



Mack Chassis - Performance Bonus Configuration; Instructions And Information - US10



> Internal Content

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Performance bonus, function description

Function description

The performance bonus feature can reward the driver with an increase of the maximal vehicle speed, depending on how the vehicle is driven. The feature can also give a penalty and decrease the maximal speed.

With the help of this feature, the fleet owner may realize fuel savings from drivers that previously did not meet the fuel economy target.

The performance bonus 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 the penalty targets are not reached, then 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 start out in bonus when the feature is enabled and set up. The feature begins logging the fuel economy data in the logs within the performance bonus function in the ECM (Engine Control Module).



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 performance bonus feature off and then turning it back on.

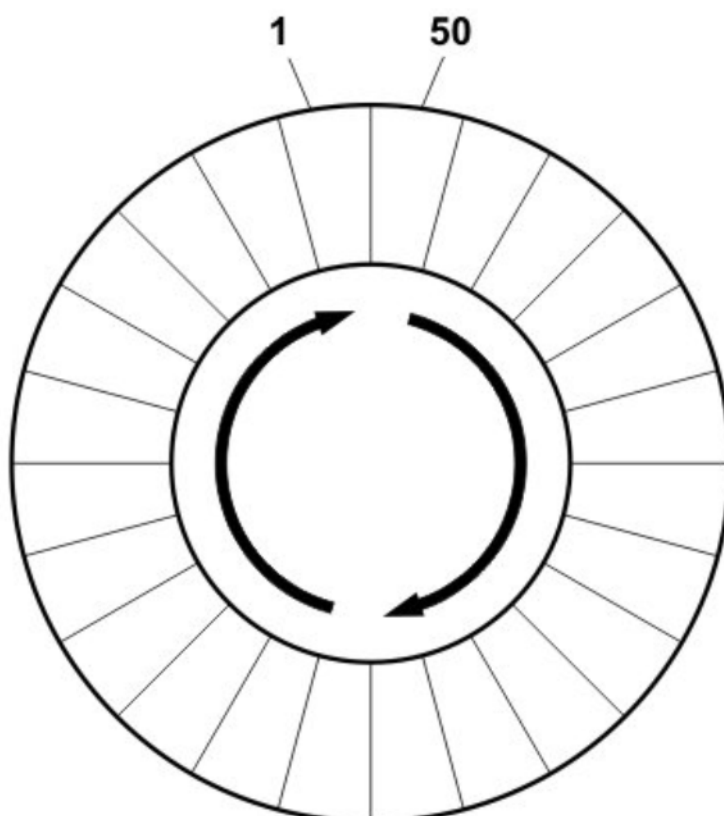
The vehicle is operated and the function stores the data over the performance bonus effective distance. The performance bonus effective distance is divided into 50 equal buckets of information (data buckets) that are recorded and stored in a rolling buffer. At the end of the performance bonus effective distance, the function evaluates the data and determines if the driver keeps the bonus, loses the bonus, or is penalized.

For example, if the effective distance is set to 1000 miles, then each data bucket will be equal to 20 miles (1000 performance bonus effective distance miles divided by 50 data buckets equals 20 miles per data bucket). Each data bucket will contain an average of the fuel economy for the last 20 miles. The averages of all 50 data buckets are then used to determine if the performance bonus is kept or lost.

If a period of bad economy is recorded that affects the performance bonus negatively and causes the bonus to be lost, that bad economy data will remain in the average until it comes back around and is overwritten by new data. For that reason, the effective distance should be large enough to allow the function to be more stable and average a larger sampling of the data. Shorter effective distances can cause the vehicle to move into and out of bonus more often, leading to driver/customer complaints.

When the performance bonus feature is turned on and set up for the first time, or is reset by the ECM, the performance bonus function will turn off for a moment and then back on. During this time, the vehicle will be in BIP (Break In Period). Once the vehicle completes the BIP or the effective distance for 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 data bucket, the function overwrites the first data bucket filled, evaluates the performance bonus reward criteria, and determines if the bonus can be retained or if the bonus must be removed, based on the average of the 50 data buckets. This process continues as long as the performance bonus feature is turned on.

