



**Muncie[®]
Power
Products**

KEEP IN VEHICLE
READ OPERATING INSTRUCTIONS
INSIDE BEFORE OPERATING PTO

EX-DRIVE SHAFT EXTENSION

**PTO INSTALLATION INSTRUCTIONS
AND OPERATOR'S MANUAL**

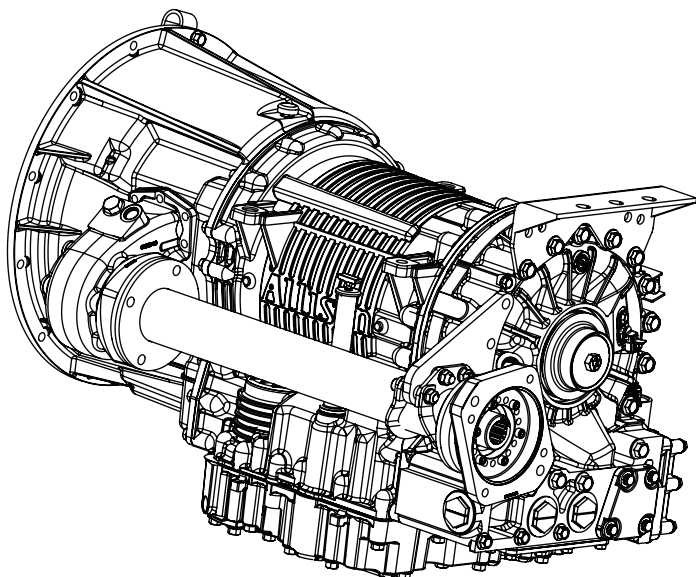


TABLE OF CONTENTS

Safety Information	3
--------------------------	---

EX Drive Model Numbers 3000 Series	5-6
--	-----

EX Drive Model Numbers 4000 Series	7-8
--	-----

Components Included in EX Drive Kit	10
---	----

SECTION 1 - PTO INSTALLATION

EX-DRIVE Installation	1-17
-----------------------------	------

Pump Selection & Installation	18-19
-------------------------------------	-------

SECTION 2 - OPERATOR'S INSTRUCTIONS

PTO Shifting Procedures & Precautions.....	20
--	----

PTO Operation	21
---------------------	----

PTO Maintenance.....	22
----------------------	----

Power Take-off Warranty	23
-------------------------------	----

▲ SAFETY INFORMATION

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 2!

- 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)

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Muncie, IN 47308-0548

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▲ THIS SYMBOL WARNS OF PERSONAL INJURY OR DEATH.

