

MaxxForce[®] DT, 9, 10 (2010)

Overview: *Engine Brake*

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General Overview: Engine Brake

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

This document will address the unique engine brake functionality for the MaxxForce® DT, 9, 10.

Description and Operation

The engine brake feature consists of two operator control switches:

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

Level Selection switch allows the operator to select from three engine brake settings:

1. Low
2. Medium
3. High

Operation

When the enable switch is placed in the ON position, two visual indicators are displayed. The engine brake ON/OFF switch indicator and the yellow ENGINE BRAKE symbol in the gauge cluster turns ON.

The engine brake feature will operate when the following interlock conditions are satisfied:

- Traction Control not active
- Clutch pedal released
- CAN torque lockup converter engaged
- Cab mounted engine brake ON/OFF switch set to ON.
- Vehicle Retarder Control Mode (7000) parameter enabled.
- Accelerator pedal fully released.
- No active vehicle speed sensor (VSS) faults or accelerator pedal faults.
- Vehicle in gear (driveline engaged).

Feature Interaction

The engine brake feature interacts with the following engine features:

- **Cruise Control** - The engine brake feature can be activated automatically during cruise control operation.
- **Vehicle Speed Governor** - Behaves similar to the interaction between engine brake and cruise control.
- **Power Take-Off (PTO)** - The engine brake feature will not function in PTO mode.

Programmable Parameters

The following programmable parameters are available with the engine brake feature. These parameters should be programmed into the engine brake feature as will best suit 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, 3 or 4) - The engine brake is active after the accelerator pedal is released. If set to (2 or 5) - the engine brake is active only while the service brake pedal is pressed. If set to (6) - The engine brake is active when the accelerator pedal is released and cruise mode is active; in this mode, the engine brake acts to maintain a set speed (typically when traveling down a grade).	0: Disable 1: Exhaust Brake Latched 2: Exhaust Brake Coast 3: Transmission Brake Latched 4: Compression Brake Latched 5: Compression Brake Coast 6: Compression Brake with Cruise Control 7: Exhaust Brake with Cruise Control Note: Mode 7 is not functional for Inline applications but may show up in the Programming/Service Tool.	YES	Customer Chosen
VRE Disable when RPS Active (7009)	This Parameter allows the Vehicle Retarder Enable (VRE) to be disabled when Remote Throttle is in use.	0: Enable VRE Control 1: Disable VRE Control when Remote Throttle is active	YES	Customer Chosen

Parameter Setup

Engine Brake Mode Specific Interlock/ Activation Conditions

Each possible Engine Brake Mode has specific interlock conditions to enable the Engine Brake:

Engine Brake Modes 1 & 3 (Exhaust Brake Latched & Transmission Brake Latched)

- The general conditions must be met
- If either Cruise Control or Power Take Off (PTO)/Auxiliary Throttle Control (ATC) are in an active control mode (an active set point is selected), no service brake faults are active and the service brake is currently active.

- If both Cruise Control and PTO/ATC are in Off or Standby (Cruise Control On switch active but no set point selected) then the enable conditions are met once the general conditions are met.

Engine Brake Mode 2 (Exhaust Brake Coast)

- The general conditions must be met
- No service brake faults are active and the service brake is currently active.

Engine Brake Mode 4 (Compression Brake Latched)

- The general conditions must be met
- The level selection switch must indicate Low, Medium or High
- Engine Speed must be greater than 1000 rpm
- Engine Oil Temperature must be greater than 77 °F (25 °C)
- No brake pressure faults are active
- No fuel pressure sensor faults are active
- If either Cruise Control or PTO/ATC is in an active control mode (an active set point is selected), no service brake faults are active and the service brake is currently active.
- If both Cruise Control and PTO/ATC are in Off or Standby (Cruise Control On switch active but no set point selected) then the enable conditions are met once the general conditions are met.

Engine Brake Mode 5 (Compression Brake Coast)

- The general conditions must be met
- The level selection switch must indicate Low, Medium or High
- Engine Speed must be greater than 1000 rpm
- Engine Oil Temperature must be greater than 77 °F (25 °C)
- No brake pressure faults are active
- No fuel pressure sensor faults are active
- No service brake faults are active and the service brake is currently active.

Engine Brake Mode 6 (Compression Brake Latched with Cruise Control)

- The general conditions must be met
- The level selection switch must indicate Low, Medium or High
- Engine Speed must be greater than 1000 rpm
- Engine Oil Temperature must be greater than 77 °F (25 °C)
- No brake pressure faults are active
- No fuel pressure sensor faults are active
- If either Cruise Control or PTO/ATC is in an active control mode (an active set point is selected), no service brake faults are active and the service brake is currently active.
- If both Cruise Control and PTO/ATC are in Off or Standby (Cruise Control On switch active but no set point selected) then the enable conditions are met once the general conditions are met.
- Road Speed Limiting must be enabled (7900)

Note: In Engine Brake Mode 6, the Brake will always engage at 'High' (100%)

Engine Brake 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	none

Frequently Asked Questions

Will the Engine Brake activate with Cruise Control engaged?

Yes, when Vehicle Retarder Control Mode (7000) is programmed to Mode 6: Compression Brake Latched with Cruise.

Can I install an Engine Brake 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.

I have driven other trucks with Engine Brake. This one does not seem to slow the truck as much, why?

This Engine Brake is quiet so you do not have the noise as an indication that the brake is working. This Engine Brake feature is also designed to be used on all routes including low noise routes so while there is a decrease in overall braking horsepower you can use the brake all the time.

What would be appropriate programmable parameter settings for an over the road application of the engine brake feature?

Set the following value: Vehicle Retarder Control Mode (7000) to 4: Compression Brake Latched.

Definitions/Acronyms

The following terms are referenced in this document:

Acronym	Definition
ATC	Auxiliary Throttle Control
PTO	Power Take-Off
RPM	Revolutions Per Minute
VRE	Vehicle Retarder Enable
VSS	Vehicle Speed Sensor