set Popup Menu found within the Setup Menu and selecting which function to set. Simply choose yes or no to enable or disable the popup for each function.

To enable or disable the popup feature for all four functions simultaneously, the Enable All or Disable All menu option provides this functionality.

Refer to the next several diagrams for setting the popup state for the various functions.

Figure 1-65: Setting Fault Popup State



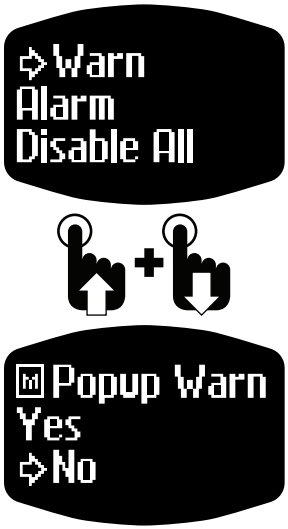
Select Fault option from the Set Popup Menu, *Main Menu-Setup-Set Popup-Fault*. Simultaneously press then release the Up and Down switches to set fault popup state.

Popup Fault Menu appears. Selection arrow cursor location depends upon current state of fault popup.

If fault popup is on, the arrow will appear next to "Yes" option and if off next to "No" option.

Select "Yes" to turn on fault popup and "No" to turn off fault popup.

Figure 1-66: Setting Warning Popup State



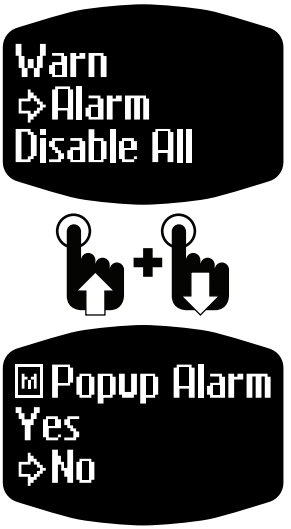
Select Warn option from the Set Popup Menu, *Main Menu-Setup-Set Popup-Warn*. Simultaneously press then release the Up and Down switches to set warning popup state.

Popup Warn Menu appears. Selection arrow cursor location depends upon current state of warning popup.

If warning popup is on, the arrow will appear next to "Yes" option and if off next to "No" option.

Select "Yes" to turn on warning popup and "No" to turn off warning popup.

Figure 1-67: Setting Alarm Popup State



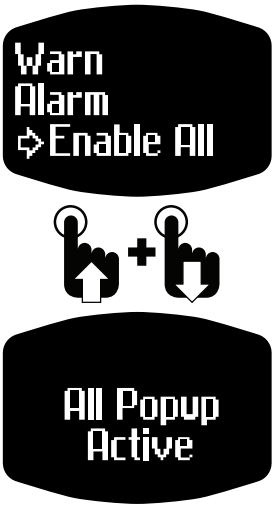
Select Alarm option from the Set Popup Menu, *Main Menu-Setup-Set Popup-Alarm*. Simultaneously press then release the Up and Down switches to set alarm popup state.

Popup Alarm Menu appears. Selection arrow cursor location depends upon current state of alarm popup.

If alarm popup is on, the arrow will appear next to "Yes" option and if off next to "No" option.

Select "Yes" to turn on alarm popup and "No" to turn off alarm popup.

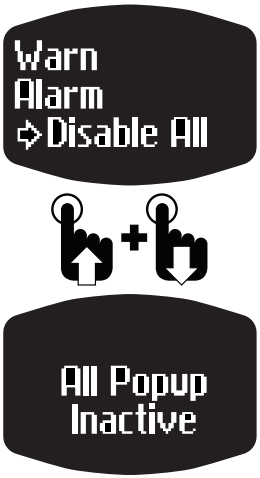
Figure 1-68: Enable All Popup Functions



If available, select Enable All option from the Set Popup Menu, *Main Menu-Setup-Set Popup-Enable All*. Simultaneously press then release the Up and Down switches to enable popup state for all functions.

The All Popup Active screen appears after selecting Enable All.

Figure 1-69: Disable All Popup Functions



If available, select Disable All option from the Set Popup Menu, *Main Menu-Setup-Set Popup-Disable All.* Simultaneously press then release the Up and Down switches to enable popup state for all functions.

The All Popup Inactive screen appears after selecting disable all.

• Set CAN Bus

Set CAN Bus Menu allows users to set the engine number to which a Master Instrument is connected in multiple engine applications. See "Setting SAE J1939 Engine Number" on page 64.

