

Instruction Manual

**Stainless Steel
Insert Bearing Units**

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1. Scope of application

This instruction manual applies to the insert bearing units shown in Tables 1.1 to 1.2.

Remarks: This instruction manual also applies to the insert bearing units marked with auxiliary marks (Note 1) and aggregation marks (Note 2) in addition to the standard products shown in Table 1.1 to 1.2.

- (Note) 1. Special and change marks showing accuracy, shape, additional processing, etc. for bearings, housings and main parts.
2. Abbreviated marks for special parts whose nominal number consists of many characters and is complicated.

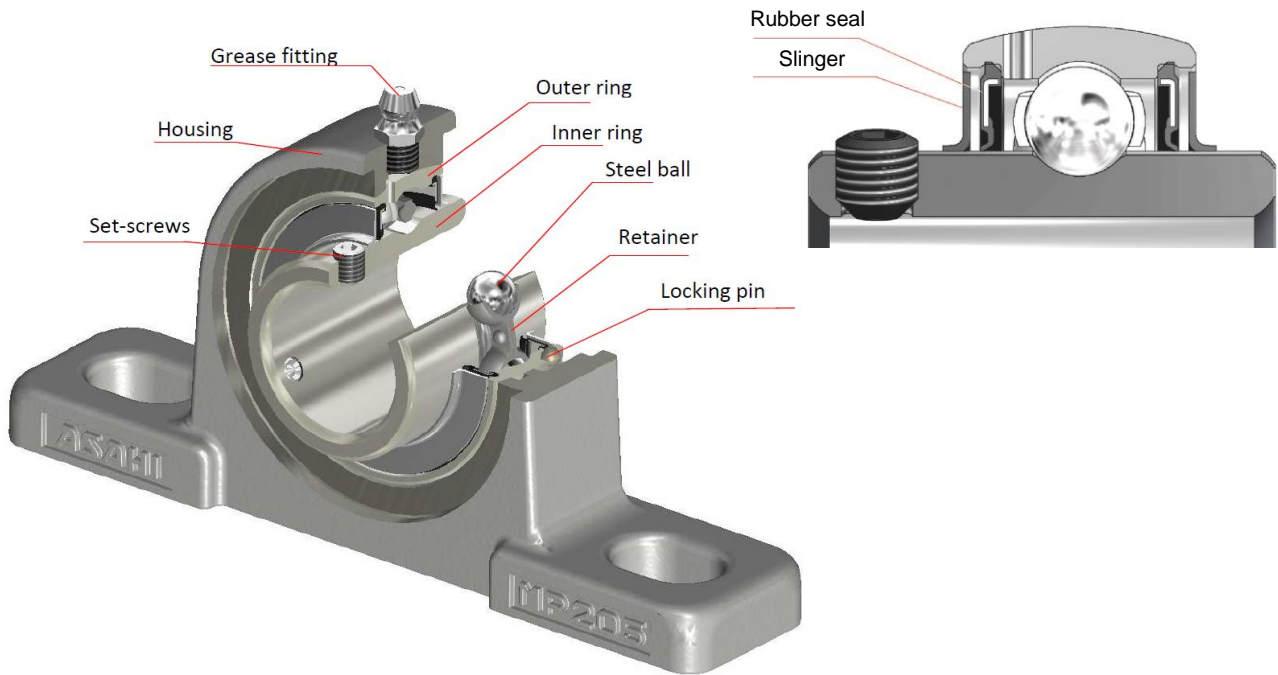
Table 1.1

Pillow block units		Square Flange units	Round flange units with spigot joint	Rhombic flange units	Take-up units
MUCP201VN,Y	MUCPA201VN,Y	MUCF201VN,Y	MUCFC201VN,Y	MUCFL201VN,Y	MUCT201VN,Y
MUCP202VN,Y	MUCPA202VN,Y	MUCF202VN,Y	MUCFC202VN,Y	MUCFL202VN,Y	MUCT202VN,Y
MUCP203VN,Y	MUCPA203VN,Y	MUCF203VN,Y	MUCFC203VN,Y	MUCFL203VN,Y	MUCT203VN,Y
MUCP204VN,Y	MUCPA204VN,Y	MUCF204VN,Y	MUCFC204VN,Y	MUCFL204VN,Y	MUCT204VN,Y
MUCP205VN,Y	MUCPA205VN,Y	MUCF205VN,Y	MUCFC205VN,Y	MUCFL205VN,Y	MUCT205VN,Y
MUCP206VN,Y	MUCPA206VN,Y	MUCF206VN,Y	MUCFC206VN,Y	MUCFL206VN,Y	MUCT206VN,Y
