

# QUICK REFERENCE CATALOG

This Muncie Power Products Quick Reference Catalog is designed to provide you and your customers with the most current PTO application information.

## HOW TO USE THIS CATALOG

Successful power take-off selection requires correct transmission identification. Manufacturer's line tickets are not always reliable. Transmissions should be identified by the transmission manufacturer's tag located in various positions, depending on the manufacturer and the specific transmission. If unable to make positive identification, consult the nearest Muncie Power Products warehouse.

Once transmission is correctly identified, PTO selection is relatively simple.

The index lists all manufacturers of popular U.S. transmissions and many foreign transmissions now in use for mobile power applications.

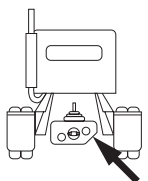

Each index page for gear driven PTOs provides the following information:

1. Transmission number, as well as all other transmission numbers with identical PTO drive data.
2. Number of forward speeds.
3. Number of teeth on PTO drive gear for I.D. purposes.
4. The correct application number.

LET. CODE	MAKE MODEL	NO. FWD. SP'DS	DIRECT DRIVE IN.	TEETH IN PTO DRIVER	PTO APPL. NO.
①		②		③	④
<b>FORD</b>					
TORQSHIFT 6R140 DIESEL (2011 & LATER DIESEL) F-250-F-550 ONLY.....6					
			4th	52L	FORD-08

Each application page for gear driven PTOs provides the following information:

1. Transmission model numbers.
2. PTO opening size. SAE (Society of Automotive Engineers) or Metric (non-standard)
3. PTO drive gear data: No. of teeth and pitch, location within the opening, PLV (pitch line velocity) in FPM (feet per minute), PLMF (pitch line of gear to the mounting face of transmission), and gear RPM at 1,000 engine RPM.
4. Each available PTO.
5. Footnotes indicating any known obstructions or special requirements.
6. Output shaft direction of rotation (see page 37).
7. Output shaft speed as a percent to engine speed.
8. Any Adapter which would be required to mount the PTO.
9. Any Spacer(s) which are required to mount the PTO.
10. Required Stud Kit to mount the PTO.
11. The standard shift type included with PTO.
12. PTO Torque and HP rating @ 1,000 RPM at the PTO Output (Intermittent Duty).

FORD TRANSMISSION							LEFT SIDE ONLY (RIGHT SIDE TURN PAGE)					
		SUPER DUTY CHASSIS F-250-F-550 TORQSHIFT (6R140 6-SPEED) 2011-2016 (Diesel Only) 4x2 OR 4x4 AUTOMATIC <div>Footnotes (1, 2, 5, 6, 7, 8)</div>					2 FORD 6-BOLT OPENING					
							PTO DRIVE GEAR DATA: 52T 12.09P 20° PA Spur LOCATION: Front PLMF: 3.439 PLV: 1,126 FPM RPM: 1,000					
6-BOLT TYPE	PTO MODEL NUMBER	FOOT NOTES	SHAFT ROTATION	ENGINE %			ADAPTER	SPACER	STUD KIT	SHIFT TYPE	INTERMITTENT RATING @ 1000 RPM of PTO	
				HI	LO	REV					TORQUE	HP
4		5	6	7			8	9	10	11	12	

All information included in the Muncie Power QR PTO Quick Reference Catalog is complete and correct to the best of our knowledge, compiled from reliable and official sources with information available at the time of publication. However, we cannot assume any responsibility for errors.

This catalog and the telephone number of your nearest Muncie Power warehouse are all you need to order the correct PTO. A Muncie Power Products specialist will provide assistance upon your request.

Prior catalogs may contain old model numbers. You can order by these old numbers and Muncie Power will automatically cross-reference the numbers to new model numbers. Use the newest catalog when possible.

## 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 (two years on Allison World Transmission PTOs) 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 catalog 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.

## GENERAL AND APPLICABLE INFORMATION

### INTERMITTENT SERVICE

"Intermittent Service" as used in this catalog refers to an on/off operation under load. If maximum horsepower (HP) or torque (lb.ft.) are being used for extended periods of time (5 minutes or more every 15 minutes), then it must be considered as "Continuous Service" and the horsepower rating and service life expectation must be reduced. Applications with operations approaching both maximum HP and maximum torque is not recommended and PTO life will be limited. See pages 6-24 for PTO rating charts.

