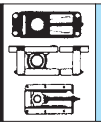
MOTION & CONTROL™

NSK

Ball Bearing Units

Dimension Table

BEARING \ HOUSING																						
				Page Nos.		Page Nos.		Page Nos.		Page Nos.		Page Nos.		Page Nos.		Page Nos.		Page Nos.		Page Nos.		Page Nos.
Set screw type		UC2	B312	UCP2 UCPL2	B4 B22	UCHP2 UCUP2	B26 B30			UCF2	B42	UCFC2	B66	UCFL2	B78	UCFA2 UCFH2	B92 B96			UCHB2	B110	UCT2	B114	UCT2- UCL2- UCM2-	B130 B132 B134	UCC2	B140
		UC3	B318	UCP3	B10					UCF3 UCFS3	B48 B60			UCFL3	B84							UCT3	B120	UCM3-	B136	UCC3	B142
		UCX	B324	UCPX	B16					UCFX	B54	UCFCX	B72	UCFLX	B90							UCTX	B126			UCCX	B146
		AS2	B328	ASPL2	B34			ASPP2 ASRPP2	B38 B40					ASFB2 ASFD2	B100 B102			ASPF2 ASRPF2 ASPFL2	B104 B106 B108					ASPT2-	B138		
Eccentric locking collar type		UEL2	B336	UELP2 UELPL2	B148 B158	UELHP2 UELUP2	B162 B164			UELF2 UELFU2	B174 B184	UELFC2	B194	UELFL2 UELFLU2	B198 B208							UELT2	B228			UELC2	B242
		UEL3	B340	UELP3	B152					UELF3 UELFS3	B178 B188			UELFL3	B202							UELT3	B232			UELC3	B244
		AEL2 JEL2	B346 B348	AELPL2 JELPL2	B166 B168			AELPP2 AELRPP2	B170 B172					AELFB2 AELFD2 JELFD2	B212 B214 B216			AELPF2 JELPF2 AELRPF2 AELPFL2 JELPFL2	B218 B220 B222 B224 B226					AELPT2- JELPT2-	B238 B240		
Adapter type		UK2	B354	UKP2	B248					UKF2	B260	UKFC2	B276	UKFL2	B284							UKT2	B294			UKC2	B306
		UK3	B358	UKP3	B252					UKF3 UKFS3	B264 B272			UKFL3	B288							UKT3	B298			UKC3	B308
		UKX	B362	UKPX	B256					UKFX	B268	UKFCX	B280	UKFLX	B292							UKTX	B302			UKCX	B310
Other bearings						AR2	B332	REL2	B350	UCS2	B366	UCS3	B370	ASS2	B374	UELS2	B376	UELS3	B380	AELS2	B384	JELS2	B386			CS2	B388

MOTION & CONTROL™
NSK

Ball Bearing Units

CAT. No. E1154f

TECHNICAL DATA INDEX

1. Construction

The **NSK** bearing unit is a combination of a radial ball bearing, seal, and a housing of high-grade cast iron or pressed steel, which comes in various shapes.

The outer surface of the bearing and the internal surface of the housing are spherical, so that the unit is self-aligning.

The inside construction of the ball bearing for the unit is such that steel balls and retainers of the same type as in series 62 and 63 of the deep groove ball bearing are used. A duplex seal consisting of a combination of an oil-proof synthetic rubber seal and a slinger is provided on both sides.

Depending on the type, the following methods of fitting to the shaft are employed:

(1) The inner ring is fastened onto the shaft in two places by set screws.
(2) The inner ring has a tapered bore and is fitted to the shaft by means of an adapter.
(3) In the eccentric locking collar system the inner ring is fastened to the shaft by means of eccentric grooves provided at the side of the inner ring and on the collar.

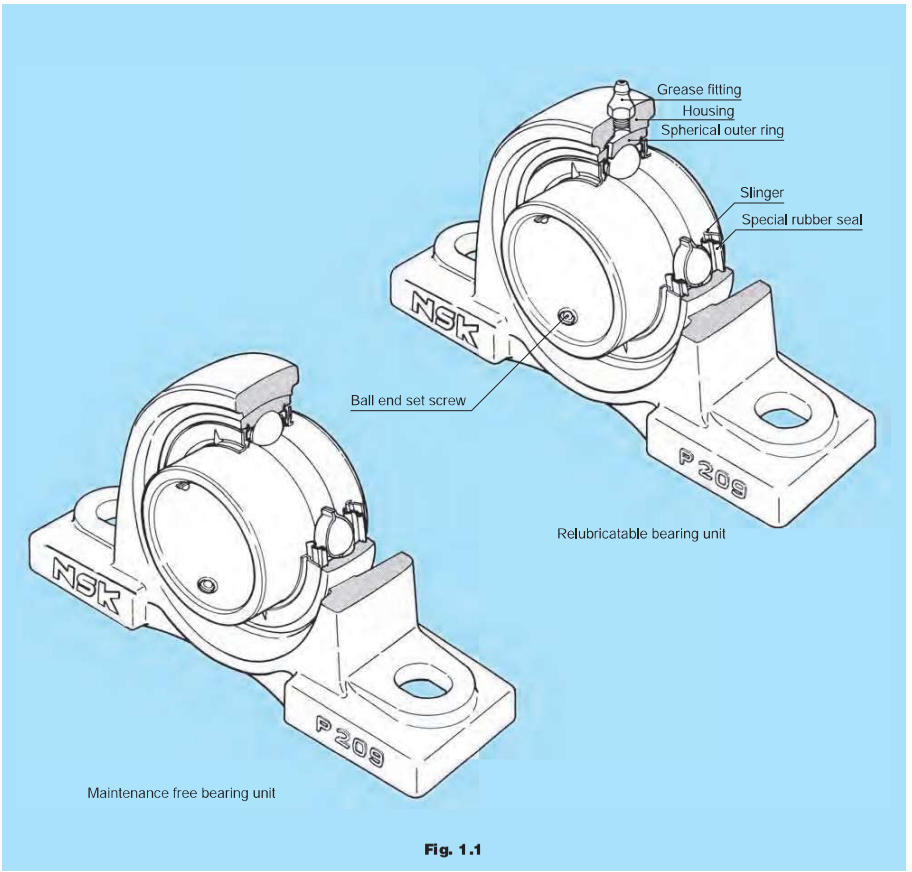


Fig. 1.1

2. Design Features and Advantages

2.1 Maintenance free type

The **NSK** Maintenance free bearing unit contains a high-grade lithium-based grease, good for use over a long period, which is ideally suited to sealed-type bearings. Also provided is an excellent sealing device, which prevents any leakage of grease or penetration of dust and water from outside.

It is designed so that the rotation of the shaft causes the sealed-in grease to circulate through the inside space, effectively providing maximum lubrication. The lubrication effect is maintained over a long period with no need for replenishment of grease.

To summarize the advantages of the **NSK** maintenance free bearing unit:

(1) As an adequate amount of good quality grease is sealed in at the time of manufacture, there is no need for replenishment. This means savings in terms of time and maintenance costs.
(2) Since there is no need for any regreasing facilities, such as piping, a more compact design is possible.
(3) The sealed-in design eliminates the possibility of grease leakage, which could lead to stained products.

2.2 Relubricatable type

The **NSK** relubricatable type bearing unit has an advantage over other simillar units being so designed as to permit regreasing even in the case of misalignment of 2° to the right or left. The hole through which the grease fitting is mounted usually causes structural weakening of the housing.

However, as a result of extensive testing, in the **NSK** bearing unit the hole is positioned so as to minimize this adverse effect. In addition, the regreasing groove has been designed to minimize weakening of the housing.

While the **NSK** maintenance free type bearing unit is satisfactory for use under normal operating conditions in-doors, in the following circumstances it is necessary to use the relubricatable type bearing unit:

(1) Cases where the temperature of the bearing rises above 100°C, 212°F:
*-Normal temperature of up to 130°C, 266°F heat-resistant bearing units.
(2) Cases where there is excessive dust, but space does not permit using a bearing unit with a cover.
(3) Cases where the bearing unit is constantly exposed to splashes of water or any other liquid, but space does not permit using a bearing unit with a cover.
(4) Cases in which the humidity is very high, and the machine in which the bearing unit is used is run only intermittently.
(5) Cases involving a heavy load of which the C_r/P_r value is about 10 or below, and the speed is 10 min^{-1} or below, or the movement is oscillatory.
(6) Cases where the number of revolutions is relatively high and the noise problem has to be considered; for example, when the bearing is used with the fan of an air conditioner.

2.3 Special sealing feature

2.3.1 Standard bearing units

The sealing device of the ball bearing for the **NSK** bearing unit is a combination of a heat-resistant and oil-proof synthetic rubber seal and a slinger of an exclusive design.

The seal, which is fixed in the outer ring, is steel-reinforced, and its lip, in contanct with the inner ring, is designed to minimize frictional torque.

The slinger is fixed to the inner ring of the bearing with which it rotates. There is a small clearance between its periphery and the outer ring.

These two types of seals on both sides of the bearing prevent grease leakage, and foreign matter is prevented from entering the bearing from outside.

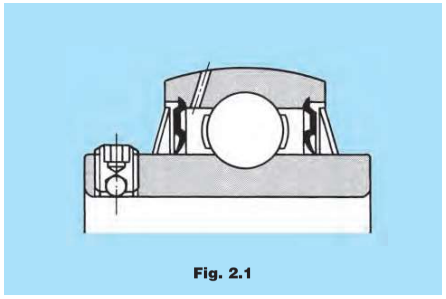


Fig. 2.1

2.3.2 Bearing units with covers

The **NSK** bearing unit with a cover consists of a standard bearing unit and an outside covering for extra protection against dust. Special consideration has been given to its design with respect to dust-proofing.

Sealing devices are provided in both the bearing and the housing, so that units of this type operate satisfactorily even in such adverse environments as flour mills, steel mills, foundries, galvanizing plants and chemical plants, where excessive dust is produced and/or liquids are used. They are also eminently suitable for outdoor environments where dust and rain are inevitable, and in heavy industrial machinery such as construction and transportation equipment.

The rubber seal of the cover contacts with the shaft by its two lips, as shown in Fig. 2.2 and 2.3 By filling the groove between the two lips with grease, an excellent sealing effect is obtained and, at the same time, the contacting portions of the lips are lubricated. Furthermore, the groove is so designed that when the shaft is inclined the rubber seal can move in the radial direction.

When bearing units are exposed to splashes of water rather than to dust, a drain hole (5 to 8 mm, 0.2 to 0.3 inches in diameter) is provided at the bottom of the cover, and grease should be applied to the side of the bearing itself instead of into the cover.

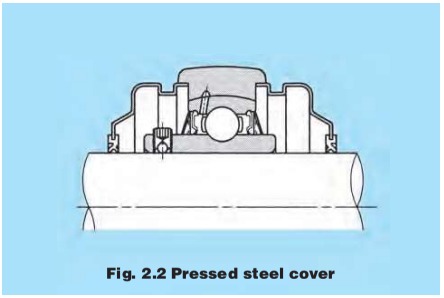


Fig. 2.2 Pressed steel cover

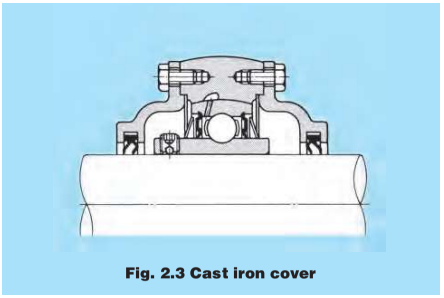


Fig. 2.3 Cast iron cover

2.4 Secure fitting

Fastening the bearing to the shaft is effected by tightening the ball-end set screw, situated on the inner ring. This is a unique feature which prevents loosening, even if the bearing is subjected to intense vibrations and shocks.

2.5 Self-aligning

With the **NSK** bearing unit, the outer surface of the ball bearing and the inner surface of the housing are spherical, thus this bearing unit has self-aligning characteristic. Any misalignment of axis that may arise from poor workmanship on the shaft or errors in fitting will be properly adjusted.

2.6 Higher rated load capacity

The bearing used in the unit is of the same internal construction as those in bearing series 62 and 63, and is capable of accommodating axial load as well as radial load, or composite load. The rated load capacity of this bearing is considerably higher than that of the corresponding self-aligning ball bearings used for standard plummer blocks.

2.7 Light weight yet strong housing

Housings for **NSK** bearing units come in various shapes. They consist of either high-grade cast iron, one-piece casting, or of precision finished pressed steel, the latter being lighter in weight. In either case, they are practically designed to combine lightness with maximum strength.

2.8 Easy mounting

The **NSK** bearing unit is an integrated unit consisting of a bearing and a housing.

As the bearing is prelubricated at manufacture with the correct amount of high-grade lithium base, it can be mounted on the shaft just as it is. It is sufficient to carry out a short test run after mounting.

