

WSM

WORKSHOP MANUAL
FRONT LOADER

LA181, LA211

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 Loader LA181 and LA211. It is divided into two parts, "Mechanism" and "Servicing".

■ Mechanism

Information on the construction and function are include. 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.

The right is reserved to make changes in all information at any time without notice.

November 2002

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels 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.



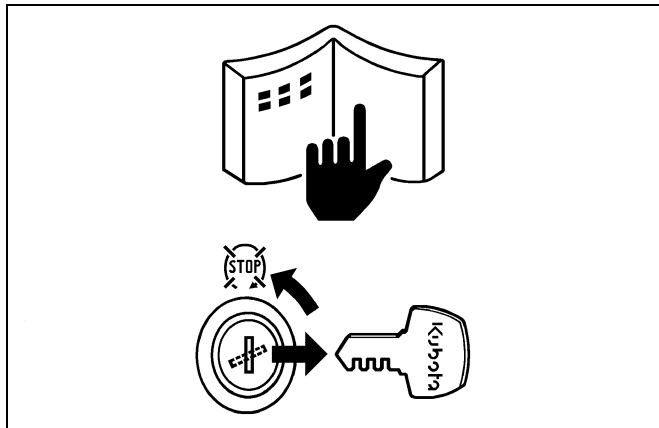
IMPORTANT

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



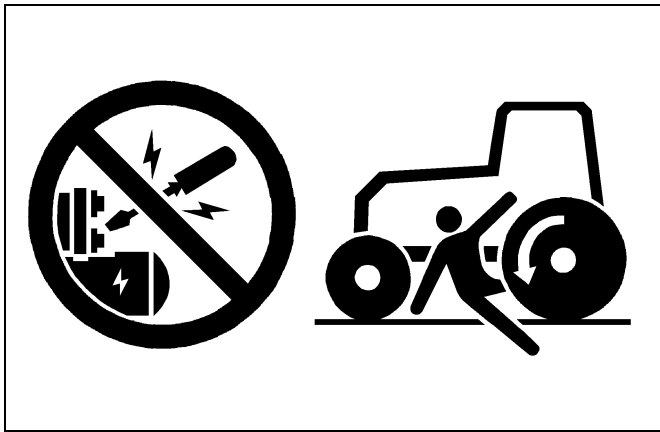
NOTE

: Gives helpful information.



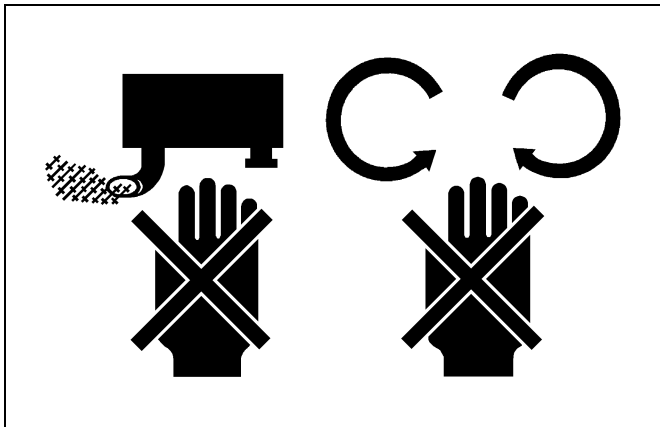
BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.
- Hang a "DO NOT OPERATE" tag in operator station.



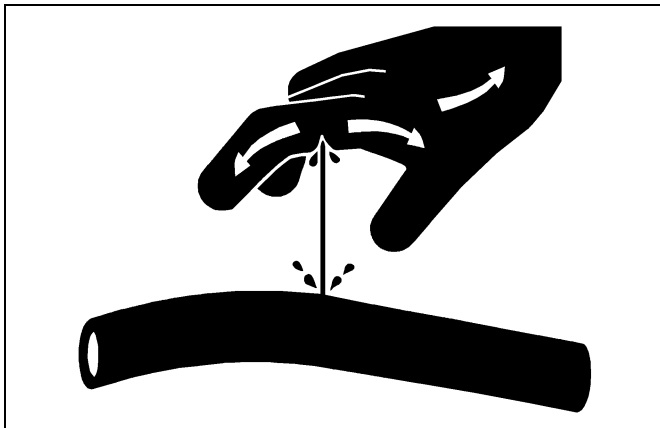
SAFETY STARTING

- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine while standing on ground. Start the engine only from operator's seat.



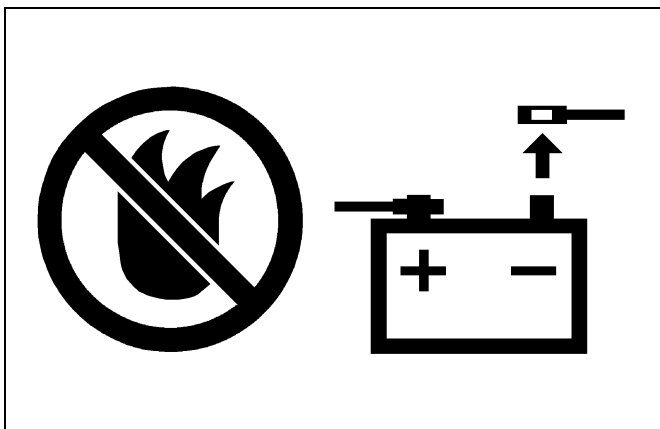
SAFETY WORKING

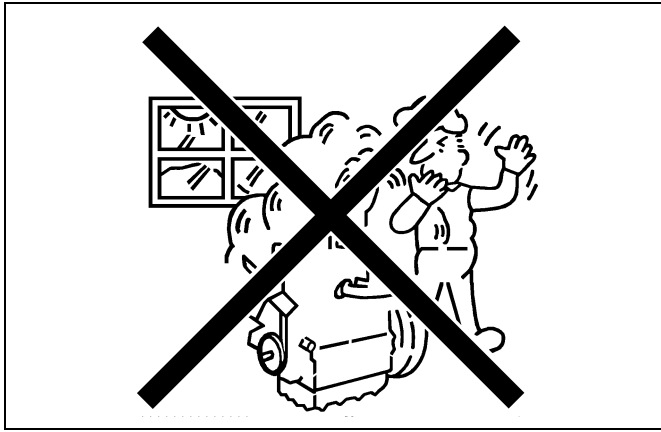
- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
- Do not touch the rotating or hot parts while the engine is running.
- 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.
- 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

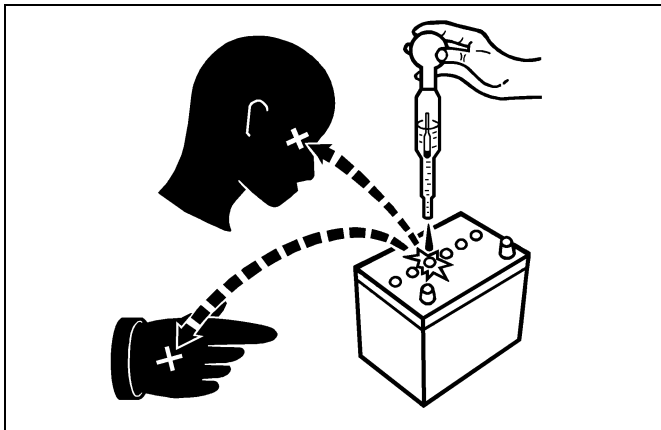
- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
- Make sure that no fuel has been spilled on the engine.





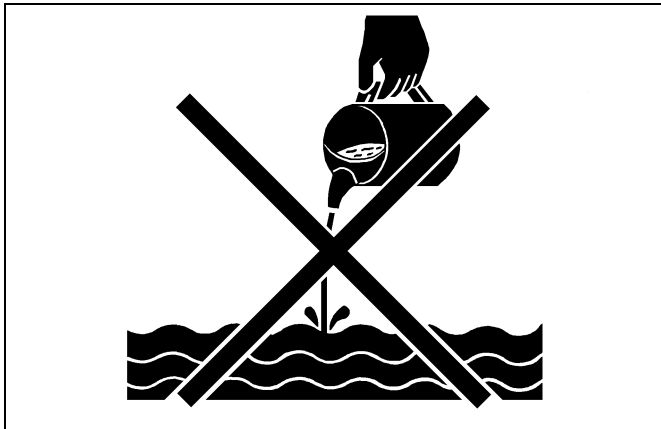
VENTILATE WORK AREA

- 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.



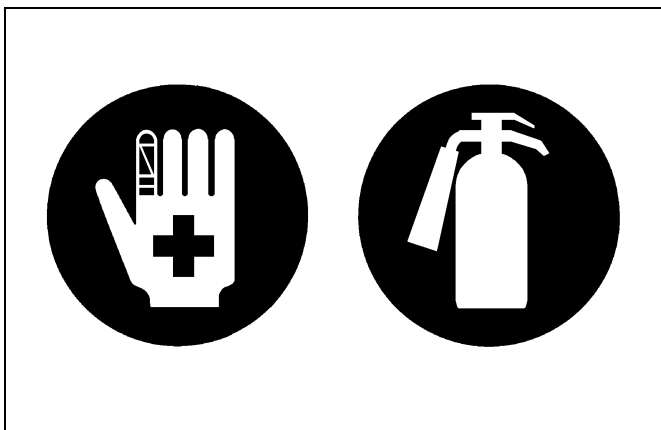
PREVENT ACID BURNS

- 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

- 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

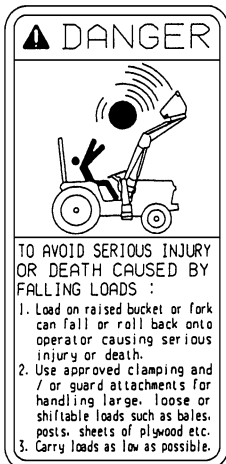
- Keep a first aid kit and fire extinguisher handy at all times.
- Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

SAFETY DECALS

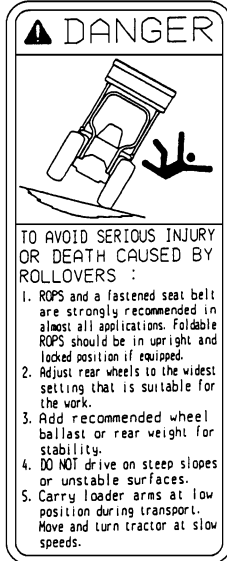
The following safety decals are installed on the machine.

If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.

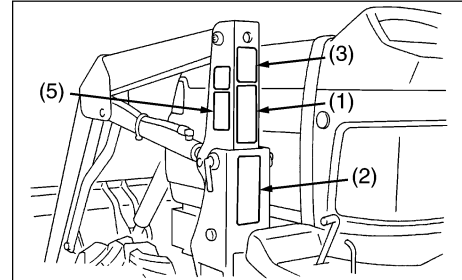
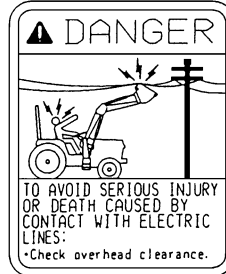
(1) Part No. 75546-56431



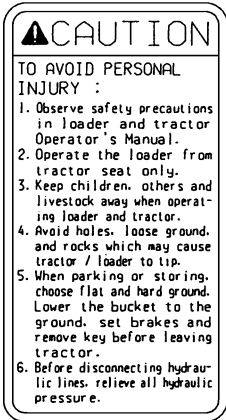
(2) Part No. 75546-56415



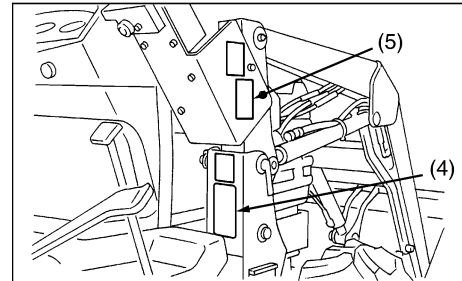
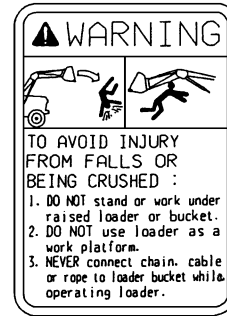
(3) Part No. 75546-56422



(4) Part No. 75546-56451



(5) Part No. 75567-56441

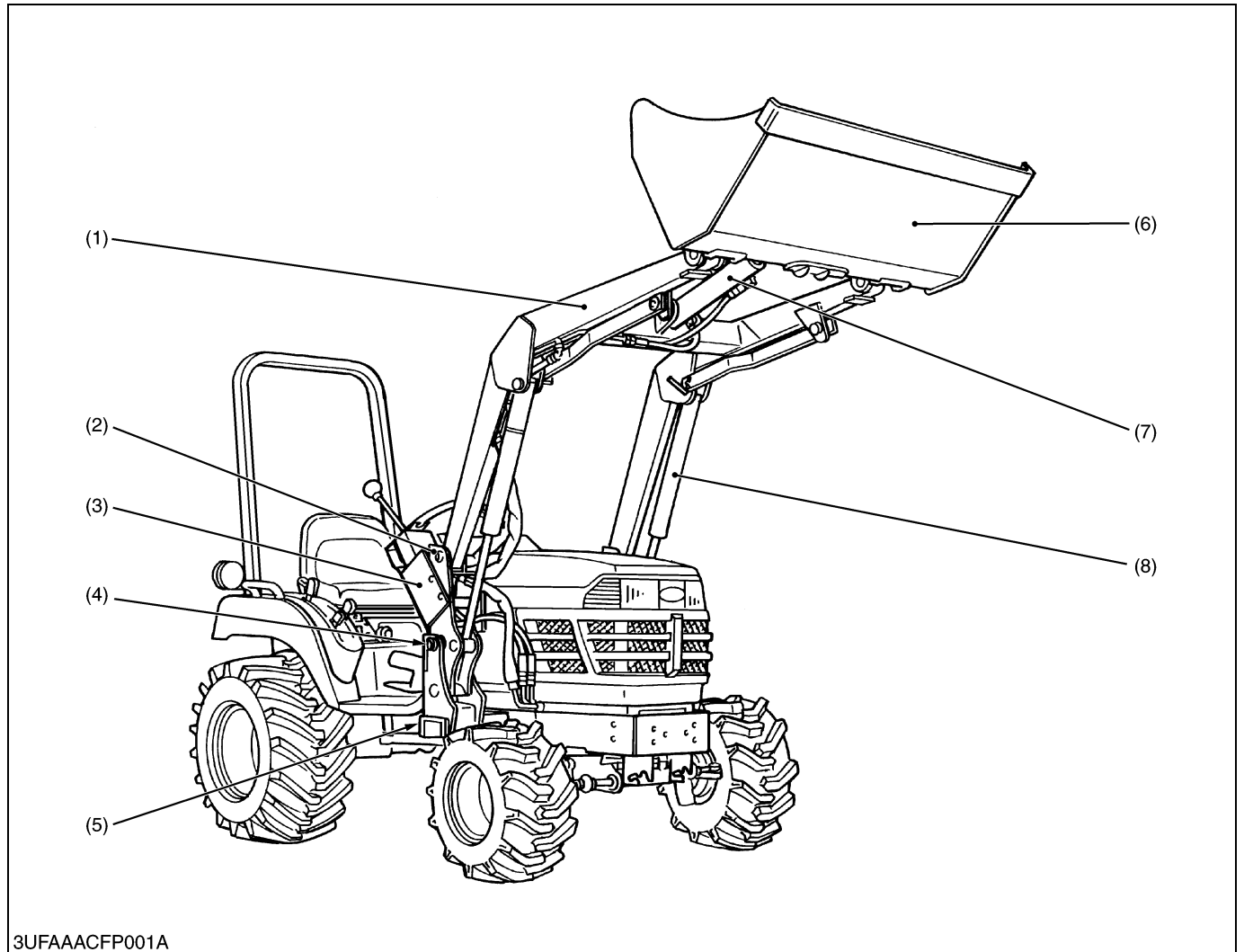


CARE OF DANGER, WARNING AND CAUTION LABELS

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 replaced with new part, make sure new label (s) is (are) attached in the same locations (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.