### CONTINUOUS SERVICE WARNING

Applications with PTO output shaft speeds above 2,000 RPM regardless of duration are to be considered continuous duty applications. PTOs used for continuous service must be considered to have reduced horsepower capacity. In most cases, the capability is reduced by 30% of the stated rating. See pages 6-24 for PTO rating chart.

Example: 100 lb.ft. minus 30% = 70 lb.ft., or  
50 HP minus 30% = 35 HP

The RL Series PTOs are not approved for continuous duty applications.

If you have any questions regarding your PTO application, consult a Muncie Power application specialist.

### FIRE PUMP APPLICATIONS

Fire pump applications are continuous duty and require derating of PTO applications by a factor of 20%.

### PNEUMATIC BLOWER/VACUUM APPLICATIONS

High inertia devices like pneumatic blowers, large air compressors, and vacuum pumps are severe PTO applications and great care must be taken when specifying PTOs for these applications. High speed blower/vacuum applications can be approved at speeds higher than the 2,500 RPM limit where the load ratings are low. Consult your application's specialist for assistance with these specific applications.

PTO intermittent torque ratings shown on the application pages apply to start-up torque requirements for high inertia applications using proper engagement procedures. The derated,

continuous duty rating is to be applied to the application's steady state torque requirement. These requirements can be obtained from most blower manufacturers. Incorrect start-up procedures will cause PTO, driveshaft, or component failures and are not covered by manufacturer warranties. **Clutch shift type PTOs are not recommended or approved for high inertia applications.**

### SEVERE DUTY

Severe duty or high service applications like blower or vacuum drives, but not limited to these applications, have varying life expectancies which can't be calculated by torque ratings alone. Other factors involved include transmission lubrication, cleanliness, heat extraction, engine characteristics, and external environmental conditions. Service intervals for transmission and lubrication cleanliness need to be reduced from the normal intervals specified in the vehicle operator's manuals. The interval should be determined by inspection and based on your maintenance records. PTO failures due to particulate contamination are not covered under PTO warranties. Contact Muncie Power Products, Inc. for application assistance.

### PTO OUTPUT SHAFTS

PTO output shafts subjected to high cycles can have improved product life by using the largest PTO output shaft available. This includes remote drive type shafts and direct mount pump shafts.

### FRETTING CORROSION

Fretting causes rapid spline wear of the PTO and hydraulic pump shafts. The wear is evident where two metal surfaces are in contact with each other and micro-movement of the two surfaces against each other wears the surfaces and typically leaves brownish residue when the surfaces are left dry. Spline failure from fretting has increased with the advent of electronically controlled diesel engines. Based upon our findings and industry reports, it is evident that failures due to fretting corrosion are not the responsibility of Muncie Power Products, Inc. and will not be covered under our stated warranty policy. Refer to the **PTO Installation and Operator's Manual** for recommended maintenance procedures for PTO output shafts.

### TRANSMISSION PTO DRIVE GEAR

The gear in domestic built transmissions which drives the PTO is typically  $\frac{1}{2}$ " to the front or  $\frac{1}{2}$ " to the rear of the vertical centerline of the PTO opening. Foreign transmissions do not always follow this SAE and ISO standard. Reference to the PTO drive gear location is made at the top right of each application page as "Front" or "Rear". This gear location determines the assembly arrangement of the PTO unit. Gear data is provided for the visual verification of the drive gear application.

### ASSEMBLY ARRANGEMENT

Standard PTO arrangements shown in this catalog will typically provide PTO output shafts to the rear, below centerline of the opening. Check footnotes for exceptions to this standard. Available arrangements for each of the Muncie Power PTOs are shown on pages 6–24 of this section.

### MOUNTING DEPTH

For standard mounting depth, the pitch line of the PTO drive gear in the transmission will be 1.085 inch from the face of the PTO mounting pad. Normal PTO design requires using one thick and one thin PTO mounting gasket. Tolerance differences in transmissions may still require additional gaskets for correct gear mesh to provide quiet operation and prevent transmission damage. (See BACKLASH)

### BACKLASH

Backlash is defined as the space between meshing surfaces of the gears in gearbox devices. Space is needed for expansion caused by heat and viscosity changes in lubricants.

