WSM

WORKSHOP MANUAL
FRONT LOADER

LA703

Kubota

KiSC issued 03, 2008 A

TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of LA703. It is divided into three parts, “General”, “Mechanism” and “Servicing”.

General

Information on the tractor identification, the general precautions, maintenance check list, check and maintenance and special tools are described.

Mechanism

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

Refer to Front Loader Mechanism Workshop Manual (Code No. 9Y021-18210) for the one which has not been described in this workshop manual.

Servicing

Information on the troubleshooting, servicing specification lists, tightening torque, checking and adjusting, disassembling and assembling, and servicing which cover precautions, factory specifications and allowable limits.

All information illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. The right is reserved to make changes in all information at any time without notice.

June 2005

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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.

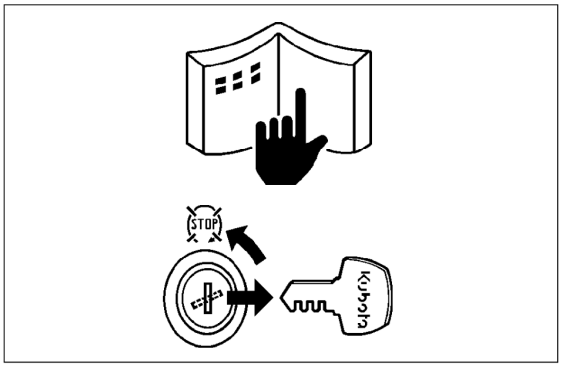
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

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.**

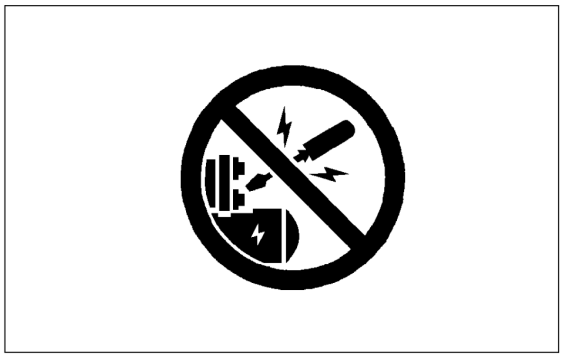
IMPORTANT : **Indicates that equipment or property damage could result if instructions are not followed.**

NOTE : **Gives helpful information.**



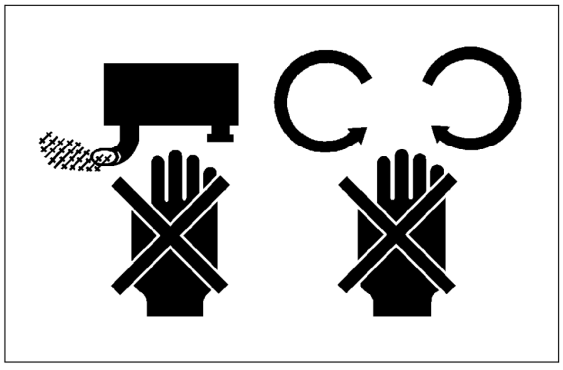
BEFORE SERVICING AND REPAIRING

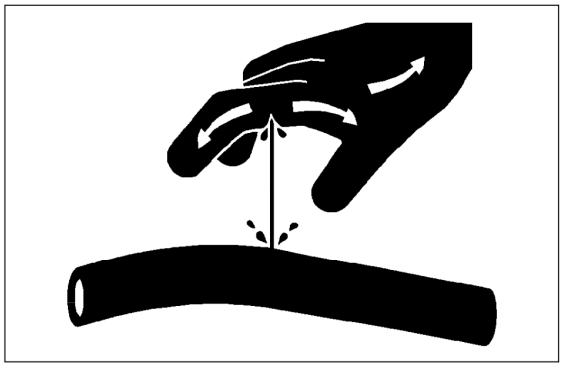
- Read all instructions and safety instructions in this manual and on your engine safety decals.
- Clean the work area and engine.
- Park the machine on a firm and level ground.
- Allow the engine to cool before proceeding.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.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

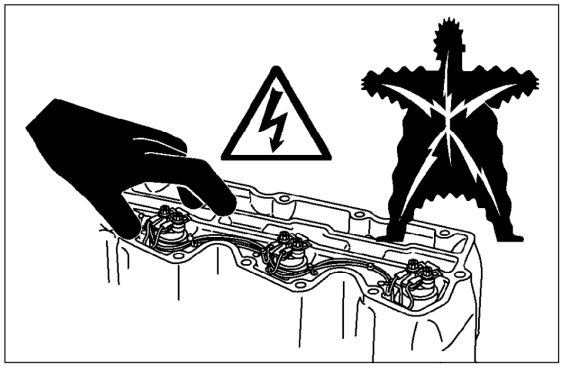


SAFETY STARTING

- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Unauthorized modifications to the engine may impair the function and / or safety and affect engine life.

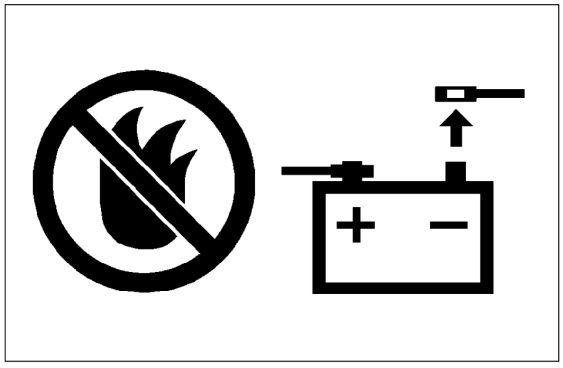






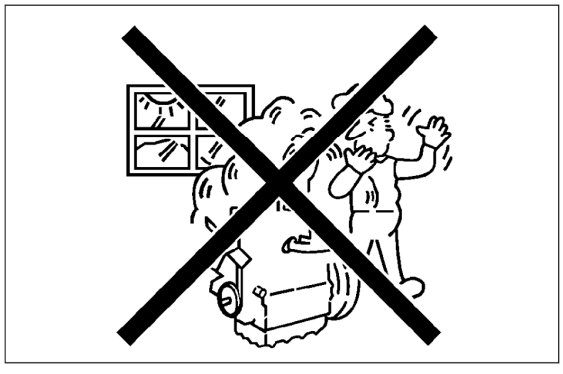
SAFETY WORKING

- 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 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.
- Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.
- Do not open high-pressure fuel system.
  High-pressure fluid remaining in fuel lines can cause serious injury. Do not disconnect or attempt to repair fuel lines, sensors, or any other components between the high-pressure fuel pump and injectors on engines with high pressure common rail fuel system.
- High voltage exceeding 100 V is generated in the ECU, and is applied to the injector.
  Pay sufficient caution to electric shock when performing work activities.