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TERMINOLOGY



3UFAAACFP001A

(1) Boom

(2) Side Frame

(3) Hydraulic Control Valve

(4) Mounting Pin

(5) Main Frame

(6) Bucket

(7) Bucket Cylinder

(8) Boom Cylinder

SPECIFICATIONS

LOADER SPECIFICATIONS

Model		LA181	LA211
ASAE Rated Lift Capacity		180 kg (400 lbs)	210 kg (460 lbs)
ASAE Rated Brakeout Force		3430 N (770 lbs)	4200 N (950 lbs)
Boom Cylinder	Bore	35 mm (1.38 in.)	38 mm (1.50 in.)
	Stroke	340 mm (13.39 in.)	325 mm (12.77 in.)
Bucket Cylinder	Bore	55 mm (2.17 in.)	57 mm (2.25 in.)
	Stroke	200 mm (7.96 in.)	
Control Valve	3 Position Bucket Control Valve Type	One Detent Float Position, Power Beyond Circuit	
	4 Position Bucket Control Valve Type	One Detent Float Position, Two Stage Bucket Dump, Power Beyond Circuit	
Relief Valve Setting Pressure		12.3 to 12.7 MPa, 125 to 130 kgf/cm ² , 1778 to 1849 psi	
Net Weight (Approx.)		185 kg (408 lbs)	195 kg (430 lbs)

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BUCKET SPECIFICATIONS

Model		LA181	LA211
Type		Square 48	
Width		1220 mm (48.0 in.)	
Length		455 mm (17.9 in.)	495 mm (19.5 in.)
Height		445 mm (17.5 in.)	165 mm (18.2 in.)
Capacity	Struck	0.12 m ³ (4.2 cu.ft)	0.14 m ³ (5.0 cu.ft)
	Heaped	0.14 m ³ (4.9 cu.ft)	0.17 m ³ (6.1 cu.ft)
Weight		56 kg (123 lbs)	60 kg (132 lbs)

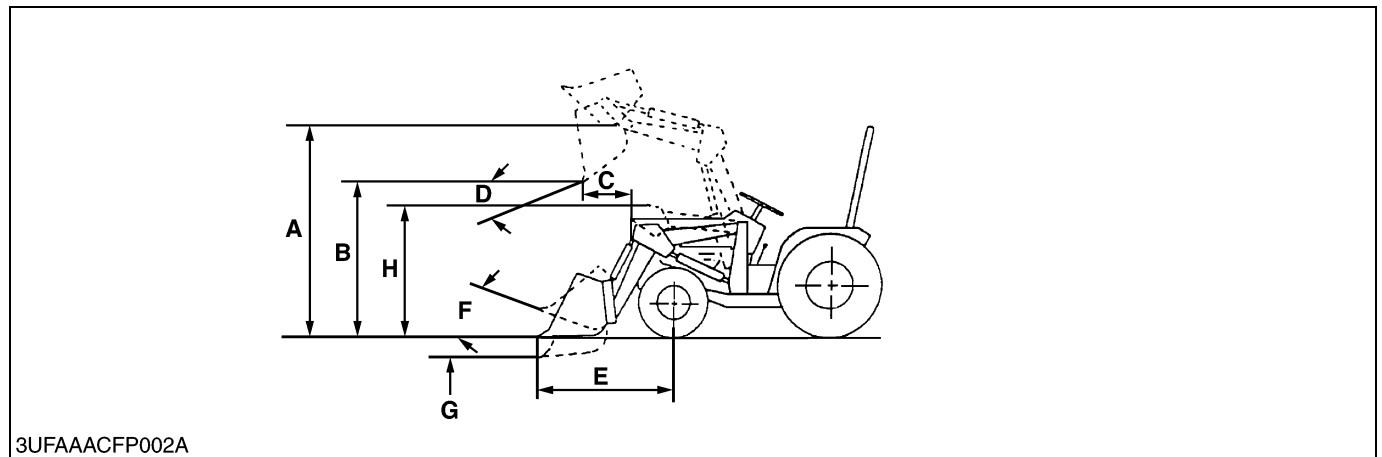
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OPERATING DIMENSIONS

Item	Model	LA181	LA211
		BX1500	BX1800D, BX2200D
Maximum Lifting Height (A)	1810 mm (71.3 in.)		
Clearance with Bucket Dumped (B)	1330 mm (52.4 in.)		1300 mm (51.2 in.)
Reach at Maximum Height (C)	745 mm (29.3 in.)		760 mm (29.9 in.)
Maximum Dump Angle (D)	45 deg.		
Reach with Bucket on Ground (E)	1240 mm (48.8 in.)		1310 mm (51.6 in.)
Bucket Roll-back Angle (F)	25 deg.		
Digging Depth (G)	75 mm (3.0 in.)		120 mm (4.7 in.)
Overall Height in Carrying Position (H)	1070 mm (42.1 in.)		1070 mm (42.1 in.)

BX1800 and BX2200 with 18 × 18.50 – 8 Front Tires and 26 × 12.00 – 12 Rear Tires.

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PERFORMANCE RATINGS (NO LOAD)

Model Item	LA181	LA211
Raise to Full Height	2.7 sec.	2.9 sec.
Lowering Time	2.2 sec.	2.9 sec.
Attachment Roll-back Time	1.5 sec.	
Attachment Dump Time	1.3 sec.	1.4 sec.

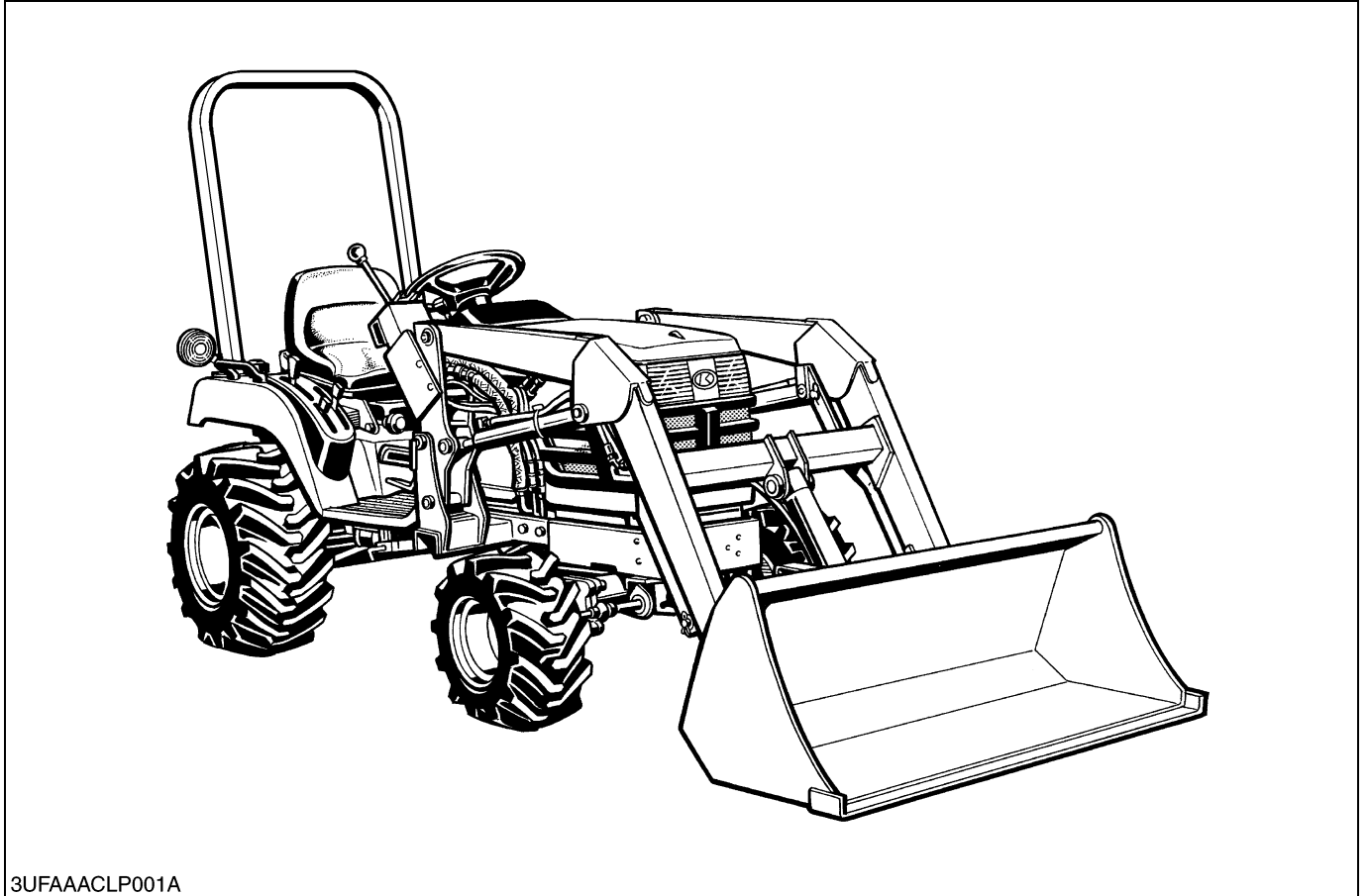
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MECHANISM

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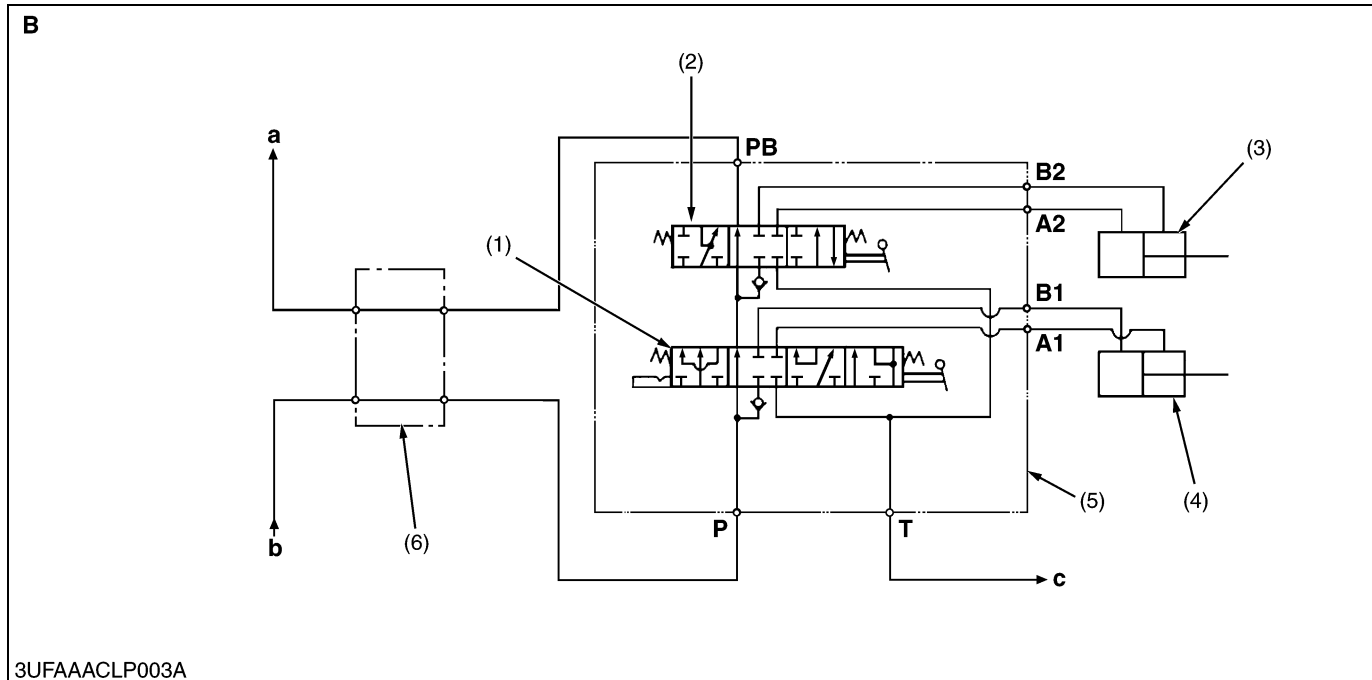
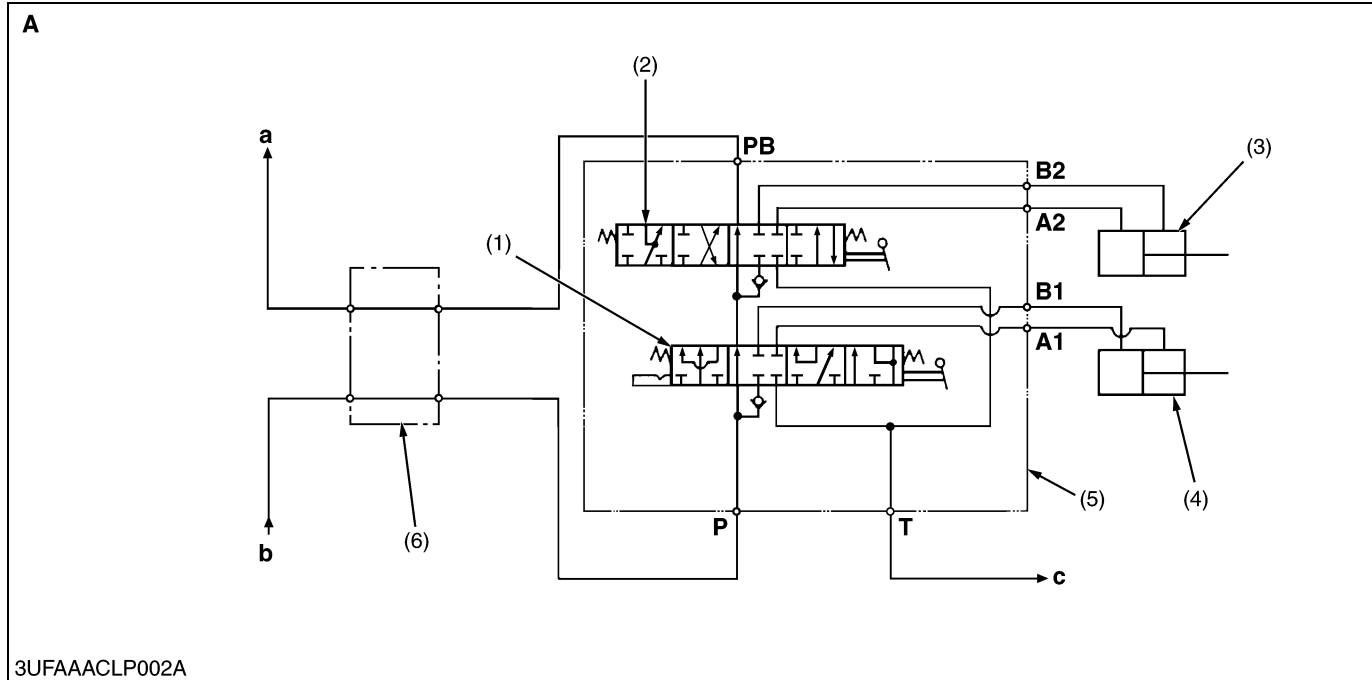
1. FEATURES