2.9 Accurate fitting of the housing

In order to simplify the fitting of the pillow block and flange type bearing units, the housings are provided with a seat for a dowel pin, which may be utilized as needed.

2.10 Bearing replaceability

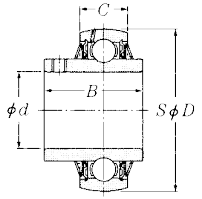
The bearing used in the **NSK** bearing unit is replaceable. In the event of bearing failure, a new bearing can be fitted to the existing housing.

3. Tolerance

The tolerances of the **NSK** bearing units are in accordance with the following JIS specifications:

3.1 Tolerances of ball bearings for the unit

The tolerances of ball bearings used in the unit are shown in the following tables, 3.1 to 3.4.



Set screw type

Table 3.1 (1) Cylindrical bore (UC, UCS, AS, ASS, UEL, UELS, AEL, AELS) Unit: μm/0.0001 inch

Nominal bore diameter d				Cylindrical bore					Radial runout K_{ia} (reference)
				Bore diameter			Width		
over		incl.		Δ_{dmp} Deviations		V_{dp} Variations	$\Delta_{Bs}\Delta_{Cs}$ Deviations(reference)		
mm	inch	mm	inch	high	low	max.	high	low	max.
10	0.3937	18	0.7087	+15	0	10	0	−120	15
				+ 6	0	4	0	− 47	6
18	0.7087	31.75	1.2500	+18	0	12	0	−120	18
				+ 7	0	5	0	− 47	7
31.75	1.2500	50.8	2.0000	+21	0	14	0	−120	20
				+ 8	0	6	0	− 47	8
50.8	2.0000	80	3.1496	+24	0	16	0	−150	25
				+ 9	0	6	0	− 59	10
80	3.1496	120	4.7244	+28	0	19	0	−200	30
				+11	0	7	0	− 79	12
120	4.7244	180	7.0866	+33	0	22	0	−250	35
				+13	0	9	0	− 98	14

Remarks Symbols
Δ_{dmp}:Mean bore diameter deviation V_{dp}:Bore diameter variation Δ_{Bs}:Inner ring width deviation Δ_{Cs}:Outer ring width deviation

Table 3.1 (2) Cylindrical bore (AR, JEL, JELS, REL) Unit: μm/0.0001 inch

Nominal bore diameter d				Cylindrical bore diameter		
over		incl.		Δ_{dmp} Deviations		V_{dp} Variations
mm	inch	mm	inch	high	low	max.
10	0.3937	18	0.7087	+13	0	6
				+ 5	0	2
18	0.7087	31.75	1.2500	+13	0	6
				+ 5	0	2
31.75	1.2500	50.8	2.0000	+13	0	6
				+ 5	0	2
50.8	2.0000	80	3.1496	+15	0	8
				+ 6	0	3

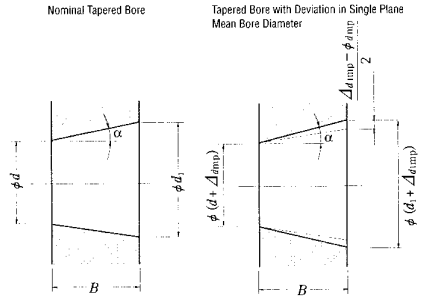
Table 3.1 (3) Cylindrical bore (CS) Unit: μm/0.0001 inch

Nominal bore diameter d				Cylindrical bore					Radial runout K_{ia} (reference)
				Bore diameter			Width		
over		incl.		Δ_{dmp} Deviations		V_{dp} Variations	$\Delta_{Bs}\Delta_{Cs}$ Deviations(reference)		
mm	inch	mm	inch	high	low	max.	high	low	max.
10	0.3937	18	0.7087	0	− 8	10	0	−120	15
				0	− 3	4	0	− 47	6
18	0.7087	31.75	1.2500	0	−10	12	0	−120	18
				0	− 4	5	0	− 47	7
31.75	1.2500	50.8	2.0000	0	−12	14	0	−120	20
				0	− 5	6	0	− 47	8

Table 3.2 Tapered bore (UK,UKS) Unit: μm/0.0001 inch

Nominal bore diameter d				Δ_{dmp} Deviations		$\Delta_{d1mp}-\Delta_{dmp}$		V_{dp} (1)
over		incl.						
mm	inch	mm	inch	high	low	max.	min.	max.
18	0.7087	30	1.1811	+21	0	+21	0	13
				+ 8	0	+ 8	0	5
30	1.1811	50	1.9685	+25	0	+25	0	15
				+10	0	+10	0	6
50	1.9685	80	3.1496	+30	0	+30	0	19
				+12	0	+12	0	7
80	3.1496	120	4.7244	+35	0	+35	0	25
				+14	0	+14	0	10
120	4.7244	180	7.0866	+40	0	+40	0	31
				+16	0	+16	0	12

Note (1) To be applied for all radial flat surfaces of tapered hole.
Remarks 1. To be applied for tapered holes of 1/12.
2. Symbols of quantity or values



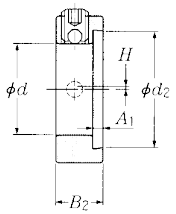
d : Nominal Bore Diameter
d_1 : Theoretical Diameter of Larger End of Tapered Bore
$d_1 = d + 1/12\,B$
Δ_{dmp} : Single Plane Mean Bore Diameter Deviation in Theoretical Diameter of Smaller End of Bore
Δ_{d1mp} : Single Plane Mean Bore Diameter Deviation in Theoretical Diameter of Larger End of Bore
V_{dp} : Bore diameter variation in a single radial plane
B : Nominal Inner Ring width
α : Half of Taper Angle of Tapered Bore

α =2°23′9.4″
=2.38594°
=0.041643 rad

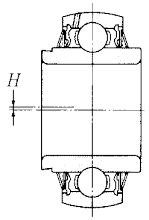
Table 3.3 Outer ring Unit: μm/0.0001 inch

Nominal outside diameter D over		incl.		Mean outside diameter deviation Δ_{Dm}		Radial runout K_{ea} (reference)
mm	inch	mm	inch	high	low	max.
18	0.7087	30	1.1811	0	− 9	15
				0	− 4	6
30	1.1811	50	1.9685	0	−11	20
				0	− 4	8
50	1.9685	80	3.1496	0	−13	25
				0	− 5	10
80	3.1496	120	4.7244	0	−15	35
				0	− 6	14
120	4.7244	150	5.9055	0	−18	40
				0	− 7	16
150	5.9055	180	7.0866	0	−25	45
				0	−10	18
180	7.0866	250	9.8425	0	−30	50
				0	−12	20
250	9.8425	315	12.4016	0	−35	60
				0	−14	24

Remarks The low deviation of outside diameter D_m does not apply within the distance of 1/4 the width of the outer ring from the side.



Eccentric locking collar



Eccentric locking collar type

Table 3.4 Eccentric locking collar Unit: mm/inch

Nominal bore diameter d over		incl.		Bore diameter deviation Δ_{ds}		Small bore diameter of eccentric surface deviation Δ_{d2s}		Eccentricity deviation Δ_{Ts}		Collar width deviation Δ_{B2s}		Collar eccentric surface width deviation Δ_{A1s}	
mm	inch	mm	inch	high	low	high	low	high	low	high	low	high	low
10	0.3937	36.512	1.4375	+0.250	+0.025	+0.3	0	+0.1	−0.1	+0.270	−0.270	0	−0.180
				+0.010	+0.001	+0.012	0	+0.004	−0.004	+0.011	−0.011	0	−0.007
36.512	1.4375	55.562	2.1875	+0.300	+0.025	+0.4	0	+0.1	−0.1	+0.330	−0.330	0	−0.180
				+0.012	+0.001	+0.016	0	+0.004	−0.004	+0.013	−0.013	0	−0.007
55.562	2.1875	61.912	2.4375	+0.300	+0.025	+0.4	0	+0.1	−0.1	+0.330	−0.330	0	−0.220
				+0.012	+0.001	+0.016	0	+0.004	−0.004	+0.013	−0.013	0	−0.009

3.2 Tolerances of housings

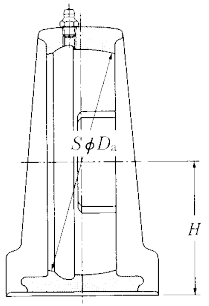
Table 3.5 Spherical bore diameter of housings Unit: μm/0.0001 inch

Nominal spherical bore diameter D_a over		incl.		D_a Deviations Δ_{Damp} Tolerance class H7		Tolerance class J7		Tolerance class K7	
mm	inch	mm	inch	high	low	high	low	high	low
30	1.1811	50	1.9685	+25	0	+14	−11	+ 7	−18
				+10	0	+ 6	− 4	+ 3	− 7
50	1.9685	80	3.1496	+30	0	+18	−12	+ 9	−21
				+12	0	+ 7	− 5	+ 4	− 8
80	3.1496	120	4.7244	+35	0	+22	−13	+10	−25
				+14	0	+ 9	− 5	+ 4	−10
120	4.7244	180	7.0866	+40	0	+26	−14	+12	−28
				+16	0	+10	− 6	+ 5	−11
180	7.0866	250	9.8425	+46	0	+30	−16	+13	−33
				+18	0	+12	− 6	+ 5	−13
250	9.8425	315	12.4016	+52	0	+36	−16	+16	−36
				+20	0	+14	− 6	+ 6	−14

Remarks 1.Symbols
Δ_{Damp}:Mean spherical bore diameter deviation
2.Dimensional tolerances for spherical bore diameter of housing are classified as H7 for clearance fit, and J7 for intermediate fit.
3.Spherical bore diameter of housings are finished by following tolerance classes such as 52mm or less : K7, over 52mm and 180mm or less : J7, and over 180mm : H7 respectively.

Table 3.6 Pillow block housings (P, PL, HP, UP) Unit: mm/inch

Housing numbers						H Deviations Δ_{Hs}
P203	—	—	—	—	—	
P204	—	—	HP204	UP204	PL204	
P205	P305	PX05	HP205	UP205	PL205	
P206	P306	PX06	HP206	UP206	PL206	±0.15
P207	P307	PX07	HP207	UP207	PL207	±0.006
P208	P308	PX08	HP208	UP208	—	
P209	P309	PX09	HP209	UP209	PL209	
P210	P310	PX10	HP210	UP210	PL210	
P211	P311	PX11	—	—	—	
P212	P312	PX12	—	—	—	
P213	P313	PX13	—	—	—	
P214	P314	PX14	—	—	—	±0.2
P215	P315	PX15	—	—	—	±0.008
P216	P316	PX16	—	—	—	
P217	P317	PX17	—	—	—	
P218	P318	PX18	—	—	—	
—	P319	—	—	—	—	
—	P320	PX20	—	—	—	
—	P321	—	—	—	—	
—	P322	—	—	—	—	±0.3
—	P324	—	—	—	—	±0.012
—	P326	—	—	—	—	
—	P328	—	—	—	—	



Remarks 1.H is height of the shaft center line.
2.This table can be applied for bearing units with dust covers.

