

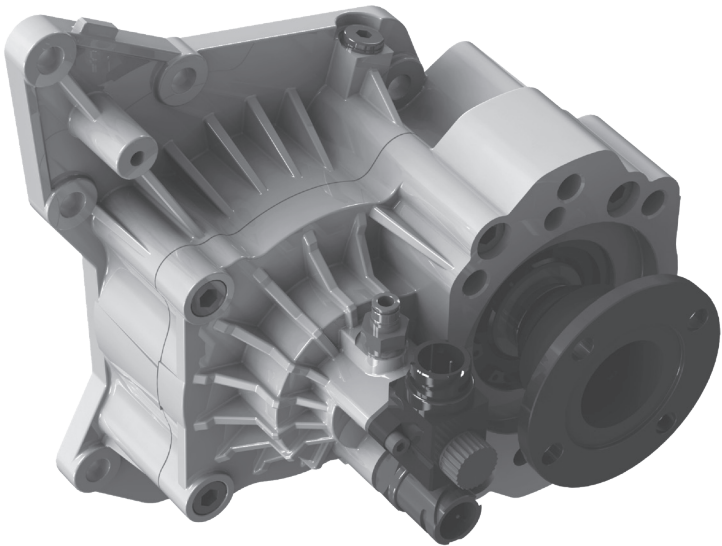


**Muncie[®]
Power
Products**

KEEP IN VEHICLE
READ OPERATING INSTRUCTIONS
INSIDE BEFORE OPERATING PTO

P89-DT12 SERIES

**INSTALLATION INSTRUCTIONS
AND OPERATOR'S MANUAL**



⚠ 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 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.
201 East Jackson Street
Muncie, IN 47305
Email: 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.



P89-DT12 SERIES

INSTALLATION INSTRUCTIONS AND OPERATOR'S MANUAL

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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.

This instruction is for Freightliner or Western Star vehicles with the Detroit DT12 transmission. The chassis must be ordered with the code 362-822 (Driveline Applications) or code 362-825 (Hydraulic Pump Applications). This provides PTO activation and clearance for PTO applications. If this option is not ordered, then the PTO will not function as specified in this manual.

This PTO installation requires the installing of a transmission connecting shaft kit as listed on the Muncie Quick Reference Catalog. This required kit is ordered separately.

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 consulted 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 ground connections, 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.

PTO INSTALLATION (CONTINUED)

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

- 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.

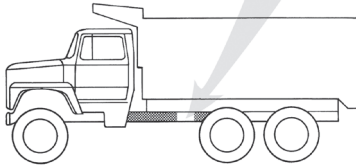
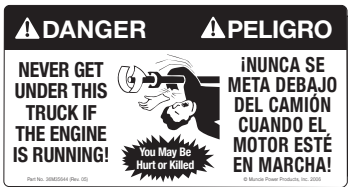


Figure 1

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 6½", is to be placed 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.

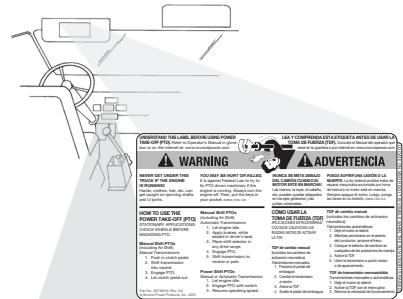


Figure 2

SECTION - 2

PTO OUTPUT

The PTO output can be either direct mounted hydraulic pump or drive shaft output. For the “Driveline” version follow the proper procedure for connection to driven equipment. For “Direct Mount Pump” option, go to page 6.

