WSM

WORKSHOP MANUAL
FRONT LOADER

LA403

Kubota

KiSC issued 09, 2007 A

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 LA403. It is divided into two parts, “Mechanism” and “Servicing” for each section.

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.

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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.

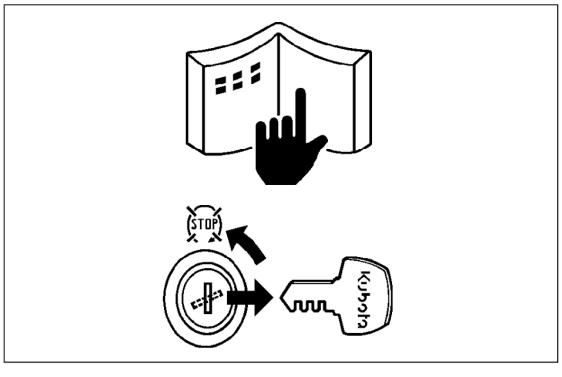
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

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.**

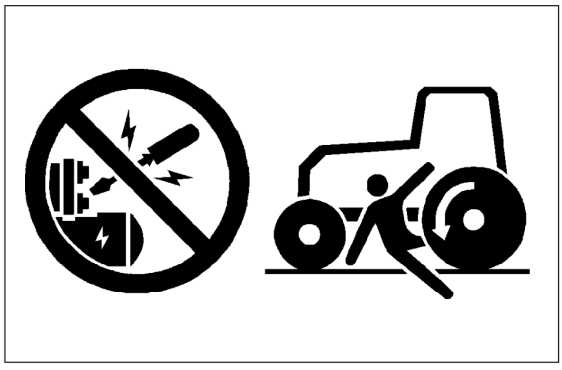
IMPORTANT : **Indicates that equipment or property damage could result if instructions are not followed.**

NOTE : **Gives helpful information.**



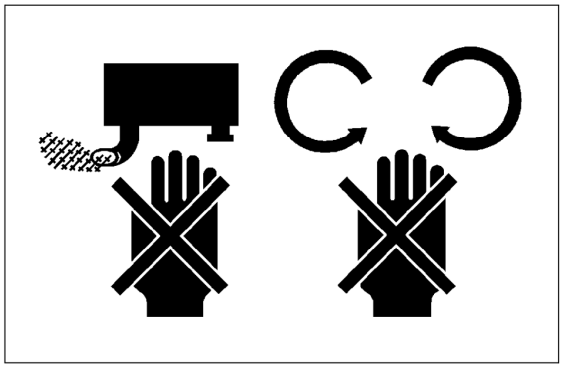
BEFORE SERVICING AND REPAIRING

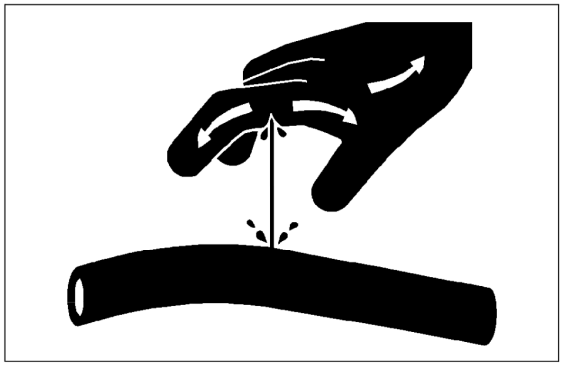
- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery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



SAFETY STARTING

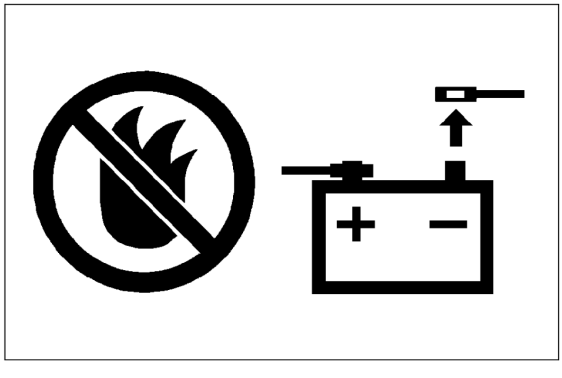
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine 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.

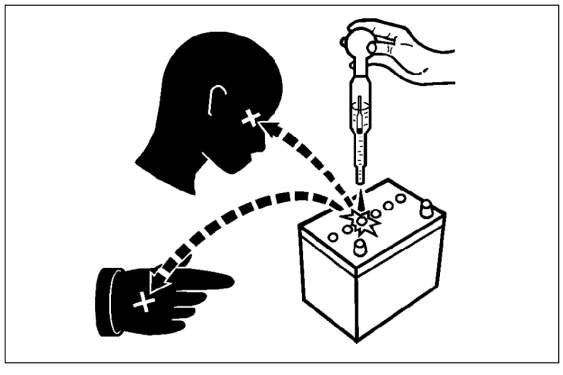


AVOID FIRES

- 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.

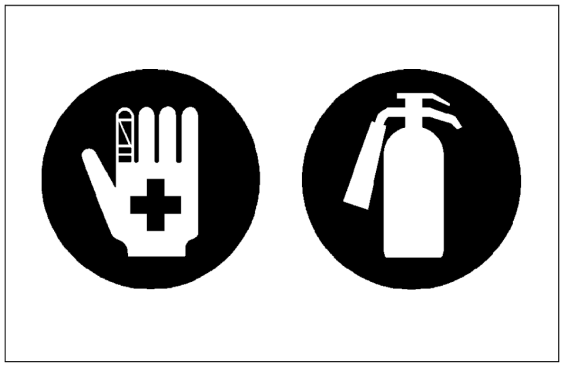


PREVENT ACID BURNS

- 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.

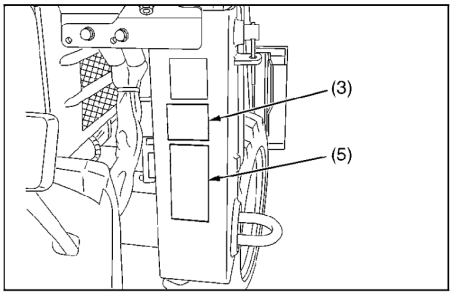


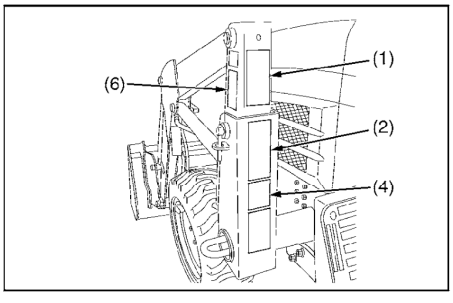
PREPARE FOR EMERGENCIES

- 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

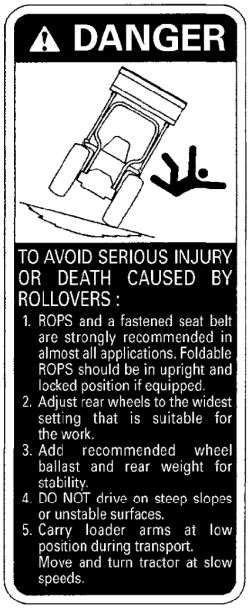
The following safety decals are installed on the machine.
If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.





