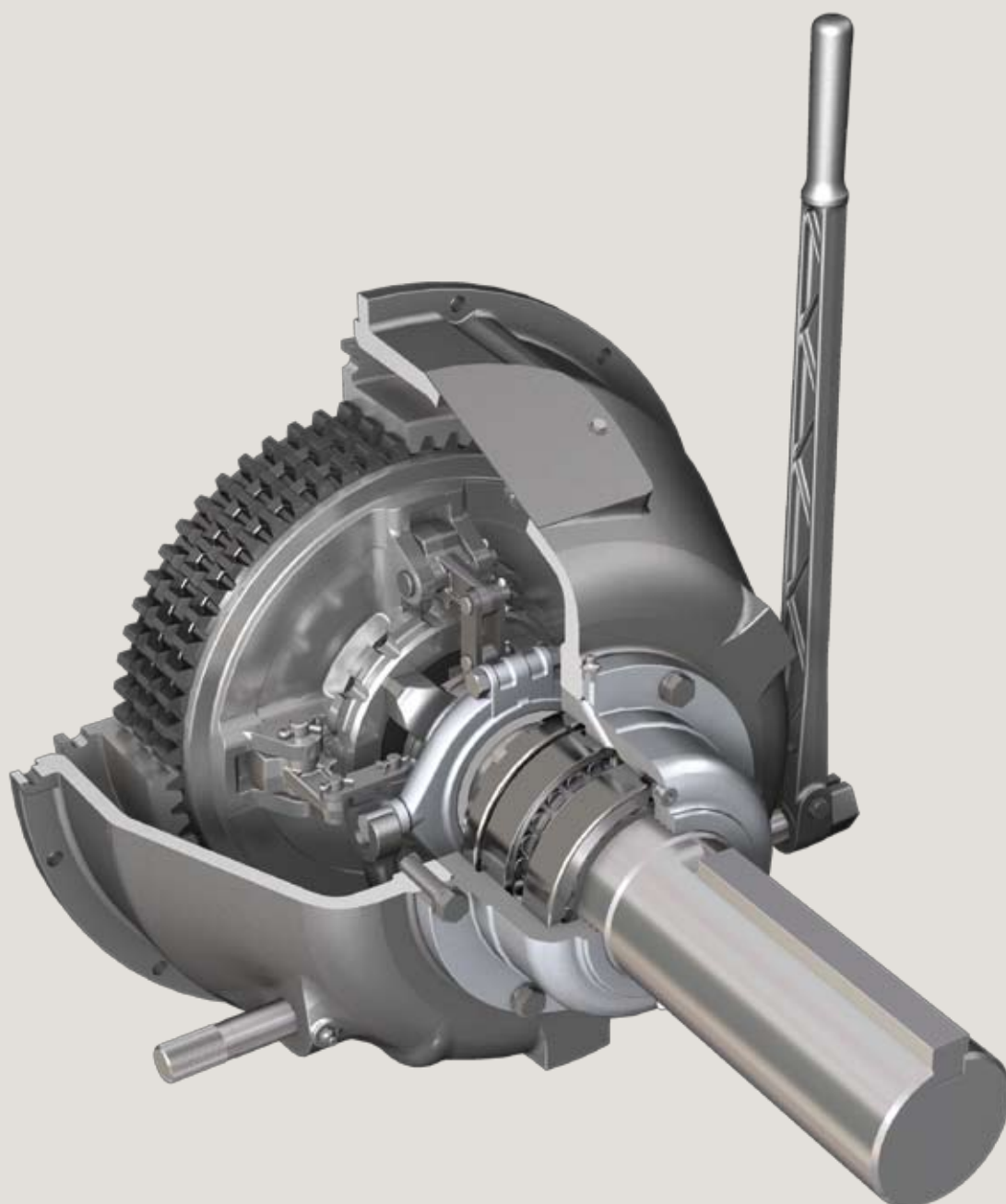




Power Take-Offs Engine mounted



Specifications

| PTO Model Number | Available Housing Sizes SAE | Max Clutch Torque Capacity Lb.ft (Nm) | Clutch Maximum HP (kW) Rating ¹ | | | | Max Operat. Speed RPM | Approx Weight Lbs. (kg) |
|---------------------|-----------------------------|---------------------------------------|--|-----------|-----------|-------------------|-----------------------|-------------------------|
| | | | Light 1 | Light 2 | Medium | Heavy | | |
| ZF EP11½ - 1 S3/S2 | 3,2 | 453 (612) | 125 (90) | 78 (60) | 63 (45) | 3000 | 145 (73) | |
| ZF EP11½ - 2 S3 /S2 | 3,2 | 906 (1224) | 250 (184) | 157 (115) | 125 (90) | | 180 (82) | |
| ZF EP11½ - 3 S3/S2 | 3,2 | 1576 (2130) | 437 (321) | 273 (201) | 218 (161) | 2500 | 220 (100) | |
| ZF EP14 - 1 S1/S0 | 1,0 | 810 (1088) | 186 (137) | 124 (91) | 101 (75) | 2500 ¹ | 265 (123) | |
| ZF EP14 - 2 S1/S0 | 1,0 | 1600 (2176) | 372 (273) | 248 (182) | 203 (149) | 2500 ² | 330 (182) | |
| ZF EP14 - 3 S1/S0 | 1,0 | 2400 (3264) | 558 (410) | 372 (273) | 304 (224) | | 410 (227) | |

¹ HP calculated at reference working speed of 1800 rpm.

² For application with higher speed engine, please contact ZF.

Note: High inertia loads or heavy shock applications may require consideration of higher class duty restrictions, which can lead to larger model choice. For evaluation of specific applications, please visit www.zf-marine.com or contact ZF.

Power (HP) = Torque (Nm) x Engine RPM / 7025; Power (HP) = Torque (Lb.ft) x Engine RPM / 5252

Duty Classification

Important Note:

A brief description of Duty Service definitions is stated below. In addition to this, during the selection process, other application factors must be considered, such as: Speed Limits – Side Load Limits – Clutch Torque Limits

The PTO Applications are usually clutch disconnect type with infrequent and low (idle) speed engagements. Engagements at higher input speed will reduce PTO components life. Clutch thermal capabilities must not be exceeded.

