Volvo Chassis - Performance Bonus Guidelines (2010)

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E7A900 **Performance Bonus Guidelines**

Affects: VN, VHD
Related: Engine Package (101)
Gauge Package (571)
Updated: April 28, 2010

PERFORMANCE BONUS / Performance Bonus Guide
DESIGN, FUNCTION AND SETUP

1 Introduction

1.1 Performance Bonus

Performance Bonus is a driver interactive system aimed at reducing operating costs by developing driver habits that will help improve fuel economy. The system is monitoring parameters that have a direct impact on operating costs of the vehicle. For each parameter, a fleet target is established and when all considered targets are met, Performance Bonus can reward the driver with more speed. And with I-Shift, it can be set up to also enable the Performance Mode and / or the Kick-Down feature. Other means of driver rewards could be administrated at the discretion of the fleet. The below parameters can be considered with Performance Bonus:

- Idle time
- Fuel consumed in the engines Sweet Spot

1.2 REWARDING

Rewarding a driver based on fuel mileage is not always fair since the fuel mileage depends on parameters that vary by the day and operation. Most of these factors are out of the driver's control, such as: payload, weather, wind, temperature, topography, seasonal variations etc.
Any driver can feel engine performance, but none can feel engine efficiency because there is no way to send this feedback to the driver, until now! That's why Volvo developed **Performance Bonus Guide** with % Sweet Spot. Performance Bonus Guide will educate the driver on how to operate for maximum fuel efficiency and judge them based on how well they succeeded in doing this. When connected to Performance Bonus, they will be rewarded for focusing on efficient driving. This will improve the utilization of the engine's efficiency and generate the best possible fuel economy for every situation, much less independent of external factors.

1.3 PERFORMANCE BONUS GUIDE

Performance Bonus Guide comes standard with all new vehicles as of October 30, 2006.
The Performance Bonus Guide does two things:

1. Guides the driver through icons in the Driver Display towards operation in the engines most efficient zone, called the "Sweet Spot".

2. It calculates the amount of fuel consumed in the Sweet Spot and compares it to the total fuel consumed over the same distance. This is presented as the "% Sweet Spot". The higher the number, the better the utilization of the engines most fuel efficient zone.

1.4 PERFORMANCE BONUS GUIDE OPERATION

Performance Bonus Guide displays one of the following icons in the bottom bar of the Driver Information Display:

Status Symbols	Meaning
$$	Engine operating in the Sweet Spot. Fuel consumed in this mode will count 100% towards the Sweet Spot percentage
$	Engine operating in a less efficient area of the Sweet Spot. Fuel consumed in this mode will count 50% towards the Sweet Spot percentage
RPM▼	Decrease Engine Speed
RPM▲	Increase Engine Speed
	Decrease Accelerator Pedal
	Increase Accelerator Pedal

Fig.1

The icons can help the driver to know when and how much to "back out of the throttle" and when to shift. In a short time he will learn the technique and will be able to drive in the Sweet Spot by listening to the sound of the engine. The icons will not display when the truck speed is operated below 20 mph.

1.5 WITH OR WITHOUT REWARD

Performance Bonus Guide can work in two ways:

1. Without Reward

As a **stand alone** tool, primarily for Owner Operators. The data is based on Trip Data. Total Data is also available in the Datalogger menu. Trip Data can be reset but not Total Data. This feature comes standard with Volvo engines.

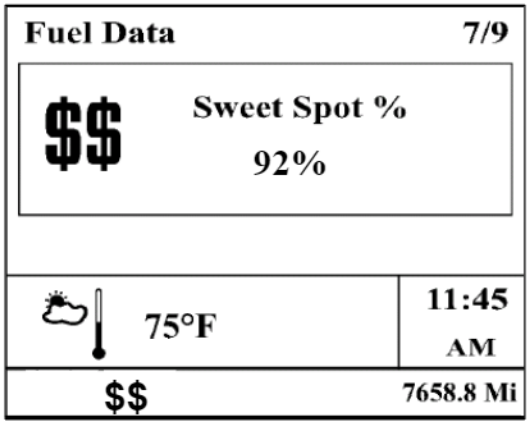


Fig.2

Performance Bonus Guide setup to work as a stand alone tool shown.
92% of the fuel has been consumed in the engines most efficient window, the Sweet Spot. The “$$” sign in the bottom toolbar indicates that the engine currently is operating in Sweet Spot. Fuel consumed in this area will count 100% towards the Sweet Spot account.

2. With Reward

Connected to Performance Bonus as a considered parameter and with a fleet defined target. Data is based on the size of a rolling buffer and cannot be reset. This is the fleet version. The setup is described on page 11 (TM2) and 12 (VCADS).

