# SPECIFICATION

## S–2000, SN–2000 and UNISPHERE II

### INCH

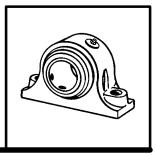
DODGE Unitized Spherical Bearings, including S-2000, SN-2000 and UNISPHERE II bearings, are general purpose high capacity double row spherical roller bearings. All are mounted in single piece precision machined housings. Bearings are mounted to shafts by means of set screw collars, with 65 degree set screw spacing for maximum clamping force.

ASTM A48 Class 30 cast iron is the standard material used in S-2000 housings and UNISPHERE II flanged housings. The standard material used in UNISPHERE II and SN-2000 pillow blocks is ductile iron (ASTM A536 Grade 65-45-12) with 65,000 p.s.i. tensile strength. Housing designs are available for survival in extreme harsh environments, through the use of special finishes and stainless hardware.

Housings are available in a variety of standard configurations, including pillow blocks, flanges, piloted flanges and take-up bearings. Rubbing lip seals are standard on all units. Metal labyrinth seals are available as an option on S-2000 and SN-2000 bearings.




| SELECTION<br>PAGE B7–10 | S-2000<br>PAGE B7–18 | UNISPHERE II<br>PAGE B7–34 | SN-2000<br>PAGE B7–32 |
|---|---|---|---|



# HOW TO ORDER

## S–2000, SN–2000 and UNISPHERE II

There are two ways to specify DODGE Bearings. Most of the product offerings have part numbers with listings shown throughout this catalog. Use of part numbers ensures accurate order processing.

When part numbers are not shown, the product may be specified by description or part name. This method is used when ordering units that include modifications or options. To order by description, use the nomenclature key shown on page B7–9 and add any special instructions to the end of the description for options not covered by the nomenclature.

DODGE Unitized Spherical Bearings are factory adjusted and pre-lubricated. For applications where extreme ambient temperatures, high speeds or high loads are expected, a variety of specialty lubricants is available. Standard grease provided is Shell Alvania #2. High temperature greases available include Moluballoy 896 HT and Mobilith SHC460. Other special lubricants are available upon request. Special lubricant options usually involve set-up charges, minimum quantities and list price premiums. To order, specify type of lubricant required at the end of the product name or after the standard part number.

Example:

045051 except with Mobilith SHC 460 grease
or
P2BS2103S except with Mobilith SHC 460 grease

For applications requiring modifications not listed, we encourage you to contact our Application Engineering Department for Bearings at 864-297-4800.

# NOMENCLATURE

## S–2000, SN–2000 and UNISPHERE II

**P2B - S2 - 207 – RE**

### HOUSING STYLE

P2B = Pillow Block 2 Bolt Base, Cast Iron

P4B = Pillow Block 4 Bolt Base, Cast Iron

F3B= Flange Bearing 3 Bolt, Cast Iron

F4B = Flange Bearing 4 Bolt, Cast Iron

FC = Piloted Flange (Flanged Cartridge)

WSTU = Wide Slot Take-Up Bearing For Use In Center- Pull Frames

TPHU = TPHU Take–Up Bearing For Use In TPHU Or Top Angle Take–Up Frames

### BEARING TYPE

S2 = S–2000

SN2 = SN–2000

UN2 = UNISPHERE II

### SIZE

Inches and 16ths
2 = 2″ and 07 = $^{7}/_{16}$″
or 207 = 2 $^{7}/_{16}$″

### SEAL TYPE & EXP FEATURE

R = S2R Dual Lip Rubbing Seal

S = S2S Sealing Disc Metallic Seal

E= Expansion Type Bearing – If “E” Does Not Appear, Bearing Is Non Expansion Type


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|---|---|---|---|

# S-2000, SN-2000, and UNISPHERE II

## SPHERICAL ROLLER BEARINGS

DODGE Unitized Spherical Roller Bearings have the capacity to carry heavy radial loads and combined radial and thrust loads. The maximum recommended load which can be applied is limited by various components in the system such as bearing, housing, shaft, shaft attachment, speed and life requirements as listed in this catalog. DODGE spherical roller bearings have been applied successfully even when these limits have been exceeded under controlled operating conditions. Contact DODGE Application Engineering (864-297-4800) for applications which exceed the recommendations of this catalog.

**$L_{10}$ Hours Life —** The life which may be expected from at least 90% of a given group of bearings operating under identical conditions.

$$L_{10}\ \text{Life, Hours} = \left(\frac{C}{P}\right)^{10/3} \times \left(\frac{16667}{RPM}\right)$$

Where:

C = Dynamic Capacity (Table 1, page B7–13) lbs.
P = Equivalent Radial Load, lbs.

