# CONTENTS


**CHAPTER 1**
## GENERAL CAUTIONS FOR MAINTENANCE WORK

1-1 Correct Work ..... 1-1
1-2 Safety Precautions ..... 1-1
1-3 Preparations ..... 1-1
1-4 Cautions for Disassembly and Reassembly ..... 1-1
1-5 Cautions for Removal and Installation of Hydraulic Equipment ..... 1-2
1-6 Cautions for Removal and Installation of Hydraulic Piping ..... 1-2
1-7 Cautions for Handling Seals ..... 1-3
1-8 Correct Installation of Hydraulic Hose ..... 1-3
1-9 Specifications of Hydraulic Hose ..... 1-6
1-10 Air Release of Hydraulic Equipment ..... 1-11

**CHAPTER 2**
## TECHNICAL DATA

2-1 Specifications ..... 2-1-1
2-2 Outline Drawing and Working Area ..... 2-2-1
2-2-1 Canopy type ..... 2-2-1
2-2-2 Cabin type ..... 2-2-2
2-3 Weight List of Main Parts ..... 2-3-1
2-4 Lifting Capacity List (For Standard Arm) ..... 2-4-1

**CHAPTER 3**
## SERVICE STANDARDS

3-1 Machine Performance ..... 3-1-1
3-2 Engine ..... 3-2-1
3-3 Undercarriage ..... 3-3-1
3-3-1 Rubber Crawler Specifications ..... 3-3-1
3-3-2 Steel Crawler Specifications ..... 3-3-2
3-3-3 Common Specifications of Steel & Rubber Crawlers ..... 3-3-3
3-4 Controls ..... 3-4-1
3-5 Hydraulic Equipment ..... 3-5-1
3-5-1 Hydraulic Cylinders ..... 3-5-1
3-6 Implement ..... 3-6-1
3-6-1 Front Attachments ..... 3-6-1
3-6-2 Blade Moving Device ..... 3-6-2
3-6-3 Bucket Teeth ..... 3-6-2
3-7 List of Tightening Torque ..... 3-7-1
3-7-1 Machine ..... 3-7-1
3-7-2 Engine ..... 3-7-4
3-7-3 Tightening Torque for General Bolts and Nuts ..... 3-7-4

**CHAPTER 4**
## HYDRAULIC SYSTEM

4-1 Outline ..... 4-1-1
4-1-1 Control Valve Operation ..... 4-1-4
4-1-2 Additional Operation of Control Valve ..... 4-1-6


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# 1. GENERAL CAUTIONS FOR MAINTENANCE WORK

## 1. General Cautions for Maintenance Work

### 1-1 Correct Work

Correct work means the quickest possible completion of according to the correct procedures and the specified standards.

It is important when conducting certain operations always to bear in mind the equipment, tools, gauges, materials, oil and grease, etc. that you must have ready, as well as items to be checked, adjusted, or disassembled, and cautions to watch out for.

### 1-2 Safety Precautions

(1) Wear work cloths, safety shoes and helmet.
(2) Check the equipment and tools before use. Especially, be sure to check the crane, lifting equipment and tools.
(3) When working together with other persons, allocate everyone's share of job, arrange the signals and act in concert with the other persons.
(4) The operation of the crane and slinging work must be performed by qualified persons.
(5) Do not enter or pass under the raised load.
(6) Lift and support the massive parts by crane before removing the installation bolts.
(7) Disconnect cables from battery before repairing the electric system.
(8) Remove the battery when welding the machine.

### 1-3 Preparations

(1) Check the service record of the machine. (That is, check how many months or hours the machine has been used since the preceding overhaul, what was the trouble then and what parts were replaced.)
(2) Have all servicing tools ready, i.e., tools, measuring devices (which have received periodic maintenance), containers, oil & grease, etc.
(3) Have the service literature (operation manual, parts catalog, etc.) ready.

### 1-4 Cautions for Disassembly and Reassembly

(1) Clean the machine before disassembly.
(2) Check and record the condition of the machine before disassembly :
- Model, machine number, operation hours
- Reasons for repair, history of repair
- Contamination of filters
- Fuel and oil condition
- Damage to parts, etc.

(3) Place alignment marks on the necessary parts to facilitate reassembly.
(4) Clean all the removed parts and new replacement parts and put them in order.
(5) Use new seals, split pins, etc. for reassembly.
(6) Keep the parts apt to be damaged by water or oil apart from the oily or wet parts.
e.g.: Electrical parts, rubber parts, V-belts, etc.

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# 2. TECHNICAL DATA

## 2. Technical Data

### 2-1 Specifications

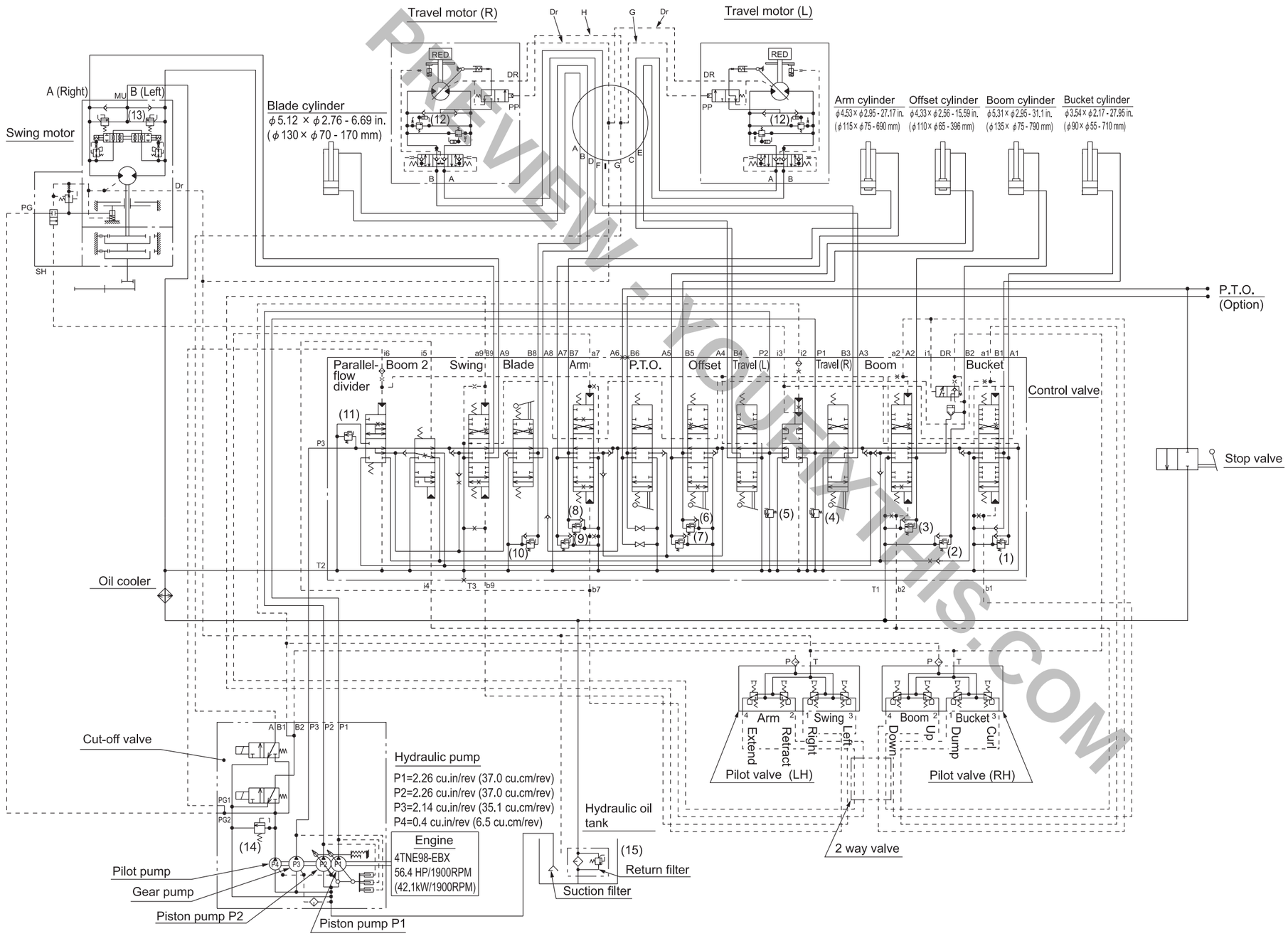
| Item | | | | | Unit | B7-3 (US |
|---|---|---|---|---|---|---|
| Main Specifications of Machine | | | | | | |
| Dimensions | | | | | | |
| | Overall length (Transportation position) | | | | in. (mm) | 227.56 (5780) |
| | Cabin | Overall height | Transportation position | | in. (mm) | 103.15 (2620) |
| | | | Traveling position | | in. (mm) | 111.57 (2834) |
| | | Overall width | Full machine width | | in. (mm) | 88.98 (2260) |
| | Canopy | Overall height | Transportation position | | in. (mm) | 102.36 (2600) |
| | | | Traveling position | | in. (mm) | 111.57 (2834) |
| | | Overall width | Full machine width | | in. (mm) | 88.98 (2260) |
| | Tumbler center distance | | Rubber | | in. (mm) | 90.08 (2288) |
| | | | Steel | | in. (mm) | 89.65 (2277) |
| | Track gauge | | | | in. (mm) | 73.62 (1870) |
| | Minimum ground clearance | | | | in. (mm) | 14.96 (380) |
| Traveling performance | | | | | | |
| | Travel speed | Steel crawler | Low speed (Forward / Reverse) | | MPH (km / h) | 1.55 (2.5) |
| | | | High speed (Forward / Reverse) | | MPH (km / h) | 2.80 (4.5) |
| | | Rubber crawler | Low speed (Forward / Reverse) | | MPH (km / h) | 1.68 (2.7) |
| | | | High speed (Forward / Reverse) | | MPH (km / h) | 2.92 (4.7) |
| | Climbing ability | | | | degrees | – |
| | Permissible water depth limit | | | | in. (mm) | 19.69 (500) |
| Work performance | | | | | | |
| | Bucket | Width (Standard) (Including side cutter) | | | in. (mm) | 29.53 (750) |
| | | (Standard. JIS heaped capacity) / [Old JIS] | | | cu.ft. (cu.m) | 9.89 (0.28) / [8.83 (0.25)] |
| | | Number of teeth / Installation method | | | pcs. | 4 / Rubber pin lock |
| | Maximum digging depth | With blade raised | | | in. (mm) | 171.26 (4350) |
| | | With blade on the ground | | | in. (mm) | 177.17 (4500) |
| | Maximum depth of vertically digging | | | | in. (mm) | 148.42 (3770) |
| | Maximum dumping height | | | | in. (mm) | 216.14 (5490) |
| | Minimum front swing radius (with boom in front) | | | | in. (mm) | 47.24 (1200) |
| | Minimum front swing radius (Boom offset) | | | Left | in. (mm) | 68.27 (1734) |
| | | | | Right | in. (mm) | 74.53 (1893) |
| | Rear end swing radius | | | | in. (mm) | 44.49 (1130) |
| | Boom offset | | Cabin | Left | in. (mm) | 40.16 (1020) |
| | | | | Right | in. (mm) | 37.99 (965) |
| | | | Canopy | Left | in. (mm) | 40.16 (1020) |
| | | | | Right | in. (mm) | 37.99 (965) |

