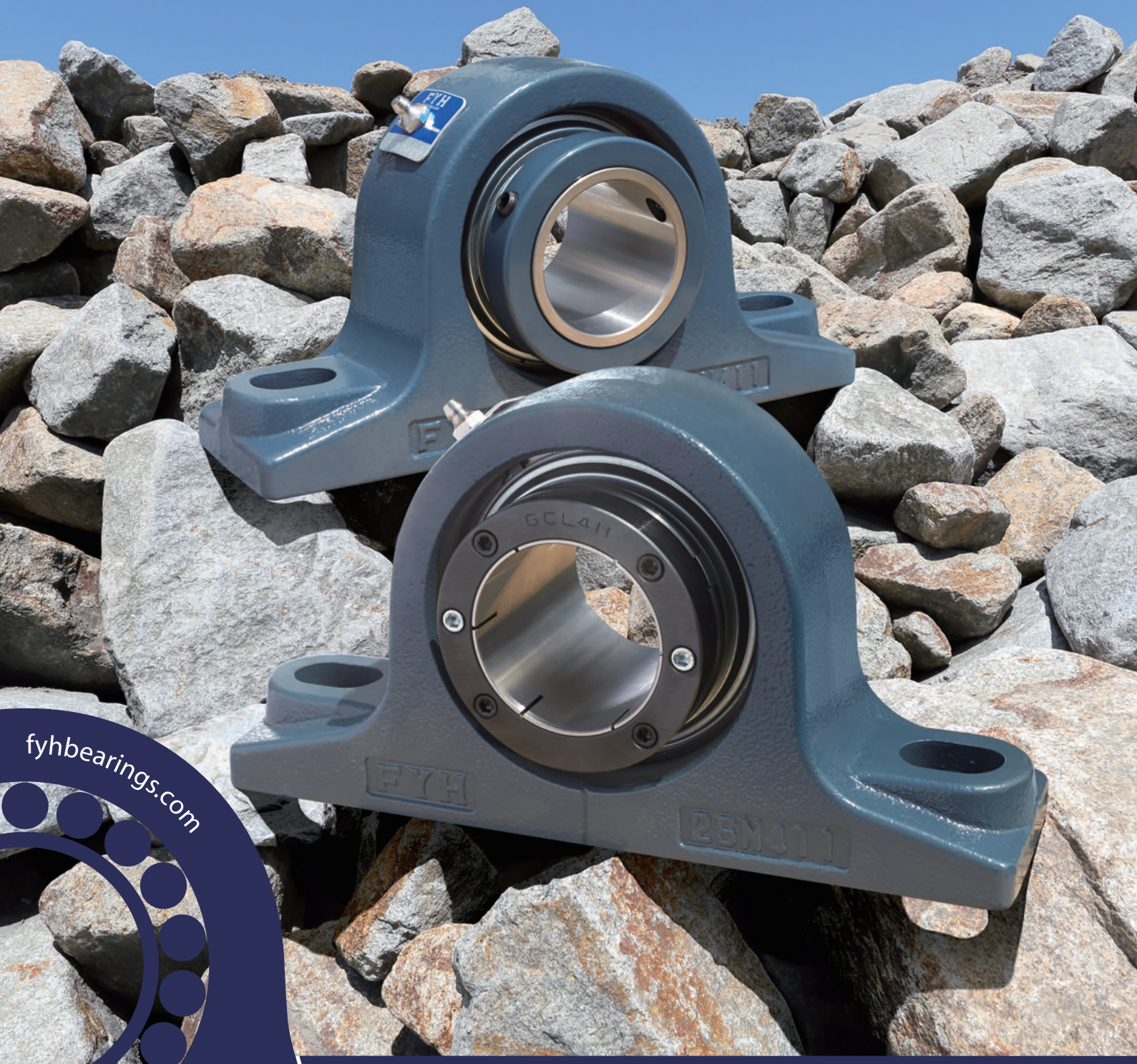
FYH®

SPHERICAL ROLLER BEARING UNITS



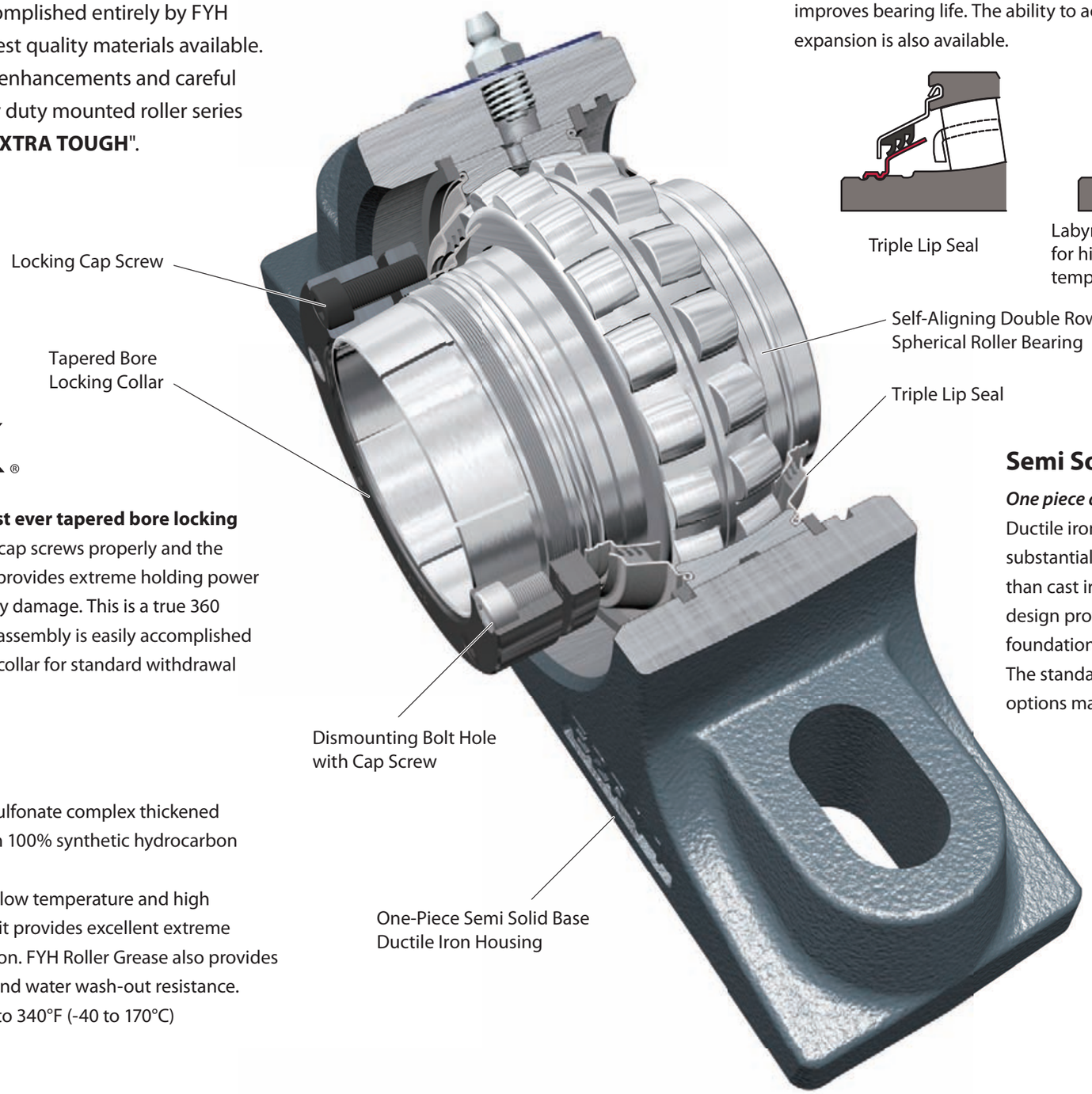
fyhbearings.com

CATALOG NO.12020

Introducing FYH Spherical Roller Bearing Units

More than sixty-five years of experience and innovation in the field of mounted ball bearing units has lead to the development of mounted spherical roller units that cater to a wide range of applications and industries. Bearing and housing production are accomplished entirely by FYH while utilizing only the highest quality materials available. Through meticulous design enhancements and careful material selection this heavy duty mounted roller series attains the designation of "**EXTRA TOUGH**".

EXTRA TOUGH



Z LOCK®

The patented Z Lock is the first ever tapered bore locking collar system. Just tighten the cap screws properly and the specialized tapered bore collar provides extreme holding power on the shaft without causing any damage. This is a true 360 degree locking mechanism. Disassembly is easily accomplished with two threaded holes in the collar for standard withdrawal dismounting.

Lubrication

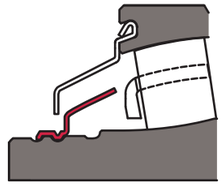
FYH Roller Grease is a calcium sulfonate complex thickened lubricating grease formulated in 100% synthetic hydrocarbon base oil.
FYH Roller Grease has excellent low temperature and high temperature performance, and it provides excellent extreme pressure and anti-wear protection. FYH Roller Grease also provides excellent corrosion protection and water wash-out resistance.
Grease temperature range: -40 to 340°F (-40 to 170°C)

Triple Lip Seal

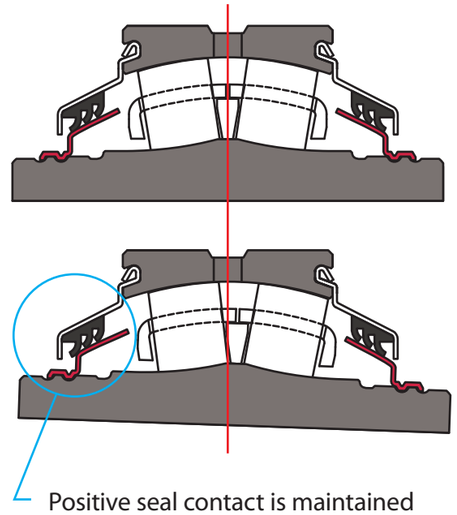
±2° Self Aligning capability

The triple lip seal maintains positive contact with a special sealing ring at virtually any angle of shaft mis-alignment. Our new patented sealing design protects the bearing against a variety of wet and dry contaminants and dramatically improves bearing life. The ability to accommodate shaft expansion is also available.

Triple Lip Seal



Labyrinth non-contact Seal for higher speeds & high temperature applications



Positive seal contact is maintained during mis-alignment at any angle.

Semi Solid Base

One piece ductile iron housings

Ductile iron housings offer substantially better fracture resistance than cast iron, and the semi-solid base design provides an excellent mounting foundation and superior rigidity over competitive offerings.
The standard housing material from FYH is ductile iron, and additional material options may also be available.

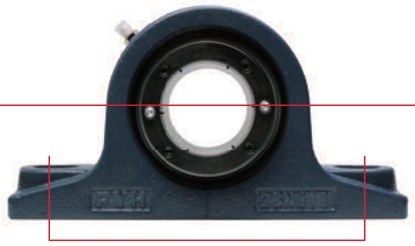
Convertible from non-expansion to expansion

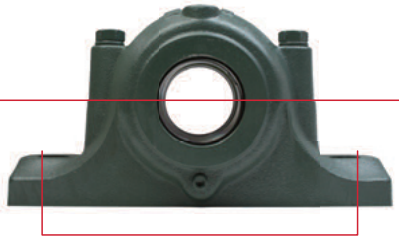
By simply moving a snap ring on the back of the unit the bearing can easily be converted from non-expansion to expansion or vice versa.
This procedure can be easily performed in the field even after the unit has been mounted.

FYH patented Z LOCK and set screw lock spherical roller bearing units now have SN style housings for the replacement of SN plummer blocks.

