

International® S13 Integrated (2023)

Overview: *Engine Speed Control - In
Cab*

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General Overview: In-Cab Engine Speed Control

The In-Cab Auxiliary Engine Speed Control (AESC) feature allows the operator to set and maintain a constant engine speed without using the accelerator pedal.

This feature controls the engine speed with variable engine speed control or up to 6 preset speeds through the steering wheel cruise switches, inside the cab, to power auxiliary devices.

The document will address unique in-cab engine speed control 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 In Cab AESC provides the operator engine speed control to any installed auxiliary devices from inside the cab. This engine speed control is accomplished by utilizing the steering wheel cruise control switches.

Operation

The operational control of the in-cab engine speed control feature consists of three cruise control switches located on the steering wheel:

- **“Cruise On/Cruise Off”** switch allows the driver to enable or disable the in-cab engine speed control preset and variable functionality. The Cruise On switch also has an indicator light.
- **“Resume/Accel”** switch allows the operator to ramp up the engine or cycle through the presets.
- **“Set/Coast”** switch allows the operator to ramp down the engine or cycle through the presets.

The in-cab engine speed control will only operate if the cruise enable switch is ON, the vehicle speed is less than a programmable limit, the cruise control switches are not faulted, and other “interlock” conditions are met (i.e., vehicle speed, engine speed, and engine load are less than programmed values, etc.) are met.

Stationary Variable

Stationary Variable AESC

Stationary variable engine speed control allows the operator to select any engine speed within the AESC boundaries. This is done by increasing or decreasing the engine speed to the desired set point by using the set/coast switch and the resume/accel switch. The vehicle must not be moving to activate AESC when programmed to Stationary Variable Mode.

Stationary Variable AESC Setup

In addition to the main setup parameters (i.e. AESC Mode Selection, etc.) there are 3 specific stationary variable speed related AESC parameters; AESC Engine Speed Throttle Up Ramp Rate, AESC Engine Speed Throttle Down Ramp Rate, and AESC Bump Up/Down Step.

Stationary Variable Speed AESC Driver Interaction

In addition to the normal interlock conditions for all AESC operation, perform the following steps for stationary variable AESC operation:

1. Press the cruise on switch.
2. Press the set/coast switch to activate AESC. The current engine speed will be the AESC Minimum Engine Speed set point.
3. Press and hold the resume/accel switch to increase the engine speed set point. The engine speed will increase by the programmed AESC Engine Speed Throttle Up Ramp Rate. When the switch is released the current engine speed will become the set speed.
4. Press and hold the set/coast switch to decrease the AESC speed set point. The engine speed will decrease by the programmed AESC Engine Speed Throttle Down Ramp Rate. When the switch is released the current engine speed will become the set speed.
5. Press and release the resume/accel switch or the set/coast switch to increase or decrease the AESC engine speed set point by the programmed AESC Bump Up/Down Step.
6. Using the accelerator to increase engine speed and momentarily pressing the set/coast switch will set the current engine speed as the AESC engine speed set point.
7. If the AESC operation is interrupted (i.e. brake pressed, or accelerator pedal, a press of the resume/accel switch will return the engine to the previous AESC engine speed set point.

The brake, or accelerator interruption described above is dependent on the programming of the AESC Disable with APS, AESC In-Cab Operator Interface, and the AESC Disable with Service Brake parameters.

Stationary Preset

Stationary preset engine speed control allows the operator to select up to 6 preset engine speeds while the vehicle is stationary. The preset speeds are selected using the set/coast switch or the resume/accel switch as described in the Stationary Preset Driver Interaction section.

Stationary Preset Setup

There are up to 6 specific preset engine speed parameters that can be programmed. The preset engine speed parameters are typically programmed in an increasing preset order.

Stationary Preset Driver Interaction

In addition to the normal interlock conditions for all AESC operation, perform the following steps for stationary preset AESC operation:

1. Press the cruise on switch.
2. Press either the set/coast switch or the resume/accel switch to activate AESC.
3. Pressing the resume/accel switch will select the next available AESC Preset Speed.
4. Pressing the set/coast switch will select the previously available AESC Preset Speed.
5. Interrupting AESC operation (i.e. brake, or accelerator) will return the engine to idle (AESC standby). If the set/coast switch is pressed, then the engine will go to preset 1. If the resume/accel switch is pressed, then the engine will go to preset 2.