The Set CAN Bus Menu is also used to set the Default Quick View Main Screen 1 to display either total distance or total hours. See "Setting SAE J1939 Default Quick View Main Screen 1 (Total Hours or Distance)" on page 65.

Figure 1-70: Set CAN Bus Protocol Menu

Select Set CAN Bus from the Setup Menu, *Main Menu-Setup-Set CAN Bus*. Simultaneously press then release the Up and Down switches to accept.

The Set CAN Bus Menu appears with the selection arrow cursor next to the SAE J1939 option.

Simultaneously press then release the Up and Down switches to view the SAE J1939 engine configuration menus.

Set CAN Bus Menu function list.

Set CAN Bus Menu function summary:

SAE J1939 - Opens the engine configuration options.
Save - Saves the engine CAN protocol settings.
Return - Brings users back to the Set CAN Bus Setup Menu option.
Main Screen - Brings users back to the default Quick View Main Screen.

• Multiple Engine Applications

Multiple engine applications require a Master Instrument for each engine. Each engine has a unique CAN identification "engine number". The "engine number" is set by either Steyr Motors or the OEM that implements the engine. SEI supports up to four engines per vessel or vehicle.

In order to read CAN data from an engine in multiple engine configurations, each SEI Master Instrument must be "told" the engines number from which it will read CAN data and be wired to that engines ignition key switch.

If either requirement is incorrect, the Master Instrument will not power up or read data from the engine when the engines ignition key is turned on.

When wired properly, determining if a Master Instrument is synced to the proper engine number simply requires turning on the ignition key switch and waiting to see if engine hours accumulate.
If engine hours do not accumulate or the message "No Data" appears, use the *Main Menu-Setup-Set CAN Bus* tool to change the engine number of the Master Instrument until the Master reads CAN data from the desired engine.

For procedure on setting the engine number for SAE J1939, see "Setting SAE J1939 Engine Number" on page 64

Figure 1-71: Engine Sync No Data Message

"No Data" appears when the Master Instrument is not synced to the proper engine number.

• Single Engine Applications

Single engine applications do not require setting the engine number from which SEI will read CAN Data. The default engine number for single engine applications using SAE J1939 is "ANY".

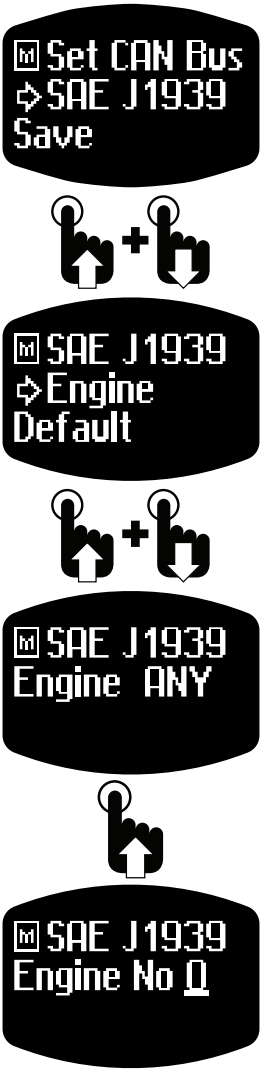
Should a problem exist reading CAN data from an engine due to the engine number, users should set the engine numbers back to the factory setting 'ANY".

• Setting SAE J1939 Engine Number

To display data from a vessel or vehicle running multiple engines and using the SAE J1939 protocol, users must sync the Master Instrument to the engine number from which it will read CAN data. The diagram below illustrates the steps to set the engine number.

Note: Single engine applications do not require setting the engine number as the factory setting of "ANY" enables reading the engines CAN data.

Figure 1-72: Setting SAE J1939 Engine Number



Navigate to the Set CAN Bus Menu, *Main Menu-Setup-Set CAN Bus*.

Move the selection arrow cursor to the SAE J1939 option then simultaneously press then release the Up and Down switches to select.

The SAE J1939 Menu appears with the selection arrow cursor next to the Engine option.
Simultaneously press then release the Up and Down switches to open engine number selection screen.

For single engine applications, selecting the "ANY" option automatically sets the engine number from which SEI will read CAN data.

Simultaneously press then release the Up and Down switches to accept "ANY" option.

For multiple engine applications press the Up switch to see the next engine number to use.

