WORKSHOP MANUAL

FRONT LOADER
LA271·LA301·LA351·LA401
LA272·LA302·LA352·LA402

Kubota
TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of KUBOTA Front Loaders. It is divided into two parts, “Mechanism” and “Servicing”.

■ Mechanism
  Information on the construction and function are included. This part should be understood before proceeding with troubleshooting, disassembling and servicing.

■ Servicing
  Under the heading “General” section comes general precautions, check and maintenance and special tools. Other section, there are troubleshooting, servicing specification lists, checking and adjusting, disassembling and assembling, and servicing which cover procedures, precautions, factory specifications and allowable limits.

All information, illustrations and specifications contained in this manual are based on the latest production information available at the time of publication.

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January 2000

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SAFETY FIRST

This symbol, the industry’s “Safety Alert Symbol”, is used throughout this manual and decals on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: Indicates that equipment or property damage could result if instructions are not followed.

NOTE: Gives helpful information.

BEFORE SERVICING AND REPAIRING

1. Read all instructions and safety instructions in this manual and on your machine safety decals.
2. Clean the work area and machine.
3. Park the machine on a firm and level ground, and set the parking brake.
4. Lower the implement to the ground.
5. Stop the engine, and remove the key.
6. Disconnect the battery negative cable.
7. Hang a “DO NOT OPERATE” tag in operator station.
SAFETY STARTING
(1) Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
(2) Do not alter or remove any part of machine safety system.
(3) Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
(4) Never start the engine while standing on ground. Start the engine only from operator's seat.

SAFETY WORKING
(1) Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
(2) Wear close fitting clothing and safety equipment appropriate to the job.
(3) Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
(4) When servicing is performed together by two or more persons, take care to perform all work safely.
(5) Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
(6) Do not touch the rotating or hot parts while the engine is running.
(7) Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
(8) Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.

AVOID FIRES
(1) Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
(2) To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
(3) Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
(4) Make sure that no fuel has been spilled on the engine.
VENTILATE WORK AREA
(1) If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

PREVENT ACID BURNS
(1) Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and cause blindness if splashed into eyes. Keep electrolyte away from eyes, hands and clothing. If you spill electrolyte on yourself, flush with water, and get medical attention immediately.

DISPOSE OF FLUIDS PROPERLY
(1) Do not pour fluids into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, electrolyte and other harmful waste.

PREPARE FOR EMERGENCIES
(1) Keep a first aid kit and fire extinguisher handy at all times.
(2) Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.
SAFETY DECAPS

- The following safety decals are installed on the machine. If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.

1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels from your local KUBOTA Dealer.
4. If a component with danger, warning and caution label(s) affixed is replace with new part, make sure new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.
(1) Bucket Cylinder
(2) Boom
(3) Hydraulic Control Valve
(4) Side Frame
(5) Mounting Pin
(6) Main Frame
(7) Bucket
(8) Boom Cylinder
(9) Brace
### SPECIFICATIONS

#### LOADER SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>LA271</th>
<th>LA301</th>
<th>LA351</th>
<th>LA401</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASAE Rated Lift Capacity</td>
<td>270 kg (595 lbs)</td>
<td>300 kg (660 lbs)</td>
<td>350 kg (770 lbs)</td>
<td>400 kg (882 lbs)</td>
</tr>
<tr>
<td>ASAE Rated Brakeout Force</td>
<td>4450 N (1000 lbs)</td>
<td>5120 N (1150 lbs)</td>
<td>5940 N (1335 lbs)</td>
<td>7060 N (1586 lbs)</td>
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<tr>
<td>Boom Cylinder Bore</td>
<td>38.1 mm (1.50 in.)</td>
<td>44.5 mm (1.75 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>307 mm (12.10 in.)</td>
<td>289 mm (11.40 in.)</td>
<td>435 mm (17.13 in.)</td>
<td></td>
</tr>
<tr>
<td>Bucket Cylinder Bore</td>
<td>38.1 mm (1.50 in.)</td>
<td>44.5 mm (1.75 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>330 mm (13.00 in.)</td>
<td>450 mm (17.72 in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Valve</td>
<td>3 Position Bucket Control Valve Type</td>
<td></td>
<td>One Detent Float Position, Power Beyond Circuit</td>
<td></td>
</tr>
<tr>
<td>Relief Valve Setting Pressure</td>
<td>133.5 to 147.5 kgf/cm² (1900 to 2000 psi)</td>
<td>147.5 to 154.6 kgf/cm² (2100 to 2200 psi)</td>
<td>133.5 to 140.5 kgf/cm² (1900 to 2000 psi)</td>
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</tr>
<tr>
<td>Net Weight (Approx.)</td>
<td>208 kg (460 lbs)</td>
<td>216 kg (475 lbs)</td>
<td>226 kg (500 lbs)</td>
<td>280 kg (617 lbs)</td>
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<table>
<thead>
<tr>
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<th>LA302</th>
<th>LA352</th>
<th>LA402</th>
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<tr>
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</tr>
<tr>
<td>ASAE Rated Brakeout Force</td>
<td>4460 N (1005 lbs)</td>
<td>4990 N (1120 lbs)</td>
<td>5940 N (1335 lbs)</td>
<td>7500 N (1685 lbs)</td>
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<tr>
<td>Boom Cylinder Bore</td>
<td>38.1 mm (1.50 in.)</td>
<td>44.5 mm (1.75 in.)</td>
<td></td>
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</tr>
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</table>
## BUCKET SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>LA271, LA301</th>
<th>LA351</th>
<th>LA401</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Square 48</td>
<td>Square 50</td>
<td>Square 54</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>1220 mm (48.0 in.)</td>
<td>1270 mm (50.0 in.)</td>
<td>1372 mm (54.0 in.)</td>
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<tr>
<td><strong>Length</strong></td>
<td>465 mm (18.3 in.)</td>
<td>490 mm (19.3 in.)</td>
<td>478 mm (18.8 in.)</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>490 mm (19.2 in.)</td>
<td>516 mm (20.3 in.)</td>
<td>530 mm (20.9 in.)</td>
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<tr>
<td><strong>Capacity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Struck</td>
<td>0.15 m$^3$ (5.2 cu.ft.)</td>
<td>0.16 m$^3$ (5.5 cu.ft.)</td>
<td>0.19 m$^3$ (6.7 cu.ft.)</td>
</tr>
<tr>
<td>Heaped</td>
<td>0.17 m$^3$ (6.2 cu.ft.)</td>
<td>0.18 m$^3$ (6.5 cu.ft.)</td>
<td>0.23 m$^3$ (8.1 cu.ft.)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>54 kg (120 lbs)</td>
<td>62 kg (137 lbs)</td>
<td>79 kg (174 lbs)</td>
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<table>
<thead>
<tr>
<th>Model</th>
<th>LA272, LA302</th>
<th>LA352</th>
<th>LA402</th>
</tr>
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<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Square 48</td>
<td>Square 50</td>
<td>Square 54</td>
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<tr>
<td><strong>Width</strong></td>
<td>1220 mm (48.0 in.)</td>
<td>1270 mm (50.0 in.)</td>
<td>1372 mm (54.0 in.)</td>
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<tr>
<td><strong>Length</strong></td>
<td>500 mm (19.7 in.)</td>
<td>525 mm (20.7 in.)</td>
<td>530 mm (20.9 in.)</td>
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<tr>
<td><strong>Height</strong></td>
<td>480 mm (18.9 in.)</td>
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<tr>
<td><strong>Capacity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Struck</td>
<td>0.15 m$^3$ (5.2 cu.ft.)</td>
<td>0.16 m$^3$ (5.5 cu.ft.)</td>
<td>0.19 m$^3$ (6.7 cu.ft.)</td>
</tr>
<tr>
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<td>0.18 m$^3$ (6.5 cu.ft.)</td>
<td>0.23 m$^3$ (8.1 cu.ft.)</td>
</tr>
<tr>
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<td>62 kg (137 lbs)</td>
<td>79 kg (174 lbs)</td>
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### OPERATING DIMENSIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>LA271</th>
<th>LA301</th>
<th>LA351</th>
<th>LA401</th>
<th>LA272</th>
<th>LA302</th>
<th>LA352</th>
<th>LA402</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Lifting Height</td>
<td>1780 mm (70.1 in.)</td>
<td>1790 mm (70.5 in.)</td>
<td>2130 mm (83.9 in.)</td>
<td>1770 mm (69.7 in.)</td>
<td>1765 mm (69.5 in.)</td>
<td>1770 mm (69.7 in.)</td>
<td>2090 mm (82.3 in.)</td>
<td></td>
</tr>
<tr>
<td>Clearance with Bucket Dumped</td>
<td>1310 mm (51.6 in.)</td>
<td>1320 mm (52.0 in.)</td>
<td>1310 mm (51.6 in.)</td>
<td>1664 mm (65.5 in.)</td>
<td>1310 mm (51.6 in.)</td>
<td>1320 mm (52.0 in.)</td>
<td>1310 mm (51.6 in.)</td>
<td>1665 mm (65.6 in.)</td>
</tr>
<tr>
<td>Reach at Maximum Height</td>
<td>680 mm (26.8 in.)</td>
<td>645 mm (25.4 in.)</td>
<td>635 mm (25.0 in.)</td>
<td>660 mm (26.0 in.)</td>
<td>680 mm (26.0 in.)</td>
<td>645 mm (25.4 in.)</td>
<td>635 mm (25.0 in.)</td>
<td>660 mm (26.0 in.)</td>
</tr>
<tr>
<td>Maximum Dump Angle</td>
<td>45 deg.</td>
<td>40 deg.</td>
<td>45 deg.</td>
<td>45 deg.</td>
<td>40 deg.</td>
<td>45 deg.</td>
<td>40 deg.</td>
<td>45 deg.</td>
</tr>
<tr>
<td>Reach with Bucket on Ground</td>
<td>1280 mm (50.4 in.)</td>
<td>1295 mm (51.0 in.)</td>
<td>1320 mm (52.0 in.)</td>
<td>1376 mm (51.4 in.)</td>
<td>1200 mm (50.4 in.)</td>
<td>1295 mm (51.0 in.)</td>
<td>1320 mm (52.0 in.)</td>
<td>1375 mm (51.4 in.)</td>
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<tr>
<td>Bucket Roll-back Angle</td>
<td>24 deg.</td>
<td>26 deg.</td>
<td>24 deg.</td>
<td>26 deg.</td>
<td>24 deg.</td>
<td>26 deg.</td>
<td>26 deg.</td>
<td>26 deg.</td>
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<tr>
<td>Digging Depth</td>
<td>110 mm (4.3 in.)</td>
<td>95 mm (3.7 in.)</td>
<td>185 mm (7.3 in.)</td>
<td>80 mm (3.15 in.)</td>
<td>135 mm (5.3 in.)</td>
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<tr>
<td>Overall Height in Carrying Position</td>
<td>1150 mm (45.3 in.)</td>
<td>1160 mm (45.7 in.)</td>
<td>1195 mm (47.0 in.)</td>
<td>1150 mm (45.3 in.)</td>
<td>1160 mm (45.7 in.)</td>
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<td></td>
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</table>

