

Driver Controls and Instruments

engine is stopped, the voltmeter shows the voltage of the engine-starting batteries.

Air Pressure Gauges

IMPORTANT: Two separate air pressure gauges indicate air pressure in the primary and secondary air systems. Build air pressure in both systems to 95 to 120 psi (620 to 827 kPa) before moving. It is normal to observe fluctuation in these gauges during operation of the vehicle. An alarm will sound if the pressure drops below a safe operating range.

Transmission Temperature Gauge (optional)

The transmission temperature gauge indicates the temperature of the transmission oil.



If the transmission continues to overheat during normal operation, have it checked and repaired. Continued operation may cause damage to the transmission.

Audible Alarms

During start-up, the LBCU will perform a self-test and an audible alarm will sound until the self-test is completed. If any faults are found during the self-test, ERROR will appear on the display screen. Acknowledge any alarms before proceeding to the pretrip checklist. The alarm will also sound if any of the following conditions occur.

- Air pressure falls below 65 psi (448 kPa).
- An audible alarm sounds anytime the low air warning light is activated. On the air system, the low air light/audible alarm will normally come on when the engine is first started, but will go off when the air pressure in the air tanks reaches approximately 65 to 76 psi (448 to 524 kPa). The parking brake will not disengage until the air pressure has reached 65 psi (448 kPa).
- Emergency engine shutdown is activated.
- The parking brake is applied and the transmission is not in neutral.

- The transmission is in neutral or the ignition is off, and the parking brake is not set and the service brake is not depressed.
- The turn indicator is active.
- The audible alarm will sound continuously anytime the ignition is turned off when the panel lamps are still illuminated.

Emergency Shutdown

The LBCU will shut down if the voltage supply is not within the normal operating range of 9 to 16 volts for more than 10 milliseconds (msec). During emergency shutdown, the gauge pointers will freeze, the display will go blank, and the lamps will turn off. When the power is restored to within the normal operating range following an emergency shutdown, the needles will resynchronize to zero, and the self-test will be performed before resuming normal operation.

Information Center

The LBCU is an interactive graphical display that is capable of displaying text messages and graphics to communicate real-time information about the status and performance of the vehicle to the operator. This information is organized in a menu structured format.

Power Initialization

When the ignition is turned on, the information center will illuminate with the Freightliner Custom Chassis logo. If there are no alarms detected from the self-test, the driver checklist is displayed.

Navigating the Menu Screen

Navigate the menu structure using the toggle switch, located in the driver's area. The "up" arrow of the toggle switch is yellow. See **Fig. 2.35**.

Menu Structure

The menu structure is organized around three menu screens: the ignition off screen, the home screen, and the setup/maintenance/diagnostics screen. Each of these screens contains lists of the sub-menu screens that may be accessed by highlighting the desired sub-menu and clicking the right arrow on the toggle switch.

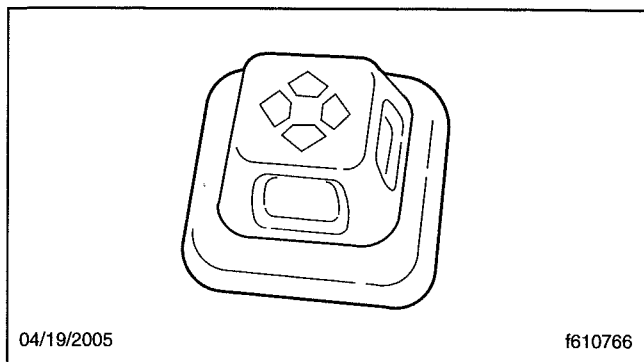


Fig. 2.35, Toggle Switch

Ignition Off Screen

When the ignition is OFF and the headlights are ON, the odometer is displayed. When the ignition is OFF and the generator is ON, the generator hours are displayed (if connected by the body builder).

Home Screen

NOTE: Alarm messages have priority over other display screens. If no alarms are present or all alarms have been acknowledged, the driver checklist will be displayed.

The following options are found in the menu and sub-menus of the home screen.

- A pretrip inspection checklist that includes 19 items and 10 driver-entered options. Once each item has been reviewed, use the toggle switch and click the right arrow to place a check by the item. Click the left arrow to exit the checklist.
- Driver's Favorite Categories—There are nine categories that the driver can select from; three can be viewed at one time. Select the category desired by using the up/down toggle switch. Then, use the toggle switch and click the right arrow for three seconds to access the sub-menu within each category. Finally, use the toggle switch and click the left arrow to exit.
- Setup/Maintenance/Diagnostics screen is actually three different categories for the driver to use. They are as follows:
 1. Setup—Includes set time and date, configure checklist, select metric/english, set LCD properties.

2. Maintenance—Includes engine oil, engine air filter, engine fuel filter, transmission oil, generator oil, generator fuel filter, generator use time.

3. Diagnostics—Includes check gauges, check icons, check inputs, check outputs, engine diagnostics, ABS diagnostics, hardware/software version, and software debug display (this menu is used by the gauge manufacturer only).

The following steps are used to make changes within the various categories.

1. From the Driver's Favorite Category menu, use the toggle switch and hold the right arrow down for five seconds to select the setup/maintenance/diagnostics screen.
2. Press the down arrow on the toggle switch to select either setup, maintenance, or diagnostics.
3. Press the right arrow on the toggle switch to select the sub-category; "Set Time and Date" for example.
4. Use the left/right arrows on the toggle switch to change the information, and the up/down arrows to move within the sub-category.
5. Once all changes have been made, hold the right arrow on the toggle switch.

Menu Structure

The menu structure road map is provided to illustrate the screens that are available in the information center and the path to specific screens. Refer to the road maps to set the time and date, view engine diagnostics, etc. See **Fig. 2.36, Fig. 2.37, Fig. 2.38, Fig. 2.39, Fig. 2.40, Fig. 2.41, Fig. 2.42, Fig. 2.43, Fig. 2.44, Fig. 2.45, Fig. 2.46, Fig. 2.47, Fig. 2.48, Fig. 2.49, Fig. 2.50, Fig. 2.51, Fig. 2.52, Fig. 2.53, Fig. 2.54, Fig. 2.55, and Fig. 2.56.**

Multiple Module Data Computer (MMDC)

The Multiple Module Data Computer (MMDC) reads and shares vehicle information from the engine, transmission, and brake system computers. Information is taken from a data bus and sensor signals (analog, digital, or frequency) on the vehicle. It is then converted to digital information for the gauges to read.

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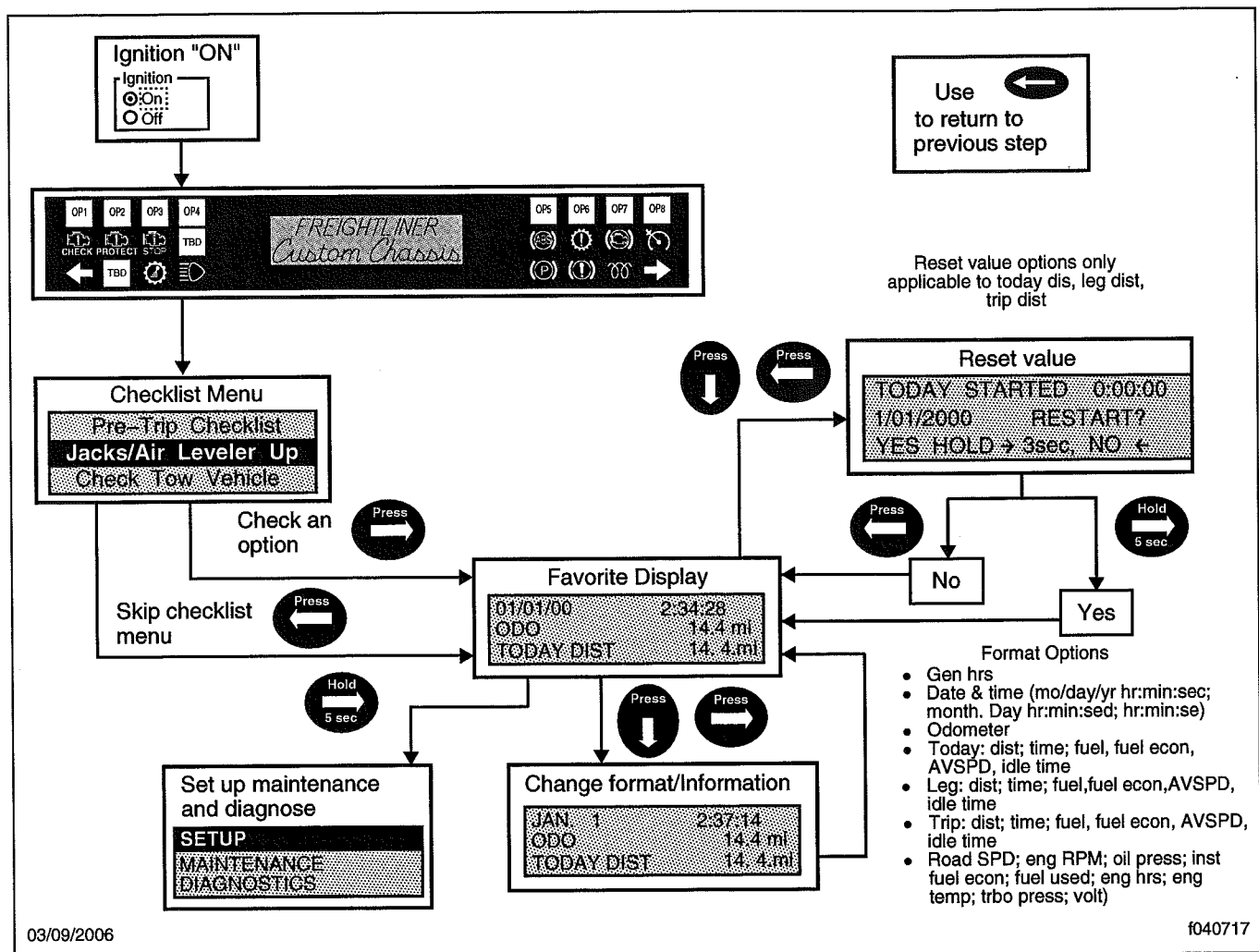


Fig. 2.36, Favorite Display

The instrument system consists of three major components:

- An annunciator module that concentrates all of the warning and indicator lights in one area to facilitate efficient visual scanning of the panel.
- An assortment of individual analog style gauges that display the value of specific performance parameters.
- An interactive graphical information center display that is capable of communicating more detailed information about the status and performance of the vehicle as needed.

The location of these components in the dash may vary from one vehicle to another.

Annunciator Module

The annunciator module contains the following warning and indicator lights. See Fig. 2.57.