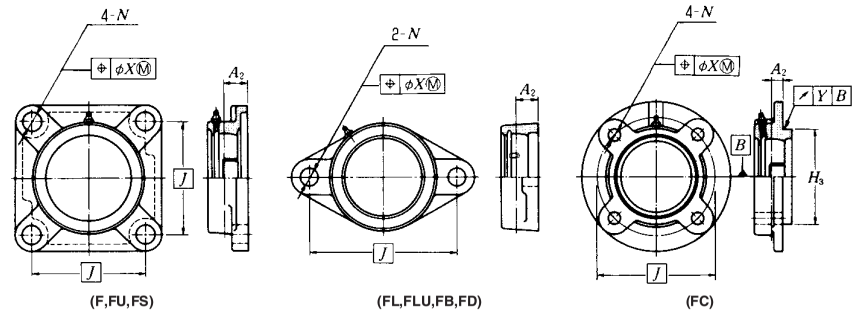


Table 3.7 (1) Flange unit housings (F,FU,FC,FS,FL,FLU,FB,FD)

Unit: mm/inch

Housing numbers								location tolerance of bolt hole X	A_2 Deviations Δ_{A2s}	H_3 Deviations Δ_{H3s}						Radial runout of spigot joint Y
										FC2		FS3		FCX		
										high	low	high	low	high	low	
—	—	—	—	—	—	—	FD201	0.7 0.028	±0.5 ±0.020	0 0	−0.046 −0.0018	—	—	—	—	0.2 0.008
F204	—	—	FC204	—	FL204	—	FD204					0 0	−0.046 −0.0018	0 0	−0.046 −0.0018	
F205	F305	FX05	FC205	FS305	FL205	FL305	FD205									
F206	F306	FX06	FC206	FS306	FL206	FL306	FD206					0 0	−0.054 −0.0021	0 0	−0.054 −0.0021	
F207	F307	FX07	FC207	FS307	FL207	FL307	FD207			0 0	−0.054 −0.0021					
F208	F308	FX08	FC208	FS308	FL208	FL308	—									
F209	F309	FX09	FC209	FS309	FL209	FL309	—					0 0	−0.063 −0.0025			
F210	F310	FX10	FC210	FS310	FL210	FL310	—									
F211	F311	FX11	FC211	FS311	FL211	FL311	—	1 0.039	±0.8 ±0.032	0 0	−0.063 −0.0025			0 0	−0.063 −0.0025	0.3 0.012
F212	F312	FX12	FC212	FS312	FL212	FL312	—									
F213	F313	FX13	FC213	FS313	FL213	FL313	—					0 0	−0.072 −0.0028			
F214	F314	FX14	FC214	FS314	FL214	FL314	—							0 0	−0.072 −0.0028	
F215	F315	FX15	FC215	FS315	FL215	FL315	—									
F216	F316	FX16	FC216	FS316	FL216	FL316	—					0 0	−0.081 −0.0032			0.4 0.016
F217	F317	FX17	FC217	FS317	FL217	FL317	—							—	—	
F218	F318	FX18	FC218	FS318	FL218	FL318	—			0 0	−0.072 −0.0028					
—	F319	—	—	FS319	—	FL319	—			—	—					
—	F320	FX20	—	FS320	—	FL320	—					0 0	−0.089 −0.0035			
—	F321	—	—	FS321	—	FL321	—									
—	F322	—	—	FS322	—	FL322	—									
—	F324	—	—	FS324	—	FL324	—									
—	F326	—	—	FS326	—	FL326	—									
—	F328	—	—	FS328	—	FL328	—									

Remarks 1. J is the bolt hole's center line dimension,and P.C.D. A_2 is distance between the center line of spherical bore diameter of the housing and mounting surfaces,and H_3 is outside diameter of the spigot joint.
2. Radial runout of spigot joint is applied for flange units with spigot joints.
3. For FU2 and FLU2 types,tolerances for F2 shall be applied.
4. For FCX and FLX types,tolerances for FX shall be applied.
5. This table can be applied for bearing units with dust covers.

Table 3.7 (2) Flange unit housings (diameter of bolt hole)

Housing type	Nominal bore diameter N				N Deviations Δ_{Ns}	
	over		incl.			
	mm	inch	mm	inch	mm	inch
F,FU,FC,FS FA,FH,FLU	—	—	30	1.1811	±0.2	±0.008
	30	1.1811	41	1.6142	±0.3	±0.012

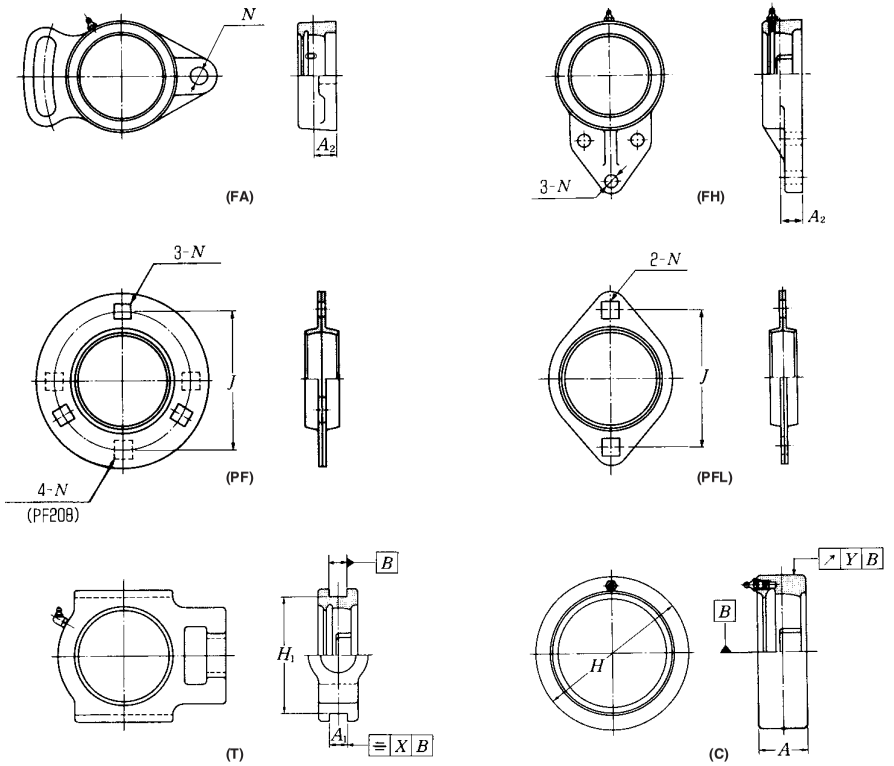


Table 3.8 Flange unit housings (FH,FA,PF,PFL)

Unit: mm/inch

Housing numbers	A_2 Deviations Δ_{A2s}	Housing numbers	J Deviations Δ_{Js}	N Deviations Δ_{Ns}
—	±0.5 ±0.020	PF203	±0.4 ±0.016	±0.25 ±0.010
FH,FA204		PF204		
FH,FA205		PF205		
FH,FA206		PF206		
FH,FA207		PF207		
FH,FA208		PF208		
FH,FA209		PFL203		
FH,FA210		PFL204		
		PFL205		
FA211	±0.8 ±0.032	PFL206		
		PFL207		

Remarks 1. A_2 is distance between the center line of spherical bore diameter of housings.
2. J is the bolt hole's center line dimension.

Table 3.9 Take-up unit housings (T) Unit: mm/inch

Housing numbers			A_1 Deviations Δ_{A1s}	H_1 Deviations Δ_{H1s} high	H_1 Deviations Δ_{H1s} low	Parallelism of guide X
T204	—	—	+0.2 0 +0.008 0	0 0	-0.5 -0.020	0.5 0.020
T205	T305	TX05				
T206	T306	TX06				
T207	T307	TX07				
T208	T308	TX08				
T209	T309	TX09				
T210	T310	TX10				
T211	T311	TX11	+0.3 0 +0.012 0	0 0	-0.8 -0.032	0.6 0.024
T212	T312	TX12				
T213	T313	TX13				
T214	T314	TX14				
T215	T315	TX15				
T216	T316	TX16				
T217	T317	TX17				
—	T318	—				
—	T319	—				0.7 0.028
—	T320	—				
—	T321	—				
—	T322	—				
—	T324	—				0.8 0.032
—	T326	—				
—	T328	—				

Remarks 1. A_1 is the width of guide rail grooves.
2. H_1 is the maximum span of guide rail grooves.
3. This table can be applied for bearing units with dust covers.

Table 3.10 Cartridge unit housings (C) Unit: mm/inch

Housing numbers			H Deviations Δ_{Hs} C2 Series high	C2 Series low	C3 Series high	C3 Series low	CX Series high	CX Series low	Radial runout of outside surface Y	A Deviations Δ_{As}
C204	—	—	0 0	-0.030 -0.0012	—	—	—	—	0.2 0.008	±0.2 ±0.008
C205	C305	CX05								
C206	C306	CX06	0 0	-0.035 -0.0014	0 0	-0.035 -0.0014	0 0	-0.035 -0.0014		
C207	C307	CX07								
C208	C308	CX08								
C209	C309	CX09								
C210	C310	CX10					0 0	-0.040 -0.0016		
C211	C311	CX11	0 0	-0.040 -0.0016	0 0	-0.040 -0.0016			0.3 0.012	±0.3 ±0.012
C212	C312	CX12								
C213	C313	—	—	—			—	—		
—	C314	—			0 0	-0.046 -0.0018				
—	C315	—								
—	C316	—								
—	C317	—								
—	C318	—								
—	C319	—							0.4 0.016	
—	C320	—			0 0	-0.052 -0.0020				
—	C321	—								
—	C322	—								
—	C324	—			0 0	-0.057 -0.0022				
—	C326	—								
—	C328	—								

Remarks 1. H is the outside diameter of cartridge housings.
2. A is width of cartridge housings.

4. Basic Load Rating and Life

4.1 Bearing life

Even in bearings operating under normal conditions, the surfaces of the raceway and rolling elements are constantly being subjected to repeated compressive stresses which cause flaking of these surfaces to occur. This flaking is due to material fatigue and will eventually cause the bearings to fail. The effective life of a bearing is usually defined in terms of the total number of revolutions a bearing can undergo before flaking of either the raceway surface or the rolling element surfaces occurs.

Other causes of bearing failure are often attributed to problems such as seizing, abrasions, cracking, chipping, gnawing, rust, etc. However, these so called "causes" of bearing failure are usually themselves caused by improper installation, insufficient or improper lubrication, faulty sealing or inaccurate bearing selection. Since the above mentioned "cause" of bearing failure can be avoided by taking the proper precautions, and are not simply caused by material fatigue, they are considered separately from the flaking aspect.

4.2 Basic rated life and basic dynamic load rating

A group of seemingly identical bearings when subjected to identical load and operating conditions will exhibit a wide diversity in their durability.

This "life" disparity can be accounted for by the difference in the fatigue of the bearing material itself. This disparity is considered statistically when calculating bearing life, and the basic rated life is defined as follows.

The basic rated life is based on a 90% statistical model which is expressed as the total number of revolutions 90% of the bearings, in an identical group of bearings subjected to identical operating conditions, will attain or surpass before flaking due to material fatigue occurs. For bearings operating at fixed constant speeds, the basic rated life (90% reliability) is expressed in the total number of hours of operation.

The basic dynamic load rating is an expression of the load capacity of a bearing based on a constant load which the bearing can sustain for one million revolutions (the basic life rating). For radial bearings this rating applies to pure radial loads, and for thrust bearings it refers to pure axialloads. The basic dynamic load ratings given in the bearing tables of this catalog are for bearings constructed of standard bearing materials, using standard manufacturing techniques. Please consult **NSK** for basic load ratings of bearings constructed of special materials or using special manufacturing techniques.

The relationship between the basic rated life, the basic dynamic load rating and the bearing load is given in formula (4.1).

$$L_{10} = \left(\frac{C_r}{P_r}\right)^3 \quad \cdots\cdots (4.1)$$

where,
L_{10}: Basic rated life 10^6 revolutions
C_r: Basic dynamic rated load, N, lbf
P_r: Equivalent dynamic load, N, lbf

The basic rated life can also be expressed in terms of hours of operation (revolution), and is calculated as shown in formula (4.2).

$$L_{10h} = 500 f_h^3 \quad \cdots\cdots (4.2)$$

$$f_h = f_n \frac{C_r}{P_r} \quad \cdots\cdots (4.3)$$

$$f_n = \left(\frac{33.3}{n}\right)^{1/3} \quad \cdots\cdots (4.4)$$

where,
L_{10h}: Basic rated life, h
f_h: Life factor
f_n: Speed factor
n: Rotational speed, min^{-1}

Formula (4.2) can also be expressed as shown in formula (4.5).

$$L_{10h} = \frac{10^6}{60n}\left(\frac{C_r}{P_r}\right)^3 \quad \cdots\cdots (4.5)$$

The relation between rotational speed n and speed factor f_n as well as the relation between the basic rated life L_{10h} and the life factor f_h is shown in Fig. 4.1.