COMPARISON OF FYH SN UNITS AND SN PLUMMER BLOCK UNITS

SAME CENTER HEIGHT
AND MOUNTING PITCH





	FYH SN UNITS	SN PLUMMER BLOCK UNITS
HOUSING	ONE PIECE DUCTILE IRON	SPLIT GRAY CAST IRON
LOCKING	Z LOCK OR SET SCREW	ADAPTER SLEEVE
SEAL	ORIGINAL ALIGNED TRIPLE LIP ON INNER RING	SINGLE LIP SEAL ON SHAFT
SELF ALIGNING CAPABILITY	±2°	±1°
LUBRICATION	CALCIUM SULFONATE SYNTHETIC GREASE	NONE
INSTALLATION	TIGHTENING 4 CAP SCREWS FOR Z LOCK TIGHTENING 2 SET SCREWS FOR SET SCREW LOCK LESS THAN 10 MINUTES	ASSEMBLY HOUSING MANUAL CLEARANCE ADJUSTMENT OF INSERT WITH FEELER GAUGES FILLING WITH THE LUBRICANT MORE THAN 45 MINUTES

Contamination is the single biggest problem that bearings face in applications such as aggregate, mining, forestry, pulp and paper and steel mills. Split plummer block units have single lip rubber seals that contact and wear on the shafting. **FYH's original triple lip seals contact on the inner ring and can handle ±2 degrees of shaft misalignment, plummer block seals are not designed for this amount of misalignment.** Adapter sleeves used in a split plummer blocks require time and skill to install correctly, incorrect installation can allow them to be too tight or too loose. FYH's true concentric Z Lock can be installed much faster and easier than adaptor sleeve locks. **The installation of Z Lock bearings should be able to be completed in less than ten minutes and saves cost in both time and manpower.**

Nomenclature

The nomenclature of a FYH Spherical Roller Unit is comprised of the roller bearing unit model code which is made up using the bearing model code and the housing model code. This in combination with the diameter series code, bore diameter code, accessory code and any special code for individual applications determines the FYH Spherical Roller Units part number.

http://www.fyhbearings.com/html/nomenclature_r.html

FYH Spherical Roller Bearing Units

Z S 2SN 4 10 - 32 F ** ---------

Bearing No.	———	ZS410-32
Housing No.	———	2SN10

EXPANSION Type

Bore Size (inch)

Number of $^{1}/_{16}$″ of Inches
(ex. 32 = 2″)

Bore Size (base)

Metric type × 5 mm of Number
(ex. 10 = 50 mm)

Series code

4	Spherical Roller

Housing model code

2SN	2 - Bolt Base Type SN Pillow Block
2P	2 - Bolt Base Pillow Block
4P	4 - Bolt Base Pillow Block
4F	4 - Bolt Flange
4FC	Flange Cartridge
T	Take - Up
E2P	2 - Bolt Base Pillow Block : TYPE E (inch)
E4F	4 - Bolt Flange : TYPE E (inch)

INSERT-2 model code

S	Spherical Roller

INSERT-1 Locking Type code

Z	Z Lock Concentric Locking System
ZD	Z Lock Concentric Locking System (Both side)
X	Concentric set screw lock (One side)
XD	Concentric set screw lock (Both side)

Engineering Information of FYH Spherical Roller Bearings

Spherical Roller Bearing Life Calculations

The relationship between the basic rating life, the basic dynamic load rating, and the dynamic equivalent load of the spherical roller bearing is indicated in Formula A. If the spherical roller bearing unit is being used at a fixed rotating speed, the life is indicated as time. This is shown in Formula B.

A. $$L_{10} = \left(\frac{C_r}{P_r}\right)^{\frac{10}{3}}$$

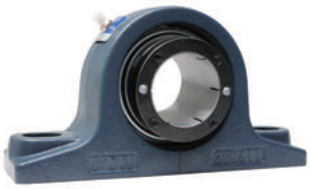
B. $$L_{10h} = \frac{10^6 L_{10}}{60n} = \frac{10^6}{60n}\left(\frac{C_r}{P_r}\right)^{\frac{10}{3}}$$

L_{10} : Basic Rating Life 10^6 rotations
L_{10h} : Rated Life (hr)
C_r : Basic Dynamic Load Rating (kN)
P_r : Dynamic equivalent Load (kN)
n : Speed (min^{-1})

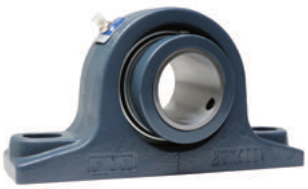
Models and Features

SPHERICAL ROLLER BEARING UNITS

2 - Bolt Base Type SN Pillow Block Units



ZS2SN



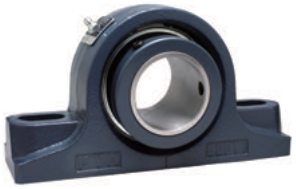
XS2SN

ZS2SN is patented Z LOCK spherical roller bearing unit with SN style housing for the replacement of SN plummer blocks.

XS2SN has the same housing dimensions as the above styles but utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place.

2 - Bolt Base Pillow Block Units

ZS2P
ZSE2P



XS2P
XSE2P

ZS2P is a two-bolt pillow block unit with a Z LOCK locking system. This unit is equivalent to many of our competitors SRB style housings. The ends of the housing are milled flat to allow for mounting inside of a fixed frame assembly.

ZSE2P is a two-bolt base pillow block unit with Type E mounting dimensions. It has a footprint that can accommodate both a tapered roller unit and a spherical roller unit for most shaft sizes.

XS2P and **XSE2P** have the same housing dimensions as the above styles but utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place.

4 - Bolt Flange Units

ZS4F
ZSE4F

XS4F
XSE4F

ZS4F is a four-bolt flange unit with standard spherical roller unit mounting dimensions and a compact footprint for areas with limited space.

ZSE4F is a four-bolt flange unit with Type E tapered roller unit mounting dimensions. This makes for easy replacement of Type E units when the features of a spherical roller unit are more desirable.

XS4F and **XSE4F** have the same housing dimensions as the above styles but utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place.

Flange Cartridge Units

ZS4FC

XS4FC

ZS4FC is a flange cartridge unit with pilot mounting dimensions that are the same as medium duty ball bearing units for easy upgrading to a heavier duty series. The threaded withdrawal holes allow for quick and easy dismounting.

XS4FC has the same housing dimensions as the above styles but utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place.

Take - Up Units

ZST

XST

ZST is a take-up unit with rail slots that are compatible with many industrial frame sizes. This unit can safely handle high belt tension and heavy shock loads.

XST has the same housing dimensions as the above styles but utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place.

4 - Bolt Base Pillow Block Units

ZS4P

XS4P

ZS4P is a four-bolt base pillow block unit with standard spherical roller bearing mounting dimensions. Four mounting bolt-holes create a firm and secure fit to the mounting surface. The ends of the housing are flat to allow for mounting inside of a fixed frame assembly.

XS4P has the same housing dimensions as the above styles but utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place.

4 - Bolt Base Pillow Block Units (Double Collar)

ZDS4P

XDS4P

ZDS4P is the same as the ZS4P but utilizes a double lock. This insert has patented Z LOCK locking mechanism on both the front and back of the inner ring. This additional locking mechanism is helpful in applications where the bearing experiences some thrust loads on the inner ring that could cause a single locking unit to slip.

XDS4P has the same housing dimensions as the above styles but utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place.

SPHERICAL ROLLER BEARING INSERTS

Spherical Roller Bearing Inserts (Single Collar)

ZS

XS

ZS is a Z LOCK concentric locking insert that utilizes a tapered collar that allows for fast mounting while avoiding damage to shafting that a setscrew unit can cause. The tapered collar keeps the 100% true concentric holding power and does not remove any clearance in the insert by over tightening like the adaptor sleeve locking system can. The unit is tightened down using a hex wrench on the cap screws in a star pattern. The insert can be uninstalled by removing all cap screws and using two of them in the withdrawal holes to disengage the collar.

XS is a setscrew locking insert that utilizes the patented Bullet Point setscrews at 120 degrees apart to hold shafting firmly in place. This is the most economical type of SRB insert and can be utilized in a wide variety of industrial and agricultural applications.

Spherical Roller Bearing Inserts (Double Collar)

ZDS

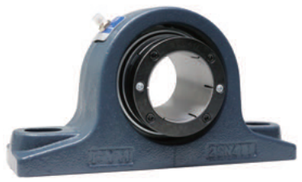
XDS

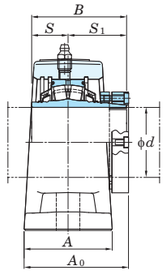
ZDS is the same as the ZS above but utilizes a double lock. This insert has a concentric tapered collar on both the front and back of the inner ring. This additional locking mechanism is helpful in applications where a bearing experiences some thrust loads on the inner ring that could cause a single locking unit to slip.

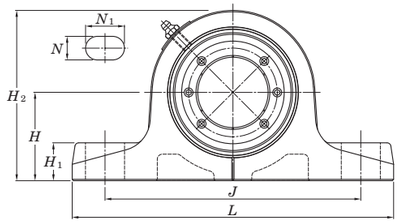
XDS is the same as the XS above but utilizes a double lock. This insert has a setscrew locking mechanism on both the front and back of the inner ring. This additional locking mechanism is helpful in applications where the bearing experiences some thrust loads on the inner ring that could cause a single locking unit to slip.

FYH

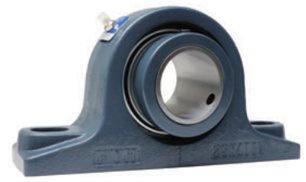
ZS2SN
Cylindrical bore
(with Z Lock)
d 40 ~ 100 mm

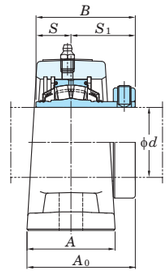


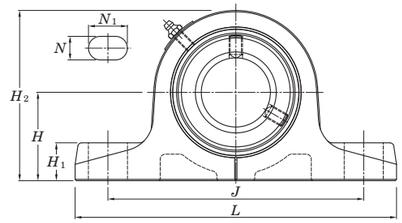




XS2SN
Cylindrical bore
(with set screw collar lock)
d 40 ~ 100 mm

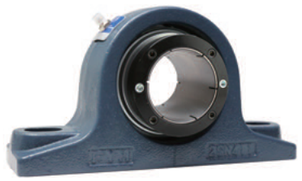


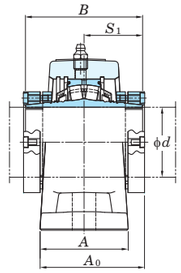


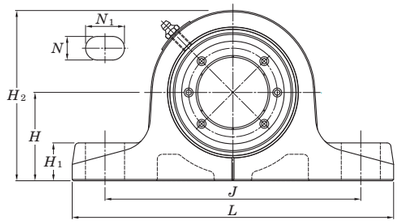


Shaft Dia. mm d	Dimensions mm H	L	A	J	N	N_1	H_1	H_2	A_0	B	S	S_1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size	Basic Load Ratings kN C_r	C_{0r}	Interchange to SN Plummer Block Units
40	60	205	60	164.8	15	24.8	25	112	68.9	64.3	25.4	38.9	**ZS2SN408**	ZS408	**XS2SN408**	XS408	2SN408	M12	88.7	101.1	SN509
45	60	205	60	167.5	15	22.5	25	115	72.1	67.5	25.4	42.1	**ZS2SN409**	ZS409	**XS2SN409**	XS409	2SN409	M12	92.6	108.8	SN510
50	70	255	70	203	20	31	28	130	81.8	72.2	25.4	46.8	**ZS2SN410**	ZS410	**XS2SN410**	XS410	2SN410	M16	96.4	116.9	SN511
55	70	255	70	203	20	31	30	135	81	74.6	28.6	46	**ZS2SN411**	ZS411	**XS2SN411**	XS411	2SN411	M16	120.8	146.8	SN512
60 **65**	80	280	80	220.5	20	33.5	30	155	89.6	81.4	31.8	49.6	**ZS2SN412** **ZS2SN413**	ZS412 ZS413	**XS2SN412** **XS2SN413**	XS412 XS413	2SN413	M16	173.3	220.4	SN513 SN515
70 **75**	95	316	90	256.4	25	34.1	32	176	104.5	91.3	31.8	59.5	**ZS2SN414** **ZS2SN415**	ZS414 ZS415	**XS2SN414** **XS2SN415**	XS414 XS415	2SN415	M20	186.8	244.4	SN516 SN517
80	100	345	100	281.8	25	34	35	198	115.1	103.6	38.5	65.1	**ZS2SN416**	ZS416	**XS2SN416**	XS416	2SN416	M20	284.1	383.7	SN518
85	112	345	100	280.2	25	38	35	210	115.1	103.6	38.5	65.1	**ZS2SN417**	ZS417	**XS2SN417**	XS417	2SN417	M20	284.1	383.7	SN519
90	112	380	110	309.9	29	43.1	40	218	120.1	103.6	38.5	65.1	**ZS2SN418**	ZS418	**XS2SN418**	XS418	2SN418	M24	284.1	383.7	SN520
100	125	410	120	335.2	29	46.8	45	239	132.6	113.9	41.3	72.6	**ZS2SN420**	ZS420	**XS2SN420**	XS420	2SN420	M24	364	497.2	SN522

