

International[®] S13 Integration (2023)

Overview: *S13 Engine Brake*

TABLE OF CONTENTS

General Overview: S13 Engine Brake 1
Description and Operation..... 1
 OPERATION.....1
Parameter Setup..... 2
Programmable Parameters..... 3
Frequently Asked Questions 5
Definitions/Acronyms 5

General Overview: S13 Engine Brake

The S13 Engine Brake 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.

Programming to support this feature is accomplished within the engine control module (CEM1) and the powertrain interface module (PIM).

This document will address the unique S13 Engine Brake functionality for the S13.

Description and Operation

NOTE: Refer to the vehicle operation and maintenance manual, as well as the S13 engine operation and maintenance manual, for additional information on operation and indications.

The S13 Engine Brake 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 (33%)

Level 2: Medium (66% or variable if the Programmable Parameter is selected to Smart Level)

Level 3: High (100%)

Operation

When the enable switch is placed in the ON position, two visual indicators are displayed. The S13 Engine Brake ON/OFF switch LED and the yellow ENGINE BRAKE symbol in the gauge cluster turns ON.

The S13 Engine Brake feature will operate when the following interlock conditions are satisfied:

- Cab mounted S13 Engine Brake ON/OFF switch must be set to ON.
- Vehicle Retarder Mode (VRM) (B103 000) 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 Minimum Vehicle Speed for Retarder Enable {MVRSE} (B103 009).
- Engine speed must be higher than a minimum speed calibrated.
- Oil temperature must be in the operating range calibrated.

Engine brake Activation Modes:

The Vehicle Retarder Mode (VRM) (B103 000) parameter allows the customer to select one of five optional activation modes:

- Engine Brake Mode (0): Off/disabled
- Engine Brake Mode (1): Service Brake Latched
- Engine Brake Mode (2): Service Brake Coast
- Engine Brake Mode (3): Latched
- Engine Brake Mode (4): Smart Latched (

Cruise Control Option

The Cruise Control, optional, feature allows the S13 Engine Brake to activate automatically during cruise control operation to help maintain the desired set speed.

Feature Interaction

The S13 Engine Brake feature interacts with the following engine features:

- Cruise Control - The S13 Engine Brake feature can be activated automatically during cruise control operation.
- Vehicle Speed Governor - Behaves similarly to the interaction between S13 Engine Brake and Cruise Control.
- Power Take-Off (AESC) - The S13 Engine Brake feature will not function in AESC mode.
- S13 Transmission - Requires specific parameter set-up.

Parameter Setup

S13 Engine Brake Example

The graph below illustrates the vehicle speed (MPH) and the corresponding S13 Engine Brake activation percentage % (in blue) where cruise control activated S13 Engine Brake is occurring.

S13 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 Mode (VRM) (B103 000)	- Latched	
Programmed Brake Delay Time for Engine Brake (PEB) (B103 001)	0.3	Sec
Programmed APS Delay Time for Engine Brake (PAPSEB) (B103 002)	0.8	Sec
Minimum Vehicle Speed for Retarder Enable (MVRSE) (B103 009)	10	MPH
Cruise Control Engine Brake Enable (CCEBAE) (B103 003)	ON	On/
Smart Engine Brake Level Enable (SEBLE) (B103 00D)	Enabled	

Programmable Parameters

The following Powertrain Interface Module (PIM) programmable parameters are available for the S13 Engine Brake 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 cannot be changed without dealer authorization.

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
Vehicle Retarder Mode (VRM) (B103 000)	<p>This parameter determines the conditions that the Engine Brake feature will be functional.</p> <p>If set to (Disable) - The Engine Brake functionality is disabled.</p> <p>If set to (Service Brake Latched) - The Engine Brake is active programmable time after service brake has been pressed (See Note 2). Also, the accelerator pedal must not be pressed.</p> <p>If set to (Coast) - The Engine Brake is active programmable time after the service brake pedal has been pressed and remains pressed</p>	<ul style="list-style-type: none"> - Disable - Service Brake Latched - Coast - Latched - Smart Latched <p>Note 1: The time is programmable by parameter (B103 001).</p> <p>Note 2: Smart Latched should only be used on trucks with the T14 transmission.</p>	YES	Customer chosen