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

IMPORTANT SAFETY INFORMATION

EX-DRIVE SHAFT EXTENSION

XD10 - A30 XX - X3 C C R X

EX DRIVE - PTO

XD10 - FOR CD10
XS10 - FOR CS10
XS24 - FOR CS24
XS41 - FOR CS41

TRANSMISSION

A30XX - ALLISON 3000
A40XX - ALLISON 4000
A47XX - ALLISON 4700

ARRANGEMENT

X3 - LEFT SIDE SHAFT LOW*
X1 - RIGHT SIDE SHAFT LOW*
X2 - RIGHT SIDE SHAFT HIGH
X4 - LEFT SIDE SHAFT HIGH

EX DRIVE MOUNTING FLANGE

B - SAE B 2/4 BOLT
C - SAE C 2/4 BOLT
I - DIN 5462

EX DRIVE OUTPUT SHAFT

B - SAE B 7/8" - 13T SPLINE
C - SAE C 1.25" - 14T SPLINE
P - SAE BB 1.0" - 15T SPLINE
I - DIN 5462 8 SPLINE

TRANSMISSION FEATURE

R - INTEGRAL RETARDER
C - DIRECT MOUNT COOLER

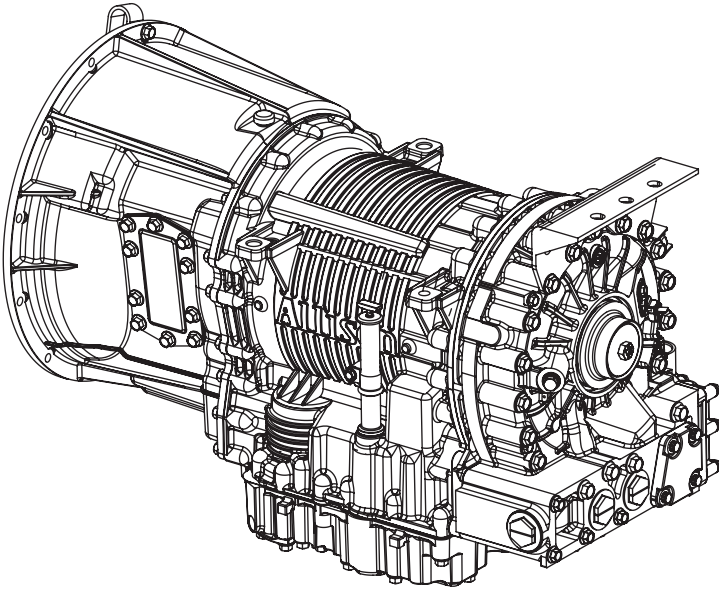
EX DRIVE SPECIAL FEATURES

X - NO SPECIAL FEATURES
C - OUTPUT END COVER

* - SHAFT HIGH ARRANGEMENT REQUIRED FOR APPLICATIONS UTILIZING AN INTEGRAL TRANSMISSION OIL COOLER; APPLICATIONS INVOLVING A RETARDER WILL GENERALLY REQUIRE THE USE OF A SHAFT LOW ARRANGEMENT FOR MAXIMUM CLEARANCE

EX-DRIVE SHAFT EXTENSION

Allison 3000 Series Transmission With Retarder



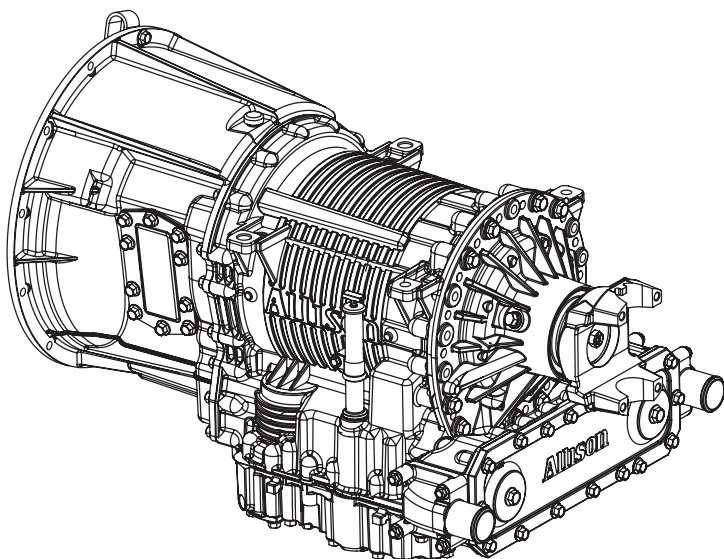
EX DRIVE PART NUMBERS

OUTPUT	PTO			
	CD10-A10**- *3*	CS24-A10**- *3V*	CS10-A10**- *3V*	CS41-A10**- *3V*
SAE "B" 2/4-Bolt	XD10-A30XX- X3BBRX	XS24-A30XX- X3BBRX	XS10-A30XX- X3BBRX	XS41-A30XX- X3BBRX
SAE "BB" 2/4-Bolt	XD10-A30XX- X3PBRX	XS24-A30XX- X3PBRX	XS10-A30XX- X3PBRX	XS41-A30XX- X3PBRX
SAE "C" 2/4-Bolt	XD10-A30XX- X3CCRX	XS24-A30XX- X3CCRX	XS10-A30XX- X3CCRX	XS41-A30XX- X3CCRX
SAE "B" 2/4-Bolt SAE "C" Shaft	XD10-A30XX- X3CBRX	XS24-A30XX- X3CBRX	XS10-A30XX- X3CBRX	XS41-A30XX- X3CBRX
DIN 5462	XD10-A30XX- X3IIRX	XS24-A30XX- X3IIRX	XS10-A30XX- X3IIRX	XS41-A30XX- X3IIRX

* All options shown for left side opening of transmission.

