4.1.3.2 Fast Idle Control.

The following algorithm requirements shall be executed by the **Platform** electronics.

4.1.3.2.1 Fast Idle Control Function Enable.

The Platform electronics shall transmit the serial data signal ***Platform Engine Speed Command System Type*** as equal to "Fast Idle" if the Fast Idle Control function is enabled on the vehicle.

4.1.3.2.2 Fast Idle Control Engine Speed Request.

    a. The following conditions shall be satisfied prior to the Platform electronics communicating a Fast Idle engine speed request to Powertrain:

      (1) The signal ***Top Of Travel Clutch Active*** is received as "False" and the signal ***Top Of Travel Clutch Switch Validity*** is received as "Valid".

      (2) The signal ***Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved*** is received as "False" and the signal ***Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved Validity*** is received as "Valid".

      (3) The signal ***Powertrain Brake Pedal Discrete Input Status Powertrain*** is received as "False" and the signal ***Brake Pedal Discrete Input Status Validity*** is received as "Valid".

      (4) The signal ***Transmission Estimated Gear*** is received as "Neutral Gear" or "Park Gear" and the signal ***Transmission Estimated Gear Validity*** is received as "Valid".

      (5) The signal ***Engine Run Active*** is received as "True".

      (6) The signal ***Engine Speed Status*** is received as "Normal Operation".

      (7) The signal ***Cruise Control Active*** is received as "False".

      (8) ***Platform Engine Speed Command Inhibit Request*** is not equal to "Inhibit Platform Eng. Speed Control".

      (9) No Platform specific reasons are present to prevent Fast Idle Control.

    b. If the above conditions are satisfied, the Platform electronics shall communicate an authorized Fast Idle Control engine speed request to Powertrain by executing the following to **enable** (turn "On") Fast Idle Control:

      (1) Transmit the serial data signal ***Platform Engine Speed Command On Switch Active*** in the sequence "False" to "True" to "False" based on the Fast Idle switch having been applied and released (momentary switch). The "False" to "True" to "False" transition of the Fast Idle switch must occur within **K_FI_MaxSwitchApplyTime**. The Fast Idle switch needs to be a momentary switch to prevent failure modes that could result in fast idle being active continuously across key cycles.

      (2) Transmit serial data signal ***Fast Idle Mode Active*** as equal to "True".

      (3) Transmit serial data signal ***Platform Engine Speed Command: Engine Speed Command Mode Active*** as equal to "True".

      (4) Transmit a Fast Idle Control desired engine speed via the serial data signal ***Platform Engine Speed Command: Engine Speed Request.***

    c. Fast Idle Control shall be **disabled** by the Platform electronics if the conditions listed in item "a" above are no longer satisfied. Platform shall transmit the following to indicate Fast Idle has been disabled. This will result in Powertrain returning engine speed back to base engine idle.

      (1) Transmit a Fast Idle Control engine speed via the serial data signal ***Platform Engine Speed Command: Engine Speed Request*** equal to "0" RPM

      (2) Transmit serial data signal ***Fast Idle Mode Active*** as equal to "False".

      (3) Transmit serial data signal ***Platform Engine Speed Command: Engine Speed Command Mode Active*** as equal to "False".

4.1.3.3 Power Take Off.

The following algorithm requirements shall be executed by the **Platform** electronics.

4.1.3.3.1 Power Take Off Function Enable.

The Platform electronics shall transmit the serial data signal, ***Platform Engine Speed Command System Type***, as equal to "Stationary PTO" or "Mobile PTO" if the PTO function is enabled on the vehicle.

4.1.3.3.2 Power Take Off Engine Speed Request.

a. The following conditions shall be satisfied prior to the Platform electronics communicating a Power Take Off engine speed request to Powertrain:

   (1) The signal ***Top Of Travel Clutch Active*** is received as "False" and the signal ***Top Of Travel Clutch Switch Validity*** is received as "Valid".

   (2) For Mobile PTO operation, the signal ***Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved*** is received as "False" and the signal ***Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved Validity*** is received as "Valid".

   (3) For Mobile PTO operation, the signal ***Powertrain Brake Pedal Discrete Input Status Powertrain*** is received as "False" and the signal ***Brake Pedal Discrete Input Status Validity*** is received as "Valid".

   (4) The signal ***Transmission Estimated Gear*** is received as "Neutral Gear" or "Park Gear" and the signal ***Transmission Estimated Gear Validity*** is received as "Valid".

   (5) The signal ***Engine Run Active*** is received as "True".

   (6) The signal ***Engine Speed Status*** is received as "Normal Operation".

   (7) ***Cruise Control Active*** is received as "False".

   (8) ***Platform Engine Speed Command Inhibit Request*** is not equal to "Inhibit Platform Eng. Speed Control".

b. If the above conditions are satisfied, the Platform electronics shall communicate an authorized PTO engine speed request to Powertrain by executing the following:

   (1) Transmit the serial data signal, ***Platform Engine Speed Command On Switch Active*** in the sequence from "False" to "True" based on the PTO Incab Mode Switch or PTO Remote Enable Switch activation to "On".

   (2) Transmit serial data signal ***Power Take Off Active*** as equal to "True".

   (3) Transmit serial data signal ***Platform Engine Speed Command: Engine Speed Command Mode Active*** as equal to "True".

   (4) Transmit the serial data signal ***Platform Engine Speed Command Switch Data Integrity*** as equal to "Data Valid".

   (5) Transmit a PTO desired engine speed via the serial data signal ***Platform Engine Speed Command: Engine Speed Request.***

c. Once the above conditions are satisfied, additional engine speed requests shall be communicated by transmitting the following serial data sequences:

   (1) ***Platform Engine Speed Command Speed Increase Switch Active*** = "False" to "True" to "False" shall be transmitted to signify that a PTO engine speed increase is being requested by the signal ***Platform Engine Speed Command: Engine Speed Request***.

   (2) ***Platform Engine Speed Command Speed Decrease Switch Active*** = "False" to "True" to "False" shall be transmitted to signify that a PTO engine speed decrease is being requested by the signal ***Platform Engine Speed Command: Engine Speed Request***.

   (3) ***Platform Engine Speed Command Switch Data Integrity*** = "Data Invalid" shall be transmitted by the Platform electronics, when the switch state has not yet been processed (i.e., processor initialization, switch failure, etc).

d. The following conditions shall disable Power Take Off engine speed request to Powertrain:

   (1) The signal ***Top Of Travel Clutch Active*** is received as "False" or the signal ***Top Of Travel Clutch Switch Validity*** is received as "Invalid".

(2) For Mobile PTO operation, the signal **Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved** is received as "True" or the signal **Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved Validity** is received as "Invalid".

(3) For Mobile PTO operation, the signal **Powertrain Brake Pedal Discrete Input Status Powertrain** is received as "True" or the signal **Brake Pedal Discrete Input Status Validity** is received as "Invalid".

