

## 1. Construction

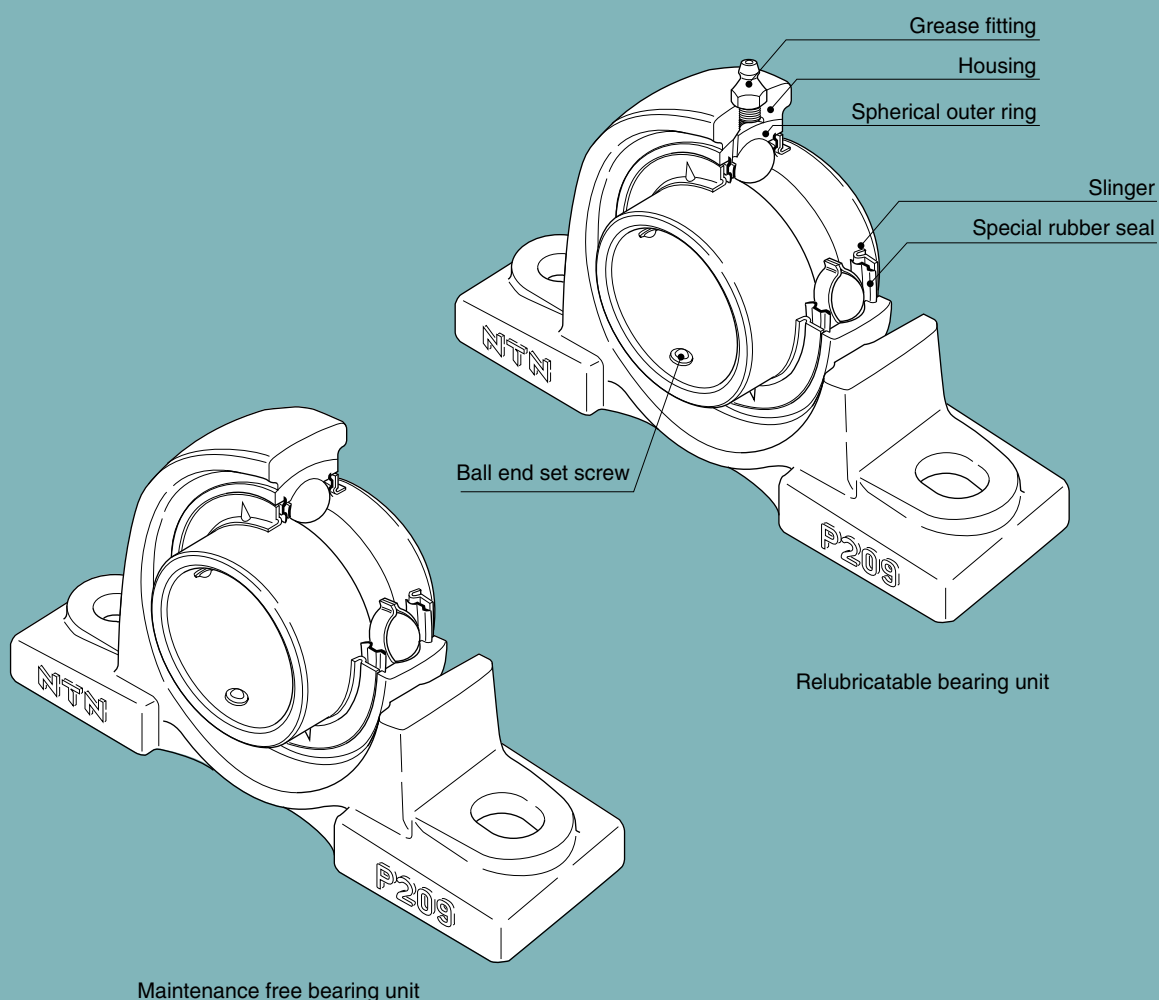
The NTN bearing unit is a combination of a radial ball bearing, seal, and a housing of high-grade cast iron or pressed steel, which comes in various shapes.

