

QUALITY AND TECHNOLOGY

PLANETARY



GEAR BOXES

 RR USA Inc.

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GENERAL INFORMATION

PLANET GEAR BEARINGS

Roller bearings for excellent start-up torque.

OPTIONAL OUTPUT FLANGES

At customer's request and interchangeable with other manufacturers.

OUTPUT SUPPORT BEARINGS

Two tapered roller bearings are used to support loads on the shaft.

INTERNAL GEARS & RING GEAR

Case hardened alloy steel

| RING GEAR | SUNGEAR | PLANETS |
|-----------|-----------|-----------|
| 60-62 HRC | 60-62 HRC | 60-62 HRC |

LUBRICATION

All our gear boxes are supplied without oil. Proper lubrication is an important factor in the operational performance of the unit. For most application, we recommend to use EP 80/90 gear lube. As to the oil change intervals, we recommend initial lubrication change after 50 hours of operation and interval changes every 1000 hours or once yearly whichever comes first.

Maintaining proper oil levels as well as regular oil changes will reduce wear and provide maximum bearing and gear life.

Failure to properly lubricate the drive will void all warranties.

| SAE VISCOSITY GRADE | MIN.TEMPERATURE RANGE |
|---------------------|-----------------------|
| 75W-90 | -40°F (-40°C) |
| 80W,80W-90 | -15°F (-26°C) |
| 85W,85W-90 | 10°F (-12°C) |
| 90 | 35°F (2°C) |

GEAR BOX RATINGS & SERVICE FACTORS

Ratings in this catalog are based on a 1.00 service factor and should be free from recurrent shock loads. Ratings are determined by the limitation of speed, torque, load capacities, power and their relation with the gear box's mechanical and thermal capacity. For other operating conditions, the rated continuous torque capacity should be increased or decreased by dividing by the proper service factor listed in the chart.

| DURATION DAY | UNIFORM LOAD | MEDIUM LOAD | HEAVY LOAD |
|------------------------|--------------|-------------|------------|
| Occasional 1/2 hrs | 0.80 | 1.00 | 1.50 |
| Intermittent 3 hrs/day | 1.00 | 1.25 | 1.75 |
| Up to 10 hrs/day | 1.25 | 1.50 | 2.00 |
| 24 hrs/day | 1.50 | 1.75 | 2.25 |

GEAR BOX SELECTION EXAMPLE

The following is a sample of a planetary gear box selection. We will guide you through the following easy steps which will enable you to be confident in future selections.

Given information:

- Gear box output torque required = 14,500 in-lbs
- Gear box output speed required = 30 RPM
- System hydraulic pressure = 2,500 PSI
- System flow = 6 GPM
- Radial load location = @ 2" from gear box mounting face
- Duty cycle = 3 hrs/day with moderate shock loads

STEP 1

DETERMINE EXACT OUTPUT TORQUE REQUIRED

Multiply output torque required by the proper service factor given in the chart.

14,500 in-lbs x 1.25 = 18,125 in-lbs (1.25 is taken from service factor chart).

From the catalog we find that the max continuous output torque of either the CF or FF is 29,500 in-lbs for the 5.18:1 ratio and 35,500 in-lbs for the 4.19:1 ratio. This means that the gear boxes in this catalog are adequate for our application.

STEP 2

VERIFY OUTPUT SHAFT BEARING'S LOAD CAPACITY AND LIFE WITH GIVEN LOAD AND LOCATION.

Compare the 4,000 lb. radial load @ 2" from mounting flange with the bearing curve chart shown in the catalog. The bearing load chart of both gearboxes shows adequate shaft bearing life and capacity.

STEP 3

SELECT GEARBOX RATIO AND SIZE HYDRAULIC MOTOR

Motor torque and speed for each available ratio should be determined.

Input torque = Output Torque / Gear Box Ratio / Gear Box efficiency.

Gear Box Input Speed = Gear Box Output Speed x Gear Box Ratio.

Approximate motor displacement can be determined by using the following equation:

Motor Displacement = Motor Torque in-lbs x (2x3.14)/PSI.

Lets choose for example ratio 5.18:1 to start with. The needed motor torque and speed to be able to output 14,500 in-lbs @ 30 rpm is 2,800 in-lbs at a speed of 155 rpm.

Motor Displacement = 2,800 in-lbs x (2x3.14) / 2,500 PSI
 Motor Displacement = 7.03 cu-in/rev (a standard displacement nearby would be 7.62 cu-in/rev).

Motor speed (RPM) = GPM x 231 / (Displacement x efficiency).

= 6 GPM x 231 / 7.62 cu-in/rev = 162 RPM. The speed is adequate for our needs.

Check motor torque @ 7.62 cu-in/rev and 2500 PSI.
 Motor torque = 7.62 cu-in/rev x 2500 PSI x 0.9 (motor efficiency) / 6.28 = 2,730 in-lbs.

