

XC Instrumentation System Owner's Manual

**Revision 3.0
07/05/06**

Revision History

Date	New Revision Level	Revision Description
11/08/05	1.0	Initial release
05/24/06	2.0	Update as with latest product changes
07/05/06	3.0	Navigation section was added

INSTRUMENTATION OPERATORS GUIDE INTRODUCTION

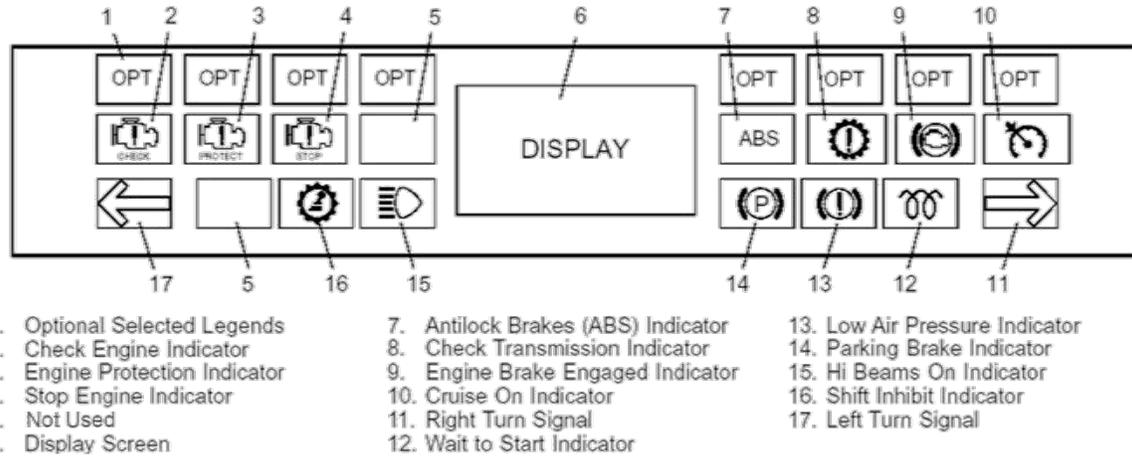
This operator's guide provides the information needed to operate and understand the Stoneridge LBCU installed on Freightliner X-Line Chassis. Although Freightliner chassis is equipped with many different types and styles of gauges, the system configuration for all X-Line chassis is the same and the data presented in this guide is applicable to all X-Line chassis equipped with the Stoneridge Instrumentation System.

The instrument cluster is a full featured individual gauge cluster with a LBCU. The individual gauges will be sealed stepper motor movements with Light Emitting Diode (LED) backlighting. To decrease the size of the light bar height, some of the gauges may contain LED telltales. The LBCU will receive inputs from SAE J1587 and J1939, sensor and discrete inputs for driving the various gauges and telltales. The LBCU will also use LED backlighting and LED telltales for low heat and high reliability. The vehicle odometer will be displayed in the light bar. A collection of LBCU controlled, stand alone mechanical and stand alone electrical gauges will complete the total LBCU instrument package.

IMPORTANT: The LBCU is capable of determining when input information is lost. The loss of input data will be noticeable to the operator by movement of the gauge to zero. The odometer value will not be driven to zero if total loss of vehicle distance data occurs. When data input is lost, hyphens (-) will replace the digits in the data field on the display screen.

WARNING AND INDICATOR LIGHTS

The LBCU contains the following warning and indicator lights:



- Green Right and Left Turn Signal Indicators, which flash on and off when the outside turn signals are flashing.
- Yellow CHECK TRANS Warning Light that will come on during vehicle operation if the Transmission ECU (electronic control unit) has broadcast a diagnostic fault code. Diagnostic codes indicate malfunctions in transmission operation. If this light stays on continuously during operation, have the transmission serviced as soon as possible.
- Yellow ABS Warning Light. The ABS Warning Light illuminates when the vehicle is started as a self-test. If an ABS fault has been cleared, the vehicle speed must exceed 7 mph (10 km/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 property damage, personal injury or death.

- Blue High-Beam Indicator that illuminates when the headlights are on high beam.
- Red LOW AIR Warning Light that comes on when the air pressure in the air tanks falls below 65 PSI. The warning light will normally come on when you first start the engine, but will go off when the air pressure in the air tanks reaches approximately 65 to 76 PSI.
- Red PARK BRAKE Indicator light, that illuminates when the parking brakes are engaged and the ignition switch is in the ON position.
- Yellow WAIT TO START Indicator. Warning Light.
- Green ENGINE BRAKE Indicator that illuminates when the Engine Brake is applied.

- Green CRUISE ON Indicator, which illuminates when the Cruise Control is on.
- Yellow SHIFT INHIBIT Warning light that illuminates when the Transmission ECU (electronic control unit) is prohibiting shifting.

The LBCU may also include the following lights: CHECK ENGINE, STOP ENGINE, and engine protection (ENG PROT). See the Caterpillar or the Cummins Operation and Maintenance Manual for more information.

IMPORTANT: When the ignition is turned on all of the Indicator Lights will illuminate for approximately 3 seconds to allow the operator to perform a bulb check.

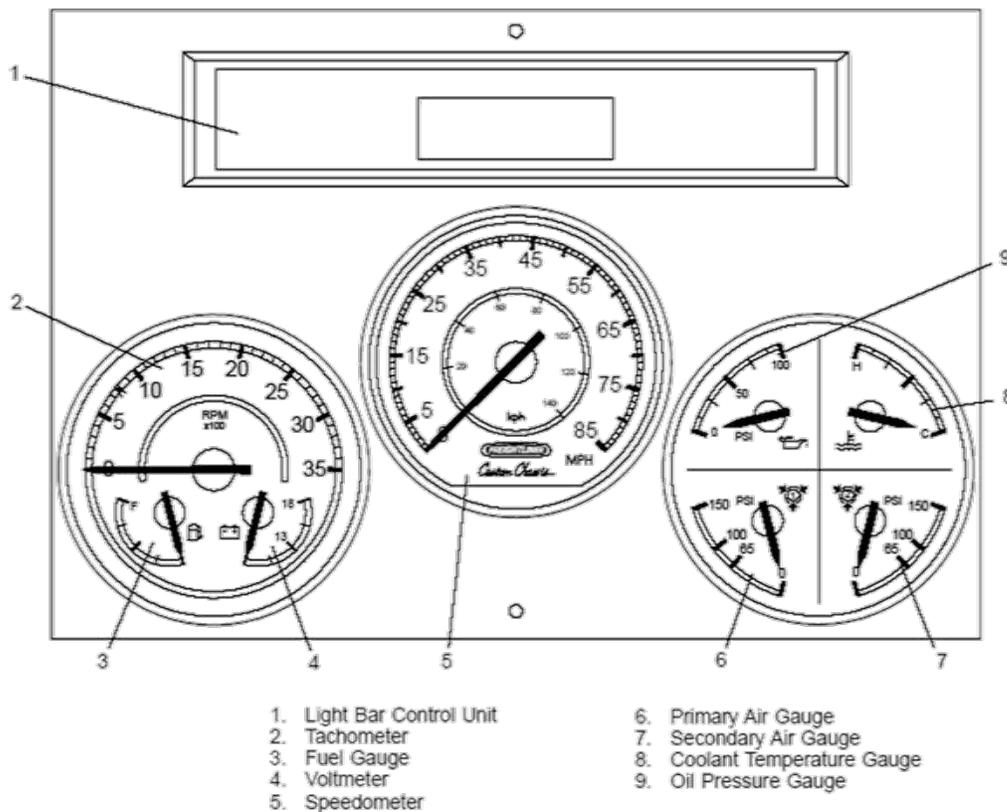
GAUGES

Gauge Configurations

- A 5" 3 in 1 multi-gauge consisting Tachometer / Battery Voltage / Fuel Gauges or Speedometer / Oil Pressure Gauge / Coolant Temp.
- 5" 4-1 multi gauge consisting of an Oil Pressure, Water Temperature, Primary Air and Secondary Air.
- 5" Speedo single gauge.
- 3 3/8" Speedometer and Tachometer.
- 2" Gauges – Coolant Temp, Trans Temp, Turbo Boost, Oil Pressure, Fuel, Voltmeter, Primary Air & Secondary Air.