(1) Part No. 7J246-5643-1

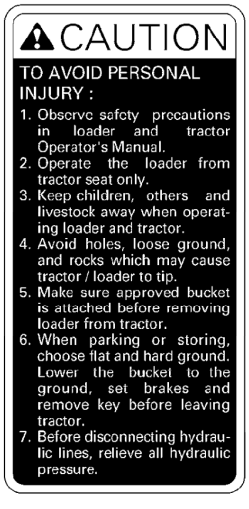
(2) Part No. 7J246-5641-1



(3) Part No. 7J266-5649-2

(4) Part No. 7J246-5642-1

(5) Part No. 7J246-5645-1



(6) Part No. 7J246-5644-2
(Both sides)

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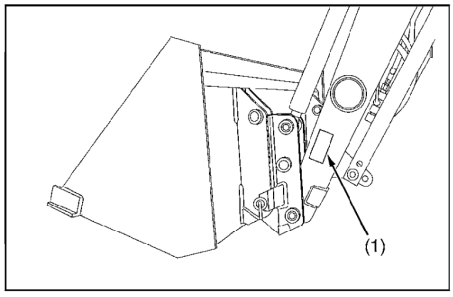
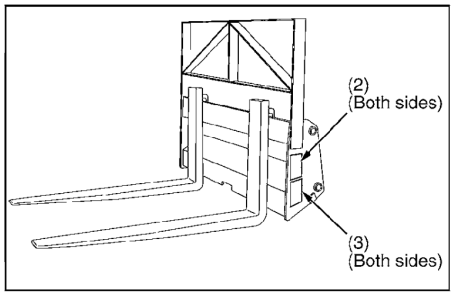
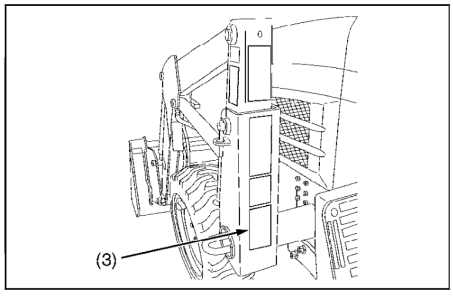
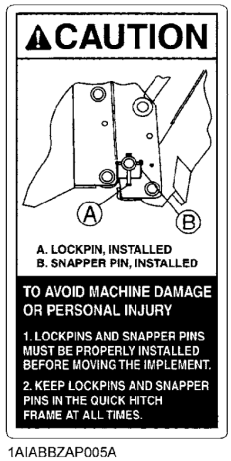






(1) Part No. 77565-3616-2



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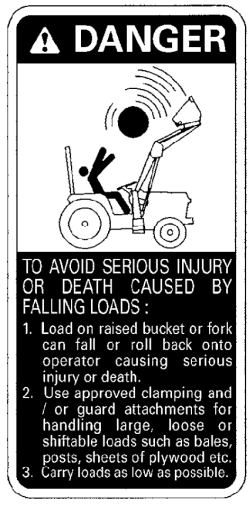
(2) Part No. 7J246-5643-1



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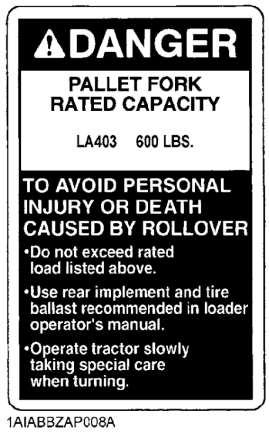

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CARE OF DANGER, WARNING AND CAUTION LABELS

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.
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 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.

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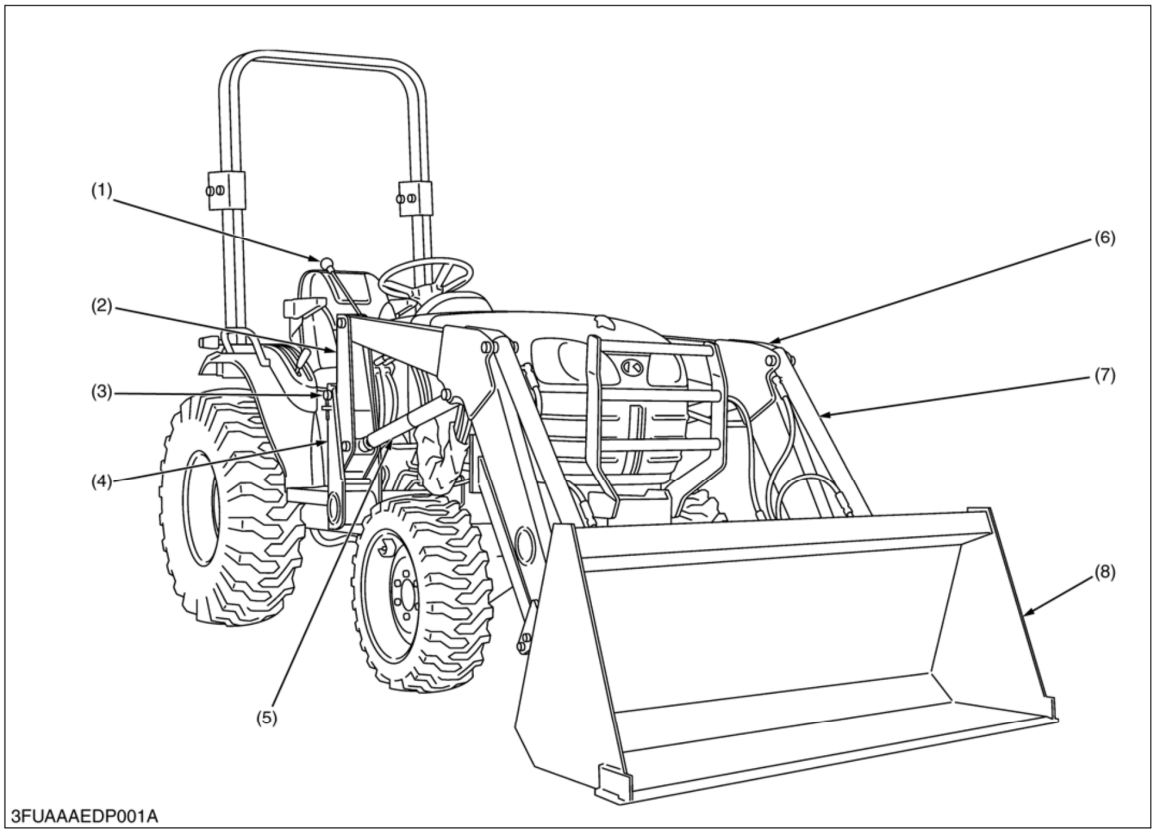
LOADER TERMINOLOGY



(1) Hydraulic Control Valve
(2) Side Frame
(3) Mounting Pin
(4) Main Frame
(5) Boom Cylinder
(6) Boom
(7) Bucket Cylinder
(8) Bucket

SPECIFICATIONS

Suitable Tractor

Loader Model	LA403
Tractor Model	B2630, B3030

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[1] LOADER SPECIFICATIONS

Loader Model		LA403
Tractor Model		B3030
Wheel Base		1666 mm (65.6 in.)
Front Tires		7-12
Rear Tires		12.4-16
Boom Cylinder	Bore	40 mm (1.57 in.)
	Stroke	448 mm (17.6 in.)
Bucket Cylinder	Bore	40 mm (1.57 in.)
	Stroke	490 mm (19.3 in.)
Control Valve		One Detent Float Position, Two Stage Bucket Dump, Power Beyond Circuit
Rated Flow		19.7 L/min. (5.2 U.S.gals./min., 4.33 Imp.gals./min.)
Maximum Pressure		16.6 MPa (169 kgf/cm^2, 2408 psi)
Net Weight (Approximate)		363 kg (800 lbs)

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[2] BUCKET SPECIFICATIONS

Loader Model		LA403	
Bucket Model		Square 54	Square 60” LM
Type		Rigid	Rigid
Width		1370 mm (54.0 in.)	1525 mm (60.0 in.)
Depth (L)		456 mm (18.0 in.)	529 mm (20.8 in.)
Height (M)		562 mm (22.1 in.)	562 mm (22.1 in.)
Length (N)		495 mm (19.5 in.)	566 mm (22.3 in.)
Capacity	Struck	0.19 m^3 (6.7 cu.ft.)	0.23 m^3 (8.1 cu.ft.)
	Heaped	0.25 m^3 (8.8 cu.ft.)	0.29 m^3 (10.2 cu.ft.)
Weight		85 kg (187 lbs)	98 kg (216 lbs)