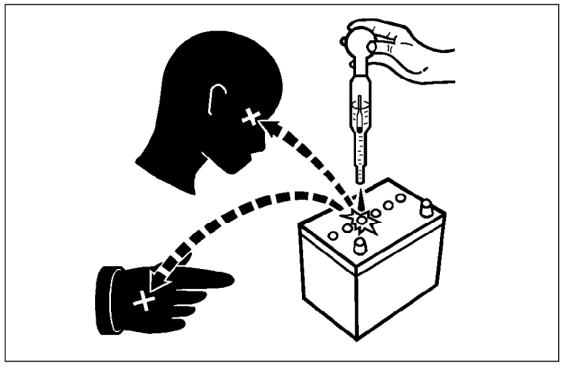
AVOID FIRES

- 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.

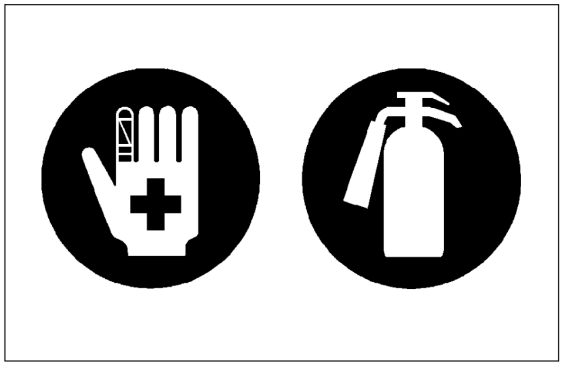


PREVENT ACID BURNS

- 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.

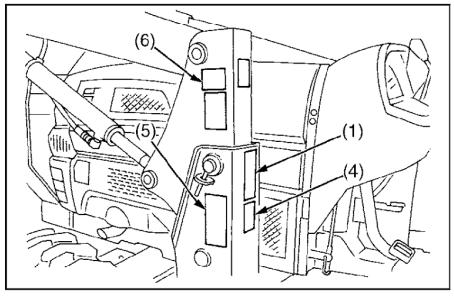


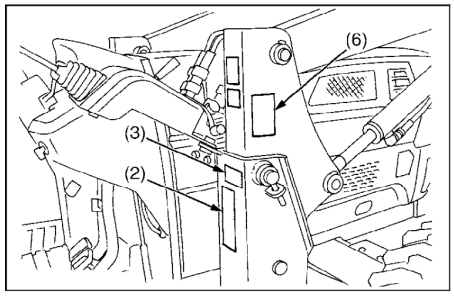
PREPARE FOR EMERGENCIES

- 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

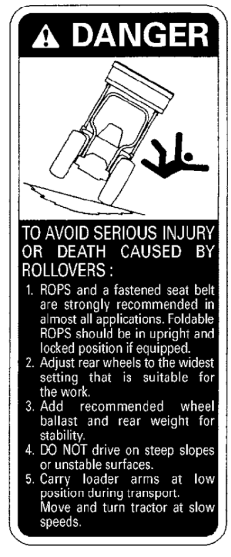
The following safety decals are installed on the machine.
If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.



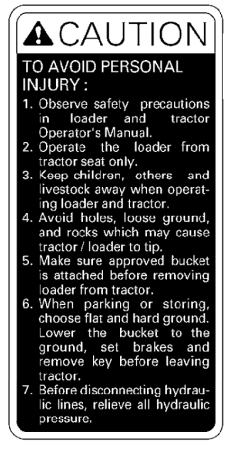


(1) Part No. 7J246-5643-1

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

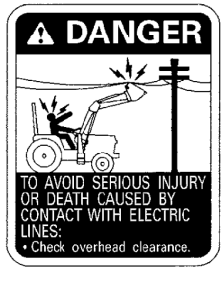


(5) Part No. 7J246-5645-1

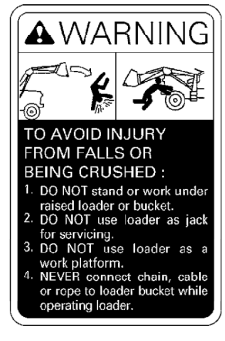


(3) Part No. 7J266-5649-2

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



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



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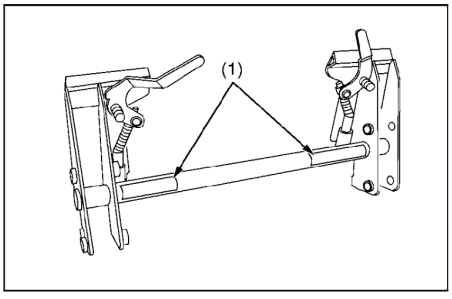
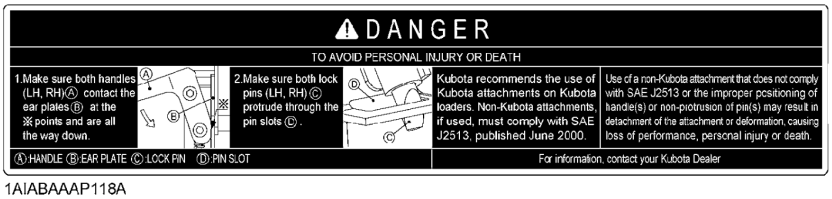
If quick hitch is equipped:



