



# PTO INSTRUCTIONS

For **GM** "New Body Style" 2007 & Later

## PTO INSTRUCTIONS FOR GM "NEW BODY STYLE" 2007 + LATER

Requires vehicle to be purchased with RPO "PTO" and "M1F". This provides access for the mounting of the PTO and the proper electronics to control the system.

Follow PTO installation instructions as listed in the GM6B Installation and Owner's Manual.

The following are excerpts from the GM Upfitter Integration Bulletin #80 which is found on the GM Upfitter website [www.gmupfitter.com](http://www.gmupfitter.com).

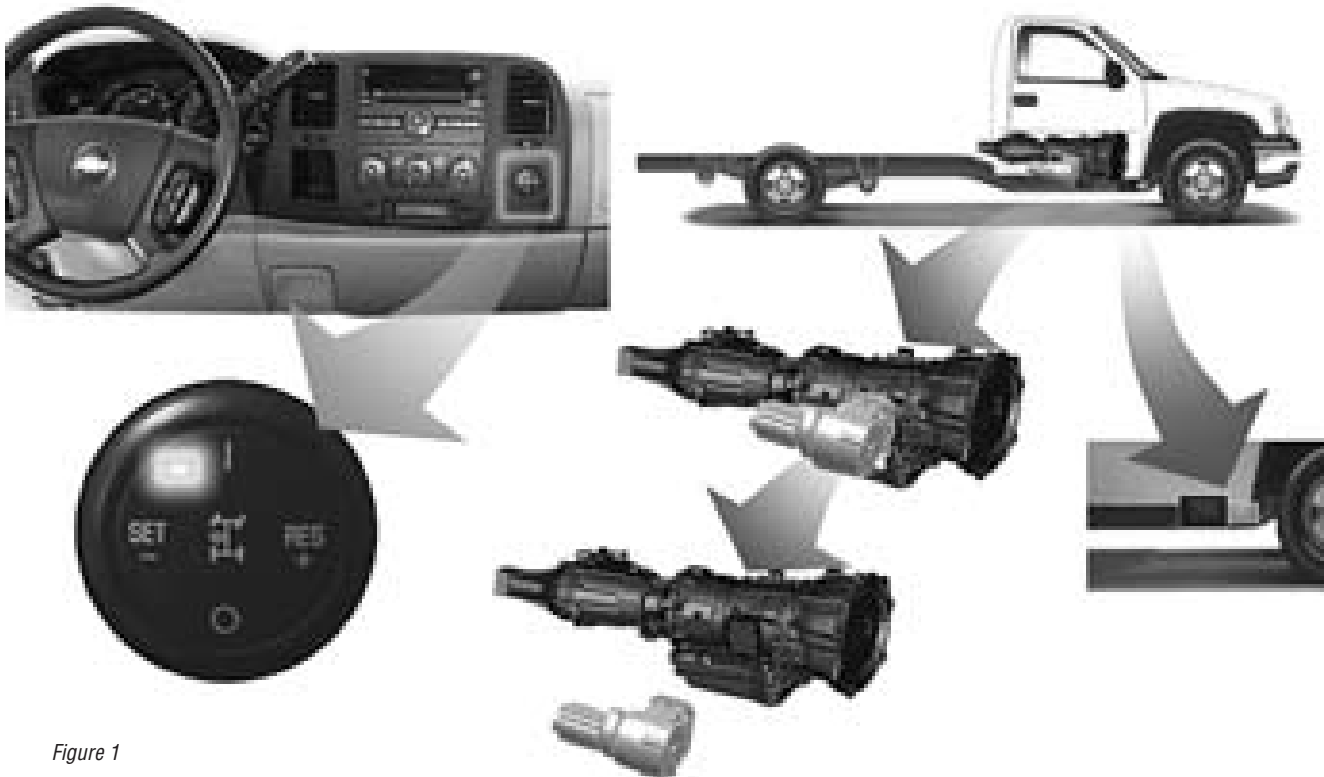


Figure 1

## PTO GEAR

The Allison 1000 Series transmission provides the PTO gear installed with the PTO option package. If the vehicle is not ordered with the PTO option, then the PTO gear will not be included in the transmission.