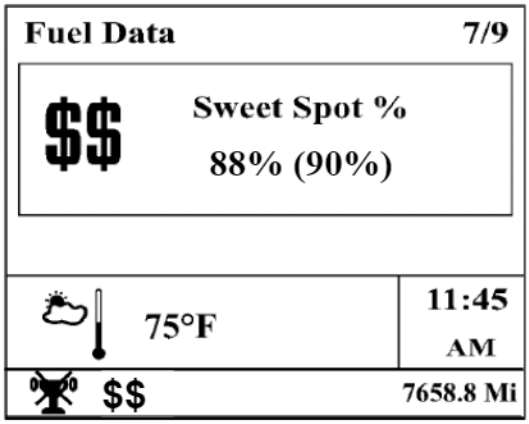


Fig.3

Performance Bonus Guide setup to work with Performance Bonus.
88% of the fuel has been consumed in the engines most efficient window, the Sweet Spot. The target is 90%.

The crossed out trophy indicates that the driver is not rewarded at this point, (target not met).

2 PERFORMANCE BONUS – DESIGN & FUNCTION

2.1 GENERAL

Performance Bonus rewards the driver with a higher Road Speed Limit (RSL) when the performance indicators defined by the fleet management meet the targets. The reward of higher RSL increases driver productivity and income - however, to achieve the reward, the driver must first focus on fuel economy.
If the vehicle is equipped with the Volvo I-Shift transmission, Performance Bonus can also be set to enable the Performance Mode and / or the Kick-Down Mode only when the driver is rewarded. Where the Kick-Down feature is available with any of the I-Shift feature packages, except for the Basic package, the Performance mode requires the Premium shifter, which comes with the Performance and Comprehensive software packages.
Calculated and presented data is based on a rolling buffer as opposed to trip data. The size of the rolling buffer is defined by the customer in the salesperson's ordering tool, TM2, or in the technician's tool, VCADS Pro / VCADS Elite.

2.2 PERFORMANCE INDICATORS

Several parameters can be considered by Performance Bonus. The fleet can choose one, two, or both of the parameters to be considered and monitored:

1. % Idle Time
2. % Sweet Spot

Targets are then set for all considered parameters based on customer preference. For example 25% idle time and 90% Sweet Spot. The setup can be done up front in TM2 or by VCADS.

2.3 1. % IDLE TIME

This parameter will monitor the idle time and compare it to the total time in the rolling buffer. The driver objective is to generate equal to or less percent idle time than the set target.

2.4 2. % SWEET SPOT (PATENT PENDING)

This parameter will monitor the fuel consumed in the engine's Sweet Spot and compare it to the total fuel consumed. The driver objective is to operate the vehicle in such a way that the percent fuel consumed in the Sweet Spot is equal to or better than the set target.

2.5 PERFORMANCE BONUS STATUS

The driver will always be informed of the status at Key-On and whenever there is a change in the reward status.

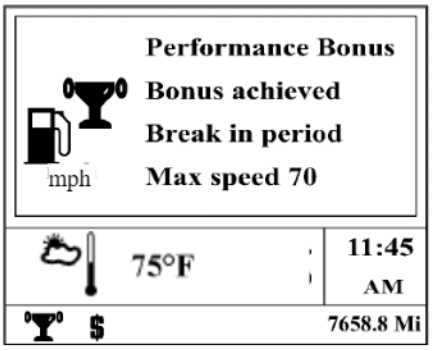


Fig. 4
The Performance Bonus status appears in the Driver Display at every Key-On.
It also appears as soon as there is a change in status.
The message remains up for 15 seconds.

2.6 ROLLING BUFFER

The “rolling buffer” is the distance that is the base for the rewards calculation. As opposed to a trip based system, the buffer will only look at the last 3000 miles or whatever was selected as the buffer size. The buffer cannot grow bigger therefore new data will continuously override the oldest data. The buffer may be set at a short or long distance.
A short buffer results in a faster reward, (or loss of reward), which provides fuel economy training to the driver, permitting the driver easy memory of the input to the buffer during this short period of time. For speed rewards, the minimum buffer size is recommended to be at least the distance equivalent of four to six days of driving.
A long buffer setting, equivalent of two to three weeks of driving, allows for the daily activities to “smooth out”. Use this in case the reward is based on non-speed based biweekly/monthly incentives. As opposed to Trip Data, the buffer can not be reset.

2.7 INITIAL BREAK-IN

For a virgin system there will be a break-in period that is equal to the size of the rolling buffer. During break-in, the system will act as if the driver was rewarded. The break-in period will continue until the buffer is filled. See Fig. 4.

