1. "Remote" 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 engine speed without using the accelerator pedal. It is commonly used for powering auxiliary devices. This functionality is described in the "In-Cab PTO" document.

When control over engine speed is required from outside the vehicle's cab, remote mounted switches must be used to turn on PTO engine speed control and select the desired engine speed. This functionality is referred to as remote engine speed control (RESC) and is the scope of this document.

The engine speed can be ramped up and down with RESC similar to the way the in-cab PTO feature works; however, the RESC feature includes two additional switches (remote preset & remote variable) which allow the operator to choose the mode of engine speed control operation.

Programmable parameters within the engine control module (ECM) provide RESC related options that can be adjusted to suit the customer's needs. Choosing whether a remote throttle pedal is used for PTO operation is an example.

The document will address unique RESC functionality for MaxxForce® 11 and 13 engines. The overall engine speed control functionality is described in the "In-Cab PTO" document. This document covers the engine related control, setup, and associated parameters for the RESC feature.

Refer to the Body Builder Book (S08323) in conjunction with the "Diamond Logic Control Systems – Features and Programmable Parameters" (PBB 71000B) for detailed engine controller pin-outs, additional hardware requirements, and advanced RESC functionality including body controller (truck related) interlocks and programming.

To set up the RESC 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

Refer to the Body Builder Book (S08323) for the available PTO accommodation packages (i.e. 60ABA) and the required associated hardware, body controller (truck related) programming and configurability.

2. Definitions/Acronyms

The following terms are referenced in this document:

- **CAP** – Cold Ambient Protection
- **ECM** – Engine Control Module
- **IST** – Idle Shutdown Timer
- **PTO** – Power Take Off
- **RESC** – Remote Engine Speed Control
- **VSS** – Vehicle Speed Sensor

3. Description and Operation

3.1. Operation

The driver control of the RESC feature consists of up to 4 switches typically located on a control panel outside the cab of the vehicle:

- "Remote Preset" which allows the driver to enable or disable the remote preset PTO functionality.
- "Remote Variable" which allows the driver to enable or disable the remote variable PTO functionality.
- "RESUME/ACCEL" which allows the operator to ramp up the engine **(See Note 1)** or cycle through the presets.
- "SET/COAST" which allows the operator to ramp down the engine **(See Note 1)** or cycle through the presets.

The functions of the above switches during RESC operation depend on which engine speed control mode is active (i.e. remote preset, remote variable).

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

Note 2: The actual switches used on a particular vehicle are provided and installed by the body builder.

The following interlocks must be satisfied for the remote engine speed controls to operate:

- The remote PTO input switches (any of the 4) must not be faulted.

Note 3: The In-Cab PTO related interlocks must also be satisfied if control of engine speed is desired both inside and outside of the cab. Refer to the "In-Cab PTO" document for more information.

The following visual indications may be remote mounted and can be used in conjunction with RESC:

- Amber Warning Lamp (AWL) – This lamp functions identical to the cab mounted AWL.
- Red Stop Lamp (RSL) – This lamp functions identical to the cab mounted RSL.
- Engine Running Output – This lamp indicates whether or not the engine is running.

Note 4: The actual lamps used on a particular vehicle are provided and installed by the body builder.

3.1.1. Remote Preset

Remote preset engine speed control allows the operator to select up to 6 preset engine speeds while the vehicle is stationary.

Remote preset PTO operation is similar to that of stationary preset PTO operation in the cab except that the controls are located outside the cab and the mode is selected by a physical switch rather than a programmable parameter.

Refer to "Stationary Preset" in the "In-Cab PTO" feature document for more information.

3.1.2. Remote Variable

Stationary variable engine speed control allows the operator to select any engine speed within the PTO boundaries.

Remote variable PTO operation is similar to that of stationary variable PTO operation in the cab except that the controls are located outside the cab and the mode is selected by a physical switch rather than a programmable parameter.

Refer to "Stationary Variable" in the "In-Cab PTO" feature document for more information.

