

WSM

WORKSHOP MANUAL

FRONT LOADER

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

Kubota



TO THE READER

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

■ Mechanism

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

■ Servicing

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

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

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

January 2000

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SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and decals on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.

It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

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

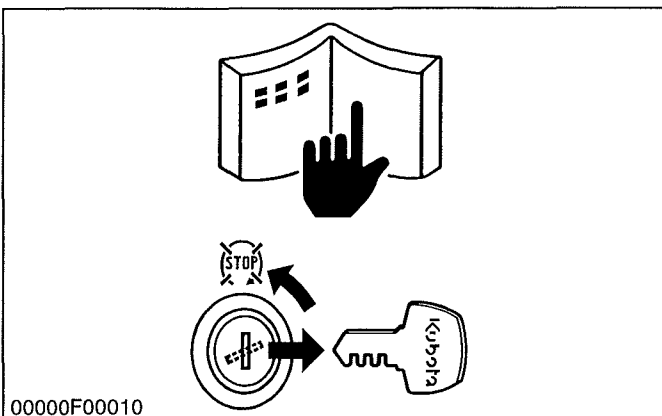
 **WARNING** :Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

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

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

 **NOTE** :Gives helpful information.

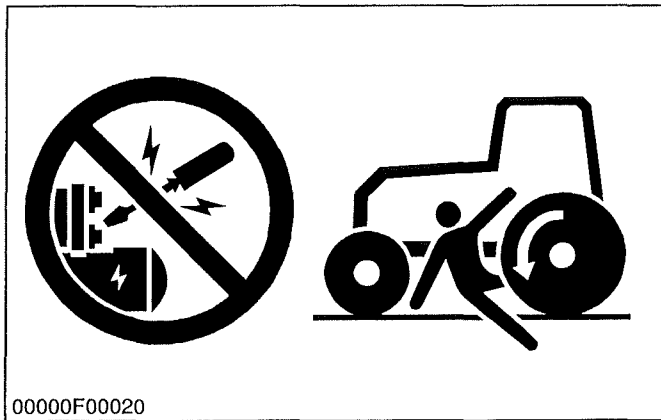
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BEFORE SERVICING AND REPAIRING

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

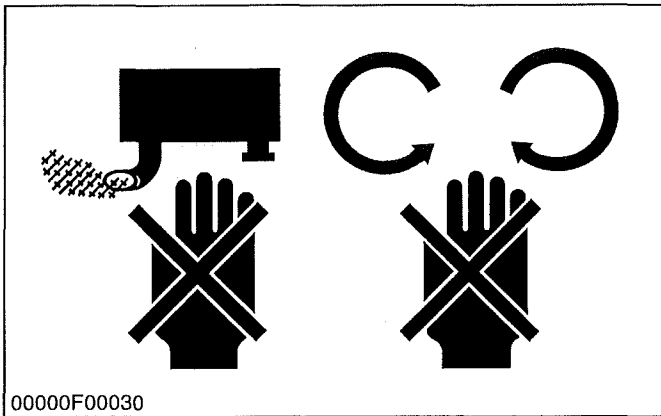
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SAFETY STARTING

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

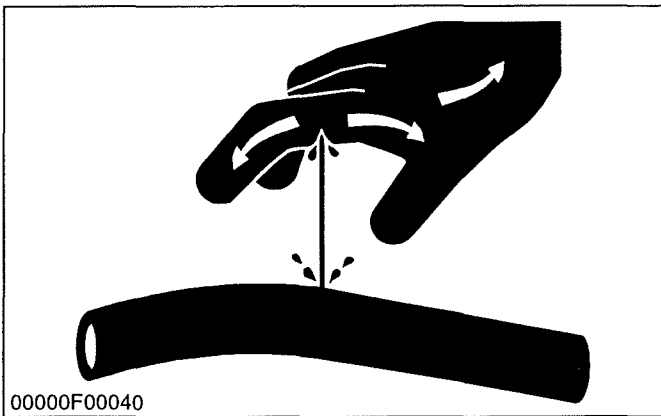
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SAFETY WORKING

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

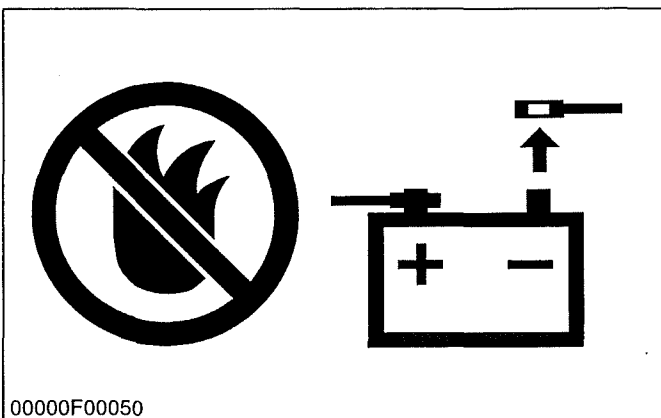
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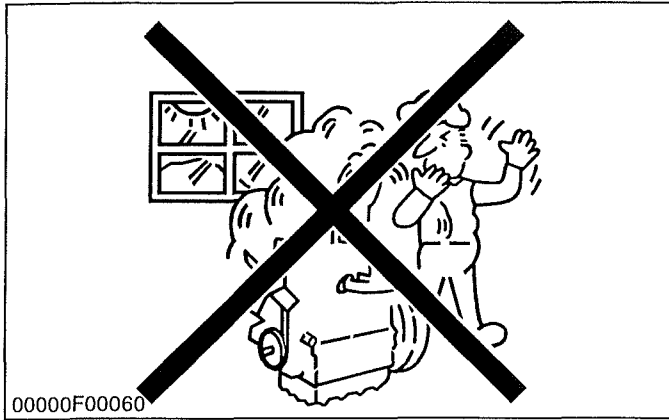


AVOID FIRES

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

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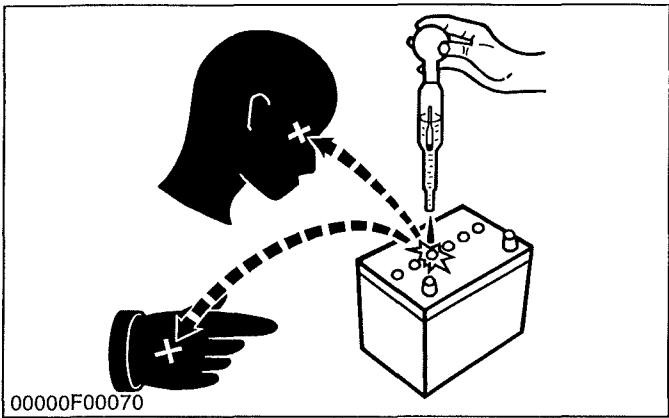




VENTILATE WORK AREA

- (1) If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

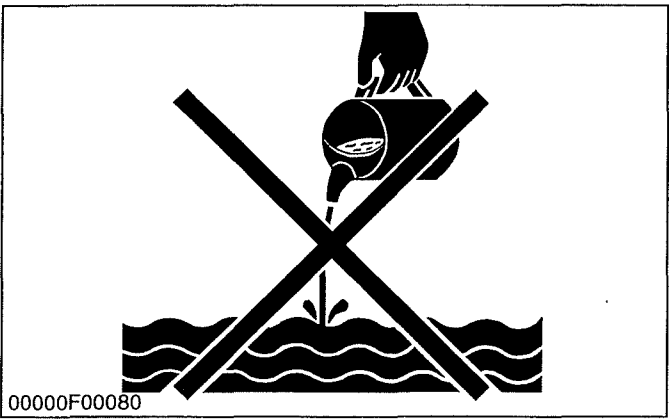
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PREVENT ACID BURNS