B7300 (4WD) with 6 - 12 Front Tires and 8.3 - 16 Rear Tires.
B1700 (4WD) with 6 - 12 Front Tires and 8.3 - 16 Rear Tires.
B2100 (4WD) with 6 - 12 Front Tires and 9.5 - 16 Rear Tires.
B2400 (4WD) with 7 - 12 Front Tires and 11.2 - 16 Rear Tires.
B2710 (4WD) with 7 - 12 Front Tires and 12.4 - 16 Rear Tires.

### PERFORMANCE RATINGS (NO LOAD)

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
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<tbody>
<tr>
<td>Raise to Full Height</td>
<td>LA271</td>
</tr>
<tr>
<td>Lowering Time</td>
<td>LA301</td>
</tr>
<tr>
<td>Attachment Roll-back Time</td>
<td>LA351</td>
</tr>
<tr>
<td>Attachment Dump Time</td>
<td>LA401</td>
</tr>
<tr>
<td>B7400 (4WD) with 6 - 12 Front Tires and 8.3 - 16 Rear Tires.</td>
<td></td>
</tr>
<tr>
<td>B7500 (4WD) with 6 - 12 Front Tires and 9.5 - 16 Rear Tires.</td>
<td></td>
</tr>
<tr>
<td>B2410 (4WD) with 7 - 12 Front Tires and 11.2 - 16 Rear Tires.</td>
<td></td>
</tr>
<tr>
<td>B2710 (4WD) with 7 - 12 Front Tires and 12.4 - 16 Rear Tires.</td>
<td></td>
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</tbody>
</table>

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# MECHANISM

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<th>Page</th>
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<td>[3]</td>
<td>CONTROL VALVE ASSEMBLY</td>
<td>M-3</td>
</tr>
<tr>
<td></td>
<td>(1) LA271 • LA301 • LA351 (Old Type Valve)</td>
<td>M-3</td>
</tr>
<tr>
<td></td>
<td>(2) LA271 • LA301 • LA351 (New Type Valve) and</td>
<td></td>
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<tr>
<td></td>
<td>LA401 • LA272 • LA302 • LA352 • LA402</td>
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<tr>
<td></td>
<td>(4 Position Bucket Control)</td>
<td>M-11</td>
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<td></td>
<td>(3) LA401 • LA272 • LA302 • LA352 • LA402</td>
<td>M-19</td>
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<td>(3 Position Bucket Control)</td>
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<td>[4]</td>
<td>RELIEF VALVE</td>
<td>M-23</td>
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<td>[5]</td>
<td>BOOM CYLINDER AND BUCKET CYLINDER</td>
<td>M-25</td>
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[1] FEATURES

1. Huge Hoisting and Scooping Power
2. Fast Cycle Time
3. One-Lever Operation
4. Heavy-Duty Bucket
5. Long Arm Reach
6. Series Circuit Hydraulic Control Valve
[2] HYDRAULIC CIRCUIT

4 Position Bucket Control

LA271 / LA301 / LA351 / LA401 / LA272 / LA302 / LA352 / LA402

To 3-point Hydraulic System

From Hydraulic Pump

To Transmission Case

3 Position Bucket Control

LA401 / LA272 / LA302 / LA352 / LA402

To 3-point Hydraulic System

From Hydraulic Pump

To Transmission Case

1. Boom Control Valve
2. Bucket Control Valve
3. Bucket Cylinder
4. Boom Cylinder
5. Control Valve Assembly
6. Relief Valve
7. Hydraulic Block
[3] CONTROL VALVE ASSEMBLY

(1) LA271 • LA301 • LA351 (Old Type Valve)

The control valve assembly is composed of one casting block and four major section as shown above. And the relief valve is installed on this valve.

(1) Inlet and Outlet Section
   This section has P and T ports.
   The P port is connected to the pump port of hydraulic block by the hydraulic hose.
   The T port is connected to the return port of transmission case by the hydraulic hose.

(2) Boom Control Section
   The boom control valve is of 4-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has A1 and B1 ports and controls oil flow to the boom cylinder.

(3) Bucket Control Section
   The bucket control valve is of 4-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has A2 and B2 ports and controls oil flow to the bucket cylinder.

(4) Power Beyond
   This section has PB port which is connected to the power beyond port of hydraulic block by the hydraulic hose, and feeds oil to the three point hydraulic control valve.
1. Pressure-fed oil from the hydraulic pump is delivered into the P port.
2. As the load check valve (8), (9) are kept closed in the neutral position, oil flows along the notched section of the spools (1), (2) to the PB port through the PB passage 1 (6) and 2 (7).
3. Then the oil is fed to the three point hydraulic system from the PB port.
1. When the hydraulic control lever is set to the “UP” position, the spool (1) of the boom control section (3) moves to the left, which forms oil passages between passage 1 (6) and B1 port, and between A1 port and PB passage 1 (2).

2. The pressure-fed oil from the P port opens the load check valve (5) and flows through the notched section of the spool (1) and B1 port to extend the boom cylinder.

3. Return oil from the boom cylinder flows from the A1 port through the passage in the spool (1) and PB passage 1 (2) to the bucket control section (4).