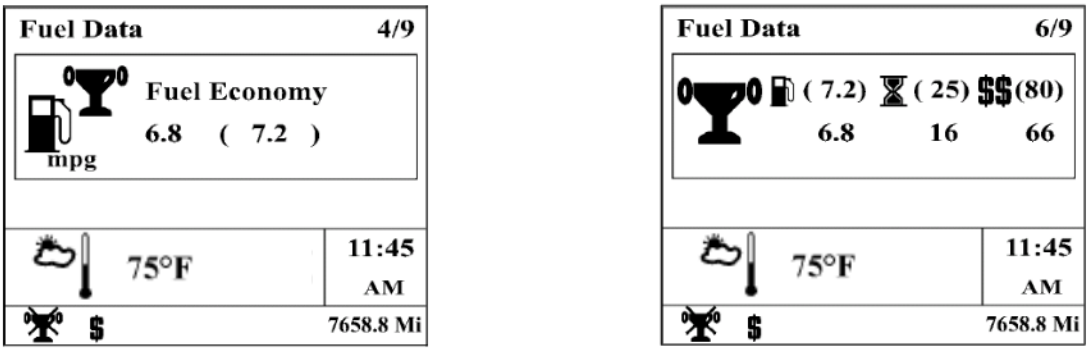


Fig.5 & 6. Use the “Favorite Display Setting” to configure the Driver Display with the Gauge windows to suit each specific case. If only one parameter is being monitored, a single parameter gauge window could be used, see left figure that shows the status of the Fuel economy. When two or more parameters are considered by Performance Bonus, select the combined “Three in one” gauge window shown to the right.

2.8 REWARDING

The driver will be rewarded when all selected Key Performance Indicators (KPI) are met. The driver will be notified by a pop-up message and with the trophy in the toolbar. The message will indicate the new available speed and that the system is ramping-up from the lower to the higher Road Speed Limit. The same procedure is applied when loosing the reward as well, as the system ramps down to the lower speed. The ramping up / down can be configured to occur in up to three steps.

2.9 DRIVER GUIDANCE

The Performance Bonus Guide provides comprehensive feedback to the driver about the optimum engine operating window during a trip through symbols in the Driver Information Display (DID). This operating window is referred to as the engine's “Sweet Spot”.
If adhered to, this results in improved fuel efficiency. The driver incentive is higher speed or other fleet rewards.

2.10 FUEL CONSUMED IN THE SWEET SPOT

The Engine ECU will monitor how much fuel is consumed in the Sweet Spot and compare it to the total fuel consumed. The Driver display will display the ratio between the fuel consumed in the Sweet Spot and the total fuel consumed over the buffer distance. This is referred to as “% Sweet Spot”.

The Performance Bonus Guide is inactive at low vehicle speeds. The engine is designed to allow the driver to stay within the Sweet Spot during most normal operating conditions. There may be situations where it is necessary to operate the engine outside the Sweet Spot – especially with transmissions that have large steps between the gears. However, this will negatively affect fuel consumption.

2.11 SWEET SPOT MAP

In general the Sweet Spot map runs from ~1000 to ~1525 rpm and from low load up to 100% load if the engine speed is below ~1350 and from low load up to 85-90% load for higher engine speeds.

2.12 INFLUENCING FACTORS

Factors having an impact on how easy it is to achieve high % Sweet Spot numbers:

1. Vehicle driveline specification and engine speed at the vehicle’s predominate road speed. Vehicles that are “geared fast run slow” and operate in the 1350 to 1400 rpm range will more easily produce higher numbers, certainly on the cruise control. The upper engine speed limit for maximum engine efficiency is in the 1500 to 1550 rpm range depending on engine load and type.
2. 10-speed transmissions have wider steps than multi-speed transmissions. For this reason multi speed transmissions have a slight advantage over the 10-speeds when trying to operate in the engines Sweet Spot.
3. Driving on the pedal vs. cruise control. Driving on the pedal allows the driver to better take advantage of the topography and reduce events that produce 100% engine load. The Sweet Spot allows full engine load up to ~1350 rpm but only ~90% at higher speeds. Avoiding high speeds and loads improves “% Sweet Spot”.
4. Very flat roads will easily produce high % Sweet Spot numbers by default. Rolling hills and hilly terrain as well as acceleration will require continuous driver attention in order to produce high “% Sweet Spot” numbers. This is where Performance Bonus Guide makes a big difference.
5. Soft Cruise may help in improving the time in the Sweet Spot compared to the standard cruise. However, for best results in hilly terrain, always drive on the pedal and follow the directions in the Driver Display.