MUCP207VN,Y	—	MUCF207VN,Y	MUCFC207VN,Y	MUCFL207VN,Y	MUCT207VN,Y
MUCP208VN,Y	—	MUCF208VN,Y	MUCFC208VN,Y	MUCFL208VN,Y	MUCT208VN,Y
MUCP209VN,Y	—	MUCF209VN,Y	—	MUCFL209VN,Y	MUCT209VN,Y
MUCP210VN,Y	—	MUCF210VN,Y	—	MUCFL210VN,Y	MUCT210VN,Y
MUCP211V,Y	—	MUCF211V,Y	—	—	—
MUCP212V,Y	—	MUCF212V,Y	—	—	—
MUCP213V,Y	—	MUCF213V,Y	—	—	—

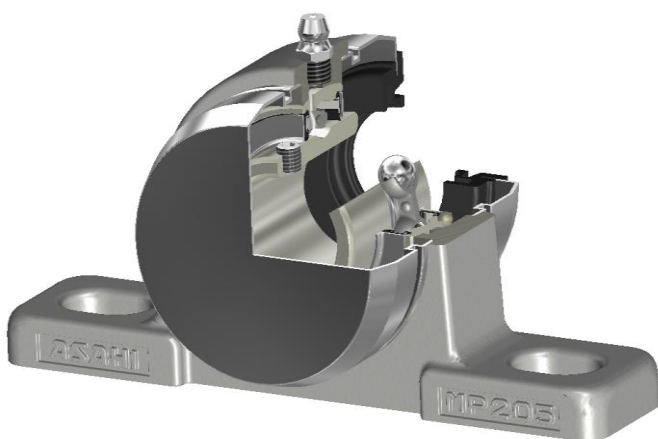
Table 1.2

Pillow block units		Square Flange units	Round flange units with spigot joint	Rhombic flange units	Take-up units
MUCP201VC(E),Y	MUCPA201VC(E),Y	MUCF201VC(E),Y	MUCFC201VC(E),Y	MUCFL201VC(E),Y	MUCT201VC(E),Y
MUCP202VC(E),Y	MUCPA202VC(E),Y	MUCF202VC(E),Y	MUCFC202VC(E),Y	MUCFL202VC(E),Y	MUCT202VC(E),Y
MUCP203VC(E),Y	MUCPA203VC(E),Y	MUCF203VC(E),Y	MUCFC203VC(E),Y	MUCFL203VC(E),Y	MUCT203VC(E),Y
MUCP204VC(E),Y	MUCPA204VC(E),Y	MUCF204VC(E),Y	MUCFC204VC(E),Y	MUCFL204VC(E),Y	MUCT204VC(E),Y
MUCP205VC(E),Y	MUCPA205VC(E),Y	MUCF205VC(E),Y	MUCFC205VC(E),Y	MUCFL205VC(E),Y	MUCT205VC(E),Y
MUCP206VC(E),Y	MUCPA206VC(E),Y	MUCF206VC(E),Y	MUCFC206VC(E),Y	MUCFL206VC(E),Y	MUCT206VC(E),Y
MUCP207VC(E),Y	—	MUCF207VC(E),Y	MUCFC207VC(E),Y	MUCFL207VC(E),Y	MUCT207VC(E),Y
MUCP208VC(E),Y	—	MUCF208VC(E),Y	MUCFC208VC(E),Y	MUCFL208VC(E),Y	MUCT208VC(E),Y
MUCP209VC(E),Y	—	MUCF209VC(E),Y	—	MUCFL209VC(E),Y	MUCT209VC(E),Y
MUCP210VC(E),Y	—	MUCF210VC(E),Y	—	MUCFL210VC(E),Y	MUCT210VC(E),Y