When several bearings are incorporated in machines or equipment as complete units, all the bearings in the unit are considered as a whole when computing bearing life (see formula 4.6). The total bearing life of the unit is a life rating based on the viable lifetime of the unit before even one of the bearings fails due to rolling contact fatigue.

$$L = \frac{1}{\left(\frac{1}{L_1^{1.1}} + \frac{1}{L_2^{1.1}} + \cdots\cdots + \frac{1}{L_n^{1.1}}\right)^{1/1.1}} \quad \cdots\cdots\cdots(4.6)$$

where,
L :Total life of the whole bearing assembly,h
L_1, L_2, $\cdots$ L_n: Rated life of bearings 1, 2,$\cdots$ n, h

In the case where load and the number of revolutions change at regulated intervals, after finding the rated life L_1, L_2, $\cdots$, L_n under conditions of n_1, P_1: n_2, P_2: $\cdots$ n_n, P_n: the built-in life L_m can be given by the formula (4.7).

$$L_1 = \frac{10^6}{60n_1}\left(\frac{C_r}{P_1}\right)^3$$

$$L_2 = \frac{10^6}{60n_2}\left(\frac{C_r}{P_1}\right)^3$$

$$\vdots$$

$$L_n = \frac{10^6}{60n_n}\left(\frac{C_r}{P_n}\right)^3$$

$$L_m = \left(\frac{\Phi_1}{L_1} + \frac{\Phi_2}{L_2} + \cdots\cdots + \frac{\Phi_n}{L_n}\right)^{-1} \quad \cdots\cdots\cdots\cdots\cdots(4.7)$$

where,
L_1, L_2, $\cdots$ L_n: Rated life under condition 1, 2,$\cdots$ n, h
n_1, n_2, $\cdots$ n_n : Number of revolutions under condition 1, 2, $\cdots$ n, min^{-1}
P_1, P_2, $\cdots$ P_n : Equivalent load under condition 1, 2, $\cdots$ n, N, lbf
Φ_1, Φ_2, $\cdots\Phi_n$: Ratio of condition 1, 2, $\cdots$ n accounting for the total operating time
L_m : Built-in life, h

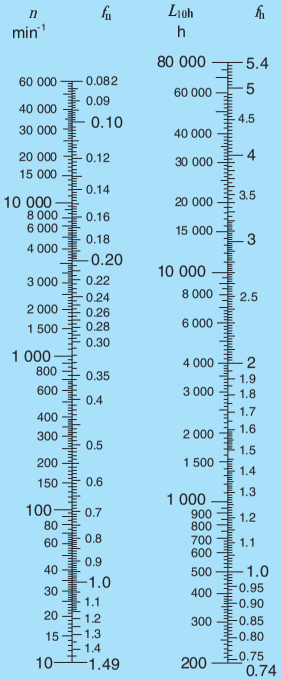


Fig. 4.1 Bearing life rating scale

Table 4.1 Rating life for applications

Service classification	Machine application	Life time L_n
Machines used occasionally	Door mechanisms,Garage shutter	500
Equipment for short period or intermittent service-interruption permissible	Household appliances,Electric hand tools, Agricultural machines,Lifting tackles in shops	4 000 to 8 000
Intermittent service machines-high reliability	Power-Station auxiliary equipment,Elevators, Conveyors,Deck cranes	8 000 to 14 000
Machines used for 8 hours a day,but not always in full operation	Ore wagon axles,important gear units	14 000 to 20 000
Machines fully used for 8 hours	Blowers,General machinery in shops,Continuous operation cranes	20 000 to 30 000
Machines continuously used for 24 hours a day	Compressors,Pumps	50 000 to 60 000
Machines continuously used for 24 hours a day with maximum reliability	Power-station equipment,Water-supply equlpment for urban areas,Mine ventilators	100 000 to 200 000

4.3 Basic static load rating

When stationary rolling bearings are subjected to static loads, they suffer from partial permanent deformation of the contact surfaces at the contact point between the rolling elements and the raceway. The amount of deformity increases as the load increases, and if this increase in load exceeds certain limits, the subsequent smooth operation of the bearing is impaired.

It has been found through experience that a permanent deformity of 0.0001 times the diameter of the rolling element, occurring at the most heavily stressed contact point between the raceway and the rolling elements, can be tolerated without any impairment in running efficiency.

The basic rated static load refers to a fixed static load limit at which a specified amount of permanent deformation occurs. It applies to pure radial loads for radial bearings. The maximum applied load values for contact stress occurring at the rolling element and raceway contact points are given below.

For ball bearings (for bearing unit): 4 200 MPa

4.4 Allowable static equivalent load

Generally the static equivalent load which can be permitted is limited by the basic static rated load as stated in Section 4.3. However, depending on requirements regarding friction and smooth operation, these limits may be greater or lesser than the basic static rated load.

In the following formula (4.8) and Table 4.2 the safety factor S_0 can be determined considering the maximum static equivalent load.

$$S_0 = \frac{C_0}{P_{0\,max}} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots(4.8)$$

where,
S_0: Safety factor
C_0: Basic static rated load, N, lbf
$P_{0\,max}$: Maximum static equivalent load, N, lbf

Table 4.2 Minimum safety factor values S_0

Operating conditions	Ball bearings
High rotational accuracy demand	2
Normal rotating accuracy demand (Universal application)	1
Siight rotational accuracy deterioration permitted (Lcw speed,heavy loading,etc.)	0.5

Remarks When vibration and/or shock loads are present, a load factor based on the shock load needs to be included in the $P_{0\,max}$ value.

5. Bearing Internal Clearance

5.1 Bearing internal clearance

Bearing internal clearance(initial clearance)is the amount of internal clearance a bearing has before being installed on a shaft or in a housing.

As shown in Fig. 5.1, when either the inner ring or the outer ring is fixed and the other ring is free to move, displacement can take place in either an axial or radial direction. This amount of displacement (radially or axially) is termed the internal clearance and, depending on the direction, is called the radial internal clearance or the axial internal clearance.

When the internal clearance of a bearing is measured, a slight measurement load is applied to the raceway so the internal clearance may be measured accurately. However, at this time, a slight amount of elastic deformation of the bearing occurs under the measurement load, and the clearance measurement value (measured clearance) is slightly larger than the true clearance. This discrepancy between the true bearing clearance and the increased amount due to the elastic deformation must be compensated for. These compensation values are given in Table 5.1.

The internal clearance values for each bearing class are shown in Tables 5.3.

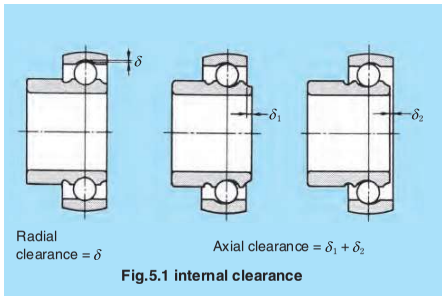


Fig.5.1 internal clearance

Table 5.1 Adjustment of radial internal clearance based on measured load Unit μm

Nominal Bore Diameter d (mm)		Measuring Load (N)	Radial Clearance Increase				
over	incl.		C2	CN	C3	C4	C5
10	18	24.5	3 to 4	4	4	4	4
18	50	49	4 to 5	5	6	6	6
50	200	147	6 to 8	8	9	9	9

5.2 Internal clearance selection

The internal clearance of a bearing under operating conditions (effective clearance) is usually smaller than the same bearing's initial clearance before being installed and operated. This is due to several factors including bearing fit, the difference in temperature between the inner and outer rings, etc. As a bearing's operating clearance has an effect on bearing life, heat generation, vibration, noise, etc.; care must be taken in selecting the most suitable operating clearance.

Effective internal clearance:

The internal clearance differential between the initial clearance and the operating (effective) clearance (the amount of clearance reduction caused by interference fits, or clearance variation due to the temperature difference between the inner and outer rings) can be calculated by the following formula:

$$\delta_{eff} = \delta_o - (\delta_f + \delta_t) \quad \cdots\cdots (5.1)$$

where,

δ_{eff} : Effective internal clearance, mm
δ_o : Bearing internal clearance, mm
δ_f : Reduced amount of clearance due to interference, mm
δ_t : Reduced amount of clearance due to temperature differential of inner and outer rings, mm

Reduced clearance due to interference:

When bearings are installed with interference fits on shafts and in housings, the inner ring will expand and the outer ring will contract; thus reducing the bearings' internal clearance. The amount of expansion or contraction varies depending on the shape of the bearing, the shape of the shaft or housing, dimensions of the respective parts, and the type of materials used. The differential can range from approximately 70% to 90% of the effective interference.

$$\delta_f = (0.70 \text{ to } 0.90) \cdot \Delta d_{eff} \quad \cdots\cdots (5.2)$$

where,

δ_f : Reduced amount of clearance due to interference,mm
Δd_{eff} : Effective interference,mm

Reduced internal clearance due to inner/outer ring temperature difference:

During operation, normally the outer ring will be from 5° to 10°C cooler than the inner ring or rotating parts. However,if the cooling effect of the housing is large, the shaft is connected to a heat source, or a heated substance is conducted through the hollow shaft; the temperature difference between the two rings can be ever greater. The amount of internal clearance is thus further reduced by the differential expansion of the two rings.

$$\delta_t = \alpha \cdot \Delta_T \cdot D_o \quad \cdots\cdots (5.3)$$

where,

δ_t : Amount of reduced clearance due to heat differential, mm
α : Bearing steel linear expansion coefficient 12.5×10^{-6}/°C
Δ_T : Inner/outer ring temperature differential,°C
D_o : Outer ring raceway diameter,mm

Outer ring raceway diameter, D_o, values can be approximated by using formula 5.4.

For ball bearings,

$$D_o = 0.20(d + 4.0D) \quad \cdots\cdots (5.4)$$

where,

d : Bearing bore diameter, mm
D : Bearing outside diameter, mm

5.3 Bearing internal clearance selection standards

Theoretically, in regard to bearing life, the optimum operating internal clearance for any bearing would be a slight negative clearance after the bearing had reached normal operating temperature.

Unfortunately, under actual operating conditions, maintaining such optimum tolerances is often difficult at best. Due to various fluctuating operating conditions this slight minus clearance can quickly become a large minus, greatly lowering the life of the bearing and causing excessive heat to be generated. Therefore, an initial internal clearance which will result in a slightly greater than negative internal operating clearance should be selected.

Under normal operating conditions (e.g. normal load, fit, speed, temperature, etc.), a standard internal clearance will give a very satisfactory operating clearance.

Table 5.2 lists non-standard clearance recommendations for various applications and operating conditions.

Table 5.2 Examples of applications where bearing clearances other than normal clearance are used

Operating conditions	Appilcations	Selected clearance
Shaft is heated and housing is cooled.	Conveyor of casting machine	C5
Shaft or inner ring is heated.	Annealing pit,Drying pit,Curing pit	C4
Allows for shaft deflection and fitting errors.	Disc harrows	C4
	Combines	C3
Tight-fitted for both inner and outer rings.	Large blowers	C3
To reduce noise and vibration when rotating.	Multi-wing fan of air conditioners	C2

Table 5.3(1)Cylindrical bore bearings Unit: μm/0.0001 inch

Nominal bore diameter d over mm	over inch	incl. mm	incl. inch	Radial internal clearance C2 min.	C2 max.	CN min.	CN max.	C3 min.	C3 max.	C4 min.	C4 max.
10	0.3937	18	0.7087	0 0	9 4	3 1	18 7	11 4	25 10	18 7	33 13
18	0.7087	24	0.9449	0 0	10 4	5 2	20 8	13 5	28 11	20 8	36 14
24	0.9449	30	1.1811	1 0	11 4	5 2	20 8	13 5	28 11	23 9	41 16
30	1.1811	40	1.5748	1 0	11 4	6 2	20 8	15 6	33 13	28 11	46 18
40	1.5748	50	1.9685	1 0	11 4	6 2	23 9	18 7	36 14	30 12	51 20
50	1.9685	65	2.5591	1 0	15 6	8 3	28 11	23 9	43 17	38 15	61 24
65	2.5591	80	3.1496	1 0	15 6	10 4	30 12	25 10	51 20	46 18	71 28
80	3.1496	100	3.9370	1 0	18 7	12 5	36 14	30 12	58 23	53 21	84 33
100	3.9370	120	4.7244	2 1	20 8	15 6	41 16	36 14	66 26	61 24	97 38
120	4.7244	140	5.5118	2 1	23 9	18 7	48 19	41 16	81 32	71 28	114 45

Remarks Heat-resistant bearings with suffix HT2 have C4 clearances.

Table 5.3(2)Tapered bore bearings Unit: μm/0.0001 inch

Nominal bore diameter d over mm	over inch	incl. mm	incl. inch	Radial internal clearance C2 min.	C2 max.	CN min.	CN max.	C3 min.	C3 max.	C4 min.	C4 max.
24	0.9449	30	1.1811	5 2	20 8	13 5	28 11	23 9	41 16	30 12	53 21
30	1.1811	40	1.5748	6 2	20 8	15 6	33 13	28 11	46 18	40 16	64 25
40	1.5748	50	1.9685	6 2	23 9	18 7	36 14	30 12	51 20	45 18	73 29
50	1.9685	65	2.5591	8 3	28 11	23 9	43 17	38 15	61 24	55 22	90 35
65	2.5591	80	3.1496	10 4	30 12	25 10	51 20	46 18	71 28	65 26	105 41
80	3.1496	100	3.9370	12 5	36 14	30 12	58 23	53 21	84 33	75 30	120 47
100	3.9370	120	4.7244	15 6	41 16	36 14	66 26	61 24	97 38	90 35	140 55
120	4.7244	140	5.5118	18 7	48 19	41 16	81 32	71 28	114 45	105 41	160 63

6.Lubrication

As bearings in **NSK** bearing units have sufficient high-grade grease sealed in at the time of manufacture, there is no need for replenishment while in use. The amount of grease necessary for lubrication is, in general, very small. With the **NSK** bearing units, the amount of grease occupies about a half to a third of the space inside the bearing.

6.1 Maximum permissible speed of rotation

The maximum speed possible while ensuring the safety and long life of ball bearings used in the unit is limited by their size, the circumferential speed at the point where the seal comes into contact, and the load acting on them.

