

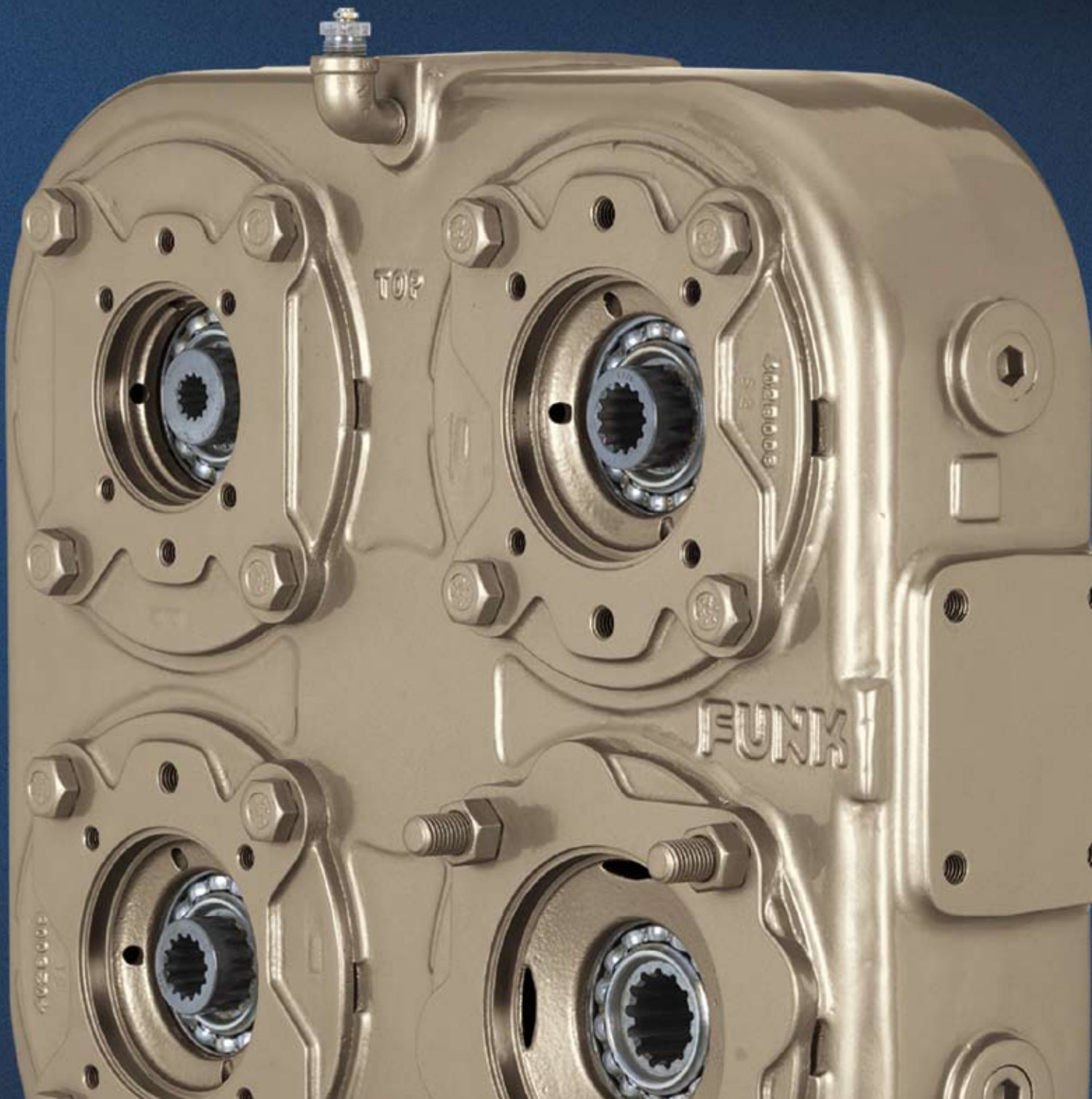
# Funk Modular Pump Drives

Selection Guide



JOHN DEERE

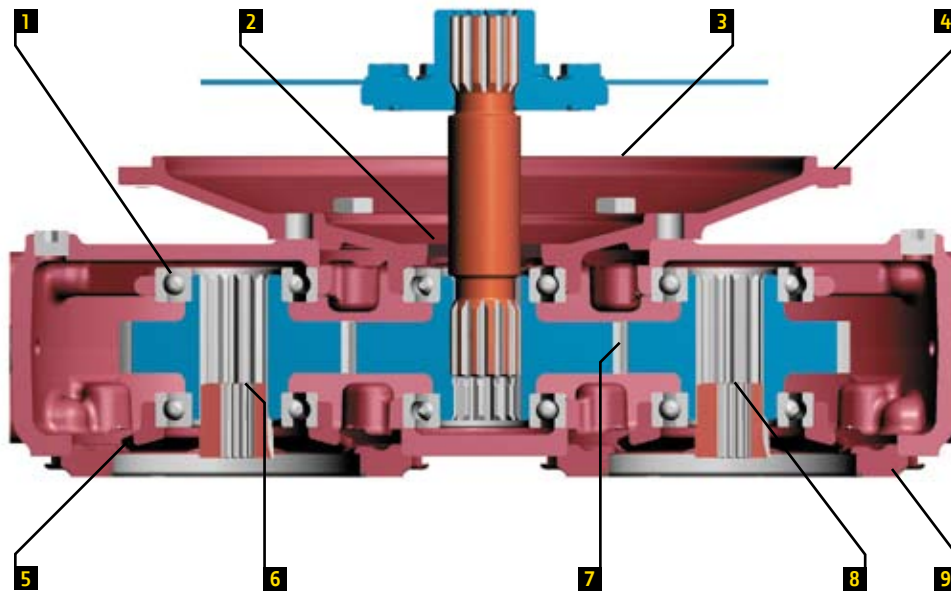
The simplest solutions  
are also the most reliable



# Built stronger and smarter from the inside out

## Modular hydraulic pump drives

When you look inside a Funk hydraulic pump drive, you are seeing the result of over 50 years of off-highway power transmission experience. This knowledge led to advancements including the development of the first modular hydraulic pump drive design. Our modular approach gives you a choice of gear ratios, pump adapters, mounting options, and more. With over 5,000 option combinations, we can provide a pump drive that meets your configuration, reliability, and durability needs. Add up all the advantages, and it is easy to see why Funk pump drives are number one.



**1 Ball bearings** include a built-in oil reservoir in the outer race to provide uninterrupted lubrication.

**2 Viton® shaft seals** provide long life in high-temperature applications.

**3 Engine housing adapters** are available for a variety of flywheel sizes.

**4 Cast iron housings** are built to withstand hard use in tough applications.

**5 Dedicated pathways** provide lubrication to bearings and splines.

**6 Internal spline adapters** make it quick and easy to configure pump drives to a variety of applications.

**7 High quality spur gears** provide quiet operation and allow the use of ball bearings.

**8 Wet splines** provide a long, trouble-free life.

**9 Pump adapter plates** can be easily changed for use with different pump sizes.

# Introduction

## Perfect fit

With more than 5,000 pump drive configurations up to 950 hp (708 kW), we are sure to have the pump drive that meets your needs. Our application engineers provide support to help you choose the best pump drive for your application.

## High quality

We use the latest manufacturing technology to ensure we deliver the highest quality products to you.

## Fast service

Whether you need a new pump drive or service support on an existing drive, our modular assembly system and experienced regional distribution network lets us get you what you need fast.

## Integration support

Getting the most out of your equipment depends on close integration between all components. Our application experts can help integrate your entire system from the engine to the pump drives, powershift transmissions, HMD transmissions, planetary drives, and inboard planetary axles.

|  |         |
|--|---------|
| Pump drive selection procedure.....                | 4       |
| Service factors .....                              | 5       |
| Clutch capacities .....                            | 5       |
| Series 28000 .....                                 | 6 – 17  |
| 360 hp* (268 kW) max input power                   |         |
| – 750 lb-ft* (1017 Nm) max input torque            |         |
| – 1, 2, or 3 pump drives                           |         |
| – A, B, C, or D available SAE pump sizes           |         |
| Series 59000 .....                                 | 18 – 27 |
| 700 hp* (522 kW) max input power                   |         |
| – 1250 lb-ft* (1694 Nm) max input torque           |         |
| – 2, 3, or 4 pump drives                           |         |
| – A, B, C, or D available SAE pump sizes           |         |
| Series 56000 .....                                 | 28 – 39 |
| 950 hp* (708 kW) max input power                   |         |
| – 2000 lb-ft* (2712 Nm) max input torque           |         |
| – 2, 3, 4, or 5 pump drives                        |         |
| – D, E, or F available SAE pump sizes              |         |
| Series 57000 .....                                 | 40 – 45 |
| 950 hp (708 kW) max input power                    |         |
| – 2000 lb-ft* (2712 Nm) max input torque           |         |
| – 4 pump drives – 14 in and 16 in centers          |         |
| – C, D, or E available SAE pump sizes              |         |
| SAE engine flywheel and housing standard .....     | 46 – 47 |
| Formulas .....                                     | 48 – 49 |
| SAE hydraulic pump and motor drive standards ..... | 50      |

\* Ratings may vary depending upon application and service. Application and installation are subject to review by John Deere.

# Pump drive selection procedure

The performance and reliability of a hydraulic pump drive is directly related to the proper selection of the pump drive series and options. Follow the steps below to determine the options required for your application.

Selection of the proper pump drive series can be accomplished by using either the “torque method” or “power method” described below.

## Torque method

1. Determine the net peak torque (lb-ft, or Nm) transmitted to the pump drive from the prime mover. Remember to deduct any continuous parasitic losses.
2. Determine the maximum pump drive input torque (lb-ft, or Nm) required to drive the hydraulic pumps attached to the pump drive. Be sure to consider the pump drive ratio.
3. Using the lesser of the torque values calculated above, select a pump drive series with a maximum input torque capacity that exceeds the torque required for the application.

## Power method

1. Determine the net peak power (hp or kW) transmitted to the pump drive from the prime mover.
2. Determine the equivalent power (hp or kW) by multiplying the net peak power by the appropriate service factor for the application. A list of service factors are found on the table on page 5.
3. Using the equivalent power calculated above, select the proper pump drive series with a maximum input power capacity that exceeds the equivalent power for the application.

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## Additional steps required for determining the proper pump drive configuration:

4. Determine the number of pump pads required by making a selection from the models available within the pump drive series. Be sure to take into consideration the maximum output torque rating per pad, and the center distance between the mounting pads for clearance of the pumps and their hydraulic plumbing.
5. Select a gear ratio from the options available for the selected model which will provide the desired pump speed and flow. Be sure to consider the maximum recommended speed for both the pump drive series and the hydraulic pumps being used.
6. Select the desired input configuration from the available options for the pump drive series:
  - Engine mounted — drive plate or torsional coupling driven
  - Engine mounted — clutch-driven (consider clutch limiting speeds and torque capacity)
  - Remote mounted
7. Select the desired output configurations from the available options for the pump drive series:
  - Pump adapter plates
  - Pump shaft adapter sleeves (if required)
  - Drive shaft or PTO options
8. After the pump drive configuration has been determined, your John Deere Power Systems distributor can assist you in reviewing the application to determine if it will meet your expectations for service life based on the duty cycle provided.

# Service factors

| Service factors                                   |   |         |                |             |
|---|---|---------|----------------|-------------|
| Prime mover                                       | Duration of service                       | Uniform | Moderate shock | Heavy shock |
| Electric motor, steam turbine, or hydraulic motor | Occasional 1/2 hr. per day                | 0.50    | 0.80           | 1.25        |
|   | Intermittent 3 hr. per day                | 0.80    | 1.00           | 1.50        |
|   | Over 3 hr. up to and incl. 10 hr. per day | 1.00    | 1.25           | 1.75        |
|   | Over 10 hr. per day                       | 1.25    | 1.50           | 2.00        |
| Multi-cylinder internal combustion engine         | Occasional 1/2 hr. per day                | 0.80    | 1.00           | 1.50        |
|   | Intermittent 3 hr. per day                | 1.00    | 1.25           | 1.75        |
|   | Over 3 hr. up to and incl. 10 hr. per day | 1.25    | 1.50           | 2.00        |
|   | Over 10 hr. per day                       | 1.50    | 1.75           | 2.25        |
| Single cylinder internal combustion engine        | Occasional 1/2 hr. per day                | 1.00    | 1.25           | 1.75        |
|   | Intermittent 3 hr. per day                | 1.25    | 1.50           | 2.00        |
|   | Over 3 hr. up to and incl. 10 hr. per day | 1.50    | 1.75           | 2.25        |
|   | Over 10 hr. per day                       | 1.75    | 2.00           | 2.50        |

# Clutch capacities

| Operating speeds and working torque |                                 |                           |
|-------------------------------------|---------------------------------|---------------------------|
| Clutch model                        | Max. safe operating speed (rpm) | Working torque lb-ft (Nm) |
| C-110                               | 3100                            | 328 (444.4)               |
| C-111                               | 2850                            | 387 (524.4)               |
| SP-211                              | 2850                            | 910 (1233.1)              |
| SP-214                              | 2400                            | 1620 (2195.1)             |

## Important notice

The presence of torsional resonant frequencies in the system can cause damage to components in the drivetrain.

The assembler of the drive and driven equipment is responsible for ensuring that damaging torsional resonant frequencies are not present in the system.

Torsional vibration analysis can be made by the engine manufacturer, torsional coupling supplier, and independent consultants. John Deere is prepared to supply the torsional data relating to the pump drive components and assist in evaluation of analyses in order to prevent damage to transmissions designed and manufactured by John Deere.

# Series 28000 single direct drive

## Ratings

|              |                  |
|--------------|------------------|
| Input torque | Clutch-dependent |
| Input speed  | Clutch-dependent |

## Pump rotation

Enginewise

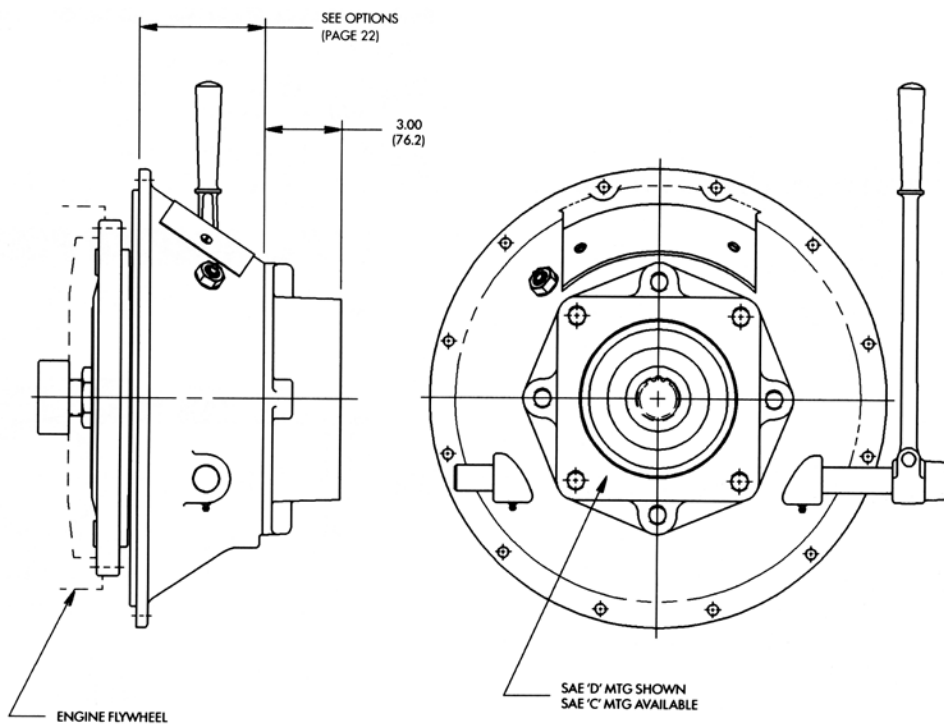
## Approximate weight

|     |                |
|-----|----------------|
| 28T | 120 lb (55 kg) |
|-----|----------------|

## Option selections

Refer to pages 20 – 21.

28T



## Ratings

|                  |                    |
|------------------|--------------------|
| Max input torque | 650 lb-ft (880 Nm) |
| Input speed      | As required        |
| Max power        | 360 hp (268 kW)    |

## Pump rotation

Enginewise

## Approximate weight

|       |               |
|-------|---------------|
| 28105 | 50 lb (23 kg) |
|-------|---------------|

## Option selections

Refer to pages 20 – 21.

## Ratings

|                  |                    |
|------------------|--------------------|
| Max input torque | 500 lb-ft (678 Nm) |
| Input speed      | As required        |
| Max power        | 250 hp (186 kW)    |

## Pump rotation

Enginewise

## Approximate weight

|       |               |
|-------|---------------|
| 281FC | 35 lb (16 kg) |
|-------|---------------|

## Flywheel covers

SAE sizes 2, 3, or 4

## Pump adaptations

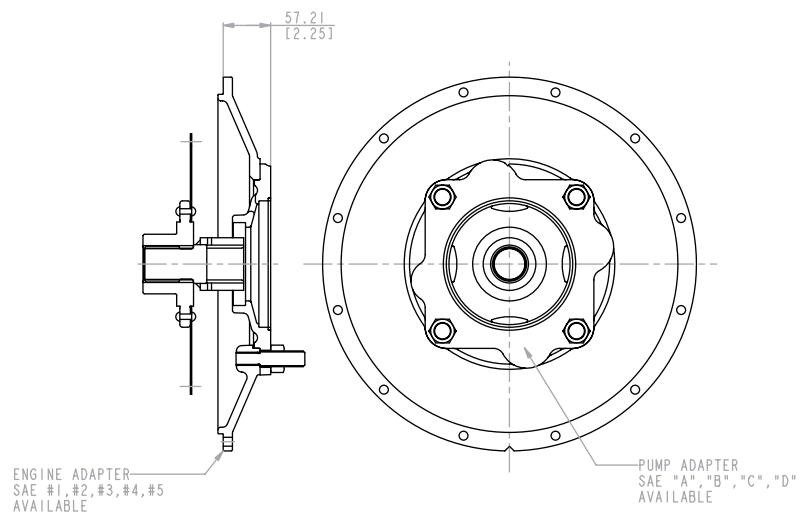
SAE sizes B, BB, C, or D

## Drive flange sizes

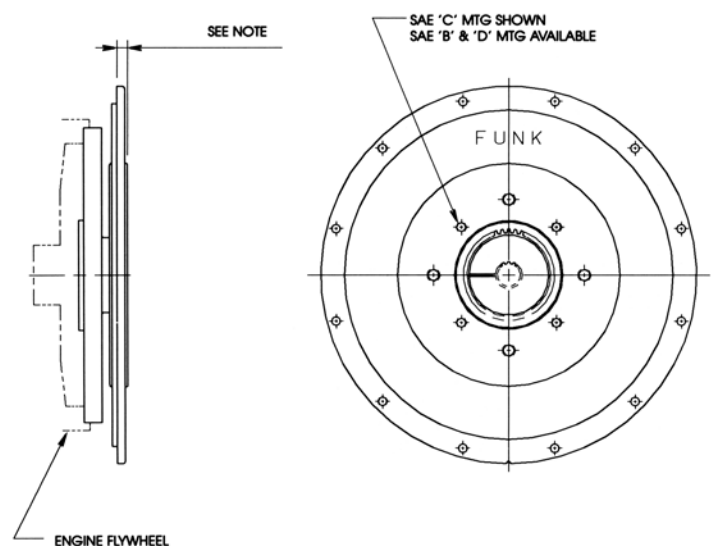
Nominal clutch size

10 in (254.0 mm) or 11-1/2 in (292.1 mm)

28105 mm (in)



281FC (flex coupling)



Note:

0.38 (9.6) – SAE 4

0.5 (12.7) – SAE 2 and 3

Refer to pages 20 – 21 for other dimensions.

# Series 28000 single

## Ratings

|                           |                    |
|---------------------------|--------------------|
| Max input torque          | 575 lb-ft (780 Nm) |
| Max output torque         | 575 lb-ft (780 Nm) |
| Max input or output speed | 3000 rpm           |
| Max input power           | 325 hp (242 kW)    |
| Max output power          | 325 hp (242 kW)    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

## Approximate weight

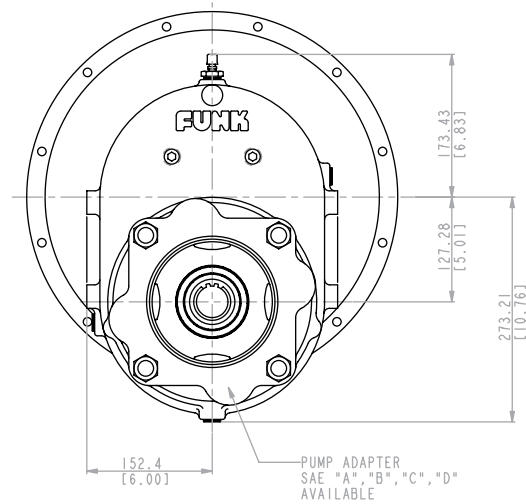
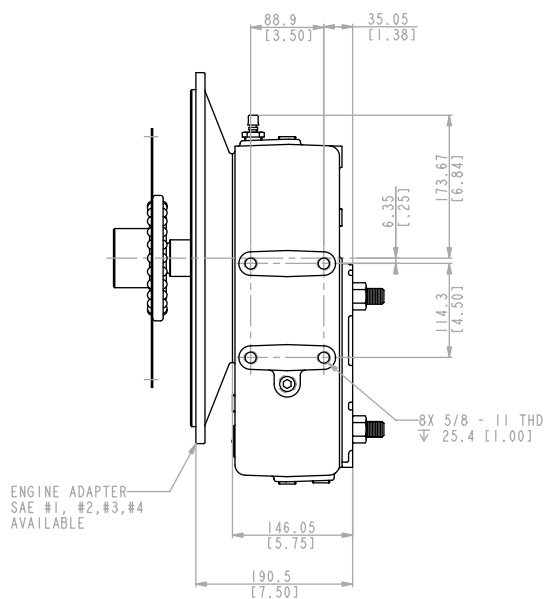
|       |                |
|-------|----------------|
| 28101 | 120 lb (55 kg) |
| 28103 | 110 lb (50 kg) |
| 28275 | 175 lb (80 kg) |

## Option selections

Refer to pages 20 – 21.