(4) The signal **Transmission Estimated Gear** is received not equal to "Neutral Gear" or "Park Gear" or the signal **Transmission Estimated Gear Validity** is received as "Invalid".

(5) The signal **Engine Run Active** is received as "False".

(6) The signal **Engine Speed Status** is received not equal to "Normal Operation".

(7) The signal **Cruise Control Active** is received as "True".

(8) The signal **Platform Engine Speed Command Inhibit Request** is not equal to "Inhibit Platform Eng. Speed Control".

(9) The signals **Vehicle Speed Average Driven Validity** is equal to "Invalid" or **Vehicle Speed Average Non Driven** is equal to "Invalid"

(10) In Stationary PTO Mode, **Vehicle Speed Average Driven** is greater than **K_PTO_StatVehSpdLim** and **Vehicle Speed Average Non Driven** is greater than **K_PTO_StatVehSpdLim**

(11) The signal **Platform Engine Speed Command On Switch Active** is received equal to "False" based on the PTO In-cab Mode Switch or PTO Remote Enable Switch activation to "Off"

4.1.3.3.3 Brake State Information.

The Platform electronics shall transmit vehicle brake state information to Powertrain via the following serial data signals:

a. Brake Pedal Initial Travel Achieved Protection

b. Brake Pedal Initial Travel Achieved Status

c. Brake Pedal Position Alive Rolling Count

See GMW8762 Section 4 for requirements of the above signals.

4.1.3.3.4 Power Take Off Transmission Gear Request.

The Platform electronics shall transmit to Powertrain the serial data signal **Power Take Off Transmission Gear Requested** (see GMW8762 Section 4 for signal requirements). For applications not utilizing this signal, the signal value shall be transmitted as "No Action".

4.1.3.3.5 Transmission Power Take Off Clutch Release Request.

The Platform electronics shall transmit to Powertrain the serial data signal **Transmission Power Take Off Clutch Release Requested** (see GMW8762 Section 4 for signal requirements). For applications not utilizing this signal, the signal value shall be transmitted as " False".

4.1.3.3.6. Power Take Off Remote Engine Shutdown Requested.

The Platform electronics shall transmit to Powertrain the serial data signal **Power Take Off Remote Engine Shutdown Requested** (see GMW8762 Section 4 for signal requirements) based on the remote engine shutdown switch having been applied.

4.1.3.3.7 Accelerator Pedal Power Take Off Override Active

Accelerator Pedal Power Take Off Override Active is transmitted by the PTO module when the PTO module is present, and is not transmitted when the PTO module is not present (note – on Fast Idle applications, the Gateway module assumes the role of the PTO module only for Fast Idle functionality; PTO functionality is not supported). This signal represents a request from the Platform electronics to ignore the in-cab accelerator pedal and limit the throttle to the **Platform Engine Speed Command: Platform Engine Speed Request**. Therefore when the signals value is equal to "true", the accelerator pedal shall have no affect on increase in engine above the ECM command PTO engine speed request. When this signal is equal to "false", then ac-

celerator pedal shall have authority to increase engine speed above the Platform requested PTO engine speed. The state of this signal is based on an internal PTO Module calibration.

4.1.3.3.8 Power Take Off Engine Torque Limit Request

The Platform electronics shall transmit to Powertrain the serial data signals *Power Take Off Engine Torque Limit Requested* and *Power Take Off Engine Torque Limit Value* (see GMW8762 Section 4 PPEI GMLAN Serial Data Signal and Definition for signal requirements). An active PTO engine torque limiting request shall be indicated to Powertrain by the following actions:

a) The Platform electronics shall transmit the serial data signal, *Platform Engine Speed Command System Type*, as equal to "Stationary PTO."

b) The Platform electronics shall transmit the serial data signal *Platform Engine Speed Command: Engine Speed Command Mode Active* as equal to "True".

c) *Power Take Off Engine Torque Limit Requested* shall be transmitted with a value of "True"

d) *Power Take Off Engine Torque Limit Value* shall be transmitted with a value between 0 and 1024 Nm as determined by a Platform located calibration.

A Platform request for PTO engine torque limiting shall become invalid if any of the above conditions are not satisfied.

Note: PTO engine torque limiting shall be selected by the customer via calibration values owned by Platform, and located in the Platform electronics.

4.1.3.4 Platform Engine Speed Command Rolling Count and Protection.

The Platform electronics shall transmit the serial data signals *Platform Engine Speed Command Rolling Count* or *Platform Engine Speed Command Protection Value* as specified in GMW8772 Section 3 PPEI Serial Data Architecture Requirements and GMW8762 Section 4 PPEI GMLAN Serial Data Signal and Definition Requirements.

4.1.3.5 Platform Engine Speed Command Inhibit Request.

The Platform electronics shall not transmit a PTO or Fast Idle Control engine speed request to Powertrain if the serial data signal *Platform Engine Speed Command Inhibit Request* is received as equal to "True". See GMW8762 Section 4 PPEI Serial Data Signal and Definition for signal requirements.

4.1.3.6 Vehicle Speed Average Driven.

The Platform electronics may use this signal to satisfy function requirements of the PTO subsystem.

4.1.3.7 Execution/Activation Requirements.

Table 3: Power Take Off and Fast Idle Control Execution/Activation Requirements

Algorithm Section	Platform Maximum Execution Interval
Power Take Off/Fast Idle Switch Processing	15 ms
Brake Pedal Apply Signal Verification Error Diagnostics	15 ms
Power Take Off/Fast Idle Engine Speed Request Determination	50 ms
Power Take Off/Fast Idle Disable/Disengage Checks	50 ms
Power Take Off Switch Diagnostics (Set 1, Set 2, and Remote Engine Shutdown)	100 ms

4.1.3.8 System State Transition Requirements.

4.1.3.8.1 Power-up Initialization.

Not applicable.

4.1.3.8.2 Power-Down Initialization.

Not applicable.

4.1.3.9 Platform Diagnostic Requirements.

4.1.3.9.1 Brake Pedal Apply Sensing.

When any failure is present associated with the brake pedal apply sensing, the signal ***Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved Validity*** shall be set to "Invalid".

4.1.3.9.2 Power Take Off Mode Switches.

The Power Take Off mode switches interface directly to the PTO module. The PTO module processes these switch inputs and relays the state of the switch information to the ECM for a supervisory function. The PTO module is responsible for using the mode switch information to determine the requested engine speed thresh-old, detecting failures and setting the appropriate diagnostic codes as defined in the following sections. The following Diagnostic Trouble Codes (DTCs) are to be maintained by the PTO module processing the PTO switches. A dedicated DTC shall be assigned to each of the failures listed below.

