



Volvo Chassis - Performance Bonus OBD13 And Newer



> **Internal Content**

[Click](#) here for more information on how to correctly set up and use the Performance Bonus feature on OBD13 and newer Volvo chassis.

NOTE: Engine ECU software must be updated to the latest level.

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Performance Bonus Volvo

Concerns:

Performance bonus function

Complaint:

Since SOP2013 the field has complained about the Performance Bonus feature not working.

Cause:

Testing in a Volvo chassis has revealed that the function does work but there are some issues that prevent the customer from getting the benefit of the function or perceiving the function as non functional including IC error with FE display, Missing parameters, lack of instructions about the function and not understanding fully how to set up the function properly.

This document is intended to be used as the input for the creation of a Performance Bonus document that can be published in the field for the dealers/customers.

Function description.

The Performance Bonus function can reward the driver with an increase of the maximal vehicle speed, depending on how the vehicle is driven.

This function allows the fleet owner to realize fuel savings from the Drivers that previously did not meet the fuel economy, idle time or sweet spot fuel targets by encouraging the drivers to drive more economically and if certain thresholds are met or exceeded they are rewarded with extra vehicle speed or functions.

The Performance Bonus feature considers fuel economy, idle and sweet spot time by calculating the average fuel consumption in km/l, the idle time and the sweet spot fuel in percent during a certain distance.

The function has the following modes:

- No targets
- Fuel economy only
- Idle % only
- Fuel and Idle
- Sweet spot only
- Fuel and Sweet spot
- Idle and Sweet spot
- Fuel and Idle and Sweet

The following should be set by the customer:

- Mode
- Idle time target
- Fuel consumption target
- Sweet spot fuel
- The running interval under which the calculations is made.
- The changes of the road speed limit
- The number of bonus steps.

How Performance Bonus works

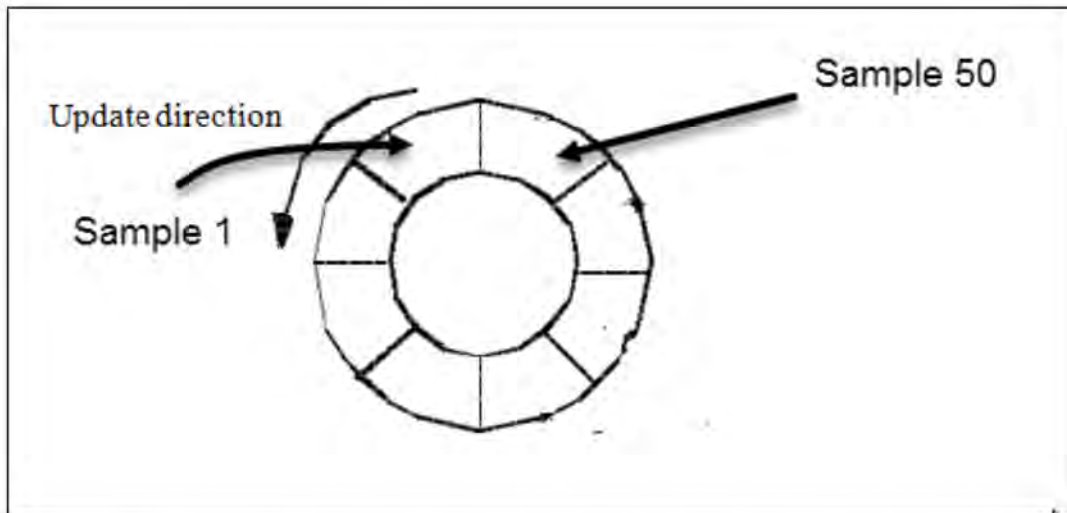
The truck will start out in Bonus when the feature is enabled and set up. The function begins logging the fuel economy, idle time and sweet spot data in the logs within the performance bonus function.

NOTE: The Performance Bonus function stores its own data for fuel consumption, idle time and sweet spot. Because of this the truck totals and the Performance Bonus values can be different. If there is a driver change or a problem with the Performance Bonus the function and its data can be reset by turning the function off and then turning it back on.