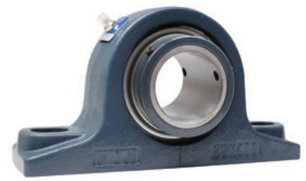
ZDS2SN
Cylindrical bore
(with Z Lock (both))
d 60 ~ 100 mm

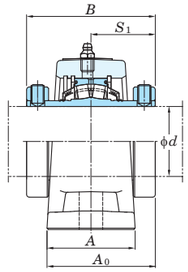


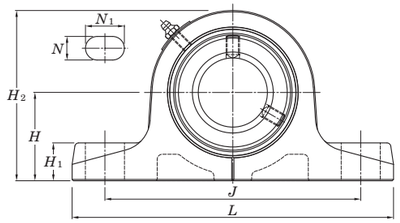




XDS2SN
Cylindrical bore
(with set screw collar lock (both))
d 60 ~ 100 mm

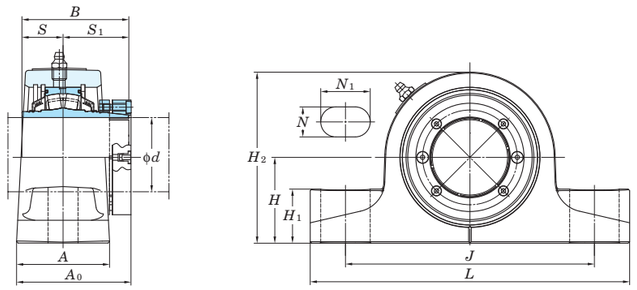






Shaft Dia. mm d	Dimensions mm H	L	A	J	N	N_1	H_1	H_2	A_0	B	S_1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size	Basic Load Ratings kN C_r	C_{0r}	Interchange to SN Plummer Block Units
60	80	280	80	220.5	20	33.5	30	155	89.6	99.2	49.6	**ZDS2SN412**	ZDS412	**XDS2SN412**	XDS412	2SN413	M16	173.3	220.4	SN513
65												**ZDS2SN413**	ZDS413	**XDS2SN413**	XDS413					SN515
70	95	316	90	256.4	25	34.1	32	176	104.5	119	59.5	**ZDS2SN414**	ZDS414	**XDS2SN414**	XDS414	2SN415	M20	186.8	244.4	SN516
75												**ZDS2SN415**	ZDS415	**XDS2SN415**	XDS415					SN517
80	100	345	100	281.8	25	34	35	198	115.1	130.2	65.1	**ZDS2SN416**	ZDS416	**XDS2SN416**	XDS416	2SN416	M20	284.1	383.7	SN518
85	112	345	100	280.2	25	38	35	210	115.1	130.2	65.1	**ZDS2SN417**	ZDS417	**XDS2SN417**	XDS417	2SN417	M20	284.1	383.7	SN519
90	112	380	110	309.9	29	43.1	40	218	120.1	130.2	65.1	**ZDS2SN418**	ZDS418	**XDS2SN418**	XDS418	2SN418	M24	284.1	383.7	SN520
100	125	410	120	335.2	29	46.8	45	239	132.6	145.2	72.6	**ZDS2SN420**	ZDS420	**XDS2SN420**	XDS420	2SN420	M24	364	497.2	SN522

ZS2P
Cylindrical bore
(with Z Lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm



XS2P
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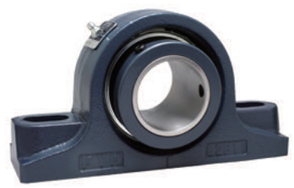
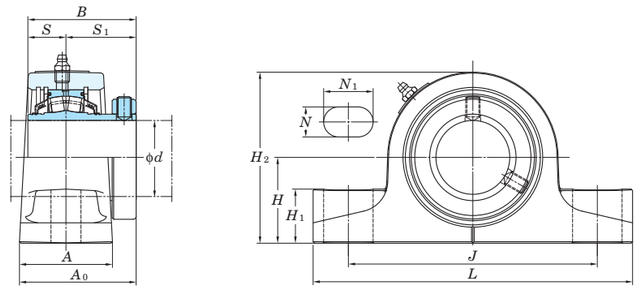
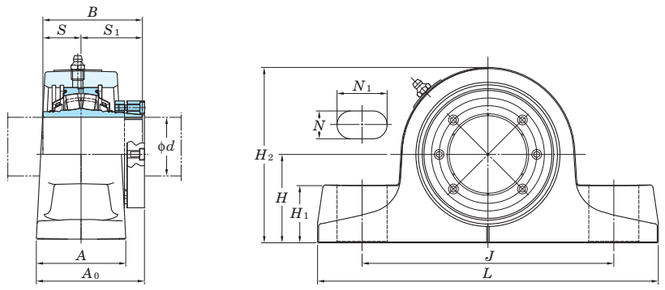


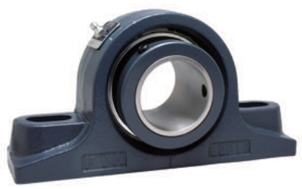


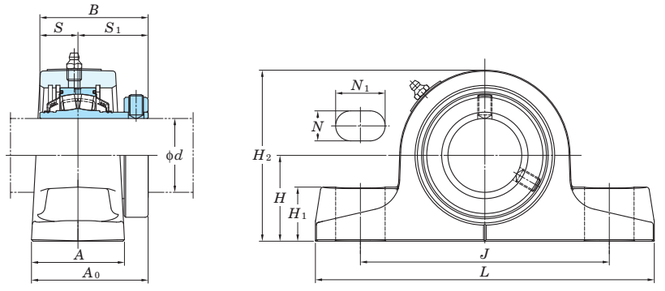
Shaft Dia. inch / mm *d*	Dimensions inch / mm *H*	*L*	*A*	*J*	*N*	*N*1	*H*1	*H*2	*A*0	*B*	*S*	*S*1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size inch / mm	Basic Load Ratings kN *Cr*	*C*0r
1 3/8													ZS2P408-22	ZS408-22	XS2P408-22	XS408-22				
1 7/16	1 7/8	6 7/8	2 5/32	5 9/32	19/32	1 3/32	1 1/4	3 25/32	2 5/8	2.531	1	1.531	ZS2P408-23	ZS408-23	XS2P408-23	XS408-23	2P408	1/2	88.7	101.1
1 1/2	47.6	175	55	134	15	28	32	96	66.4	64.3	25.4	38.9	ZS2P408-24	ZS408-24	XS2P408-24	XS408-24		M12		
40													**ZS2P408**	ZS408	**XS2P408**	XS408				
1 11/16													**ZS2P409-27**	ZS409-27	**XS2P409-27**	XS409-27				
1 3/4	2 1/8	7 3/8	2 3/8	5 25/32	19/32	1 3/32	1 5/16	4 1/4	2 27/32	2.657	1	1.657	**ZS2P409-28**	ZS409-28	**XS2P409-28**	XS409-28	2P409	1/2	92.6	108.8
45	54	187	60	147	15	28	33	108	72.1	67.5	25.4	42.1	**ZS2P409**	ZS409	**XS2P409**	XS409		M12		
1 15/16													**ZS2P410-31**	ZS410-31	**XS2P410-31**	XS410-31				
50	2 1/4	8 3/8	2 7/16	6 17/32	25/32	1 5/16	1 3/8	4 1/2	3 1/16	2.843	1	1.843	**ZS2P410**	ZS410	**XS2P410**	XS410	2P410	5/8	96.4	116.9
2	57.2	213	62	166	20	33	35	114	77.8	72.2	25.4	46.8	**ZS2P410-32**	ZS410-32	**XS2P410-32**	XS410-32		M16		
55													**ZS2P411**	ZS411	**XS2P411**	XS411				
2 3/16	2 1/2	8 7/8	2 5/8	6 7/8	25/32	1 3/16	1 5/8	4 31/32	3 1/8	2.937	1.126	1.811	**ZS2P411-35**	ZS411-35	**XS2P411-35**	XS411-35	2P411	5/8	120.8	146.8
2 1/4	63.5	225	67	175	20	30	41	126	79.5	74.6	28.6	46	**ZS2P411-36**	ZS411-36	**XS2P411-36**	XS411-36		M16		
60													**ZS2P412**	ZS412	**XS2P412**	XS412				
2 7/16	2 3/4	9 1/4	2 7/8	7 9/32	25/32	1 3/16	1 25/32	5 19/32	3 3/8	3.205	1.252	1.953	**ZS2P413-39**	ZS413-39	**XS2P413-39**	XS413-39	2P413	5/8	173.3	220.4
2 1/2	69.8	235	73	185	20	30	45	142	86.1	81.4	31.8	49.6	**ZS2P413-40**	ZS413-40	**XS2P413-40**	XS413-40		M16		
65													**ZS2P413**	ZS413	**XS2P413**	XS413				
70													**ZS2P414**	ZS414	**XS2P414**	XS414				
2 11/16													**ZS2P415-43**	ZS415-43	**XS2P415-43**	XS415-43				
2 3/4	3 1/4	10 7/16	3	8 9/32	15/16	1 9/32	1 7/8	6 3/8	3 13/16	3.594	1.252	2.343	**ZS2P415-44**	ZS415-44	**XS2P415-44**	XS415-44	2P415	3/4	186.8	244.4
2 15/16	82.6	265	76	210	24	32	48	162	97	91.3	31.8	59.5	**ZS2P415-47**	ZS415-47	**XS2P415-47**	XS415-47		M20		
75													**ZS2P415**	ZS415	**XS2P415**	XS415				
3													**ZS2P415-48**	ZS415-48	**XS2P415-48**	XS415-48				
80													**ZS2P416**	ZS416	**XS2P416**	XS416				
3 1/4													**ZS2P417-52**	ZS417-52	**XS2P417-52**	XS417-52				
85	3 3/4	13	3 3/8	10 5/16	1 1/16	1 23/32	2 1/4	7 15/32	4 1/4	4.079	1.516	2.563	**ZS2P417**	ZS417	**XS2P417**	XS417	2P418	7/8	284.1	383.7
3 7/16	95.2	330	86	262	27	44	57	190	108.1	103.6	38.5	65.1	**ZS2P418-55**	ZS418-55	**XS2P418-55**	XS418-55		M22		
3 1/2													**ZS2P418-56**	ZS418-56	**XS2P418-56**	XS418-56				
90													**ZS2P418**	ZS418	**XS2P418**	XS418				
100													**ZS2P420**	ZS420	**XS2P420**	XS420				
3 15/16	4 1/4	15 1/4	3 3/4	11 1/4	1 5/32	2 5/16	2 17/32	8 11/32	4 23/32	4.484	1.626	2.858	**ZS2P420-63**	ZS420-63	**XS2P420-63**	XS420-63	2P420	1	364	497.2
4	108	387	95	286	29	59	64	212	120.1	113.9	41.3	72.6	**ZS2P420-64**	ZS420-64	**XS2P420-64**	XS420-64		M24		

ZSE2P
Cylindrical bore
(with Z Lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm



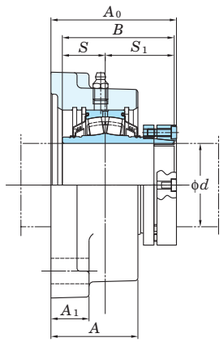
XSE2P
Cylindrical bore
(with set screw collar lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm

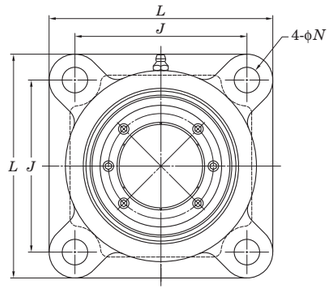




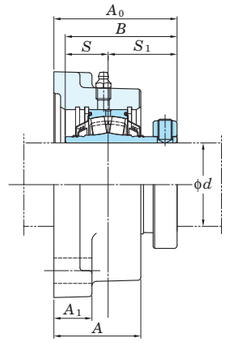
Shaft Dia. inch / mm d	Dimensions inch / mm H	L	A	J	N	N_1	H_1	H_2	A_0	B	S	S_1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size inch / mm	Basic Load Ratings kN C_r	C_{0r}
1 3/8													ZSE2P408-22	ZS408-22	XSE2P408-22	XS408-22				
1 7/16	1 7/8	7 3/8	2 5/32	5 9/32	19/32	1 3/32	1 1/4	3 25/32	2 5/8	2.531	1	1.531	ZSE2P408-23	ZS408-23	XSE2P408-23	XS408-23	E2P08	1/2	88.7	101.1
1 1/2	47.6	187	55	134	15	28	32	96	66.4	64.3	25.4	38.9	ZSE2P408-24	ZS408-24	XSE2P408-24	XS408-24		M12		
40													**ZSE2P408**	ZS408	**XSE2P408**	XS408				
1 11/16													ZSE2P409-27	ZS409-27	XSE2P409-27	XS409-27				
1 3/4	2 1/8	7 7/8	2 3/8	5 25/32	19/32	1 3/32	1 5/16	4 1/4	2 27/32	2.657	1	1.657	ZSE2P409-28	ZS409-28	XSE2P409-28	XS409-28	E2P09	1/2	92.6	108.8
45	54	200	60	147	15	28	33	108	72.1	67.5	25.4	42.1	**ZSE2P409**	ZS409	**XSE2P409**	XS409		M12		
1 15/16													ZSE2P410-31	ZS410-31	XSE2P410-31	XS410-31				
50	2 1/4	8 29/32	2 7/16	6 17/32	25/32	1 5/16	1 3/8	4 1/2	3 1/16	2.843	1	1.843	**ZSE2P410**	ZS410	**XSE2P410**	XS410	E2P10	5/8	96.4	116.9
2	57.2	226	62	166	20	33	35	114	77.8	72.2	25.4	46.8	ZSE2P410-32	ZS410-32	XSE2P410-32	XS410-32		M16		
55													**ZSE2P411**	ZS411	**XSE2P411**	XS411				
2 3/16	2 1/2	9 21/32	2 5/8	7 1/8	25/32	1 13/32	1 5/8	4 31/32	3 1/8	2.937	1.126	1.811	ZSE2P411-35	ZS411-35	XSE2P411-35	XS411-35	E2P11	5/8	120.8	146.8
2 1/4	63.5	245	67	181	20	36	41	126	79.5	74.6	28.6	46	ZSE2P411-36	ZS411-36	XSE2P411-36	XS411-36		M16		
60													**ZSE2P412**	ZS412	**XSE2P412**	XS412				
2 7/16	2 3/4	10 1/4	2 7/8	7 11/16	25/32	1 9/16	1 25/32	5 19/32	3 3/8	3.205	1.252	1.953	ZSE2P413-39	ZS413-39	XSE2P413-39	XS413-39	E2P13	5/8	173.3	220.4
2 1/2	69.8	260	73	195	20	40	45	142	86.1	81.4	31.8	49.6	ZSE2P413-40	ZS413-40	XSE2P413-40	XS413-40		M16		
65													**ZSE2P413**	ZS413	**XSE2P413**	XS413				
70													**ZSE2P414**	ZS414	**XSE2P414**	XS414				
2 11/16													ZSE2P415-43	ZS415-43	XSE2P415-43	XS415-43				
2 3/4	3 1/8	11 5/8	3	8 11/16	15/16	1 11/16	1 25/32	6 1/4	3 13/16	3.594	1.252	2.343	ZSE2P415-44	ZS415-44	XSE2P415-44	XS415-44	E2P15	3/4	186.8	244.4
2 15/16	79.5	295	76	221	24	43	45	159	97	91.3	31.8	59.5	ZSE2P415-47	ZS415-47	XSE2P415-47	XS415-47		M20		
75													**ZSE2P415**	ZS415	**XSE2P415**	XS415				
3													ZSE2P415-48	ZS415-48	XSE2P415-48	XS415-48				
80													**ZSE2P416**	ZS416	**XSE2P416**	XS416				
3 1/4													ZSE2P417-52	ZS417-52	XSE2P417-52	XS417-52				
85	3 3/4	13 1/2	3 3/8	10 5/16	1 1/16	1 23/32	2 1/4	7 15/32	4 1/4	4.079	1.516	2.563	**ZSE2P417**	ZS417	**XSE2P417**	XS417	E2P18	7/8	284.1	383.7
3 7/16	95.2	343	86	262	27	44	57	190	108.1	103.6	38.5	65.1	ZSE2P418-55	ZS418-55	XSE2P418-55	XS418-55		M22		
3 1/2													ZSE2P418-56	ZS418-56	XSE2P418-56	XS418-56				
90													**ZSE2P418**	ZS418	**XSE2P418**	XS418				
100													**ZSE2P420**	ZS420	**XSE2P420**	XS420				
3 15/16	4 1/8	15 1/4	3 3/4	11 1/4	1 5/32	2 5/16	2 13/32	8 7/32	4 23/32	4.484	1.626	2.858	ZSE2P420-63	ZS420-63	XSE2P420-63	XS420-63	E2P20	1	364	497.2
4	104.9	387	95	286	29	59	61	209	120.1	113.9	41.3	72.6	ZSE2P420-64	ZS420-64	XSE2P420-64	XS420-64		M24		

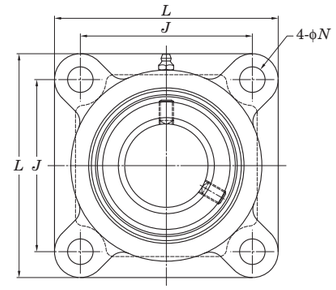
ZS4F
Cylindrical bore
(with Z Lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm





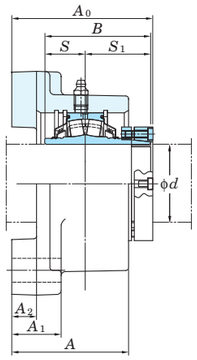
XS4F
Cylindrical bore
(with set screw collar lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm

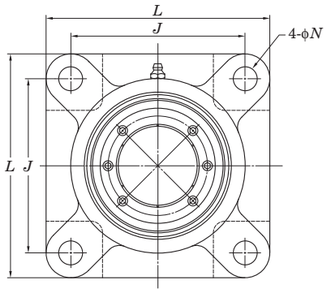




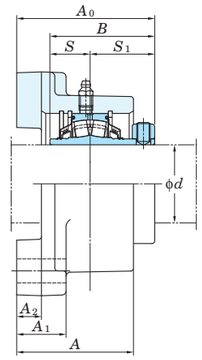
Shaft Dia. inch / mm *d*	Dimensions inch / mm *L*	*A*	*J*	*N*	*A*1	*A*0	*B*	*S*	*S*1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size inch / mm	Basic Load Ratings kN *C*r	*C*0r
1 3/8										ZS4F408-22	ZS408-22	XS4F408-22	XS408-22				
1 7/16	4 3/4	2 3/32	3 17/32	35/64	3/4	2 3/4	2.531	1	1.531	ZS4F408-23	ZS408-23	XS4F408-23	XS408-23	4F408	1/2	88.7	101.1
1 1/2	121	53	89.7	14	19	70.2	64.3	25.4	38.9	ZS4F408-24	ZS408-24	XS4F408-24	XS408-24		M12		
40										**ZS4F408**	ZS408	**XS4F408**	XS408				
1 11/16	5 1/8	2 5/32	3 57/64	35/64	3/4	2 31/32	2.657	1	1.657	ZS4F409-27	ZS409-27	XS4F409-27	XS409-27				
1 3/4	130	55	98.8	14	19	75.4	67.5	25.4	42.1	ZS4F409-28	ZS409-28	XS4F409-28	XS409-28	4F409	1/2	92.6	108.8
45										**ZS4F409**	ZS409	**XS4F409**	XS409		M12		
1 15/16										ZS4F410-31	ZS410-31	XS4F410-31	XS410-31				
50	5 5/16	2 5/32	4 1/16	35/64	3/4	3 5/32	2.843	1	1.843	**ZS4F410**	ZS410	**XS4F410**	XS410	4F410	1/2	96.4	116.9
2	135	55	103.2	14	19	80.2	72.2	25.4	46.8	ZS4F410-32	ZS410-32	XS4F410-32	XS410-32		M12		
55										**ZS4F411**	ZS411	**XS4F411**	XS411				
2 3/16	5 29/32	2 9/32	4 33/64	21/32	1 1/32	3 1/4	2.937	1.126	1.811	ZS4F411-35	ZS411-35	XS4F411-35	XS411-35	4F411	5/8	120.8	146.8
2 1/4	150	58	114.7	17	26	82.2	74.6	28.6	46	ZS4F411-36	ZS411-36	XS4F411-36	XS411-36		M16		
60										**ZS4F412**	ZS412	**XS4F412**	XS412				
2 7/16	6 1/8	2 9/16	4 25/32	21/32	1 1/32	3 17/32	3.205	1.252	1.953	ZS4F413-39	ZS413-39	XS4F413-39	XS413-39	4F413	5/8	173.3	220.4
2 1/2	156	65	121.4	17	26	89.3	81.4	31.8	49.6	ZS4F413-40	ZS413-40	XS4F413-40	XS413-40		M16		
65										**ZS4F413**	ZS413	**XS4F413**	XS413				
70										**ZS4F414**	ZS414	**XS4F414**	XS414				
2 11/16										ZS4F415-43	ZS415-43	XS4F415-43	XS415-43				
2 3/4	7 7/32	2 5/8	5 9/16	7/8	1 1/32	3 29/32	3.594	1.252	2.343	ZS4F415-44	ZS415-44	XS4F415-44	XS415-44	4F415	3/4	186.8	244.4
2 15/16	183	67	141.3	22	26	99.2	91.3	31.8	59.5	ZS4F415-47	ZS415-47	XS4F415-47	XS415-47		M20		
75										**ZS4F415**	ZS415	**XS4F415**	XS415				
3										ZS4F415-48	ZS415-48	XS4F415-48	XS415-48				
80										**ZS4F416**	ZS416	**XS4F416**	XS416				
3 1/4										ZS4F417-52	ZS417-52	XS4F417-52	XS417-52				
85	8 9/32	3 5/32	6 23/32	7/8	1 5/32	4 3/8	4.079	1.516	2.563	**ZS4F417**	ZS417	**XS4F417**	XS417	4F418	3/4	284.1	383.7
3 7/16	210	80	170.7	22	29	111.5	103.6	38.5	65.1	ZS4F418-55	ZS418-55	XS4F418-55	XS418-55		M20		
3 1/2										ZS4F418-56	ZS418-56	XS4F418-56	XS418-56				
90										**ZS4F418**	ZS418	**XS4F418**	XS418				
100										**ZS4F420**	ZS420	**XS4F420**	XS420				
3 15/16	9 1/4	3 19/32	7 39/64	63/64	1 3/16	4 27/32	4.484	1.626	2.858	ZS4F420-63	ZS420-63	XS4F420-63	XS420-63	4F420	7/8	364	497.2
4	235	91	193.3	25	30	123	113.9	41.3	72.6	ZS4F420-64	ZS420-64	XS4F420-64	XS420-64		M22		

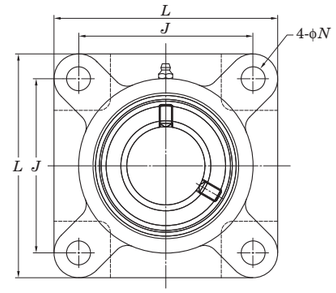
ZSE4F
Cylindrical bore
(with Z Lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm





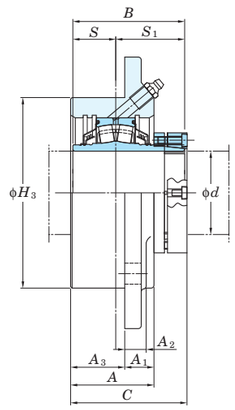
XSE4F
Cylindrical bore
(with set screw collar lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm

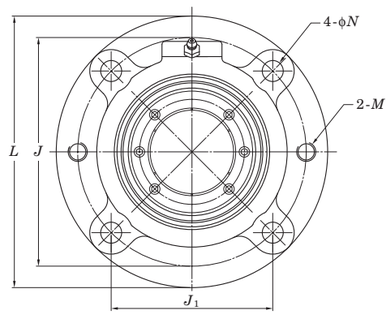




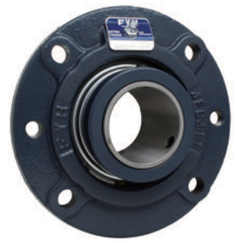
Shaft Dia. inch / mm *d*	Dimensions inch / mm *L*	*A*	*J*	*N*	A_1	A_2	A_0	*B*	*S*	S_1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size inch / mm	Basic Load Ratings kN C_r	C_{0r}
1 3/8											ZSE4F408-22	ZS408-22	XSE4F408-22	XS408-22				
1 7/16	4 19/32	2 15/32	3 1/2	35/64	1 1/16	1/2	3 1/16	2.531	1	1.531	ZSE4F408-23	ZS408-23	XSE4F408-23	XS408-23	E4F408	1/2	88.7	101.1
1 1/2	117	63	88.9	14	27	13	77.8	64.3	25.4	38.9	ZSE4F408-24	ZS408-24	XSE4F408-24	XS408-24		M12		
40											**ZSE4F408**	ZS408	**XSE4F408**	XS408				
1 11/16											ZSE4F409-27	ZS409-27	XSE4F409-27	XS409-27				
1 3/4	5 11/32	2 15/16	4 1/8	35/64	1 3/16	5/8	3 1/2	2.657	1	1.657	ZSE4F409-28	ZS409-28	XSE4F409-28	XS409-28	E4F409	1/2	92.6	108.8
45	136	75	104.9	14	30	16	88.8	67.5	25.4	42.1	**ZSE4F409**	ZS409	**XSE4F409**	XS409		M12		
1 15/16											ZSE4F410-31	ZS410-31	XSE4F410-31	XS410-31				
50	5 5/8	2 15/16	4 3/8	35/64	1 3/16	5/8	3 5/8	2.843	1	1.843	**ZSE4F410**	ZS410	**XSE4F410**	XS410	E4F410	1/2	96.4	116.9
2	143	75	111	14	30	16	92	72.2	25.4	46.8	ZSE4F410-32	ZS410-32	XSE4F410-32	XS410-32		M12		
55											**ZSE4F411**	ZS411	**XSE4F411**	XS411				
2 3/16	6 1/4	3 9/32	4 7/8	21/32	1 3/8	23/32	3 7/8	2.937	1.126	1.811	ZSE4F411-35	ZS411-35	XSE4F411-35	XS411-35	E4F411	5/8	120.8	146.8
2 1/4	159	83	123.7	17	35	18	98.2	74.6	28.6	46	ZSE4F411-36	ZS411-36	XSE4F411-36	XS411-36		M16		
60											**ZSE4F412**	ZS412	**XSE4F412**	XS412				
2 7/16	6 7/8	3 11/32	5 3/8	21/32	1 1/2	25/32	4 3/16	3.205	1.252	1.953	ZSE4F413-39	ZS413-39	XSE4F413-39	XS413-39	E4F413	5/8	173.3	220.4
2 1/2	175	85	136.4	17	38	20	106.3	81.4	31.8	49.6	ZSE4F413-40	ZS413-40	XSE4F413-40	XS413-40		M16		
65											**ZSE4F413**	ZS413	**XSE4F413**	XS413				
70											**ZSE4F414**	ZS414	**XSE4F414**	XS414				
2 11/16											ZSE4F415-43	ZS415-43	XSE4F415-43	XS415-43				
2 3/4	7 3/4	3 13/16	6	7/8	1 5/8	15/16	4 11/16	3.594	1.252	2.343	ZSE4F415-44	ZS415-44	XSE4F415-44	XS415-44	E4F415	3/4	186.8	244.4
2 15/16	197	97	152.4	22	41	24	119	91.3	31.8	59.5	ZSE4F415-47	ZS415-47	XSE4F415-47	XS415-47		M20		
75											**ZSE4F415**	ZS415	**XSE4F415**	XS415				
3											ZSE4F415-48	ZS415-48	XSE4F415-48	XS415-48				
80											**ZSE4F416**	ZS416	**XSE4F416**	XS416				
3 1/4											ZSE4F417-52	ZS417-52	XSE4F417-52	XS417-52				
85	9 1/4	4 9/32	7	7/8	1 7/8	31/32	5 5/16	4.079	1.516	2.563	**ZSE4F417**	ZS417	**XSE4F417**	XS417	E4F418	3/4	284.1	383.7
3 7/16	235	109	177.8	22	48	24.5	135.1	103.6	38.5	65.1	ZSE4F418-55	ZS418-55	XSE4F418-55	XS418-55		M20		
3 1/2											ZSE4F418-56	ZS418-56	XSE4F418-56	XS418-56				
90											**ZSE4F418**	ZS418	**XSE4F418**	XS418				
100											**ZSE4F420**	ZS420	**XSE4F420**	XS420				
3 15/16	10 1/4	5 1/2	7 3/4	63/64	2 1/8	1 3/32	6 1/2	4.484	1.626	2.858	ZSE4F420-63	ZS420-63	XSE4F420-63	XS420-63	E4F420	7/8	364	497.2
4	260	140	196.9	25	54	28	165.2	113.9	41.3	72.6	ZSE4F420-64	ZS420-64	XSE4F420-64	XS420-64		M22		

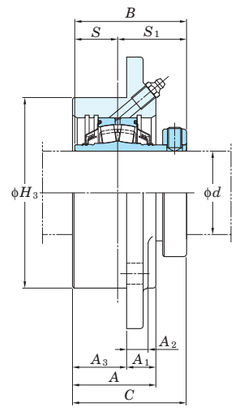
ZS4FC
Cylindrical bore
(with Z Lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm

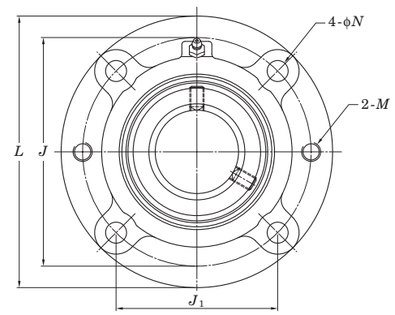




XS4FC
Cylindrical bore
(with set screw collar lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm

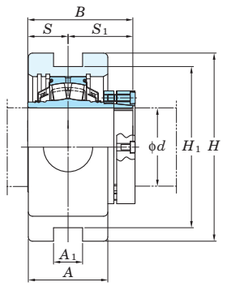


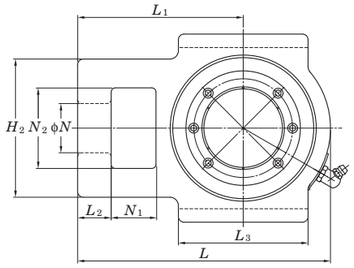




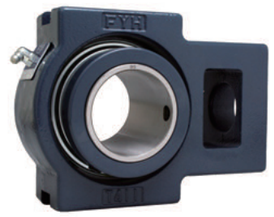
Shaft Dia. inch / mm *d*	Dimensions inch / mm *L*	*H*3	*J*	*J*1	*N*	*A*	*A*1	*A*2	*A*3	*C*	*M*	*B*	*S*	*S*1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size inch / mm	Basic Load Ratings kN *C*r	*C*0r
1 3/8															ZS4FC408-22	ZS408-22	XS4FC408-22	XS408-22				
1 7/16	5 1/4	3.625	4 3/8	3 3/32	15/32	1 27/32	13/16	11/16	1 1/32	2 17/32		2.531	1	1.531	ZS4FC408-23	ZS408-23	XS4FC408-23	XS408-23	4FC408	3/8	88.7	101.1
1 1/2	133	92.1	111.1	78.6	12	46.8	21	17.3	26	64.3	3/8-16UNC	64.3	25.4	38.9	ZS4FC408-24	ZS408-24	XS4FC408-24	XS408-24		M10		
40															**ZS4FC408**	ZS408	**XS4FC408**	XS408				
1 11/16															ZS4FC409-27	ZS409-27	XS4FC409-27	XS409-27				
1 3/4	6 5/32	4.25	5 1/8	3 5/8	9/16	1 29/32	5/8	1/2	1 17/64	2 23/32		2.657	1	1.657	ZS4FC409-28	ZS409-28	XS4FC409-28	XS409-28	4FC409	7/16	92.6	108.8
45	156	107.8	130.2	92.1	14	48.4	16	12.7	32.2	69.1	7/16-14UNC	67.5	25.4	42.1	**ZS4FC409**	ZS409	**XS4FC409**	XS409		M12		
1 15/16															ZS4FC410-31	ZS410-31	XS4FC410-31	XS410-31				
50	6 3/8	4.5	5 3/8	3 51/64	9/16	2	3/4	9/16	1 17/64	2 55/64		2.843	1	1.843	**ZS4FC410**	ZS410	**XS4FC410**	XS410	4FC410	7/16	96.4	116.9
2	162	114.3	136.5	96.5	14	50.8	19	14.3	32.2	72.6	7/16-14UNC	72.2	25.4	46.8	ZS4FC410-32	ZS410-32	XS4FC410-32	XS410-32		M12		
55															**ZS4FC411**	ZS411	**XS4FC411**	XS411				
2 3/16	7 1/8	5	6	4 1/4	35/64	2 3/16	25/32	9/16	1 27/64	3		2.937	1.126	1.811	ZS4FC411-35	ZS411-35	XS4FC411-35	XS411-35	4FC411	1/2	120.8	146.8
2 1/4	181	127	152.4	107.8	14	55.6	20	14.3	36.1	76.1	1/2-13UNC	74.6	28.6	46	ZS4FC411-36	ZS411-36	XS4FC411-36	XS411-36		M12		
60															**ZS4FC412**	ZS412	**XS4FC412**	XS412				
2 7/16	7 5/8	5.5	6 1/2	4 19/32	35/64	2 1/2	15/16	5/8	1 9/16	3 7/16		3.205	1.252	1.953	ZS4FC413-39	ZS413-39	XS4FC413-39	XS413-39	4FC413	1/2	173.3	220.4
2 1/2	194	139.7	165.1	116.7	14	63.5	24	15.9	39.7	87.4	1/2-13UNC	81.4	31.8	49.6	ZS4FC413-40	ZS413-40	XS4FC413-40	XS413-40		M12		
65															**ZS4FC413**	ZS413	**XS4FC413**	XS413				
70															**ZS4FC414**	ZS414	**XS4FC414**	XS414				
2 11/16															ZS4FC415-43	ZS415-43	XS4FC415-43	XS415-43				
2 3/4	8 3/4	6.375	7 1/2	5 19/64	43/64	2 5/8	31/32	3/4	1 5/8	3 41/64		3.594	1.252	2.343	ZS4FC415-44	ZS415-44	XS4FC415-44	XS415-44	4FC415	5/8	186.8	244.4
2 15/16	222	161.9	190.5	134.7	17	66.7	25	19.1	41.3	92.5	5/8-11UNC	91.3	31.8	59.5	ZS4FC415-47	ZS415-47	XS4FC415-47	XS415-47		M16		
75															**ZS4FC415**	ZS415	**XS4FC415**	XS415				
3															ZS4FC415-48	ZS415-48	XS4FC415-48	XS415-48				
80															**ZS4FC416**	ZS416	**XS4FC416**	XS416				
3 1/4															ZS4FC417-52	ZS417-52	XS4FC417-52	XS417-52				
85	10 1/4	7.375	8 5/8	6 3/32	29/32	3	1 15/32	15/16	1 33/64	4 5/32		4.079	1.516	2.563	**ZS4FC417**	ZS417	**XS4FC417**	XS417	4FC418	3/4	284.1	383.7
3 7/16	260	187.3	219.1	154.9	23	76.2	38	23.8	38.5	105.6	3/4-10UNC	103.6	38.5	65.1	ZS4FC418-55	ZS418-55	XS4FC418-55	XS418-55		M20		
3 1/2															ZS4FC418-56	ZS418-56	XS4FC418-56	XS418-56				
90															**ZS4FC418**	ZS418	**XS4FC418**	XS418				
100															**ZS4FC420**	ZS420	**XS4FC420**	XS420				
3 15/16	10 7/8	8.125	9 3/8	6 5/8	29/32	3 1/2	1 9/16	1 1/4	1 29/32	4 9/16		4.484	1.626	2.858	ZS4FC420-63	ZS420-63	XS4FC420-63	XS420-63	4FC420	3/4	364	497.2
4	276	206.4	238.1	168.4	23	88.9	40	31.4	48.4	115.9	3/4-10UNC	113.9	41.3	72.6	ZS4FC420-64	ZS420-64	XS4FC420-64	XS420-64		M20		