(1) Part No. 7J802-3648-4



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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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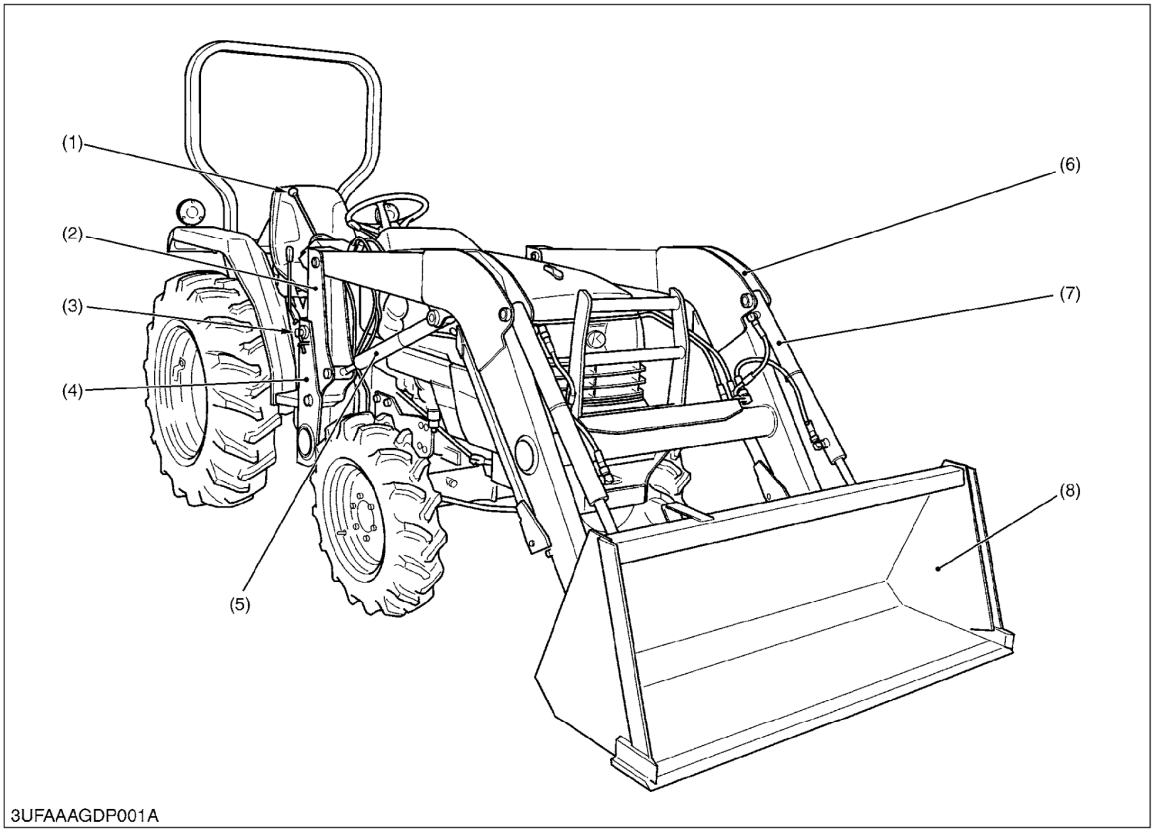
LOADER TERMINOLOGY



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

SPECIFICATIONS

Suitable Tractor

Loader Model	LA703
Tractor Model	L4400

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[1] LOADER SPECIFICATIONS

Loader Model		LA703
Tractor Model		L4400
Wheel Base (WB)		1845 mm (72.6 in.)
Front Tires		8.00 - 16
Rear Tires		14.9 - 24
Boom Cylinder	Bore	50 mm (1.97 in.)
	Stroke	502 mm (19.76 in.)
Bucket Cylinder	Bore	50mm (1.97 in.)
	Stroke	480.5 mm (18.92 in.)
Control Valve	4-position bucket control type	One Detent Float Position, Two-Stage Bucket Dump, Power Beyond Circuit
Rated Flow		29.4 L/min. 7.77 U.S.gals/min. 6.47 Imp.gals/min.
Maximum Pressure		17.7 MPa 180 kgf/cm^2 2560 psi
Net Weight (Approximate)		480 kg (1058 lbs)

[2] BUCKET SPECIFICATIONS

Loader Model		LA703
Bucket Model		Square 72”
Type		Rigid
Width		1830 mm (72 in.)
Depth (L)		509 mm (20 in.)
Height (M)		562 mm (22.1 in.)
Length (N)		591 mm (23.3 in.)
Capacity	Struck	0.25 m^3 (8.8 cu.ft)
	Heaped	0.31 m^3 (10.9 cu.ft)
Weight		133 kg (293 lbs)

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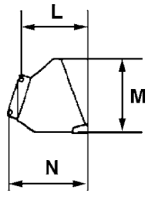

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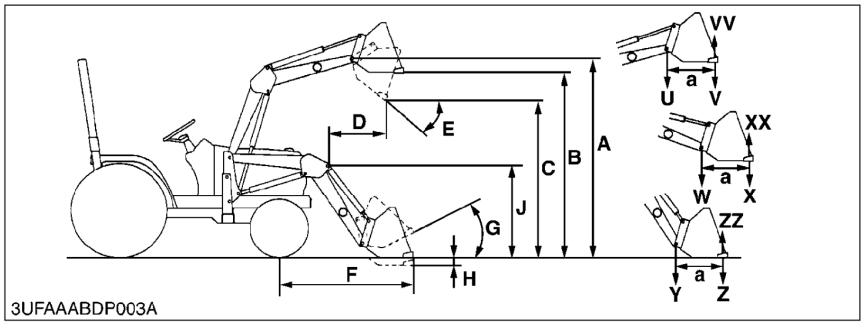
[3] DIMENSIONAL AND OPERATIONAL SPECIFICATIONS



a : 500 mm (19.7 in.)

Dimensional Specifications

Loader Model		LA703
Tractor Model		L4400
A	Max. lift height (to bucket pivot pin)	2600 mm (102.4 in.)
B	Max. lift height under level bucket	2440 mm (96.1 in.)
C	Clearance with bucket dumped	2130 mm (83.9 in.)
D	Reach at max. lift height (dumping reach)	483 mm (19 in.)
E	Max. dump angle	0.698 rad (40 deg.)
F	Reach with bucket on ground	1640 mm (64.5 in.)
G	Bucket roll-back angle	0.401 rad (23 deg.)
H	Digging depth	90 mm (3.5 in.)
J	Overall height in carrying position	1410 mm (55.5 in.)

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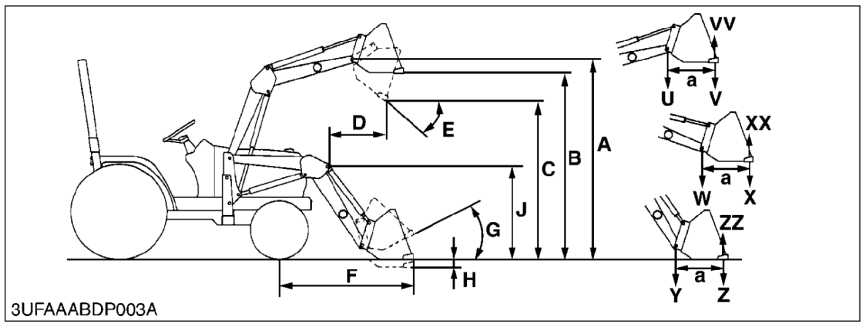

a : 500 mm (19.7 in.)