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# 4. HYDRAULIC SYSTEM

## 4-2 Hydraulic Circuit Schematic

### 4-2-1 Standard Specifications



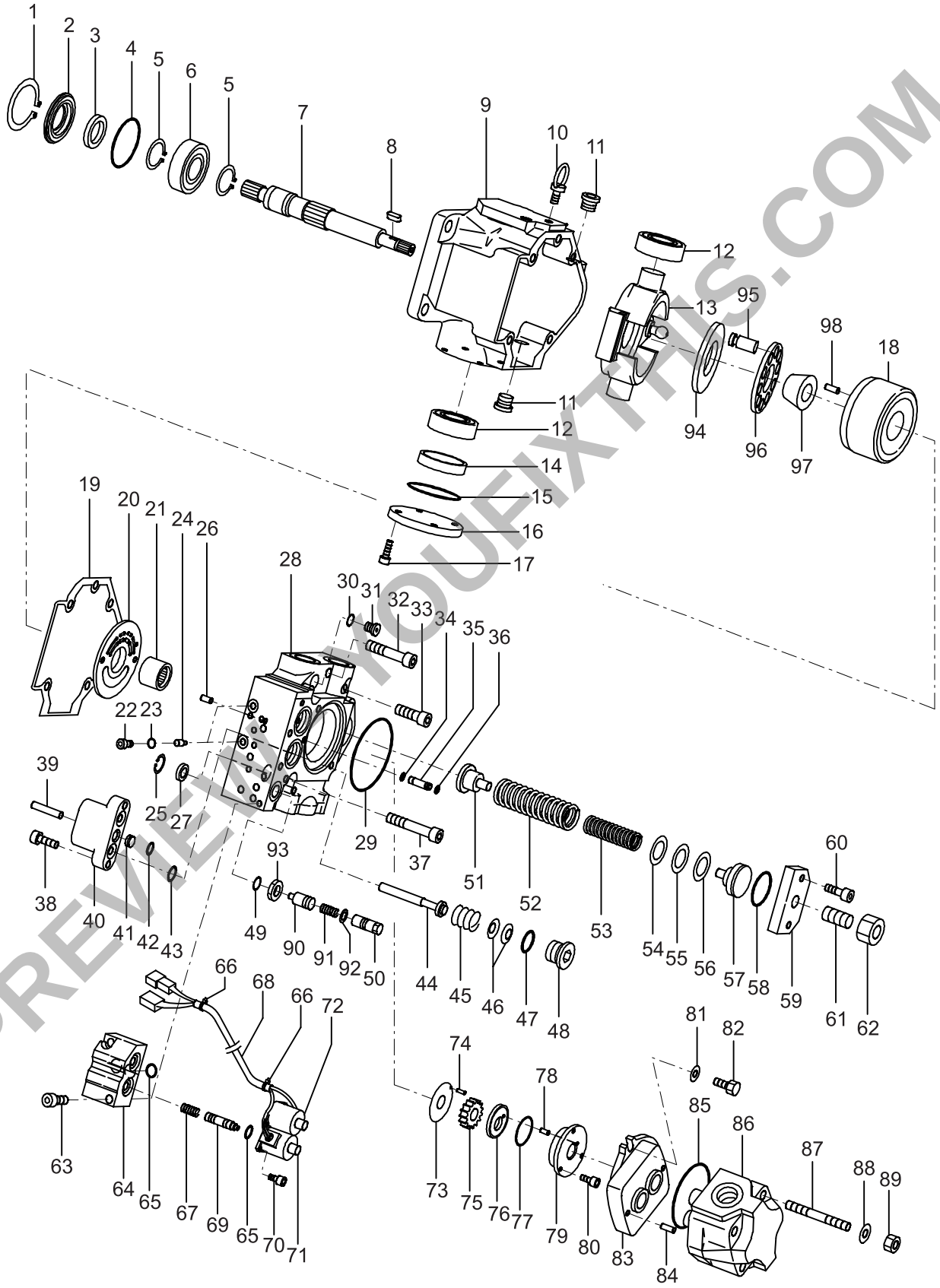

Relief valve set pressure

(1) 3981.6 PSI (27.5 MPa)
(2) 4266.0 PSI (29.4 MPa)
(3) 3981.6 PSI (27.5 MPa)
(4) 3555.0 PSI (24.5 MPa)
(5) 3555.0 PSI (24.5 MPa)
(6) 3981.6 PSI (27.5 MPa)
(7) 3981.6 PSI (27.5 MPa)
(8) 3981.6 PSI (27.5 MPa)
(9) 3981.6 PSI (27.5 MPa)
(10) 2133.0 PSI (14.7 MPa)
(11) 2986.2 PSI (20.6 MPa)
(12) 3555.0 PSI (24.5 MPa)
(13) 2986.2 PSI (20.6 MPa)
(14) 426.6 PSI (2.9 MPa)
(15) 21.3 PSI (0.15 MPa)

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**3. Exploded view and parts comprised**




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## 3-7 List of Tightening Torque

