

Subject
DTM70-H Pump Selection and Flow Setting (DM20011)

System or Parts affected

System	
DM20011 - DTM70-H, FORD 6.7L F250-F550, 2017+	
Parts	
4500147	PUMP, HYDRAULIC, DTM70-H, FORD,026
4500148	PUMP, HYDRAULIC, DTM70-H, FORD,037
4500149	PUMP, HYDRAULIC, DTM70-H, FORD,055
4500150	PUMP, HYDRAULIC, DTM70-H, FORD,061

Index

System or Parts affected	1
Overview	1
Before placing an order	2
Hydraulic Pump Options	2
Pump Port Styles	3
Performance Calculation	3
Flow calculation formulas:	4
Hydraulic Pump Identification	4

Overview

The VMAC DTM70-H Air Compressor is a Direct-Transmission™ mounted PTO driven air compressor with hydraulic pump (Figure 1). The air compressor and hydraulic pump are designed to run simultaneously. The air flow (cfm) and hydraulic flow (gpm) are dependent on the pump size and the engine speed (rpm). VMAC offers 4 hydraulic pumps which have all been approved for use with the DTM70-H. This document outlines how to select the hydraulic pump and engine speed to meet the air and hydraulic demands of the application.

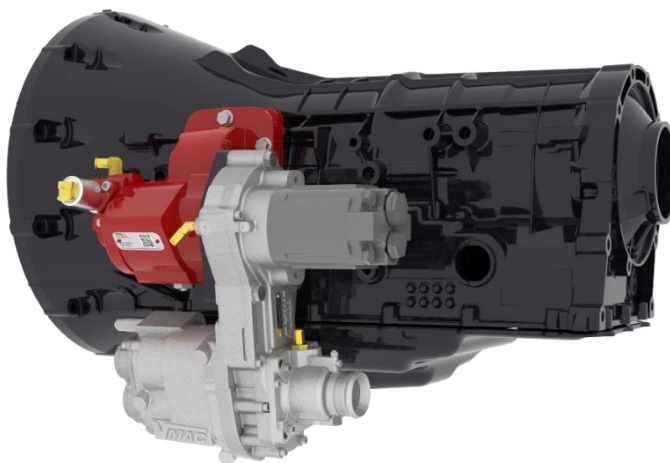


Figure 1 – DTM70-H Transmission-Mounted™ Air / Hydraulic System

Document	Version	Department	Revision Details	Revised by	Tech	Engineering	Implemented
EXT-DTM-001	B	Eng	update	BDJ 5 July 2019	N/A	CM 8 July 2019	8 July 2019

Subject

DTM70-H Pump Selection and Flow Setting (DM20011)

Before placing an order

- Read the following sections on pump selection and flow setting.
- Determine the minimum and maximum flow requirements for the application.

Hydraulic Pump Options

- VMAC offers a choice of 4 hydraulic pumps which have been approved for use with the DTM70-H. These pumps have been tested by VMAC with the DTM70-H system and verified to provide adequate clearance between the pump, vehicle and drivetrain components.
- For ordering convenience, VMAC's DTM-H can be ordered with the desired hydraulic pump option. Hydraulic pumps can also be ordered as separate line items.

DM2 **A** 011

Hydraulic Pump Option

- A. = Part No. 4500147 (3.5 gpm @ 1200 Engine rpm)
- B. = Part No. 4500148 (4.9 gpm @ 1200 Engine rpm)
- C. = Part No. 4500149 (3.5 gpm @ 1200 Engine rpm)
- D. = Part No. 4500150 (8.1 gpm @ 1200 Engine rpm)

DM2 **0** 011

Hydraulic Pump Ordered Separately

System #	Pump Option	Part #	Qty	Description
DM2A011	A	4500147	1	PUMP, HYDRAULIC, DTM70-H, FORD,026
DM2B011	B	4500148	1	PUMP, HYDRAULIC, DTM70-H, FORD,037
DM2C011	C	4500149	1	PUMP, HYDRAULIC, DTM70-H, FORD,055
DM2D011	D	4500150	1	PUMP, HYDRAULIC, DTM70-H, FORD,061
DM20011	ANY	-	-	-



Installation of hydraulic pumps not approved by VMAC may result in damage to the front driveshaft, VMAC compressor assembly, vehicle transmission, or the PTO, and may void the VMAC warranty.

Document	Version	Department	Revision Details	Revised by	Tech	Engineering	Implemented
EXT-DTM-001	B	Eng	update	BDJ 5 July 2019	N/A	CM 8July 2019	8 July 2019

Subject

DTM70-H Pump Selection and Flow Setting (DM20011)

Pump Port Styles:

- Table 1 summarizes the inlet and outlet port sizes for each pump option.
- Figure 1 illustrates location / orientation of the pump ports.

