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1. “In-Cab” Engine Speed Control (General Overview)

The engine speed control feature, commonly referred to as “PTO”, provides a method for an operator to set and maintain a constant engine speed without using the accelerator pedal. It is commonly used for powering auxiliary devices.

The “In-Cab” engine speed control allows the operator to select up to 6 preset engine speeds or to adjust the engine speed manually via the cruise switches on the steering wheel inside the cab.

Programmable parameters within the engine control module (ECM) provide in-cab engine speed control related options that can be adjusted to suit the customer’s needs. Choosing whether the operator is allowed to increase the engine speed using the accelerator pedal without disengaging the PTO is an example.

The document will address unique in-cab engine speed control functionality for MaxxForce® 11 and 13 engines. Remote engine speed control and remote accelerator functionality is described in the “Remote Engine Speed Control” document.

To set up the engine speed control feature it is recommended that you use one of the example settings, referenced in the “Parameter Setup” section, and then modify only the specific parameters that will help meet your vehicle application.

1.1. Feature Codes

N/A

2. Definitions/Acronyms

The following terms are referenced in this document:

- **APS** – Accelerator Pedal Sensor
- **ECM** – Engine Control Module
- **IST** – Idle Shutdown Timer
- **PTO** – Power Take Off
- **RSL** – Road Speed Limiting
- **VSS** – Vehicle Speed Sensor

3. Description and Operation

3.1. Operation

The driver control of the “In-Cab” engine speed control consists of two (cruise control) switches:

- 1 switch which allows the driver to enable the system (using “CRUISE ON”) or disable the system (using “CRUISE OFF”).
- 1 switch which allows the operator to ramp up the engine (using “RESUME/ACCEL”), ramp down the engine (using “SET/COAST”) (**See Note 1**), or cycle through the presets.

The functions of the cruise switches during PTO operation depend on which engine speed control mode is selected (i.e. stationary variable, stationary preset, etc.). Refer to the “PTO In-Cab PTO Mode” (7502) parameter for more information.

Note 1: “Ramping” the engine means that the engine speed gradually increases or decreases.

Note 2: The Cruise Control feature enables at a vehicle speed higher than the PTO feature is allowed to operate; therefore, pressing “RESUME/ACCEL” OR “SET/COAST” may result in Cruise Control functionality rather than PTO engine speed control functionality depending on the vehicle speed.

The following visual indications occur when the enable switch is placed in the ON position:

- The enable switch (“CRUISE ON”) indicator turns ON.

The following interlocks must be satisfied for engine speed control to operate:

- Cab mounted PTO enable switch (“CRUISE ON” switch) must be set to “ON”.
- The vehicle speed must be less than a programmable limit (**See Note 3**).
- The PTO input switches (in-cab or remote) must not be faulted.
- (Optional) – The service brake is not being pressed, depending on the “PTO Disable with Service Brake” (7511) parameter setting and the “PTO In-Cab Operator Interface” (7503) parameter.
- (Manual Transmissions) – The clutch pedal is not being pressed, depending on the “PTO Disable with Clutch” (7510) parameter and the “PTO In-Cab Operator Interface” (7503) parameter.
- (Automatic Transmissions – Stationary PTO Operation) – The transmission must be in the PARK or NEUTRAL position.
- (Optional) – The accelerator pedal must be released, depending on the “PTO Disable with APS” (7513) parameter and the “PTO In-Cab Operator Interface” (7503) parameter.
- The engine speed is less than the programmable “PTO Maximum Engine Speed” (7508) parameter setting.
- If the vehicle speed sensor (VSS) is faulted, the engine speed will be limited to the programmable “PTO Engine Speed Limit with VSS Fault” (7518) parameter setting.
- The engine load must be below the programmed “PTO Maximum Engine Load” (7519) parameter setting.

Note 3: The vehicle speed limit for stationary PTO is different than the limit for mobile PTO operation. Refer to the [Programmable Parameters](#) section for more information.