Data buckets



1	Sample 1 (data bucket 1)
50	Sample 50 (data bucket 50)

Sample 1 is the first data collected and it will be overwritten when all the 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 (Road Speed Limiter) = 60 mph

AI = CC (Cruise Control) set speed = 66 mph

P1I0P = Performance bonus, vehicle speed bonus = 6 mph

Performance bonus step

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

When the vehicle is moving slowly (<30 km/h (18 mph)), the maximum RSL will not change.

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, a message appears in the DID (Driver Information Display) to indicate that the performance bonus was achieved or not achieved. There is a 120 second delay before the maximum speed is increased or decreased at a rate of 1/2 mph/minute until the maximum 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 the step values.

If the bonus is lost and is ramping down, and the function has not removed the entire bonus, and the vehicle is stopped and the key is turned off, 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 completely applied (customer RSL+ bonus speed) or the function is in the process of ramping up to the maximum RSL with bonus and the vehicle is stopped and the key is turned off, the ramp up will return to the customer RSL and the ramp up will be started over.

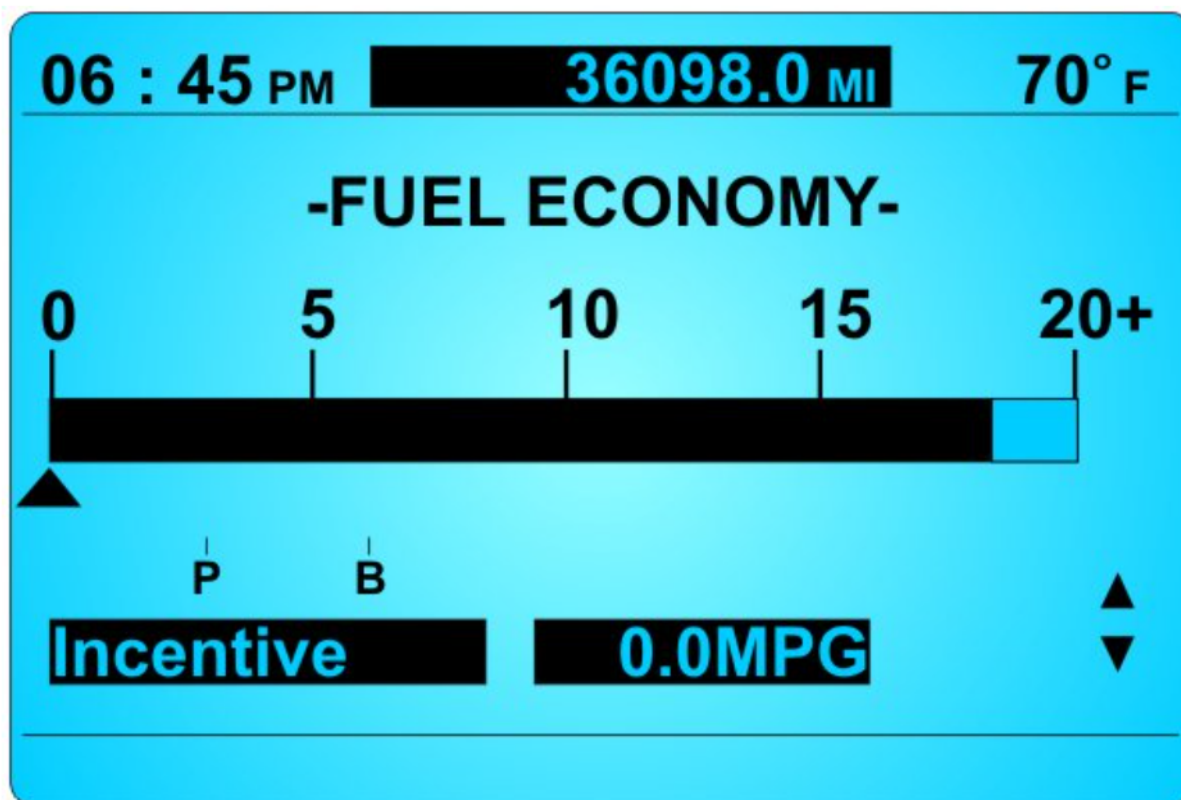
If the CC is on and set to the maximum speed without bonus, the CC set speed does not ramp up on its own when the bonus is achieved. Only the limit increases. However, if the bonus is lost and the vehicle is in cruise control and set at a speed greater than the base speed without bonus, then the vehicle speed will slowly ramp down over the distance in a step distance X.