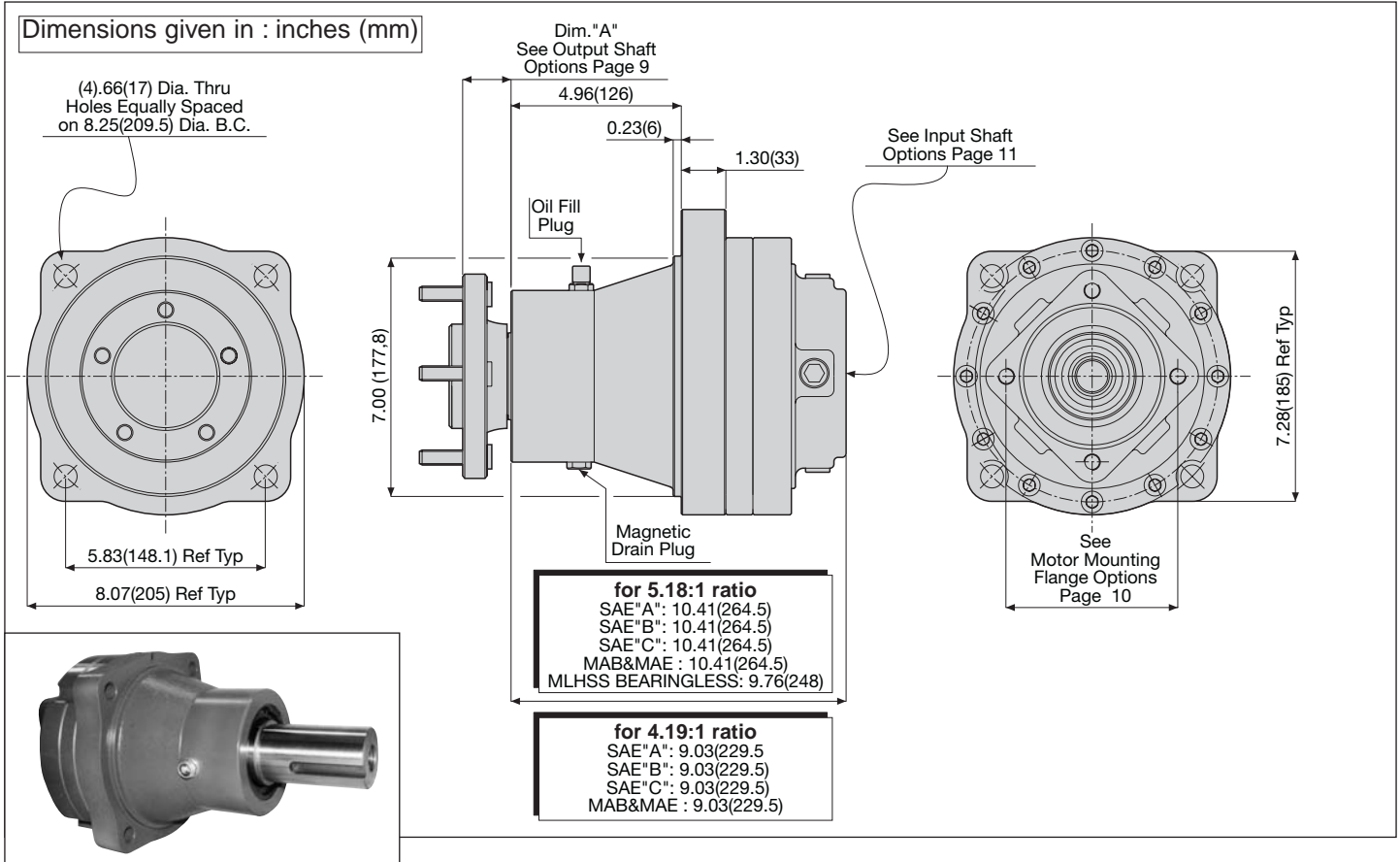
The last information we can check is the output speed of the gear box.

Gear box output speed = Motor speed / Gear box ratio
 Gear box output speed = 162 / 5.18 = 31.27 RPM

We hope this simple example could assist you during any future gear box selection. In case you have further questions or require additional assistance, we always welcome you to contact RR-TCI USA and we will be pleased to assist you at any time.

| RATIO | GEAR BOX INPUT TORQUE | GEAR BOX INPUT SPEED |
|-------|-----------------------|----------------------|
| 4.19 | 3,530 in-lbs | 125 rpm |
| 5.18 | 2,800 in-lbs | 155 rpm |

