



Mack Chassis - Performance Bonus Configuration Instructions And Information - US10+OBD13 And Newer Emissions (16 Pin Diagnostic Connector)



> Internal Content

For Performance Bonus Configuration information and instructions, refer to the document below.

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

 [Performance Bonus Mack OBD13 And Newer.pdf](#)

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Performance Bonus Mack

Concerns:

Performance bonus function

Complaint:

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

Cause:

Testing in a Mack 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. The function can also give a penalty and decrease the limit.

The fleet owner will by this feature realize fuel savings from the Drivers that previously did not meet the fuel economy.

The Performance Bonus/Penalty feature considers fuel economy by calculating the average fuel consumption in km/l during a certain distance.

It is possible to use the feature in four different ways:

- Deactivated
- Bonus mode
- Penalty mode
- Bonus and Penalty mode

Target values for fuel consumption are set, and if the target values according to current mode are reached the driver is rewarded with an increased road speed limit. If performance drops below the penalty targets the driver gets a decreased road speed limit. There are different targets for bonus and penalty mode.

During the first running interval no changes between bonus or penalty stages are allowed.

The following should be set by the customer:

- Bonus and/or Penalty functionality.
- Fuel consumption target (penalty and bonus).
- The running interval under which the calculations is made.
- The changes of the road speed limit (penalty and bonus).
- The number of bonus steps

How Performance Bonus works

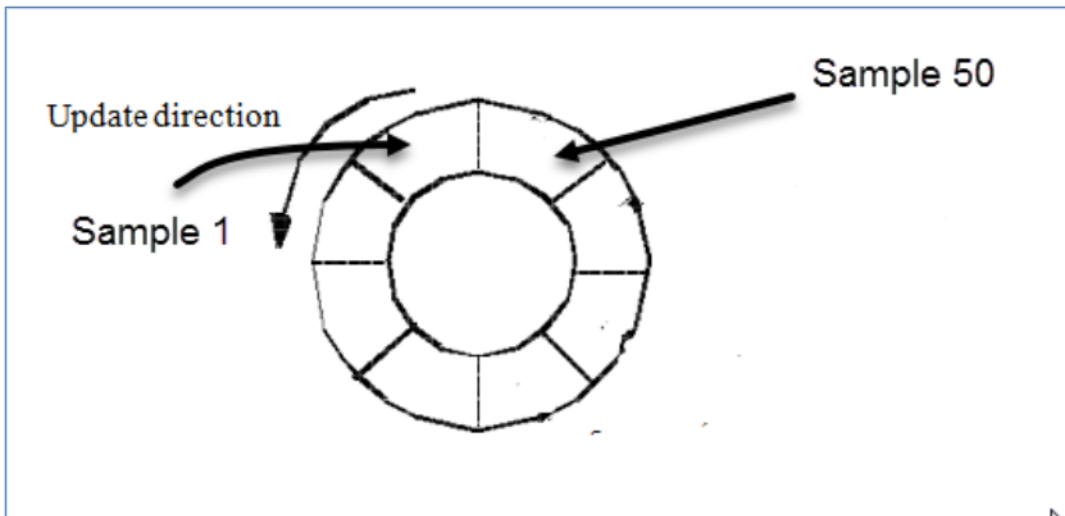
The truck will not start out in Bonus when the feature is enabled and set up. The function begins logging the fuel economy data in the logs within the performance bonus function in the Engine ECU.

NOTE: The Performance Bonus function stores its own data for fuel consumption. 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, loses the bonus or gets a penalty applied.

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.

When the Performance Bonus is turned on and set up the first time or is reset by turning the EECU parameter for enabling Performance Bonus off and back on the unit is in the 'Break in period'(BIP). Once it completes the BIP or the effective distance the first time the function will then award the driver the RSL increase reward or apply a RSL penalty 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 criteria and determines if the average of the 50 buckets of data requires the BP settings to be adjusted. The process continues as long as the function is turned on.



