

## GROUP 3 MAINTENANCE

### 1. CLEANING

Clean outer parts before repairing. Dust and impurities shorten not only the life span of equipments and parts but also the exchanging periods of them. Flush the parts with clean solvent. Using other kinds of treated oil but solvent may cause damages to rubber goods and skin.

Must follow the steps to clean the hydraulic parts.

- 1) After washing the hose and tube with solvent, blow away with compression air.
- 2) Keep fitting and screw undamaged until protective cap should be put on them.
- 3) Put protective caps on the hose and tube.
- 4) Flush oil tank, fuel tank and inner part of gear housing with solvent to remove the metal filings and welding wastes.
- 5) When you finish with the cleaning, stuff up all the holes to keep them uncontaminated.(Cylinder, valve, tank, pump and motor)
- 6) When you fill up oil, must use clearly filtered oil.
- 7) The purity level in the hydraulic system goes more than ISO CODE 19/16 to the minimum.

### 2. PARTS REPLACEMENT

Replace rubber goods such as O-ring, seal and gaskets by brand new ones. Never mind the conditions of the parts and must not mix used ones in replacement.

### 3. HOSE, TUBE

#### 1) INSPECTION

- (1) Replace the hose and tube if damages are found in coupling areas of both ends of the hose(Crushed, dent and oil leakage).
- (2) Surface of the hose should be washed clean without a flaw and replace the hose if any abnormality is found in swaging area.
- (3) Replace the hose if one of the followings is found.
  - Surface damaged or abraded
  - Rust in auxiliary wire
  - Swelled up(Requires immediate replacement)
  - Twisted, crushed, loose or transformed

## **2) MOUNTING**

- (1) When you mount a hose, connect loosely both of the ends and hold the hose toward proper direction and tighten the connections. To prevent damages out of friction, fix it with cramp or tie-wrap not so far as it gets crushed.
- (2) In case of replacing a hose connected to moving parts such as cylinder, be careful not to make it damage from those parts.
- (3) After you finish with mounting, be careful not to make it twisted or wrenched.
- (4) For the hose which is not fixed and is movable in operation, be careful not to make it contacted with other parts around it. Abrasion by contacts shortens the life span of the hose.

## **4. BEARING**

### **1) REMOVAL**

When removing or mounting the bearings or bushings, check for discoloration, flaws, abrasion and overheated marks. Replace any that are not functional.

### **2) WASHING**

For a usable bearing, wash it with solvent and soak it in lubricant for a while.

### **3) MOUNTING**

- (1) Mount the bearing carefully in the prescribed position in accordance with the maintenance procedures.
- (2) The followings show the ways of positioning the bearing.
  - Press it into the rotary equipments such as shaft or gear.
  - Push it into the fixed equipments such as reduction gear and housing.
- (3) When mounting a bearing, assemble in rotary equipment first.
- (4) When mounting a bearing and bushing, use suitable tools and presses.
- (5) If no suitable tools and presses, put the bearing and casing in hot oil so that it gets not enough to be mounted.

## **5. PRESSURE TEST**

Be fore pressure test, check the hose and the connections.

Use a pressure gauge capable of marking the standard pressure. Follow the testing steps correctly, or you may cause damages to the equipments and hydraulic system and accidents as well.

## 6. TORQUE

### 1) FASTENER

All fasteners should be in the same class with SAE GR5(PC8.8) unless receiving special regulations. Use the fastener with a gold plating treatment.

### 2) BOLT, NUT

Unless separate regulations, the permitted limit of torques of bolt and nut is allowed within  $\pm 10\%$  of the torques of GR5.(PC8.8)

Standard Inch	Torque		Standard mm	Torque	
	kgf · m	lbf · ft		kgf · m	lbf · ft
1/4	1.3	9.4	6.0	1.0	7.2
5/16	2.5	18.1	8.0	2.5	18.1
3/8	5.3	38.3	10.0	5.0	36.2
7/16	8.1	58.6	-	-	-
1/2	12.1	87.5	12.0	8.1	58.6
9/16	16.8	122	14.0	13.0	94.0
5/8	22.8	165	16.0	20.0	145
3/4	41.0	297	20.0	36.0	260
7/8	60.0	434	22.0	51.0	369
1.0	88.0	637	24.0	65.0	470

### 3) FLARE TYPE FITTING(37°C still)

(1) Set tube and fitting in a straight line.

(2) Tighten nuts by following values of the torque.

SAE size	Torque	
	kgf · m	lbf · ft
4	1.1 - 1.6	8.3 - 11.7
6	2.6 - 3.1	18.8 - 22.9
8	5.1 - 6.3	37.5 - 45.8
10	6.9 - 8.0	50.0 - 58.3
12	11.6 - 12.6	83.3 - 91.7
14	13.8 - 14.9	100 - 108
16	16.1 - 17.8	117 - 129
20	24.2 - 27.6	175 - 200
24	34.5 - 39.1	250 - 283

#### 4) STRAIGHT SCREW O-RING FITTING(Inadjustable)

- (1) Check for scratches, groove, sharp burr, dents or alien substances on the surface of both screws and the sealing.
- (2) Lubricate the O-ring.
- (3) Value of the torque follow the table below.