EX-DRIVE SHAFT EXTENSION

Allison 3000 Series Transmission With Cooler

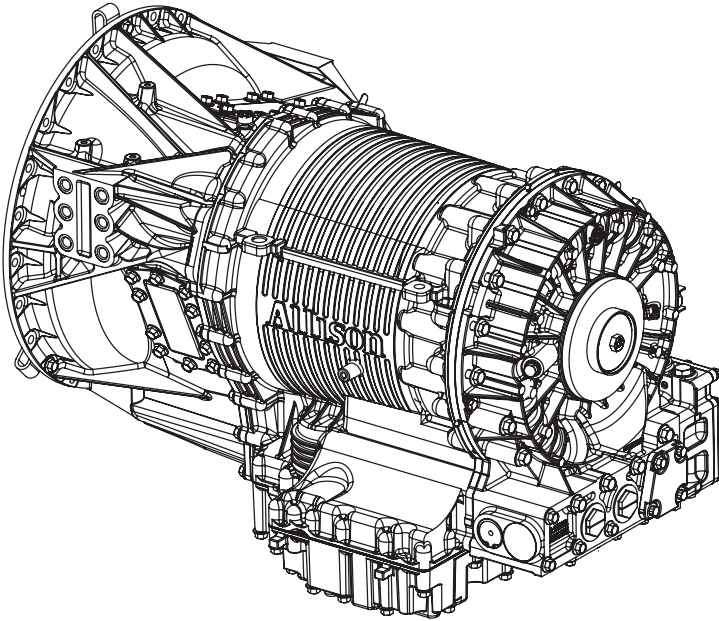


EX DRIVE PART NUMBERS

OUTPUT	PTO			
	LEFT SIDE		RIGHT SIDE	
	CD10-A10**- *1V*	CS24-A10**- *1V*	CS10-A10**- *1V*	CS41-A10**- *1V*
SAE "B" 2/4-Bolt	XD10-A30XX- X4BBCX	XS24-A30XX- X4BBCX	XS10-A30XX- X4BBCX	XS41-A30XX- X4BBCX
SAE "BB" 2/4-Bolt	XD10-A30XX- X4PBRX	XS24-A30XX- X4PBRX	XS10-A30XX- X4PBRX	XS41-A30XX- X4PBRX
SAE "C" 2/4-Bolt	XD10-A30XX- X4CCCX	XS24-A30XX- X4CCCX	XS10-A30XX- X4CCCX	XS41-A30XX- X4CCCX
SAE "B" 2/4-Bolt SAE "C" Shaft	XD10-A30XX- X4CBCX	XS24-A30XX- X4CBCX	XS10-A30XX- X4CBCX	XS41-A30XX- X4CBCX
DIN 5462	XD10-A30XX- X4IICX	XS24-A30XX- X4IICX	XS10-A30XX- X4IICX	XS41-A30XX- X4IICX

EX-DRIVE SHAFT EXTENSION

Allison 4000 Series Transmission With Retarder



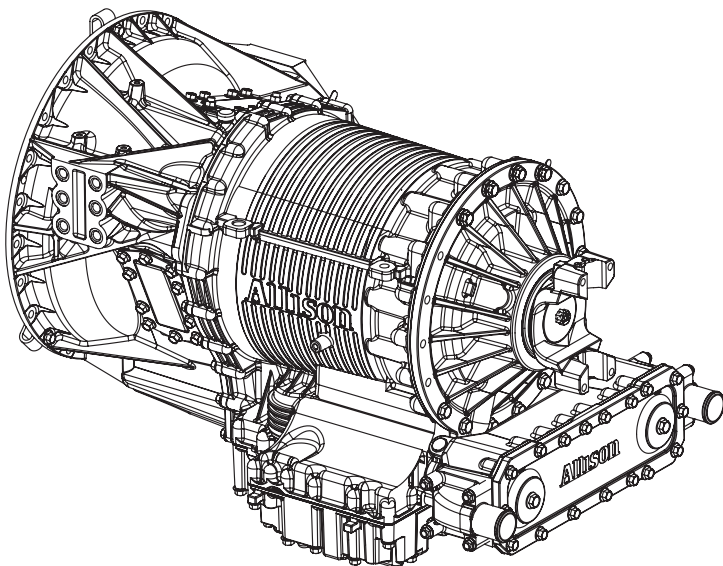
EX DRIVE PART NUMBERS

OUTPUT	PTO			
	CD10-A10**- *3V*	CS24-A10**- *3V*	CS10-A10**- *3V*	CS41-A10**- *3V*
SAE "B" 2/4-Bolt	XD10-A40XX- X3BBRX	XS24-A40XX- X3BBRX	XS10-A40XX- X3BBRX	XS41-A40XX- X3BBRX
SAE "BB" 2/4-Bolt	XD10-A40XX- X3PBRX	XS24-A40XX- X3PBRX	XS10-A40XX- X3PBRX	XS41-A40XX- X3PBRX
SAE "C" 2/4-Bolt	XD10-A40XX- X3CCRX	XS24-A40XX- X3CCRX	XS10-A40XX- X3CCRX	XS41-A40XX- X3CCRX
SAE "B" 2/4-Bolt SAE "C" Shaft	XD10-A40XX- X3CBRX	XS24-A40XX- X3CBRX	XS10-A40XX- X3CBRX	XS41-A40XX- X3CBRX
DIN 5462	XD10-A40XX- X3IIRX	XS24-A40XX- X3IIRX	XS10-A40XX- X3IIRX	XS41-A40XX- X3IIRX

* All options shown for left side opening of transmission.

EX-DRIVE SHAFT EXTENSION

Allison 4000 Series Transmission With Cooler



EX DRIVE PART NUMBERS

OUTPUT	PTO		
	CD10-A10**- *1V*	CS24-A10**- *1V*	CS41-A10**- *1V*
SAE "B" 2/4-Bolt	XD10-A40XX- X4BBCX	XS24-A40XX- X4BBCX	XS41-A40XX- X4BBCX
SAE "BB" 2/4-Bolt	XD10-A40XX- X4PBCX	XS24-A40XX- X4PBCX	XS41-A40XX- X4PBCX
SAE "C" 2/4-Bolt	XD10-A40XX- X4CCCX	XS24-A40XX- X4CCCX	XS41-A40XX- X4CCCX
SAE "B" 2/4-Bolt SAE "C" Shaft	XD10-A40XX- X4CBCX	XS24-A40XX- X4CBCX	XS41-A40XX- X4CBCX
DIN 5462	XD10-A40XX- X4IICX	XS24-A40XX- X4IICX	XS41-A40XX- X4IICX

* All options shown for left side opening of transmission.