3.1.3. Remote Pedal

This optional feature gives the operator control of the engine speed outside the cab similar to that of the in-cab accelerator pedal. The engine speed can be ramped from normal low engine idle to maximum PTO engine speed.

Some examples might include Vernier Throttles, Physical Throttle Pedals, and Electronic Throttle Governors.

To add a remote pedal to the engine control module (ECM) configuration, it is required to enable the "PTO Remote Pedal Enable (7504)" parameter. To operate the remote pedal control you must first enable remote variable or remote preset.

Refer to the Parameter Setup section for an example application and parameter setup.

NOTE: The remote pedal hardware is provided and installed by the body builder and is outside the scope of this document. Refer to the Body Builder Book (S08323) in conjunction with the "Diamond Logic Control Systems – Features and Programmable Parameters" (PBB 71000B) for more information.

3.1.4. Split-Shaft PTO

This optional feature is used in conjunction with RESC and is targeted for applications that use a transfer case or auxiliary driveshaft. The auxiliary drive unit is often connected to a pump that performs vacuum functions (i.e. sewage removal truck or fire pumps).

To add split shaft functionality to the engine control module (ECM) configuration it is required to set the "Split Shaft Enable" (9301)" parameter to 1: "Split Shaft Operation". To operate the split shaft you must engage the split shaft mechanism (i.e. place transfer case in "NEUTRAL").

Refer to the Parameter Setup section for an example application and parameter setup.

Note 1: While the system is functioning in Split Shaft mode (i.e. pump engaged), the ECM receives wheel-based vehicle speed from a Brake System Electronic Control Unit (ECU) as a safety interlock feature to ensure that the vehicle is not moving.

Note 2: The split shaft hardware is provided and installed by the body builder and is outside the scope of this document. Refer to the Body Builder Book (S08323) in conjunction with the "Diamond Logic Control Systems – Features and Programmable Parameters" (PBB 71000B) for more information.

3.2. Feature Interaction

The RESC feature interacts with the following engine features:

- In-Cab PTO – If it is desired to control the engine speed both inside and outside the cab, there may be interaction with the In-Cab PTO feature while using the RESC feature. Refer to the "In-Cab" PTO document for more information (i.e. in-cab interlocks and related parameters).
- 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.
- CAP – There may be applications where it would be desired to have CAP disabled. Refer to the "Vehicle Setup" feature document and the MaxxForce® 11 and 13 Diesel Engines Operation and Maintenance Manual for more information about CAP.

4. Programmable Parameters

The following programmable parameters are required for RESC and PTO 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 RESC configurations. Please see the Parameter Setup section for a few examples and specific setup instructions.

Parameters for Remote Pedal Configurations:

Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
PTO Remote Pedal Enable (7504)	This parameter sets the driveline mode for PTO operation: • If set to (0) – The remote throttle pedal input is disabled. • If set to (1) – The remote throttle pedal input is enabled.	0: Disable 1: Enable	YES	Customer Chosen NOTE: Must be set to 1 if engine speed is desired to be controller by a remote throttle pedal.

Parameters for Split Shaft PTO Configurations:

Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
Split Shaft Enable (9301)	This parameter sets the driveline mode for PTO operation: • If set to (0) – The ECM receives vehicle speed via SAE J1939 or hardwired from the transmission output shaft vehicle speed sensor input. NOTE: The driveline must be disengaged at all times for operation of the split shaft feature. • If set to (1) – The ECM receives wheel-based vehicle speed via SAE J1939 from the anti-lock brake system (ABS). NOTE: A transition in driveline status will cause the split shaft feature to be deactivated.	0: Neutral Operation 1: Split Shaft Operation	YES	Customer Chosen NOTE: Must be set to 1 if Split Shaft operation is desired.

Additional Related Parameters:

In addition to the required in-cab PTO feature parameters, there may be other parameters that affect RESC operation which may need to be considered. Parameters such as: "EWPS Mode" (7700) – referenced in the "Engine Warning and Protection System" document, "CAP Enable" (9400) – referenced in the "Vehicle Setup" document, and "Idle Shutdown Timer Mode (7400)" – referenced in the "Idle Shutdown Timer" document are some examples.