## MUNCIE GM6B PTO

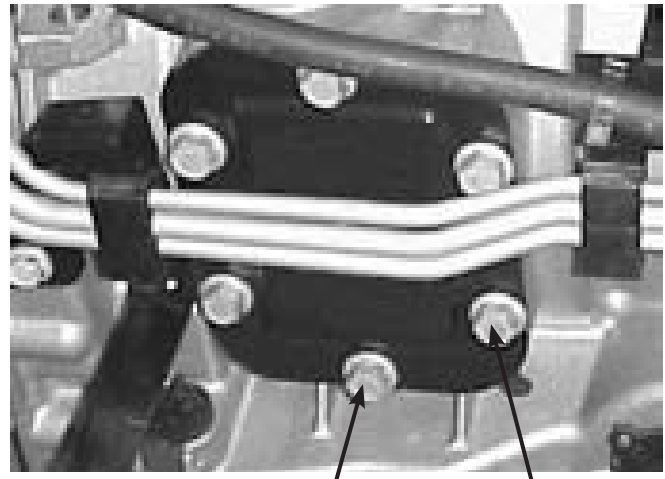
Refer to Muncie PTO catalog CHEV-04 for selection of the PTO and its specifications.

Order the GM6B-A6805-H1TX PTO with the activation and installation kit 49TK4962.

The GM6B PTO requires the use of the Muncie PF series hydraulic pump. Be sure that the pump is ordered with side ports. The 49TK4962 kit includes the fittings and tubing for installation of the PTO and pump. It also includes a small heat shield that is used to cover the exhaust pipe located nearest to the PTO.

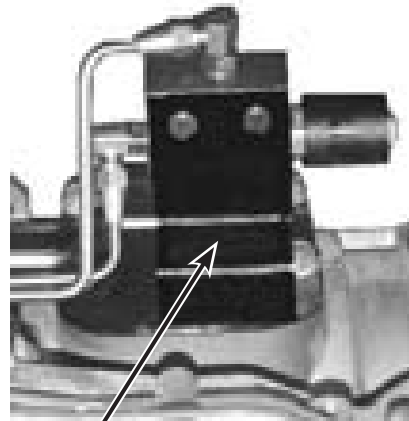
A wiring harness is included with this activation kit as well as the activation solenoid valve and piping for this valve. Once the connections are made to the hydraulic valve and the electrical connections, proceed with the calibration instructions list after this sectional.

1. READ WARNING ON INSIDE OF FRONT COVER OF THE PTO INSTALLATION AND OWNER'S MANUAL INCLUDED WITH THIS PTO.
2. Read PTO installation Manual IN84-03 included with PTO before getting started. Section one applies to all PTO installations including this PTO.
3. Allow Engine and exhaust system to cool before beginning installation.
4. Remove full floor board heat shield from under right side of cab.
5. Caution: Transmission fluid may be HOT. Remove PTO cover and clean PTO mounting surface, taking care not to let contamination fall into PTO opening. Shop rag can be used for additional protection. Remove shop rag when finished.
6. Install PTO mounting studs provided matching the 10mm thread to the transmission.

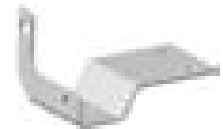


Remove these capscrews and reuse to mount bracket.

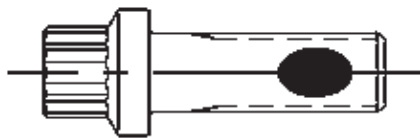
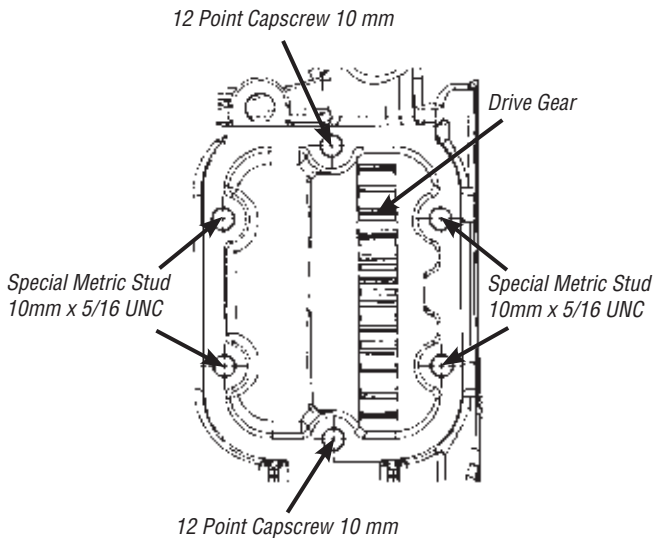
8. On the left side opening remove the two PTO cover capscrews shown and Install solenoid bracket, provided.
9. Install fittings into activation solenoid manifold.