EX-DRIVE SHAFT EXTENSION

Allison 4000 Series Standard w/o Retarder or Cooler

Refer to MP13-02 for other standard Shaft Extension models.

EX DRIVE PART NUMBERS

OUTPUT	PTO
	CS10-A10*-3V*
SAE "B" 2/4-Bolt	XS10-A40XX-X3BBCX
SAE "BB"2/4-Bolt	XD10-A40XX-X3PBCX
SAE "C" 2/4-Bolt	XD10-A40XX-X3CCXX
SAE "B" 2/4-Bolt SAE "C" Shaft	XD10-A40XX-X3CBSX
DIN 5462	XD10-A40XX-X3IIXX

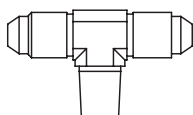
Lubrication Kit for EX Drives on Cooler Applications

Used on all units with the PTO installed in shaft high position.

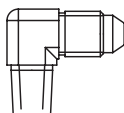
Kit Part Number is 48TK6008



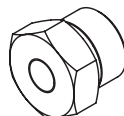
Lubrication Hose – 45T60187



Tee Fitting
43T36307



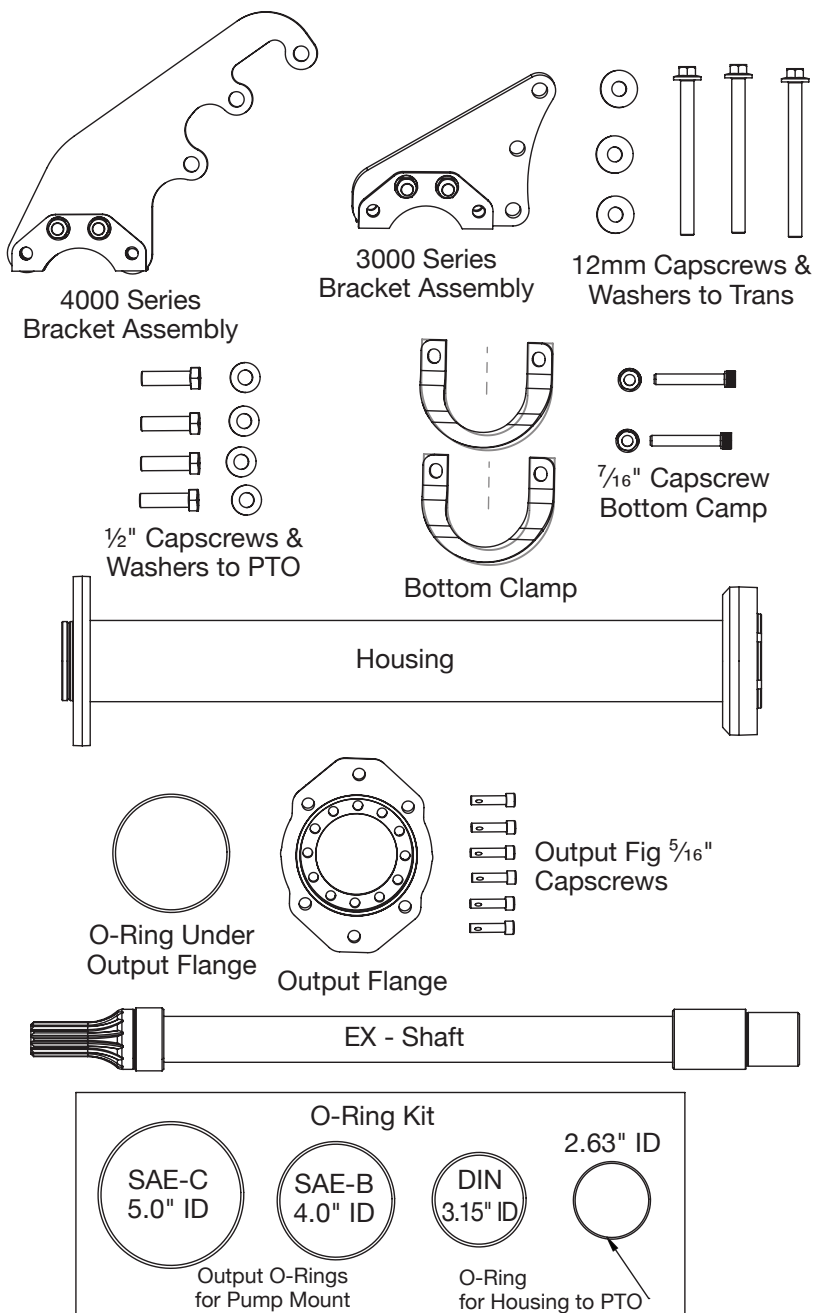
Elbow Fitting
43T35867



Lube Port
25T35784

EX-DRIVE SHAFT EXTENSION

Components Included in EX Drive Kit.