(1) Spool
(2) PB Passage 1
(3) Boom Control Section
(4) Bucket Control Section
(5) Load Check Valve
(6) Passage 1

P: P Port
T: T Port
A1: A1 Port (From Boom Cylinder)
B1: B1 Port (To Boom Cylinder)
PB: PB Port
1. When the hydraulic control lever is set to the "DOWN" position, the spool (1) moves to the right, which forms oil passages between passage 1 (6) and A1 port, and between B1 port and PB passage 1 (2).
2. The pressure-fed oil from the P port opens the load check valve (5) and flows through the notched section of the spool (1) and A1 port to retract the boom cylinder.
3. Return oil from the boom cylinder flows from the B1 port through the passage in the spool (1) and PB passage 1 (2) to the bucket control section (4).

(1) Spool
(2) PB Passage 1
(3) Boom Control Section
(4) Bucket Control Section
(5) Load Check Valve
(6) Passage 1

P: P Port
T: T Port
A1: A1 Port (To Boom Cylinder)
B1: B1 Port (From Boom Cylinder)
PB: PB Port
1. When the hydraulic control lever is set to the "FLOAT" position, the spool (1) moves to the right from the "DOWN" position and is retained by the detent mechanism (4).

2. This forms oil passages among the A1 port, B1 port and T port. As a result, oil in the boom cylinder flows freely from the A1 port and B1 port through the T port to the transmission case.

3. Oil entering the P port flows to the PB port via the PB passage 1 (2) and 2 (6). Then the oil flows to the three point hydraulic system.

---

(1) Spool
(2) PB Passage 1
(3) Boom Control Section
(4) Detent Mechanism
(5) Bucket Control Section
(6) PB Passage 2

**Legend:**

- P: P Port
- T: T Port
- A1: A1 Port (From Boom Cylinder)
- B1: B1 Port (From Boom Cylinder)
- PB: PB Port
1. When the hydraulic control lever is set to the "ROLL-BACK" position, the spool (4) of the bucket control section (3) moves to the left, which forms oil passages between passage 2 (6) and B2 port, and between A2 port and T port.

2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows through the notched section of the spool (4) and B2 port to retract the bucket cylinder.

3. Return oil from the bucket cylinder flows to the transmission case through the A2 port and T port.

(1) PB Passage 1
(2) Boom Control Section
(3) Bucket Control Section
(4) Spool
(5) Load Check Valve
(6) Passage 2

P : P Port
T : T Port
A2 : A2 Port (From Bucket Cylinder)
B2 : B2 Port (To Bucket Cylinder)
PB : PB Port
1. When the hydraulic control lever is set to the "DUMP 1" position, the spool (4) of the bucket control section (3) moves to the right, which forms oil passages between passage 2 (6) and A₂ port, and between B₂ port and T port.

2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows to the bucket cylinder to extend the cylinder through the notched section of the spool (4) and A₂ port.

3. Return oil from the bucket cylinder flows to the transmission case through the B₂ port and T port.

---

PB: Passage 1
P: P Port
T: T Port
A₂: A₂ Port (To Bucket Cylinder)
B₂: B₂ Port (From Bucket Cylinder)
PB: PB Port

---

Diagram labels:
1. PB Passage 1
2. Boom Control Section
3. Bucket Control Section
4. Spool
5. Load Check Valve
6. Passage 2
1. When the hydraulic control lever is set to the “DUMP 2” position, the spool (4) of the bucket control section (3) moves to the right, which forms oil passages among passage 2 (6), A2 port and B2 port.

2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows to the bucket cylinder to extend the cylinder through the notched section of the spool (4) and A2 port.

3. Return oil from the bucket cylinder flows from the B2 port to the passage 2 (6), and flows together with the pressure-fed oil from the P port. As a result, the dump speed of this front loader is increased.

(Reference)
- The oil pressure of the A2 port and B2 port is identical, but the bucket cylinder extend by the difference of received pressure area (cylinder rod part).

1. PB Passage 1
2. Boom Control Section
3. Bucket Control Section
4. Spool
5. Load Check Valve
6. Passage 1

P : P Port  T : T Port  A2 : A2 Port (To Bucket Cylinder)  B2 : B2 Port (From Bucket Cylinder)  PB : PB Port
(2) LA271 • LA301 • LA351 (New Type Valve) and LA401 • LA272 • LA302 • LA352 • LA402 (4 Position Bucket Control)

The control valve assembly is composed of one casting block and four major sections as shown above. And the relief valve is installed on this valve.

(1) Inlet and Outlet Section
This section has P and T ports.
The P port is connected to the pump port of hydraulic block by the hydraulic hose.
The T port is connected to the return port of transmission case by the hydraulic hose.

(2) Boom Control Section
The boom control valve is of 4-position, 6-connection, detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has A1 and B1 ports and controls oil flow to the boom cylinder.

(3) Bucket Control Section
The bucket control valve is of 4-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has A2 and B2 ports and controls oil flow to the bucket cylinder.

(4) Power Beyond
This section has PB port which is connected to the power beyond port of hydraulic block by the hydraulic hose, and feeds oil to the three point hydraulic control valve.
1. Pressure-fed oil from the hydraulic pump is delivered into P port.
2. As the load check valve (7), (8) are kept closed in the neutral position, oil flows along the notched section of the spools (1), (3) to the PB port through the PB passage 1 (2) and 2 (6).
3. Then the oil is fed to the three point hydraulic system from the PB port.
1. When the hydraulic control lever is set to the "UP" position, the spool (1) of the boom control section (3) moves to the left, which forms oil passages between passage 1 (6) and B1 port, and between A1 port and PB passage 1 (2).
2. The pressure-fed oil from the P port opens the load check valve (5) and flows through the notched section of the spool (1) and B1 port to extend the boom cylinder.
3. Return oil from the boom cylinder flows from the A1 port through the passage in the spool (1) and PB passage 1 (2) to the bucket control section (4).

(1) Spool P: P Port
(2) PB Passage 1 T: T Port
(3) Boom Control Section A1: A1 Port (From Boom Cylinder)
(4) Bucket Control Section B1: B1 Port (To Boom Cylinder)
(5) Load Check Valve PB: PB Port
(6) Passage 1
1. When the hydraulic control lever is set to the “DOWN” position, the spool (1) moves to the right, which forms oil passages between passage 1 (6) and A1 port, and between B1 port and PB passage 1 (2).

2. The pressure-fed oil from the P port opens the load check valve (5) and flows through the notched section of the spool (1) and A1 port to retract the boom cylinder.

3. Return oil from the boom cylinder flows from the B1 port through the passage in the spool (1) and PB passage 1 (2) to the bucket control section (4).

(1) Spool
(2) PB Passage 1
(3) Boom Control Section
(4) Bucket Control Section
(5) Load Check Valve
(6) Passage 1

P : P Port
T : T Port
A1 : A1 Port (To Boom Cylinder)
B1 : B1 Port (From Boom Cylinder)
PB : PB Port
1. When the hydraulic control lever is set to the "FLOAT" position, the spool (1) moves to the right from the "DOWN" position and is retained by the detent mechanism (4).

2. This forms oil passages among the A1 port, B1 port and T port. As a result, oil in the boom cylinder flows freely from the A1 port and B1 port through the T port to the transmission case.

3. Oil entering the P port flows to the PB port via the PB passage 1 (2) and 2 (6). Then the oil flows to the three point hydraulic system.

- (1) Spool
- (2) PB Passage 1
- (3) Boom Control Section
- (4) Detent Mechanism
- (5) Bucket Control Section
- (6) PB Passage 2

P : P Port
T : T Port
A1 : A1 Port (From Boom Cylinder)
B1 : B1 Port (From Boom Cylinder)
PB : PB Port
1. When the hydraulic control lever is set to the "ROLL-BACK" position, the spool (4) of the bucket control section (3) moves to the left, which forms oil passages between passage 2 (6) and B2 port, and between A2 port and T port.

2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows through the notched section of the spool (4) and B2 port to retract the bucket cylinder.