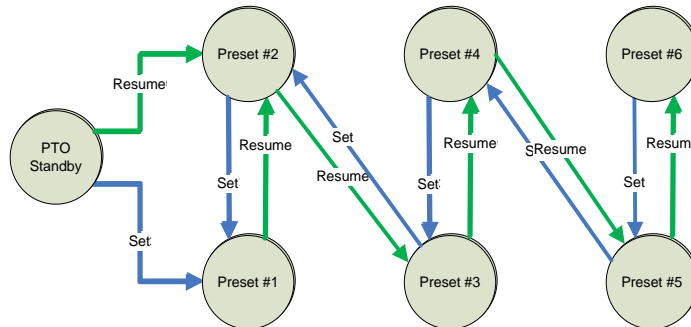
The brake, or accelerator interruption described above is dependent on the programming of the AESC Disable with APS, AESC In-Cab Operator Interface, and the AESC Disable with Service Brake parameters.

Refer to the Stationary Preset Diagram for a general visual representation of how the operator interacts with the switches during stationary preset AESC operation.

Stationary Preset Notes

- The engine will accelerate the engine speed, when a preset speed is selected that is greater than the current engine speed.
- The engine will decelerate the engine speed when a preset speed is selected less than the current engine speed.
- Pressing and holding either the set/coast switch or the resume/accel switch will not result in cycling through the preset speeds.

Stationary and Mobile Variable Preset Diagram



Mobile Variable

Mobile Variable Speed AESC Control

Mobile variable speed control permits a desired variable engine speed to be selected. The vehicle can be moving or stationary during AESC operation.

Mobile Variable Speed AESC Setup

There are two specific mobile variable speed related AESC parameters; AESC Vehicle Speed Kick Out, and AESC Vehicle Speed Limit.

Mobile Variable Speed AESC Driver Interaction

Functionality and setup are identical to Stationary Variable Speed AESC with the exception that a stationary vehicle is no longer required.

Feature Interaction

The In-Cab Engine Speed Control feature interacts with these engine features:

- Cruise Control. There is no interaction with cruise control; however, AESC uses the same switches (resume/accel & set/coast) as the cruise control feature.
- Idle Shutdown Timer (IST)
- Road Speed Limiting (RSL)

Programmable Parameters

The following programmable parameters are required for auxiliary engine speed control. These parameters should be programmed to the engine speed control operation which 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 cannot be changed without authorization.

There are multiple available AESC configurations. Please see the Parameter Setup section for a few examples and specific setup instructions.

Base Parameters for AESC Configurations.

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
PIM AESC Speed Control - Mode (B10F 004)	<p>This parameter determines the conditions that the Engine Speed Control (AESC) feature will be functional. Set this parameter to enable AESC operation and to choose which inputs are used for control.</p> <ul style="list-style-type: none"> If set to (Disable) - The AESC functionality is disabled. If set to (Remote Operation Only) - Only the Only the remote AESC inputs will be able to control AESC. If set to (In Cab Operation Only -) - Only the in-cab inputs will be able to control AESC (See Note 1 & 2). If set to (Remote and In Cab Operation) - Both remote and in-cab inputs will be able to control AESC (See Note 2). <p>Note 1: The last input received will take priority when Remote and In Cab Operation is selected.</p> <p>Note 2: Remote Operation Only and the remote portion of Remote and In Cab Operation are discussed in the Remote Engine Speed Control document.</p>	<ul style="list-style-type: none"> - Disable - Remote Operation Only - In Cab Operation Only - Remote and In Cab Operation 	YES	Customer Chosen
PIM AESC - In Cab Mode (B10F 006)	<p>Set this parameter after selecting In-Cab Or Remote and In-Cab Operation to determine which AESC mode is active.</p> <ul style="list-style-type: none"> If set to (None) - The switches will not be used. Refer to the Remote Engine Speed Control document. If set to (Stationary Preset) - The switches will be used to select up to 6 preset engine speeds. Refer to the Stationary Preset section for more information. If set to (Stationary Variable) - The switches will be used to adjust the engine speed variably. Refer to the Stationary Variable section for more information. If set to (Mobile Variable) - The switches will be used to adjust the engine speed to a desired set point to allow for vehicle movement. Refer to the Mobile Variable section for more information. 	<ul style="list-style-type: none"> - None - Stationary Preset - Stationary Variable - Mobile Variable. 	YES	Customer Chosen