### GENERAL

**Heavy Service —** For heavy shock loads, frequent shock loads, or severe vibrations, add up to 50% (according to severity of conditions) to the Equivalent Radial Load to obtain a Modified Equivalent Radial Load. Consult DODGE Application Engineering for additional selection assistance.

Thrust load values shown in the table below are recommended as a guide for general applications that will give adequate $L_{10}$ life. Spherical bearings require a radial load at least equal to the thrust load for proper operation. If the thrust load exceeds this limit, consult Application Engineering. Where substantial radial load is also present, it is advisable to calculate actual $L_{10}$ life to assure that it meets the requirements. The effectiveness of the shaft attachment to carry thrust load depends on proper tightening of the set screws, shaft tolerance and shaft deflections. Therefore, it is advisable to use auxiliary thrust carrying devices such as shaft shoulder, snap ring or a thrust collar to locate the bearing under thrust loads heavier than shown below, or where extreme reliability is desired.

| RPM RANGE | 20-200 | 201-2000 | over 2000 |
|---|---|---|---|
| RECOMMENDED THRUST LOAD | C/20 | C/40 | C/60 |

The shaft tolerances recommended below are adequate for normal radial and radial/thrust load applications. The radial load is limited by the attachment to the shaft (see Table 1). Where the applied radial load ($F_R$) exceeds this limit (maximum allowable slip fit radial load), a snug-to-light press fit of the shaft is required. Since the allowable load, especially at a low speed, is very large, the shaft should be checked to assure adequate shaft strength.

The magnitude and direction of both the thrust and radial load must be taken into account when selecting a housing. **When pillow blocks are utilized, heavy loads should be directed through the base. Where uplift loads are involved, see Tables 5 and 6, pages B7–16 and B7–17 for maximum values.** Where a load pulls the housing away from the mounting base, both the hold-down bolts and housing must be of adequate strength. Auxiliary load carrying devices such as shear bars are advisable for side or end loading of pillow blocks and radial loads for flange units.

**SHAFT TOLERANCES**

| SHAFT SIZE | S-2000, SN-2000, UNISPHERE II |
|---|---|
| UP TO 1–1/2″ | +.0000 –.0005″ |
| 1–9/16 TO 4″ | +.000 –.001″ |
| 4–7/16 TO 5″ | +.000 –.0015″ |

# S-2000, SN-2000, and UNISPHERE II

## BEARINGS SUPPORTING RADIAL LOADS ONLY

1. Define $L_{10}$ Life Hours desired.
2. Establish bearing radial load, $F_R$ ($F_R$ = P for Pure Radial Load Conditions). The DODGE program BEST™★ can be used to find application loads.
3. Establish RPM.

Using the easy selection Table 2, page B7–14, find, under the RPM column, the equivalent radial load that equals or is slightly higher than the application radial load for the desired life. The shaft size on the far left will be the minimum shaft size that you can use for your application.

If the desired life is different than the values shown on the chart, use alternate Method A shown below.

Example:
1. $L_{10}$ Life = 30,000 Hours
2. Radial load = 4000 lbs.
3. RPM = 1,000

At the intersection of the 1,000 RPM column and the 30,000 hours $L_{10}$ life row, the equivalent radial load of 4010 lbs. exceeds the 4000 lbs. radial load for shaft sizes $2^3/_8$ - $2^7/_{16}$″. A bearing with bore ranging from $2^3/_8$″ to $2^7/_{16}$″ may be used for this application.

### ALTERNATE METHOD A — SELECTING A BEARING FOR AN $L_{10}$ LIFE VALUE NOT SHOWN IN THE EASY SELECTION CHART.

The $L_{10}$ life equation can be rearranged so that the bearing dynamic capacity **C** is identified in terms of $L_{10}$, RPM and P

$$\mathbf{C} = \left(\frac{L_{10} \times RPM}{16667}\right)^{0.3} \times P$$

(P = $F_R$ for Pure Radial Load Conditions)

Since the $L_{10}$, RPM and P are known, solve for **C**. Select from the dynamic capacity column on Table 1, page B7–13★ the **C** value equal to or greater than the **C** value just calculated. The bore size on the far left represents the proper bore size selection. Check that the application RPM does not exceed the MAX. RPM on Table 1★. Also check that the radial load does not exceed the Maximum Allowable Slip Fit Radial Load shown on Table 1. If it does, a line to line to light press fit of shaft is required. When selecting an $L_{10}$ life of less than 30,000 hours, particular attention must be paid to shaft deflection and proper lubricant selection.