3. Return oil from the bucket cylinder flows to the transmission case through the A2 port and T port.

PB: PB Port
P: P Port
T: T Port
A2: A2 Port (From Bucket Cylinder)
B2: B2 Port (To Bucket Cylinder)
PB: PB Port
1. When the hydraulic control lever is set to the "DUMP 1" position, the spool (4) of the bucket control section (3) moves to the right, which forms oil passages between passage 2 (6) and A2 port, and between B2 port and T port.

2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows to the bucket cylinder to extend the cylinder through the notched section of the spool (4) and A2 port.

3. Return oil from the bucket cylinder flows to the transmission case through the B2 port and T port.

(1) PB Passage 1
(2) Boom Control Section
(3) Bucket Control Section
(4) Spool
(5) Load Check Valve
(6) Passage 2

P : P Port
T : T Port
A2 : A2 Port (To Bucket Cylinder)
B2 : B2 Port (From Bucket Cylinder)
PB : PB Port
1. When the hydraulic control lever is set to the "DUMP 2" position, the spool (4) of the bucket control section (3) moves to the right, which forms oil passages among passage 2 (6), A2 port and B2 port.
2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows to the bucket cylinder to extend the cylinder through the notched section of the spool (4) and A2 port.
3. Return oil from the bucket cylinder flows from the B2 port to the passage 2 (6), and flows together with the pressure-fed oil from the P port.
As a result, the dump speed of this front loader is increased.

(Reference)
- The oil pressure of the A2 port and B2 port is identical, but the bucket cylinder extend by the difference of received pressure area (cylinder rod part).

(1) PB Passage 1  P : P Port
(2) Boom Control Section  T : T Port
(3) Bucket Control Section  A2 : A2 Port (To Bucket Cylinder)
(4) Spool  B2 : B2 Port (From Bucket Cylinder)
(5) Load Check Valve
(6) Passage 1  PB : PB Port
### (3) LA401 • LA272 • LA302 • LA352 • LA402 (3 Position Bucket Control)

#### Diagram

The control valve assembly is composed of one casting block and four major sections as shown above. And the relief valve is installed on this valve.

#### (1) Inlet and Outlet Section
This section has P and T ports.
- The P port is connected to the pump port of the hydraulic block by the hydraulic hose.
- The T port is connected to the return port of the transmission case by the hydraulic hose.

#### (2) Boom Control Section
The boom control valve is of 4-position, 6-connection, detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has A1 and B1 ports and controls oil flow to the boom cylinder.

#### (3) Bucket Control Section
The bucket control valve is of 3-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has A2 and B2 ports and controls oil flow to the bucket cylinder.

#### (4) Power Beyond
This section has PB port which is connected to the power beyond port of the hydraulic block by the hydraulic hose, and feeds oil to the three point hydraulic control valve.
1. Pressure-fed oil from the hydraulic pump is delivered into P port.
2. As the load check valve (7), (8) are kept closed in the neutral position, oil flows along the notched section of the spools (1), (3) to the PB port through the PB passage 1 (2) and 2 (6).
3. Then the oil is fed to the three point hydraulic system from the PB port.
1. When the hydraulic control lever is set to the "ROLL-BACK" position, the spool (4) of the bucket control section (3) moves to the left, which forms oil passages between passage 2 (6) and B2 port, and between A2 port and T port.

2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows through the notched section of the spool (4) and B2 port to retract the bucket cylinder.

3. Return oil from the bucket cylinder flows to the transmission case through the A2 port and T port.

(1) PB Passage 1
(2) Boom Control Section
(3) Bucket Control Section
(4) Spool
(5) Load Check Valve
(6) Passage 2

P : P Port
T : T Port
A2 : A2 Port (From Bucket Cylinder)
B2 : B2 Port (To Bucket Cylinder)
PB : PB Port
1. When the hydraulic control lever is set to the "DUMP" position, the spool (4) of the bucket control section (3) moves to the right, which forms oil passages among passage 2 (6), A2 port and B2 port.

2. The pressure-fed oil from the P port flows through the boom control section (2), opens the load check valve (5), and flows to the bucket cylinder to extend the cylinder through the notched section of the spool (4) and A2 port.

3. Return oil from the bucket cylinder flows from the B2 port to the passage 2 (6), and flows together with the pressure-fed oil from the P port.

As a result, the dump speed of this front loader is increased.

(Reference)
- The oil pressure of the A2 port and B2 port is identical, but the bucket cylinder extend by the difference of received pressure area (cylinder rod part).

(1) PB Passage 1
(2) Boom Control Section
(3) Bucket Control Section
(4) Spool
(5) Load Check Valve
(6) Passage 2

P : P Port
t : T Port
A2 : A2 Port (To Bucket Cylinder)
B2 : B2 Port (From Bucket Cylinder)
PB : PB Port
[4] RELIEF VALVE

A pilot operated relief valve is used on these models. This relief valve is suitable for a high pressure and large volumetric flow, and has better pressure override performance than direct acting relief valves.

This relief valve is a combination valve combining a relief operation and anti-cavitation operation.

(1) Relief Valve Poppet
(2) Check Valve Poppet
(3) Spring
(4) Main Body
(5) Adjust Screw
(6) Poppet
(7) Spring
(8) Pilot Poppet
(9) Jam Nut
(10) Acorn Nut

 Relief Operation

[Step 1]
The relief valve is in communication between the high pressure port HP and low pressure LP. Oil is admitted through the hole in poppet (6) and because of the differential area between diameters A and B relief valve poppet (1) and check valve poppet (2) are tightly seated as shown in the first step.

(1) Relief Valve Poppet
(2) Check Valve Poppet

[Step 2]
The oil pressure in the high pressure port HP has reached the setting of the pilot poppet spring force and unseats the pilot poppet (8) and oil flows around the poppet-through the cross drilled holes and to the low pressure area LP.

(8) Pilot Poppet
[Step 3]
The loss of oil behind poppet (6), effected by the opening of pilot poppet (8), causes poppet (6) to move back and seat against pilot poppet (8). This shuts off the oil flow to the area behind relief valve poppet (1), and causes a low pressure area internally.

(1) Relief Valve Poppet
(6) Poppet

[Step 4]
The imbalance of pressure on the inside as compared to that of the high pressure port HP, forces the relief valve poppet (1) to open and relieve the oil directly to the low pressure chamber LP in the valve.

(Reference)

<table>
<thead>
<tr>
<th>Oil temperature</th>
<th>Valve opening pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 to 55°C</td>
<td>LA271 / LA272</td>
</tr>
<tr>
<td>(113 to 131°F)</td>
<td>13.1 to 13.8 MPa</td>
</tr>
<tr>
<td></td>
<td>LA351 / LA352</td>
</tr>
<tr>
<td></td>
<td>133.5 to 140.5 kgf/cm²</td>
</tr>
<tr>
<td></td>
<td>LA401 / LA402</td>
</tr>
<tr>
<td></td>
<td>1900 to 2000 psi</td>
</tr>
<tr>
<td></td>
<td>LA301 / LA302</td>
</tr>
<tr>
<td></td>
<td>14.5 to 15.2 MPa</td>
</tr>
<tr>
<td></td>
<td>144.5 to 152 kgf/cm²</td>
</tr>
<tr>
<td></td>
<td>2100 to 2200 psi</td>
</tr>
</tbody>
</table>

(1) Relief Valve Poppet

---

Anti-cavitation Operation
The anti-void unit supplies oil to the high pressure port HP when cavitation has occurred. A lower pressure exists in the port HP compared to the low pressure chamber LP. The difference between the effective area of diameter A and G causes imbalance of the check valve poppet (2) which unseats, thus allowing oil from the low pressure chamber LP to enter the port HP and fill the void.

(2) Check Valve Poppet

---

LA271 • LA301 • LA351

---

(1) Acorn Nut
(2) Jam Nut
(3) Control Valve Body
(4) Ball
(5) Relief Seat
(6) Ball Retainer
(7) Spring
(8) Adjusting Screw
[5] BOOM CYLINDER AND BUCKET CYLINDER

They are single-rod double acting cylinders in which the reciprocating motion of the piston is controlled by hydraulic force applied to both of its ends.

Both boom cylinder and bucket cylinder consist of a head (4), cylinder tube (3), piston rod (5), piston (2), and other parts as shown in the figure above.