MODEL CF380 SHAFT OUTPUT-SINGLE STAGE REDUCTION



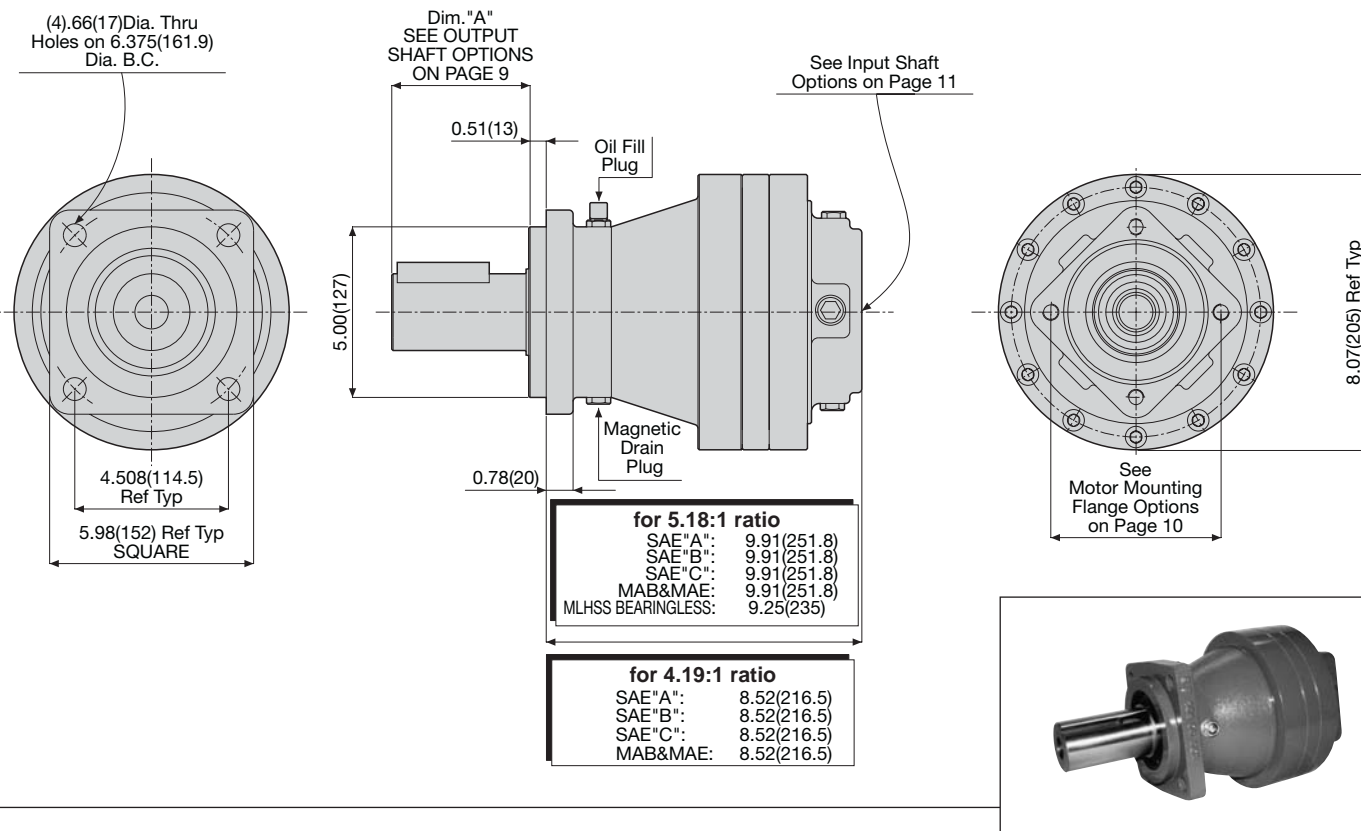
GEAR BOX TECHNICAL FEATURES

| | | | | |
|------------------------|-------------------------------|------------------|------------|---------------|
| 5.18:1 RATIO | Max Continuous Output Torque* | 29,500 LB-in | (340daNm) | |
| | Max Input Speed | 3000 Rpm | | |
| | Reduction Ratio | 5.18:1 | | |
| | Max Output Radial Shaft Load | 21,000 LB | (9,500 Kg) | |
| | Max Output Thrust Load | 7,700 LB | (3,500 Kg) | |
| | Lube Oil Capacity | Vertical Mount | 2.60 Pints | (1.23 Liters) |
| | | Horizontal Mount | 1.30 Pints | (0.61 Liters) |
| Approximate Weight Dry | 77 LB | (35 Kg) | | |
| 4.19:1 RATIO | Max Continuous Output Torque* | 35,500 LB-in | (415daNm) | |
| | Max Input Speed | 3000 Rpm | | |
| | Reduction Ratio | 4.19:1 | | |
| | Max Output Radial Shaft Load | 21,000 LB | (9,500 Kg) | |
| | Max Output Thrust Load | 7,700 LB | (3,500 Kg) | |
| | Lube Oil Capacity | Vertical Mount | 2.60 Pints | (1.23 Liters) |
| | | Horizontal Mount | 1.30 Pints | (0.61 Liters) |
| Approximate Weight Dry | 75 LB | (34 Kg) | | |

* Output torque values shown are based on a 2000 hours B10 Life and should result in acceptable life for most applications. Applications requiring both high output torque and high output speed will reduce the expected life for the unit so please contact RR-TCI USA for final approval

MODEL FF380 SHAFT OUTPUT-SINGLE STAGE REDUCTION

Dimensions given in : inches (mm)

