



Muncie<sup>®</sup>  
Power  
Products

**KEEP IN VEHICLE**

READ OPERATING INSTRUCTIONS  
INSIDE BEFORE OPERATING PTO

# RM SERIES

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## PTO INSTALLATION AND OPERATOR'S MANUAL

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FOR ALLISON TC10



# **⚠ WARNING!**

## **ALWAYS READ AND UNDERSTAND THE ENTIRE MANUAL COMPLETELY BEFORE INSTALLATION OR OPERATION OF PTO AND DRIVEN EQUIPMENT INCLUDING THESE WARNINGS AND OPERATOR'S INSTRUCTIONS IN SECTION 3!**

- ALWAYS DISENGAGE THE PTO WHEN THE DRIVEN EQUIPMENT IS NOT IN OPERATION
- DO NOT ATTEMPT TO INSTALL OR SERVICE ANY POWER TAKE-OFF WITH THE TRUCK ENGINE RUNNING. PUT IGNITION KEYS IN YOUR POCKET BEFORE GETTING UNDER TRUCK.
- DO NOT ALLOW TRUCK ENGINE TO BE STARTED WHILE WORKERS ARE UNDER TRUCK.
- BEFORE WORKING ON A VEHICLE PLACE TRANSMISSION IN NEUTRAL OR PARK, SET BRAKES, AND IMMOBILIZE TRUCK WHEELS WITH SUITABLE CHOCKS.
- BE SURE TO BLOCK ANY RAISED BODY OR MECHANISM BEFORE WORKING ON OR UNDER EQUIPMENT.
- INSTALLED POWER TAKE-OFFS MUST NEVER BE SHIFTED IN OR OUT OF GEAR BY ANY MEANS EXCEPT BY THE CONTROLS IN THE CAB OF THE TRUCK.
- STAY CLEAR OF SPINNING DRIVESHAFTS TO AVOID BECOMING ENTANGLED AND INJURED.
- IT SHALL BE THE RESPONSIBILITY OF THE INSTALLER OF A MUNCIE POWER TAKE-OFF TO DECIDE WHETHER TO INSTALL GUARDS IN THE PTO AND/OR DRIVELINE AREA BECAUSE OF POTENTIAL EXPOSURE TO DANGER. THIS IS BECAUSE MOST MUNCIE POWER PTOS ARE INSTALLED BY EQUIPMENT DISTRIBUTORS OR MANUFACTURERS AND THEREFORE, THE RESPONSIBILITY OF THE INSTALLATION IS BEYOND THE CONTROL OF MUNCIE POWER PRODUCTS.
- OBTAIN PROPER TRAINING BEFORE OPERATING THIS MACHINERY
- DO NOT INSTALL OR OPERATE EQUIPMENT WHICH HAS NOT BEEN PROPERLY SPECIFIED FOR YOUR VEHICLE
- INSTALLERS ARE TO INSURE THAT PTO COMPONENTS DO NOT INTERFERE WITH ANY CHASSIS COMPONENTS, INCLUDING BUT NOT LIMITED TO VEHICLE CROSSMEMBERS, FRAME RAILS, DRIVESHAFTS, EXHAUSTS, CONVERTERS, FUEL LINES, ETC. WHILE VEHICLE IS STATIONARY OR MOBILE.
- ALLOW THE VEHICLE, PTO AND DRIVEN EQUIPMENT TO WARM UP WHEN OPERATING IN WEATHER WHERE TEMPERATURES ARE NEAR OR BELOW FREEZING 32° F (0° C)
- INSTALL SEPARATE CONTROLS FOR PTO AND DRIVEN EQUIPMENT.
- ALWAYS INSTALL THE SAFETY LABELS PROVIDED AND PLACE THE OPERATOR'S MANUAL IN THE VEHICLE GLOVE COMPARTMENT.