Eventually, the driver will learn how to operate the engine in its most fuel efficient window, without even looking at the guiding symbols. A good driver that has learned and adjusted to the way of driving can achieve up to 95-96% Sweet Spot, which means that 95-96% of the fuel is burned at maximum efficiency. A bad driver may see as low as 60-70%. For a normal line haul vehicle it’s recommended to start with a % Sweet Spot target of 90%. *See table:*

GCW \ Trq	1350 Lb-ft	1450 Lb-ft	1550 Lb-ft	1650 Lb-ft	1750 Lb-ft	1850 Lb-ft	2050 Lb-ft
65k Lbs	89%	90%	91%	92%	93%	94%	95%
80k Lbs	87%	88%	89%	90%	91%	92%	93%
110k Lbs	83%	84%	85%	86%	87%	88%	90%
143k Lbs	79%	80%	81%	82%	83%	84%	86%

Fig.7. Table - Sweet Spot target numbers as a function of engine torque vs. GCW

3 DRIVER INFORMATION DISPLAY (DID)

3.1 DRIVING MODE

The Performance Bonus Guide icons are displayed in the DID toolbar at speeds above 20 mph (30 km/h).
The symbols are:

Status Symbols	Meaning
$$	Engine operating in the Sweet Spot. Fuel consumed in this mode will count 100% towards the Sweet Spot percentage
$	Engine operating in a less efficient area of the Sweet Spot. Fuel consumed in this mode will count 50% towards the Sweet Spot percentage
RPM▼	Decrease Engine Speed
RPM▲	Increase Engine Speed
	Decrease Accelerator Pedal
	Increase Accelerator Pedal

Fig.8

The **"$$"** is also used as identifier in the % Sweet Spot Gauge window:

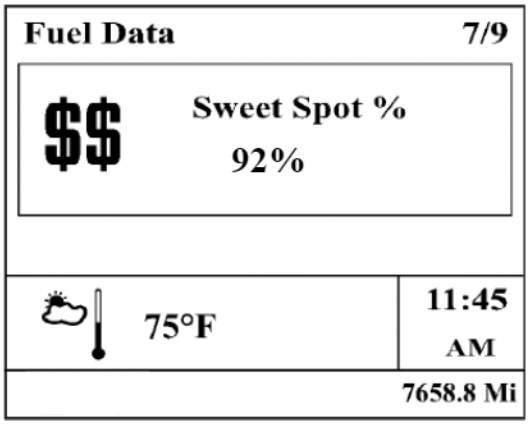
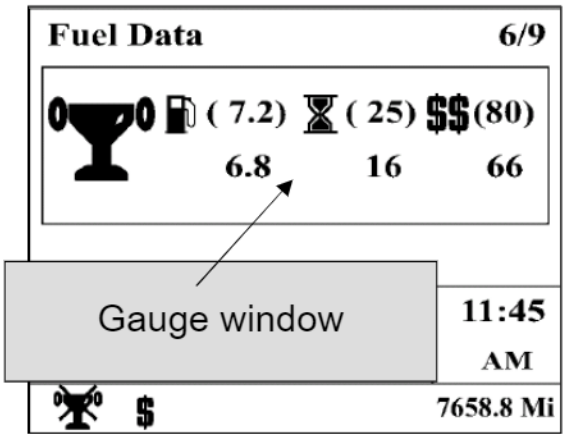


Fig.9

3.2 FAVORITE DISPLAY SETTING

- After programming the Performance Bonus parameters, (see table on last page), the Driver Display must be configured to show the desired gauge window(s).
- This is done in the Main Driver Display menu under Display and then Favorite Display Setting.
- Use the up/down rocker switch on the stalk to move to the desired position in the display and press Enter to select it.
- Use the up/down arrows to find the preferred gauge window and press Enter to select it.
- Press Esc to exit.



3.3 NON-DRIVING MODE

If **Performance Bonus is disabled,** the Sweet Spot percentage data can be reset by resetting the vehicle trip data.

If **Performance Bonus is enabled** and percent Sweet Spot is a considered parameter, there will be two calculations of percent Sweet Spot.

1. Sweet Spot data based on Trip data, which can be reset by resetting the Vehicle Trip data.
2. Sweet Spot data tied to Performance Bonus, which is based on the rolling buffer. This data CANNOT be reset because the rolling buffer cannot be reset.

Because there are two calculations based on different data, there will also be two "% Sweet Spot" numbers. Both values will be displayed simultaneously if the gauge windows for the stand alone Sweet spot and the Performance Bonus Sweet spot are both displayed in the Driver Display. This is not recommended since the numbers will not match, which could be confusing.

Recommendation: If % Sweet Spot is considered with Performance Bonus – only configure the Display to show a gauge window that will show Sweet Spot data related to Performance Bonus. The Performance Bonus gauge window shows both the actual value as well as the target within parenthesis.

The **Total Data** menu displays the percentage of distance the vehicle has spent in the Sweet Spot during the life of the vehicle.

4 VEHICLE REQUIREMENTS

Performance Bonus is supported by all US'07 and late US'04 Volvo engines. Through software reloads, it is also backwards compatible with all US'04 Volvo engines as long as the Engine ECU and the Cluster ECU are of the latest generations.

Vehicles built on or after June 12, 2006 have hardware and software support for Performance Bonus from the factory, meaning the feature can be enabled without any hardware or software upgrades.

