Mack Engine or PTO/Pump Speed Calculator
How to Use

Tool Purpose: The purpose of this tool is to confirm the match of proprietary Mack PTO and pump products to an *m*DRIVE transmission.

Prepare: Before interacting with this tool, you will need to gather some information from your customer. Your customer or body builder will typically know what engine speed, or pump speed they want to maintain and how many gallons per minute (GPM) of hydraulic pump output they need to support. Here is the information you need to collect to begin:

1. What is your customer's application i.e. dump body, bulk hauling, refuse, etc.? Consider the following questions about the application the truck will be working in. The answers to the following questions will narrow your PTO product search.

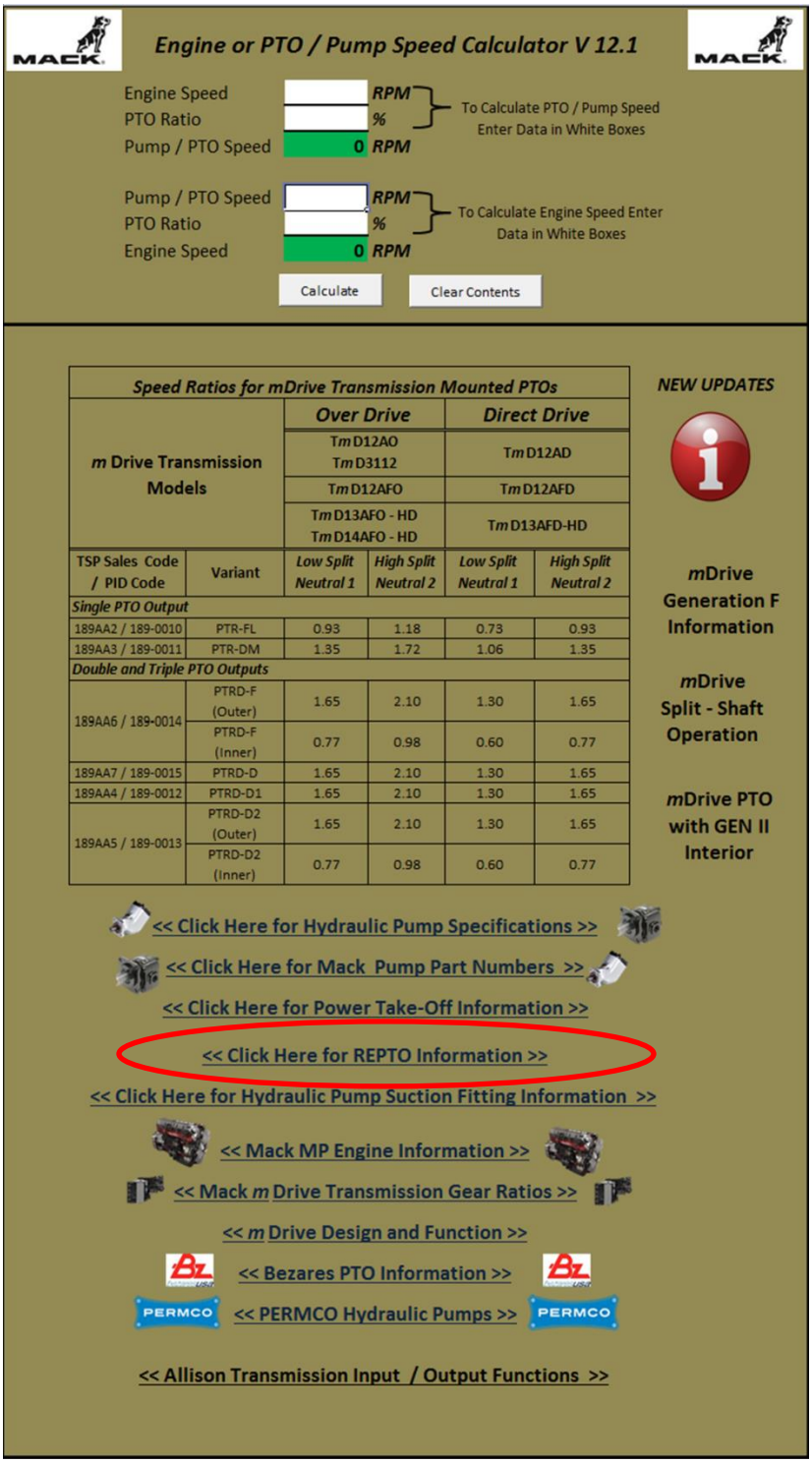
2. Will the truck need to be able to move at road speed while working in the application, i.e. snow plow, street sweeper, etc.? You will need a clutch-independent REPTO (Rear Engine mounted PTO) or FEPTO (Front engine mounted PTO).