3.1.1. Stationary Variable

Stationary Variable Speed PTO Setup and Control

Stationary variable engine speed control allows the operator to select any engine speed within the PTO boundaries. This is done by increasing the engine speed to the desired set point using “SET/COAST” and “RESUME/ACCEL”. The vehicle must not be moving to activate PTO when programmed to Stationary Variable Mode.

Stationary Variable Speed PTO Setup

In addition to the main setup parameters (i.e. “PTO Mode Selection”, etc.) there are 3 specific stationary variable speed related PTO parameters.

- “PTO Engine Speed Throttle Up Ramp Rate” (7507).
- “PTO Engine Speed Throttle Down Ramp Rate” (7524).
- “PTO Bump Up/Down Step” (7525).

Stationary Variable Speed PTO Driver Interaction

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

1. Press “CRUISE ON”.
2. Press “SET/COAST” to activate PTO. The current engine speed will be the PTO engine speed set point.
3. Press and hold “RESUME/ACCEL” to increase the engine speed set point. The engine speed will increase by the programmed “PTO Engine Speed Throttle Up Ramp Rate” (7507). When the button is released the current engine speed will become the set speed.
4. Press and hold “SET/COAST” to decrease the PTO speed set point. The engine speed will decrease by the programmed “PTO Engine Speed Throttle Down Ramp Rate” (7524). When the button is released the current engine speed will become the set speed.
5. Press and release “RESUME/ACCEL” OR “SET/COAST” to increase or decrease the PTO engine speed set point by the programmed “PTO Bump Up/Down Step” (7525).
6. Using the accelerator to increase engine speed and momentarily pressing “SET/COAST” will set the current engine speed as the PTO engine speed set point.

NOTE: Parameter (7513) and (7503) must be set to (0).

7. If the PTO operation is interrupted (i.e. brake or clutch pressed, or accelerator pedal, a press of “RESUME/ACCEL” will return the engine to the previous PTO engine speed set point.

NOTE: The clutch, brake, or accelerator interruption described above is dependent upon the programming of parameters (7503, 7510, 7511, and 7513).

3.1.2. 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 “SET/COAST” OR “RESUME/ACCEL” as described in the “Stationary Preset Driver Interaction” section.

Stationary Preset Setup

In addition to the main setup parameters (i.e. “PTO Mode Selection”, etc.) 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.

- “PTO Preset Engine Speed 1 (SET/COAST)” (7505).
- “PTO Preset Engine Speed 2 (RESUME/ACCEL)” (7506).
- “PTO Preset Engine Speed 3” (7514).
- “PTO Preset Engine Speed 4” (7515).
- “PTO Preset Engine Speed 5” (7516).
- “PTO Preset Engine Speed 6” (7517).
- “PTO Engine Speed Throttle Up Ramp Rate” (7507).
- “PTO Engine Speed Throttle Down Ramp Rate” (7524).

Refer to the [Programmable Parameters](#) section for more information about these parameters (i.e. programming range, etc.).

Refer to the “Additional Stationary Preset Notes” and the [Possible In-Cab PTO Applications](#) section to understand how an operator would use these presets.

Stationary Preset Driver Interaction

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

1. Press “CRUISE ON”.
2. Press either of the following:
 - “SET/COAST” to activate PTO. The engine will ramp to PTO Preset Speed #1.
 - “RESUME/ACCEL” to activate PTO. The engine will ramp to PTO Preset Speed #2.

3. Pressing “RESUME/ACCEL” will select the next available PTO Preset Speed. For example, if the current selected PTO Preset Speed is #4, pressing “RESUME/ACCEL” will select Preset Speed #5.
4. Pressing “SET/COAST” will select the previous available PTO Preset Speed. For example, if the current selected PTO Preset Speed is #4, pressing “SET/COAST” will select Preset Speed #3.
5. Interrupting PTO operation (i.e. clutch, brake, or accelerator) will return the engine to idle (“PTO standby”). If “SET” is pressed, then the engine will go to preset 1. If “RESUME” is pressed, then the engine will go to preset 2.

NOTE: The clutch, brake, or accelerator interruption described above is dependent upon the programming of parameters (7503, 7510, 7511, and 7513).