4.1.3.9.2.1 Power Take Off Mode Switch Applied Too Long.

If a position of the PTO mode switch is continuously applied for greater than a calibratable time (e.g. 60 sec-onds), a DTC shall be set. Once the code is set, the code shall be latched for the remainder of the ignition cycle. When the DTC is set, the signal ***Platform Engine Speed Command Switch Data Integrity*** shall be set to "Failure Detected".

4.1.3.9.3 Remote Engine Shutdown Switch Diagnosis.

The platform shall be responsible for the diagnosis of the remote engine shutdown switch. If it is determined this switch is failed, the PTO module shall disable/disengage Power Take Off. The state of this switch shall be redundantly transmitted over serial data to the ECM via the signal ***Power Take Off Remote Engine Shut-down Requested.***

4.1.3.10 Off-Vehicle Communications / Serial Data Interaction Requirements.

TBD.

4.1.4 Powertrain Algorithm Requirements.

4.1.4.1 Powertrain Context Diagram.

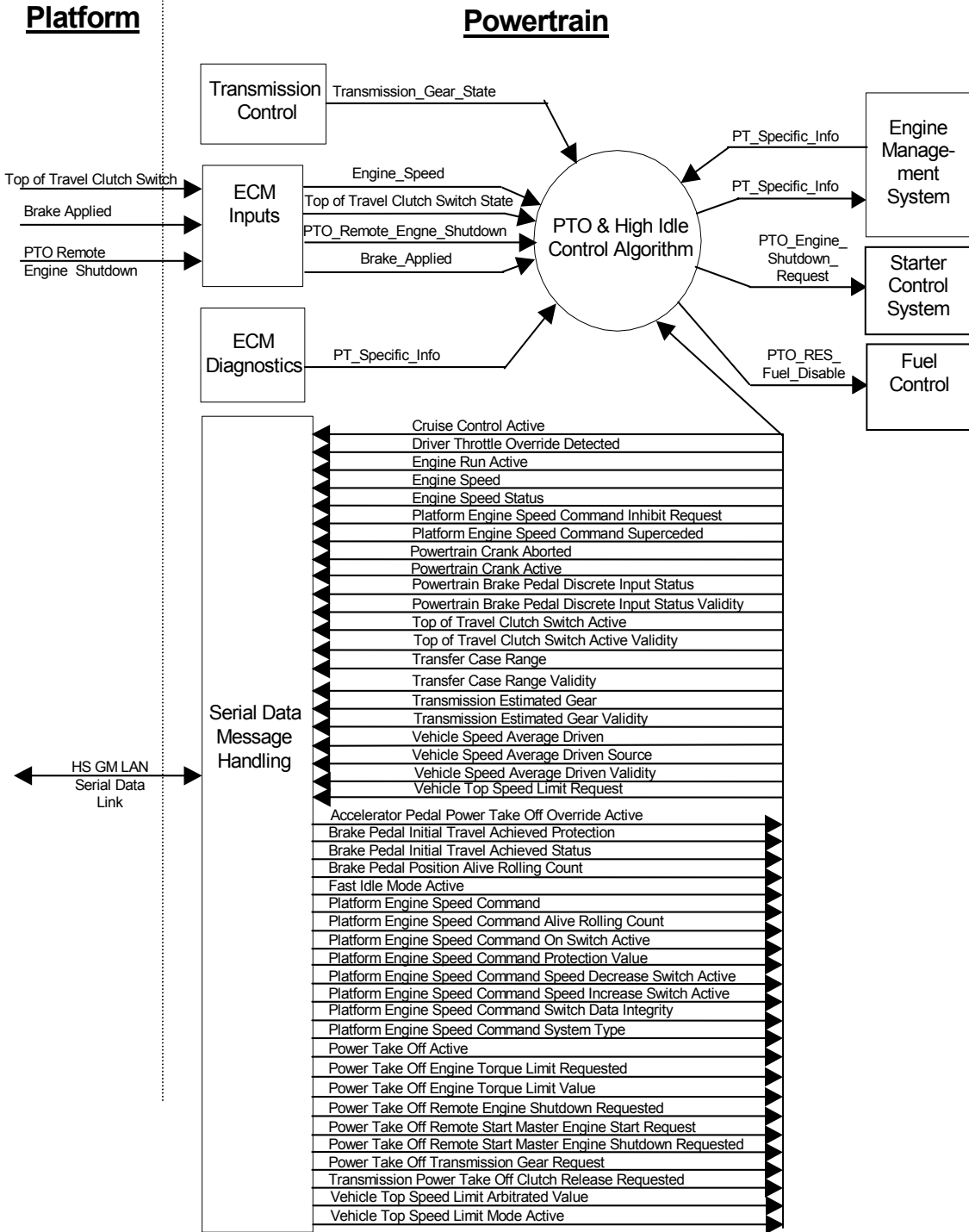## Platform   ## Powertrain

Figure 5: Power Take Off and Fast Idle Control Powertrain Context Diagram

4.1.4.2 Fast Idle Engine Speed Control.

The Powertrain algorithm requirements for Fast Idle Control are defined in the following sections.

4.1.4.2.1 Fast Idle Engine Speed Control Enable Requirements.

The Powertrain electronics shall respond to the serial data request, *Platform Engine Speed Request: Engine Speed Command,* to control engine idle if all the following conditions are satisfied:

a. The serial data signal *Platform Engine Speed Command System Type* is equal to "Fast Idle".

b. The calibration **K_PTO_EngSpdCmndSysType** is equal to "Fast Idle".

c. The serial data signal *Platform Engine Speed Command: Engine Speed Command Mode Active* is equal to "True".

d. The serial data signal *Fast Idle Mode Active* is equal to "True".

e. The fast idle switch is activated as determined by the following:

   (1) The serial data signal *Platform Engine Speed Command On Switch Active* has transitioned from "False" to "True" to "False" (momentary switch)**.**

   (2) The serial data signal *Platform Engine Speed Command Switch Data Integrity* is not equal to "Failure Detected".

f. The Fast Idle engine speed being requested by the platform via the serial data signal *Platform Engine Speed Request: Engine Speed Command* will be limited to a maximum value as defined by the Powertrain owned calibration **K_PTO_FastIdleEngSpdLim.** If the engine speed being requested by the platform is being limited via this calibration, the serial data signal *Platform Engine Speed Command Superceded* shall be sent with a value of "True".

4.1.4.2.2 Fast Idle Engine Speed Control Disable Requirements.

The Powertrain electronics shall disable Fast Idle engine speed control and revert to engine base idle if any of the following conditions are satisfied:

a. Conditions a, b, c d, e or g in Section 4.1.4.2.1 are not satisfied.

b. The serial data signals *Platform Engine Speed Command Alive Rolling Count* or *Platform Engine Speed Command Protection Value* have incurred **K_PTO_SignalVerErrorFail** errors within **K_PTO_SignalVerErrorWindow** frames**.**

c. Serial data signals from frame *PPEI PTO Command Data* ($1F9) have not been received for a calibratable amount of time (reference Section 4.1.4.12.1.2).

