

SHOP MANUAL

KOMATSU

HD1200

**DUMP TRUCK
CHASSIS**

MACHINE MODEL



SERIAL No.

HD1200

1005 and up

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for the safe operation of machine. The service and repair techniques recommended by Komatsu and described in this manual are both effective and safe methods of operation. Some of these operations require the use of tools specially designed by Komatsu for the purpose.

To prevent injury to workers, the symbols  and  are used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

FOREWORD

This shop manual has been prepared as an aid in improving the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every available opportunity.

Organization

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into chapters for each main group of components; these chapters are further divided into the following sections.

Structure and function

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for trouble shooting.

Disassembly and assembly

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations and explains how to adjust each component.

Maintenance standards

This section gives the judgement standards when inspecting disassembled parts.

USING THE SHOP MANUAL

Volumes

Shop manuals are issued for carrying out repairs.

They are divided as follows:

Chassis volume:	issued for machine chassis
Engine volume:	issued for engine
Electrical volume:	issued for electrical system






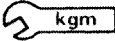



This shop manual is **chassis volume**.

Distribution and Updating

Recipients of shop manuals are recorded at the Komatsu Head Office. Any additions, amendments or other changes will be sent to all recipients without fail, so someone should be appointed to be in charge of manuals. In this way, pages can be added or removed immediately and the manuals kept up to date and easy to use.

Symbols

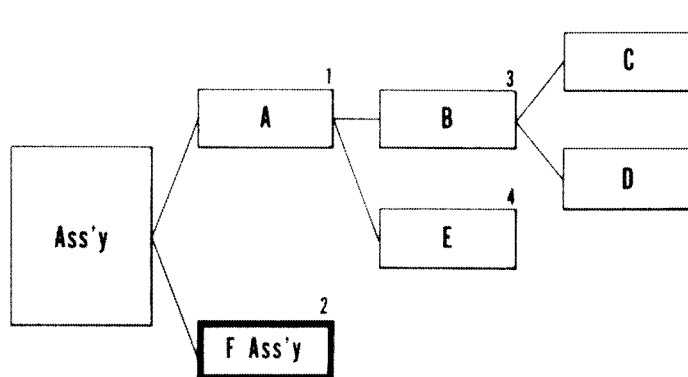
So that the shop manual can be of sufficient practical use, we have marked important places for safety and quality with the following symbols.

SYMBOL	ITEM	REMARKS
	Security	This indicates work that requires special precautions for the security of the machine when assembling.
	Safety	Special safety precautions are necessary when performing the work.
		Extra special safety precautions are necessary when performing the work because it is under internal pressure.
	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts or systems. Caution necessary when selecting hoisting wire, or when working posture is important, etc.
	Tightening torque	Places that require special care with the tightening torque when assembling.
	Coat	Places to be coated with adhesives, etc. when assembling.
	Oil, water	Places for filling with oil, etc. Oil capacity.
	Drain	Places for draining oil, etc. Quantity to be drained.

Network Diagrams

The standard procedures for disassembly and assembly are described and shown in photographs for each part of the machine.

The sequence or steps employed in disassembly and assembly are shown in network diagrams as depicted below.



The sequence of the procedural steps is given in arabic numbers on the top right of each block. For example, when it is necessary to remove part **D** from the assembly, the steps for removal should be **A** → **B** → **D**. Or, to remove part **E** the step is **A** → **E**. **F Ass'y** is an assembly for which the disassembling procedure is described separately. For assembly, the sequence is presented under each section, in the same manner as for disassembly.

Troubleshooting Chart

- The mark ★ is a reference to a note describing the precautions to be followed when removing the part.
- The boldface numeral located at the top left of a square corresponds to the index number used in the structural drawing to indicate that part.
- The numeral located at the top right of a square indicates the disassembling order recommended by Komatsu.

