



# 2011 FORD SUPERDUTY DIESEL

## With LIVE DRIVE PTO FOR CENTRAL HYDRAULIC SYSTEMS

### **PREFACE:**

*The Ford 2011 & later F-Super Duty chassis, or F-650/750 Series Medium Duty chassis, with diesel or gas engine and 6-speed 6R140 transmission, has a PTO drive gear driven directly from the engine. Ford has dubbed this the "Live Drive" PTO which means that the PTO drive gear is active any time that the engine is running. For central hydraulic systems this means that you can have active PTO operation at all times.*

**Note: At the point of installation you must choose between stationary operation (PARK) or mobile operation (DRIVE & NEUTRAL).** Mobile option should be chosen for spreader applications. This document has been drafted to guide you with tips and recommendations for the PTO and pump when used on a central hydraulic system.

---

### **CENTRAL HYDRAULICS:**

Central hydraulics terminology implies that a single driven component (one PTO & pump) can be combined with several devices to provide multiple operations of vehicle mounted equipment. For our example, we will discuss using the New Muncie FR66 PTO on a tailgate salt spreader and plow system.

Due to the limited space available on the Ford F-Super Duty chassis, the PTO is designed to drive a direct mounted Muncie F series hydraulic pump. This size of pump is the only design found to fit the PTO space constraints between the transmission and front axle drive shaft coming off the transfer case. This combination presents challenges when specifying a central hydraulic system. The challenge is to provide adequate flow and pressure to operate the tailgate spreader while driving the vehicle and enough flow and pressure to operate the dump body and/or spreader with the vehicle stopped. In principal, the live drive PTO system is similar to the application of a clutch pump that has been done for many years on various chassis and engine combinations.

### **THE APPLICATION OF THE FR66 AND F PUMP OR CS6 & W SERIES PUMP:**

On the F-650/750 4x2 chassis, a drive-line driven hydraulic pump system has been used. An F-650/750 chassis with after-market 4x4 systems would be dependent on the type of system used as to whether or not there is clearance for PTO applications. The Muncie PTO is a clutch shiftable PTO which means the PTO output shaft can be turned on and off as needed within limits. The envelope being restrictive means only certain sizes and

mounting configurations can be used that will provide pump clearance to the vehicle forward drive shaft. If you are familiar with a clutch pump system on this type of application, then you should expect the same performance from the Muncie PTO and pump operation, as they are going to be very similar in operation and functionality. The FR66 PTO turns the output shaft at a speed-up percentage of 127% when compared to engine speed. The CS6 PTO has 4 output speed options. In a clutch pump application the pulley sizes for the belt also increase speeds to the pump by a factor of typically 135% (reference an add on type of pulley system).

Use the Muncie QR application catalog (found on our web site, [munciepower.com](http://munciepower.com)) PTO and pump selection. On the application page you will find the pumps listed by largest displacement to smallest displacement. Most spreaders will respond effectively with flows around 10 GPM. The spreader valve splits flow to operate the auger motor and spinner motor. The 6.7L Ford diesel engine reaches maximum torque at 2800 RPM but red-lines at 3400 RPM and with a 127% PTO; this means that the pump is turning at 4284 RPM. At 4284 RPM the PF4-502 would have a flow rating of approximately 21 GPM.

15 GPM is adequate flow to operate the spinner/auger on the spreader. When the vehicle idles down the flow goes down to approximately 5 GPM. This is enough flow to lift a plow, however the spreader will stop functioning when doing so.

Operating the PTO at 2800 RPM is above the recommended catalog speed, but is approved on the central hydraulics application since the load on the PTO is low. At these speeds, feeding the pump will be critical.

# 2011 FORD SUPERDUTY DIESEL

With LIVE DRIVE PTO FOR CENTRAL HYDRAULIC SYSTEMS

The pump should not exceed 5 in.Hg. of vacuum on the inlet. This inlet condition can be improved by insuring that the correct hose size is used to feed the pump. When sizing a hose Muncie recommends a velocity of 2 to 4 ft/sec (4 being the maximum). This means the recommended hose size for 15 GPM would be 1 ½”I.D. The hose needs to be SAE 100R4 rated for suction use. This is despite the SAE-12 port size of the pump. To help “push” the oil through the pump’s inlet port, it is recommended that a pressure cap rated at 3-5 psi be used on the system reservoir. This cap will help to ensure that the pump will be properly fed with oil.

Standard Mobile Hydraulic system practices should be used on installations of this type. Sizing of all components needs to be adequate for the maximum hydraulic flow. The recommended velocity for oil in the return hose (to the reservoir) is 8 ft/sec and for high pressure lines it is 15 ft/sec.

A hydraulic hose supply house can recommend the proper hose and size for you application.

## CLUTCH PUMP MOUNTING KIT:

If the PTO/Pump combination is not the preferred power choice on your application, Muncie does offer clutch pump mounting kits for Diesel and Gas applications as an alternative to the PTO installation. This clutch pump system adds a pulley to the engine crank damper and is not affected by Fords FEAD Torque limitations (see below). Remember, feeding the pump is critical with vacuum conditions and hose sizes are just as important as with the PTO system.

- Ford Notice: For clutch pump systems, which use the Ford inline belt, the available torque allowed by Ford is limited. Ford recommends a maximum of 15 ft.lbs. of torque with A/C ON (2.4 HP\*) and 35 ft.lbs. of torque with A/C OFF (5.5 HP\*) for any auxiliary unit added to the existing 6.7L engine beltline. Most central hydraulic systems require between 10 HP to 20 HP for standard operation. (See Ford bulletin Q-189 for details.)

- There are no torque restrictions when using a Muncie clutch pump mounting kit with a separate pulley and belt system added to the engine crank damper.
- \*Calculate using the formula:  
Pump Flow @1000 RPMp X Pressure /1714/  
Pump Efficiency Value. HP above assumes a 120% pulley ratio speed increase which is typical for inline type installations and a conservative .85% efficiency factor.

## HIGH SPEED DYNAMIC ENGAGEMENTS:

When “Live Drive” functionality is available, the operator finds they have the capability to turn the systems on at any engine RPM or during any part of the hydraulic systems operating cycles. In these situations equipment can be damaged from over speed conditions. MPP advises against engagements of the clutches in the PTO or Clutch pump at high RPM or under a highly loaded condition. The clutch mechanism needs adequate time to complete the engagement cycle before work is performed and without proper shifting, the clutches could slip and become damaged over time. Safety devices are available in the market place, including Muncie’s SPD-1001 series “Safety Protection Device”. Call Muncie at 1-800-367-7867 to determine the suitability of this product for your application.

## CONCLUSION:

The use of the Muncie PTO/Pump combination with the Ford “Live Drive” can be used successfully on mobile applications including snow & ice control central hydraulic systems when properly sized and installed using the these guidelines.

**FOR MORE INFORMATION REGARDING THE INSTALLATION OF YOUR SYSTEM, CONTACT MUNCIE CUSTOMER SERVICE AT 1-800-FOR-PTOS OR YOUR LOCAL MUNCIE REPRESENTATIVE FOR ASSISTANCE.**



Member of the Interpump Group

IN10-12 (Rev. 08-16)

201 East Jackson Street • Muncie, Indiana 47305  
800-367-7867 • Fax 765-284-6991 • info@munciepower.com • www.munciepower.com

Specifications are subject to change without notice. Visit www.munciepower.com for warranties and literature. All rights reserved. © Muncie Power Products, Inc. (2010)