4.1 INSTRUMENT CLUSTER, MID 140

HARDWARE:

Mid or High-end cluster of the most recent generation.
The required generation of the Instrument Cluster, was introduced in production on November 7, 2005. Visually it can be distinguished from the earlier instrument cluster by the speed range of the green and red tachometer bands. The new Instrument Cluster has the green band ranging from 1000 rpm to 1600 rpm and the red above 2200 rpm.
Also, during boot-up the Volvo iron-mark is displayed for a few seconds.
Note: Performance Bonus does not work with the Basic cluster!

SOFTWARE:

Instrument Cluster Main software supporting Performance Bonus was introduced in production on June 12, 2006. Cluster Main software P/N: 20915592 or later supports all MID 140 parameters listed in chapter 9.

SOFTWARE UPGRADE:

If any of the MID 140 parameters in chapter 9 are missing, the Main software must be updated through a Cluster ECU reload of MID140.

4.2 ENGINE ECU, MID 128

HARDWARE:

EPA'02/'04: Any Volvo D12D, D16D-EPA'04 with Engine ECU P/N 20561256 & 20814642. The early Engine ECU P/N 20412511 is only partly supporting Performance Bonus and must not be used since the software compatible with this ECU has not been updated to support some necessary parameters such as the "$" area. Also, the "% Sweet Spot" calculation is not correct.

EPA'07: Any Volvo D11F, D13F, D16F engines.

SOFTWARE:

Engine ECU main software supporting Performance Bonus was introduced in production on May 29, 2006.
D12 main software P/N 20926055 or later supports all MID 128 parameters in chapter 9.
D16 main software P/N 20928770 or later supports all MID 128 parameters in chapter 9.

SOFTWARE UPGRADE:

If any of the MID 128 parameters in chapter 9 are missing, the main software must be updated through an ECU reload of MID128.

5 EASY VEHICLE CHECK

Easy check to validate vehicle support for Performance Bonus:

1. Power up the vehicle and make sure the cluster shows the Volvo Iron Mark in the display during boot-up. The green tachometer band ranges from 1200-1600 rpm and the red starts at 2200 rpm. If this is not the case, the cluster hardware is too old.

2. Check Engine ECU for P/N **20561256** or **20814642**. Engine ECU P/N **20412511** does not provide the support.

3. If Engine ECU hardware and Cluster ECU hardware are both OK – Connect VCADS to the vehicle and identify all Engine ECU and Cluster ECU parameters listed in chapter 9. If parameters are missing, a software reload must be performed on the applicable ECU.

Note to Volvo Tech Support:
Vehicle must have EMS 2+ controller and Instrument Cluster IC05.

6 PERFORMANCE BONUS – TM2 SETUP (WITH REWARD)

Rewarding a driver based on fuel mileage is not always fair since the fuel mileage depends on parameters that vary by the day and the mission. Most of these factors are out of control of the driver such as: Payload, weather, wind, temperature, topography, seasonal variations etc. That's why Volvo developed Performance Bonus Guide with Sweet Spot %. Performance Bonus Guide will educate the driver on how to operate for maximum fuel efficiency and judge him based on how well he succeeded in doing this. This will improve the utilization of the engines efficiency and generate the best possible fuel economy for every situation, much less independent of external factors.

Note: Performance Bonus Guide is Standard on all vehicles equipped with Volvo Engines.

Follow the steps below to configure Performance Bonus in the TM2 Sales tool:

1. Go to ENGINE FEATURES Category in TM2

The Standards set in TM2 can be used to start with, but always explain and discuss monitored parameters, target values and buffer size with the customer.

2. Enable Performance Bonus by selecting E7AABX

			Code	FUEL ECONOMY INCENTIVE PROGRAM (ADZ)
○	ⓘ	S	E7AZ1X	WITHOUT PERFORMANCE BONUS PROGRAM (MUST USE ENGINE PARAMETERS WORKSHEET FOR CUMMINS)
◉	ⓘ	O	E7AABX	PERFORMANCE BONUS PROGRAM, REWARD ONLY
○	✖		E7A996	MUST SPECIFY

3. Select Bonus Speed Limit Increase when chosen parameters are achieved

Selects the level that will be awarded when the Performance Bonus targets are met. The chosen speed will be added to the normal Road Speed Limit (RSL).

Note: In no case can the RSL + Bonus speed exceed the maximum speed limit of 87 mph.