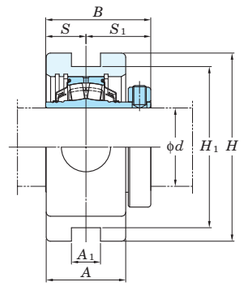
ZST
Cylindrical bore
(with Z Lock)
d 1 15/16 ~ 3 1/2 inch
50 ~ 90 mm

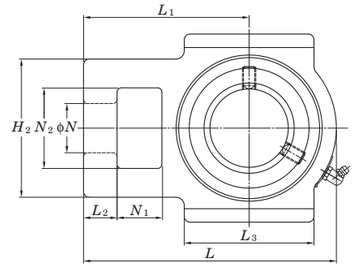




XST
Cylindrical bore
(with set screw collar lock)
d 1 15/16 ~ 3 1/2 inch
50 ~ 90 mm

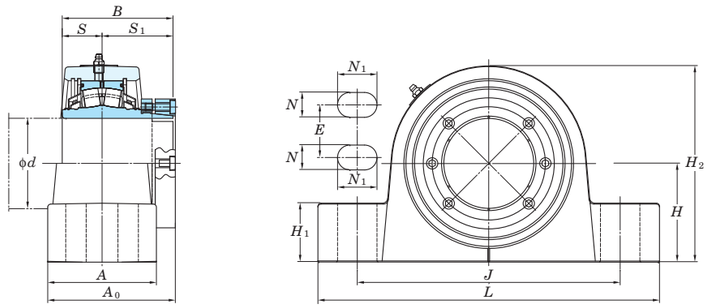




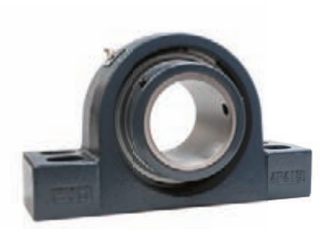


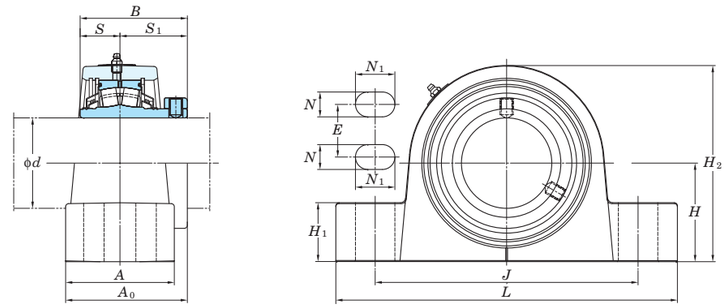
Shaft Dia. inch / mm	Dimensions inch / mm															Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Basic Load Ratings kN	
d	*A*	A_1	*H*	H_1	H_2	*L*	L_1	L_2	L_3	*N*	N_1	N_2	*B*	*S*	S_1						C_r	C_{0r}
1 15/16	2	11/16	4 3/4	4	3 5/16	6 3/16	3 15/16	15/16	3 5/8	1 1/8	3/4	1 15/16	2.843	1	1.843	**ZST410-31**	ZS410-31	**XST410-31**	XS410-31			
50	51	17.5	121	101.6	84	157.2	100	23.8	92	28.6	19.1	49.2	72.2	25.4	46.8	**ZST410**	ZS410	**XST410**	XS410	T410	96.4	116.9
2																**ZST410-32**	ZS410-32	**XST410-32**	XS410-32			
55																**ZST411**	ZS411	**XST411**	XS411			
2 3/16	2 7/32	13/16	5 1/4	4 1/2	3 27/32	7 1/16	4 5/8	15/16	3 5/8	1 3/8	1 1/4	2 1/4	2.937	1.126	1.811	**ZST411-35**	ZS411-35	**XST411-35**	XS411-35	T411	120.8	146.8
2 1/4	56	20.6	133	114.3	98	179.4	117.5	23.8	92	34.9	31.8	57.2	74.6	28.6	46	**ZST411-36**	ZS411-36	**XST411-36**	XS411-36			
60																**ZST412**	ZS412	**XST412**	XS412			
2 7/16	2 7/16	1 1/16	5 7/8	5 1/8	4 1/4	7 25/32	5	15/16	4 3/8	1 3/8	1 1/4	2 1/2	3.205	1.252	1.953	**ZST413-39**	ZS413-39	**XST413-39**	XS413-39	T413	173.3	220.4
2 1/2	62	27	149	130.2	108	198	127	23.8	111	34.9	31.8	63.5	81.4	31.8	49.6	**ZST413-40**	ZS413-40	**XST413-40**	XS413-40			
65																**ZST413**	ZS413	**XST413**	XS413			
70																**ZST414**	ZS414	**XST414**	XS414			
2 11/16																**ZST415-43**	ZS415-43	**XST415-43**	XS415-43			
2 3/4	2 11/16	1 13/16	6 11/16	5 15/16	4 7/8	8 7/8	5 3/4	1 1/8	4 1/2	1 5/8	1 1/2	2 3/4	3.594	1.252	2.343	**ZST415-44**	ZS415-44	**XST415-44**	XS415-44	T415	186.8	244.4
2 15/16	68	46	170	150.8	124	225.4	146.1	28.6	114.3	41.3	38.1	69.9	91.3	31.8	59.5	**ZST415-47**	ZS415-47	**XST415-47**	XS415-47			
75																**ZST415**	ZS415	**XST415**	XS415			
3																**ZST415-48**	ZS415-48	**XST415-48**	XS415-48			
80																**ZST416**	ZS416	**XST416**	XS416			
3 1/4																**ZST417-52**	ZS417-52	**XST417-52**	XS417-52			
85	3 1/16	1 13/16	7 25/32	6 13/16	5 1/8	10 1/16	6 3/8	1 1/16	5 1/2	1 7/8	1 5/8	2 7/8	4.079	1.516	2.563	**ZST417**	ZS417	**XST417**	XS417	T418	284.1	383.7
3 7/16	78	46	198	173	130	255.6	161.9	27	139.7	47.6	41.3	73	103.6	38.5	65.1	**ZST418-55**	ZS418-55	**XST418-55**	XS418-55			
3 1/2																**ZST418-56**	ZS418-56	**XST418-56**	XS418-56			
90																**ZST418**	ZS418	**XST418**	XS418			

ZS4P
Cylindrical bore
(with Z Lock)
d 2 7/16 ~ 4 inch
60 ~ 100 mm



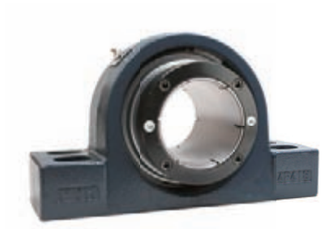
XS4P
Cylindrical bore
(with set screw collar lock)
d 2 7/16 ~ 4 inch
60 ~ 100 mm

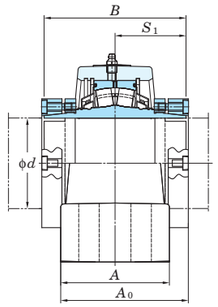


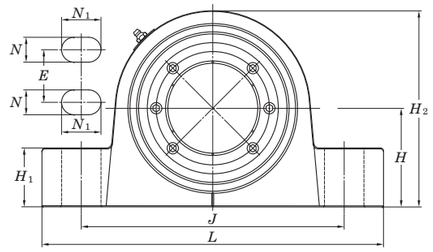


Shaft Dia.	Dimensions													Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size	Basic Load Ratings	
inch mm	inch mm																		inch	kN	
d	H	L	A	J	N	N_1	E	H_1	H_2	A_0	B	S	S_1						mm	C_r	C_{0r}
60														**ZS4P412**	ZS412	**XS4P412**	XS412				
2 7/16	2 3/4	9 1/4	3 3/8	7 1/8	19/32	13/16	1 3/4	1 5/8	5 19/32	3 21/32	3.205	1.252	1.953	**ZS4P413-39**	ZS413-39	**XS4P413-39**	XS413-39	4P413	1/2	173.3	220.4
2 1/2	69.8	235	86	181	15	21	44	41	142	92.6	81.4	31.8	49.6	**ZS4P413-40**	ZS413-40	**XS4P413-40**	XS413-40		M12		
65														**ZS4P413**	ZS413	**XS4P413**	XS413				
70														**ZS4P414**	ZS414	**XS4P414**	XS414				
2 11/16														**ZS4P415-43**	ZS415-43	**XS4P415-43**	XS415-43				
2 3/4	3 1/4	10 7/16	3 3/4	8 1/8	25/32	15/16	1 7/8	1 7/8	6 3/8	4 7/32	3.594	1.252	2.343	**ZS4P415-44**	ZS415-44	**XS4P415-44**	XS415-44	4P415	5/8	186.8	244.4
2 15/16	82.6	265	95	206	20	24	48	48	162	107	91.3	31.8	59.5	**ZS4P415-47**	ZS415-47	**XS4P415-47**	XS415-47		M16		
75														**ZS4P415**	ZS415	**XS4P415**	XS415				
3														**ZS4P415-48**	ZS415-48	**XS4P415-48**	XS415-48				
80														**ZS4P416**	ZS416	**XS4P416**	XS416				
3 1/4														**ZS4P417-52**	ZS417-52	**XS4P417-52**	XS417-52				
85	3 3/4	13	4 1/8	10	15/16	1 1/2	2	2 1/4	7 9/16	4 5/8	4.079	1.516	2.563	**ZS4P417**	ZS417	**XS4P417**	XS417	4P418	3/4	284.1	383.7
3 7/16	95.2	330	105	254	24	38	50.8	57	192	117.6	103.6	38.5	65.1	**ZS4P418-55**	ZS418-55	**XS4P418-55**	XS418-55		M20		
3 1/2														**ZS4P418-56**	ZS418-56	**XS4P418-56**	XS418-56				
90														**ZS4P418**	ZS418	**XS4P418**	XS418				
100														**ZS4P420**	ZS420	**XS4P420**	XS420				
3 15/16	4 1/4	15 1/4	4 1/2	12 1/2	15/16	1 17/32	2 1/4	2 7/16	8 3/8	5 3/32	4.484	1.626	2.858	**ZS4P420-63**	ZS420-63	**XS4P420-63**	XS420-63	4P420	3/4	364	497.2
4	108	387	114	318	24	39	57	62	213	129.6	113.9	41.3	72.6	**ZS4P420-64**	ZS420-64	**XS4P420-64**	XS420-64		M20		

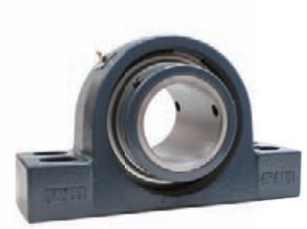
ZDS4P
Cylindrical bore
(with Z Lock)
d 2 7/16 ~ 4 inch
60 ~ 100 mm

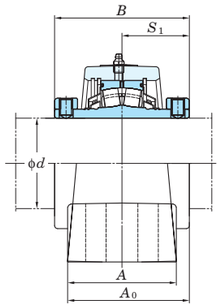


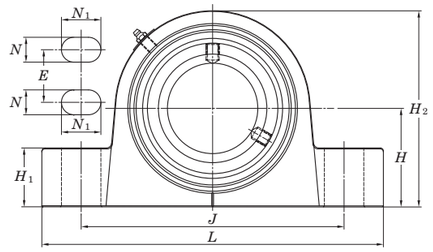




XDS4P
Cylindrical bore
(with set screw collar lock)
d 2 7/16 ~ 4 inch
60 ~ 100 mm