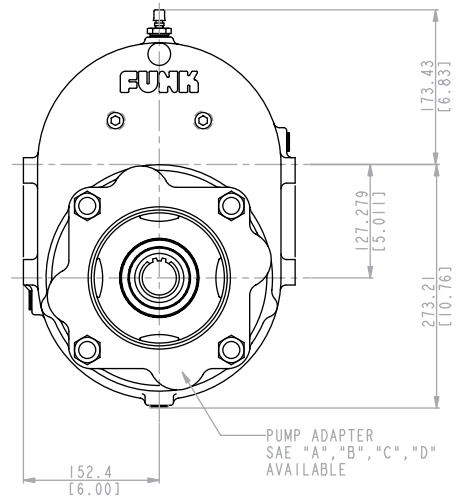
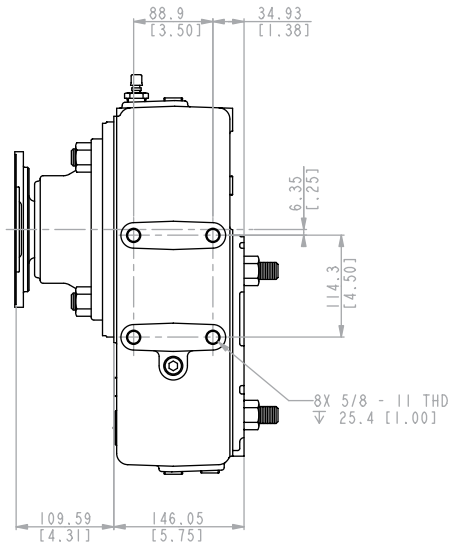
28101

28101X

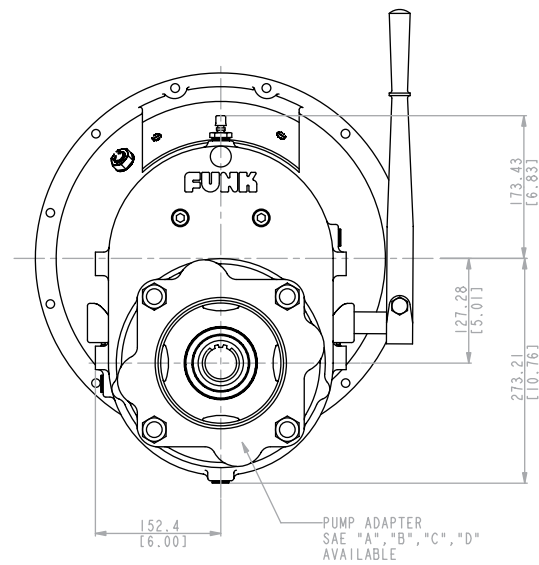
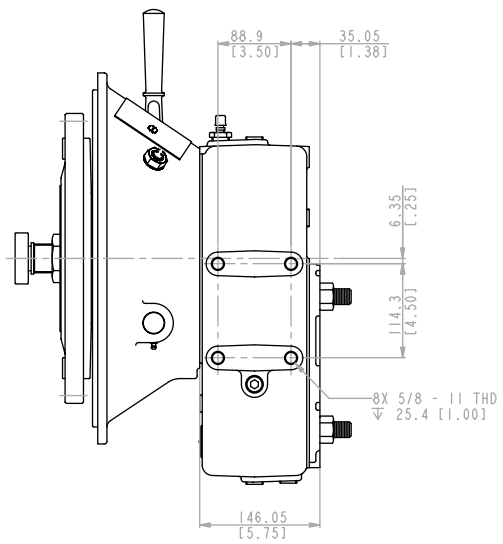




28103



28275



# Series 28000 double 127 mm (5 in) gear centers

## Ratings

|                           |                              |
|---------------------------|------------------------------|
| Max input torque          | 650 lb-ft (881 Nm)           |
| Max output torque         | 575 lb-ft (780 Nm)           |
| Max input or output speed | 3000 rpm                     |
| Max input power           | 360 hp (268 kW)              |
| Max output power          | 325 hp (242 kW) per pump pad |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

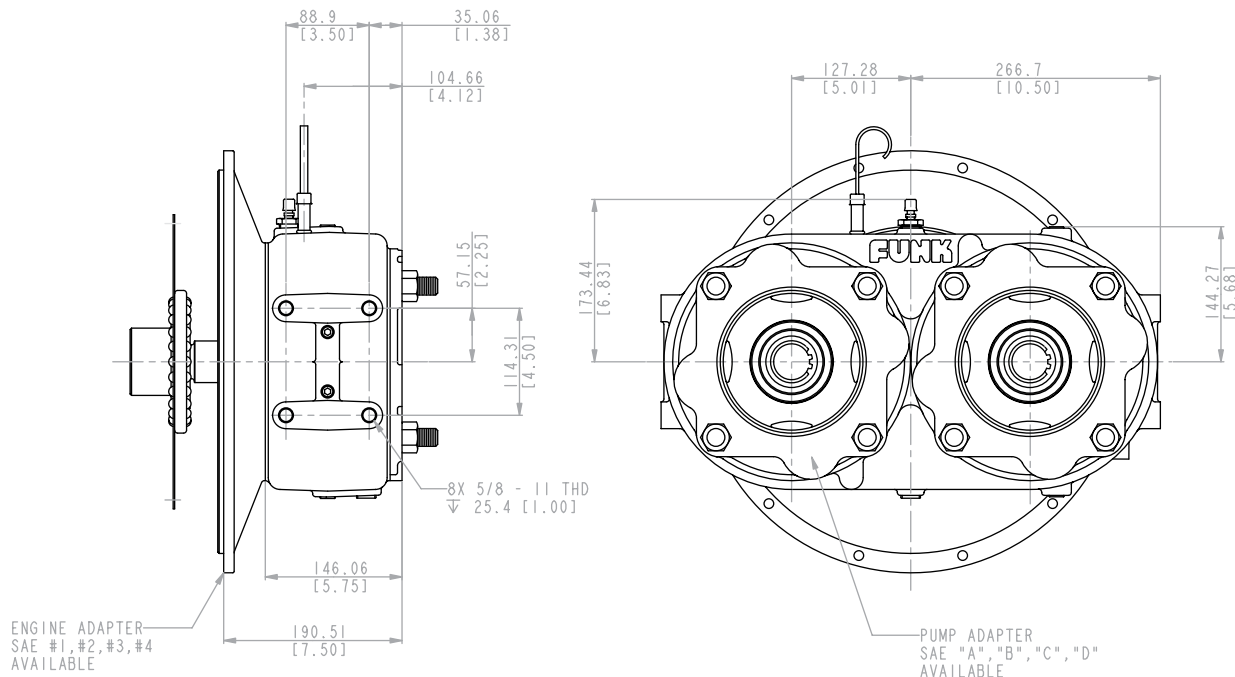
## Approximate weight

|       |                |
|-------|----------------|
| 28102 | 160 lb (73 kg) |
| 28104 | 150 lb (68 kg) |
| 28180 | 215 lb (98 kg) |

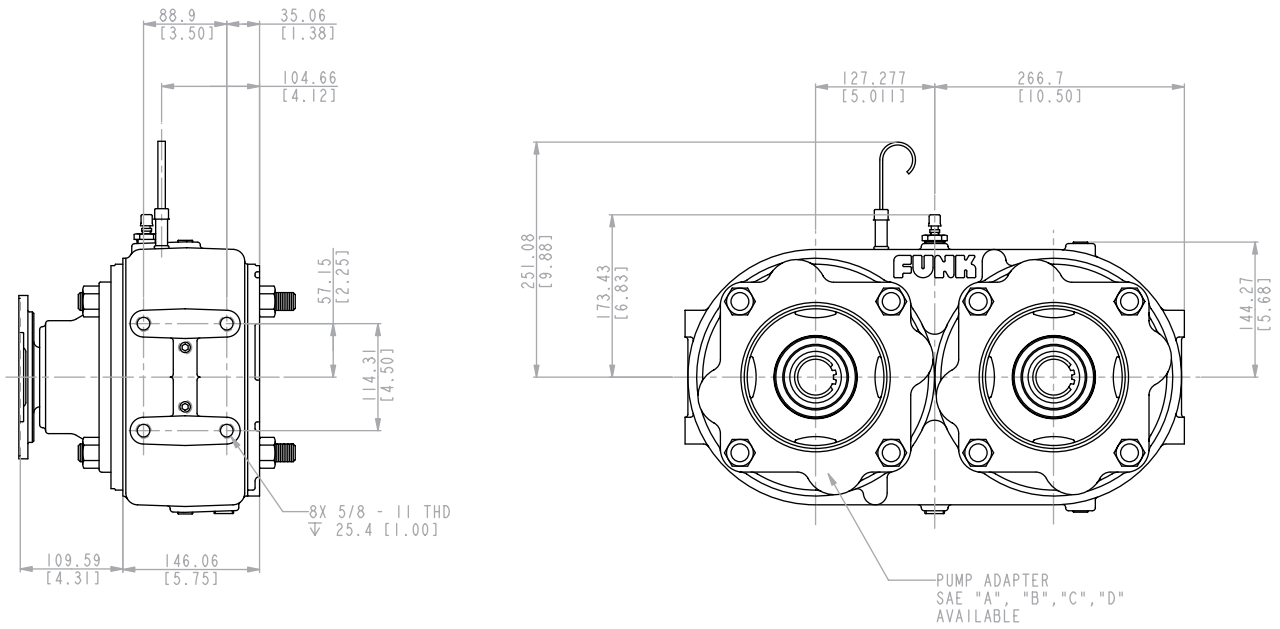
## Option selections

Refer to pages 20 – 21.

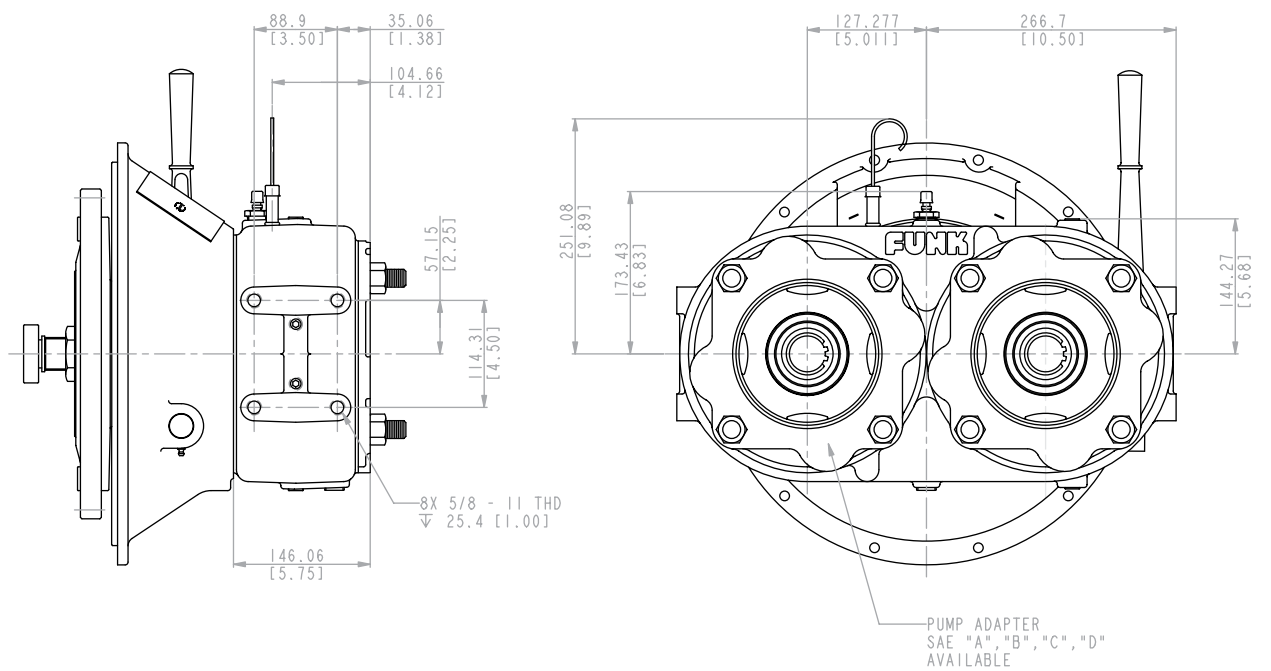
### 28102



28104



28180



# Series 28000 double 152.7 mm (6 in) gear centers

## Ratings

|                           |                                 |
|---------------------------|---------------------------------|
| Max input torque          | 750 lb-ft (1017 Nm)             |
| Max output torque         | 650 lb-ft (881 Nm) per pump pad |
| Max input or output speed | 3000 rpm                        |
| Max input power           | 360 hp (268 kW)                 |
| Max output power          | 360 hp (268 kW) per pump pad    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

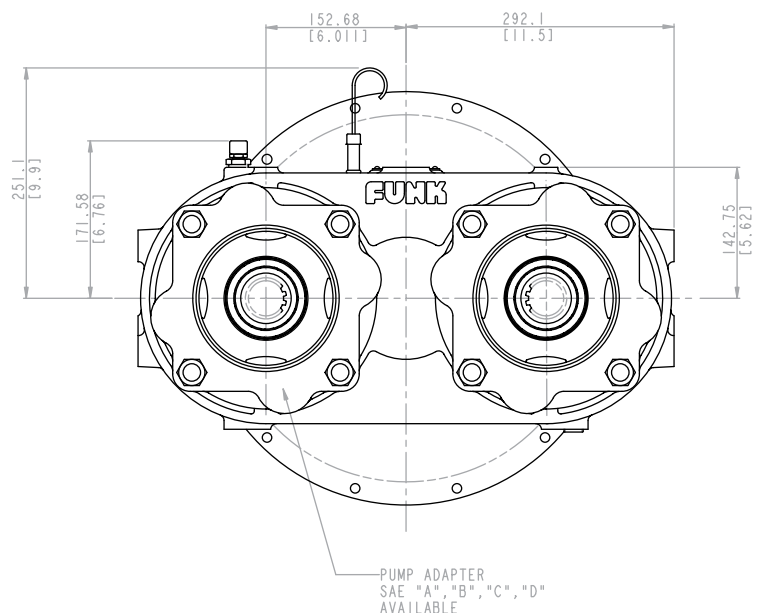
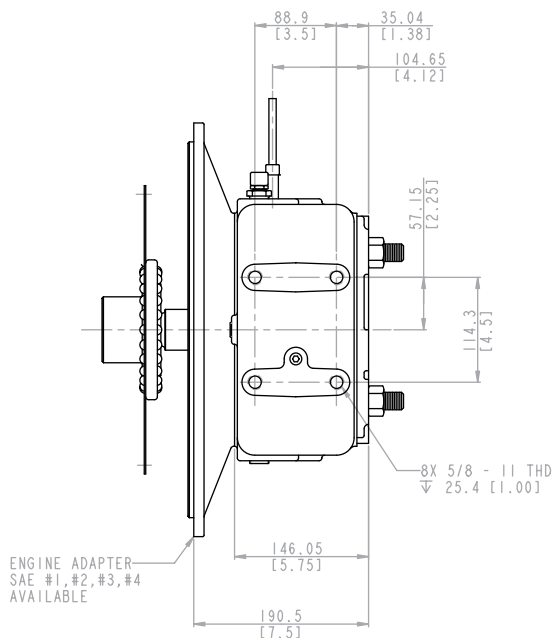
## Approximate weight

|         |                 |
|---------|-----------------|
| 2826XXP | 175 lb (80 kg)  |
| 2826XR  | 165 lb (75 kg)  |
| 2826XXC | 230 lb (105 kg) |

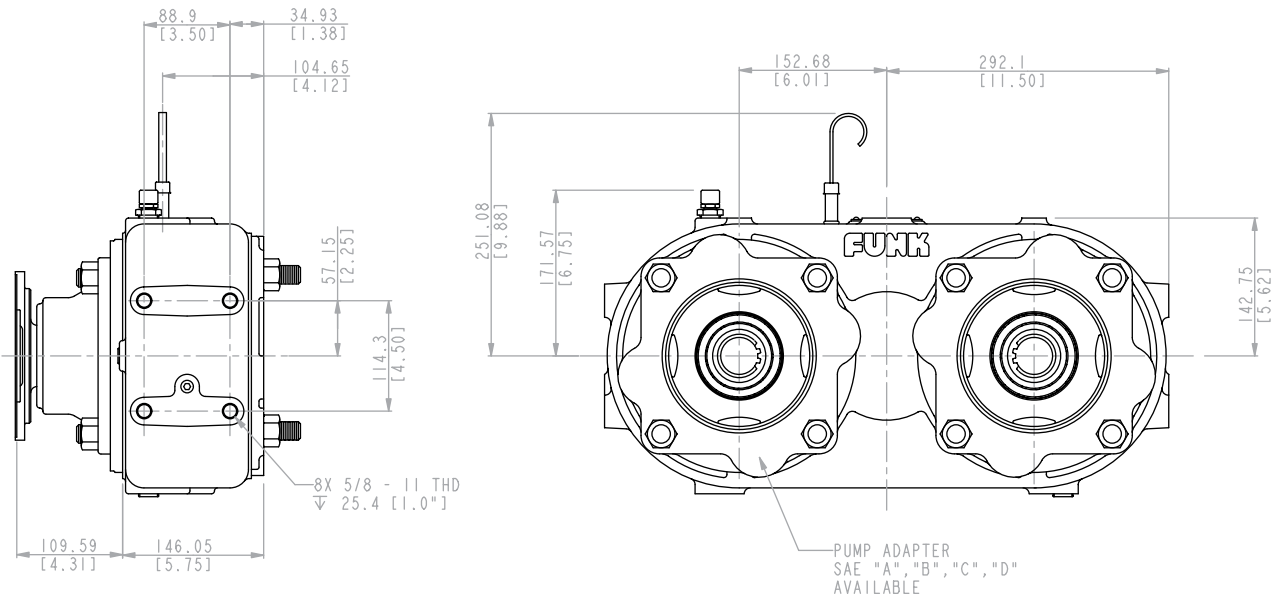
## Option selections

Refer to pages 20 – 21.

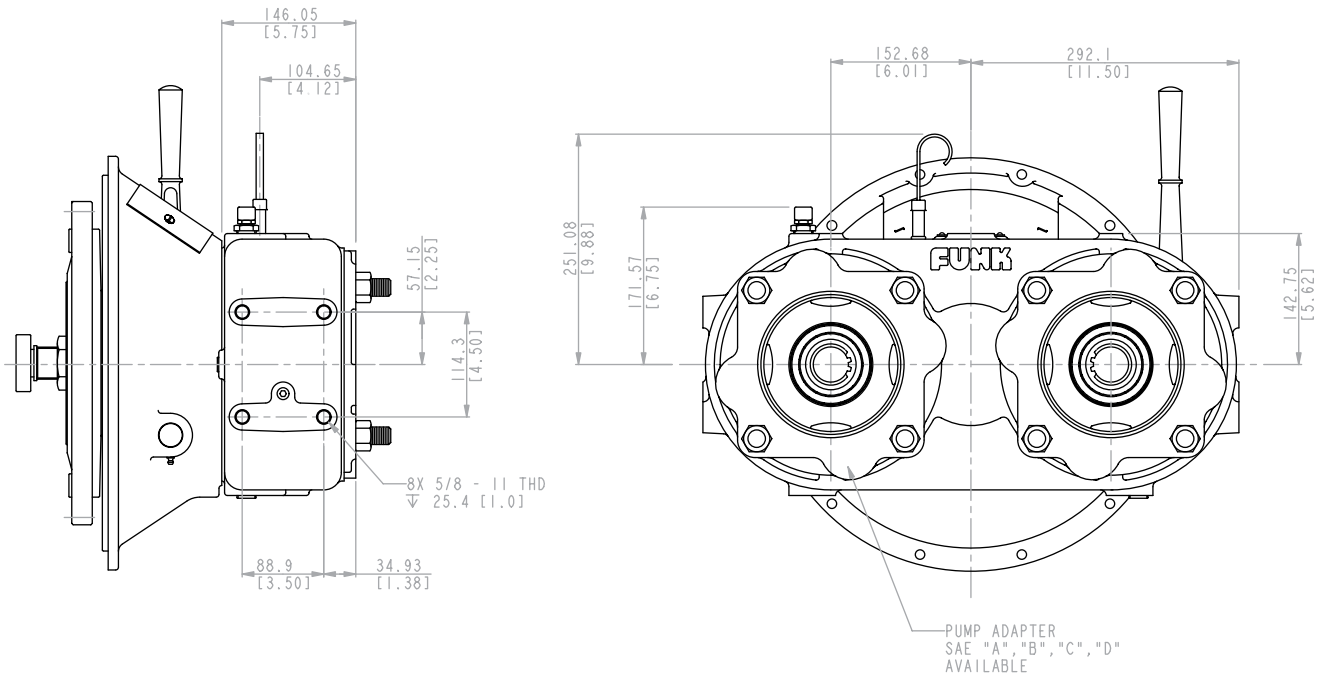
### 2826XXP



2826XR



2826XXC



# Series 28000 triple

## Ratings

|                           |                                 |
|---------------------------|---------------------------------|
| Max input torque          | 750 lb-ft (1017 Nm)             |
| Max output torque         | 650 lb-ft (881 Nm) per pump pad |
| Max input or output speed | 3000 rpm                        |
| Max input power           | 360 hp (268 kW)                 |
| Max output power          | 360 hp (268 kW) per pump pad    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

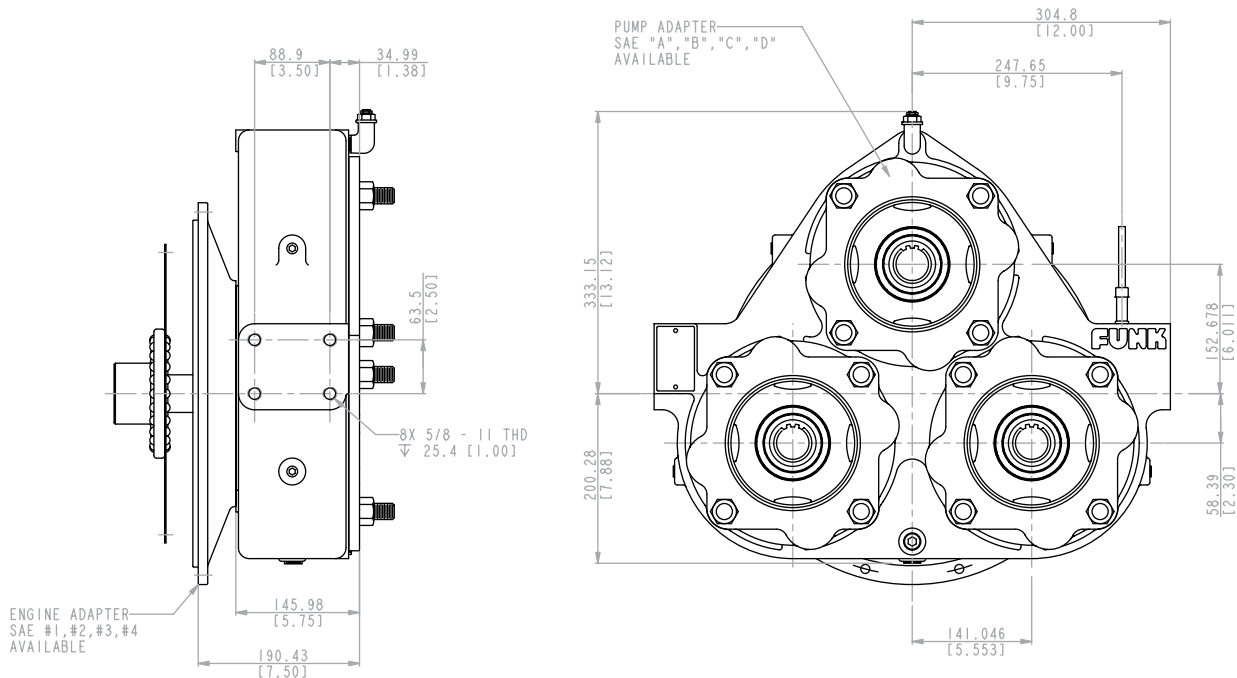
## Approximate weight

|       |                 |
|-------|-----------------|
| 28211 | 220 lb (100 kg) |
| 28212 | 210 lb (96 kg)  |
| 28213 | 275 lb (125 kg) |

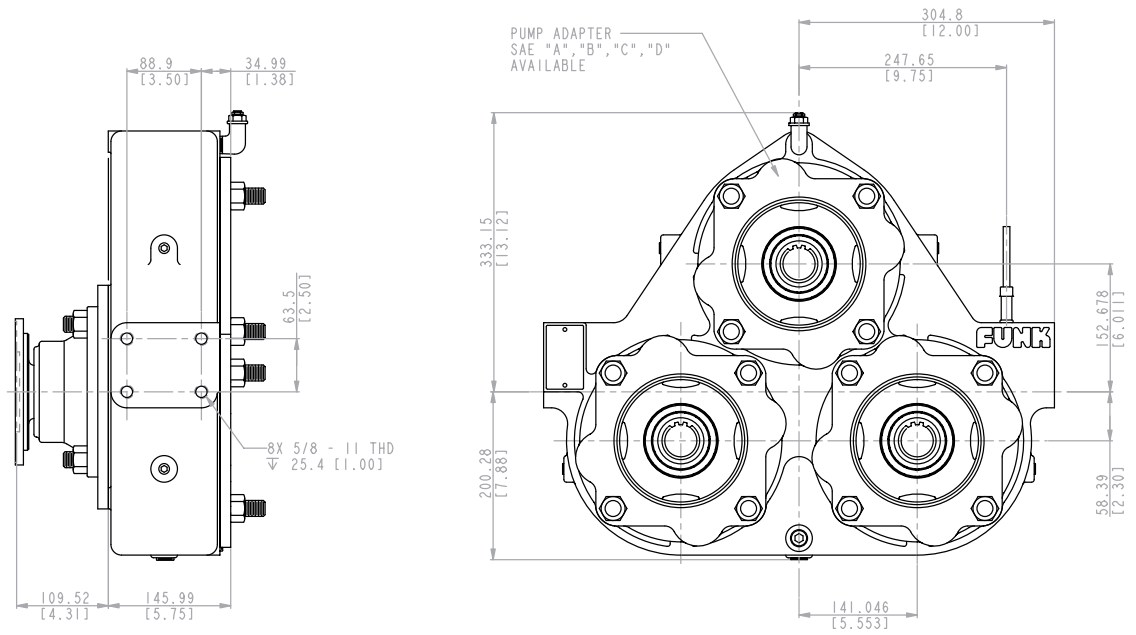
## Option selections

Refer to pages 20 – 21.