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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



- (1) Boom Control Valve
- (2) Bucket Control Valve
- (3) Bucket Cylinder

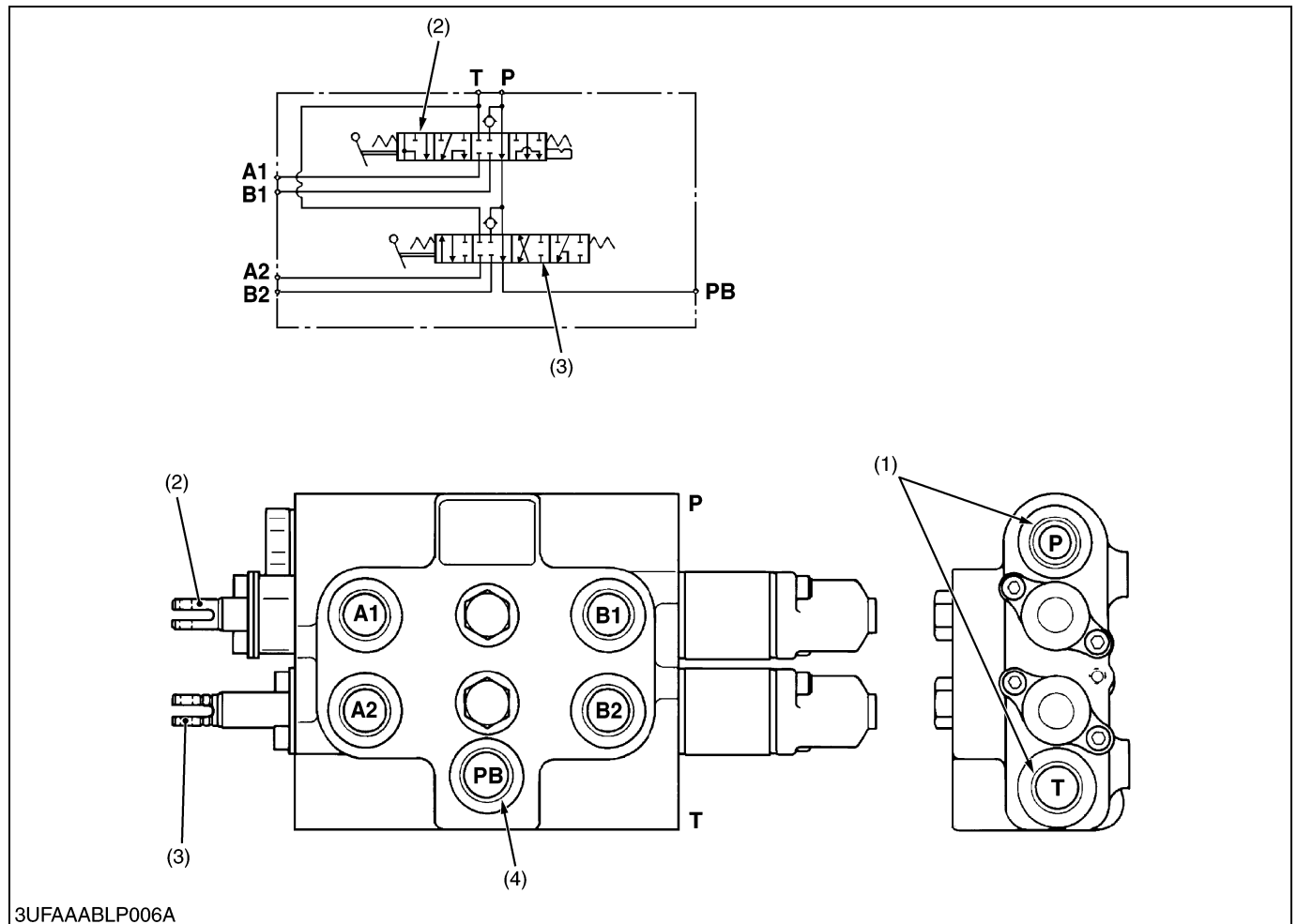
- (4) Boom Cylinder
- (5) Control Valve Assembly
- (6) Hydraulic Block

- A : 4 Position Bucket Control**
- B : 3 Position Bucket Control**

- a : To 3-Point Hydraulic System**
- b : From Hydraulic Pump**
- c : To Transmission Case**

3. CONTROL VALVE ASSEMBLY

[1] 4 POSITION BUCKET CONTROL



- (1) Inlet and Outlet Section
 (2) Boom Control Valve
 (3) Bucket Control Valve
 (4) Power Beyond

P : P Port
T : T Port

A1 : A1 Port
A2 : A2 Port

B1 : B1 Port
B2 : B2 Port
PB : PB Port

The control valve assembly is composed of one casting block and four major section as shown above.

(1) Inlet and Outlet Section

This section has **P** and **T** ports.

The **P** port is connected to the **OUTLET** port of hydraulic block by the hydraulic hose.

The **T** port is connected to the **TANK** port of hydraulic block 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.

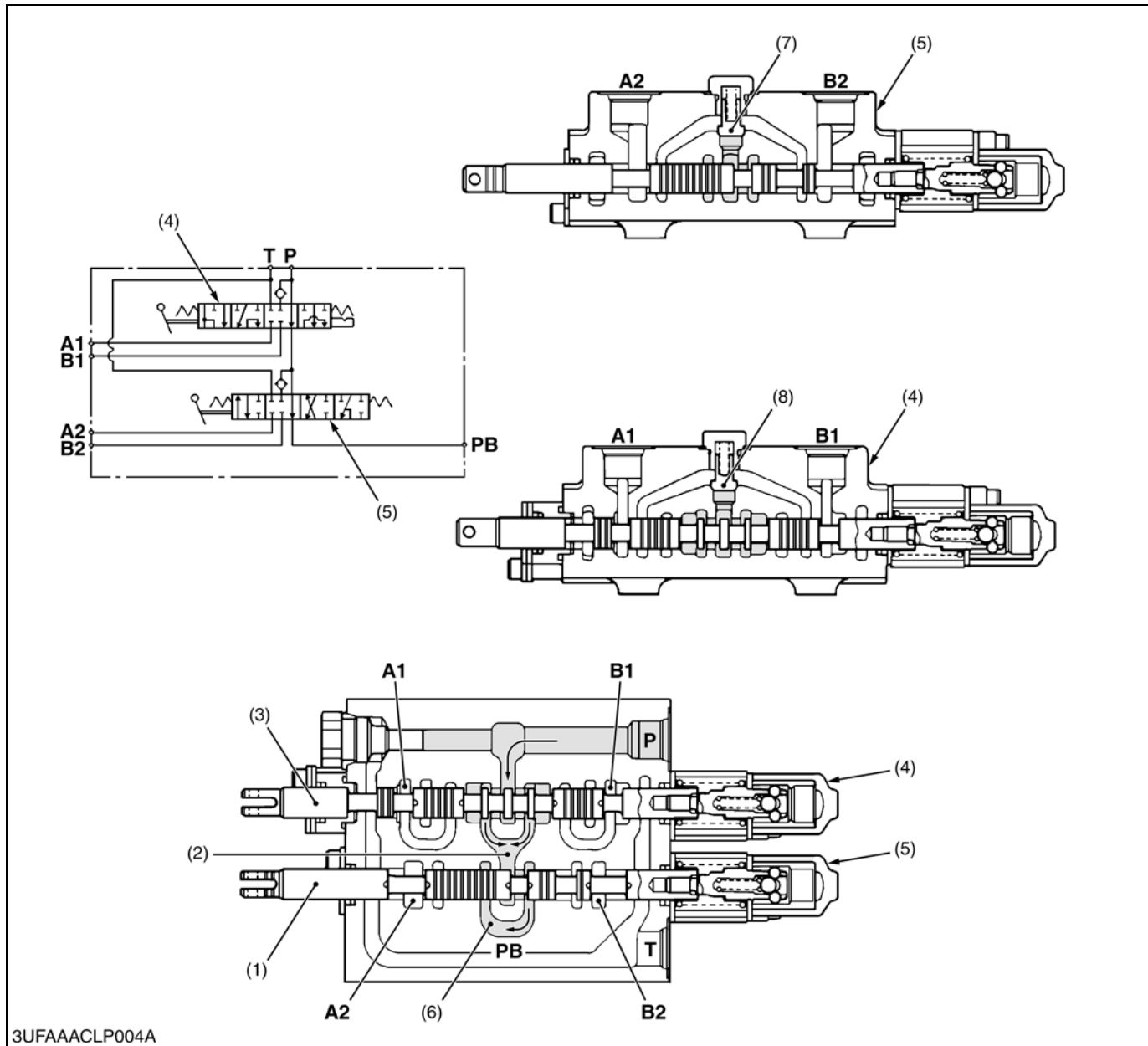
(3) Bucket Control Section

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

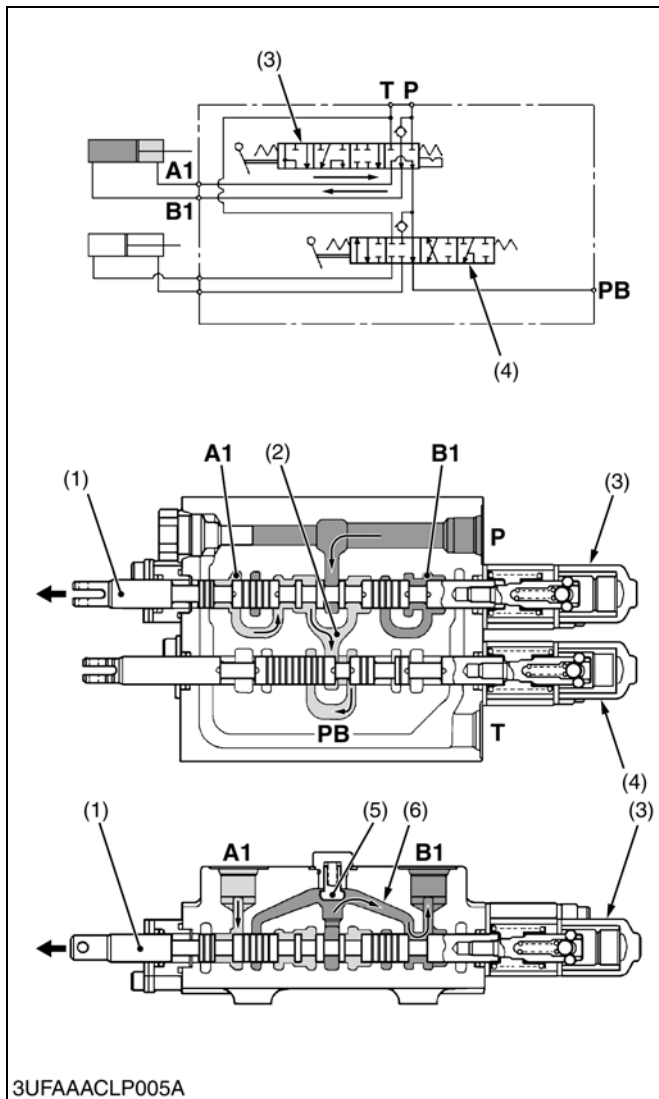
This section has **PB** port which is connected to the **INLET** port of hydraulic block by the hydraulic hose, and feeds oil to the three point hydraulic control valve.

■ Neutral



- | | | | |
|--------------------------|----------------------------|---|--|
| (1) Spool | (5) Bucket Control Section | P : P Port (From OUTLET Port of Hydraulic Block) | A2 : A2 Port |
| (2) PB Passage 1 | (6) PB Passage 2 | T : T Port (To TANK Port of Hydraulic Block) | B1 : B1 Port |
| (3) Spool | (7) Load Check Valve | | B2 : B2 Port |
| (4) Boom Control Section | (8) Load Check Valve | | PB : PB Port (To INLET Port of Hydraulic Block) |
| | | A1 : A1 Port | |

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.

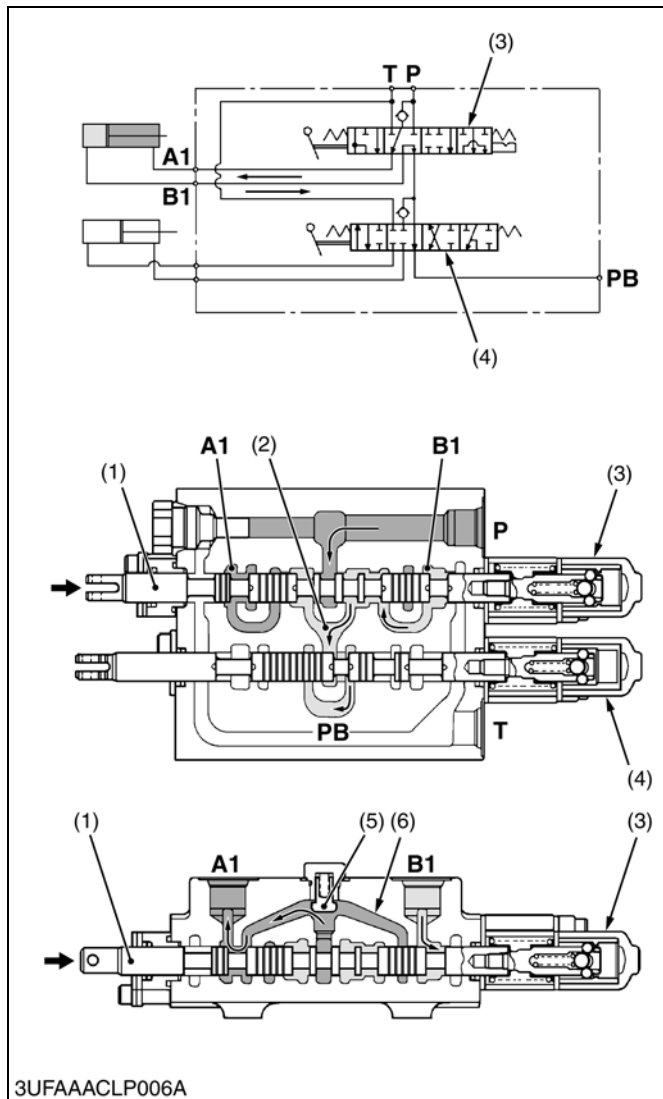


■ Up

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 | |

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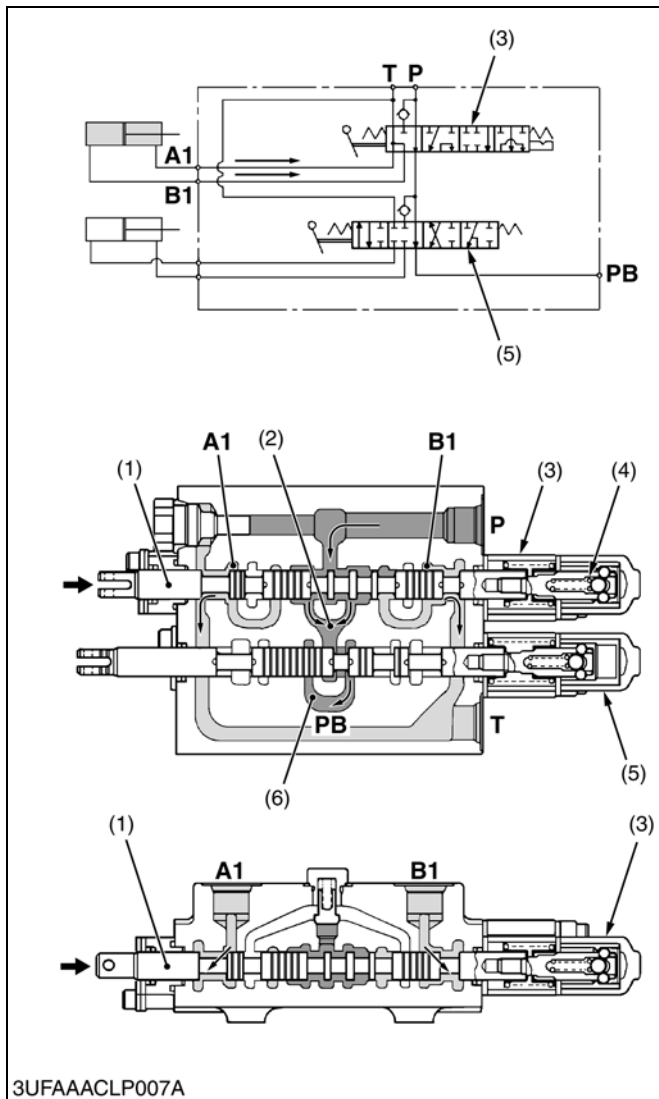
■ Down