Operational Specifications

Loader Model		LA703
Tractor Model		L4400
Lift capacity (Bucket bottom mid point)		700 kg (1543 lbs)
U	Lift capacity (Bucket pivot pin, max. height)	825 kg (1818 lbs)
V	Lift capacity (500 mm (19.7 in.) Forward max. height)	615 kg (1356 lbs)
W	Lift capacity (Bucket pivot pin, 1500 mm (59.06 in.) height)	1020 kg (2249 lbs)
X	Lift capacity (500 mm (19.7 in.) Forward, 1500 mm (59.06 in.) height)	815 kg (1797 lbs)
Y	Breakout force (Bucket pivot pin)	14580 N (3278 lbs)
Z	Breakout force (500 mm (19.7 in.) Forward)	11255 N (2530 lbs)
VV	Bucket roll-back force at Max. height	15339 N (3448 lbs)
XX	Bucket roll-back force at 1.5 m (59 in.)	19237 N (4325 lbs)
ZZ	Bucket roll-back force at ground level	14658 N (3295 lbs)
Raising time		3.3 sec.
Lowering time		2.2 sec.
Bucket dumping time		1.3 sec.
Bucket roll-back time		2.2 sec.

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MECHANISM

CONTENTS

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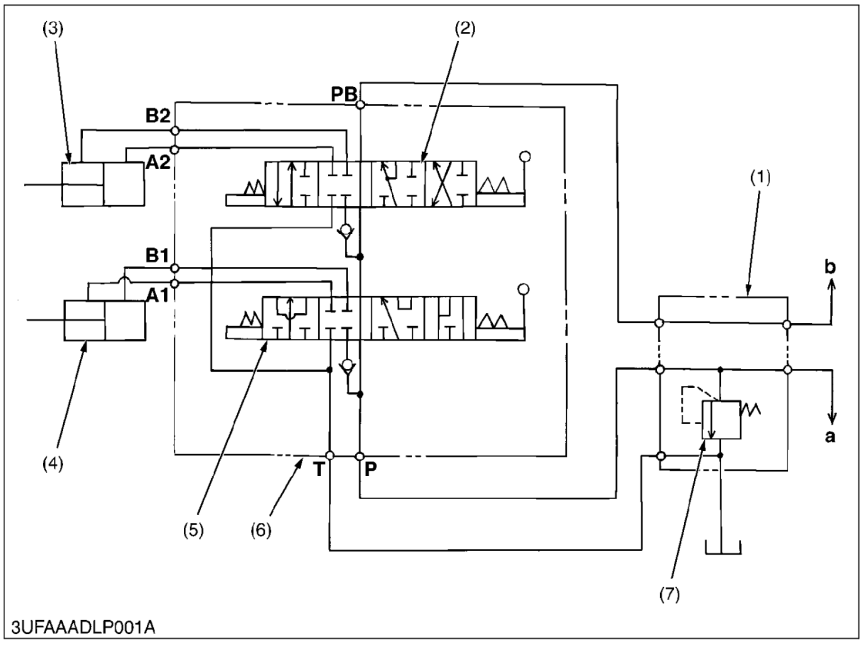
1. HYDRAULIC CIRCUIT



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

P : P Port
T : T Port
A1 :A1 Port
B1 :B1 Port
A2 :A2 Port
B2 :B2 Port
PB :Power Beyond Port
a : From Pump
b : To 3-Point Hydraulic System

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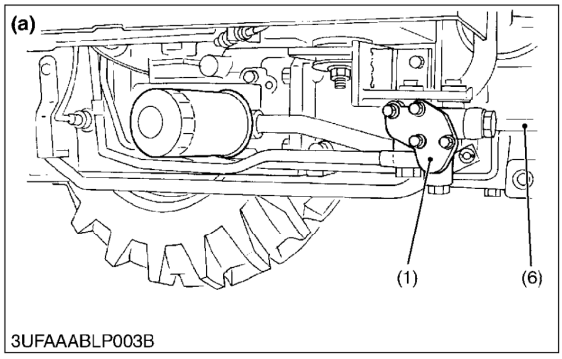
2. HYDRAULIC BLOCK



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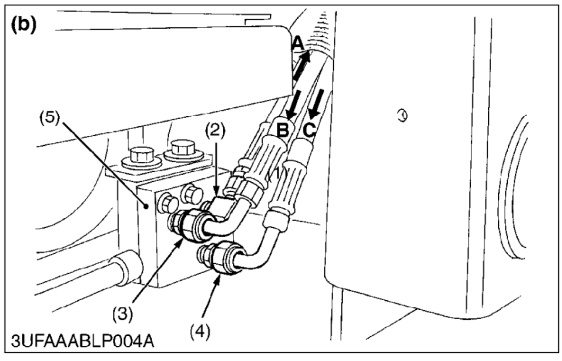

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Filtered oil is forced out by the hydraulic pump to the hydraulic block (5) through the delivery pipe (6).

There is a relief valve in hydraulic block.

(a) When Front Loader is not Attached

1. Oil from the hydraulic pump is delivered into the hydraulic block (1).

(b) When Front Loader is Attached

1. Oil from the hydraulic pump is delivered into the **P** port of hydraulic block (5) through the pump port (2).
2. 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. 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
(2) Pump Port
(3) Power Beyond Port
(4) Tank Port
(5) Hydraulic Block
(6) Delivery Pipe

A : To Front Loader (P Port)
B : From Front Loader (PB Port)
C : From Front Loader (T Port)

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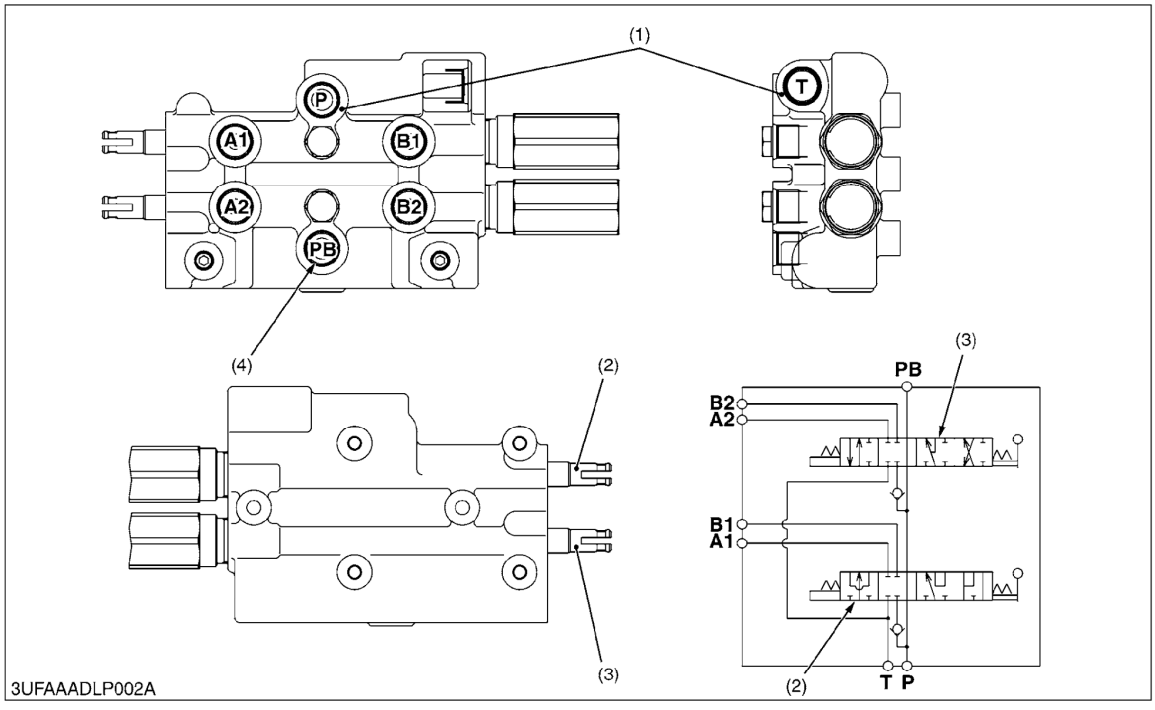
3. CONTROL VALVE ASSEMBLY