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

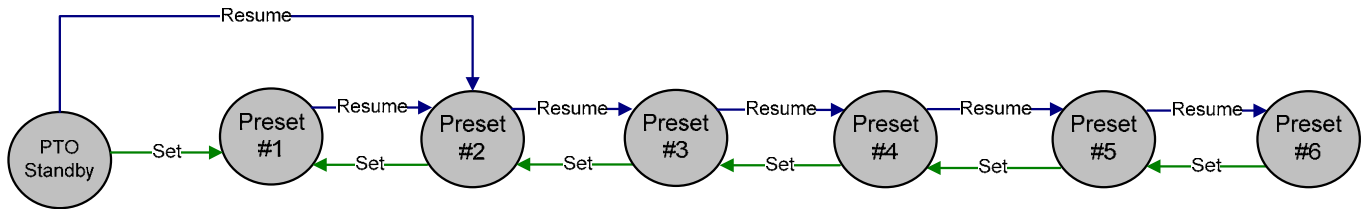
Stationary Preset Notes

- Presets speeds that will not be used can be set to 0 rpm.
- If one of the PTO Preset Engine Speeds is programmed to 0 rpm, that setting will be skipped for the next available preset.
- If all of the remaining preset speeds are programmed to 0 rpm, the last preset speed will be maintained.
- The engine will accelerate the engine speed at the programmed “PTO Engine Speed Throttle Up Ramp Rate” (7507) parameter setting when a preset speed is selected that is greater than the current engine speed.
- The engine will decelerate the engine speed at the programmed “PTO Engine Speed Throttle Down Ramp Rate” (7524) parameter setting when a preset speed is selected that is less than the current engine speed.
- Pressing and holding either “SET/COAST” or “RESUME/ACCEL” will not result in cycling through the preset speeds.

Additional Stationary Preset Notes

- The operator may desire less than 6 preset engine speeds. Presets that will not be used can be set to 0 revolutions per minute (RPM).
- For example, setting presets 4, 5, and 6 to 0 RPM will limit the operator to only 3 speed settings. In other words, if “RESUME/ACCEL” is pressed while in preset 3 and there are no higher presets available (programmed above 0), then remain in the current preset.
- However, if presets 1-3 are set to values above 0, preset 4 is set to 0, and 5 is set above 0, pressing “RESUME/ACCEL” will skip preset 4 when changing from 3 to 4, and go directly to preset 5.
- The “skipping” of presets described above works similarly when moving in a downward preset order using “SET/COAST”.

Stationary Preset Diagram



3.1.3. Mobile Variable

Mobile Variable Speed PTO Setup and Control

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

Mobile Variable Speed PTO Setup

In addition to the main setup parameters (i.e. "PTO Mode Selection", etc.) there is 1 specific mobile variable speed related PTO parameter:

- "PTO Vehicle Speed Kick Out" (7521)
- "PTO Parameter #3" (7531)
- "PTO Vehicle Speed Limit" (7501)

Mobile Variable Speed PTO Driver Interaction

Functionality and setup is identical to the functionality described previously for Stationary Variable Speed PTO with the exception that a stationary vehicle is no longer required.

3.2. Feature Interaction

The engine speed control (PTO) feature interacts with the following engine features:

- Cruise Control – There is no interaction with cruise control; however, PTO uses the same switches (“RESUME/ACCEL” & “SET/COAST”) as the cruise control feature. Commands from these switches may be part of the PTO feature or the cruise control feature depending on the speed at which the vehicle is traveling.
- Engine Cooling Fan – It may not be desirable to have the fan cycling ON & OFF during PTO operation; therefore parameter (9007) can be used to keep the fan engaged at all times when PTO is active.
- Idle Shutdown Timer (IST) – Refer to the “Idle Shutdown Timer” feature document for more information.
- Road Speed Limiting (RSL) – The RSL feature must be enabled for PTO to operate correctly.

4. Programmable Parameters

The following programmable parameters are required for engine speed control and power take off operation. 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 can’t be changed without authorization.

NOTE: There are multiple available PTO configurations. Please see the section for each configuration for specific setup instructions.