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

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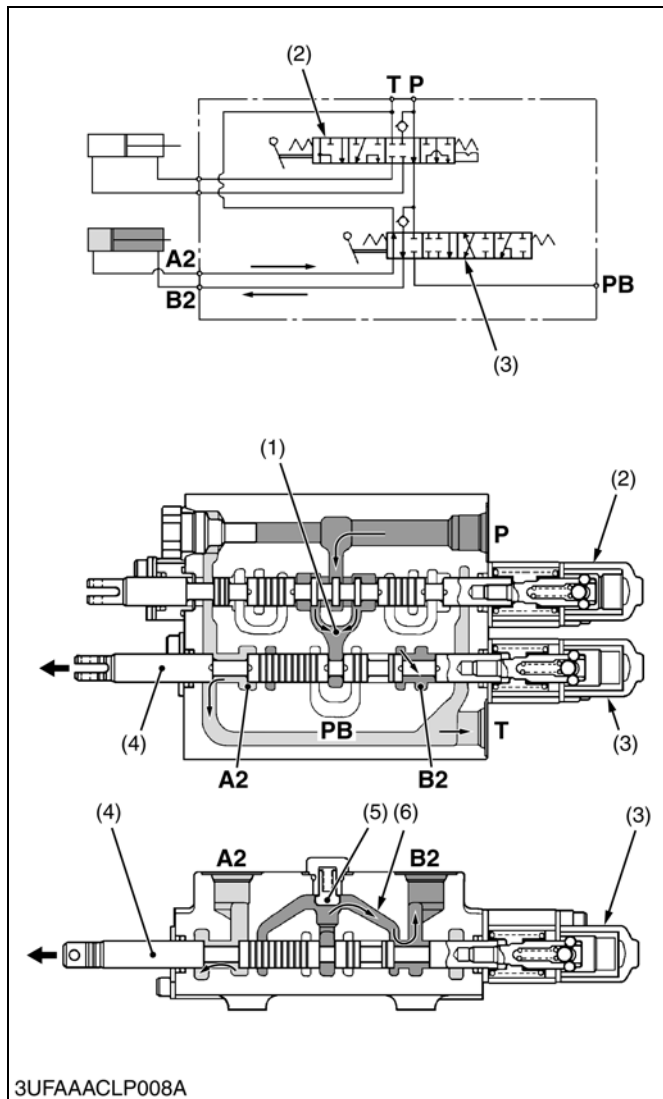
■ Floating

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 (To Boom Cylinder)
- PB** : PB Port

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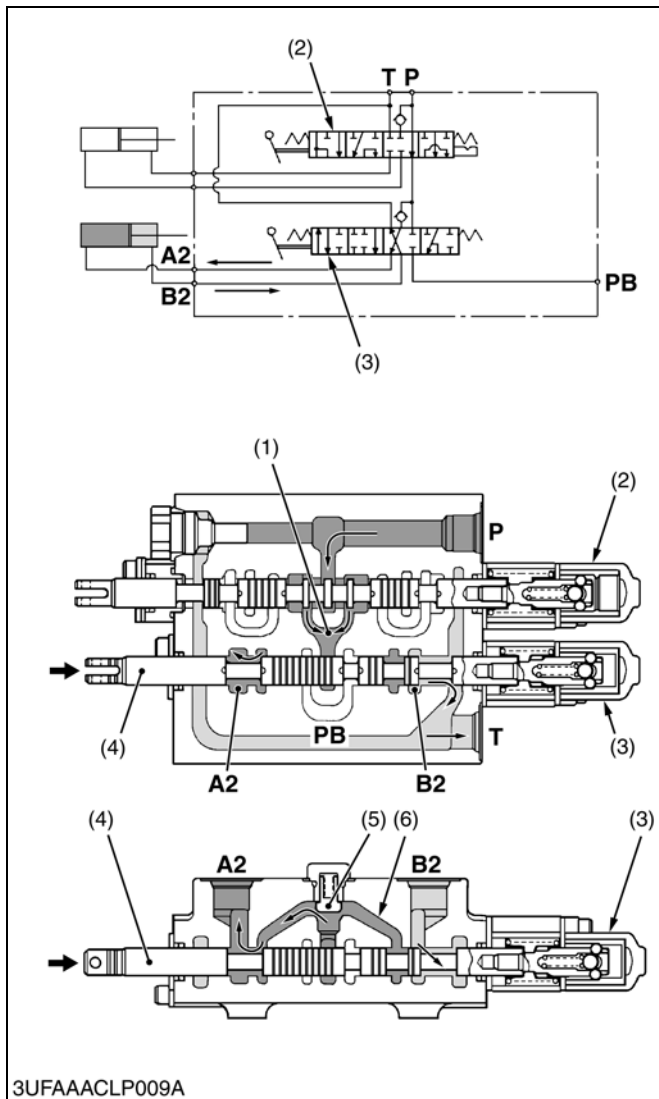


■ Roll-back

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 | P : P Port |
| (2) Boom Control Section | T : T Port |
| (3) Bucket Control Section | A2 : A2 Port (From Bucket Cylinder) |
| (4) Spool | B2 : B2 Port (To Bucket Cylinder) |
| (5) Load Check Valve | PB : PB Port |
| (6) Passage 2 | |

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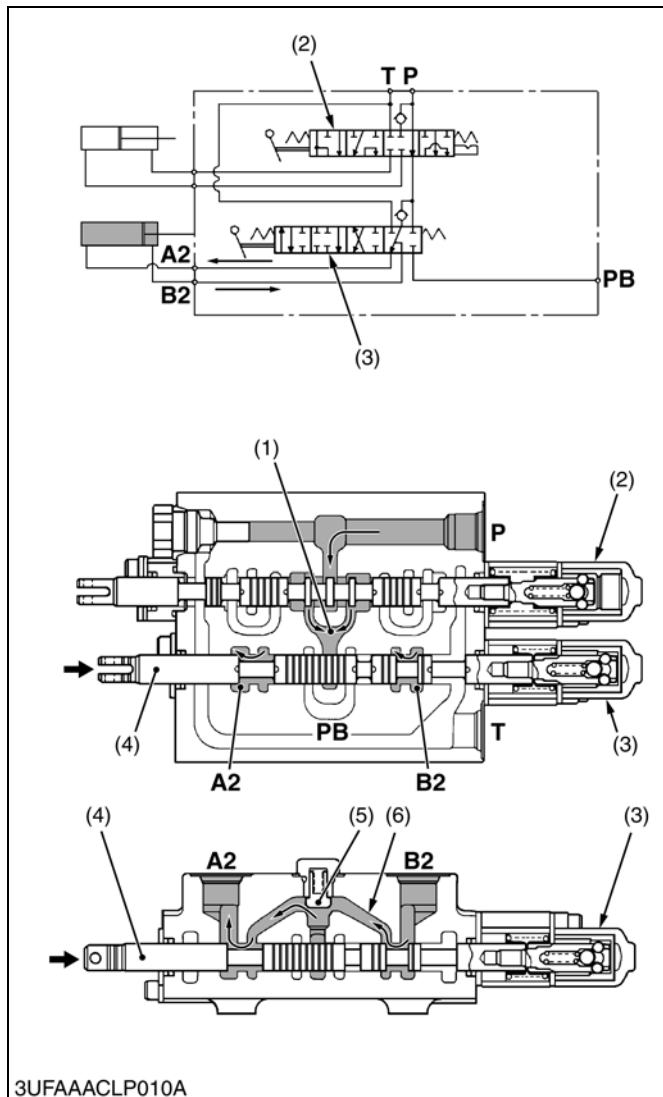


■ **Dump 1**

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 | 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 | PB : PB Port |
| (6) Passage 2 | |

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■ **Dump 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)

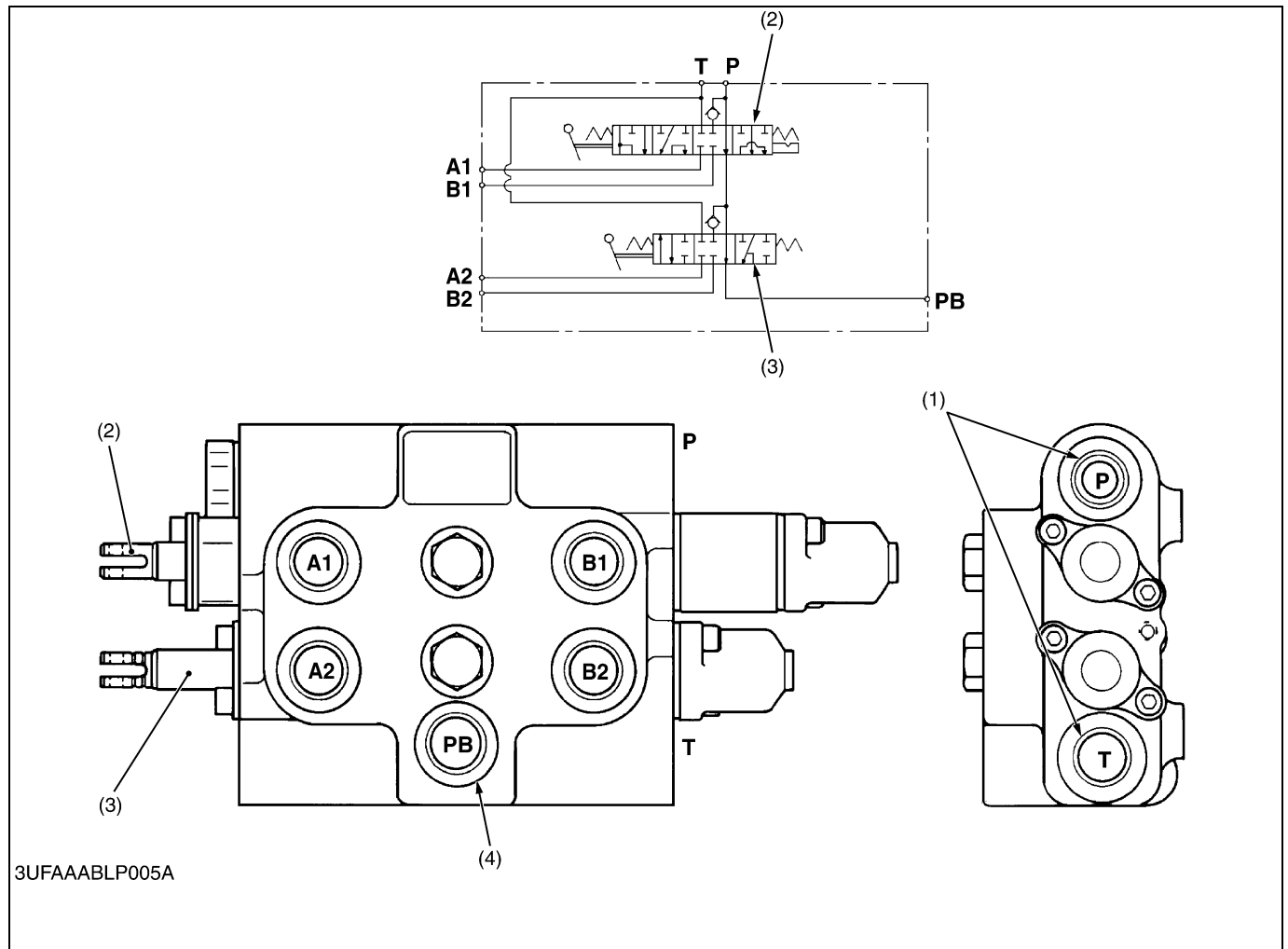
- The oil pressure of the **A2** port and **B2** port is identical, but the bucket cylinder extend by the difference of received pressure area (cylinder rod part).

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

- P** : **P** Port
- T** : **T** Port
- A2** : **A2** Port (To Bucket Cylinder)
- B2** : **B2** Port (From Bucket Cylinder)
- PB** : **PB** Port

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[2] 3 POSITION BUCKET CONTROL



- (1) Inlet and Outlet Section
- (2) Boom Control Valve
- (3) Bucket Control Valve
- (4) Power Beyond

P : P Port
T : T Port

A1 : A1 Port
A2 : A2 Port

B1 : B1 Port
B2 : B2 Port
PB : PB Port

The control valve assembly is composed of one casting block and four major section as shown above.

(1) Inlet and Outlet Section

This section has **P** and **T** ports.

The **P** port is connected to the **OUTLET** port of hydraulic block by the hydraulic hose.

The **T** port is connected to the **TANK** port of hydraulic block 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.

