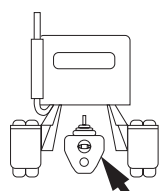



CAUTION: MAXIMUM OUTPUT SHAFT SPEED NOT TO EXCEED 2,500 RPM.

| RAM TRANSMISSION  |                     |  |                   |          |          |               | RIGHT SIDE ONLY<br>(LEFT SIDE TURN PAGE)  |   |  |   |    |
|---|---------------------|--|-------------------|----------|----------|---------------|---|---|---|---|----|
|  |                     | TORQUEFLITE HD<br>ZF POWERLINE<br>Footnotes (1, 2, 3, & 4) |                   |          |          |               | ZF 8-BOLT OPENING   |   |   |   |    |
|   |                     |  |                   |          |          |               | PTO DRIVE GEAR DATA:<br>51T 9.42P 20°PA 22.0° R.H.<br>LOCATION: Front      PLMF: 3.891<br>PLV: 1417 FPM      RPM: 1,000 |   |   |   |    |
| 8-BOLT<br>TYPE  | PTO<br>MODEL NUMBER | FOOT<br>NOTES  | SHAFT<br>ROTATION | ENGINE % | STUD KIT | SHIFT<br>TYPE | SHAFT<br>EXTENSION  | CONTINUOUS RATING<br>@ 1,000 RPM of PTO |   | INTERMITTENT RATING<br>@ 1,000 RPM of PTO |    |
|   |                     |  |                   |          |          |               |   | TORQUE                                  | HP  | TORQUE                                    | HP |
| CLUTCH<br>SHIFT   | Z21-Z1111-DXBBBX    |  | Crnk              | 130      | Included | Elec/Hyd      |   | 265                                     | 50  | 265                                       | 50 |

#### FOOTNOTES:

- 1 Engine driven direct drive PTO gear.
- 2 Requires RAM wiring connection for PTO activation. Minimum engine speed for PTO use is 900 RPMs.
- 3 Driveline outputs cannot be used due to exhaust interference.
- 4 Passenger side PTO opening can be accessed through the passenger side floorboard via a patch panel. Patch panel is present on all PTO prep trucks.

#### Pump Selection Example:

- First you need to know the flow and pressure requirement of your application.
- Next find the closest pump output flow from the chart that is based on the most appropriate engine speed for your application. Follow the grid up to the top to read the basic pump series and size. This is the pump that will give you the flow you desire.
- If your system required 8 GPM to operate. Then you would look for 8 GPM in the columns. Finding the first one under the pump PH1-07 would give you a pump which will deliver the 8 GPM you require at an engine speed of 1,000 RPM. You would also get 8 GPM if you select the PH1-05 pump, but you would need to operate the engine at 1,300 RPM.
- After you have selected the Pump Series and size the complete pump model number can be ordered.

The PH Series would follow PH1-\*\*-02BSBR-S for "BB" output option. PK Series would follow PK1-\*\*-02BSBB-S for "BB" output option.