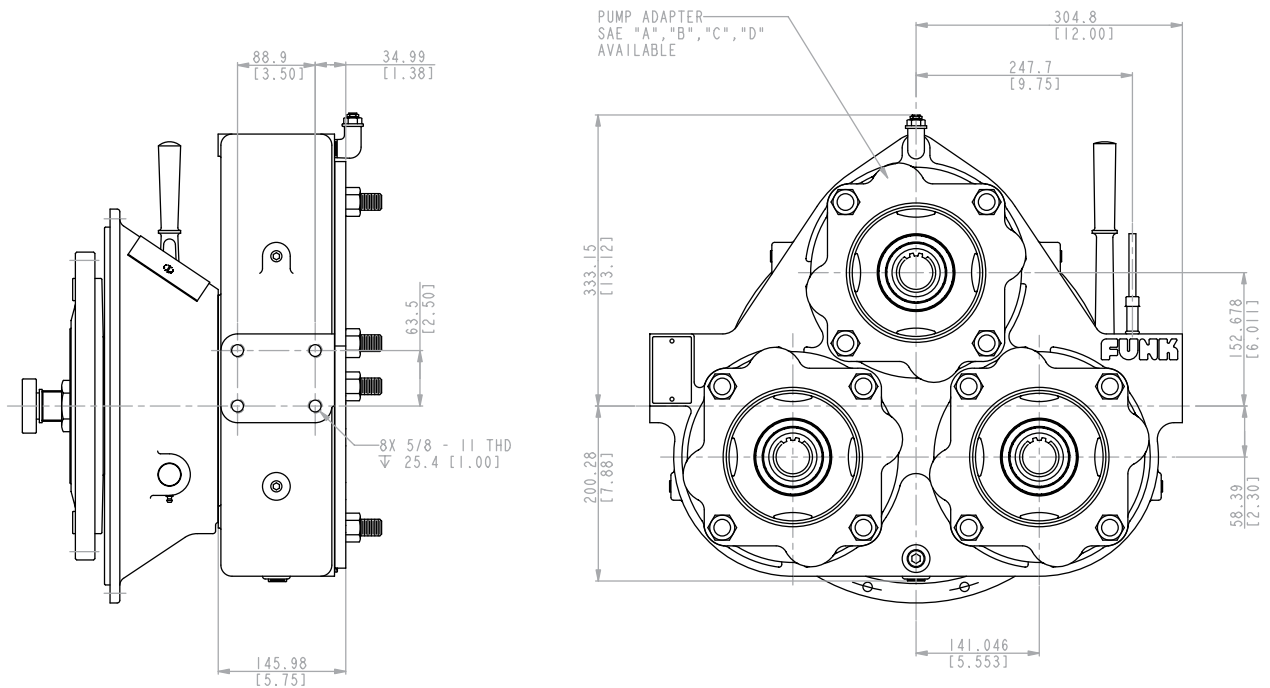
28211



28212



28213



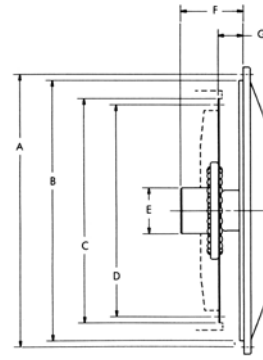
# Series 28000 option selections

## Input

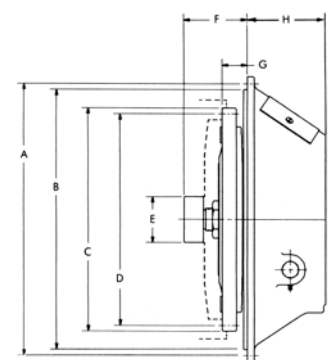
| Flywheel cover housing in (mm) |                |                |                   |
|--------------------------------|----------------|----------------|-------------------|
| SAE size                       | A dimension    | B dimension    | Bolts required    |
| 1 <sup>4</sup>                 | 20.875 (530.2) | 20.125 (511.2) | 12-7/16 (11.1)-14 |
| 2                              | 18.375 (466.7) | 17.625 (447.7) | 12-3/8 (9.5)-16   |
| 3                              | 16.875 (428.6) | 16.125 (409.6) | 12-3/8 (9.5)-16   |
| 4                              | 15.000 (381.0) | 14.250 (362.0) | 12-3/8 (9.5)-16   |
| 5 <sup>1</sup>                 | 13.125 (333.4) | 12.375 (314.3) | 8-3/8 (9.5)-16    |

<sup>1</sup> Available on 28105 only.

Plate-driven



Clutch-driven



| Clutch cover housing in (mm) |                |                |               |                  |
|------------------------------|----------------|----------------|---------------|------------------|
| SAE size                     | A dimension    | B dimension    | H dimension   | Bolts required   |
| 1 <sup>3</sup>               | 20.875 (530.2) | 20.125 (511.2) | 9.625 (244.5) | 12-7/16(11.1)-14 |
| 2                            | 18.375 (466.7) | 17.625 (447.7) | 4.875 (123.8) | 12-3/8 (9.5)-16  |
| 2 <sup>3</sup>               | 18.375 (466.7) | 17.625 (447.7) | 9.625 (244.5) | 12-3/8 (9.5)-16  |
| 3                            | 16.875 (428.6) | 16.125 (409.6) | 4.875 (123.8) | 12-3/8 (9.5)-16  |
| 3 <sup>3</sup>               | 16.875 (428.6) | 16.125 (409.6) | 9.625 (244.5) | 12-3/8 (9.5)-16  |
| 4                            | 15.000 (381.0) | 14.250 (362.0) | 4.875 (123.8) | 12-3/8 (9.5)-16  |

<sup>3</sup> SP-211 only.

<sup>4</sup> Not available on 28T.

| Drive plate assembly in (mm) |                |                |                            |              |                            |       |              |
|------------------------------|----------------|----------------|----------------------------|--------------|----------------------------|-------|--------------|
| Nominal flywheel size        | C dimension    | D dimension    | E dimension                | F dimension  | G dimension                | Holes | Hole size    |
| 8 (203.2)                    | 10.375 (263.5) | 9.625 (244.5)  | 2.04 (51.8) or 2.44 (62.0) | 3.94 (100.0) | 2.44 (62.0)                | 6     | 13/32 (10.3) |
| 10 (254.0)                   | 12.375 (314.3) | 11.625 (295.3) | 2.44 (62.0) or 2.83 (71.9) | 3.94 (100.0) | 2.12 (53.8)                | 8     | 13/32 (10.3) |
| 11-1/2 (292.1)               | 13.875 (352.4) | 13.125 (333.4) | 2.44 (62.0) or 2.83 (71.9) | 3.94 (100.0) | 1.56 (39.6) or 2.12 (53.8) | 8     | 13/32 (10.3) |
| 14 (355.6)                   | 18.375 (466.7) | 17.250 (438.2) | 2.83 (71.9) or 3.15 (80.0) | 3.94 (100.0) | 1.00 (25.4)                | 8     | 17/32 (13.5) |

| Pump drive clutch data in (mm) |            |                       |                |                |                             |              |                            |       |              |
|--------------------------------|------------|-----------------------|----------------|----------------|-----------------------------|--------------|----------------------------|-------|--------------|
| Nominal clutch size            | Clutch no. | Working torque        | C dimension    | D dimension    | E dimension (pilot bearing) | F dimension  | G dimension                | Holes | Hole size    |
| 10 (254)                       | C-110      | 328 lb-ft (444.4 Nm)  | 12.375 (314.3) | 11.625 (295.3) | 2.83 (72.0) or 2.44 (62.0)  | 3.94 (100.0) | 2.12 (53.8)                | 8     | 13/32 (10.3) |
| 11-1/2 (292.1)                 | C-111      | 387 lb-ft (524.4 Nm)  | 13.875 (352.4) | 13.125 (333.4) | 2.83 (72.0) or 2.44 (62.0)  | 3.94 (100.0) | 1.56 (39.6) or 2.12 (53.8) | 8     | 13/32 (10.3) |
| 11-1/2 (292.1)                 | SP-211     | 910 lb-ft (1233.1 Nm) | 13.875 (352.4) | 13.125 (333.4) | 2.83 (72.0) or 2.44 (62.0)  | 3.94 (100.0) | 1.56 (39.6) or 2.12 (53.8) | 8     | 13/32 (10.3) |



## Gear ratios

### 28000 single and double

5 in (127 mm)

.628:1 .71:1 .89:1 1:1 1.12:1 1.41:1 1.592:1

### 28000 triple and double

6 in (152 mm)

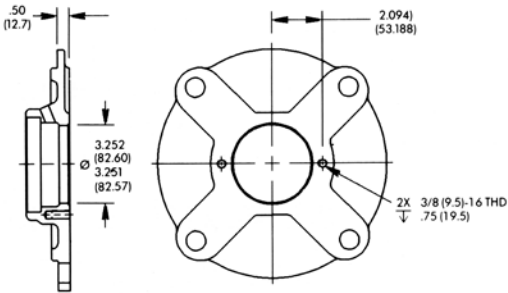
.647:1 .714:1 .826:1 .867:1 .909:1 1:1 1.10:1

1.27:1 1.40:1

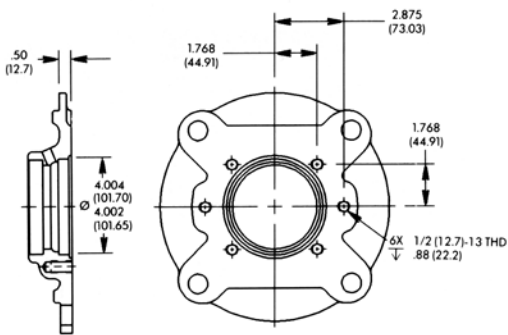
## Pump adapter plates

These pump adapter plates are available for Series 28000 (except 28T) models.

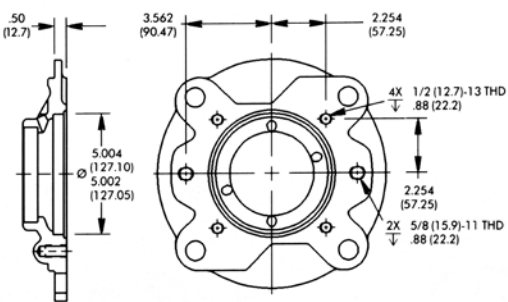
### SAE A



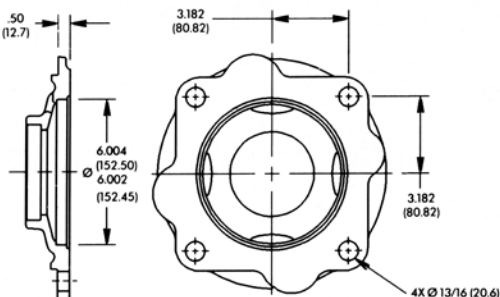
### SAE B



### SAE C

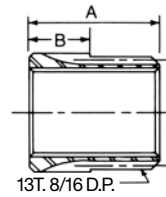


### SAE D



## Spline adapter

Specifications in (mm)



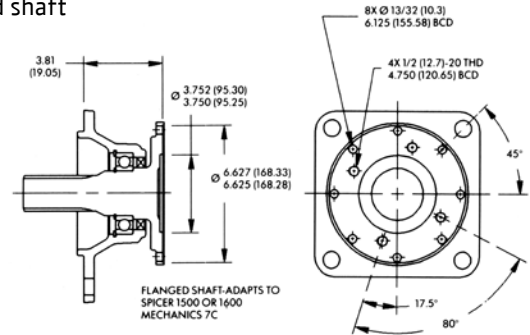
## Output

### Pump adapter sleeves in (mm)

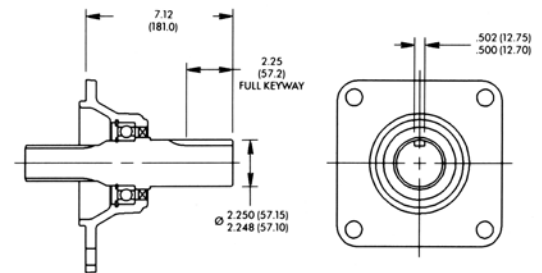
| SAE size | A dimension | B dimension | Internal spline            |
|----------|-------------|-------------|----------------------------|
| B        | 1.81 (46.0) | .75 (19.1)  | 7/8 (22.2)-13T. 16/32 P.   |
| C        | 2.00 (50.8) | .94 (23.9)  | 1-1/4 (31.8)-14T. 12/24 P. |
|          | 1.87 (47.5) | .81 (20.6)  | 1-1/4 (31.8)-14T. 12/24 P. |
|          | 2.00 (50.8) | .94 (23.9)  | 1-3/8 (34.9)-21T. 16/32 P. |
| BB       | 2.00 (50.8) | .94 (23.9)  | 1 (25.4)-15T. 16/32 P.     |

### Input or output drive assemblies in (mm)

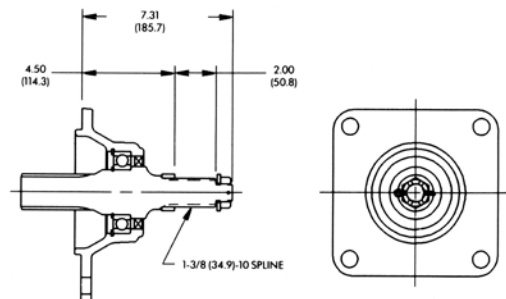
#### Flanged shaft



#### 2-1/4 (57.2) Diameter keyed shaft



#### 1-3/8 (34.9)-10 Straight-side splined shaft



# Series 59000 double

## Ratings

|                           |                                 |
|---------------------------|---------------------------------|
| Max input torque          | 1250 lb-ft (1695 Nm)            |
| Max output torque         | 650 lb-ft (881 Nm) per pump pad |
| Max input or output speed | 3000 rpm                        |
| Max input power           | 700 hp (522 kW)                 |
| Max output power          | 360 hp (268 kW) per pump pad    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

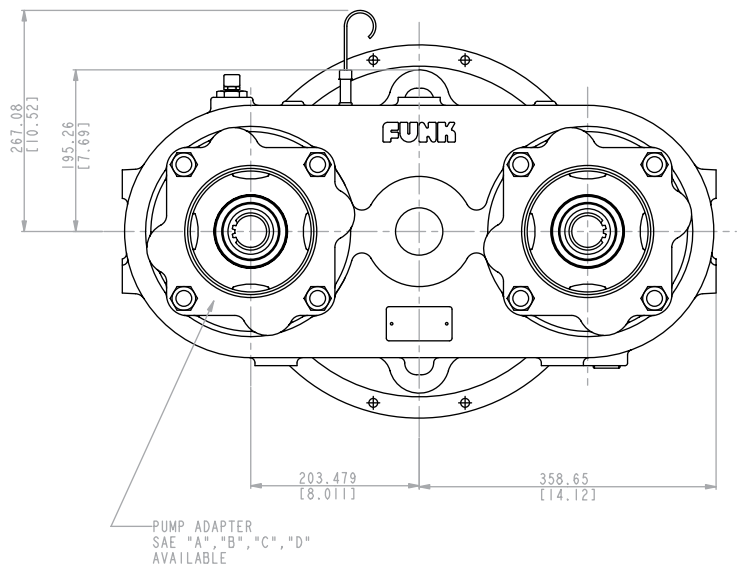
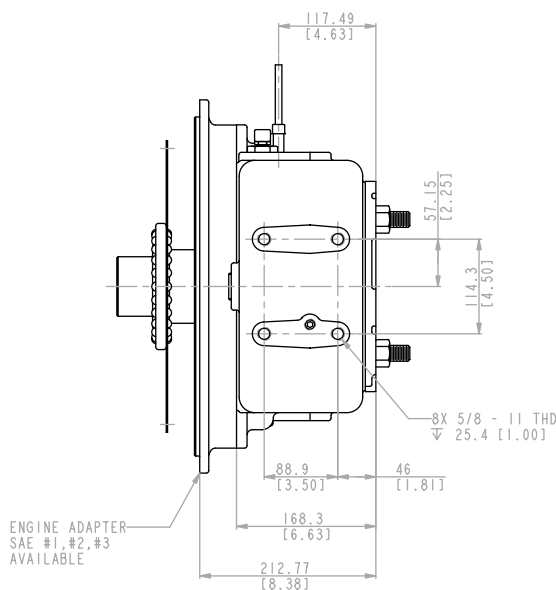
## Approximate weight

|         |                 |
|---------|-----------------|
| 5928XXP | 240 lb (109 kg) |
| 5928XR  | 215 lb (98 kg)  |
| 5928XXC | 320 lb (145 kg) |

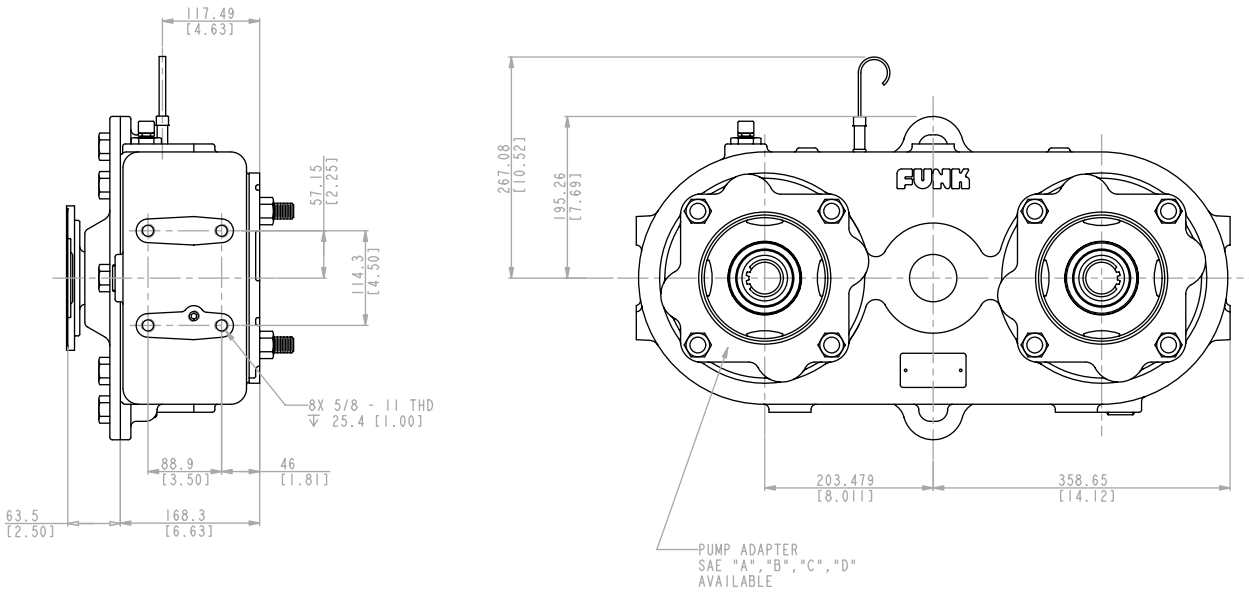
## Option selections

Refer to pages 30 – 31.

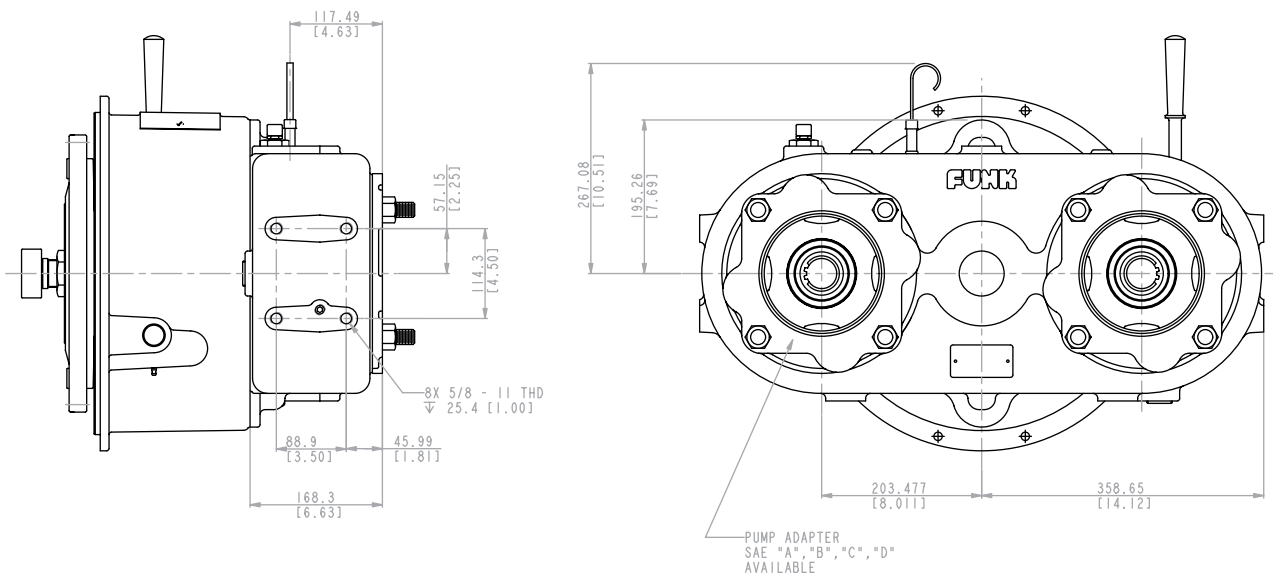
### 5928XXP



5928XR



5928XXC



# Series 59000 triple

## Ratings

|                           |                                 |
|---------------------------|---------------------------------|
| Max input torque          | 1250 lb-ft (1695 Nm)            |
| Max output torque         | 650 lb-ft (881 Nm) per pump pad |
| Max input or output speed | 3000 rpm                        |
| Max input power           | 700 hp (522 kW)                 |
| Max output power          | 360 hp (268 kW) per pump pad    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

