NAVISTAR ENGINE GROUP

MaxxForce® 11 and 13 (2010)

Overview: *MaxxForce Engine Brake by Jacobs®*

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General Overview: MaxxForce Engine Brake by Jacobs®

The MaxxForce Engine Brake by Jacobs® feature is used to supplement the function of the primary braking system. This feature helps to decelerate the vehicle and maintain a steady speed on declines.

This document will address the unique MaxxForce Engine Brake by Jacobs® functionality for the MaxxForce® 11 and 13.

Description and Operation

The MaxxForce Engine Brake by Jacobs® feature consists of two operator control switches:

The ON/OFF switch allows the operator to enable or disable the system.

The level selection switch allows the operator to select from three settings:

Level 1: Low

Level 2: Medium

Level 3: High

Operation

When the enable switch is placed in the ON position, two visual indicators are displayed. The MaxxForce Engine Brake by Jacobs® ON/OFF switch LED and the yellow ENGINE BRAKE symbol in the gauge cluster turns ON.

The MaxxForce Engine Brake by Jacobs® feature will operate when the following interlock conditions are satisfied:

- Cab mounted MaxxForce Engine Brake by Jacobs® ON/OFF switch must be set to ON.
- Vehicle Brake Control Mode (7000) must not be disabled.
- Clutch pedal must be released.
- Accelerator pedal must be fully released.
- There must be no active vehicle speed sensor (VSS) faults.
- There must be no active truck or trailer anti-lock brake (ABS) faults.
- Vehicle must be in gear.
- Vehicle speed must be greater than the value of the Engine Retarder Minimum Vehicle Speed parameter (7002).
- Engine speed must be higher than a minimum speed calibrated.
- Oil temperature must be in the operating range calibrated.

Service Brake Option

The Vehicle Brake Control Mode (7000) parameter allows the customer to select one of two optional modes of service brake pedal activation:

- Engine Brake Mode (1): Service Brake Latched

- Engine Brake Mode (2): Service Brake Coast

Cruise Control Option

The Cruise Control optional feature allows the MaxxForce Engine Brake by Jacobs® to activate automatically during cruise control operation to help maintain the desired set speed.

Feature Interaction

The MaxxForce Engine Brake by Jacobs® feature interacts with the following engine features:

- Cruise Control – The MaxxForce Engine Brake by Jacobs® feature can be activated automatically during cruise control operation.
- Vehicle Speed Governor – Behaves similarly to the interaction between MaxxForce Engine Brake by Jacobs® and Cruise Control.
- Power Take-Off (PTO) – The MaxxForce Engine Brake by Jacobs® feature will not function in PTO mode.
- Eaton Ultrashift® Transmission – Requires specific parameter set-up.

Programmable Parameters

The following programmable parameters are available with the MaxxForce Engine Brake by Jacobs® feature. Full benefits of this feature will be realized when programming is done based on the vehicle conditions expected.

Parameters indicated as customer programmable can be adjusted differently than the production assembly plant setting to meet the customer's needs. If the parameter is indicated as non-customer programmable, the parameter setting is preset from the factory and can't be changed without dealer authorization.

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
Vehicle Retarder Control Mode (7000)	This parameter determines the conditions that the Engine Brake feature will be functional. If set to (0) - The Engine Brake functionality is disabled. If set to (1) - The Engine Brake is active programmable time after service brake has been pressed (See Note 2). Also, the accelerator pedal must not be pressed. If set to (2) - The Engine Brake is active programmable time after the service brake pedal has been pressed and remains pressed (See Note 2). If set to (3) - The Engine Brake is active programmable time after the accelerator pedal is released (See Note 1).	**0**: Disable **1:** Service Brake Latched **2:** Coast **3:** Latched **Note 1:** The time is programmable by parameter (7008). **Note 2:** The time is programmable by parameter (7001).	YES	Customer Chosen