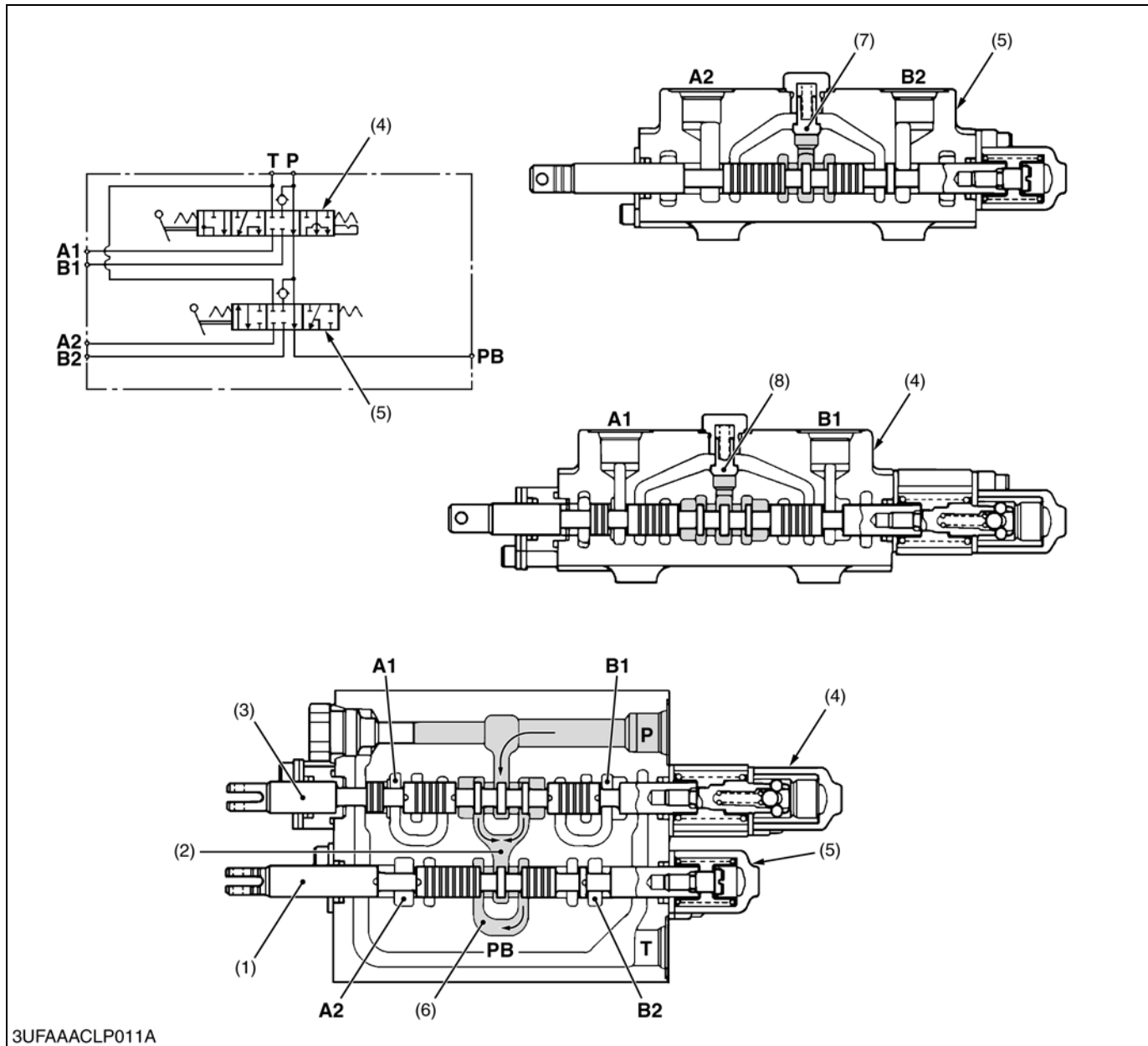
(3) Bucket Control Section

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

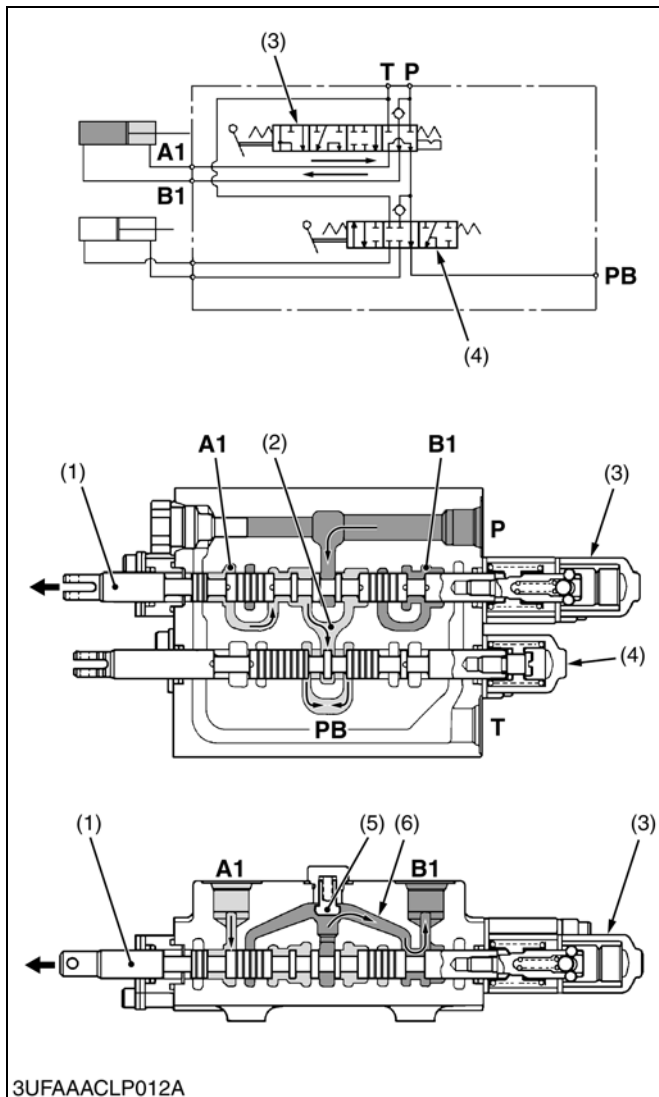
This section has **PB** port which is connected to the **INLET** port of hydraulic block by the hydraulic hose, and feeds oil to the three point hydraulic control valve.

■ Neutral



- | | | | |
|--------------------------|----------------------------|---|---------------------|
| (1) Spool | (5) Bucket Control Section | P : P Port (From OUTLET Port of Hydraulic Block) | A2 : A2 Port |
| (2) PB Passage 1 | (6) PB Passage 2 | T : T Port (To TANK Port of Hydraulic Block) | B1 : B1 Port |
| (3) Spool | (7) Load Check Valve | | B2 : B2 Port |
| (4) Boom Control Section | (8) Load Check Valve | PB : PB Port (To INLET Port of Hydraulic Block) | |
| | | A1 : A1 Port | |

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.



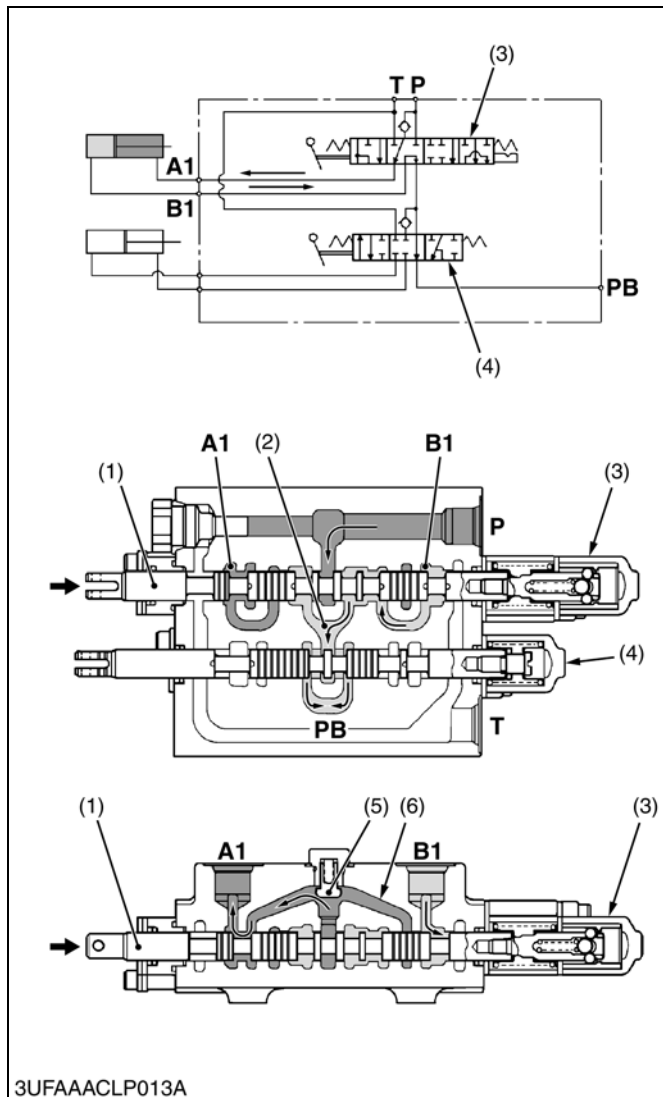
■ Up

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

W1014351



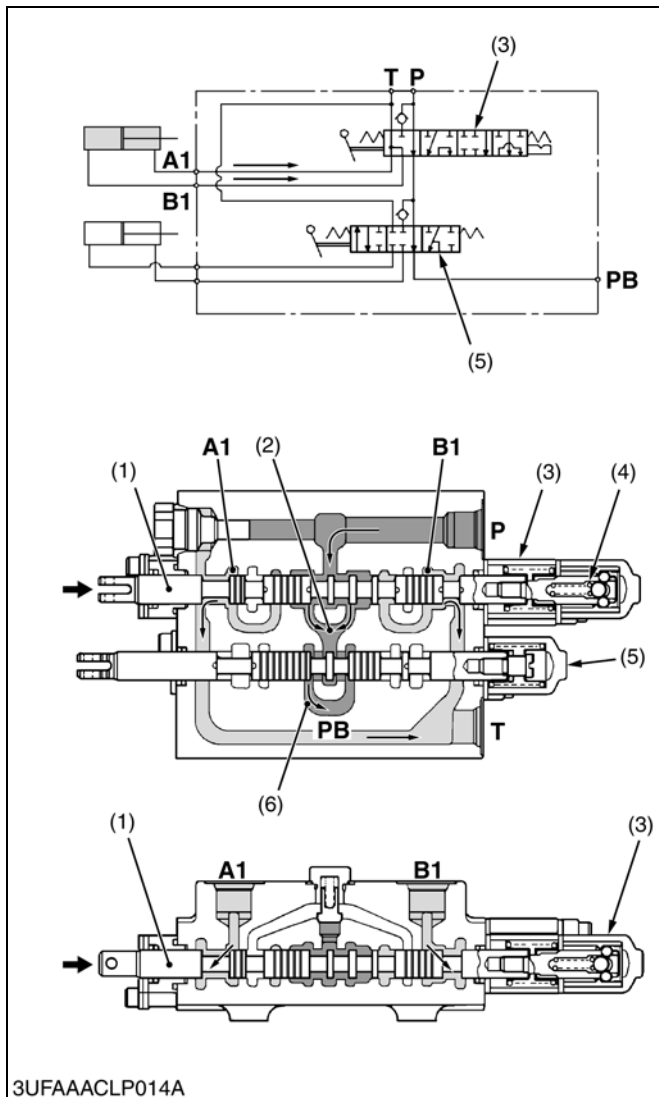
■ Down

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

W1014573



■ Floating

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 (To Boom Cylinder)
- PB** : PB Port

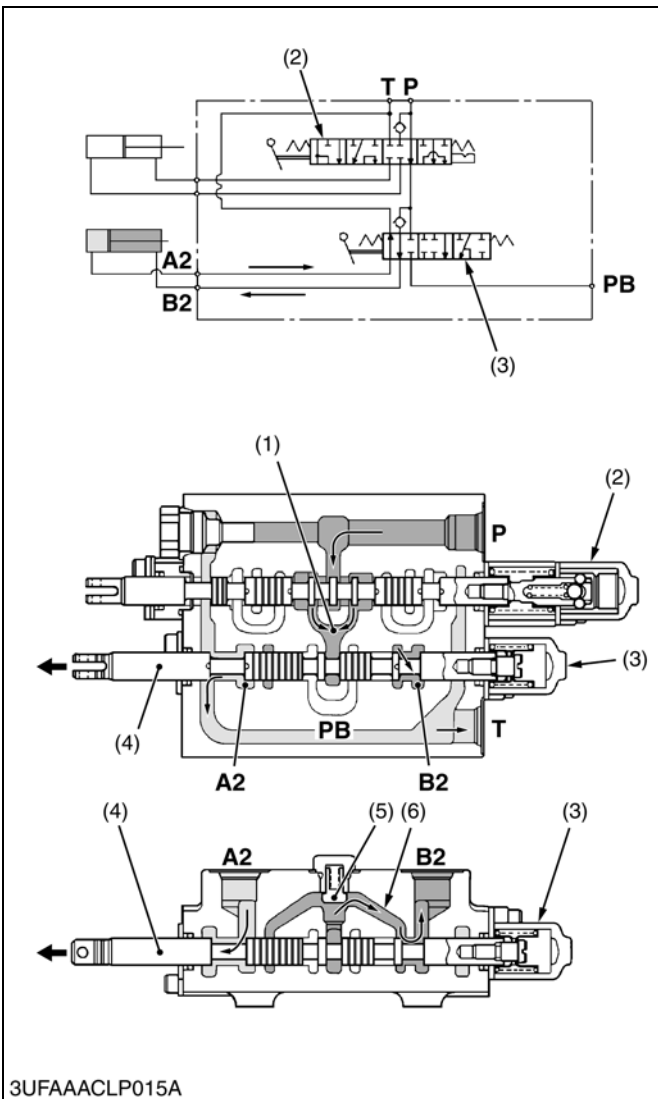
W1014787

■ **Roll-back**

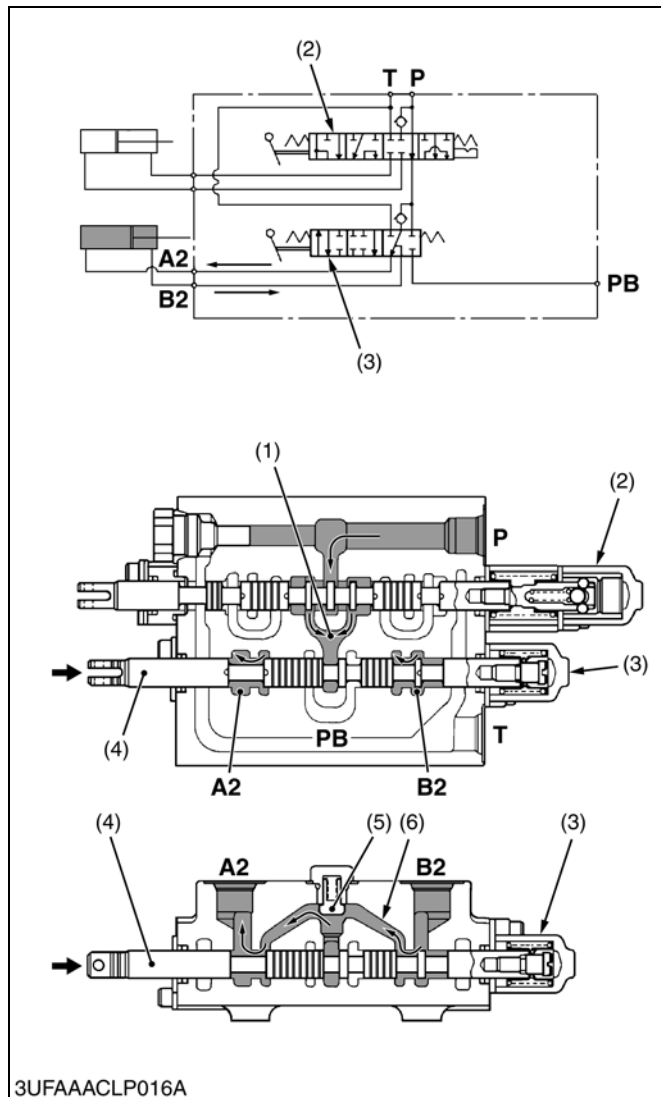
1. When the hydraulic control lever is set to the “**ROLL-BACK**” position, the spool (4) of the bucket control section (3) moves to the left, which forms oil passages between passage 2 (6) and **B2** port, and between **A2** port and **T** port.
2. The pressure-fed oil from the **P** port flows through 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 | P : P Port |
| (2) Boom Control Section | T : T Port |
| (3) Bucket Control Section | A2 : A2 Port (From Bucket Cylinder) |
| (4) Spool | B2 : B2 Port (To Bucket Cylinder) |
| (5) Load Check Valve | PB : PB Port |
| (6) Passage 2 | |

W1015034



3UFAAACLP015A



■ **Dump**

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)