Light 1

The main use is for the clutch to disconnect the power, with very soft engagement that does not increase the temperature at the pressure plate outer surface. PTO Light 1 usage is for applications where operation is for one or more hours before disengagement of the clutch occurs.

Light 2

The primary use is for the clutch to disconnect the power, but the clutch does more work during the engagement than in Duty Class Light 1, and the pressure plate temperature should not increase more than 50°F (28°C) above ambient. Clutch engagement must occur within two seconds. PTO Light 2 usage is for applications where operation is for one or more hours before disengagement of the clutch occurs. See the above table for the maximum horsepower (kW) the clutch can absorb for this type of duty.

Medium

The pressure plate temperature must not increase more than 100°F (56°C) above ambient. Clutch engagement must occur within three seconds. PTO Medium Duty usage is for applications where operation is for one or more hours before disengagement of the clutch occurs. See the above table for the maximum horsepower (kW) the clutch can absorb for this type of duty.

Heavy

The pressure plate temperature must not increase more than 150°F (83°C) above ambient. Clutch engagement must occur within four seconds. PTO heavy Duty usage is for applications where operation is for one or more hours before disengagement of the clutch occurs. See the above table for the maximum horsepower (kW) the clutch can absorb for this type of duty.³

Examples

| Light Duty 1 | Light Duty 2 | Medium Duty | Heavy Duty |
|--|--|--|---|
| Centrifugal, hydraulic, irrigation pumps, agitators pure liquids | Generators, elevators, bow thrusters, line shafts, all types of machines with uniform loads, non reversing | Blowers, fans, screw/centrifugal compressors, centrifugal dredge pumps, elevators non uniformly loaded | Rock crushers, mud pumps, barking drums, impact load machines, mills ball type, road planers ³ |

