

MPQ

MUNCIE POWER QUARTERLY



Introducing the
F20 PTO

for Ford 10-speed Transmissions

ALSO INSIDE:

**HYDRAULIC OIL: THE LIFE
OF THE HYDRAULIC SYSTEM**

**A REFLECTION OF
SERVANT LEADERSHIP**

By Investing in Community, We Invest in Our Culture

I have learned plenty of things during my tenure with Muncie Power Products, but nothing so revealing as the importance of community. Encouraging employee involvement in the community is part of our core values and company philosophy. We have witnessed how this kind of involvement has helped us develop a more positive culture. It allows employees to have access to social settings and activities to develop capabilities that enable them to grow in their work. We have seen an improvement in morale, trust and respect for history and individuals in all walks of life. Also, company pride is promoted not only internally, but externally as well.

One of the greatest blessings in my life is my affiliation with a company like Muncie Power where community is part of its DNA. In my position, one of my commitments has been to provide opportunities for this generation of leaders and the emerging leaders to better understand the importance of the community where they live,

work and worship. My hope is that they find the positive in their community and be part of the solution to make it even better. It is a win-win from my perspective. Our employees learn the importance of serving one another and those in the community. In turn, those in the community learn about our company's brand and corporate commitment to making this a better place.

In our industry, Muncie Power is fortunate to provide essential products and services that help people get an important job done—day in and day out. The core of who we are is that the energy we put into our relationships—whether it be personal, business or community—will always recirculate and find its way back to us. The more you give, the more you get.



Ray L. Chambers
Chairman, CEO & President



Hydraulic Oil: The Life of the Hydraulic System

By Breanna Daugherty, Marketing Communications Specialist

One thing that's not often talked about is hydraulic oil and its importance in any hydraulic system.

This non-compressible fluid is used to transfer power within hydraulic machinery and equipment and performs several functions for a system. Hydraulic oil delivers power, lubricates

components, dissipates heat, and carries away contaminants. To perform these functions, hydraulic oils contain specific additives to enhance their ability to stand up to the pressure, temperature extremes, and other operating conditions to which they are subjected. One other important function of hydraulic oil is to deliver contaminants

to a filter where they can be removed from the system or to the reservoir where they can settle out rather than be held in suspension.

Suffice to say, the life of the hydraulic system is primarily tied directly to the life of the oil. When oil is kept clean and below 140° F the entire system benefits.

It consists of oils and additives that are designed to transmit power while also acting as a lubricant and coolant. The oil reduces wear, rust, and corrosion and is effective in a wide range of temperatures.

HYDRAULIC OIL

DIFFERENCE BETWEEN HYDRAULIC OIL AND HYDRAULIC FLUID

VS

It has similar uses to oil, but has a wider use in automobile systems for automatic transmissions and power brakes and steering. Additionally, aircraft systems require hydraulic fluid.

HYDRAULIC FLUID

Viscosity

Because the oil in hydraulic systems does a dual purpose of lubrication and transmission of power, it's important to take viscosity into account. Viscosity is the measurement of how fluid resists flowing. This is measured in Saybolt Seconds Universal (SSU or SUS), which represents the amount of time it takes 60 milliliters, or about 2 ounces, of fluid at a given temperature, usually 100° F, to flow through an opening.

Oil has a higher viscosity at low temperatures, a lower viscosity at high temperatures. During the winter months, it's important not to try to thin oil with kerosene or diesel fuel. Instead, try switching to a lower viscosity oil or adding an approved thinning agent designed to get the job done.

Lubricity

As previously mentioned, hydraulic oil helps lubrication of the system, which leads to discuss lubricity. This is the ability of oil to maintain a protective film on metal surfaces. This oil film prevents friction, which can lead to excessive wear and heat generation.

Interestingly enough, the thickness of the film is related to viscosity. When there is a higher viscosity, the film is thicker, in turn forming a thicker film on internal components. While automatic transmission fluid is

“Suffice to say, the life of the hydraulic system is primarily tied directly to the life of the oil.”

often used as hydraulic fluid, it's a poor choice because it loses film strength in high pressures and temperatures, despite its excellent thermal stability.