[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 sections as shown above.

(1) Inlet and Outlet Section

There are **P** port and **T** port in this section.
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 consists of 4-position, 6-connection, detent, spring center type spool, a mono block valve housing, load check valve, etc. This valve connects to **A1** and **B1** port and controls oil flow to the boom cylinder.

(3) Bucket Control Section

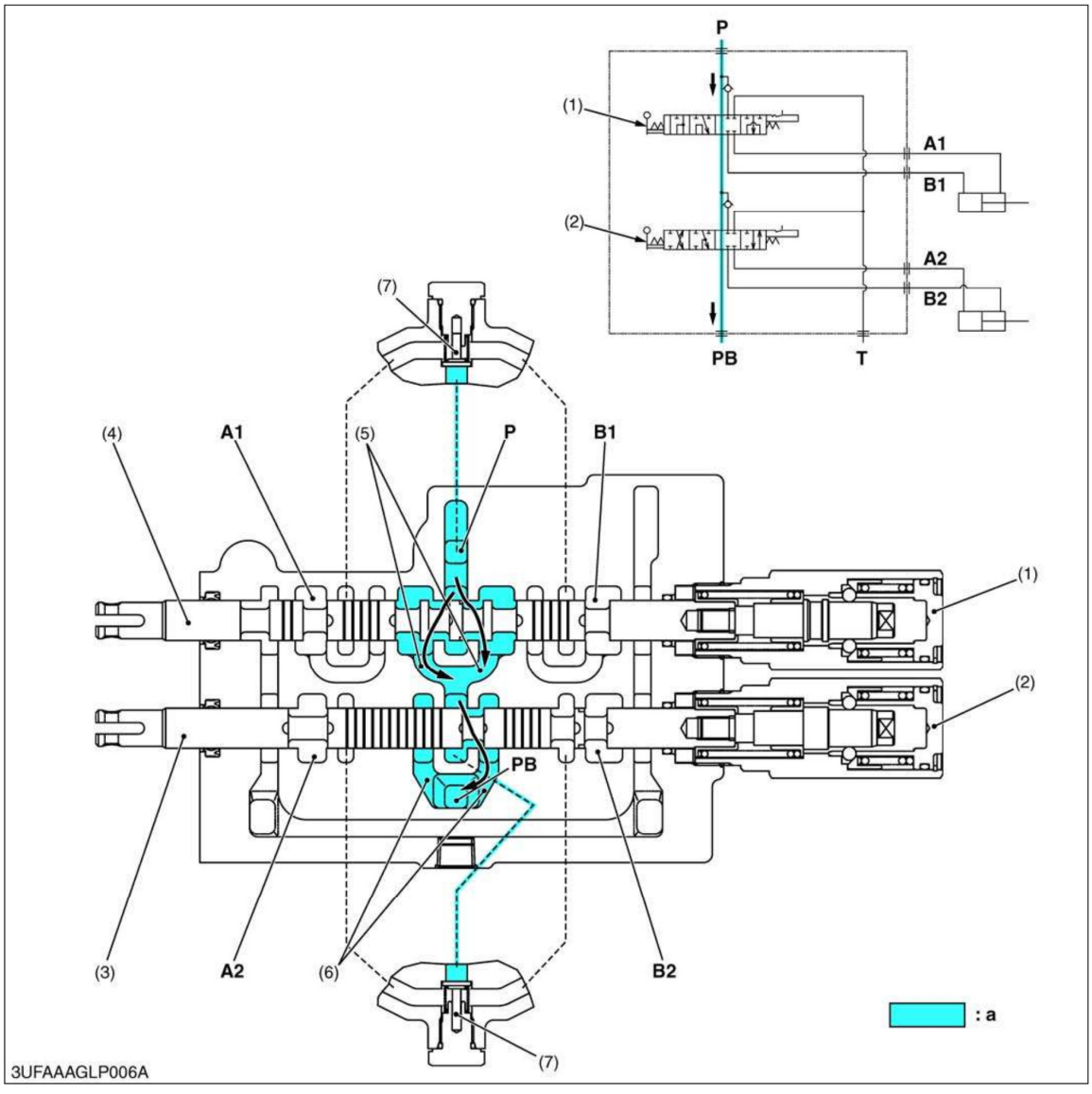
The bucket control valve consists of 4-position, 6-connection, no detent, spring center type spool, a mono block valve housing, load check valve, etc. This valve connects to **A2** and **B2** port and controls oil flow to the bucket cylinder.

(4) Power Beyond

This section includes **PB** port which is connected to the **INLET** port of hydraulic block by the hydraulic hose, and feeds oil to the 3-P hydraulic control valve.