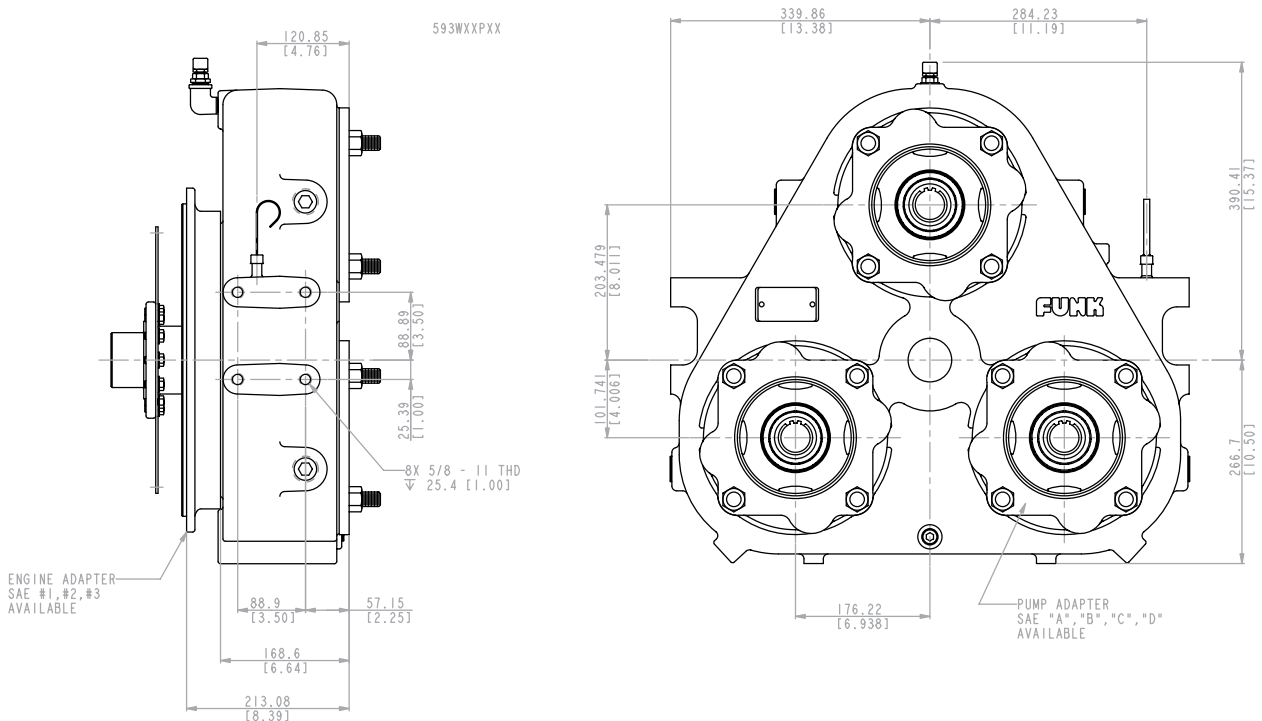
## Approximate weight

|         |                 |
|---------|-----------------|
| 593WXXP | 290 lb (132 kg) |
| 593WXR  | 265 lb (120 kg) |
| 593WXXC | 370 lb (168 kg) |

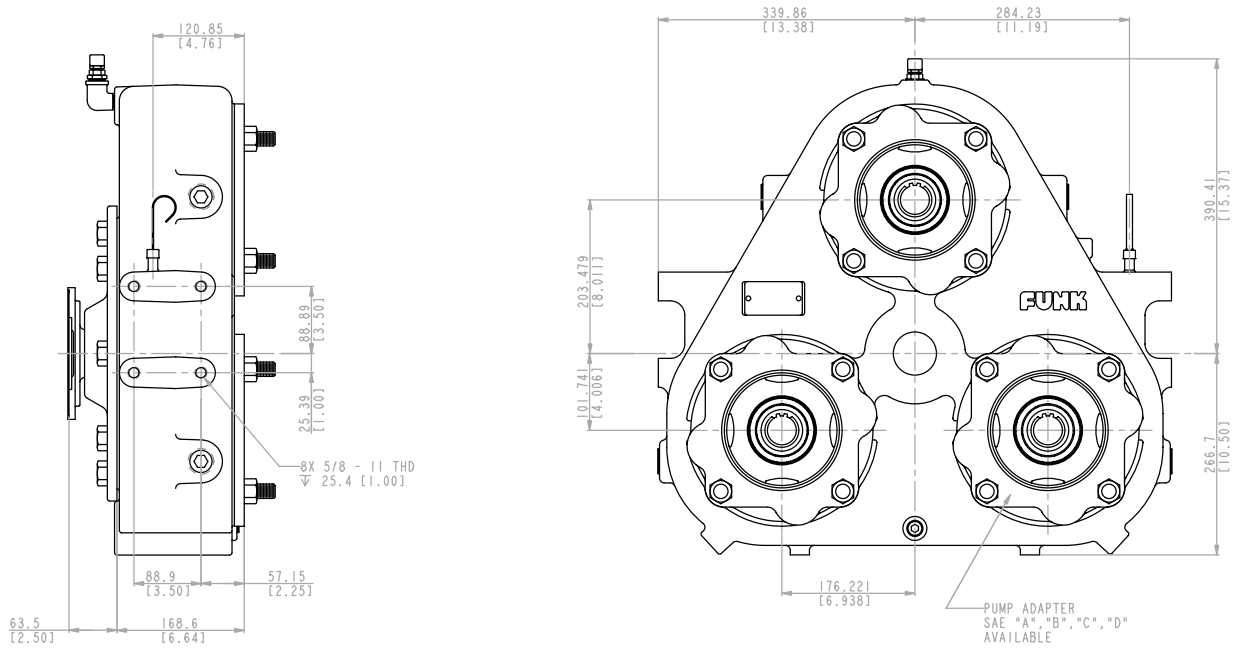
## Option selections

Refer to pages 30 – 31.

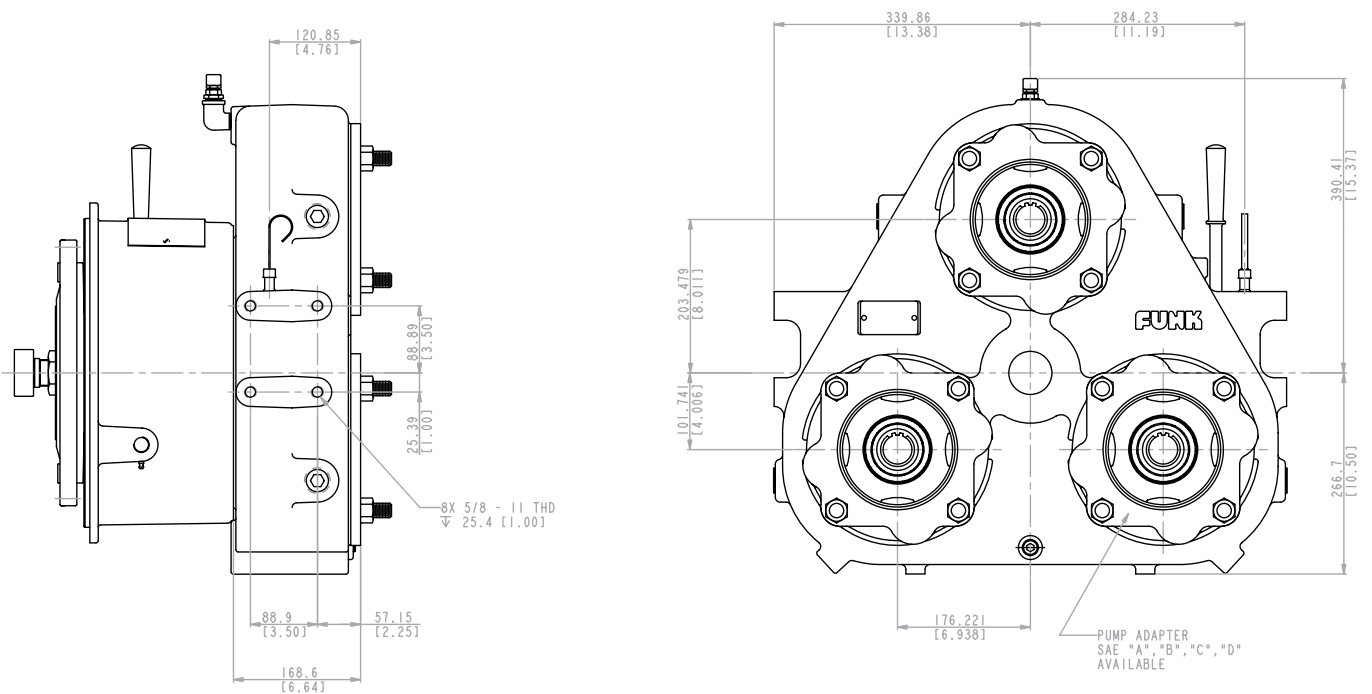
### 593WXXP



593WXR



593WXXC



# Series 59000 four

## Ratings

|                           |                                 |
|---------------------------|---------------------------------|
| Max input torque          | 1250 lb-ft (1695 Nm)            |
| Max output torque         | 650 lb-ft (881 Nm) per pump pad |
| Max input or output speed | 3000 rpm                        |
| Max input power           | 700 hp (522 kW)                 |
| Max output power          | 360 hp (268 kW) per pump pad    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

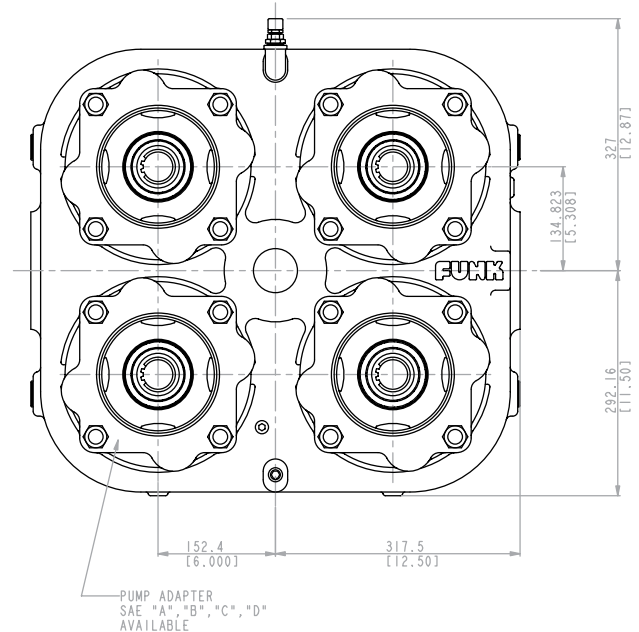
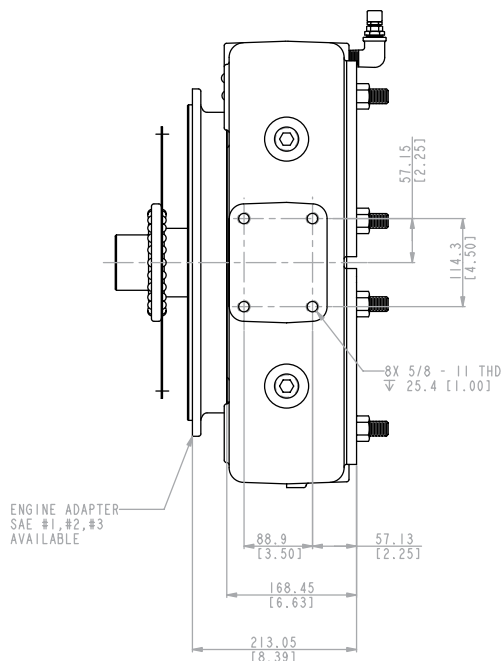
## Approximate weight

|         |                 |
|---------|-----------------|
| 594PXXP | 340 lb (154 kg) |
| 594PXR  | 315 lb (143 kg) |
| 594PXXC | 420 lb (191 kg) |

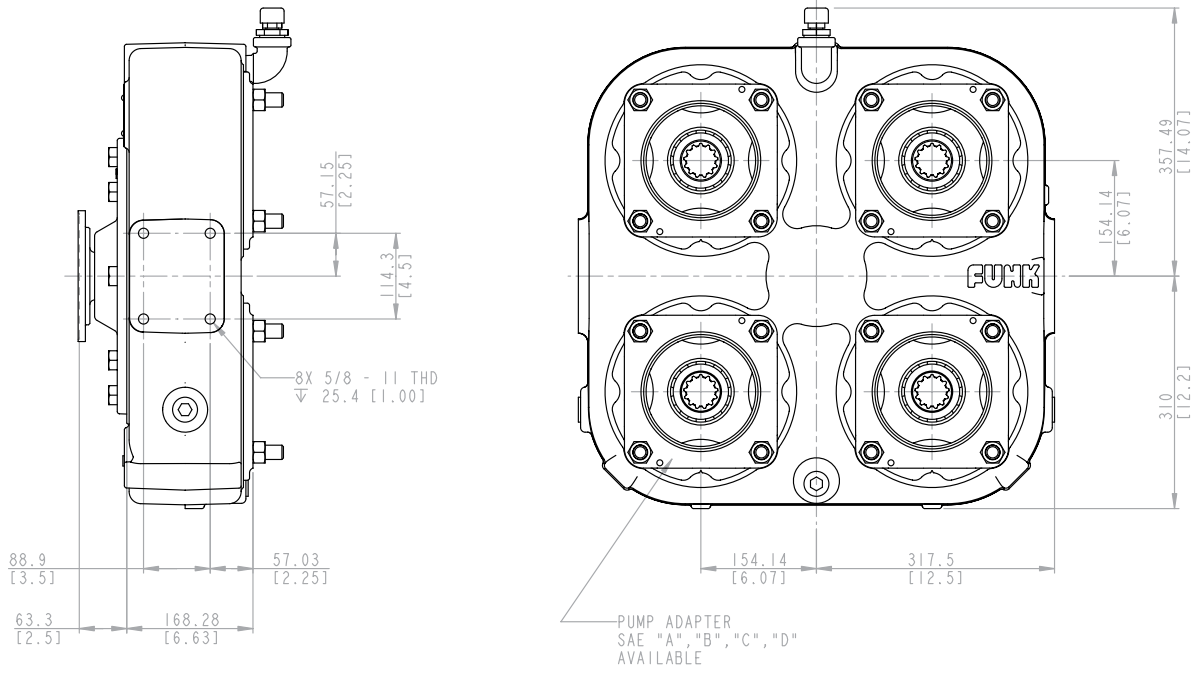
## Option selections

Refer to pages 30 – 31.

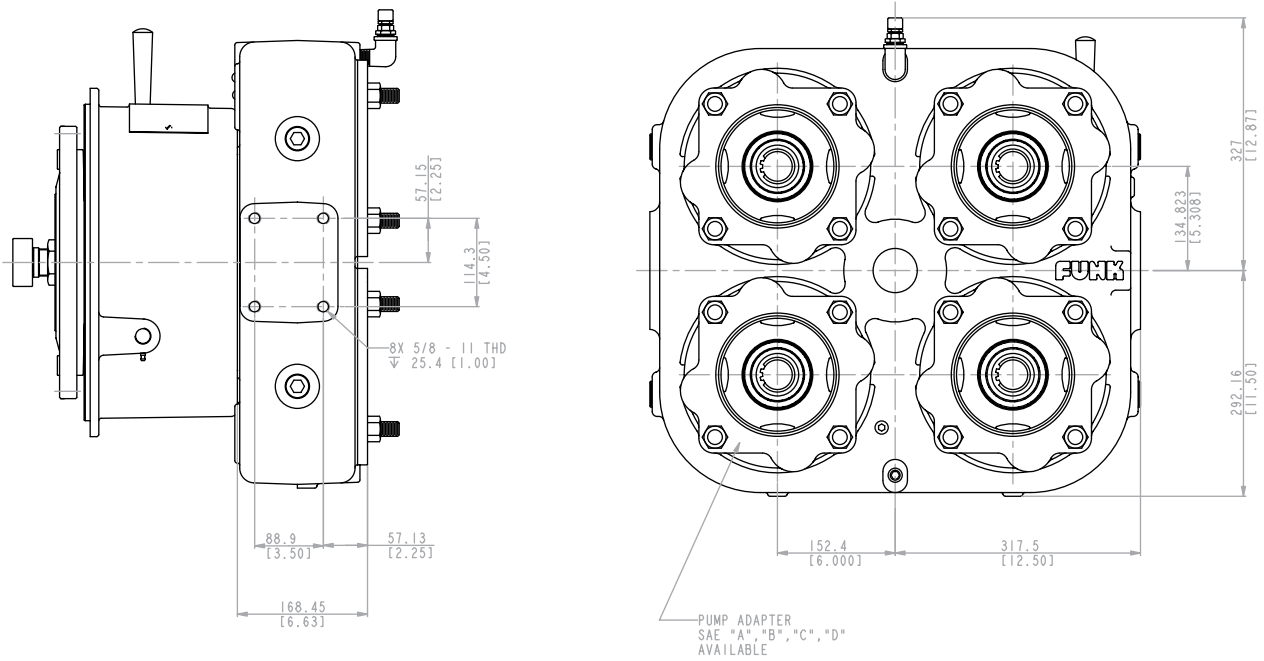
### 594PXXP



594PXR



594PXXC



# Series 59000 four (wide)

## Ratings

|                           |                                 |
|---------------------------|---------------------------------|
| Max input torque          | 1250 lb-ft (1695 Nm)            |
| Max output torque         | 650 lb-ft (881 Nm) per pump pad |
| Max input or output speed | 3000 rpm                        |
| Max input power           | 700 hp (522 kW)                 |
| Max output power          | 360 hp (268 kW) per pump pad    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

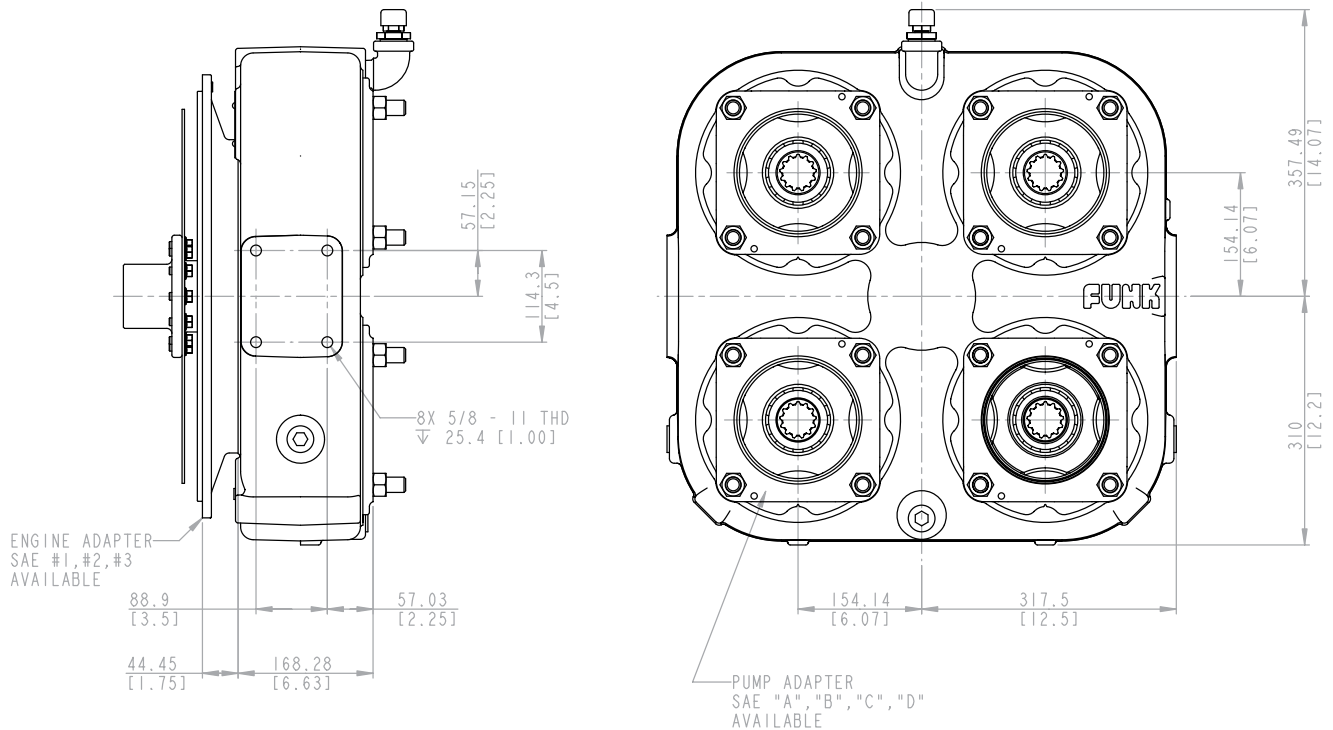
## Approximate weight

|         |                 |
|---------|-----------------|
| 594WXXP | 389 lb (176 kg) |
| 594WXXR | 364 lb (165 kg) |
| 594WXXC | 469 lb (213 kg) |

## Option selections

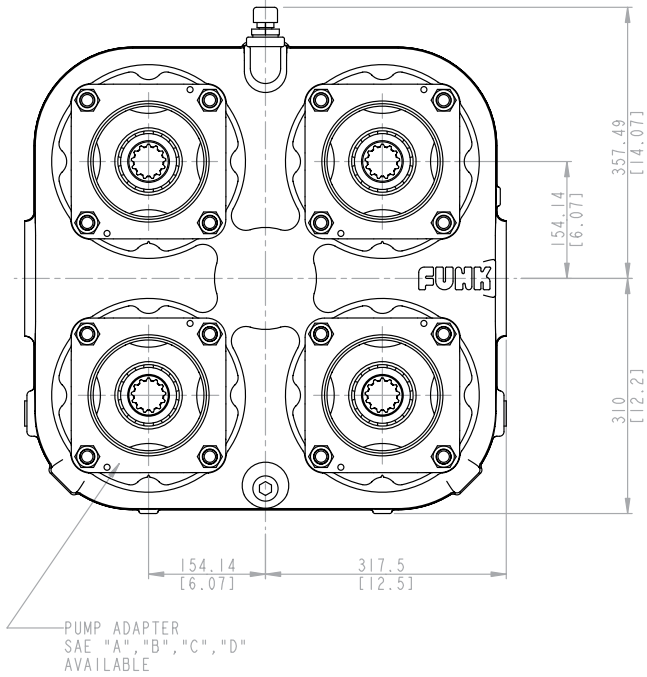
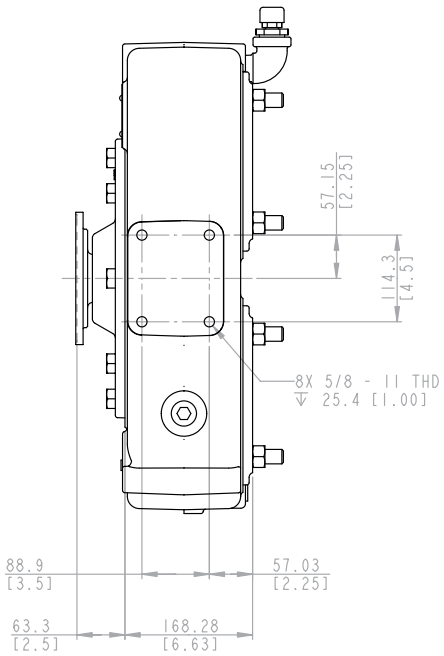
Refer to pages 30 – 31.