3. Will the truck need to be able to move, but at a very slow speed (6 mph or less), while working in the application, i.e. dump, paving, roll-off, etc.? A clutch-dependent PTO, which will be mounted to the *m*DRIVE, will work to serve these applications.

4. Will the truck need to be stationary, and not move at all, while working in the application, i.e. bucket trucks, cranes, etc.? Again, a clutch-dependent PTO, which will be mounted to the *m*DRIVE, will work to serve these applications.

Example 1: The customer's application is snow plow/salt spreader. You need a clutch-independent REPTO. The customer's requirement is to pump 30-35 GPM.

1. Scroll down this screen and click on "Click Here for REPTO Information"



Engine or PTO / Pump Speed Calculator V 12.1

Engine Speed ____ RPM
PTO Ratio ____ %
Pump / PTO Speed 0 RPM
To Calculate PTO / Pump Speed Enter Data in White Boxes

Pump / PTO Speed ____ RPM
PTO Ratio ____ %
Engine Speed 0 RPM
To Calculate Engine Speed Enter Data in White Boxes

Calculate | Clear Contents

Speed Ratios for mDrive Transmission Mounted PTOs

m Drive Transmission Models		Over Drive		Direct Drive	
		Tm D12AO Tm D3112		Tm D12AD	
		Tm D12AFO		Tm D12AFD	
		Tm D13AFO - HD Tm D14AFO - HD		Tm D13AFD-HD	
TSP Sales Code / PID Code	Variant	Low Split Neutral 1	High Split Neutral 2	Low Split Neutral 1	High Split Neutral 2
Single PTO Output					
189AA2 / 189-0010	PTR-FL	0.93	1.18	0.73	0.93
189AA3 / 189-0011	PTR-DM	1.35	1.72	1.06	1.35
Double and Triple PTO Outputs					
189AA6 / 189-0014	PTRD-F (Outer)	1.65	2.10	1.30	1.65
	PTRD-F (Inner)	0.77	0.98	0.60	0.77
189AA7 / 189-0015	PTRD-D	1.65	2.10	1.30	1.65
189AA4 / 189-0012	PTRD-D1	1.65	2.10	1.30	1.65
189AA5 / 189-0013	PTRD-D2 (Outer)	1.65	2.10	1.30	1.65
	PTRD-D2 (Inner)	0.77	0.98	0.60	0.77

NEW UPDATES

mDrive Generation F Information

mDrive Split - Shaft Operation

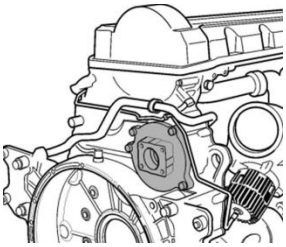
mDrive PTO with GEN II Interior

<< Click Here for Hydraulic Pump Specifications >>
<< Click Here for Mack Pump Part Numbers >>
<< Click Here for Power Take-Off Information >>
<< Click Here for REPTO Information >>
<< Click Here for Hydraulic Pump Suction Fitting Information >>
<< Mack MP Engine Information >>
<< Mack m Drive Transmission Gear Ratios >>
<< m Drive Design and Function >>
<< Bezares PTO Information >>
<< PERMCO Hydraulic Pumps >>
<< Allison Transmission Input / Output Functions >>

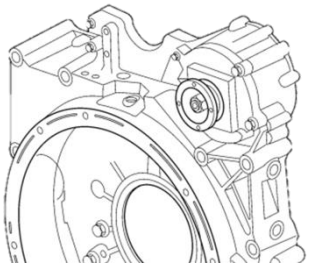
2. What engine is installed in the truck? Reference the table below to see REPTO options that match up with each engine. The customer has an MP7 with a DIN mount PTO, the ratio is 108% (see Ratio outlined in red in the table below).

How to read this table:

Engine: Find the engine that is in your customer's truck; MP7, MP8, MP10 (The MP10 is not available in newer models after 2016).

Drive/Ratio: DIN = A direct mount option 

DIN mount allows for a direct mount Hydraulic Pump i.e. for snow plow application.

SAE = A flange mount option 

SAE Flange allows for remote mount Hydraulic Pump i.e. for cement mixer application.

Sales Code: Used when ordering a truck with the REPTO option.

Part Number: Each component that is included.

Description: A written description that corresponds to each component.