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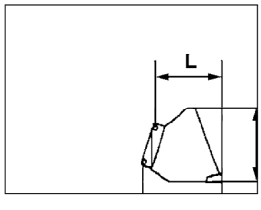
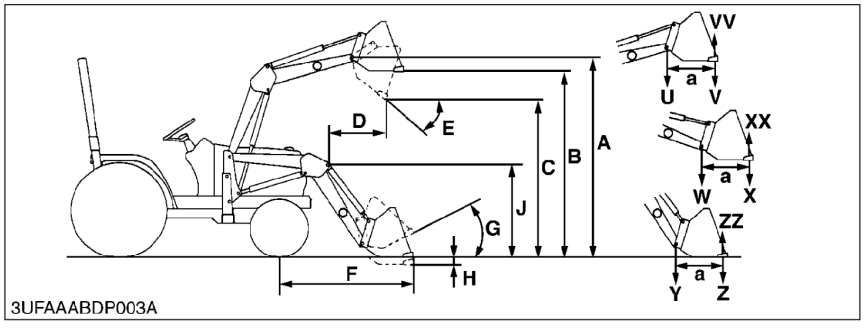


[3] DIMENSIONAL AND OPERATIONAL SPECIFICATIONS



Dimensional Specifications

Loader Model		LA403
Tractor Model		B3030
(A)	Maximum lift height to pivot pin	2150 mm (84.6 in.)
(B)	Maximum lift height under level bucket	1980 mm (78.0 in.)
(C)	Clearance with bucket dumped	1700 mm (67.0 in.)
(D)	Reach at maximum lift height	ROPS Model : 625 mm (24.6 in.) CAB Model : 513 mm (20.2 in.)
(E)	Maximum dump angle	0.698 rad (40 °)
(F)	Reach with bucket on ground	1395 mm (55.0 in.)
(G)	Bucket roll-back angle	0.524 rad (30 °)
(H)	Digging depth	127 mm (5.0 in.)
(J)	Overall height in carry position	1135 mm (44.7 in.)

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Operational Specifications

Loader Model		LA403
Tractor Model		B3030
Lift capacity (Bucket bottom mid point)		400 kg (880 lbs)
(U)	Lift capacity (Bucket pivot pin, max. height)	495 kg (1091 lbs)
(V)	Lift capacity (500 mm forward, max. height)	355 kg (783 lbs)
(W)	Lift capacity (Bucket pivot pin, 1500 mm height)	615 kg (1356 lbs)
(X)	Lift capacity (500 mm forward, 1500 mm height)	465 kg (1025 lbs)
(Y)	Breakout force (Bucket pivot pin)	10290 N (2313 lbs)
(Z)	Breakout force (500 mm forward)	7517 N (1690 lbs)
(VV)	Bucket roll-back force at maxumum height	8643 N (1943 lbs)
(XX)	Bucket roll-back force at 1.5 m (59 in.)	11015 N (2476 lbs)
(ZZ)	Bucket roll-back force at ground level	10174 N (2287 lbs)
Raising time		3.1 sec.
Lowering time		3.7 sec.
Bucket dumping time		1.6 sec.
Bucket roll-back time		2.3 sec.

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MECHANISM

CONTENTS

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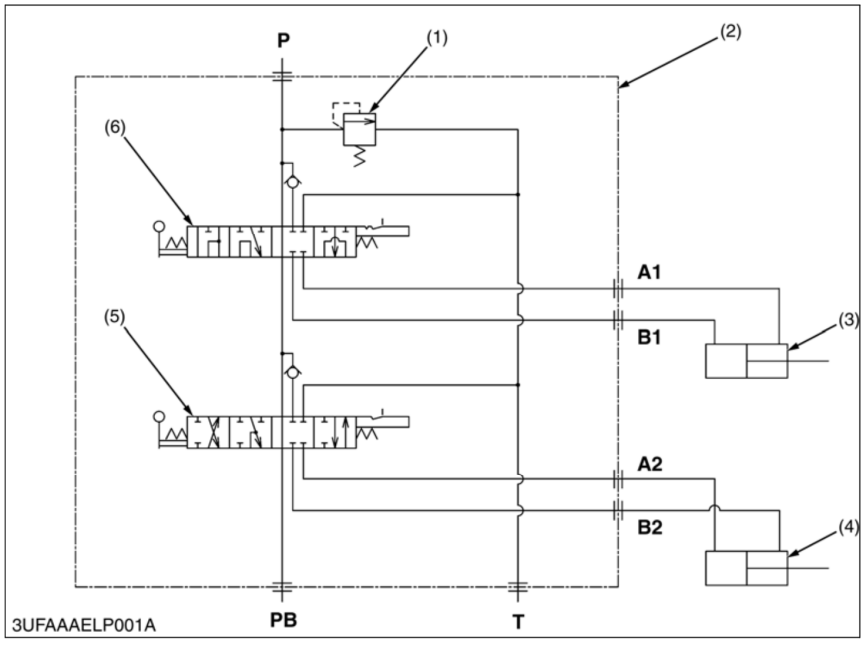
1. HYDRAULIC CIRCUIT



(1) Relief Valve
(2) Control Valve Assembly
(3) Boom Cylinder
(4) Bucket Cylinder
(5) Bucket Control Valve
(6) Boom Control Valve

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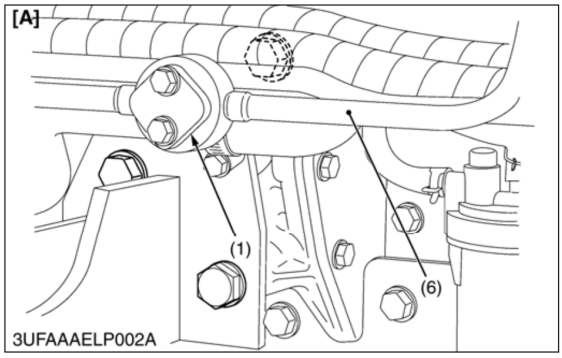
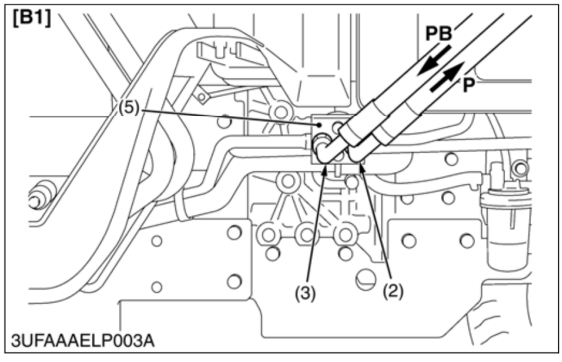
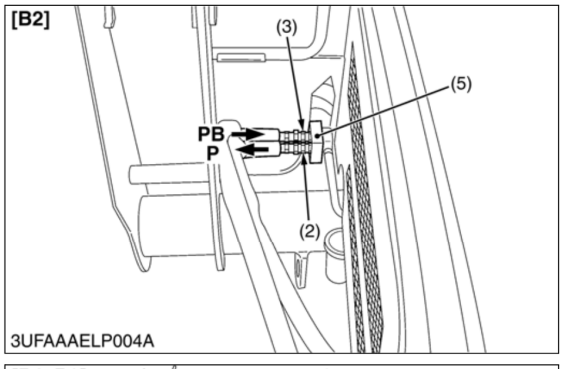
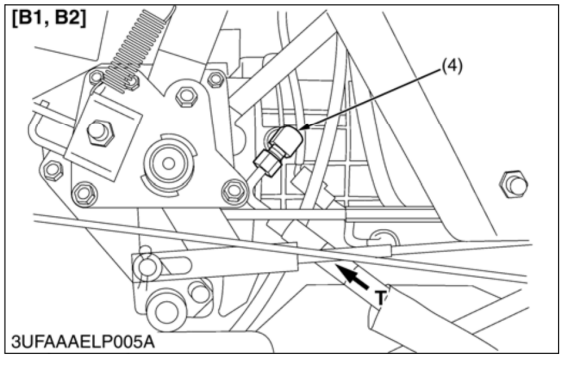
2. HYDRAULIC BLOCK









A filtered oil is forced out by the hydraulic pump to the hydraulic block (5) through the delivery pipe (6).