NOTE: This is not a comprehensive list; however, and may not include all parameters that need to be considered for a particular vehicle application. Check your specific vehicle application and refer to the Parameter Setup section for application examples.

5. Parameter Setup

5.1. Possible RESC Applications

The RESC feature is application specific. This section briefly describes a few examples of RESC 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 RESC parameters might be best configured for your vehicle.

(Example A) Typical Split – Shaft Scenario

Typical split-shaft applications may include fire pump, sewer evacuation, etc.

This example is applicable for "general" split-shaft operation using stationary PTO mode and with preset(s) for elevated engine speed. The presets are activated remotely OR via the cruise control switches.

Adjust parameters as follows:

Parameter Name	Action Required
PTO Mode Selection (7500)	Select 3: "Enabled – Remote and In Cab Operation"
PTO In-Cab PTO Mode" (7502)	Select one of the following: 0: "None", 1: "Stationary Preset", 2: "Stationary Variable", OR 3: "Mobile Variable"
Split Shaft Enable (9301)	Select 1: "Split Shaft Operation"
PTO Remote Pedal Enable (7504)	Select 0: "Disable" OR 1: "Enable"
(Optional) – PTO Preset Engine Speed 1 (SET/COAST) (7505)	Set this to 900.
(Optional) – PTO Preset Engine Speed 2 (RESUME/ACCEL) (7506)	Set this to 1100.
(Optional) – PTO Preset Engine Speed 3 (7514)	Set this to 0.
(Optional) – PTO Preset Engine Speed 4 (7515)	Set this to 0.
(Optional) – PTO Preset Engine Speed 5 (7516)	Set this to 0.
(Optional) – PTO Preset Engine Speed 6 (7517)	Set this to 0.
(Optional) – PTO In-Cab Operator Interface (7503)	Select 1: "Disable" NOTE: The accelerator, brake, and clutch will be ignored during PTO operation.
(Optional) – PTO Maximum Engine Speed (7508)	Check the recommendations for the PTO equipment.
PTO Engine Speed Limit with VSS Fault (7518)	Set this to the value of the "PTO Maximum Engine Speed" (7508) parameter setting referenced in the "In-Cab PTO" document.
Engine Load Limit Select (7530) This parameter selects whether the PTO engine speed control is limited or deactivated if an engine load threshold is reached. • 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.	A setting of 1 is recommended.
Maximum Engine Load (7519) The engine speed control will be limited or deactivated if this parameter value is reached. Note 1: The functionality of this parameter is dependent on the "Engine Load Limit Select" (7530) parameter setting.	Set between 30 and 100% based on the recommendations for the PTO equipment. NOTE: A setting of 100% is recommended.
Maximum Engine Load Time (7527) This parameter sets the time that the PTO will remain active while the engine load is at a maximum threshold.	A setting of 5 (seconds) is recommended.
Vehicle Speed Limit Select (7531) This parameter selects whether the PTO engine speed control is limited or deactivated if a vehicle speed threshold is reached.	A setting of 1 is recommended.

• 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.	
Preset Engine Speed Select (7528) If enabled, the engine speed will be ramped immediately after the remote preset switch is enabled. Normal engine speed control PTO conditions apply. • If set to 0: Remote preset functions work as described in the Remote Preset section. This is considered normal operation. • If set from 1 – 6: When the remote preset switch is enabled, the engine will ramp up (from idle speed) to the engine speed value set for the respective preset.	Set to any of the following values: 0: Off 1: Preset Speed 1 2: Preset Speed 2 3: Preset Speed 3 4: Preset Speed 4 5: Preset Speed 5 6: Preset Speed 6
PTO Engine Speed Limit with VSS Fault Select (7529) 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. • 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.	Set to 0: "Off" OR 1: "On" NOTE: A setting of 1 is recommended.
PTO Parameter #1 (7526)	Must be set to 1.