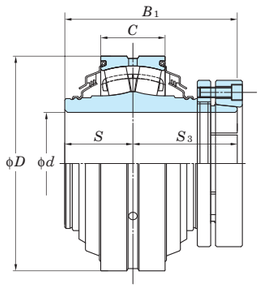




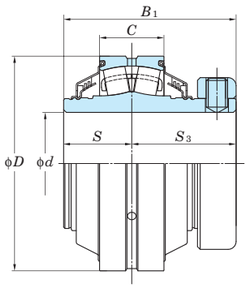


Shaft Dia. inch / mm *d*	Dimensions inch / mm *H*	*L*	*A*	*J*	*N*	*N*1	*E*	*H*1	*H*2	*A*0	*B*	*S*1	Unit No.	Bearing No.	Unit No.	Bearing No.	Housing No.	Bolt Size inch / mm	Basic Load Ratings kN *C*r	*C*0r
60													**ZDS4P412**	ZDS412	**XDS4P412**	XDS412				
2 7/16	2 3/4	9 1/4	3 3/8	7 1/8	19/32	13/16	1 3/4	1 5/8	5 19/32	3 21/32	3.906	1.953	**ZDS4P413-39**	ZDS413-39	**XDS4P413-39**	XDS413-39	4P413	1/2	173.3	220.4
2 1/2	69.8	235	86	181	15	21	44	41	142	92.6	99.2	49.6	**ZDS4P413-40**	ZDS413-40	**XDS4P413-40**	XDS413-40		M12		
65													**ZDS4P413**	ZDS413	**XDS4P413**	XDS413				
70													**ZDS4P414**	ZDS414	**XDS4P414**	XDS414				
2 11/16													**ZDS4P415-43**	ZDS415-43	**XDS4P415-43**	XDS415-43				
2 3/4	3 1/4	10 7/16	3 3/4	8 1/8	25/32	15/16	1 7/8	1 7/8	6 3/8	4 7/32	4.686	2.343	**ZDS4P415-44**	ZDS415-44	**XDS4P415-44**	XDS415-44	4P415	5/8	186.8	244.4
2 15/16	82.6	265	95	206	20	24	48	48	162	107	119	59.5	**ZDS4P415-47**	ZDS415-47	**XDS4P415-47**	XDS415-47		M16		
75													**ZDS4P415**	ZDS415	**XDS4P415**	XDS415				
3													**ZDS4P415-48**	ZDS415-48	**XDS4P415-48**	XDS415-48				
80													**ZDS4P416**	ZDS416	**XDS4P416**	XDS416				
3 1/4													**ZDS4P417-52**	ZDS417-52	**XDS4P417-52**	XDS417-52				
85	3 3/4	13	4 1/8	10	15/16	1 1/2	2	2 1/4	7 9/16	4 5/8	5.126	2.563	**ZDS4P417**	ZDS417	**XDS4P417**	XDS417	4P418	3/4	284.1	383.7
3 7/16	95.2	330	105	254	24	38	50.8	57	192	117.6	130.2	65.1	**ZDS4P418-55**	ZDS418-55	**XDS4P418-55**	XDS418-55		M20		
3 1/2													**ZDS4P418-56**	ZDS418-56	**XDS4P418-56**	XDS418-56				
90													**ZDS4P418**	ZDS418	**XDS4P418**	XDS418				
100	4 1/4	15 1/4	4 1/2	12 1/2	15/16	1 17/32	2 1/4	2 7/16	8 3/8	5 3/32	5.716	2.858	**ZDS4P420**	ZDS420	**XDS4P420**	XDS420	4P420	3/4	364	497.2
3 15/16													**ZDS4P420-63**	ZDS420-63	**XDS4P420-63**	XDS420-63				
4	108	387	114	318	24	39	57	62	213	129.6	145.2	72.6	**ZDS4P420-64**	ZDS420-64	**XDS4P420-64**	XDS420-64		M20		

ZS4
Cylindrical bore
(with Z Lock)
d 1 3/8 ~ 4 inch
40 ~ 100 mm

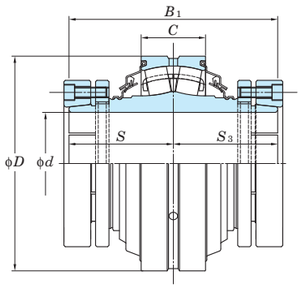


XS4
Cylindrical bore
(with set screw collar lock)

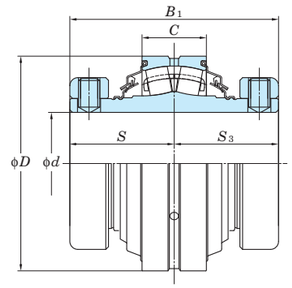


Shaft Dia. inch / mm d	Dimensions inch / mm C	D	B1	S	S3	Bearing No.	Bearing No.	Basic Load Ratings kN Cr	C0r
1 3/8						ZS408-22	XS408-22		
1 7/16	15/16	3 5/32	2.531	1	1.531	ZS408-23	XS408-23	88.7	101.1
1 1/2	24	80	64.3	25.4	38.9	ZS408-24	XS408-24		
40						ZS408	XS408		
1 11/16						ZS409-27	XS409-27		
1 3/4	15/16	3 11/32	2.657	1	1.657	ZS409-28	XS409-28	92.6	108.8
45	24	85	67.5	25.4	42.1	ZS409	XS409		
1 15/16						ZS410-31	XS410-31		
50	15/16	3 17/32	2.843	1	1.843	ZS410	XS410	96.4	116.9
2	24	90	72.2	25.4	46.8	ZS410-32	XS410-32		
55						ZS411	XS411		
2 3/16	1 1/32	3 15/16	2.937	1.126	1.811	ZS411-35	XS411-35	120.8	146.8
2 1/4	26	100	74.6	28.6	46	ZS411-36	XS411-36		
60						ZS412	XS412		
2 7/16	1 1/4	4 23/32	3.205	1.252	1.953	ZS413-39	XS413-39	173.3	220.4
2 1/2	32	120	81.4	31.8	49.6	ZS413-40	XS413-40		
65						ZS413	XS413		
70						ZS414	XS414		
2 11/16						ZS415-43	XS415-43		
2 3/4	1 1/4	5 1/8	3.594	1.252	2.343	ZS415-44	XS415-44	186.8	244.4
2 15/16	32	130	91.3	31.8	59.5	ZS415-47	XS415-47		
75						ZS415	XS415		
3						ZS415-48	XS415-48		
80						ZS416	XS416		
3 1/4						ZS417-52	XS417-52		
85	1 5/8	6 5/16	4.079	1.516	2.563	ZS417	XS417	284.1	383.7
3 7/16	41	160	103.6	38.5	65.1	ZS418-55	XS418-55		
3 1/2						ZS418-56	XS418-56		
90						ZS418	XS418		
100						ZS420	XS420		
3 15/16	1 27/32	7 3/32	4.484	1.626	2.858	ZS420-63	XS420-63	364	497.2
4	47	180	113.9	41.3	72.6	ZS420-64	XS420-64		

ZDS4
Cylindrical bore
(with Z Lock (both))
d 2 7/16 ~ 4 inch
60 ~ 100 mm



XDS4
Cylindrical bore
(with set screw collar lock (both))



Shaft Dia. inch / mm d	Dimensions inch / mm C	D	B1	S	S3	Bearing No.	Bearing No.	Basic Load Ratings kN Cr	C0r
60						ZDS412	XDS412		
2 7/16	1 1/4	4 23/32	3.905	1.953	1.953	ZDS413-39	XDS413-39	173.3	220.4
2 1/2	32	120	99.2	49.6	49.6	ZDS413-40	XDS413-40		
65						ZDS413	XDS413		
70						ZDS414	XDS414		
2 11/16						ZDS415-43	XDS415-43		
2 3/4	1 1/4	5 1/8	4.685	2.343	2.343	ZDS415-44	XDS415-44	186.8	244.4
2 15/16	32	130	119	59.5	59.5	ZDS415-47	XDS415-47		
75						ZDS415	XDS415		
3						ZDS415-48	XDS415-48		
80						ZDS416	XDS416		
3 1/4						ZDS417-52	XDS417-52		
85	1 5/8	6 5/16	5.126	2.563	2.563	ZDS417	XDS417	284.1	383.7
3 7/16	41	160	130.2	65.1	65.1	ZDS418-55	XDS418-55		
3 1/2						ZDS418-56	XDS418-56		
90						ZDS418	XDS418		
100						ZDS420	XDS420		
3 15/16	1 27/32	7 3/32	5.716	2.858	2.858	ZDS420-63	XDS420-63	364	497.2
4	47	180	145.2	72.6	72.6	ZDS420-64	XDS420-64		

PRECAUTIONS

- Read the entire installation guide prior to beginning.
- Bearings are precision instruments and they must always be handled carefully to prevent damage.
- Store bearings in a cool and dry location, and always leave bearings in original packaging until ready for installation.
- Bearing life calculations should be performed prior to installation to ensure that the selected unit is acceptable for the application.
- The use of more than two bearings on a single shaft is not recommended.
- To maximize the life of the bearing avoid mis-alignment and pre-loading by carefully following these instructions.
- Always lock out the power source and adhere closely to industry safety standards before performing any work on the equipment.

PREPARATION

The mounting surface and housing base must be clean, flat, and of sufficient thickness to support the weight of the entire assembly without deflecting or breaking. Make sure that the mounting surface is parallel to the plane of the shaft for pillow blocks, and perpendicular to the shaft for flanges and take-up units. FYH mounted bearings can accommodate up to ±2 degrees of mis-alignment, however longer bearing life can be achieved if mis-alignment can be minimized during installation.

Check the shaft diameter and make sure that it is within tolerance as indicated in **Table 1**. Check that the shaft is straight, clean, and free of burrs or other imperfections. Use emery cloth or a fine file to smooth the surface as necessary. A small amount of lubricant may be applied to both the shaft and the bore of the bearing; however lubricant should not be applied to the areas where the bearing locking mechanism contacts the shaft.

Table 1 - Shaft Tolerance

Shaft Size (mm)		h6		h7	
		Shaft Speed Greater Than 50% of Max RPM Rating		Shaft Speed Less Than 50% of Max RPM Rating	
Over	Incl.	Max (mm)	Min (mm)	Max (mm)	Min (mm)
30	50	0	–0.016	0	–0.025
50	80	0	–0.019	0	–0.03
80	120	0	–0.022	0	–0.035

INSTALLATION

1. Slide the unit onto the shaft while holding the inner ring of the bearing. Position the unit on the mounting surface so that the plane of the shaft is perpendicular to the face of the housing, and alternately tighten the mounting bolts to the specified torque as shown in **Table 2**. Make sure to use bolts, washers, and nuts of sufficient strength and grade rating for the application.

Table 2 - Mounting Bolt Tightening Torque (recommended)

Bolt Size		Tightening Torque		
mm	inch	N·m	in-lbf	ft-lbf
M6	1/4	5	43	4
M8	5/16	10	92	8
M10	3/8	22	196	17
M12	7/16	38	334	27
M14	1/2	61	541	46
M16	5/8	95	840	70
M18	–	139	1231	103
M20	3/4	189	1664	139
M22	7/8	260	2301	192
M27	1	484	4277	358

2. Check the final position of the shaft and alternately tighten the set screws of the non-expansion unit onto the shaft to the specified torque setting as shown in **Table 3**. The set screws in the bearing on the opposite side of the shaft should line up with the set screws of the bearing that was installed first (**See Table 4, Figure A**). Expansion bearings should be installed only after the shaft and adjacent machinery has cooled down to the ambient temperature. After positioning the expansion unit on the shaft slide the insert to the rearmost position within the housing until it seats against the retaining ring. Then slide the insert forward in the housing approximately one thirty-second of an inch (1/32") and alternately tighten the set screws onto the shaft to the specified torque setting as shown in **Table 3**. Allowable shaft expansion and expansion calculation data can be found in **Table 4** and **Formula 1** respectively.

Table 3 - Set Screw Tightening Torque (recommended)

Size Code	Set Screw Size	Set Screw Tightening Torque		
		N·m	in-lbf	ft-lbf
XS408-XS409	$^{5}/_{16}$-28UNF×$^{1}/_{2}$	14.5	128	11
XS410-XS413	$^{3}/_{8}$-24UNF×$^{5}/_{8}$	25.5	226	19
XS414-XS420	$^{1}/_{2}$-20UNF×$^{3}/_{4}$	56.5	500	42

Table 4 - Quantity of Total Movement

Size Code		Quantity of Total Movement	
		mm	inch
XS408-XS410	ZS408-ZS410	5	$^{13}/_{64}$
XS411-XS420	ZS411-ZS420	6	$^{15}/_{64}$

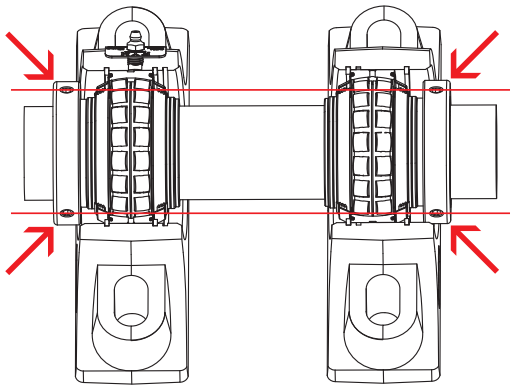
Formula 1 – Linear Shaft Expansion

$L = A \cdot T \cdot D$

L : Expansion of shaft (mm)
A : Linear expansion coefficient of shaft for ordinary steel (11.5×10^{-6})
T : Temperature increase (°C)
D : Installation distance between bearing units (mm)

Allowable shaft expansion: 3/16" max

Figure A – Set Screws Lined Up in Both Bearings



3. Once installed, slowly rotate the bearing by hand to confirm that it turns smoothly and without resistance, vibration, or any other abnormalities.