Solenoid Mounting Bracket installed



Solenoid Mounting Bracket - 49T38282



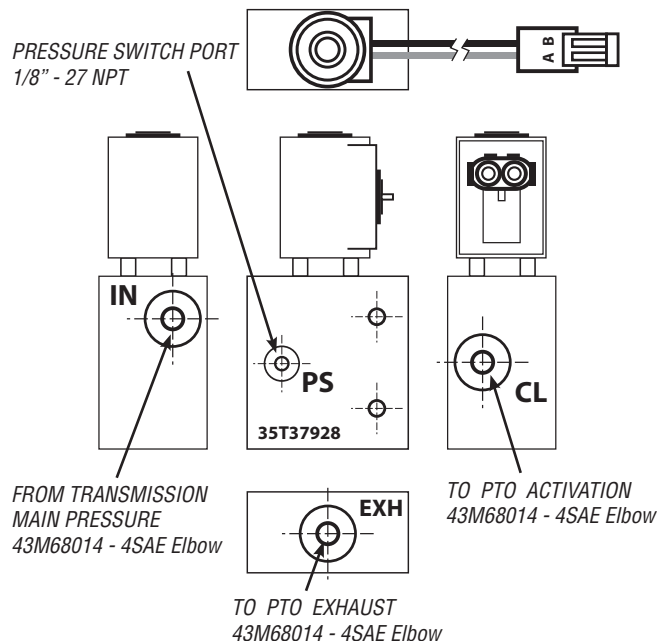
12 Point Capscrew - 19T35778  
30-35 lbs. ft.

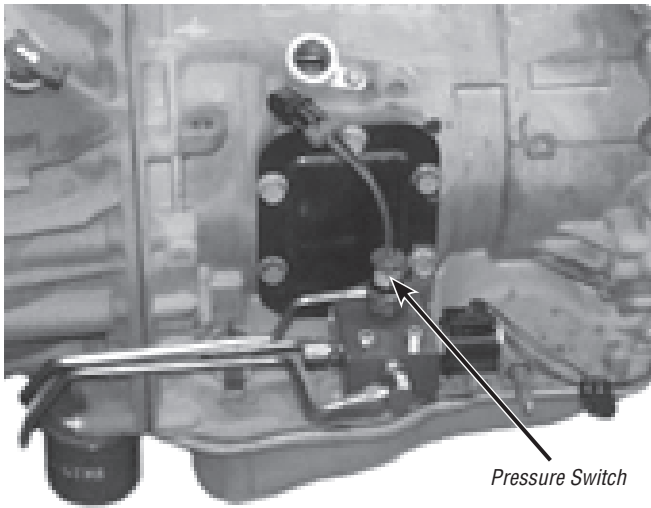


Whiz-Lock Nut - 22T37605  
17-20 lbs. ft.

Step Stud - 20T37952

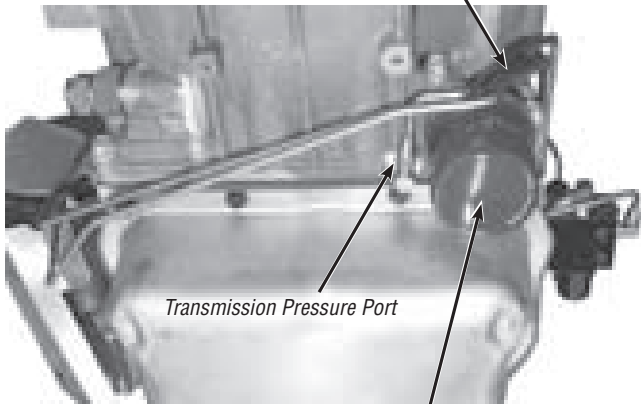
7. Install GM6B PTO using Gasket/Shim and additional mounting capscrews provided.





10. Mount solenoid to bracket (49T38282) using 1/4"-20 x 2.0" bolts (19T36623) and nuts (22MX2520), install pressure switch into manifold.