To indicate the maximum speed permissible, it is customary to use the value of dn or $d_m n$(d is the bore of the bearing; d_m is the diameter of the pitch circle=(I. D.+O.D.) /2; n is the number of revolutions).

Problem connected with the lubrication of bearings are the generation of heat and seizures occurring at the sliding parts inside the bearing, in particular at the points where the ball is in contact with the retainer, inner and outer rings. The contact pressure at the points where friction occurs on the retainer is only slightly affected by the load acting on the bearing; the amount of heat generated there is approximately in proportion to the sliding velocity. Therefore, this sliding velocity serves as a yardstick to measure the limit of the rotating speed of the bearing. In the case of a bearing unit, however, there is another large factor that has to be taken into account— the circumferential speed at the part where the seal is in contact.

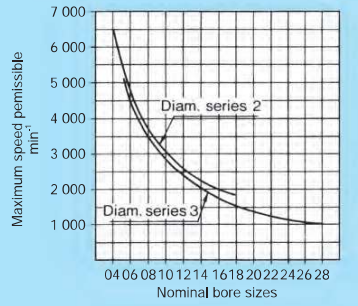


Fig. 6.1

The graph in Fig.6.1 indicates the maximum speed of rotation permissible, talking into account the aforementioned factors.

There are two common methods of locking the bearing unit onto the shaft— the set screw system and the eccentric collar system. However, in both of these systems high-speed operation will cause deformation of the inner ring, which may result in vibration of the bearing. For high-speed operation, therefore, it is recommended that an interference fit or a clearance fit with a near-zero clearance be used.

For standard bearing units with the contact type seal, the maximum speed permissible is 120 000/d. Where a higher speed is required, bearing units with the non-contact type seal, are advised. Please contact **NSK** regarding the use of the latter type. Additionally, it is necessary that the surface on which the housing is mounted be finished to as a high a degree of accuracy as possible. A regularity of within ±0.05mm, ±0.002inch is required.

6.2 Replenishment of grease

6.2.1 Sealed-in grease

With **NSK** bearing units, no relubrication is the general rule. The standard self-lubricating type of bearing units contain high-grade lithium-based grease which, being suitable for long-term use, is ideal for sealed-type bearings. Relubrication, therefore, is unnecessary under most operating conditions.

At high temperatures, or where there is exposure to: water or excessive dust, the highest quality grease is essential. Therefore. **NSK** uses its own specially selected brands which are shown in Table 6.1. It is necessary to use the same brand when replenishing grease.

Table 6.1 Brands of grease used in NSK bearing units

Bearing units	Grease: Name of grease	Grease: Thickening agent	Grease: Base oil	Symbols	Operating temperature range °C,°F
Standard	Alvania grease S3	Li soap	Mineral oil	D1	-10°to +100°C,(+14°to +212°F).
Heat-resistant	SH44MT	Li soap	Silicone oil	HT2D1	Nomal temp.to + 130°C(266°F).
Cold-resistant	SH33L	Li soap	Silicone oil	CT1D1	-60°C(-76°F)to nomal temp.

6.2.2 Mixing of different kinds of grease

Whether or not different kinds of grease may be mixed usually depends on their thickeners. The commonly used criteria are shown in Table 6.2. Properties which are most susceptible to influences from mixing are viscosity, dropping point and penetration. Water and heat resisting properties as well as mechanical stability are also lowered. Therefore, when mixing in a grease which is different to that which is already in use, it is essential that the thickener (soap base) and the base oil be of the same group.

When relubricating **NSK** bearing units, it is advisable to use the brands of grease shown in Table 6.1

Table 6.2 Mixing properties of grease

Soap base	Ca	Na	Al	Ba	Li
Ca	○	△	△	×	△
Na	△	○	△	×	×
Al	△	△	○	×	×
Ba	×	×	×	○	×
Li	△	×	×	×	○

○ Mixing will not produce any appreciable change of properties.
△ Mixing may produce considerable variations of properties.
× Mixing will cause a drastic change of properties.

6.2.3 Relubrication frequency

Relubrication frequency varies with the kind and quality of grease used as well as the operating conditions. Therefore, it is difficult to establish a general rule, but under ordinary operating conditions, it is desirable that grease be replenished before one third (1/3) of its calculated life elapses. It is necessary, however, to take into consideration such factors as hardening of grease in the oil hole, making replenishment impossible; deterioration of grease while operation of the machine is suspended, and so forth.

In Table 6.3 below are shown standard relubrication frequencies. Irrespective of the calculated life of the grease, this list takes into consideration such factors as the rotational speed of the bearings, operating temperatures and environmental conditions, with a view to safety.

6.2.4 Re-greasing

The performance of a bearing is greatly influenced by the quantity of grease. In order to avoid over-filling, it is advisable to replenish the grease while the machine is in operation.

Continue to insert grease until a little oozes out from between the outer ring raceway and the periphery of the slinger, for optimum performance.

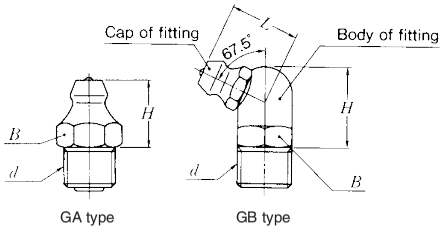
Table 6.3 Standard relubrication frequencies

Type of unit	Symbol	*dn* Value	Environmental conditions	Operating temp. °C, °F	Relubrication frequency	
					Hours	Period
Standard	D1	40 000 and below	Ordinary	−10 to +80, +14 to +176	1 500 to 3 000	6 to 12 mo.
Standard	D1	70 000 and below	Ordinary	−10 to +80, +14 to +176	1 000 to 2 000	3 to 6 mo.
Standard	D1	70 000 and below	Ordinary	+80 to +100, +176 to +212	500 to 700	1 mo.
Heat-resistant	HT2D1	70 000 and below	Ordinary	+100 to +130, +212 to +266	300 to 700	1 mo.
Cold-resistant	CT1D1	70 000 and below	Ordinary	−60 to +80, −76 to +176	1 000 to 2 000	3 to 6 mo.
Standard	D1	70 000 and below	Very dusty	−10 to +100, +14 to +212	100 to 500	1 wk.to 1 mo.
Standard	D1	70 000 and below	Exposed to water splashes	−10 to +100, +14 to +212	30 to 100	1 day to 1 wk.

6.3 Grease fitting

NSK bearing units are, as a general rule, provided with a grease fitting, as shown in Table 6.4, and a grease gun is used for regreasing. However, button-head and pin types may also be furnished on demand.

Grease fitting dimensions and the designation of applicable bearing units are given in Table 6.5.



GA type GB type

Table 6.4 Grease fitting types available for bearing units.

Types of housing	Standard grease fitting types
Pillow type	GA type
Flange type	GA type
Take-up type	GB type
Hanger type	GA type
Cartridge type	GA type

Table 6.5 Grease fitting dimensions and designations of applicable bearing units

GA type(Vertical type)

Designation	*d*	*H*		*B*	
		mm	inch	mm	inch
GA-1/4-28 UNF	1/4-28 UNF	8.5	0.335	7	0.276
GA-PF 1/8	G 1/8	12	0.472	10	0.394
GA-PF 1/4	G 1/4	14	0.551	14	0.551

GB type(67.5°)

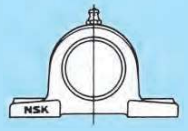
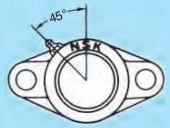
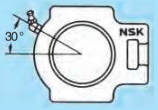
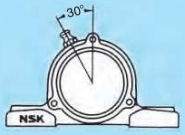
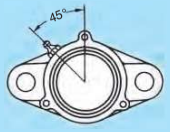
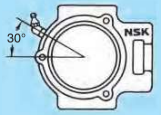
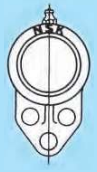
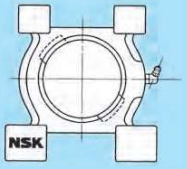
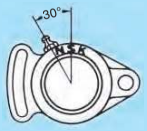
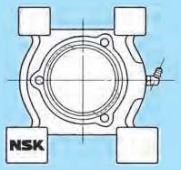
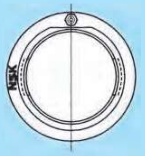
Designation	*d*	*H*		*L*		*B*	
		mm	inch	mm	inch	mm	inch
GB-1/4-28UNF	1/4-28 UNF	10.5	0.413	9.3	0.366	8	0.315
GB-PF 1/8	G 1/8	14.2	0.559	13.5	0.531	10	0.394
GB-PF 1/4	G 1/4	15	0.591	13.5	0.531	14	0.551

Nominal screw size *d*	Series 2	Series X	Series 3
1/4-28 UNF	203 - 209	X05 - X08	305 - 309
G 1/8	210 - 215	X09 - X14	310 - 315
G 1/4	216 - 218	X15 - X20	316 - 328

Remarks Screw size for the cartridge type is 1/4-28 UNF.
That for C310D1 to C328D1 is G 1/8(PF 1/8).

6.4 standard location of the grease fitting

Standard location of grease fitting on the housing for the relubricatable bearing units of each type is illustrated below.

			
P, PL, Z-P, type	C-F type	FL, FLU, Z-FL type	T, Z-T type
			
C-P type	F, FU, Z-F (#204, #205) FS type	C-FL type	C-T type
			
HP type	C-FS type	FH type	M, L, Z-M, Z-L type
			
UP type	FC, Z-FC type	FA type	C-M, C-L type
 Except (#204, #205)			
F, FU, Z-F type	C-FC type	HB type	C type

7. Recommended Torques for Tigtening Set Screws

Table 7.1 Recommended torques for tightening set screws

A)Metric series,applied to metric bore size.

Designation of the bearings of applicable units			Designation of set screws	Tightening torques N·m(max.)
UC201 to UC205	—	—	M 5×0.8 × 7	3.9
UC206	—	UC305 to UC306	M 6×0.75 × 8	4.9
UC207	UCX05	—	M 6×0.75 × 8	5.8
UC208 to UC210	—	—	M 8×1 ×10	7.8
UC211	UCX06 to UCX08	UC307	M 8×1 ×10	9.8
UC212	UCX09	—	M10×1.25 ×12	16.6
UC213 to UC215	—	UC308 to UC309	M10×1.25 ×12	19.6
UC216	UCX10	—	M10×1.25 ×12	22.5
—	UCX11 to UCX12	—	M10×1.25 ×12	24.5
UC217 to UC218	UCX13 to UCX15	UC310 to UC314	M12×1.5 ×13	29.4
—	UCX16 to UCX17	—	M12×1.5 ×13	34.3
—	UCX18	UC315 to UC316	M14×1.5 ×15	34.3
—	UCX20	UC317 to UC319	M16×1.5 ×18	53.9
—	—	UC320 to UC324	M18×1.5 ×20	58.8
—	—	UC326 to UC328	M20×1.5 ×25	78.4

B)Inch series,applied to inch bore size.

Designation of the bearings for the unit to which torques given are applicable			Designation of set screws	Tightening torques lbf·inch(max.)
UC201 to UC205	—	—	No.10-32UNF	34
UC206	—	UC305 to UC306	1/4-28UNF	43
UC207	UCX05	—	1/4-28UNF	52
UC208 to UC210	—	—	5/16-24UNF	69
UC211	UCX06 to UCX08	UC307	5/16-24UNF	86
UC212	UCX09	—	3/8-24UNF	147
UC213 to UC215	—	UC308 to UC309	3/8-24UNF	173
UC216	UCX10	—	3/8-24UNF	199
—	UCX11 to UCX12	—	3/8-24UNF	216
UC217 to UC218	UCX13 to UCX15	UC310 to UC314	1/2-20UNF	260
—	UCX16 to UCX17	—	1/2-20UNF	303
—	UCX18	UC315 to UC316	9/16-18UNF	303
—	UCX20	UC317 to UC319	5/8-18UNF	477
—	—	UC320	5/8-18UNF	520

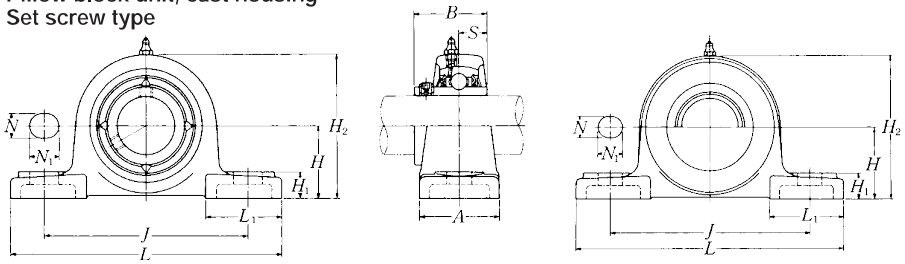
Designation of the bearings of applicable units	Designation of set screws	Tightening torques N·m(max.)
AS201 to 205	M 5×0.8 × 7	3.4
AS206	M 6×0.75 × 8	4.4
AS207	M 6×0.75 × 8	4.9
AS208	M 8×1 ×10	6.8