### 594WXXP

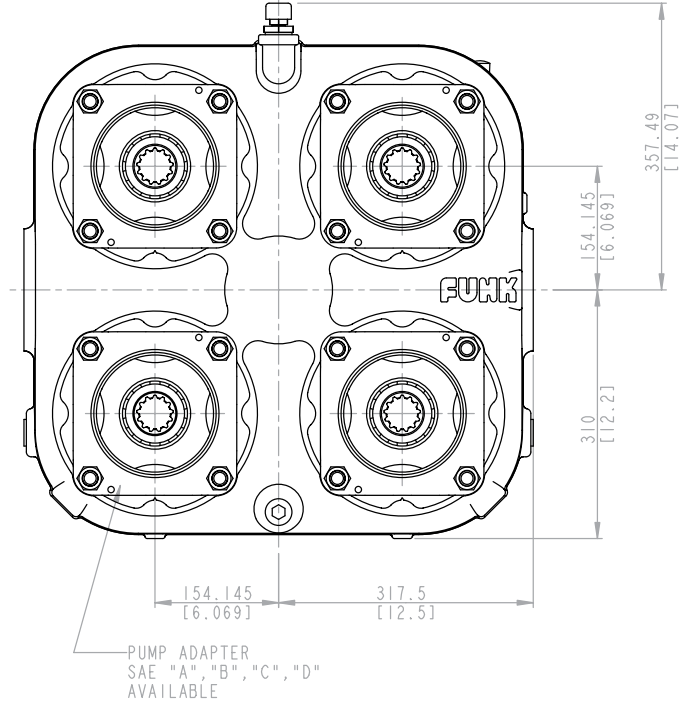
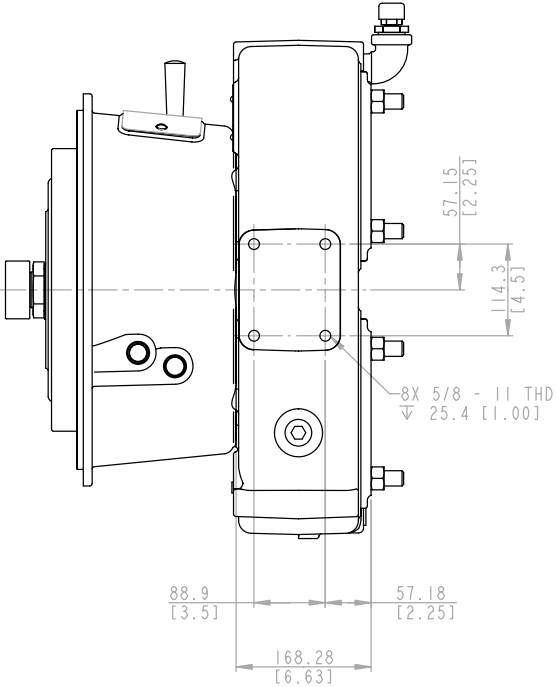




594WXXR



594WXXC

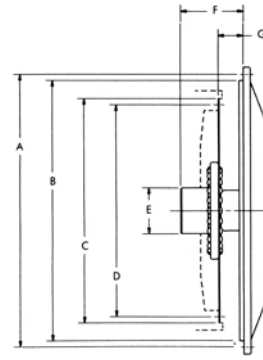


# Series 59000 option selections

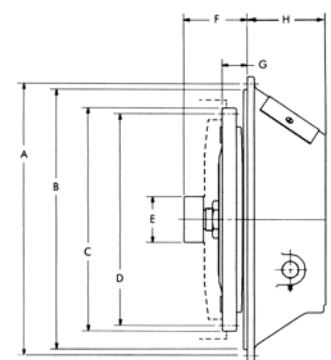
## Input

| Flywheel cover housing in (mm) |                |                |                   |
|--------------------------------|----------------|----------------|-------------------|
| SAE size                       | A dimension    | B dimension    | Bolts required    |
| 1                              | 20.875 (530.2) | 20.125 (511.2) | 12-7/16 (11.1)-14 |
| 2                              | 18.375 (466.7) | 17.625 (447.7) | 12-3/8 (9.5)-16   |
| 3                              | 16.875 (428.6) | 16.125 (409.6) | 12-3/8 (9.5)-16   |

Plate-driven



Clutch-driven



| Clutch cover housing in (mm) |                |                |                |                   |
|------------------------------|----------------|----------------|----------------|-------------------|
| SAE size                     | A dimension    | B dimension    | H dimension    | Bolts required    |
| 1                            | 20.875 (530.2) | 20.125 (511.2) | 7.500 (190.5)  | 12-7/16 (11.1)-14 |
| 1*                           | 20.875 (530.2) | 20.125 (511.2) | 10.250 (260.4) | 12-7/16 (11.1)-14 |
| 2                            | 18.375 (466.7) | 17.625 (447.7) | 7.500 (190.5)  | 12-3/8 (9.5)-16   |
| 3                            | 16.875 (428.6) | 16.125 (409.6) | 7.500 (190.5)  | 12-3/8 (9.5)-16   |

\* For SP-214 only.

| Drive plate assembly in (mm) |                |                |                            |              |                            |       |              |
|------------------------------|----------------|----------------|----------------------------|--------------|----------------------------|-------|--------------|
| Nominal flywheel size        | C dimension    | D dimension    | E dimension                | F dimension  | G dimension                | Holes | Hole size    |
| 10 (254.0)                   | 12.375 (314.3) | 11.625 (295.3) | 2.44 (62.0) or 2.83 (71.9) | 3.94 (100.0) | 2.12 (53.8)                | 8     | 13/32 (10.3) |
| 11-1/2 (292.1)               | 13.875 (352.4) | 13.125 (333.4) | 2.44 (62.0) or 2.83 (71.9) | 3.94 (100.0) | 1.56 (39.6) or 2.12 (53.8) | 8     | 13/32 (10.3) |
| 14 (355.6)                   | 18.375 (466.7) | 17.250 (438.2) | 2.83 (71.9) or 3.15 (80)   | 3.94 (100.0) | 1.00 (25.4)                | 8     | 17/32 (13.5) |

| Pump drive clutch data in (mm) |            |                       |                |                |                             |              |             |       |              |
|--------------------------------|------------|-----------------------|----------------|----------------|-----------------------------|--------------|-------------|-------|--------------|
| Nominal clutch size            | Clutch no. | Working torque        | C dimension    | D dimension    | E dimension (pilot bearing) | F dimension  | G dimension | Holes | Hole size    |
| 11-1/2 (292.1)                 | C-111      | 387 lb-ft (524.4 Nm)  | 13.875 (352.4) | 13.125 (333.4) | 2.83 (72.0) or 2.44 (62.0)  | 3.94 (100.0) | 1.56 (39.6) | 8     | 13/32 (10.3) |
| 11-1/2 (292.1)                 | SP-211     | 910 lb-ft (1233.1 Nm) | 13.875 (352.4) | 13.125 (333.4) | 2.83 (72.0) or 2.44 (62.0)  | 3.94 (100.0) | 1.56 (39.6) | 8     | 13/32 (10.3) |
| 14 (355.6)                     | SP-214     | 1620 lb-ft (2195 Nm)  | 18.375 (466.7) | 17.250 (438.2) | 3.15 (80.0) or 2.83 (72.0)  | 3.94 (100.0) | 1.00 (25.4) | 8     | 17/32 (13.5) |

## Gear ratios

### 59000 double, triple, four

.72:1 .78:1 .84:1 .898:1 1:1 1.13:1 1.2:1

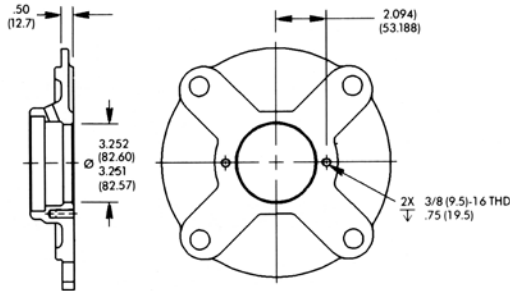
### 59000 four (wide)

.74:1 1:1

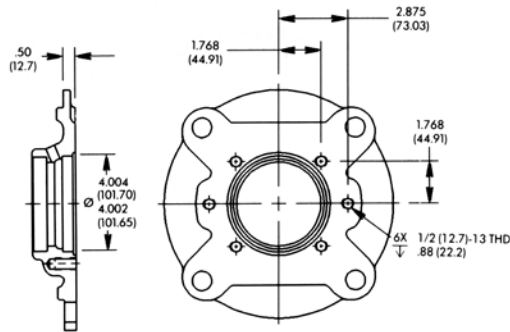
## Pump adapter plates

These pump adapter plates are available for Series 59000 models.

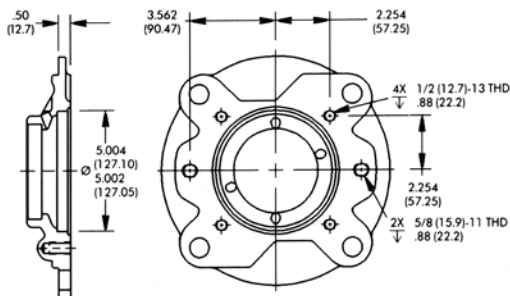
### SAE A



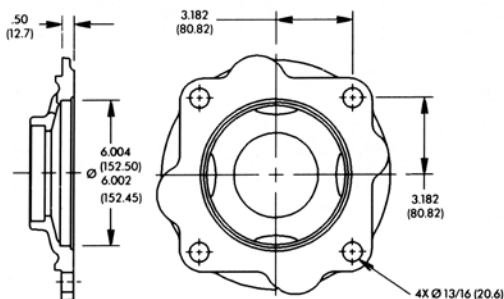
### SAE B



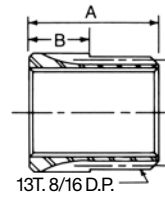
### SAE C



### SAE D



## Spline adapter



## Specifications in (mm)

## Output

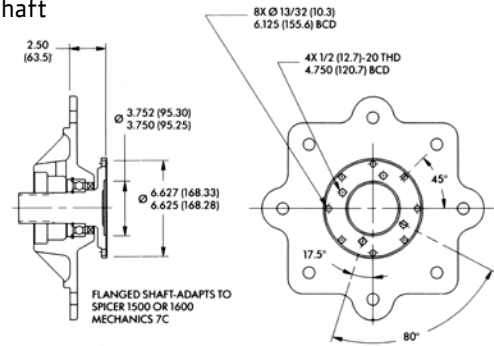
### Pump adapter sleeves in (mm)

| SAE Size | A dimension | B dimension | Internal spline            |
|----------|-------------|-------------|----------------------------|
| B        | 1.81 (46.0) | .75 (19.1)  | 7/8 (22.2)-13T. 16/32 P.   |
| C        | 2.00 (50.8) | .94 (23.9)  | 1-1/4 (31.8)-14T. 12/24 P. |
|          | 1.87 (47.5) | .81 (20.6)  | 1-1/4 (31.8)-14T. 12/24 P. |
|          | 2.00 (50.8) | .94 (23.9)  | 1-3/8 (34.9)-21T. 16/32 P. |
| BB       | 2.00 (50.8) | .94 (23.9)  | 1 (25.4)-15T. 16/32 P.     |

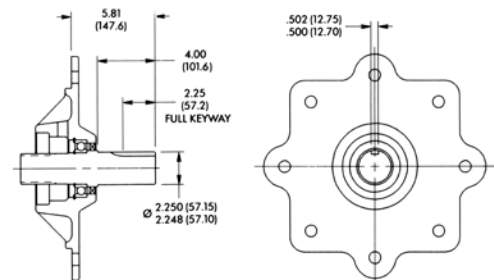
### Input drive assemblies in (mm)

\* Refer to page 21 for output drive assemblies.

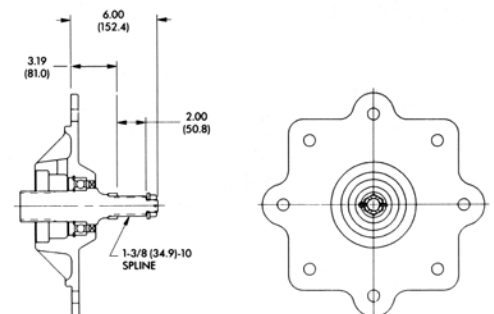
## Flanged shaft



## 2-1/4 (57.2) Diameter keyed shaft



## 1-3/8 (34.9)-10 Straight-side splined shaft



# Series 56000 double

## Ratings

|                           |   |
|---------------------------|---|
| Max input torque          | 2000 lb-ft (2712 Nm) or clutch rating-dependent |
| Max output torque         | 2000 lb-ft (2712 Nm) per pump pad               |
| Max input or output speed | 2500 rpm  |
| Max input power           | 950 hp (708 kW) or clutch rating-dependent      |
| Max output power          | 950 hp (708 kW) per pump pad                    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise, except through shaft-drive, enginewise.

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

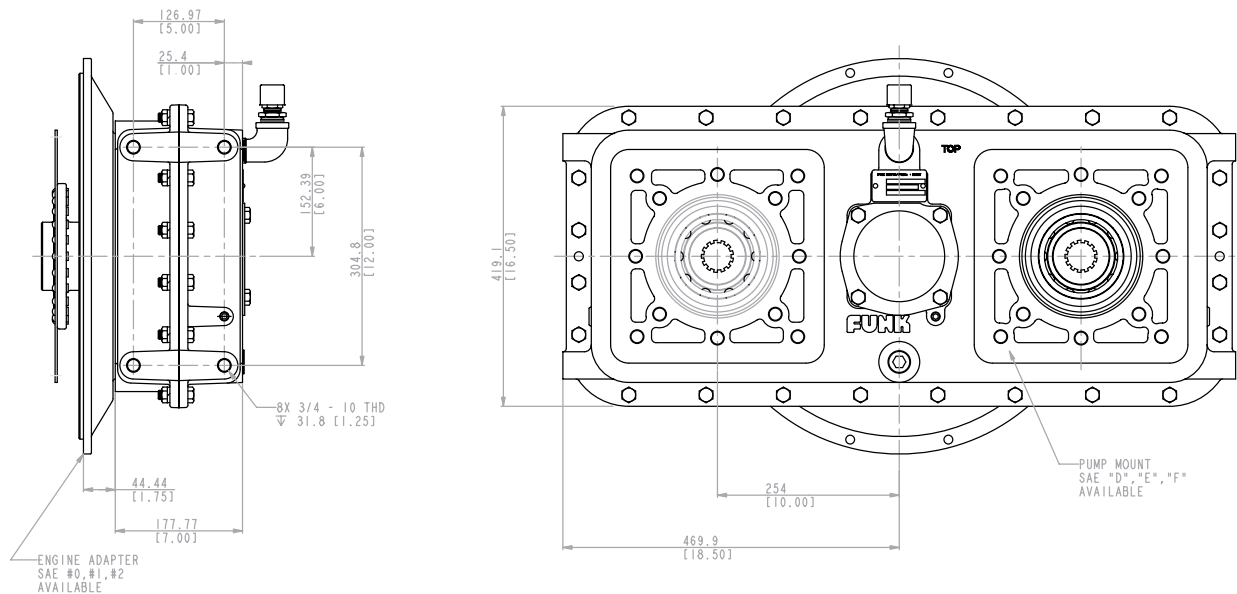
## Approximate weight

|       |                 |
|-------|-----------------|
| 56005 | 450 lb (204 kg) |
| 56006 | 425 lb (193 kg) |
| 56004 | 600 lb (272 kg) |

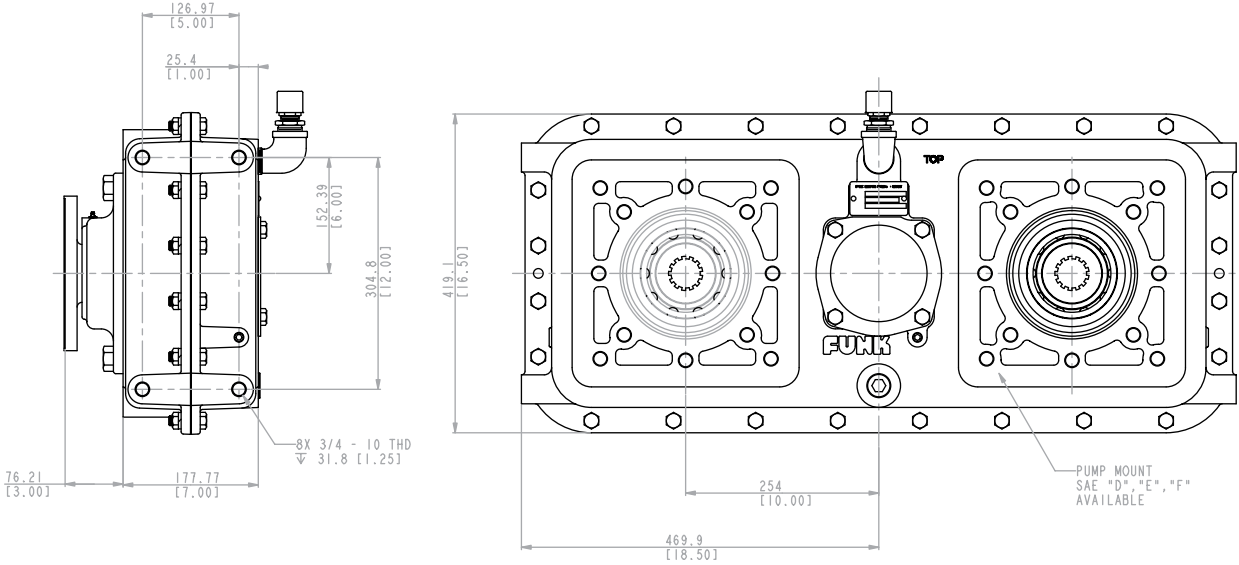
## Option selections

Refer to pages 42 – 43.

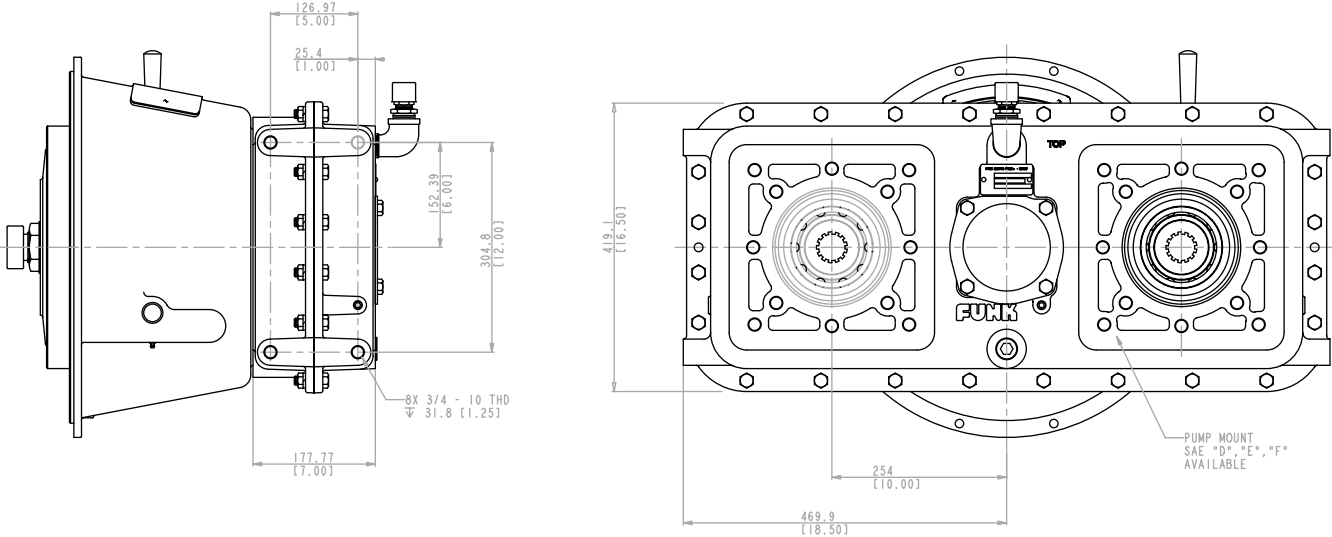
### 56005



56006



56004



# Series 56000 triple

## Ratings

|                           |   |
|---------------------------|---|
| Max input torque          | 2000 lb-ft (2712 Nm) or clutch rating-dependent |
| Max output torque         | 2000 lb-ft (2712 Nm) per pump pad               |
| Max input or output speed | 2500 rpm  |
| Max input power           | 950 hp (708 kW) or clutch rating-dependent      |
| Max output power          | 950 hp (708 kW) per pump pad                    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Anti-enginewise.

## Oil

John Deere HY-GARD or any oil that meets John Deere standard JDM J20C.

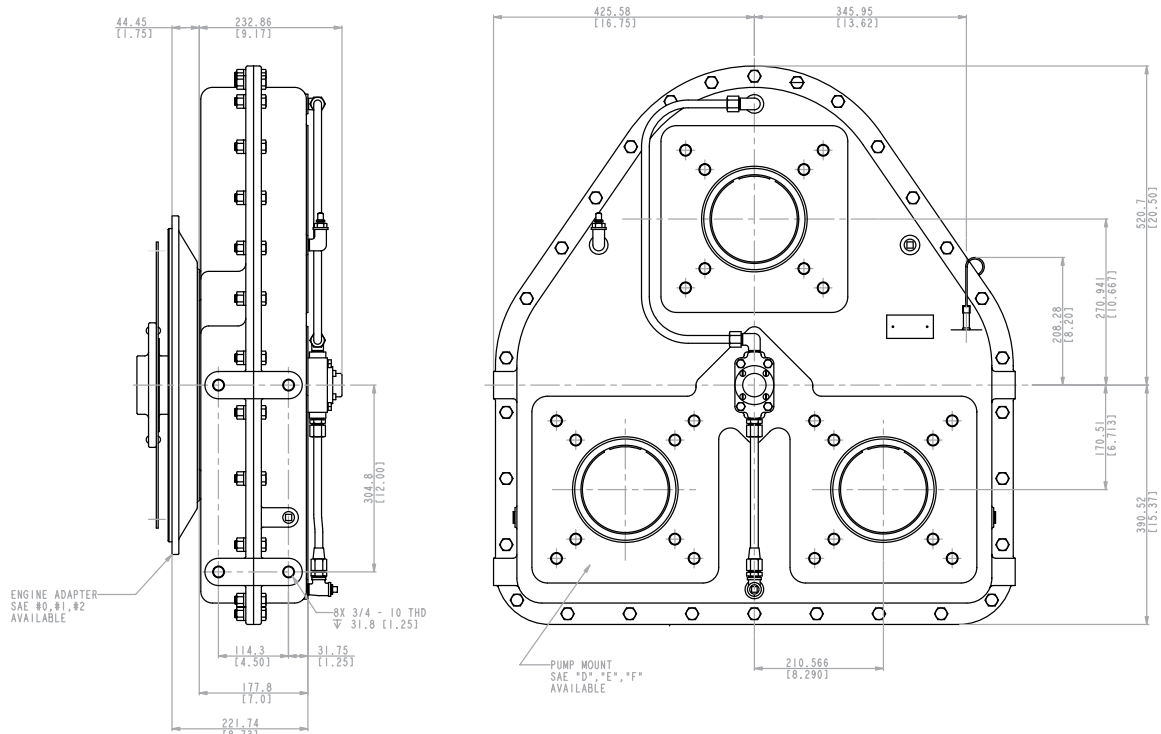
## Approximate weight

|       |                 |
|-------|-----------------|
| 56016 | 725 lb (329 kg) |
| 56018 | 700 lb (318 kg) |
| 56019 | 910 lb (413 kg) |

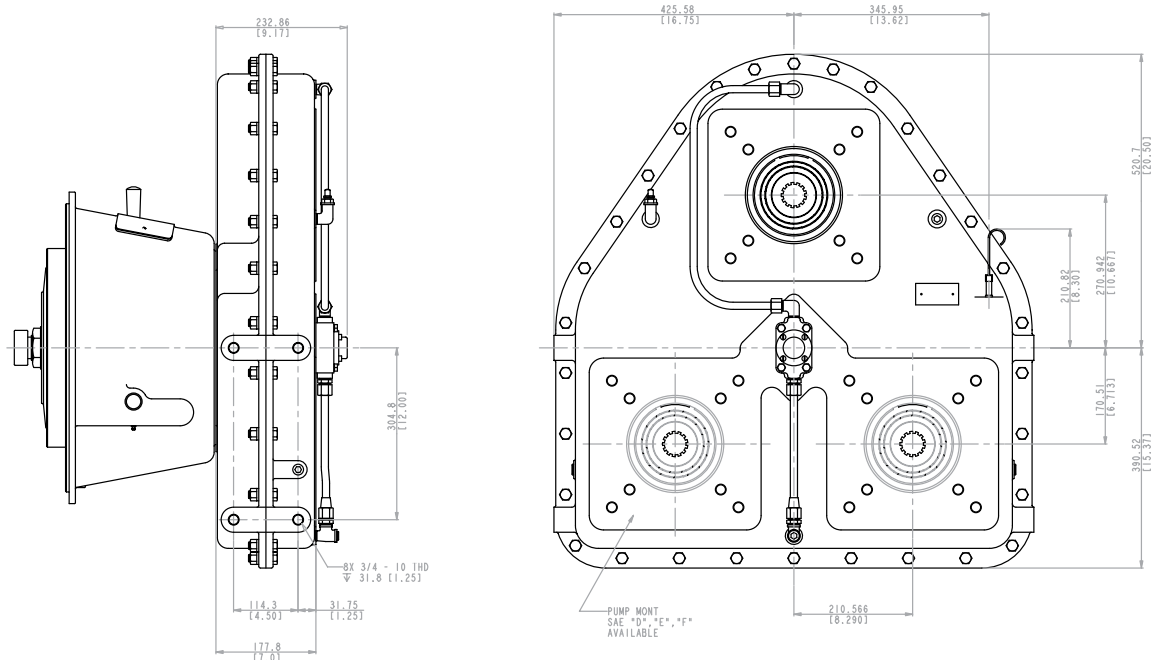
## Option selections

Refer to pages 42 – 43.