Parameters for All PTO Configurations:

Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
PTO Mode Selection (7500)	<p>This parameter determines the conditions that the Engine Speed Control (PTO) feature will be functional. Set this parameter to enable PTO operation and to choose which inputs are used for control.</p> <ul style="list-style-type: none"> If set to (0) – The PTO functionality is disabled. If set to (2) – Only the in-cab inputs will be able to control PTO. If set to (3) – Both remote and in-cab inputs will be able to control PTO (See Note 1 & 2). If set to (1) – Only the remote PTO inputs will be able to control PTO (See Note 2). <p>Note 1: The last input received will take priority when Mode 3 is selected.</p> <p>Note 2: Mode 1 and the remote portion of Mode 3 are discussed in the “Remote Engine Speed Control” document.</p>	<p>0: Disabled – All PTO Operation</p> <p>2: Enabled – In Cab Operation Only</p> <p>3: Enabled – Remote and In Cab Operation</p> <p>1: Enabled – Remote Operation Only</p>	YES	Customer Chosen
PTO In-Cab PTO Mode (7502)	<p>Set this parameter after selecting “In-Cab” or “Remote and In-Cab” Operation to determine which PTO mode is active.</p> <ul style="list-style-type: none"> If set to (0) – The in-cab switches will not be used. Refer to the “Remote Engine Speed Control” document. If set to (1) – The in-cab switches will be used to select up to 6 preset engine speeds. Refer to the Stationary Preset section for more information. If set to (2) – The in-cab switches will be used to adjust the engine speed variably. Refer to the Stationary Variable section for more information. If set to (3) – The in-cab 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. 	<p>0: None</p> <p>1: Stationary Preset</p> <p>2: Stationary Variable</p> <p>3: Mobile Variable</p>	YES	Customer Chosen

“In-Cab” Engine Speed Control (PTO)

PTO Preset Engine Speed Activation (CRUISE ON) (7522)	<p>This parameter is used to select a specific engine speed that the engine will ramp to immediately after “CRUISE ON” is pressed.</p> <p>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.</p> <p>Note 2: To disable this functionality, set this parameter to normal low engine idle speed.</p>	Low Idle – High Idle (rpm)	YES	Customer Chosen (See Note 1 & 2)
PTO Maximum Engine Speed (7508)	<p>The maximum engine speed that can be reached using any PTO controls.</p> <p>Note 1: This parameter must be set properly to protect PTO related equipment.</p>	Low Idle – High Idle (rpm)	YES	Customer Chosen (See Note 1)
PTO Engine Speed Limit with VSS Fault Select (7529)	<p>This parameter selects whether the PTO engine speed control is limited or deactivated if an engine speed threshold is reached while an active VSS fault exists.</p> <ul style="list-style-type: none"> • If set to 0: Engine speed control will be deactivated if the engine speed reaches the “PTO Engine Speed Limit with VSS Fault” (7518) parameter setting. • If set to 1: Engine speed will be limited if the engine speed reaches the “PTO Engine Speed Limit with VSS Fault” (7518) parameter setting. 	0: Off 1: On	YES	A setting of 1 is recommended.
PTO Engine Speed Limit with VSS Fault (7518)	<p>This parameter sets the maximum engine speed allowed when an active vehicle speed sensor (VSS) fault exists and PTO engine speed control is active.</p> <p>Above this engine speed, PTO cannot be activated, however; if this engine speed is exceeded while in PTO then PTO will be deactivated.</p> <p>This parameter might be useful in preventing the operator from over speeding or over loading the equipment.</p>	Low Idle – High Idle (rpm)	YES	Customer Chosen

“In-Cab” Engine Speed Control (PTO)