Cylinder Specifications

<table>
<thead>
<tr>
<th></th>
<th>LA271 / LA272</th>
<th>LA301 / LA302</th>
<th>LA351 / LA352</th>
<th>LA401 / LA402</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boom Cylinder</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cylinder I.D.</td>
<td>38.1 mm (1.50 in.)</td>
<td>38.1 mm (1.50 in.)</td>
<td>44.5 mm (1.75 in.)</td>
<td>44.5 mm (1.75 in.)</td>
</tr>
<tr>
<td>Rod O.D.</td>
<td>25.4 mm (1.00 in.)</td>
<td>25.4 mm (1.00 in.)</td>
<td>25.4 mm (1.00 in.)</td>
<td>25.4 mm (1.00 in.)</td>
</tr>
<tr>
<td>Stroke</td>
<td>307 mm (12.10 in.)</td>
<td>307 mm (12.10 in.)</td>
<td>289 mm (11.40 in.)</td>
<td>435 mm (17.13 in.)</td>
</tr>
<tr>
<td><strong>Bucket Cylinder</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cylinder I.D.</td>
<td>38.1 mm (1.50 in.)</td>
<td>38.1 mm (1.50 in.)</td>
<td>44.5 mm (1.75 in.)</td>
<td>44.5 mm (1.75 in.)</td>
</tr>
<tr>
<td>Rod O.D.</td>
<td>25.4 mm (1.00 in.)</td>
<td>25.4 mm (1.00 in.)</td>
<td>25.4 mm (1.00 in.)</td>
<td>25.4 mm (1.00 in.)</td>
</tr>
<tr>
<td>Stroke</td>
<td>330 mm (13.00 in.)</td>
<td>330 mm (13.00 in.)</td>
<td>330 mm (13.00 in.)</td>
<td>450 mm (17.72 in.)</td>
</tr>
</tbody>
</table>
SERVICING

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[2] GENERAL PRECAUTION ..........................................................................................S-1
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GENERAL

[1] IDENTIFICATION

When contacting your local KUBOTA distributor, always specify front loader model and serial number.

(1) Model / Serial Number

[2] GENERAL PRECAUTION

- During disassembly, carefully arrange removed parts in a clean area to prevent later confusion. Screws, bolts and nuts should be replaced in their original positions to prevent reassembly errors.
- When special tools are required, use genuine KUBOTA tools. Special tools which are not used frequently should be made according to the drawings provided.
- Clean parts before measuring them.
- Use only genuine KUBOTA parts for parts replacement to maintain loader performance and to assure safety.
- O-rings and oil seals must be replaced during reassembly. Apply grease to new O-rings or oil seals before reassembling.
### [3] LUBRICANTS

To prevent serious damage to hydraulic systems, use only specified fluid or its equivalent.

<table>
<thead>
<tr>
<th>Place</th>
<th>Capacities</th>
<th>Lubricants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B7300</td>
<td>B1700</td>
</tr>
<tr>
<td>Transmission Case (Front loader is not attached)</td>
<td>(for Gear)</td>
<td>(for HST)</td>
</tr>
<tr>
<td></td>
<td>11 L</td>
<td>12 L</td>
</tr>
<tr>
<td>Grease fittings</td>
<td>Until grease overflows</td>
<td>Multi-purpose type grease</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place</th>
<th>Capacities</th>
<th>Lubricants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B7400</td>
<td>B7500</td>
</tr>
<tr>
<td>Transmission Case (Front loader is not attached)</td>
<td>(for Gear)</td>
<td>(for HST)</td>
</tr>
<tr>
<td></td>
<td>11.2 L</td>
<td>11.5 L</td>
</tr>
<tr>
<td>Grease fittings</td>
<td>Until grease overflows</td>
<td>Multi-purpose type grease</td>
</tr>
</tbody>
</table>

**NOTE:**

*1 KUBOTA UDT or SUPER UDT Fluid ................... KUBOTA original transmission hydraulic fluid
*2 B2710 Serial No.: ~15496
*3 B2710 Serial No.: 50101 ~

### [4] MAINTENANCE CHECK LIST

To keep the machine working in good condition as well as to avoid any accident and trouble, carry out periodic inspection and maintenance. Check the following points before use.

<table>
<thead>
<tr>
<th>Service Interval</th>
<th>Check Points</th>
<th>Reference Page</th>
</tr>
</thead>
</table>
| Daily (Each use) | • Check the transmission fluid level  
                  • Check the hydraulic hoses | S-3 |
| Every 10 hours   | • Grease all grease fittings  
                  • Lubricate joints of control lever linkage | S-3 |

### [5] CHECK AND MAINTENANCE

**CAUTION**

- When checking and repairing, park the tractor on flat ground and apply the parking brake.
- When checking and repairing, lower the bucket and stop the engine.
(1) Check Points of Each Use or Daily

Checking Transmission Fluid Level
1. Check the oil level at the dipstick (2).
2. If the level is too low, add new oil to the prescribed level at the oil inlet.

**IMPORTANT**
- If oil level is low, do not run engine.

(1) Oil Filling Plug  
(2) Dipstick

(A) Oil level is acceptable within this range.

Checking Hydraulic Hoses
1. Check all hydraulic hoses for cuts or wear.
2. If defects are found, replace them.

(2) Check Points of Every 10 Hours

Greasing
1. Inject grease in all grease fittings with a hand grease gun.

Lubricating
1. Lubricate joints of control lever linkage.
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause</th>
<th>Solution</th>
<th>Reference Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boom Does Not Rise</td>
<td>• Control valve malfunctioning</td>
<td>Repair or replace</td>
<td>S-9</td>
</tr>
<tr>
<td></td>
<td>• Boom cylinder defective</td>
<td>Repair or replace</td>
<td>S-12</td>
</tr>
<tr>
<td></td>
<td>• Control lever linkage defective</td>
<td>Repair or replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hydraulic pump malfunctioning</td>
<td>Repair or replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Oil filter clogged</td>
<td>Clean or replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relief valve spring damaged</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hydraulic hose damaged</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relief valve dirty or stuck</td>
<td>Clean or replace</td>
<td></td>
</tr>
<tr>
<td>Boom Does Not Lower</td>
<td>• Control valve malfunctioning</td>
<td>Repair or replace</td>
<td>S-9</td>
</tr>
<tr>
<td>Insufficient Boom Speed</td>
<td>• Boom cylinder tube worn or damaged</td>
<td>Replace</td>
<td>S-12</td>
</tr>
<tr>
<td></td>
<td>• Boom cylinder piston ring (piston seal and O-ring) worn or damaged</td>
<td>Replace</td>
<td>S-13</td>
</tr>
<tr>
<td></td>
<td>• Oil leaks from tube joints</td>
<td>Repair</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relief valve setting pressure too low</td>
<td>Adjust</td>
<td>S-9</td>
</tr>
<tr>
<td></td>
<td>• Insufficient transmission fluid</td>
<td>Refill</td>
<td>S-2</td>
</tr>
<tr>
<td></td>
<td>• Dirty relief valve</td>
<td>Clean</td>
<td></td>
</tr>
<tr>
<td>Bucket Does Not Move</td>
<td>• Control valve malfunctioning</td>
<td>Repair or replace</td>
<td>S-9</td>
</tr>
<tr>
<td></td>
<td>• Boom cylinder defective</td>
<td>Repair or replace</td>
<td>S-12</td>
</tr>
<tr>
<td></td>
<td>• Control lever linkage defective</td>
<td>Repair or replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hydraulic pump malfunctioning</td>
<td>Repair or replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Oil filter clogged</td>
<td>Clean or replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relief valve spring damaged</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hydraulic hose damaged</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dirty relief valve</td>
<td>Clean</td>
<td></td>
</tr>
<tr>
<td>Insufficient Bucket Speed</td>
<td>• Bucket cylinder tube worn or damaged</td>
<td>Replace</td>
<td>S-12</td>
</tr>
<tr>
<td></td>
<td>• Bucket cylinder piston ring (piston seal and O-ring) worn or damaged</td>
<td>Replace</td>
<td>S-13</td>
</tr>
<tr>
<td></td>
<td>• Oil leaks from tube joints</td>
<td>Repair</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relief valve setting pressure too low</td>
<td>Adjust</td>
<td>S-9</td>
</tr>
<tr>
<td></td>
<td>• Insufficient transmission fluid</td>
<td>Refill</td>
<td>S-2</td>
</tr>
<tr>
<td></td>
<td>• Dirty relief valve</td>
<td>Clean</td>
<td></td>
</tr>
<tr>
<td>Front End Loader Drops by Its Weight</td>
<td>• Boom cylinder tube worn or damaged</td>
<td>Replace</td>
<td>S-12</td>
</tr>
<tr>
<td></td>
<td>• Boom cylinder piston ring (piston seal and O-ring) worn or damaged</td>
<td>Replace</td>
<td>S-13</td>
</tr>
<tr>
<td></td>
<td>• Oil leaks from tube joints</td>
<td>Repair</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Control valve malfunctioning</td>
<td>Repair or replace</td>
<td></td>
</tr>
</tbody>
</table>
## SERVICING SPECIFICATIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Factory Specification</th>
<th>Allowable Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relief Valve Setting Pressure</td>
<td>13.1 to 13.8 MPa</td>
<td>–</td>
</tr>
<tr>
<td>LA271 / LA272</td>
<td>133.5 to 140.5 kgf/cm²</td>
<td>–</td>
</tr>
<tr>
<td>LA351 / LA352</td>
<td>1900 to 2000 psi</td>
<td>–</td>
</tr>
<tr>
<td>LA401 / LA402</td>
<td>14.5 to 15.2 MPa</td>
<td>–</td>
</tr>
<tr>
<td>LA301 / LA302</td>
<td>147.5 to 154.6 kgf/cm²</td>
<td>–</td>
</tr>
<tr>
<td>Engine Speed</td>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>Oil Temperature</td>
<td>45 to 55 °C</td>
<td></td>
</tr>
<tr>
<td>Piston Rod Bend</td>
<td>–</td>
<td>0.25 mm 0.0098 in.</td>
</tr>
</tbody>
</table>