## SELECTING BEARINGS SUPPORTING COMBINATION RADIAL AND THRUST LOADS

When a bearing supports both a radial load and a thrust load, the loading on the two rows is shared unequally depending on the ratio of thrust to radial load. The use of the X (radial factor) and Y (thrust factor) from Table 1★ converts the applied thrust load and radial loads to an equivalent radial load having the same effect on the life of the bearing as a radial load of this magnitude.

The equivalent radial load $P = XF_R + YF_A$

Where:

- P = Equivalent radial load, lbs.
- $F_R$ = Radial load, lbs. (see Table 1 for allowable slip fit maximum load)
- $F_A$ = Thrust (axial) load, lbs.
- **e** = Thrust load to radial load factor (Table 1)★
- X = Radial load factor (Table 1)★
- Y = Thrust load factor (Table 1)★

★ The DODGE Bearing Evaluation and Selection Technique (BEST) is a menu driven computer program that calculates bearing loads, fatigue life and operating temperature for a two bearing shaft system based on user supplied input parameters. To order, call (864) 297-4800.


| UNISPHERE II PAGE B7–34 | SN-2000 PAGE B7–32 | METRIC PAGE B7–40 | |
|---|---|---|---|

# S-2000, SN-2000, and UNISPHERE II

To find X and Y, calculate $F_A/F_R$ and compare to **e** for the selected bore size. Determine X and Y from Table 1, page B7–13 depending on whether $F_A/F_R$ is equal to or less than **e**, or $F_A/F_R$ is greater than **e**. Substitute all known values into the equivalent radial load equation. P (equivalent radial load) can be used in the life formula to determine $L_{10}$, or it can be compared to the allowable equivalent radial load ratings for the speed and hours life desired in the easy selection Table 2, page B7–14.

## SELECTING BEARINGS SUPPORTING ONLY THRUST LOADS

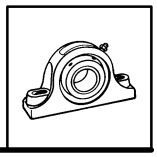
Spherical Roller Bearings generally are not recommended for pure thrust load applications. However, they will perform satisfactorily under very light pure thrust loads. Consult DODGE Application Engineering (864-297-4800).

## SELECTING LUBRICATION

DODGE S-2000, SN-2000, and UNISPHERE II spherical roller bearings are lubricated at the factory with Shell Alvania #2 grease. Shell Alvania #2 grease is a superior industrial grease using a lithium hydroxystearate thickener and highly refined base oil. This grease will adequately handle low and medium speeds with low and medium loads at normal temperatures as defined on Table 4, page B7–15. For very low and high speeds, for heavy loads and for low and high temperatures, special greases must be used. Contact DODGE Application Engineering (864-297-4800), DODGE engineers will recommend bearings and lubricants for the above unusual conditions. DODGE also has the expertise to custom design and build special bearings for your needs. The only maintenance requirement for DODGE Unitized roller bearings is periodic relubrication at regular intervals as outlined in the appropriate instruction manuals.

## MISALIGNMENT CONSIDERATIONS

In nearly all applications good design practice requires two bearings supporting the shaft. In cases where three or more bearings are installed, unless precautions are taken to line the bearings up, both vertically and horizontally, it is possible to induce heavy loads. In the case of two bearings, alignment is not as critical, especially with DODGE Unitized Spherical Roller Bearings. S-2000, SN-2000, and UNISPHERE II bearings are designed to allow a maximum of ±2° of static and dynamic misalignment. However, for optimum seal performance, misalignment should be kept under ±0.5°. To ensure good alignment, mounting surfaces must be checked for flatness and must lie in the same plane. When tightening base bolts, each bolt should be alternately tightened in incremental torque values until full torque is achieved to prevent the angular shifting of the pillow block that occurs when one bolt is tightened to its full torque. Shimming may be required to minimize misalignment.