4.1.4.3 Power Take Off Engine Speed Control.

The following algorithm requirements shall be executed by the Powertrain electronics to provide an elevated engine speed based on serial data information transmitted from Platform.

4.1.4.3.1 PTO Engine Speed Control Enable Requirements.

The Powertrain electronics shall control to a requested PTO engine speed via the serial data signal, *Platform Engine Speed Command: Engine Speed Request*, if all the following conditions are satisfied:

a. The serial data signal, *Platform Engine Speed Command System Type*, is set to equal to "Stationary PTO," or "Mobile PTO".

b. The calibration **K_PTO_EngSpdCmndSysType** is equal to "Stationary PTO" or "Mobile PTO".

c. High-level supervisory requirements as monitored by the ECM have been satisfied. See Section 4.1.4.10 ECM Supervisory Function.

d. The serial data signal *Platform Engine Speed Command: Engine Speed Command Mode Active* is equal to "True".

e. The serial data signal *Power Take Off Active* is equal to "True".

f. The serial data signal **Platform Engine Speed Command Switch Data Integrity** is not equal to "Failure Detected".

4.1.4.3.2 PTO Engine Speed Control Disable Requirements.

The Powertrain electronics shall to disable PTO speed control if the following criteria are satisfied:

a. The conditions in Section 4.1.4.3.1 are not satisfied.

b. A remote engine shutdown request (see Section 4.1.4.4) has been received as indicated by the following:

(1) The serial data signal **Power Take Off Remote Engine Shutdown Request** is equal to True, or

(2) The hardware input for PTO Remote Engine Shutdown is activated.

c. The serial data signals **Platform Engine Speed Command Alive Rolling Count** and **Platform Engine Speed Command Protection Value** have incurred **K_PTO_SignalVerErrorFail** errors within **K_PTO_SignalVerErrorWindow** frames.

d. Serial data signals from frame **PPEI PTO Command Data** ($1F9) have not been received for a calibratable amount of time (reference Section 4.1.4.12.1.2).

e. If **K_PTO_EngSpdCmndSysType** is equal to "Stationary PTO" and the vehicle speed is greater than **K_PTO_StatVehSpdLim**.

4.1.4.3.3 Limit PTO Engine Speed as a Function of Vehicle Speed

While conditions are met to allow PTO Operation, the Powertrain electronics shall limit the top vehicle speed operation of the vehicle based on the serial data signal **Vehicle Top Speed Limit Request**.

Powertrain shall report via the signal **Vehicle Top Speed Limit Arbitrated Value** the lowest vehicle top speed limit value resulting from arbitration between the platform **Vehicle Top Speed Limit Request** signal and other powertrain top speed limit events or calibrations.

Powertrain shall set the serial data signal **Vehicle Top Speed Limit Mode Active** value to "True" when Powertrain is actively limiting the vehicle speed to the value contained in the serial data signal **Vehicle Top Speed Limit Arbitrated Value**.

4.1.4.4 PTO Engine Shutdown Requirements.

While in PTO Mode there are two possible reasons the engine could be shutdown. The customer has initiated a remote engine shutdown request or vehicle conditions exist that require shutdown of the engine.

4.1.4.4.1 PTO Remote Engine Shutdown Enable Criteria.

The Powertrain electronics shall provide a means to shutdown the engine while in PTO mode.

4.1.4.4.1.1 Monitor for Engine Shutdown Conditions Which Determine Engine Re-start.

a. The Powertrain electronics shall enable monitoring for "Engine Shutdown Conditions Which Determine Engine Re-Start" when all the following conditions are satisfied.

1) The engine is running as determined by Powertrain.

2) The serial data signal **Power Take Off Remote Start Master Engine Start Request** is equal to "PTO Remote Start Requested".

b. Once this function is enabled, it shall be disabled if either of the following conditions are satisfied:

1) The engine is no longer running as determined by Powertrain.

2) The serial data signal **Platform Engine Speed Command On Switch Active** is equal to "False", AND the serial data signal **Power Take Off Remote Start Master Engine Start Request** is equal to "PTO Remote Start Not Requested".

4.1.4.4.1.1.1 Monitoring For Conditions That Do Not Allow a Re-start.

The Powertrain electronics following conditions that "do not allow" an engine re-start.

a. Fuel shall be disabled (set PTO_RES_Fuel_Disable to "True") and ***Power Take Off Powertrain Run Aborted*** shall be set equal to "True" when **any** of the following conditions exist:

1) The vehicle has an automatic transmission and the transmission is not in Park or Neutral OR data signal is not valid.

2) Vehicle_Speed is not equal to 0 OR is not valid.

3) ***Power Take Off Remote Start Master Engine Shutdown Request*** is equal to "True" OR data signal is not valid.

b. Fuel shall be re-enabled (PTO_RES_Fuel_Disable set to "False") and ***Power Take Off Powertrain Run Aborted*** shall be set equal to "False" when **all** the following conditions are satisfied:

1) The ignition switch has been cycled from "ON" to "OFF" to "ON", and

2) The above conditions in item "a." are no longer satisfied.

4.1.4.4.1.1.2 Monitoring For Conditions That Allow a Re-start.

The Powertrain electronics shall monitor for the following conditions that "allow" an engine re-start:

a. Fuel shall be disabled (set PTO_RES_Fuel_Disable to "True") when **any** of the following conditions exist:

1) Engine_Speed is greater than **K_PTO_EngSpdThresh_1** for greater than **K_PTO_EngSpdThresh_1_Tme** seconds. Note that the value used for the calibration K_PTO EngSpdThresh1 must be calibrated greater than the value used for the calibration "PTO_Max_Engine_Speed" that is determined by the platform and located in the PTO module. Otherwise, Powertrain could incorrectly disable the PTO function. The value of these calibrations must to be coordinated between Powertrain and the Platform.

2) Engine_Speed is greater than **K_PTO_EngSpdThresh_2** for greater than **K_PTO_EngSpdThresh_2_Tme** seconds. Note that the value used for the calibration K_PTO EngSpdThresh2 must be calibrated greater than the value used for the calibration "PTO_Max_Engine_Speed" that is determined by the platform and located in the PTO module. Otherwise, Powertrain could incorrectly disable the PTO function. The value of these calibrations must to be coordinated between Powertrain and the Platform.

3) Any serial data communication errors with PTO Remote Start Master Module, PTO Module or the Module providing System Power Mode.

4) Run/Crank hardwire voltage goes low (< 2V).

b. Fuel shall be re-enabled (PTO_RES_Fuel_Disable shall be re-set to "False") when **all** the following conditions are satisfied:

1) The above of conditions in item "a." are no longer present.

2) The engine has successfully been shutdown and is no longer rotating.

Note: Cycling of the ignition to "OFF" shall not be required.