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

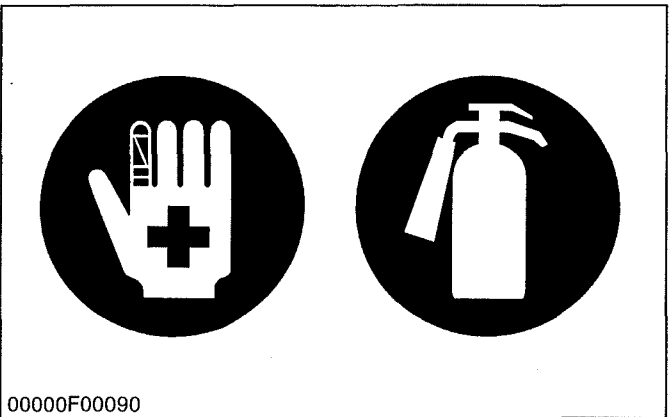
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DISPOSE OF FLUIDS PROPERLY

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

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PREPARE FOR EMERGENCIES

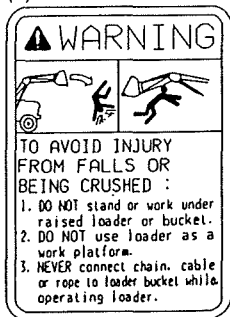
- (1) Keep a first aid kit and fire extinguisher handy at all times.
- (2) Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

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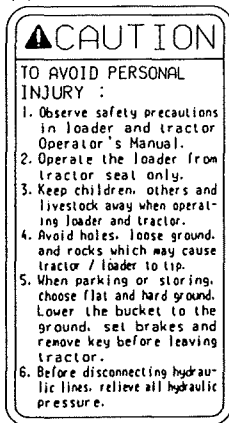
SAFETY DECALS

- 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.

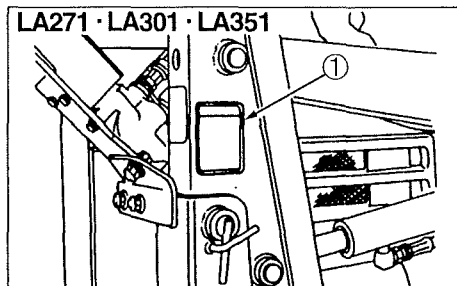
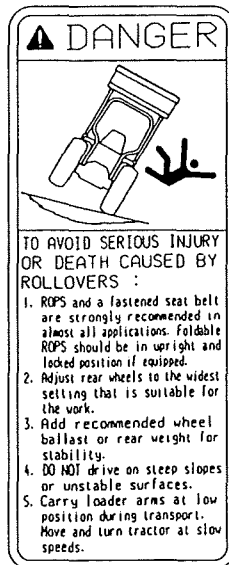
(1) Part No. 75546-56441



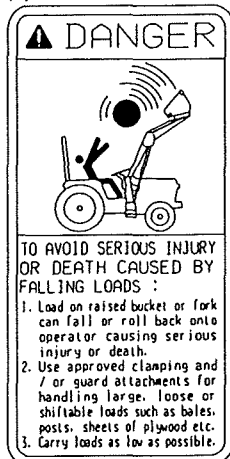
(2) Part No. 75546-56451



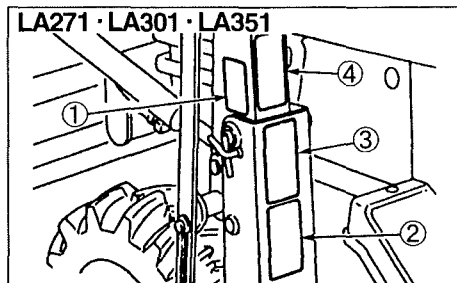
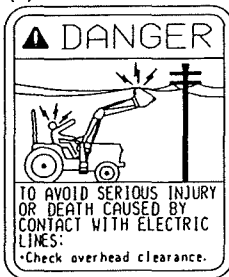
(3) Part No. 75546-56415