Designation of the bearings for the unit to which torques given are applicable	Designation of set screws	Tightening torques lbf·inch(max.)
AS201 to 205	No.10-32UNF	30
AS206	1/4-28UNF	39
AS207	1/4-28UNF	43
AS208	5/16-24UNF	60

Contents of ball bearing units and ball bearings for bearing units

DIMENSION TABLE

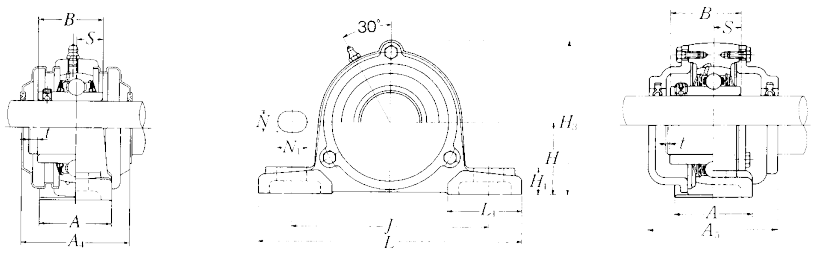
Pillow block unit, cast housing
Set screw type



Pressed steel dust cover type
Open end **Z-UCP···D1**
Closed end **ZM-UCP···D1**

Shaft dia. mm / inch	Unit number (1)	Nominal dimensions mm / inch: H	L	J	A	N	N_1	H_1	H_2	L_1	B	S	Bolt size mm / inch	Bearing number
12	UCP201D1	30.2	127	95	38	13	16	14	62	42	31	12.7	M10	UC201D1
1/2	UCP201-008D1	1 3/16	5	3 3/4	1 1/2	1/2	5/8	9/16	2 7/16	1 21/32	1.2205	0.500	3/8	UC201-008D1
15	UCP202D1	30.2	127	95	38	13	16	14	62	42	31	12.7	M10	UC202D1
9/16	UCP202-009D1	1 3/16	5	3 3/4	1 1/2	1/2	5/8	9/16	2 7/16	1 21/32	1.2205	0.500	3/8	UC202-009D1
5/8	UCP202-010D1													UC202-010D1
17	UCP203D1	30.2	127	95	38	13	16	14	62	42	31	12.7	M10	UC203D1
11/16	UCP203-011D1	1 3/16	5	3 3/4	1 1/2	1/2	5/8	9/16	2 7/16	1 21/32	1.2205	0.500	3/8	UC203-011D1
20	UCP204D1	33.3	127	95	38	13	16	14	65	42	31	12.7	M10	UC204D1
3/4	UCP204-012D1	1 5/16	5	3 3/4	1 1/2	1/2	5/8	9/16	2 9/16	1 21/32	1.2205	0.500	3/8	UC204-012D1
25	UCP205D1	36.5	140	105	38	13	16	15	71	42	34.1	14.3	M10	UC205D1
13/16	UCP205-013D1													UC205-013D1
7/8	UCP205-014D1	1 7/16	5 1/2	4 1/8	1 1/2	1/2	5/8	19/32	2 25/32	1 21/32	1.3425	0.563	3/8	UC205-014D1
15/16	UCP205-015D1													UC205-015D1
1	UCP205-100D1													UC205-100D1
30	UCP206D1	42.9	165	121	48	17	20	17	83	54	38.1	15.9	M14	UC206D1
1 1/16	UCP206-101D1													UC206-101D1
1 1/8	UCP206-102D1	1 11/16	6 1/2	4 3/4	1 7/8	21/32	25/32	21/32	3 9/32	2 1/8	1.5000	0.626	1/2	UC206-102D1
1 3/16	UCP206-103D1													UC206-103D1
1 1/4	UCP206-104D1													UC206-104D1
35	UCP207D1	47.6	167	127	48	17	20	18	93	54	42.9	17.5	M14	UC207D1
1 1/4	UCP207-104D1													UC207-104D1
1 5/16	UCP207-105D1	1 7/8	6 9/16	5	1 7/8	21/32	25/32	23/32	3 21/32	2 1/8	1.6890	0.689	1/2	UC207-105D1
1 3/8	UCP207-106D1													UC207-106D1
1 7/16	UCP207-107D1													UC207-107D1
40	UCP208D1	49.2	184	137	54	17	20	18	98	52	49.2	19	M14	UC208D1
1 1/2	UCP208-108D1	1 15/16	7 1/4	5 13/32	2 1/8	21/32	25/32	23/32	3 27/32	2 1/16	1.9370	0.748	1/2	UC208-108D1
1 9/16	UCP208-109D1													UC208-109D1
45	UCP209D1	54	190	146	54	17	20	20	106	60	49.2	19	M14	UC209D1
1 5/8	UCP209-110D1													UC209-110D1
1 11/16	UCP209-111D1	2 1/8	7 15/32	5 3/4	2 1/8	21/32	25/32	25/32	4 3/16	2 3/8	1.9370	0.748	1/2	UC209-111D1
1 3/4	UCP209-112D1													UC209-112D1

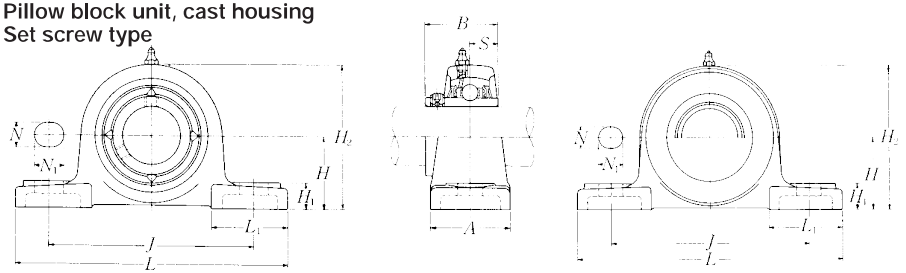
Note (1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".
Remarks Please refer to page **A21** for size of grease fitting.



Cast dust cover type
Open end **C-UCP···D1**
Closed end **CM-UCP···D1**

Housing number	Unit number (1) pressed steel dust cover type	Unit number (1) cast dust cover type	Nominal dimensions mm / inch: t max.	A_4	H_3	A_5	Mass of unit kg / lb: UCP	Z(ZM)	C(CM)
P203D1	Z(ZM)-UCP201D1	C(CM)-UCP201D1	2	45	67	62	0.7	0.7	1.0
P203D1	Z(ZM)-UCP201-008D1	C(CM)-UCP201-008D1	5/64	1 25/32	2 5/8	2 7/16	1.5	1.5	2.2
P203D1	Z(ZM)-UCP202D1	C(CM)-UCP202D1	2	45	67	62	0.7	0.7	1.0
P203D1	Z(ZM)-UCP202-009D1	C(CM)-UCP202-009D1							
P203D1	Z(ZM)-UCP202-010D1	C(CM)-UCP202-010D1	5/64	1 25/32	2 5/8	2 7/16	1.5	1.5	2.2
P203D1	Z(ZM)-UCP203D1	C(CM)-UCP203D1	2	45	67	62	0.7	0.7	1.0
P203D1	Z(ZM)-UCP203-011D1	C(CM)-UCP203-011D1	5/64	1 25/32	2 5/8	2 7/16	1.5	1.5	2.2
P204D1	Z(ZM)-UCP204D1	C(CM)-UCP204D1	2	45	70	62	0.7	0.7	0.9
P204D1	Z(ZM)-UCP204-012D1	C(CM)-UCP204-012D1	5/64	1 25/32	2 3/4	2 7/16	1.5	1.5	2.0
P205D1	Z(ZM)-UCP205D1	C(CM)-UCP205D1	2	48	76	70	0.8	0.9	1.1
P205D1	Z(ZM)-UCP205-013D1	C(CM)-UCP205-013D1							
P205D1	Z(ZM)-UCP205-014D1	C(CM)-UCP205-014D1							
P205D1	Z(ZM)-UCP205-015D1	C(CM)-UCP205-015D1	5/64	1 29/32	3	2 3/4	1.8	2.0	2.4
P205D1	Z(ZM)-UCP205-100D1	C(CM)-UCP205-100D1							
P206D1	Z(ZM)-UCP206D1	C(CM)-UCP206D1	2	53	88	75	1.4	1.4	1.7
P206D1	Z(ZM)-UCP206-101D1	C(CM)-UCP206-101D1							
P206D1	Z(ZM)-UCP206-102D1	C(CM)-UCP206-102D1							
P206D1	Z(ZM)-UCP206-103D1	C(CM)-UCP206-103D1	5/64	2 3/32	3 15/32	2 15/16	3.1	3.1	3.7
P206D1	—	—							
P207D1	Z(ZM)-UCP207D1	C(CM)-UCP207D1	3	60	99	80	1.6	1.7	2.0
P207D1	Z(ZM)-UCP207-104D1	C(CM)-UCP207-104D1							
P207D1	Z(ZM)-UCP207-105D1	C(CM)-UCP207-105D1							
P207D1	Z(ZM)-UCP207-106D1	C(CM)-UCP207-106D1	1/8	2 3/8	3 29/32	3 5/32	3.5	3.7	4.4
P207D1	—	—							
P208D1	Z(ZM)-UCP208D1	C(CM)-UCP208D1	3	69	105	90	1.9	2.1	2.7
P208D1	Z(ZM)-UCP208-108D1	C(CM)-UCP208-108D1							
P208D1	Z(ZM)-UCP208-109D1	C(CM)-UCP208-109D1	1/8	2 23/32	4 1/8	3 17/32	4.2	4.6	6.0
P209D1	Z(ZM)-UCP209D1	C(CM)-UCP209D1	3	69	113	95	2.2	2.4	3.1
P209D1	Z(ZM)-UCP209-110D1	C(CM)-UCP209-110D1							
P209D1	Z(ZM)-UCP209-111D1	C(CM)-UCP209-111D1							
P209D1	Z(ZM)-UCP209-112D1	C(CM)-UCP209-112D1	1/8	2 23/32	4 7/16	3 3/4	4.9	5.3	6.8

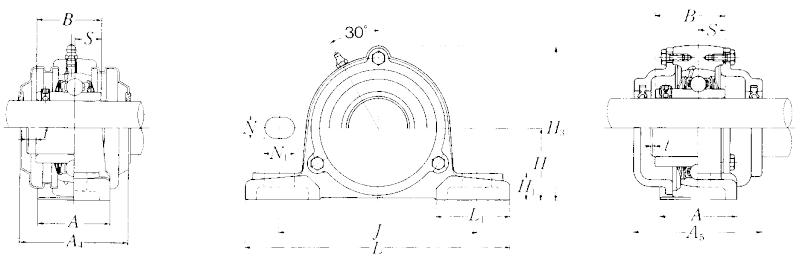
Pillow block unit, cast housing
Set screw type



Pressed steel dust cover type
Open end **Z-UCP···D1**
Closed end **ZM-UCP···D1**

Shaft dia. mm / inch	Unit number (1)	Nominal dimensions mm / inch: H	L	J	A	N	N_1	H_1	H_2	L_1	B	S	Bolt size mm / inch	Bearing number
50	UCP210D1	57.2	206	159	60	20	23	21	114	65	51.6	19	M16	UC210D1
1 13/16	UCP210-113D1													UC210-113D1
1 7/8	UCP210-114D1	2 1/4	8 1/8	6 1/4	2 3/8	25/32	29/32	13/16	4 1/2	2 9/16	2.0315	0.748	5/8	UC210-114D1
1 15/16	UCP210-115D1													UC210-115D1
2	UCP210-200D1													UC210-200D1
55	UCP211D1	63.5	219	171	60	20	23	23	126	65	55.6	22.2	M16	UC211D1
2	UCP211-200D1													UC211-200D1
2 1/16	UCP211-201D1	2 1/2	8 5/8	6 23/32	2 3/8	25/32	29/32	29/32	4 31/32	2 9/16	2.1890	0.874	5/8	UC211-201D1
2 1/8	UCP211-202D1													UC211-202D1
2 3/16	UCP211-203D1													UC211-203D1
60	UCP212D1	69.8	241	184	70	20	23	25	138	70	65.1	25.4	M16	UC212D1
2 1/4	UCP212-204D1													UC212-204D1
2 5/16	UCP212-205D1	2 3/4	9 1/2	7 1/4	2 3/4	25/32	29/32	31/32	5 7/16	2 3/4	2.5630	1.000	5/8	UC212-205D1
2 3/8	UCP212-206D1													UC212-206D1
2 7/16	UCP212-207D1													UC212-207D1
65	UCP213D1	76.2	265	203	70	25	28	27	151	77	65.1	25.4	M20	UC213D1
2 1/2	UCP213-208D1	3	10 7/16	8	2 3/4	31/32	1 3/32	1 1/16	5 15/16	3 1/32	2.5630	1.000	3/4	UC213-208D1
2 9/16	UCP213-209D1													UC213-209D1
70	UCP214D1	79.4	266	210	72	25	28	27	157	77	74.6	30.2	M20	UC214D1
2 5/8	UCP214-210D1													UC214-210D1
2 11/16	UCP214-211D1	3 1/8	10 15/32	8 9/32	2 27/32	31/32	1 3/32	1 1/16	6 3/16	3 1/32	2.9370	1.189	3/4	UC214-211D1
2 3/4	UCP214-212D1													UC214-212D1
75	UCP215D1	82.6	275	217	74	25	28	28	163	80	77.8	33.3	M20	UC215D1
2 13/16	UCP215-213D1													UC215-213D1
2 7/8	UCP215-214D1	3 1/4	10 13/16	8 17/32	2 29/32	31/32	1 3/32	1 3/32	6 13/32	3 5/32	3.0630	1.311	3/4	UC215-214D1
2 15/16	UCP215-215D1													UC215-215D1
3	UCP215-300D1													UC215-300D1
80	UCP216D1	88.9	292	232	78	25	28	30	175	85	82.6	33.3	M20	UC216D1
3 1/16	UCP216-301D1													UC216-301D1
3 1/8	UCP216-302D1	3 1/2	11 1/2	9 1/8	3 1/16	31/32	1 3/32	1 3/16	6 7/8	3 11/32	3.2520	1.311	3/4	UC216-302D1
3 3/16	UCP216-303D1													UC216-303D1