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
PIM AESC Minimum Engine Speed (B10F 017)	This parameter is used to select a specific engine speed that the engine will ramp to after the CRUISE ON is momentarily pressed and the Set button is pressed. . Note 1: This feature is selected by programming a value above normal engine idle speed. If selected, this parameter must be set properly to ensure optimal equipment performance. Note 2: To disable this functionality, set this parameter to normal low engine idle speed.	Low Idle - High Idle (rpm)	YES	Customer Chosen (See Note 1 & 2)
PIM AESC Maximum Engine Speed (B10F 00C)	The maximum engine speed that can be reached using any AESC controls. Note 1: This parameter must be set properly to protect AESC related equipment.	Low Idle - High Idle (rpm)	YES	Customer Chosen (See Note 1)
PIM AESC - Engine Speed Limit with VSS Fault (B10F 014)	This parameter sets the maximum engine speed allowed when an active vehicle speed sensor (VSS) fault exists, and AESC engine speed control is active. Above this engine speed, AESC cannot be activated, however; if this engine speed is exceeded while in AESC then AESC will be deactivated. This parameter might be useful in preventing the operator from over speeding or over loading the equipment.	Low Idle - High Idle (rpm)	YES	Customer Chosen
PIM AESC - Disable with APS (B10F 00F)	Set this parameter to determine how the accelerator pedal interacts with active AESC operation. <ul style="list-style-type: none"> If set to (APS Is Ignored) – Pressing the accelerator pedal will not change the engine speed. If set to (APS Overrides ATC Set Speed) – Choose this setting to allow the operator to increase the engine speed up to the (7520) parameter setting using the accelerator pedal without disengaging the AESC function. If set to (APS Disables ATC) – Pressing the accelerator pedal will deactivate AESC operation (See Note 2). Note 1: If (APS Overrides ATC Set Speed) is chosen, the AESC - AESC Maximum Engine Speed Override. (B10F 016) parameter must also be programmed.	- APS Is Ignored - APS Overrides ATC Set Speed - APS Disables ATC	YES	Customer Chosen (See Note 1)
PIM AESC - Disable with Brake (B120 002)	Choosing this feature will allow the operator to deactivate AESC operation when the brake pedal is pressed. Otherwise the brake pedal is ignored and will not deactivate the AESC.	- Service Brake is Ignored - Service Brake Disables AESC	YES	Customer Chosen
PIM AESC - Disable with Parking Brake (B10F 01D)	Choosing this feature will allow the operator to deactivate AESC operation when the brake pedal is pressed. Otherwise the brake pedal is ignored and will not deactivate the AESC.	- Disengaging Parking Brake does not affect AESC - Disengaging Parking Brake Disables AESC	YES	Customer Chosen

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
PIM AESC - Speed Controlled to Engine Load (B10F 01C)	This parameter selects whether the AESC engine speed control is limited or deactivated if an engine load threshold is reached. <ul style="list-style-type: none"> If set to (Off) - AESC will continue to run regardless of the engine load % If set to (On) - The Maximum Engine Load parameter and AESC will disable when the engine load % is met for a certain amount of time. The Speed Controlled to Engine Load parameter does not limit engine speed. 	- Off - On	YES	A setting of On is recommended.
PIM AESC - Maximum Engine Load (B10F 015)	AESC will be deactivated once the parameter value is exceeded for the allotted time set by the AESC - Maximum Engine Load Time parameter.	Set between 30% and 100% based on the recommendations for the AESC equipment.	YES	Customer Chosen
PIM AESC - Maximum Engine Load Time (B10F 01A)	This parameter sets the time that the AESC will remain active while the engine load is exceeding the threshold set by the AESC maximum engine load parameter.	Set between 0 and 32 seconds.	YES	A setting of 5 seconds is recommended.
PIM AESC - Engine Speed Throttle Ramp Rate (B10F 00B)	This parameter sets the rate at which the engine will try to increase its speed. Note 1: The engine only attempts to increase the engine speed at this rate because actual engine changes are influenced by other factors such as engine load and available engine power. Note 2: This parameter should be set to provide a smooth transition to the desired engine speed to accommodate applicable AESC equipment.	1 - 1500 RPM	YES	100 rpm/sec (default)
PIM AESC - Engine Speed Throttle Down Ramp Rate (B10F 018)	This parameter sets the rate at which the engine will try to decrease engine speed. Note 1: The engine only attempts to decrease the engine speed at this rate because actual engine changes are influenced by other factors such as engine load and available engine power. Note 2: This parameter should be set to provide a smooth transition to the desired engine speed to accommodate applicable AESC equipment.	1 - 1500 RPM	YES	100 rpm/sec (default)
PIM AESC - Maximum Vehicle Speed (B10F 005)	This parameter sets the vehicle speed that the AESC can operate up too. If this vehicle speed is exceeded, AESC will be disabled. Note 1: Set this parameter to the maximum vehicle speed that is desired in AESC mode.	0 - 25 mph	YES	Customer Chosen (See Note 1)