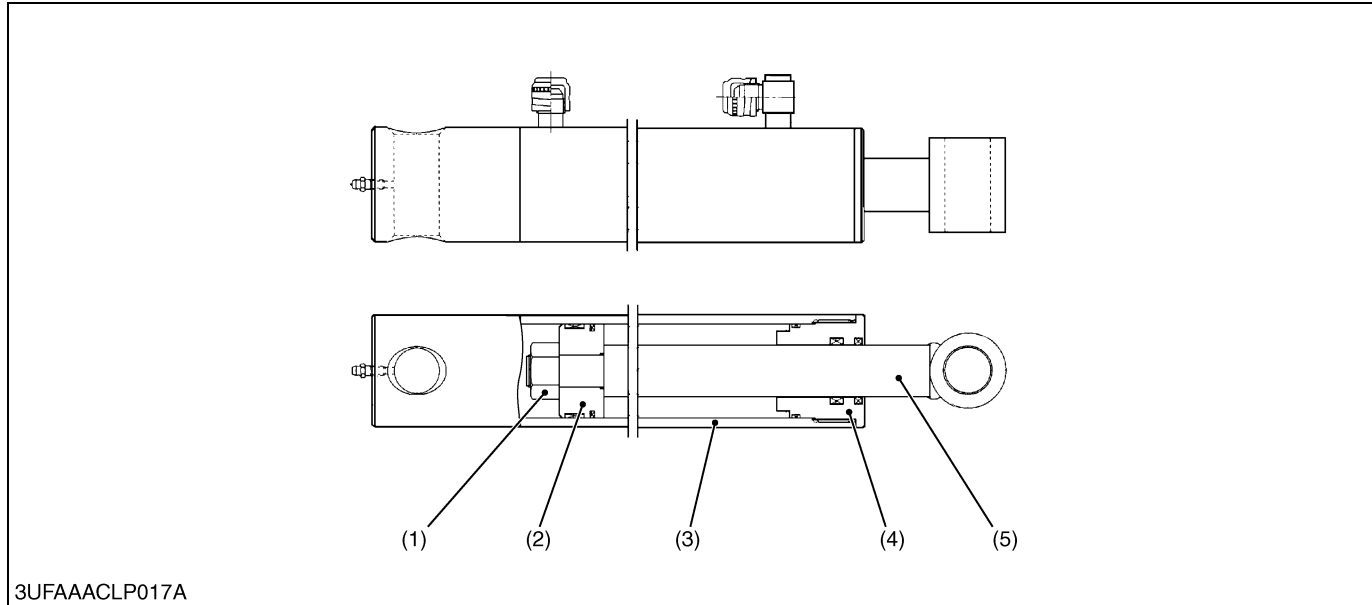
- The oil pressure of the **A2** port and **B2** port is identical, but the bucket cylinder extend by the difference of received pressure area (cylinder rod part).

- (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

W1015237

4. BOOM CYLINDER AND BUCKET CYLINDER



3UFAAACLP017A

- (1) Nut
- (2) Piston
- (3) Cylinder Tube
- (4) Head
- (5) Piston Rod

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

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

CYLINDER SPECIFICATIONS

Item		LA181	LA211
Boom Cylinder	Cylinder I.D.	35 mm (1.38 in.)	38 mm (1.50 in.)
	Rod I.D.	20 mm (0.79 in.)	25.4 mm (1.00 in.)
	Stroke	340 mm (13.39 in.)	324 mm (12.77 in.)
Bucket Cylinder	Cylinder I.D.	55 mm (2.16 in.)	57 mm (2.25 in.)
	Rod I.D.	30 mm (1.18 in.)	32 mm (1.25 in.)
	Stroke	200 mm (7.87 in.)	202 mm (7.96 in.)

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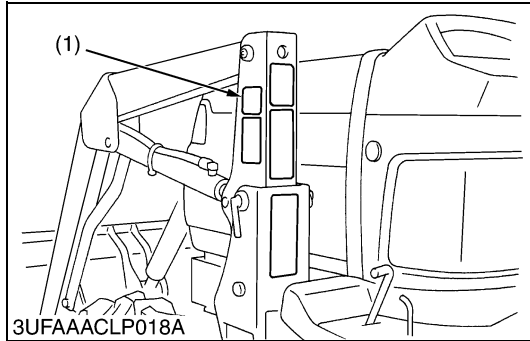
SERVICING

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1. GENERAL

[1] IDENTIFICATION

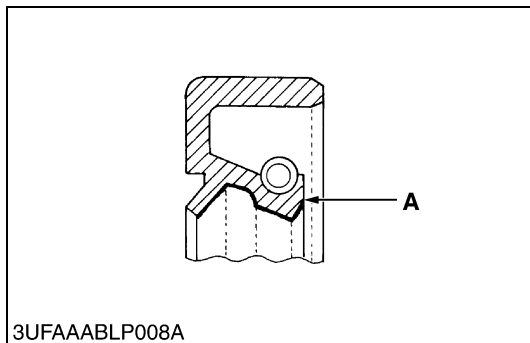


When contacting your local KUBOTA distributor, always specify front loader model and serial number.

(1) Model / Serial Number

W1010491

[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-ring and oil seals must be replaced during reassembly. Apply grease to new O-rings or oil seals before reassembling.

A : Grease

W1010531

[3] LUBRICANTS

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

Place	Capacities			Lubricants
	BX1500	BX1800	BX2200	
Transmission Case (Front loader is not attached)	10.1 L 2.7 U.S.gals. 2.2 Imp.gals.			KUBOTA SUPER UDT Fluid*
Grease fittings	Until grease overflows			Multi-purpose type grease

■ **NOTE**

- * KUBOTA SUPER UDT Fluid.....KUBOTA original transmission hydraulic fluid

W1010650

[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.

Service Interval	Check Points	Reference Page
Daily (Each use)	<ul style="list-style-type: none"> • Check the transmission fluid level • Check the hydraulic hoses 	S-2 S-2
Every 10 hours	<ul style="list-style-type: none"> • Grease all grease fittings • Lubricate joints of control lever linkage 	S-2 S-2

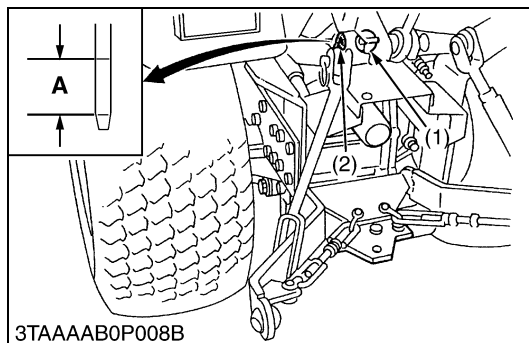
W1010764

[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.

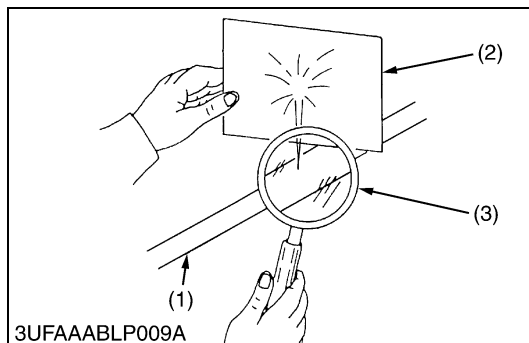
■ IMPORTANT

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

- (1) Oil Filling Plug
(2) Dipstick

(A) Oil level is acceptable within this range.

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Checking Hydraulic Hoses

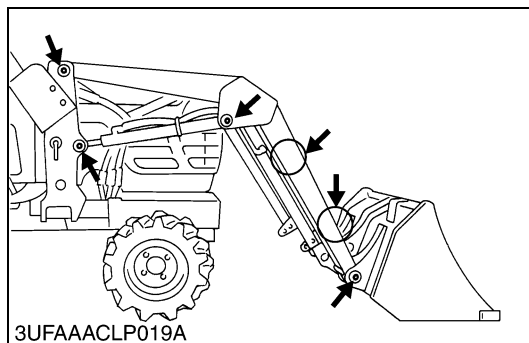
1. Check all hydraulic hoses for cuts or wear.
2. If defects are found, replace them.

- (1) Hydraulic Hose
(2) Cardboard

(3) Magnifying Glass

W1011064

(2) Check Points of Every 10 Hours



Greasing

1. Inject grease in all grease fitting with a hand grease gun.

W1011132

Lubricating

1. Lubricate joints of control lever linkage.

W1011274

2. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Boom Does Not Rise	<ul style="list-style-type: none"> • Control valve malfunctioning • Boom cylinder defective • Control lever linkage defective • Hydraulic pump malfunctioning • Oil filter clogged • Hydraulic hose damaged 	Repair or replace Repair or replace Repair or replace Repair or replace Clean or replace Replace	S-10 S-13 – – – –
Boom Does Not Lower	<ul style="list-style-type: none"> • Control valve malfunctioning 	Repair or replace	S-10
Insufficient Boom Speed	<ul style="list-style-type: none"> • Boom cylinder tube worn or damaged • Boom cylinder piston ring (piston seal and O-ring) worn or damaged • Oil leaks from tube joints • Relief valve setting pressure too low • Insufficient transmission fluid • Dirty relief valve 	Replace Replace Repair Adjust Refill Clean	S-13 S-12, 14 – S-7 S-2 –
Bucket Does Not Move	<ul style="list-style-type: none"> • Control valve malfunctioning • Bucket cylinder defective • Control lever linkage defective • Hydraulic pump malfunctioning • Oil filter clogged • Relief valve spring damaged • Hydraulic hose damaged • Dirty relief valve 	Repair or replace Repair or replace Repair or replace Repair or replace Clean or replace Replace Replace Clean	S-10 S-13 – – – – – –
Insufficient Bucket Speed	<ul style="list-style-type: none"> • Bucket cylinder tube worn or damaged • Bucket cylinder piston ring (piston seal and O-ring) worn or damaged • Oil leaks from tube joints • Insufficient transmission fluid 	Replace Replace Repair Refill	S-13 S-12, 14 – S-2
Front End Loader Drops by Its Weight	<ul style="list-style-type: none"> • Boom cylinder tube worn or damaged • Boom cylinder piston ring (piston seal and O-ring) worn or damaged • Oil leaks from tube joints • Control valve malfunctioning 	Replace Replace Repair Repair or replace	S-13 S-12, 14 – –

W1014322

3. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Piston Rod	Bend	–	0.25 mm 0.0098 in.

W1013874

4. 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.

American standard cap screws with UNC or UNF Threads				Metric cap screws			
Grade	SAE 5 or 8			Grade	Property class 8.8 (Approx. SAE grade 5)		
Size \ Unit	N-m	kgf-m	ft-lbs	Size \ Unit	N-m	kgf-m	ft-lbs
1/4	9.8 to 11.7	1.0 to 1.2	7.2 to 8.6	M6	9.8 to 11.2	1.0 to 1.1	7.2 to 8.3
5/16	19.0 to 23.1	1.9 to 2.4	14 to 17	M8	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2
3/8	33.9 to 40.7	3.5 to 4.2	25 to 30	M10	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2
1/2	88.1 to 105.8	9.0 to 10.8	65 to 78	M12	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5
9/16	122.0 to 146.4	12.4 to 14.9	90 to 108	M14	124 to 147	12.6 to 15.0	91.2 to 108
5/8	176.3 to 211.5	18.0 to 21.6	130 to 156	M16	196 to 225	20.0 to 23.0	145 to 166
–	–	–	–	M18	275 to 318	28.0 to 32.5	203 to 235

W1012507

[2] HYDRAULIC FITTINGS

Item	Thread size	Tightening torque		
		N-m	kgf-m	ft-lbs
Adjustable elbow and adapter	9/16	37 to 44	3.7 to 4.6	27 to 33
	3/4	47 to 54	4.8 to 5.5	35 to 40
Hose fitting and flare nut	9/16	22 to 25	2.2 to 2.6	16 to 19
	3/4	35 to 41	3.6 to 4.1	26 to 30
	7/8	65 to 71	6.6 to 7.2	48 to 52
	1/4	30 to 35	3.1 to 3.6	22 to 26
Adapter (NPT)	3/8	39 to 44	3.9 to 4.4	28 to 32
	1/2	49 to 58	5.0 to 5.9	36 to 43

■ 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.

W1013389

[3] SPECIAL USE SCREWS, BOLTS AND NUTS

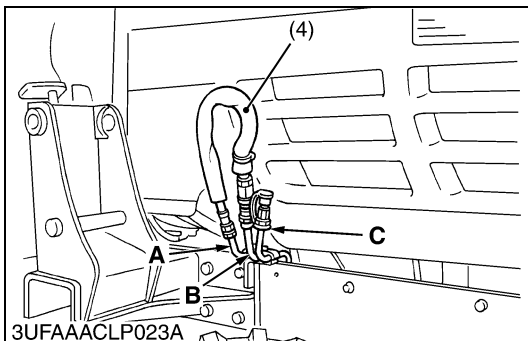
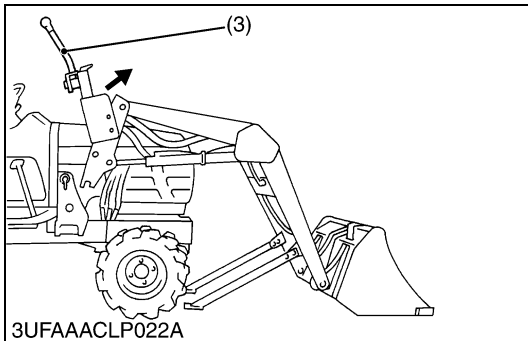
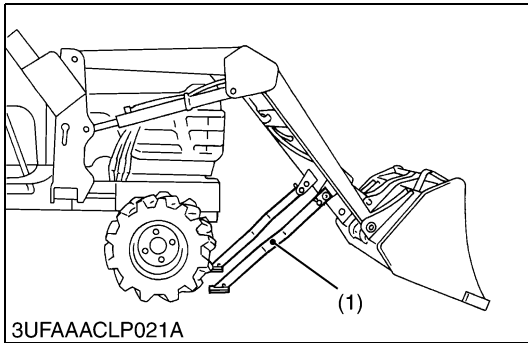
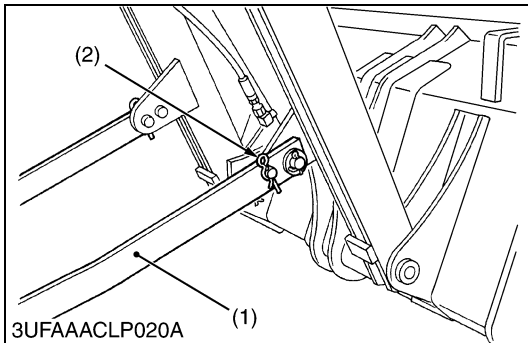
Item	N-m	kgf-m	ft-lbs
Control valve mounting bolt	12.2 to 13.6	1.2 to 1.4	9 to 10
Control valve stay mounting bolt and nut	33.7	3.5	25
Adaptor	47.5 to 54.2	4.8 to 5.5	35 to 40
Front guard mounting bolt and nut	83	8.5	61
Main frame mounting bolt (M14)	147	15.0	108
Boom cylinder piston mounting nut (LA181)	78 to 98	8.0 to 10.0	58 to 72
(LA211)	170 to 183	17.3 to 18.6	125 to 135
Bucket cylinder piston mounting nut (LA181)	216 to 245	22.0 to 25.0	159 to 180
(LA211)	170 to 183	17.3 to 18.6	125 to 135

W1012736

5. DISMOUNTING FRONT LOADER FROM TRACTOR

■ IMPORTANT

- When dismantling 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.