The PTO is supplied with a packet containing warning labels. If you did not receive any, or if you need extra, you may order them, no charge, by phone, email or mail. They are available through your nearest Muncie® distributor or at the number and address below:

1-800-FOR-PTOS (1-800-367-7867)  
Muncie Power Products, Inc.  
P.O. Box 548  
Muncie, IN 47308-0548  
info@munciepower.com

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**⚠ This symbol indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

**NOTE: Muncie is not liable for damages, and consequential damages, related to lack of compliance with previous suggestions and guidelines.**

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## SECTION - 1 PTO INSTALLATION

ALL INSTALLERS MUST READ THE FOLLOWING

### PTO AND ACTIVATION KIT INSTALLATION INSTRUCTIONS

*Always wear safety glasses. Read entire manual before starting installation.*

**IMPORTANT:** Disconnect vehicle battery prior to installing electrical and electric/hydraulic activation kits.

- A. Vehicle manufacturers may have specific locations for accessing electrical power and activating hydraulics. The body builder manual or company representative for the vehicle chassis should be contacted prior to installing electrical or hydraulic systems.
- B. Route wires and activation lines away from rotating and high temperature components. Use appropriate looms and bulk head pass-thru's wherever possible to avoid rubbing through insulation or tubing and causing an electrical short or oil leak.
- C. Follow all Federal Motor Vehicle Safety Standards (FMVSS) for your vehicle.
- D. Where electrical grounds are indicated, be sure that they are good grounds, with straight paths to the vehicle battery ground (many vehicle cabs are insulated from the vehicle frame and a weak ground is a very common cause for malfunctions).
- E. When installing hydraulic components, be certain to follow common installation and testing procedures. If you are not familiar with acceptable installation procedures request instructions and guidance from the hydraulic equipment supplier.
- F. Caution should be taken by installer with any PTO installation to insure components do not interfere with any chassis component during installation or when vehicle is operated.
- G. Cold weather start conditions require that the transmission be started and warmed prior to engaging PTO and using equipment. Hydraulic pumps should be run at idle and under no load conditions to allow oil to warm before activating hydraulic system.

## INSTALLATION INSTRUCTIONS

**Always wear safety glasses. Read entire manual before starting installation.**

1. There is a packet with the PTO which contains four (4) warning labels. Before adhering the labels, make sure the surfaces are free of dirt and grease. Place the labels supplied with the PTO as follows:

### Truck Frame Labels

The two (2) Truck Frame Labels, which measure approximately 4" x 8", are to be placed on the outside of the vehicle frame rail. These labels are to be easily seen by anyone who might go under the truck or near the PTO. One label is to be placed on each side of the vehicle. See Figure 1.



Figure 1

### Visor and Dash Labels

The PTO Equipped Caution Label, which measures approximately 2" x 3", is to be placed within the cab of the vehicle and in easy view of the vehicle operator. It should be located near the PTO control, when the control is installed in the vehicle dash (see Figure 2). This label directs the operator to read the PTO operating instructions on the Visor Label. The Visor Label, which measures approximately 4" x 6 1/2", is to be placed on the visor on the operator's side of the vehicle. See figure 2.

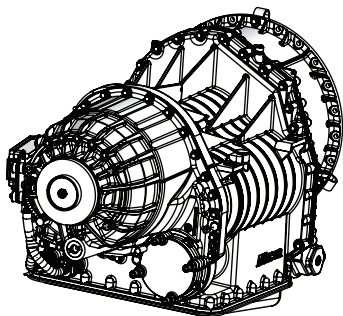
**Note:** Should the vehicle body installed on the chassis cover the frame rail, place the label on the body in a position easily visible by anyone who might go under the vehicle or near the PTO.