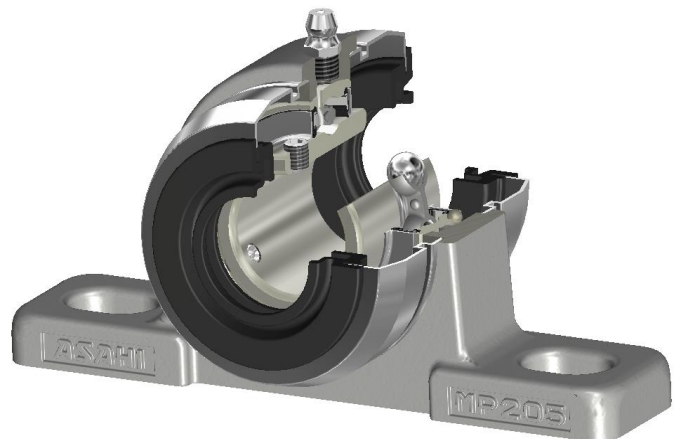
2. Name of parts and functions



Name of parts	Functions
Grease fitting	A part to supply lubrication grease to enable the service lives of bearings to be extended by supplying grease at an interval suitable for the use environment.
Set-screws	Secures the insert bearing and shaft.
Locking pin	Prevents the outer ring from drag turning and the section between the bearing and housing from being worn.
Rubber seal	Prevents dust and moisture from intruding because it is secured to the outer ring and the lip part comes in contact with the inner ring.
Slinger	Prevents dust from intruding by centrifugal force because it is secured to the inner ring and rotates together with the inner ring.



Insert bearing unit with pressed steel covers



Insert bearing unit with cast-iron covers

3. Selection of shafts

Clearance fit “h” is normally applied for the dimensional tolerance between bearing inner rings and spherical in side diameter of housing. The values shown in Table 3.1 are considered appropriate for the shaft dimensional tolerance in the case of loose press-fitting.

For high precision operation, high speed rotation, heavy and/or shock load application, interference fit is recommended for the fit between the shaft and the bearing inner ring. When applying tight fit like this, it is recommended to follow the dimensional tolerance for the shaft as shown as per the Table 3.2. For such tight fit between the bearing and the shaft, the initial bearing internal clearance must be larger than its standard clearance.

Table 3.1: Shaft dimensional tolerance (for loose press-fitting)

Shaft diameter (mm)		Shaft dimensional tolerance (µm)		
Over	Or less	js7	h7	h8
10	18	±9	0 to -18	0 to -27
18	30	±10.5	0 to -21	0 to -33
30	50	±12.5	0 to -25	0 to -39
50	80	±15	0 to -30	0 to -46

Remarks: In general, js7 shall be applied.

Table 3.2: Shaft dimensional tolerance (for tight press-fitting)

Shaft diameter (mm)		Shaft dimensional tolerance (µm)			
Over	Or less	n6	n7	m6	m7
10	18	+23 to +12	+30 to +12	+18 to +7	+25 to +7
18	30	+28 to +15	+36 to +15	+21 to +8	+29 to +8
30	50	+33 to +17	+42 to +17	+25 to +9	+34 to +9
50	80	+39 to +20	+50 to +20	+30 to +11	+41 to +11

Remarks: If the shaft diameter is 30mm or less, it is better that values other than m6 are not used.

4. Mounting method

- 1) Slide the insert bearing unit onto the shaft slowly and bring it to the predetermined position.
- 2) Mount the insert bearing unit on the machine base and secure it firmly with bolts.
- 3) Tighten the set-screws by equal force with a hexagonal wrench key to secure the insert bearing unit to the shaft.