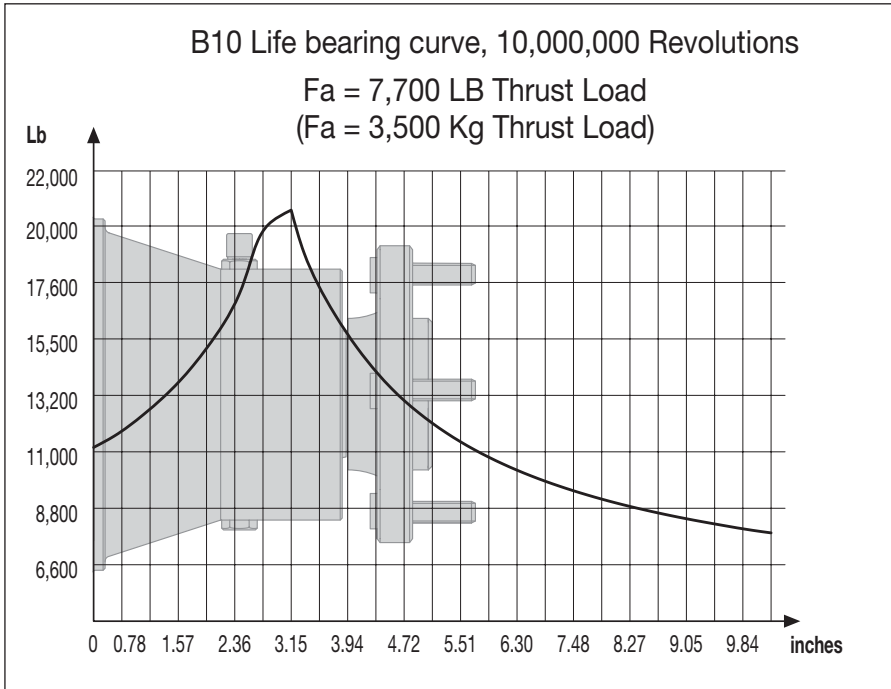


GEAR BOX TECHNICAL FEATURES

| | | | | |
|------------------------|-------------------------------|------------------|------------|---------------|
| 5.18:1 RATIO | Max Continuous Output Torque* | 29,500 LB-in | (340daNm) | |
| | Max Input Speed | 3000 Rpm | | |
| | Reduction Ratio | 5.18:1 | | |
| | Max Output Radial Shaft Load | 21,000 LB | (9,500 Kg) | |
| | Max Output Thrust Load | 7,700 LB | (3,500 Kg) | |
| | Lube Oil Capacity | Vertical Mount | 2.60 Pints | (1.23 Liters) |
| | | Horizontal Mount | 1.30 Pints | (0.61 Liters) |
| Approximate Weight Dry | 72,7 LB | (33 Kg) | | |
| 4.19:1 RATIO | Max Continuous Output Torque* | 35,500 LB-in | (415daNm) | |
| | Max Input Speed | 3000 Rpm | | |
| | Reduction Ratio | 4.19:1 | | |
| | Max Output Radial Shaft Load | 21,000 LB | (9,500 Kg) | |
| | Max Output Thrust Load | 7,700 LB | (3,500 Kg) | |
| | Lube Oil Capacity | Vertical Mount | 2.60 Pints | (1.23 Liters) |
| | | Horizontal Mount | 1.30 Pints | (0.61 Liters) |
| Approximate Weight Dry | 70.5 LB | (32 Kg) | | |

* Output torque values shown are based on a 2000 hours B10 Life and should result in acceptable life for most applications. Applications requiring both high output torque and high output speed will reduce the expected life for the unit so please contact RR-TCI USA for final approval

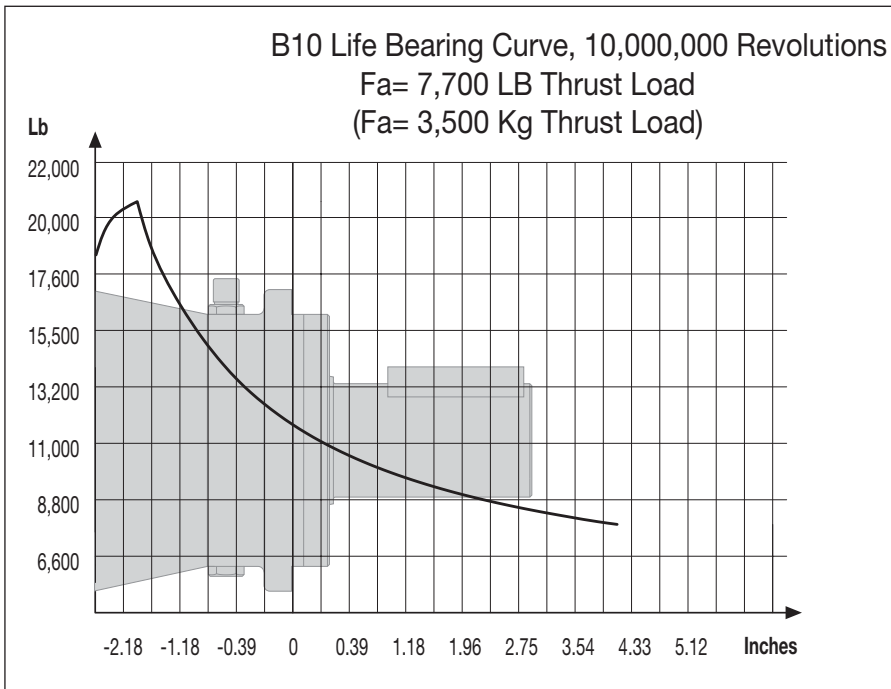
ALLOWABLE RADIAL SHAFT LOADS VS LOAD POSITION



CF380 MODEL

For other values of life desired multiply allowable load read from curve as follows

| NO. OF REV. | LOAD MULTIPLIER |
|-------------------|-----------------|
| 1.0×10^6 | 1.995 |
| 2.5×10^6 | 1.516 |
| 5.0×10^6 | 1.231 |
| 7.5×10^6 | 1.090 |
| 1.0×10^7 | 1.000 |
| 2.5×10^7 | 0.760 |
| 5.0×10^7 | 0.617 |
| 7.5×10^7 | 0.546 |
| 1.0×10^8 | 0.501 |