4.1.4.4.1.2 Monitor for Operator Initiated Remote Engine Shutdown Request Conditions.

The Powertrain electronics shall monitor for the following conditions requesting a remote engine shutdown:

a. ***Power Take Off Engine Shutdown Requested*** shall be set to "True" and Fuel shall be disabled (PTO_RES_Fuel_Disable shall be set to "True") when the following conditions exist:

1) The calibration **K_PTO_EngShutDwnEnbl** set equal to "True".

2) Either of the following conditions are satisfied:

(a) The serial data signal, ***Power Take Off Remote Engine Shutdown Requested***, is equal to "True"

    (b)   The PTO Remote Engine Shutdown input at the ECM is indicating, "shutdown requested" as interpreted by a "High" condition (> 4.0 volts).

  b. ***Power Take Off Engine Shutdown Requested*** shall be set to "False" and Fuel shall be re-enabled (PTO_RES_Fuel_Disable shall be re-set to "False"):

    1)   The above of conditions in item "a." are no longer present.

    2)   The engine has successfully been shutdown and is no longer rotating.

    Note: Cycling of the ignition to "OFF" shall not be required.

4.1.4.4.2 PTO Remote Engine Shutdown Disable Criteria.

A PTO remote engine shutdown request from Platform shall be ignored by the engine control system if the calibration, **K_PTO_EngShutDwnEnbl** set to "False".

4.1.4.5 Accelerator Pedal Power Take Off Override Active

Accelerator Pedal Power Take Off Override Active is received by Powertrain.

  a. Powertrain shall limit any driver throttle override request via the "in-cab" accelerator to the most recent value of the signal Platform Engine Speed Command: Platform Engine Speed Request when the following conditions are satisfied:

    (1) PTO is enabled as defined per section 4.1.4.3.1,

    (2) The serial data Accelerator Pedal Power Take Off Override Active is equal to "True".

  b. Powertrain shall allow the "in-cab" accelerator to override the current value of the Platform Engine Speed Command: Platform Engine Speed Request when the following conditions are satisfied:

    (1) PTO is enabled as defined per section 4.1.4.3.1,

    (2) The serial data Accelerator Pedal Power Take Off Override Active is equal to "False".

4.1.4.6 Power Take Off Engine Torque Limit Request

The Powertrain electronics shall limit engine torque while controlling to Platform PTO engine speed based on the following criteria.

4.1.4.6.1 Power Take Off Engine Torque Limit Request Enable Criteria

The Powertrain electronics shall limit engine torque to the value provided by the serial data signal ***Power Take Off Engine Torque Limit Request Value*** (see GMW8762 Section 4 PPEI GMLAN Serial Data Signal and Definitions for signal requirements) if the following conditions are satisfied:

  a. The serial data signal, ***Platform Engine Speed Command System Type***, has been received equal to "Stationary PTO". Note: torque limited shall not be allowed if ***Platform Engine Speed Command System Type*** is equal to "Mobile Variable" or "Fast Idle" or "Enhanced Fast Idle".

  b. The calibration **K_PTO_EngSpdCmndSysType** is equal to "Stationary PTO". Note: torque limited shall not be allowed if **K_PTO_EngSpdCmndSysType** is equal to "Mobile PTO" or "Fast Idle".

  c. High-level supervisory requirements as monitored by the ECM have been satisfied. See Section 4.1.4.10 ECM Supervisory Function.

  d. The serial data signal, ***Platform Engine Speed Command: Engine Speed Command Mode Active*** has been received as equal to "True".

  e. The serial data signal, ***Power Take Off Engine Torque Limit Requested*** has been received as equal to "True".

4.1.4.6.2 Power Take Off Engine Torque Limit Request Disable Criteria

The Powertrain electronics shall disable engine torque limiting if any of the following conditions are present:

  a. Any of the PTO engine speed control disable requirements a through f, or h defined in Section 4.1.4.3.2 have been satisfied.

   b. The serial data signal *Power Take Off Engine Torque Limit Requested* is received as equal to "False".

4.1.4.7 Platform Engine Speed Command Inhibit Request.

The Powertrain electronics shall transmit the signal *Platform Engine Command Inhibit Request* as "True" if any of the following conditions are present:

   a. The ECM Supervisory Function requirements are not being satisfied.

   b. Engine has not been running for a minimum time (typ. 5 seconds)

   c. Engine overspeed protection is active.

   d. Engine speed is not above a calibratable threshold.

   e. Failure is identified within ETC subsystem.

4.1.4.8 Driver Throttle Override Detected.

The Powertrain electronics shall transmit the signal *Driver Throttle Override Detected* as "True" when the driver is overriding the throttle position via the pedal (i.e. the throttle position is higher than that which would result from the PTO engine speed request). See GMW8762 Section 4 PPEI GMLAN Serial Data Signal and Definitions for signal requirements.

4.1.4.9 Platform Engine Speed Command Superceded.

The Powertrain electronics shall transmit the signal *Platform Engine Speed Command Superceded* as "True" if the engine speed request from PTO is not currently being provided by the Powertrain ETC system (i.e. another throttle request is overriding the PTO request, resulting in a lower throttle position than that which would result from the PTO engine speed request). See GMW8762 Section 4 PPEI GMLAN Serial Data Signal and Definitions for signal requirements.

4.1.4.10 PTO Supervisory Function.

The ECM as part of a rationality check shall monitor several key GMLAN signals and/or inputs. The ECM processing this information redundant to the PTO module enhances the system's robustness. The ECM monitors the information to verify key enable/disable criteria before responding to a PTO request for throttle control. If the ECM has not seen critical enable criteria satisfied when PTO becomes active, the ECM shall ignore the PTO request. Additionally if PTO is engaged and the ECM identifies a disable criterion satisfied, the ECM shall ignore the PTO command and set the serial data signal *Platform Engine Speed Command Inhibit Request* to "True". The inhibit by the ECM shall be delayed sufficiently to allow the PTO module an opportunity to first recognize the disable criterion becoming active and take action.

4.1.4.10.1 Parameters Monitored.

The following parameters shall be monitored as part of the supervisory function:

   a. <u>Discrete Inputs</u>:

     Brake Pedal Apply (Mobile PTO only)

   b. <u>GMLAN Signals</u>:

     1. Platform Engine Speed Command On Switch Active

     2. Platform Engine Speed Command Speed Increase Switch Active

     3. Platform Engine Speed Command Speed Decrease Switch Active

     4. Platform Engine Speed Command Switch Data Integrity

     5. Platform Engine Speed Command System Type

     6. Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved (Mobile PTO only)

     7. Platform Engine Speed Command: Platform Engine Speed Command Active

   c. <u>Internal variables</u>:

Vehicle Speed

4.1.4.10.2 Supervisory Function Enable Criteria Checked.

The following criteria shall be checked as part of the supervisory function. If the supervisory function enable criteria have not been satisfied, the ECM shall ignore the PTO command. If the PTO command continues to indicate PTO active and the enable criteria remain unsatisfied for **K_PTO_DisengageDelay**, the ECM shall respond by setting *Platform Engine Speed Command Inhibit Request* as "Inhibit Platform Eng. Speed Control".

a. No disable criteria are satisfied as defined in section 4.1.4.3.2 PTO Engine Speed Control Disable Requirements.

b. As long as no disable criteria are active, the ECM shall monitor the application and sequencing of various inputs relating to PTO operation. The criteria listed below must be satisfied prior to granting a PTO request. If these criteria have been satisfied, it shall continue to be considered satisfied as long as no disable criteria are active.