Section 1 – EX-DRIVE SHAFT EXTENSION

ALL INSTALLERS **MUST** READ THE FOLLOWING

PTO WITH EX-DRIVE 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. Refer to the individual PTO installation instructions which are provided with the PTO.

- 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.

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

1. Install the Power Take-Off per the instructions provided with the unit you have purchased. The PTO must have a “V” output option which is required for mounting the EX Drive shaft extension. The installation of the PTO will instruct you to place warning labels on the chassis. Note the instructions below for confirmation that the labels have been installed.

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.B.

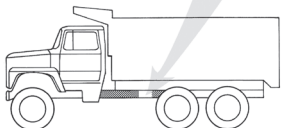
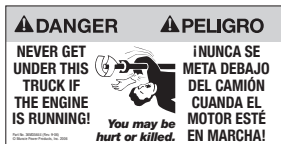


Figure 1

Note: Should the vehicle body, which is installed on the chassis, cover the frame rail, then 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.

Visor and Dash Labels

The PTO Equipped Warning 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. Note: the Dump Pump label is supplied when a Dump Pump is used in the PTO application. See Figure 2.

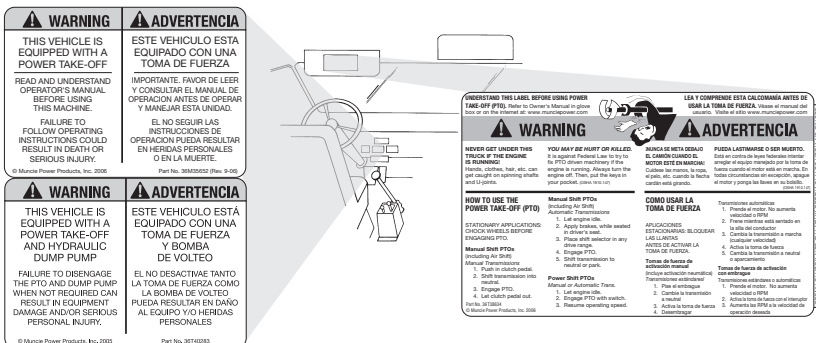
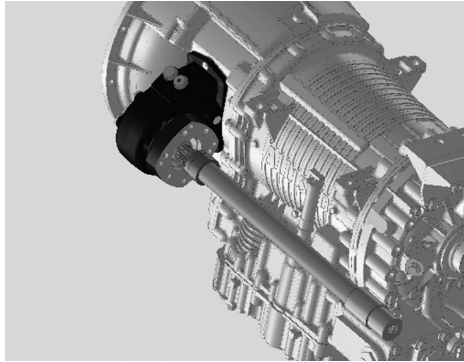


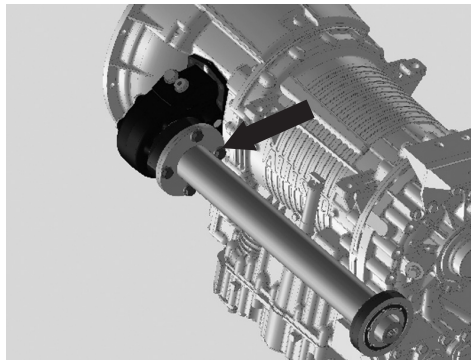
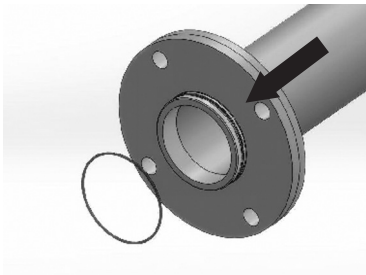
Figure 2

EX-DRIVE SHAFT EXTENSION

2. Install the PTO per the instructions shipped with the PTO series ordered. These instructions are for the EX Drive Installations.
3. Insert the EX shaft into the PTO output.



4. Place the 2.63" ID o-ring in the o-ring groove on the PTO end of the EX housing. Place lube on the o-ring before inserting. Slide the EX-Drive housing over the shaft, and using the 4) 1/2" washers and 1/2" capscrews, loosely attach the housing to the PTO output flange.



Allision 3000 Series

- 5. Remove the transmission capscrews from the end cover of the transmission.
- 6. Install the EX bracket assembly to the end cover of the transmission with the 3) 12mm capscrews and 12mm flat washers provided.
See Figure 3.