<p>PTO Disable with APS (7513)</p>	<p>Set this parameter to determine how the accelerator pedal interacts with active PTO operation.</p> <ul style="list-style-type: none"> If set to (0) – Pressing the accelerator pedal will not change the engine speed. If set to (1) – 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 PTO function. If set to (2) – Pressing the accelerator pedal will deactivate PTO operation (See Note 2). <p>Note 1: If setting (1) is chosen, the “PTO APS Maximum Engine Speed Override Limit” (7520) parameter must also be programmed.</p> <p>Note 2: The “PTO In-Cab Operator Interface (7503)” parameter must be set to (0) for this parameter setting to be recognized by the feature.</p>	<p>0: APS Is Ignored</p> <p>1: APS Overrides PTO Set Speed</p> <p>2: APS Disables PTO</p>	<p>YES</p>	<p>Customer Chosen (See Note 1)</p>
<p>PTO APS Maximum Engine Speed Override Limit (7520)</p>	<p>This parameter is the engine speed limit that is allowed by pressing the accelerator while PTO is active.</p> <p>Note 1: The “PTO Disable with APS” (7513) parameter must be set to (1) “APS Overrides PTO Set Speed” for this parameter to be recognized by the feature.</p>	<p>Low Idle – High Idle (rpm)</p>	<p>YES</p>	<p>Customer Chosen (See Note 1)</p>
<p>PTO In-Cab Operator Interface (7503)</p>	<p>Select this parameter when accelerator, brake or clutch is desired to be ignored during engine speed control operation.</p> <ul style="list-style-type: none"> If set to (0) – The accelerator, brake, and clutch are inputs used for PTO operation. If set to (1) – The accelerator, brake, and clutch will be ignored during PTO operation. <p>Note: Use parameters (7510), (7511), and (7513) to provide the specific input options.</p>	<p>0: Off</p> <p>1: On</p>	<p>YES</p>	<p>Customer Chosen</p>
<p>PTO Disable with Clutch (7510)</p>	<p>Choosing this feature will allow the operator to deactivate PTO operation when the clutch pedal is pressed (See Note 1).</p> <p>Otherwise the clutch pedal is ignored and will not deactivate the PTO.</p> <p>Note 1: The “PTO In-Cab Operator Interface (7503)” parameter must be set to (0) for this parameter to be recognized by the feature.</p>	<p>0: Clutch is Ignored</p> <p>1: Clutch Disables PTO</p>	<p>YES</p>	<p>Customer Chosen</p>

“In-Cab” Engine Speed Control (PTO)

<p>PTO Disable with Service Brake (7511)</p>	<p>Choosing this feature will allow the operator to deactivate PTO operation when the brake pedal is pressed.</p> <p>Otherwise the brake pedal is ignored and will not deactivate the PTO.</p> <p>Note 1: The “PTO In-Cab Operator Interface (7503)” parameter must be set to (0) for this parameter to be recognized by the feature.</p>	<p>0: Service Brake is Ignored</p> <p>1: Service Brake Disables PTO</p>	<p>YES</p>	<p>Customer Chosen</p>
<p>Engine Load Limit Select (7530)</p>	<p>This parameter selects whether the PTO engine speed control is limited or deactivated if an engine load threshold is reached.</p> <ul style="list-style-type: none"> • If set to 0: Engine speed control will be deactivated if the engine speed reaches the “Maximum Engine Load” (7519) parameter setting. • If set to 1: Engine speed will be limited if the engine speed reaches the “Maximum Engine Load” (7519) parameter setting. 	<p>0: Off</p> <p>1: On</p>	<p>YES</p>	<p>A setting of 1 is recommended.</p>
<p>Maximum Engine Load (7519)</p>	<p>The engine speed control will be limited or deactivated if this parameter value is reached.</p> <p>Note 1: The functionality of this parameter is dependent on the “Engine Load Limit Select” (7530) parameter setting.</p>	<p>Set between 30 and 100% based on the recommendations for the PTO equipment.</p>	<p>YES</p>	<p>A setting of 100% is recommended.</p>
<p>Maximum Engine Load Time (7527)</p>	<p>This parameter sets the time that the PTO will remain active while the engine load is at a maximum threshold.</p>	<p>Set between 0 and 32 seconds.</p>	<p>YES</p>	<p>A setting of 5 (seconds) is recommended.</p>
<p>PTO Engine Speed Throttle Up Ramp Rate (7507)</p>	<p>This parameter sets the speed at which the engine will attempt to increase the engine speed.</p> <p>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.</p> <p>Note 2: This parameter should be set to provide a smooth transition to the desired engine speed to accommodate applicable PTO equipment.</p>	<p>1 – 1500 rpm/sec</p>	<p>YES</p>	<p>100 rpm/sec (default)</p>