   1) The serial data signal *Platform Engine Speed Command On Switch Active* has transitioned from "False" to "True".

   2) *Platform Engine Speed Command Speed Increase Switch Active* or *Platform Engine Speed Command Speed Decrease Switch Active* has transitioned from "False" to "True" to "False".

   3) Vehicle speed is below a minimum threshold **K_PTO_StatVehSpdLim** and *Platform Engine Speed Command System Type* is "Stationary PTO".

   4) For Mobile PTO applications,

       a) *Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved* is set to "False", and

       b) *Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved Validity* is received as "Valid"

       c) Vehicle speed is below a maximum operating threshold of **K_PTO_VehSpdHighLim.**

       d) Discrete input Brake Pedal Apply indicates the brake pedal is not applied.

   If for any reason the ECM, based upon this supervisory function, determines PTO should not be operating, the ECM shall ignore the *Platform Engine Speed Command: Platform Engine Speed Request* signal. If the disable criteria remains active for greater than **K_PTO_DisengageDelay** and PTO is engaged at the end of this period, the ECM shall initiate a disable of PTO by transmitting *Platform Engine Speed Command Inhibit Request* as "Inhibit Platform Eng. Speed Control".

4.1.4.10.3 Supervisory Function Disable Criteria Checked.

As long as the above enable criteria continue to be satisfied, the following disable criteria shall be checked as part of the supervisory function. If the ECM receives a PTO command indicating PTO is active (*Platform Engine Speed Command: Platform Engine Speed Command Active* as "True") and *Platform Engine Speed Command On Switch Active* is set to "True", the ECM shall ignore the PTO command. If the PTO command continues to indicate PTO active and *Platform Engine Speed Command On Switch Active* is set to "True" remain unsatisfied for **K_PTO_DisengageDelay**, the ECM shall respond by setting *Platform Engine Speed Command Inhibit Request* as "Inhibit Platform Eng. Speed Control".

4.1.4.11 Fast Idle Supervisory Function

The ECM as part of a rationality check shall monitor several key GMLAN signals and/or inputs. The ECM processing this information redundant to the platform module enhances the system's robustness. The ECM monitors the information to verify key enable/disable criteria before responding to a Fast Idle request for throttle control. If the ECM has not seen critical enable criteria satisfied when Fast Idle becomes active, the ECM shall ignore the Fast Idle request. Additionally if Fast Idle is engaged and the ECM identifies a disable criterion satisfied, the ECM shall ignore the Fast Idle command and set the serial data signal Platform Engine Speed Command Inhibit Request to "True". The inhibit by the ECM shall be delayed sufficiently to allow the Fast Idle module an opportunity to first recognize the disable criterion becoming active and take action.

4.1.4.11.1 Parameters Monitored

The following parameters shall be monitored as part of the supervisory function:

a. Discrete Inputs:

Brake Pedal Apply

b. GMLAN Signals:

1. Platform Engine Speed Command On Switch Active
2. Platform Engine Speed Command Switch Data Integrity
3. Platform Engine Speed Command System Type
4. Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved
5. Platform Engine Speed Command: Platform Engine Speed Command Active
6. Fast Idle Mode Active

c. Internal Variables:

Vehicle Speed

4.1.4.11.2 Supervisory Function Enable Criteria Checked

The following criteria shall be checked as part of the supervisory function. If the supervisory function enable criteria have not been satisfied, the ECM shall ignore the Fast Idle command. If the Fast Idle command continues to indicate Fast Idle active and the enable criteria remain unsatisfied for **K_PTO_DisengageDelay**, the ECM shall respond by setting *Platform Engine Speed Command Inhibit Request* as "Inhibit Platform Eng. Speed Control".

The ECM shall monitor the application and sequencing of various inputs relating to Fast Idle operation. The criteria listed below must be satisfied prior to granting a Fast Idle request.

1. *Platform Engine Speed Command On Switch Active* has transitioned from "False" to "True" to "False".
2. Vehicle speed is below a minimum threshold **K_PTO_StatVehSpdLim** and *Platform Engine Speed Command System Type* is "Fast Idle".
3. *Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved* is set to "False", and
4. *Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved Validity* is received as "Valid"
5. Discrete input Brake Pedal Apply indicates the brake pedal is not applied.

If for any reason the ECM, based upon this supervisory function, determines Fast Idle should not be operating, the ECM shall ignore the *Platform Engine Speed Command: Platform Engine Speed Request* signal. If the disable criteria remains active for greater than **K_PTO_DisengageDelay** and Fast Idle is active at the end of this period, the ECM shall initiate a disable of Fast Idle by transmitting *Platform Engine Speed Command Inhibit Request* as "Inhibit Platform Eng. Speed Control".

4.1.4.11.3 Supervisory Function Disable Criteria Checked.

As long as the above enable criteria continue to be satisfied, the following disable criteria shall be checked as part of the supervisory function. If the ECM receives a Fast Idle command indicating Fast Idle is active (**Platform Engine Speed Command: Platform Engine Speed Command Active** as "True") and any of the following criteria are not satisfied, the ECM shall ignore the Fast Idle command. If the Fast Idle command continues to indicate Fast Idle active and any of the disable criteria remain unsatisfied for **K_PTO_DisengageDelay**, the ECM shall respond by setting **Platform Engine Speed Command Inhibit Request** as "Inhibit Platform Eng. Speed Control".

Platform Engine Speed Command On Switch Active has transitioned from "False" to "True" to "False".

4.1.4.12 Powertrain Diagnostic Requirements.

4.1.4.12.1 Platform Engine Speed Command.

For Power Take Off and Fast Idle systems, the ECM is responsible for detecting errors associated with the serial communication of the Platform Engine Speed Command. These diagnostics are described in the following sections.

4.1.4.12.1.1 Sliding Window Verification Error.

The ECM shall perform a "sliding window" check on Platform Engine Speed Command as indicated in GMW8772 Section 3 PPEI Serial Data Architecture. The existence of X Signal Verification Errors (either **Platform Engine Speed Command Alive Rolling Count** error or **Platform Engine Speed Command Protection Value** error) within a window of Y consecutive frames shall constitute a Sliding Window Verification Error. The value of Y shall be between 8 and 16. Typical values for X and Y are X = 4 and Y = 10. Once a sliding window verification error has been detected, Power Take Off/Fast Idle shall be disengaged, a DTC shall be stored and engagement shall not be allowed until recovery conditions have been satisfied. Recovery consists of the reception of between 20 and 40 consecutive Platform Engine Speed Command frames without any signal verification errors present.