Oil Recommendations

In truth, there is much more to oil than petroleum. Oils contain additive packages specific to their function. Motor oil, for example, contains high temperature and detergent additives. Quality hydraulic oils must contain high pressure, anti-rust, anti-wear, and anti-foaming agents—all are necessary for the oil to do its job. Selection of hydraulic oil should be based on frequency of use, maximum PSI, climate, and how essential the piece of equipment is.

It is important to remember that these additives are heat sensitive. The ideal operating temperature for hydraulic systems is 100°–140° F. Temperatures over 180° F can contribute to

oxidation, robbing the oil of its ability to perform. As additives cook out, they leave behind varnishes, which can cause valves to stick and degrade performance. These oils feel sticky to the touch rather than slick. Heat also affects performance efficiency. As a rule, system efficiency suffers approximately 1% for each 10° F over 130° F. At 180° F, that represents a 5% efficiency loss and a ⅔ reduction in the projected useful life of the oil.

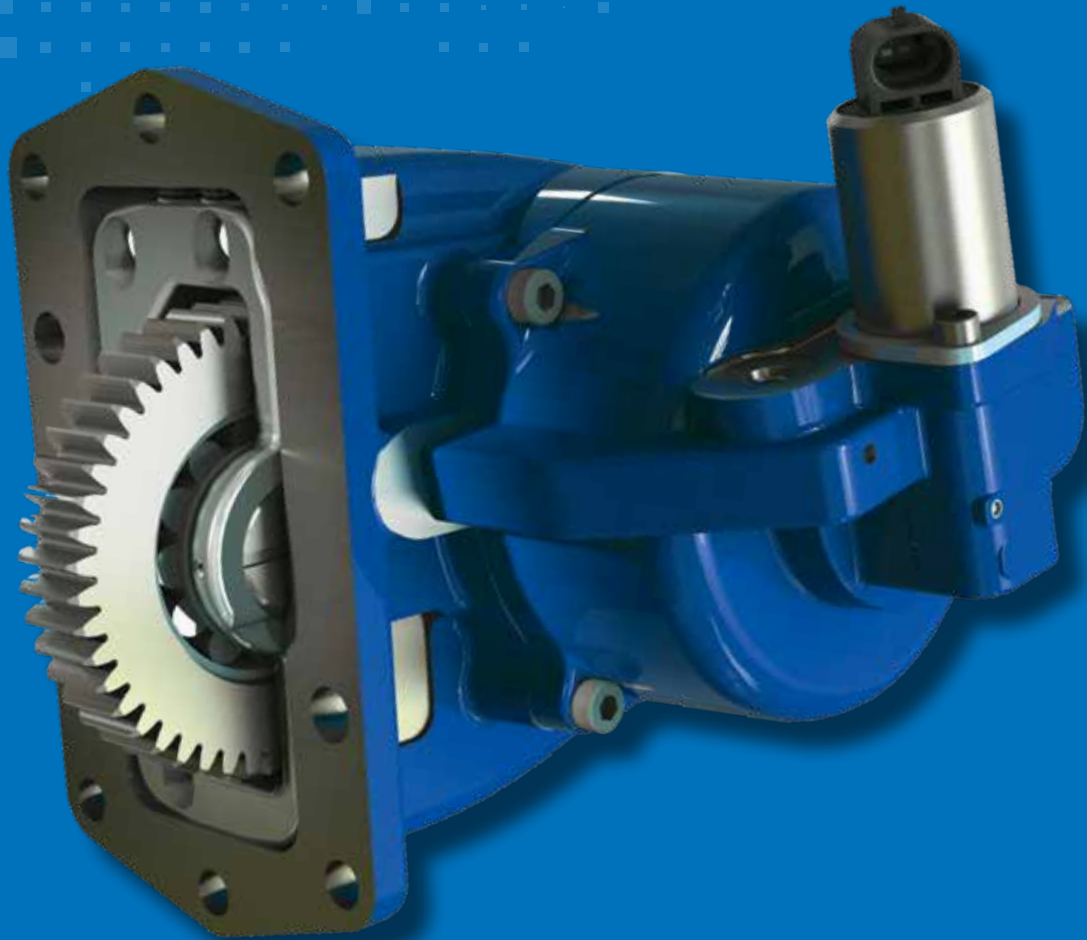
Muncie Power Products does not promote specific manufacturer's brands of oil, but does recommend the use of quality petroleum-based hydraulic fluids. Different climate temperatures require that the oil viscosity be appropriate for the operating conditions. Consult the oil manufacturer for your exact application needs. ♦