Parameter Value	Description	Possible Values	Cust Pgrm	Recommended Settings
PIM AESC Load Application (B113 002)	This parameter determines how hard the engine will work to achieve the desired speed. <ul style="list-style-type: none"> ● If set to (0) - The engine speed response will be relaxed/soft. ● If set to (1) - The engine speed response will be slow. ● If set to (2) - The engine speed response will be medium. ● If set to (3) - The engine speed response will be fast. ● If set to (4) - The engine speed response will be aggressive. 	0: Relaxed/Soft 1: Slow 2: Medium 3: Fast 4: Aggressive	YES	1: Slow
PIM Cruise Control/AESC On/Off Switch Input Selection (B101 005)	This parameter selects the source for the Cruise Control/AESC On/Off Switch. <ul style="list-style-type: none"> ▪ If set to (Hardwired Input) - The Cruise Control/AESC On/Off Switch signal is sensed from a hardwired input. ▪ If set to (Can) - The Cruise Control/AESC On/Off Switch is sensed on the J1939 data link. 	- Hardwired Input - Can	YES	Customer Chosen
PIM Cruise Control Set/Coast Switch Input Selection (B101 006)	This parameter selects the source for the Cruise Control Resume/Accelerate Switch. <ul style="list-style-type: none"> ▪ If set to (Hardwired Input) - The Cruise Control Resume/Accelerate Switch signal is sensed from a hardwired input. ▪ If set to (Can) - The Cruise Control Resume/Accelerate Switch is sensed on the J1939 data link. ▪ If set to (Both) - The Cruise Control Resume/Accelerate Switch is sensed on both the hardwired input and the J1939 data link 	- Hardwired Input - Can - Both	YES	2: Both
PIM Cruise Control Resume/Accelerate Switch Input Selection (B101 007)	This parameter selects the source for the Cruise Control Resume/Accelerate Switch. <ul style="list-style-type: none"> ▪ If set to (Hardwired Input) - The Cruise Control Resume/Accelerate Switch signal is sensed from a hardwired input. ▪ If set to (Can) - The Cruise Control Resume/Accelerate Switch is sensed on the J1939 data link. ▪ If set to (Both) - The Cruise Control Resume/Accelerate Switch is sensed on both the hardwired input and the J1939 data link. 	- Hardwired Input - Can - Both	YES	- Both

Parameters for Variable Engine Speed AESC Configurations.

Parameter Value	Description	Possible Values	Cust Pgrm?	Recommended Settings
PIM AESC - Bump Up/Down Step (B10F 019)	This parameter sets the following: The amount of increase in engine speed after RESUME/ACCEL is momentarily pressed. The amount of decrease in engine speed after SET/COAST is momentarily pressed.	0 – 500 RPM	YES	25 rpm

Parameters for Preset Engine Speed AESC Configurations.

Parameter Value	Description	Possible Values	Cust Pgrm?	Recommended Settings
PIM AESC Throttle Control - Preset Engine Speed 1 (Set/Coast) (B10F 009)	This parameter sets the running engine speed set point maintained when the first AESC preset speed is selected.	Range must be between the following settings: <ul style="list-style-type: none"> AESC Minimum Engine Speed (B10F 017) AESC Maximum Engine Speed (B10F 00C) 	YES	Customer Chosen
PIM AESC - Preset Engine Speed 2 (Resume/Accel) (B10F 00A)	This parameter sets the running engine speed set point maintained when the second AESC preset speed is selected.	Range must be between the following settings: <ul style="list-style-type: none"> AESC Minimum Engine Speed (B10F 017) AESC Maximum Engine Speed (B10F 00C) 	YES	Customer Chosen
PIM AESC - Preset Engine Speed 3 (B10F 010)	This parameter sets the running engine speed set point maintained when the third AESC preset speed is selected. Note 1: Presets speeds that will not be used can be set to 0 rpm. Refer to the Stationary Preset section for more information.	Range must be between the following settings: <ul style="list-style-type: none"> AESC Minimum Engine Speed (B10F 017) AESC Maximum Engine Speed (B10F 00C) 	YES	Customer Chosen (See Note 1)