QTY: The quantity of each component that is needed.

Rotation: Bodybuilders may ask for this information

Max HP: Bodybuilders may ask for this information

Torque: For Bodybuilders may ask for this information

Rear Engine Power Take-Off (REPTO)

Engine	Drive / Ratio	Sales Code	Part Number	Description	QTY	Rotation	Max HP	Torque
MP7	DIN 5642 108%	4160008	21909758	REPTO Unit	1	Same as Engine Rotation CCW	250 HP Maximum	**740 lb.ft.** [1000 Nm] Stationary **480 lb.ft.** [650 Nm] (>3 MPH) ***Maximum Torque with mDrive While Driving MP7 148 lb.ft. [200 Nm] MP8 221 lb.ft. [300 Nm]***
			976068	O-Ring	1			
			984850	Bolt	2			
			984820	Bolt	2			
MP7	SAE 1400 108%	4160007	21912452	REPTO Unit	1		250 HP Maximum	
			976068	O-Ring	1			
			984850	Bolt	2			
			984820	Bolt	2			
MP8	DIN 5642 126%	4160008	21912752	REPTO Unit	1		250 HP Maximum	
			976068	O-Ring	1			
			984850	Bolt	2			
			984820	Bolt	2			
MP8	SAE 1400 126%	4160007	21913220	REPTO Unit	1		250 HP Maximum	
			976068	O-Ring	1			
			984850	Bolt	2			
			984820	Bolt	2			
MP10	DIN 5642 126%	MP10 is No Longer in Production	21912752	REPTO Unit	1		250 HP Maximum	
			976068	O-Ring	1			
			984850	Bolt	2			
			984820	Bolt	2			
MP10	SAE 1400 126%	MP10 is No Longer in Production	21913220	REPTO Unit	1		250 HP Maximum	
			976068	O-Ring	1			
			984850	Bolt	2			
			984820	Bolt	2			

Misc. REPTO Information

Technical Reg.	20538824
Drive Type	Part No.
SAE 1410 Flange	1667973
SAE 1300 Flange	1526019
Square Flange	21264675
100 Flange	20738739

3. Click on Pump Info to see if there are any pumps that meet the customers' requirement. Do we have any pumps that can pump 30-35 GPM?

Parker Bent Axial Piston Fixed Pump Specifications

Theoretical Pump Flow (GPM) at Pump Speed (RPM)

Sales ID	Pump	1000 RPM	1200 RPM	1400 RPM	1600 RPM	1800 RPM	2000 RPM	2200 RPM	CG
	F1-25	6.8	8.1	9.4	10.8	12.2	13.5	14.9	85mm
	F1-41	10.8	12.9	15.1	17.2	19.4	21.6	23.7	85mm
826046	F1-61	15.7	18.9	22	25.1	28.3	31.4	34.6	85mm
826036	F1-81	21.6	25.9	30.2	34.5	38.8	43.1		85mm
826056	F1-101	27	32.4	37.8	43.2	48.5	*OVER SPEED*	*OVER SPEED*	119mm
	F2-42/42	11.3 / 10.8	13.6 / 13.0	15.9 / 15.2	18.1 / 17.3	20.4 / 19.5			119mm
	F2-53/53	14.3 / 13.7	17.1 / 16.5	20.0 / 19.2	22.9 / 22.0	25.6 / 24.7			119mm