Gauge Sizes & Styling

- 2", 3 3/8" & 5" diameter
- White and black dial faces available with black or chrome gauge rings



Speedometer

The speedometer registers vehicle speed in miles per hour or kilometers per hour (mph/kph). It is available in 5" or 3 3/8" size.

Tachometer (0-3500 RPM)

The tachometer indicates the revolutions per minute (rpm) of the engine. It is available as a 3 3/8" gauge or 5 inch 3-in-1 multi-gauge.

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. See the Engine Operation and Maintenance Manual for normal range of operation. It is available as a standalone gauge with 2" diameter, and integrated in the multi-gauge.

Fuel Level Gauge

The fuel gauge indicates the amount of fuel in the fuel tank. It is available in 2" stand alone gauge or integrated in the multi-gauge.

Turbo Boost Air Pressure Gauge

The turbo boost gauge indicates the boost pressure at the turbo. See the engine Operation and Maintenance Manual for normal range of operation. It is available as a stand alone 2" gauge.

Engine Oil Pressure Gauge

The oil pressure gauge should read in the normal range. It is available as a 2" standalone gauge, and integrated in the multi-gauge. See the engine Operation and Maintenance Manual for normal range of operation.



WARNING

A sudden decrease or absence of engine oil pressure may indicate mechanical failure. Bring the vehicle to a safe stop and turn off the engine. 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 the engine starting battery voltage when the engine is stopped. By monitoring the voltmeter, the driver can detect potential charging system problems and have them repaired before the batteries discharge enough to create starting difficulties. 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.

NOTE: Some vehicles may be equipped with a battery isolator system and a gel cell battery by the body builder. On these vehicles, the voltmeter measures the average voltage of all of the batteries when the engine is running. When the engine is stopped, the voltmeter indicates only the engine starting batteries.

Primary and Secondary 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 between 100 and 130 psi (689 to 895 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. These gauges are available as 2" diameter gauges, and integrated in the multi-gauge.



Transmission Oil Temperature Gauge

Indicates the temperature of the transmission oil. Available in 2" size.



WARNING

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.

THE INFORMATION CENTER

Introduction

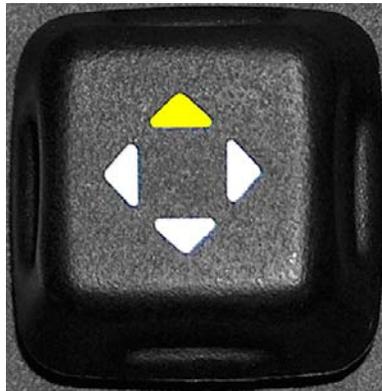
The LBCU has an interactive Liquid Crystal Graphical Display that is capable of displaying text messages and graphics to communicate vital real-time information about the status and performance of the vehicle to the operator. This information is organized in a menu (driven format).

Power On Initialization

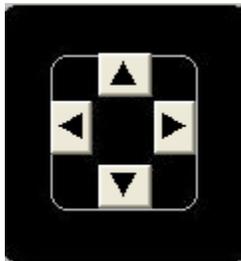
When the ignition is turned on, the Info Center will illuminate with the Freightliner Custom Chassis Logo then display the driver checklist if no alarms are present.

Navigating the Menu Screens

The menu structure is navigated using one button located on the vehicle panel. This button has 4 arrows (Right, Left, Up and Down), the Upper arrow is yellow. This yellow arrow on the joystick must be in the up position for all commands to work properly.



- **NOTE:** Joystick will be represented in the tutorial software with the following icon:



Menu Structure

The menu structure is organized around Top level menus, the Ignition Off Screens, Home Screen Overview Screen, and the Setup Main and Diagnostics menus.

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 submenus 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. There is a service reminder which tells you when to provide service to the engine (configurable, can be set from 1,000mi to 100,000mi).
 3. Diagnostics – Includes check gauges, check icons, check inputs, check outputs, engine diagnostics, ABS diagnostics, and hardware / software version.

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 setup, maintenance or diagnostics.
3. Press the right arrow on the toggle switch to select the subcategory; "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 subcategory.
5. Once all changes have been made, hold the right arrow on the toggle switch

Ignition Off Screens

- Headlights ON displays odometer.
- Generator ON displays generator hours.
- Park brake not set. Icon will be on when park brake is set.

Home Screen Overview

- Alarms: 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.
- Driver checklist which includes:

Favorite Display: 9 lines, 3 viewed at a time. The driver can select which item to view with left arrow. Time, Odometer, Trip, Today, Leg, Road speed, Trans, Generator Hours.

Setup Main and Diagnostic

- Select Diagnose Category: Includes Check gauges, Check icons, Check inputs, Check outputs, Engine diagnostics, ABS diagnostics, SW HW version, Odometer diagnostics, and Input override.
- Select Maintenance Category: Includes Engine Maintenance, Transmission Maintenance, and Generator Maintenance.
- Select Setup Category: Includes Set time and date, Configure check list, Select English/metric and Set LCM properties.

Setting Time and Date

- 1 From favorite menu, hold right button 3 sec to Select SMD Category
- 2 Press right to Select Setup Category
- 3 Right to Highlight Set Time and Date
- 4 Left and right to select, up and down to change
- 5 Right to save and exit
- 6 Left to exit without saving

Changing from English/Metric

- 1 From favorite menu, hold right button 3 sec to Select SMD Category
- 2 Press right to Select Setup Category
- 3 Right to highlight Select English/Metric
- 4 Right to change
- 5 Left to save and exit

Menu Structure Roadmap

The menu structure road map is provided below that illustrates the screens that are available in the Info Center, the path to specific screens, and the details of each individual screen. Comments are included where necessary for added clarification.

Pre-Trip Checklist
Jacks/Air Leveler Up
Check Tow Vehicle

CHECKLIST MENU

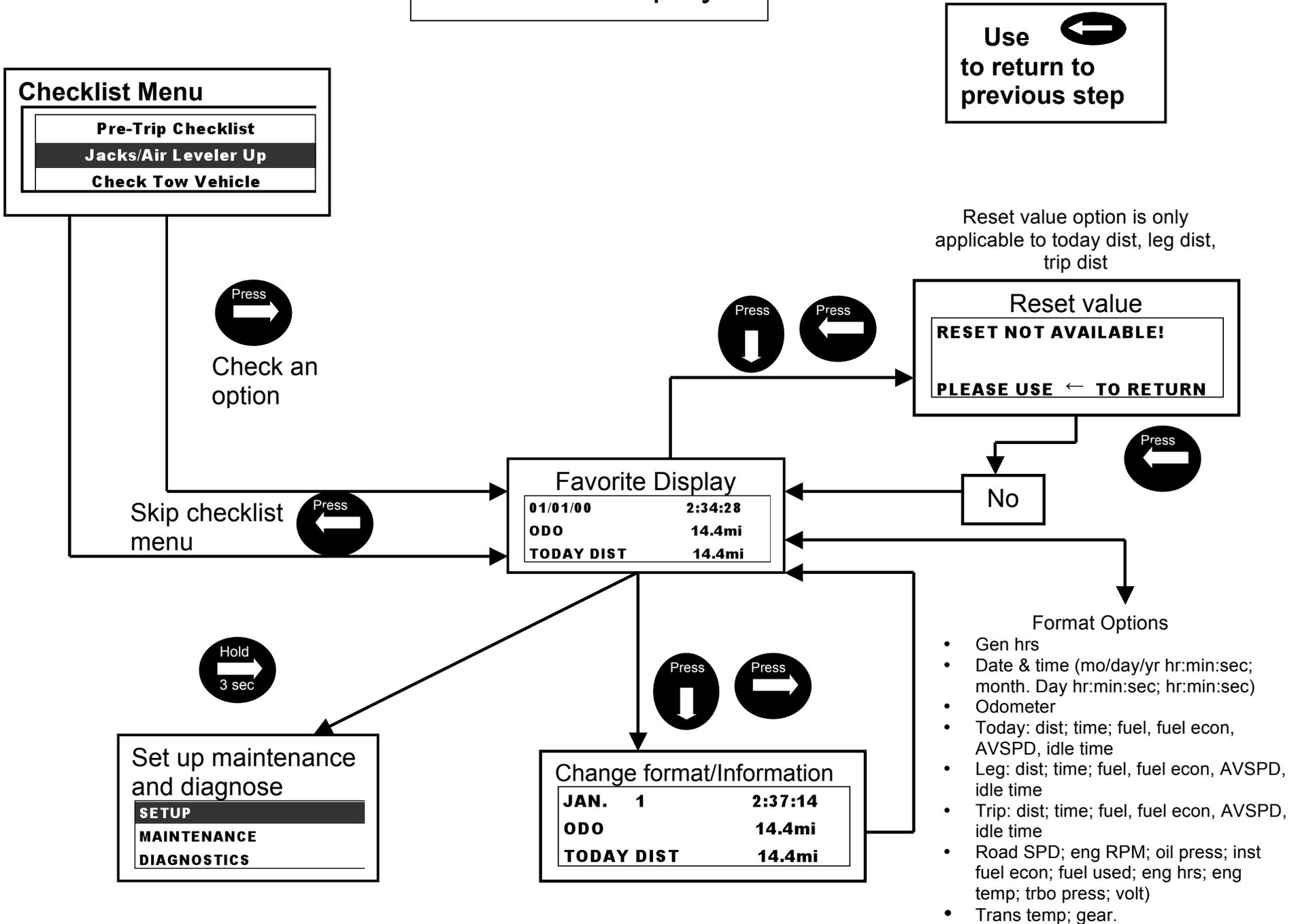
Here you have to verify every item on the checklist and check it with the Right Key. You can move up/down on the checklist with the Up/Down Key, or you can skip it by holding the Right Key 3 seconds. Once you have acknowledged all the items, the Control will take you to the next display.