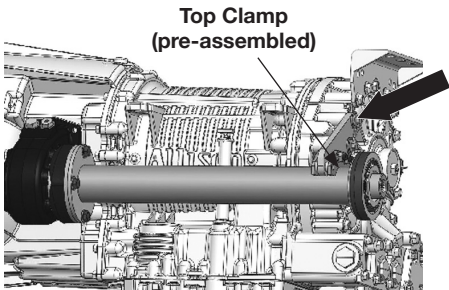
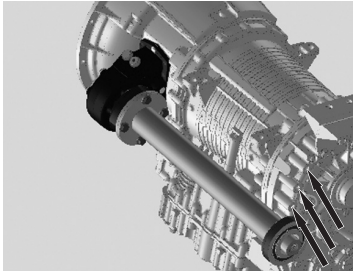


Figure 3



Remove Capscrews

Allision 4000 Series

- 5. Remove the transmission capscrews from the end cover of the transmission.
- 6. Install the EX bracket assembly to the end cover of the transmission with the 3) 12mm capscrews washers provided.
See Figure 4.

Top Clamp
(pre-assembled)

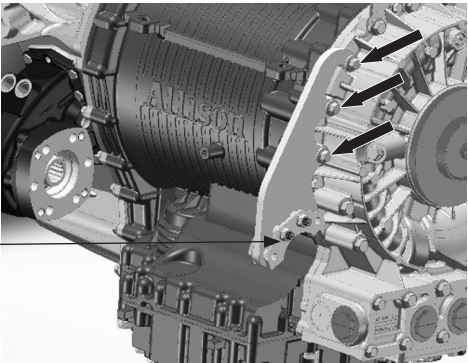
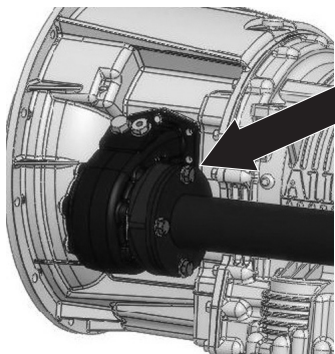
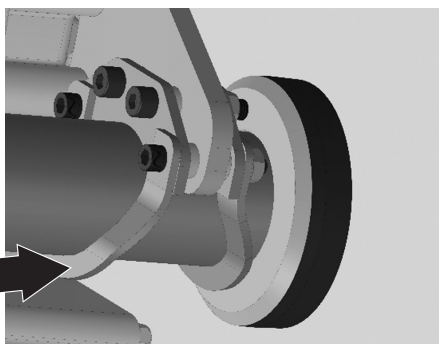


Figure 4

7. Mount the EX Housing to rear support bracket using the provided bottom clamps.
8. Place the bottom clamps under the housing and loosely attach to the upper bracket using the 2) $\frac{7}{16}$ " x 2.5" sockethead capscrews.
9. Hand tighten the capscrews at the PTO flange first, then hand tighten the clamping bracket. Tighten the capscrews at the transmission and torque to 70 ft.lb.
10. Torque the 1/2" PTO hexhead capscrews to 57 ft.lb., and tighten the 2) $\frac{7}{16}$ " socket head capscrews at the clamping bracket to 50 ft.lb. Make sure all other capscrews are torqued.

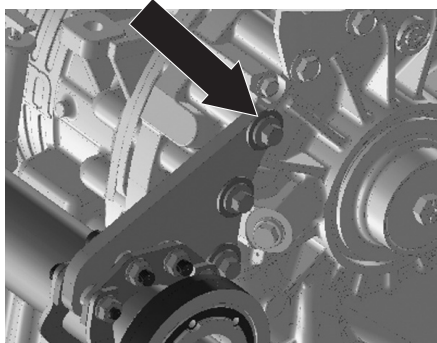
Torque 50 ft.lb.

Clamp

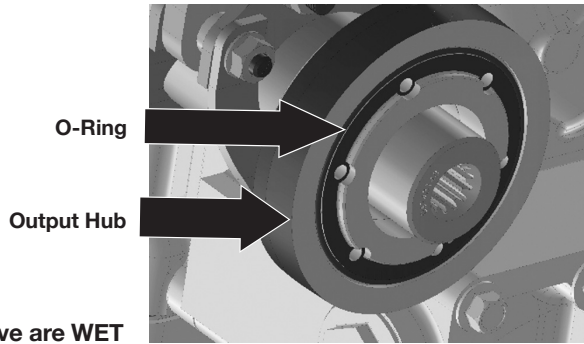


Torque 57 ft.lb.

Torque 70 ft.lb.



11. The output flange on the EX Drive is mounted with 5/16" socket head capscrews. The flange can be rotated into multiple orientations to allow better fitment of the hydraulic pump. Between the EX Drive output and the output flange there is an O-Ring that must be installed as shown here.



CAUTION! :

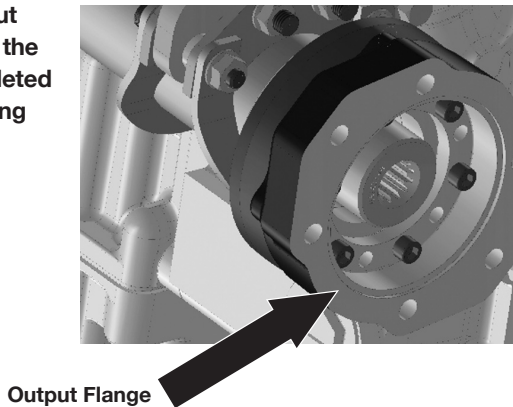
The PTO and EX Drive are **WET SPLINE** and **REQUIRES** the removal of the output shaft and installation of an output cover or the installation of the hydraulic pump and completed pump system before running the transmission.