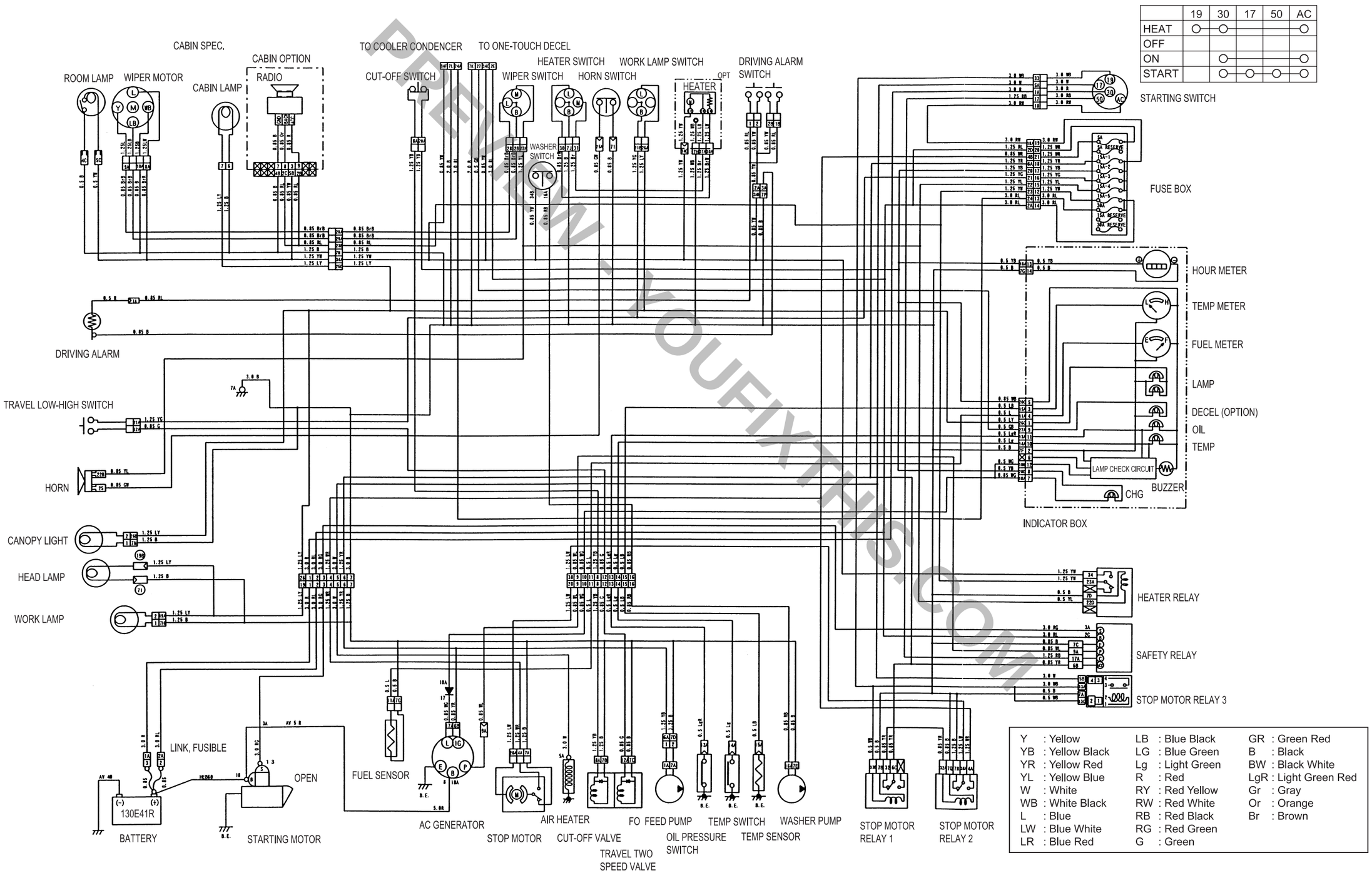
### 3-7-1 Machine

| Applicable model | | | B7-3 (US | | |
|---|---|---|---|---|---|
| Equipment | | | Thread size | Tightening torque ft•lbf (N•m) | Adhesive |
| | No. | Tightening part | | | |
| Engine / Electrical equipment | | | | | |
| | 1 | Engine mount vibroisolating rubber | M16 (10.9T) | 151.9 to 173.6 (205.9 to 235.4) | Three Bond 1324 |
| | 2 | Engine × Engine mount (Flywheel side) | M10 (11T) | 61.5 (83.4) | Three Bond 1324 |
| | 3 | Engine × Engine mount (Radiator side) | M12 (10.9T) | 79.6 to 94.0 (107.9 to 127.5) | Three Bond 1324 |
| | 4 | Clamp | M10 Nut 10 | 18.1 to 23.9 (24.5 to 32.4) | |
| | 5 | Air cleaner | M8 | 14.5 to 16.7 (19.6 to 22.6) | |
| | 6 | Air cleaner intake hose | Hose clip 70 | 1.5 to 2.1 (2.0 to 2.9) | |
| | 7 | Air cleaner intake hose | Hose clip 80 | 1.5 to 2.1 (2.0 to 2.9) | |
| | 8 | Air cleaner intake hose | Hose clip 80 | 0.7 to 1.5 (1.0 to 2.0) | |
| | 9 | Cooling water hose | Hose band 50 | 2.1 (2.9) | |
| | 10 | Fuel gauge unit | Pan-head machine screw M5 | 0.7 to 1.5 (1.0 to 2.0) | |
| | 11 | Fuel gauge hose | Hose band 14 | 0.7 to 1.5 (1.0 to 2.0) | |
| | 12 | Fuel tank | M16 | 123.0 to 151.9 (166.7 to 205.9) | Three Bond 1324 |
| | 13 | Buttery holding rod | Nut M8 | 2.1 (2.9) | |
| | 14 | Radiator bracket R | M16 | 195.3 to 224.2 (264.8 to 304.0) | Three Bond 1324 |
| | 15 | Radiator mount vibroisolating rubber | Nut M8 | 9.4 to 12.3 (12.7 to 16.7) | |
| | 16 | Radiator mount vibroisolating rubber | Nut M10 | 18.1 to 23.9 (24.5 to 32.4) | |
| | 17 | Exhaust duct vibroisolating rubber | Nut M10 | 18.1 to 23.9 (24.5 to 32.4) | |
| | 18 | Heater hose | Hose clip 22 | 1.5 to 2.1 (2.0 to 2.9) | |
| | 19 | Starter switch | Fine lock nut M18 | 21.7 to 25.3 (29.4 to 34.3) | |
| | 20 | Safety switch | Fine lock nut M16 | 21.7 to 25.3 (29.4 to 34.3) | |

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### 6-1-3 Wiring Diagram

#### 1) Standard specifications




| | 19 | 30 | 17 | 50 | AC |
|---|---|---|---|---|---|
| HEAT | ○ | ○ | | | ○ |
| OFF | | | | | |
| ON | | ○ | | | ○ |
| START | | ○ | ○ | ○ | ○ |

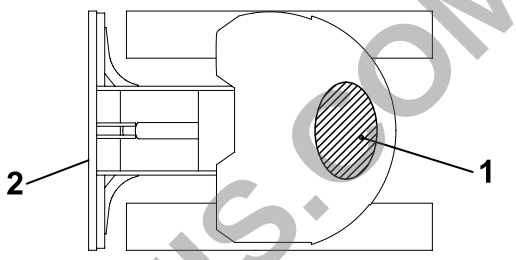
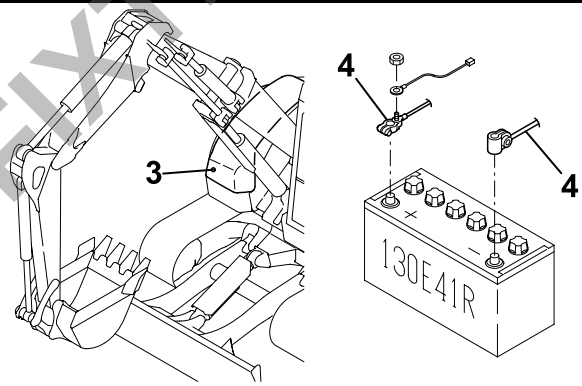
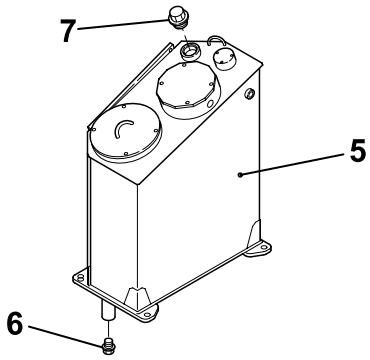
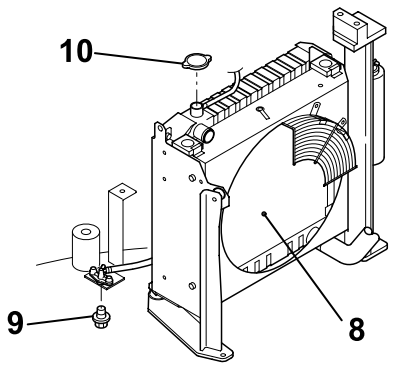
| | | | | | |
|---|---|---|---|---|---|
| Y | : Yellow | LB | : Blue Black | GR | : Green Red |
| YB | : Yellow Black | LG | : Blue Green | B | : Black |
| YR | : Yellow Red | Lg | : Light Green | BW | : Black White |
| YL | : Yellow Blue | R | : Red | LgR | : Light Green Red |
| W | : White | RY | : Red Yellow | Gr | : Gray |
| WB | : White Black | RW | : Red White | Or | : Orange |
| L | : Blue | RB | : Red Black | Br | : Brown |
| LW | : Blue White | RG | : Red Green | | |
| LR | : Blue Red | G | : Green | | |



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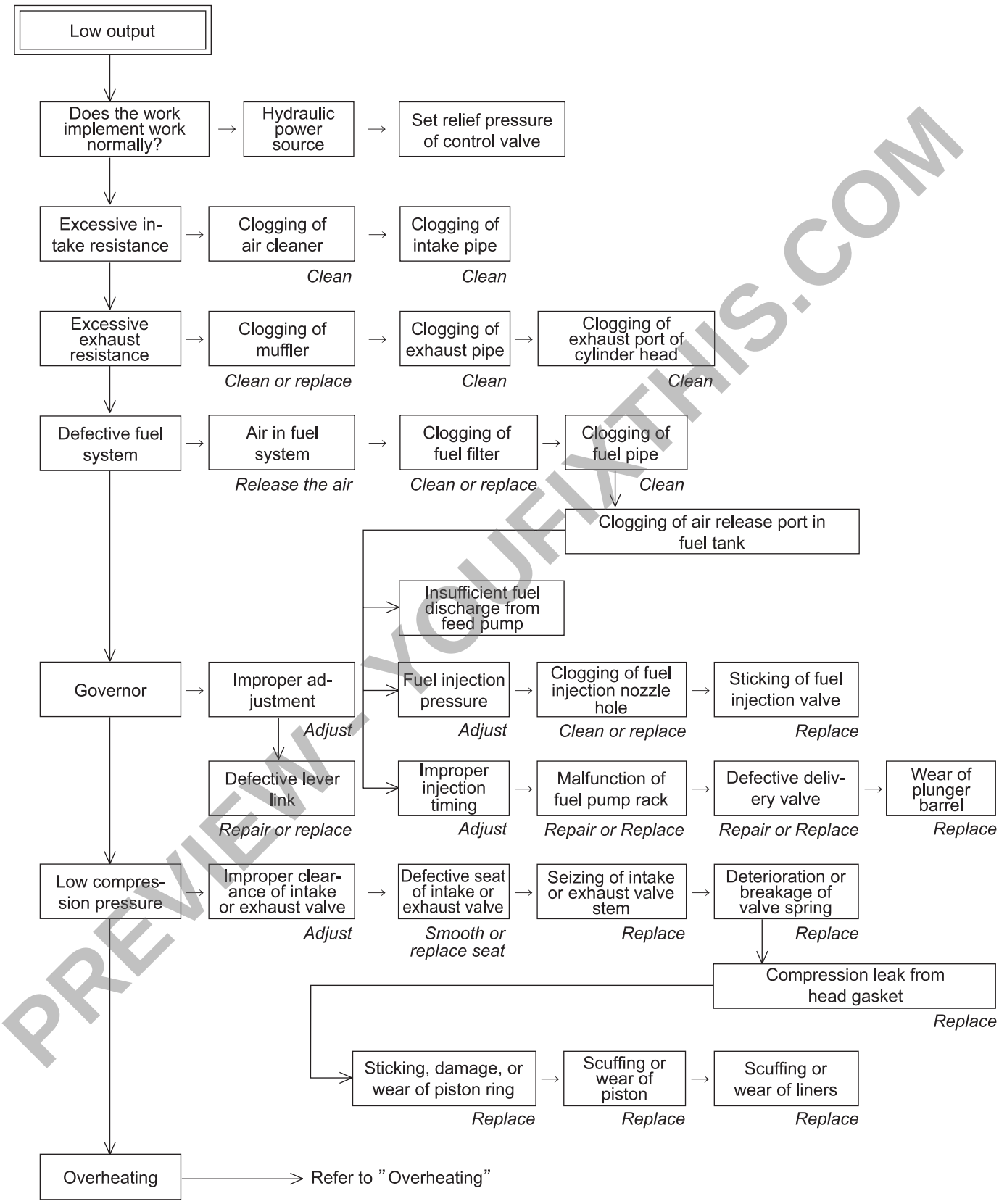
## 6-1-5 Removal and Reinstallation of Engine