## TIGHTENING TORQUES

### [1] GENERAL USE SCREWS, BOLTS AND NUTS

Screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual should be tightened according to the table below.

<table>
<thead>
<tr>
<th>American standard cap screws with UNC or UNF threads</th>
<th>Metric cap screws</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade</strong></td>
<td><strong>Property class 8.8 (Approx. SAE grade 5)</strong></td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td><strong>Unit</strong></td>
</tr>
<tr>
<td><strong>Unit</strong></td>
<td><strong>N·m</strong></td>
</tr>
<tr>
<td>1/4</td>
<td>9.8 to 11.7</td>
</tr>
<tr>
<td>5/16</td>
<td>19.0 to 23.1</td>
</tr>
<tr>
<td>3/8</td>
<td>33.9 to 40.7</td>
</tr>
<tr>
<td>1/2</td>
<td>88.1 to 105.8</td>
</tr>
<tr>
<td>9/16</td>
<td>122.0 to 146.4</td>
</tr>
<tr>
<td>5/8</td>
<td>176.3 to 211.5</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### [2] HYDRAULIC FITTINGS

<table>
<thead>
<tr>
<th>Item</th>
<th>Thread size</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable elbow and adapter</td>
<td>9/16</td>
<td>37 to 44</td>
</tr>
<tr>
<td></td>
<td>3/4</td>
<td>47 to 54</td>
</tr>
<tr>
<td>Hose fitting and flare nut</td>
<td>9/16</td>
<td>22 to 25</td>
</tr>
<tr>
<td></td>
<td>3/4</td>
<td>35 to 41</td>
</tr>
<tr>
<td></td>
<td>7/8</td>
<td>65 to 71</td>
</tr>
<tr>
<td></td>
<td>1/4</td>
<td>30 to 35</td>
</tr>
<tr>
<td>Adapter (NPT)</td>
<td>3/8</td>
<td>39 to 44</td>
</tr>
<tr>
<td></td>
<td>1/2</td>
<td>49 to 58</td>
</tr>
</tbody>
</table>

NOTE: When connecting a hose with flare nut, after tightening the nut with specified torque, return it approximately 45 degrees and re-tighten it to specified torque.
[3] TIGHTENING TORQUES OF SCREWS, BOLTS AND NUTS ON THE TABLE BELOW ARE ESPECIALLY SPECIFIED

<table>
<thead>
<tr>
<th>Item</th>
<th>N·m</th>
<th>kgf·m</th>
<th>ft-lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control valve cover mounting bolt</td>
<td>23.1 to 25.7</td>
<td>2.4 to 2.6</td>
<td>17 to 19</td>
</tr>
<tr>
<td>Control valve mounting bolt</td>
<td>12.2 to 13.6</td>
<td>1.2 to 1.4</td>
<td>9 to 10</td>
</tr>
<tr>
<td>Connecting bar mounting bolt and nut</td>
<td>147</td>
<td>15.0</td>
<td>108</td>
</tr>
<tr>
<td>Control valve stay mounting bolt and nut</td>
<td>83</td>
<td>8.5</td>
<td>61</td>
</tr>
<tr>
<td>Front guard mounting bolt and nut</td>
<td>83</td>
<td>8.5</td>
<td>61</td>
</tr>
<tr>
<td>Brace mounting bolt and nut (LA271-LA301-LA351-LA272-LA302-LA352)</td>
<td>135</td>
<td>14.0</td>
<td>100</td>
</tr>
<tr>
<td>(LA401-LA402)</td>
<td>147</td>
<td>15.0</td>
<td>108</td>
</tr>
<tr>
<td>Main frame mounting bolt (M14) (M12)</td>
<td>147</td>
<td>15.0</td>
<td>108</td>
</tr>
<tr>
<td>(LA271-LA301-LA351-LA272-LA302-LA352)</td>
<td>83</td>
<td>8.5</td>
<td>61</td>
</tr>
<tr>
<td>Boom and bucket cylinder piston mounting nut (LA271-LA301-LA351-LA272-LA302-LA352)</td>
<td>170 to 183</td>
<td>17.3 to 18.6</td>
<td>125 to 135</td>
</tr>
<tr>
<td>(LA401-LA402)</td>
<td>122 to 135</td>
<td>12.4 to 13.8</td>
<td>90 to 100</td>
</tr>
</tbody>
</table>

DISMOUNTING FRONT LOADER FROM TRACTOR

■ IMPORTANT
- When dismounting the loader, park the tractor on flat and hard ground, apply the parking brake.
- When starting the engine or using the hydraulic control valve, always sit in the operator's seat.

[1] LA271 • LA301 • LA351

**Side Frame**
1. Start the engine and run at a slow idle.
2. Lower the boom and level the bucket.
3. Raise the front wheels slightly.
4. Stop the engine.
5. Remove the mounting pins from the loader main frame (1).
6. Pull the stands (4) from the top of the loader side frames (2) and rotate them to the level with the ground.
7. Slide the stands (4) toward the front of the tractor. Then rotate stands to the ground level and insert the mounting pins (3) through the stands and side frames (2).
8. Start the engine and run at a slow idle.
9. Slowly move the hydraulic control lever to up position to raise the loader side frames up and out of the main frame sockets until the stands (4) are vertical position with ground.
10. Stop the engine.

(1) Main Frame (3) Mounting Pin
(2) Side Frame (4) Stand
Hoses
1. Slowly release the hydraulic pressure by moving the hydraulic control lever in all directions.
2. Disconnect the four hoses (1) with quick couplers from the control valve (2).
3. Place the protective caps and plugs on the quick coupler ends and nipple ends.
4. Start the engine and slowly back the tractor away from the loader.

(1) Hose  (2) Control Valve

Stand
1. Start the engine and run at an idle.
2. Raise the boom until the stands (1) can be rotated.
3. Stop the engine.
4. Remove the snap pins holding the stands (1) to the boom.
5. Slide the stands (1) to outside and rotate the stand to the setting position. Then slide the stands back and set them with snap pins (2).
6. Start the engine and run at an idle.
7. Dump the bucket approximately 20 degrees.
8. Lower the boom and raise the front wheels slightly.
9. Stop the engine.