**Do NOT paint over the labels.**



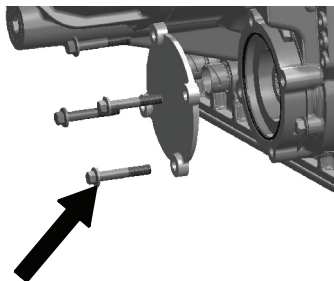
Figure 2

## ALLISON TC-10-TS Series Transmission PTO Installation Instructions

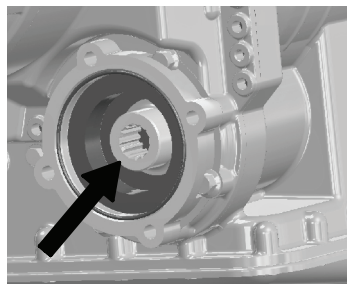


2. Drain the transmission fluid (avoid contact as it may be HOT).

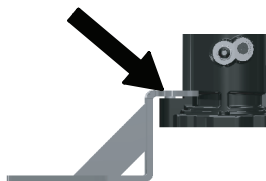
3. Be prepared for oil to come out of the transmission when removing PTO cover. Carefully remove the rear PTO cover by removing 4 capscrews as shown. The O-Ring on this cover is not to be reused. Clean mounting pad and inspect bolt holes in aperture for thread sealant used on OEM bolts. Clean these internal threads with wire brush to clear out any material and remove shop towel.



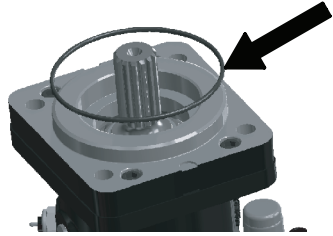
4. Check within this opening for the internal splined shaft which is used to drive the PTO. If the shaft is not there then the transmission was not ordered for PTO use. Contact the vehicle dealer to have the PTO drive installed.



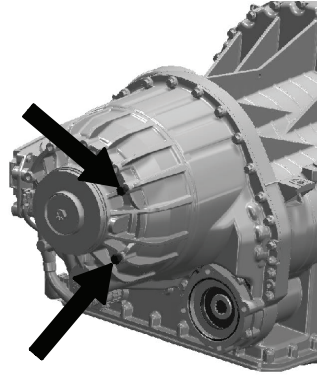
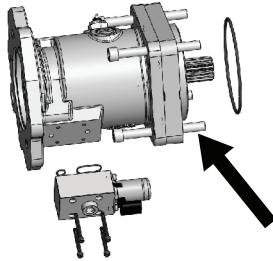
5. Insert the support bracket pin into the output cover of the PTO. Install the support bracket on to the bracket pin located on the PTO output cover.



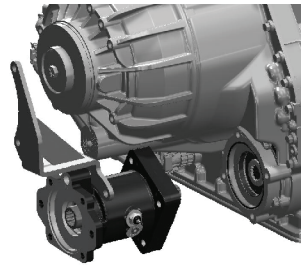
6. Prepare the PTO for installation. Remove any protective covers from the input. Using the O-Ring provided with the PTO, install it around the pilot of the PTO.



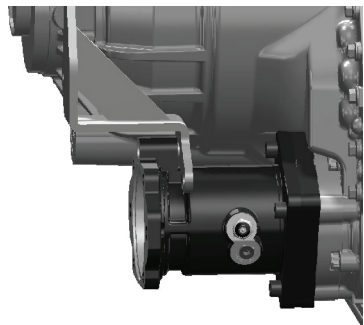
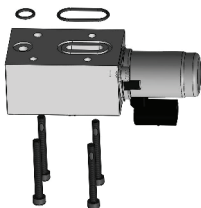
7. Remove the two transmission capscrews from the rear transmission cover as shown. Insert the capscrew before placing the PTO on to the opening.



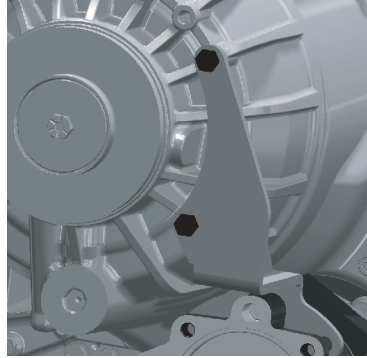
8. Align the PTO with the transmission spline and slide the PTO against the transmission face. Using the 4 capscrews provided mount the PTO to the transmission.