DEFINITION

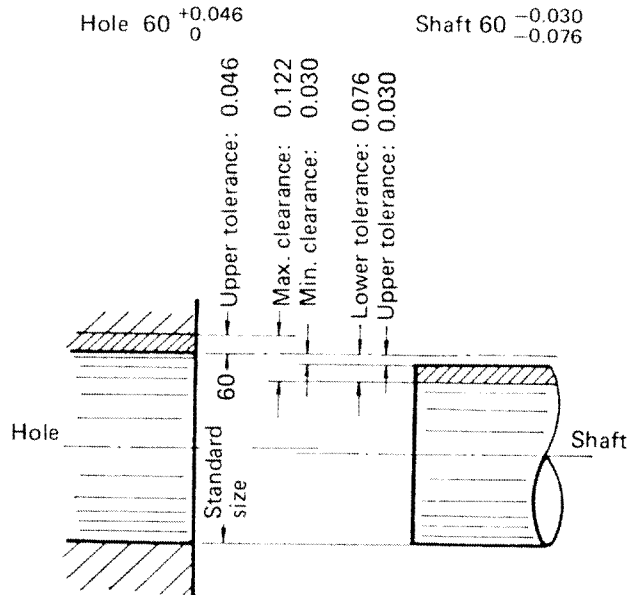
Standard Size, Tolerance

The dimensions of finished parts each differ a little. Therefore, when determining the finished dimensions of parts, a dimension that will be standard is determined provisionally, and then the difference allowed from it is indicated. The former is called the **standard size**, and the latter the **tolerance**.

The way to show this is by a plus or a minus sign with the tolerance in smaller numerals to the right the standard size.

Example: $120 \begin{smallmatrix} -0.022 \\ -0.126 \end{smallmatrix}$ (The same meaning as 119.874 – 119.978)

Moreover, when expressing the dimensions of a hole and the shaft that goes inside it, for the sake of convenience, the standard size for the hole and the shaft usually taken as the same, and the tolerances changed to indicate the tightness of the fit. For example, the fit of revolving shaft is indicated as follows, and is shown in the drawing.



Standard Size This is the standard value at the time of design, the finished dimension of new parts.

Repair Limit This is the limit in dimension up to which the part can be used. (The size of parts changes due to wear or distortion during use). When parts exceed the repair limit, they must be repaired or replaced as specified.

Standard Clearance This is the clearance between two new parts after assembly, shown as a range between minimum clearance and maximum clearance. In general, parts are adjusted to this clearance after repair.

Clearance Limit This is the maximum clearance allowed between parts. (The clearance increases due to wear, etc. during use.)
When the clearance exceeds the clearance limit, the parts must be repaired or replaced as specified.

Maintenance Standard This is the number given to items in diagrams of individual components. The same number is given in the left-hand column for ease of identification.

Unit: mm

No.	Check item	Criteria			Remedy
		Serial No.	Standard size	Repair limit	
1					

Unit: mm

No.	Check item	Criteria					Remedy	
		Serial No.	Standard size	Tolerance		Standard clearance		Clearance limit
				Shaft	Hole			
10								

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1 GENERAL

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- 2-3 ASSEMBLY
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2 POWER MODULE

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3 REAR AXLE AND ELECTRIC WHEEL

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4 FRONT AXLE AND STEERING SYSTEM