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

How to set up performance bonus

For OBD2013 (On Board Diagnostics) and later, the settings in the instrument cluster are for display purposes only. The ECM makes all the decisions about performance bonus. However, the values have to be set up in the ECM and in the instrument cluster so the driver will know what the targets are.

If the vehicle was not ordered with the performance bonus feature, an accessory kit (85151352 - for the Premium Tech Tool) can be used to turn on the performance bonus icons in the instrument cluster FUEL ECONOMY display.



After enabling the performance bonus feature using the accessory kit, a new FUEL ECONOMY graph will be displayed in the instrument cluster which shows the fuel economy from the performance bonus function. In the graph, the P indicates the limit to exceed to avoid the penalty and the B indicates the minimum limit needed to get the bonus.

To turn on performance bonus

Parameter/DOID (Diagnostic Operation Identifier)	Name	ECU (Electronic Control Unit)	Minimum	Maximum	Unit	Description
P110G	Performance bonus, enable	ECM	0	1	no unit	Enables the performance bonus feature. 0 = Disabled 1 = Enabled
85151352	Conversion kit	Instrument cluster				Run this kit in Premium Tech Tool to turn on the performance bonus display in the instrument cluster fuel economy menu.

Set fuel economy values

Parameter/DOID (Diagnostic Operation Identifier)	Name	ECU	Minimum	Maximum	Unit	Description
P1I0H	Performance bonus, fuel consumption, target value	ECM	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	ECM	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	Instrument cluster	1.2 (3.0)	4.1 (9.6)	km/l (mpg(US))	This parameter will set the target value in the instrument cluster display.
FXA	Performance bonus penalty fuel	Instrument cluster	1.2 (3.0)	4.1 (9.6)	km/l (mpg(US))	This parameter will set the target value in the instrument cluster display.

How do you want the function to work

Parameter/DOID (Diagnostic Operation Identifier)	Name	ECU	Minimum	Maximum	Unit	Description
	Performance					Specifies the number of steps for the performance bonus. There are 1-3

P1I0M	bonus, number of steps	ECM	0	3.0	no unit	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	ECM	5.0 (3.1)	800 (497)	km (miles)	The minimum distance in a step for the performance bonus function.
P1I0P	Performance bonus, vehicle speed bonus	ECM	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	ECM	0	40 (24.8)	km/h (mph)	The amount of speed penalty to apply if P1I0I is not achieved.
P1I53	Performance bonus effective distance	ECM	150 (93.2)	17000 (10563.3)	km/h (mph)	The effective distance. All mean values relates to this distance.
P1I0I	Performance bonus, fuel consumption, penalty target value	ECM	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	ECM	0	2		Sets the performance bonus function mode. 0 = Bonus 1 = Penalty 2 = Bonus and Penalty
						Specifies the customer selectable maximum speed

P1AOC	Customer RSL	ECM	30(18.6)	140 (87)	km/h (mph)	the vehicle can operate on level road. The vehicle speed will be limited by the lowest of the following: customer RSL (P1AOC), RSL (P1ALV) and secondary RSL (request via CAN (Controller Area Network)-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 RSL (P1AOC) value, as (so) long as the overall maximum of 140 km/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 maximum speed	VECU (Vehicle Electronic Control Unit)/ECM	30 (19)	140 (87)	km/h (mph)	Maximum CC set speed. Must be set to the value of P1AOC + P1I0P.

For the vehicle with mDrive (mDRIVE)

Parameter/DOID (Diagnostic Operation Identifier)	Name	ECU	Minimum	Maximum	Description
P1IK0	Performance bonus II, enable kickdown and performance mode as reward	TECU (Transmission Electronic Control Unit)	0	2	Enables the kickdown and/or the performance mode only when the driver is rewarded with performance bonus II. This feature requires that at least one of the parameters P1AP3 (enable performance mode) and P1APZ (enable kickdown) 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	TECU	0	2	Defines when the Kickdown function is available. 0 = Not available

	kickdown mode				1 = Always available 2 = Only available in economy mode
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