“In-Cab” Engine Speed Control (PTO)

PTO Engine Speed Throttle Down Ramp Rate (7524)	<p>This parameter sets the speed at which the engine will attempt to decrease the engine speed.</p> <p>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.</p> <p>Note 2: This parameter should be set to provide a smooth transition to the desired engine speed to accommodate applicable PTO equipment.</p>	1 – 1500 rpm/sec	YES	100 rpm/sec (default)
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Parameters for Variable Engine Speed PTO Configurations:

Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
PTO Bump Up/Down Step (7525)	<p>This parameter sets the following:</p> <ul style="list-style-type: none"> 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 PTO Configuration:

Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
PTO Preset Engine Speed 1 (SET/COAST) (7505)	<p>This parameter sets the running engine speed set point that will be maintained when the first PTO preset speed is selected OR when “SET/COAST” is pressed.</p> <p>Note 1: Presets speeds that will not be used can be set to 0 rpm.</p> <p>Refer to the Stationary Preset section for more information.</p>	<p>Range must be between the following settings:</p> <ul style="list-style-type: none"> “PTO Preset Engine Speed Activation (CRUISE ON)” (7522). “PTO Maximum Engine Speed” (7508) 	YES	Customer Chosen (See Note 1)

“In-Cab” Engine Speed Control (PTO)

<p>PTO Preset Engine Speed 2 (RESUME/ACCEL) (7506)</p>	<p>This parameter sets the running engine speed set point that will be maintained when the second PTO preset speed is selected OR when “RESUME/ACCEL” is pressed.</p> <p>Note 1: Presets speeds that will not be used can be set to 0 rpm.</p> <p>Refer to the Stationary Preset section for more information.</p>	<p>Range must be between the following settings:</p> <ul style="list-style-type: none"> • “PTO Preset Engine Speed Activation (CRUISE ON)” (7522). • “PTO Maximum Engine Speed” (7508) 	<p>YES</p>	<p>Customer Chosen (See Note 1)</p>
<p>PTO Preset Engine Speed 3 (7514)</p>	<p>This parameter sets the running engine speed set point that will be maintained when the third PTO preset speed is selected.</p> <p>Note 1: Presets speeds that will not be used can be set to 0 rpm.</p> <p>Refer to the Stationary Preset section for more information.</p>	<p>Range must be between the following settings:</p> <ul style="list-style-type: none"> • “PTO Preset Engine Speed Activation (CRUISE ON)” (7522). • “PTO Maximum Engine Speed” (7508) 	<p>YES</p>	<p>Customer Chosen (See Note 1)</p>
<p>PTO Preset Engine Speed 4 (7515)</p>	<p>This parameter sets the running engine speed set point that will be maintained when the fourth PTO preset speed is selected.</p> <p>Note 1: Presets speeds that will not be used can be set to 0 rpm.</p> <p>Refer to the Stationary Preset section for more information.</p>	<p>Range must be between the following settings:</p> <ul style="list-style-type: none"> • “PTO Preset Engine Speed Activation (CRUISE ON)” (7522). • “PTO Maximum Engine Speed” (7508) 	<p>YES</p>	<p>Customer Chosen (See Note 1)</p>
<p>PTO Preset Engine Speed 5 (7516)</p>	<p>This parameter sets the running engine speed set point that will be maintained when the fifth PTO preset speed is selected.</p> <p>Note 1: Presets speeds that will not be used can be set to 0 rpm.</p> <p>Refer to the Stationary Preset section for more information.</p>	<p>Range must be between the following settings:</p> <ul style="list-style-type: none"> • “PTO Preset Engine Speed Activation (CRUISE ON)” (7522). • “PTO Maximum Engine Speed” (7508) 	<p>YES</p>	<p>Customer Chosen (See Note 1)</p>
<p>PTO Preset Engine Speed 6 (7517)</p>	<p>This parameter sets the running engine speed set point that will be maintained when the sixth PTO preset speed is selected.</p> <p>Note 1: Presets speeds that will not be used can be set to 0 rpm.</p> <p>Refer to the Stationary Preset section for more information.</p>	<p>Range must be between the following settings:</p> <ul style="list-style-type: none"> • “PTO Preset Engine Speed Activation (CRUISE ON)” (7522). • “PTO Maximum Engine Speed” (7508) 	<p>YES</p>	<p>Customer Chosen (See Note 1)</p>