(1) Stand  (2) Snap Pin

Side Frame
1. Remove the mounting pins from the loader side frames.
2. Start the engine and run at an idle.
3. Slowly move the hydraulic control lever (1) to "ROLL-BACK" position to raise the loader side frames up and out of the main frame sockets.
4. Stop the engine.

(1) Hydraulic Control Lever
Hoses
1. Slowly release the hydraulic pressure by moving the hydraulic control lever in all direction.
2. Disconnect the four hoses (1) with quick couplers from the control valve (2).
3. Place the protective caps and plugs on the quick coupler ends.
4. Start the engine and slowly back the tractor away from the loader.

(1) Hose | (2) Control Valve
### Relief Valve Setting Pressure

1. Remove the hose with quick coupler from the A2 port (1) of the control valve, and set a pressure gauge.
2. Start the engine, warm it up at an idle, and then set the engine speed at maximum.
3. Move the hydraulic control lever to "DUMP" position, and read the pressure gauge indication when a sound indicating the relief valve operation is heard.
4. If the pressure is not within the factory specifications, remove the acorn nut (4) and loosen the jam nut (3) then adjust by adjust screw (5).

<table>
<thead>
<tr>
<th>Relief valve setting pressure</th>
<th>Factory spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA271 / LA272</td>
<td>13.1 to 13.8 MPa</td>
</tr>
<tr>
<td>LA351 / LA352</td>
<td>133.5 to 140.5 kgf/cm²</td>
</tr>
<tr>
<td>LA401 / LA402</td>
<td>1900 to 2000 psi</td>
</tr>
<tr>
<td>LA301 / LA302</td>
<td>14.5 to 15.2 MPa</td>
</tr>
<tr>
<td>LA401 / LA402</td>
<td>147.5 to 154.6 kgf/cm²</td>
</tr>
<tr>
<td>LA301 / LA302</td>
<td>2100 to 2200 psi</td>
</tr>
</tbody>
</table>

**Condition**
- Engine speed ...... Maximum
- Oil temperature ... 45 to 55 °C
  113 to 131 °F

(1) A2 Port  
(2) Relief Valve  
(3) Jam Nut  
(4) Acorn Nut  
(5) Adjust Screw
DISASSEMBLING AND ASSEMBLING

Hydraulic Hose and Control Valve Cover
1. Disconnect the hydraulic hoses from the control valve.
2. Remove the control valve cover (1).

(When reassembling)

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Control valve cover mounting bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23.1 to 25.7 N·m</td>
</tr>
<tr>
<td></td>
<td>2.4 to 2.6 kgf·m</td>
</tr>
<tr>
<td></td>
<td>17 to 19 ft-lbs</td>
</tr>
</tbody>
</table>

(1) Control Valve Cover

Control Lever Rod and Control Valve
1. Disconnect the control lever rods (4) and (5) at the control valve spools and remove the control lever (1) with them.
2. Remove the control valve (2) from the valve stay (3).

(When reassembling)

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Control valve mounting bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12.2 to 13.6 N·m</td>
</tr>
<tr>
<td></td>
<td>1.2 to 1.4 kgf·m</td>
</tr>
<tr>
<td></td>
<td>9 to 10 ft-lbs</td>
</tr>
</tbody>
</table>

(Reference)
- The length "A" of rod 1 should be adjusted as follows.
  - LA271 - LA301 - LA351: 74.4 to 75.4 mm (2.93 to 2.97 in.)
  - LA401 - LA272 - LA302 - LA352 - LA402 and New Valve: 60.2 to 61.2 mm (2.37 to 2.41 in.)

(1) Control Lever (4) Rod 1
(2) Control Valve (5) Rod 2
(3) Valve Stay

Adapter and Elbow
1. Remove the adapters and elbows from the control valve.

(When reassembling)
- Use care not to damage the O-ring.

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Adapter and elbow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>47.5 to 54.2 N·m</td>
</tr>
<tr>
<td></td>
<td>4.8 to 5.5 kgf·m</td>
</tr>
<tr>
<td></td>
<td>35 to 40 ft-lbs</td>
</tr>
</tbody>
</table>

- Install the elbow angle as indicated below.
  PB port: 0°

(1) A1 Port (Adapter)  (5) B2 Port (Adapter)
(2) B1 Port (Adapter)  (6) PB Port (Elbow)
(3) P Port (Adapter)   (7) A2 Port (Adapter)
Disassembling Control Valve (For LA401 • LA272 • LA302 • LA352 • LA402 and New Valve)

**SERVICING**

(14) Wiper Ring
(15) O-ring
(16) Spool for Bucket
(17) O-ring
(18) Wiper Ring
(19) Screw
(20) Seal Plate
(21) Screw
(22) Cap Screw
(23) Collar
(24) Plug
(25) Spring
(26) Load Check Valve
(27) Valve Housing
(28) Spool for Bucket
(29) Screw
(30) Cap
(31) Sleeve
(32) Ball
(33) Spring
(34) Ball
(35) Pin
(36) Seal Plate
(37) Spacer
(38) Spring Seat
(39) Spring
(40) Spring Seat
(41) Seal Plate
(42) Wiper Ring
(43) O-ring
(44) Seal Ring
(45) Relief Valve
(46) Spool for Boom
(47) O-ring
(48) Spacer
(49) O-ring
(50) Wiper Ring
(51) Seal Plate
(52) Screw

**Boom Control Section**
1. Remove the plug (24) and take out the spring (25) and load check valve (26).
2. Remove the seal plates (51), wiper ring (50) and spacer from the valve housing (27).
3. Remove the cap (30) and spacer (37), and draw out the spool (46) with other component parts from valve housing (27).

**Bucket Control Section**
1. Remove the plug (24) and take out the spring (25) and load check valve (26).
2. Remove the seal plate (20) and wiper ring (18) from the valve housing (27).

**[3 Position Bucket Control Type]**
3. Remove the cap (2), seal plate (13) and wiper ring (14), and draw out the spool (28) with other component parts from the valve housing (27).

**[4 Position Bucket Control Type]**
3. Remove the cap (2), seal plate (8), spacer (9), seal plate (13) and wiper ring (14), and draw out the spool (16) with other component parts from the valve housing (27).

**(When reassembling)**
- Clean all parts with a suitable solvent, and dry with a lint-free cloth or air.
- Visually inspect all parts for signs of scoring of damage.
- Install the spool and spacer to the valve housing, using care not to damage the O-rings.

17021500060
[2] BUCKET, BOOM AND HYDRAULIC CYLINDERS
DISASSEMBLING AND ASSEMBLING

Bucket
1. Remove the pins (1) and remove the bucket (2).

(1) Pin
(2) Bucket

Boom and Hydraulic Cylinders
1. Disconnect the hydraulic hoses from the hydraulic cylinders (3), (4).
2. Remove the pins and remove the hydraulic cylinders (3), (4).
3. Disconnect the hydraulic hoses (6) with quick couplers at the control valve (5).
4. Remove the pin and remove the boom (2) from the side frame (1).
5. Remove the hydraulic tubes (7) from the boom (2).

(When reassembling)
- When installing the hydraulic cylinders (3), (4), the hydraulic port should face inside and be careful of the direction of grease fittings.

(1) Side Frame
(2) Boom Cylinder
(3) Boom Cylinder
(4) Bucket Cylinder
(5) Control Valve
(6) Hose 1 and 2
(7) Hydraulic Tubes
**Piston Rod Assembly**

1. Drain hydraulic oil from the cylinder, and secure the tube end of the cylinder in a vise.
2. Unscrew the cylinder head (1) with the adjustable gland nut wrench (4).
3. Pull out the piston rod assembly (2) from the cylinder tube (3).

**When reassembling**

- Visually inspect the cylinder tube for signs of scoring or damage.
- Insert the piston rod assembly to the cylinder tube, using care not to damage the piston seal on the piston.
- Install the cylinder head to the cylinder tube, using care not to damage the O-ring on the cylinder head.

(1) Cylinder Head  
(2) Piston Rod Assembly  
(3) Cylinder Tube  
(4) Adjustable Gland Nut Wrench

**Cylinder Head, Piston and Nut**

1. Secure the rod end in a vise.
2. Unscrew the nut (4), and remove the piston (3) and cylinder head (2) from the piston rod (1).