The unit is operated and the function stores the data over the Performance Bonus Effective Distance. This distance is divided into 50 equal buckets of information that is recorded and stored in a rolling buffer. At the end of the Performance Bonus Effective Distance the function evaluates the data and determines if the driver can keep the bonus or if he loses the bonus.

For example if the effective distance is set to 1000 miles then each bucket of data will be equal to 20 miles. Each bucket will contain an average of the fuel economy, idle time and sweet spot for the last 20 miles. The averages of all 50 buckets of information are then used to determine if the PB is kept or lost. If a period of bad economy is recorded that affects the PB negatively and causes the Bonus to be lost then that 'Bad' data will remain in the average until it comes back around and is over written by new data. For that reason the effective distance should be large to allow the function to be more stable and average a larger sampling of the data. Shorter effective distances can cause the unit to move into and out of bonus more often leading to driver/customer complaints.

Once it completes the BIP or the effective distance the first time the function will then allow the driver to keep the reward or remove the reward based on the data collected. At the end of the next 20 mile bucket of data the function overwrites the first bucket filled and evaluates the PB reward criteria and determines if the average of the 50 buckets of data will allow the bonus to stay in effect or to remove the bonus. The process continues as long as the function is turned on.



Sample 1 above is the first data collected and the first data overwritten when all buckets are filled.

The number of bonus steps can vary from one to three. If three steps are chosen for example, the Driver is rewarded with 0%, 33%, 67% or 100% bonus.

Example:

P1I0M=Number of steps=3

P1I0O=Distance in a step=20 miles

P1AOC=Customer RSL=60 MPH

AI=CC set speed=66 MPH

P1I0P=Performance Bonus, Vehicle Speed Bonus=6 MPH

	No Bonus 0%	No bonus 0%	Bonus achieved 33%	Bonus achieved 67%	Bonus achieved 100%
Step #			Step 1	Step 2	Step 3
Distance in the step			Ramps up 2MPH over the next 20 miles	Ramps up 2MPH over the next 20 miles	Ramps up 2MPH over the next 20 miles
RSL	60	60	62	64	66
CC Max speed	60	60	62	54	66

Changes of the maximum road speed limit are never made when the vehicle is moving slowly (<30km/h; 18 mph).

If the number of steps is set to 1 then the distance in a step does not apply. The distance in a step only applies if the number of steps is 2 or 3.

If the number of steps is set to 1, then after the IC message appears that indicates that the Performance bonus was achieved or not achieved, there is a 120 second delay before the Max speed is increased or decreased at a rate of ½ mph/minute until the max bonus is applied.

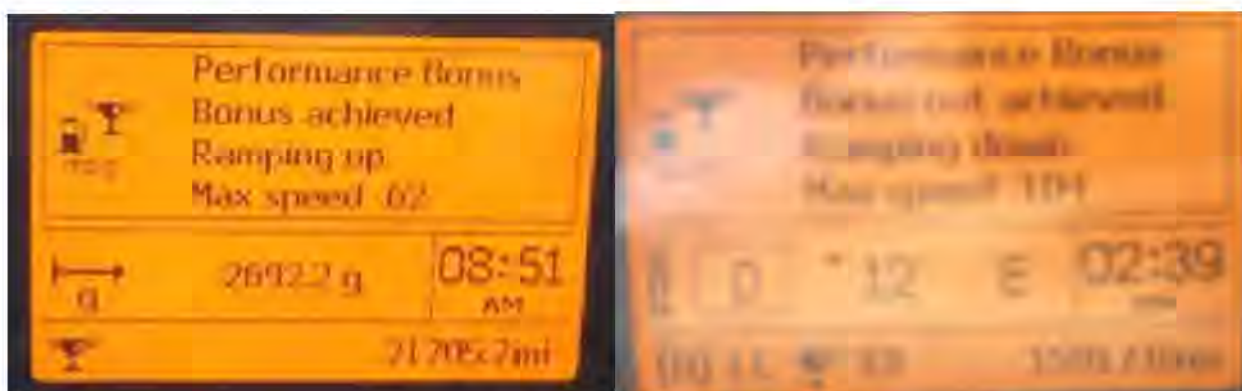
If the number of steps is set to 2 or 3 then the same 120 second delay applies when the message appears in the DID and then the speed will begin to ramp up or down based on the number of steps and the distance in a step values.