[2] OPERATION

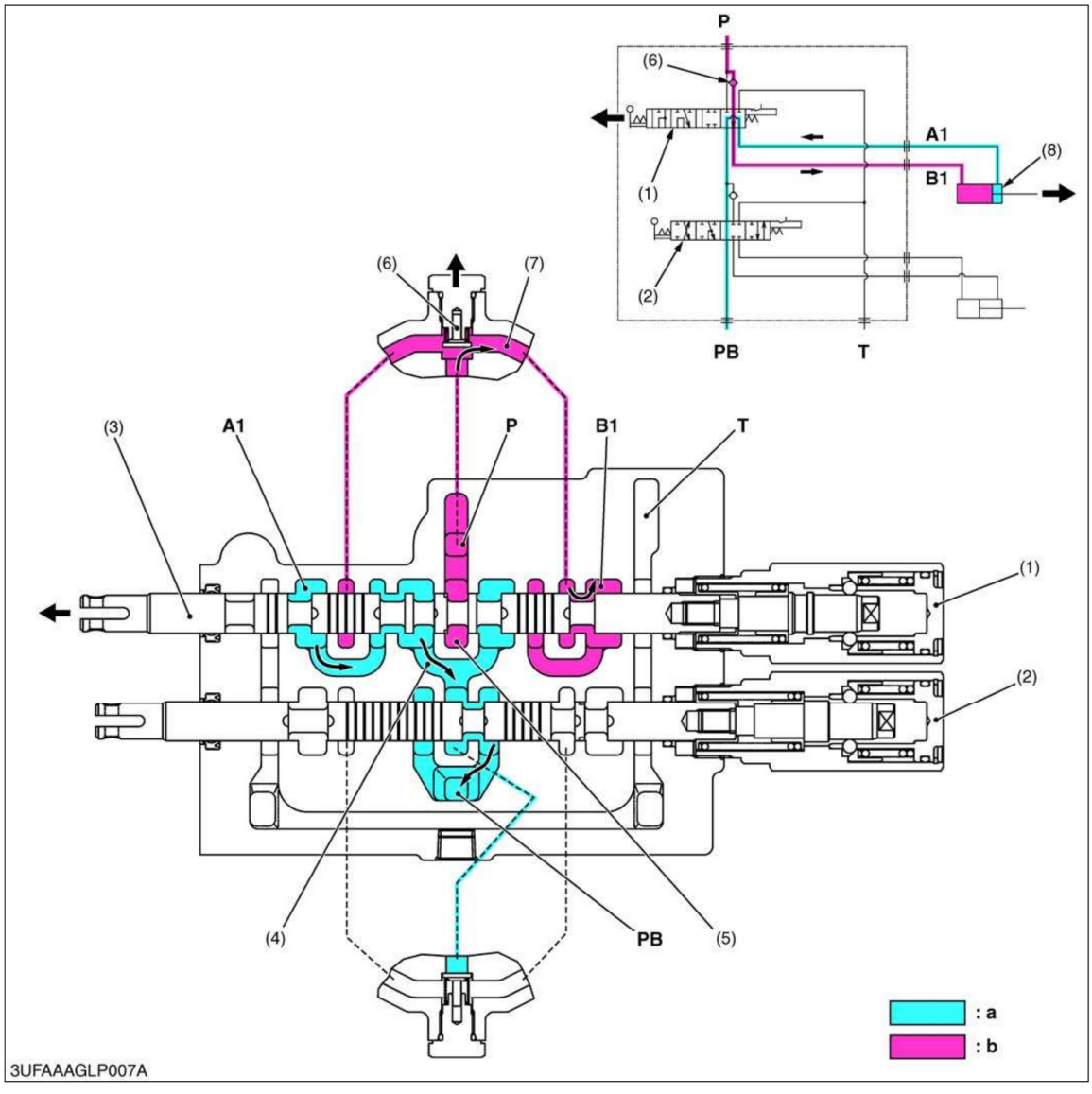
Neutral



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

T : T Port
P : P Port
A1 : A1 Port
A2 : A2 Port
B1 : B1 Port
B2 : B2 Port
PB : PB Port
a : Low Pressure

Up

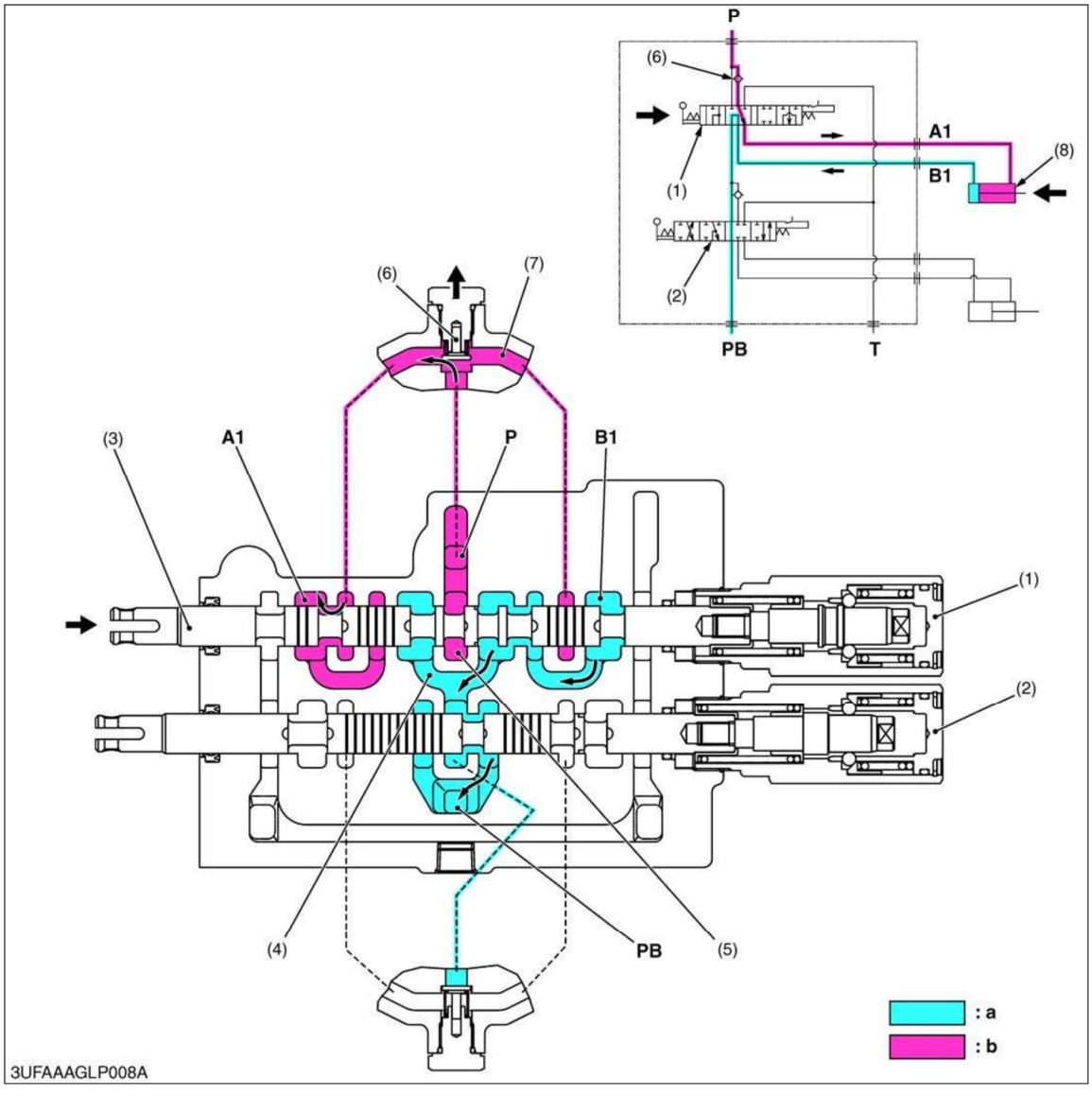


(1) Boom Control Section
(2) Bucket Control Section
(3) Spool
(4) **PB** Passage 1
(5) Neutral Passage 1
(6) Load Check Valve
(7) Passage 1
(8) Boom Cylinder