### 1) Removal

| Procedure | |
|---|---|
| (1) Turn the upperstructure so that engine **1** side should be on the opposite side to blade **2**. Lower the bucket to the ground and then, stop the engine. |  |
| (2) Remove cover B **3** and positive and negative terminals **4** of the battery.<br><br>***Note :***<br>*Remove the negative terminal, first.* |  |
| (3) Remove drain plug **6** from hydraulic tank **5**, and drain the hydraulic oil.<br>Oil quantity : 15.05 Gals (57 L)<br>Remove filler cap **7**, and draining the oil will be smoother. |  |
| (4) Remove drain plug **9** from radiator **8** to drain the cooling water.<br>Cooling water quantity : 8.77 Qts (8.3 L)<br>Remove radiator cap **10**, and draining the cooling water will be smoother. |  |

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# 9. TROUBLESHOOTING




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# 8. FUEL, LUBE OIL AND GREASE RECOMMENDED

## 8. Fuel, Lube Oil and Grease Recommended

| Item | Recommended type | Capacity |
|---|---|---|
| Fuel | Diesel light oil | 26.4 Gals. (100 L) |
| Engine oil | Engine oil SAE10W30, CD class | 10.78 Qts. (10.2 L) |
| Hydraulic oil | ISO VG46 | In the tank : 15.05 Gals. (57 L)<br>Other parts : 11.35 Gals. (43 L) |
| Swing reduction gear oil | Gear oil SAE90 (GL-4) | 1.59 Qts. (1.5 L) |
| Travel reduction gear oil | Engine oil SAE30 CC | 1.59 Qts. (1.5 L) each |
| Cooling water | Soft-water (drinking water) + antirust and antifreeze | Radiator : 8.77 Qts. (8.3 L)<br>Subtank : 0.42 Qts. (0.4 L) |
| Grease | Multipurpose grease | |
| Antifreeze | Long-life coolant | |

**Mixture ratio of cooling water and antifreeze**

| Lowest temperature | °F (°C) | 23 (-5) | 14 (-10) | 5 (-15) | -4 (-20) | -13 (-25) | -22 (-30) | -31 (-35) | -40 (-40) |
|---|---|---|---|---|---|---|---|---|---|
| Amount of anti-freeze | Qts. (L) | 1.37 (1.3) | 2.33 (2.2) | 2.75 (2.6) | 3.17 (3.0) | 3.70 (3.5) | 4.12 (3.9) | 4.65 (4.4) | 5.07 (4.8) |
| Amount of water | Qts. (L) | 7.82 (7.4) | 6.87 (6.5) | 6.45 (6.1) | 6.02 (5.7) | 5.50 (5.2) | 5.07 (4.8) | 4.55 (4.3) | 4.12 (3.9) |

***Note :***

*At the delivery, water and antifreeze are mixed at the ratio for 5 °F (-15 °C) temperature above.*

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# 7. PERIODIC INSPECTION AND SERVICING

## 7. Periodic Inspection and Servicing

### 7-1 List of Periodic Inspection and Servicing

◇ : Check ○ : Supply ● : Replace □ : Adjust (clean) ■ : Oil & grease

| Check & service items | | | Daily | Every 50 | Every 100 | Every 250 | Every 500 | Every 1000 hrs |
|---|---|---|---|---|---|---|---|---|
| General | Check falling off, breakage of parts | | ◇ | | | | | |
| | Check loosened bolts & nuts, retighten | | ◇ | | | | | |
| | Check engine condition | | ◇ | | | | | |
| | Clean | | □ | | | | | |
| Lube oil | *Swing gear case oil | Check, resupply | | | | ○ | | |
| | | Replace | | | ● 1st time | | | ● |
| | Travel reduction gear oil | Check, resupply | | | | ○ | | |
| | | Replace | | | ● 1st time | | | ● |
| | *Transmission oil | Check, resupply | ◇ | | | | | |
| | | Replace | | | ● 1st time | | | ● |
| | *Differential gear oil | Check, resupply | | | ◇ | | | |
| | | Replace | | | ● 1st time | | | ● |
| Hydraulic system | Hydraulic oil | Check, resupply | ◇ | | | | | |
| | | Replace | | | | | | ● |
| | Clean suction filter | | | | | □ 1st time | | □ |
| | Replace return filter | | | | | ● 1st time | ● | |
| | Check for abnormality of hydraulic pump | | ◇ | | | | | |
| Grease | Check grease-up positions, grease | | ■ | | | | | |
| | Greasing the swing gears and the swing bearings | | | ■ | | | | |
| Undercar-riage | Check, adjust track tension | | ◇ | | | | | |
| | *Check air pressure, wear, flaw in tyres | | ◇ | | | | | |
| Steering equipment | Check performance, play of steering lever | | ◇ | | | | | |
| | Check performance, play of travel lever | | ◇ | | | | | |
| | *Check performance of speed change lever | | ◇ | | | | | |
| | *Check performance of forward/reverse pedal | | ◇ | | | | | |
| | *Check performance, play of steering wheel | | ◇ | | | | | |
| | *Brake pedal | Stroke | ◇ | | | | | |
| | | Performance | ◇ | | | | | |
| | *Parking brake | Stroke | ◇ | | | | | |
| | | Performance | ◇ | | | | | |
| | Check performance of accel. level | | ◇ | | | | | |
| Electric equipment | Check front & work lights, horn | | ◇ | | | | | |
| | Check hourmeter function | | ◇ | | | | | |
| | Check function of change, oil and pilot lamps | | ◇ | | | | | |
| | Check wire breakage, short-circuits, loosened terminals, retighten | | ◇ | | | | | |
| | Check, resupply battery fluid | | ◇ | | | | | |
| | Check specific gravity of electrolyte | | ◇ | | | | □ As required | |
| | Check function of OK monitor | | ◇ | | | | | |

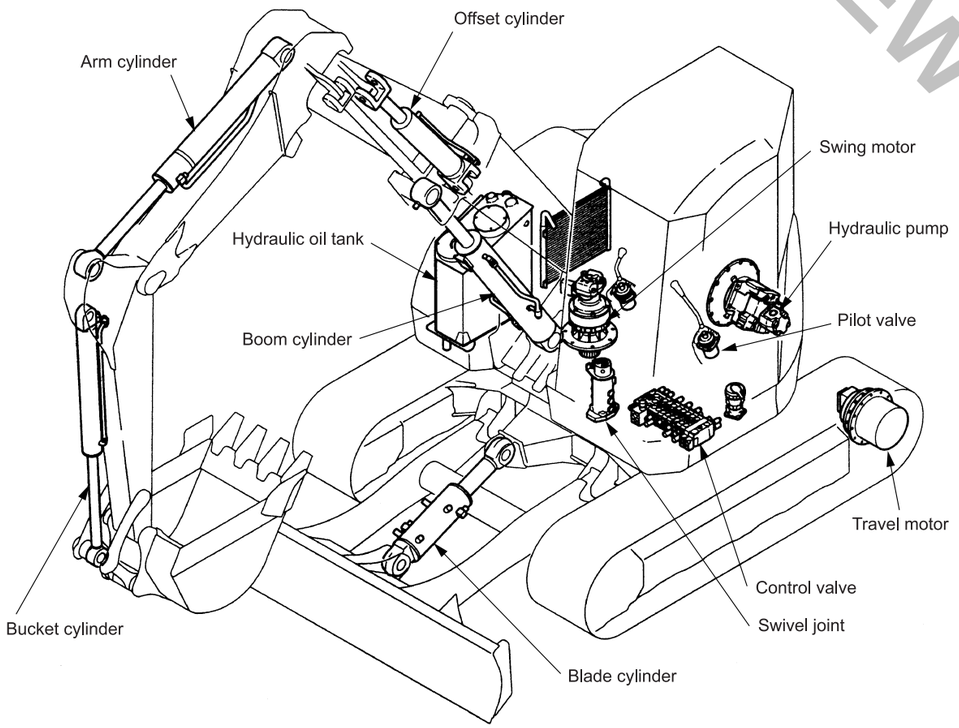
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# 4. HYDRAULIC SYSTEM

## 4. Hydraulic System

### 4-1 Outline

The hydraulic system consists of an engine, variable displacement piston pumps, a gear pump, a control valve, a boom cylinder, an arm cylinder, a bucket cylinder, a boom offset cylinder, a blade cylinder, a swing motor, a swivel joint, two travel motors and a hydraulic oil tank. The oil discharged from the variable displacement piston pumps and that from the gear pump flow to the actuators through the control valve.
The hydraulic pilot control system comprises a pilot pump, a cut-off valve mounted on the hydraulic pump and two pilot valves. The oil discharged from the pilot pump flows into the pilot ports of the control valve through the cut-off valve and the pilot valves to control the valve spool movement in proportion to the pressure at the port.