- Green right and left turn signal indicator lights, that flash on and off when the outside turn signals are flashing.
- A check transmission warning light that will come on during vehicle operation if the transmission electronic control unit (ECU) has signalled a diagnostic fault code. Diagnostic

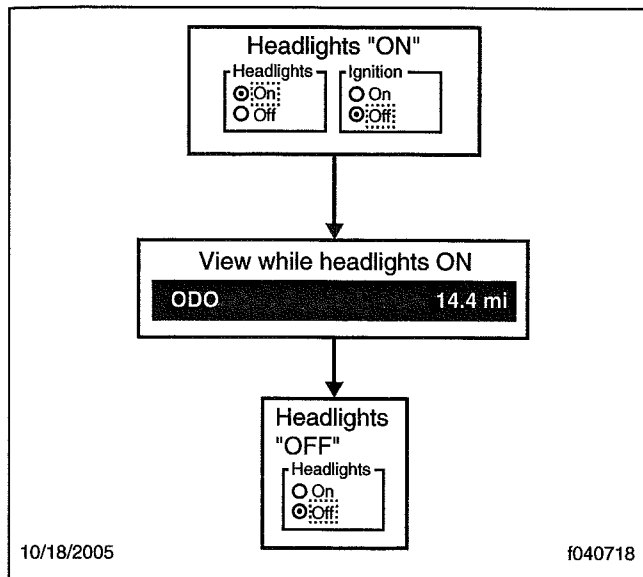


Fig. 2.37, View Odometer Value

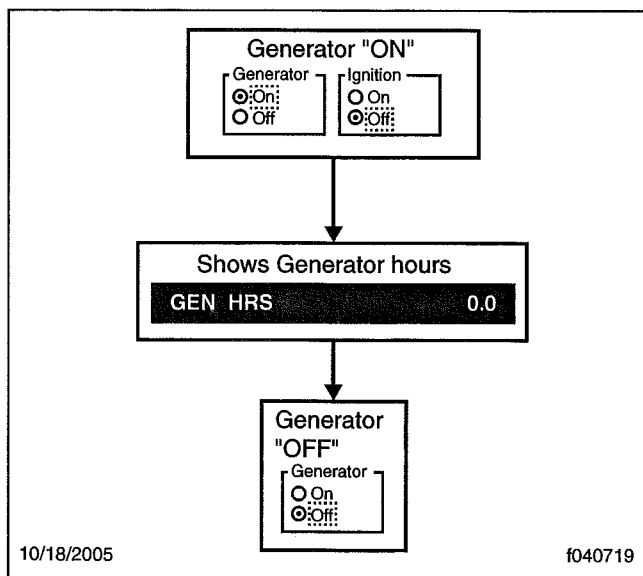


Fig. 2.38, View Generator Hours

codes indicate malfunctions in the transmission operation. If this light stays on continuously during operation, have the transmission serviced as soon as possible.

- A blue high-beam indicator light that comes on when the headlights are on high beam.
- On the air brake system, the low air light activates when the brake system pressure is low.

The light will normally come on when the engine is first started, but will go off when the air pressure in the air tanks reach approximately 65 to 76 psi (448 to 524 kPa).

- A red parking brake indicator light that comes on when the parking brake is activated and the ignition switch is in the ON position.
- An amber wait to start indicator light that comes on when the intake-air pre-heater is activated.
- An amber check info center indicator light that comes on when the info center is displaying an alarm condition or warning message.
- A cruise on indicator light that comes on when the cruise control is on.
- A shift inhibit warning light that comes on when the transmission ECU is prohibiting shifting.
- Vehicles equipped with an antilock braking system (ABS) have an ABS warning light that comes on when the vehicle is started. If an ABS fault has been cleared, the vehicle speed must exceed 7 mph (10km/h), for the light to go off if the ABS system is functioning normally.

⚠ WARNING

If the ABS warning light does not work as described above or comes on while driving, repair the ABS system immediately to ensure full antilock braking capability. Operating the vehicle when the ABS needs to be serviced could cause an accident, possibly resulting in personal injury or death, or property damage.

The annunciator module may also include the following lights: check engine, stop engine, and engine protection. See the *Caterpillar* or the *Cummins Operation and Maintenance Manual* for more information.

IMPORTANT: If the warning system does not activate when the ignition switch is in the ON position, repair the system to provide proper warning protection.

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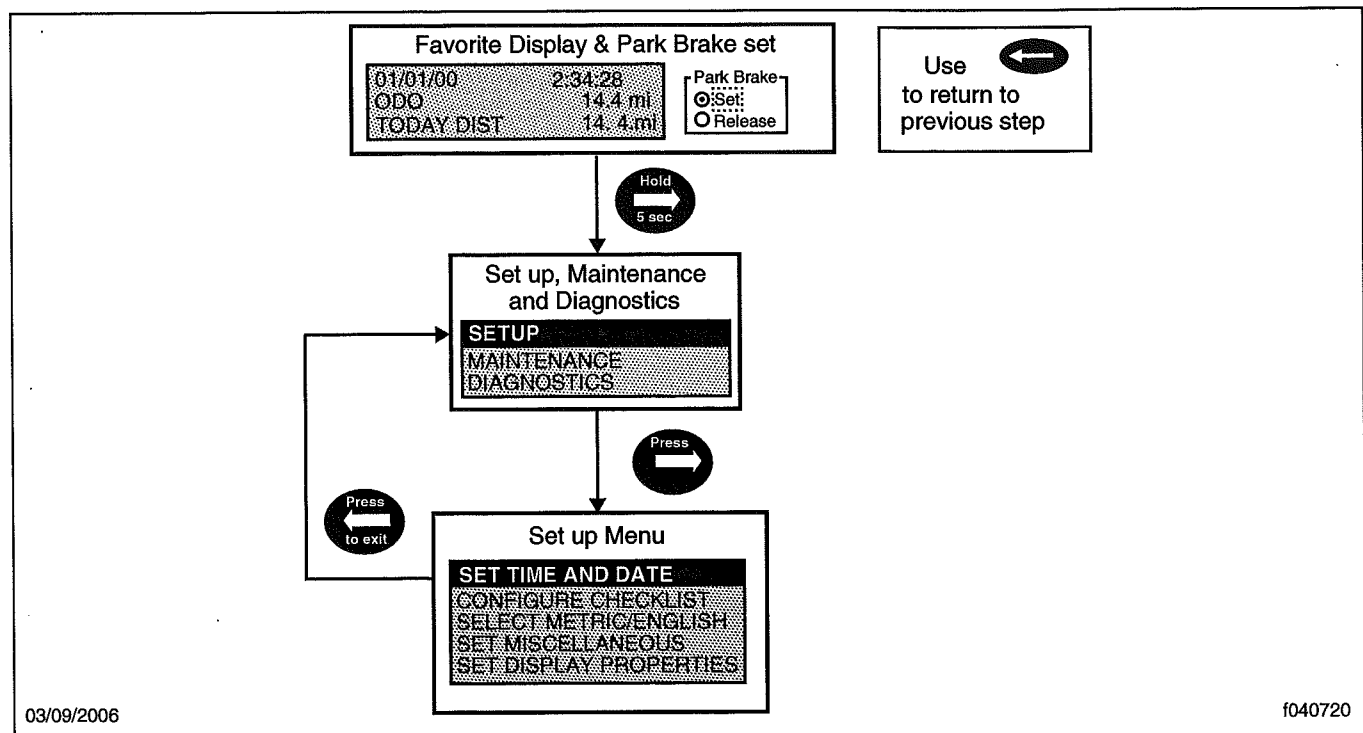


Fig. 2.39, Set Up Menu

Gauges

See Fig. 2.58 for an example of a typical instrument panel. The following is a description of the instrument panel gauges.

Speedometer/Odometer

The speedometer registers vehicle speed in miles per hour or kilometers per hour (mph/kph). Standard speedometers are equipped with a combination odometer/tripmeter that records total distance traveled and trip distance. Resetting the trip odometer will erase the current display and start counting at 0000.0 miles. A short press (less than three seconds) of the trip reset will toggle the display between trip mode and odometer mode. A long press (greater than three seconds) of the trip reset while in trip mode will reset the tripmeter. The tripmeter can also be reset using the information center. The odometer will be displayed with six numbers and no decimal (000000), while the tripmeter will be displayed with four numbers and one decimal (0000.0).

Tachometer

The tachometer indicates the revolutions per minute (rpm) of the engine.

Coolant Temperature Gauge

During normal engine operation, the coolant temperature gauge should read in the normal range. If the temperature remains below or exceeds the normal range, inspect the cooling system to determine the cause.

Fuel Gauge

The fuel gauge indicates the amount of fuel in the fuel tank.

Turbo Boost Gauge (optional)

The turbo boost gauge indicates the boost pressure at the turbo. See the *Caterpillar* or the *Cummins Operation and Maintenance Manual* for more information.

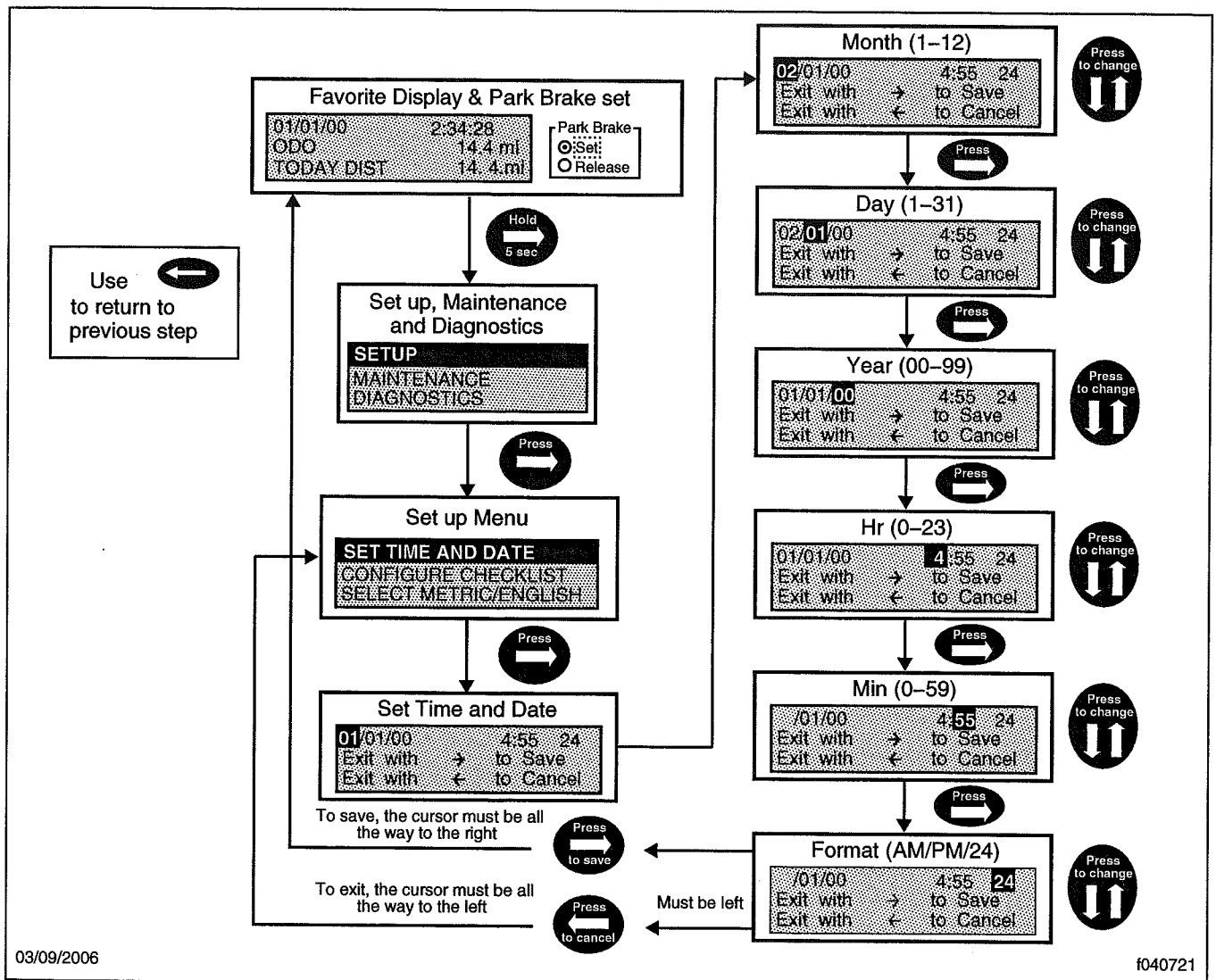


Fig. 2.40, Set Time and Date

Engine Oil Pressure Gauge

The oil pressure gauges should read in the normal range.

CAUTION

A sudden decrease or absence of engine oil pressure may indicate mechanical failure. Bring the vehicle to a safe stop and investigate the cause to prevent further damage. Do not operate the engine until the cause has been determined and corrected.

Voltmeter

The voltmeter indicates the vehicle charging system voltage when the engine is running, and battery voltage when the engine is stopped. By monitoring the voltmeter, the driver can be aware of potential charging system problems and have them repaired before the batteries discharge enough to create starting difficulties.