# S-2000, SN-2000, and UNISPHERE II

## TABLE 1 – S-2000, SN-2000 AND UNISPHERE II SPHERICAL ROLLER BEARINGS RADIAL AND THRUST FACTORS

| SHAFT SIZE INCH | BASIC BEARING DESCRIPTION | e | $F_A/F_R \leq e$ | | $F_A/F_R > e$ | | MAX. ALLOW. SLIP FIT RADIAL LOAD $F_R$* LBS. | DYNAMIC CAPACITY (C) LBS. | MAXIMUM RPM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | S-2000 & SN-2000 | | UNISPHERE II |
| | | | X | Y | X | Y | | | S2S SEAL | S2R SEAL | |
| 1–1/8<br>1–3/16<br>1–1/4<br>1–3/8<br>1–7/16<br>1–1/2 | 22208 | .28 | 1.0 | 2.4 | .67 | 3.6 | 3,750 | 20,800 | 3,600 | 2,830 | 3,000 |
| 1–5/8<br>1–11/16<br>1–3/4 | 22209 | .26 | 1.0 | 2.6 | .67 | 3.9 | 3,750 | 20,800 | 3,360 | 2,400 | 2,800 |
| 1–7/8<br>1–15/16<br>2 | 22210 | .24 | 1.0 | 2.8 | .67 | 4.2 | 4,000 | 22,000 | 3,180 | 2,150 | 2,625 |
| 2–3/16<br>2–1/4 | 22211 | .23 | 1.0 | 2.9 | .67 | 4.3 | 4,860 | 27,000 | 2,700 | 1,900 | 2,325 |
| 2–3/8<br>2–7/16<br>2–1/2 | 22213 | .24 | 1.0 | 2.8 | .67 | 4.2 | 6,840 | 38,000 | 2,160 | 1,700 | 1,900 |
| 2–11/16<br>2–3/4<br>2–15/16<br>3 | 22215 | .22 | 1.0 | 3.1 | .67 | 4.6 | 7,500 | 41,500 | 2,040 | 1,450 | 1,700 |
| 3–3/16<br>3–1/4<br>3–7/16<br>3–1/2 | 22218 | .23 | 1.0 | 2.9 | .67 | 4.3 | 11,500 | 64,000 | 1,560 | 1,250 | 1,400 |
| 3–11/16<br>3–15/16<br>4 | 22220 | .24 | 1.0 | 2.8 | .67 | 4.2 | 14,400 | 80,000 | 1,320 | 1,050 | 1,250 |
| 4–7/16<br>4–1/2 | 22222 | .25 | 1.0 | 2.7 | .67 | 4.1 | 18,400 | 102,000 | 1,200 | 975 | — |
| 4–15/16<br>5 | 22226 | .26 | 1.0 | 2.6 | .67 | 3.9 | 25,700 | 143,000 | 1,020 | 850 | — |

* If load exceeds “Max. allowable slip fit load,” line to line to light press fit of shaft required. Maximum slip fit radial loads apply if recommended shaft sizes are used.