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ELECTRIC
CIRCUIT

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8
FRAME AND
DUMP BODY

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9
CABIN

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11
SPECIAL TOOL

SHOP MANUAL

HD 1200

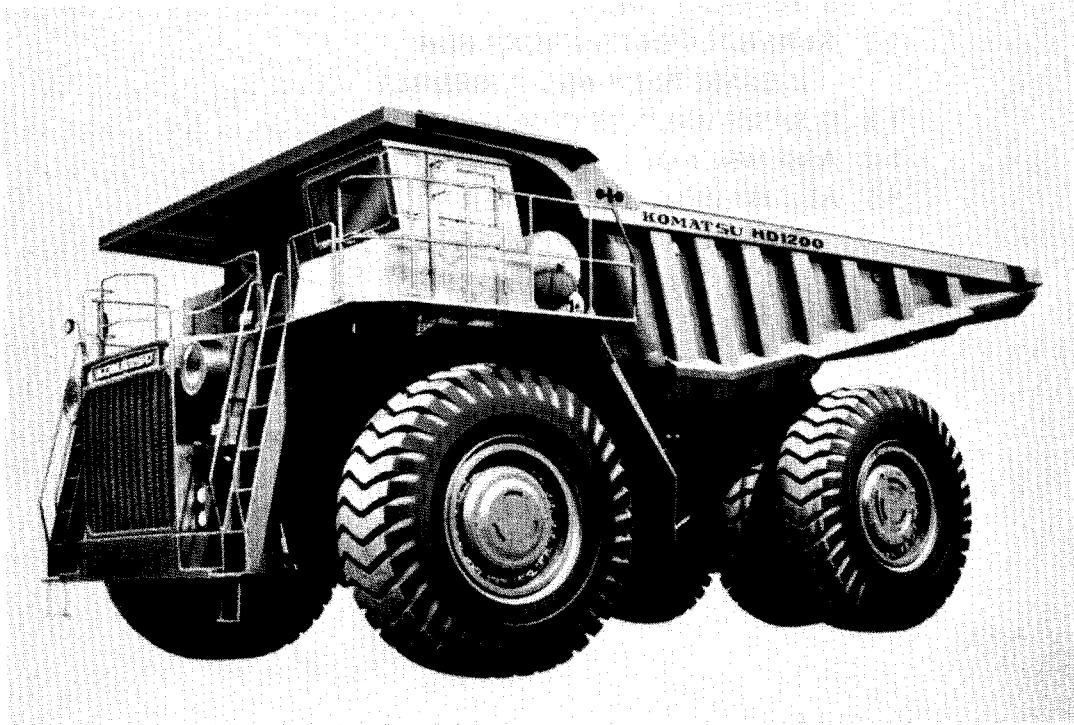
Serial No. HD1200 1005 and up

I GENERAL

1. GENERAL

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1-1 SPECIFICATIONS



KOMATSU HD1200 DUMP TRUCK

KOMATSU HD1200 REAR DUMP TRUCK

TYPE Diesel electric drive,
rear dump truck

CAPACITY:

(Standard)

Struck 46.1m³ (60.3 cu.yds.)

Heaped (2 : 1) 70.0m³ (91.6 cu.yds.)

(Option)

Struck 55.3m³ (72.3 cu.yds.)

Heaped (2 : 1) 76.0m³ (99.4 cu.yds.)

WEIGHTS:

Net weight 84,500 kg

Distribution;

Front axle 36,335 kg

Rear axle 48,165 kg

Max. payload 120 t (132 short ton)

Gross weight 204,500 kg

Distribution;

Front axle 65,440 kg

Rear axle 139,060 kg

PERFORMANCE:

Max. travel speed 57.5 km/h

Turning radius 10.3 m

Dumping angle 47.5 deg.

Dumping speed 18 second

DIMENSIONS:

Overall length 10,885 mm

Overall width 6,610 mm

Overall height (when no load) 5,125 mm

Loading height (when no load) 4,530 mm

Wheelbase 5,400 mm

Tread;

Front wheel 4,965 mm

Rear wheel 4,020 mm

Ground clearance with max. load 715 mm

ENGINE:

Model CUMMINS KTA-2300

Type Water cooled, 4 cycle,
V-type, direct injection,
turbocharged and aftercooled

No. of cylinder — bore x stroke
..... 12 — 159mm x 159mm
(12 — 6.25" x 6.25")

Piston displacement 37,700cc (2,300 cu.in.)

Performance;

Rated brake horse power ... 1200HP/2,100 rpm

Flywheel horse power 1100HP/2,100 rpm

Max. torque 457kg.m/1,500rpm
(3,300 ft.lbs./1,500 rpm)

Fuel Diesel gas oil ASTM specifi-
cation D975-60T No. 2D

Lubrication system;

Lubricating method ... Forced lubrication by
gear pump

Filter Full flow type and
by-pass type

Oil cooler Water cooled

Cooling system Forced circulating by
water pump, suction
type fan

Starting method Air starter

ELECTRIC DRIVE SYSTEM:

Type AC/DC current

Traction generator TOYO DENKI
AC alternator, connected
to the engine through
flexible coupling

Traction motors Two TOYO DENKI
series wound motors

Cooling Forced, filtered air cools
both traction motors and
generator

FINAL DRIVE:

Type Heavy duty, axle suspension

Reduction ratio 29.37 : 1

TIRES:

Front and rear 33.00-51-46PR (Standard)

33.00-51-50PR (Option)

Rim size 22.00-51 (Standard)

24.00-51 (Option)

SPECIFICATIONS

STEERING SYSTEM

Full hydraulic power steering with dual steering cylinders

BRAKES:

Emergency and parking . . Spring loaded, internally expanding type

Service, front and rear . . Shoe internal-expanding type, 980mm x 250mm (38.6" x 9.8")

Dynamic brake 2,000 HP (See KOMATSU curve) Dynamic braking on rear wheels, utilizes wheel motors as generators and dissipates vehicle kinetic energy into air cooled resistors

SUSPENSION Independent, hydropneumatic type

DUMP SYSTEM:

Type Twin, 3-stage hydraulic cylinders, double acting in third stage

Hydraulic pump;
Type Gear pump
Max. pressure 210kg/cm² (3,000 lb./in²)
Capacity 500ℓ/min. (132 U.S. Gal./min.)

CAPACITY:

Fuel tank 1900ℓ (500 U.S. Gal.)
Cooling water 250ℓ (61 U.S. Gal.)
Engine oil 150ℓ (35 U.S. Gal.)

CAB:

One side cab type with 2 seats. Steering wheel is located on the left side

WEIGHT TABLE

Unit: kg

Machine model and Applicable serial Nos.	HD1200 1002 and up
Power module	Approx. 7500
Engine	Approx. 3800
Radiator	700
AC generator (including blower)	1900
Propeller shaft	28
Pump drive unit (including gear pump)	225
Electric wheel (including traction motor, rear brake and parking brake)	Approx. 7000
Front axle (including front brake and front suspension)	Approx. 3000
Frame	Approx. 7800
Rear suspension	Approx. 580
Cab	Approx. 250
Hydraulic oil reservoir (including bracket)	Approx. 400
Hoist valve	107
Steering valve	107
Hoist cylinder	144
Steering cylinder	Approx. 490
Fuel tank (including hanger and cover)	Approx. 630
Air cleaner	96
Brake chamber	38
Battery	53
Dump body	Approx. 16000
Front tire ass'y, rear tire ass'y	Approx. 2700
Traction motor	1650
Brake resistor	1060
Control cabinet	940

(Specifications are subject to change without notice.)

1-2 GENERAL PRECAUTIONS FOR DISASSEMBLY AND ASSEMBLY

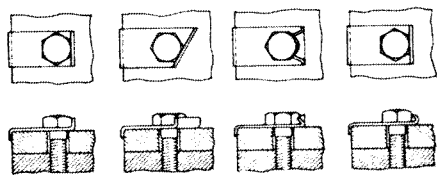
(1) PREPARATIONS FOR DISASSEMBLY

- Before attempting to disassemble, determine the cause of the trouble by systematically checking and analyzing the symptoms. Needless disassembly will not only hinder troubleshooting, but will also result in losses from unnecessary replacement parts and man-hour costs.
- During disassembly, carefully check every sliding part for any signs of seizing, interference or contact, since these may be hidden faults which could be the cause of the trouble.
- Unless major disassembly for some definite reasons is to be made, the related parts should be first briefly inspected, and disassembly started after confidence in the operation is established.
- Thoroughly clean the part of the machine to be disassembled, before attempting to disassemble.
- Proceed with the disassembly only after confirming the fitting conditions of the relative parts: their positions fore-and-aft, left-and-right and upper-and-lower, and the proper sequence of their removal.
- When draining lubricating oils, take note of their viscosity, color and state of contamination. Observation of used oils often provides clues to the wear condition of the lubricated parts (specially in regards to gears and bearings.)
- Put match marks across mating joints where required, before separating parts. The parts should be clearly marked to prevent confusion at the time of assembly.
- For disassembly of certain designated parts, only use the special tools prescribed for this purpose.
- When a part, after removal of fastening nuts and bolts, is still found to be unremovable, never force the part; but carefully check for the cause of the tightness.
- When looseness exists between press-fitted or taper-fitted parts, check both of the mating surfaces for damage or wear. Repair or replace the part(s) if necessary.
- When removing a control-link assembly, be careful to maintain the original adjustment of the length of the rods unless any re-adjustment is necessary. If it is necessary to remove the rod-end for disassembly, check the original length of each rod and record it before removal of the link assembly.
- Maintain disassembled parts in good order for storage, paying special care not to confuse any similar parts with each other. If it is unnecessary to store a part separated from its assembly, keep the part fitted in its original place. Take care that the standard parts such as bolts and nuts are properly stored with reference to the location and quantities that are to be used.
- Wash disassembled parts clean, neatly arrange the parts for each assembly, and keep in storage, free from dust and dirt.
Use of two vessels filled with washing oil, one for washing dirty parts and the other for rinsing them, is recommended for cleaning more effectively.
- Keep each set of shims stacked in its original arrangement so that the same clearances as before disassembly can be obtained when the machine is reassembled.