If the bonus is lost and is ramping down and has not removed the entire bonus and the vehicle is stopped and the key is turned off then the bonus will be completely ramped down to the base customer RSL when the key is turned back on.

If the Bonus has been achieved and has been completely applied (customer RSL+ Bonus speed) or is in the process of ramping up to the Max RSL with bonus and the vehicle is stopped and the key is turned off the ramp will return to the customer RSL and the ramp will be started over.

When the Performance Bonus function evaluates and the bonus is achieved or lost, there is a message displayed to the driver about this. The message also tells what the current Max speed is, not what the target speed is. This message also appears at key on.

If the driver has the CC set when the message appears the Max speed displayed is the current CC set speed. If the CC is on and set to the Max speed without bonus when the bonus is achieved the CC set speed does not ramp up on its own. Only the limit increases. However if the bonus is lost and the vehicle is in Cruise control and set at a speed greater than the base speed without bonus then the Vehicle speed will slowly ramp down over the distance in a step distance X the Number of steps.



If the unit has a manual gearbox and the Differential RSL is turned on then the IC may display the following message if the bonus is achieved and the unit is in any gear other than top gear. In this case the Max speed displayed is the Differential RSL.



How to set up Performance Bonus

For OBD13 and later the settings in the IC are for display purposes only. The engine makes all the decisions about performance bonus however the values have to be set up in both places so the driver will know what his targets are.

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
To turn on Performance Bonus						
P1I0G	Performance Bonus, Enable	EECU	0	1		Enables the Performance Bonus feature. 0 = Disabled 1 = Enabled
DXN	Performance Bonus II – Enable Feature in Display	IC	0	1		Enables Performance Bonus in the Driver Display. 0 = Disabled 1 = Enabled

When P1I0G is enabled the parameter must be programmed first then the parameter programming function exited and restarted to show the hidden parameters P1I0H, P1I0J and P1I0K.

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
What values do you want considered for Performance Bonus						
P1I0L	Performance Bonus, Parameters	EECU	0	7		Sets the Performance Bonus running mode: 0 = No targets 1 = Fuel 2 = Idle 3 = Fuel and Idle 4 = Sweet spot 5 = Fuel and Sweet spot 6 = Idle and Sweet spot 7 = Fuel and Idle and Sweet spot

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
Depending on the selection you made with Parameter P1I0L set the following parameters as needed.						
Set Fuel economy values						
P1I0H	Performance Bonus, Fuel Consumption, Target Value	EECU	1.2(3.0)	4.1(9.6)	km/l(mpg(US))	Specifies the fuel consumption [km/l] target value for the Performance Bonus function. Not Visible unless P1I0G is enabled.
ADX	Performance Bonus Target Fuel	IC	1.2(3.0)	4.1(9.6)	km/l(mpg(US))	This parameter will set the target value in the IC display. Currently there is a rounding error in the IC display of this data that causes the IC to display a target value less than what you enter with Tech Tool. The actual entered number may need to be increased a bit to get the IC to display the correct target value.

Set Idle time values						
P1I0J	Performance Bonus, Idle Time, Target Value	EECU	0	80	%	Specifies the percentage value for Idle time below which the driver gets a performance bonus. Not Visible unless P1I0G is enabled.
ADY	Performance Bonus Target Idle	IC	0	80	%	Percent idle time target displayed to the driver
Set up Sweet Spot						
P1I0K	Performance Bonus, Sweet Spot, Target Value	EECU	0	100		Specifies the amount of time the driver must spend in the sweet spot to get a performance bonus. Not Visible unless P1I0G is enabled.
FWX	Performance Bonus Sweet-spot Target	IC	0	100	%	Percent sweet spot fuel target Displayed to the driver