**When reassembling**

- Visually inspect all parts for signs of scoring or damage.
- Insert the piston rod to the cylinder head, using care not to damage the wiper seal (5) and oil seal (6).

---

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Boom cylinder piston mounting nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LA271 / LA272</td>
</tr>
<tr>
<td></td>
<td>LA301 / LA302</td>
</tr>
<tr>
<td></td>
<td>LA351 / LA352</td>
</tr>
<tr>
<td></td>
<td>LA401 / LA402</td>
</tr>
<tr>
<td></td>
<td>12.4 to 13.8 kgf·m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Bucket cylinder piston mounting nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LA271 / LA272</td>
</tr>
<tr>
<td></td>
<td>LA301 / LA302</td>
</tr>
<tr>
<td></td>
<td>LA351 / LA352</td>
</tr>
<tr>
<td></td>
<td>LA401 / LA402</td>
</tr>
<tr>
<td></td>
<td>12.4 to 13.8 kgf·m</td>
</tr>
</tbody>
</table>

(1) Piston Rod  
(2) Cylinder Head  
(3) Piston  
(4) Nut  
(5) Wiper Seal  
(6) Oil Seal  
(7) O-ring
Piston Seal and O-ring

1. Remove the piston seal (2) and O-ring (3) from the piston (1).

**IMPORTANT**
- When installing the O-ring (3) and piston seal (2) to the piston (1), use the slide jig and correcting jig as shown in the figure.

<table>
<thead>
<tr>
<th></th>
<th>LA271 / LA301 / LA272 / LA302</th>
<th>LA351 / LA401 / LA352 / LA402</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>80°</td>
<td>80°</td>
</tr>
<tr>
<td>B</td>
<td>3° 0.0523 rad.</td>
<td>3° 0.0523 rad.</td>
</tr>
<tr>
<td>C</td>
<td>37.46 mm 1.475 in.</td>
<td>43.8 mm 1.724 in.</td>
</tr>
<tr>
<td>D</td>
<td>39.46 mm 1.554 in.</td>
<td>45.8 mm 1.803 in.</td>
</tr>
<tr>
<td>E</td>
<td>76.0 mm 2.992 in.</td>
<td>75.5 mm 2.972 in.</td>
</tr>
<tr>
<td>F</td>
<td>14.0 mm 0.551 in.</td>
<td>14.5 mm 0.571 in.</td>
</tr>
<tr>
<td>G</td>
<td>100.0 mm 3.937 in.</td>
<td>100.0 mm 3.937 in.</td>
</tr>
<tr>
<td>H</td>
<td>70.0 mm 2.756 in.</td>
<td>70.0 mm 2.756 in.</td>
</tr>
<tr>
<td>I</td>
<td>110.0 mm 4.331 in.</td>
<td>110.0 mm 4.331 in.</td>
</tr>
<tr>
<td>J</td>
<td>3° 0.0523 rad.</td>
<td>3° 0.0523 rad.</td>
</tr>
<tr>
<td>K</td>
<td>38.1 mm 1.5 in.</td>
<td>44.45 mm 1.75 in.</td>
</tr>
<tr>
<td>L</td>
<td>47.83 mm 1.875 in.</td>
<td>55.0 mm 2.165 in.</td>
</tr>
</tbody>
</table>

(1) Piston Seal  (2) Piston  (3) O-ring

**Installing O-ring and Piston Seal**

1. Place the slide jig (2) on the piston (4).
2. Install the O-ring (3) on the piston using the slide jig.
3. Install the piston seal (1) over the O-ring using the slide jig.
4. Compress the piston seal to the correct size by installing the piston into the correcting jig (5).

**NOTE**
- Do not turn (roll) the piston seal as you install it.

(1) Piston Seal  (2) Slide Jig  (3) O-ring  (4) Piston  (5) Correcting Jig
SERVICING

Piston Rod Bend
1. Place piston rod on V blocks.
2. Set a dial indicator on the center of the rod.
3. Turn the piston rod and read the dial indicator.
4. If the measurement exceeds the allowable limit, replace it.

<table>
<thead>
<tr>
<th>Piston rod bend</th>
<th>Allowable limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.25 mm</td>
</tr>
<tr>
<td></td>
<td>0.0098 in.</td>
</tr>
</tbody>
</table>

[3] MAIN FRAME, BRACE AND OTHERS
DISASSEMBLING AND ASSEMBLING

Boom Assembly
1. Disconnect the four hydraulic hoses (1) with quick couplers at the control valve (2).
2. Remove the pins (4) and separate the boom assembly (5) from the side frame (3).

(1) Hose 1 and 2
(2) Control Valve
(3) Side Frame
(4) Mounting Pin
(5) Boom Assembly
Connecting Bar and Side Frame
1. Remove the connecting bar (1) from the side frames (2).
2. Remove the mounting pins (3).
3. Remove the side frames (2) from the main frame (4).

(When reassembling)

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Connecting bar mounting bolt and nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>147 N·m</td>
</tr>
<tr>
<td></td>
<td>15.0 kgf·m</td>
</tr>
<tr>
<td></td>
<td>108 ft-lbs</td>
</tr>
</tbody>
</table>

(1) Connecting Bar  (3) Mounting Pin
(2) Side Frame     (4) Main Frame

Control Valve with Stay
1. Disconnect the hydraulic hoses (1), (2), (3) from the control valve (4).
2. Remove the stay mounting bolts and nuts and remove the control valve (4) with stay (5).

(When reassembling)

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Control valve stay mounting bolt and nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>83 N·m</td>
</tr>
<tr>
<td></td>
<td>8.5 kgf·m</td>
</tr>
<tr>
<td></td>
<td>61 ft-lbs</td>
</tr>
</tbody>
</table>

(1) Hose 5 (PB)    (4) Control Valve
(2) Hose 6 (P)     (5) Control Valve Stay
(3) Hose 7 (T)
Front Guard (Option for LA271 - LA272)
1. Remove the front guard (1).

(When reassembling)

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Front guard mounting bolt and nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>83 N·m</td>
</tr>
<tr>
<td></td>
<td>8.5 kgf·m</td>
</tr>
<tr>
<td></td>
<td>61 ft-lbs</td>
</tr>
</tbody>
</table>

(1) Front Guard

Brace
1. Remove the brace mounting bolts and nuts at the main frame (2).
2. Remove the brace mounting bolts and nuts at the tractor front frame (3), and separate the brace (1).

(When reassembling)
- Do not tighten any bolts firmly until most components are attached onto the tractor.

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Brace mounting bolt and nut</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LA271 / LA272</td>
</tr>
<tr>
<td></td>
<td>135 N·m</td>
</tr>
<tr>
<td></td>
<td>14.0 kgf·m</td>
</tr>
<tr>
<td></td>
<td>100 ft-lbs</td>
</tr>
<tr>
<td></td>
<td>LA351 / LA352</td>
</tr>
<tr>
<td></td>
<td>147 N·m</td>
</tr>
<tr>
<td></td>
<td>15.0 kgf·m</td>
</tr>
<tr>
<td></td>
<td>108 ft-lbs</td>
</tr>
</tbody>
</table>

(1) Brace
(2) Main Frame
(3) Tractor Front Frame
Main Frame

1. Remove the main frame mounting bolts and nuts from the tractor body and sub frames (2).
2. Remove the main frame (1).

*(When reassembling)*
• Do not tighten any bolts firmly until most components are attached onto the tractor.

<table>
<thead>
<tr>
<th>Tightening torque</th>
<th>Main frame mounting bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M12</td>
</tr>
<tr>
<td></td>
<td>83 N·m</td>
</tr>
<tr>
<td></td>
<td>8.5 kgf·m</td>
</tr>
<tr>
<td></td>
<td>61 ft-lbs</td>
</tr>
<tr>
<td></td>
<td>M14</td>
</tr>
<tr>
<td></td>
<td>147 N·m</td>
</tr>
<tr>
<td></td>
<td>15.0 kgf·m</td>
</tr>
<tr>
<td></td>
<td>108 ft-lbs</td>
</tr>
</tbody>
</table>

(1) Main Frame  (2) Sub Frame