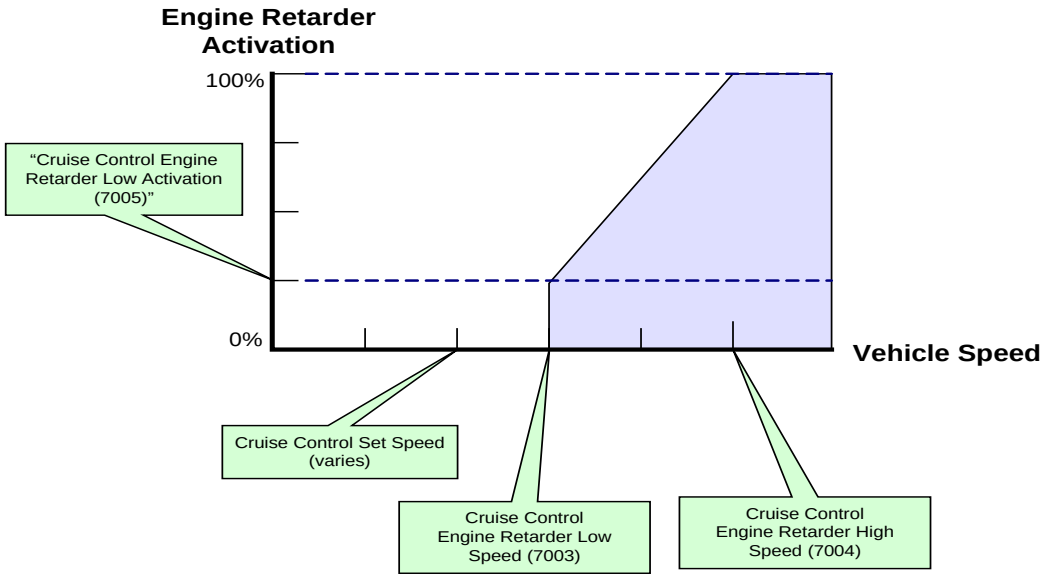
Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
Engine Retarder - Brake Pedal Delay (7001)	This parameter sets the delay time for the (optional) service brake pedal activated Engine Brake. **Note:** The Engine Brake mode must be set to Service Brake Latched or Coast (Mode 1 or 2).	0 to 300 seconds	YES	0 seconds
Engine Retarder – Accelerator Pedal Delay (7008)	This parameter sets the delay time for (optional) accelerator pedal activated Engine Brake. **Note:** The Engine Brake mode must be set to Latched (Mode 3).	0 to 300 seconds	YES	0 seconds
Engine Retarder Minimum Vehicle Speed (7002)	This parameter sets the minimum vehicle speed limit) that the Engine Brake can be activated. **Note:** If a minimum vehicle speed for Engine Brake engagement is NOT desired, this parameter should be set to (0).	0 to 130.5 MPH	NO	10 MPH
Cruise Control Engine Retarder Enable (7006)	**(Optional Feature)** This parameter enables the cruise control related Engine Brake functionality.	**0:** Disabled **1:** Enabled	YES	Customer Chosen
Cruise Control Engine Retarder Low Speed (7003)	**(Optional Feature)** This parameter sets the vehicle speed above the cruise set speed at which the Engine Brake will activate at the programmed Cruise Control Engine Brake Low Activation (7005) parameter setting.	1 to 130.5 MPH	YES	4 MPH **Note:** This should be set higher than the Cruise Over Speed (7605) parameter value.
Cruise Control Engine Retarder High Speed (7004)	**(Optional Feature)** This parameter sets the programmed speed (above the cruise set speed) at which the engine brake will activate at 100%.	0 to 130.5 MPH	YES	6 MPH
Cruise Control Engine Retarder Low Activation (7005)	**(Optional Feature)** This parameter sets the activation percent (%) that the engine brake feature starts at the Cruise Control Engine Retarder Low Speed (7003) parameter setting.	0 to 100%	YES	

Parameter Setup

MaxxForce Engine Brake by Jacobs® Example

The graph below illustrates the vehicle speed (MPH) and the corresponding MaxxForce Engine Brake by Jacobs® activation percentage % (in blue) where cruise control activated MaxxForce Engine Brake by Jacobs® is occurring.

Cruise Control Engine Brake Graph



The following programmable parameters, shown in the graph, are customer adjustable. Default settings are used in this example:

- Cruise Control Engine Brake Low Activation (7005) (default = 10%)
- Cruise Control Engine Retarder Low Speed (7003) (default = 4 MPH)
- Cruise Control Engine Retarder High Speed (7004) (default = 6 MPH)

When the cruise set speed is 55 MPH and the vehicle speed reaches 59 MPH (set speed + 4 MPH), the Cruise Control Engine Retarder Low Speed (7003) parameter is satisfied and the feature will activate the MaxxForce Engine Brake by Jacobs® at 10% as programmed in the Cruise Control Engine Retarder Low Activation (7005) parameter. When the vehicle speed reaches 61 MPH (set speed + 6 MPH) the Cruise Control Engine Retarder High Speed (7004) parameter is satisfied and the feature will activate the MaxxForce Engine Brake by Jacobs® at 100%.

MaxxForce Engine Brake by Jacobs® activation percentage increases as vehicle speed increases above the cruise set speed only between the programmed parameter settings for Cruise Control Engine Retarder Low Speed (7003) and Cruise Control Engine Retarder High Speed (7004) reaching a maximum value of 100%.

MaxxForce Engine Brake by Jacobs® Applications

This section describes one feature application and how the programmable parameters can be effectively configured for this application. This is not a

comprehensive list, and does not include all possible applications that an owner/operator might encounter.

Please review the description and operation section and the programmable parameters for a better understanding of how the various engine parameters might be best configured to your vehicle.

Programmable Parameter Setup		
Parameter	Value	Units
Vehicle Retarder Control Mode (7000)	4	
Engine Retarder - Brake Pedal Delay (7001)	0	Sec
Engine Brake - Accelerator Pedal Delay (7008)	0	Sec
Engine Retarder Minimum Vehicle Speed (7002)	10	MPH
Cruise Control Engine Retarder Low Speed (7003)	4	MPH
Cruise Control Engine Retarder High Speed (7004)	6	MPH
Cruise Control Engine Retarder Low Activation (7005)	10	%
Cruise Control Engine Retarder Enable (7006)	ON	On/Off

Frequently Asked Questions

Will the MaxxForce Engine Brake by Jacobs® activate with Cruise Control engaged?

Yes, if the Cruise Control Engine Retarder Enable (7006) programmable parameter is "Enabled" and the related parameters are set correctly, the Engine Brake will activate automatically to help maintain the desired cruise control set speed.

Can I install a MaxxForce Engine Brake by Jacobs® if my truck is not originally equipped with one?

Yes, but it may be expensive as some internal engine components may need to be swapped out.

Definitions/Acronyms

The following terms are referenced in this document:

Acronym	Definition
HP	Horsepower
PTO	Power Take-Off
RPM	Revolutions Per Minute
VSS	Vehicle Speed Sensor