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

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.

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 Performance bonus was achieved or not achieved or a penalty is applied, there is a 120 second delay before the Max speed is increased or decreased at a rate of $\frac{1}{2}$ mph/minute until the max bonus/penalty is applied.

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

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

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.

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.

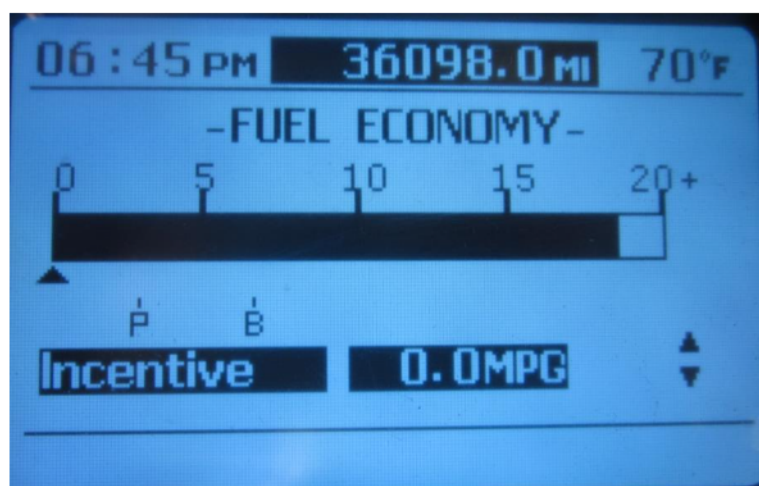
The same is true when the penalty is applied or removed.

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.

If the Chassis was not ordered with the Performance Bonus feature run accessory kit 85151352 to turn on the Performance Bonus Icons in the IC Fuel economy display.

After the accessory kit is run there will be a new fuel economy display available in the IC display that shows the fuel economy from the Performance Bonus function in the graph and below that the 'P' indicates the limit to exceed to not get the penalty and the 'B' indicates the limit needed to get the Bonus.



To turn on Performance Bonus						
Parameter/DOID	Name	ECU	Min	Max	Unit	Description
P1I0G	Performance Bonus, Enable	EECU	0	1		Enables the Performance Bonus feature. 0 = Disabled 1 = Enabled
85151352	Conversion kit	IC				Run this kit in Tech Tool to turn on the Performance bonus display in the Instrument Cluster fuel economy menu.

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
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.
P1I0I	Performance Bonus, Fuel Consumption, Penalty Target Value	EECU	1.2(3.0)	4.1(9.6)	km/l (mpg(US))	Specifies the Minimum fuel consumption [km/l] target value for the Performance Bonus penalty function.
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
FXA	Performance Bonus Penalty 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

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.
P1I0Q	Performance Bonus, Vehicle Speed Penalty	EECU	0	40(24.8)	km/h (mph)	The amount of speed penalty to apply if P1I0I is not achieved.
P1I53	Performance Bonus Effective	EECU	150(93.2)	17000 (10563.3)	Km (miles)	The effective distance, all mean values relates to this distance.

	Distance					
P1I0I	Performance Bonus, Fuel Consumption, Penalty Target Value	EECU	1.27	4.1		Specifies the penalty target value for fuel consumption [km/l]. Below this target value the driver will lose speed as a penalty.
P1I0N	Performance Bonus, Function Mode	EECU	0	2		Sets the Performance Bonus function mode. 0 = Bonus 1 = Penalty 2 = Bonus and Penalty
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 markets that use 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. Any speed penalty imposed by the Differential Road Speed Governor will be subtracted from this maximum value.
AI	Cruise control max speed	VECU /EECU	30(19)	140(87)	Km/h (MPH)	Max CC set speed. Must be set to the value of P1AOC + P1I0P

Parameter/DOID	Name	ECU	Min	Max	Unit	Description
For Units with mDrive						
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