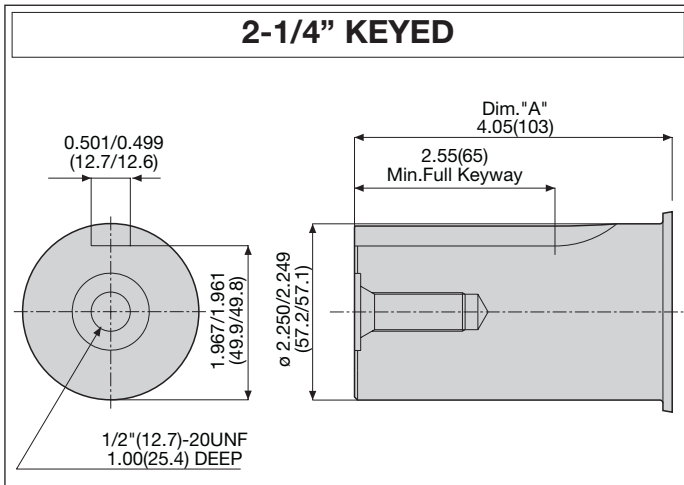


FF380 MODEL

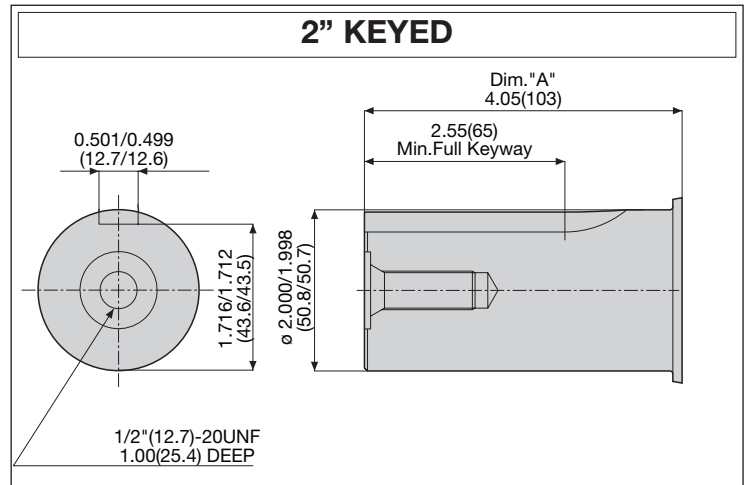
For other values of life desired multiply allowable load read from curve as follows

| NO. OF REV. | LOAD MULTIPLIER |
|-------------------|-----------------|
| 1.0×10^6 | 1.995 |
| 2.5×10^6 | 1.516 |
| 5.0×10^6 | 1.231 |
| 7.5×10^6 | 1.090 |
| 1.0×10^7 | 1.000 |
| 2.5×10^7 | 0.760 |
| 5.0×10^7 | 0.617 |
| 7.5×10^7 | 0.546 |
| 1.0×10^8 | 0.501 |