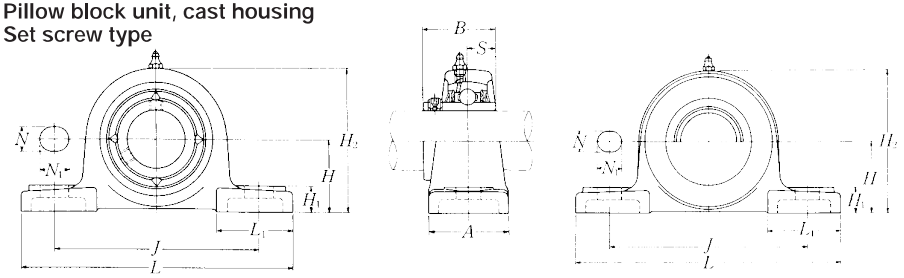
Note (1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".
Remarks Please refer to page **A21** for size of grease fitting.



Cast dust cover type
Open end **C-UCP···D1**
Closed end **CM-UCP···D1**

Housing number	Unit number (1) pressed steel dust cover type	Unit number (1) cast dust cover type	Nominal dimensions mm / inch: t max.	A_4	H_3	A_5	Mass of unit kg / lb: UCP	Z(ZM)	C(CM)
P210D1	Z(ZM)-UCP210D1	C(CM)-UCP210D1	3	76	119	100	2.7	2.8	3.6
P210D1	Z(ZM)-UCP210-113D1	C(CM)-UCP210-113D1							
P210D1	Z(ZM)-UCP210-114D1	C(CM)-UCP210-114D1	1/8	3	4 11/16	3 15/16	6.0	6.2	7.9
P210D1	Z(ZM)-UCP210-115D1	C(CM)-UCP210-115D1							
P210D1	—	C(CM)-UCP210-200D1							
P211D1	Z(ZM)-UCP211D1	C(CM)-UCP211D1	4	77	130	100	3.5	3.5	4.4
P211D1	Z(ZM)-UCP211-200D1	C(CM)-UCP211-200D1							
P211D1	Z(ZM)-UCP211-201D1	C(CM)-UCP211-201D1	5/32	3 1/32	5 1/8	3 15/16	7.7	7.7	9.7
P211D1	Z(ZM)-UCP211-202D1	C(CM)-UCP211-202D1							
P211D1	Z(ZM)-UCP211-203D1	C(CM)-UCP211-203D1							
P212D1	Z(ZM)-UCP212D1	C(CM)-UCP212D1	4	89	143	115	4.7	5.0	6.0
P212D1	Z(ZM)-UCP212-204D1	C(CM)-UCP212-204D1							
P212D1	Z(ZM)-UCP212-205D1	C(CM)-UCP212-205D1	5/32	3 1/2	5 5/8	4 17/32	10	11	13
P212D1	Z(ZM)-UCP212-206D1	C(CM)-UCP212-206D1							
P212D1	—	C(CM)-UCP212-207D1							
P213D1	Z(ZM)-UCP213D1	C(CM)-UCP213D1	4	91	155	120	5.6	5.8	7.2
P213D1	Z(ZM)-UCP213-208D1	C(CM)-UCP213-208D1	5/32	3 19/32	6 3/32	4 23/32	12	13	16
P213D1	Z(ZM)-UCP213-209D1	C(CM)-UCP213-209D1							
P214D1	—	C(CM)-UCP214D1	4	—	162	135	6.5	—	8.3
P214D1		C(CM)-UCP214-210D1							
P214D1	—	C(CM)-UCP214-211D1	5/32	—	6 3/8	5 5/16	14	—	18
P214D1		C(CM)-UCP214-212D1							
P215D1	—	C(CM)-UCP215D1	4	—	168	135	7.2	—	9.3
P215D1		C(CM)-UCP215-213D1							
P215D1		C(CM)-UCP215-214D1	5/32	—	6 5/8	5 5/16	16	—	21
P215D1	—	C(CM)-UCP215-215D1							
P215D1		C(CM)-UCP215-300D1							
P216D1	—	C(CM)-UCP216D1	4	—	181	145	8.7	—	11
P216D1		C(CM)-UCP216-301D1							
P216D1	—	C(CM)-UCP216-302D1	5/32	—	7 1/8	5 23/32	19	—	24
P216D1		C(CM)-UCP216-303D1							

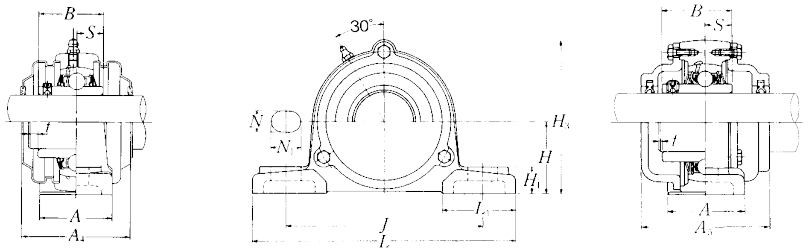
Pillow block unit, cast housing
Set screw type



Pressed steel dust cover type
Open end **Z-UCP···D1**
Closed end **ZM-UCP···D1**

Shaft dia. mm / inch	Unit number (1)	Nominal dimensions mm / inch H	L	J	A	N	N_1	H_1	H_2	L_1	B	S	Bolt size mm / inch	Bearing number
85	**UCP217D1**	95.2	310	247	83	25	28	32	187	85	85.7	34.1	M20	UC217D1
3 1/4	**UCP217-304D1**													UC217-304D1
3 5/16	**UCP217-305D1**	3 3/4	12 7/32	9 23/32	3 9/32	31/32	1 3/32	1 1/4	7 3/8	3 11/32	3.3740	1.343	3/4	UC217-305D1
3 7/16	**UCP217-307D1**													UC217-307D1
90	**UCP218D1**	101.6	327	262	88	27	30	33	200	90	96	39.7	M22	UC218D1
3 1/2	**UCP218-308D1**	4	12 7/8	10 5/16	3 15/32	1 1/16	1 3/16	1 5/16	7 7/8	3 17/32	3.7795	1.563	7/8	UC218-308D1

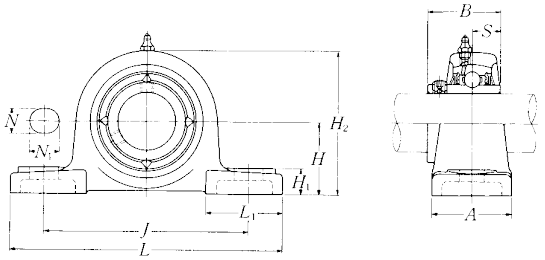
Note (1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".
Remarks Please refer to page **A21** for size of grease fitting.



Cast dust cover type
Open end **C-UCP···D1**
Closed end **CM-UCP···D1**

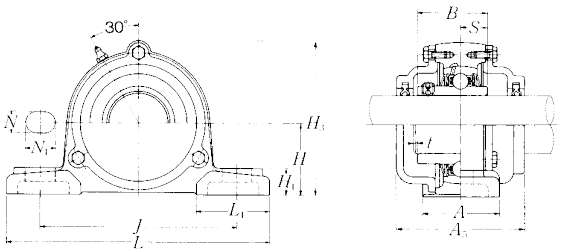
Housing number	Unit number (1) pressed steel dust cover type	Unit number (1) cast dust cover type	Nominal dimensions mm / inch t max.	A_4	H_3	A_5	Mass of unit kg / lb UCP	Z(ZM)	C(CM)
P217D1	—	**C(CM)-UCP217D1**	5	—	191	155	11	—	13
P217D1		**C(CM)-UCP217-304D1**							
P217D1	—	**C(CM)-UCP217-305D1**	13/64	—	7 17/32	6 3/32	24	—	29
P217D1		**C(CM)-UCP217-307D1**							
P218D1	—	**C(CM)-UCP218D1**	5	—	204	165	13	—	16
P218D1	—	**C(CM) UCP218-308D1**	13/64	—	8 1/32	6 1/2	29	—	35

Pillow block unit, cast housing
Set screw type



Shaft dia. mm / inch	Unit number (1)	Nominal dimensions mm / inch H	L	J	A	N	N1	H1	H2	L1	B	S	Bolt size mm / inch
25	UCP305D1	45	175	132	45	17	20	15	85	54	38	15	M14
13/16	UCP305-013D1												
7/8	UCP305-014D1	1 49/64	6 7/8	5 3/16	1 25/32	21/32	25/32	19/32	3 11/32	2 1/8	1.4961	0.591	1/2
15/16	UCP305-015D1												
1	UCP305-100D1												
30	UCP306D1	50	180	140	50	17	20	18	95	54	43	17	M14
1 1/16	UCP306-101D1												
1 1/8	UCP306-102D1	1 31/32	7 3/32	5 1/2	1 31/32	21/32	25/32	23/32	3 3/4	2 1/8	1.6929	0.669	1/2
1 3/16	UCP306-103D1												
35	UCP307D1	56	210	160	56	17	25	20	106	60	48	19	M14
1 1/4	UCP307-104D1												
1 5/16	UCP307-105D1	2 13/64	8 9/32	6 5/16	2 7/32	21/32	31/32	25/32	4 3/16	2 3/8	1.8898	0.748	1/2
1 3/8	UCP307-106D1												
1 7/16	UCP307-107D1												
40	UCP308D1	60	220	170	60	17	27	22	116	60	52	19	M14
1 1/2	UCP308-108D1	2 23/64	8 21/32	6 11/16	2 3/8	21/32	1 1/16	7/8	4 9/16	2 3/8	2.0472	0.748	1/2
1 9/16	UCP308-109D1												
45	UCP309D1	67	245	190	67	20	30	24	129	65	57	22	M16
1 5/8	UCP309-110D1												
1 11/16	UCP309-111D1	2 41/64	9 21/32	7 15/32	2 5/8	25/32	1 3/16	15/16	5 3/32	2 9/16	2.2441	0.866	5/8
1 3/4	UCP309-112D1												
50	UCP310D1	75	275	212	75	20	35	27	143	75	61	22	M16
1 13/16	UCP310-113D1												
1 7/8	UCP310-114D1	2 61/64	10 13/16	8 11/32	2 15/16	25/32	1 3/8	1 1/16	5 5/8	2 15/16	2.4016	0.866	5/8
1 15/16	UCP310-115D1												
55	UCP311D1	80	310	236	80	20	38	30	154	85	66	25	M16
2	UCP311-200D1												
2 1/16	UCP311-201D1	3 5/32	12 7/32	9 9/32	3 5/32	25/32	1 1/2	1 3/16	6 1/16	3 11/32	2.5984	0.984	5/8
2 1/8	UCP311-202D1												
2 3/16	UCP311-203D1												

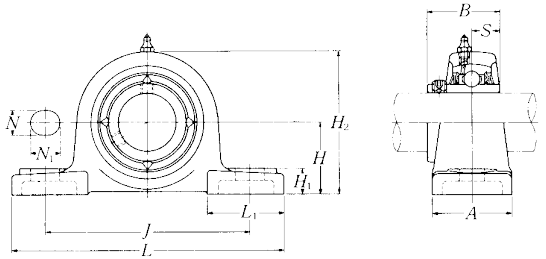
Note (1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".
Remarks Please refer to page **A21** for size of grease fitting.