Remarks: 1. Before sliding the insert bearing unit onto the shaft, check that the tips of set-screws do not protrude from the inside diameter of bearing. If a tip protrudes, loosen the set-screws.

2. When sliding the insert bearing unit onto the shaft, do not allow the shaft to come in direct contact with the side of the inner ring or the slinger and use extra caution to prevent it from being twisted.

If strong impact is applied to the insert bearing unit, it is possible that the slingers on both sides may move and come in contact with the seal. In this case, the rotation torque becomes larger, which may cause abnormal heating and noise to be generated if the insert bearing unit is used in such condition. After mounting the insert bearing unit, applying strong impact when mounting transmission system parts such as pulleys, sprockets, etc. on the shaft may cause the same phenomenon, so extra caution should be taken to prevent strong impact from being applied to the insert bearing unit.

3. The machine base on which the insert bearing unit is mounted must have high rigidity and high flatness to prevent the housing from being deformed.
(Excluding cartridge type and take-up type models)

Inside diameter number	Flatness
13 or less (shaft diameter: $\Phi 65$ or less)	0.1mm or less

4. The values shown in Table 4.1 are considered appropriate for the tightening torque.

If the set-screws is tightened excessively, deformation of the inner ring may cause the rotational accuracy to be reduced and the inner ring to be cracked.

5. The values shown in Table 4.2 are considered appropriate for the tightening torque of housing mounting bolts.
6. Use washers to prevent the housing from being damaged when fixing the bearing unit on the mounting base with bolts.

Table 4.1: Appropriate tightening torque of set-screws

Bearing nominal number	Hexagonal wrench key nominal number	Appropriate tightening torque (N·m)
MUC201V ~ MUC206V	2.5	2.4
MUC207V ~ MUC209V	3	3.9
MUC210V , MUC211V	4	8.3
MUC212V , MUC213V	5	16.2

Table 4.2: Tightening torque of housing mounting bolts (reference values)

Bolt nominal number	Torque (N·m)	Bolt nominal number	Torque (N·m)
M5	1.7 to 2.7	M14	38 to 61
M6	2.8 to 4.5	M16	59 to 95
M8	6.9 to 11	M18	81 to 130
M10	14 to 22	M20	118 to 186
M12	24 to 38	-	-

5. Installation the covers

- 1) Attach the covers after finishing mounting the insert bearing unit.
- 2) Apply an amount of grease corresponding to 1/3 to 1/2 of the volume of the space inside the covers to that space as shown in Figs. 5.1.

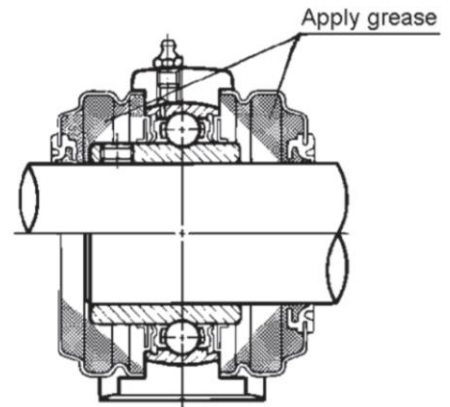


Fig. 5.1: For pressed steel covers

- 3) Press-fit the spigot joint of the covers into the spigot joint of the housing.
- 4) For cast-iron covers, secure it with hexagon bolts.
- 5) For pressed steel covers, attach it by tapping the side of the circumference with a wood hammer or plastic hammer as shown in Fig. 5.2.