Cover plates are available:
(sold separately)

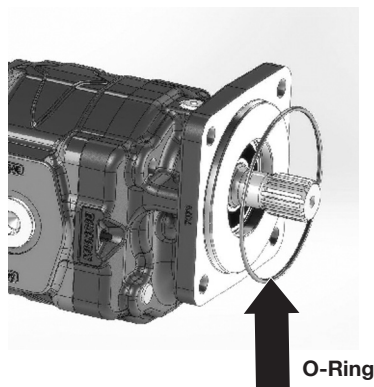
16TK5504 SAE-C kit

16TK5507 SAE-B or BB Kit

16TK5508 DIN5462 kit



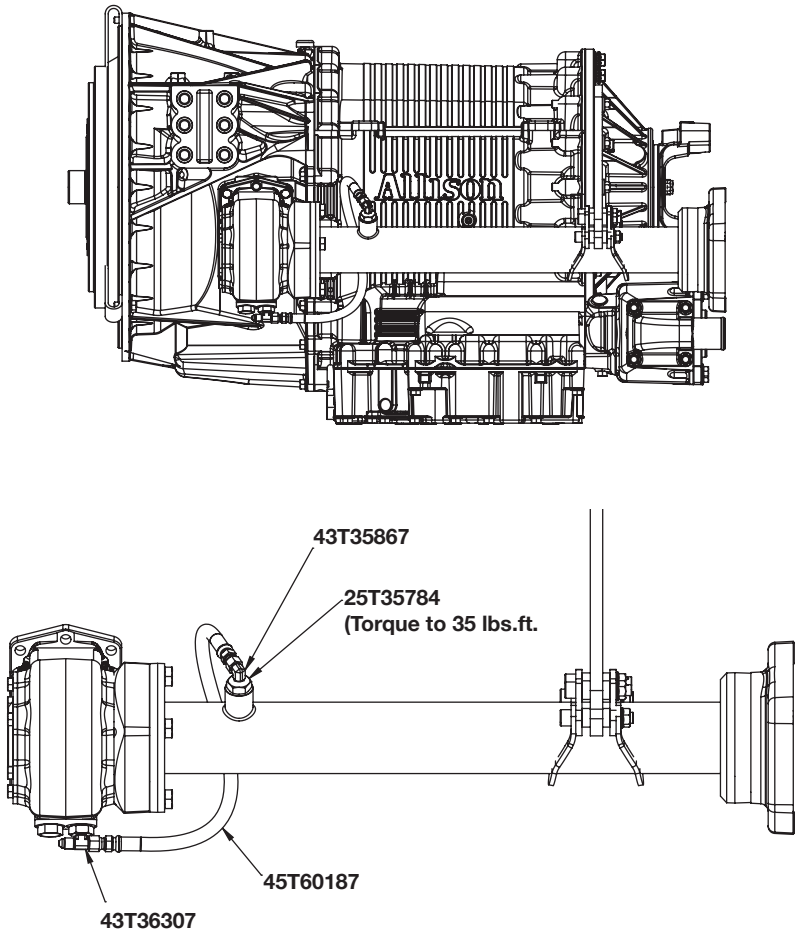
12. The installation of the hydraulic pump (not included with EX Drive) requires an installation of an O-Ring which is supplied with the EX Drive. The maximum weight for an unsupported pump is 110 lb. Pumps that weigh more than 110 lbs. or are longer than 12", and all multiple section pumps must have additional support.



EX-DRIVE SHAFT EXTENSION

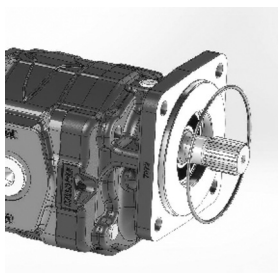
48TK6008 – Cooler Application Lubrication Kit

(CD10/ XD10 on Allison 4000 Series with Cooler Shown)



If the EX Drive being installed is for a cooler application, the 48TK6008 lubrication kit must be used to ensure adequate lubrication reaches the output end splines. The kit includes part numbers 25T35784, 43T35867, 43T36307, and 45T60187. The 43T36307 tee fitting replaces the elbow fitting in the lubrication port on the PTO. The 25T35784 lube port is installed in the corresponding port in the shaft extension housing (torque to 35 lbs.ft.), as shown, and the 43T35867 elbow is then installed in 25T35784. The 45T60187 lube hose is then used to connect the tee fitting to the elbow.