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, also 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

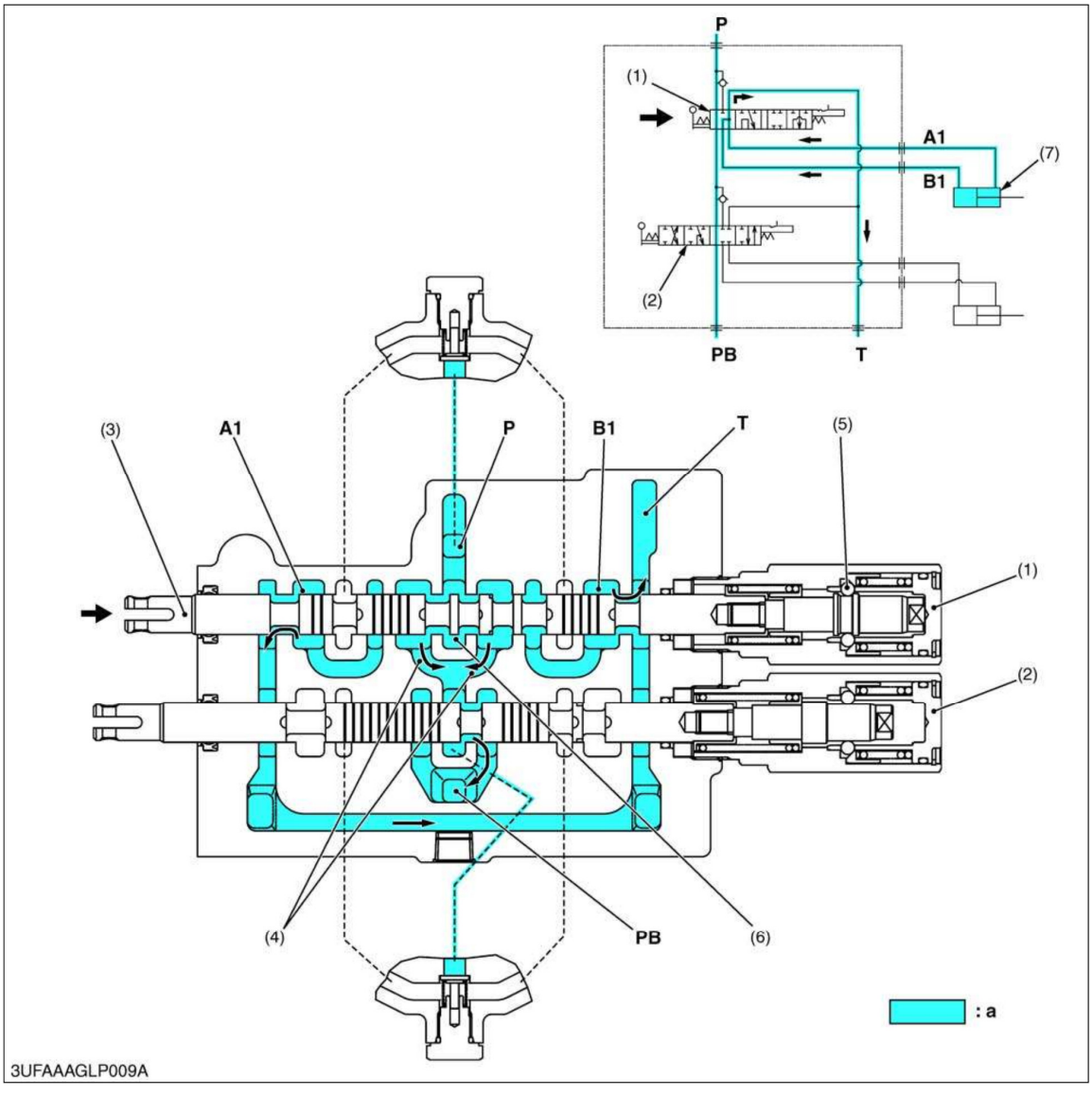


(1) Boom Control Section
(2) Bucket Control Section
(3) Spool
(4) **PB** Passage 1
(5) Neutral Passage 1
(6) Load Check Valve
(7) Passage 1
(8) Boom Cylinder

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, also 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