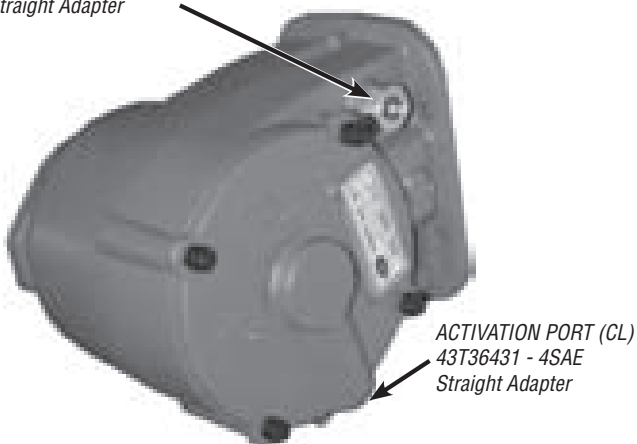
*Note that the lines run in front of the filter.*



*Remove filter to gain clearance to insert pressure port fitting. Replace when finished.*

11. Remove the plug from the activation port in the bottom of the transmission and install fitting (43M68014 -4SAE 90 Str. Thd to JIC).

RETURN PORT (EXH) - 43T36431 - 4SAE Straight Adapter



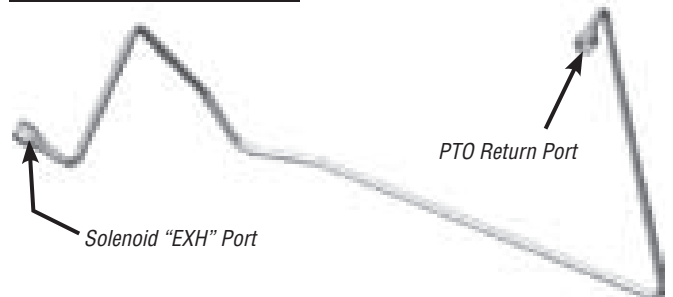
12. Install fitting into appropriate ports on the PTO as shown.

**PART NO. 49T38270**



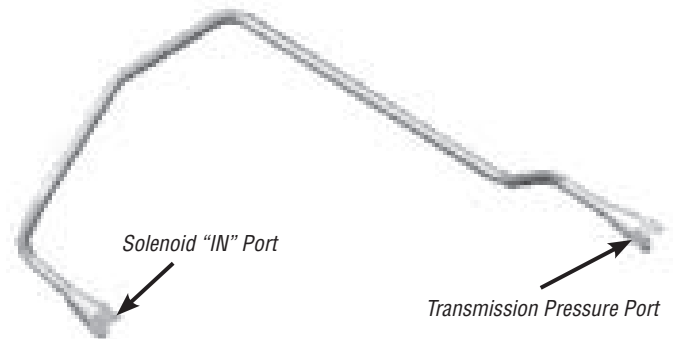
PTO Engage line (Connect to CL port on solenoid and cylinder port on PTO end cover.)

**PART NO. 49T38280**



PTO Exhaust line (Connect to EXH port on solenoid and to return port on side of PTO housing.)

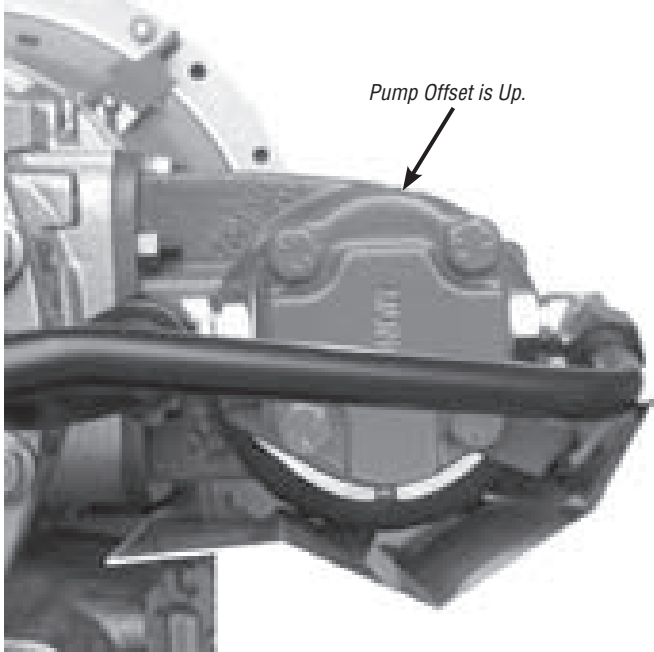
**PART NO. 49T38271**



PTO - Transmission- Pressure line (Connect to Transmission Main pressure port and to IN port on solenoid block.)