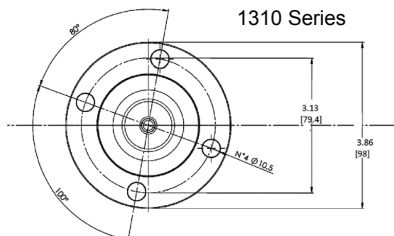
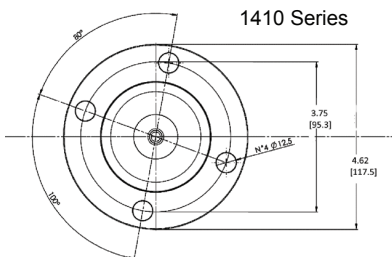
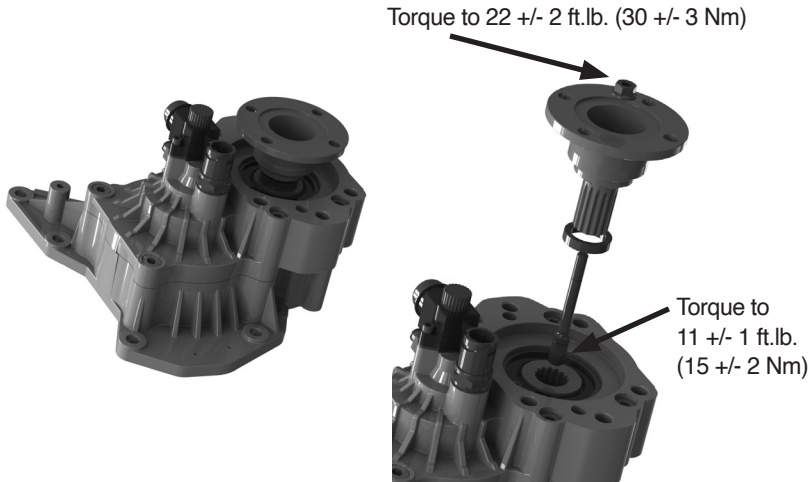
PTO With Driveline Driven Device:

This configuration is for applications utilizing a driveshaft in place of a direct mounted hydraulic pump. From a hardware perspective, the customer must order and install the correct flange kit part to adapt to their driveshaft. The two available Spicer flange kit part numbers are:

- a. Spicer 1300 Flange: 197KFL10300 Kit.
- b. Spicer 1400 Flange: 197KFL10400 Kit.

PTO output - driveshaft companion flange mount:

An example of a successfully installed Spicer flange can be seen in the following.



PTO OUTPUT (continued)

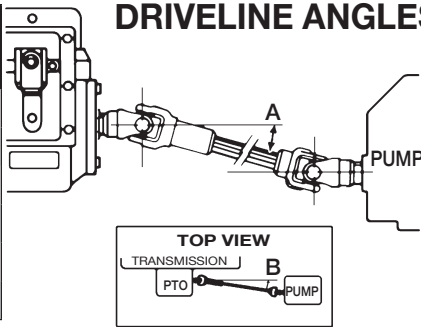
PTO With Driveline Driven System (continued):

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.

MAX. SPEED (RPM)	MAX. TJA "A"
3,500*	5°
3,000*	5°
2,500	7°
2,000	8°
1,500	11°
1,000	12°

DRIVELINE ANGLES



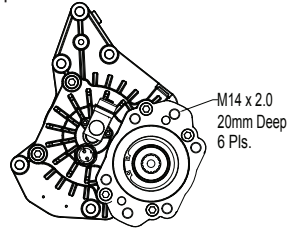
Note: For installations with angles in the top and side views use this formula to compute the true joint angle (TJA):
 $TJA = \sqrt{A^2 + B^2}$

NOTE:

* For speeds over 2,500 RPM contact Muncie Power for Approval.

PTO With Direct Couple Hydraulic Pump:

PTO has an SAE-B mounting flange with 14mm threaded mounting holes. The maximum weight of the pump and components must not exceed the calculated maximum bending moment for this application as show below.



Max Bending Moment = Mpump + Mftgs + Mfluid + Mhoses

Mpump = Bending Moment of the hydraulic pump (lb.ft.) = (weight of pump in lbs.)