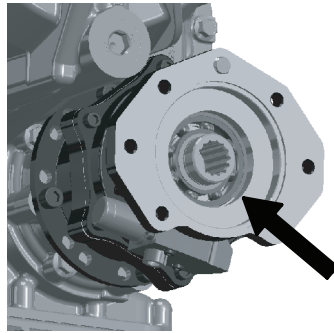
9. Torque capscrews to 45 ft.lb. Install the solenoid valve block making sure the O-Rings are held in their positions. Using 4 #10 capscrews provided and the O-Rings shown. Torque the valve capscrews to 3 ft.lb.



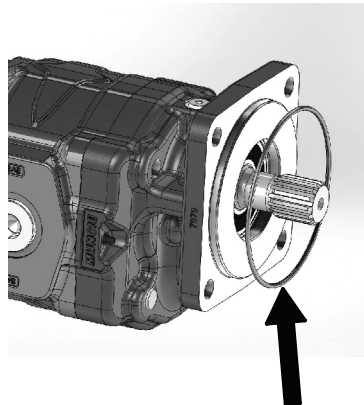
10. Rotate the bracket to align with the transmission holes and install the supplied capscrews. Torque to 45 lb.ft.



11. CAUTION! The PTO is a wet spline PTO and requires an output cover or installation of the hydraulic pump before running the transmission. The companion flange version has a seal and does not require a cover or pump.



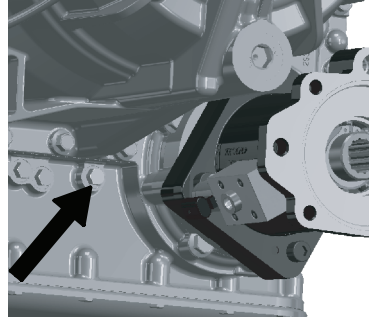
12. The installation of the hydraulic pump requires an installation of an O-Ring which is supplied with the PTO.





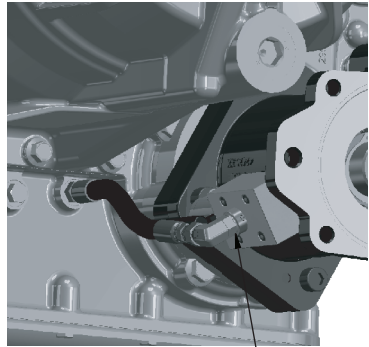
13. Remove the plug from the transmission main pressure port located in the rear of the transmission.

Remove the plastic port cover from the PTO activation port.



14. Locate the supplied hose assembly with O-Ring Straight thread hose end on one end and an O-Ring Face seal swivel on the other end. Install the O-ring Straight thread to the transmission activation port.

15. Install 90 elbow fitting shown into PTO solenoid port. This fitting is an O-Ring-face-seal type (OFS) connection and it's helpful to lubricate the O-Ring before installing the hose connection. Connect the hose OFS end to this elbow.

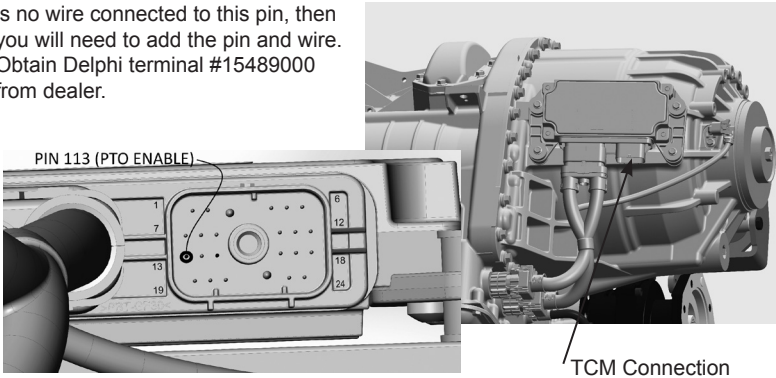


ORFS ELBOW

## SECTION 2 - WIRE HARNESES, SCHEMATICS, AND AUXILIARY WIRING INSTRUCTIONS

16. Remove wire harness from package. The rocker switch mounts in the vehicle cab.
17. Route the harness through cab wall down to PTO. Connect the two wire MetriPack connector to the PTO solenoid and connect the single wire connector to the indicator switch.
18. From the rocker switch there is a red wire lead that needs to be connected to the TCM.