The voltmeter should indicate voltage in the normal range when the engine is running. The voltage of a fully charged battery is 12.7 to 12.8 volts when the engine is stopped. A completely discharged battery

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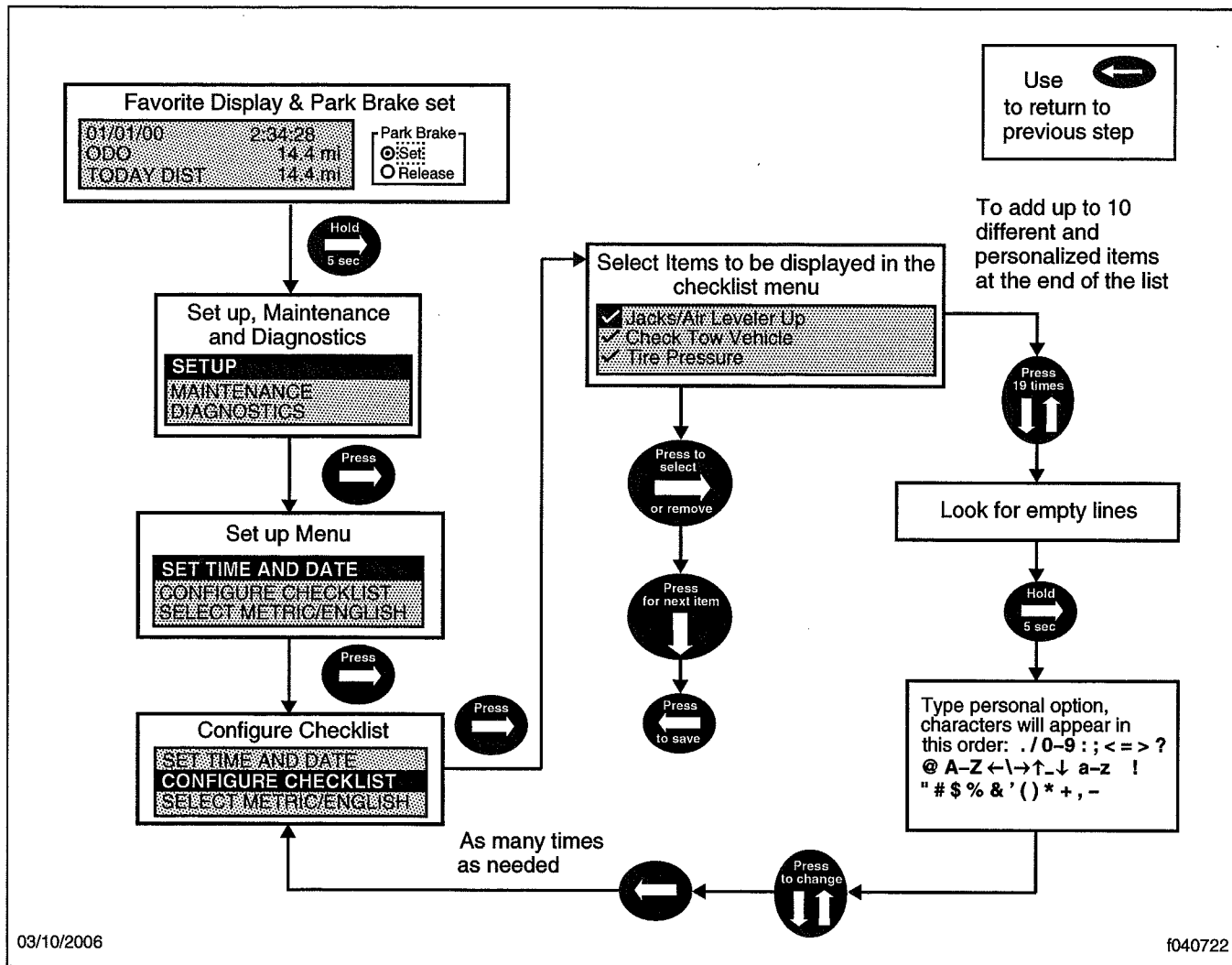


Fig. 2.41, Configure Checklist

will produce only about 12.0 volts. The voltmeter will indicate lower voltage as the vehicle is being started or when electrical devices in the vehicle are being used.

If the voltmeter shows an undercharged or overcharged condition for an extended period, have the charging system and batteries checked at a repair facility.

Some vehicles may be equipped (by the body builder) with a battery isolator system and a gel cell battery. On these vehicles, the voltmeter measures the average voltage of all the batteries when the engine is running. When the en-

gine is stopped, the voltmeter shows only the gel cell battery voltage and does not indicate the voltage of the engine-starting batteries.

Air Pressure Gauges

IMPORTANT: Two separate air pressure gauges indicate air pressure in the primary and secondary air systems. Build up air pressure in both systems to 95 to 120 psi (620 to 827 kPa) before moving. It is normal to observe fluctuation in these gauges during operation of the vehicle. An alarm will sound if the pressure drops below a safe operating range.

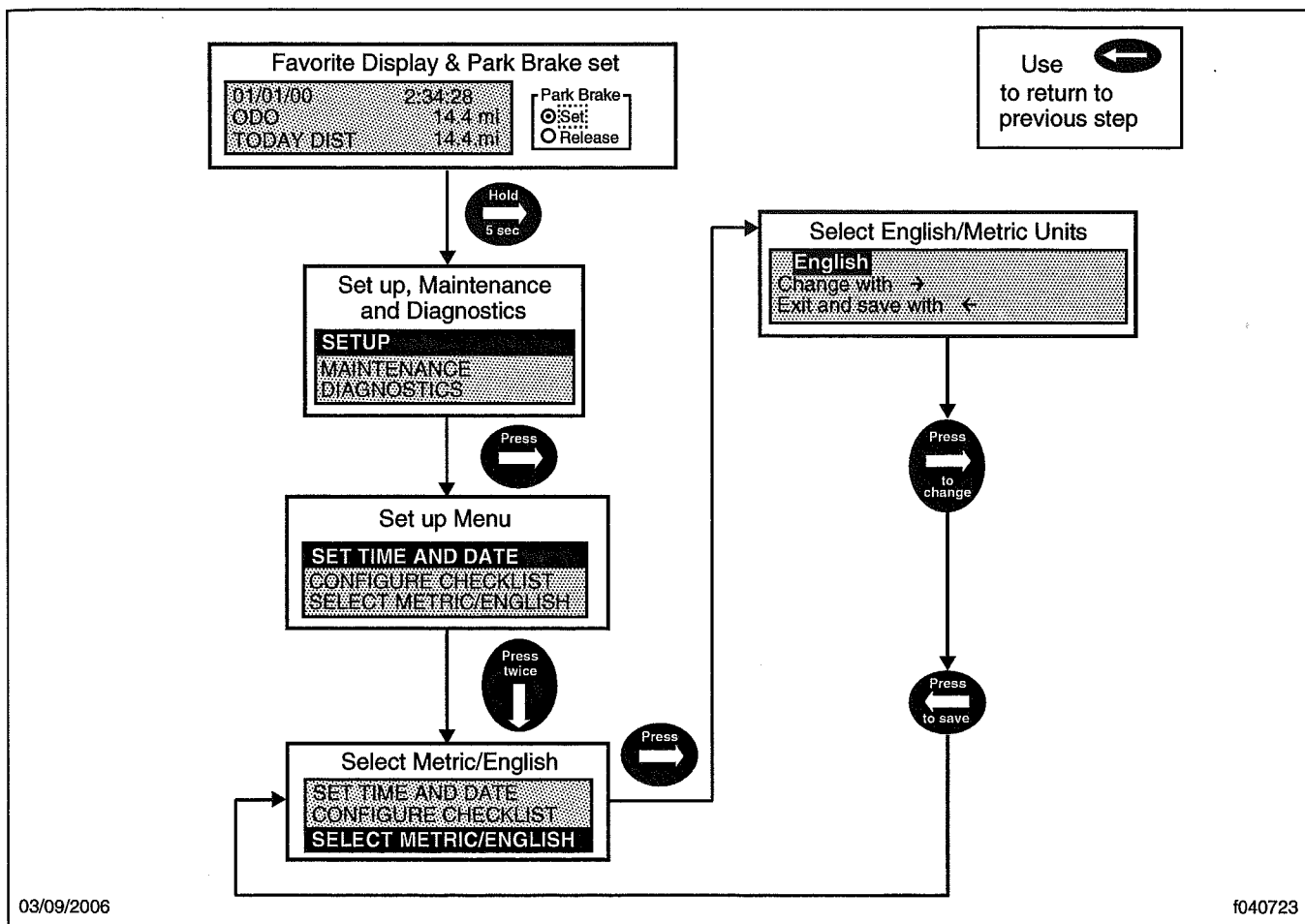


Fig. 2.42, Change Units

Transmission Temperature Gauge (optional)

The transmission temperature gauge indicates the temperature of the transmission oil.

CAUTION

If the transmission continues to overheat during normal operation, have it checked and repaired. Continued operation may cause damage to the transmission.

Audible Alarms

The instrumentation system provides for the following audible alarms:

- A rapidly pulsating buzzer sounds anytime the stop engine warning light is activated.
- A rapidly pulsating buzzer sounds anytime the low air warning light is activated. On the air system, the low air light/buzzer will normally come on when the engine is first started, but will go off when the air pressure in the air tanks reaches approximately 65 to 76 psi (448 to 524 kPa). The parking brake will not disengage until the air pressure has reached 65 psi (448 kPa).
- A chirping buzzer sounds under the following conditions:
 - The ignition key is in the ON position, the transmission is not in neutral (N), and the parking brake is applied.

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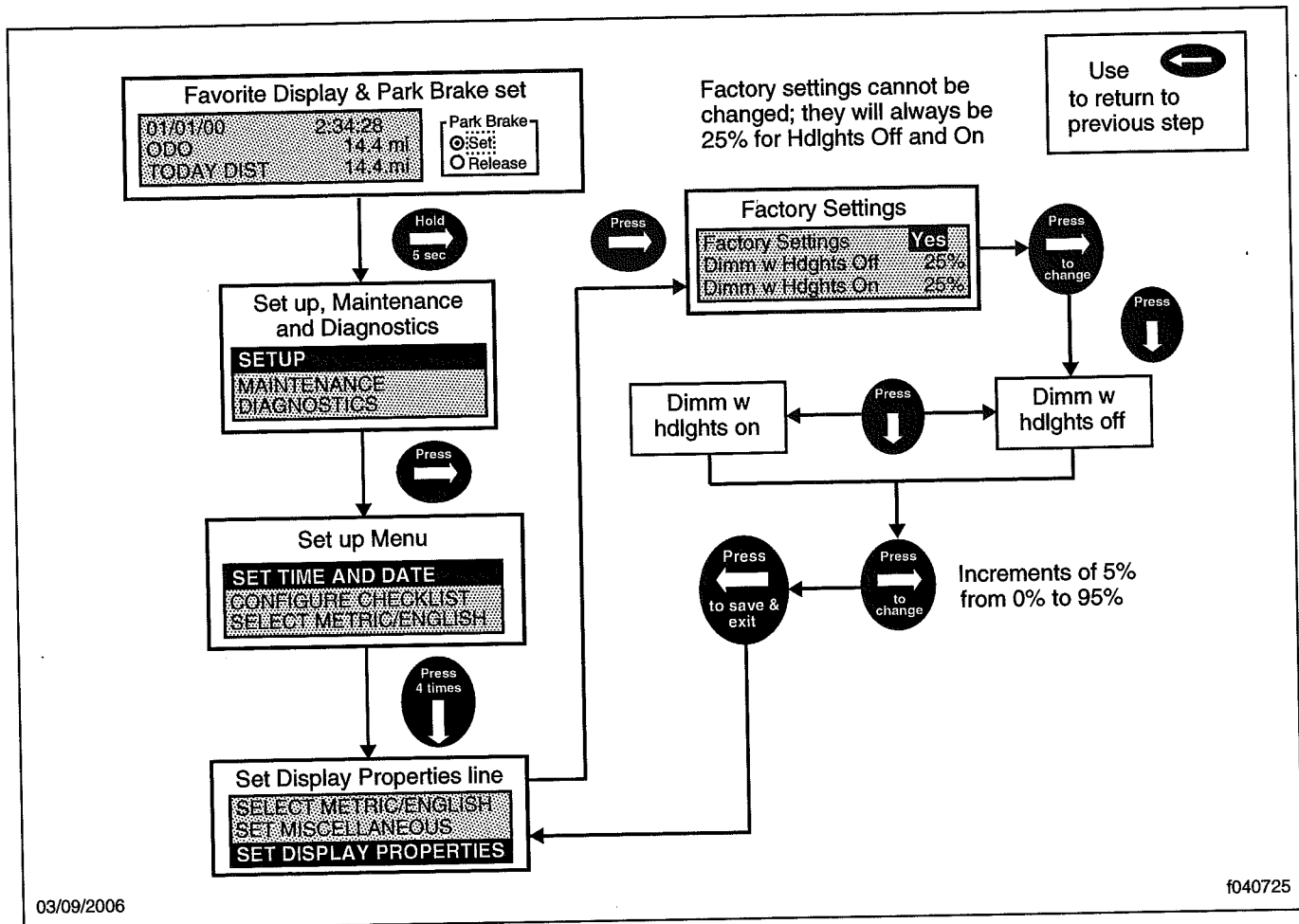