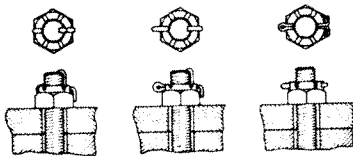
(2) PRECAUTIONS FOR ASSEMBLY

- Thoroughly clean all parts before assembly. Check for scratches and nicks in the surfaces of parts. If any, repair.
- Wash new parts to remove rust preventives, if coated, before assembly.
Detergent Light oil
- Use a press or a press-fitting tool when assembling bearings, bushings and oil seals. When installing a bearing, be careful to keep the marking on the bearing outward unless necessary to install otherwise because of its structure. (This is good practice for the convenience of identifying the bearing being installed.)
- Be sure to securely lock bolts and nuts which are usually invisible from the outside or which are used for some important parts that need locking, by the use of wires, cotter pins or lock washers.

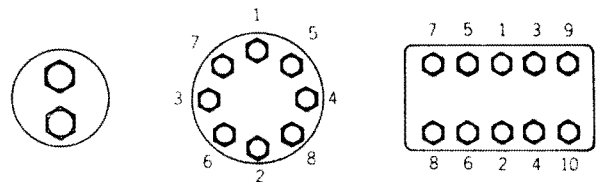
- Apply two or three drops of thread tightener (screw thread bonding agent) to important bolts. (White thread tightener adhered on the threads of a bolt that is removed from a part when disassembling the part may be used as a mark indicating the depth to which the bolt is to be screwed-in when reassembling the part.)
Prior to coating with thread tightener, wash the bolt with light oil and dry.
- Tighten bolts in the prescribed sequence as shown in the figure below so that they can exhibit even tightening force.



Correct Correct Wrong Wrong



Correct Wrong Wrong



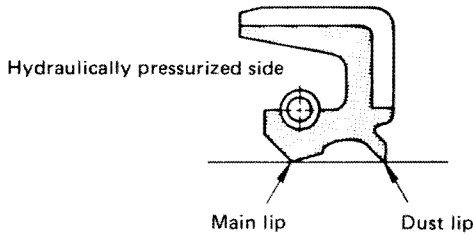
Be careful not to tighten bolts with unreasonably heavy force.

- Be sure to tighten each bolt to the specified torque with an appropriate torque wrench. Apply even tightening force to the bolts fastening a part together by alternately screwing them.

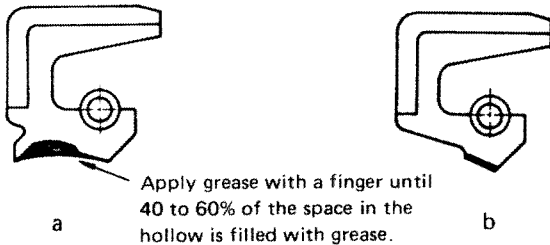
- Be sure to align match marks if provided.
- Keep the working area, tools, worker's hands, etc. clean during assembly.
- Coat molybdenum disulfide grease to the surfaces of parts to be press-fitted.

(3) HANDLING OF OIL SEALS

- Be careful to install an oil seal with its lips faced in the proper direction as shown in the figure below.

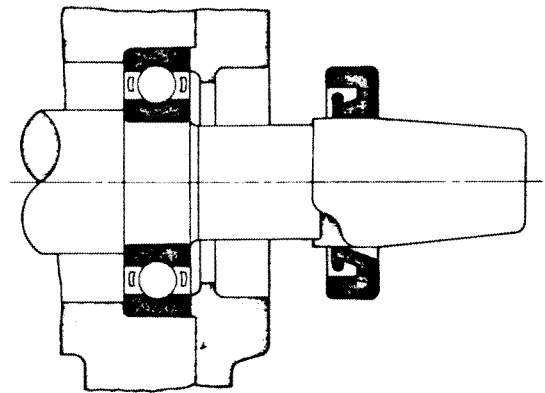


- Before installation of an oil seal, coat it with grease to prevent dry-friction which may be caused during the break-in operation of the machine, using the following procedure:
 - a. In the case of double-lip type oil seal, uniformly coat grease in the hollow around the lips.
 - b. In the case of single-lip type oil seal, uniformly and flatly coat grease around the lip on the opposite side of the sealing surface of the lip.