**Allison TC-10:** The 24 pin connector is located on the side of the transmission. This wire can be extended by splicing additional wire length to it. The wire is to be connected to pin #113. If there is no wire connected to this pin, then you will need to add the pin and wire. Obtain Delphi terminal #15489000 from dealer.

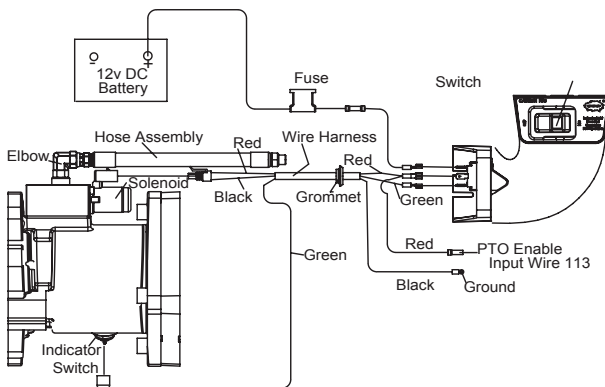


Install the Muncie Power rocker switch in the vehicle cab in a location accessible to the operator while seated in the driver's seat. Make connections to the PTO as shown below.

19. Mount the rocker switch bracket in a convenient location in the cab or mount the switch into the vehicle dash.

### RM series (Allison TC10 Only)

20. The RMI has a single terminal mechanical indicator switch. The wire harness has a connector for this switch and a small MetriPack connector for the PTO solenoid. Make these connections.

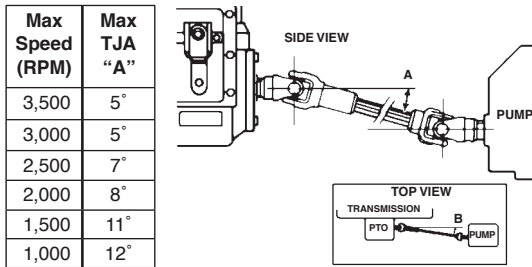


## PTO With Driveline System

21. The PTO output can be either direct mounted hydraulic pump or drive shaft output.  
For the drive shaft version follow the proper procedure for connection to driven equipment.

If your system utilizes a driveline between the PTO and another device and if you have noise in your system that was not there before, the angularity or phasing of your driveline may be the cause.

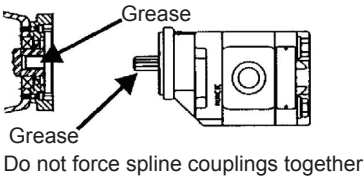
Check driveline angularity and reduce total angularity per recommendation on chart and be sure the PTO shaft is parallel within 1.5° to the pump shaft (or driven unit). Drivelines must be in phase, that is, the yoke ears on the PTO and pump shafts must be in alignment, as illustrated below. PTO with Direct Couple Hydraulic Pump Installation



**Note:** For installations with angles in the top and side views, use the following formula to compute the true joint angles (TJA)  $TJA = \sqrt{A^2 + B^2}$

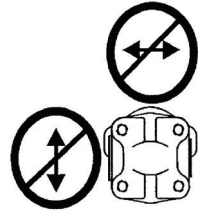
\*For speeds over 2,500 RPM, contact Muncie for approval.

# PTO WITH DIRECT COUPLE HYDRAULIC PUMP



Before bolting the pump to the PTO, place non-seizing compound or grease on the PTO shaft and pump shaft. All Muncie direct mount PTOs are supplied with the appropriate grease. Reusing an existing pump will require inspection of the pump splines. Clean any old grease from pump prior to installation.

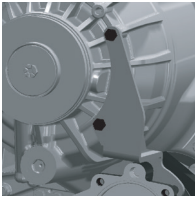
Muncie Power provides a bracket for the PTO which is mounted to the rear of the transmission. This bracket is designed to support single section pumps up to 60#. For multiple section pumps and pumps over the 60# an additional bracket must be designed and installed. It should be attached to the rear of the pump and to the transmission to support the pump and to inhibit movement in all directions.