Fig. 2.43, Set Display Properties

- The ignition key is in the ON position, the transmission is in neutral (N), the service brake is not depressed, and the parking brake is not applied.
- The ignition key is switched to the OFF position and the parking brake is not applied.
- The buzzer will sound continuously any time the ignition is turned off when the panel lamps are still illuminated.
- The buzzer will sound for three seconds to indicate that the system is operating correctly.

Information Center

The information center is an interactive graphical display that is capable of displaying text messages and graphics to communicate real-time information about the status and performance of the vehicle to the operator. This information is organized in a menu structured format.

Power on Initialization

When the ignition is turned on, the information center will illuminate with the Freightliner Custom Chassis logo, and then display the home screen. The favorite screen will be displayed if a favorite screen is set up.

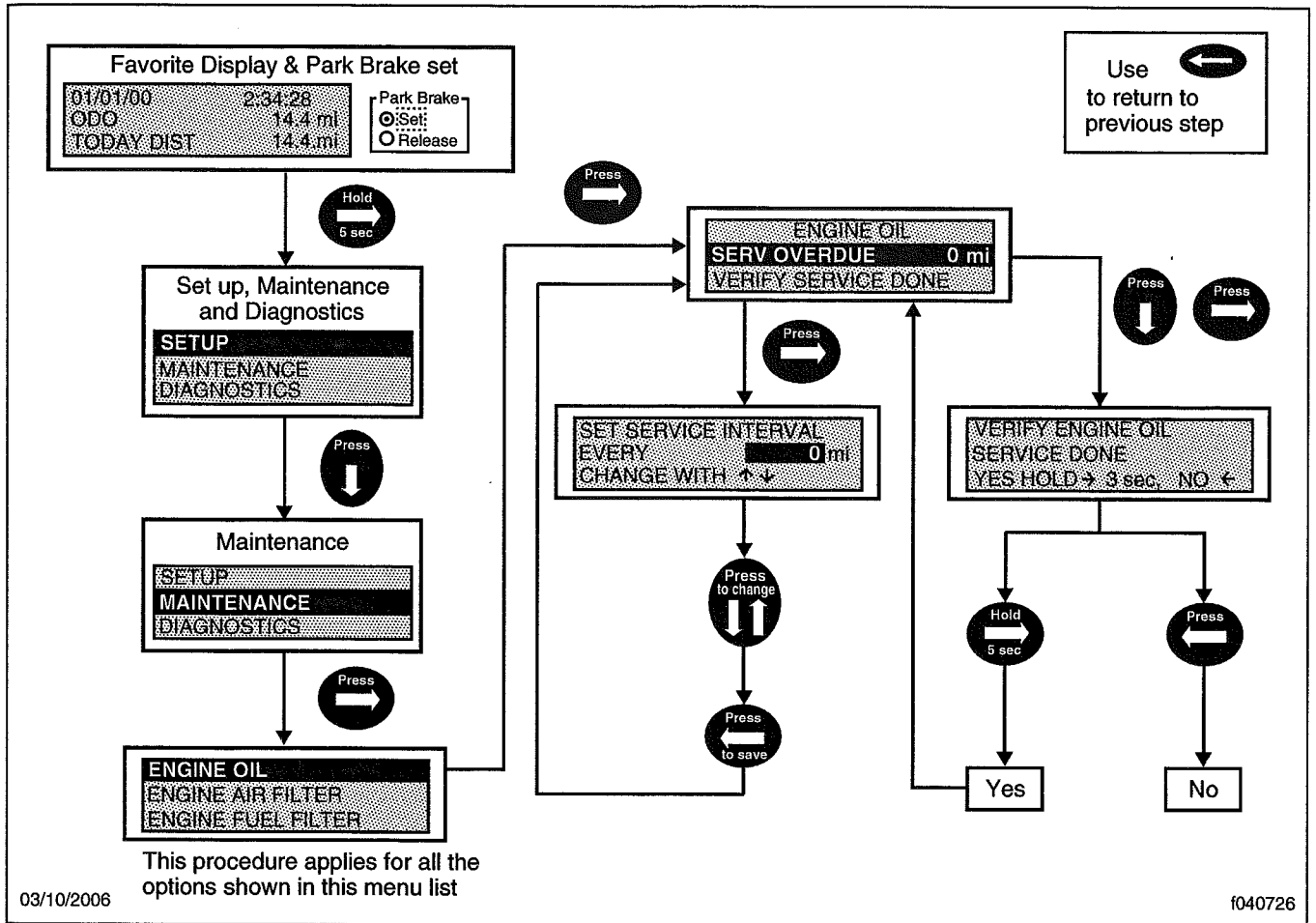


Fig. 2.44, Maintenance Menu

Navigating the Menu Screens

The menu structure is navigated using six buttons located on the face of the information center. See Fig. 2.59 for the symbol, name, and function of the navigation buttons.

Menu Structure

The menu structure is organized around three menu screens: the home screen, the setup screen, and the alarm screen. Each of these screens contains lists of the sub-menu screens that may be accessed by highlighting the desired sub-menu and pushing the enter button.

Home Screen Features

The following real time trip computer data is found in the trip computer and trip meter sub-menus of the home screen.

- Instantaneous Fuel Economy
- Average Fuel Economy
- Fuel Remaining
- Odometer
- Multiple Trip Odometers

The following vehicle performance data is found in the engine sub-menu of the home screen.

- (E-information) A screen that simultaneously displays speed, RPM, and gear information.

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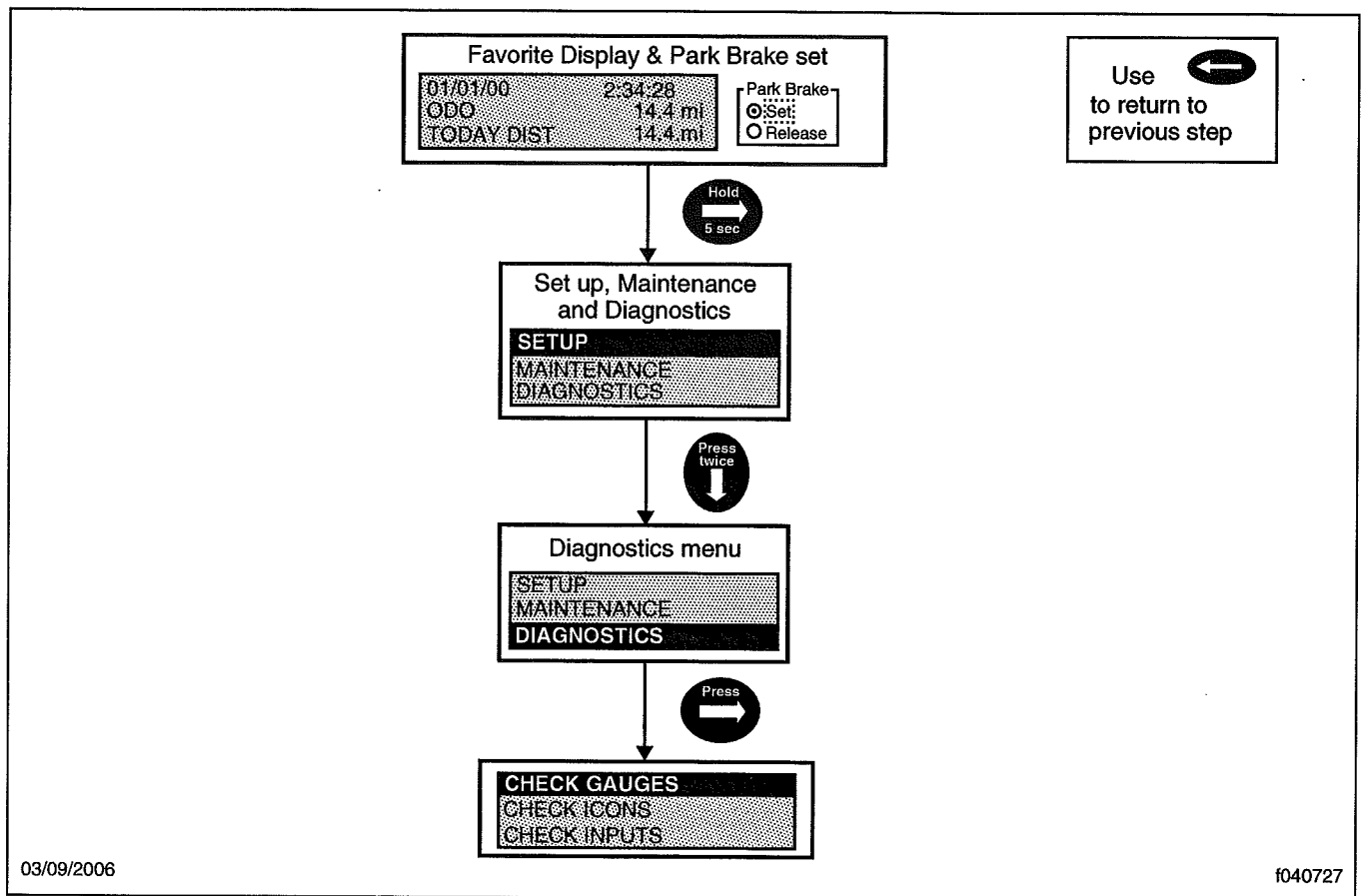


Fig. 2.45, Diagnostics Menu

- RPM
- Speed
- Engine Temperature
- Oil Pressure
- Battery Voltage

Service and diagnostic screens are found under the service sub-menu of the home screen. These are password protected sub-menus and are for Freightliner Custom Chassis dealer use only.

Setup Screen Features

The following can be done from the setup screen.

- Adjust the contrast of the display
- Switch between English and metric mode

- Designate a favorite screen that the display will move to when the ignition is turned on or when the red button is pushed. The clock display is the default.

Alarm Screen Features

The following alarm screen features are available.

- Alarm sub-menu—Alarm messages have priority over other display screens. Pushing the "E" button temporarily clears the alarms. But if the alarm is still active after five minutes, the information center will display the alarm screen again.
- Time/Date sub-menu—the clock can be set using this sub-menu.