4. To install **Z LOCK**, tighten the four cap screws on the face of the locking collar with the included Allen wrench evenly. Repeat to draw the collar onto the inner ring. (**See Table 5**) To disassemble, remove all the black cap screws as well as the two silver cap screws. Screw two black cap screws where the silver cap screws had been. Screw the two black cap screws until the collar disengages.

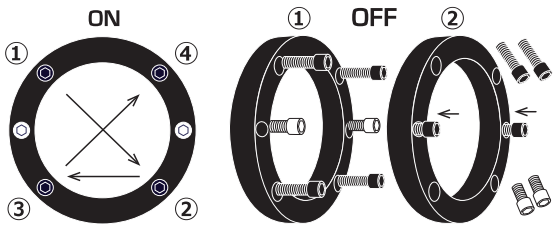


Table 5 - Cap screw of Z LOCK Tightening Torque (recommended)

Size Code	Allen Wrench (mm)	Tightening Torque		
		N·m	in-lbf	ft-lbf
ZS408-ZS409	3	0.6-1.1	5-10	0.5-0.8
ZS410-ZS411	4	1.2-2.2	10-19	0.9-1.7
ZS412-ZS420	5	2.4-4.4	21-39	1.8-3.3

LUBRICATION

Proper lubrication practices will greatly extend the life of the bearing.
Bearings are factory lubricated with the proper amount and type of lubricant for most general purpose applications as well as many highly demanding operating environments, and except as recommended by FYH, no further lubrication is required upon installation.

Lubrication tips:

- The factory standard lubricant is a **calcium sulfonate** grease. Always use the same type of lubricant to avoid compatibility issues and other potential problems.
- When adding lubricant do so slowly and while the bearing is rotating until a small amount of lubricant can be seen coming out of the seals.
- At low speeds (below 200 RPM) it is acceptable to completely fill the bearing with grease.
- At moderate to high speeds it is not advisable to completely fill the bearing with grease as it could lead to overheating and reduced bearing life.
- It is generally better to use less lubrication more frequently than more lubricant less often.
- If the unit will not be operated for an extended period of time extra lubricant should be added to prevent corrosion.
- If the unit has not been operated for an extended period of time fresh lubricant should be added prior to start-up.
- If the unit becomes too hot during operation from over-lubrication remove the grease fitting and operate the unit for approximately thirty minutes to allow excess grease to purge.

Appropriate lubrication intervals can be determined by referring to **Table 6**; however experience should largely determine the actual lubrication regimen for a particular application. Consult with an FYH representative for assistance.

If a suitable Calcium Sulfonate lubricant is not available for re-lubrication then the following compatible lubricants may also be used:
Barium Complex, Calcium Stearate, Lithium Complex, Polyurea (Shear Stable)

The use of any other type of lubricant should be avoided to prevent compatibility issues with the Calcium Sulfonate grease that is originally supplied.

To find the proper lubrication interval in **Table 6** obtain the relevant percentage of max allowable RPM by referring to **Table 7**.
Example: XS411 with positive contact seals has a max RPM rating of 2000. If the application has an RPM of 600 then the percentage of max RPM is 30% (600/2000 = .30).
The amount of grease for replenishment can be found in **Table 8**.

Table 6 - Lubrication Schedule (recommended)								
Environment	**Clean to Moderately Dirty**							**Dirty to Very Dirty**
Temperature (°C)	**Under 120 degrees**				**Over 120 degrees**			**From -20 to 200**
% of max allowable RPM	0 - 25%	25 - 50%	50 - 75%	75 - 100%	0 - 25%	25 - 50%	50 - 100%	0 - 100%
Lubrication interval	From three to eight months	From one to three months	From one week to one month	Daily to once per week	From two to six weeks	From one week to one month	Daily to once per week	Daily to once per week

Table 7 - Limiting Speed for Seals (min^{-1})			
Size Code		**Standard Triple Lip Seal Limiting**	**Non Contact Seal Limiting**
XS408	ZS408	2750	3200
XS409	ZS409	2450	2800
XS410	ZS410	2200	2600
XS411	ZS411	2000	2360
XS412-XS413	ZS412-ZS413	1692	2000
XS414-XS415	ZS414-ZS415	1460	1730
XS416-XS418	ZS416-ZS418	1220	1440
XS420	ZS420	1100	1300

Table 8 - Grease Amount for Replenishment (recommended)		
Size Code		**Amount of Grease (grams)**
XS408	ZS408	7-8
XS409	ZS409	7-9
XS410	ZS410	8-9
XS411	ZS411	10-12
XS412-XS413	ZS412-ZS413	19-22
XS414-XS415	ZS414-ZS415	22-26
XS416-XS418	ZS416-ZS418	40-46
XS420	ZS420	50-59

Converting units from fixed to expansion

FYH mounted roller units are capable of operating in both a fixed or expansion configuration.

Before bearing installation

On the back side of the unit (opposite the housing markings), remove the bearing retaining ring located on the inner diameter of the housing and move it back to the groove on the outer position of the housing. Slide the bearing insert rearward within the housing until it sits against the retaining ring that was just relocated. When ready for installation, slide the insert forward in the housing approximately one thirty-second of an inch ($^1/_{32}$”) and alternately tighten the set screws onto the shaft to the specified torque setting as shown in **Table 3**.

After bearing installation

Before performing any work on the bearing, lock out the power source and allow the shaft and adjacent machinery to cool down to ambient temperature. Loosen the set screws or other locking mechanism to allow the shaft to move freely within the bore then follow the same procedures explained in the **“Before bearing installation”** section.

Allowable Radial Load (kN) at Various RPM																			
Shaft Size	Size	L_{10h}	RPM																
			50	100	150	300	500	750	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200
1 3/8″ 1 7/16″ 1 1/2″ 40 mm	XS408 ZS408	10000	31.9	25.9	23	18.6	16	14.1	13	12.3	11.7	11.3	10.9	10.5	10.2	10	9.7	9.5	9.3	9.1
		25000	24.2	19.7	17.4	14.1	12.1	10.7	9.8	9.3	8.9	8.5	8.2	8	7.8	7.6	7.4	7.2	7.1	6.9
		50000	19.7	16	14.1	11.5	9.8	8.7	8	7.6	7.2	6.9	6.7	6.5	6.3	6.1	6	5.9	5.7	5.6
		70000	17.8	14.4	12.8	10.4	8.9	7.9	7.2	6.8	6.5	6.3	6	5.9	5.7	5.5	5.4	5.3	5.2	5.1
		100000	16	13	11.5	9.3	8	7.1	6.5	6.1	5.9	5.6	5.4	5.3	5.1	5	4.9	4.7	4.6	4.6
1 11/16″ 1 3/4″ 45 mm	XS409 ZS409	10000	33.3	27.1	24	19.5	16.7	14.8	13.5	12.8	12.2	11.8	11.3	11	10.7	10.4	10.2	9.9		
		25000	25.3	20.6	18.2	14.8	12.7	11.2	10.3	9.7	9.3	8.9	8.6	8.3	8.1	7.9	7.7	7.5		
		50000	20.6	16.7	14.8	12	10.3	9.1	8.3	7.9	7.5	7.2	7	6.8	6.6	6.4	6.2	6.1		
		70000	18.6	15.1	13.4	10.8	9.3	8.2	7.5	7.1	6.8	6.5	6.3	6.1	5.9	5.8	5.6	5.5		
		100000	16.7	13.5	12	9.7	8.3	7.4	6.8	6.4	6.1	5.9	5.7	5.5	5.3	5.2	5.1	5		
1 15/16″ 50 mm 2″	XS410 ZS410	10000	34.7	28.2	24.9	20.2	17.4	15.4	14.1	13.3	12.7	12.1	11.8	11.4	11.1	10.8	10.6			
		25000	26.3	21.4	18.9	15.4	13.2	11.7	10.7	10.1	9.7	9.3	9	8.7	8.4	8.2	8			
		50000	21.4	17.4	15.4	12.5	10.7	9.5	8.7	8.2	7.8	7.5	7.3	7	6.8	6.7	6.5			
		70000	19.3	15.7	13.9	11.3	9.7	8.6	7.8	7.4	7.1	6.8	6.6	6.4	6.2	6	5.9			
		100000	17.4	14.1	12.5	10.1	8.7	7.7	7	6.7	6.4	6.1	5.9	5.7	5.5	5.4	5.3			
55 mm 2 3/16″ 2 1/4″	XS411 ZS411	10000	43.5	35.3	31.3	25.4	21.8	19.3	17.7	16.7	16	15.4	14.8	14.4	14					
		25000	33	26.8	23.8	19.3	16.5	14.6	13.4	12.7	12.1	11.7	11.2	10.9	10.6					
		50000	26.8	21.8	19.3	15.7	13.4	11.9	10.9	10.3	9.8	9.5	9.1	8.8	8.6					
		70000	24.3	19.7	17.4	14.1	12.1	10.7	9.8	9.3	8.9	8.5	8.2	8	7.8					
		100000	21.8	17.7	15.7	12.7	10.9	9.6	8.8	8.4	8	7.7	7.4	7.2	7					
60 mm 2 7/16″ 2 1/2″ 65 mm	XS412 XS413 ZS412 ZS413	10000	62.4	50.7	44.9	36.5	31.3	27.7	25.4	24	23	22	21.3	20.6						
		25000	47.4	38.5	34.1	27.7	23.7	21	19.3	18.3	17.4	16.7	16.2	15.7						
		50000	38.5	31.3	27.7	22.5	19.3	17.1	15.6	14.8	14.1	13.6	13.1	12.7						
		70000	34.8	28.3	25	20.3	17.4	15.4	14.1	13.4	12.8	12.3	11.9	11.5						
		100000	31.3	25.4	22.5	18.2	15.6	13.9	12.7	12	11.5	11	10.6	10.3						
70 mm 2 11/16″ 2 3/4″ 2 15/16″ 75 mm 3″	XS414 XS415 ZS414 ZS415	10000	67.3	54.6	48.4	39.3	33.7	29.8	27.4	25.9	24.7	23.8								
		25000	51.1	41.5	36.7	29.8	25.6	22.7	20.8	19.7	18.8	18								
		50000	41.5	33.7	29.8	24.2	20.8	18.4	16.9	16	15.2	14.6								
		70000	37.5	30.5	27	21.9	18.8	16.6	15.2	14.4	13.8	13.2								
		100000	33.7	27.4	24.2	19.7	16.9	14.9	13.7	13	12.4	11.9								
80 mm 3 1/4″ 85 mm 3 7/16″ 3 1/2″ 90 mm	XS416 XS417 XS418 ZS416 ZS417 ZS418	10000	102.4	83.1	73.6	59.8	51.3	45.4	41.6	39.4	37.6									
		25000	77.7	63.1	55.9	45.4	38.9	34.5	31.6	29.9	28.6									
		50000	63.1	51.3	45.4	36.9	31.6	28	25.7	24.3	23.2									
		70000	57.1	46.3	41	33.3	28.6	25.3	23.2	22	21									
		100000	51.3	41.6	36.9	29.9	25.7	22.7	20.8	19.7	18.8									
100 mm 3 15/16″ 4″	XS420 ZS420	10000	131.2	106.5	94.3	76.6	65.7	58.2	53.4	50.5	48.2									
		25000	99.6	80.9	71.6	58.2	49.9	44.2	40.5	38.4	36.6									
		50000	80.9	65.7	58.2	47.3	40.5	35.9	32.9	31.2	29.7									
		70000	73.1	59.4	52.6	42.7	36.6	32.4	29.7	28.2	26.9									
		100000	65.7	53.4	47.3	38.4	32.9	29.1	26.7	25.3	24.2									

1. Blue area: The Standard Triple Lip Seal is used.
2. Green area: A non-contact seal is used.

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