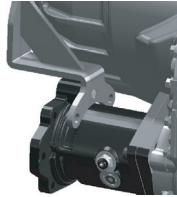
*\*Weight includes fittings, oil and unsupported hose sections.*

**This requirement does not take into account the system duty cycles, vehicle vibrations, application, terrain, and other external influences. We recommend that direct mounted components of any size or weight be supported when these conditions are extreme or unknown.**

This recommendation is based upon our experiences to date. Bracket design illustrations and pump recommendations is to be used as a **GUIDELINE ONLY**. Bracket design shown is representative and is not to be duplicated for all applications. Any failure as a result of damage caused by unsupported weight attached to the PTO will affect any warranty considerations.



Transmission Attachment



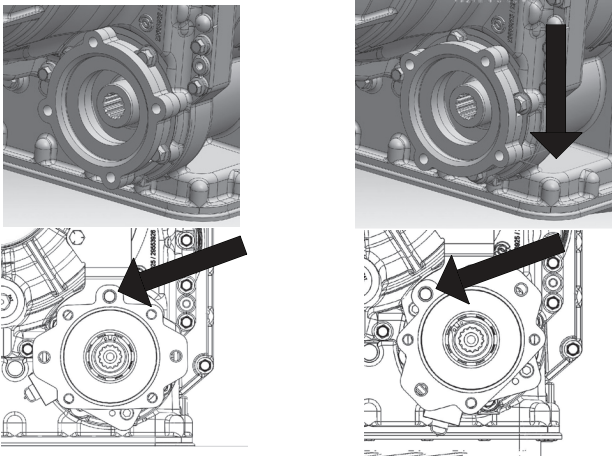
RM1 Installation (TC10 Only)

## PTO WITH DIRECT COUPLE HYDRAULIC PUMP

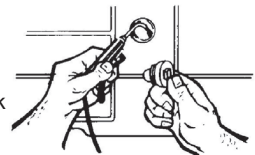
A bracket attached to two or more transmission bolts and two pump bolts is required. The bracket design should assure that there is no stress or force exerted on the pump or PTO shaft. If the vertical supports are greater than 20° off of perpendicular with the transmission main shaft then a reinforced "Z" bracket must be used. Reinforce horizontal members to prohibit flexing at bend or weld. Attach the bracket at the pump bolt closest to the center of gravity of the pump.

### Pump Orientation Adjustment

The Allison TC-10 mounting adapter is rotatable should there be a need for hydraulic pump or port clearance. Remove the PTO from the transmission. Remove the adapter. Remove the 4) 12mm capscrews holding the gasket and rotate 60 degrees. Re-install the 4 capscrews and torque to 45 ft.lb. Reinstall the adapter and PTO in the new rotated position. The PTO bracket has alternate hole positions for the pin attachment to the PTO.



22. Check the transmission oil level and refill transmission with manufacturer's approved fluid, if necessary. Make sure no one is under the vehicle and when clear, start the engine. Run the engine for 5 to 10 minutes to check for leaks, always staying clear of rotating components.



### Shut Off Engine.

23. Complete installation by placing warning labels as indicated on borders of the decals. Placement examples are illustrated on page 5; turn to Section 1 of the Operator's manual.

After complete installation, installers need to check for leaks and proper mounting-torque of fasteners. Operate the equipment for an appropriate amount of time to establish for proper operation or per the equipment manufacturer's recommendation. After shutting down equipment and engine, check for leaks. Allow unit to sit for 60 minutes, then check again for any leaks. Fix all leaks per manufacturer's recommendation.