The hydraulic block has a relief valve.

(A) When Front Loader is not Attached

1. An oil from the hydraulic pump is delivered into the hydraulic block cover (1).

(B1 · B2) When Front Loader is Attached

1. An oil from the hydraulic pump is delivered into the **P** port of hydraulic block (5) through the pump port (2).
2. An oil returning from the **PB** (power beyond) port of loader control valve is delivered into the three point hydraulic system through the power beyond port (3) of the hydraulic block (5).
3. An oil returning from the **T** (tank) port of the loader control valve is delivered into the transmission case through the tank port (4).

(1) Hydraulic Block Cover
(2) Pump Port
(3) Power Beyond Port
(4) Tank Port
(5) Hydraulic Block
(6) Delivery Pipe

P : To Front Loader (P Port)
PB :From Front Loader (PB Port)
T : From Front Loader (T Port)

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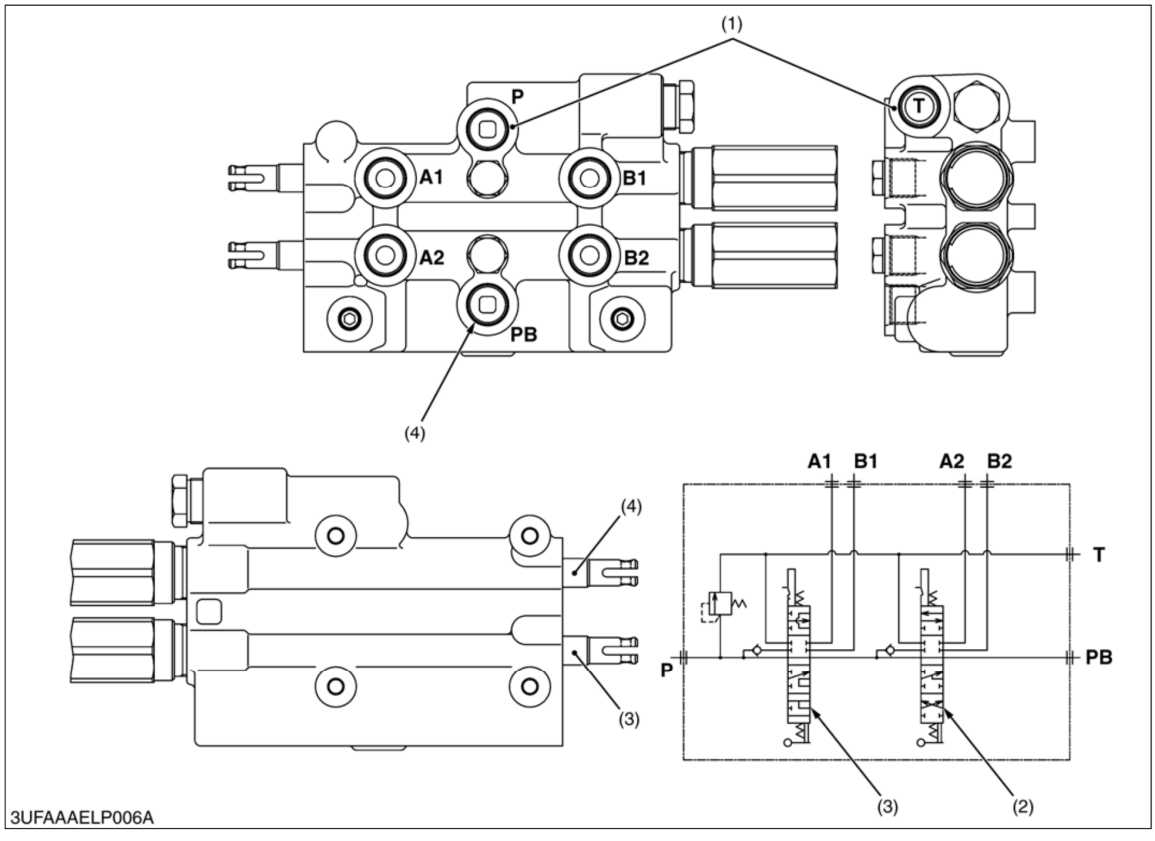
3. CONTROL VALVE ASSEMBLY

[1] STRUCTURE



(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

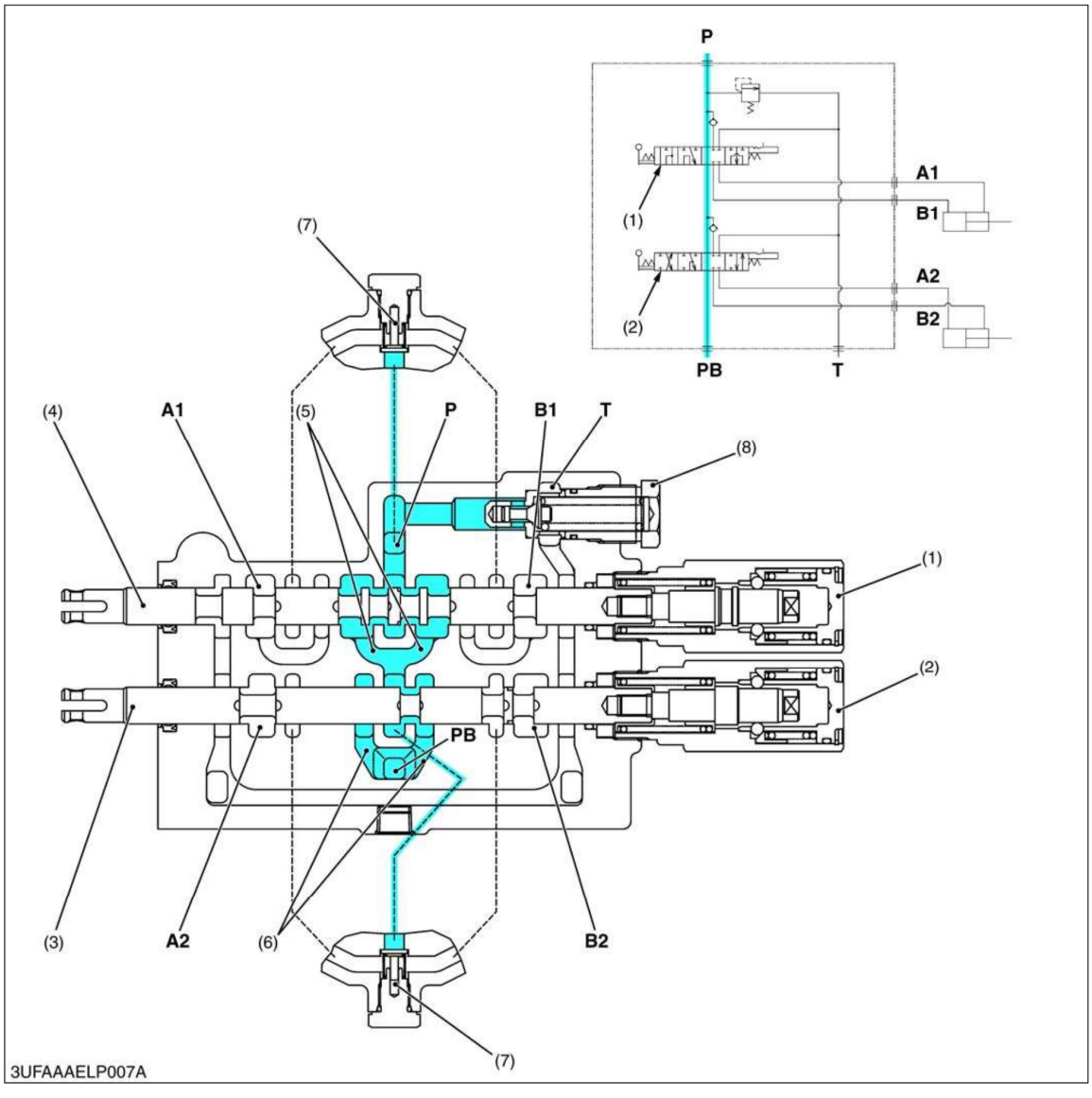
The bucket control valve is of 4-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has **A2** and **B2** ports and controls oil flow to the bucket cylinder.