#### APPROXIMATE FLOW AND PRESSURE FOR PUMP P/N PH1-\*\*\*-02BSBR-S PAIRED WITH PTO P/N Z21-Z1111-DX1BBBX

| ENGINE<br>SPEED |       | PH1-11<br><i>2.48 cu. in./Rev</i> |          | PH1-09<br><i>2.17 cu. in./Rev</i> |          | PH1-08<br><i>1.86 cu. in./Rev</i> |          | PH1-07<br><i>1.55 cu. in./Rev</i> |          | PH1-05<br><i>1.24 cu. in./Rev</i> |          | PH1-03<br><i>0.62 cu. in./Rev</i> |          |
|-----------------|-------|-----------------------------------|----------|-----------------------------------|----------|-----------------------------------|----------|-----------------------------------|----------|-----------------------------------|----------|-----------------------------------|----------|
|                 | GPM   |                                   | MAX. PSI | GPM                               | MAX. PSI | GPM                               | MAX. PSI | GPM                               | MAX. PSI | GPM                               | MAX. PSI | GPM                               | MAX. PSI |
|                 | 900   | 12.6                              | 2,500    | 11.0                              | 2,900    | 9.4                               | 3,250    | 7.9                               | 3,500    | 6.3                               | 3,500    | 3.1                               | 3,500    |
|                 | 1,000 | 14.0                              | 2,500    | 12.2                              | 2,900    | 10.5                              | 3,250    | 8.7                               | 3,500    | 7.0                               | 3,500    | 3.5                               | 3,500    |
|                 | 1,100 | 15.4                              | 2,500    | 13.4                              | 2,900    | 11.5                              | 3,250    | 9.6                               | 3,500    | 7.7                               | 3,500    | 3.8                               | 3,500    |
|                 | 1,200 | 16.7                              | 2,500    | 14.7                              | 2,900    | 12.6                              | 3,250    | 10.5                              | 3,500    | 8.4                               | 3,500    | 4.2                               | 3,500    |
|                 | 1,300 | 18.1                              | 2,500    | 15.9                              | 2,900    | 13.6                              | 3,250    | 11.3                              | 3,500    | 9.1                               | 3,500    | 4.5                               | 3,500    |
|                 | 1,400 | 19.5                              | 2,500    | 17.1                              | 2,900    | 14.7                              | 3,250    | 12.2                              | 3,500    | 9.8                               | 3,500    | 4.9                               | 3,500    |
|                 | 1,500 | 20.9                              | 2,500    | 18.3                              | 2,900    | 15.7                              | 3,250    | 13.1                              | 3,500    | 10.5                              | 3,500    | 5.2                               | 3,500    |
|                 | 1,600 | 22.3                              | 2,500    | 19.5                              | 2,900    | 16.7                              | 3,250    | 14.0                              | 3,500    | 11.2                              | 3,500    | 5.6                               | 3,500    |
| 1,700           | 23.7  | 2,500                             | 20.8     | 2,900                             | 17.8     | 3,250                             | 14.8     | 3,500                             | 11.9     | 3,500                             | 5.9      | 3,500                             |          |
| 1,800           | 25.1  | 2,500                             | 22.0     | 2,900                             | 18.8     | 3,250                             | 15.7     | 3,500                             | 12.6     | 3,500                             | 6.3      | 3,500                             |          |
| 1,900           | 26.5  | 2,500                             | 23.2     | 2,900                             | 19.9     | 3,250                             | 16.6     | 3,500                             | 13.3     | 3,500                             | 6.8      | 3,500                             |          |