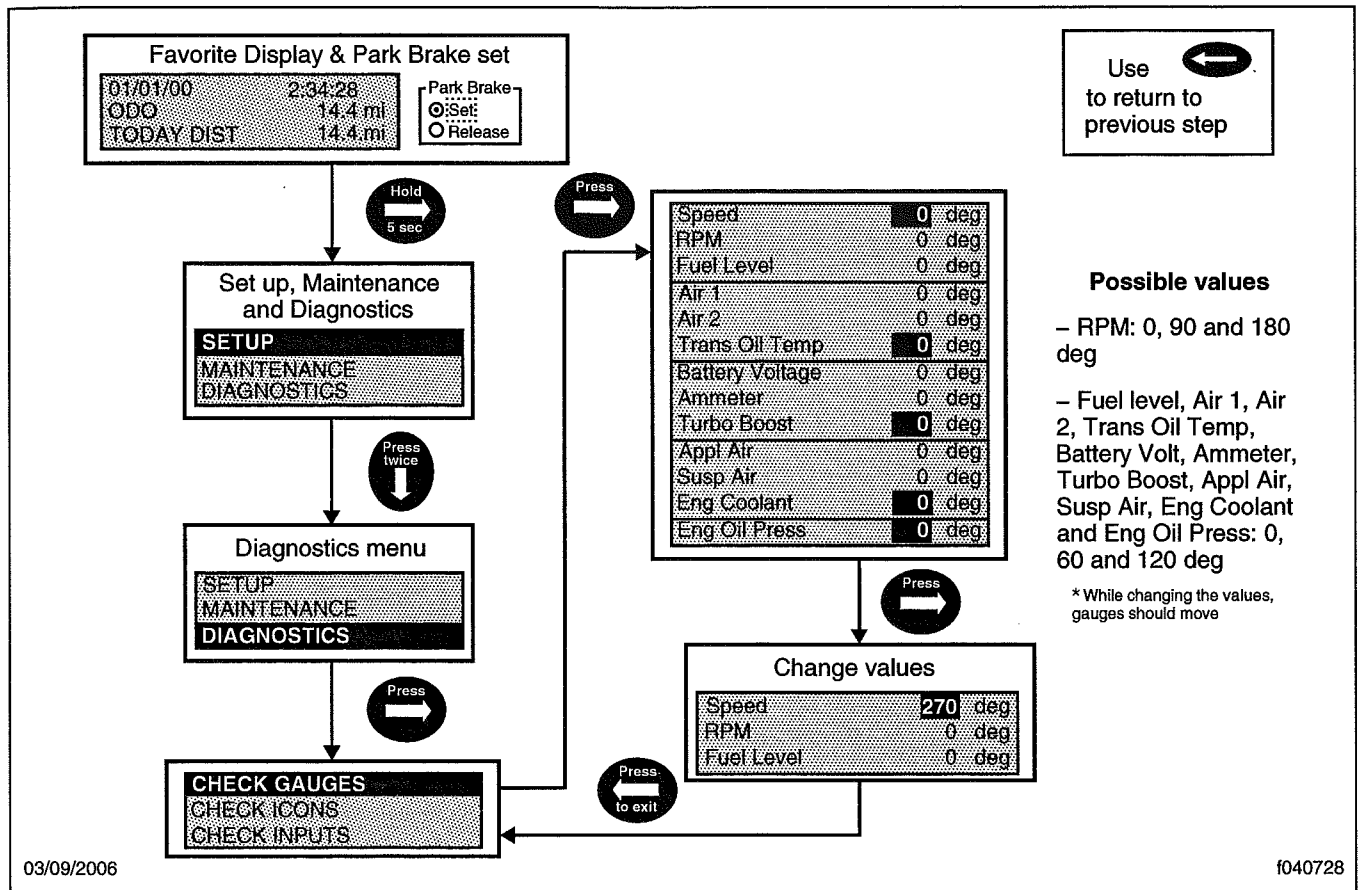


Fig. 2.46, Check Gauges and Change Values

Menu Structure Road Map

The menu structure road map is provided to illustrate the screens that are available in the information center, the path to specific screens, and the details of each individual screen. See Fig. 2.60, Fig. 2.61, Fig. 2.62, Fig. 2.63, Fig. 2.64, and Fig. 2.65.

Instrumentation Control Unit (front-engine diesel chassis)

Figure 2.66 shows a typical set of instruments for vehicles equipped with the MC Recreational Vehicle instrument cluster (ICU3-M2).

Figure 2.67 shows a more basic instrument cluster. The tachometer and the transmission temperature gauge are not shown.

The Recreational Vehicle instrument cluster (ICU3-M2) is an updated version of the basic electronic dashboard (ICU3). It can accept information from the datalink and from various sensors installed on the vehicle, and deliver that information to electronic gauges.

There are six gauges on the driver's instrument panel.

The instrument cluster has the capability to drive independent stand-alone gauges such as those installed on the auxiliary dash panel. Figure 2.68 shows a typical dash.

Dash Message Center

The dash message center is the heart of the instrument cluster. It has two parts, a set of 26 warning and indicator lights similar to those found on a conventional lightbar, and a dash driver display screen.

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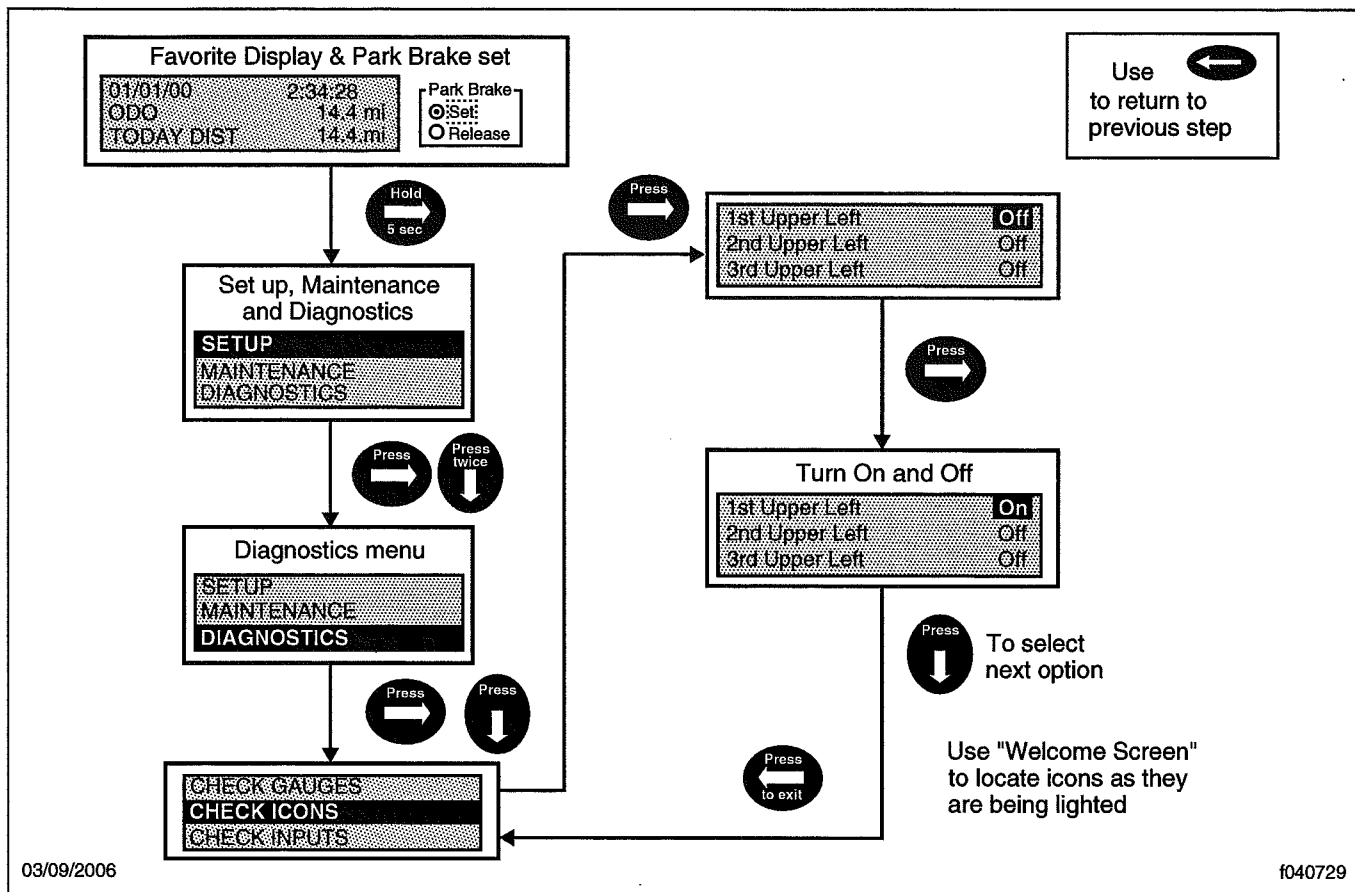


Fig. 2.47, Check Icons and Change Values

The driver display screen is a one-line by seven-character liquid crystal display (LCD) that normally shows odometer readings. Below this display is a smaller one-line by three-character LCD that shows voltmeter readings.

The dash message center houses all of the standard and optional warning and indicator lights. Warning messages and diagnostic fault codes will appear in the driver display screen. For more information on this system, see under the heading "Ignition Sequence" in this chapter.

Ignition Sequence

The dash message center goes through a prescribed ignition sequence each time the ignition switch is turned on. See Fig. 2.69 for the ignition sequence.

When the ignition is turned on, all the electronic gauges complete a full sweep of their dials, the

warning and indicator lights light up, and the buzzer sounds for 3 seconds.

The following lights illuminate during the ignition sequence:

- Fasten Seat Belt Warning
- Low Battery Voltage Warning
- High Coolant Temperature Warning
- Low Engine Oil Pressure Warning
- Parking Brake On Indicator
- All engine indicator/warning lights, including Check Engine and Engine Protection
- All ABS indicator/warning lights, including Wheel Spin, Tractor ABS, and Trailer ABS (if installed)