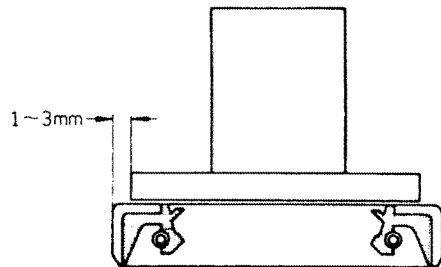


- Coat lubricating oil or grease to the surface and the chamfered edge of the shaft on which the oil seal is to be installed so that the shaft may be smoothly inserted in the oil seal without picking-up the lip and that proper lubrication to the shaft during the break-in period of the machine is satisfied.
- Be sure to use only a finger for applying grease to oil seals. Fill 40 to 60% of the space in the hollow around the lips with grease.

- When installing an oil seal, use a suitable lip-protecting jig as shown below to prevent the lips from being damaged.



- Check and remove rust and scratches from the shaft on which the oil seal is to be installed.
- Use a suitable jig and hand press when press-fitting an oil seal. Never attempt to use a hydraulic press. The jig should be 1 to 3mm smaller in diameter than the outside diameter of the oil seal. Confirm that the press-fitting surface of the oil seal is free from damage or unevenness.



- After press-fitting an oil seal, confirm that the seal is not installed at an excessive slant.
Repair limit of a slant: 0.2mm/100mm dia.

GENERAL PRECAUTIONS FOR DISASSEMBLY AND ASSEMBLY

(4) HANDLING OF PACKINGS AND GASKETS

- Remove all copper packings with new ones.
 - Soak leather packings in oil before installation.
 - Coat "Gasket sealant" LG-1 to the gaskets and O-rings to be used in special places prescribed in this manual.
- ★ **When coating gasket sealant, observe the following instructions:**
- Thoroughly remove scratches, dust, paint and grease from the surface to which gasket sealant is to be coated.
 - Coat gasket sealant uniformly and dry it for several minutes. After checking the dryness of sealant with your fingers, attach the gasket onto the mating part.

(6) HANDLING OF BEARINGS

- Since the bearing are of highly precise construction, the following instructions should be carefully observed during handling of the bearings.
1. **Keep the bearings completely free from dust and dirt.**
Even invisibly fine particles, if lodged in a bearing, will affect smooth rotation of the bearing.
 2. **Protect the bearings from unreasonable force or impacts.**
Since bearings are finished to the utmost precise construction and given wear-resistant property by heat treatment, excessively large force or impacts applied to the bearing outer race may cause either cracking of the outer race or brittling of the sliding surfaces between the outer and inner races.
 3. **Do not heat the bearings excessively.**
Hardness of the bearings will deteriorate at 120°C or above, causing reduction of bearing life.
 4. **Use only the jigs appropriate for individual bearings.**
Substitution of improper jigs in hand should absolutely be avoided.
 5. **Be sure to apply proper methods necessary to prevent bearings from rusting.**
- Be sure to keep the work area clean. Leave the bearings packed until just before installation.
 - Do not attempt to install a bearing by such unreasonable means as tapping the outer race to fit the inner race onto a shaft or tapping the inner race to fit the outer race into a hole. These procedures will dent the tracks in the bearing races.

(5) HANDLING OF O-RINGS

- O-rings are provided on their circumferences with an identification spot(s) which is classified as follows:

Code mark	Part Number	Material	Application
Blue spot	07000-0	Nitrile rubber	For low-pressure use
Two blue spots	07000-1	Nitrile rubber	For high-pressure use
Green spot	07000-3	Fluorine rubber	For low-pressure use
Two green spots	07000-2	Fluorine rubber	For high-pressure use
Red spot	07000-4	Nitrile rubber	For low-pressure use in cold weather
Two red spots	07000-5	Nitrile rubber	For high-pressure use in cold weather
Orange spot	07000-6	Silicon rubber	For low-pressure use at high-temperature