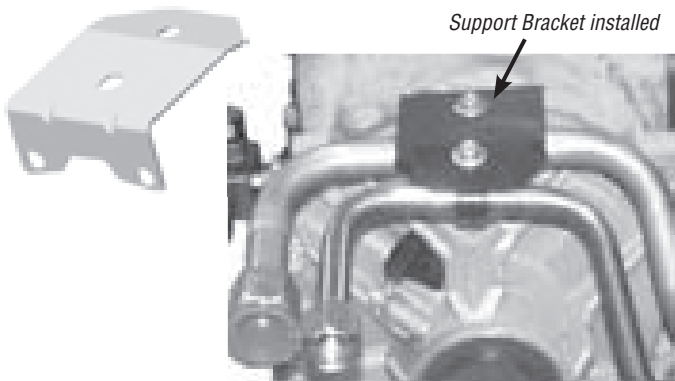
13. Select the appropriate 1/4" steel lines as shown.  
14. Install the steel lines to the activation port, exhaust port, and main pressure port.

15. Remove the cap plug from the PTO output shaft.
16. Install the pump port fittings in to the PF series pump. The inside pump mounting capscrew may need to be place in pump mounting flange prior to installing the suction fitting. (Pump Inlet = 43T38323 -16SAE Elbow. Pump Pressure = 43T38392 -10SAE Elbow) The automatic transmission requires a Right Hand rotation pump and uses the side ports.
17. Install the PF series hydraulic pump so that pump offset is up.

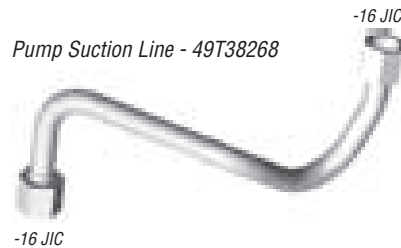
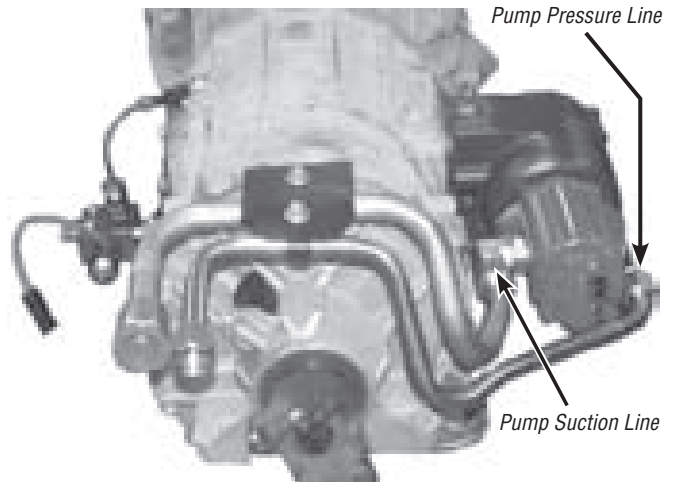


18. This places the inlet port next to the transmission side for the Automatic transmission.
19. Install the hydraulic pump line support bracket on the top/back of the transmission using two transmission bolts.

Line Support Bracket - 49T38269



20. Install and connect the appropriate steel hydraulic lines to the pump and attach them to the support bracket installed at the back of the PTO using the supplied clamps and 3/8"-24 x .5" bolts.