(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.

[2] OPERATION

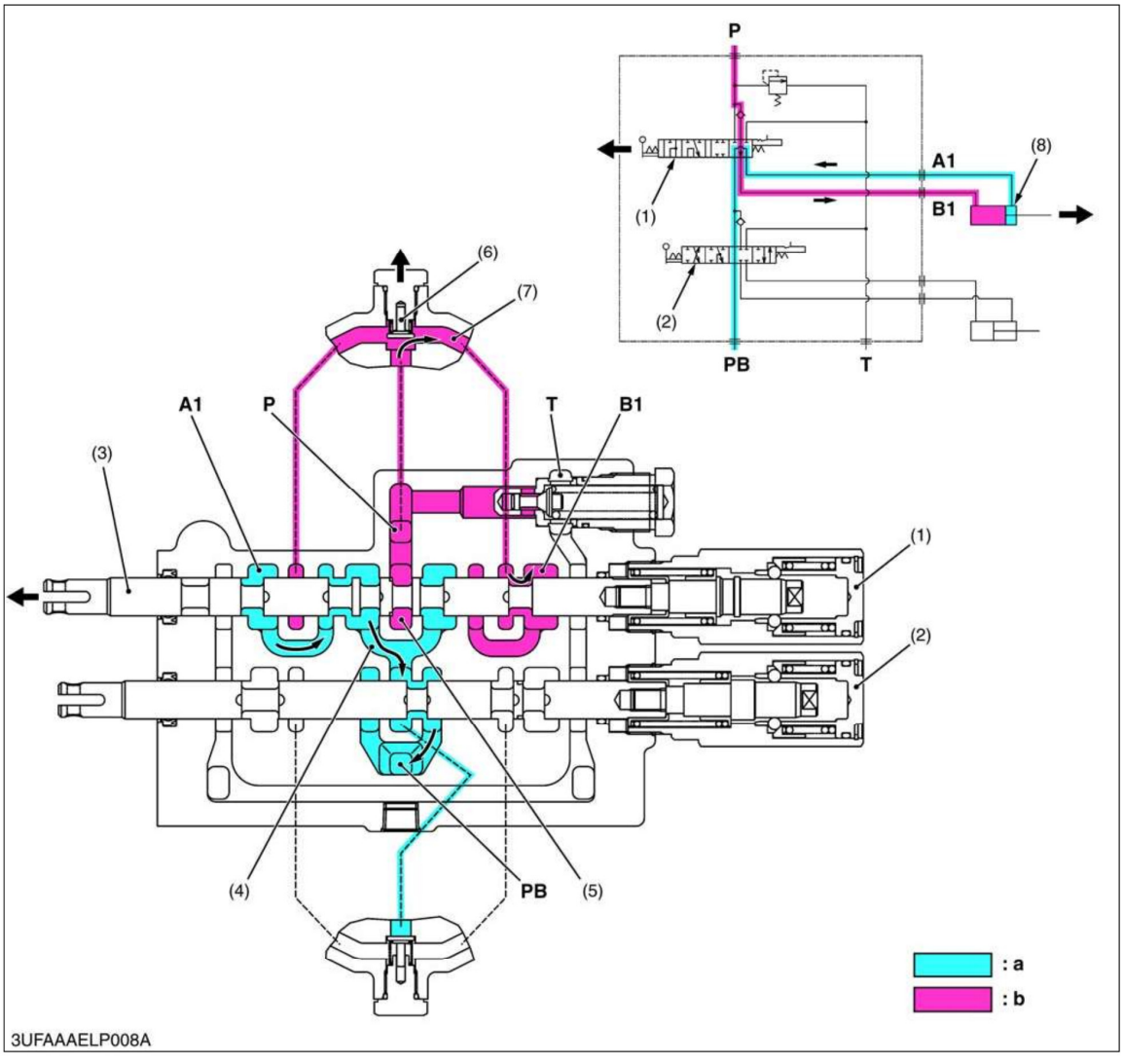
Neutral



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

T : T Port
P : P Port
A1 : A1 Port
A2 : A2 Port
B1 : B1 Port
B2 : B2 Port
PB : PB Port

Up



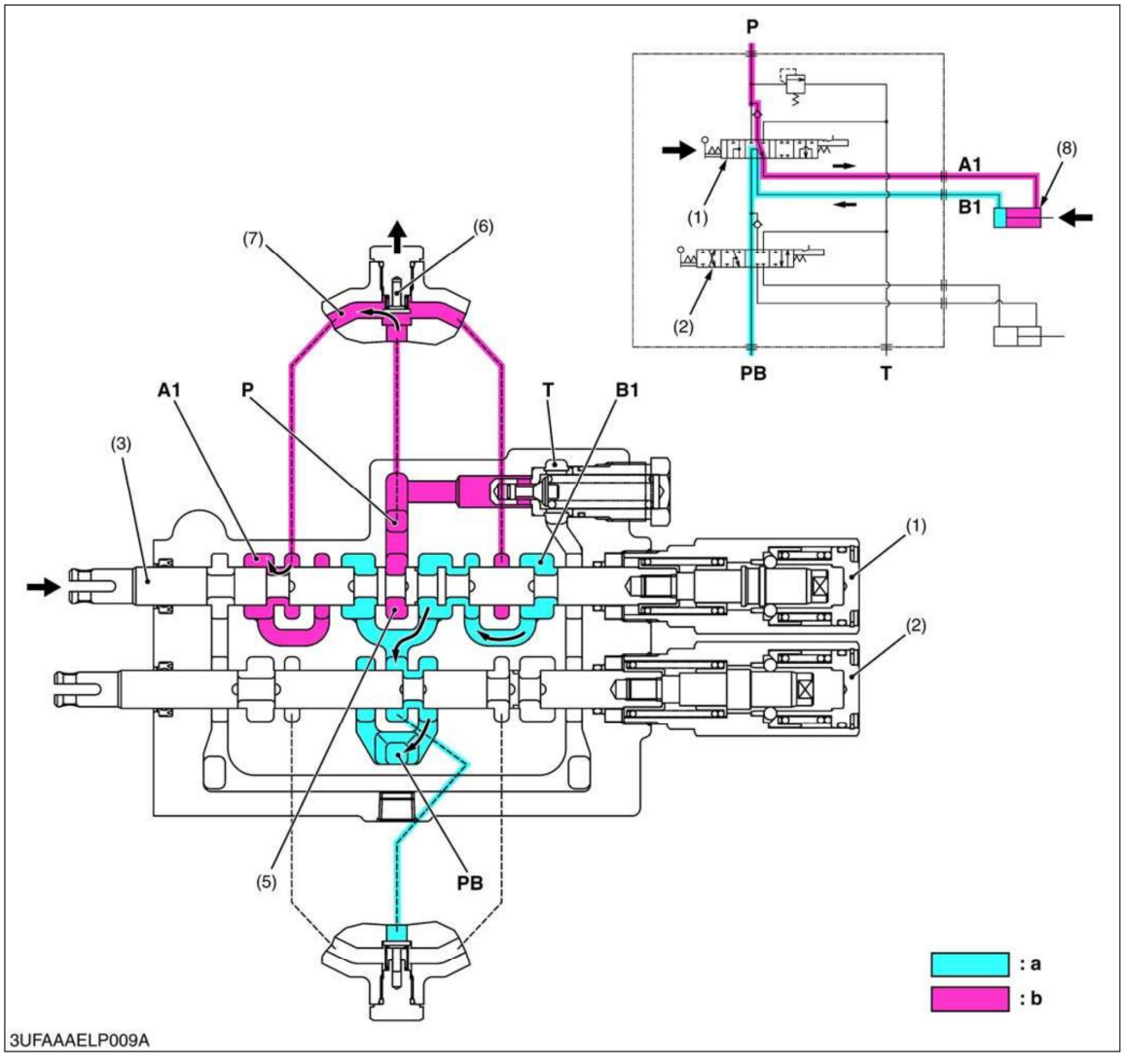
(1) Boom Control Section
(2) Bucket Control Section
(3) Spool
(4) **PB** Passage 1
(5) Neutral Passage 1
(6) Load Check Valve
(7) Passage 1
(8) Boom Cylinder