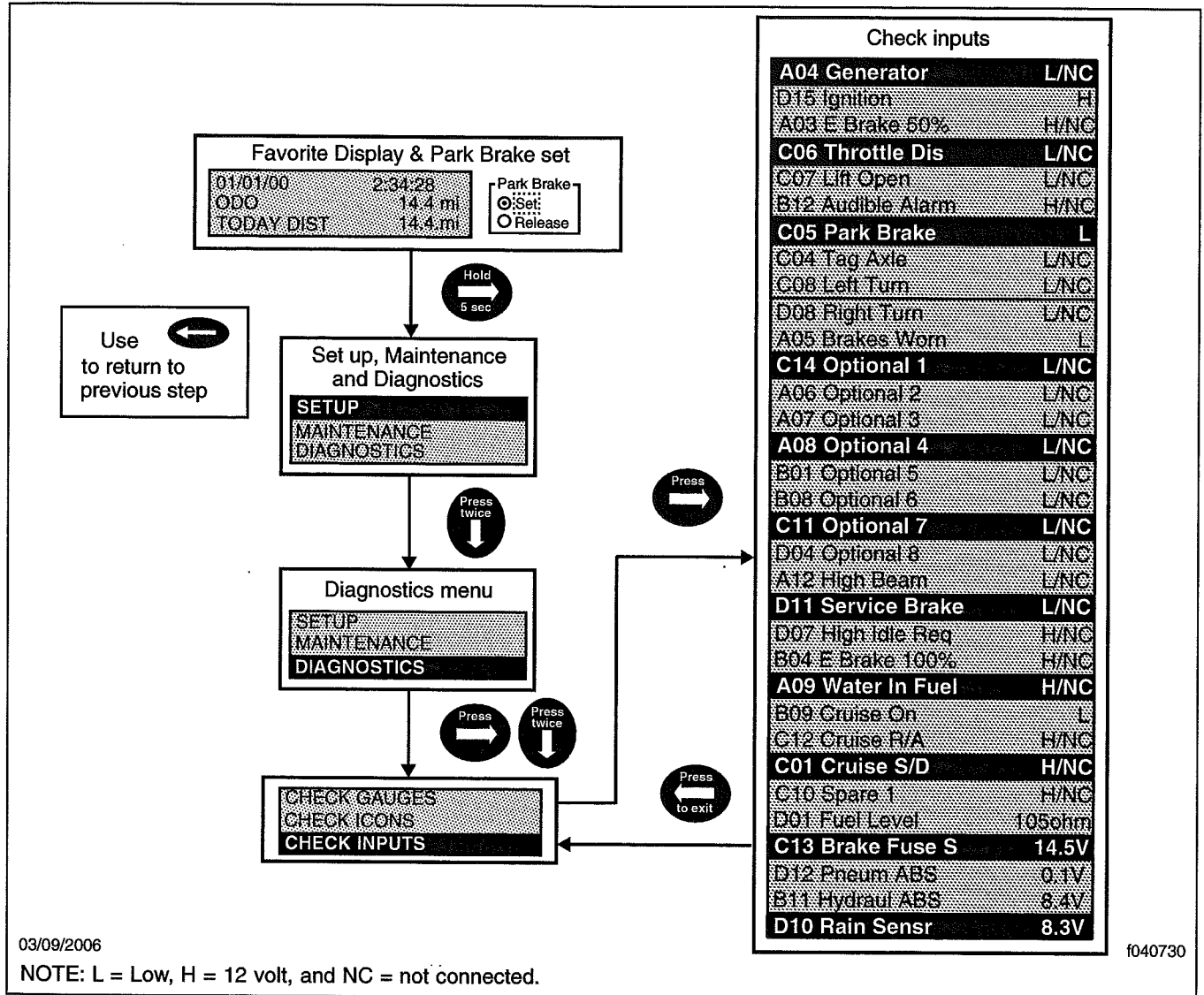


Fig. 2.48, Check Inputs

NOTE: While the engine and ABS warning lights illuminate during the ignition sequence, they are not controlled by the instrument cluster but by their own system ECU (electronic control unit). On Caterpillar engines, the engine protection light illuminates when the engine starts, and stays on for about 5 seconds.

When the ignition switch has been turned on, the ICU performs a self-test, looking for active faults. During the first half of the self-test, all segments of the display illuminate as follows:

- First line (odometer): "888888.8"
- Second line (units): "TRIP MI KM HOURS"
- Third line (voltmeter): "38.8 VOLTS SERVICE"
- Fourth line: "ENGINE"

During the second half of the self-test, the software revision level is displayed.

If there are no active faults, the driver display screen displays the odometer.

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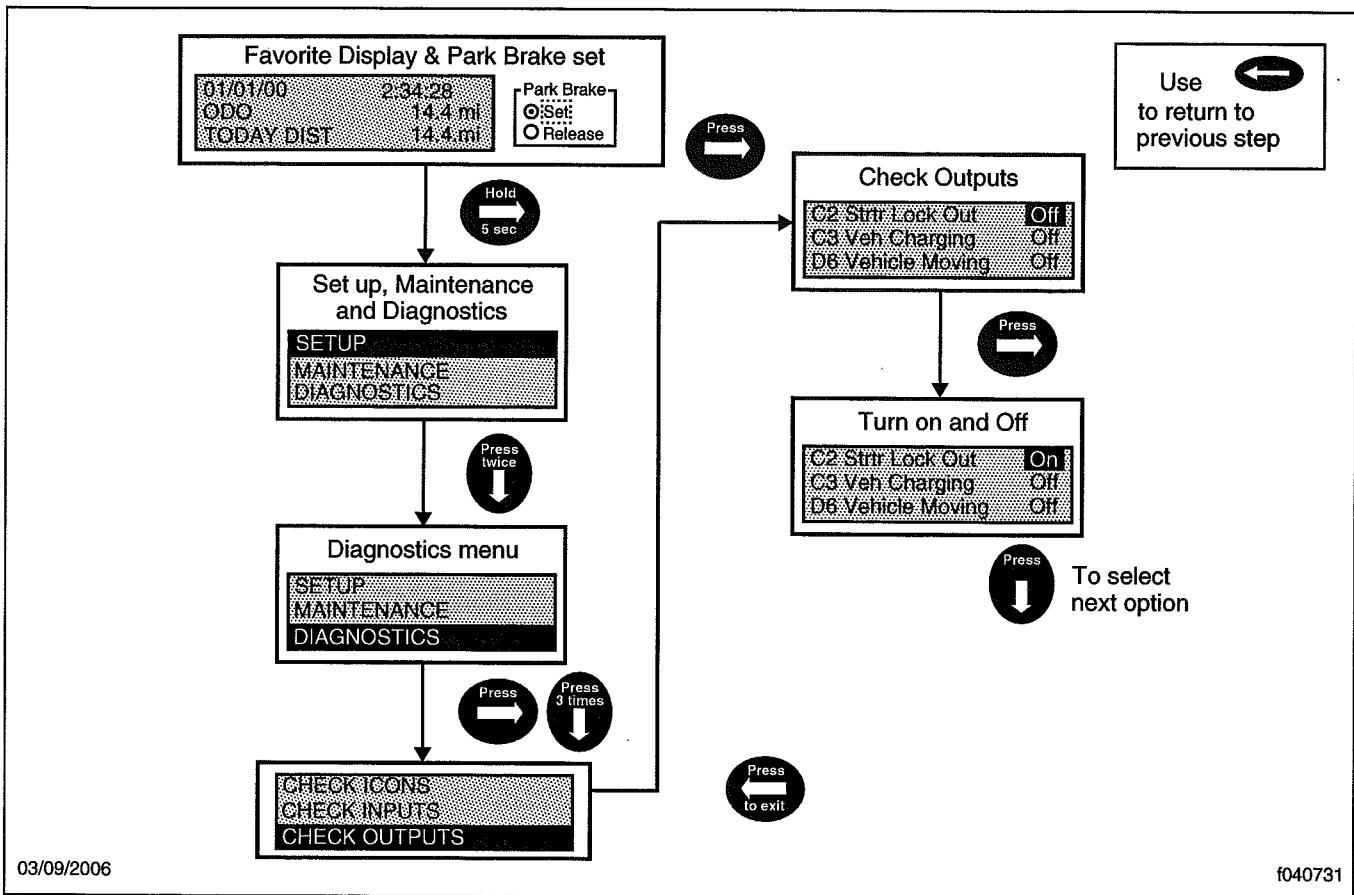


Fig. 2.49, Check Outputs

If the instrument cluster has received active fault codes from other devices, it displays them one after the other until the parking brake is released, or the ignition switch is turned off. Once the parking brake is released, the dash message center displays the odometer again.

NOTE: If active faults are present, take the vehicle as soon as possible to an authorized Freightliner service facility.

If the fault is mission critical, that is, if it is a serious problem that requires immediate attention, the engine protection system will activate. In most cases, the check engine light will illuminate also.

Some examples of mission critical faults include:

- High coolant temperature
- Low coolant level

- Low engine oil pressure

NOTE: The check engine light does not illuminate for a low air pressure fault.

The legend "SERVICE ENGINE" can appear on the driver display screen as an active fault code. If this legend appears, it means the trip miles (or hours) have gone beyond the next required service interval, as set by the vehicle operator.

IMPORTANT: If the legend "SERVICE ENGINE" does appear on the driver display screen while operating the vehicle, bring the vehicle to an authorized Freightliner service facility when convenient.

Odometer

The odometer is set to display in either miles or kilometers, depending on the primary scale of the

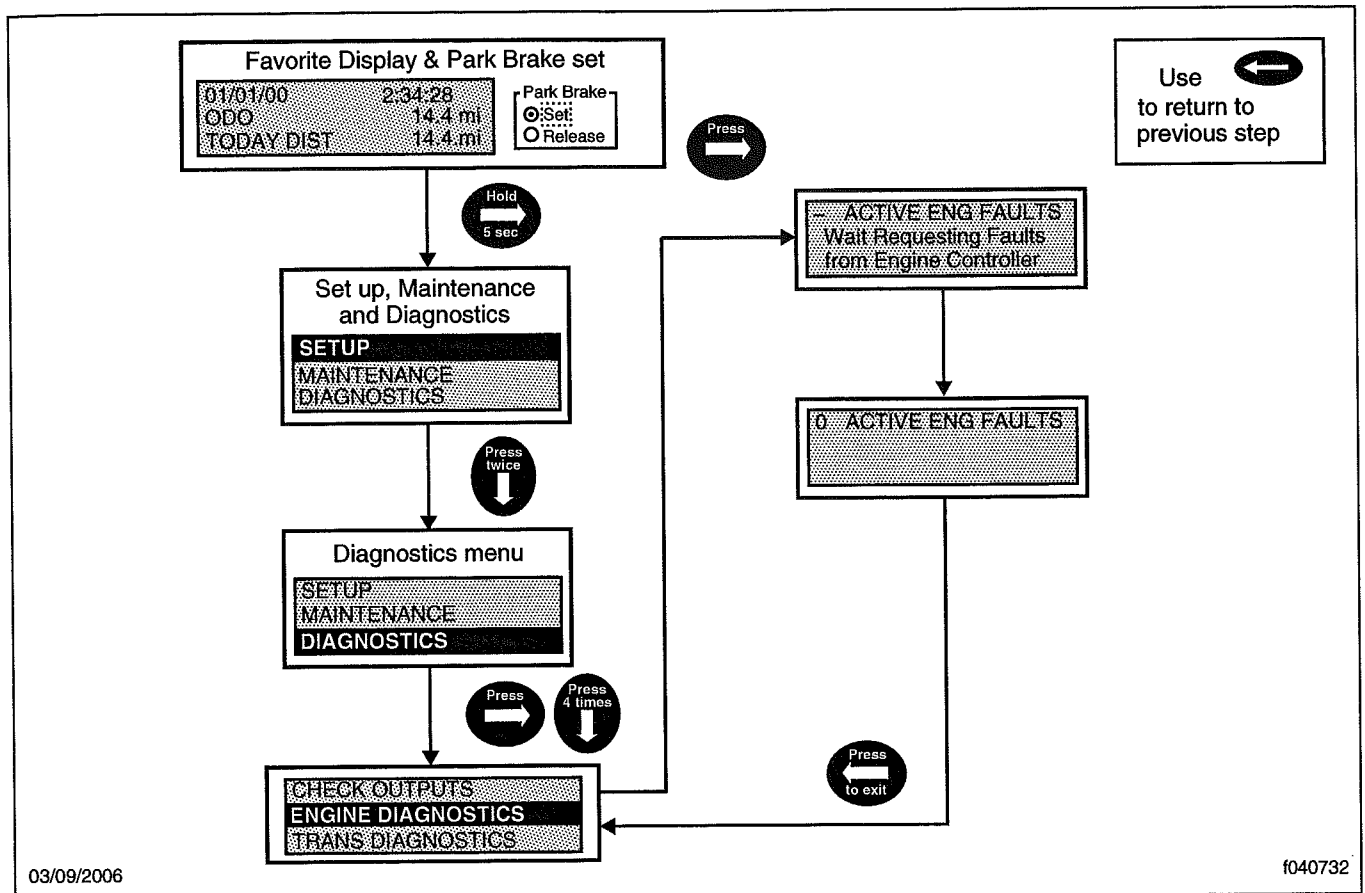


Fig. 2.50, Engine Diagnostics

speedometer. The legend, either "MI" or "KM," illuminates between the odometer and the volts display when the engine is running or the headlights are turned on.

The odometer is a seven-digit display with a decimal point, until the vehicle has traveled 999,999.9 miles or kilometers (km). At one million miles (km), the odometer resets itself to "1000000," without the decimal point, and can continue up to 9,999,999. The odometer only displays significant figures (no leading zeros).

Mode/Reset Switch

The mode/reset switch is located on the right side of the instrument cluster. See Fig. 2.70. The mode/reset switch is used to scroll through the displays on the message display screen, and to reset the trip distance and trip hours values to zero.