Side Frame

1. Raise the boom until the stands (1) can be rotated.
2. Stop the engine.
3. Remove the spring pins (2) holding the stands (1) to the boom.
4. Slide the stands (1) outward and rotate them until the hole in the stand and pin on the boom are aligned. Then slide the stands (1) inward and insert the spring pin (2) as shown.
5. Start the engine.
6. Dump the bucket approximately 20 degrees.
7. Lower the boom and raise the front wheels slightly.
8. Stop the engine.
9. Remove the mounting pins from the loader side frames.
10. Start the engine and run at idle. Slowly move the hydraulic control lever (3) to rollback position to raise the loader side frames up and out of the receivers of the main frames as shown.
11. Stop the engine.
12. Slowly release all hydraulic pressure by moving the hydraulic control lever (3) in all directions.
13. Disconnect the three hoses with quick couplers on the right side of the tractor. Reconnect hose 4 (4) remaining on the tractor, to the hydraulic line with quick coupler as shown.
14. Place the protective caps and plugs on the quick coupler ends.

■ IMPORTANT

- Before starting the engine, make sure hose 4 (4) is securely connected to the pump port.
15. Start the engine and slowly back the tractor away from the loader.

- (1) Stand
- (2) Spring Pin
- (3) Hydraulic Control Lever
- (4) Hose 4

- A : Power Beyond Port
- B : Pump Port
- C : Tank Port

W1013412

6. CHECKING, DISASSEMBLING AND SERVICING

[1] CONTROL VALVE

(1) Checking and Adjusting

Relief Valve Setting Pressure

NOTE

- The relief valve does not installed on these models. However the relief valve of the tractor hydraulic system is used as the relief valve of the front loader. Refer to the applicable tractor Workshop manual for details.

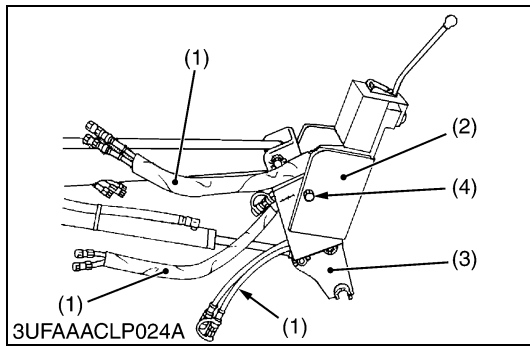
Relief valve setting pressure	Factory spec.	12.3 to 12.7 MPa 125 to 130 kgf/cm ² 1778 to 1849 psi
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Condition

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

W1014688

(2) Disassembling and Assembling



Hydraulic Hose and Control Valve Stay

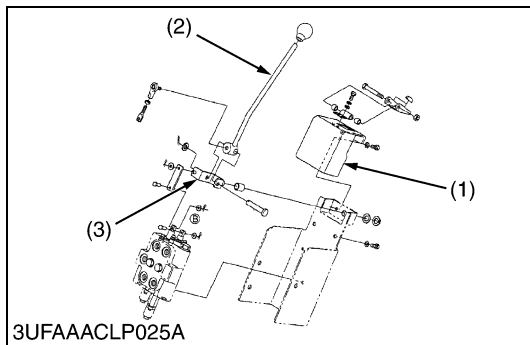
- Disconnect the hydraulic hoses (1) from each connections.
- Remove the control valve stay (2) from the side frame RH (3).

(When reassembling)

Tightening torque	Control valve stay mounting bolt	33.7 N·m 3.5 kgf·m 25 ft·lbs
-------------------	----------------------------------	------------------------------------

- (1) Hydraulic Hose
- (2) Control Valve Stay
- (3) Side Frame RH
- (4) Control Valve Stay Mounting Bolt

W1015690



Control Valve Cover, Control Lever and Control Lever Rod (LA211)

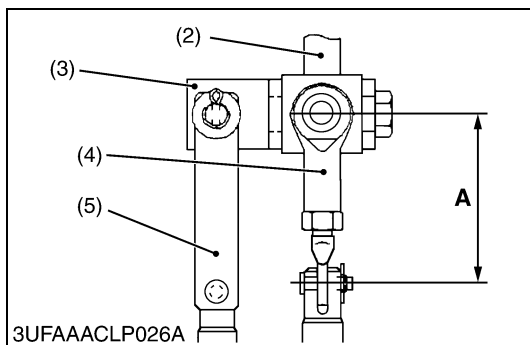
- Remove the control valve cover (1) from the control valve stay.
- Disconnect the control lever (2) from the control valve stay and lever (3).
- Disconnect the control lever rods (4) and (5) at the control valve spools.

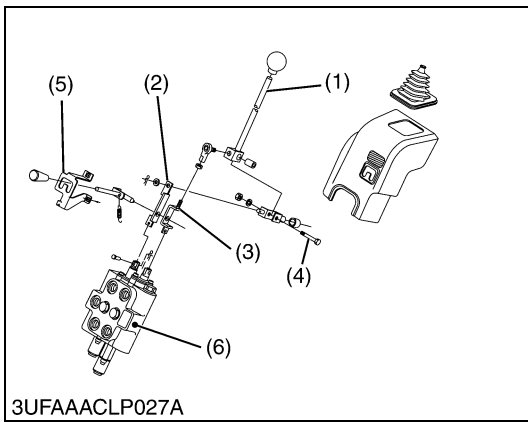
(Reference)

Length "A" of rod 1	Factory spec.	60.2 to 61.2 mm 2.37 to 2.41 in.
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- (1) Control Valve Cover
- (2) Control Lever
- (3) Lever
- (4) Rod 1
- (5) Rod 2

W1015830





Control Lever and Control Valve (LA181)

1. Disconnect the spool plate (2) and rod 1 (3) from the control valve spools.
2. Remove the clevis pin (4) and remove the control lever (1).
3. Remove the control valve (6) from the valve stay.

(When reassembling)

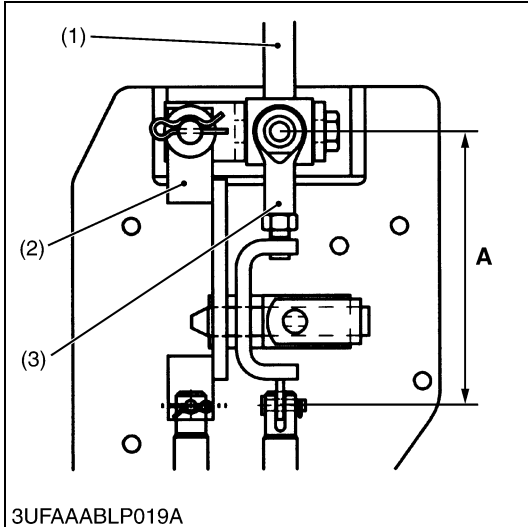
Tightening torque	Control valve mounting bolt	12.2 to 13.6 N·m 1.2 to 1.4 kgf·m 9 to 10 ft-lbs
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(Reference)

Length "A" of rod 1	Factory spec.	115.3 to 116.3 mm 4.54 to 4.58 in.
---------------------	---------------	---------------------------------------

- | | |
|-------------------|-------------------|
| (1) Control Lever | (4) Clevis Pin |
| (2) Spool Plate | (5) Lever guide |
| (3) Rod 1 | (6) Control Valve |

W1015045



Control Valve

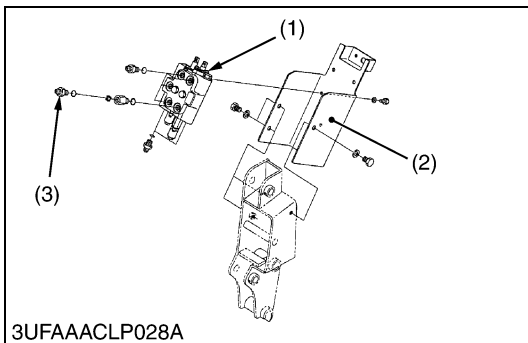
1. Remove the control valve (1) from the control valve stay (2).

(When reassembling)

Tightening torque	Control valve mounting bolt	12.2 to 13.6 N·m 1.2 to 1.4 kgf·m 9 to 10 ft-lbs
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- | | |
|------------------------|---------------------------------|
| (1) Control Valve | (3) Control Valve Mounting Bolt |
| (2) Control Valve Stay | |

W1016433



Adaptor and Elbow

1. Remove the adaptors from the control valve.

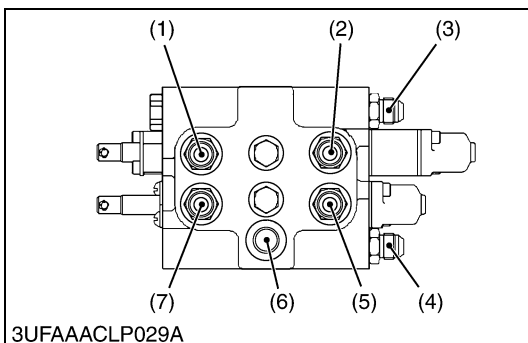
(When reassembling)

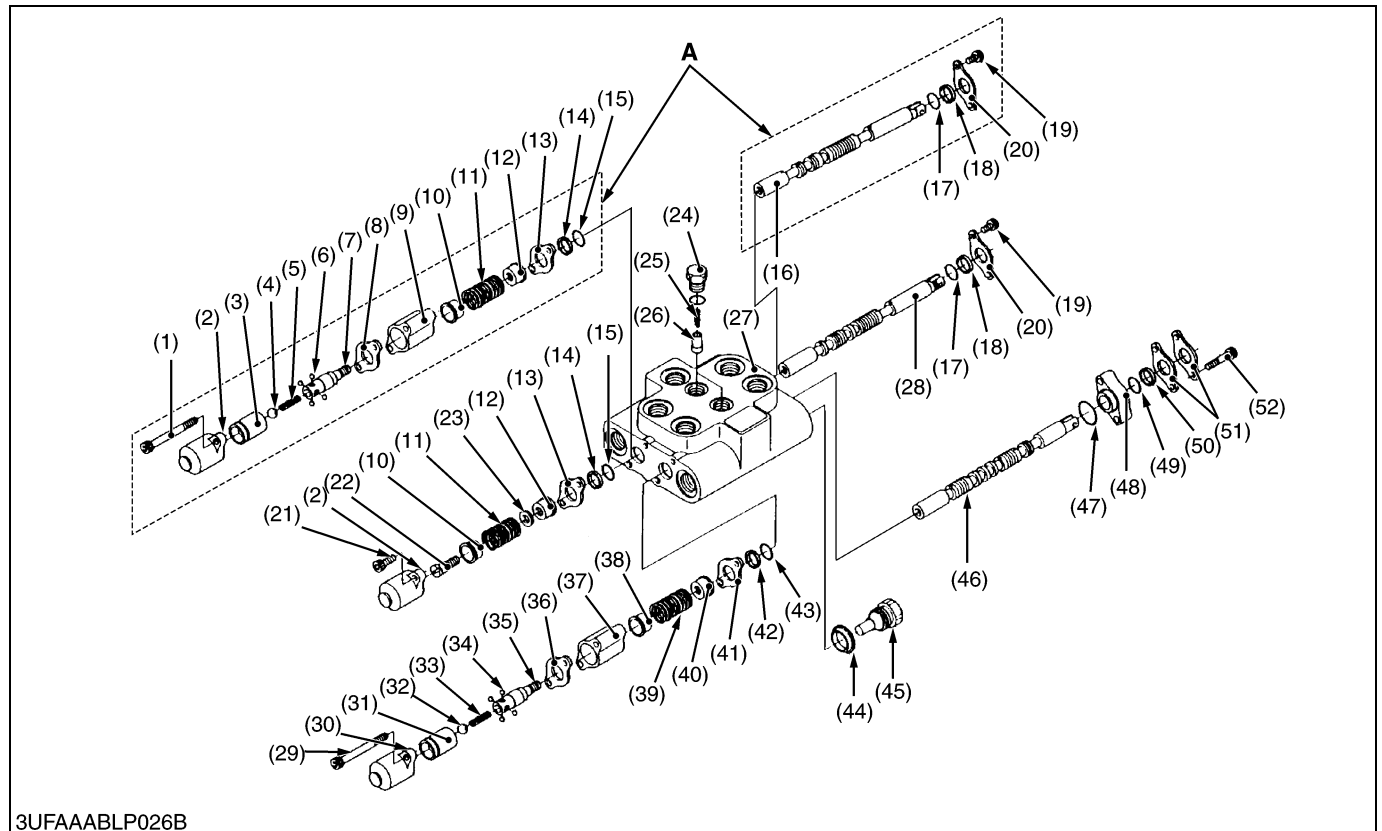
- Use care not to damage the O-ring.

Tightening torque	Adaptor	47.5 to 54.2 N·m 4.8 to 5.5 kgf·m 35 to 40 ft-lbs
-------------------	---------	---

- | | |
|-------------|-------------|
| (1) B1 Port | (5) A2 Port |
| (2) A1 Port | (6) PB Port |
| (3) P Port | (7) B2 Port |
| (4) T Port | |

W1016555



Disassembling Control Valve (4 Position Bucket Control)

3UFAAABLP026B

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

A : 4 Position Bucket Control Type

■ 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]

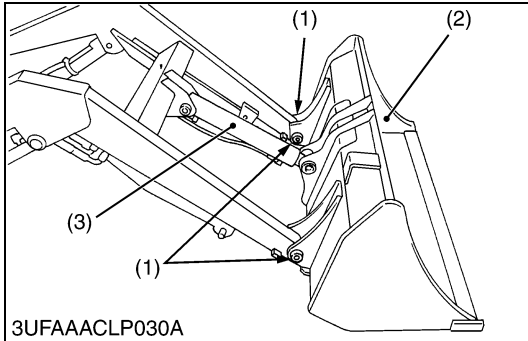
3. Remove the cap (2), seal plate (8), spacer (9), seal plate (13) and wiper ring (14), and draw out the spool (16) with other component parts from the valve housing (27).

(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 or damage.
- Install the spool and spacer to the valve housing, using care not to damage the O-ring.

[2] BUCKET, BOOM AND HYDRAULIC CYLINDERS

(1) Disassembling and Assembling

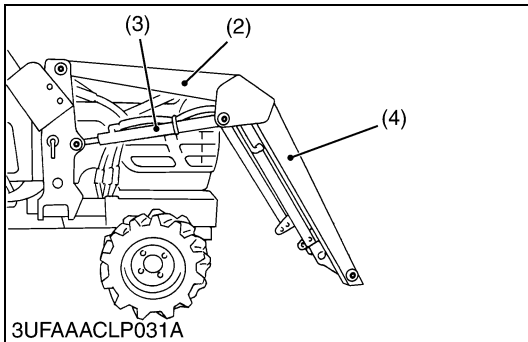


Bucket

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

(1) Pin (3) Bucket Cylinder
(2) Bucket

W1016780



Boom and Hydraulic Cylinders

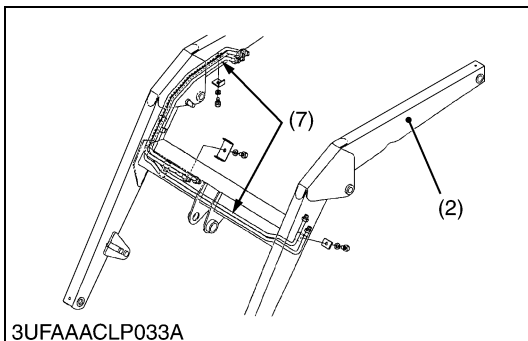
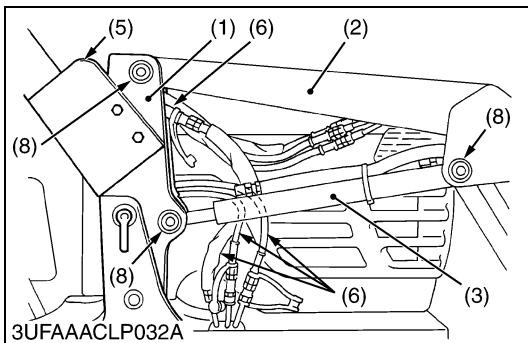
1. Disconnect the hydraulic hoses from the hydraulic cylinders (3), (4).
2. Remove the pins and remove the hydraulic cylinders (3), (4).
3. Disconnect the hydraulic hoses (6) with quick couplers at the control valve (5).
4. Remove the pins (8) and remove the boom (2) from the side frame (1).
5. Remove the hydraulic tubes (7) from the boom (2).