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4-2 Hydraulic Circuit Schematic ..... 4-2-1
4-2-1 Standard Specifications ..... 4-2-1
4-3 Circuit Operation ..... 4-3-1
4-3-1 Boom ..... 4-3-1
4-3-2 Arm ..... 4-3-3
4-3-3 Bucket ..... 4-3-5
4-3-4 Swing ..... 4-3-7
4-3-5 Boom Offset ..... 4-3-9
4-3-6 Blade ..... 4-3-11
4-3-7 Travel ..... 4-3-13
4-3-8 Simultaneous Operation of Travel and Boom / Bucket ..... 4-3-15
4-3-9 Simultaneous Operation of Travel and Arm / Boom Offset ..... 4-3-17
4-3-10 Simultaneous Operation of Boom Up and Arm Retract ..... 4-3-19
4-3-11 Simultaneous Operation of Boom Up and Bucket ..... 4-3-21
4-3-12 Simultaneous Operation of Boom Up and Swing ..... 4-3-23
4-3-13 Hydraulic P.T.O. ..... 4-3-25
4-4 Pressure Adjustment ..... 4-4-1
4-4-1 Relief Valves ..... 4-4-1
4-4-2 Swing Brake Valve ..... 4-4-3
4-4-3 Cut-off Valve ..... 4-4-4

**CHAPTER 5**
## HYDRAULIC EQUIPMENT

5-1 Hydraulic Pump ..... 5-1-1
5-2 Control Valve ..... 5-2-1
5-3 Pilot Valve ..... 5-3-1
5-4 Swing Motor ..... 5-4-1
5-5 Travel Motor ..... 5-5-1

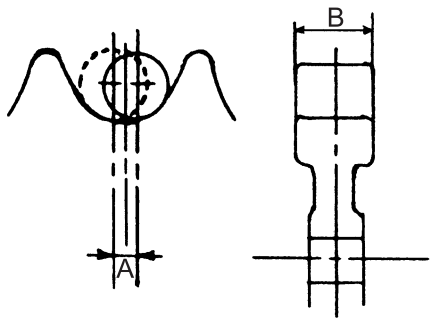
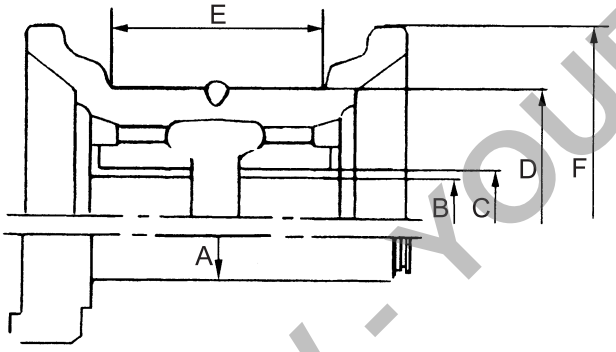
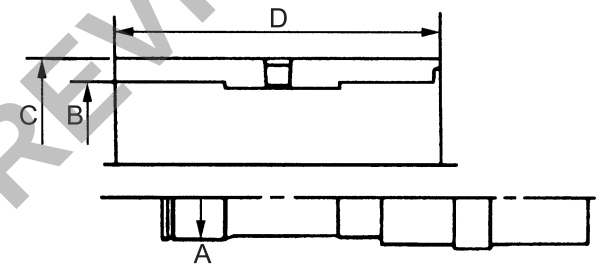
**CHAPTER 6**
## ADJUSTMENT AND REPAIR

6-1 Electric Equipment of the Machine ..... 6-1-1
6-1-1 Parts Layout of Electrical Equipment ..... 6-1-1
6-1-2 Monitor and Alarm Systems ..... 6-1-4
6-1-3 Wiring Diagram ..... 6-1-7
6-1-4 Stop Motor Operation ..... 6-1-9
6-1-5 Removal and Reinstallation of Engine ..... 6-1-13
6-1-6 Removal and Reassembly of Starter Motor ..... 6-1-22
6-2 Undercarriage ..... 6-2-1
6-2-1 Outline ..... 6-2-1
6-2-2 Main Parts ..... 6-2-1
6-2-3 Points of Reassembly (Rubber Crawler) ..... 6-2-2
6-2-4 Points of Reassembly (Steel Crawler) ..... 6-2-3
6-2-5 Disassembly and Reassembly of Steel Crawler ..... 6-2-4
6-2-6 Disassembly and Reassembly of Idler ..... 6-2-6
6-2-7 Disassembly and Reassembly of Track Roller ..... 6-2-9
6-2-8 Disassembly and Reassembly of Carrier Roller ..... 6-2-11

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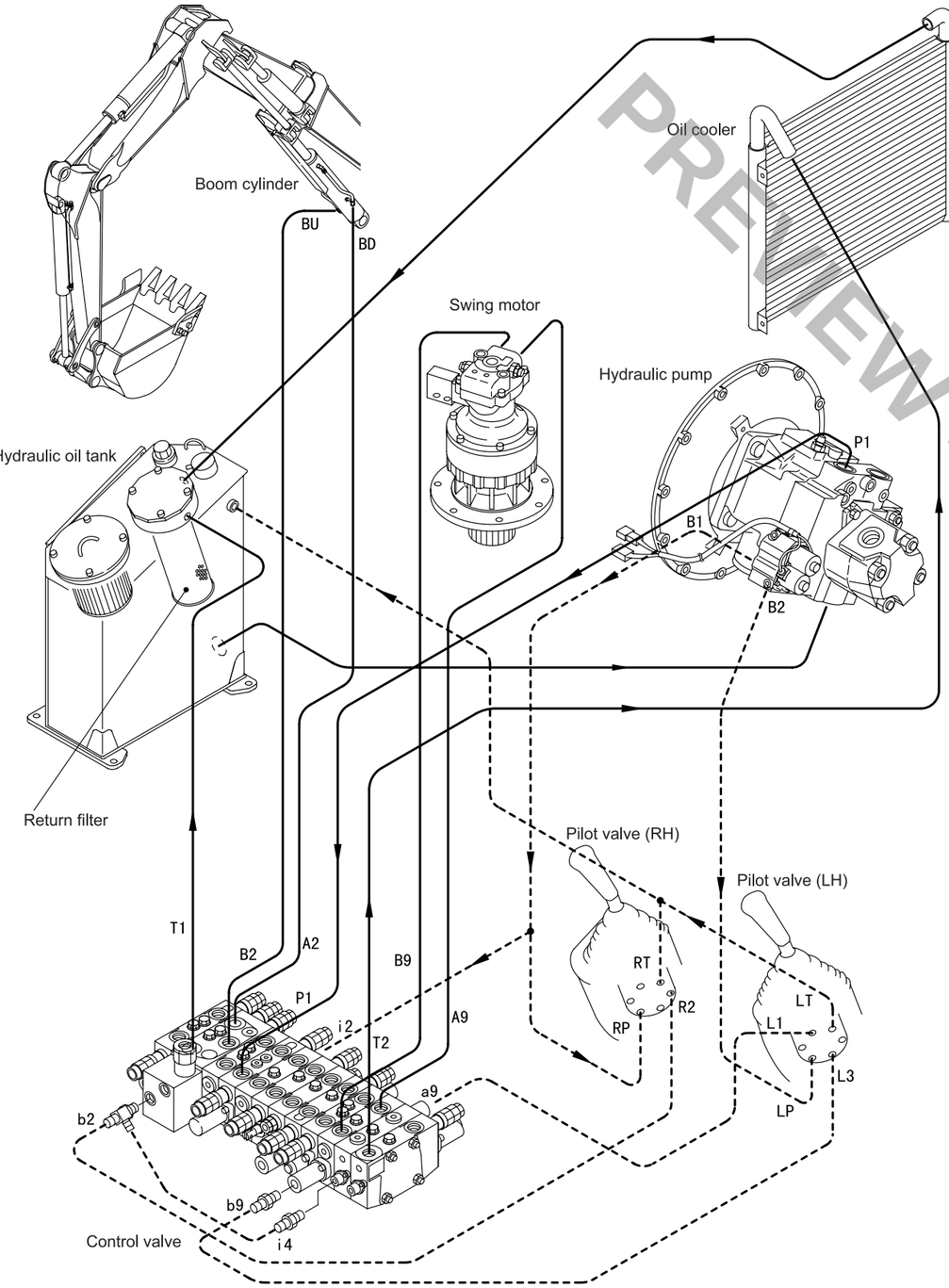
### 3-3-3 Common Specifications of Steel & Rubber Crawlers