When the odometer reading is displayed and the parking brake is applied:

- Press the mode/reset switch once and the trip distance will display.
- Press the mode/reset switch a second time and the trip hours (engine hours) will display.
- Press the mode/reset switch a third time and the SELECT screen and the current units, MI or KM, will display.
- Press the mode/reset switch a fourth time to return to the odometer reading.

To reset trip miles and/or trip hours to zero, press the mode/reset switch for 1 second or longer. To toggle between MI (miles) or KM (kilometers), press the mode/reset switch while in the SELECT screen.

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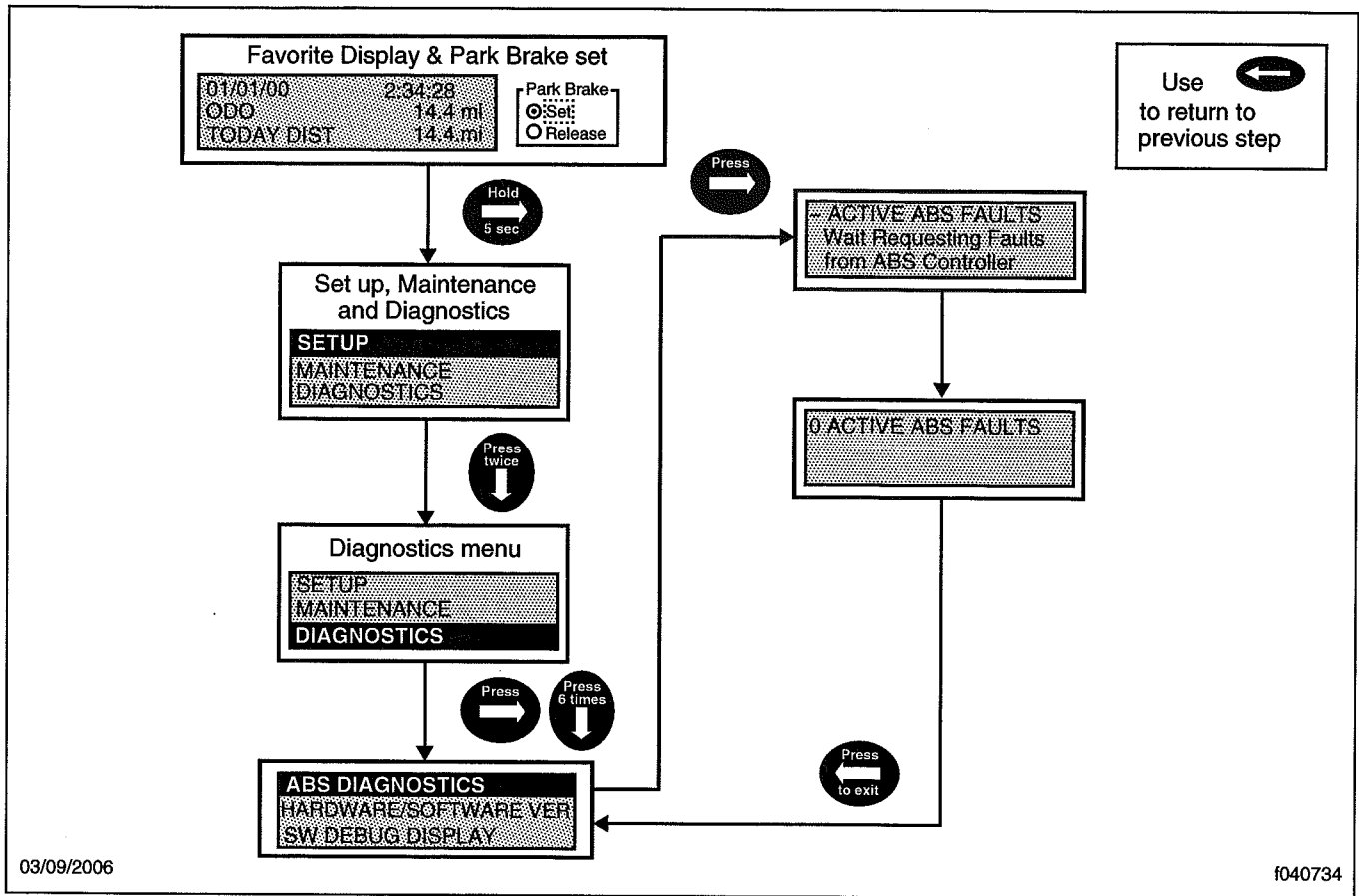


Fig. 2.51, ABS Diagnostics

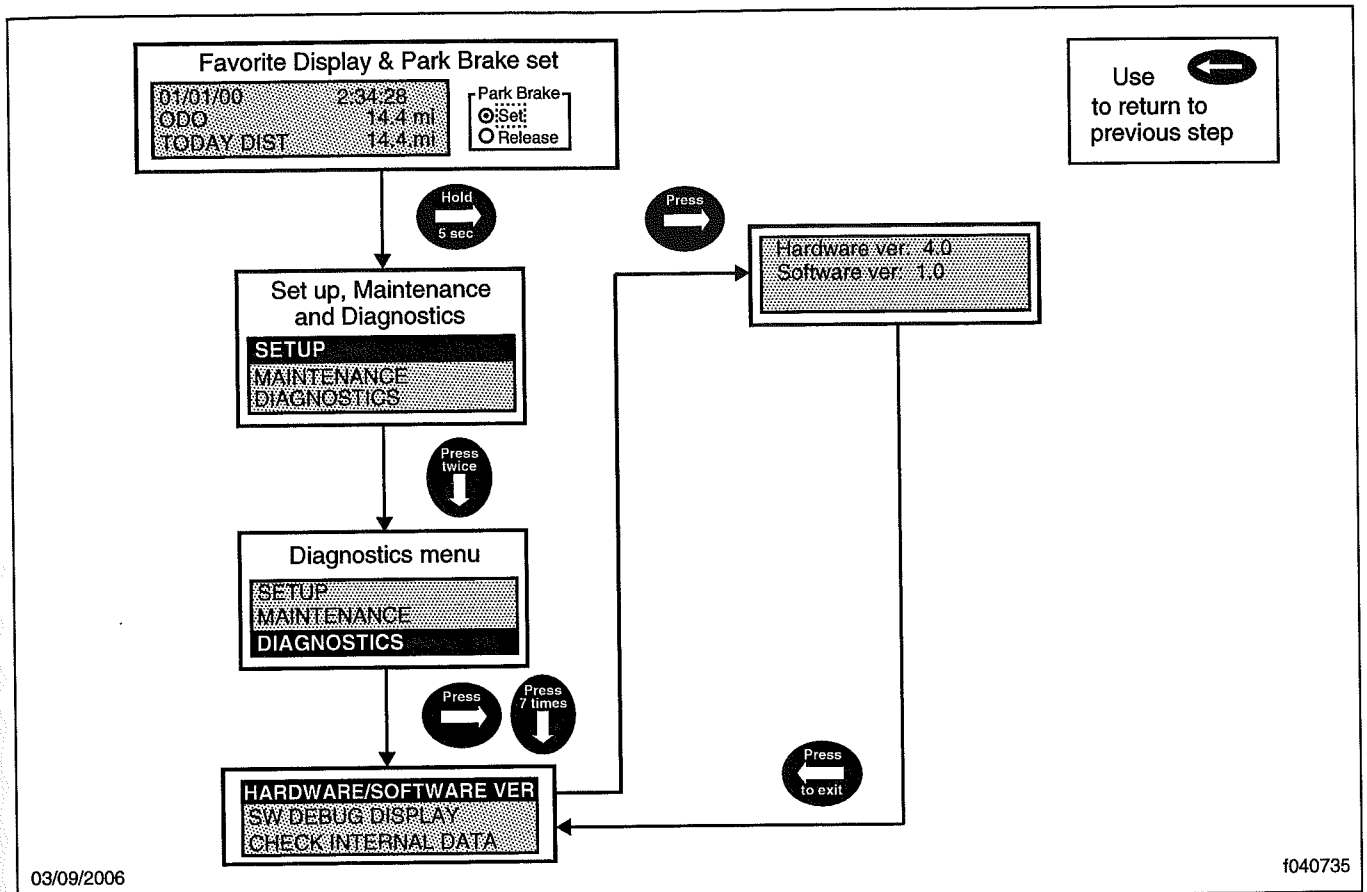


Fig. 2.52, Hardware/Software Menu

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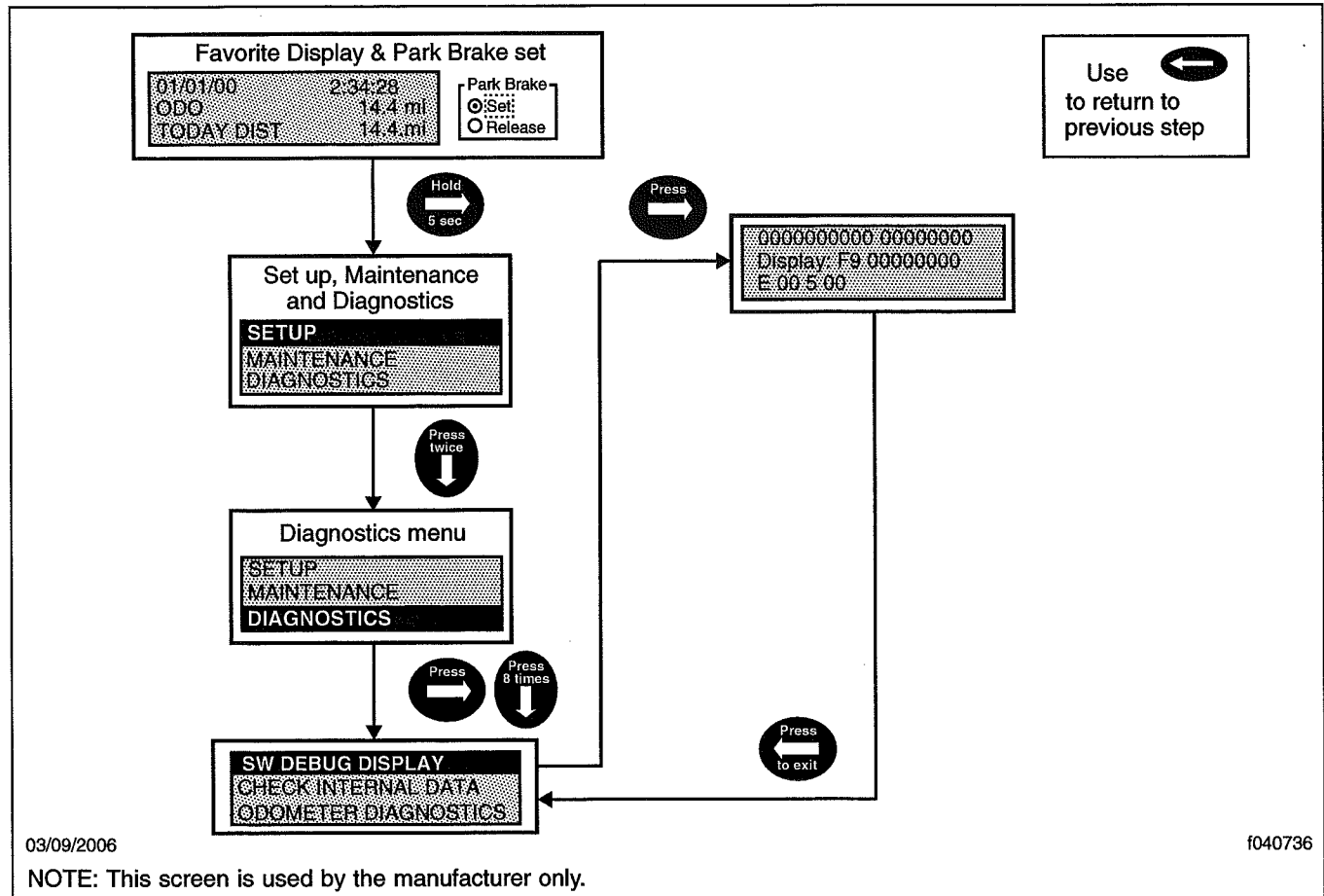