Parameter Value	Description	Possible Values	Cust Pgrm?	Recommended Settings
PIM AESC - Preset Engine Speed 4 (B10F 011)	This parameter sets the running engine speed set point maintained when the fourth AESC preset speed is selected. Note 1: Presets speeds that will not be used can be set to 0 rpm. Refer to the Stationary Preset section for more information.	Range must be between the following settings: <ul style="list-style-type: none"> AESC Minimum Engine Speed (B10F 017) AESC Maximum Engine Speed (B10F 00C) 	YES	Customer Chosen (See Note 1)
PIM AESC - Preset Engine Speed 5 (B10F 012)	This parameter sets the running engine speed set point maintained when the fifth AESC preset speed is selected. Note 1: Presets speeds that will not be used can be set to 0 rpm. Refer to the Stationary Preset section for more information.	Range must be between the following settings: <ul style="list-style-type: none"> AESC Minimum Engine Speed (B10F 017) AESC Maximum Engine Speed (B10F 00C) 	YES	Customer Chosen (See Note 1)
PIM AESC - Preset Engine Speed 6 (B10F 013)	This parameter sets the running engine speed set point maintained when the sixth AESC preset speed is selected. Note 1: Presets speeds that will not be used can be set to 0 rpm. Refer to the Stationary Preset section for more information.	Range must be between the following settings: <ul style="list-style-type: none"> AESC Minimum Engine Speed (B10F 017) AESC Maximum Engine Speed (B10F 00C) 	YES	Customer Chosen (See Note 1)

Parameter Setup

Possible In-Cab AESC Applications

The In-Cab AESC feature is application specific. This section briefly describes one example of in-cab AESC configuration and operation. This configuration will likely need to be modified to meet the actual application needs the owner/operator requires.

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

EXAMPLE A - Typical In-Cab AESC Scenario

In this example, the operator requires two preset engine speeds while the vehicle is stationary. The presets are activated via the cruise control switches.

Adjust parameters as follows:

Parameter Name	Action Required
AESC Speed Control - Mode (B10F 004)	Select In Cab Operation Only
AESC - In Cab Mode (B10F 006)	Select Stationary Preset
Aux Throttle Control - Preset Engine Speed 1 (Set/Coast) (B10F 009)	Set this to 900 rpm
Aux Throttle Control - Preset Engine Speed 2 (Resume/Accel) (B10F 00A)	Set this to 1100 rpm
Cruise Control Set/Coast Switch Input Selection (B101 006)	Set this to Both
Cruise Control Resume/Accelerate Switch Input Selection (B101 007)	Set this to Both

Operation:

1. Activate the AESC by pressing the cruise on switch on the steering wheel.
2. Activate the 1st preset engine speed (900 rpm) by pressing the set/coast switch.
3. Activate the 2nd preset engine speed (1100 rpm) by pressing the resume/accel switch.

EXAMPLE B - In-Cab AESC with Variable Speed Control Scenario

In this example, the operator requires the engine speed to be able to ramp up and down within a range of engine speeds while the vehicle is stationary. The engine speed is controlled through the cruise control switches.

Adjust parameters as follows:

Parameter Name	Action Required
AESC Speed Control - Mode (B10F 004)	Select In Cab Operation Only
AESC - In Cab Mode (B10F 006)	Select Stationary Variable
Cruise Control Set/Coast Switch Input Selection (B101 006)	Set this to Both
Cruise Control Resume/Accelerate Switch Input Selection (B101 007)	Set this to Both

Operation:

1. Activate the AESC by pressing the cruise on then cruise set/coast switch on the steering wheel.
2. Increase the current engine speed by pressing and holding the resume/accel switch. Release the switch when the desired engine speed is reached.
3. Decrease the current engine speed by pressing and holding the set/coast switch. Release the switch when the desired engine speed is reached.

Frequently Asked Questions

How many presets can I configure in the in-cab AESC feature?

Six preset engine speeds can be programmed if Stationary Preset mode is selected. Refer to the stationary preset section for more information.

My application requires a ramp in rather than step increments for engine speed control. Can I do this with in cab AESC?

Yes, refer to Example B in the parameter setup section for details.

My application uses external AESC controls (located outside the cab). How do I set these up?

An example of this application is described in the remote engine speed control document.

Definitions/Acronyms

The following terms are referenced in this document:

Acronym	Definition
AESC	Auxiliary Engine Speed Control
APS	Accelerator Pedal Sensor
ATC	Aux Throttle Control
ECM	Engine Control Module
IST	Idle Shutdown Timer
PTO	Power Take Off
RSL	Road Speed Limiting
VSS	Vehicle Speed Sensor