01/01/00	2:34:28
ODO	14.4mi
TODAY DIST	14.4mi

FAVORITE DISPLAY

Here you can configure it to see what you want by selecting a line with the Up/Down Key, reset a value, change the Line Format/Information, or change the information on the selected line. To simulate the Alarm messages on the display, set it to the number of desired alarms using the control under the text 'Number of Alarms'. To access the Setup Maintenance and Diagnose Menus hold the Right Key for 3 seconds. Park Brake must be set and no line selected in the menu. You can turn On/Off the Ignition and the Headlights switches whenever you want to see what happens.

Favorite Display



View Odometer value

Headlamps "ON"
INITIAL CONDITIONS:
Ignition Off and
Headlamps On

View while headlamps ON

ODO

14.4mi

Headlamps
"OFF"

Headlamps

On

Off

View Generator hours

Generator "ON"
INITIAL CONDITIONS:
Ignition Off and
Generator On

Shows Generator hours
GEN HRS 0.0

Generator
"OFF"
Generator
 On
 Off

Set Up Menu

From the "Favorite Display" and once the "Park Brake" is set:

Use  to return to previous step

Hold  3 sec

Set up, Maintenance and Diagnostics

SETUP
MAINTENANCE
DIAGNOSTICS

Press 

Set up Menu

SET TIME AND DATE
CONFIGURE CHECKLIST
SELECT METRIC/ENGLISH
SET MISCELLANEOUS
SET DISPLAY PROPERTIES

Press  to exit

SETUP MAINTENANCE AND DIAGNOSTICS
This menu allows you to access technical and diagnostics information in the product. On this menu you will be able to read inputs, read sensor data, change information and test output signals. Select an option moving with the Up/Down Key and then press the Right Key. If you want to Exit this menu press the Left Key.

From the "Favorite Display" and once the "Park Brake" is set:

Use  to return to previous step

Set time and date

Set up, Maintenance and Diagnostics

SETUP
MAINTENANCE
DIAGNOSTICS

Set up Menu

SET TIME AND DATE
CONFIGURE CHECKLIST
SELECT METRIC/ENGLISH

Set Time and Date

01/01/00	4:55	24
Exit with → to Save		
Exit with ← to Cancel		

To save, the cursor must be all the way to the right

To exit, the cursor must be all the way to the left



Month (1-12)

02/01/00	4:55	24
Exit with → to Save		
Exit with ← to Cancel		



Day (1-31)

02/01/00	4:55	24
Exit with → to Save		
Exit with ← to Cancel		



Year (00-99)

02/01/00	4:55	24
Exit with → to Save		
Exit with ← to Cancel		



Hr (0-23)

02/01/00	4:55	24
Exit with → to Save		
Exit with ← to Cancel		



Min (0-59)

02/01/00	4:55	24
Exit with → to Save		
Exit with ← to Cancel		

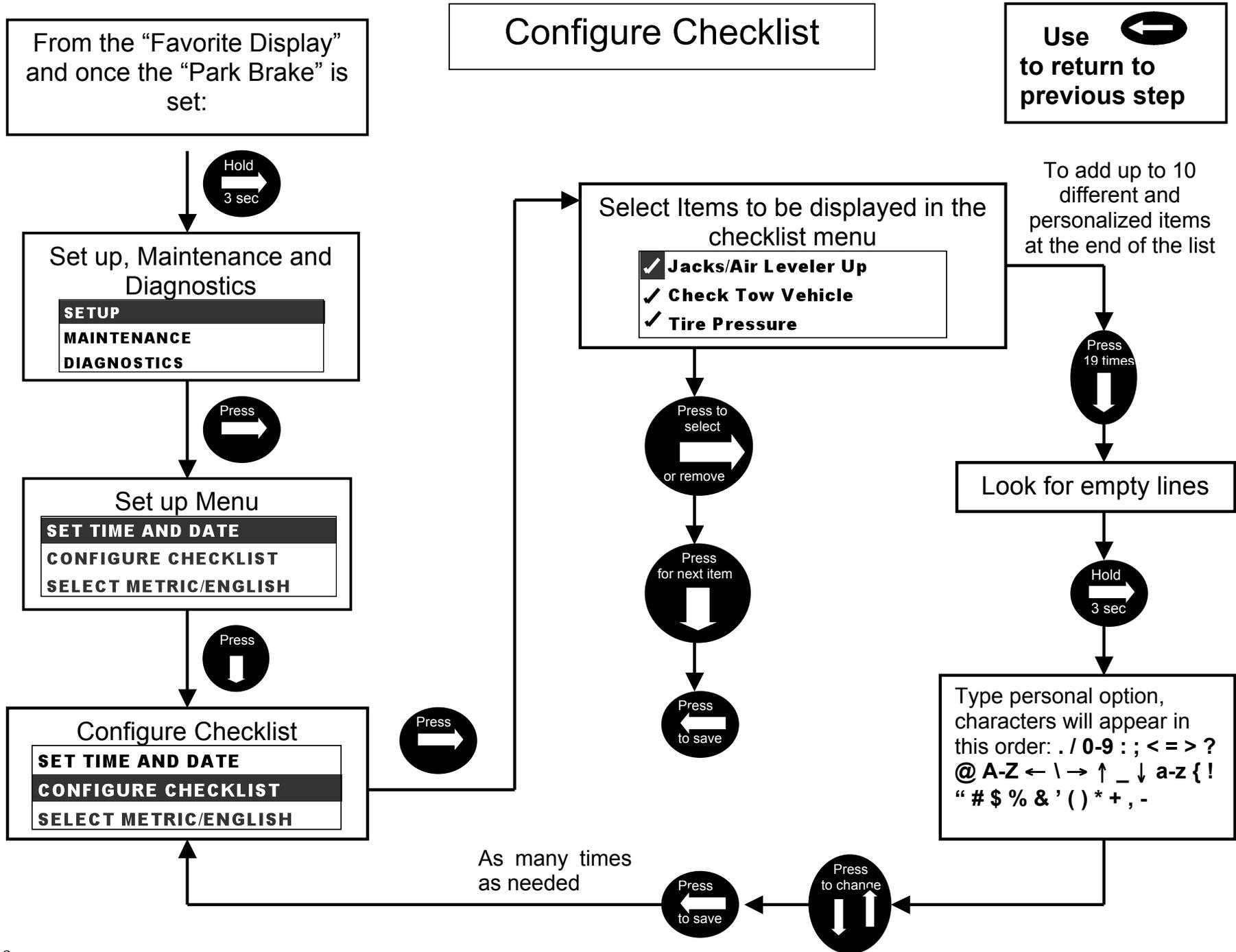


Format (AM/PM/24)