## SECTION 3 - TEST PROCEDURE

Start engine and with engine at idle or output shaft speed under 1,200 RPM engage PTO. If PTO fails to operate or will not develop enough torque to operate your equipment, check pressures as follows:

- a. **Stop engine.**
- b. Install 400 PSI pressure gauge at the pressure inlet of PTO and a 400 PSI gauge at the pressure switch port.
- c. Start engine. **Stay clear of rotating components.** Check gauge at inlet to PTO. If gauge registers less than 150 PSI, check for obstructions in the hoses and verify that activation hose is connected to the correct port on the transmission. Recheck the transmission information for the main pressure tap location on your model transmission. If plumbing is correct then transmission should be inspected at an authorized Allison service center or dealer.
- d. Place PTO switch in engage position. **Stay clear of rotating components.** If either gauge registers less than 150 PSI or if there is more than 50 PSI difference in the readings, then **Turn off engine** and remove the solenoid valve and check the solenoid orifices, fittings and hoses for contamination.
- e. If these suggestions do not improve the operation of the PTO then a catastrophic failure may have occurred and the PTO should be inspected at a Muncie Power dealer or contact Muncie Power Products for return authorization.

# SECTION 4 - OPERATOR'S INSTRUCTIONS

## PTO Shifting Procedure & Precautions



### WARNING

#### Power Take-off Operation – Vehicle Stationary

**WARNING** - parking brake must always be set

**WARNING** - vehicle's wheels must always be chocked

**WARNING** - transmission must always be in neutral or park

**WARNING** - an operator must always be in the driver's seat whenever the engine is running and the transmission is in gear, in order to prevent or stop any unexpected movement of the vehicle which may cause injuries to the operator or others in the vicinity.

- Read all operators manuals and instructions for the equipment that you are operating on this vehicle.
- Obtain instructions and training for all operations of the equipment on this vehicle including those not covered by this instruction booklet.
- Never work alone when repairing or going under a vehicle for repair or maintenance.
- Always block any raised or moveable components or devices when working on or around the vehicle as specified by the equipment manufacturer.
- Warning: PTOs may drive driven equipment with an exposed drive shaft which may cause severe injury or death if contacted.
- Care must be taken when using a PTO for any specific application that the PTO has been properly specified to match the transmission and auxiliary equipment. Improper specification and installation can cause severe damage to the vehicle transmission and the auxiliary components including driveshafts and driven equipment. Damaged components, equipment resulting in failure can cause serious personal injury to operators and persons in the vicinity.
- Always follow recommended procedures for selecting, installing, operating or repairing a power take-off as found in Muncie Power operator's manuals, service parts lists and service manuals, catalogs and application guides.
- Never use a Muncie Power PTO above the recommended operating speed of the unit or specified driven unit.
- Never use a power take-off that has not been specified for the output capabilities for the equipment being driven.

#### Rotating PTO drive shafts

It is recommended that direct couple hydraulic pumps be used whenever possible, but if your application requires the use of an exposed drive shaft it is the responsibility of the installer and purchaser to determine the best installation of a guard.

- Rotating shaft can snag clothing, skin, hands, hair, etc. and will cause serious injury or death.
- Do not go under the vehicle when the engine is running.
- Do not work near an exposed drive shaft with engine running.
- Auxiliary shaft can be installed with recessed or protruding set screws. If raised and square head set screws are chosen, then be aware that this is a catch point for clothes, skin, hair, hands, etc. and serious injury or death may result.

The output shaft of a PTO with internal clutch packs may rotate in cold temperatures with the PTO disengaged. PTO shaft rotation can cause sudden movement of the output shaft and attached drive shaft leading to personal injury or death. Allow transmission to operate for a few minutes before engaging PTO. Allow PTO to operate for a few minutes before actuating application controls.

Some O.E.M. chassis manufacturers have integrated electronic controls which require certain conditions to be met before engaging a PTO. These include, but are not limited to setting parking brake, foot off service brake, engine at idle, foot off accelerator pedal, and/or transmission selector in park or neutral.



**THIS SYMBOL WARNS OF PERSONAL INJURY OR DEATH**

## **SECTION 4 - OPERATOR'S INSTRUCTIONS (con't)**

### **PTO Shifting Procedure & Precautions**

ALLISON TC10 Automatic Transmission with RM1 PTO - On automatic transmissions, the Shafts in the transmission turn when the transmission is in neutral, therefore, gear clashing will occur if the Power Take-off is shifted *into gear (engaged)* or *out of gear (disengaged)* at this time.