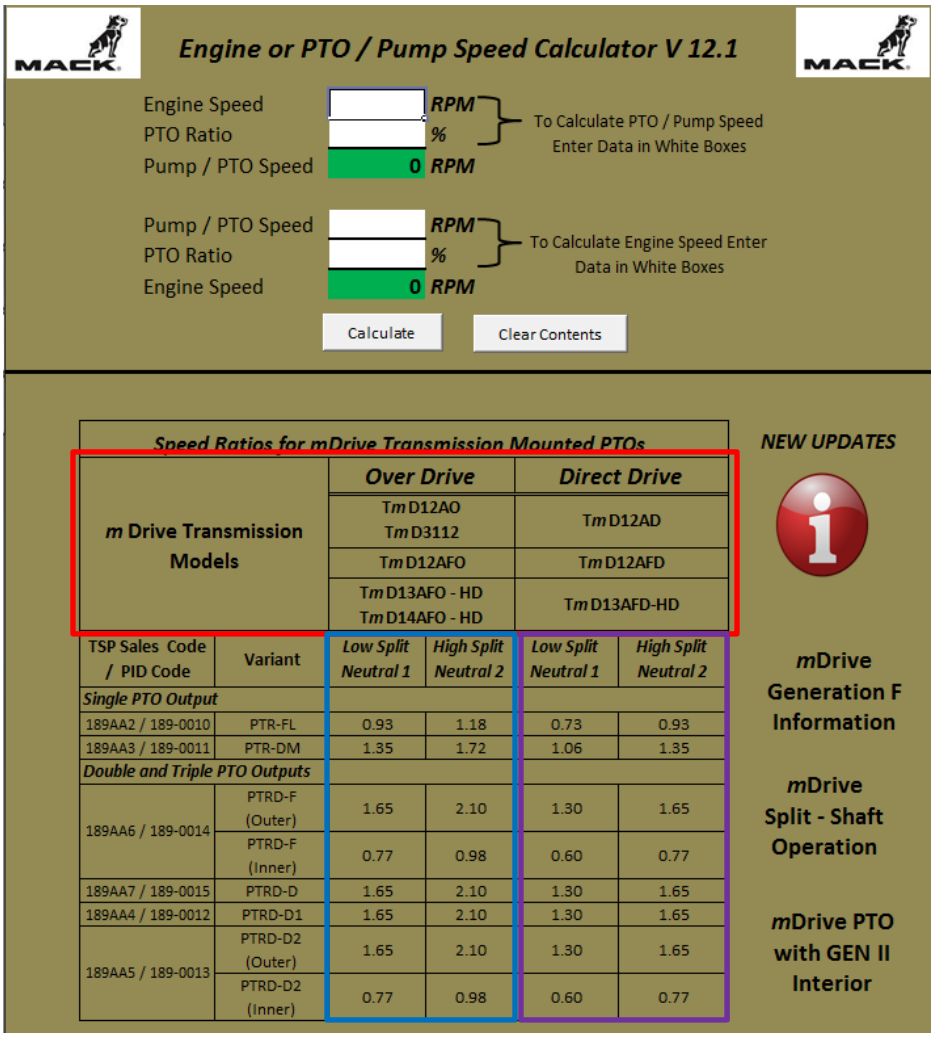
Pump Model F1-81 Select Pump
Pump Speed 1700 RPM
Displacement 4.98 CU.IN./Rev
Theo. Pump Flow 36.6 GPM

Calculate | Reset Fields

Select the Pump and enter the Pump Speed above for the GPM

We can see that the F1-81 pump has the potential to offer the GPM that the customer needs. In the calculator box to the right we can select F1-81 from the dropdown menu and manually enter 1700 to see if we can get close to the 35 GPM the customer wants. We find that the F1-81 at 1700 RPM can supply 36.6 GPM. This is very close to the high side of what the customer wants; offer this option.

Example 2: The customer's application is a crane truck that hangs/installs billboards. You need a clutch-dependent PTO that will be mounted to the *m*DRIVE. The customer has the TmD12AO transmission with a single output DIN mount PTO. His body builder advised that 1100 RPM is optimal engine speed and the pump needs a flow rate of no more than 40 GPM.



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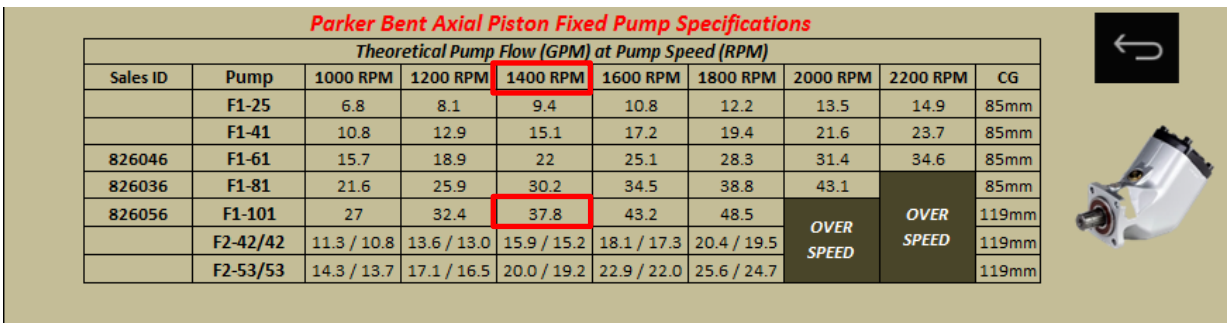
NEW UPDATES

*m*Drive Generation F Information

*m*Drive Split - Shaft Operation

*m*Drive PTO with GEN II Interior

1. Click on the Pump Info worksheet to see if we have any pumps that closely meet the 40 GPM requirement. Only the Parker Bent Axial Piston Fixed Pump offers the F1-101 which has GPM close to the requirement, but the RPM of 1400 exceeds the acceptable engine speed of 1100 RPM.