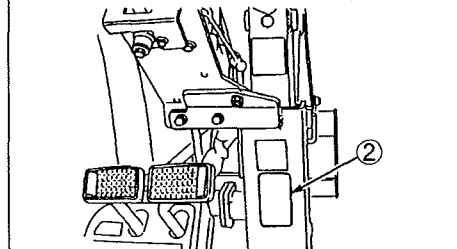
(4) Part No. 75546-56431



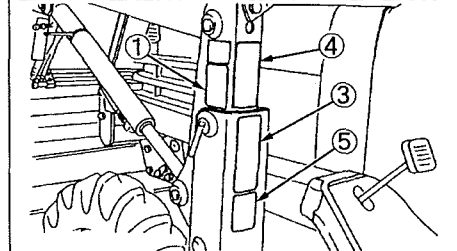
(5) Part No. 75567-56422



LA401 • LA272 • LA302 • LA352 • LA402



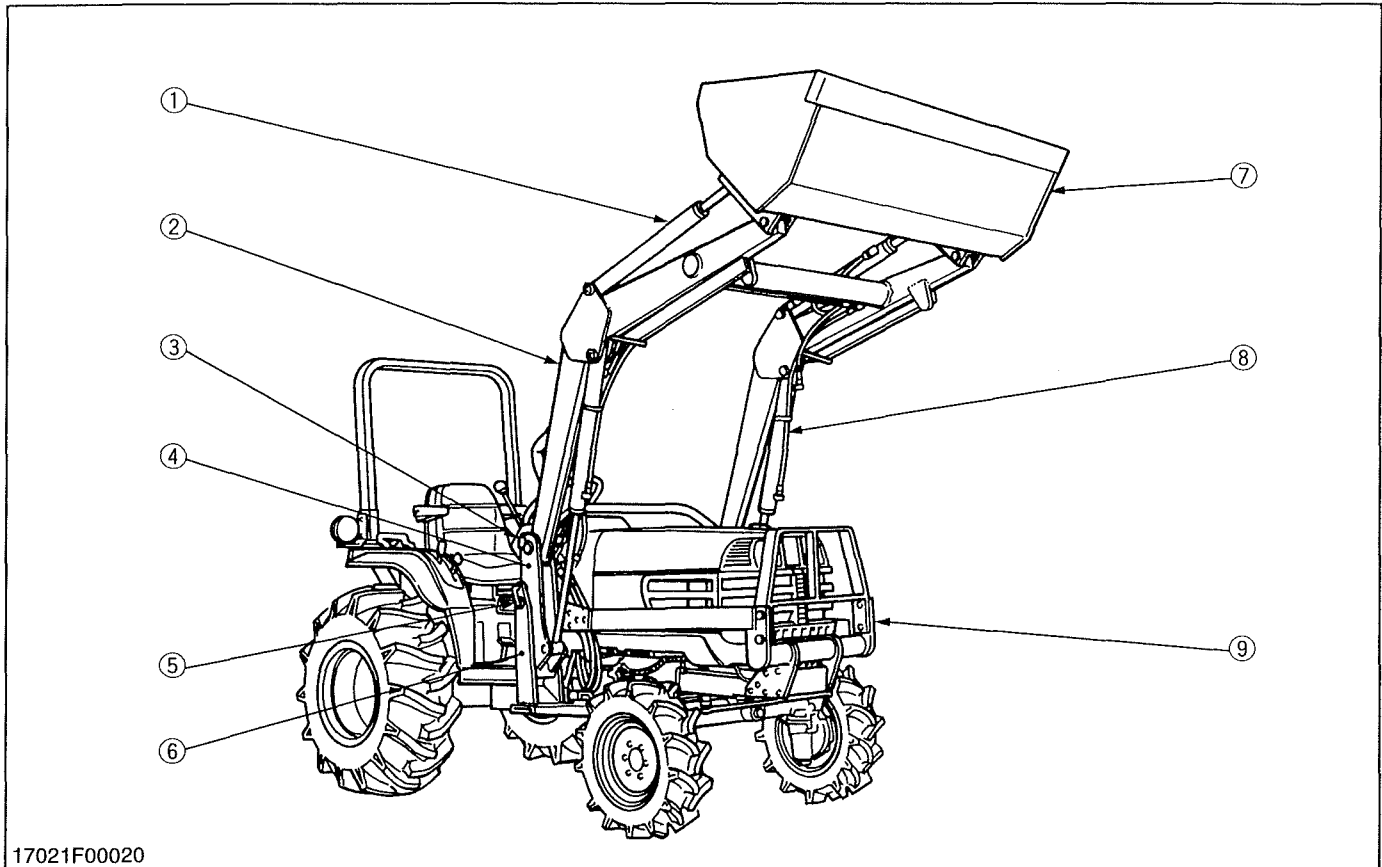
LA401 • LA272 • LA302 • LA352 • LA402



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.

TERMINOLOGY



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- | | | | |
|-----------------------------|------------------|----------------|-------------------|
| (1) Bucket Cylinder | (4) Side Frame | (6) Main Frame | (8) Boom Cylinder |
| (2) Boom | (5) Mounting Pin | (7) Bucket | (9) Brace |
| (3) Hydraulic Control Valve | | | |

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SPECIFICATIONS

LOADER SPECIFICATIONS

Model		LA271	LA301	LA351	LA401
ASAE Rated Lift Capacity		270 kg (595 lbs)	300 kg (660 lbs)	350 kg (770 lbs)	400 kg (882 lbs)
ASAE Rated Brakeout Force		4450 N (1000 lbs)	5120 N (1150 lbs)	5940 N (1335 lbs)	7060 N (1586 lbs)
Boom Cylinder	Bore	38.1 mm (1.50 in.)		44.5 mm (1.75 in.)	
	Stroke	307 mm (12.10 in.)		289 mm (11.40 in.)	435 mm (17.13 in.)
Bucket Cylinder	Bore	38.1 mm (1.50 in.)		44.5 mm (1.75 in.)	
	Stroke	330 mm (13.00 in.)			450 mm (17.72 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		133.5 to 140 kgf/cm ² (1900 to 2000 psi)	147.5 to 154.6 kgf/cm ² (2100 to 2200 psi)	133.5 to 140.5 kgf/cm ² (1900 to 2000 psi)	
Net Weight (Approx.)		208 kg (460 lbs)	216 kg (475 lbs)	226 kg (500 lbs)	280 kg (617 lbs)

Model		LA272	LA302	LA352	LA402
ASAE Rated Lift Capacity		270 kg (595 lbs)	300 kg (660 lbs)	350 kg (770 lbs)	400 kg (882 lbs)
ASAE Rated Brakeout Force		4460 N (1005 lbs)	4990 N (1120 lbs)	5940 N (1335 lbs)	7500 N (1685 lbs)
Boom Cylinder	Bore	38.1 mm (1.50 in.)		44.5 mm (1.75 in.)	
	Stroke	307 mm (12.10 in.)		289 mm (11.40 in.)	435 mm (17.13 in.)
Bucket Cylinder	Bore	38.1 mm (1.50 in.)		44.5 mm (1.75 in.)	
	Stroke	330 mm (13.00 in.)			450 mm (17.72 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		133.5 to 140 kgf/cm ² (1900 to 2000 psi)	147.5 to 154.6 kgf/cm ² (2100 to 2200 psi)	133.5 to 140.5 kgf/cm ² (1900 to 2000 psi)	
Net Weight (Approx.)		208 kg (460 lbs)	216 kg (475 lbs)	226 kg (500 lbs)	280 kg (617 lbs)

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BUCKET SPECIFICATIONS

Model		LA271, LA301	LA351	LA401	
Type		Square 48	Square 50	Square 54	Square 60LM
Width		1220 mm (48.0 in.)	1270 mm (50.0 in.)	1372 mm (54.0 in.)	1524 mm (60.0 in.)
Length		465 mm (18.3 in.)	490 mm (19.3 in.)	478 mm (18.8 in.)	518 mm (20.4 in.)
Height		490 mm (19.2 in.)		516 mm (20.3 in.)	530 mm (20.9 in.)
Capacity	Struck	0.15 m ³ (5.2 cu.ft.)	0.16 m ³ (5.5 cu.ft.)	0.19 m ³ (6.7 cu.ft.)	0.23 m ³ (8.1 cu.ft.)
	Heaped	0.17 m ³ (6.2 cu.ft.)	0.18 m ³ (6.5 cu.ft.)	0.23 m ³ (8.1 cu.ft.)	0.28 m ³ (9.9 cu.ft.)
Weight		54 kg (120 lbs)	62 kg (137 lbs)	79 kg (174 lbs)	82 kg (181 lbs)

Model		LA272, LA302	LA352	LA402	
Type		Square 48	Square 50	Square 54	Square 60LM
Width		1220 mm (48.0 in.)	1270 mm (50.0 in.)	1372 mm (54.0 in.)	1524 mm (60.0 in.)
Length		500 mm (19.7 in.)	525 mm (20.7 in.)	530 mm (20.9 in.)	570 mm (22.4 in.)
Height		480 mm (18.9 in.)	485 mm (19.1 in.)	525 mm (20.7 in.)	540 mm (21.3 in.)
Capacity	Struck	0.15 m ³ (5.2 cu.ft.)	0.16 m ³ (5.5 cu.ft.)	0.19 m ³ (6.7 cu.ft.)	0.23 m ³ (8.1 cu.ft.)
	Heaped	0.17 m ³ (6.2 cu.ft.)	0.18 m ³ (6.5 cu.ft.)	0.23 m ³ (8.1 cu.ft.)	0.28 m ³ (9.9 cu.ft.)
Weight		54 kg (120 lbs)	62 kg (137 lbs)	79 kg (174 lbs)	82 kg (181 lbs)

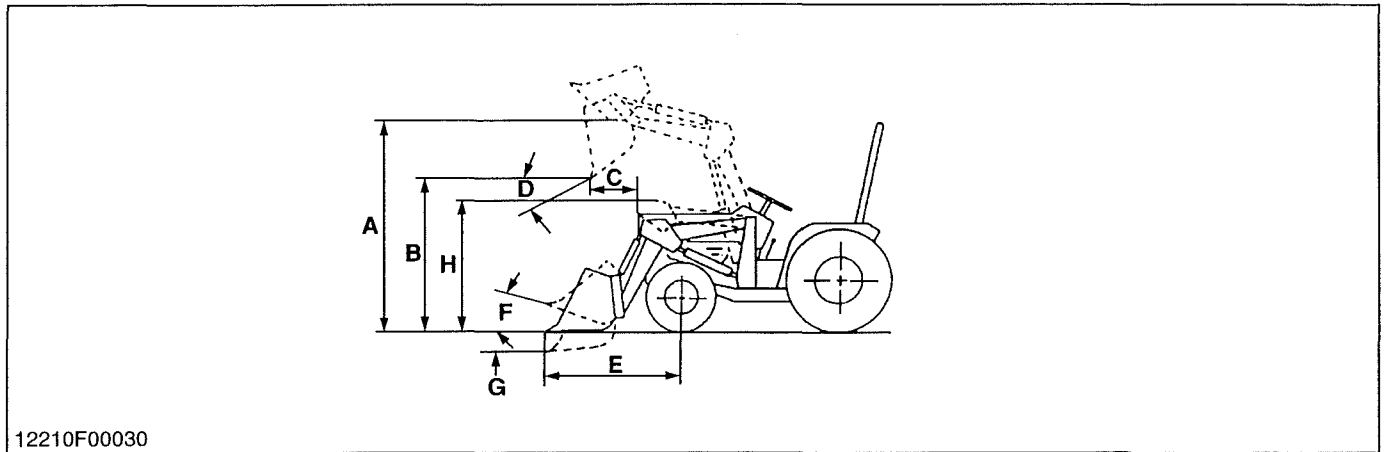
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OPERATING DIMENSIONS