[Unit : in. (mm)]

| Applicable model | | B7-3 (US | |
|---|---|---|---|
| Part | Measuring position | Standard | Wear limit |
| Common specifications of steel & rubber crawlers | | | |
| (1) Sprocket   | A | – | – |
| | B | 1.5 (38) | 1.3 (33) |
| (2) Track roller & shaft   | A | Ø1.5 (Ø38) | Ø1.48 (Ø37.5) |
| | B | Ø1.5 (Ø38) | Ø1.51 (Ø38.4) |
| | C | Ø1.89 (Ø48) | – |
| | D | Ø4.72 (Ø120) | Ø4.57 (Ø116) |
| | E | 4.25 (108) | 4.49 (114) |
| | F | Ø6.93 (176) | Ø6.77 (Ø172) |
| (3) Carrier roller & shaft   | A | Ø1.18 (Ø30) | Ø1.16 (Ø29.5) |
| | B | Ø2.44 (Ø62) | – |
| | C | Ø3.15 (Ø80) | 2.99 (76) |
| | D | 4.72 (120) | – |
| | | | |

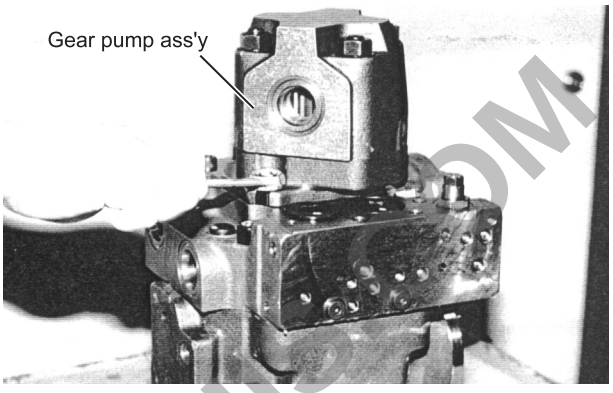
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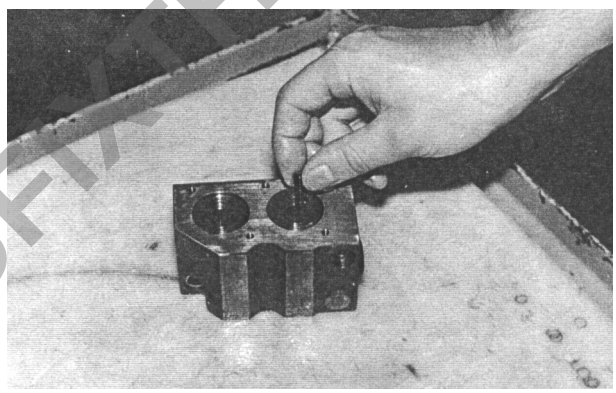
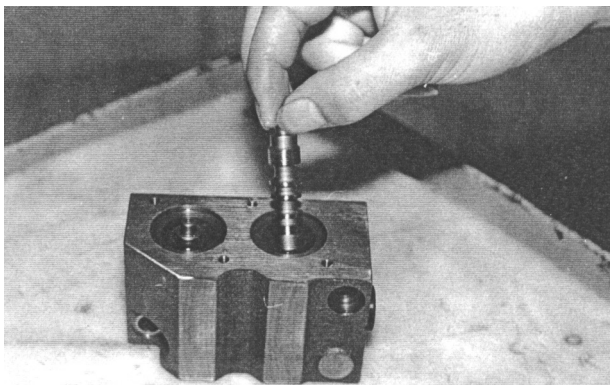
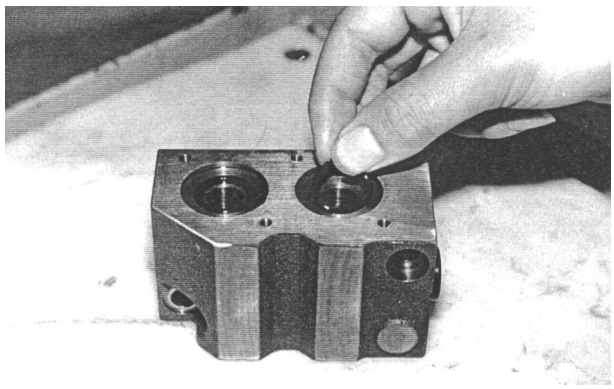
# 4. HYDRAULIC SYSTEM




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| Procedure | |
|---|---|
| (9) Tighten two hexagon head bolts **82** to hold gear pump ass'y.<br><br>Tightening torque : 40.49 to 50.6 ft•lbf (54.9 to 50.6 N•m) |  |

| | |
|---|---|
| **3. Valve ass'y**<br>(1) Install springs **67**. |  |
| (2) Install spools **69**. |  |
| (3) Install O-rings **65**. |  |

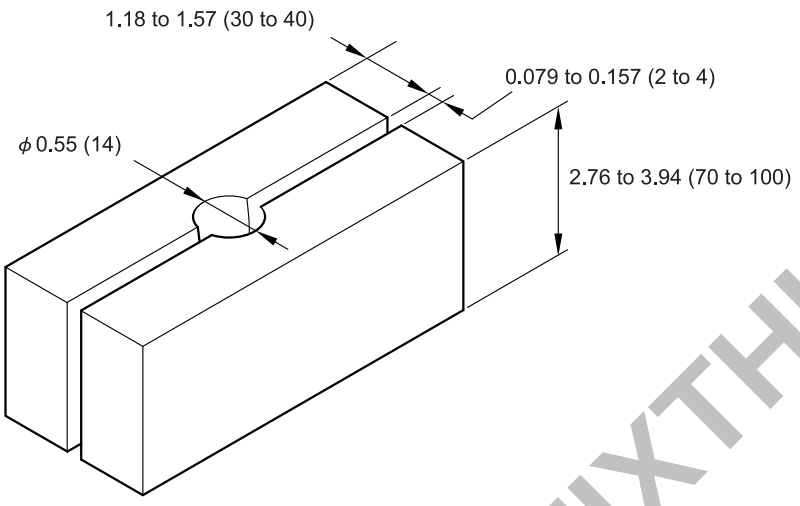
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**4. Disassembly and reassembly**

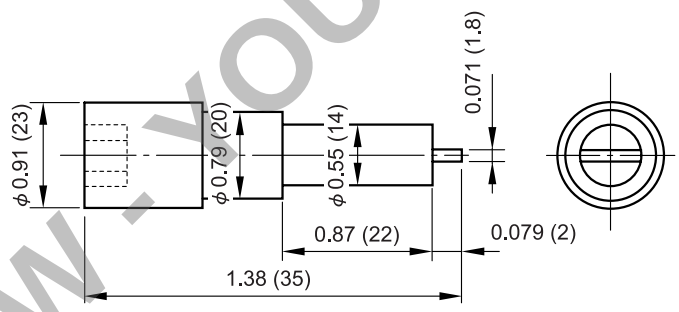
**1) Special tools**

(1) Spool clamp

Unit : in. (mm)
Material : Wood



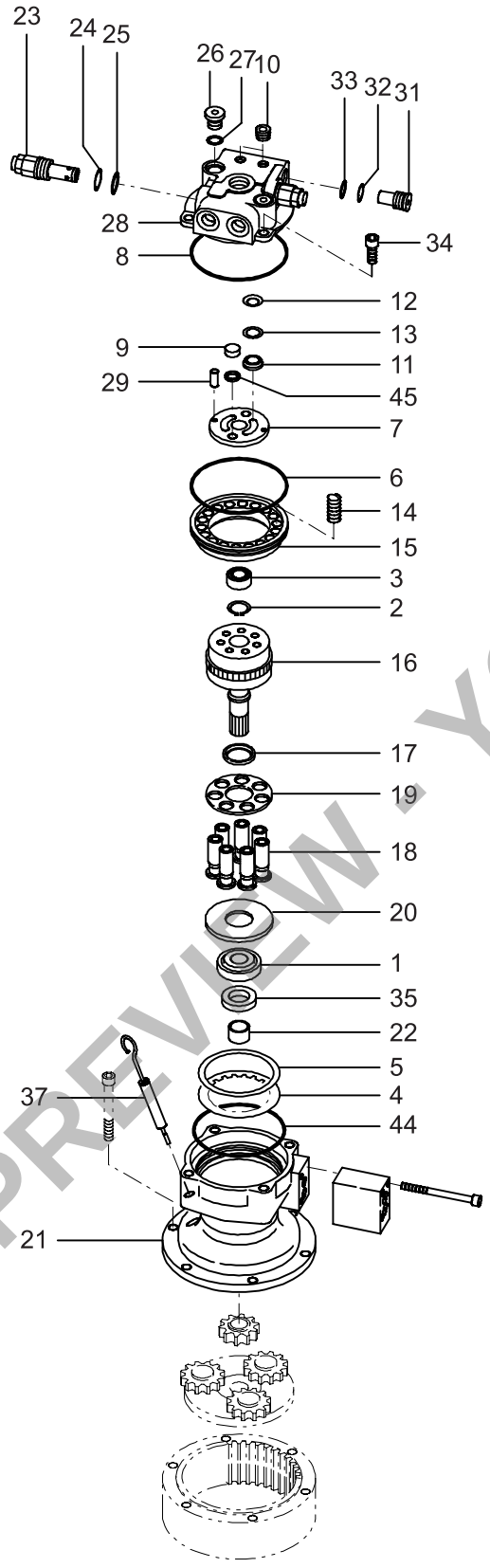

(2) Tools for cap screws (mechanical link-operated valve)




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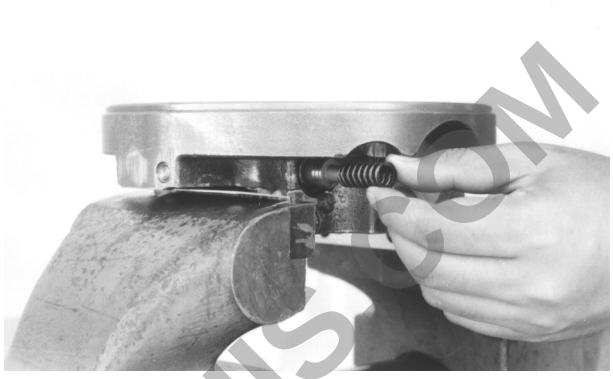
**2) Motor**