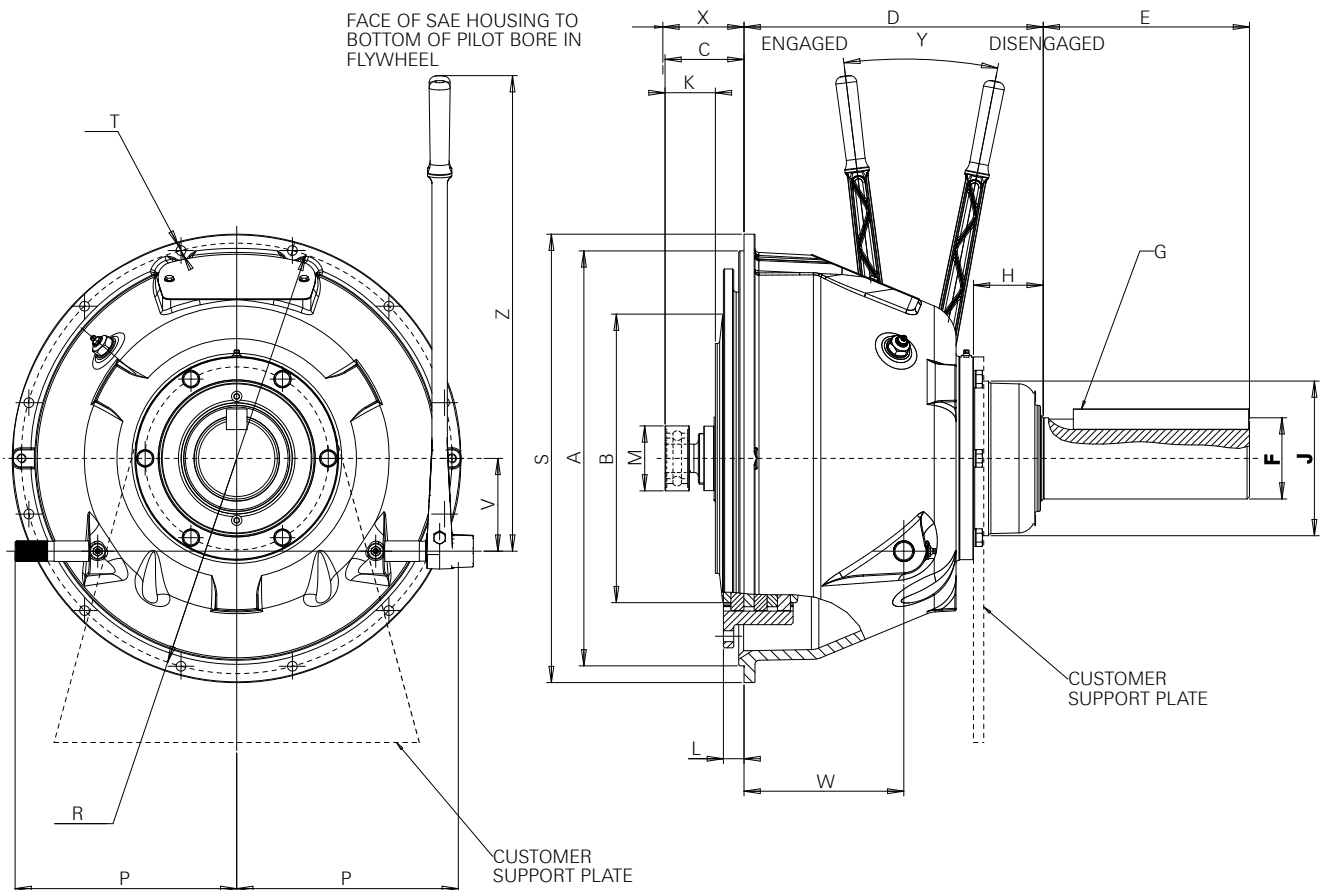
³ For Heavy Duty applications not falling in the above category please contact ZF.