#### APPROXIMATE FLOW AND PRESSURE FOR PUMP P/N PK1-\*\*\*-02BSBB-S PAIRED WITH PTO P/N Z21-Z1111-DX1BBBX

| ENGINE<br>SPEED |              | PK1-17<br><i>3.94 cu. in./Rev</i> |       |              | PK1-15<br><i>3.45 cu. in./Rev</i> |       |              | PK1-13<br><i>2.96 cu. in./Rev</i> |       |              | PK1-11<br><i>2.46 cu. in./Rev</i> |       |              | PK1-08<br><i>1.97 cu. in./Rev</i> |  |              | PK1-06<br><i>1.47 cu. in./Rev</i> |  |  |
|-----------------|--------------|-----------------------------------|-------|--------------|-----------------------------------|-------|--------------|-----------------------------------|-------|--------------|-----------------------------------|-------|--------------|-----------------------------------|--|--------------|-----------------------------------|--|--|
|                 | GPM MAX. PSI |                                   |       | GPM MAX. PSI |                                   |       | GPM MAX. PSI |                                   |       | GPM MAX. PSI |                                   |       | GPM MAX. PSI |                                   |  | GPM MAX. PSI |                                   |  |  |
|                 | 900          | 20.0                              | 2,500 | 17.5         | 2,500                             | 15.0  | 3,000        | 12.5                              | 3,000 | 10.0         | 3,000                             | 7.4   | 3,000        |                                   |  |              |                                   |  |  |
|                 | 1,000        | 22.2                              | 2,500 | 19.4         | 2,500                             | 16.7  | 3,000        | 13.8                              | 3,000 | 11.1         | 3,000                             | 8.3   | 3,000        |                                   |  |              |                                   |  |  |
|                 | 1,100        | 24.4                              | 2,500 | 21.4         | 2,500                             | 18.3  | 3,000        | 15.2                              | 3,000 | 12.2         | 3,000                             | 9.1   | 3,000        |                                   |  |              |                                   |  |  |
|                 | 1,200        | 26.6                              | 2,500 | 23.3         | 2,500                             | 20.0  | 3,000        | 16.6                              | 3,000 | 13.3         | 3,000                             | 9.9   | 3,000        |                                   |  |              |                                   |  |  |
|                 | 1,300        | 28.8                              | 2,500 | 25.2         | 2,500                             | 21.7  | 3,000        | 18.0                              | 3,000 | 14.4         | 3,000                             | 10.8  | 3,000        |                                   |  |              |                                   |  |  |
|                 | 1,400        | 31.0                              | 2,500 | 27.2         | 2,500                             | 23.3  | 3,000        | 19.4                              | 3,000 | 15.5         | 3,000                             | 11.6  | 3,000        |                                   |  |              |                                   |  |  |
|                 | 1,500        | 33.3                              | 2,500 | 29.1         | 2,500                             | 25.0  | 3,000        | 20.8                              | 3,000 | 16.6         | 3,000                             | 12.4  | 3,000        |                                   |  |              |                                   |  |  |
|                 | 1,600        | 35.5                              | 2,500 | 31.1         | 2,500                             | 26.7  | 3,000        | 22.2                              | 3,000 | 17.7         | 3,000                             | 13.2  | 3,000        |                                   |  |              |                                   |  |  |
| 1,700           | 37.7         | 2,500                             | 33.0  | 2,500        | 28.3                              | 3,000 | 23.5         | 3,000                             | 18.8  | 3,000        | 14.1                              | 3,000 |              |                                   |  |              |                                   |  |  |
| 1,800           | 39.9         | 2,500                             | 34.9  | 2,500        | 30.0                              | 3,000 | 24.9         | 3,000                             | 20.0  | 3,000        | 14.9                              | 3,000 |              |                                   |  |              |                                   |  |  |
| 1,900           | 42.1         | 2,500                             | 36.9  | 2,500        | 31.7                              | 3,000 | 26.3         | 3,000                             | 21.1  | 3,000        | 15.7                              | 3,000 |              |                                   |  |              |                                   |  |  |

#### PLEASE NOTE:

If you are accustomed to ordering a hydraulic pump based on the pump model number, you may be ordering a pump larger than you require when you apply that pump to this application.

#### To calculate the PTO output speed:

Engine speed  $\times$  130% = PTO output speed. Example: Engine speed of 1,000 RPM would yield the following:

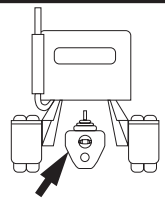

$$1,000 \times 1.3 = 1,300 \text{ RPM PTO}$$

A 7 GPM pump (like the PH1-07) would deliver a theoretical output flow of:  $\text{Disp.} \times \text{RPM} / 231$

$$1.55 \times 1,300 / 231 = 8.7 \text{ GPM}$$

\* Theoretical Flow Shown.

Speed shown for pump at 0 in.Hg. vacuum.

| RAM TRANSMISSION  |   |               |                   |          |          |   | LEFT SIDE ONLY<br>(RIGHT SIDE TURN PAGE) |   |  |   |    |
|---|---|---------------|-------------------|----------|----------|---|--|---|---|---|----|
|  | TORQUEFLITE HD<br>ZF POWERLINE<br>Footnotes (1, 2, & 3) |               |                   |          |          | ZF 8-BOLT OPENING   |  |   |   |   |    |
|   |   |               |                   |          |          | PTO DRIVE GEAR DATA:<br>51T 9.42P 20°PA 22.0° R.H.<br>LOCATION: Front      PLMF: 3.891<br>PLV: 1417 FPM      RPM: 1,000 |  |   |   |   |    |
| 8-BOLT<br>TYPE  | PTO<br>MODEL NUMBER                                     | FOOT<br>NOTES | SHAFT<br>ROTATION | ENGINE % | STUD KIT | SHIFT<br>TYPE   | SHAFT<br>EXTENSION                       | CONTINUOUS RATING<br>@ 1,000 RPM of PTO |   | INTERMITTENT RATING<br>@ 1,000 RPM of PTO |    |
|   |   |               |                   |          |          |   |  | TORQUE                                  | HP  | TORQUE                                    | HP |
| CLUTCH<br>SHIFT   | Z25-Z1113-DXTAPX  |               | Crnk              | 145      | Included | Elec/Hyd  |  | 125                                     | 24  | 125                                       | 24 |