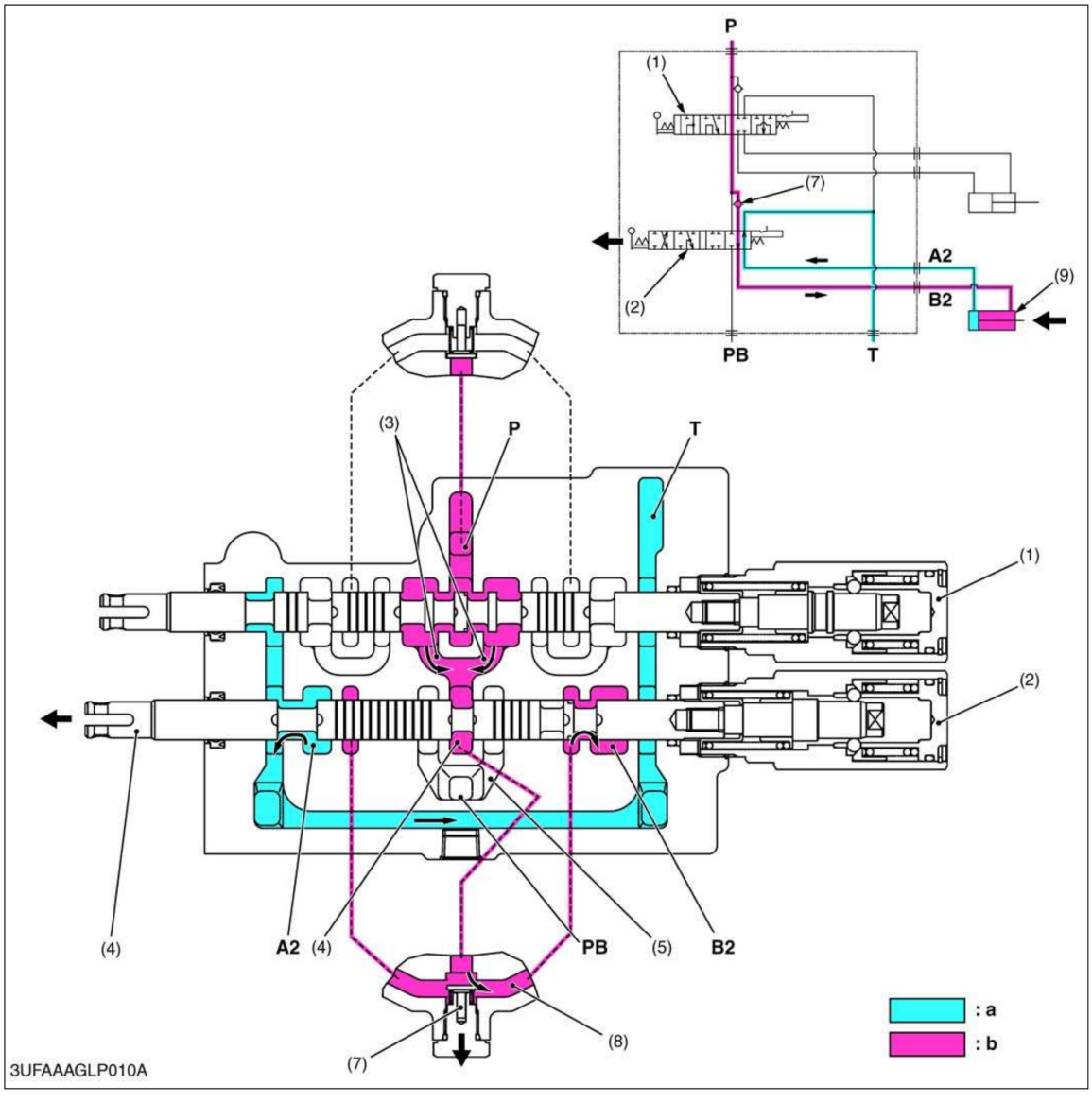
(1) Boom Control Section
(2) Bucket Control Section
(3) Spool
(4) **PB** Passage 1
(5) Detent Mechanism
(6) Neutral Passage 1
(7) Boom Cylinder

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

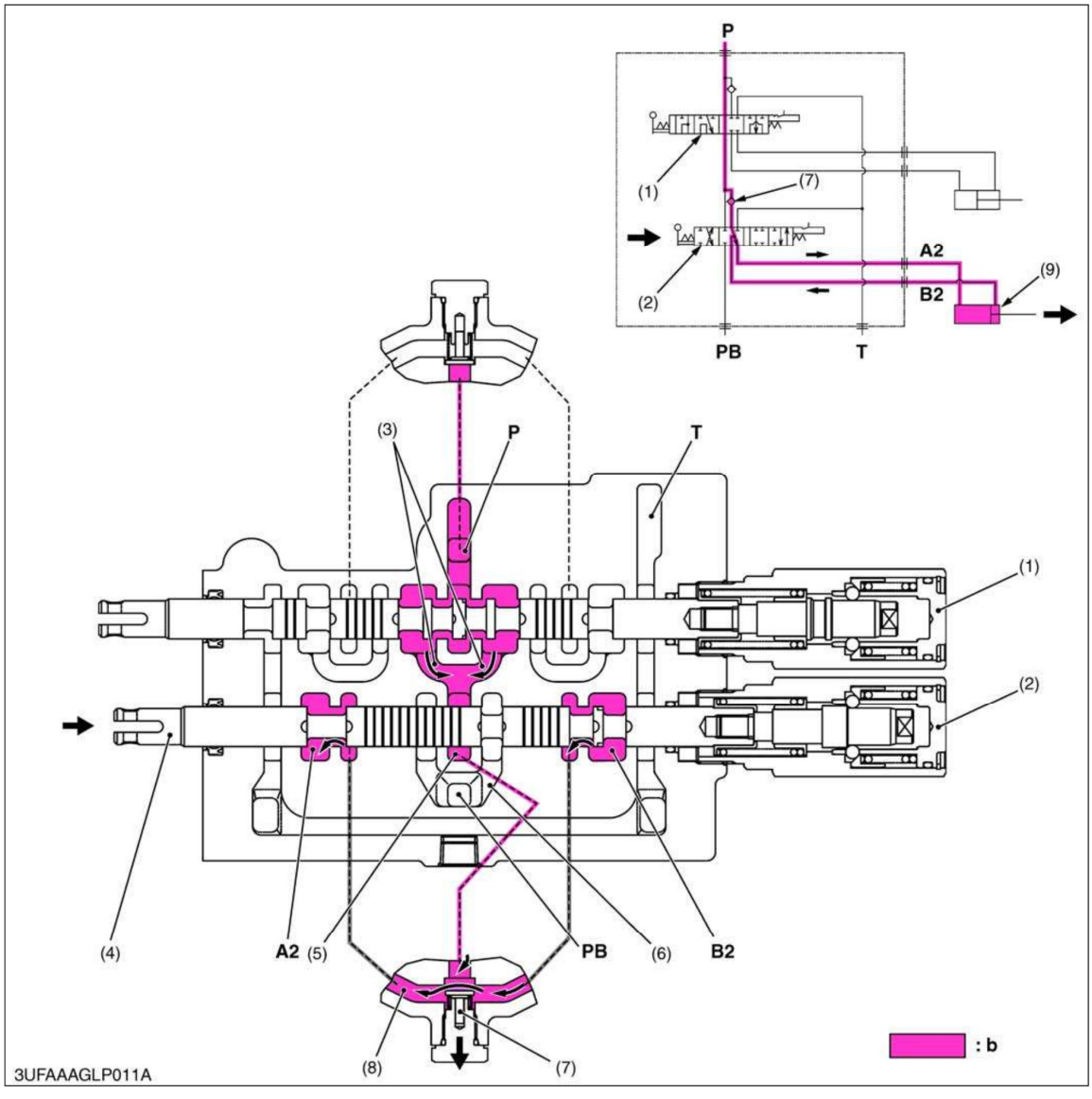


(1) Boom Control Section
(2) Bucket Control Section
(3) **PB** Passage 1
(4) Spool
(5) Neutral Passage 2
(6) **PB** Passage 2
(7) Load Check Valve
(8) Passage 2
(9) Bucket Cylinder

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, also 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) of the bucket control section (2) moves to the right, 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 through the notched section of the spool and **A2** port to the bucket cylinder to extend the cylinder.
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 extends by the difference of received pressure area (cylinder rod part).