Dimensions

| PTO Model number | | SHAFT | | | B PTO Dia | C | H | J | M +0,000 -0,005 +0,000 -0,013 | D | V | W | X | K | L | Z | Degrees Operating Lever Travel |
|-----------------------|--------|---|-------------|------------------|-----------|------|------|-------|---|-------|-------|-------|------|------|------|-------|--------------------------------|
| | | F +0,000 -0,001 +0,000 -0,025 | E Length | G Key Size | | | | | | | | | | | | | |
| ZF EP11½ - 1 S3/S2 | inches | 2,250 | 6,50 | 5/8x 5/8 | 11,42 | 3,88 | 3,75 | 5,75 | 2,836 | 9,23 | 3,00 | 3,94 | 3,94 | 1,83 | 1,56 | 25,00 | 15,50 ° |
| | mm | 57,15 | 165 | 15,9x 15,9 | 290 | 98,5 | 95,3 | 146,1 | 72,0 | 234,5 | 76,2 | 81,0 | 100 | 46,5 | 39,6 | 390,0 | |
| ZF EP11½ - 2 S3/S2 | inches | 2,500 | 6,50 | 5/8x 5/8 | 11,42 | 3,88 | 3,00 | 6,50 | 2,836 | 9,67 | 3,75 | 4,06 | 3,94 | 1,97 | 1,56 | 25,00 | 15,50 ° |
| | mm | 63,5 | 165 | 15,9x 15,9 | 290 | 98,5 | 76,2 | 165,1 | 72,0 | 245,5 | 95,25 | 103 | 100 | 50 | 39,6 | 390,0 | |
| ZF EP11½ - 3 S3/S2 | inches | 3,500 | 10,00 | 7/8x 7/8 | 11,42 | 3,82 | 3,39 | 7,50 | 2,836 | 13,90 | 4,50 | 7,06 | 3,94 | 2,32 | 1,56 | 23,38 | 18 ° |
| | mm | 88,9 | 254,0 | 22,22x 22,22 | 290 | 97,0 | 86 | 190,5 | 72,0 | 353 | 114,3 | 179,3 | 100 | 58,9 | 39,7 | 590,0 | |
| ZF EP14 - 1 S1/S0 | inches | 3,000 | 8,50 | 3/4x 3/4 | 14,00 | 3,82 | 3,44 | 6,66 | 3,147 | 12,13 | 4,50 | 5,44 | 3,94 | 2,44 | 1,00 | 23,38 | 18 ° |
| | mm | 76,2 | 216 | 19,05x 19,05 | 355,5 | 97,0 | 87,4 | 169,2 | 80,0 | 308 | 114,3 | 138,2 | 100 | 62 | 25,4 | 590,0 | |
| ZF EP14 - 2 S1/S0 | inches | 3,500 | 10,00 | 7/8 x 7/8 | 14,00 | 3,82 | 3,39 | 7,50 | 3,147 | 13,74 | 4,50 | 6,63 | 3,94 | 2,40 | 1,00 | 23,38 | 18 ° |
| | mm | 88,9 | 254 | 22,22x 22,22 | 355,5 | 97,0 | 86 | 190,5 | 80,0 | 349 | 114,3 | 168,4 | 100 | 61 | 25,4 | 590,0 | |
| ZF EP14 - 3 S1/S0 | inches | 3,938 | 10,00 | 1x1 | 14,00 | 3,82 | 3,39 | 7,50 | 3,147 | 14,51 | 4,50 | 7,80 | 3,94 | 2,44 | 1,0 | 23,38 | 18 ° |
| | mm | 100,025 | 254 | 25,4x 25,4 | 355,5 | 97,0 | 86 | 190,5 | 80,0 | 368,5 | 114,3 | 196,9 | 100 | 62 | 25,4 | 590,0 | |

For triple 11, 5" PTO and for double and triple plate 14" P.T.O.'s support plates are required, on side loaded applications, and is recommended for in-line applications.