SAE size	Torque	
	kgf · m	lbf · ft
4	1.1 - 1.6	8.3 - 11.7
6	2.6 - 3.1	18.8 - 22.9
8	5.1 - 6.3	37.5 - 45.8
10	6.9 - 8.0	50.0 - 58.3
12	11.6 - 12.6	83.3 - 91.7
14	13.8 - 14.9	100 - 108
16	16.1 - 17.8	117 - 129
20	24.2 - 27.6	175 - 200
24	34.5 - 39.1	250 - 283

#### 5) STRAIGHT SCREW O-RING FITTING(Adjustable)

- (1) Check for defects and alien substances in both of the contact surfaces.
- (2) Lubricate the O-ring.
- (3) Full the fitting into the port and turn the back-up washer until it comes in contact with the port to let the back-up washer and O-ring pushed toward the lock nut.
- (4) Turn the fitting a little bit reversely to set it at the prescribed position. At this time, must not turn the fitting more than a round.
- (5) Set the fitting at the prescribed position to tighten the lock nut by following values of the torque.

SAE size	Torque	
	kgf · m	lbf · ft
4	1.1 - 1.6	8.3 - 11.7
6	2.6 - 3.1	18.8 - 22.9
8	5.1 - 6.3	37.5 - 45.8
10	6.9 - 8.0	50.0 - 58.3
12	11.6 - 12.6	83.3 - 91.7
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## 7. HOW TO START NEW EQUIPMENT

When starting new equipments, must take the following steps to prevent each part and system from damages.

1) Check for quantity of oil and leakage.

The fluid level of oil in the tank should be on top of the sight plug, if it's new equipment.

2) Prop the wheels off the ground.

3) Check if the hose, wiring and tubing twisted too much and be in contact with the rotary parts.

4) Check mountings of the equipments(Engine, pump, valve and radiator).

5) Check if the control linkage should move freely and keep in neutral.

6) Pull the throttle lever full backward and crank the starter for 15 seconds and pause for 30 seconds. Try it again.

7) Push throttle lever forward about 1/3 or 1/2 of the way.(Idling position)

8) Turn the start switch to ON position, and wait the preheater pilot lamp OFF.

When the preheater pilot lamp is turned ON, the control unit starts counting the specified time while the heater lamp is lit. After 5~20 seconds of preheating, the control unit turns OFF the preheater lamp to indicate that preheating is completed.

9) When the preheater pilot lamp goes out, turn the start switch to START position.

If the engine does not start within 15 seconds, repeat preheater operation.

※ **Do not use the starter motor continuously more than 15 seconds.**

10) As soon as it comes to normal operation, return the start switch to ON position.

**▲ This diesel engine uses air heater for starting. Do not use any auxiliary fuel to help starting. It may cause explosions or accidents.**

11) Check the engine oil pressure warning lamp and battery charging warning lamp. They should light during engine starting and turn OFF when the engine running.

※ **The battery charge warning lamp is turned ON when the alternator is not producing sufficient current. The engine oil pressure warning lamp indicated low engine oil pressure. The hydraulic oil temperature warning lamp is turned ON when the hydraulic oil in the reservoir is overheated. If any of these warning lamp turn ON while the engine is running, shut off the engine immediately and determine the cause.**

12) Once the engine is running, release the start switch. The switch will return to the ON position

13) Push the control lever all the way forward and pull it backward. Try it three times.

14) If necessary, adjust the linkage of the control lever.

15) Push the throttle lever full forward and operate the control lever for three minutes at an interval of 3 seconds to raise the hydraulic oil temperature.

16) Stop the engine and check for oil leakage.

17) Fill up the oil until you can see the fluid level on top of the sight gauge.

## **8. QUANTITY OF OIL AND LUBRICATION**

### **1) CHAIN SPROCKET CASE**

Put the loader at a flat place and remove the check/fill plug between the two wheels to check oil level. If oil can be detected by inserting a finger through the check/fill plug opening, the level is satisfactory. If not, add 15W-40(API CH-4) oil as required through the same plug opening.

### **2) OIL TANK**

Put the loader at a flat place and check the sight gauge plug after oil cools. If the fluid level of oil can be seen on plug nothing is abnormal. If it is not seen on the plug fill up the oil immediately.

### **3) ENGINE OIL**

The fluid level of oil should be on top of the deep stick.

### **4) COOLING SYSTEM**

To check coolant level open the rear door. Check to see that the coolant level lies between FULL and LOW.

### **5) SPLINE**

Paint molybdenum disulfide compound to the splines in the operating motor and pump.

### **6) GREASE FITTING**

(1) Inject grease into these parts.

- Rear boom pivot pin(2)
- Implement pivot pin(2)
- Boom and tilt cylinder(8)

(2) Remove the extra grease.