Item #	Part #	Description	Inlet Port	Outlet Port
1	4500147	PUMP, HYDRAULIC, DTM70-H, FORD,026	#12 ORB	#10 ORB
2	4500148	PUMP, HYDRAULIC, DTM70-H, FORD,037	#12 ORB	#10 ORB
3	4500149	PUMP, HYDRAULIC, DTM70-H, FORD,055	#12 ORB	#10 ORB
4	4500150	PUMP, HYDRAULIC, DTM70-H, FORD,061	#16 ORB	#10 ORB

Table 1 – Pump part numbers

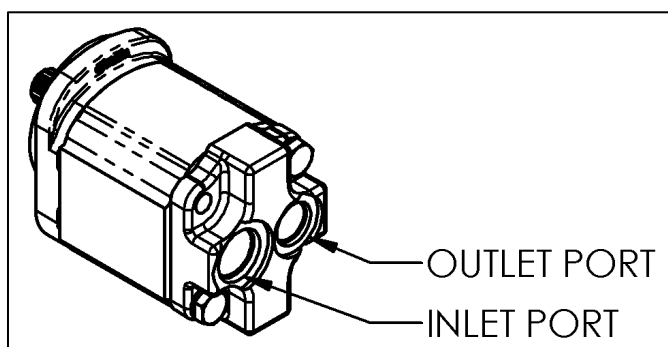


Figure 1 – Pump ports

Performance Calculation

Refer to Table 2 below for air flow and hydraulic flow at several common engine speed settings.

Engine Speed (RPM)			1,200	1,300	1,400	1,500	1,700	1,800	2,000	2,100	2,200	2,600	2,700
Compressor Output (CFM @ 100 psi)			30	34	37	41	46	49	53	55	58	66	69
VMAC Part #s													
4500150	Hydraulic Output	(GPM @ 3,265 psi)	8.1	8.8	9.5	10.2	11.5	12.2	13.5	14.2	14.9	2,258 Max RPM	
4500149		(GPM @ 3,410 psi)	7.4	8.0	8.7	9.3	10.5	11.1	12.4	13.0	13.6		
4500148		(GPM @ 3,625 psi)	4.9	5.3	5.8	6.2	7.0	7.4	8.2	8.6	9.0	10.7	2,661 Max RPM
4500147			3.5	3.8	4.1	4.4	5.0	5.3	5.9	6.2	6.5	7.7	

Table 2 – Compressor and hydraulic pump performance chart

To accurately determine pump output gpm or the engine rpm set point, reference the pump displacement table (Table 3) below and apply figures to the flow calculation formulas provided:

Part #	Description	Displacement, gpr [Gal/Rev]
4500147	PUMP, HYDRAULIC, DTM70-H, FORD,026	0.0026
4500148	PUMP, HYDRAULIC, DTM70-H, FORD,037	0.0037
4500149	PUMP, HYDRAULIC, DTM70-H, FORD,055	0.0055
4500150	PUMP, HYDRAULIC, DTM70-H, FORD,061	0.0061

Table 3 – Displacement / gpr

Document	Version	Department	Revision Details	Revised by	Tech	Engineering	Implemented
EXT-DTM-001	B	Eng	update	BDJ 5 July 2019	N/A	CM 8July 2019	8 July 2019

Subject

DTM70-H Pump Selection and Flow Setting (DM20011)

Flow calculation formulas:

To determine gpm of a pump at a set engine rpm:

$$gpm = (gpr_{pump}) \times (rpm_{engine}) \times 1.24_{(PTO\ ratio)} \times 0.90_{(pump\ efficiency)}$$

To determine engine rpm for a desired flow:

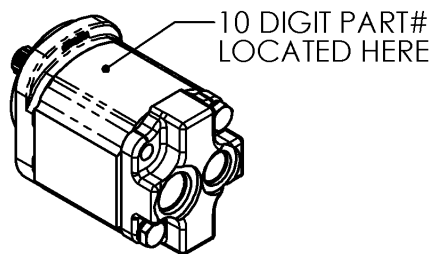
$$(rpm_{engine}) = \frac{gpm}{(gpr_{pump} \times 1.24_{(PTO\ ratio)} \times 0.90_{(pump\ efficiency)})}$$

Hydraulic Pump Identification

The hydraulic pump installed on the DTM-H can be identified by doing the following:

- Locate the Parker part number.
 - Look for a small part number ID plate of the top of the pump body (Figure 2).
 - Record the 10 digit part number.
 - Refer to Table 4 to determine the VMAC pump part number.
- If the part number is not visible or the tag is missing, measure pump length:
 - Measure the length of the pump body as shown in Figure 2.
 - Refer to Table 4 to determine the VMAC pump part number

OPTION 1: CHECK PART NUMBER



OPTION 2: MEASURE PUMP BODY

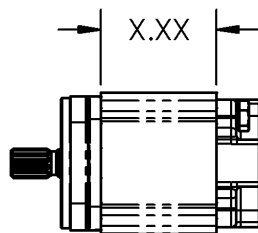


Figure 2 – Pump identification points

VMAC Part #	Description	Part # on Pump	Pump body length IN (mm)
4500147	PUMP, HYDRAULIC, DTM70-H, FORD,026	3349110028	2.22 (56)
4500148	PUMP, HYDRAULIC, DTM70-H, FORD,037	3349110029	2.47 (63)
4500149	PUMP, HYDRAULIC, DTM70-H, FORD,055	3349110031	2.90 (74)
4500150	PUMP, HYDRAULIC, DTM70-H, FORD,061	3349110097	3.03 (77)

Table 4 – Pump number / body length

Document	Version	Department	Revision Details	Revised by	Tech	Engineering	Implemented
EXT-DTM-001	B	Eng	update	BDJ 5 July 2019	N/A	CM 8 July 2019	8 July 2019