4.1.4.12.1.2 Maximum Elapsed Time Since Last Valid Signals.

The ECM shall keep track of the elapsed time since the last valid **Platform Engine Speed Command** signal had been received. A valid **Platform Engine Speed Command** requires no signal verification error. If the elapsed time exceeds **K_PTO_SignalTimeOut**, power take off shall be disabled and engagement shall not be allowed until recovery conditions have been satisfied. Recovery consists of the reception of between 20 and 40 consecutive Platform Engine Speed Command frames without any signal verification errors present. No DTC shall be set associated with this elapsed time condition.

4.1.4.12.2 Brake Pedal Apply Sensing.

The ECM is responsible for detecting errors associated with the serial communication of brake pedal apply sensing information as well as the Brake Pedal Apply discrete input. Reference GMW8773 Section 3 PPEI Brakes and Traction Control Subsystem Requirements for additional information.

4.1.4.12.2.1 Sliding Window Verification Error Determination.

The ECM shall perform a "sliding window" check on **Brake Pedal Initial Travel Achieved Status** as indicated in GMW8772 Section 3 PPEI Serial Data Architecture. The existence of X Signal Verification Errors (either **Brake Pedal Position Alive Rolling Count** error or **Brake Pedal Initial Travel Achieved Protection** error) within a window of Y consecutive frames shall constitute a Sliding Window Verification Error. The value of Y shall be between 8 and 16. Typical values for X and Y are X = 4 and Y = 10. Once a sliding window verification error has been determined, a DTC shall be stored and engagement shall not be allowed until recovery conditions have been satisfied. Recovery consists of the reception of between 20 and 40 consecutive **Brake Pedal Initial Travel Achieved Status** frames without any signal verification errors present. Once a sliding window verification error has been determined, the ECM shall cease throttle control relative to Mobile Power Take Off/Fast Idle operation and set the signal **Platform Engine Speed Command Inhibit Request** to "True" after **K_PTO_DisengageDelay** has elapsed. The delay time will be a calibratable time (e.g. 500 ms).

4.1.4.12.2.2 Maximum Elapsed Time Since Last Valid Signals.

The ECM shall keep track of the elapsed time since the last valid ***Brake Pedal Initial Travel Achieved Status*** signal had been received. A valid ***Brake Pedal Initial Travel Achieved Status*** requires no signal verification error and ***Brake Pedal Initial Travel Achieved Status: Brake Pedal Initial Travel Achieved Validity*** received as "Valid". If the elapsed time exceeds 500 ms, Power Take Off shall disengage and engagement shall not be allowed until recovery conditions have been satisfied. Recovery consists of the reception of between 20 and 40 consecutive ***Brake Pedal Initial Travel Achieved Status*** frames without any signal verification errors present. No DTC shall be set associated with this elapsed time condition. Once a maximum elapsed time error has been detected, the ECM shall cease throttle control relative to Mobile Power Take Off/Fast Idle operation and set the signal ***Platform Engine Speed Command Inhibit Request*** to "True" after **K_PTO_DisengageDelay** has elapsed. The delay time will be a calibratable time (e.g. 500 ms).

4.1.4.12.2.3 Brake Apply Discrete Failed in "Not Applied" State.

The ECM shall apply a rationality check to assess the functionality of the brake pedal apply discrete input against the GMLAN signal ***Brake Pedal Initial Travel Achieved Status*** signal. The diagnostics identifies failures of the brake pedal apply discrete input in the "Not Applied" state. The rationality check shall monitor the vehicle speed signals to identify specific vehicle deceleration conditions. The deceleration conditions require the vehicle speed initially be above a calibratable threshold and later drop below a calibratable threshold within a calibratable time period, thereby exceeding a deceleration threshold. A failure is defined when a deceleration exceeds the threshold, the GMLAN signal ***Brake Pedal Initial Travel Achieved Status*** is in the "True" state and the Brake Pedal Apply discrete has not indicated the "Applied" state. A DTC shall be set if a calibratable number of failures occur and ***Powertrain Brake Pedal Discrete Input Status Validity*** signal shall be set to "Invalid".

4.1.4.12.2.4 Brake Apply Discrete Failed in "Applied" State.

The ECM shall apply a rationality check to assess the functionality of the brake pedal apply discrete input against the GMLAN signal ***Brake Pedal Initial Travel Achieved Status*** signal. The diagnostics identifies failures of the brake pedal apply discrete input in the "Applied" state. The rationality check shall monitor the vehicle speed signals to identify specific vehicle acceleration conditions. The acceleration conditions require the vehicle speed initially be below a calibratable threshold and later increase above a calibratable threshold within a calibratable time period, thereby exceeding an acceleration threshold. A failure is defined when a acceleration exceeds the threshold, the GMLAN signal ***Brake Pedal Initial Travel Achieved Status*** is in the "False" state and the Brake Pedal Apply discrete has not indicated the "Not Applied" state. A DTC shall be set if a calibratable number of failures occur and ***Powertrain Brake Pedal Discrete Input Status Validity*** signal shall be set to "Invalid".

4.1.4.12.3 Wheel Speed Sensing.

The diagnostics associated with vehicle speed are defined by the Vehicle Speed and Rough Road Sensing subsystem. Power Take Off and Fast Idle shall disengage if a failure exists associated with the vehicle speed signals.

4.1.4.12.4 OBDII Diagnostics.

Powertrain shall disable certain OBDII diagnostics as appropriate to avoid the setting of false diagnostic trouble codes when PTO or Fast Idle Control is active.

4.1.4.13 Execution/Activation Requirements.

Table 4: Power Take Off and Fast Idle Control Execution/Activation Requirements

Algorithm Section	Powertrain Maximum Execution Interval
ECM Supervisory Function	25 ms
Brake Pedal Apply Signal Verification Error Diagnostics	25ms
PTO Engine Shutdown	50ms
Power Take Off/Fast Idle Engine Speed Control	100ms
Platform Engine Speed Command Signal Verification Error Diagnostics	250ms

4.1.4.14 System State Transition Requirements.

4.1.4.14.1 Power-up Initialization.

Platform Engine Speed Command Switch Data Integrity = "Data Invalid" shall be transmitted by the Platform electronics when the switch state has not yet been processed (i.e., processor initialization, etc).

4.1.4.14.2 Power-Down Initialization.

Not applicable.

4.1.4.15 Off-Vehicle Communications/Serial Data Interaction Requirements.

TBD (Parameter Identification Data (PID) requirements for Allison Transmission unknown).