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
Turn on readings in the IC						
HVK	Performance Bonus Guide - Enable Sweet Spot Data	IC	0	1		Enables Sweet Spot Data in the Datalog Menu. 0 = Disabled 1 = Enabled
HWH	Performance Bonus II - Enable Sweet Spot Gauge	IC	0	1		Enables the Performance Bonus Sweet Spot gauge 0 = Disabled 1 = Enabled
HWJ	Performance Bonus II - Enable Summary Gauge	IC	0	1		Enables the Performance Bonus Summary gauge. The gauge window shows Fuel Economy, Idle Time and Sweet Spot all together. This gauge window is recommended when more than one target parameter is selected. 0 = Disabled 1 = Enabled
HVJ	Performance Bonus II - Enable RSL Gauge	IC	0	1		Enables the Performance Bonus Road Speed Limit Gauge 0 = Disabled 1 = Enabled

HVI	Performance Bonus II - Enable Fuel Economy Gauge	IC	0	1		Enables the Performance Bonus Fuel Economy gauge. 0 = Disabled 1 = Enabled
HWI	Performance Bonus II - Enable Idle Time Gauge	IC	0	1		Enables the Performance Bonus Idle Time gauge. 0 = Disabled 1 = Enabled
FLN	Performance Bonus Guide with Sweet Spot - Enable	IC	0	1		Enables guiding icons in the driver display. The icons will guide the driver to the engines most efficient operating zone - the sweet spot. 0 = Disabled 1 = Enabled This is the '\$\$' signs in the IC.

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
How do you want the function to work						
P1I0M	Performance Bonus, Number of Steps	EECU	0.0	3.0		Specifies the number of steps for the Performance Bonus. There are 1-3 steps. If three steps are chosen for example, the Driver is rewarded with 0%, 33%, 67% or 100% bonus.
P1I0O	Performance Bonus, Distance in a Step	EECU	5(3.1)	800(497.0)	km(miles)	The minimum distance in a step for the Performance Bonus function.
P1I0P	Performance Bonus, Vehicle Speed Bonus	EECU	0.0	40(24.8)	km/h(mph)	The delta value to adjust the customer vehicle speed limit for the Performance Bonus function.
P1I53	Performance Bonus Effective Distance	EECU	150(93.2)	17000(10563.3)	km(miles)	The effective distance, all mean values relates to this distance.
P1AOC	Customer Road Speed Limit	EECU	30(18.6)	140(87)	km(miles)	"Specifies the customer selectable maximum speed

						the vehicle can operate on level road. The vehicle speed will be limited by the lowest of the following: Customer Road Speed Limit (P1AOC), Road Speed Limit (P1ALV) and Secondary Road Speed Limit (Request via CAN-signal from Bodybuilder Module) if available. For performance bonus: Any additional speed granted by the Performance Bonus feature will be added to the Customer Road Speed Limit (P1AOC) value, as (so) long as the overall maximum of 140km/h (87 MPH) is not exceeded. Max Cruise Control Speed must be set less than or equal to the accelerator-pedal maximum specified by the Customer Road Speed Limit (P1AOC) value."
AI	Cruise control max speed	VECU	30(18.6)	140(87)	km(miles)	The maximum speed that can be set in the cruise control. This setting must be set to the value of P1AOC + the value of P1I0P.

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
For Units with iShift						
P1IK0	Performance Bonus II, Enable K-D and P as Reward	TECU	0	2		Enables the Kick-Down and /or the Performance mode only when the driver is rewarded by Performance Bonus II. This feature requires that at least one of the parameters P1AP3, (Enable Performance Mode) and P1APZ, (Enable Kick-Down) are enabled. 0 = Disable 1 = Enable 2 = Reserved for future use
P1AP3	Transmission Performance Mode	TECU	0	2		The transmission will automatically return to Economy mode when the engine is no longer operating under high load when set to Auto: 0 = Manual 1 = Auto 2 = Disable
P1APZ	Transmission Kickdown Mode	TECU	0	2		Defines when the Kickdown function is available. 0 = Not available 1 = Always available 2 = Only available in Economy mode

Set up notes

Sweet Spot

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.