Refer to the **PTO Installation and Operator's Manual** for the correct backlash adjustment procedure which is to be performed on every PTO installation. Use of a dial indicator is recommended. The recommended backlash between the transmission and PTO is from .006 to .012 inch. Too many gaskets will create too much backlash and may cause the PTO to rattle when running at no load. To correct, remove one or more gaskets. Too few gaskets may cause PTO to whine and cause difficult shifting of the PTO and transmission. To correct, add one or more gaskets. PTOs will not always make noises when improperly spaced.

Correct backlash must also be established when gear adapters are used (See ADAPTERS). Transmissions using automatic transmission fluid may have higher noise levels caused by the thinner consistency of the lubricant and the large PTO drive gear in the transmission.

### ADAPTERS

Adapters are normally used to reverse rotation of the PTO output and to clear mounting obstructions (See pages 33–35 of this section). Standard adapters will move the PTO outward from the transmission approximately three inches. Where adapters are shown on an application sheet with a PTO listing, the adapter is required because of a design problem and must be used as shown. Adapters often reduce horsepower ratings and service life. Adjustments to the application rating are noted in the footnotes found on the adapter gear page 35.

To establish the correct backlash when using a gear adapter, first bench mount the PTO to the adapter. Set aside the gasket set that yielded correct backlash. Then mount the adapter to the transmission, establishing correct backlash there.

### PTO SPEEDS

PTO speeds are shown on each application page as a percentage of engine speed. For example, if a PTO is listed as 65%, and the truck engine is running at 1,000 RPM, the PTO shaft will be rotating at 650 RPM. If the truck engine is accelerated to 1,800 RPM, the same PTO will increase in speed to 1,170 RPM ( $.65 \times 1,800 = 1,170$ ).

This catalog typically shows only PTO percentages between 40% to 150% on single speed PTOs and 40% to 200% on reversible PTOs. If your application requires a percentage other than what is shown, please contact Muncie Power for assistance.

Note: The maximum advertised speed for the Muncie Power Series PTO output shaft is 2,500 RPM.

### ROTATION

The rotation shown for each PTO on the application sheets specifies "crnk" or "opp", indicating rotation of the PTO output shaft in relation to the rotation of the engine crankshaft. All engine crankshafts rotate in the same direction; CW when viewed from the front of the engine. See page 37 for a more detailed description.

### INSTALLATION INTERFERENCE

Muncie Power Products, Inc. provides power take-off products based upon data provided by transmission manufacturers. We also address known issues related to chassis applications. Due to variations of vehicle manufacturers and the location of components mounted in proximity of the PTO and driven components, it is not possible to list all interference issues with regards to PTO installations within this catalog. Therefore, the installers of our products should pay particular attention to potential interference points due to the motion of the engine/transmission/PTO assembly in relation to fixed components on the chassis. Care should also be taken when mounting products near heat sources such as exhaust systems. Adequate insulation should be installed to prevent damage. It is the responsibility of the installer or up-fitter to examine possible interference issues and resolve them prior to releasing any installation. Contact Muncie Power's customer service team when issues are found and we will work with you to resolve them.

### INSTALLATION

Limited information is included in this catalog regarding installation of the PTO. Should more information be desired, request a copy of the **PTO Installation and Operator's Manual** before you order the PTO. Installation manuals are supplied with every PTO.

### DIRECT MOUNT HYD. PUMP INSTALLATIONS

It is recommended that direct mounted hydraulic pumps be supported to the transmission with a 4-point support bracket. The bracket is to be attached at the transmission with two attachment bolts and at the pump with two attachment bolts in order to prevent movement of the pump in all directions. Guidelines are found in the **PTO Installation and Operator's Manual**. Pump weight, size, and type are variables which contribute to the requirement for the use of a bracket, but system cycles, terrain, and other external influences can be factors in determining the requirements for proper installation. Hydraulic pumps with a combined weight of 40 lbs. (pump, fittings, hose, oil, etc.) must be supported. Refer to the **PTO Installation and Operator's Manual** for further recommendations.