For multiple engine applications, users must choose an engine number from which a Master Instrument will read CAN data. The number options range from 0-4.

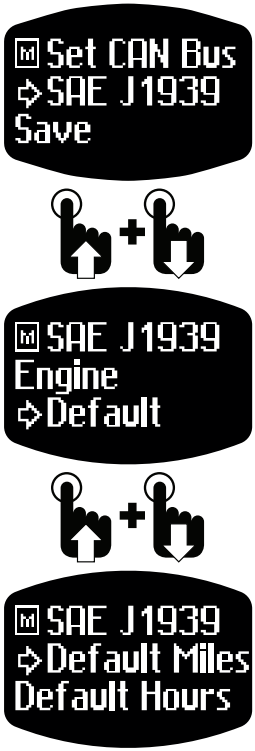
Use the Up switch to scroll to the other engine number options if necessary. Simultaneously press then release the Up and Down switches to accept the displayed engine number.

• Setting SAE J1939 Default Quick View Main Screen 1 (Total Hours or Distance)

When Using the SAE J1939 protocol, users have the option to set Total Hours or Total Distance as the default Quick View Main Screen 1.

See "Default Quick View Main Screen" and "Quick View Main Screens" on page 5.

Figure 1-73: Setting SAE J1939 Default Quick View Main Screen 1



Navigate to the Set CAN Bus Menu, *Main Menu-Setup-Set CAN Bus*.

Move the selection arrow cursor to the SAE J1939 option then simultaneously press then release the Up and Down switches to select.

The SAE J1939 Menu appears. Place the selection arrow cursor next to the Default option.
Simultaneously press then release the Up and Down switches to open Default Hours/Distance selection screen.

Place the selection arrow cursor next to the desired option then simultaneously press then release the Up and Down switches to set.

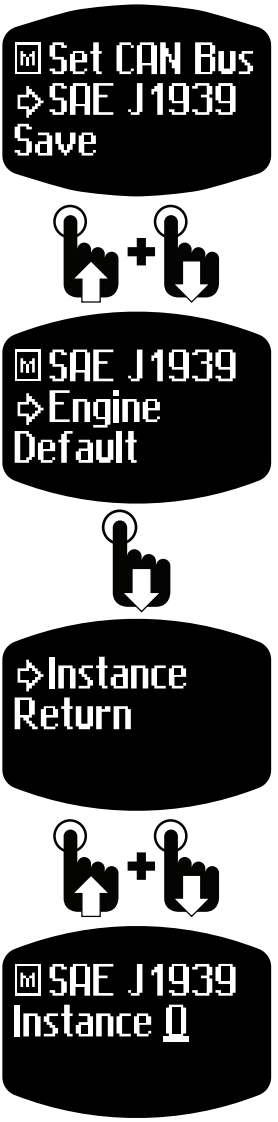
Note: To set Quick View Screen 1 to display Total Distance, select Default Miles.

• Setting Master Instrument Instance Number (SAE J1939)

SEI allows for up to four Master Instruments to be connected to a single engine. This is often done when applications require a Master Instrument in the cabin or at the helm as well as another location, such as the engine compartment or engine room.

When using the SAE J1939 CAN protocol and multiple Master Instruments with a single engine, users must set an instance number for each Master Instrument in order to read CAN data from the engine. The instance number for each Master Instrument must be unique.

Figure 1-74: Setting Master Instrument Instance Number



Navigate to the Set CAN Bus Menu, *Main Menu-Setup-Set CAN Bus*.

Move the selection arrow cursor to the SAE J1939 option then simultaneously press then release the Up and Down switches to select.

The SAE J1939 Menu appears with the selection arrow cursor next to the Engine option.
Press the Down switch to scroll to the Instance option.

With the selection arrow cursor next to the Instance option, simultaneously press then release the Up and Down switches to open the instance number selection screen.

The default Instance number 0 (zero) appears. Simultaneously press then release the Up and Down switches to accept the number or use the Up switch to scroll to the other instance number options. The instance numbers range from 0-4.

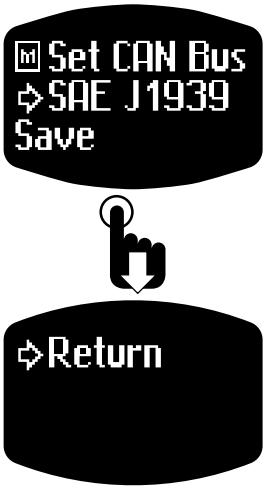
Note: When using multiple Master Instruments with a single engine, each Master Instrument connected to the engine must have a unique instance number. A maximum of four Master Instruments may be connected to an engine.