* [(distance from pump center of gravity to PTO mounting surface in inches) / 12]

If center of gravity is not known, assume this is at ½ the total length of the pump

Mftgs = Bending moment of the hydraulic line fittings (lb.ft.) = (# of fittings) * (weight of fittings in lbs.) * [(distance of fittings from pump mounting surface in inches) / 12]

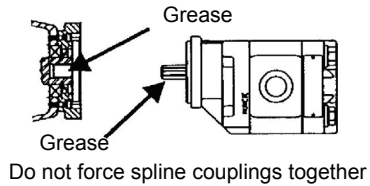
Mfluid = Bending moment due to the hydraulic fluid (lb.ft.) = (# of hydraulic hoses) * (weight of fluid) * [(½ * length of hoses until first clipping point) + (distance of pump center of gravity to PTO mounting surface)]

Mhoses = Bending moment due to the hydraulic hoses (lb.ft.) = (# of hydraulic hoses) * (weight of hoses in lbs.) * [(½ * length of hoses until first clipping point) + (distance of pump center of gravity to PTO mounting surface)] / 12

If the calculated Bending Moment exceeds the 29.5 lb.ft. limit, try shortening the length of the hydraulic hoses to the first clipping/support point.

PTO With Direct Couple Hydraulic Pump (continued):

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.



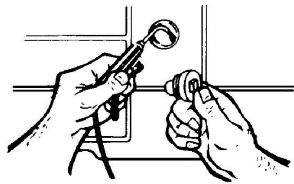
Any Direct Mount Pump installation over the 29.5 lb.ft. bending moment can not be used on this transmission PTO application and will need to be converted to a driveline driven installation.

Complete the PTO Installation:

Refill transmission with manufacturer's approved fluid and run engine for 5 to 10 minutes to check for leaks.

Always Staying Clear of Rotating Components.

Complete installation by placing warning labels as indicated on borders of the decals. Placement examples are illustrated on page 4.



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 PTO CONNECTIONS

WIRING AND ACTIVATION INSTRUCTIONS

This PTO is not provided with activation components as it is connected to the provided connectors from the factory.

Should you be desiring a separate activation installation, refer to the instructions in the separate activation kit.

Freightliner and Western Star PTO Prep Option 362-822 of Option 362-825 includes the wiring harness for the PTO activation and PTO indication.

The air line is not included and the ¼" airline is provided with the PTO.

Locate the main pneumatic manifold for the chassis you have by reviewing the body builders manual or contacting the Dealer.

The airline needs to be protected by a pressure protection valve and proper connection the vehicle will insure this protection.

SECTION - 4

OPERATOR'S MANUAL

OPERATOR'S 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 operator's 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 movable 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 operator's manuals, service parts lists and service manuals, catalogs, and application guides.
- Never use a Muncie PTO above the recommended operating speed of the unit or the 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

PTO MAINTENANCE

Do not go under or near PTO when the engine is running. Shut off engine and disconnect batteries on electric motor driven PTOs (i.e.: Hybrid vehicles) before checking or servicing. 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 may include the activation control parts, and then runs an auxiliary driveline device, or hydraulic pump. The PTO requires periodic checks. Typically the interval for maintenance checks of the PTO depends on the application of the vehicle. Every time the chassis is lubricated or a mechanic is under the vehicle the PTO should be checked. For severe duty PTO applications, it is recommended that the PTO be checked for service every 100 hours of use (this guideline can be adjusted based on past service history once you have it established). Service should include checking and lubricating direct mount pump shaft connections on a regular basis. PTO gears can be checked for wear by removing the inspection or shifter cover. If pitting, galling, cracking, or deformation of the gears or splines has occurred, then the PTO needs to be rebuilt or replaced.

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 cable or lever connections for proper adjustment and tighten any loose connections. At regular maintenance intervals, check adjustments and lubricate moving parts, tighten and repair the connections, mounting hardware, cable or lever linkages.

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

Pumps that are mounted directly to the PTO output require the application of an anti-seize or a high temperature, high pressure grease (unless the PTO is a wet spline option). Muncie PTOs are initially supplied with the required grease. The purpose of this grease is to help make the PTO easier to service and to reduce the effects of fretting corrosion on the mating PTO and pump shafts. PTO applications under severe duty cycles and/or high torque requirements may require servicing this pump shaft connection by periodically re-greasing the shafts. Vehicles with low speed diesel engines are also severe applications due to the vibrations inherent in these vehicles. Fretting corrosion cannot be stopped by applying grease, the grease is only a deterrent. Wet Spline PTOs do not require servicing this connection. Ask your equipment installer if you have this option.

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.



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