Parameters for Mobile Variable PTO Configurations:

Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
PTO Vehicle Speed Kick Out (7521)	<p>This parameter is the maximum vehicle speed that the PTO will be allowed to operate.</p> <p>Note 1: It is recommended that you set this parameter higher than the “PTO Vehicle Speed Limit” (7501) parameter setting.</p>	5 – 20 mph	YES	Customer Chosen (See Note 1)
Vehicle Speed Limit Select (7531)	<p>This parameter selects whether the PTO engine speed control is limited or deactivated if a vehicle speed threshold is reached.</p> <ul style="list-style-type: none"> • If set to 0: Engine speed control will be deactivated if the vehicle speed reaches the “PTO Vehicle Speed Kick Out” (7521) parameter setting. • If set to 1: Engine speed will be limited if the vehicle speed reaches the “PTO Vehicle Speed Limit” (7501) parameter setting. 	0: Off 1: On	YES	A setting of 1 is recommended.
PTO Vehicle Speed Limit (7501)	<p>This parameter is the maximum vehicle speed that the PTO will be allowed to operate.</p> <p>Note 1: It is recommended that you set this parameter to the maximum vehicle speed that the PTO is typically used.</p> <p>Note 2: (7531) must be enabled for this parameter to be recognized by the feature.</p>	0 to 20 (mph)	YES	Customer Chosen (See Note 1 & 2)

Related Factory Set Parameters:

Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
PTO Parameter #1 (7526)	This parameter is required to be set to 1.	N/A	NO	Must be set to 1

5. Parameter Setup

5.1. Possible In-Cab PTO Applications

The In-Cab PTO feature is application specific. This section briefly describes one example of in-cab PTO configuration and operation. This configuration will likely need to be modified to meet the needs of the actual application that 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 PTO Scenario

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

Adjust parameters as follows:

Parameter Name	Action Required
“PTO Mode Selection” (7500)	Select 2: “Enabled – In Cab Operation Only”
“PTO In-Cab PTO Mode” (7502)	Select 1: “Stationary Preset”
“PTO Preset Engine Speed 1 (SET/COAST)” (7505)	Set this to “900” (rpm).
“PTO Preset Engine Speed 2 (RESUME/ACCEL)” (7506)	Set this to “1100” (rpm).

Operation:

1. Activate the PTO by pressing the “CRUISE ON” switch on the steering wheel.
2. Activate the 1st preset engine speed (900 rpm) by pressing “SET/COAST”.
3. Activate the 2nd preset engine speed (1100 rpm) by pressing “RESUME/ACCEL”.

(Example B) In-Cab PTO 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 via the cruise control buttons.

Adjust parameters as follows:

Parameter Name	Action Required
“PTO Mode Selection” (7500)	Select 2: “Enabled – In Cab Operation Only”
“PTO In-Cab PTO Mode” (7502)	Select 2: “Stationary Variable”

Operation:

1. Activate the PTO by pressing the “CRUISE ON” switch on the steering wheel.
2. Increase the current engine speed by pressing and holding “RESUME/ACCEL”. Release the button when the desired engine speed is reached.
3. Decrease the current engine speed by pressing and holding “SET/COAST”. Release the button when the desired engine speed is reached.

6. Frequently Asked Questions

Q: How many presets can I configure in the in-cab PTO feature?

A: 6 preset engine speeds can be programmed if “Stationary Preset” mode is selected. Refer to the “Stationary Preset” section for more information.

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

A: Yes, refer to “Example B” in the Parameter Setup section for details.

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

A: An example of this application is described in the “Remote Engine Speed Control” document.