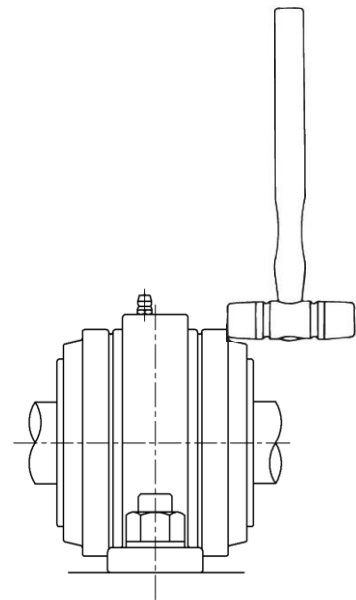


Fig. 5.2: Attaching pressed steel covers

- Remarks:**
1. For a rubber-sealed cover to be located inside, slide it onto the shaft before mounting it on the insert bearing unit main body.
 2. To maximize dust resistance and humidity resistance, also apply grease to the spigot joint of the housing and the shaft surface where the lip part of the rubber seal comes in contact.

6. Inspection

After finishing mounting the insert bearing unit, inspect whether the mounting conditions are appropriate or not.

First, turn the shaft by hand to check that the insert bearing unit rotates smoothly. If no problem is observed, rotate it by electric power to inspect for noise or temperature increases.

6.1 Noise

Touch the housing with a listening rod or screwdriver and listen for noises during operation to check for abnormalities. (Photo 6.1)

For normal operation conditions, a smooth rotation noise is generated, but if there is an abnormality in mounting, an abnormal noise may be generated.



Photo 6.1: Checking the rotation noise with a listening rod

6.2 Rise of temperature

Measure the temperature on the outer circumferences of the bearing outer ring and housing. (Photos 6.2 and 6.3)

The rise of temperature reaches saturation 2 to 3 hours after start of operation and the insert bearing unit reaches to the regular conditions in general; however, if there are abnormalities in mounting, etc., the temperature will increase excessively, which will prevent the insert bearing unit from reaching the regular conditions. (For temperature measurement of cartridge type bearings, measure at the side of housing.)



Photo 6.2: Temperature measurement (contact type)

Inspect the above items during commissioning and start operating the insert bearing unit fully after checking that there is no abnormality.

Further, it is recommended that inspections also be performed periodically at the predetermined interval during operation to detect failures in the bearings at an early stage.

In addition, monitoring to check that there are no changes in noise or increases in temperature by comparing the differences between the results of periodic inspections and other inspections is an effective measure for preventing accidents and damage to machinery.

For the bearing failure and its preventive measures during the test run and the periodical inspection of the insert bearing units, please refer to our General Catalogue and/or access ASAHI WEBSITE to 'Inspection and Failure'.



Photo 6.3: Temperature measurement (non-contact type)

7. Lubrication

7.1 Lubrication grease

This insert bearing has been factory-lubricated with the grease shown in Table 7.1. Therefore, it is recommended that the same grease as the factory-lubricated grease be used.

Table 7.1: Properties of standard factory-lubricated grease

Type	Auxiliary mark	Product name	Manufacturer name	NLGI No.	Soap-based grease	Drop point (°C)	Usable temperature range (°C)	Remarks
For food machines use	— HR20	CLARION® FOOD MACHINERYHTEP GREASE, NO.2	CITGO Petroleum Corporation	2	Al-mixed	260	-12 to +163	—
For low-temperature-resistant use	CR2A	AeroShell Grease 7	Showa Shell Sekiyu	—	(Microgel)	Approx. 250	-70 to +150	Equivalent with the level between NLGI No. 1 and 2

Remarks: 1. The usable temperature ranges in the above table are the ranges for the grease. The usable temperature ranges for the insert bearing unit are as follows:

2. For heat-resistant specifications, the bearing radial inside clearance has been designed to be larger originally; therefore, clearance marks such as C3, C4, etc. are added as auxiliary marks.

Type	Auxiliary mark	Range of operating temperature point (°C)
For heat-resistant use	UL200	Normal temperature to +230
For low-temperature-resistant use	CR2A	-40 to +100
For food machines use	—	-10 to +100
	HR20 (heat-resistant)	-10 to +150

* HR23 specifications

For H23 specifications, the insert bearing chamber has been filled with fluorinated high-quality heat-resistant grease and lubrication-free insert bearing units are provided as standard.