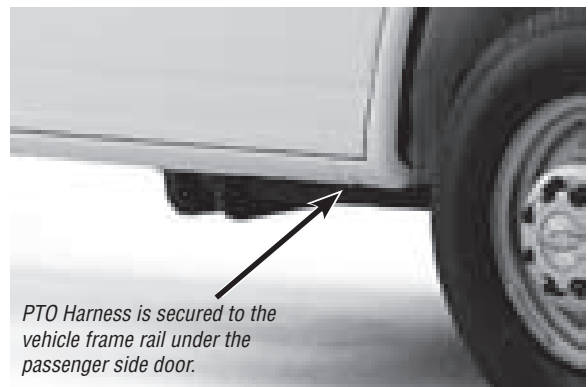


1.0" Clamp - 49T38322  
5/8" Clamp - 49T38393



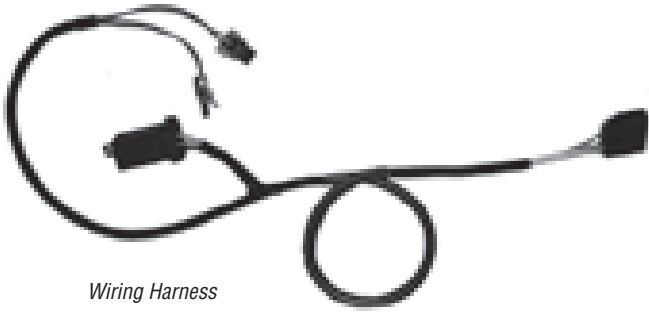
## 21. Harness Installation Instructions

The supplied harness 34T40692 is assembled according to the GM specification. Raise the vehicle with jack or hoist to access the Power Take-Off and transmission. Locate the power take-off harness secured to the vehicle frame rail under passenger side door.



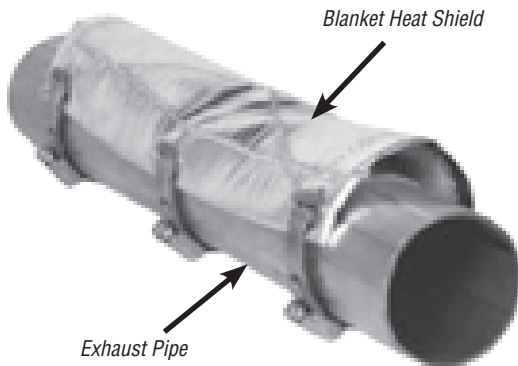
Remove the protective plug from the connector.

22. Connect the power take-off harness to the supplied wiring harness.



Wiring Harness

23. Attach wiring harness to the power take off
24. The other end of the harness has two plugs. Match the plug to the pressure switch and the plug to the activation solenoid and connect together and secure loose wiring.
25. Check the mounting fasteners of the PTO and the Pump and make sure they are tight.



26. Install the blanket type heat shield on the exhaust pipe nearest to PTO.
27. **Before activating the PTO the remainder of the hydraulic system must be connected, including the hydraulic reservoir, control valves, and hydraulic oil. DO NOT operate the PTO until the hydraulic system is completed and hydraulic system is properly filled with oil.**
28. After installation of the hydraulic system and filling the reservoir with the proper hydraulic fluid operate the system and listen for noise. It is a common occurrence that this PTO system will produce a rattling noise. Most of this noise can be attributed to the total drivetrain torsional vibration which is transmitted through the components and amplified by the heat shield system installed around and to the PTO. When the hydraulic system is energized and placed under a load this noise should greatly diminish. If this is the case then the noise should not be detrimental to the application. If not then double check that you have used the proper mounting gasket (13M13541 .030") to mount the PTO. Then, remove PTO for inspection of transmission and PTO.

29. The vehicle is supplied from the Dealer with the preset throttle option. If you desire the variable throttle option the vehicle control module will need to be changed by the Dealer.

### GM PTO MODULE

The PTO electrical system is integrated around a central PTO module (PTOM). The PTOM provides the following key functions:

- Processes the PTO operator switch inputs and translates these inputs into an engine speed request to the engine control module (ECM).
- Controls the engagement of the PTO load relay.
- Process requests to the BCM and ECM to start and shutdown the engine. • Requests the Engine Control Module (ECM) to command an engine shutdown and engine shut down horn warning for critical engine and transition conditions (stationary remote PTO, only).
- Requests the Instrument Panel Cluster (IPC) to display on the Driver Information Center (DIC) actions the driver must take to enable PTO.

The PTO system also utilizes the following vehicle electronic modules, which communicate over the vehicle's serial data system:

- The body control module (BCM):
- Maintains the PTO configuration mode (PTO's factory default mode). Note: the BCM must be re-programmed by the dealer to change the PTO configuration mode from the factory pre-set (Stationary Preset) to either Stationary Variable or Mobile Variable.
- Serves as the vehicle remote engine start master controller.
- The engine control module (ECM)
- Controls engine speed based on requests from the PTOM
- Controls engine starting based on requests from the PTOM
- Provides PTO specific engine information to the PTOM.
- The instrument panel cluster (IPC)
- The DIC of the IPC displays actions the driver must take to turn "ON" PTO.
- The transmission control module (TCM)
- Adjust shift patterns to minimize shift busyness during PTO operation.
- Provide transmission gear state and temperature conditions to the PTOM.