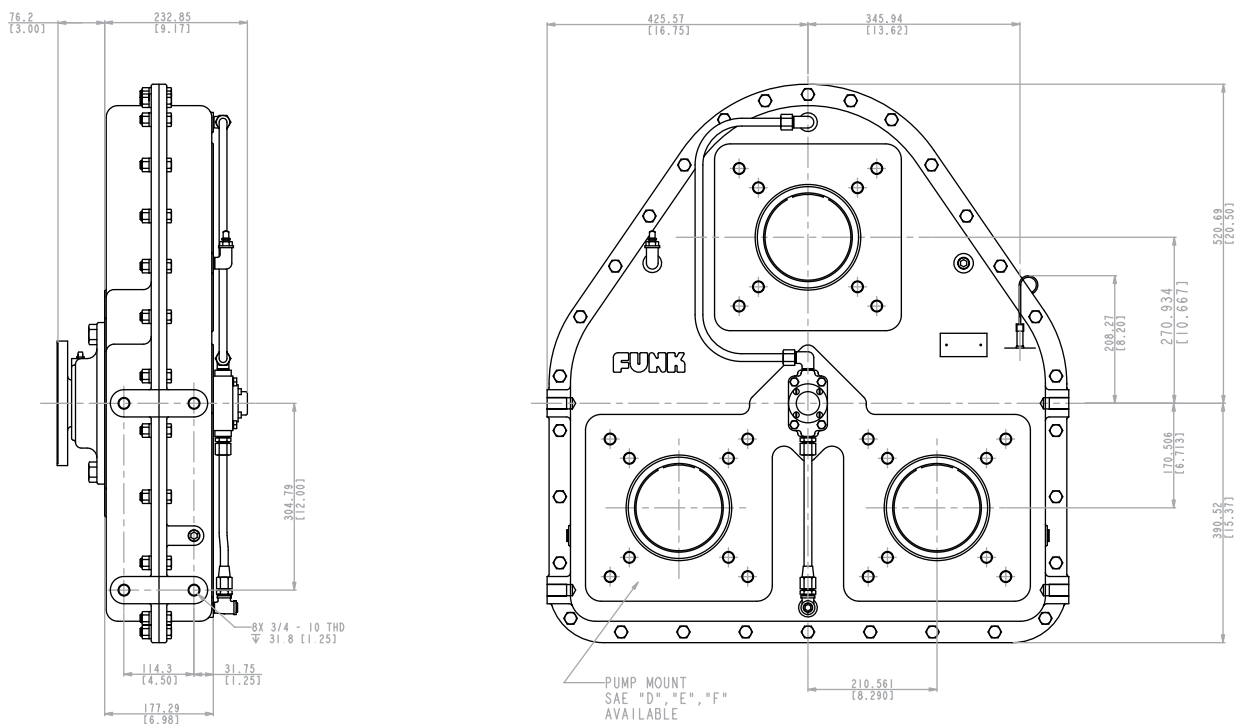
### 56016



56018



56019



## Series 56000 four

### Ratings

|                           |                                   |
|---------------------------|-----------------------------------|
| Max input torque          | 2000 lb-ft (2712 Nm)              |
| Max output torque         | 2000 lb-ft (2712 Nm) per pump pad |
| Max input or output speed | 2500 rpm                          |
| Max input power           | 950 hp (708 kW)                   |
| Max output power          | 950 hp (708 kW) per pump pad      |

For further explanation of ratings, see service factors on page 5.

### Pump rotation

Anti-enginewise, except through shaft-drive.

### Oil

Any oil that meets EP gear lubrication specification MIL-L-2105C or API classification GL-5.

### Approximate weight

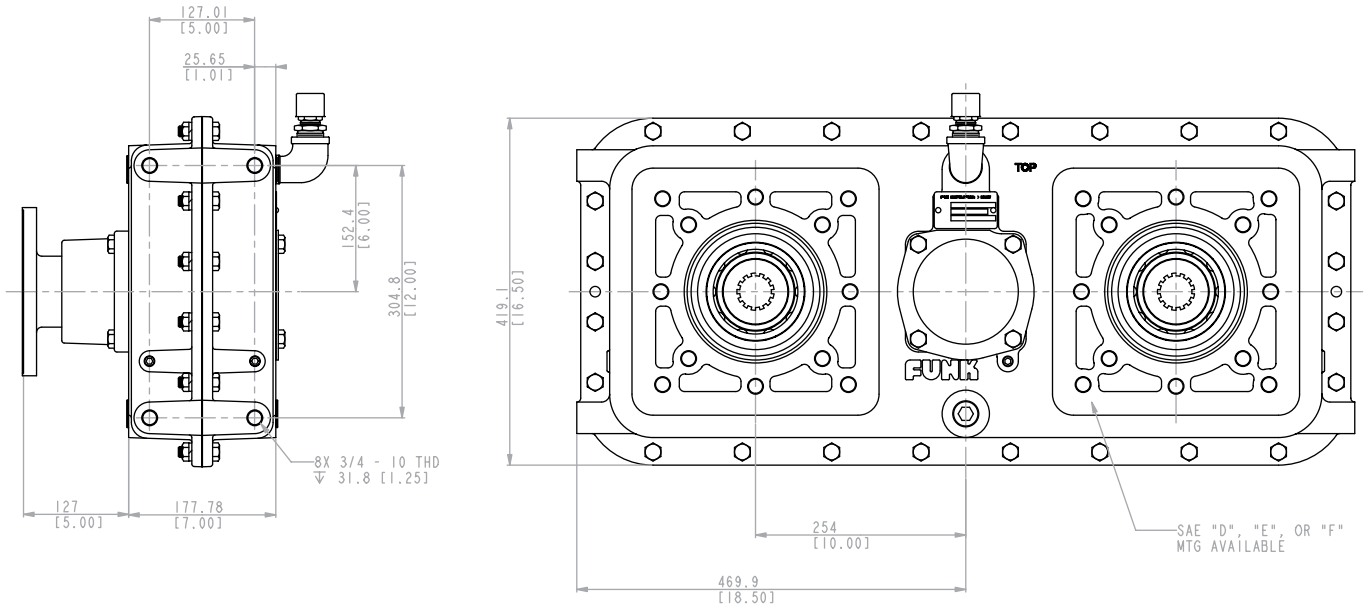
|       |                 |
|-------|-----------------|
| 56009 | 480 lb (218 kg) |
|-------|-----------------|

### Option selections

Refer to pages 42 – 43.



56009



# Series 56000 five

## Ratings

|                           |   |
|---------------------------|---|
| Max input torque          | 2000 lb-ft (2712 Nm) or clutch rating-dependent |
| Max output torque         | 1500 lb-ft (2034 Nm) per pump pad               |
| Max input or output speed | 2500 rpm  |
| Max input power           | 950 hp (708 kW) or clutch rating-dependent      |
| Max output power          | 700 hp (522 kW) per pump pad                    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Enginewise\*

## Oil

Any oil that meets EP gear lubrication specification MIL-L-2105 or API classification GL-5.

## Approximate weight

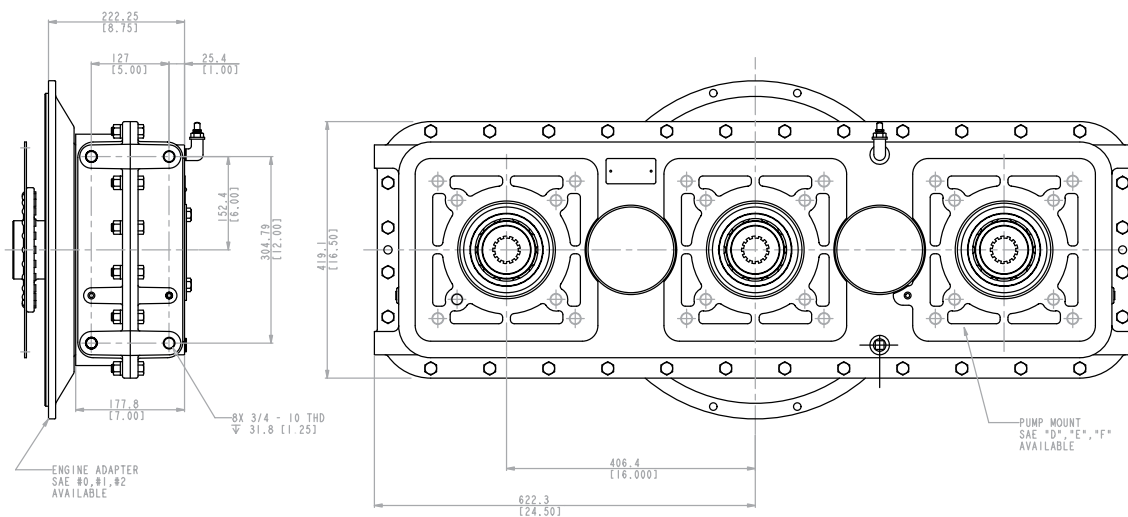
|       |                 |
|-------|-----------------|
| 56012 | 615 lb (279 kg) |
| 56013 | 580 lb (263 kg) |
| 56011 | 775 lb (352 kg) |

## Option selections

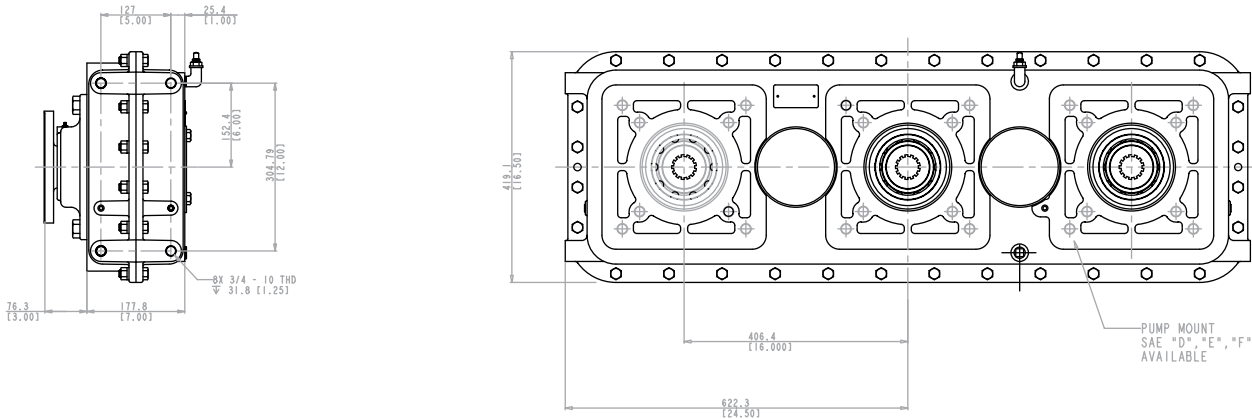
Refer to pages 42 – 43.

\*NOTE: Engine side pump mounts on models 56011 and 56012 may be limited on pump size due to interference with adapter housing and/or engine components.

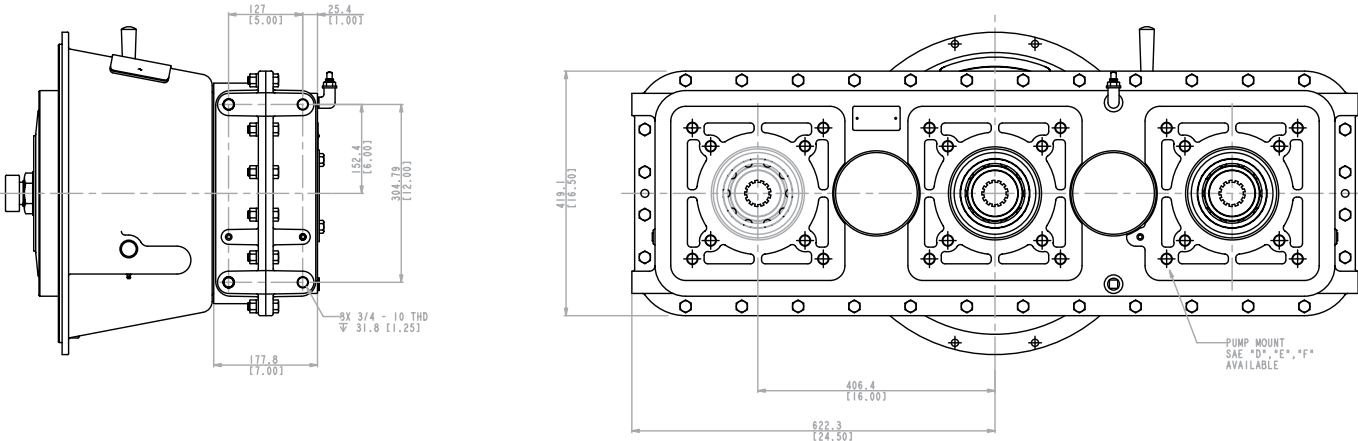
### 56012



56013



56011



# Series 56000 five deep sump

## Ratings

|                           |   |
|---------------------------|---|
| Max input torque          | 2000 lb-ft (2712 Nm) or clutch rating-dependent |
| Max output torque         | 1500 lb-ft (2034 Nm) per pump pad               |
| Max input or output speed | 2500 rpm  |
| Max input power           | 950 hp (708 kW) or clutch rating-dependent      |
| Max output power          | 700 hp (522 kW) per pump pad                    |

For further explanation of ratings, see service factors on page 5.

## Pump rotation

Enginewise\*

## Oil

John Deere HY-GARD or any oil that meets John Deere standard JDM J20C.

## Approximate weight

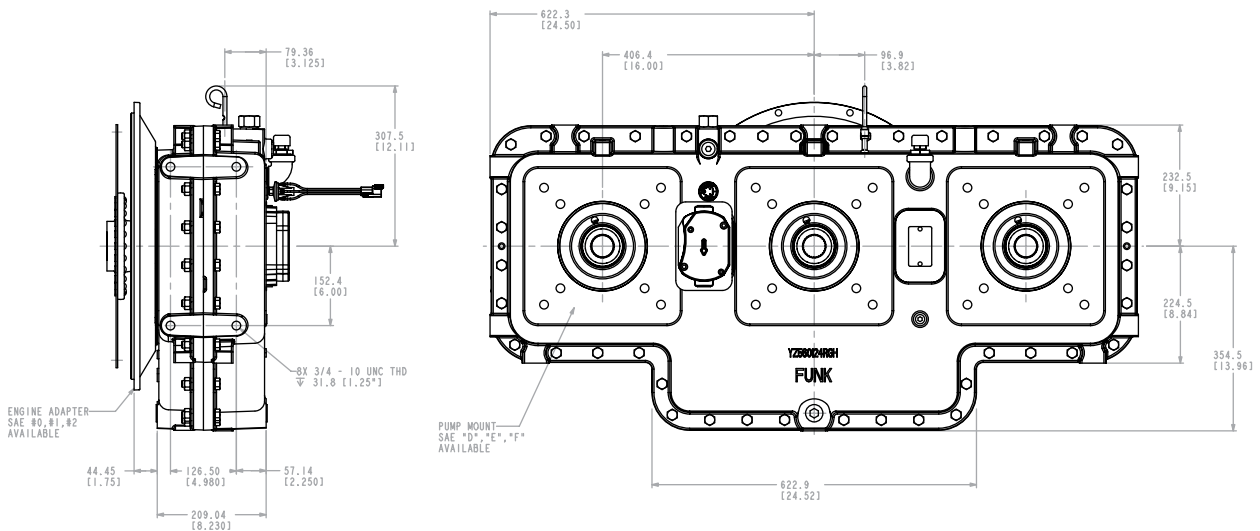
|         |                  |
|---------|------------------|
| 565LXXP | 884 lb (402 kg)  |
| 565LXR  | 849 lb (386 kg)  |
| 565LXXC | 1044 lb (475 kg) |

## Option selections

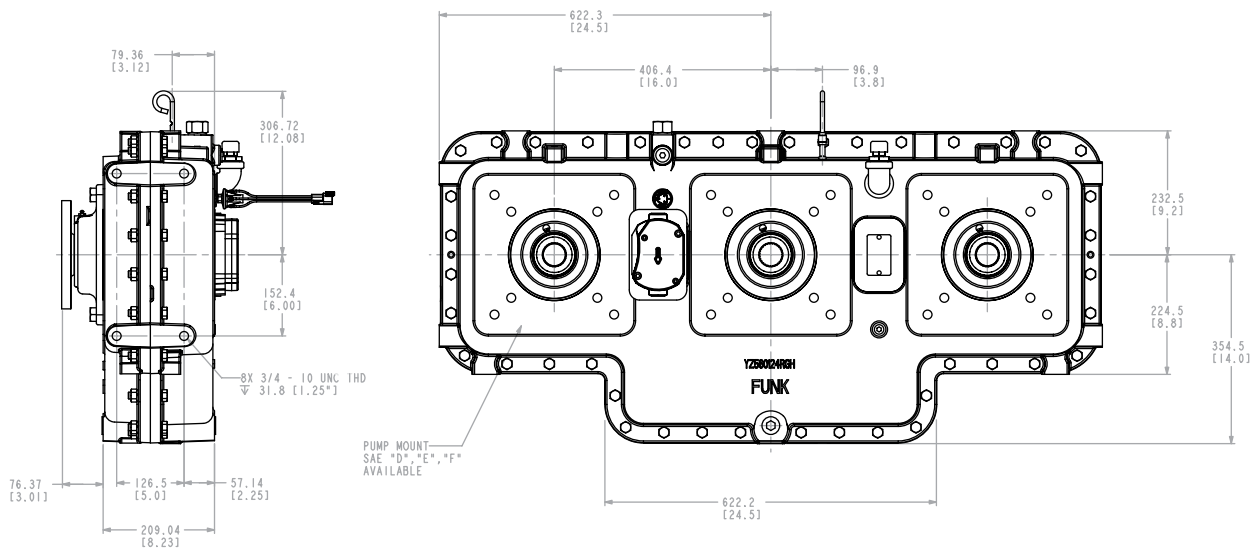
Refer to pages 42 – 43.

\*NOTE: Engine side pump mounts on models 565LXXP and 565LXXC may be limited on pump size due to interference with adapter housing and/or engine components.

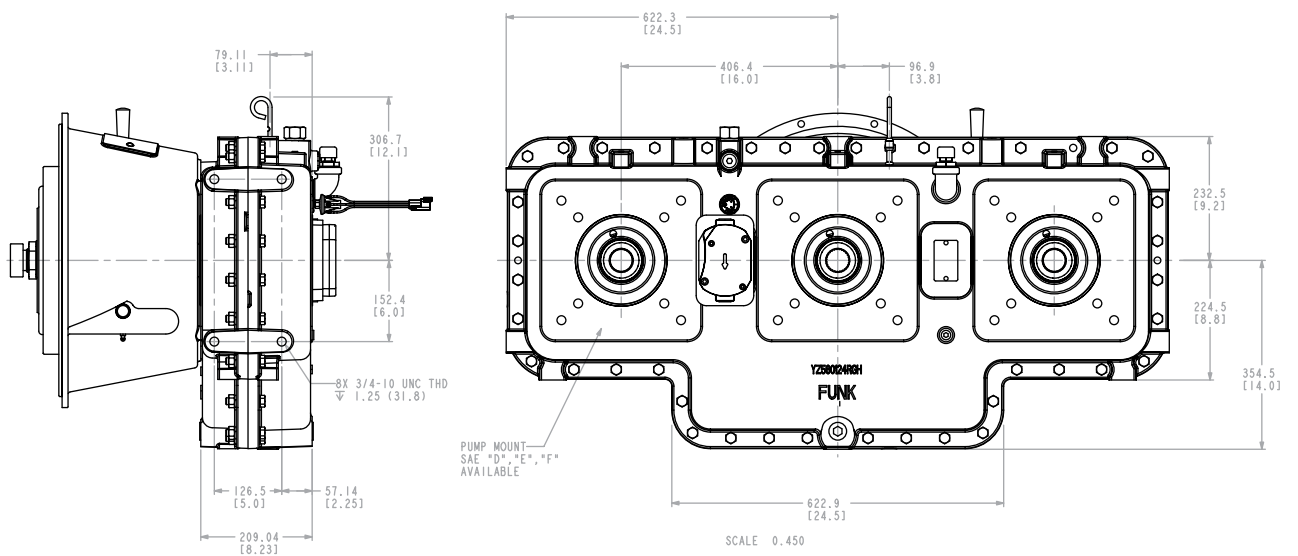
### 565LXXP



565LXR



565LXXC

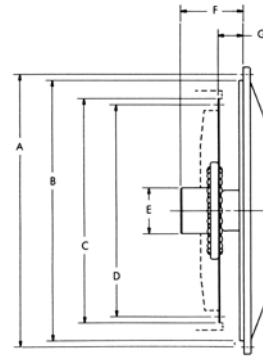


# Series 56000 option selections

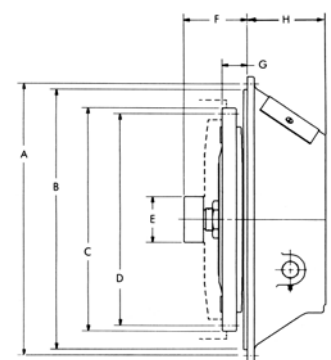
## Input

| Flywheel cover housing in (mm) |                |                |                   |
|--------------------------------|----------------|----------------|-------------------|
| SAE size                       | A dimension    | B dimension    | Bolts required    |
| 0                              | 26.750 (679.5) | 25.500 (647.7) | 16-1/2 (12.7)-13  |
| 1                              | 20.875 (530.2) | 20.125 (511.2) | 12-7/16 (11.1)-14 |
| 2                              | 18.375 (466.7) | 17.625 (447.7) | 12-3/8 (9.5)-16   |

Plate-driven



Clutch-driven



| Clutch cover housing in (mm) |                |                |                |                   |
|------------------------------|----------------|----------------|----------------|-------------------|
| SAE size                     | A dimension    | B dimension    | H dimension    | Bolts required    |
| 1                            | 20.875 (530.2) | 20.125 (511.2) | 10.250 (260.4) | 12-7/16 (11.1)-14 |

| Drive plate assembly in (mm) |                |                |             |       |              |
|------------------------------|----------------|----------------|-------------|-------|--------------|
| Nominal flywheel size        | C dimension    | D dimension    | G dimension | Holes | Hole size    |
| 11-1/2 (292.1)               | 13.875 (352.4) | 13.125 (333.4) | 1.56 (39.6) | 8     | 13/32 (10.3) |
| 14 (355.6)                   | 18.375 (466.7) | 17.250 (438.2) | 1.00 (25.4) | 16    | 17/32 (13.5) |
| 18 (457.2)                   | 22.5 (571.5)   | 21.375 (542.9) | .62 (15.7)  | 6     | 21/32 (16.7) |

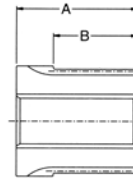
| Pump drive clutch data in (mm) |            |                       |                |                |                             |              |             |       |              |
|--------------------------------|------------|-----------------------|----------------|----------------|-----------------------------|--------------|-------------|-------|--------------|
| Nominal clutch size            | Clutch no. | Working torque        | C dimension    | D dimension    | E dimension (pilot bearing) | F dimension  | G dimension | Holes | Hole size    |
| 11-1/2 (292.1)                 | SP-211     | 910 lb-ft (1233.1 Nm) | 13.875 (352.4) | 13.125 (333.4) | 2.44 (62.0) or 2.83 (72.0)  | 3.94 (100.0) | 1.56 (39.6) | 8     | 13/32 (10.3) |
| 14 (355.6)                     | SP-214     | 1620 lb-ft (2195 Nm)  | 18.375 (466.7) | 17.250 (438.2) | 2.83 (72.0) or 3.15 (80.0)  | 3.94 (100.0) | 1.00 (25.4) | 8     | 17/32 (13.5) |

## Output

| Pump flange data in (mm) |               |                |           |               |
|--------------------------|---------------|----------------|-----------|---------------|
| SAE size                 | Pilot size    | B.C.D.         | No. holes | Tap size      |
| B                        | 4.000 (101.6) | 5.750 (146.1)  | 2         | 1/2 (12.7)-13 |
|                          |               | 5.000 (127.0)  | 4         | 1/2 (12.7)-13 |
| C                        | 5.000 (127.0) | 7.125 (181.0)  | 2         | 5/8 (15.9)-11 |
|                          |               | 6.375 (161.9)  | 4         | 1/2 (12.7)-13 |
| D                        | 6.000 (152.4) | 9.000 (228.6)  | 4         | 3/4 (19.1)-10 |
| E                        | 6.500 (165.1) | 12.500 (317.5) | 4         | 3/4 (19.1)-10 |
| F                        | 7.000 (177.8) | 13.781 (350.0) | 4         | 1 (25.4)-8    |

## Spline adapter

Specifications in (mm)



19T. 8/16P.