P : P Port
T : T Port

A1 : A1 Port (From Boom Cylinder)
B1 : B1 Port (To Boom Cylinder)
PB : PB Port
a : Low Pressure
b : High Pressure

1. When the hydraulic control lever is set to the "**UP**" position, the spool (3) of the boom control section (1) moves to the left, which forms oil passages between passage 1 (7) and **B1** port, and between **A1** port and **PB** passage 1 (4).
2. As the oil passage from the neutral passage 1 (5) to the **PB** passage 1 (4) is closed by the spool (3), the pressure-fed oil from the **P** port opens the load check valve (6) and flows through the notched section of the spool (3) and **B1** port to extend the boom cylinder (8).
3. Return oil from the boom cylinder (8) flows from the **A1** port through the passage in the spool (3) and **PB** passage 1 (4) to the bucket control section (2).

Down



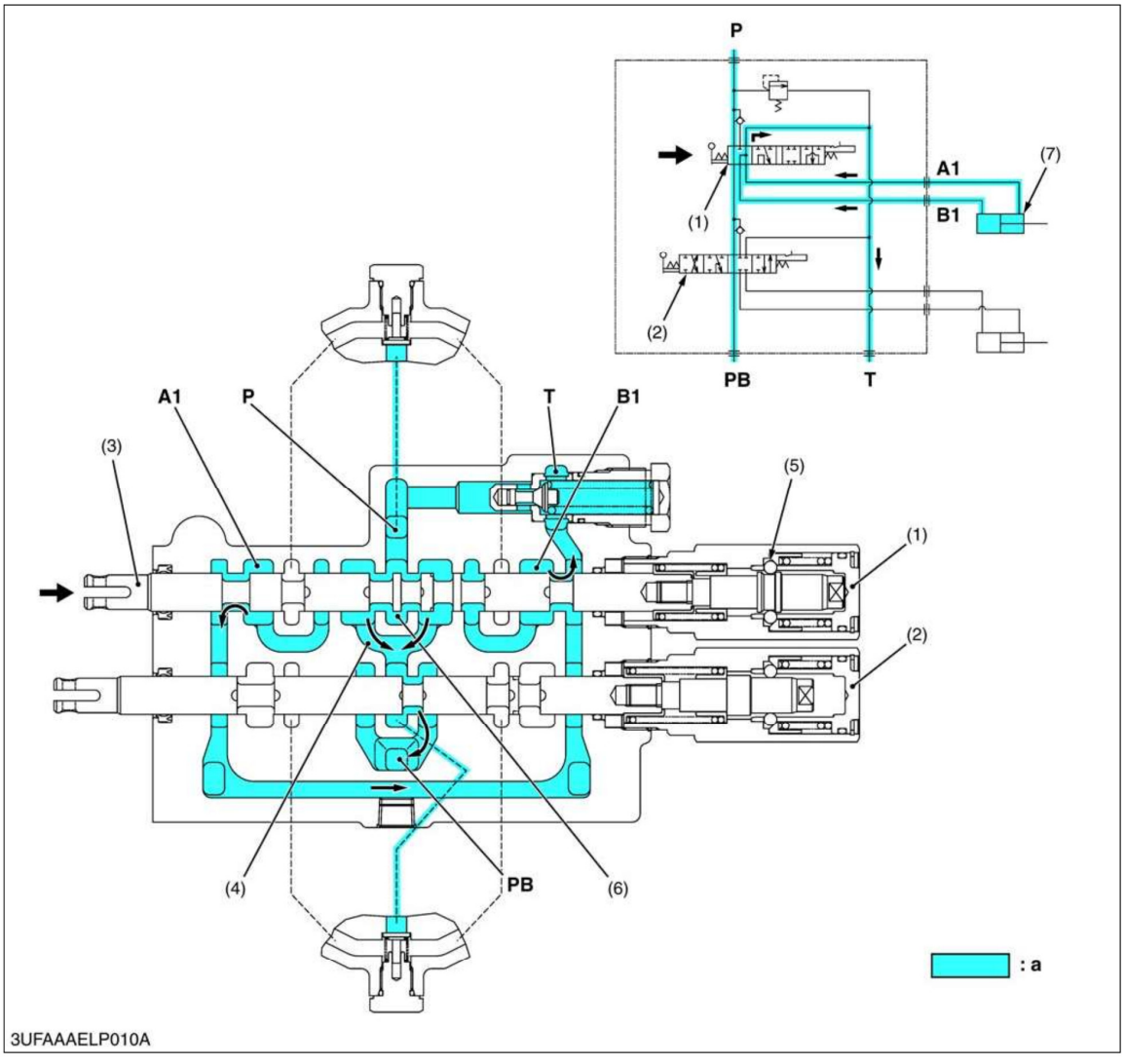
(1) Boom Control Section
(2) Bucket Control Section
(3) Spool
(4) **PB** Passage 1
(5) Neutral Passage 1
(6) Load Check Valve
(7) Passage 1
(8) Boom Cylinder

P : P Port
T : T Port

A1 : A1 Port (To Boom Cylinder)
B1 : B1 Port (From Boom Cylinder)
PB : PB Port
a : Low Pressure
b : High Pressure

1. When the hydraulic control lever is set to the **"DOWN"** position, the spool (3) moves to the right, which forms oil passages between passage 1 (7) and **A1** port, and between **B1** port and **PB** passage 1 (4).
2. As the oil passage from the neutral passage 1 (5) to the **PB** passage 1 (4) is closed by the spool (3), the pressure-fed oil from the **P** port opens the load check valve (6) and flows through the notched section of the spool (3) and **A1** port to retract the boom cylinder (8).
3. Return oil from the boom cylinder (8) flows from the **B1** port through the passage in the spool (3) and **PB** passage 1 (4) to the bucket control section (2).