| UNISPHERE II PAGE B7–34 | SN-2000 PAGE B7–32 | METRIC PAGE B7–40 | |
|---|---|---|---|

# S-2000, SN-2000, and UNISPHERE II

## TABLE 2 – SELECTION TABLE (INCHES)
## S-2000, SN-2000 AND UNISPHERE II SPHERICAL ROLLER BEARINGS

| SHAFT SIZE IN. | $L_{10}$ HOURS | ALLOWABLE EQUIVALENT RADIAL LOAD RATING (LBS.) AT VARIOUS REVOLUTIONS PER MINUTE | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 50 | 100 | 150 | 250 | 500 | 750 | 1000 | 1200 | 1250 | 1350 | 1500 | 1750 | 2000 | 2600 | 2750 | 3000 | 3250 | 3500 |
| | 10000 | 7495 | 6090 | 5390 | 4625 | 3755 | 3325 | 3050 | 2890 | 2855 | 2790 | 2700 | 2580 | 2480 | 2320 | 2255 | 2195 | 2145 | 2095 |
| 1–1/8 1–3/16 | 30000 | 5390 | 4380 | 3880 | 3325 | 2700 | 2395 | 2195 | 2080 | 2055 | 2005 | 1945 | 1855 | 1785 | 1665 | 1620 | 1580 | 1540 | 1505 |
| 1–1/4 | 40000 | 4945 | 4015 | 3555 | 3050 | 2480 | 2195 | 2015 | 1905 | 1885 | 1840 | 1785 | 1700 | 1635 | 1530 | 1485 | 1450 | 1415 | 1380 |
| 1–3/8 1–7/16 | 60000 | 4380 | 3555 | 3150 | 2700 | 2195 | 1945 | 1785 | 1690 | 1665 | 1630 | 1580 | 1505 | 1460 | 1355 | 1315 | 1280 | 1250 | 1225 |
| 1–1/2 | 100000 | 3755 | 3050 | 2700 | 2320 | 1885 | 1665 | 1530 | 1450 | 1430 | 1400 | 1355 | 1295 | 1240 | 1160 | 1130 | 1100 | 1075 | 1050 |
| 1–5/8 | 10000 | 7495 | 6090 | 5390 | 4625 | 3755 | 3325 | 3050 | 2890 | 2855 | 2790 | 2700 | 2580 | 2480 | 2320 | 2255 | 2195 | 2145 | |
| 1–11/16 | 30000 | 5390 | 4380 | 3880 | 3325 | 2700 | 2395 | 2195 | 2080 | 2055 | 2005 | 1945 | 1855 | 1785 | 1665 | 1620 | 1580 | 1540 | |
| 1–3/4 | 40000 | 4945 | 4015 | 3555 | 3050 | 2480 | 2195 | 2015 | 1905 | 1885 | 1840 | 1785 | 1700 | 1635 | 1530 | 1485 | 1450 | 1415 | |
| | 60000 | 4380 | 3555 | 3150 | 2700 | 2195 | 1945 | 1785 | 1690 | 1665 | 1630 | 1580 | 1505 | 1450 | 1355 | 1315 | 1280 | 1250 | |
| | 100000 | 3755 | 3050 | 2700 | 2320 | 1945 | 1665 | 1530 | 1450 | 1430 | 1400 | 1355 | 1295 | 1240 | 1160 | 1130 | 1100 | 1075 | |
| 1–7/8 | 10000 | 7930 | 6440 | 5705 | 4895 | 3975 | 3520 | 3230 | 3055 | 3020 | 2950 | 2860 | 2730 | 2620 | 2450 | 2385 | 2320 | | |
| 1–15/16 | 30000 | 5705 | 4630 | 4100 | 3520 | 2860 | 2530 | 2320 | 2200 | 2170 | 2120 | 2055 | 1965 | 1885 | 1765 | 1715 | 1670 | | |
| 2 | 40000 | 5230 | 4250 | 3765 | 3230 | 2620 | 2320 | 23130 | 2015 | 1990 | 1945 | 1885 | 1800 | 1730 | 1620 | 1570 | 1530 | | |
| | 60000 | 4630 | 3765 | 3330 | 2860 | 2320 | 2055 | 1885 | 1785 | 1765 | 1725 | 1670 | 1595 | 1530 | 1430 | 1390 | 1355 | | |
| | 100000 | 3975 | 3230 | 2860 | 2450 | 1990 | 1765 | 1620 | 1530 | 1515 | 1480 | 1430 | 1365 | 1315 | 1230 | 1195 | 1165 | | |
| 2–3/16 | 10000 | 9730 | 7905 | 7000 | 6005 | 4875 | 4320 | 3960 | 3750 | 3705 | 3620 | 3510 | 3350 | 3220 | 3010 | 2925 | | | |
| 2–1/4 | 30000 | 7000 | 5685 | 5035 | 4320 | 3510 | 3105 | 2850 | 2695 | 2665 | 2605 | 2525 | 2410 | 2315 | 2165 | 2105 | | | |
| | 40000 | 6420 | 5215 | 4620 | 3960 | 3220 | 2850 | 2615 | 2475 | 2445 | 2390 | 2315 | 2210 | 2125 | 1985 | 1930 | | | |
| | 60000 | 5685 | 4620 | 4090 | 3510 | 2850 | 2525 | 2315 | 2190 | 2165 | 2115 | 2050 | 1955 | 1880 | 1760 | 1710 | | | |
| | 100000 | 4875 | 3960 | 3510 | 3010 | 2445 | 2165 | 1985 | 1880 | 1855 | 1815 | 1760 | 1680 | 1610 | 1510 | 1465 | | | |