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%

Instrument cluster symbols

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

Parameters and what they control

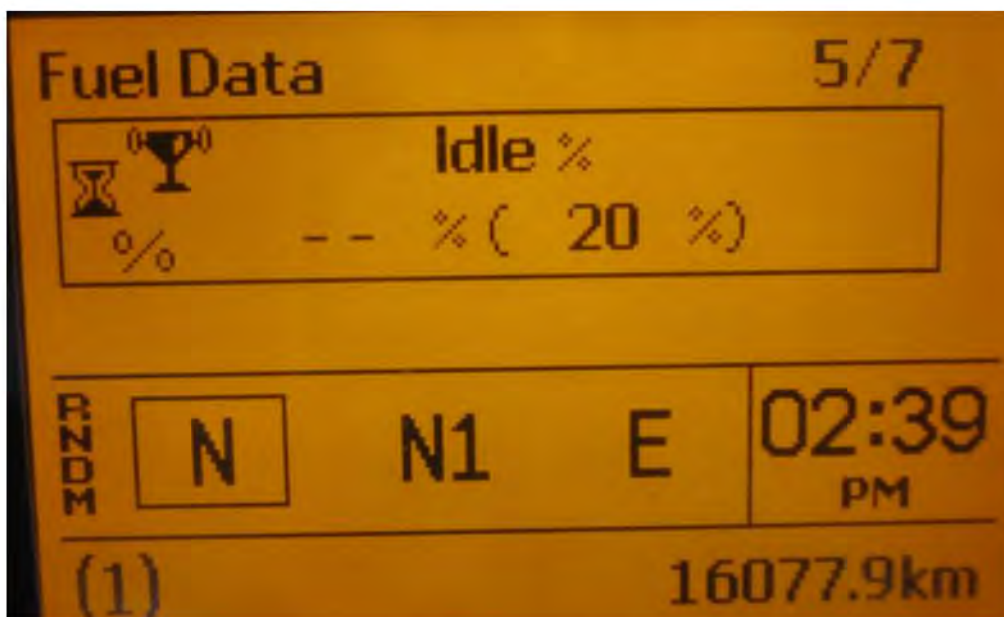
The Performance Bonus displays can be accessed in the Instrument Cluster (IC) under the Fuel Data selection.



IC parameter HVJ turns on the RSL limit gage in the IC and will display the current maximum RSL. This value includes any bonus that is applied.



IC parameter HVI turns on the Fuel Economy gage. The limit in the '()' is the value that is entered in the IC parameter for the fuel economy target. The '- -' will display the fuel economy average that is stored in the Performance Bonus function. This may be different than the fuel economy that is displayed by the truck.



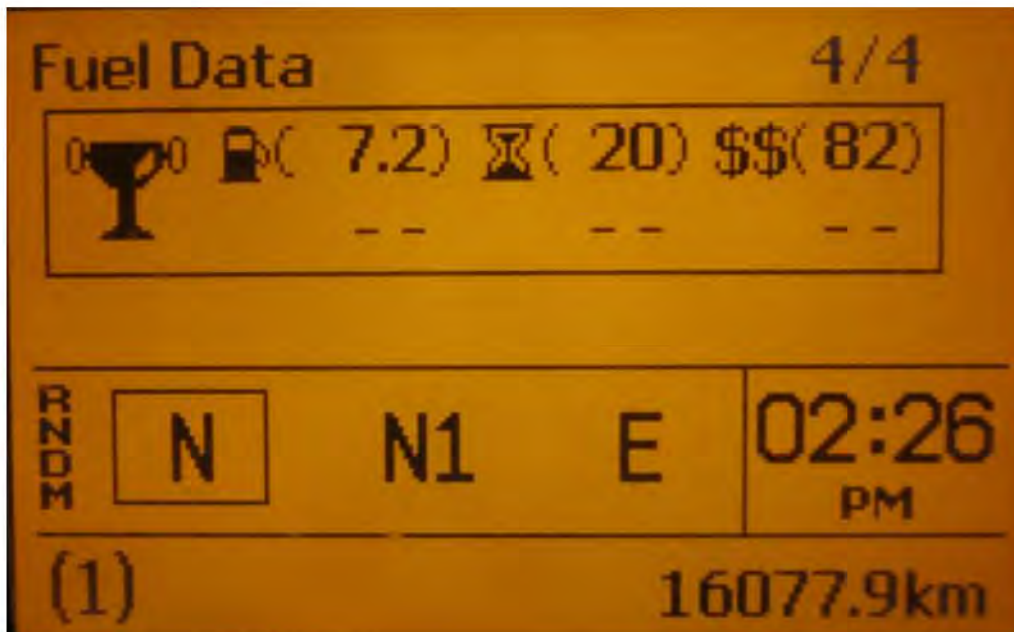
IC parameter HWI turns on the idle time gage. The limit in the '()' is the value that is entered in the IC parameter for the idle time target. The '- -' will display the idle time average that is stored in the Performance Bonus function. This may be different than the idle time that is displayed by the truck.