(1) Exploded view and parts

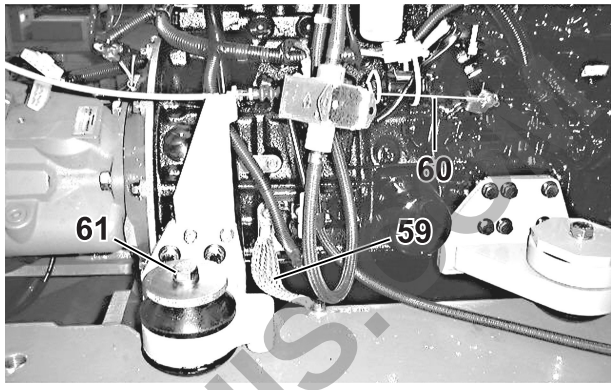



| No. | Part | Q'ty |
|---|---|---|
| 1 | Taper roller bearing | 1 |
| 2 | Snap ring | 1 |
| 3 | Needle bearing | 1 |
| 4 | Friction plat | 1 |
| 5 | Steel plate | 1 |
| 6 | O-ring | 1 |
| 7 | Balance plate | 1 |
| 8 | O-ring | 1 |
| 9 | Piston | 2 |
| 10 | Plug PT1/4 | 2 |
| 11 | Bush | 4 |
| 12 | Wave washer | 4 |
| 13 | Teflon ring | 4 |
| 14 | Spring | 18 |
| 15 | Brake piston | 1 |
| 16 | Cylinder | 1 |
| 17 | Spring ring | 1 |
| 18 | Piston S/A | 7 |
| 19 | Return plate | 1 |
| 20 | Cam plate | 1 |
| 21 | Housing | 1 |
| 22 | Collar | 1 |
| 23 | Relief valve | 2 |
| 24 | Back-up ring | 2 |
| 25 | O-ring | 2 |
| 26 | Cap | 1 |
| 27 | O-ring | 1 |
| 28 | Cover | 1 |
| 29 | Dowel pin | 2 |
| 31 | Bypass valve | 2 |
| 32 | Back-up ring | 2 |
| 33 | O-ring | 2 |
| 34 | Hexagon socket head bolt | 4 |
| 35 | Oil seal | 1 |
| 37 | Level gauge CMP | 1 |
| 44 | O-ring | 1 |
| 45 | Teflon ring | 1 |

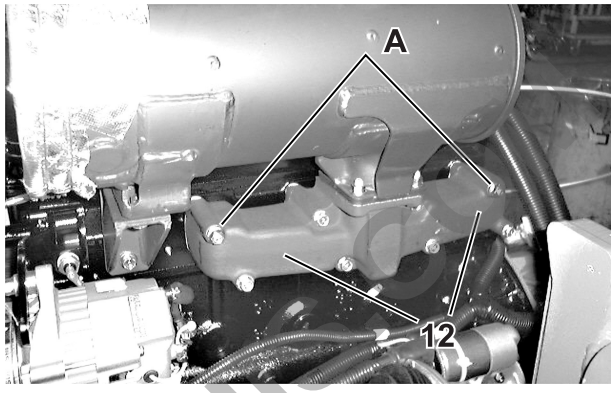
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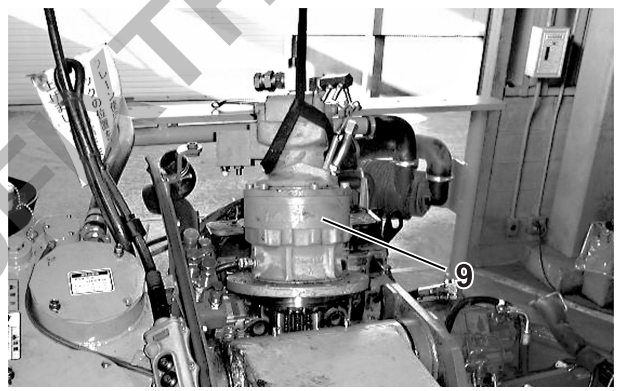
| Procedure | |
|---|---|
| (37) Remove plug **19** with O-ring to remove spring **21** and spool **22** from body 1 **43**.<br><br>(Tool : Hexagon socket screw key <width across flats : 8>) |  |

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| Procedure | |
|---|---|
| (33) Remove engine ground cable **59** and accelerator cable **60**.<br><br>(34) Remove bolts M16 **61** (4pcs.) for engine. |  |
| (35) Put a rope around engine **1** with hydraulic pump and remove it by lifting with a crane. |  |

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| Procedure | |
|---|---|
| (8) Remove exhaust manifold **12** of the engine.<br><br>***Note :***<br>*Remove two stud bolts **A** on the light and left of upper part, which are the bolts for the manifold, as they contact with the operator's seat mount cover and make it difficult to remove the manifold.* |  |

| | |
|---|---|
| (9) Put a rope around swing motor **9** and lift it. |  |

**2) Reinstallation**

Reinstall the swing motor in the reverse order of the removal procedure.

***Note :***

*Installation bolt for swing motor*

- Apply three bond 1324 or its equivalent
- Tightening torque : 123.0 to 151.9 ft•lbf (166.7 to 206.0 N•m)

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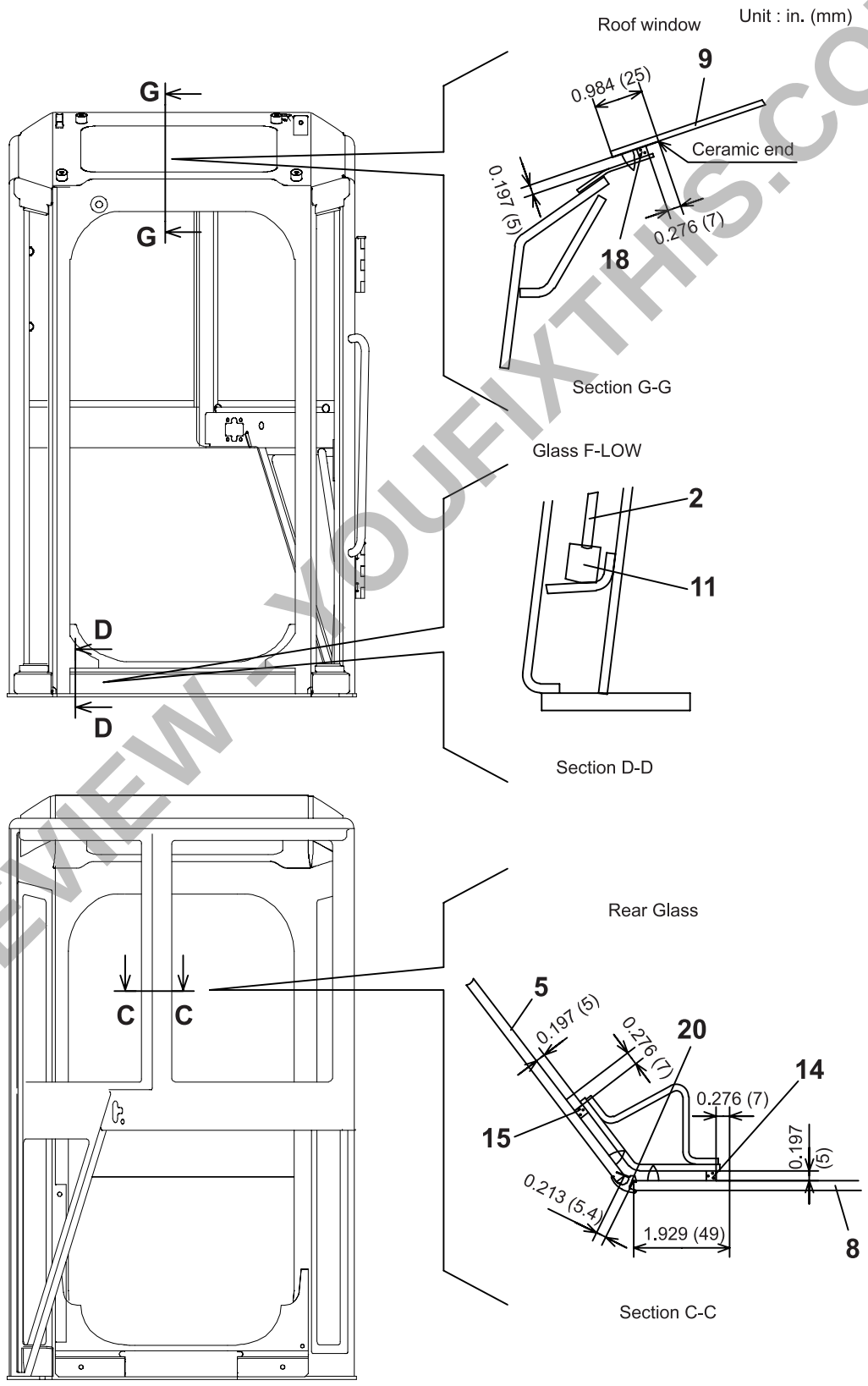
**3) Removal and installation of roof window, glass F-LOW and LH-UPR, and rear glass**

(1) Remove and install the glass according to the same procedures as those described in the previous section.

(2) Stick the respective dam rubbers or the stopper rubbers. (Refer to the figure below for the locations of the rubbers.)