• Saving Set CAN Bus Changes

After changing the CAN protocol configuration to read the proper engine number, instance number and/or the display of hours or distance for default Quick View Main Screen display, users must save the changes before exiting the Set CAN Bus Menu to apply the changes.

When a CAN protocol change is made and saved, the Master Instrument will reset. A screen indicating a reset is pending appears followed by the start-up routine.

Figure 1-75: Saving Set CAN Bus Changes



Navigate to the Set CAN Bus Menu, *Main Menu-Setup-Set CAN Bus*.

The selection arrow cursor appears next to the SAE J1939.

Press the Down switch until the selection arrow cursor is next to the Save option then simultaneously press then release the Up and Down switches to save.

A second save prompt appears to confirm the change. A "no save" option will also appear.

Scroll down to the Return option to move to the Set CAN Bus Menu.

• Analog Input Parameters Table

Parameter	Analog Input	LCD Display Name
Block Pressure	240-33Ω/10-180Ω	Block Press
Boost Pressure	240-33Ω/10-180Ω	Boost Press
Brake Application Pressure	240-33Ω/10-180Ω	Brake Appl Pr
Brake Primary Pressure	240-33Ω/10-180Ω	Brake Prim Pr
Brake Secondary Pressure	240-33Ω/10-180Ω	Brake Sec Prs
Coolant Level	240-33Ω/10-180Ω/0-90Ω	Coolant Level
Engine Oil Level	240-33Ω/10-180Ω/0-90Ω	Eng Oil Lvl
Engine Oil Pressure	240-33Ω/10-180Ω	Eng Oil Press
Front Air Pressure	240-33Ω/10-180Ω/0-90Ω	Front Air
Fresh Water Level	240-33Ω/10-180Ω/0-90Ω	Fresh Wat Lvl
Fuel Delivery Pressure	240-33Ω/10-180Ω	Fuel Press
Fuel Level 1	240-33Ω/10-180Ω/0-90Ω/Centroid 3	Fuel Level 1
Fuel Level 2	240-33Ω/10-180Ω/0-90Ω/Centroid 3	Fuel Level 2
Hydraulic Oil Level	240-33Ω/10-180Ω/0-90Ω	Hydr Oil Lvl
Hydraulic Oil Pressure	240-33Ω/10-180Ω	Hydr Oil Pres
Inside Temperature	10K Thermistor	Inside Air Tm
Outside Temperature	10K Thermistor	Outsde Air Tm
Rear Air Pressure	240-33Ω/10-180Ω/0-90Ω	Rear Air
Rudder Angle	240-33Ω/10-180Ω/0-90Ω	Rudder Angle
Steering Angle	240-33Ω/10-180Ω/0-90Ω	Steer Angle
Transmission Oil Level	240-33Ω/10-180Ω/0-90Ω	Trns Oil Lvl
Transmission Oil Pressure	240-33Ω/10-180Ω	Trns Oil Pres
Trim	240-33Ω/10-180Ω/ 0-90Ω/167-10Ω	Trim Position
Washer Fluid Level	240-33Ω/10-180Ω/0-90Ω	Washer Level
Waste Water Level	240-33Ω/10-180Ω/0-90Ω	Waste Wat Lvl
Water Temperature	10K Thermistor	Water Temp
GPS Compass	NMEA 0183	GPS Compass
GPS Heading	NMEA 0183	GPS Heading
GPS Speed	NMEA 0183	GPS Speed
Latitude	NMEA 0183	Latitude
Longitude	NMEA 0183	Longitude
Speed (Water Reference)	NMEA 0183	Water Speed
Water Depth	NMEA 0183	Water Depth
Water Temperature	NMEA 0183	Water Temp