02/01/00	4:55	24
Exit with → to Save		
Exit with ← to Cancel		



Must be left



From the "Favorite Display" and once the "Park Brake" is set:



Set up, Maintenance and Diagnostics
SETUP
MAINTENANCE
DIAGNOSTICS



Set up Menu
SET TIME AND DATE
CONFIGURE CHECKLIST
SELECT METRIC/ENGLISH



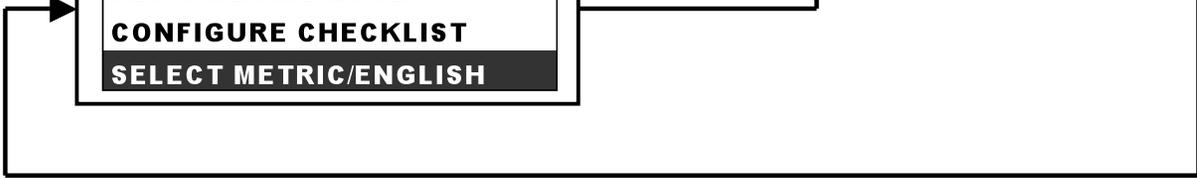
Select Metric/English
SET TIME AND DATE
CONFIGURE CHECKLIST
SELECT METRIC/ENGLISH



Change Units English / Metric

Use to return to previous step

Select English/Metric Units
English
Change with →
Exit and save with ←



Set Display Properties Menu

Use  to return to previous step

From the "Favorite Display" and once the "Park Brake" is set:

Hold  3 sec

Set up, Maintenance and Diagnostics
SETUP
 MAINTENANCE
 DIAGNOSTICS

Press 

Set up Menu
SET TIME AND DATE
 CONFIGURE CHECKLIST
 SELECT METRIC/ENGLISH

Press 3 times 

Set Display Properties line
 CONFIGURE CHECKLIST
 SELECT METRIC/ENGLISH
SET DISPLAY PROPERTIES

Factory settings cannot be changed; they will always be 25% for Hdlghts Off and On

Factory Settings
Factory Settings **Yes**
Dimm w Hdlghts Off 25%
Dimm w Hdlghts On 25%

Press  to change

Press 

Dimm w hdlghts on

Dimm w hdlghts off

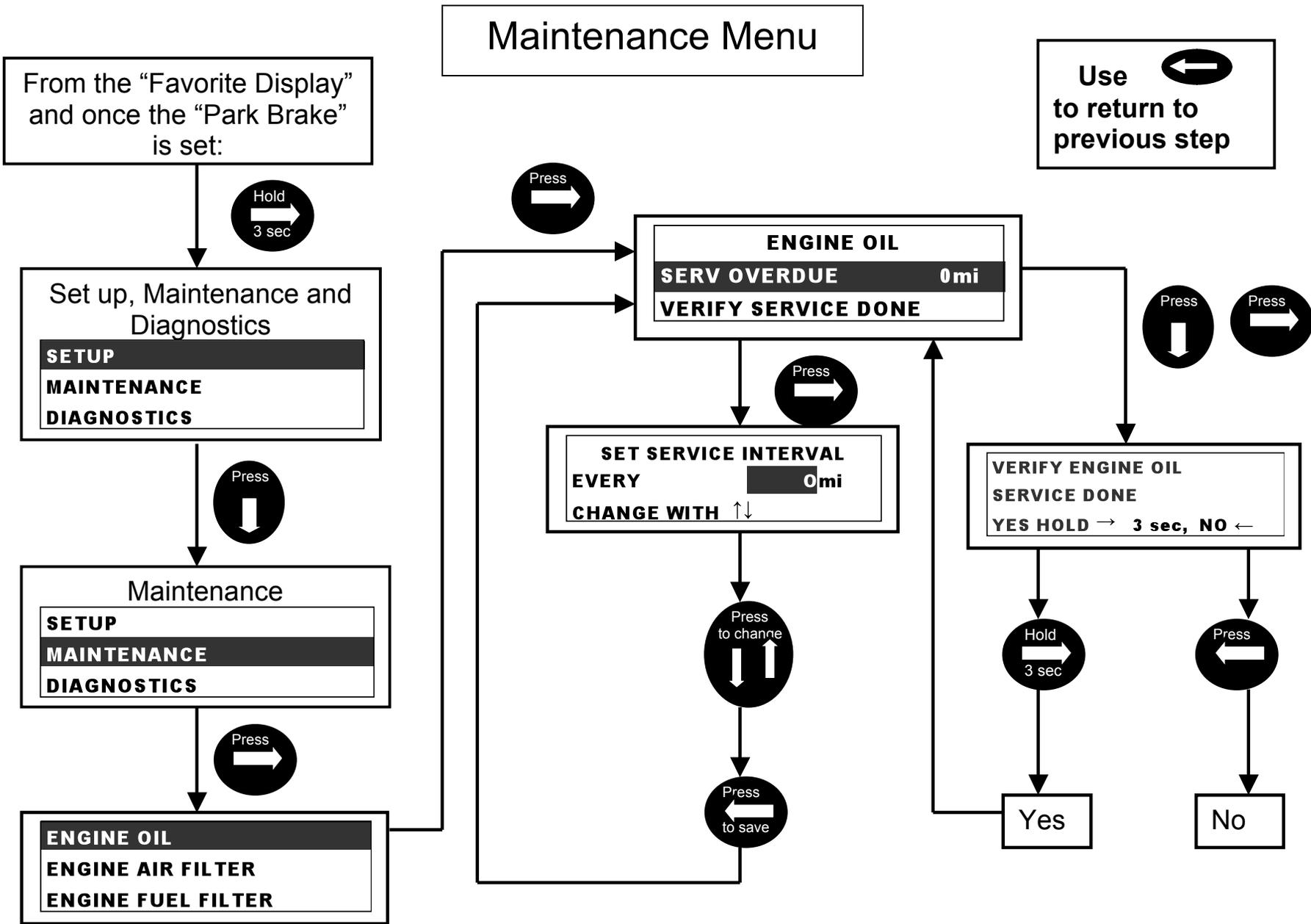
Press 

Increments of 5% from 0% to 95%

Press  to save & exit

Press  to change

DISPLAY PROPERTIES
 Here you can set the dimming level for the Headlights or select the default values for it. To select the default values choose Yes on the Factory Settings line, otherwise select the dimming level you want. Press the Right Key to change the values and the Up/Down Key to move. Press the Left Key to save and Exit.