| 2–3/8 | 10000 | 13695 | 11125 | 9850 | 8450 | 6865 | 6080 | 5575 | 5280 | 5215 | 5095 | 4935 | 4715 | 4530 | | | | | |
| 2–7/16 | 30000 | 9850 | 8000 | 7085 | 6080 | 4935 | 4370 | 4010 | 3795 | 3750 | 3665 | 3550 | 3390 | 3255 | | | | | |
| 2–1/2 | 40000 | 9035 | 7340 | 6500 | 5575 | 4530 | 4010 | 3680 | 3485 | 3440 | 3360 | 3255 | 3110 | 2990 | | | | | |
| | 60000 | 8000 | 6500 | 5755 | 4935 | 4010 | 3550 | 3255 | 3085 | 3045 | 2975 | 2885 | 2755 | 2645 | | | | | |
| | 100000 | 6865 | 5575 | 4935 | 4235 | 3440 | 3045 | 2795 | 2645 | 2615 | 2555 | 2475 | 2360 | 2270 | | | | | |
| 2–11/16 | 10000 | 14960 | 12150 | 10760 | 9230 | 7495 | 6640 | 6090 | 5765 | 5695 | 5565 | 5390 | 5150 | 4945 | | | | | |
| 2–3/4 | 30000 | 10760 | 8740 | 7740 | 6640 | 5390 | 4775 | 4380 | 4145 | 4095 | 4000 | 3880 | 3705 | 3555 | | | | | |
| 2–15/16 | 40000 | 9870 | 8015 | 7100 | 6090 | 4945 | 4380 | 4015 | 3805 | 3755 | 3670 | 3555 | 3395 | 3265 | | | | | |
| 3 | 60000 | 8740 | 7100 | 6285 | 5390 | 4380 | 3880 | 3555 | 3370 | 3325 | 3250 | 3150 | 3005 | 2890 | | | | | |
| | 100000 | 7495 | 6090 | 5390 | 4625 | 3755 | 3325 | 3050 | 2890 | 2855 | 2790 | 2700 | 2580 | 2480 | | | | | |
| 3–3/16 | 10000 | 23070 | 18740 | 16590 | 14235 | 11560 | 10240 | 9390 | 8890 | 8785 | 8580 | 8315 | | | | | | | |
| 3–1/4 | 30000 | 16590 | 13475 | 11935 | 10240 | 8315 | 7365 | 6755 | 6395 | 6315 | 6175 | 5980 | | | | | | | |
| 3–7/16 | 40000 | 15220 | 12360 | 10945 | 9390 | 7630 | 6755 | 6195 | 5865 | 5795 | 5660 | 5485 | | | | | | | |
| 3–1/2 | 60000 | 13475 | 10945 | 9695 | 8315 | 6755 | 5980 | 5485 | 5195 | 5130 | 5015 | 4860 | | | | | | | |
| | 100000 | 11560 | 9390 | 8315 | 7135 | 5795 | 5130 | 4705 | 4455 | 4400 | 4300 | 4165 | | | | | | | |
| 3–11/16 | 10000 | 28835 | 23425 | 20740 | 17795 | 14450 | 12795 | 11740 | 11115 | 10980 | 10730 | | | | | | | | |
| 3–15/16 | 30000 | 20740 | 16845 | 14915 | 12795 | 10395 | 9205 | 8445 | 7995 | 7895 | 7715 | | | | | | | | |
| 4 | 40000 | 19025 | 15455 | 13685 | 11740 | 9535 | 8445 | 7745 | 7330 | 7245 | 7080 | | | | | | | | |
| | 60000 | 16845 | 13685 | 12115 | 10395 | 8445 | 7475 | 6860 | 6495 | 6415 | 6265 | | | | | | | | |
| | 100000 | 14450 | 11740 | 10395 | 8915 | 7245 | 6415 | 5885 | 5570 | 5500 | 5375 | | | | | | | | |
| 4–7/16 | 10000 | 36765 | 29865 | 26445 | 22685 | 18425 | 16315 | 14965 | 14170 | 14000 | | | | | | | | | |
| 4–1/2 | 30000 | 26445 | 21480 | 19020 | 16315 | 13255 | 11735 | 10765 | 10190 | 10070 | | | | | | | | | |
| | 40000 | 24255 | 19705 | 17445 | 14965 | 12155 | 10765 | 9875 | 9350 | 9235 | | | | | | | | | |
| | 60000 | 21480 | 17445 | 15450 | 13255 | 10765 | 9530 | 8745 | 8280 | 8175 | | | | | | | | | |
| | 100000 | 18425 | 14965 | 13255 | 11370 | 9235 | 8175 | 7500 | 7100 | 7015 | | | | | | | | | |
| 4–15/16 | 10000 | 51545 | 41870 | 37075 | 31805 | 25835 | 22875 | 20985 | | | | | | | | | | | |
| 5 | 30000 | 37075 | 30115 | 26665 | 22875 | 18580 | 16450 | 15090 | | | | | | | | | | | |
| | 40000 | 34010 | 27625 | 24460 | 20985 | 17045 | 15090 | 13845 | | | | | | | | | | | |
| | 60000 | 30115 | 24460 | 21660 | 18580 | 15090 | 13365 | 12260 | | | | | | | | | | | |
| | 100000 | 25835 | 20985 | 18580 | 15940 | 12945 | 11465 | 10515 | | | | | | | | | | | |