### PTO UPFITTER CONNECTOR

The PTO upfitter connector provides access to all remote PTO functions. The connector is located on the right-hand outside frame rail, underneath the passenger side door (see Figure 1). Electrical connections to the following components are provided

by this connector. The upfitter connector pin circuits (other than battery, ignition and ground) are disabled as the vehicle is received from the factory. The PTO module must be re-programmed by the upfitter or dealer to specially enable these circuit functions.

- Remote PTO Arming
- Remote PTO Enable
- Remote PTO Set
- Remote Accelerator
- Remote Engine Start
- Remote Engine Shutdown
- PTO Engage Relay Control
- PTO Load Feedback
- PTO Remote Indicator (available starting with model year 2009 vehicles)
- Remote Tachometer (available starting with model year 2009 vehicles)

### **AFTERMARKET UPFITTER/BODY BUILDER ADD-ON COMPONENTS**

The following PTO system components (if required) must be provided by and installed by the aftermarket upfitter or body builder. These functions are disabled when the vehicle is received from the factory and must be enabled by a service technician.

#### **PTO RELAY**

The PTO relay must be provided by the vehicle upfitter (if relay is desired). The PTO Module controls both the high side (power side) and low side (ground side) of the PTO relay. If the PTO relay is used to engage the PTO load, the upfitter must use both these signals, or the PTO module will prevent PTO operation. Note: PTO Engage Relay control must be programmed "ENABLED" by a service technician. **This must be done for the Muncie harness to activate the PTO.** Ref.: UI Bulletin #80, page 18.

#### **PTO OPERATION**

The PTO Module (PTOM) is the control center of the PTO system. The PTOM monitors numerous engine and vehicle conditions which must be satisfied before PTO can be enabled.

### **PTO ENABLING CONDITIONS**

#### **STATIONARY PTO ENABLING CONDITIONS**

To engage stationary PTO operation, the following conditions must be met:

- The engine must be running.
- The vehicle cannot be moving and the parking brake must be set.
- The shift lever must be in PARK (P) or NEUTRAL (N).
- The brake pedal must not be pressed.
- The engine speed must be less than the maximum allowed PTO engage speed of 1500 rpm. The PTO engage speed can be adjusted by a service technician.

For in-cab PTO operation:

Press and release the position on the PTO switch. The PTO LED light will blink fast until the PTO load becomes engaged. The LED light will then be on steady.

The switch positions can then be used to establish the desired PTO operating speed.

#### **PTO DISENGAGE CONDITIONS**

To disengage the stationary or mobile PTO operation, do one of the following:

- Press the brake. PTO will disengage immediately. The PTO LED will blink slowly; indicating that the PTO set speed is stored in memory. Pressing the switch position will restore engine speed to the stored PTO set speed.

Note: In mobile PTO mode, PTO can be reprogrammed to re-engage at PTO standby speed after releasing the brake pedal.

- Press the on the PTO in-cab switch. The engine speed will decrease to base engine idle, then the PTO LED light will turn "OFF", and the PTO load relay will disengage.
- From the remote PTO controls, move the speed enable switch to the "OFF" position. The engine will return to normal idle.

The PTO load relay is disengaged. PTO memory speed is also cleared. (Stationary PTO only)

- From the remote PTO controls, press the remote engine shutdown switch. PTO is disengaged and the engine is shutdown simultaneously. (Stationary remote PTO only)

#### **STATIONARY PTO ADDITIONAL DISENGAGE CONDITIONS**

The stationary PTO mode will also disengage if any of the following conditions are detected by the vehicle electronics:

- Movement of the vehicle.
- The park brake is released.
- The transmission is shifted from PARK (P) or NEUTRAL (N) to DRIVE (D) or REVERSE (R).
- The PTO load becomes disengaged (this condition is indicated by the PTO load feedback changing from a high voltage {approx. 12 Volts} to a low voltage {approx. 0 Volts} while PTO is engaged).
- Engine speed exceeds the maximum allowed PTO operating speed of 3100 rpm (factory setting = 2100 rpm), **OR**
- Engine speed is 200 rpm greater than the operator-requested speed for 6 seconds, or
- The PTO control system will attempt to limit accelerator pedal and PTO switch input as the vehicle approaches the above operational

limits. There are some vehicle conditions, such as downhill acceleration, which may cause vehicle speed and/or engine speed limits to be exceeded. Under these conditions, the PTO is disengaged.