Item	Model							
	LA271	LA301	LA351	LA401	LA272	LA302	LA352	LA402
	B7300	B1700 B2100 B2400GEAR	B2400HST	B2710	B7400	B7500	B2410	B2710 B2910
Maximum Lifting Height (A)	1780 mm (70.1 in.)	1790 mm (70.5 in.)		2130 mm (83.9 in.)	1770 mm (69.7 in.)	1765 mm (69.5 in.)	1770 mm (69.7 in.)	2090 mm (82.3 in.)
Clearance with Bucket Dumped (B)	1310 mm (51.6 in.)	1320 mm (52.0 in.)	1310 mm (51.6 in.)	1664 mm (65.5 in.)	1310 mm (51.6 in.)	1320 mm (52.0 in.)	1310 mm (51.6 in.)	1665 mm (65.6 in.)
Reach at Maximum Height (C)	680 mm (26.8 in.)	645 mm (25.4 in.)	635 mm (25.0 in.)	660 mm (26.0 in.)	680 mm (26.8 in.)	645 mm (25.4 in.)	635 mm (25.0 in.)	660 mm (26.0 in.)
Maximum Dump Angle (D)	45 deg.			40 deg.	45 deg.			40 deg.
Reach with Bucket on Ground (E)	1280 mm (50.4 in.)	1295 mm (51.0 in.)	1320 mm (52.0 in.)	1376 mm (54.2 in.)	1280 mm (50.4 in.)	1295 mm (51.0 in.)	1320 mm (52.0 in.)	1375 mm (54.1 in.)
Bucket Roll-back Angle (F)	24 deg.			26 deg.	24 deg.			26 deg.
Digging Depth (G)	110 mm (4.3 in.)	95 mm (3.7 in.)		185 mm (7.3 in.)	80 mm (3.15 in.)			135 mm (5.3 in.)
Overall Height in Carrying Position (H)	1150 mm (45.3 in.)	1160 mm (45.7 in.)		1195 mm (47.0 in.)	1150 mm (45.3 in.)	1160 mm (45.7 in.)		1195 mm (47.0 in.)

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

B7400 (4WD) with 6 – 12 Front Tires and 8.3 – 16 Rear Tires.
 B7500 (4WD) with 6 – 12 Front Tires and 9.5 – 16 Rear Tires.
 B2410 (4WD) with 7 – 12 Front Tires and 11.2 – 16 Rear Tires.
 B2710 (4WD) with 7 – 12 Front Tires and 12.4 – 16 Rear Tires.
 B2910 (4WD) with 7 – 12 Front Tires and 12.4 – 16 Rear Tires.



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PERFORMANCE RATINGS (NO LOAD)

Item	Model							
	LA271	LA301	LA351	LA401	LA272	LA302	LA352	LA402
Raise to Full Height	3.9 sec.	2.9 sec.	3.3 sec.	3.2 sec.	3.3 sec.	2.7 sec.	3.1 sec.	3.2 sec.
Lowering Time	3.0 sec.	2.3 sec.	2.6 sec.	2.4 sec.	2.5 sec.	2.2 sec.	2.5 sec.	2.4 sec.
Attachment Roll-back Time	2.5 sec.	2.0 sec.	2.7 sec.	2.4 sec.	2.2 sec.	1.8 sec.	2.5 sec.	2.4 sec.
Attachment Dump Time	2.1 sec.	1.6 sec.	2.0 sec.	1.9 sec.	1.9 sec.	1.6 sec.	1.9 sec.	1.9 sec.

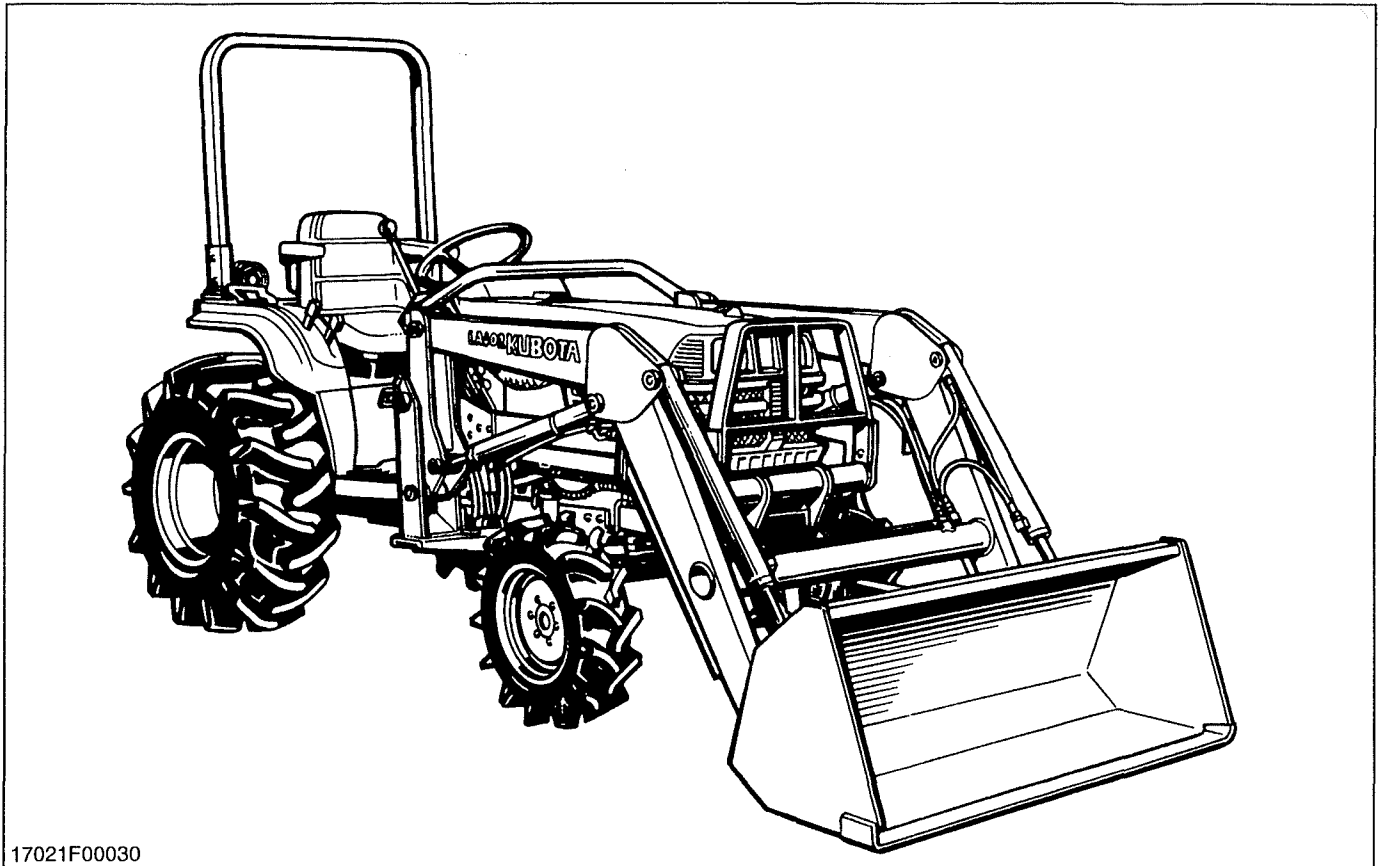
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MECHANISM