INNOVATING

THE F20

FOR THE NEW FORD

10-SPEED TRANSMISSION



When Ford Motor Company launched their new 2020 truck models in December 2019, they integrated a new, 10-speed transmission into numerous Super Duty models; including the F-250, F-350, F-450, F-550, and the upcoming F-600. This new transmission features a unique 10-bolt mounting pattern which required Muncie Power Products to develop a new power take-off (PTO) to fit these trucks.

The new PTO, the F20, is a 10-bolt, clutch shift PTO specifically designed for Ford's new 10R140 10-speed transmission. The F20 is applicable for a number of markets including tow and recovery, refuse, dump, utility, and snow plows. At 130% of engine speed, the PTO utilizes the full transmission torque capacity of 300 lbs.ft. It also features both direct and round shaft output options and a pre-configured wiring harness.

Muncie Power had a lot of success with the spring loaded design to dampen noise on the FR6Q; the goal was to find a way to replicate that design in the F20. This was a challenge because the new 10R140 transmission does not require a PTO adapter to extend into the transmission, like the FR6Q did on the 6R140 transmission. In the new transmission, the PTO gear in the transmission is much closer to the PTO mounting aperture, meaning the PTO does not have to reach into the transmission as far to engage the PTO gear. This, combined with space constraints, required Muncie Power to develop a new design.

Product Manager **Jim Abbott** worked with the idea of utilizing relative motion between the



The above F20 PTO render highlights the patent-pending design for quiet performance.

transmission and PTO gears, which led to placing springs in a newly designed carrier to create a sliding motion in the F20. (see image above)

This new carrier holds the input gear and slides up and down against the springs—essentially creating some cushion—to remove the gear rattle when the PTO is unloaded. The springs are stacked in a 2x2 pattern on the top side of the carrier and when the PTO clutch is disengaged, they act like shock absorbers on a car.

After Jim came up with the idea for the springs in the F20, Principal Engineer **Tom Funk** began working out the details on how to effectively incorporate

it within the PTO. This involved integrating new shoulder bolts for the carrier to slide on as well as a unique gasket design. While the sliding mechanism was the focus on the F20, it wasn't the only new design change.

Keeping focus on the customer, the PTO needed to be easier to install; and there are a few ways the F20 achieves that. Engineers worked on the architecture of the PTO housing to allow accessibility for torquing and installation, and used common 10 mm 12 pt fasteners to minimize the number of tools required to install it. Additionally, the F20 features internal pressure lubrication, unlike the external lubrication tube setup found on the FR6Q, allowing for easier assembly as well as eliminating a potential leak point.

The F20 is available for both gas and diesel applications and is applicable with the Muncie Start[®], which eliminates torque spikes upon start up for high-inertia loads.