Fuel Data		7/9
\$\$ Sweet Spot % 88% (90%)		
☁ 75°F		11:45 AM
0/00 \$\$		7658.8 Mi

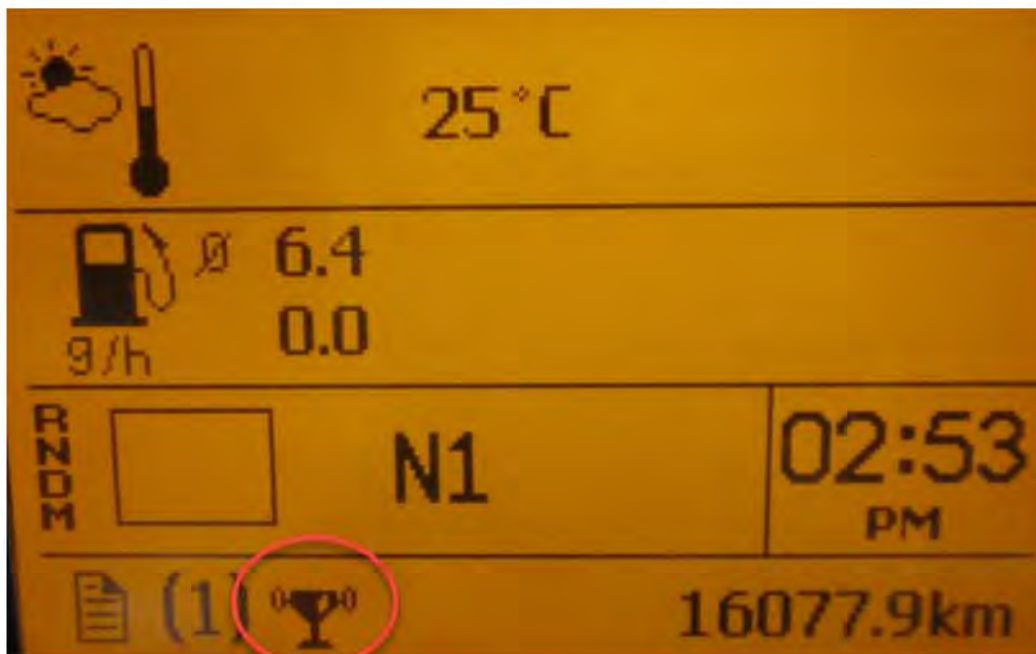
Fuel Data			5/5
\$\$ Sweet Spot % 92 %			
RZDP	N	N1	E
	02:34 PM		
(1)	16077.9km		

IC parameter HWH turns on the sweet spot gage. The limit in the '()' is the value that is entered in the IC parameter for the sweet spot % target. The '- -' will display the sweet spot % average that is stored in the Performance Bonus function. This may be different than the sweet spot % that is displayed by the truck.

Note: If not using Performance Bonus. Sweet Spot data is tied to Trip data, which can be reset by resetting the Vehicle Trip data. If connected to Performance Bonus, the Sweet Spot data is connected to a rolling buffer, and can't be reset using Vehicle Trip data.



IC parameter turns on the Performance bonus summary gage. This gage can be used even if the other individual gages are turned off and it will display all the data shown here even if the data is not being used as a bonus item. The limit in the '()' is the value that is entered in the IC parameter for the respective data target. The '- '-will display the average that is stored in the Performance Bonus function. This may be different than what is displayed by the truck.



Parameter P1I0G enables the performance bonus function in the engine ECU. When the function is first enabled and set up the 'Bonus' icon will appear and the driver will receive the maximum bonus of the function for the first break in period called the effective distance. This ICON will be as seen here or displayed with an 'X' through it if the driver does not meet all the PB requirements.