Parker Bent Axial Piston Fixed Pump Specifications

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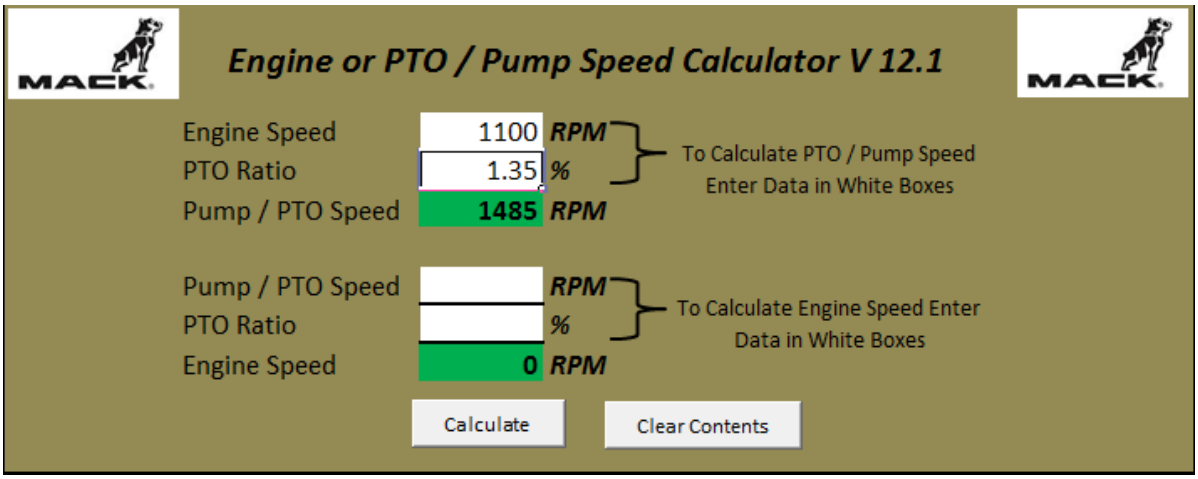
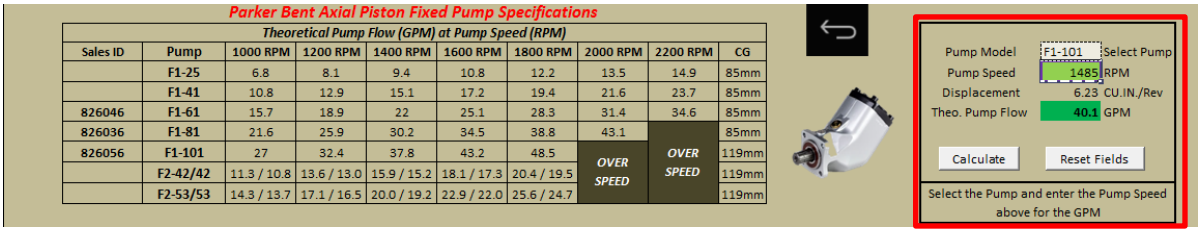
826036	F1-81	21.6	25.9	30.2	34.5	38.8	43.1	OVER SPEED	85mm
826056	F1-101	27	32.4	37.8	43.2	48.5	OVER SPEED		119mm
	F2-42/42	11.3 / 10.8	13.6 / 13.0	15.9 / 15.2	18.1 / 17.3	20.4 / 19.5			119mm
	F2-53/53	14.3 / 13.7	17.1 / 16.5	20.0 / 19.2	22.9 / 22.0	25.6 / 24.7			119mm

2. Use the back button to access the main worksheet. This will help us to identify the PTO speed that works at 1100 RPM engine speed. Enter the desired RPM (1100) and the PTO ratio for the DIN mount PTO that our customer is working with. We now know that 1485 RPM is what we need to meet a flow rate of up to 40 MPG.



3. Go back to the Pump Info worksheet to see what flow rate we can expect from the F1-101 pump with 1485 RPM. Using the calculator to the right of the pump table, select F1-101 from the dropdown list and enter 1485 RPM. Click Calculate and the GPM that this offers is 40.1 GPM. But the body builder advised that we don't exceed 40 GPM and the RPM is still higher that requested.



4. The customer/body builder can decide if they want to consider operating the engine at higher RPM to achieve the flow rate or if they prefer a lower flow rate to bring the engine speed down.