- The PTO load becomes disengaged (this condition is indicated by the PTO load feedback changing from a high-voltage state {approximately 12 Volts} to a low-voltage state {approximately 0 Volts} while the PTO is engaged).

### DRIVER INFORMATION CENTER (DIC) WARNING MESSAGES

If the PTO will not engage, one or more of the following DIC messages may appear on the instrument panel cluster (IPC). To successfully engage PTO, the operator must take the action indicated, then again press and release the position of the PTO switch.

In addition to these messages, the PTO switch LED will indicate when all conditions required to engage PTO have not been met. When enabling PTO, the LED will turn "ON", then "OFF" after one second. Under normal operating conditions, the PTO LED will remain "ON" throughout the PTO operating cycle.

#### DIC PTO Messages

STATIONARY PTO	MOBILE PTO
MY2007 - PTO: Release Accelerator (MY2008 - PTO: Reduced Vehicle Speed PTO: Release Brake PTO: Reduce Engine Speed PTO: Shift to P or N	PTO: Disengage Cruise Control PTO: Press & Release Brake PTO: Reduce Engine Speed PTO: Release Brake PTO: Set Park Brake

### PROLONGED OR EXTENDED PTO OPERATIONS

While operating your vehicle in stationary PTO mode, the Diesel Particulate Filter (DPF) will continue to filter the exhaust and accumulate soot. The engine control system, depending on the speed and load being applied by the PTO, may not be able to generate enough energy or adequate heat needed to clean or regenerate the DPF.

Continued operation under conditions that do not allow effective regeneration or cleaning will eventually plug the DPF and result in reduced power. The ENGINE POWER IS REDUCED Driver Information Center (DIC) message and Malfunction Indicator Lamp will be displayed, and dealer/retailer service will be required to return your vehicle to normal, full power operation.

To prevent this from occurring, frequently monitor your vehicle during PTO operation, paying particular attention to the CLEAN EXHAUST FILTER SEE OWN-

ER MANUAL NOW DIC warning message. If the DIC message is displayed during PTO operation, see Diesel Particulate Filter for information on how to clean or regenerate the DPF.

## ENGINE SPEED CONTROL MODES

### PRESET PTO MODE

Preset PTO can only be used when the vehicle is not moving. After the PTO in-cab switch position is pressed and released, the engine speed is initially set to a stand-by engine speed (850 rpm). Using Remote switch controls, by pressing and releasing the remote arming switch, then within five seconds, push the remote PTO enable switch to "ON" will also establish standby speed operation. This provides an initial start-up engine speed to match the engagement of the PTO load. The PTO standby engine speed can be reprogrammed to a higher speed by your dealer. Pressing the switch position on the PTO in-cab switch or moving the remote PTO enable switch to "OFF" will return the engine speed back to normal idle. The PTO load relay is also disengaged.

Maximum PTO Operating Speed: During PTO operation, the accelerator pedal can be pressed to adjust the engine speed. To protect the PTO from over-speed, the PTO system will disengage when the engine speed exceeds 2100 rpm for longer than six seconds.

The Stationary PTO Mode provides both in-cab and remote controls. The in-cab controls are enabled as the factory preset. The remote controls are disabled. This factory preset configuration can also be reprogrammed to enable the remote controls, and disable the In-Cab PTO controls (i.e., PTO switch, accelerator pedal). See your dealer for more information.

### IN-CAB PTO SET SWITCH OPERATION

Three factory pre-programmed engine speeds can be selected from the In-Cab PTO switch.

- The first speed is selected when the PTO system is turned "ON". This is the PTO Standby speed – 850 rpm.
- The second engine speed – 1250 rpm can now be selected by depressing the portion of the switch.
- The third engine speed – 1700 rpm can be selected by depressing the portion of the switch.

Each of these three speeds can be reprogrammed by a service technician to values other than the factory settings.

- PTO ON: Pressing the position of the PTO switch will cause the engine to go to the PTO preset Standby speed – 850 rpm.

Note: Many applications just use "ON" and "OFF" for a single working speed. Since the PTO Standby speed is programmable, you can select the desired working speed and simply turn the system "ON" – to run at this speed and then turn it "OFF" again.



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