Operation:

1. Ensure that the vehicle is completely stopped and that the parking brake is set.
2. Place the transmission in neutral.
3. Engage the split-shaft mechanism.
4. Place the transmission into the appropriate drive gear. Refer to the appropriate transmission documentation for specific instructions (Eaton, Allison, etc.).
5. Continue with desired engine speed control operation.

(Example B) Typical Utility Bucket Truck

Typical utility bucket applications may include tree trimmers, lineman bucket trucks, lamp repair trucks, etc.

This example is applicable for "general" utility bucket operation using a mechanical PTO with preset(s) for elevated engine speed for a stabilizing outrigger. The presets are activated remotely OR via the cruise control switches.

NOTE: Propane trucks and tow trucks may use similar settings.

Adjust parameters as follows:

Parameter Name	Action Required
PTO Mode Selection (7500)	Select 3: "Enabled – Remote and In Cab Operation"
PTO In-Cab PTO Mode (7502)	Select one of the following: 0: "None", 1: "Stationary Preset", OR 2: "Stationary Variable"
Split Shaft Enable (9301)	Select 0: "Neutral Operation"
PTO Remote Pedal Enable (7504)	Select 0: "Disable"
(Optional) – PTO Preset Engine Speed 1 (SET/COAST) (7505)	Set this to 900.
(Optional) – PTO Preset Engine Speed 2 (RESUME/ACCEL) (7506)	Set this to 1100.
(Optional) – PTO Preset Engine Speed 3 (7514)	Set this to 0.
(Optional) – PTO Preset Engine Speed 4 (7515)	Set this to 0.
(Optional) – PTO Preset Engine Speed 5 (7516)	Set this to 0.
(Optional) – PTO Preset Engine Speed 6 (7517)	Set this to 0.
(Optional) – PTO In-Cab Operator Interface (7503)	Select 1: "Disable" NOTE: The accelerator, brake, and clutch will be ignored during PTO operation.
(Optional) – PTO Maximum Engine Speed (7508)	Check the recommendations for the PTO equipment.
PTO Engine Speed Limit with VSS Fault (7518)	Set this to the value of the "PTO Maximum Engine Speed" (7508) parameter setting.
Engine Load Limit Select (7530) This parameter selects whether the PTO engine speed control is limited or deactivated if an engine load threshold is reached. • 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.	A setting of 1 is recommended.

Maximum Engine Load (7519) The engine speed control will be limited or deactivated if this parameter value is reached. Note 1: The functionality of this parameter is dependent on the "Engine Load Limit Select" (7530) parameter setting.	Set between 30 and 100% based on the recommendations for the PTO equipment. NOTE: A setting of 100% is recommended.
Maximum Engine Load Time (7527) This parameter sets the time that the PTO will remain active while the engine load is at a maximum threshold.	A setting of 5 (seconds) is recommended.
Vehicle Speed Limit Select (7531) This parameter selects whether the PTO engine speed control is limited or deactivated if a vehicle speed threshold is reached. • 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.	A setting of 0 is recommended for utility bucket vehicles.
Preset Engine Speed Select (7528) If enabled, the engine speed will be ramped immediately after the remote preset switch is enabled. Normal engine speed control PTO conditions apply. • If set to 0: Remote preset functions work as described in the Remote Preset section. This is considered normal operation. • If set from 1 – 6: When the remote preset switch is enabled, the engine will ramp up (from idle speed) to the engine speed value set for the respective preset.	Set to any of the following values: 0: Off 1: Preset Speed 1 2: Preset Speed 2 3: Preset Speed 3 4: Preset Speed 4 5: Preset Speed 5 6: Preset Speed 6
PTO Engine Speed Limit with VSS Fault Select (7529) 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. • 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.	Set to 0: "Off" OR 1: "On" NOTE: A setting of 1 is recommended.
PTO Parameter #1 (7526)	Must be set to 1.

Operation

1. Engage the mechanical PTO device.
2. Ramp the engine to the desired preset speed according to the equipment.
3. Continue with desired utility bucket operation.

(Example C) Typical Utility Derrick Digger

Derrick diggers are commonly used for digging holes for utility poles, ditches, etc.