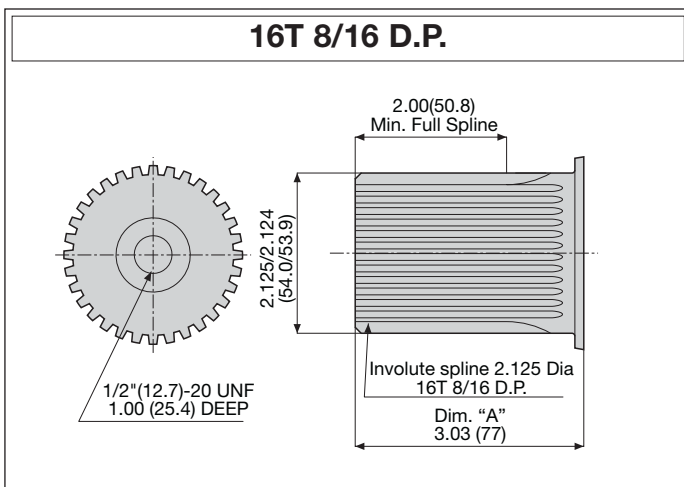
CF380 & FF380 OUTPUT SHAFT OPTIONS



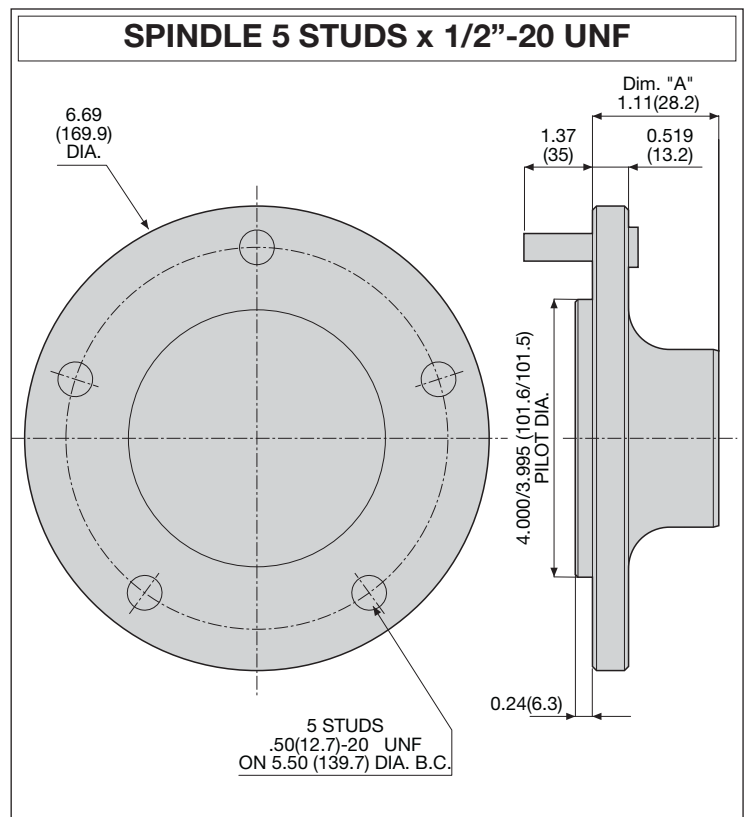
OPTION "A"



OPTION "B"

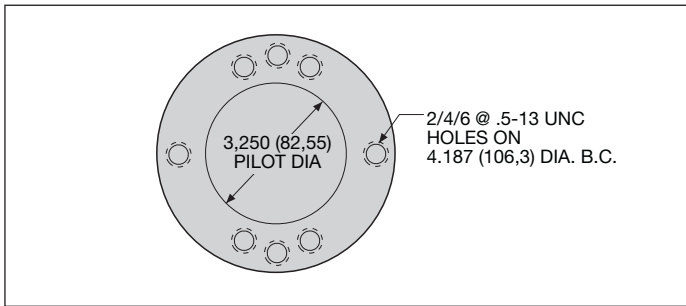


OPTION "C"

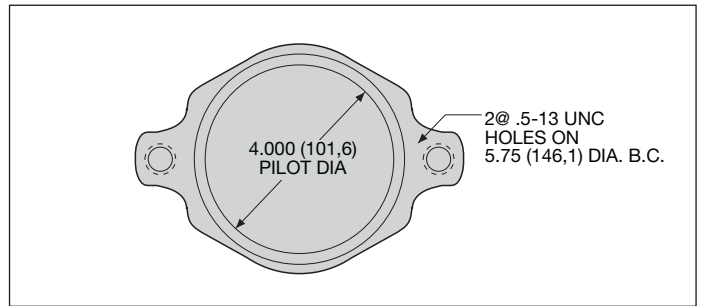


OPTION "D"

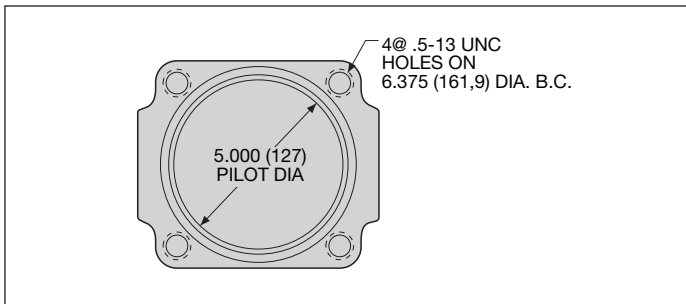
HYDRAULIC MOTOR MOUNTING FLANGES OPTIONS



SAE "A" 2/4/6 BOLTS

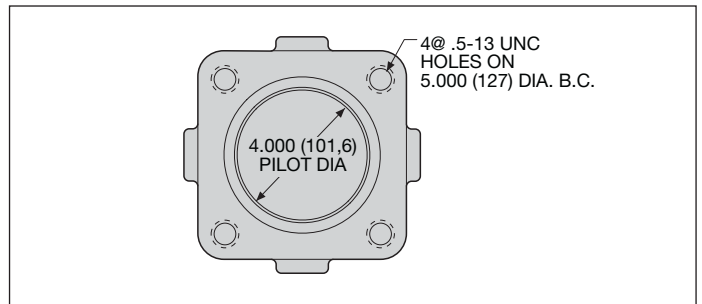


SAE "B" 2 BOLTS



SAE "C" 4 BOLTS

NOTE: available on request

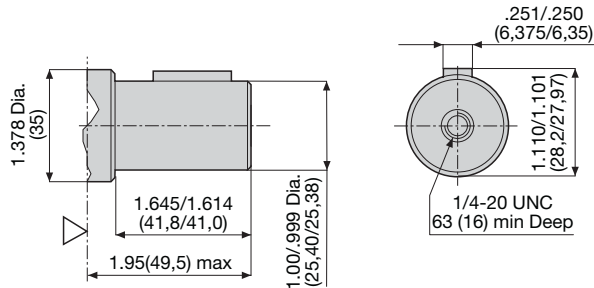


BEARINGLESS 4 BOLTS

NOTE: this motor connection is only available for 5.18:1 ratio

INPUT SHAFT OPTIONS (MOTORS)