			Code	FUEL ECONOMY REWARD, SPEED LIMIT INCREASE (AEB)
○	ⓘ		E8AAAX	PERFORMANCE BONUS REWARD, SPEED LIMIT INCREASE, 1 MPH (1.6 KMH)
○	ⓘ		E8AABX	PERFORMANCE BONUS REWARD, SPEED LIMIT INCREASE, 2 MPH (3.2 KMH)
◉	ⓘ	S	E8AACX	PERFORMANCE BONUS REWARD, SPEED LIMIT INCREASE, 3 MPH (4.8 KMH)
○	ⓘ		E8AADX	PERFORMANCE BONUS REWARD, SPEED LIMIT INCREASE, 4 MPH (6.4 KMH)
○	ⓘ		E8AAEX	PERFORMANCE BONUS REWARD, SPEED LIMIT INCREASE, 5 MPH (8 KMH)
○	✖		E8AZ1X	WITHOUT PERFORMANCE BONUS REWARD, SPEED LIMIT INCREASE
○	✖		E8A996	MUST SPECIFY

4. Select Number of Speed Bonus Steps

Specifies the number of steps that will be used when granting the Performance Bonus speed. Instead of adding / removing the entire speed bonus in one step, it can be introduced in or removed gradually, using the number of steps chosen below.

			Code	NUMBER OF SPEED BONUS STEPS (BTR)
◉	ℹ	S	W6BA1X	NUMBER OF SPEED BONUS STEPS 1
○	ℹ		W6BB1X	NUMBER OF SPEED BONUS STEPS 2
○	ℹ		W6BC1X	NUMBER OF SPEED BONUS STEPS 3
○	✖		W6BZ1X	WITHOUT NUMBER OF SPEED BONUS STEPS
○	✖		W6B996	MUST SPECIFY

5. Select Driver Performance Parameters to consider

Specifies the parameters to consider in the Performance Bonus reward. Sweet Spot only or Sweet Spot and Idle can be chosen. Fuel Economy consideration has been removed as a choice. If a driver can achieve both the Sweet Spot and Idle goals, they will be maximizing fuel economy to the full extent possible.

			Code	DRIVER PERFORMANCE PARAMETERS (AEA)
○	✖	S	0PAZ1X	WITHOUT DRIVER PERFORMANCE BONUS PARAMETERS
○	ℹ		0PAD1X	DRIVER PERFORMANCE BONUS PARAMETER, SWEET SPOT ONLY
◉	ℹ	O	0PAE1X	DRIVER PERFORMANCE BONUS PARAMETERS, SWEET SPOT AND IDLE
○	✖		0PA996	MUST SPECIFY

6. Select Optimized Fuel Economy Indicator

Performance Bonus Guide is Standard on all vehicles equipped with Volvo Engines.

			Code	OPTIMIZED FUEL ECON INDICATOR (FLN)
◉	ℹ	S	0NAA1X	OPTIMIZED FUEL ECONOMY INDICATOR, SWEET SPOT
○	✖		0NAZ1X	WITHOUT OPTIMIZED FUEL ECONOMY INDICATOR
○	✖		0NA996	MUST SPECIFY

7. Select Sweet Spot Target (95% - 20%)

Specifies the percentage of time spent in the Sweet Spot that must be maintained in order to keep the Performance Bonus active. Set Sweet Spot % per table on the next page unless the fleet has had experience with the feature and wants another target value. If the vehicle is equipped with I-Shift, the MID 130 parameters are available as well to use for a Bonus.

			Code	SWEET SPOT TARGET % (FWX)
○	ℹ		W9BP1X	SWEET SPOT TARGET 95%
◉	ℹ	S	W9BO1X	SWEET SPOT TARGET 90%
○	ℹ		W9BN1X	SWEET SPOT TARGET 85%
○	ℹ		W9BM1X	SWEET SPOT TARGET 80%
○	ℹ		W9BL1X	SWEET SPOT TARGET 75%
○	ℹ		W9BK1X	SWEET SPOT TARGET 70%

Sweet Spot Target Guidelines

GCW \ Trq	1350 Lb-ft	1450 Lb-ft	1550 Lb-ft	1650 Lb-ft	1750 Lb-ft	1850 Lb-ft	2050 Lb-ft
65k Lbs	89%	90%	91%	92%	93%	94%	95%
80k Lbs	87%	88%	89%	90%	91%	92%	93%
110k Lbs	83%	84%	85%	86%	87%	88%	90%
143k Lbs	79%	80%	81%	82%	83%	84%	86%

Table - Sweet Spot target numbers as a function of engine torque vs. GCW

8. Select Idle Time Target (50% - 5%)

Specifies the idle time target in percentage that must be maintained in order to keep the Performance Bonus active.

			Code	IDLE TIME TARGET % (ADY)
○	ⓘ		W7BP1X	IDLE TIME TARGET 50%
○	ⓘ		W7BO1X	IDLE TIME TARGET 40%
○	ⓘ		W7BN1X	IDLE TIME TARGET 30%
◉	ⓘ	S	W7BM1X	IDLE TIME TARGET 25%
○	ⓘ		W7BL1X	IDLE TIME TARGET 20%
○	ⓘ		W7BK1X	IDLE TIME TARGET 15%

9. Select Fuel Economy Calculation Distance Interval

Specifies the distance of the “rolling buffer” which will be used for calculating how well the Performance Bonus targets are met. Lower values will give earlier feedback to the driver, but will also be more sensitive to variations in driving conditions. Higher values will average out the variations, but will take longer for the driver to be rewarded.