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[1] FEATURES



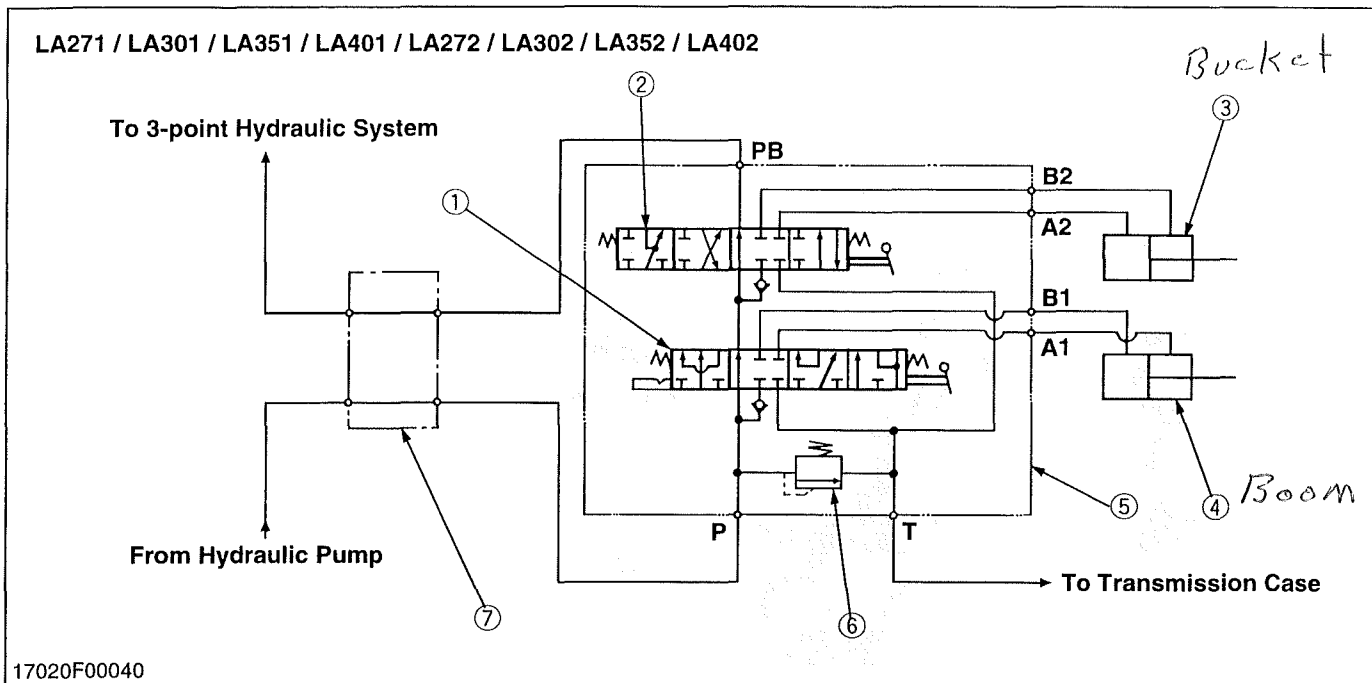
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- (1) Huge Hoisting and Scooping Power
- (2) Fast Cycle Time
- (3) One-Lever Operation
- (4) Heavy-Duty Bucket
- (5) Long Arm Reach
- (6) Series Circuit Hydraulic Control Valve

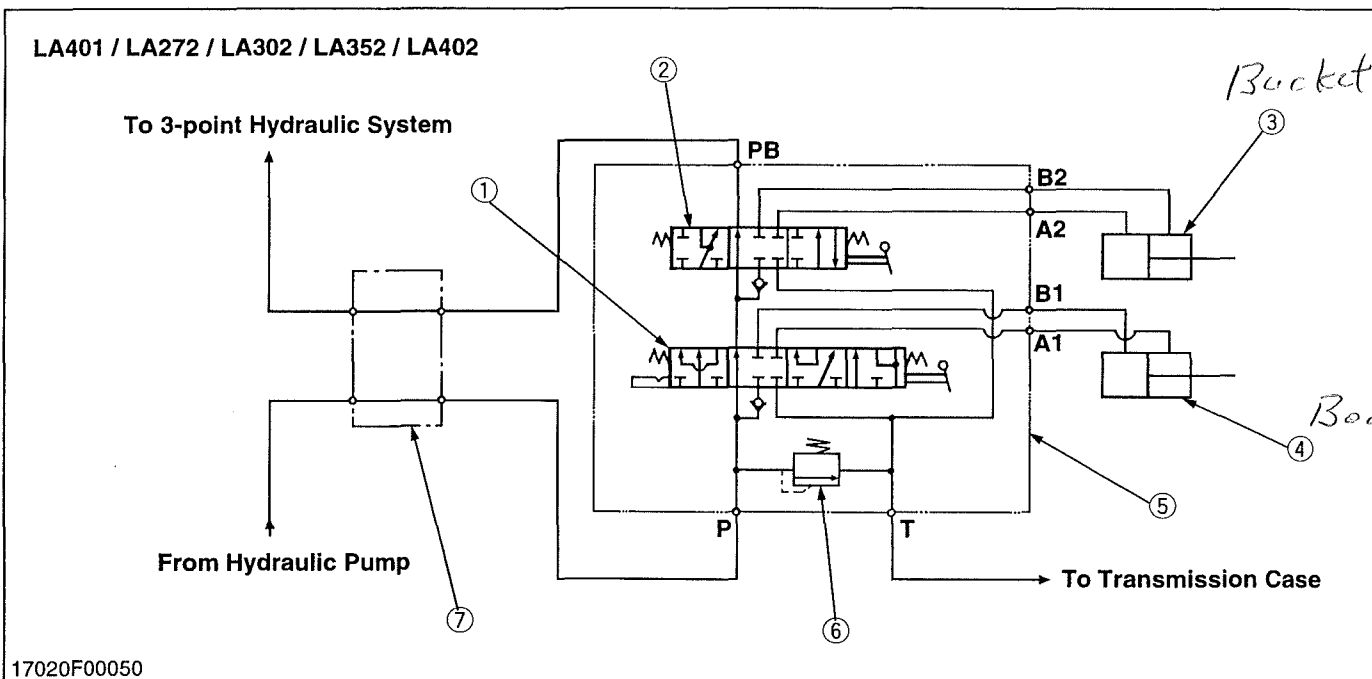
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[2] HYDRAULIC CIRCUIT