Floating



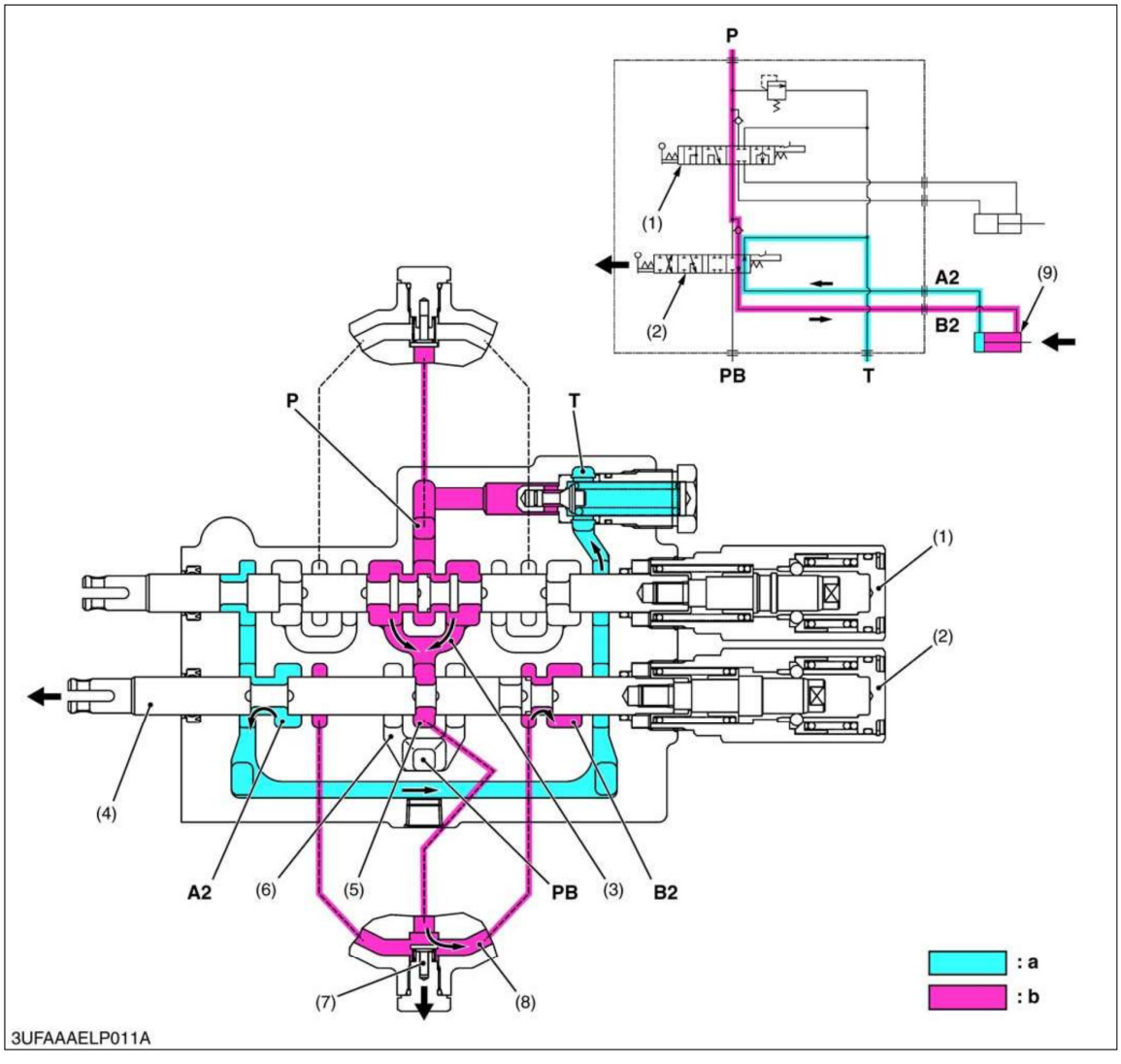
(1) Boom Control Section
(2) Bucket Control Section
(3) Spool
(4) **PB** Passage 1
(5) Detent Mechanism
(6) Neutral Passage 1
(7) Boom Cylinder

P : P Port
T : T Port

A1 : A1 Port
B1 : B1 Port
PB : PB Port
a : Low Pressure

1. When the hydraulic control lever is set to the **"FLOAT"** position, the spool (3) moves further to the right from the **"DOWN"** position and is retained by the detent mechanism (5).
2. This forms oil passages among the **A1** port, **B1** port and **T** port. As a result, oil in the boom cylinder (7) 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 bucket control section (2) through the neutral passage 1 (6) and **PB** passage 1 (4).

Roll-back

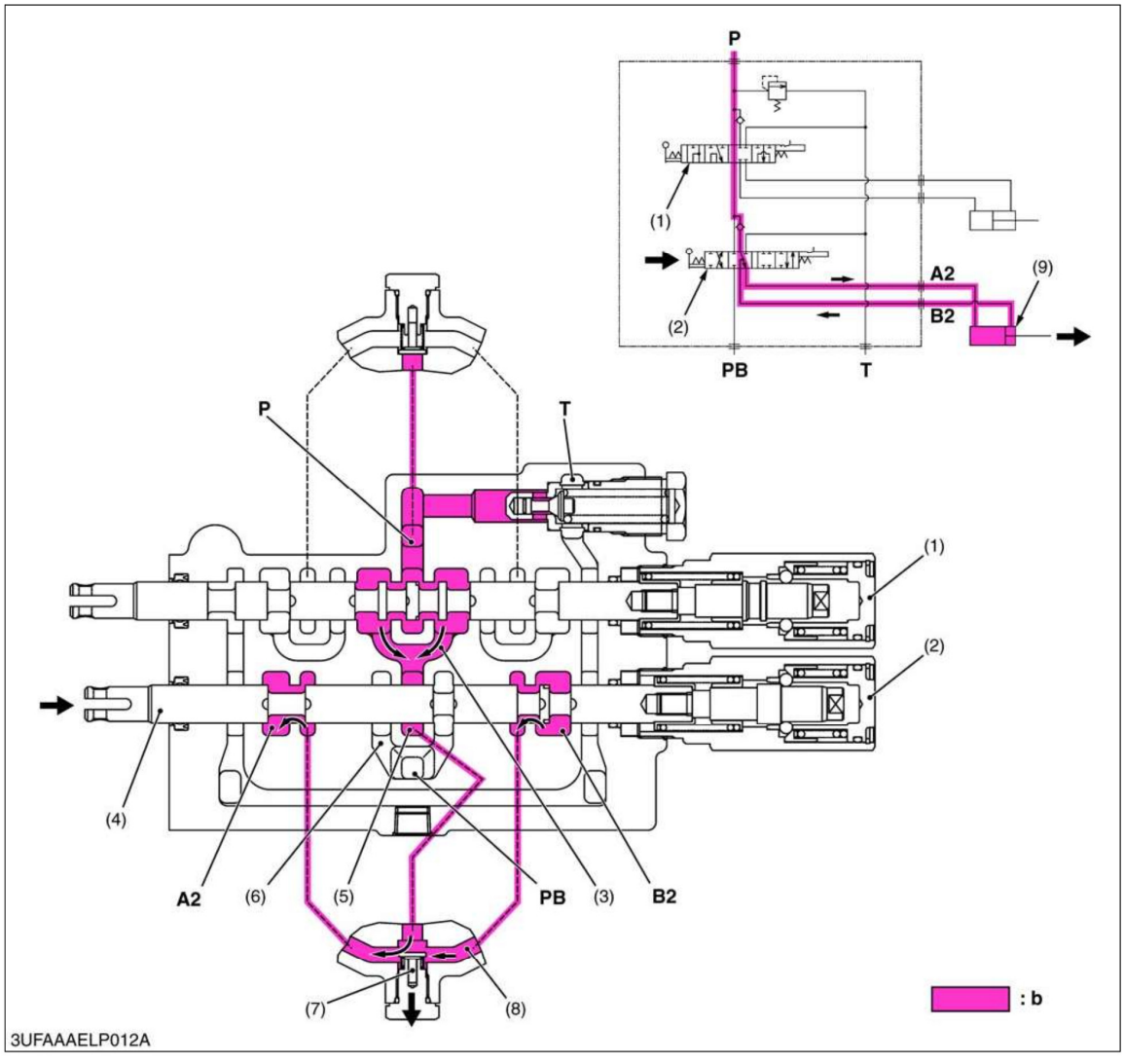


(1) Boom Control Section
(2) Bucket Control Section
(3) **PB** Passage 1
(4) Spool
(5) Neutral Passage 2
(6) **PB** Passage 2
(7) Load Check Valve
(8) Passage 2
(9) Bucket Cylinder

P : P Port
T : T Port
PB : PB Port
A2 : A2 Port (From Bucket Cylinder)
B2 : B2 Port (To Bucket Cylinder)
a : Low Pressure
b : High Pressure

1. When the hydraulic control lever is set to the **"ROLL-BACK"** position, the spool (4) of the bucket control section (2) moves to the left, which forms oil passages between passage 2 (8) and **B2** port, and between **A2** port and **T** port.
2. The pressure-fed oil from the **P** port flows to the neutral passage 2 (5) through the boom control section (1) and **PB** passage 1 (3). As the oil passage from the neutral passage 2 (5) to the **PB** passage 2 (6) is closed by the spool (4), this oil opens the load check valve (7), and flows through the notched section of the spool (4) and **B2** port to retract the bucket cylinder (9).
3. Return oil from the bucket cylinder (9) flows to the transmission case through the **A2** port and **T** port.