			Code	FUEL ECONOMY CALC DISTANCE INTERVAL (ADV)
○	ⓘ		4KAD1X	PERFORMANCE BONUS CALCULATION INTERVAL, 100 MILES (160 KM)
○	ⓘ		4KAN1X	PERFORMANCE BONUS CALCULATION INTERVAL, 250 MILES (400 KM)
○	ⓘ		4KAO1X	PERFORMANCE BONUS CALCULATION INTERVAL, 500 MILES (800 KM)
◉	ⓘ	S	4KAP1X	PERFORMANCE BONUS CALCULATION INTERVAL, 1000 MILES (1600 KM)
○	ⓘ		4KAQ1X	PERFORMANCE BONUS CALCULATION INTERVAL, 1500 MILES (2400 KM)
○	ⓘ		4KAR1X	PERFORMANCE BONUS CALCULATION INTERVAL, 2000 MILES (3200 KM)
○	ⓘ		4KAS1X	PERFORMANCE BONUS CALCULATION INTERVAL, 2500 MILES (4000 KM)
○	✖		4KAZ1X	WITHOUT PERFORMANCE BONUS CALCULATION INTERVAL
○	✖		4KA996	MUST SPECIFY

7 PERFORMANCE BONUS II – VCADS SETUP (WITH REWARD)

Follow the steps below to configure Performance Bonus in VCADS

1. Make sure the vehicle requirements are met (See page 9)

This step is only required for vehicles built prior to June 12, 2006.

- Hardware – Vehicle must have Instrument cluster 2005
- Cluster Software
- Engine ECU Software

The easiest way to confirm support for Performance Bonus is to connect VCADS and make sure all MID 128 and MID 140 parameters are available. Mid 130 parameters are only available with I-Shift.

If a required parameter is missing – the applicable ECU needs a software reload.

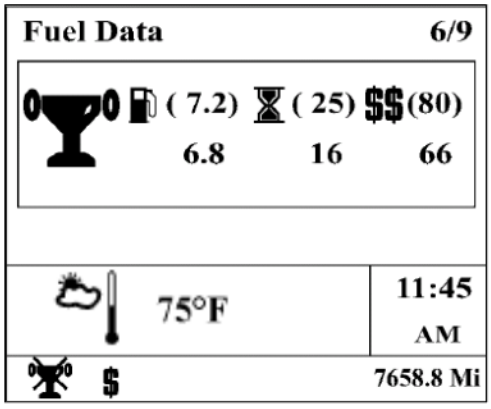
2. Program parameters

Program all MID 128 and MID 140 parameters listed in the table column "PB" in chapter 9 according to customer preference. The values used in the table can be used to start with but always discuss target values and buffer size with the customer. Set Sweet Spot % per table below unless the fleet has had experience with the feature and wants another target value. If the vehicle is equipped with I-Shift, the MID 130 parameters are available as well to use for a Bonus.

GCW \ Trq	1350 Lb-ft	1450 Lb-ft	1550 Lb-ft	1650 Lb-ft	1750 Lb-ft	1850 Lb-ft	2050 Lb-ft
65k Lbs	89%	90%	91%	92%	93%	94%	95%
80k Lbs	87%	88%	89%	90%	91%	92%	93%
110k Lbs	83%	84%	85%	86%	87%	88%	90%
143k Lbs	79%	80%	81%	82%	83%	84%	86%

3. Configure the Driver Display

Use the Favorite Display Setting to program what gauge window(s) should be displayed. See page 8 for details.



4. Test drive

Drive the vehicle faster than 20 mph to verify that the guiding symbols show up in the DID toolbar and make sure the gauge window showing the considered parameters are being populated by numbers and not dashes.

8 PERFORMANCE BONUS GUIDE – VCADS SETUP (W/O REWARD)

Follow the steps below to configure Performance Bonus Guide in VCADS as a stand alone feature when not connected to Performance Bonus (No driver reward wanted).

1. Make sure the vehicle requirements are met (See page 10)

This step is only required for vehicles built prior to June 12, 2006.