■ 4 Position Bucket Control



■ 3 Position Bucket Control

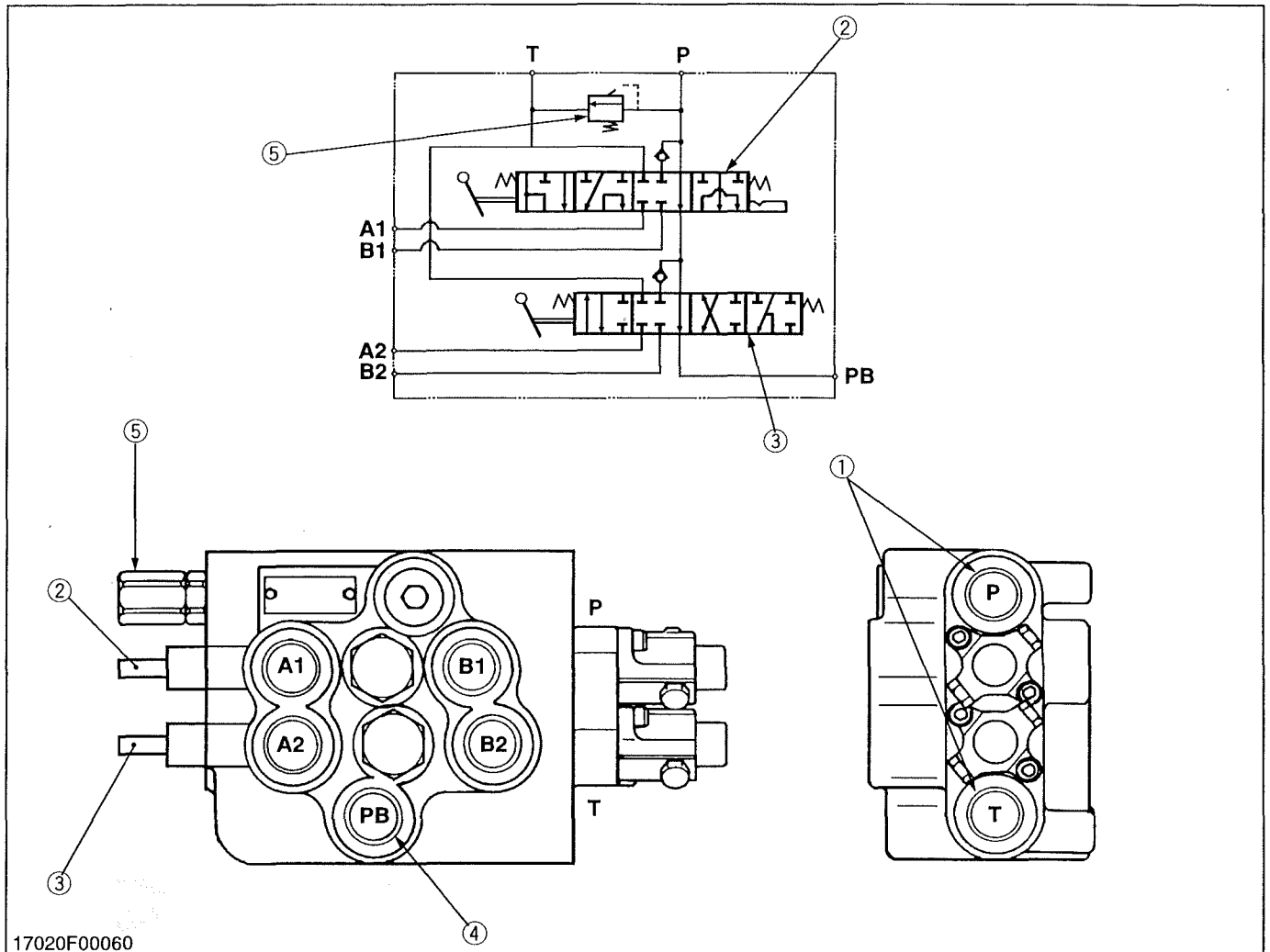


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|--------------------------|---------------------|----------------------------|---------------------|
| (1) Boom Control Valve | (3) Bucket Cylinder | (5) Control Valve Assembly | (7) Hydraulic Block |
| (2) Bucket Control Valve | (4) Boom Cylinder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

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[3] CONTROL VALVE ASSEMBLY

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



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

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. And the relief valve is installed on this valve.

(1) Inlet and Outlet Section

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

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

The **T** port is connected to the return port of transmission case by the hydraulic hose.

(2) Boom Control Section

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

(3) Bucket Control Section

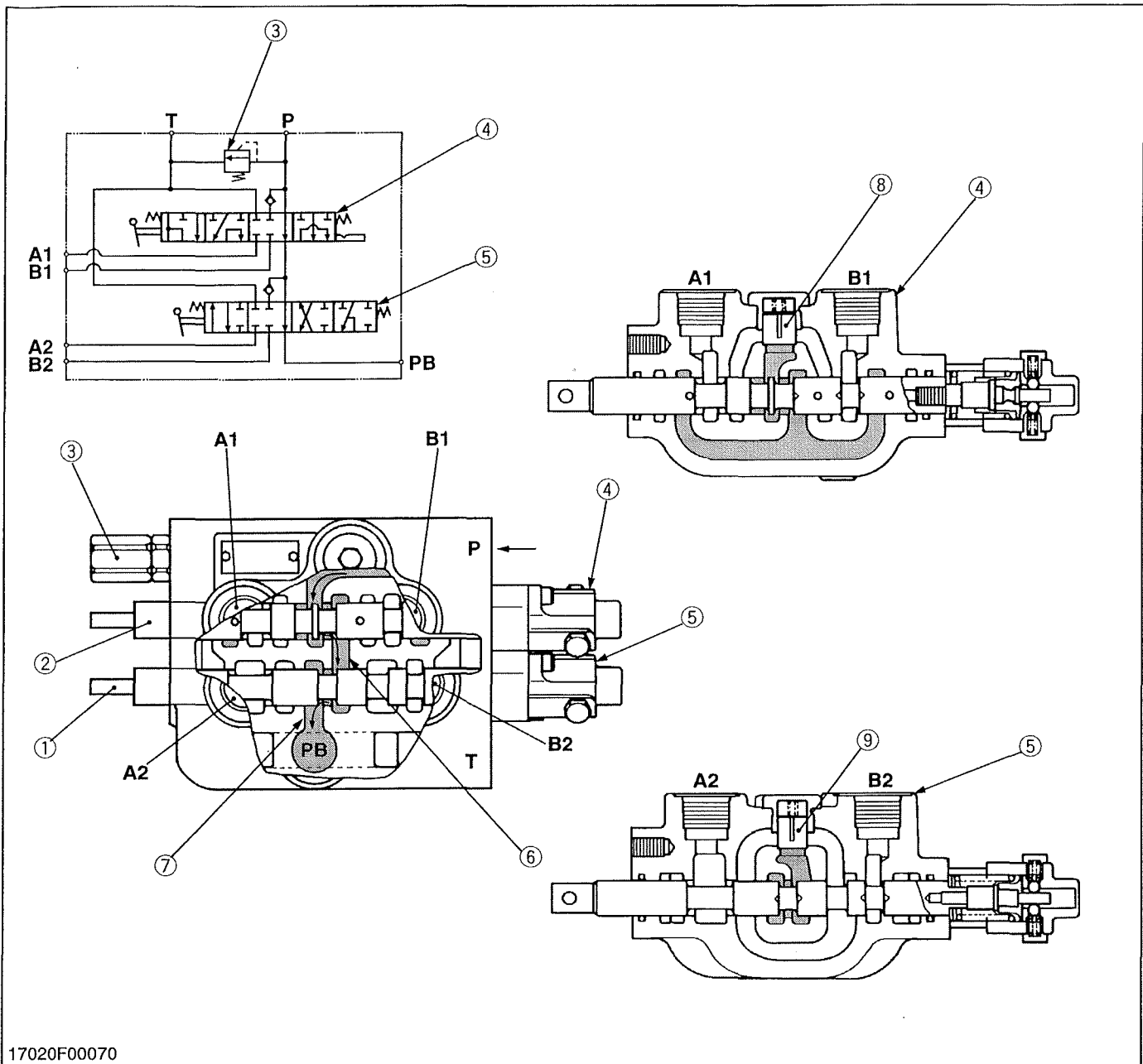
The bucket control valve is of 4-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has **A2** and **B2** ports and controls oil flow to the bucket cylinder.