• SEI Implementation of SAE J1939 Parameters

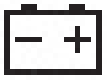
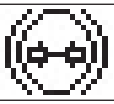
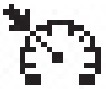
Parameter Name	SPN	PGN	LCD Display Name
Accelerator Pedal Position 1	91	61443	Accel Pedal %
Charging System Potential	167	65271	Alternator
Alternator Current	115	65271	Alt Current
Altitude	580	65256	Altitude
Barometric Pressure	108	65269	Barometrc Prs
Net Battery Current	114	65271	Battery Curr
Battery Potential/Power Input 1	168	65271	Battery Volt
Engine Intake Manifold #1 Pressure	102	65270	Boost Press
Brake Application Pressure	116	65274	Brake Appl Pr
Brake Primary Pressure	117	65274	Brake Prim Pr
Brake Secondary Pressure	118	65274	Brake Sec Prs
Engine Crankcase Pressure	101	65263	Cnkcase Press
Compass Bearing	165	65256	Compass Bear
Engine Coolant Level	111	65263	Coolant Level
Engine Coolant Pressure	109	65263	Coolant Press
Engine Coolant Temperature	110	65262	Coolant Temp
Cruise Control Active	595	65265	Cruise Set
Transmission Current Gear	523	61445	Current Gear
Aftertreatment 1 SCR Catalyst Reagent Concentration	3516	64923	DEF Conc
Aftertreatment 1 SCR Catalyst Tank Level	1761	65110	DEF Level
Aftertreatment 1 SCR Catalyst Tank Level 2	3517	65110	DEF Level Lvl2
Aftertreatment 1 SCR Catalyst Tank Temperature	3031	65110	DEF Temp
Aftertreatment 1 SCR Catalyst Reagent Temperature 2	3515	64923	DEF Tmp2
Drive Axle Temperature	578	65273	Drive Axle
Engine Total Hours of Operation	247	65253	Engine Hours
Engine Oil Level	98	65263	Eng Oil Level
Engine Oil Pressure	100	65263	Eng Oil Press
Engine Oil Temperature 1	175	65262	Eng Oil Temp
Engine Speed	190	61444	Engine Speed
Turbo Charger Exhaust Temperature (T30)	2433	65031	Exh Mnfld T30
Engine Exhaust Gas Temperature	173	65270	Exhaust Gas
Fuel Density	Custom	Custom	Fuel Density
Engine Average Fuel Economy	185	65266	Fuel Avg Econ
Engine Instantaneous Fuel Economy	184	65266	Fuel Economy
Fuel Level 1	96	65276	Fuel Level 1
Fuel Level 2	38	65276	Fuel Level 2

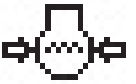
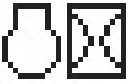
• SEI Implementation of SAE J1939 Parameters

Parameter Name	SPN	PGN	LCD Display Name
Engine Fuel Delivery Pressure	94	65263	Fuel Pressure
Engine Injector Metering Rail 1 Pressure	157	65243	Fuel Rail 1 Pr
Engine Fuel Rate	183	65266	Fuel Rate
Engine Fuel Temperature 1	Custom	Custom	Fuel Temp
Hydraulic Oil Level	2602	65128	Hydr Oil Lvl
Hydraulic Oil Pressure	1762	61448	Hydraulc Prs
Hydraulic Temperature	1638	65128	Hydraulc Temp
Cab Interior Temperature	170	65269	Inside Air
Engine Intercooler Temperature	52	65262	Intrcooler
Latitude	584	65267	Latitude
Longitude	585	65267	Longitude
Engine Intake Manifold 1 Temperature	105	65270	Manifold Temp
Ambient Air Temperature	171	65269	Outside Air
Parking Brake Actuator	619	65274	Park Brake Ac
Parking Brake Switch	70	65265	Parking Brake
Engine Percent Load At Current Speed	92	61443	Percent Load
Power Takeoff Oil Temperature	90	65264	PTO Oil Temp
Power Takeoff Speed	186	65264	PTO Speed
Road Surface Temperature	79	65269	Road Temp
Sea Water Pump Outlet Pressure	2435	65172	Sea Water Prs
Wheel-Based Vehicle Speed	84	65265	Speed
Navigation-Based Vehicle Speed	517	65256	Speed NAV
Steering Axle Temperature	75	65273	Steer Axle
Trim Tab - Port	N/A	130576	Tab Port
Trim Tab - Starboard	N/A	130576	Tab Starboard
Engine Throttle Position	51	65266	Throttle
Tire Location	929	65268	Tire Location
Tire Pressure	241	65268	Tire Press
Tire Temperature	242	65268	Tire Temp
Total Fuel Used	250	65257	Tot Fuel Used
Transmission Oil Level	124	65272	Trans Oil Lvl
Transmission Oil Pressure	127	65272	Trans Oil Prs
Transmission Oil Temperature	177	65272	Trans Oil Tmp
High Resolution Total Trip Distance	918	65217	Trip Dist Hr
Trip Drive Fuel Economy	1006	65209	Trip Fuel Eco
Trip Drive Fuel Used	1001	65209	Trip Fuel Use
Engine Turbocharger 1 Speed	103	65245	Turbo 1 Speed