**FOOTNOTES:**

- 1 Engine driven direct drive PTO gear.
- 2 Requires RAM wiring connection for PTO activation. Minimum engine speed for PTO use is 900 RPMs.
- 3 1¼" Round keyed shaft output only usable on 4 × 2 applications, or 4 × 4 trucks with modified transfer case.

**Pump Selection Example:**

- First you need to know the flow and pressure requirement of your application.
- Next find the closest pump output flow from the chart that is based on the most appropriate engine speed for your application. Follow the grid up to the top to read the basic pump series and size. This is the pump that will give you the flow you desire.
- If your system requires 6 GPM to operate, then you would look for 6 GPM in the columns. Finding the first one under the pump PF4-502 would give you a pump which will deliver the 6 GPM you require at an engine speed of 900 RPM. You would also get 6 GPM if you select the PF4-424 pump, but you would need to operate the engine at 1,000 RPM.
- After you have selected the Pump Series and size the complete pump model number can be ordered.

**APPROXIMATE FLOW AND PRESSURE FOR PUMP P/N PF4-\*\*\*-16ASRR PAIRED WITH PTO P/N Z25-Z1113-DX3TAPX**

| ENGINE<br>SPEED | PF4-870                       |             | PF4-818          |             | PF4-714          |             | PF4-606         |             | PF4-502          |             | PF4-424          |             | PF4-368          |             | PF4-290          |             | PF4-264          |             | PF4-212          |             | PF4-160          |             |
|-----------------|-------------------------------|-------------|------------------|-------------|------------------|-------------|-----------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|------------------|-------------|
|                 | 2.01 cu. in./Rev              |             | 1.83 cu. in./Rev |             | 1.71 cu. in./Rev |             | 1.4 cu. in./Rev |             | 1.16 cu. in./Rev |             | 0.98 cu. in./Rev |             | 0.85 cu. in./Rev |             | 0.73 cu. in./Rev |             | 0.61 cu. in./Rev |             | 0.49 cu. in./Rev |             | 0.37 cu. in./Rev |             |
|                 | GPM                           | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM             | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM              | MAX.<br>PSI | GPM              | MAX.<br>PSI |
| 900             | 11.4                          | 2,320       | 10.2             | 2,900       | 9.7              | 2,900       | 7.9             | 3,625       | 6.6              | 3,625       | 5.5              | 3,625       | 4.8              | 3,625       | 4.1              | 3,625       | 3.4              | 3,625       | 2.8              | 3,625       | 2.1              | 3,625       |
| 1,000           | 12.6                          | 2,320       | 11.5             | 2,900       | 10.7             | 2,900       | 8.8             | 3,625       | 7.3              | 3,625       | 6.2              | 3,625       | 5.3              | 3,625       | 4.6              | 3,625       | 3.8              | 3,625       | 3.1              | 3,625       | 2.3              | 3,625       |
| 1,100           | 13.9                          | 2,320       | 12.6             | 2,900       | 11.8             | 2,900       | 9.7             | 3,625       | 8.0              | 3,625       | 6.8              | 3,625       | 5.9              | 3,625       | 5.0              | 3,625       | 4.2              | 3,625       | 3.4              | 3,625       | 2.6              | 3,625       |
| 1,200           | 15.1                          | 2,320       | 13.8             | 2,900       | 12.9             | 2,900       | 10.5            | 3,625       | 8.7              | 3,625       | 7.4              | 3,625       | 6.4              | 3,625       | 5.5              | 3,625       | 4.6              | 3,625       | 3.7              | 3,625       | 2.8              | 3,625       |