This example is applicable for "general" utility derrick digger operation using a mechanical PTO with preset(s) for elevated engine speed for a stabilizing outrigger, variable engine speed control and remote pedal for digging from the perch. The presets are activated remotely OR via the cruise control switches.

NOTE: Oil field trucks may use similar settings.

Adjust parameters as follows:

Parameter Name	Action Required
PTO Mode Selection (7500)	Select 3: "Enabled – Remote and In Cab Operation"
PTO In-Cab PTO Mode (7502)	Select one of the following: 0: "None", 1: "Stationary Preset", OR 2: "Stationary Variable".
Split Shaft Enable (9301)	Select 0: "Neutral Operation"
PTO Remote Pedal Enable (7504)	Select 1: "Enable"
(Optional) – PTO Preset Engine Speed 1 (SET/COAST) (7505)	Set this to 620.
(Optional) – PTO Preset Engine Speed 2 (RESUME/ACCEL) (7506)	Set this to 1200.
(Optional) – PTO Preset Engine Speed 3 (7514)	Set this to 0.
(Optional) – PTO Preset Engine Speed 4 (7515)	Set this to 0.
(Optional) – PTO Preset Engine Speed 5 (7516)	Set this to 0.
(Optional) – PTO Preset Engine Speed 6 (7517)	Set this to 0.
(Optional) – PTO In-Cab Operator Interface (7503) Select this parameter when accelerator, brake or clutch is desired to be ignored during engine speed control operation. • 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.	Select 0: "ON" OR 1: "OFF"

Note: Use parameters (7510), (7511) and (7513) to provide the specific input options.	
(Optional) – PTO Maximum Engine Speed (7508)	Check the recommendations for the PTO equipment.
PTO Engine Speed Limit with VSS Fault (7518)	Set this to the value of the "PTO Maximum Engine Speed" (7508) parameter setting.
Engine Load Limit Select (7530) This parameter selects whether the PTO engine speed control is limited or deactivated if an engine load threshold is reached. • 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.	A setting of 1 is recommended.
Maximum Engine Load (7519) The engine speed control will be limited or deactivated if this parameter value is reached. Note 1: The functionality of this parameter is dependent on the "Engine Load Limit Select" (7530) parameter setting.	Set between 30 and 100% based on the recommendations for the PTO equipment. NOTE: A setting of 100% is recommended.
Maximum Engine Load Time (7527) This parameter sets the time that the PTO will remain active while the engine load is at a maximum threshold.	A setting of 5 (seconds) is recommended.
Vehicle Speed Limit Select (7531) This parameter selects whether the PTO engine speed control is limited or deactivated if a vehicle speed threshold is reached. • 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.	A setting of 1 is recommended.
Preset Engine Speed Select (7528) If enabled, the engine speed will be ramped immediately after the remote preset switch is enabled. Normal engine speed control PTO conditions apply. • If set to 0: Remote preset functions work as described in the Remote Preset section. This is considered normal operation.	Set to any of the following values: 0: Off 1: Preset Speed 1 2: Preset Speed 2 3: Preset Speed 3 4: Preset Speed 4 5: Preset Speed 5 6: Preset Speed 6

• If set from 1 – 6: When the remote preset switch is enabled, the engine will ramp up (from idle speed) to the engine speed value set for the respective preset.	
PTO Engine Speed Limit with VSS Fault Select (7529) 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. • 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.	Set to 0: "Off" OR 1: "On" NOTE: A setting of 1 is recommended.
PTO Parameter #1 (7526)	Must be set to 1.

Operation:

1. Engage the mechanical PTO device.
2. Activate remote preset engine speed.
3. Operate outriggers.
4. REMOTE CONTROL:
    a. Activate remote variable
    b. Operate digger (adjusting engine speed variably as required)

- OR-

5. PEDESTAL:
    a. Activate remote pedal
    b. Operate digger

(Example D) Typical Construction Dump Scenario

Typical construction dump applications may include dump bodies, landscape dumps, etc.