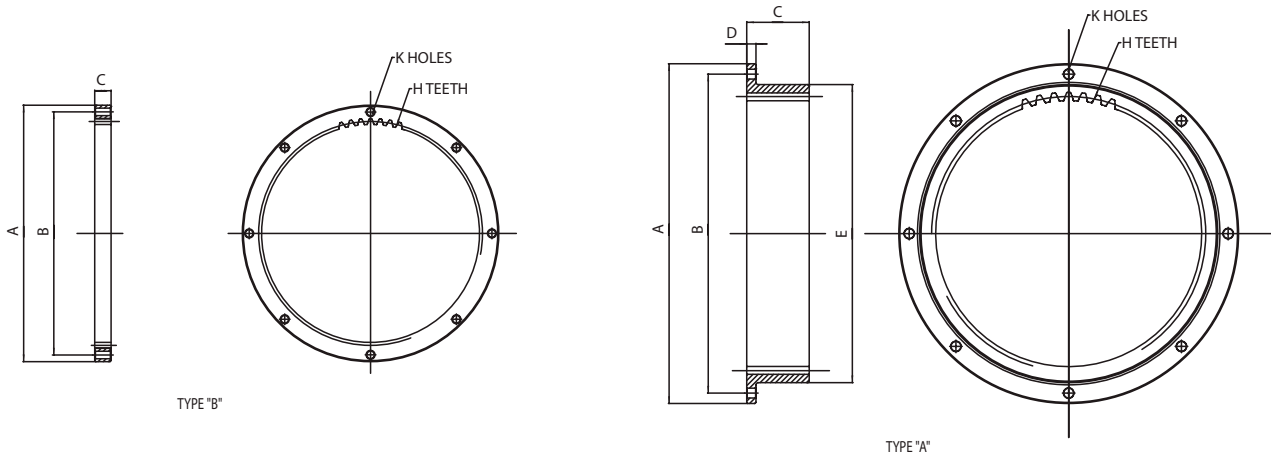
Note: All P.T.O. models have grease lubricated main bearings. Pilot bearing offered as an option.



Housing Flanges Dimensions

| SAE HSG No | A | | R | | S | | T (Bolt Holes) | | | P Shaft Length | | g Degrees |
|------------|------------------|----------------|--------|-------|--------|-------|----------------|----------|-------|----------------|--------|-----------|
| | +0,000 -0,005 | +0,00 -0,13 | inches | mm | inches | mm | No | Diameter | | inches | mm | |
| | inches | mm | | | | | | inches | mm | | | |
| 3 | 16,125 | 409,6 | 16,88 | 428,6 | 17,75 | 450,8 | 12 | 0,413 | 10,50 | 9,75 | 247,50 | 15 ° |
| 2 | 17,625 | 447,65 | 18,38 | 466,7 | 19,25 | 489,0 | 12 | 0,413 | 10,50 | 9,75 | 247,50 | 15 ° |
| 1 | 20,125 | 511,18 | 20,88 | 530,2 | 21,75 | 552,4 | 12 | 0,47 | 12,00 | 9,75 | 247,50 | 15 ° |
| 0 | 25,50 | 647,7 | 26,75 | 679,5 | 28,00 | 711,2 | 16 | 0,53 | 13,5 | 12,75 | 323,9 | 11,25 ° |

Driving Rings (Dynamically Balanced)



Note: All drive rings are made in nodular iron.

| PTO Model Number | Type Ring | A Dia +0,000 -0,005 +0,00 -0,13 | B Bolt Circle | C | D | E | K Holes | | H Teeth 20° P.A. | | Approx Weight Lbs (kg) | |
|--------------------|--------------|---|------------------|----------------|--------------|--------------|----------------|--------------|------------------|-------|------------------------|----------------|
| | | | | | | | No | Size | No | P. | | |
| ZF EP11½ - 1 S3/S2 | inches mm | A | 13,875 352,43 | 13,13 333,5 | 0,90 22,5 | - - | 8 | 0,41 10,3 | 72 | 6 / 8 | 8,2 (3,7) | |
| ZF EP11½ - 2 S3/S3 | inches mm | A | 13,875 352,43 | 13,13 333,5 | 1,89 48,0 | - - | 8 | 0,41 10,3 | 72 | 6 / 8 | 17,8 (8,0) | |
| ZF EP11½ - 3 S3/S3 | inches mm | A | 13,875 352,43 | 13,13 333,5 | 3,13 79,5 | - - | 8 | 0,41 10,3 | 72 | 6 / 8 | 30,0 (13,5) | |
| ZF EP14 - 1 S1/S0 | inches mm | B | 18,375 466,73 | 17,25 438,2 | 1,13 28,6 | 0,50 12,7 | 16,00 406,4 | 8 | 0,53 13,5 | 59 | 4 / 5 | 16,7 (7,5) |
| ZF EP14 - 2 S1/S0 | inches mm | B | 18,375 466,73 | 17,25 438,2 | 2,38 60,5 | 0,50 12,7 | 16,13 409,7 | 8 | 0,53 13,5 | 59 | 4 / 5 | 28,2 (12,7) |
| ZF EP14 - 3 S1/S0 | inches mm | B | 18,375 466,73 | 17,25 438,2 | 3,38 85,8 | 0,50 12,7 | 16,13 409,7 | 8 | 0,53 13,5 | 59 | 4 / 5 | 35,1 (15,8) |

Important Note

Use Operational Manual and carefully follow instructions for installation.