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 NTN deep groove ball bearing are used. A duplex seal consisting of a combination of an oil-proof synthetic rubber seal and a slinger, unique to NTN, 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.



## 2. Design Features and Advantages

### 2.1 Maintenance free type

The NTN 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, unique to NTN, 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 NTN 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 NTN relubricatable type bearing unit has an advantage over other similar 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 NTN 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 NTN maintenance free type bearing unit is satisfactory for use under normal operating conditions indoors, 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 200°C, 392°F heatresistant 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  $C_T/P_T$  value is about 10 or below, and the speed is 10 rpm 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 NTN bearing unit is a combination of a heat-resistant and oil-proof synthetic rubber seal and a slinger of an exclusive NTN design.

The seal, which is fixed in the outer ring, is steelreinforced, and its lip, in contact 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.

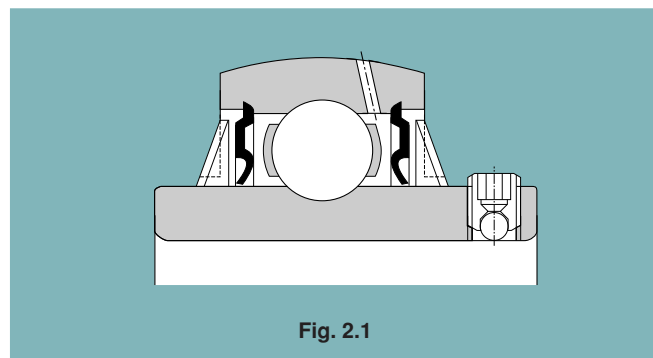


Fig. 2.1

#### 2.3.2 Bearing units with covers

The NTN 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

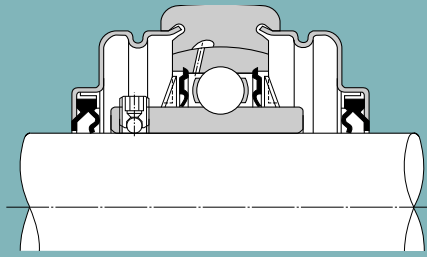


Fig. 2.2 Pressed steel cover

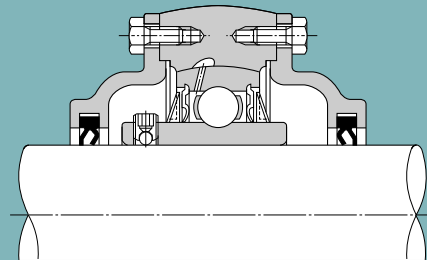


Fig. 2.3 Cast iron cover

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.

## 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 NTN feature which prevents loosening, even if the bearing is subjected to intense vibrations and shocks.

## 2.5 Self-aligning

With the NTN 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 NTN 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 NTN 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 NTN 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 NTN bearing unit is replaceable. In the event of bearing failure, a new bearing can be fitted to the existing housing.

## Bearing units with ductile cast iron housing (Spheroidal graphite cast iron housing)

The NTN ductile series helps with design optimization!



### Housing weight is reduced by 40%, with a compact design

When compared with the standard NTN housing the ductile series housing enjoys a 40% weight reduction. Additionally the housing is useful for a size reduction in machine equipment. This is achieved by minimizing as much as possible non-critical dimensions of the housing allowing the housing to be placed in tight locations.

### High fracture strength of housing

Spheroidal graphite cast iron is used for the bearing housing. It is designed to have high strength with fine material structure and uniformed thickness. The average fracture strength for the series is increased by approximately 30% when compared with NTN's standard product (FC200, Gray cast iron).

### Two lubrication types : Relubricatable type maintenance free type

The relubricatable type is suitable for high temperature and high speed application, and the maintenance free type is optimized for a long period under normal using conditions without re-greasing.

### Interchangeability

This series is interchangeable with NTN standard product and other domestic suppliers' product. This is achieved by keeping the dimensions related to mounting the same as for standard product made according to JIS B 1559 (Housings for rolling bearing units).