This example is applicable for "general" construction dump operation using a mechanical PTO with preset(s) for elevated engine speed for raising and lowering the dump body. The presets are activated remotely OR via the cruise control switches.

Adjust parameters as follows:

Parameter Name	Action Required
PTO Mode Selection (7500)	Select 3: "Enabled – Remote and In Cab Operation"
PTO In-Cab PTO Mode (7502)	Select one of the following: 0: "None", 1: "Stationary Preset", 2: "Stationary Variable", OR 3: "Mobile Variable"
Split Shaft Enable (9301)	Select 0: "Neutral Operation"
PTO Remote Pedal Enable (7504)	Select 0: "Disable"
(Optional) – PTO Preset Engine Speed 1 (SET/COAST) (7505)	Set this to 1100.
(Optional) – PTO Preset Engine Speed 2 (RESUME/ACCEL) (7506)	Set this to 0.
(Optional) – PTO Preset Engine Speed 3 (7514)	Set this to 0.
(Optional) – PTO Preset Engine Speed 4 (7515)	Set this to 0.
(Optional) – PTO Preset Engine Speed 5 (7516)	Set this to 0.
(Optional) – PTO Preset Engine Speed 6 (7517)	Set this to 0.
(Optional) – PTO In-Cab Operator Interface (7503) Select this parameter when accelerator, brake or clutch is desired to be ignored during engine speed control operation. • 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. **Note:** Use parameters (7510), (7511) and (7513) to provide the specific input options.	Select 0: "ON" OR 1: "OFF"
(Optional) – PTO Maximum Engine Speed (7508)	Check the recommendations for the PTO equipment.
PTO Engine Speed Limit with VSS Fault (7518)	Set this to the value of the "PTO Maximum Engine Speed" (7508) parameter setting.
Engine Load Limit Select (7530) This parameter selects whether the PTO engine speed control is limited or deactivated if an engine load threshold is reached.	A setting of 1 is recommended.

• 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.	
Maximum Engine Load (7519) The engine speed control will be limited or deactivated if this parameter value is reached. Note 1: The functionality of this parameter is dependent on the "Engine Load Limit Select" (7530) parameter setting.	Set between 30 and 100% based on the recommendations for the PTO equipment. NOTE: A setting of 100% is recommended.
Maximum Engine Load Time (7527) This parameter sets the time that the PTO will remain active while the engine load is at a maximum threshold.	A setting of 5 (seconds) is recommended.
Vehicle Speed Limit Select (7531) This parameter selects whether the PTO engine speed control is limited or deactivated if a vehicle speed threshold is reached. • 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.	A setting of 1 is recommended.
Preset Engine Speed Select (7528) If enabled, the engine speed will be ramped immediately after the remote preset switch is enabled. Normal engine speed control PTO conditions apply. • If set to 0: Remote preset functions work as described in the Remote Preset section. This is considered normal operation. • If set from 1 – 6: When the remote preset switch is enabled, the engine will ramp up (from idle speed) to the engine speed value set for the respective preset.	Set to any of the following values: 0: Off 1: Preset Speed 1 2: Preset Speed 2 3: Preset Speed 3 4: Preset Speed 4 5: Preset Speed 5 6: Preset Speed 6
PTO Engine Speed Limit with VSS Fault Select (7529) 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. • 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	Set to 0: "Off" OR 1: "On" NOTE: A setting of 1 is recommended.

reaches the "PTO Engine Speed Limit with VSS Fault" (7518) parameter setting.	
PTO Parameter #1 (7526)	Must be set to 1.

Operation

1. Engage the mechanical PTO device.
2. Ramp the engine to the desired preset speed according to the equipment.
3. Continue with desired construction dump body operation.

6. Frequently Asked Questions

Q: Can the RESC feature be used for split-shaft operation, such as a fire pump application?

A: Yes, Refer to the Split-Shaft PTO section and "Example A" in the Parameter Setup section for more information.

Q: How do I configure my engine parameters for utility derrick digger operation?

A: Refer to "Example C" in the Parameter Setup section for more information.