*The TC10 transmission has a Converter Driven Gear.*

*For activation follow the following instructions:*

- A. Engine idle. With the operator seated in the driver's seat and while activating the vehicle's brake, shift transmission lever into any of the drive positions (this will stop transmission shaft from turning.)
- B. Shift Power Take-off into or out of gear.
- C. If the PTO does not engage, release the PTO to the disengage position, shift the transmission to neutral and repeat the above steps from step A.
- D. Shift transmission into park or neutral (this will start transmission shaft turning). If you hear a grinding or ratcheting sound, turn PTO off and repeat these procedures from step A.

*To Disengage PTO:*

- A. *Shut off* engine with transmission in drive mode.
- B. Disengage PTO.
- C. Shift transmission selector to park.
- D. Restart engine.
- E. Remove wheel blocks and release parking brake.
- F. Vehicle can now be driven.
- G. Failure to follow proper shifting or operating sequences will result in premature PTO failure with possible damage to the equipment.



## PTO Maintenance

The Power Take-off, being an integral part of the transmission, should be serviced at the same intervals as the transmission. Transmission fluid changes should follow the interval recommended by the vehicle manufacturer for severe service. Transmission oil level is important. Checking for PTO leaks and checking the transmission oil level should be done on a regular basis.

Check for leaks upon delivery of the vehicle and after initial operation of your equipment. Loss of any oil can significantly affect or damage a transmission or PTO. Muncie Power Products, Inc. is not responsible for damage resulting from improper fastener installation, mounting torque or maintenance of the PTO.

The Power Take-off is also part of a system. The PTO system may include the activation control parts, a driveshaft, or hydraulic pump. This PTO system requires periodic checks and service. Typically the interval for maintenance checks of the PTO system depends on the application of the system. Every time the chassis is lubricated or a mechanic is under the vehicle the PTO system should be checked and serviced. For severe duty PTO system applications, it is recommended that the system be checked for service every 100 hours of use (this guideline can be adjusted based on past service history once you have it established).

**Within the first week of use, recheck the installation of the PTO. Check for leaks and loose mounting hardware (studs, cap screws, nuts).** Recheck the connections for proper engagement and tighten any loose connections. At regular maintenance intervals, check adjustments and lubricate moving parts, tighten and repair the connections, mounting hardware.

It is recommended that the operator do a visual inspection for leaks under and around the vehicle and equipment on at least a weekly basis. Any leaks found should be corrected immediately.

# Power Take-off Warranty

The Muncie Power Take-off is warranted to be free of defects in material or workmanship and to meet Muncie's standard written specifications at the time of sale. Muncie's obligation and liability under this warranty is expressly limited to repairing or replacing, at Muncie's option, within one year after date of original installation any defective part or parts or any product not meeting the specifications.

**THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. MUNCIE MAKES NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE. MUNCIE'S OBLIGATION UNDER THIS WARRANTY SHALL NOT INCLUDE ANY TRANSPORTATION CHARGES OR COSTS OF INSTALLATION OR ANY LIABILITY FOR DIRECT, INDIRECT SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR DELAY. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE, AND MUNCIE'S LIABILITY WITH RESPECT TO ANY CONTRACT OR SALE OR ANYTHING DONE IN CONNECTION THEREWITH, WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, OR OTHERWISE, SHALL NOT, EXCEPT AS EXPRESSLY PROVIDED HEREIN, EXCEED THE PRICE OF THE PRODUCT OR PART ON WHICH SUCH LIABILITY IS BASED.**

If requested by Muncie, products or parts for which a warranty claim is made are to be returned transportation prepaid to a Muncie Service Center. Any installation or use not in accordance with catalogue or package instructions, other improper use, operation beyond capacity, substitution of parts not approved by Muncie, use with equipment other than the equipment on which the Power Take-off is first installed, or alteration or repair made to the Power Take-off other than at a Muncie Service Center shall void this warranty. No employee or representative of Muncie is authorized to change this warranty in any way or to grant any other warranty.

**NOTES:**



**Muncie<sup>®</sup>  
Power  
Products**

*Member of the Interpump Group*

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