## Bearing units steel series (Rolled steel housing for general structures)

NTN rolled steel housings ensure a safer design



### Superior Housing Strength

Made of precision gas cut rolled steel, NTN steel housings offer superior strength characteristics when compared to cast iron and cast steel housings.

### Consistent Microstructure

The rolled steel microstructure is more consistent than cast iron or cast steel, reducing the risk of housing fracture under severe conditions.

### Interchangeability























Rolled steel housing dimensions are consistent with cast units, allowing them to be interchanged with NTN standard housings and other manufacturers ISO standard.

### Applications

NTN rolled steel housings provide superior strength to cast steel and cast iron. Their ability to resist impact loads makes them suitable for applications involving heavy loads and vibration. Possible applications for NTN rolled steel housings include but are not limited to conveyors, trucks and overhead cranes at steel mills, mining machinery and pollution control equipment.








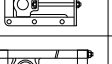



## Set screw type (1)

Page

Pillow blocks	Pillow blocks cast housing		UCP2 UCP3 UCPX	58 64 70
	Pillow blocks cast housing low center height		UCPL2 ASPL2	76 108
	Pillow blocks (Steel series)		UCPG2 UCPG3	80 82
	Pillow blocks (Stainless series)		F-UCPM2	84
	Pillow blocks (Plastic housing series)		F-UCPR2	86
	Thick pillow blocks cast housing		UCIP2 UCIP3	88 90
	Thick pillow blocks (Steel series)		UCIPG2, 3	94
	Pillow blocks cast housing high center height		UCHP2	96
	Narrow pillow blocks cast housing		UCUP2	100
	Light pillow blocks cast housing		ASPB2	104
	Pillow blocks ductile cast housing (Ductile series)		UCPE2	106
	Pillow blocks pressed steel housing		ASPP2 ASRPP2	112 114
Flanged units	Square flanged units cast housing		UCF2 UCF3 UCFX	116 122 128
	Square flanged units (Steel series)		UCFG2 UCFG3	134 136
	Square flanged units cast housing w/ spigot joint		UCFS3	138
	Square flanged units w/ spigot joint (Steel series)		UCFSG3	144
	Round flanged units cast housing w/ spigot joint		UCFC2 UCFCX	146 152
	Round flanged units w/ spigot joint (Steel series)		UCFCG2	158
	Rhombus flanged units cast housing		UCFL2 UCFL3 UCFLX	160 166 172
	Rhombus flanged units (Steel series)		UCFLG2 UCFLG3	174 176
	Rhombus flanged units (Stainless series)		F-UCFM2	178
	Rhombus flanged units (Plastic housing series)		F-UCFLR2	180
	Modified rhombus flanged units cast housing		UCFA2	182
	Modified flanged units cast housing		UCFH2	186
	Light rhombus flanged units cast housing		ASFB2 ASFD2	190 192












## Set screw type (2)

Page

Flanged units	Rhombus flanged units ductile cast housing (Ductile series)		UCFE2	194
	Round flanged units pressed steel housing		ASPF2 ASRPF2	196 198
	Rhombus flanged units pressed steel housing		ASPF2 ASRPF2	200
Hanger units	Hanger units cast housing		UCHB2	202
Take-up units	Take-up units cast housing		UCT2 UCT3 UCTX	206 212 218
	Take-up units (Steel series)		UCTG2 UCTG3	224 226
	Cartridge units cast housing		UCC2 UCC3 UCCX	228 230 233
Stretcher units	Mini stretcher units		ASPT2	235
	Take-up stretcher units		UCT2	408
	Type L stretcher units		UCL2	410
	Type M stretcher units		UCM2 UCM3	411 412