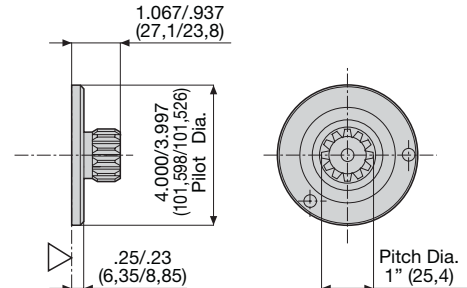
1" KEYED



1K

1"(25,4), Parallel key 1/4"x 1/4"x1" BS46
Max.Torque 3900in-lb (44daNm)

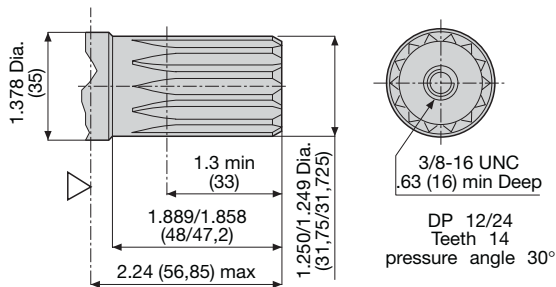
1" 12T SPLINED BEARINGLESS



BL

12T Splined, 1"(25,4), ANS B92.1-1976
CLASS 5, 12/24 DP, 30° P.A.

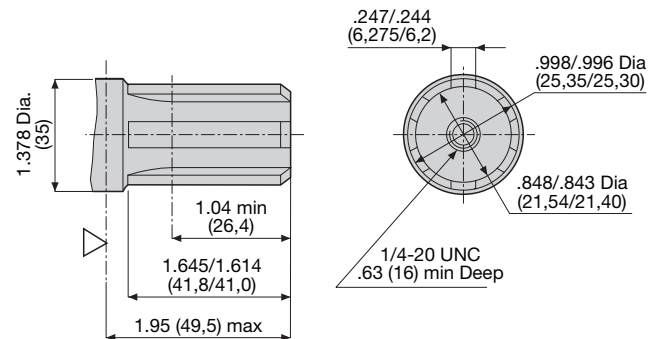
1-1/4" 14T SPLINED



14T

14T Splined, 1 1/4" (31,75), ANS B92.1 - 1976
Max.Torque 6815in-lb (77daNm)

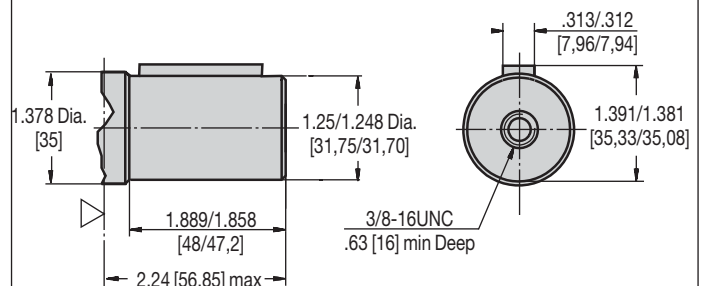
1" SAE 6B SPLINED



6B

1" (25,4), SAE 6B Splined Bs2509
Max.Torque 3900in-lb (44daNm)

1 1/4" KEYED



2K

1 1/4" (31,75) straight, Parallel key 5/16"x 5/16"x 1/4"BS46
Max.Torque 6815 in-lb (77daNm)

▷ Motor Mounting Surface



APPLICATION DATA SHEET

COMPANY INFORMATION

Company name: _____
 Address: _____ City: _____
 State: _____ Zip: _____ Phone: _____
 Contact: _____ Fax: _____ e-mail : _____

APPLICATION INFORMATION

Type of equipment: _____
 Type of application: _____
 Max. output torque required: _____ in-lbs. Max. radial shaft load: _____ lbs.
 Max. output speed: _____ rpm. Max. axial shaft load: _____ lbs.
 Load location from mounting flange: _____ in.
 Required gear box ratio: _____

WHEN DUTY CYCLES ARE KNOWN, PLEASE COMPLETE THE FOLLOWING QUESTIONNAIRE

| TIME | TORQUE | SPEED |
|---------------------|--------------------|-----------|
| 1. _____ % at _____ | _____ in-lbs _____ | _____ rpm |
| 2. _____ % at _____ | _____ in-lbs _____ | _____ rpm |
| 3. _____ % at _____ | _____ in-lbs _____ | _____ rpm |
| 4. _____ % at _____ | _____ in-lbs _____ | _____ rpm |