Cast dust cover type
Open end **C-UCP···D1**
Closed end **CM-UCP···D1**

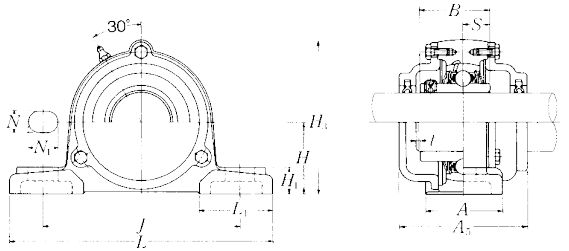
Bearing number	Housing number	Unit number (1) cast dust cover type	Nominal dimensions mm / inch t max.	H3	A5	Mass of unit kg / lb UCP	C(CM)
UC305D1	P305D1	C(CM)-UCP305D1	2	91	80	1.4	1.8
UC305-013D1	P305D1	C(CM)-UCP305-013D1					
UC305-014D1	P305D1	C(CM)-UCP305-014D1	5/64	3 19/32	3 5/32	3.1	4.0
UC305-015D1	P305D1	C(CM)-UCP305-015D1					
UC305-100D1	P305D1	C(CM)-UCP305-100D1					
UC306D1	P306D1	C(CM)-UCP306D1	2	105	85	1.8	2.5
UC306-101D1	P306D1	C(CM)-UCP306-101D1					
UC306-102D1	P306D1	C(CM)-UCP306-102D1	5/64	4 1/8	3 11/32	4.0	5.5
UC306-103D1	P306D1	C(CM)-UCP306-103D1					
UC307D1	P307D1	C(CM)-UCP307D1	3	115	95	2.5	3.2
UC307-104D1	P307D1	C(CM)-UCP307-104D1					
UC307-105D1	P307D1	C(CM)-UCP307-105D1	1/8	4 17/32	3 3/4	5.5	7.1
UC307-106D1	P307D1	C(CM)-UCP307-106D1					
UC307-107D1	P307D1	C(CM)-UCP307-107D1					
UC308D1	P308D1	C(CM)-UCP308D1	3	125	105	3.1	4.0
UC308-108D1	P308D1	C(CM)-UCP308-108D1	1/8	4 29/32	4 1/8	6.8	8.8
UC308-109D1	P308D1	C(CM)-UCP308-109D1					
UC309D1	P309D1	C(CM)-UCP309D1	3	140	110	4.1	5.4
UC309-110D1	P309D1	C(CM)-UCP309-110D1					
UC309-111D1	P309D1	C(CM)-UCP309-111D1	1/8	5 1/2	4 11/32	9.0	12
UC309-112D1	P309D1	C(CM)-UCP309-112D1					
UC310D1	P310D1	C(CM)-UCP310D1	3	156	120	5.6	7.0
UC310-113D1	P310D1	C(CM)-UCP310-113D1					
UC310-114D1	P310D1	C(CM)-UCP310-114D1	1/8	6 5/32	4 23/32	12	15
UC310-115D1	P310D1	C(CM)-UCP310-115D1					
UC311D1	P311D1	C(CM)-UCP311D1	4	166	125	7.3	8.8
UC311-200D1	P311D1	C(CM)-UCP311-200D1					
UC311-201D1	P311D1	C(CM)-UCP311-201D1	5/32	6 17/32	4 29/32	16	19
UC311-202D1	P311D1	C(CM)-UCP311-202D1					
UC311-203D1	P311D1	C(CM)-UCP311-203D1					

Pillow block unit, cast housing
Set screw type



Shaft dia. mm / inch	Unit number (1)	Nominal dimensions mm / inch H	L	J	A	N	N1	H1	H2	L1	B	S	Bolt size mm / inch
60	UCP312D1	85	330	250	85	25	38	32	165	95	71	26	M20
2 1/4	UCP312-204D1												
2 5/16	UCP312-205D1	3 11/32	13	9 27/32	3 11/32	31/32	1 1/2	1 1/4	6 1/2	3 3/4	2.7953	1.024	3/4
2 3/8	UCP312-206D1												
2 7/16	UCP312-207D1												
65	UCP313D1	90	340	260	90	25	38	33	176	105	75	30	M20
2 1/2	UCP313-208D1	3 35/64	13 3/8	10 1/4	3 17/32	31/32	1 1/2	1 5/16	6 15/16	4 1/8	2.9528	1.181	3/4
2 9/16	UCP313-209D1												
70	UCP314D1	95	360	280	90	27	40	35	187	105	78	33	M22
2 5/8	UCP314-210D1												
2 11/16	UCP314-211D1	3 47/64	14 3/16	11 1/32	3 17/32	1 1/16	1 9/16	1 3/8	7 3/8	4 1/8	3.0709	1.299	7/8
2 3/4	UCP314-212D1												
75	UCP315D1	100	380	290	100	27	40	35	198	110	82	32	M22
2 13/16	UCP315-213D1												
2 7/8	UCP315-214D1	3 15/16	14 31/32	11 13/32	3 15/16	1 1/16	1 9/16	1 3/8	7 25/32	4 11/32	3.2283	1.260	7/8
2 15/16	UCP315-215D1												
3	UCP315-300D1												
80	UCP316D1	106	400	300	110	27	40	40	210	110	86	34	M22
3 1/16	UCP316-301D1												
3 1/8	UCP316-302D1	4 11/64	15 3/4	11 13/16	4 11/32	1 1/16	1 9/16	1 9/16	8 9/32	4 11/32	3.3858	1.339	7/8
3 3/16	UCP316-303D1												
85	UCP317D1	112	420	320	110	33	45	40	220	120	96	40	M27
3 1/4	UCP317-304D1												
3 5/16	UCP317-305D1	4 13/32	16 17/32	12 19/32	4 11/32	1 5/16	1 25/32	1 9/16	8 21/32	4 23/32	3.7795	1.575	1
3 7/16	UCP317-307D1												
90	UCP318D1	118	430	330	110	33	45	45	235	120	96	40	M27
3 7/16	UCP318-307D1	4 41/64	16 15/16	13	4 11/32	1 5/16	1 25/32	1 25/32	9 1/4	4 23/32	3.7795	1.575	1
3 1/2	UCP318-308D1												

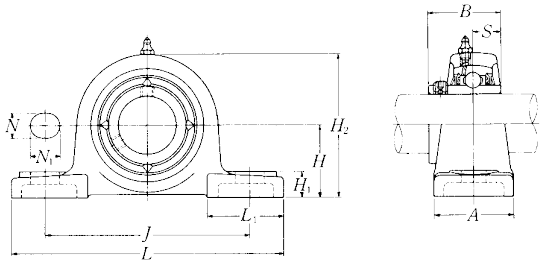
Note (1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".
Remarks Please refer to page **A21** for size of grease fitting.



Cast dust cover type
Open end **C-UCP···D1**
Closed end **CM-UCP···D1**

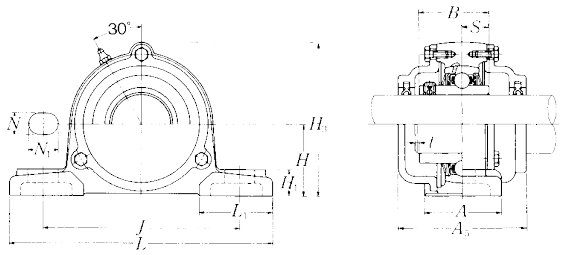
Bearing number	Housing number	Unit number (1) cast dust cover type	Nominal dimensions mm / inch t max.	H3	A5	Mass of unit kg / lb UCP	C(CM)
UC312D1	P312D1	C(CM)-UCP312D1	4	179	135	9.4	11
UC312-204D1	P312D1	C(CM)-UCP312-204D1					
UC312-205D1	P312D1	C(CM)-UCP312-205D1	5/32	7 1/16	5 5/16	21	24
UC312-206D1	P312D1	C(CM)-UCP312-206D1					
UC312-207D1	P312D1	C(CM)-UCP312-207D1					
UC313D1	P313D1	C(CM)-UCP313D1	4	190	140	10	12
UC313-208D1	P313D1	C(CM)-UCP313-208D1	5/32	7 15/32	5 1/2	22	26
UC313-209D1	P313D1	C(CM)-UCP313-209D1					
UC314D1	P314D1	C(CM)-UCP314D1	4	200	140	12	14
UC314-210D1	P314D1	C(CM)-UCP314-210D1					
UC314-211D1	P314D1	C(CM)-UCP314-211D1	5/32	7 7/8	5 1/2	26	31
UC314-212D1	P314D1	C(CM)-UCP314-212D1					
UC315D1	P315D1	C(CM)-UCP315D1	4	210	150	14	17
UC315-213D1	P315D1	C(CM)-UCP315-213D1					
UC315-214D1	P315D1	C(CM)-UCP315-214D1	5/32	8 9/32	5 29/32	31	37
UC315-215D1	P315D1	C(CM)-UCP315-215D1					
UC315-300D1	P315D1	C(CM)-UCP315-300D1					
UC316D1	P316D1	C(CM)-UCP316D1	4	221	155	17	21
UC316-301D1	P316D1	C(CM)-UCP316-301D1					
UC316-302D1	P316D1	C(CM)-UCP316-302D1	5/32	8 11/16	6 3/32	37	46
UC316-303D1	P316D1	C(CM)-UCP316-303D1					
UC317D1	P317D1	C(CM)-UCP317D1	5	235	170	19	24
UC317-304D1	P317D1	C(CM)-UCP317-304D1					
UC317-305D1	P317D1	C(CM)-UCP317-305D1	13/64	9 1/4	6 11/16	42	53
UC317-307D1	P317D1	C(CM)-UCP317-307D1					
UC318D1	P318D1	C(CM)-UCP318D1	5	246	170	22	27
UC318-307D1	P318D1	C(CM)-UCP318-307D1	13/64	9 11/16	6 11/16	49	60
UC318-308D1	P318D1	C(CM)-UCP318-308D1					

Pillow block unit, cast housing
Set screw type



Shaft dia. mm / inch	Unit number (1)	Nominal dimensions mm / inch H	L	J	A	N	N_1	H_1	H_2	L_1	B	S	Bolt size mm / inch
95	UCP319D1	125	470	360	120	36	50	45	250	125	103	41	M30
3 5/8	UCP319-310D1												
3 11/16	UCP319-311D1	4 59/64	18 1/2	14 3/16	4 23/32	1 13/32	1 31/32	1 25/32	9 27/32	4 29/32	4.0551	1.614	1 1/8
3 3/4	UCP319-312D1												
100	UCP320D1	140	490	380	120	36	50	50	275	130	108	42	M30
3 13/16	UCP320-313D1												
3 7/8	UCP320-314D1	5 33/64	19 9/32	14 31/32	4 23/32	1 13/32	1 31/32	1 31/32	10 13/16	5 1/8	4.2520	1.654	1 1/8
3 15/16	UCP320-315D1												
4	UCP320-400D1												
105	UCP321D1	140	490	380	120	36	50	50	280	130	112	44	M30
110	UCP322D1	150	520	400	140	40	55	55	300	135	117	46	M33
120	UCP324D1	160	570	450	140	40	55	65	320	140	126	51	M33
130	UCP326D1	180	600	480	140	40	55	75	355	140	135	54	M33
140	UCP328D1	200	620	500	140	40	55	75	390	140	145	59	M33

Note (1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".
Remarks Please refer to page **A21** for size of grease fitting.



Cast dust cover type
Open end **C-UCP···D1**
Closed end **CM-UCP···D1**

Bearing number	Housing number	Unit number (1) cast dust cover type	Nominal dimensions mm / inch t max.	H_3	A_5	Mass of unit kg / lb UCP	C(CM)
UC319D1	P319D1	C(CM)-UCP319D1	5	258	180	26	32
UC319-310D1	P319D1	C(CM)-UCP319-310D1					
UC319-311D1	P319D1	C(CM)-UCP319-311D1	13/64	10 5/32	7 3/32	57	71
UC319-312D1	P319D1	C(CM)-UCP319-312D1					
UC320D1	P320D1	C(CM)-UCP320D1	5	283	190	33	39
UC320-313D1	P320D1	C(CM)-UCP320-313D1					
UC320-314D1	P320D1	C(CM)-UCP320-314D1	13/64	11 5/32	7 15/32	73	86
UC320-315D1	P320D1	C(CM)-UCP320-315D1					
UC320-400D1	P320D1	C(CM)-UCP320-400D1					
UC321D1	P321D1	C(CM)-UCP321D1	5	290	195	35	42
UC322D1	P322D1	C(CM)-UCP322D1	5	313	200	43	52
UC324D1	P324D1	C(CM)-UCP324D1	5	335	215	50	67
UC326D1	P326D1	C(CM)-UCP326D1	6	375	225	69	83
UC328D1	P328D1	C(CM)-UCP328D1	6	407	235	84	99