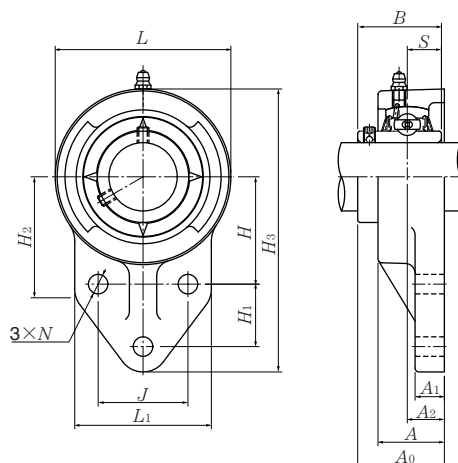
## Eccentric locking collar type (1)

Page

Pillow blocks	Pillow blocks cast housing		UEL2 UEL3	236 240
	Pillow blocks cast housing low center height		UEL2 AEL2 JEL2	246 254 258
	Pillow blocks cast housing high center height		UELHP2	250
	Narrow pillow blocks cast housing		UELUP2	252
	Light pillow blocks cast housing		AELPB2	262
	Pillow blocks pressed steel housing		AELPP2 AELRPP2	264 266
	Square flanged units cast housing		UELF2 UELF3	268 272 276
	Square flanged units cast housing w/ spigot joint		UELFS3	282
Flanged units	Round flanged units cast housing w/ spigot joint		UELFC2	288
	Rhombus flanged units cast housing		UELFLU2 UELFL2 UELFL3	292 296 300
	Light rhombus flanged units cast housing		AELFB2 AELFD2 JELFD2	306 308 309