## Output

### Pump adapter sleeves in (mm)

| SAE size | A dim.       | B dim.      | Internal spline |
|----------|--------------|-------------|-----------------|
| BB*      | 4.25 (108.0) | 1.88 (47.8) | 15T. 16/32P.    |
| B*       | 4.25 (108.0) | 1.88 (47.8) | 13T. 16/32P.    |
| CC*      | 4.25 (108.0) | 1.88 (47.8) | 17T. 12/24P.    |
| C*       | 4.25 (108.0) | 1.88 (47.8) | 14T. 12/24P.    |
| D*       | 4.25 (108.0) | 1.88 (47.8) | 13T. 8/16P.     |
| D        | 2.5 (63.5)   | 1.88 (47.8) | 13T. 8/16P.     |
| E        | 2.5 (63.5)   | 1.88 (47.8) | 13T. 8/16P.     |
| F        | 2.88 (7.32)  | 1.88 (47.8) | 15T. 8/16P.     |

\* These are for use with add-on adapter plates.

## Gear ratios

### 56000 double

.76:1    .875:1    1:1    1.14:1    1.31:1

### 56000 triple

.882:1    1:1    1.14:1

### 56000 four

.76:1    .875:1    1:1    1.14:1    1.31:1

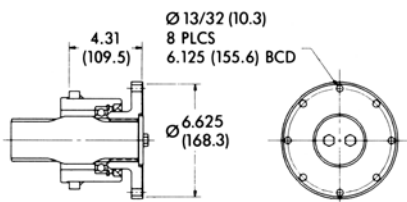
### 56000 five

.875:1    1:1    1.18:1

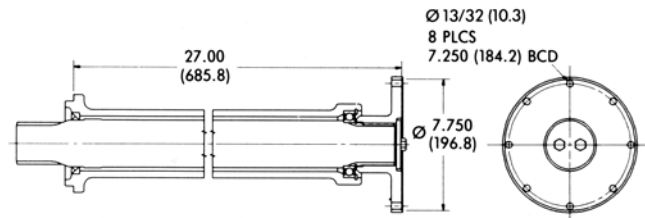
### 56000 five (deep sump)

.722:1    .857:1    1:1

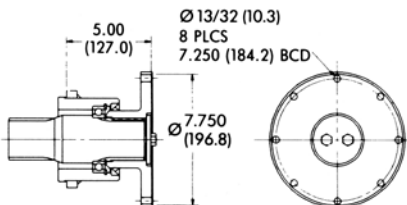
## Input drive assemblies in (mm)



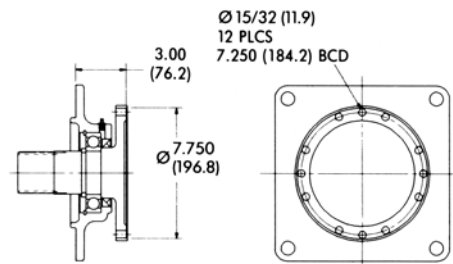
SPICER 1600, MECH 6C OR 7C FLANGE



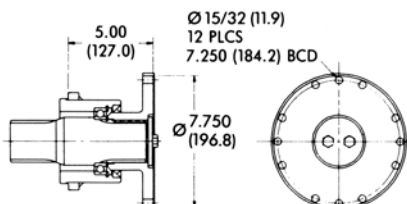
SPICER 1700, MECH 7C OR 8C FLANGE



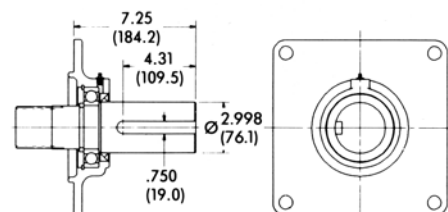
SPICER 1700, MECH 7C OR 8C FLANGE



SPICER 1800 OR 1850 FLANGE



SPICER 1800 OR 1850 FLANGE



Ø 3" KEYED SHAFT

# Series 57000 Four (14 in centers)

## Ratings

|                           |   |
|---------------------------|---|
| Max input torque          | 2000 lb-ft (2712 Nm) or clutch rating-dependent |
| Max output torque         | 2000 lb-ft (2712 Nm) per pump pad               |
| Max input or output speed | 2500 rpm  |
| Max input power           | 950 hp (708 kW) or clutch rating-dependent      |
| Max output power          | 950 hp (708 kW) per pump pad                    |

## Pump rotation

Anti-enginewise

## Oil

John Deere HY-GARD or any oil that meets John Deere standard JDM J20C.

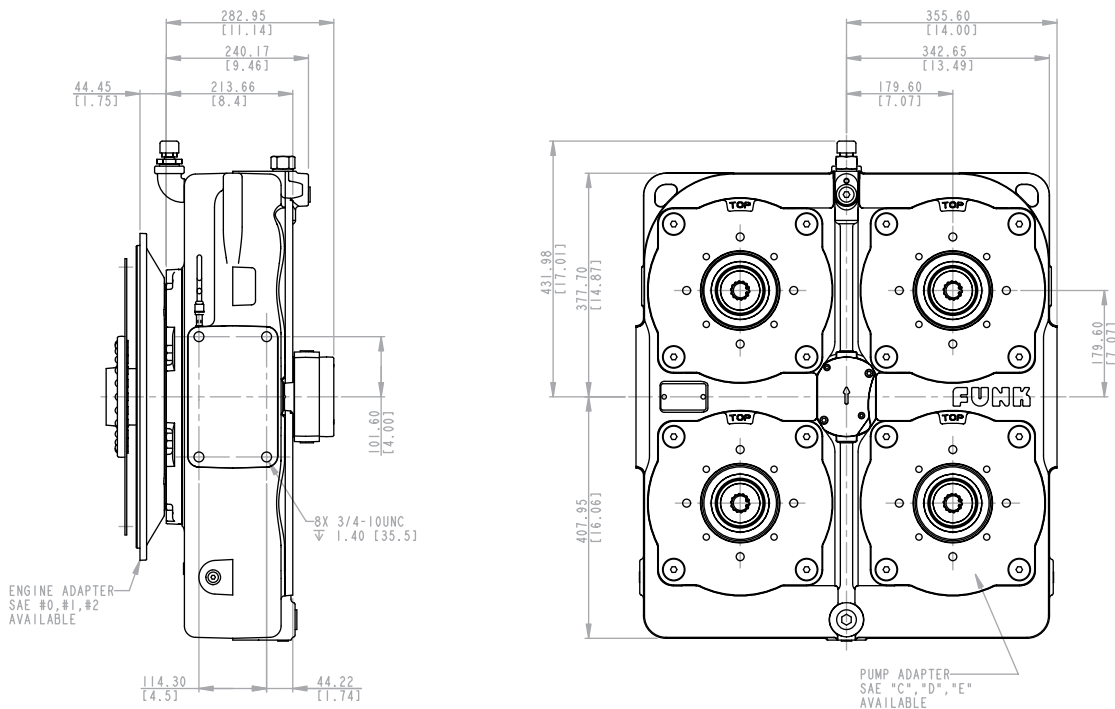
## Approximate weight

|       |                 |
|-------|-----------------|
| 5714P | 725 lb (329 kg) |
| 5714R | 700 lb (318 kg) |
| 5714C | 775 lb (352 kg) |

## Option selections

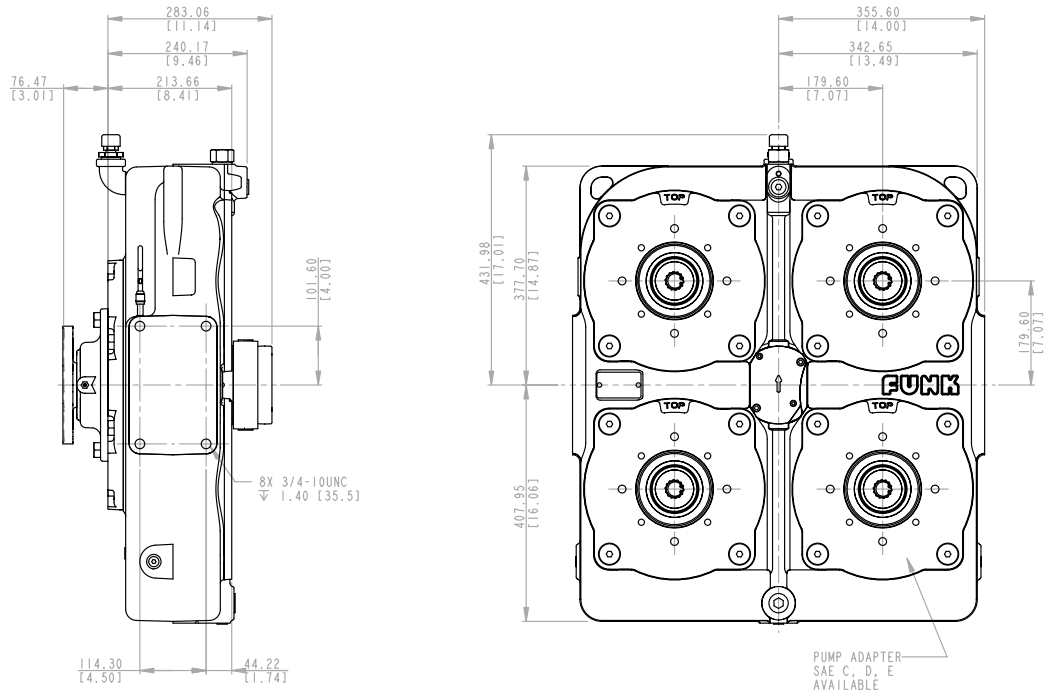
Refer to pages 48 – 49.

### 5714P

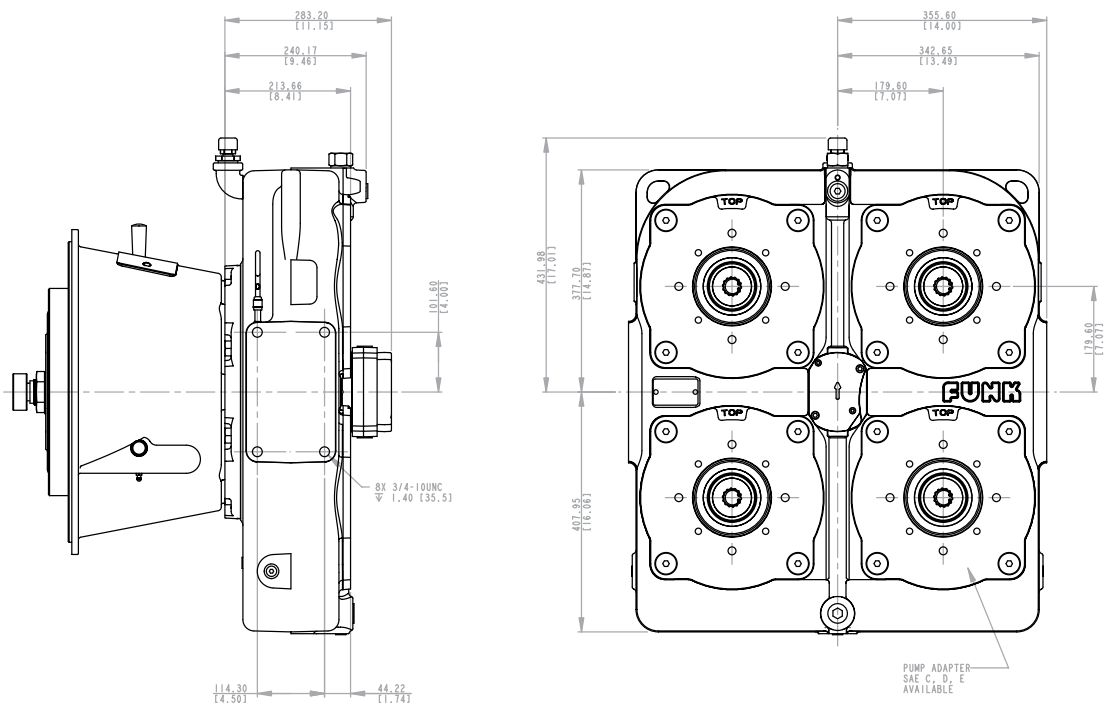




5714R



5714C



# Series 57000 four (16 in centers)

## Ratings

|                           |   |
|---------------------------|---|
| Max input torque          | 2000 lb-ft (2712 Nm) or clutch rating-dependent |
| Max output torque         | 2000 lb-ft (2712 Nm) per pump pad               |
| Max input or output speed | 2500 rpm  |
| Max input power           | 950 hp (708 kW) or clutch rating-dependent      |
| Max output power          | 950 hp (708 kW) per pump pad                    |

## Pump rotation

Anti-enginewise

## Oil

John Deere HY-GARD or any oil that meets John Deere standard JDM J20C.

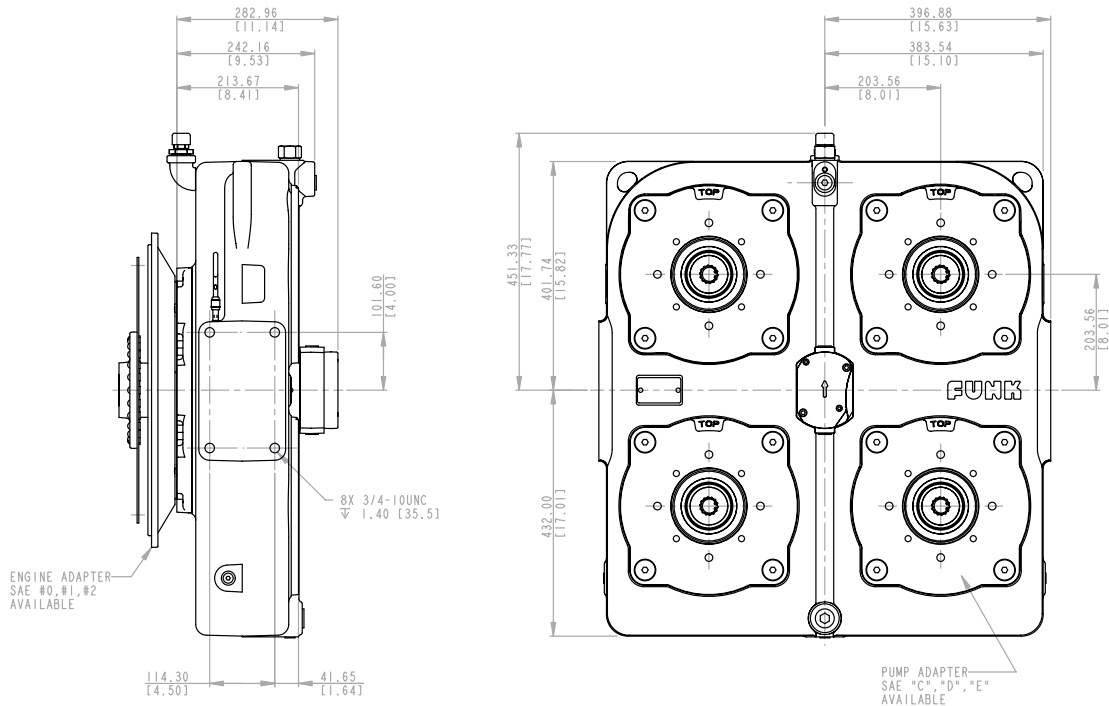
## Approximate weight

|       |                 |
|-------|-----------------|
| 5716P | 770 lb (350 kg) |
| 5716R | 735 lb (334 kg) |
| 5716C | 920 lb (418 kg) |

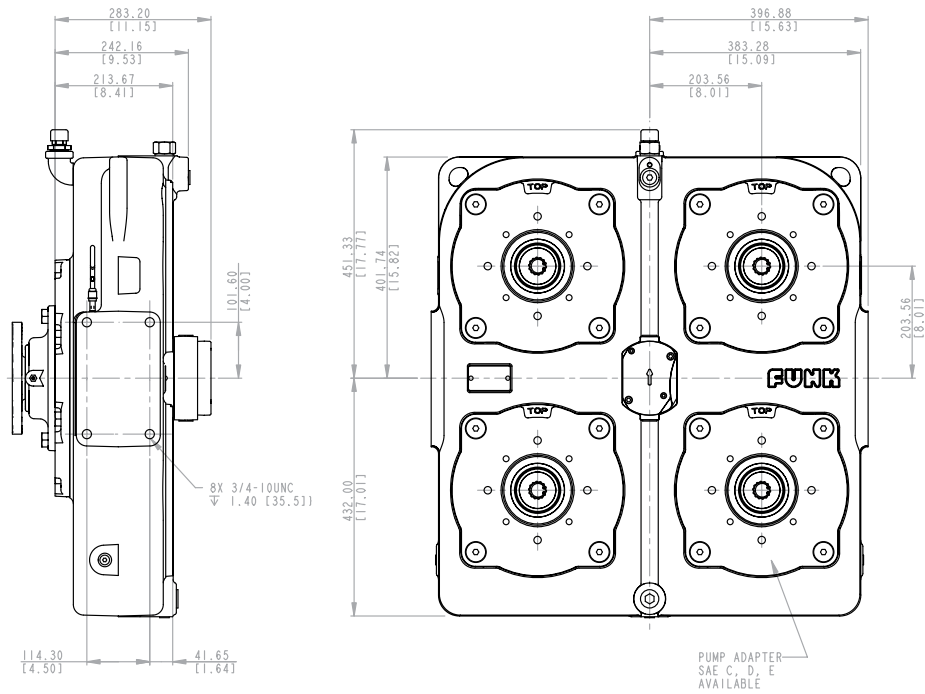
## Option selections

Refer to pages 48 – 49.

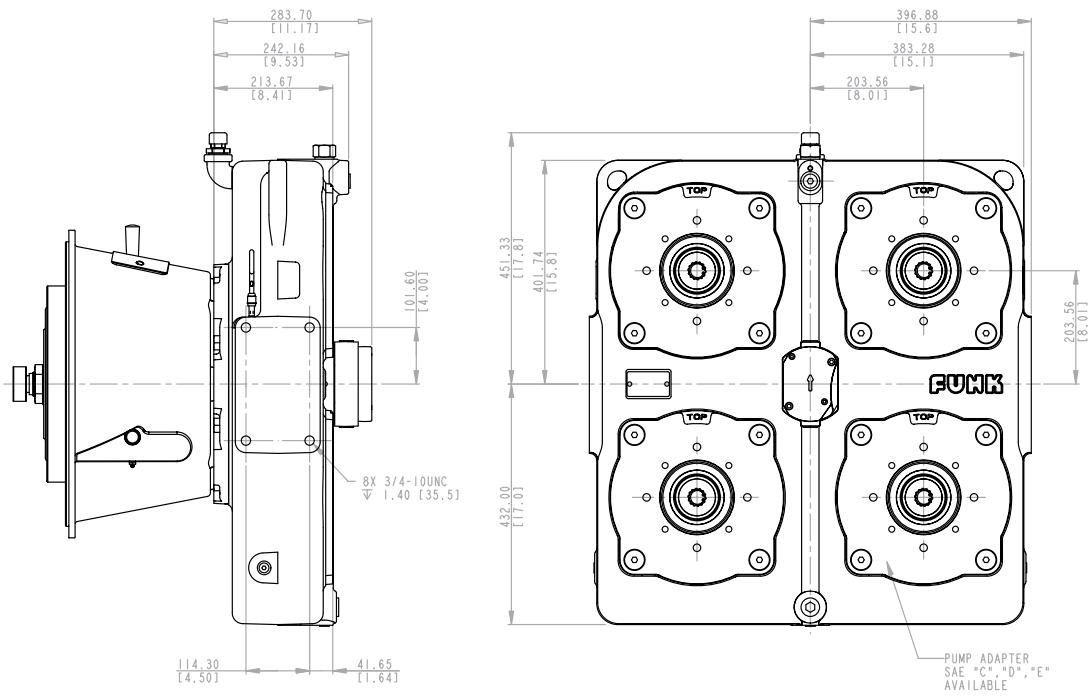
### 5716P



5716R



5716C

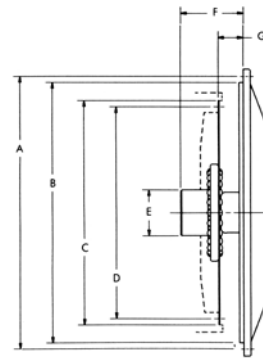


# Series 57000 option selections

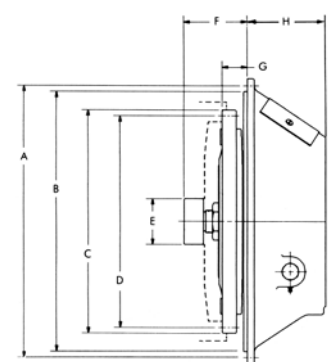
## Input

| Flywheel cover housing in (mm) |                |                |                   |
|--------------------------------|----------------|----------------|-------------------|
| SAE size                       | A dimension    | B dimension    | Bolts required    |
| 0                              | 26.750 (679.5) | 25.500 (647.7) | 16-1/2 (12.7)-13  |
| 1                              | 20.875 (530.2) | 20.125 (511.2) | 12-7/16 (11.1)-14 |
| 2                              | 18.375 (466.7) | 17.625 (447.7) | 12-3/8 (9.5)-16   |

Plate-driven



Clutch-driven



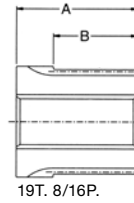
| Clutch cover housing in (mm) |                |                |                |                   |
|------------------------------|----------------|----------------|----------------|-------------------|
| SAE size                     | A dimension    | B dimension    | H dimension    | Bolts required    |
| 1                            | 20.875 (530.2) | 20.125 (511.2) | 10.250 (260.4) | 12-7/16 (11.1)-14 |

| Drive plate assembly in (mm) |                |                |             |       |              |
|------------------------------|----------------|----------------|-------------|-------|--------------|
| Nominal flywheel size        | C dimension    | D dimension    | G dimension | Holes | Hole size    |
| 11-1/2 (292.1)               | 13.875 (352.4) | 13.125 (333.4) | 1.56 (39.6) | 8     | 13/32 (10.3) |
| 14 (355.6)                   | 18.375 (466.7) | 17.250 (438.2) | 1.00 (25.4) | 16    | 17/32 (13.5) |
| 18 (457.2)                   | 22.5 (571.5)   | 21.375 (542.9) | .62 (15.7)  | 6     | 21/32 (16.7) |

| Pump drive clutch data in (mm) |            |                       |                |                |                             |              |             |       |              |
|--------------------------------|------------|-----------------------|----------------|----------------|-----------------------------|--------------|-------------|-------|--------------|
| Nominal clutch size            | Clutch no. | Working torque        | C dimension    | D dimension    | E dimension (pilot bearing) | F dimension  | G dimension | Holes | Hole size    |
| 11-1/2 (292.1)                 | SP-211     | 910 lb-ft (1233.1 Nm) | 13.875 (352.4) | 13.125 (333.4) | 2.44 (62.0) or 2.83 (72.0)  | 3.94 (100.0) | 1.56 (39.6) | 8     | 13/32 (10.3) |
| 14 (355.6)                     | SP-214     | 1620 lb-ft (2195 Nm)  | 18.375 (466.7) | 17.250 (438.2) | 2.83 (72.0) or 3.15 (80.0)  | 3.94 (100.0) | 1.00 (25.4) | 8     | 17/32 (13.5) |

Spline adapter

Specifications in (mm)



19T. 8/16P.