Side Loads

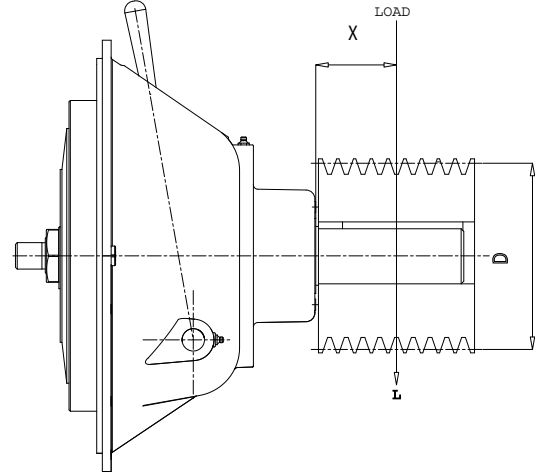
The following formula should be used for determining

$$L = \frac{126000 \times HP}{N \times D} \times FL \times SF$$

the actual side load 'L' (lbs.):

Where:

- L = Actual side load (lbs.)
- HP = Engine horsepower
- N = Shaft speed (RPM)
- D = Pitch Dia. (in.) of pulley, chain on gear
- FL = Load Factor
 - 1,0 for chain or gear drive
 - 1,5 for timing belt
 - 2,5 for V belt
 - 3,5 for flat belt



SF = Shock Factor → 2,1 for reciprocating compressors and other severe shock drives and 1,8 for large inertia type drives