The lubrication-free type shows all insert bearing units having specifications not equipped with a grease filling mechanism, such as specifications using completely-lubrication-free type housings whose housing nominal number includes an auxiliary mark "G00", specifications whose housing grease fitting hole is blocked with steel plugs. (Figs. 7.1 to 7.3)

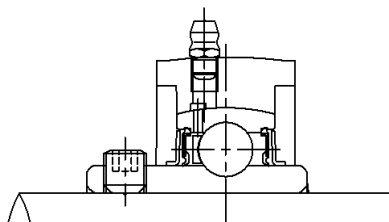


Fig. 7.1: Lubrication type insert bearing unit
Example of nominal number : MUCP205VN,Y

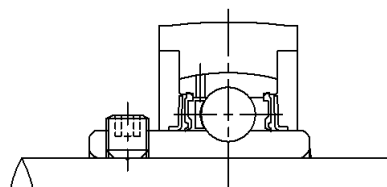


Fig. 7.2: Lubrication-free type insert bearing unit (G00 specifications)
Example of nominal number : MUCP205VN-G00,Y

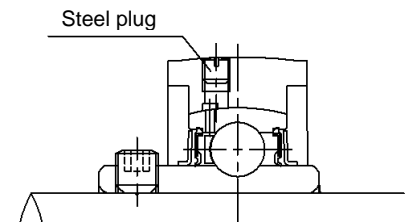


Fig. 7.3: Lubrication-free type insert bearing unit (Steel-plug filled specifications)
Example of nominal number : MUCP205VN,/SW-Y

7.2 Grease replenishing method

Replenish grease using a grease gun (Photo 7.1) from the grease fitting mounted on the housing. (Photo 7.2) Be careful to prevent dust or other foreign materials from getting into the grease to be replenished. If the grease fitting is contaminated, wipe it off before replenishing.



Photo 7.1: Grease gun



Photo 7.2: Example of filling with a grease gun

Grease is injected into the inside of the bearing from the grease hole of the outer ring through the grease groove provided on the circumference of the spherical bearing seat from the grease fitting replenishing port. Injected grease is stirred by the rotation of the bearing and mixed with previously-injected grease in the bearing and excess grease is discharged from the section between the slinger and outer ring through the rubber seal lip part. (Photo 7.3, Fig. 7.4)



Photo 7.3: Normal grease discharging conditions from inside the bearing

Re-lubrication should be performed during operation to cause the grease to be spread into every corner of the inside of the bearing. However, if it is difficult to replenish grease during operation because replenishment during operation at high speed may cause dangerous accidents, after replenishing the grease while operation is stopped, continue to replenish while performing intermittent operation to cause the grease to be mixed by manual operation or regular operation. **Replenishing with a large amount of grease at one time while operation is stopped may cause the rubber seal to be peeled by internal pressure acting on the rubber seals on both sides from the grease and the seals may come in contact with the slinger. In this case, the rotation torque will increase, which may cause abnormal heating conditions to be generated if the insert bearing unit is operated without correcting the situation.**

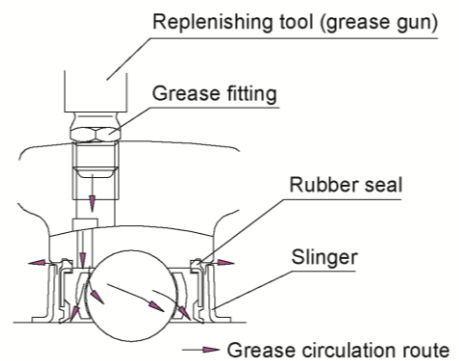


Fig. 7.4: Grease circulation route

7.3 Grease replenishment amount

The values shown in Table 7.2 are considered appropriate for grease replenishment amounts. If it is difficult to replenish grease quantitatively, replenish grease until deteriorated grease comes out from the clearance between the outer ring and slinger as a reference of the replenishment amount. (Photo 7.3)

Table 7.2: Grease replenishment amount Unit: g

Bearing nominal number	Grease replenishment amount
MUC201V to MUC204V	1.2
MUC205V	1.4
MUC206V	2.2
MUC207V	3.2
MUC208V	3.9
MUC209V	5.0
MUC210V	5.4
MUC211V	7.4
MUC212V	10.0
MUC213V	11.8

(Note) The replenishment amount shows the amount per one shot.