(4) Power Beyond

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

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■ Neutral



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- (1) Spool
- (2) Spool
- (3) Relief Valve
- (4) Boom Control Section
- (5) Bucket Control Section

- (6) PB Passage 1
- (7) PB Passage 2
- (8) Load Check Valve
- (9) Load Check Valve

- P : P Port (From Pump Port of Hydraulic Block)
- T : T Port (To Return Port of Transmission Case)
- A1 : A1 Port

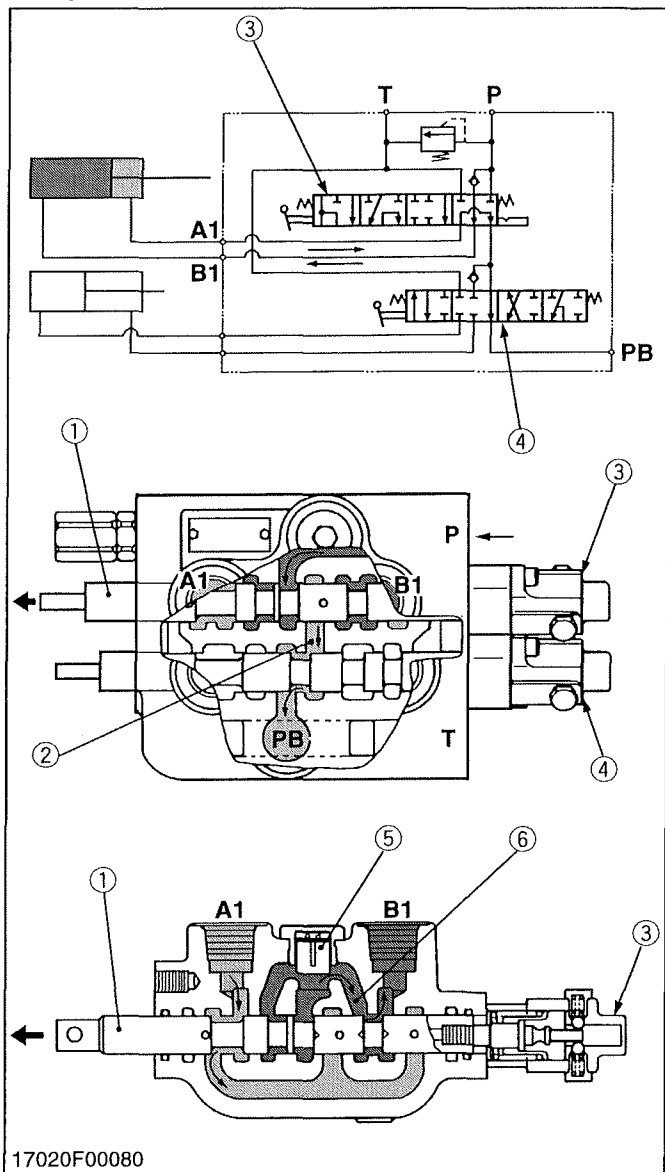
- A2 : A2 Port
- B1 : B1 Port
- B2 : B2 Port
- PB : PB Port (To Power Beyond Port of Hydraulic Block)

1. Pressure-fed oil from the hydraulic pump is delivered into P port.
2. As the load check valve (8), (9) are kept closed in the neutral position, oil flows along the notched section of

- the spools (1), (2) to the PB port through the PB passage 1 (6) and 2 (7).
3. Then the oil is fed to the three point hydraulic system from the PB port.

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■ Up



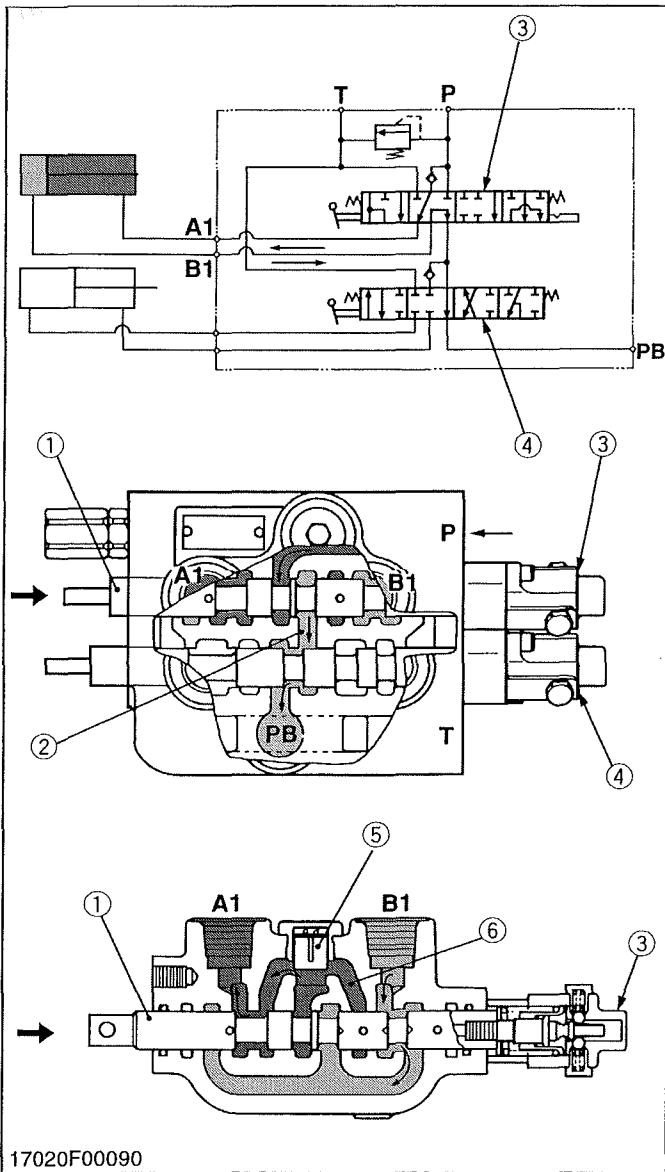
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1. When the hydraulic control lever is set to the “UP” position, the spool (1) of the boom control section (3) moves to the left, which forms oil passages between passage 1 (6) and B1 port, and between A1 port and PB passage 1 (2).
2. The pressure-fed 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