The F20 is the PTO solution for the new Ford 10-speed transmission. ♦

KEY FEATURES

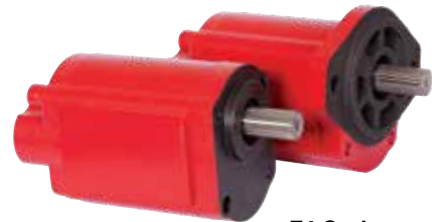
- Designed for Ford F-250 – F-600 trucks with the Ford 10R140 transmission
- Solenoid activated
- Features patent-pending noise abatement technology
- Available with direct mount and round shaft output options
- Pre-configured wiring harness

PTO TORQUE AND HORSEPOWER RATINGS

INTERNAL SPEED RATIO CODE	% OF ENGINE SPEED	INTERMITTENT HP @ 1,000 RPM	INTERMITTENT TORQUE LBS.FT.
12	130%	50 (37 kW)	261 (354 Nm)

COMPATIBLE PUMPS

Ultimate power and performance in a small package best describes the all new **F4 Series** gear pumps. The pressure balanced bushing blocks and sleeve bearings provide both extra long life and high performance. Requires F20 output code “TN.”



F4 Series

The all cast iron **H Series** gear pump for those low to medium flow systems. Small package size makes it ideal for direct mounting to PTOs. Contains SAE shaft and flanges. Both side and rear ports are standard. All standard H Series displacements will be available for F20 “BA” mount applications. Each unit will come standard with a SAE “A” 2-bolt mounting flange and 7/8" - 13T splined shaft.



H Series

AVAILABLE WITH MUNCIE START®

An electronically controlled, modulated clutch engagement system that eliminates torque spikes upon start up for high-inertia loads.

Shift Codes:

- GS – Gas Engine
- DS – Diesel Engine



A Reflection of Servant Leadership

When we think of servant leadership, oftentimes names like Mother

Theresa and Martin Luther King Jr. come to mind as some of the most well-known servant leaders of all time. These are people who gave the best of themselves to others both locally and on a much larger scale, not for personal gain but in the service of others. These are people who led by example, who spoke the loudest through peaceful action.

Whether its within our family unit, our workplace, or our community, we all should strive to be servant leaders. Because if we aren't giving the best of ourselves to the people in our lives, then what's the point? This means being mindful of everything we do in the service

of others, focusing on the details because the details matter.

It's why Muncie Power Products' Executive Administrative Assistant **Liz Ludwick** takes such great care in company initiatives and details, ensuring all she does are top notch as those in our lives deserve our best. Servant leadership isn't necessarily some big, elaborate gesture, but it is a cognizant effort to do the best by those in our lives. For example, Liz's attention to, and leadership of, company events, lunches, and recognitions—whether it's serving drinks and joking around with coworkers to foster relationships or creating an experience for employees—is a reflection of a commitment to serving others and giving others her best as a leader.

“ The point is that we continue to make a cognizant effort and strive to give our best because those in our lives deserve no less, and encourage others to do the same. ”



Executive Administrative Assistant Liz Ludwick believes servant leadership is a key part when it comes to being the liaison between the company and community.

Her leadership, energy, and initiative regarding these endeavors hasn't gone unnoticed. Liz continues to create opportunities to serve others outside of the company and share this philosophy. This includes recruitment by other organizations within the Muncie community to be the lead on their events. Liz invests in the details not for personal gain, but because she wants every person her actions touch to feel and know that they're important, too. Isn't this how we all should want the people in our lives to feel?

Within the business and corporate world, how we serve others reflects a great deal

more than our own attitude, as well. As employees of Muncie Power, to the people we serve—whether it be those in the outside world or one another—we are a reflection of the company, our department, and staff as a whole. This is regardless of whether it is a mirror image of giving our best or a flawed representation. An extension of Chairman, CEO & President Ray Chambers and the first point of contact for many people outside of the company, Liz is conscious of the fact that how she serves others and leads is a reflection, not just of her and her actions, but a reflection upon leadership and the company to both employees and the outside world.

At Muncie Power, we have people that are willing to help and go the extra mile, people who ensure that the details matter, people who strive to give their best each and every day, people who are a reflection of servant leadership. There will be times where we have a bad day, or we let ourselves get in the way when it comes to serving others.

The point is that we continue to make a cognizant effort and strive to give our best because those in our lives deserve no less, and encourage others to do the same. ♦



A Member of the Interpump Group