This procedure applies for all the options shown in this menu list

Diagnostics Menu

Use  to return to previous step

From the “Favorite Display” and once the “Park Brake” is set:



Set up, Maintenance and Diagnostics

SETUP
MAINTENANCE
DIAGNOSTICS



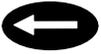
Diagnostics menu

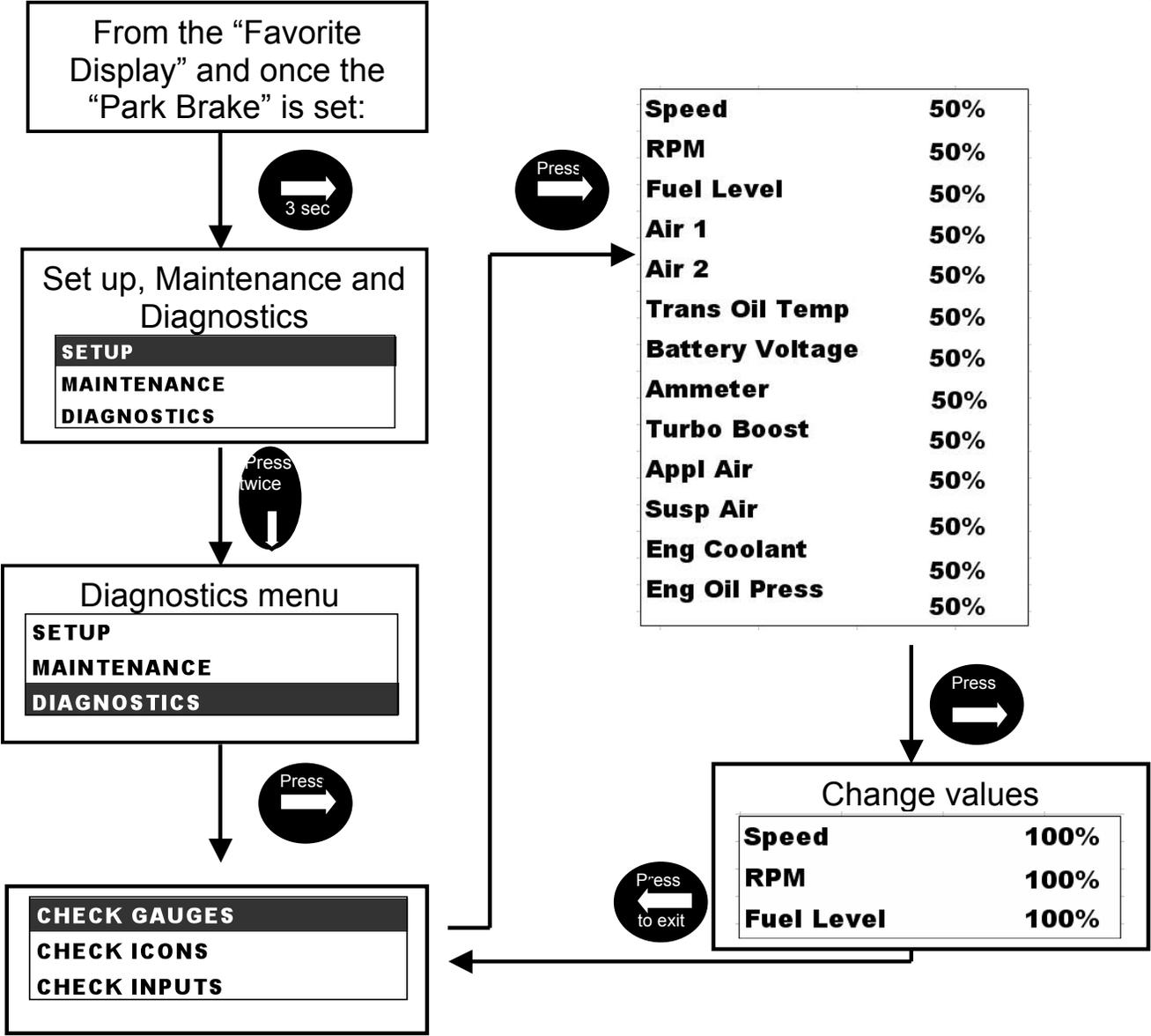
SETUP
MAINTENANCE
DIAGNOSTICS



CHECK GAUGES
CHECK ICONS
CHECK INPUTS

Check gauges and change values

Use  to return to previous step



Possible values

- Speed: 0% (0 MPH), 50% (42.5 MPH) and 100% (85 MPH).
- RPM: 0% (0 RPMx100), 50%(17.5 RPMx100) and 100% (35 RPMx100)
- Fuel level: 0% (empty), 50% (half) and 100% (full).
- Air 1 and Air 2: 0% (0 PSI), 50% (75 PSI) and 100% (150 PSI).
- Trans Oil Temp: 0% (125°F), 50% (237.5°F) and 100% (300°F).
- Battery Volt: 0% (8), 50% (13) and 100% (18) deg
- Turbo Boost: 0% (0 PSI), 50% (25 PSI) and 100% (50 PSI).
- Eng Coolant: 0% ("C" Cold), 50% (half) and 100% ("H" Hot).
- Eng Oil Press: 0% (0 PSI), 50% (50 PSI) and 100% (100 PSI).
- Ammeter, Appli. Air and Susp Air: No gauge shown

*While changing the values, gauges should move

Check icons and change values

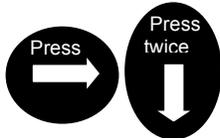
Use  to return to previous step

From the "Favorite Display" and once the "Park Brake" is set:



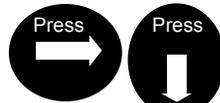
Set up, Maintenance and Diagnostics

SETUP
MAINTENANCE
DIAGNOSTICS



Diagnostics menu

SETUP
MAINTENANCE
DIAGNOSTICS



CHECK GAUGES
CHECK ICONS
CHECK INPUTS

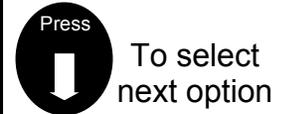


1st Upper Left **Off**
2nd Upper Left **Off**
3rd Upper Left **Off**



Turn On and Off

1st Upper Left **On**
2nd Upper Left **Off**
3rd Upper Left **Off**



Use "Welcome Screen" to locate icons as they are being lighted

Check inputs

From the "Favorite Display" and once the "Park Brake" is set:



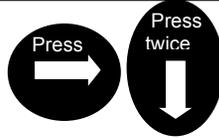
Set up, Maintenance and Diagnostics

SETUP
MAINTENANCE
DIAGNOSTICS



Diagnostics menu

SETUP
MAINTENANCE
DIAGNOSTICS



CHECK GAUGES
CHECK ICONS
CHECK INPUTS

Use to return to previous step



Check inputs

A04	Generator	L/NC
D15	Ignition	H
A03	E brake 50%	H/NC
C06	Throttle Dis	L/NC
C07	Lift Open	L/NC
B12	Buzzer	H/NC
C05	Park Brake	L
C04	Tag Axle	L/NC
C08	Left Turn	L/NC
D08	Right Turn	L/NC
A05	Brakes Worn	L
C14	Optional 1	L/NC
A06	Optional 2	L/NC
A07	Optional 3	L/NC
A08	Optional 4	L/NC
B01	Optional 5	L/NC
B08	Optional 6	L/NC
C11	Optional 7	L/NC
D04	Optional 8	L/NC
A12	High Beam	L/NC
D11	Service Brake	L/NC
D07	High Idle Req	H/NC
B04	E Brake 100%	H/NC
A09	Water4 in Fuel	H/NC
B09	Cruise On	L
C12	Cruise R/A	H/NC
C01	Cruise S/D	H/NC
C10	Spare 1	H/NC
D01	Fuel Level	105 ohm
C13	Brake Fuse S	14.5V
D12	Pneum ABS	0.1V
B11	Hydraul ABS	8.4V
D10	Rain Sensr	8.3V
C16	Spare 2	8.7V
D16	Headlamp Pwr	OFF
A01	PanelLight Pwm	0%
D14	Battery	14.3V

Check Outputs

Use  to return to previous step

From the "Favorite Display" and once the "Park Brake" is set:

Hold  3 sec

Set up, Maintenance and Diagnostics

SETUP
MAINTENANCE
DIAGNOSTICS

Press twice 

Diagnostics menu

SETUP
MAINTENANCE
DIAGNOSTICS

Press  Press 3 times 

CHECK ICONS
CHECK INPUTS
CHECK OUTPUTS

Press 

Check Outputs

C2 Strtr Lock Out	Off
C3 Veh Charging	Off
D6 Vehicle Moving	Off

Press 

Turn on and Off

C2 Strtr Lock Out	On
C3 Veh Charging	Off
D6 Vehicle Moving	Off

Press 

To select next option

Strtr Lock Output	
Vehicle Charging	
Vehicle Moving	
Exhaust Break	

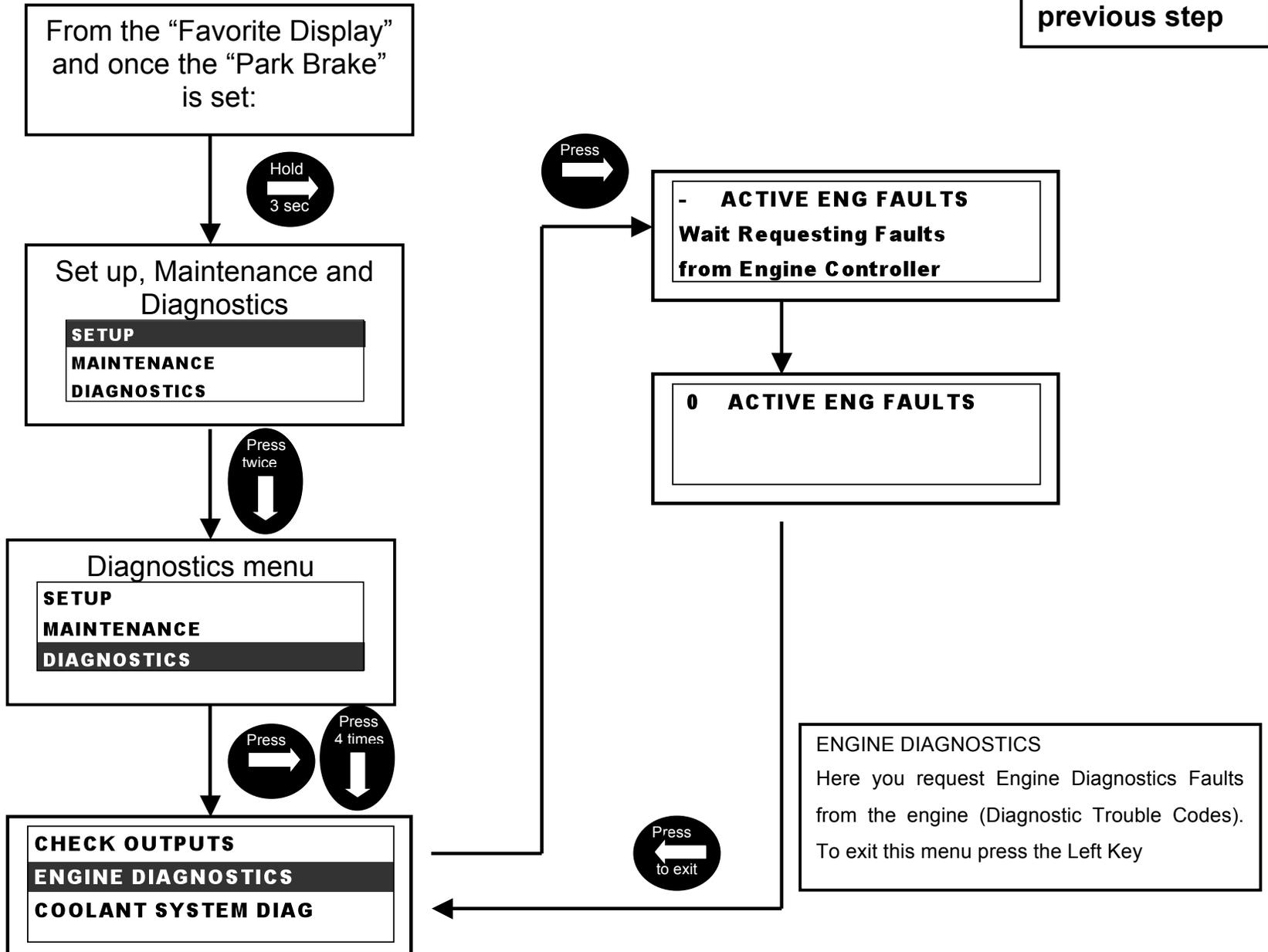
To change the status of these LEDs go to Check Outputs

Output light should be as options lighted are changed to "ON"