Output

Pump adapter sleeves in (mm)

| SAE size | A dimension  | B dimension  | Internal spline |
|----------|--------------|--------------|-----------------|
| C        | 2.88 (73.15) | 2.00 (50.80) | 14T. 12/24P.    |
| D        | 2.5 (63.5)   | 1.88 (47.78) | 13T. 8/16P.     |
| E        | 2.5 (63.5)   | 1.88 (47.78) | 13T. 8/16P.     |

Gear ratios

57000 four (14 in centers)

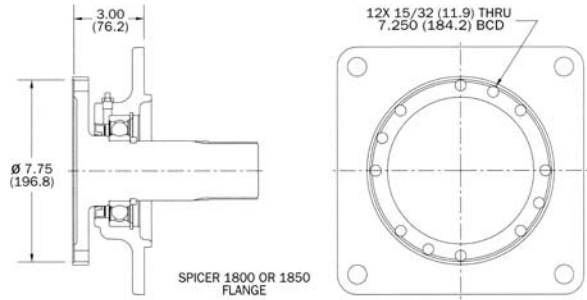
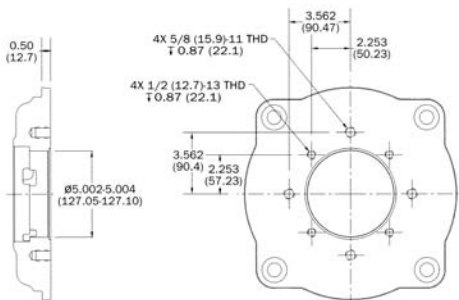
.667:1      .837:1      1:1      1.195:1

57000 four (16 in centers)

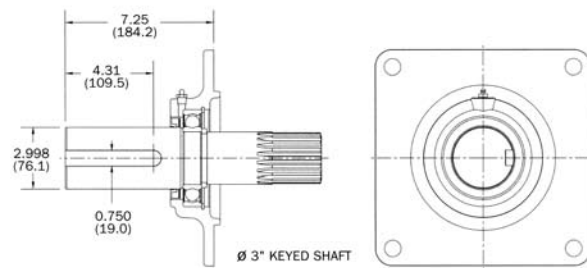
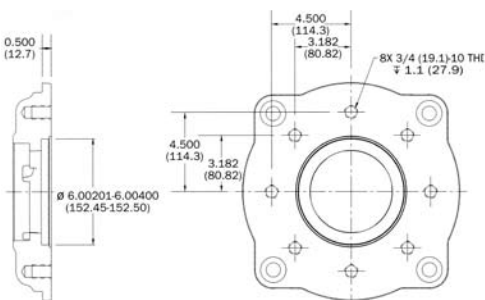
.774:1      .83:1      1:1      1.204:1

Pump adapter plates in (mm)

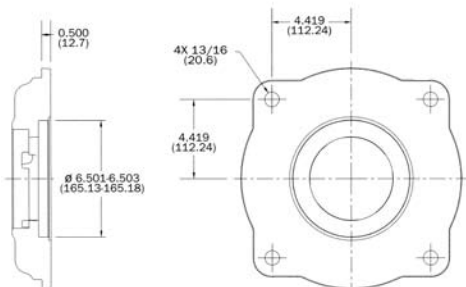
SAE C



SAE D



SAE E



# SAE engine flywheel and housing standards

The table and drawings below give dimensions for flywheel housings. The drawings also show spacing for 8-, 12-, and 16-bolt flange mounting patterns.

## Mating housing flanges

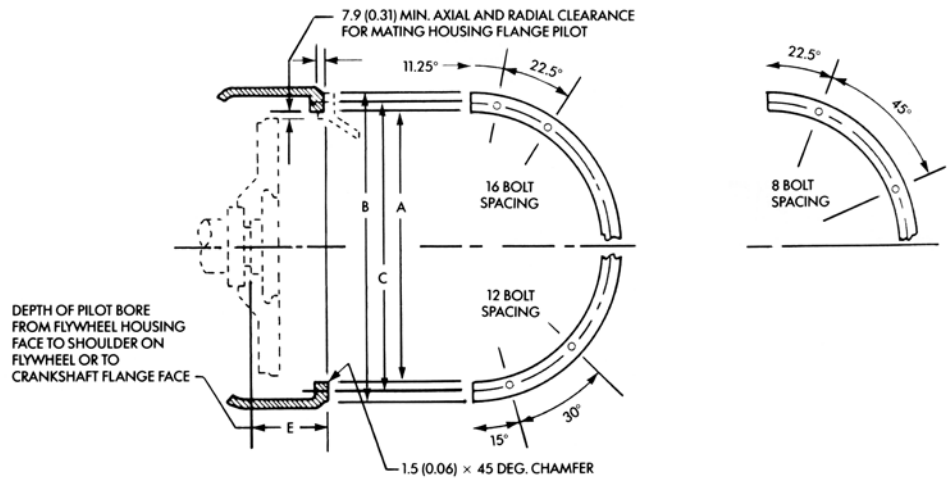
The capscrew holes on the mating housing flanges shall be 1.19 (0.047) larger than the nominal diameter of the capscrews used on the flywheel housing.

The diameter of the pilot on the flange of the mating housing shall be the same as the nominal diameter of the bore in the flywheel housing:

The tolerances shall be +0.000 and -0.13 (0.005), and the maximum eccentricity shall be 0.064 (0.0025) [indicated runout 0.13 (0.005)].

The mating housing flange pilot diameter shall be 6.4 (0.25) long, and its lead-in chamfer shall not exceed 2.0 (0.08) in length. The fillet radius between the mounting flange face and the pilot diameter shall not exceed 1.0 (0.04) R.

The maximum variation of the face of the mating housing flange from its true position, when rotated about its axis, shall be 0.064 (0.0025) [indicated runout 0.13 (0.005)].



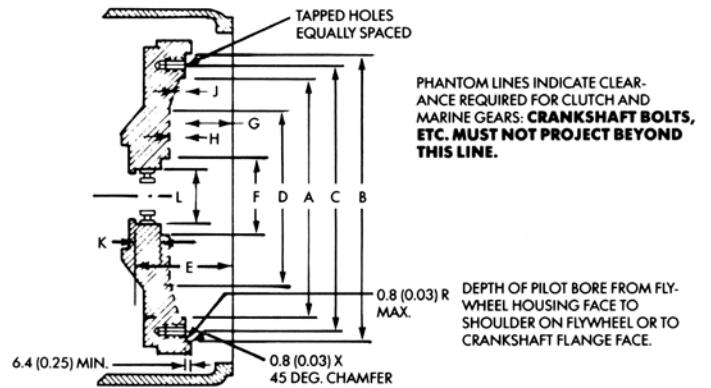
**Flywheel housing dimensions mm (in)**

| SAE no. | A               | Tolerance             |                                      | B             | C               | E            | Tapped holes |           |
|---------|-----------------|-----------------------|--------------------------------------|---------------|-----------------|--------------|--------------|-----------|
|         |                 | Bore diameter<br>0.00 | Bore eccentricity/<br>face deviation |               |                 |              | Holes        | Hole size |
| 00      | 787.40 (31.000) | +0.25 (0.010)         | 0.30 (0.012)                         | 882.6 (34.75) | 850.90 (33.500) | 100.0 (3.94) | 16           | 1/2-13    |
| 0       | 647.70 (25.500) | +0.25 (0.010)         | 0.25 (0.010)                         | 711.2 (28.00) | 679.45 (26.750) | 100.0 (3.94) | 16           | 1/2-13    |
| 1/2     | 584.20 (23.000) | +0.20 (0.008)         | 0.25 (0.010)                         | 647.7 (25.50) | 619.12 (24.375) | 100.0 (3.94) | 12           | 1/2-13    |
| 1       | 511.18 (20.125) | +0.13 (0.005)         | 0.20 (0.008)                         | 552.4 (21.75) | 530.22 (20.875) | 100.0 (3.94) | 12           | 7/16-14   |
| 2       | 447.68 (17.625) | +0.13 (0.005)         | 0.20 (0.008)                         | 489.0 (19.25) | 466.72 (18.375) | 100.0 (3.94) | 12           | 3/8-16    |
| 3       | 409.58 (16.125) | +0.13 (0.005)         | 0.20 (0.008)                         | 450.8 (17.75) | 428.62 (16.875) | 100.0 (3.94) | 12           | 3/8-16    |
| 4       | 361.95 (14.250) | +0.13 (0.005)         | 0.15 (0.006)                         | 403.4 (15.88) | 381.00 (15.000) | 100.0 (3.94) | 12           | 3/8-16    |
| 5       | 314.32 (12.375) | +0.13 (0.005)         | 0.15 (0.006)                         | 355.6 (14.00) | 333.38 (13.125) | 71.4 (2.81)  | 8            | 3/8-16    |
| 6       | 266.70 (10.500) | +0.13 (0.005)         | 0.15 (0.006)                         | 307.8 (12.12) | 285.75 (11.250) | 71.4 (2.81)  | 8            | 3/8-16    |

The tables and drawing give dimensions for flywheel housings.

For dimensions of industrial power take-offs with driving-ring-type over-center clutches, see SAE J620.

For flywheel dimensions for engine-mounted torque converters without front disconnect clutch, see SAE J927.



| Flywheel dimensions mm (in) |               |                   |                 |               |              |              |
|-----------------------------|---------------|-------------------|-----------------|---------------|--------------|--------------|
| Clutch no.                  | A             | B <sup>a, b</sup> | C               | D             | E            | F            |
| 6-1/2                       | 184.2 (7.25)  | 215.90 (8.500)    | 200.02 (7.875)  | 127.0 (5.00)  | 71.4 (2.81)  | 63.5 (2.50)  |
| 7-1/2                       | 206.2 (8.12)  | 241.30 (9.500)    | 222.25 (8.750)  | —             | 71.4 (2.81)  | 63.5 (2.50)  |
| 8                           | 225.6 (8.88)  | 263.52 (10.375)   | 244.48 (9.625)  | —             | 100.0 (3.94) | 76.2 (3.00)  |
| 10                          | 276.4 (10.88) | 314.32 (12.375)   | 295.28 (11.625) | 196.8 (7.75)  | 100.0 (3.94) | 76.2 (3.00)  |
| 11-1/2                      | 314.5 (12.38) | 352.42 (13.875)   | 333.38 (13.125) | 203.2 (8.00)  | 100.0 (3.94) | —            |
| 14                          | 409.4 (16.12) | 466.72 (18.375)   | 438.15 (17.250) | 222.2 (8.75)  | 100.0 (3.94) | 101.6 (4.00) |
| 16                          | 460.2 (18.12) | 517.52 (20.375)   | 488.95 (19.250) | 254.0 (10.00) | 100.0 (3.94) | 104.6 (4.12) |
| 18                          | 498.3 (19.62) | 571.52 (20.375)   | 542.92 (21.375) | —             | 100.0 (3.94) | 104.6 (4.12) |
| 21                          | 584.2 (23.00) | 673.10 (26.500)   | 641.35 (25.250) | —             | 100.0 (3.94) | 146.0 (5.75) |
| 24                          | 644.7 (25.38) | 733.42 (28.875)   | 692.15 (27.250) | —             | 100.0 (3.94) | 146.0 (5.75) |

| Flywheel dimensions mm (in) |             |             |             |                |                  |              |           |
|-----------------------------|-------------|-------------|-------------|----------------|------------------|--------------|-----------|
| Clutch no.                  | G           | H           | J           | K <sup>c</sup> | L <sup>bc</sup>  | Tapped holes |           |
|                             |             |             |             |                |                  | No. holes    | Hole size |
| 6-1/2                       | 30.2 (1.19) | 12.7 (0.50) | 9.7 (0.38)  | 17.5 (0.69)    | 52.000 (2.0472)  | 6            | 5/16-18   |
| 7-1/2                       | 30.2 (1.19) | 12.7 (0.50) | 12.7 (0.50) | 17.5 (0.69)    | 52.000 (2.0472)  | 8            | 5/16-18   |
| 8                           | 62.0 (2.44) | 12.7 (0.50) | 12.7 (0.50) | 19.0 (0.75)    | 62.000 (2.4409)  | 6            | 3/8-16    |
| 10                          | 53.8 (2.12) | 15.7 (0.62) | 12.7 (0.50) | 28.4 (1.12)    | 72.000 (2.8346)  | 8            | 3/8-16    |
| 11-1/2                      | 39.6 (1.56) | 28.4 (1.12) | 22.4 (0.88) | 31.8 (1.25)    | 72.000 (2.8346)  | 8            | 3/8-16    |
| 14                          | 25.4 (1.00) | 28.4 (1.12) | 22.4 (0.88) | 38.1 (1.50)    | 80.000 (3.1496)  | 8            | 1/2-13    |
| 16                          | 15.7 (0.62) | 28.4 (1.12) | 22.4 (0.88) | 44.4 (1.75)    | 100.000 (3.9370) | 8            | 1/2-13    |
| 18                          | 15.7 (0.62) | 31.8 (1.25) | 31.8 (1.25) | 44.4 (1.75)    | 100.000 (3.9370) | 6            | 5/8-11    |
| 21                          | 0.0 (0.00)  | 31.8 (1.25) | 31.8 (1.25) | 57.2 (2.25)    | 130.000 (5.1181) | 12           | 5/8-11    |
| 24                          | 0.0 (0.00)  | 31.8 (1.25) | 31.8 (1.25) | 57.2 (2.25)    | 130.000 (5.1181) | 12           | 3/4-10    |

NOTE: Suggested tolerances are to be measured on assembled engine; for measuring procedure, see SAE J1033.

\* Diameter tolerance of driving-ring pilot bore 'B' is +0.13 (0.005), -0.000; maximum eccentricity is 0.13 (0.005) total indicator reading (see footnote b); face runout maximum total indicator reading is 0.0005 times the measured diameter. Diameter tolerance for mating driving-ring, etc. pilot diameter is +0.000, -0.13 (0.005).

<sup>b</sup> Eccentricity between driving-ring pilot bore 'B' and pilot bearing bore 'L' is not to exceed 0.20 (0.008) total indicator reading.

<sup>c</sup> 'k' is length of bore for pilot bearing; 'L' is nominal diameter of bearing. Diameter and fit are to suit installation. Maximum eccentricity is 0.13 (0.005) total indicator reading (see footnote b).

<sup>d</sup> Tapped holes shall be threaded in accordance with UNC Class 2B tolerances of ANSI B1.1 screw threads, and the minimum length of thread engagement shall be 1.5 times the nominal diameter.

## Formulas

| Fluid power formulas                             |  |
|--|--|
| Formula for:                                     | Word formula   |
| <b>Fluid pressure</b><br>Pounds/square inch      | = $\frac{\text{force (lb)}}{\text{unit area (sq in)}}$   |
| <b>Cylinder area</b><br>Square inches (head end) | = $\pi \times \text{radius}^2 \text{ (in)}$ or<br>= $\pi \times \text{diameter}^2 \text{ (in)}/4$  |
| <b>Cylinder area</b><br>Square inches (rod end)  | = $\frac{\pi}{4} \times (\text{diameter piston}^2 - \text{diameter rod}^2)$  |
| <b>Cylinder force</b><br>Pounds, push or pull    | = pressure (psi) x net area (sq in)  |
| <b>Cylinder velocity</b><br>Feet/second          | = $\frac{231 \times \text{flow rate (gpm)}}{12 \times 60 \times \text{net area (sq in)}}$  |
| <b>Cylinder volume capacity</b><br>Gallons       | = $\frac{\pi \times \text{radius}^2 \text{ (in)} \times \text{stroke (in)}}{231}$<br>= $\frac{\text{net area (sq in)} \times \text{stroke (in)}}{231}$   |
| <b>Cylinder flow rate</b><br>Gallons/minute      | = $\frac{12 \times 60 \times \text{velocity (ft/sec)} \times \text{net area (sq in)}}{231}$  |
| <b>Fluid motor torque</b><br>Inch pounds         | = $\frac{\text{pressure (psi)} \times \text{F.M. displacement (in}^3\text{/rev)}}{2\pi}$<br>= $\frac{\text{horsepower} \times 63025}{\text{rpm}}$<br>= $\frac{\text{flow rate (gpm)} \times \text{pressure (psi)} \times 36.77}{\text{rpm}}$ |
| <b>Fluid motor speed</b><br>Revolutions/minute   | = $\frac{231 \times \text{flow rate (gpm)}}{\text{F.M. displacement (in}^3\text{/rev)}}$   |
| <b>Fluid motor power</b><br>Horsepower output    | = $\frac{\text{torque output (in/lb)} \times \text{rpm}}{63025}$   |
| <b>Pump outlet flow</b><br>Gallons/minute        | = $\frac{\text{rpm} \times \text{pump displacement (in}^3\text{/rev)}}{231}$   |
| <b>Pump input power</b><br>Horsepower required   | = $\frac{\text{flow rate output (gpm)} \times \text{pressure (psi)}}{1714 \times \text{efficiency (overall)}}$   |
| <b>Flow velocity</b><br>Feet/second              | = $\frac{.3208 \times \text{flow rate through I.D. (gpm)}}{\text{internal area (sq in)}}$  |



## Formulas (Metric)

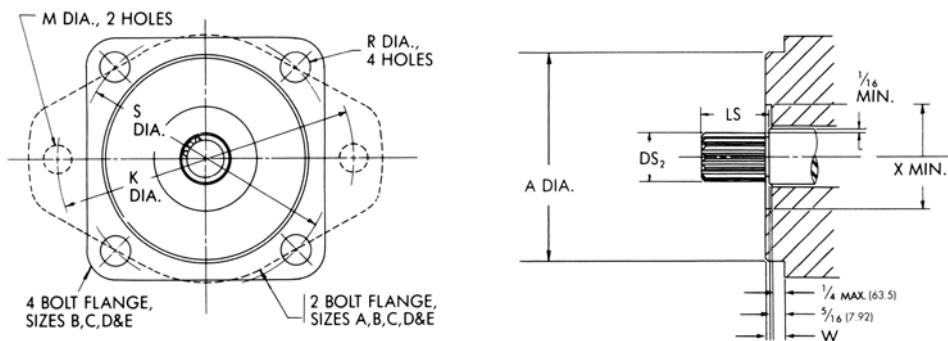
| Fluid power formulas                           |  |
|--|--|
| Formula for:                                   | Word formula   |
| Fluid pressure<br>(Bar)                        | = $\frac{\text{force (N)}}{\text{area (cm}^2\text{)} \times 10}$   |
| Cylinder area<br>(cm <sup>2</sup> ) (head end) | = $\pi \times \text{radius}^2 \text{ (cm)}$ or<br>= $\pi \times \text{diameter}^2 / 4$                             |
| Cylinder area<br>(cm <sup>2</sup> ) (rod end)  | = $\pi \times (\text{diameter piston}^2 - \text{diameter rod}^2) / 4$  |
| Cylinder force<br>(N)                          | = pressure (bar) x area (cm <sup>2</sup> ) x 10  |
| Cylinder velocity<br>(m/s)                     | = $\frac{\text{flow rate (l/min)}}{\text{cylinder area (cm}^2\text{)} \times 6}$                                   |
| Cylinder volume capacity<br>(liters)           | = $\frac{\text{cylinder area (cm}^2\text{)} \times \text{stroke (cm)}}{1000}$                                      |
| Cylinder flow rate<br>(l/m)                    | = area (cm <sup>2</sup> ) x velocity (m/s) x 600   |
| Fluid motor torque<br>(Nm)                     | = $\frac{\text{pres. (bar)} \times \text{displacement (cm}^3\text{/rev)} \times \text{efficiency}}{20 \times \pi}$ |
| Fluid motor speed<br>(rpm)                     | = $\frac{\text{flow (l/m)} \times 1000}{\text{displacment (cm}^3\text{/ rev)}}$                                    |
| Fluid motor power<br>(kW)                      | = $\frac{\text{torque (Nm)} \times \text{speed (rpm)}}{9549}$  |
| Pump outlet flow<br>(l/m)                      | = $\frac{\text{displacment (cm}^3\text{/ rev)} \times \text{speed (rpm)}}{1000}$                                   |
| Pump input power<br>(kW)                       | = $\frac{\text{flow (l/m)} \times \text{pressure (bar)}}{600 \times \text{efficiency}}$                            |
| Flow velocity<br>(m/s)                         | = $\frac{\text{flow (l/m)}}{\text{area (cm}^2\text{)} \times 6}$   |

# SAE hydraulic pump and motor drive standards

## SAE standards

The SAE standards and specifications shown below are intended primarily for hydraulic power transmission pumps and motors on construction and industrial machinery and equipment.

We provide pump mounting flange and spline configurations to match most typical SAE flange sizes used within the power range of the pump drive. Other non-SAE standard spline sizes may be available. Consult your John Deere Power Systems distributor for other spline sizes available.



| Flywheel housing dimensions in (mm) |                                  |                                |                  |                    |                    |                  |                  |                  |                  |                         |
|-------------------------------------|----------------------------------|--------------------------------|------------------|--------------------|--------------------|------------------|------------------|------------------|------------------|-------------------------|
| SAE size                            | A                                | W                              | X                | K                  | S                  | M                | R                | DS <sub>2</sub>  | LS               | Spline 30° involute     |
| A                                   | 3.250 (82.55)<br>3.248 (82.49)   | 0.250 (6.35)<br>0.230 (5.84)   | —                | 4.188<br>(106.38)  | —                  | 0.438<br>(11.13) | —                | .625<br>(15.88)  | 0.938<br>(23.82) | 9 Teeth<br>16/32 D. P.  |
| B                                   | 4.000 (101.60)<br>3.998 (101.55) | 0.380 (9.65)<br>0.360 (9.14)   | 2.000<br>(50.80) | 5.750<br>(146.05)  | 5.000<br>(127.00)  | 0.562<br>(14.27) | 0.562<br>(14.27) | .875<br>(22.23)  | 1.312<br>(33.32) | 13 Teeth<br>16/32 D. P. |
| BB                                  | 4.000 (101.60)<br>3.998 (101.55) | 0.360 (9.14)<br>0.340 (8.63)   | 2.000<br>(50.80) | 5.750<br>(146.05)  | 5.000<br>(127.00)  | 0.562<br>(14.27) | 0.562<br>(14.27) | 1.000<br>(25.40) | 1.500<br>(38.10) | 15 Teeth<br>16/32 D. P. |
| C                                   | 5.000 (127.00)<br>4.998 (126.95) | 0.500 (12.70)<br>0.480 (12.19) | 2.500<br>(63.5)  | 7.125<br>(180.98)  | 6.375<br>(161.93)  | 0.68<br>(17.27)  | 0.562<br>(14.27) | 1.25<br>(31.75)  | 1.875<br>(46.63) | 14 Teeth<br>12/24 D. P. |
| CC                                  | 5.000 (127.00)<br>4.998 (126.95) | 0.500 (12.70)<br>0.480 (12.19) | 2.500<br>(63.5)  | 7.125<br>(180.98)  | 6.375<br>(161.93)  | 0.688<br>(17.48) | 0.562<br>(14.27) | 1.500<br>(38.10) | 2.125<br>(53.98) | 17 Teeth<br>12/24 D. P. |
| D                                   | 6.000 (152.40)<br>5.998 (152.35) | 0.500 (12.70)<br>0.480 (12.19) | 2.750<br>(69.85) | 9.000<br>(228.60)  | 9.000<br>(228.60)  | 0.812<br>(20.62) | 0.812<br>(20.62) | 1.75<br>(44.45)  | 2.625<br>(66.68) | 13 Teeth<br>8/16 D. P.  |
| E                                   | 6.500 (165.10)<br>6.498 (165.05) | 0.625 (15.88)<br>0.605 (15.37) | 2.750<br>(69.85) | 12.500<br>(317.50) | 12.500<br>(317.50) | 1.062<br>(26.97) | 0.812<br>(20.62) | 1.75<br>(44.45)  | 2.625<br>(66.68) | 13 Teeth<br>8/16 D. P.  |
| F                                   | 7.000 (177.80)<br>6.998 (177.75) | 0.625 (15.88)<br>0.605 (15.37) | 2.750<br>(69.85) | 13.781<br>(350.04) | 13.781<br>(350.04) | 1.062<br>(26.97) | 1.062<br>(26.97) | 1.998<br>(50.75) | 3.125<br>(79.38) | 15 Teeth<br>8/16 D. P.  |

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