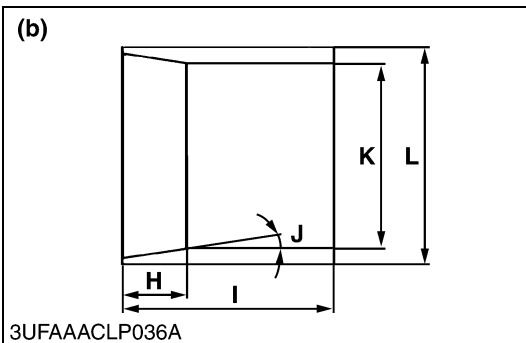
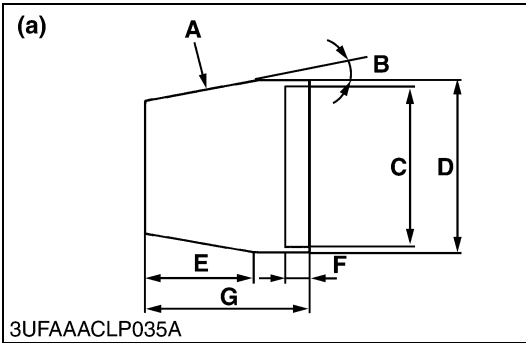
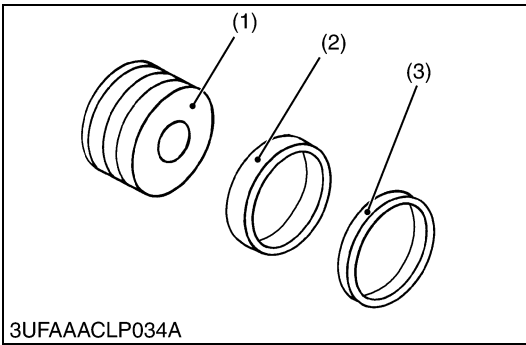
(When reassembling)

- 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 (5) Control Valve
(2) Boom (6) Hose 4, 5, 6 and 7
(3) Boom Cylinder (7) Hydraulic Tubes
(4) Bucket Cylinder (8) Pin

W1016879





Piston Seal and O-ring

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

■ **IMPORTANT**

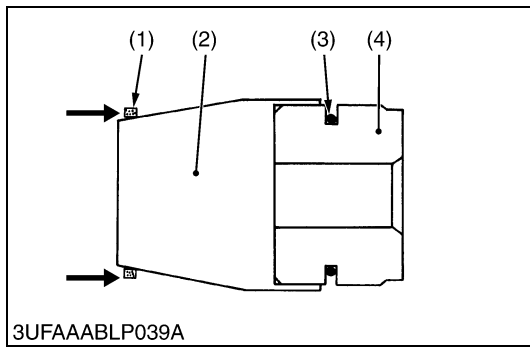
- When installing the O-ring (3) and piston seal (2) to the piston (1), use the slide jig and correcting jig as shown in the figure.

	LA181		LA211	
	Boom	Bucket	Boom	Bucket
A	80 √	80 √	80 √	80 √
B	0.0523 rad. 3°	0.0523 rad. 3°	0.0523 rad. 3°	0.0523 rad. 3°
C	35.40 mm dia. 1.394 in. dia.	55.40 mm dia. 2.181 in. dia.	37.46 mm dia. 1.475 in. dia.	57.45 mm dia. 2.262 in. dia.
D	37.40 mm dia. 1.472 in. dia.	57.40 mm dia. 2.260 in. dia.	39.46 mm dia. 1.554 in. dia.	59.45 mm dia. 2.341 in. dia.
E	76.0 mm 2.992 in.	76.0 mm 2.992 in.	76.0 mm 2.992 in.	76.0 mm 2.992 in.
F	14.0 mm 0.551 in.	14.0 mm 0.551 in.	14.0 mm 0.551 in.	14.0 mm 0.551 in.
G	100.0 mm 3.937 in.	100.0 mm 3.937 in.	100.0 mm 3.937 in.	100.0 mm 3.937 in.
H	70.0 mm 2.756 in.	70.0 mm 2.756 in.	70.0 mm 2.756 in.	70.0 mm 2.756 in.
I	110.0 mm 4.331 in.	110.0 mm 4.331 in.	110.0 mm 4.331 in.	110.0 mm 4.331 in.
J	0.0523 rad. 3°	0.0523 rad. 3°	0.0523 rad. 3°	0.0523 rad. 3°
K	35.40 mm dia. 1.394 in. dia.	55.4 mm dia. 2.181 in. dia.	38.1 mm dia. 1.5 in. dia.	57.45 mm dia. 2.262 in. dia.
L	45 mm dia. 1.772 in. dia.	65 mm dia. 2.560 in. dia.	47.63 mm dia. 1.875 in. dia.	65 mm dia. 2.560 in. dia.

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

- (a) Slide Jig
- (b) Correcting Jig

W1017590



Installing O-ring and Piston Seal

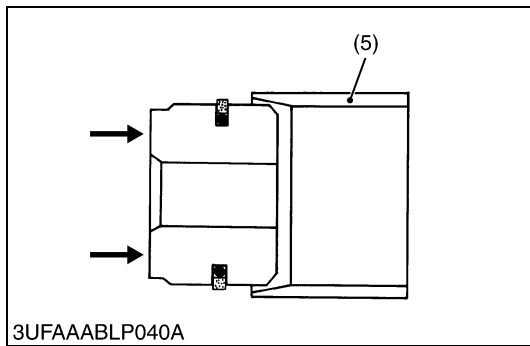
1. Place the slide jig (2) on the piston (4).
2. Install the O-ring (3) on the piston using the slide jig.
3. Install the piston seal (1) over the O-ring using the slide jig.
4. Compress the piston seal to the correct size by installing the piston into the correcting jig (5).

NOTE

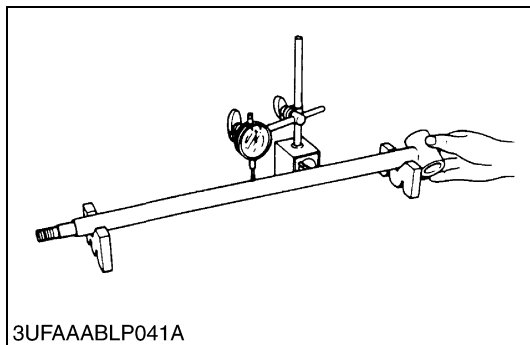
- Do not turn (roll) the piston seal as you install it.

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

W1018156



(2) Servicing



Piston Rod Bend

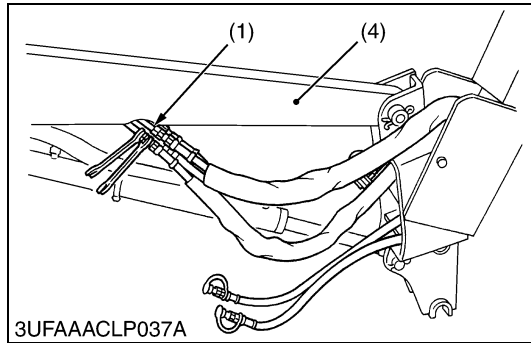
1. Place piston rod on V blocks.
2. Set a dial indicator on the center of the rod.
3. Turn the piston rod and read the dial indicator.
4. If the measurement exceeds the allowable limit, replace it.

Piston rod bend	Allowable limit	0.25 mm 0.0098 in.
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W1018329

[3] SIDE FRAMES, FRONT GUARD (OPTIONAL), HYDRAULIC TUBES AND MAIN FRAMES

(1) Disassembling and Assembling

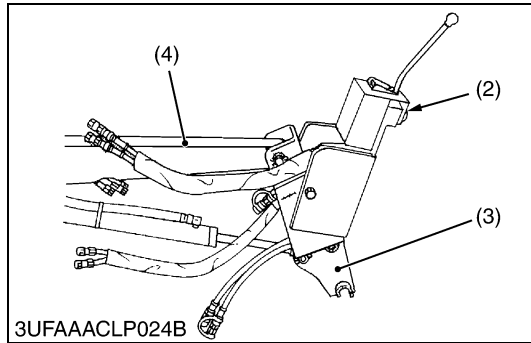


Side Frames

1. Disconnect the four hoses (1) with quick couplers from the control valve.
2. Remove the control valve with stay (2) from side frame (3).
3. Remove the side frame (3) from the boom assembly (4).

- | | |
|-----------------------------|-------------------|
| (1) Hose 1 and 2 | (3) Side Frame |
| (2) Control Valve with Stay | (4) Boom Assembly |

W1015835



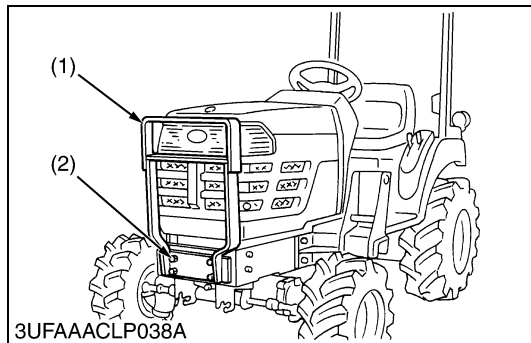
Front Guard (Option)

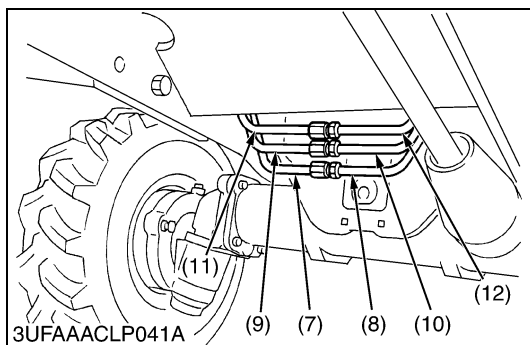
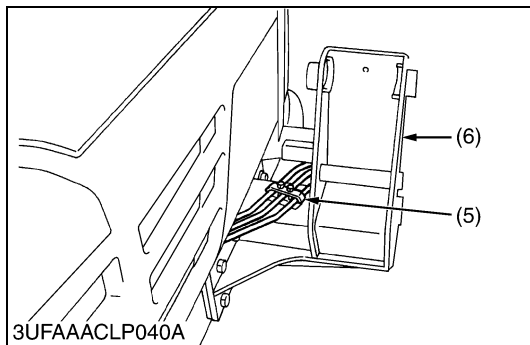
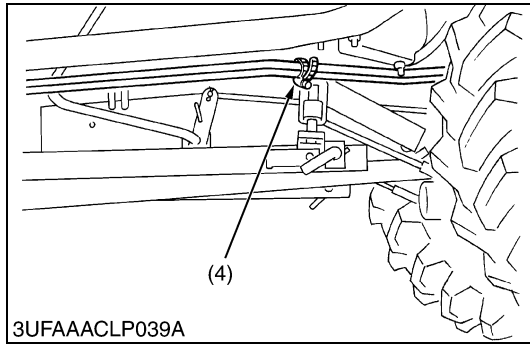
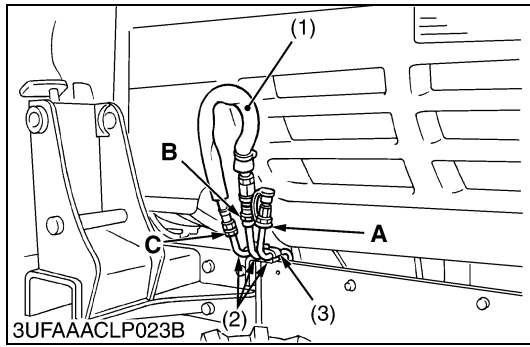
1. Remove the front guard (1).
- (When reassembling)**

Tightening torque	Front guard mounting bolt and nut	83 N·m 8.3 kgf·m 61 ft-lbs
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- | | |
|-----------------|---|
| (1) Front Guard | (2) 4-M12 × 35 Bolts (Pitch 1.25)
4-M12 Spring Lock Washers
4-M12 Nuts (Pitch 1.25) |
|-----------------|---|

W1019455



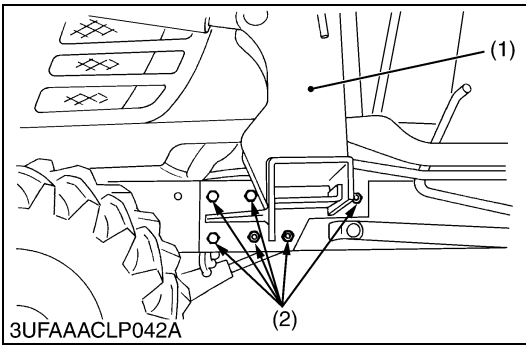


Hydraulic Tubes

1. Disconnect the hose 4 (1) from delivery tube 2 (2).
2. Remove the tube clamp (3).
3. Loosen the tube clamp bolts. Remove the metal band (4) from three tubes.
4. Remove the tube clamp (5) from the main frame LH (6) as shown.
5. Disconnect the return tube 2 (8) with male coupler from the return tube 1 (7) as shown. Disconnect the pump tube 2 (10) with the delivery tube 2 (12) with the hydraulic hose from the delivery tube 1 (11) as shown.

- | | |
|---------------------|----------------------|
| (1) Hose 4 | (9) Pump Tube |
| (2) Delivery Tube 2 | (10) Pump Tube 2 |
| (3) Tube Clamp | (11) Delivery Tube 1 |
| (4) Metal Band | (12) Delivery Tube 2 |
| (5) Tube Clamp | |
| (6) Main Frame LH | |
| (7) Return Tube 1 | |
| (8) Return Tube 2 | |
- A : Tank Port**
B : Pump Port
C : Power Beyond Port

W1019563



Main Frame

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

(When reassembling)

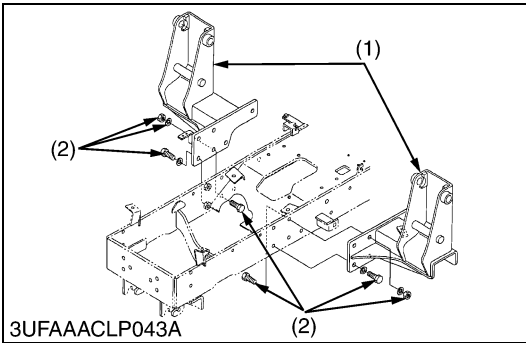
- Do not tighten any bolts firmly until most components are attached onto the tractor.

Tightening torque	Main frame mounting bolt (M14)	147 N·m 15.0 kgf·m 108 ft·lbs
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(1) Main Frame

(2) 12-9/16-18 UNF × 1 1/2 Bolt
6-9/16-18 UNF Nut
12-9/16 Spring Lock Washer

W1020080



EDITOR:

KUBOTA FARM & INDUSTRIAL MACHINERY SERVICE, LTD.

64, ISHIZU-KITAMACHI, SAKAI-KU, SAKAI-CITY, OSAKA, 590-0823, JAPAN

PHONE : (81)72-241-1129

FAX : (81)72-245-2484

E-mail : ksos-pub@kubota.co.jp