Fig. 2.53, Software Debug Display

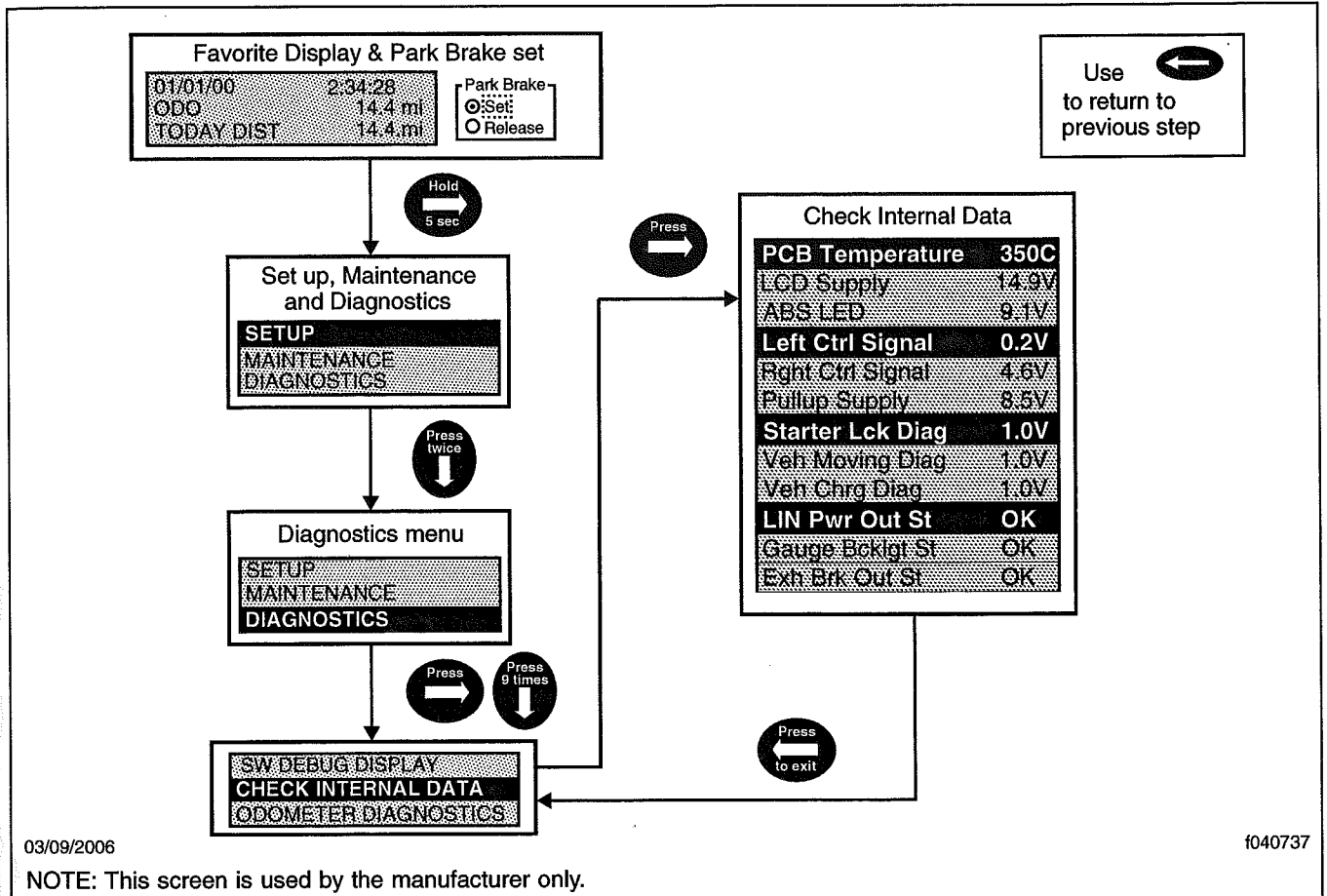


Fig. 2.54, Check Internal Data

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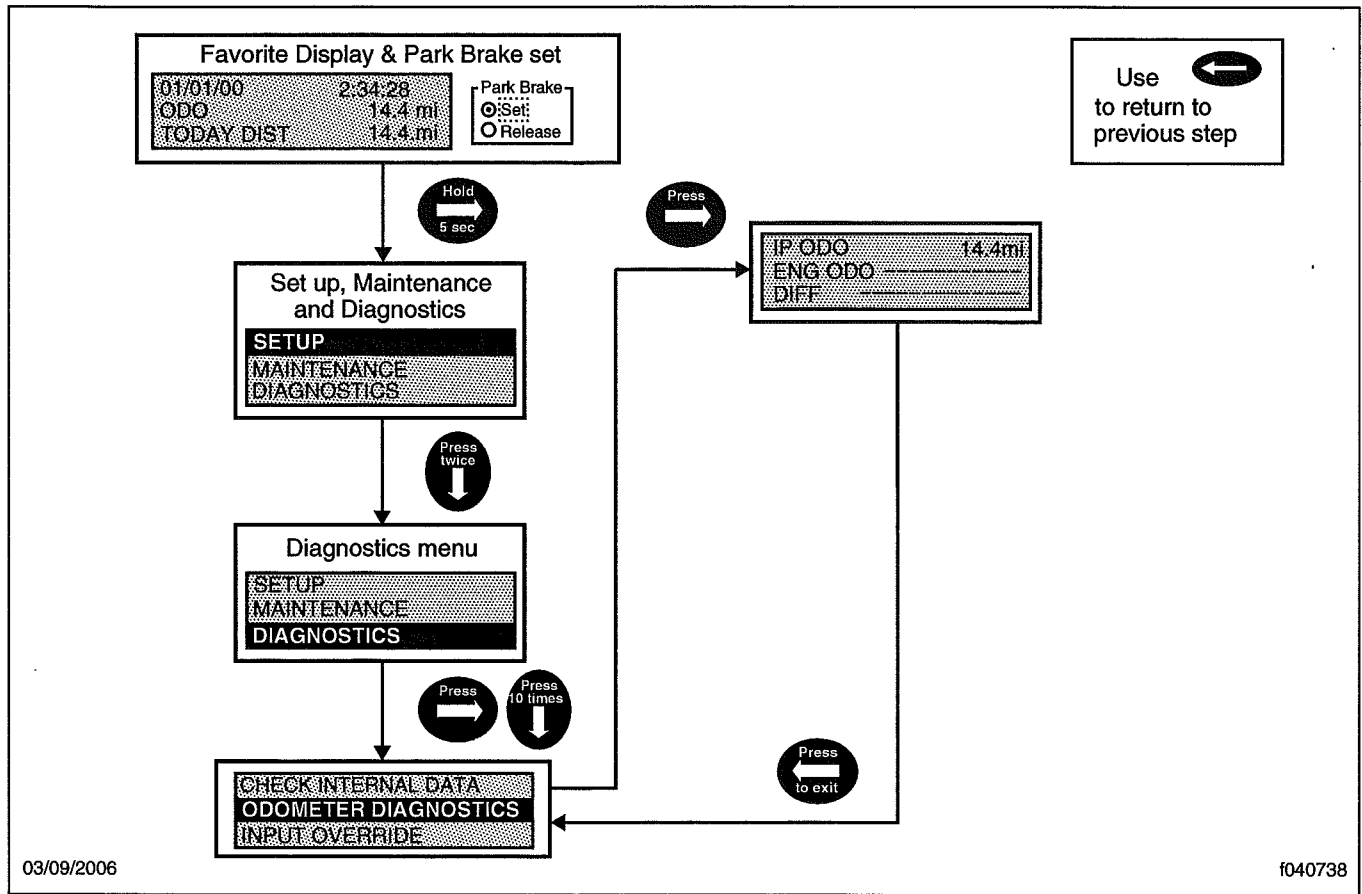


Fig. 2.55, Odometer Diagnostics

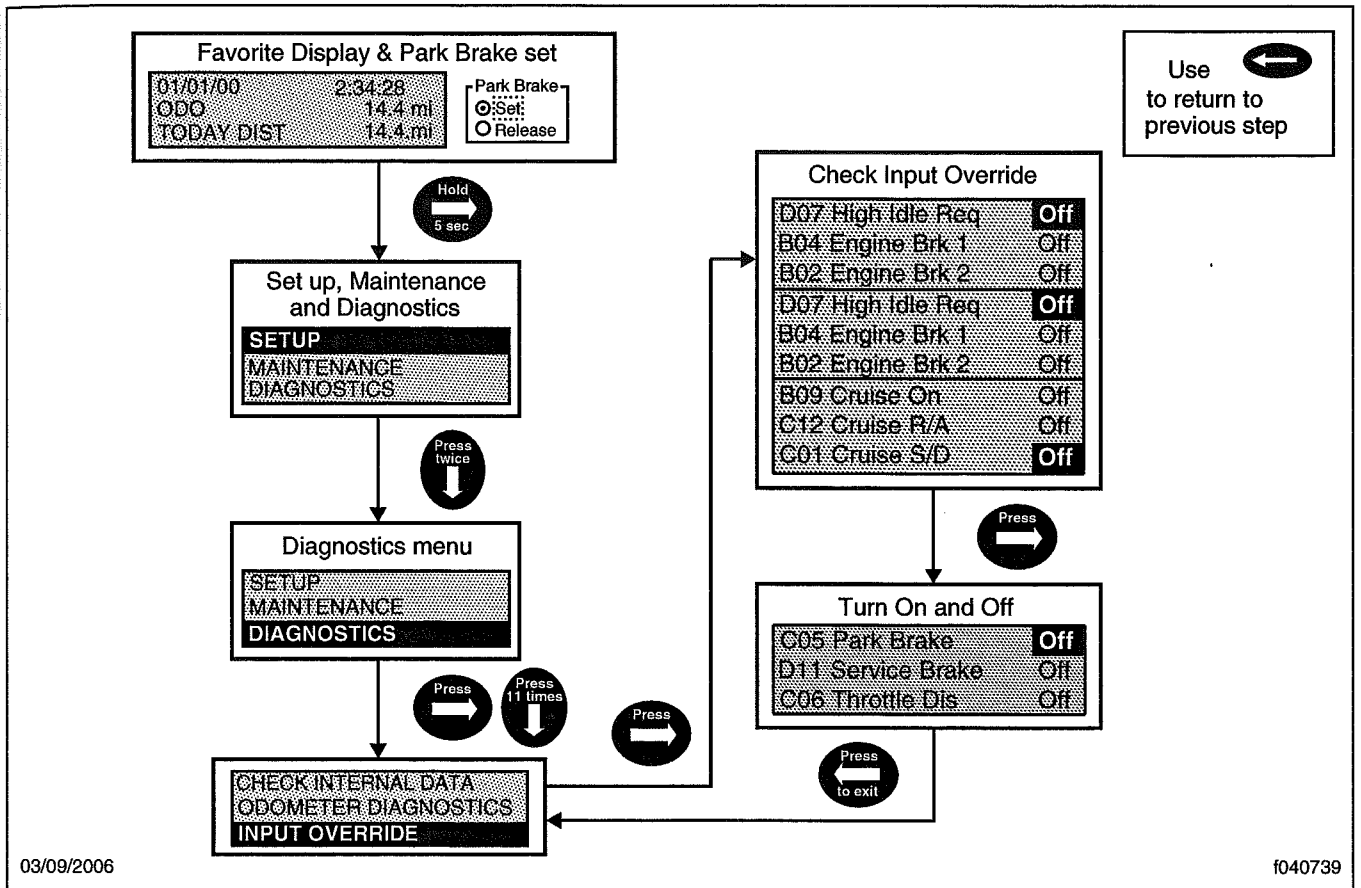


Fig. 2.56, Check Input Override