4.1.5 Data Dictionary.

4.1.5.1 Calibrations.

All of the following calibrations are Platform-owned.

K_FI_MaxSwitchApplyTime = the maximum amount of time the Fast Idle switch can be applied before being released and have to apply and release of the switch be processed

>   Engineering unit: milliseconds

>   Minimum range: TBD

>   Minimum resolution: TBD

>   Typical Value: TBD

>   Owner: Powertrain

>   Location: Platform

K_PTO_DisengageDelay = The time the ECM should delay before disengaging PTO for a criterion that is also monitored by the PTO module. This allows the PTO to first initiate disengagement under normal operation providing consistent disengagement history. The delay begins when a criterion has first been satisfied.

>   Engineering unit: milliseconds

>   Minimum range: 0 – 1000ms

>   Minimum resolution: 1.0ms

>   Typical Value: 500 ms

>   Owner: Platform

>   Location: Powertrain

K_PTO_EngShutDwnEnbl = Enables the PTO remote engine shutdown function when set to "True".

>   Engineering unit: N/A

Minimum range: True, False

Minimum resolution: N/A

Typical Value: N/A

Owner: Platform

Location: Powertrain

K_PTO_EngSpdCmndSysType = The Power Take Off (PTO) and Fast Idle system types defined by this signal shall be stored in non-volatile memory of the Powertrain electronics in case communications is lost with the platform controller sending this signal. The information contained in this calibration shall be coordinated with the equivalent calibration located in the Platform.

Engineering unit: enumeration

Minimum range: $0 to $7

$0 = No Platform Engine Speed Command System

$1 = Stationary PTO

$2 = Mobile PTO

$3 = Fast Idle

Minimum resolution: 1 bit

Typical Value: N/A

Owned: Platform

Location: Powertrain and Platform

K_PTO_FastIdleEngSpdLim = maximum Fast Idle engine speed request that will be honored by Powertrain based on requirement to allow execution of OBD2 diagnostics.

Engineering unit: RPM

Minimum range: 0 to 2000

Minimum resolution: 1 RPM

Typical Value: 1300

Owner: Powertrain

Location: Powertrain

K_PTO_LoadFeedbackEnbl = This calibration determines whether the PTO Load Feedback signal is present from the PTO vehicle subsystem.

Engineering unit: Boolean

Minimum range: True, False

Minimum resolution: N/A

Typical Value: N/A

Owner: Platform

Location: Powertrain (TCM calibration)

K_PTO_StatVehSpdLim = Vehicle speed above which stationary variable or stationary preset PTO will be disabled.

    Engineering unit: KPH

    Minimum range: 0-255

    Minimum resolution: 1

    Typical Value: 3

    Owner: Platform

    Location: Powertrain

K_PTO_EngSpdThresh_1= Fuel shall be disabled (set PTO_RES_Fuel_Disable to "True") when Engine_Speed is greater than **K_PTOEngSpdThresh_1** for greater than **K_PTOEngSpdThresh_1_Tme** seconds.

    Engineering unit: RPM

    Minimum range: 0-8192

    Minimum resolution: 1

    Typical Value: 1500

    Owner: Platform

    Location: Powertrain

K_PTO_EngSpdThresh_1_Tme = Fuel shall be disabled (set PTO_RES_Fuel_Disable to "True") when Engine_Speed is greater than **K_PTOEngSpdThresh_1** for greater than **K_PTOEngSpdThresh_1_Tme** seconds.

    Engineering unit: seconds

    Minimum range: 0-255

    Minimum resolution: 1

    Typical Value: 8

    Owner: Platform

    Location: Powertrain

K_PTO_EngSpdThresh_2 = Fuel shall be disabled (set PTO_RES_Fuel_Disable to "True") when Engine_Speed is greater than **K_PTOEngSpdThresh_2** for greater than **K_PTOEngSpdThresh_2_Tme** seconds.

    Engineering unit: RPM

    Minimum range: 0-8192

    Minimum resolution: 1

    Typical Value: 1800

    Owner: Platform

    Location: Powertrain

K_PTO_EngSpdThresh_2_Tme = Fuel shall be disabled (set PTO_RES_Fuel_Disable to "True") when Engine_Speed is greater than **K_PTOEngSpdThresh_2** for greater than **K_PTOEngSpdThresh_2_Tme** seconds.

Engineering unit: seconds

Minimum range: 0-255

Minimum resolution: 1

Typical Value: 8

Owner: Platform

Location: Powertrain

4.1.5.2 Variables.

PTO_Engine_Shutdown_Request = set to "True" and Fuel shall be disabled (PTO_RES_Fuel_Disable shall be set to "True") when the serial data signal, ***Power Take Off Remote Engine Shutdown Requested***, is equal to "True" or the PTO Remote Engine Shutdown input at the ECM is indicating "shutdown requested" (input voltage < 2.0 volts).

Engineering unit: Logical

Minimum range: True, False

Minimum resolution: N/A

PTO_RES_Fuel_Disable = is "True" and Fuel shall be disabled when **any** of the following conditions are satisfied: "Monitoring For Conditions That Do Not Allow a Re-start", "Monitoring For Conditions That Allow a Re-start" or "Monitoring For Remote Engine Shutdown Request Conditions". Note: The conditions that allow the Powertrain electronics re-enable fuel and allow engine re-start are specific to the conditions above.

Engineering unit: Logical

Minimum range: True, False

Minimum resolution: N/A

5 Provisions for Shipping

Not Applicable.

6 Notes

6.1 Glossary

None.

6.2 Acronyms, Abbreviations, and Symbols.

See GMW8762 Appendix Section A.3

7 Additional Paragraphs

7.1 All materials supplied to this specification must comply with the requirements of GMW3001, **Rules and Regulations for Materials Specifications.**

7.2 All materials supplied to this specification must comply with the requirements of GMW3059, **Restricted and Reportable Substances for Parts.**

8 Coding System

This specification shall be referenced in other documents, drawings, VTS, CTS, etc. as follows:

GMW8780

9 Release and Revisions

9.1 Release. This general specification originated in June 2003; approved by The Global PPEI Core Team in December 2003 and initially published in February 2004 for the Global PPEI Version 3.4.

9.2 Revisions.

Rev	Approval Date	Description (Organization)
A	Aug 2004	Global PPEI Version 3.5 Release.
B	Jul 2005	Global PPEI Version 3.6 Release.
C	Mar 2006	Global PPEI Version 3.7 Release.

Appendix A

The following are approved Change Requests (CRs) for the Global PPEI Version 3.7 Release that impacted the GMW8780 Power Take-Off and Fast Idle Control Subsystem.

Sections Changed	Description of Change	Rationale/Authorization
4.1.3.2.2 4.1.4.2.2	Correct Fast Idle switch disable requirements to eliminate the criteria Platform Engine Speed Command On Switch Active transition from "False" to "True" to "False".	CR 345

Deviations

None.