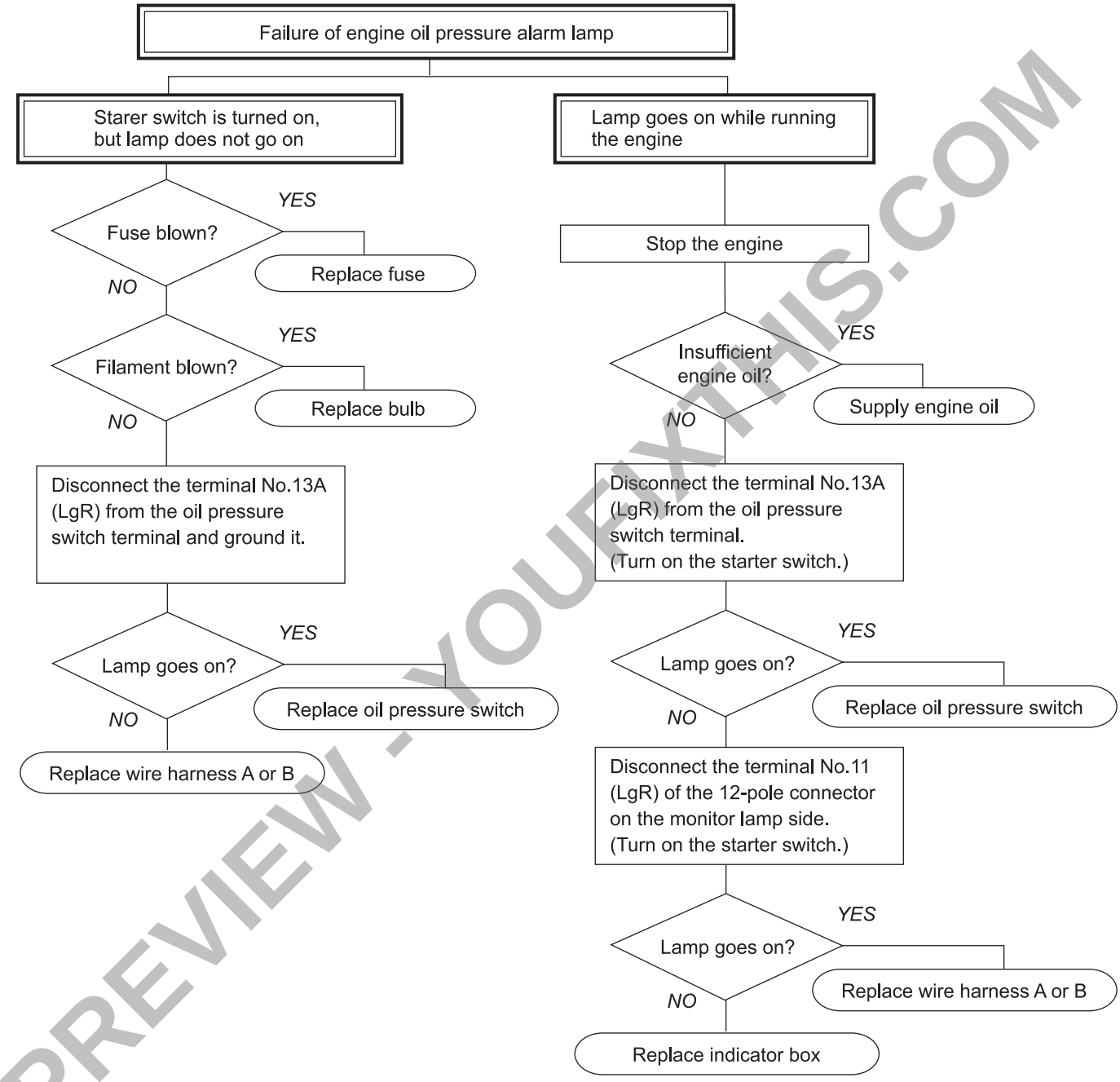
***Note :***

*Follow the same procedure as that described in the previous section for handling after installing the glass.*




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**Engine oil pressure alarm lamp**




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## 4. Engine Body

### 4-1 Introduction

Make preparation as follows before starting engine inspection and service :

(1) Fix the engine on a horizontal base.

**⚠ CAUTION**

**Be sure to fix the engine securely to prevent injury or damage to parts due to falling during the work.**

(2) Remove the cooling water hose, fuel oil pipe, wire harness, control wires etc. connecting the driven machine and engine, and drain cooling water, lubricating oil and fuel.

(3) Clean soil, oil, dust, etc. from the engine by washing with solvent, air, steam, etc. Carefully operate so as not to let any foreign matter enter the engine.

**⚠ CAUTION**

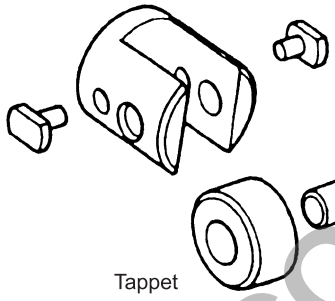
**Always wear glasses or other protectors when using compressed air or steam to prevent any foreign matter from getting in the eyes.**

***Notice :***

- *Any part which is found defective as a result of inspection or any part whose measured value does not satisfy the standard or limit shall be replaced.*
- *Any part predicted to dissatisfy the standard or limit before the next service as estimated from the state of use should be replaced even when the measured value then satisfies the standard or limit.*

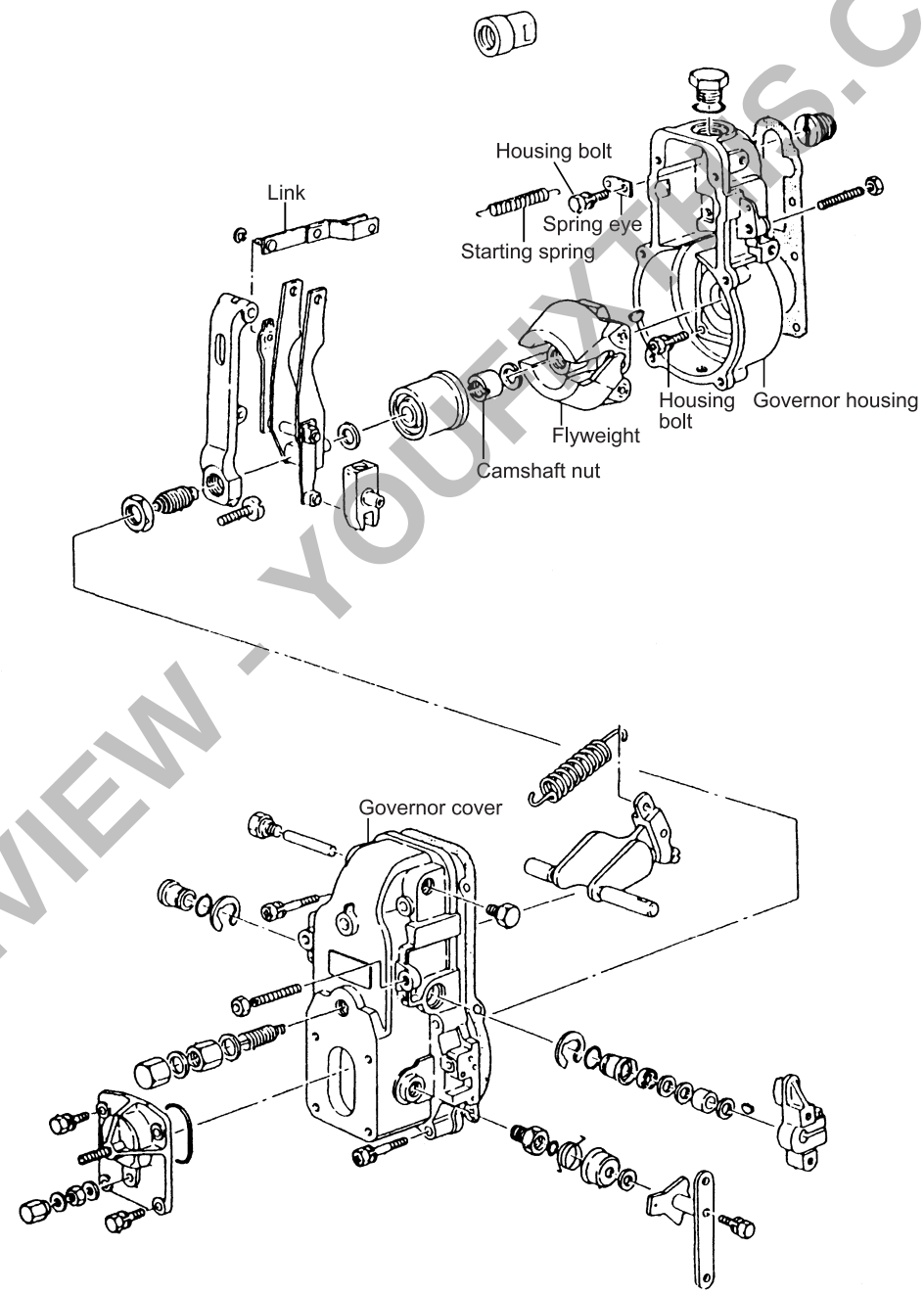
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(4) Tappet ass'y and push rod
Check mainly for surface defect and wear. If the push rod outer surface is worn, replace the whole housing ass'y.




## 7-5 Governor

### 1) Components




***Note :***
*This figure shows the standard RSV governor components.*
*Shapes of some parts are different in the governor for this engine.*

### 2) Disassembly procedure (reverse the procedure for assembly.)

1 Follow steps 2 and 3 in fuel injection pump disassembly procedure 7-2 3) (2).

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