| 1,300           | 16.4                          | 2,320       | 14.9             | 2,900       | 14.0             | 2,900       | 11.4            | 3,625       | 9.5              | 3,625       | 8.0              | 3,625       | 6.9              | 3,625       | 6.0              | 3,625       | 5.0              | 3,625       | 4.0              | 3,625       | 3.0              | 3,625       |
| 1,400           | 17.7                          | 2,320       | 16.1             | 2,900       | 15.0             | 2,900       | 12.3            | 3,625       | 10.2             | 3,625       | 8.6              | 3,625       | 7.5              | 3,625       | 6.4              | 3,625       | 5.4              | 3,625       | 4.3              | 3,625       | 3.3              | 3,625       |
| 1,500           | 18.9                          | 2,320       | 17.2             | 2,900       | 16.1             | 2,900       | 13.2            | 3,625       | 10.9             | 3,625       | 9.2              | 3,625       | 8.0              | 3,625       | 6.9              | 3,625       | 5.7              | 3,625       | 4.6              | 3,625       | 3.5              | 3,625       |
| 1,600           | 20.2                          | 2,320       | 18.4             | 2,900       | 17.2             | 2,900       | 14.1            | 3,625       | 11.7             | 3,625       | 9.8              | 3,625       | 8.5              | 3,625       | 7.3              | 3,625       | 6.1              | 3,625       | 4.9              | 3,625       | 3.7              | 3,625       |
| 1,700           | 21.4                          | 2,320       | 19.5             | 2,900       | 18.2             | 2,900       | 14.9            | 3,625       | 12.4             | 3,625       | 10.5             | 3,625       | 9.1              | 3,625       | 7.8              | 3,625       | 6.5              | 3,625       | 5.2              | 3,625       | 3.9              | 3,625       |
| 1,800           | <b>RPM EXCEEDS PUMP LIMIT</b> |             |                  |             |                  |             |                 |             | 13.1             | 3,625       | 11.1             | 3,625       | 9.6              | 3,625       | 8.2              | 3,625       | 6.9              | 3,625       | 5.5              | 3,625       | 4.2              | 3,625       |
| 1,900           |                               |             |                  |             |                  |             |                 |             | 13.8             | 3,625       | 11.7             | 3,625       | 10.1             | 3,625       | 8.7              | 3,625       | 7.3              | 3,625       | 5.8              | 3,625       | 4.4              | 3,625       |

**APPROXIMATE FLOW  
AND PRESSURE FOR PUMP  
P/N 24FXG-\*\*\*-D00000  
PAIRED WITH PTO P/N  
Z25-Z1113-DX3UUPX**

| ENGINE<br>SPEED | 016 |             | 025       |             |
|-----------------|-----|-------------|-----------|-------------|
|                 | GPM | MAX.<br>PSI | GPM       | MAX.<br>PSI |
|                 | 900 | 5.8 6.525   | 8.9 6.525 |             |
| 1,000           | 6.5 | 6.525       | 9.9       | 6.525       |
| 1,100           | 7.2 | 6.525       | 10.8      | 6.525       |
| 1,200           | 7.8 | 6.525       | 11.8      | 6.525       |
| 1,300           | 8.4 | 6.525       | 12.8      | 6.525       |
| 1,400           | 9.1 | 6.525       | 13.8      | 6.525       |
| 1,500           | 9.7 | 6.525       | 14.8      | 6.525       |

**PLEASE NOTE:**

If you are accustomed to ordering a hydraulic pump based on the pump model number, you may be ordering a pump larger than you require when you apply that pump to this application.

**To calculate the PTO output speed:**

Engine speed × 145% = PTO output speed. Example: Engine speed of 1,000 RPM would yield the following:

$$1,000 \times 1.45 = 1,450 \text{ RPM PTO}$$

A .98 cubic inch pump like PF4-424 would deliver a theoretical output flow of: Disp. × RPM/ 231

$$0.98 \times 1,450/231 = 6.2 \text{ GPM}$$

\* Theoretical Flow Shown.

Speed shown for pump at 0 in.Hg. vacuum.