In the light shaded area a line-to-line to light press fit of the shaft is required. Only S-2000S or SN-2000S (Spring Disc Seals) bearings may be used to the right of the heavy line. UNISPHERE II can also operate in the dark shaded area to the right of the heavy line.


| FEATURES/BENEFITS PAGE B7–2 | HOW TO ORDER PAGE B7–8 | NOMENCLATURE PAGE B7–9 | HOUSING RATINGS PAGE B7–16 |
|---|---|---|---|

# S-2000, SN-2000, and UNISPHERE II

### TABLE 3 – S-2000, SN-2000 & UNISPHERE II MAXIMUM AXIAL EXPANSION

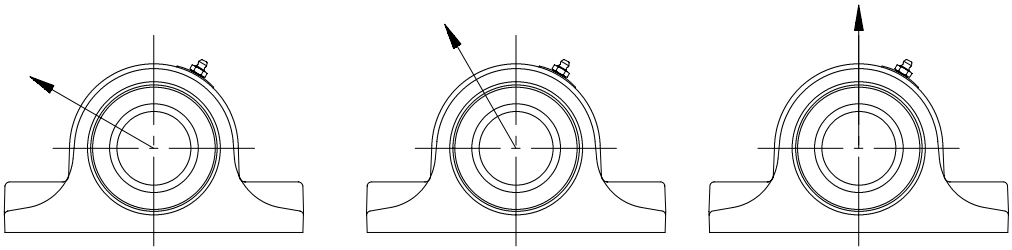
| S-2000 & SN-2000 | | UNISPHERE II | |
|---|---|---|---|
| BORE SIZE INCHES | MAXIMUM EXPANSION INCHES | BORE SIZE INCHES | MAXIMUM EXPANSION INCHES |
| 1-1/8 to 1-1/2 | 1/8 | 1-7/16 to 1-1/2 | 1/8 |
| 1-5/8 to 1-3/4 | 1/4 | 1-11/16 to 1-3/4 | 1/8 |
| 1-7/8 to 2 | 1/4 | 1-15/16 to 2 | 1/8 |
| 2-3/16 to 2-1/4 | 1/4 | 2–3/16 | 1/8 |
| 2-3/8 to 2-1/2 | 1/4 | 2-7/16 to 2-1/2 | 1/8 |
| 2-11/16 to 3 | 1/4 | 2-11/16 to 3 | 1/8 |
| 3-3/16 to 3-1/2 | 1/4 | 3-7/16 to 3-1/2 | 1/8 |
| 3-11/16 to 4 | 5/16 | 3-15/16 to 4 | 5/32 |
| 4-7/16 to 4-1/2 | 3/8 | | |
| 4-15/16 to 5 | 3/8 | | |

### TABLE 4 – DEFINITION OF OPERATING CONDITIONS FOR UNITIZED SPHERICAL ROLLER BEARINGS

| | |
|---|---|
| LOW SPEED<br>MEDIUM SPEED<br>HIGH SPEED | UP TO 20% OF MAX. RPM (TABLE 1)<br>OVER 20% TO 80% OF MAX. RPM<br>OVER 80% OF MAX. RPM |
| LIGHT LOAD<br>NORMAL LOAD<br>HEAVY LOAD | UP TO 8% OF **C** (TABLE 1)<br>OVER 8% TO 18% OF **C**<br>OVER 18% OF **C**<br>**C** = DYNAMIC CAPACITY |
| LOW TEMPERATURE<br>MEDIUM TEMPERATURE<br>HIGH TEMPERATURE<br>VERY HIGH TEMPERATURE | 20°F TO –100°F<br>OVER 20°F TO 200°F<br>OVER 200°F TO 300°F<br>OVER 300°F TO 450°F |