# Modified flanged units cast housing

## Set screw type



Shaft dia.	Unit number <sup>1)</sup>	Nominal dimensions														
		mm							inch							
mm		$H_3$	$J$	$A_2$	$A_1$	$A$	$N$	$H$	$H_1$	$L_1$	$H_2$	$L$	$A_0$	$B$	$S$	
inch																
<b>12</b>	<b>UCFH201D1</b>	110	32	15	13	25.5	10	42	27	52	52	62	33.3	31	12.7	
$\frac{1}{2}$	<b>UCFH201-008D1</b>	$4\frac{11}{32}$	$1\frac{17}{64}$	$\frac{19}{32}$	$\frac{1}{2}$	1	$\frac{25}{64}$	$1\frac{21}{32}$	$1\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{7}{16}$	$1\frac{5}{16}$	1.2205	0.500	
<b>15</b>	<b>UCFH202D1</b>	110	32	15	13	25.5	10	42	27	52	52	62	33.3	31	12.7	
$\frac{9}{16}$	<b>UCFH202-009D1</b>	$4\frac{11}{32}$	$1\frac{17}{64}$	$\frac{19}{32}$	$\frac{1}{2}$	1	$\frac{25}{64}$	$1\frac{21}{32}$	$1\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{7}{16}$	$1\frac{5}{16}$	1.2205	0.500	
$\frac{5}{8}$	<b>UCFH202-010D1</b>															
<b>17</b>	<b>UCFH203D1</b>	110	32	15	13	25.5	10	42	27	52	52	62	33.3	31	12.7	
$\frac{11}{16}$	<b>UCFH203-011D1</b>	$4\frac{11}{32}$	$1\frac{17}{64}$	$\frac{19}{32}$	$\frac{1}{2}$	1	$\frac{25}{64}$	$1\frac{21}{32}$	$1\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{7}{16}$	$1\frac{5}{16}$	1.2205	0.500	
<b>20</b>	<b>UCFH204D1</b>	110	32	15	13	25.5	10	42	27	52	52	62	33.3	31	12.7	
$\frac{3}{4}$	<b>UCFH204-012D1</b>	$4\frac{11}{32}$	$1\frac{17}{64}$	$\frac{19}{32}$	$\frac{1}{2}$	1	$\frac{25}{64}$	$1\frac{21}{32}$	$1\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{1}{16}$	$2\frac{7}{16}$	$1\frac{5}{16}$	1.2205	0.500	
<b>25</b>	<b>UCFH205D1</b>	116	34	16	13	27	10	45	27	56	52	68	35.8	34.1	14.3	
$\frac{13}{16}$	<b>UCFH205-013D1</b>															
$\frac{7}{8}$	<b>UCFH205-014D1</b>	$4\frac{9}{16}$	$1\frac{11}{32}$	$\frac{5}{8}$	$\frac{1}{2}$	$1\frac{1}{16}$	$\frac{25}{64}$	$1\frac{49}{64}$	$1\frac{1}{16}$	$2\frac{7}{32}$	$2\frac{1}{16}$	$2\frac{11}{16}$	$1\frac{13}{32}$	1.3425	0.563	
$\frac{15}{16}$	<b>UCFH205-015D1</b>															
<b>1</b>	<b>UCFH205-100D1</b>															
<b>30</b>	<b>UCFH206D1</b>	130	40	18	13	31	10	50	29	65	55	78	40.2	38.1	15.9	
$1\frac{1}{16}$	<b>UCFH206-101D1</b>															
$1\frac{1}{8}$	<b>UCFH206-102D1</b>	$5\frac{1}{8}$	$\frac{37}{64}$	$\frac{45}{64}$	$\frac{1}{2}$	$1\frac{7}{32}$	$\frac{25}{64}$	$1\frac{31}{32}$	$1\frac{9}{64}$	$2\frac{9}{16}$	$2\frac{5}{32}$	$3\frac{1}{16}$	$1\frac{37}{64}$	1.5000	0.626	
$1\frac{3}{16}$	<b>UCFH206-103D1</b>															
$1\frac{1}{4}$	<b>UCFH206-104D1</b>															
<b>35</b>	<b>UCFH207D1</b>	144	46	19	15	34	10	55	32	70	62	90	44.4	42.9	17.5	
$1\frac{1}{4}$	<b>UCFH207-104D1</b>															
$1\frac{5}{16}$	<b>UCFH207-105D1</b>	$5\frac{21}{32}$	$1\frac{13}{16}$	$\frac{3}{4}$	$\frac{19}{32}$	$1\frac{11}{32}$	$\frac{25}{64}$	$2\frac{11}{64}$	$1\frac{17}{64}$	$2\frac{3}{4}$	$2\frac{7}{16}$	$3\frac{17}{32}$	$1\frac{3}{4}$	1.6890	0.689	
$1\frac{3}{8}$	<b>UCFH207-106D1</b>															
$1\frac{7}{16}$	<b>UCFH207-107D1</b>															
<b>40</b>	<b>UCFH208D1</b>	164	50	21	16	36	12	60	41	78	72	100	51.2	49.2	19	
$1\frac{1}{2}$	<b>UCFH208-108D1</b>	$6\frac{15}{32}$	$1\frac{31}{32}$	$\frac{53}{64}$	$\frac{5}{8}$	$1\frac{13}{32}$	$\frac{15}{32}$	$2\frac{23}{64}$	$1\frac{39}{64}$	$3\frac{1}{16}$	$2\frac{27}{32}$	$3\frac{15}{16}$	$2\frac{1}{64}$	1.9370	0.748	
$1\frac{9}{16}$	<b>UCFH208-109D1</b>															
<b>45</b>	<b>UCFH209D1</b>	174	54	22	18	38	12	65	43	80	76	106	52.2	49.2	19	
$1\frac{5}{8}$	<b>UCFH209-110D1</b>															
$1\frac{11}{16}$	<b>UCFH209-111D1</b>	$6\frac{27}{32}$	$2\frac{1}{8}$	$\frac{55}{64}$	$\frac{23}{32}$	$1\frac{1}{2}$	$\frac{15}{32}$	$2\frac{9}{16}$	$1\frac{11}{16}$	$3\frac{5}{32}$	3	$4\frac{3}{16}$	$2\frac{1}{16}$	1.9370	0.748	
$1\frac{3}{4}$	<b>UCFH209-112D1</b>															

Remarks: 1) These numbers indicate relubricatable type. If maintenance free type is needed, please order without suffix "D1".

Note: Please refer to page 36 for size of grease fitting.