*** Low torque specifications (auxiliary: TAA)**

Low-torque specifications are exhibited as “TAA” in which non-contact type rubber seals (Fig. 7.5) are used, Alvania Grease S1 (NLGI No. 1) is used as the factory-lubricated grease. The pre-lubricated grease amount is designed to be 1/3 of standard amount; note that if grease is replenished, the amount of inside grease increases.

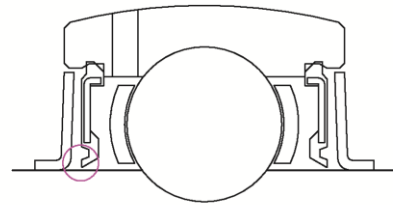


Fig. 7.5: Non-contact seal

7.4 Grease replenishment interval

The recommended grease replenishment interval is shown in Table 7.3.

Table 7.3: Grease replenishment interval

Bearing operation temperature (°C)	Environment conditions		
	Very clean	Very dirty	Very dirty, very humid, much splashing
50 or less	3 years	6 months	3 months
70	1 year	2 months	1 month
100	2.5 months	2 weeks	1 week
120	1.5 months	1 week	3 days
150	2 weeks	3 days	every day

8. Replacement of bearing

When replacing the insert bearing unit with a new one, if either the bearing or housing is slightly damaged, replacement of either one is possible instead of replacing both ones.

When assembling the bearing into the housing, position the bearing outer ring at right angles to the bearing seat, and press-fit it into the notched part of housing, and then turn the bearing. (Photo 8.1)

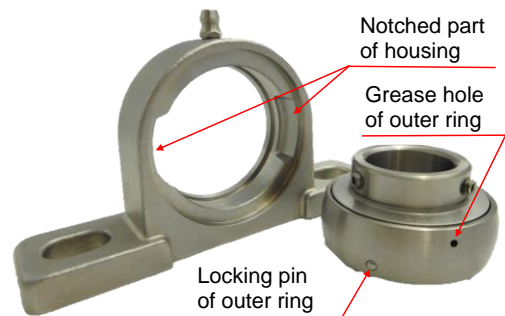


Photo 8.1

At this time, ensure that the outer ring locking pin is inserted into the notched part of housing. **Note that forcibly pressing the locking pin in the bearing seat other than at the notched part may cause outer ring cranking.** (Photo 8.2)

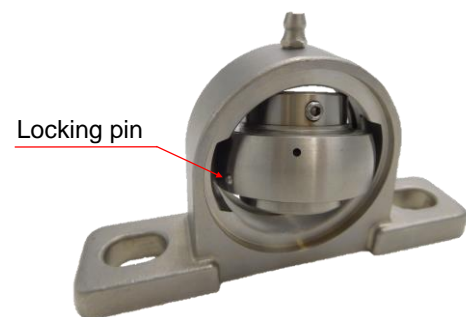


Photo 8.2

Further, when replenishing grease, in order to help the grease spread into every corner of the inside of the bearing, it is recommended to assemble the bearing so that the grease hole of outer ring is located near the grease fitting of housing. (Photo 8.3)

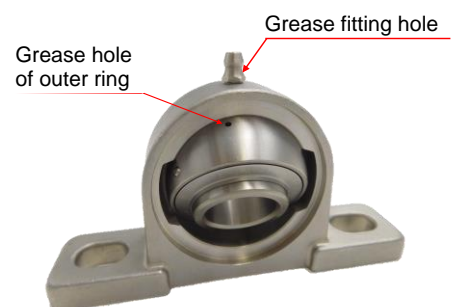


Photo 8.3

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ASAHI

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