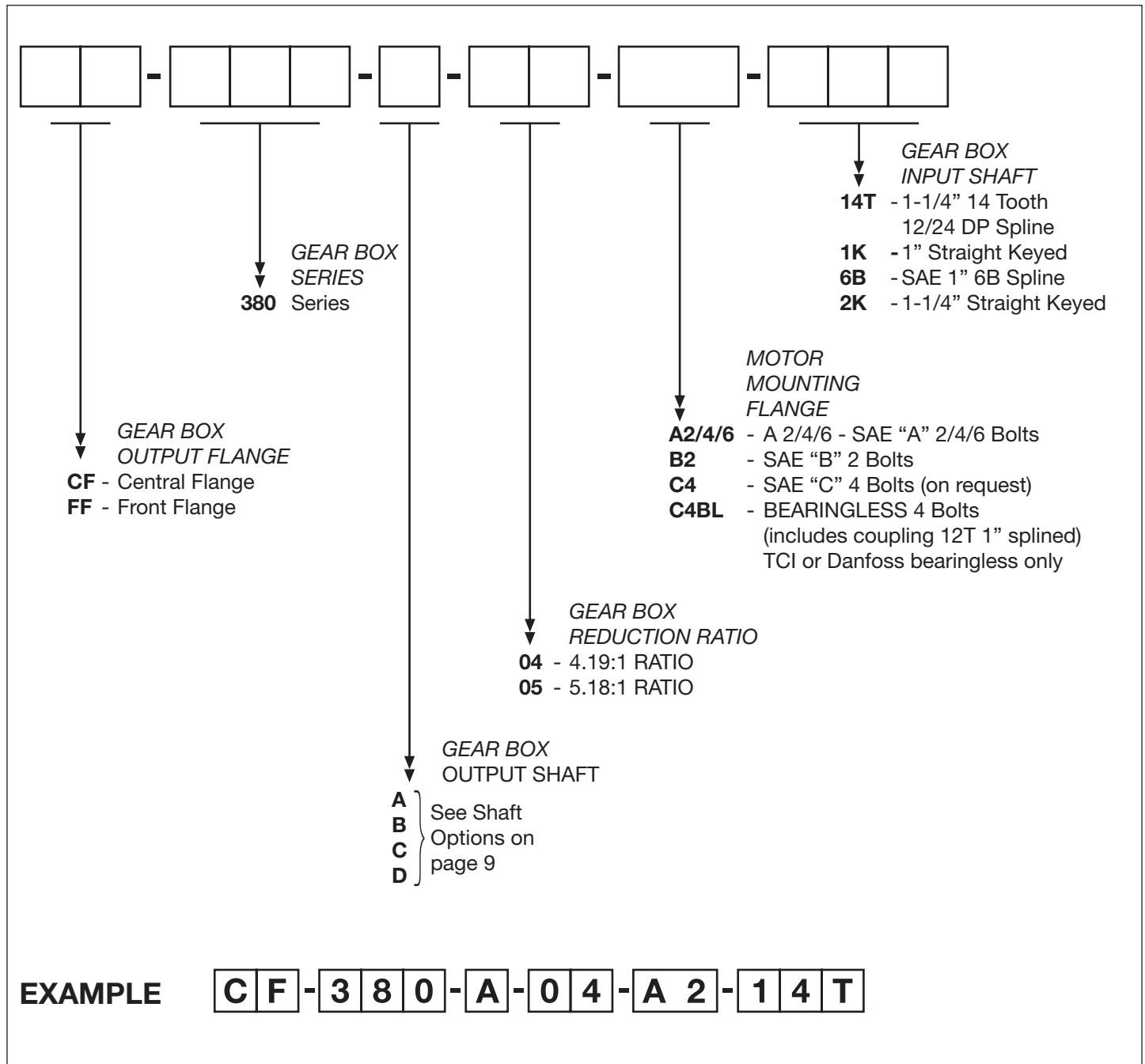
Required lifetime: _____ hrs/B10 life.

PLEASE LET US KNOW MORE ABOUT THE GEAR BOX PRIME MOVER

Motor type: _____ Model: _____ P/N: _____ Displacement: _____ cu-in/rev.
 Max. relief pressure: _____ psi. Max. speed: _____ rpm.
 Mounting: SAE A,B,C _____ 2B, 4B, 2-4B _____ Output shaft : 1"Key, 14T, 6B, etc.: _____
 Other: _____
 Hydraulic brake required: _____ YES _____ NO
 Output slewing pinion required : _____ YES _____ NO
 (if Yes, please let us know the following information) :
 Number of teeth: _____ Diametral pitch: _____ Pitch diameter: _____
 Gear face width: _____ Pressure angle: _____
 Estimated yearly usage: _____ Qty.
 Shipping batches: _____ Qty.

We remind you that RR USA range of products also includes slewing ring bearings, hydraulic orbital motors, hydraulic negative type brakes, valves, hydraulic cylinders, steering columns, rotary manifolds, grapple rotators, thus we always remain at your complete disposal if you would like to explore a complete package solution aswell. Feel free to contact us at any time, or consult our individual catalogs for further information.

ORDERING INFORMATION SHEET



*As a standard, a high pressure seal is provided with this motor connection in order to maintain separate gear box lubrication from hydraulic motor lubrication. If a case drain is specified, the high pressure seal will not be supplied from the factory.

WARRANTY

R.R. USA, INC. warrants to Purchaser that its products are free from defects in material and workmanship under normal use and service for a period of one (1) year from the date the product is shown to have been placed into operation by original user or for eighteen (18) months from the date of shipment from seller's plant, whichever shall first occur.

R.R. USA, INC. obligation under this warranty is expressly limited to the repair or replacement at its option; of the Products a written claim of defect f.o.b. seller's factory, Boothwyn, Pa, U.S.A., and which is determined by seller to be defective in fact.

This is the sole and only of seller and no other warranty is applicable, either expressed or implied, in fact or by law, including any warranty as to merchantability or fitness for a particular use or purpose.

The sole and only remedy in regard to any defective Products shall be the repair or replacement there of herein provided, and seller shall not be liable for any consequential, special, incidental, or punitive damages, losses or expenses resulting from or caused by any defects.

R.R. USA, INC.
Boothwyn, Pennsylvania, U.S.A.

Effective DATE: JULY 1,1985



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