Dump 1



(1) Boom Control Section
(2) Bucket Control Section
(3) **PB** Passage 1
(4) Spool
(5) Neutral Passage 2
(6) **PB** Passage 2
(7) Load Check Valve
(8) Passage 2
(9) Bucket Cylinder

P : P Port
T : T Port
PB :PB Port

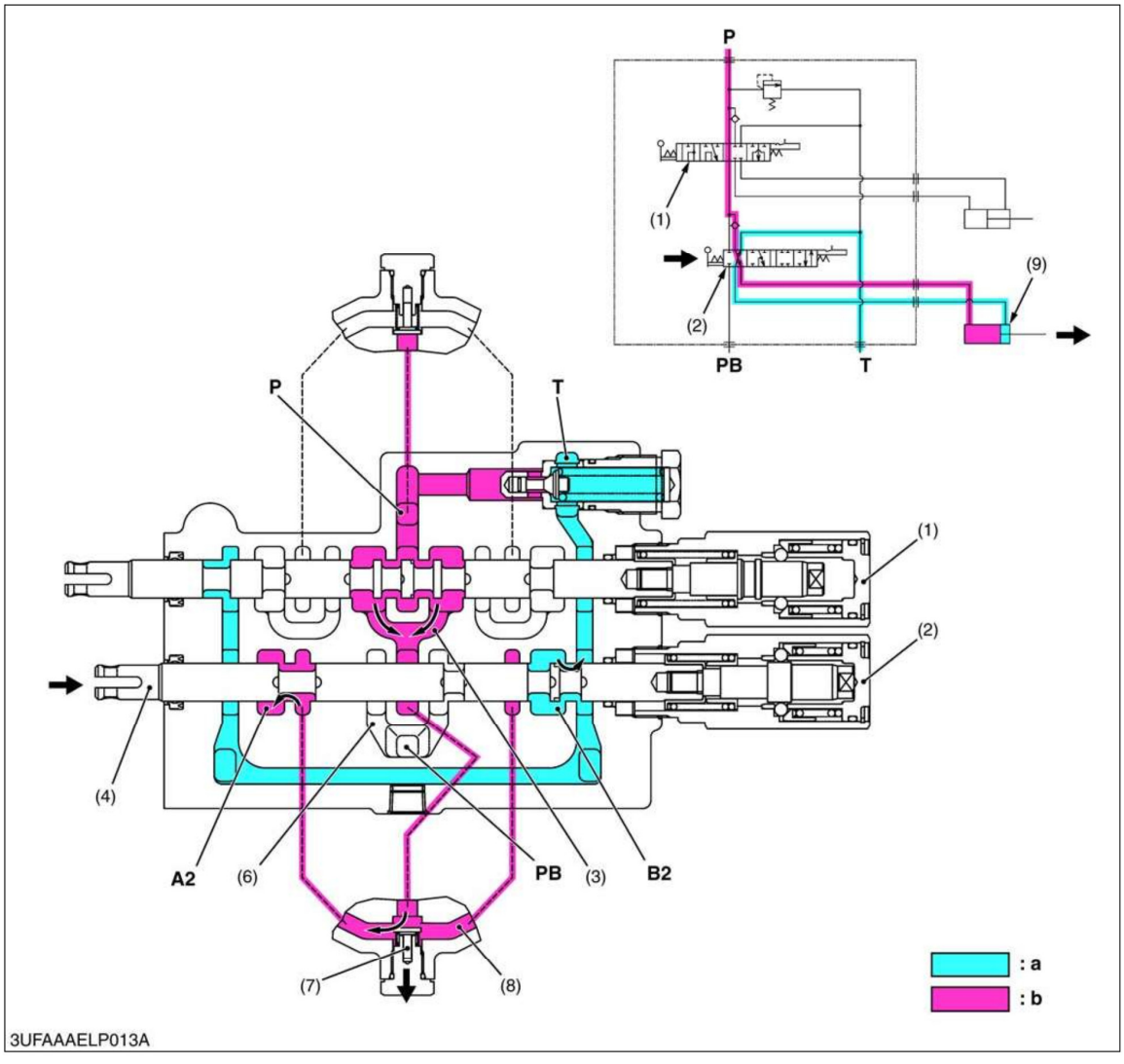
A2 : A2 Port (To Bucket Cylinder)
B2 : B2 Port (From Bucket Cylinder)
b : High Pressure

1. When the hydraulic control lever is set to the **"DUMP 1"** position, the spool (4), which forms oil passages among passage 2 (8), **A2** port and **B2** port.
2. The pressure-fed oil from the **P** port flows through the boom control valve, opens the load check valve, and flows to the bucket cylinder to extend the cylinder through the notched section of the spool and **A2** port.
3. Return oil from the bucket cylinder (9) flows from the **B2** port to the passage 2 (8), and flows to the **A2** port together with the pressure-fed oil from the **P** port.
   As a result, the dump speed 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).

Dump 2



(1) Boom Control Section
(2) Bucket Control Section
(3) **PB** Passage 1
(4) Spool
(5) Neutral Passage 2
(6) **PB** Passage 2
(7) Load Check Valve
(8) Passage 2
(9) Bucket Cylinder

P : P Port
T : T Port
PB :PB Port

A2 : A2 Port
(To Bucket Cylinder)
B2 : B2 Port
(From Bucket Cylinder)
a : Low Pressure
b : High Pressure

1. When the hydraulic control lever is set to the **"DUMP 2"** position, the spool (4) of the bucket control section (2) moves to the right of the bucket control section (2) moves further to the right from the **"DUMP 1"** position, which forms oil passages between passage 2 (8) and **A2** port, and between **B2** port and **T** port.
2. The pressure-fed oil from the **P** port flows to the neutral passage 2 (5) through the boom control section (1) and **PB** passage 1 (3). As the oil passage from the neutral passage 2 (5) to the **PB** passage 2 (6) is closed by the spool (4), this oil opens the load check valve (7) and flows through the notched section of the spool (4) and **B2** port to extend the bucket cylinder (9).
3. Return oil from the bucket cylinder (9) flows to the transmission case through the **B2** port and **T** port.

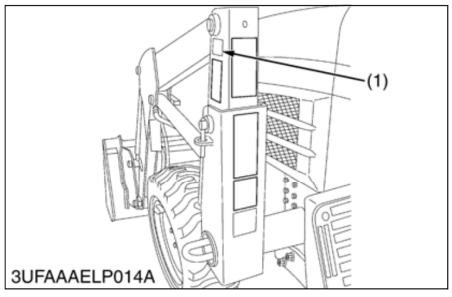
SERVICING

CONTENTS

KiSC issued 09, 2007 A

1. GENERAL

[1] IDENTIFICATION

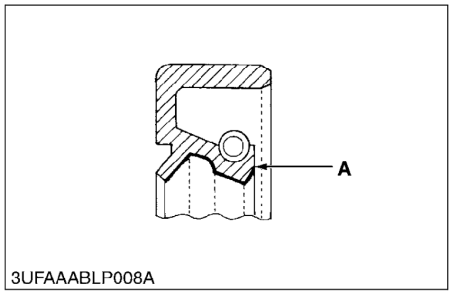


When contacting your local KUBOTA distributor, always specify front loader model and serial number.

(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
	B2630, B3030	
Transmission Case (Front loader is not attached)	15 L 4.0 U.S.gals. 3.3 Imp.gals.	KUBOTA UDT or SUPER UDT Fluid *1
Grease fitting	Until grease overflows	Multi-purpose type grease

NOTE

- ***1 KUBOTA UDT or 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)	Check the transmission fluid level	S-2
	Check the hydraulic hoses	S-2
Every 10 hours	Grease all grease fitting	S-2
	Lubricate joints of control lever linkage	S-2

W1010764