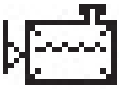
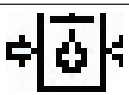
• SEI Implementation of SAE J1939 Parameters			
Parameter Name	**SPN**	**PGN**	**LCD Display Name**
Engine Turbocharger Oil Temperature	176	65262	Turbo Oil Tmp
Total Vehicle Distance	245	65248	Vehicle Dist
Total Vehicle Hours	246	65255	Vehicle Hours
Washer Fluid Level	80	65276	Washer Level
Water In Fuel Indicator	97	65279	Water in Fuel

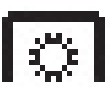
• Parameter Icons & Descriptions

Parameter Icon	Description
	Accelerator Pedal Position
	Alternator Current or Voltage
	Altitude
	Atmospheric/ Barometric Pressure
	Battery Voltage or current
	Black Water (Sewage) Level Waste Water
	Block Pressure or Sea Water Pump Pressure
	Boost Pressure
	Brake Application Pressure
	Brake Primary Pressure
	Brake Secondary Pressure
	Crankcase Pressure
	Cruise Control Active
	Drive Axle Temperature

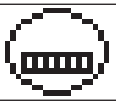
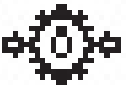
Parameter Icon	Description
	Engine Coolant Level
	Engine Coolant Pressure
	Engine Coolant Temperature
	Engine Exhaust Temperature
	Engine Hours Total
	Engine Injector Metering Rail 1 Pressure
	Engine Intercooler Temperature
	Engine Manifold Pressure
	Engine Manifold Temperature
	Engine Oil Level
	Engine Oil Pressure
	Engine Oil Temperature
	Engine RPM/Speed
	Exhaust Manifold Temperature T30

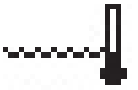
• Parameter Icons & Descriptions

Parameter Icon	Description
	Fresh Water Level
	Fuel Average Economy
	Fuel Density
	Fuel Level 1
	Fuel Level 2
	Fuel Pressure
	Fuel Rate/Flow Total
	Fuel Temperature
	Gear Pressure
	Gear Temperature
	GPS Compass Heading
	Hydraulic Oil Level
	Hydraulic Oil Pressure
	Hydraulic Oil Temperature

Parameter Icon	Description
	Inside Air Temperature
	Instantaneous Fuel Economy
	Latitude
	Longitude
	Outside Air Temperature
	Parking Brake Switch or Actuator
	Percent Load
	Power Takeoff Oil Temperature
	Power Takeoff Speed
	Road Surface Temperature
	Rudder Angle
	Speed, Wheel, Water or GPS Based
	Steering Angle
	Steering Axle Temperature

• Parameter Icons & Descriptions

Parameter Icon	Description
	Throttle Position
	Tire Pressure
	Tire Temperature
	Total Fuel Used
	Total Trip Distance High Resolution
	Total Vehicle Distance
	Transmission Gear Actual/Current
	Transmission Oil Level
	Transmission Oil Pressure
	Transmission Oil Temperature
	Trim Position

Parameter Icon	Description
	Trim Tab Port
	Trim Tab Starboard
	Trip Drive Fuel Economy
	Trip Fuel Used
	Turbocharger Oil Temperature
	Turbocharger Speed
	Vehicle Hours
	Water In Fuel
	Washer Fluid Level
	Water Depth
	Water Temperature

• Menu Navigation Icon Descriptions

Menu Navigation Icon	Description
	Menu List Identifier
	Selection Arrow Cursor
	Blinking Bar Cursor (Shown under number 0, zero)
	Fault Indicator (Blinks)
	Warning Indicator (Blinks)
	Alarm Indicator (Blinks)
	Higher Than Alarm Threshold Indicator
	Lower Than Alarm Threshold Indicator

Menu Navigation Icon	Description
	Analog to Digital Signal Source Identifier
	CAN Data Not Available
	No CAN or NMEA 0183 Data Available
	Indicates Analog Input 1
	Indicates Analog Input 2
	Indicates Analog Input 3
	Indicates Data is Read from Analog Satellite Instrument

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