| PTO Model number | RPM | "X" Distance, inches (mm) | | | | | | | | | | | | | | | | | |
|------------------|------|---------------------------|------|----------|------|----------|------|-----------|------|---------|------|-----------|------|-----------|------|-----------|------|-----------|------|
| | | 1 (25,4) | | 2 (50,8) | | 3 (76,2) | | 4 (101,6) | | 5 (127) | | 6 (152,4) | | 7 (177,8) | | 8 (203,2) | | 9 (228,6) | |
| | | N | LBF | N | LBF | N | LBF | N | LBF | N | LBF | N | LBF | N | LBF | N | LBF | N | LBF |
| ZF EP11½ - 1 | 1000 | 12460 | 2800 | 11570 | 2600 | 9924 | 2230 | 8233 | 1850 | 6942 | 1560 | | | | | | | | |
| | 1200 | 11570 | 2600 | 10903 | 2450 | 9924 | 2230 | 8233 | 1850 | 6942 | 1560 | | | | | | | | |
| | 1800 | 10235 | 2300 | 9701 | 2180 | 8900 | 2000 | 8233 | 1850 | 6942 | 1560 | | | | | | | | |
| | 2400 | 9434 | 2120 | 8900 | 2000 | 8277 | 1860 | 7788 | 1750 | 6942 | 1560 | | | | | | | | |
| ZF EP11½ - 2 | 1000 | 20114 | 4520 | 15130 | 3400 | 12015 | 2700 | 10013 | 2250 | 8455 | 1900 | 7565 | 1700 | | | | | | |
| | 1200 | 19358 | 4350 | 15130 | 3400 | 12015 | 2700 | 10013 | 2250 | 8455 | 1900 | 7565 | 1700 | | | | | | |
| | 1800 | 17355 | 3900 | 15130 | 3400 | 12015 | 2700 | 10013 | 2250 | 8455 | 1900 | 7565 | 1700 | | | | | | |
| | 2400 | 15575 | 3500 | 14685 | 3300 | 12015 | 2700 | 10013 | 2250 | 8455 | 1900 | 7565 | 1700 | | | | | | |
| | 2800 | 15063 | 3385 | 14018 | 3150 | 12015 | 2700 | 10013 | 2250 | 8455 | 1900 | 7565 | 1700 | | | | | | |
| ZF EP11½ - 3 | 1000 | 21952 | 4935 | 17259 | 3880 | 14234 | 3200 | 12099 | 2720 | 10520 | 2365 | 9297 | 2090 | 8340 | 1875 | 7562 | 1700 | | |
| | 1800 | 21952 | 4935 | 17259 | 3880 | 14234 | 3200 | 12099 | 2720 | 10520 | 2365 | 9297 | 2090 | 8340 | 1875 | 7562 | 1700 | | |
| | 2500 | 21952 | 4935 | 17259 | 3880 | 14234 | 3200 | 12099 | 2720 | 10520 | 2365 | 9297 | 2090 | 8340 | 1875 | 7562 | 1700 | | |
| | 3000 | 21129 | 4750 | 17259 | 3880 | 14234 | 3200 | 12099 | 2720 | 10520 | 2365 | 9297 | 2090 | 8340 | 1875 | 7562 | 1700 | | |
| ZF EP14 - 1 | 1000 | 15130 | 3400 | 11570 | 2600 | 9345 | 2100 | 7899 | 1775 | 6675 | 1500 | 6008 | 1350 | 5340 | 1200 | 4895 | 1100 | | |
| | 1500 | 15130 | 3400 | 11570 | 2600 | 9345 | 2100 | 7899 | 1775 | 6675 | 1500 | 6008 | 1350 | 5340 | 1200 | 4895 | 1100 | | |
| | 2000 | 15130 | 3400 | 11570 | 2600 | 9345 | 2100 | 7899 | 1775 | 6675 | 1500 | 6008 | 1350 | 5340 | 1200 | 4895 | 1100 | | |
| | 2200 | 15130 | 3400 | 11570 | 2600 | 9345 | 2100 | 7899 | 1775 | 6675 | 1500 | 6008 | 1350 | 5340 | 1200 | 4895 | 1100 | | |
| ZF EP14 - 2 | 1000 | 26700 | 6000 | 20915 | 4700 | 17222 | 3870 | 14685 | 3300 | 12683 | 2850 | 11214 | 2520 | 10146 | 2280 | 9123 | 2050 | | |
| | 1500 | 26700 | 6000 | 20915 | 4700 | 17222 | 3870 | 14685 | 3300 | 12683 | 2850 | 11214 | 2520 | 10146 | 2280 | 9123 | 2050 | | |
| | 2000 | 26700 | 6000 | 20915 | 4700 | 17222 | 3870 | 14685 | 3300 | 12683 | 2850 | 11214 | 2520 | 10146 | 2280 | 9123 | 2050 | | |
| | 2200 | 26700 | 6000 | 20915 | 4700 | 17222 | 3870 | 14685 | 3300 | 12683 | 2850 | 11214 | 2520 | 10146 | 2280 | 9123 | 2050 | | |
| ZF EP14 - 3 | 1000 | 27368 | 6150 | 22695 | 5100 | 18690 | 4200 | 15798 | 3550 | 13795 | 3100 | 12104 | 2720 | 10903 | 2450 | 9790 | 2200 | 8989 | 2020 |
| | 1500 | 23808 | 5350 | 22695 | 5100 | 18690 | 4200 | 15798 | 3550 | 13795 | 3100 | 12104 | 2720 | 10903 | 2450 | 9790 | 2200 | 8989 | 2020 |
| | 2000 | 22295 | 5010 | 21138 | 4750 | 18690 | 4200 | 15798 | 3550 | 13795 | 3100 | 12104 | 2720 | 10903 | 2450 | 9790 | 2200 | 8989 | 2020 |
| | 2200 | 21583 | 4850 | 20693 | 4650 | 18690 | 4200 | 15798 | 3550 | 13795 | 3100 | 12104 | 2720 | 10903 | 2450 | 9790 | 2200 | 8989 | 2020 |

ZF Marine Arco S.p.A

Via S. Andrea, 16

I - 38062 Arco (TN)

ITALY

Phone +39 0464 580 555

Fax +39 0464 580 544

www.ZF-Marine.com



Driveline and Chassis Technology