Press  to exit

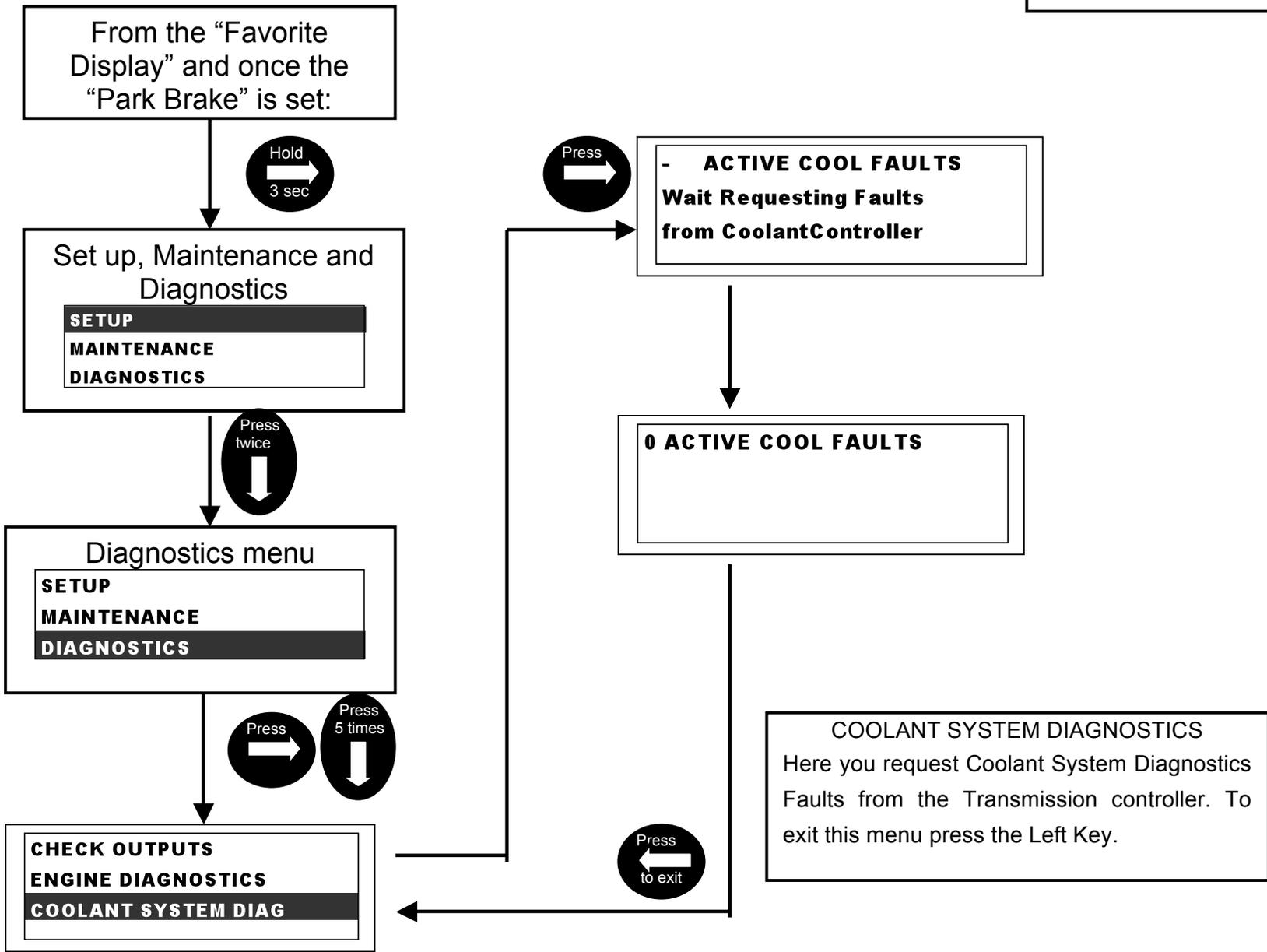
Engine Diagnostics

Use  to return to previous step



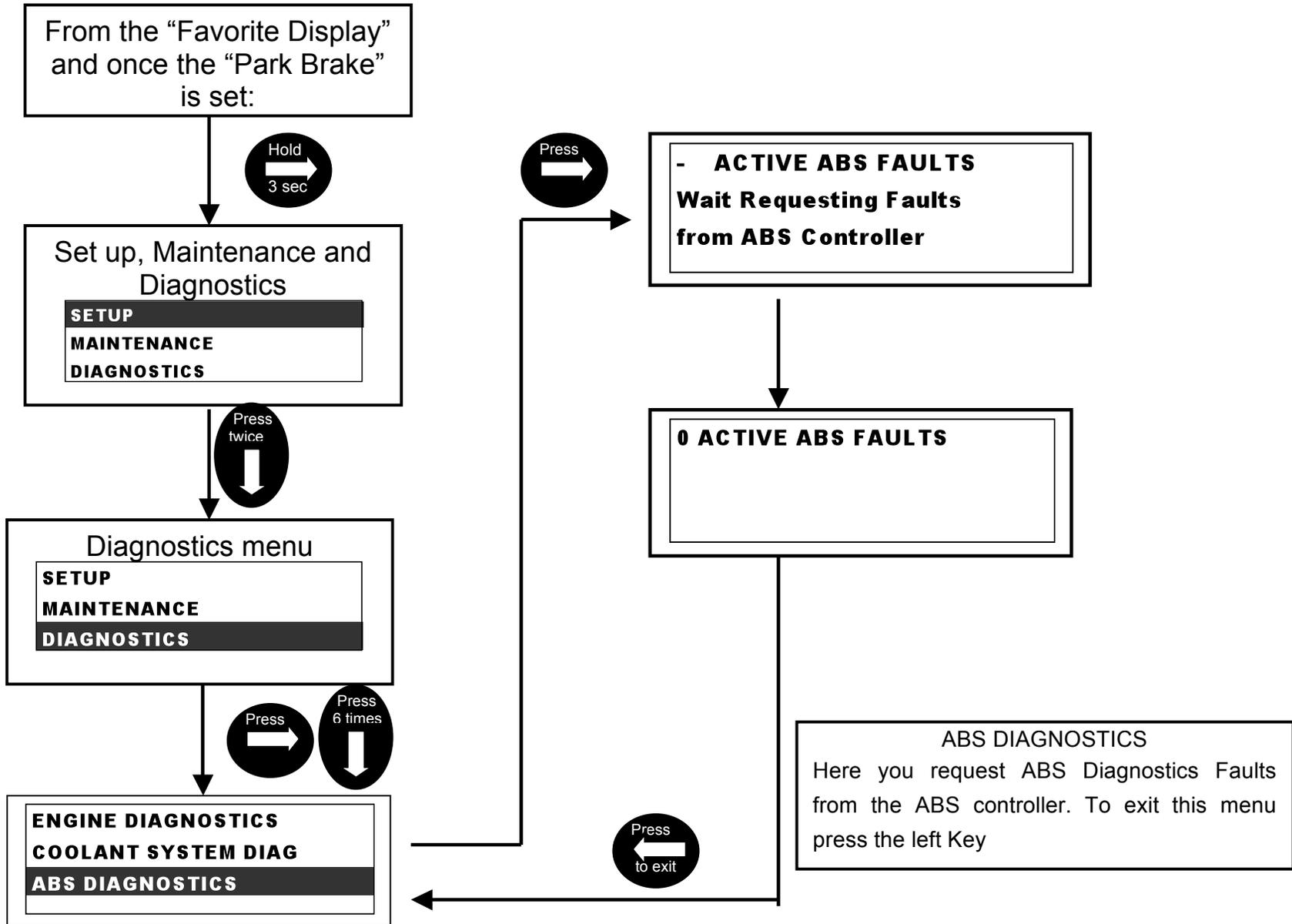
Coolant Diagnostics

Use  to return to previous step



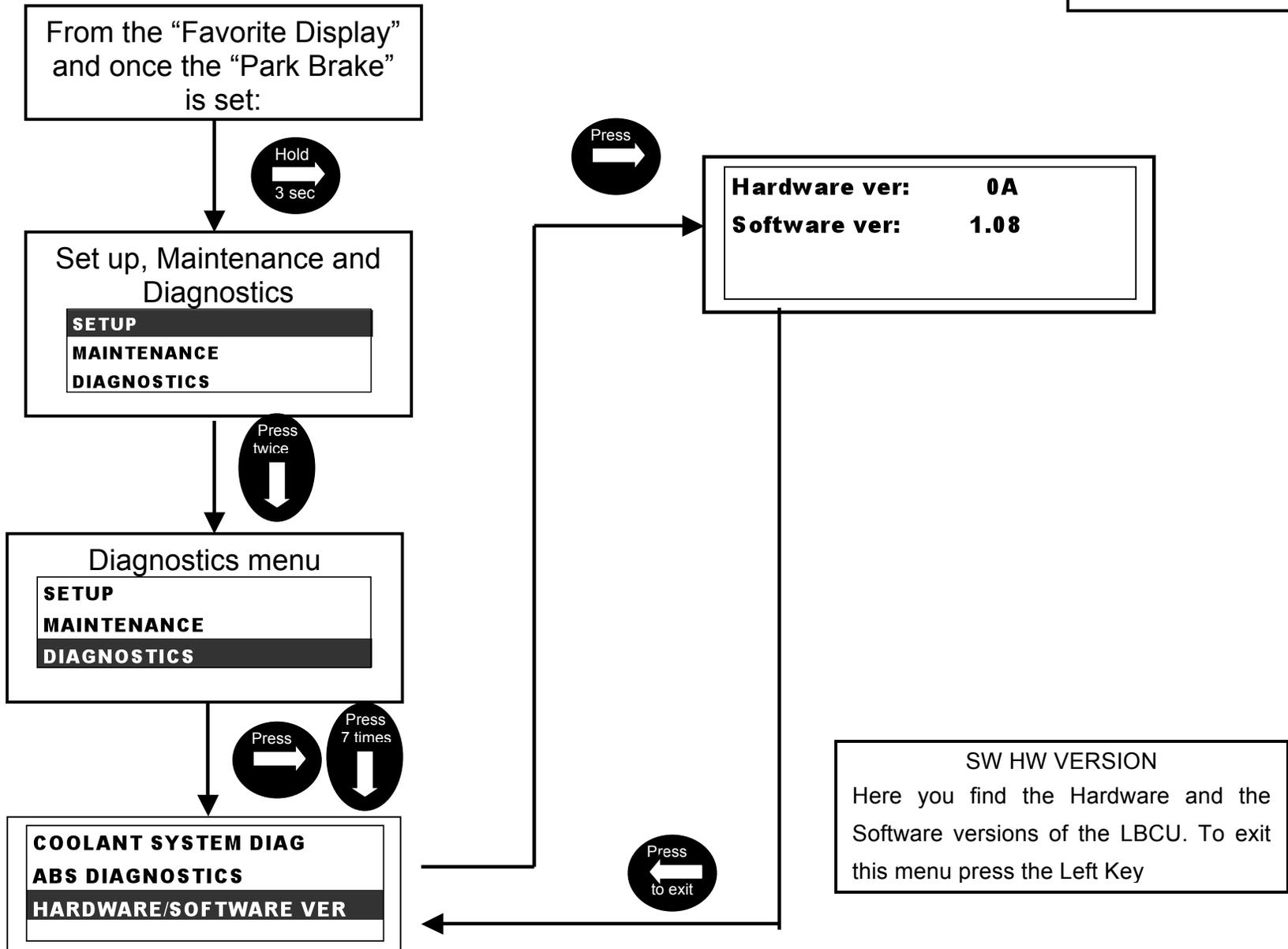
ABS Diagnostics

Use  to return to previous step



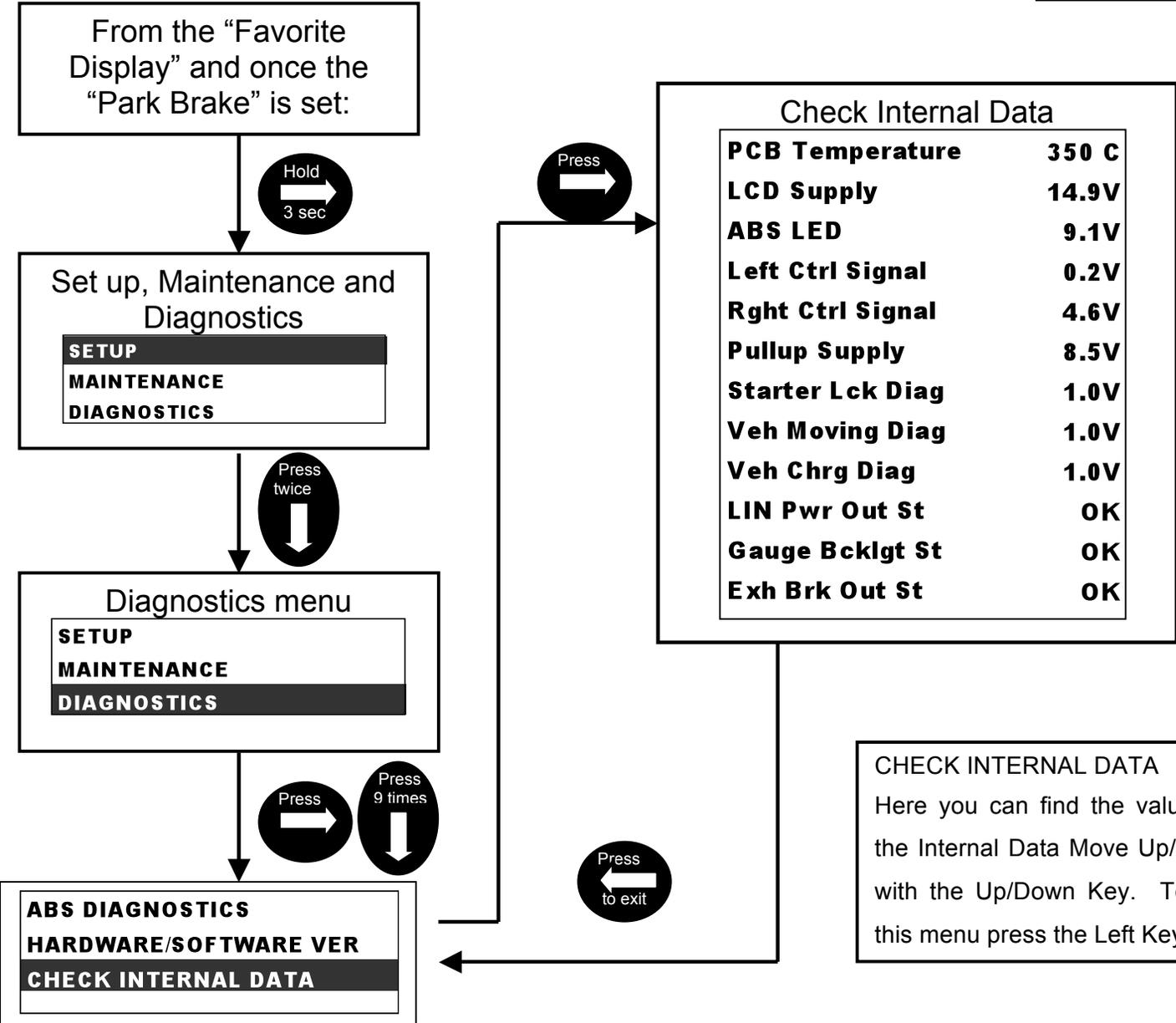
Hardware/Software version

Use  to return to previous step



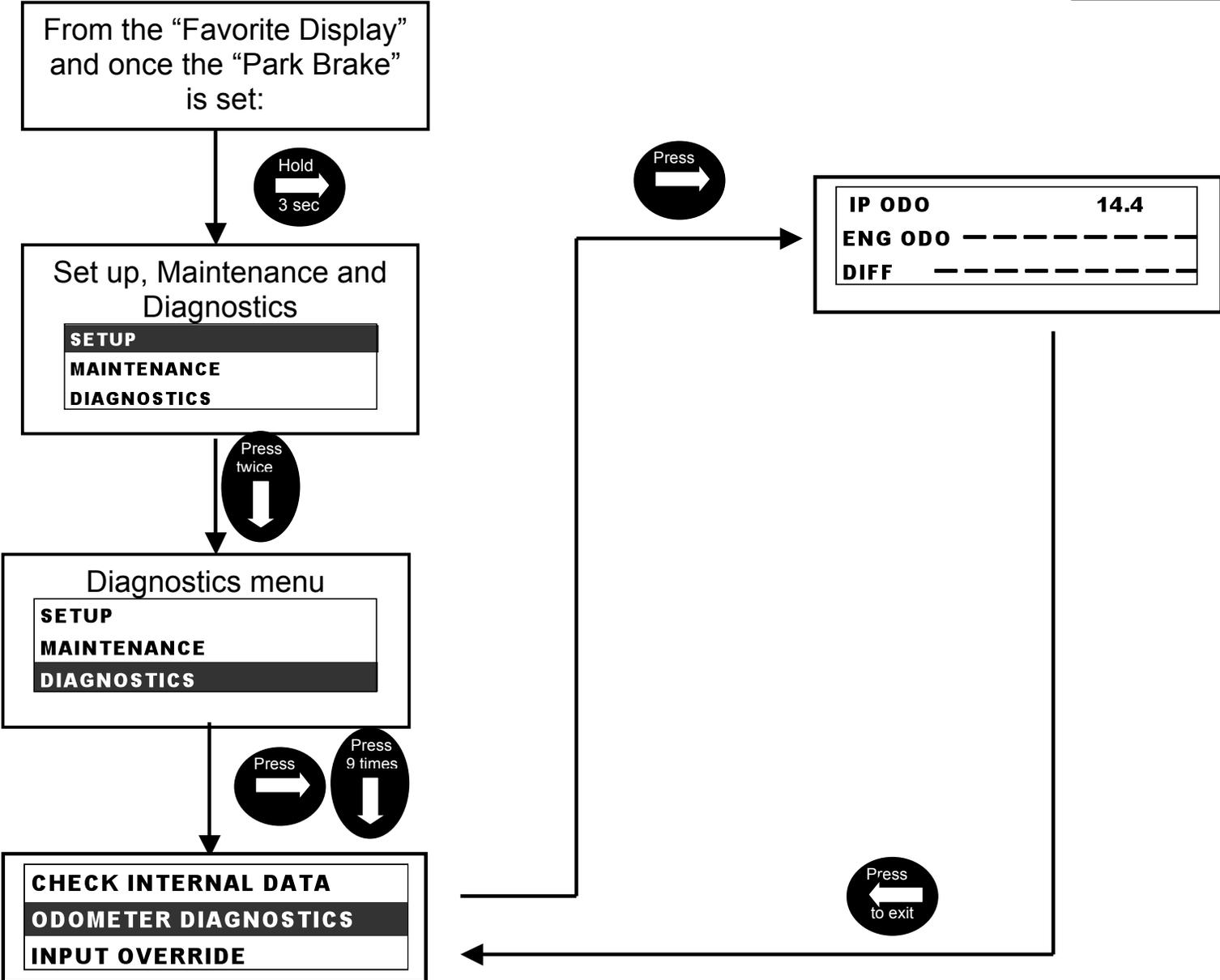
Check Internal Data

Use  to return to previous step



Odometer diagnostics

Use  to return to previous step



Check Input Override

Use  to return to previous step

From the "Favorite Display" and once the "Park Brake" is set:

Hold  3 sec

Set up, Maintenance and Diagnostics

SETUP
MAINTENANCE
DIAGNOSTICS

Press twice 

Diagnostics menu

SETUP
MAINTENANCE
DIAGNOSTICS

Press  Press 10 times 

CHECK INTERNAL DATA
ODOMETER DIAGNOSTICS
INPUT OVERRIDE

Check Input Override

C05	Park Brake	On
D11	Service Brake	Off
C06	Throttle Dis	Off
D07	High Idle Req	Off
B04	Engine Brk 1	Off
B02	Engine Brk 2	Off
B09	Cruise On	Off
C12	Cruise R/A	Off
C01	Cruise S/D	Off

Press 

Press to change 

Press  to exit

INPUT OVERRIDE
Here you can override the Inputs values for testing periodic message transmission functions. Move Up/Down with the Up/Down Key and once selected modify the values with the Right Key. To exit this menu press the Left Key