- Hardware – Vehicle must have Instrument cluster 2005
- Cluster Software
- Engine ECU Software

The easiest way to confirm support for Performance Bonus Guide is to connect VCADS and make sure the applicable MID 140 parameters in column "PBG only" in chapter 9 are available.
To make sure MID128 is supporting the Sweet Spot – Check if parameter FWZ is available. If not, there is no support for Sweet Spot or there are bugs and the EECU must have a SW reload. (Don't program FWZ; it's just an identifier that the EECU has the right SW)

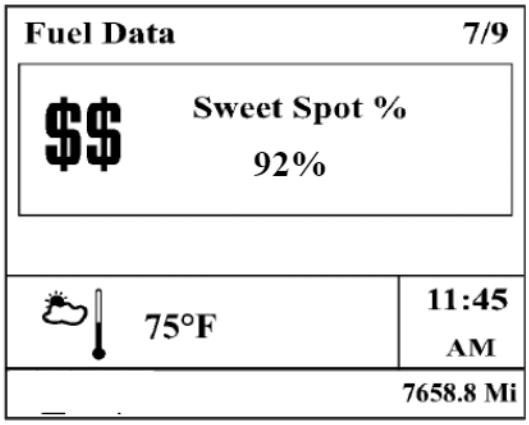
If a required parameter is missing – the applicable MID needs a software reload.

2. Program parameters

Program all three MID 140 parameters shown in the parameter table in column "PBG only" on the last page. (Parameters FLN, HVK and HWH). No MID 128 parameters should be programmed, neither FWZ nor AEB.

3. Configure the Driver Display

Use the Favorite Display Setting to program what gauge window should be displayed. See page 8 for details.



4. Test drive

Drive the vehicle faster than 20 mph to verify that the guiding symbols show up in the DID bottom toolbar and make sure the gauge window showing the considered parameters are being populated by numbers and not dashes.
If no guiding symbols are shown above 20 mph although cluster parameters FLN, HVK and HWH were successfully programmed, the Engine ECU Software is not supporting the feature and a software reload is required.

9 VCADS PARAMETERS FOR PERFORMANCE BONUS (PB) & PERFORMANCE BONUS GUIDE (PBG)

Engine ECU		(The EECU parameter values are examples – customer preference must be considered)			
MID	**ID**	**Name**	**Description**	**PB**	**PBG only**
128	ADZ	Performance Bonus, enable / disable	Enables Performance Bonus in the EECU.	Yes	
128	ADV	Performance Bonus Running Interval	Defines the size of the rolling distance buffer which becomes the database for the calculations. Select a minimum of 1500 miles (2400 km) for speed reward. Set the maximum mileage for monthly non-speed rewards. The system will be in Break-in mode until the buffer has been filled.	3000 miles	
128	AEA	Performance Bonus Mode	Defines the parameter(s) that should be considered for Performance Bonus. It could be one or both of Sweet Spot % and Idle Time.	Idle time and Sweet Spot	
128	FWX	Performance Bonus Sweet Spot Target	Sets the Fleet "% Fuel burned in Sweet Spot" target. 95% is about the maximum that can be achieved when the driver really tries hard. 90% is a good target for normal operations.	90 %	
128	ADX	Performance Bonus Target Fuel	Sets the Fleet "Fuel economy" target. This is the overall number covering drive and idle.	6.2 mpg	
128	ADY	Performance Bonus Target Idle	Sets the Fleet "% Idle time" target.	25%	
128	AEB	Performance Bonus Delta Vehicle Speed	Sets the added vehicle speed when rewarded. RSL plus Bonus cannot be higher than 87mph (140kph).	3 mph	
128	BTR	Performance Bonus, number of steps	Defines in how many steps the ramp-up /down between "normal" and "rewarded" speed should be.	1	
Cluster ECU					
MID	**ID**	**Name**	**Description**	**PB**	**PBG only**
140	DXN	Driver information, Perf Bonus enable	Enables Performance Bonus in the cluster.	On	
140	FLN	Sweet Spot indicator	Enables the Sweet Spot icons in the cluster that guides the driver to the engines Sweet Spot, Fig 1.	On	On
140	HVK	Sweet Spot Trip data	Enables Sweet Spot in the Data logger.	1	1
140	HVI	Performance Bonus Gauge window, Fuel Economy	Enables the gauge window showing Fuel economy status, see Fig. 5.	1	
140	HWI	Performance Bonus Gauge window, Idle Time	Enables the gauge window showing % Idle time status.	1	
140	HWH	Performance Bonus Gauge window, Sweet Spot	Enables the gauge window showing % Sweet Spot status.	3	1
140	HWJ	Performance Bonus Gauge window, Fuel Econ., Idle Time and Sweet Spot	All three parameters shown in one window, Fig. 6.	1	
140	HVJ	Performance Bonus Gauge window, Road Speed Limit	Enables the gauge window showing RSL status.	1	
Transmission ECU (I-Shift only)					
MID	**ID**	**Name**	**Description**	**PB**	**PBG only**
130	IHL	Kick-Down and Performance mode only with Performance Bonus reward. IEO and IEH must be enabled.	If yes the Kick-Down and Performance modes will be enabled only when rewarded.	Yes / No	