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
	<p>(See Note 2).</p> <p>If set to (Latched) - The Engine Brake is active programmable time after the accelerator pedal is released (See Note 1).</p> <p>If set to (Smart Latched) - The Engine Brake will transition between Service Brake Latched and Latched. The mode transitions are determined by the road grade. This allows the truck to use the more fuel efficient service brake latched mode on flat terrain and transition to the more aggressive braking mode in steep hills.</p>			
Programmed Brake Delay Time for Engine Brake (PEB) (B103 001)	<p>This parameter sets the delay time for the (optional) service brake pedal activated Engine Brake.</p> <p>Note: The Engine Brake mode must be set to Service Brake Latched or Coast.</p>	0 to 300 seconds	YES	0.3 seconds
Programmed APS Delay Time for Engine Brake (sec) (PAPSEB) (B103 002)	<p>This parameter sets the delay time for (optional) accelerator pedal activated Engine Brake or Smart Latched.</p> <p>Note: The Engine Brake mode must be set to Latched or Smart Latched.</p>	0 to 300 seconds	YES	0.8 seconds
Cruise Control Engine Brake Enable (CCEBAE) (B103 003)	<p>(Optional Feature)</p> <p>This parameter enables the cruise control related Engine Brake functionality.</p>	<ul style="list-style-type: none"> - Disabled - Enabled 	YES	10 MPH
Cruise Control Engine Brake Activation Overspeed (CCEBAO) (B103 004)	<p>This parameter sets the vehicle speed overspeed over Cruise Control set speed that the Engine Brake will be activated.</p> <p>Note: If a minimum vehicle speed for Engine Brake engagement is NOT desired, parameter(Cruise Control Engine Brake Enable (CCEBAE) (B103 003)) should be set to Disabled.</p>	0 to 130.5 MPH	YES	5 MPH
Road Speed Limit Engine Brake Activation Enable (RSLEBAE) (B103 007)	<p>When enabled the engine brake will active when the truck exceeds the maximum programmed vehicle speed. It also allows the customer to determine if the driver can disable the brake with the accelerator pedal in vehicle over speed situations.</p>	<ul style="list-style-type: none"> - Disabled - Enabled, accelerator pedal will disable brake - Enabled, accelerator pedal will NOT disable brake 	YES	
Engine Brake Switch Override of CC/RSL Engine Brake Activation (EBSOCCRSLEBA) (B103 008)	<p>This parameter determines if the retarder on/off level switch will affect the operation of the retarder during cruise control of when the road speed limiting is active.</p>	<ul style="list-style-type: none"> - Switch off will allow CC/RSL brake activation - Switch off will only disable RSL brake activation. - Switch off will disable both CC and RSL brake activation. - Switch off will only disable CC brake activation. 	YES	1

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
Minimum Vehicle Speed for Retarder Enable (MVRSE) (B103 009)	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	YES	
Smart Engine Brake Level Enable (SEBLE) (B103 00D)	When enabled level 2-Medium will switch to an acceleration based brake level. This allows the driver to descend long hills with varying grades and not have to manually switch brake levels to maintain the vehicle speed. This feature is optimized for S13 AMT transmissions.	- Disabled - Enabled	YES	0
Engine Brake Switch 1 Input Selection (B103 00E)	This parameter selects how the ECM sees the switch for setting Source addresses. <ul style="list-style-type: none"> If set to (Enabled with Hardwire input) - The switch input is supplied on a hardwired circuit If set to (Enabled with CAN input) - The switch input is supplied on the data link. 	- Enabled with Hardwire input - Enabled with CAN input	YES	Enabled with CAN input
Retarder Will Pause Cruise (RWPC) (B121 002)	If cruise control is on and the engine brake transitions from off to on, cruise control will pause (the set speed will flash). When the engine brake is turned off, cruise control will automatically resume.	- Disable - Enable	No	

Frequently Asked Questions

Will the S13 Engine Brake activate with Cruise Control engaged?

Yes, if the Cruise Control Engine Brake Enable (CCEBAE) (B103 003) 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 the S13 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 changed.

Definitions/Acronyms

The following terms are referenced in this document:

Acronym	Definition
HP	Horsepower
AESC	Auxiliary Engine Speed Control
RPM	Revolutions Per Minute
VSS	Vehicle Speed Sensor
APS	Accelerator Pedal Sensor
PIM	Powertrain Interface Module