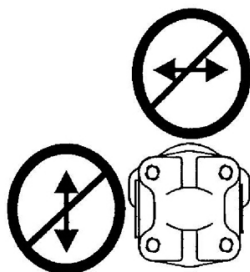
PUMP SELECTION AND INSTALLATION



Because the EX Drive is a wet spline connection, be sure to place the proper O-Ring around the pump pilot before assembling the pump to the output of the EX Drive.

It is important that a bracket for the pump be used when the pump & system weight exceed a total of 110 lbs*, or if the pump is longer than 12". The bracket must be designed and attached to the rear of the pump in two or more places and to the transmission in two or more places to support the pump and to inhibit movement in all directions. For multiple section pumps a bracket must be used.

**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.

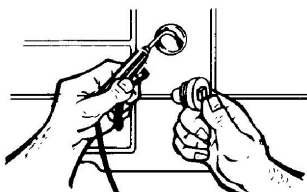
This recommendation is based upon our experiences to date. Bracket design illustrations and pump recommendations are to be used as a **GUIDELINE ONLY**. Bracket design is not the responsibility of Muncie Power Products, Inc. Any failure as a result of damage caused by unsupported weight attached to the PTO will affect any warranty considerations.

PUMP SELECTION AND INSTALLATION

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. (Follow vehicle manufacturer’s recommendations for welding and disconnection of computer or control modules, should you attempt to weld bracket while on the vehicle. Do not attach weld circuit through the PTO or EX Drive.) Attach the bracket at the pump bolt closest to the center of gravity of the pump.

The Muncie direct mount flanges offer multiple mounting bolt holes which allow the flange to be rotated to multiple orientations on the PTO for improved port location or clearance. Be sure to torque the capscrew to 25 ft.lb. It is advisable to use a thread locker to secure the cap screws (Loctite 241 or NyLoc or equivalent).

13. Check transmission oil level and 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. Do Not Go Under the Vehicle While the Engine is Running. For Hybrid type vehicles, disconnect the batteries before going under a vehicle.



14. Complete installation by placing warning labels as indicated on borders of the decals. Placement examples are illustrated on page 1.1 and 1.2 of the PTO Owner’s Manual (IN95-02).

IMPORTANT: 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 2 – 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 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 a 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 operation 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 SHIFTING PROCEDURE & PRECAUTIONS

The Muncie EX Drive can be connected to shiftable PTOs or constant mesh (nonshiftable) PTOs. Because the EX Drive shaft is free floating within the housing, a hydraulic pump is required to mount to the EX Drive as this will contain the output shaft within the system.

For Constant Mesh PTOs (CD Series): The output shaft of the EX Drive will turn anytime the engine is running. The constant mesh PTO cannot be disengaged, therefore, the engine must be shut off in order to stop the pump from turning.

For PTO with Internal Clutch Packs (CS Series): The output shaft of the EX Drive can be dis-engaged. Upon installation, the Clutch Shift output shaft may rotate while in the "OFF" position. If this occurs, recheck plumbing for restrictions in the lines. If the plumbing is okay, then service of PTO unit will be required.

For Stationary Vehicle Operation:

- A. SET wheel blocks on Vehicle.
- B. Engine idle. With the operator seated in the driver's seat and while activating the vehicle's brake. Shift transmission into "park" or "neutral."
- C. Turn power take-off ON.
- D. Observe PTO Indicator light. Light should be ON when PTO is engaged.
- E. If you hear a grinding or ratcheting sound, turn PTO off. Notify qualified service professional.

To Disengage PTO:

- F. Shut off PTO.
- G. Check the shift selector in "park" or "neutral."
- H. Remove wheel blocks and release parking brake.
- I. Vehicle can now be driven.

For Mobile Vehicle Operation:

- A. Engine idle. With the operator seated in the driver's seat and while activating the vehicle's brake. Shift transmission into "park" or "neutral."
- B. Turn power take-off ON.
- C. Observe PTO Indicator light. Light should be ON when PTO is engaged.
- D. If you hear a grinding or ratcheting sound, turn PTO off. Notify qualified service professional.
- E. Observe surroundings and when clear, shift transmission into Drive Mode.
- F. Vehicle can be driven.

To Disengage PTO:

- G. Bring vehicle to STOP.
- H. Shut off PTO.
- I. Observe PTO indicator light. Light should turn OFF when PTO is disengaged. If not, notify qualified service professional.
- J. Vehicle can now be driven.

Failure to follow proper shifting or operating sequences will result in premature PTO failure with possible damage to the equipment.

Consult your Muncie product literature or call your nearest Muncie Power Center for information on the SPD System Protection Device which prevents engagement of your Clutch Shift PTO above unsafe speeds.

PTO MAINTENANCE

The EX-Drive and 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 system 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, and/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). Service should include checking and lubricating direct mount pump shaft connections. 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 PTO activation components and tighten any loose connections. At regular maintenance intervals, check adjustments and lubricate moving parts, tighten and repair the connections, mounting hardware, and activation components. It is recommended that the operator/owner 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.



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Power
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