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|---|---|---|---|

## S-2000, SN-2000, and UNISPHERE II



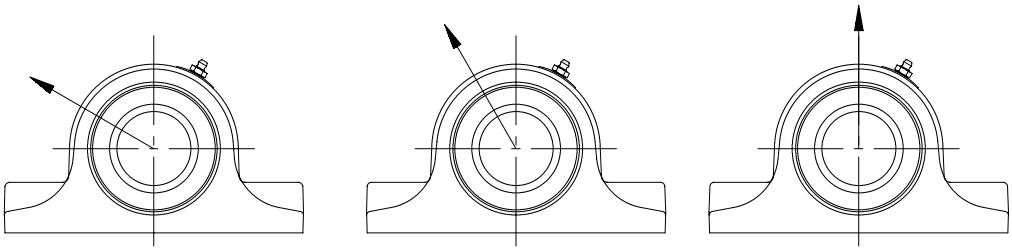

### TABLE 5 – S-2000 HOUSING RATINGS, GRAY IRON*

| Pillow Block Designation | Max. Recommended Housing Cap Loads | | |
|---|---|---|---|
| S-2000 | P120 lbf | P150 lbf | P180 lbf |
| S2107 - 2 Bolt | 2110 | 2640 | 3100 |
| S2111 - 2 Bolt | 2380 | 2980 | 3500 |
| S2115 - 2 Bolt | 3130 | 3910 | 4600 |
| S2115 - 4 Bolt | 3200 | 4000 | 4700 |
| S2203 - 2 Bolt | 3330 | 4160 | 4900 |
| S2203 - 4 Bolt | 3300 | 4100 | 4800 |
| S2207 - 2 Bolt | 3330 | 4160 | 4900 |
| S2207 - 4 Bolt | 3810 | 4760 | 5600 |
| S2215 - 2 Bolt | 4420 | 5520 | 6500 |
| S2215 - 4 Bolt | 4620 | 5780 | 6800 |
| S2307 - 2 Bolt | 4620 | 5780 | 6800 |
| S2307 - 4 Bolt | 4700 | 5870 | 6900 |
| S2315 - 2 & 4 Bolt | 7500 | 9350 | 11000 |
| S2407 - 4 Bolt | 9900 | 12330 | 14500 |
| S2415 - 4 Bolt | 13400 | 16750 | 19700 |

* When utilizing heavy cap loads on pillow block housings, the installation must adhere to the following procedures:

1. The pillow block base bolts must be of **high strength (Grade 8) bolts and properly tightened** to mounting structure.
2. Stop bars (shear strips) should be used against the pillow block where side loads are encountered.
3. In all cases where loads are heavy, the $L_{10}$ life of the bearing should be checked for proper selection and life requirements.

## S-2000, SN-2000, and UNISPHERE II




### TABLE 6 – UNISPHERE II and SN2000 HOUSING RATINGS, DUCTILE*

| Bore Size | Pillow Block Designation | Max. Recommended Housing Cap Loads | | |
|---|---|---|---|---|
| | | P120 lbf | P150 lbf | P180 lbf |
| 1-1/8 to 1-1/2 | UN2107 | 5500 | 6750 | 8000 |
| 1-5/8 to 1-3/4 | UN2111 | 6800 | 8600 | 10000 |
| 1-7/8 to 2 | UN2115 | 8000 | 9900 | 11700 |
| 2-3/16 to 2-1/4 | UN2203 | 10200 | 12500 | 14800 |
| 2-3/8 to 2-1/2 | UN2207 | 10200 | 12400 | 14900 |
| 2-11/16 to 3 | UN2215 | 12900 | 15900 | 18900 |
| 3-3/16 to 3-1/2 | UN2307 | 11900 | 14600 | 17400 |
| 3-11/16 to 4 | UN2315 | 16900 | 20800 | 24600 |
| 30mm | SN2030 | 8310 | 11560 | 12580 |
| 35mm | SN2035 | 9890 | 11910 | 14380 |
| 40mm | SN2040 | 11560 | 13030 | 15510 |
| 45mm | SN2045 | 11560 | 13030 | 15510 |
| 50mm | SN2050 | 13030 | 15960 | 18880 |
| 55mm | SN2055 | 10340 | 12580 | 15060 |
| 60mm | SN2060 | 15960 | 19550 | 23150 |
| 65mm | SN2065 | 15960 | 19550 | 23150 |
| 70mm | SN2070 | 17980 | 22250 | 26520 |
| 75mm | SN2075 | 17980 | 22250 | 26520 |
| 80mm | SN2080 | 18650 | 22920 | 26970 |
| 85mm | SN2085 | 23150 | 28320 | 33720 |
| 90mm | SN2090 | 23150 | 28320 | 33720 |

* When utilizing heavy cap loads on plummer block housings, the installation must adhere to the following procedures:

1. The plummer block base bolts must be of **high strength (Grade 8) bolts and properly tightened** to mounting structure.
2. Stop bars (shear strips) should be used against the plummer block where side loads are encountered.
3. In all cases where loads are heavy, the $L_{10}$ life of the bearing should be checked for proper selection and life requirements.


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|---|---|---|---|