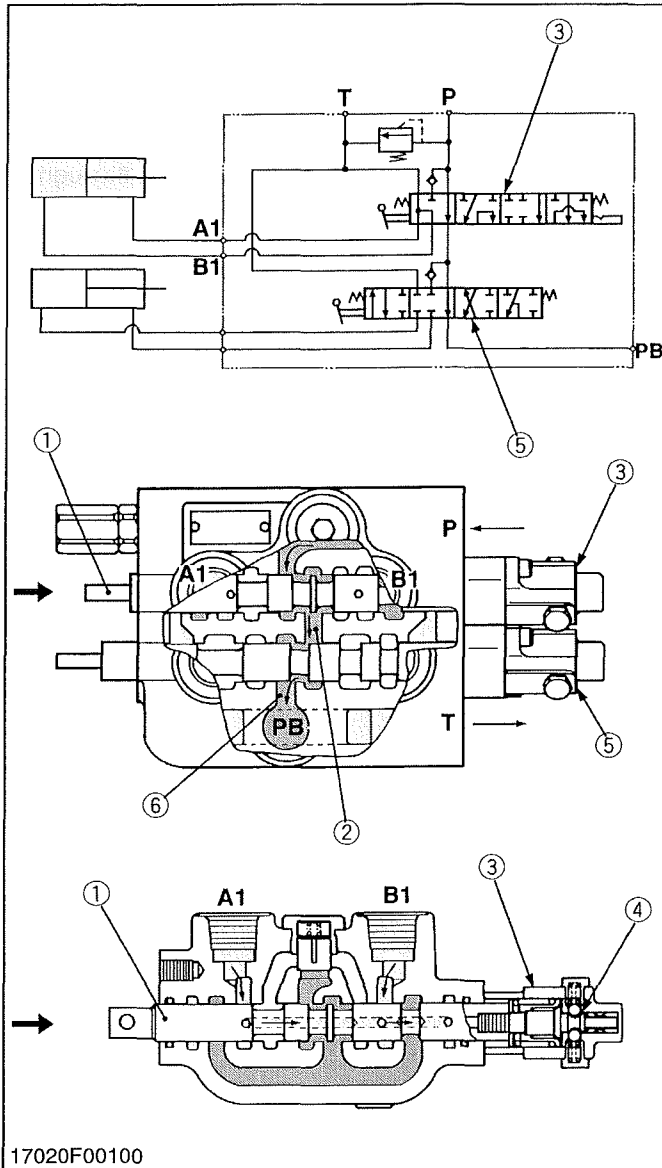
1. When the hydraulic control lever is set to the "DOWN" position, the spool (1) moves to the right, which forms oil passages between passage 1 (6) and A1 port, and between B1 port and PB passage 1 (2).
2. The pressure-fed oil from the P port opens the load check valve (5) and flows through the notched 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 | P : P Port |
| (2) PB Passage 1 | T : T Port |
| (3) Boom Control Section | A1 : A1 Port (To Boom Cylinder) |
| (4) Bucket Control Section | B1 : B1 Port (From Boom Cylinder) |
| (5) Load Check Valve | PB : PB Port |
| (6) Passage 1 | |

17020F00090

17020M00060

Floating



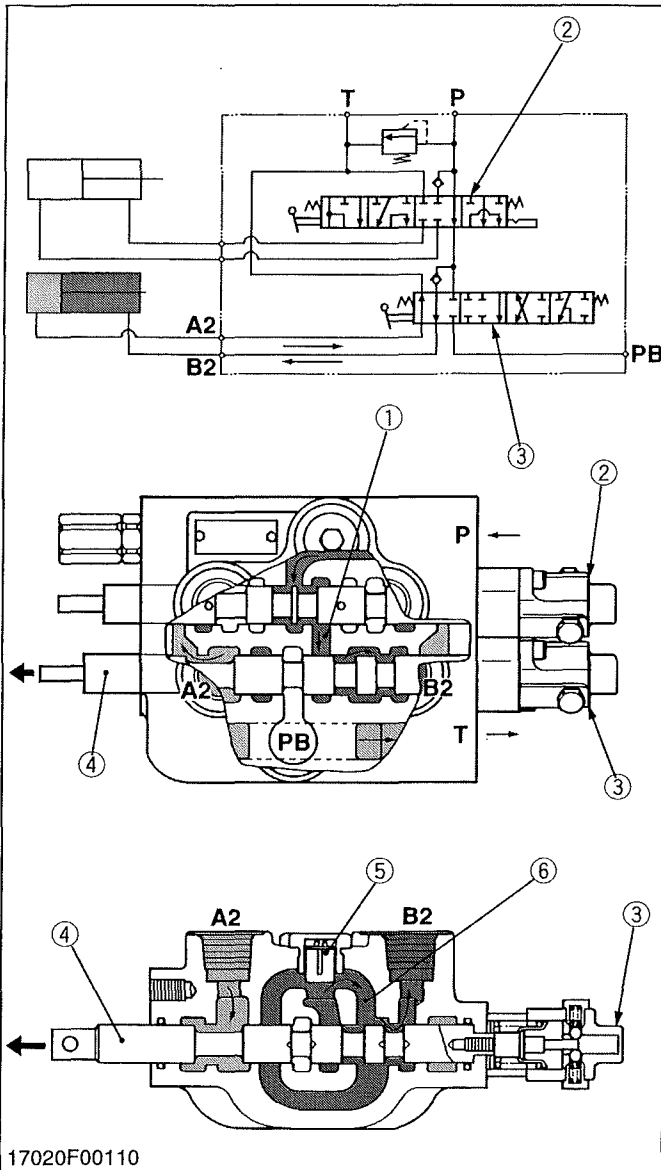
17020F00100

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 | P : P Port |
| (2) PB Passage 1 | T : T Port |
| (3) Boom Control Section | A1 : A1 Port (From Boom Cylinder) |
| (4) Detent Mechanism | B1 : B1 Port (From Boom Cylinder) |
| (5) Bucket Control Section | PB : PB Port |
| (6) PB Passage 2 | |

17020M00070

■ Roll-back



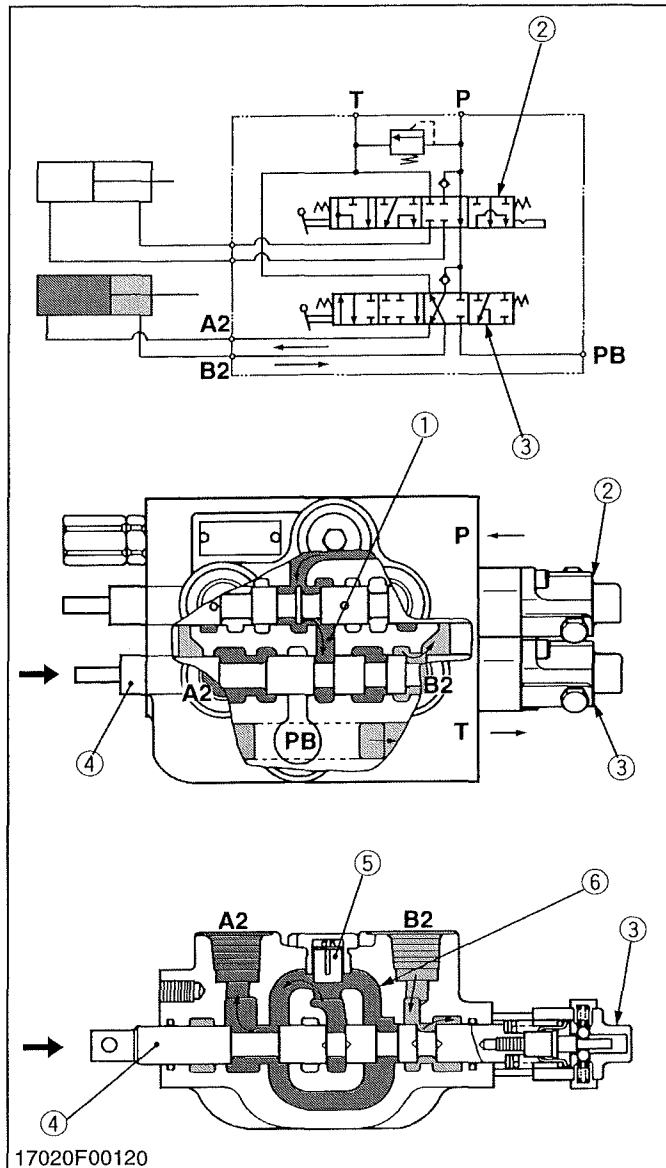
1. When the hydraulic control lever is set to the “**ROLL-BACK**” position, the spool (4) of the bucket control section (3) moves to the left, which forms oil passages between passage 2 (6) and **B2** port, and between **A2** port and **T** port.
2. The pressure-fed oil from the **P** port flows through 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 | |

17020F00110

17020M00080

■ Dump 1



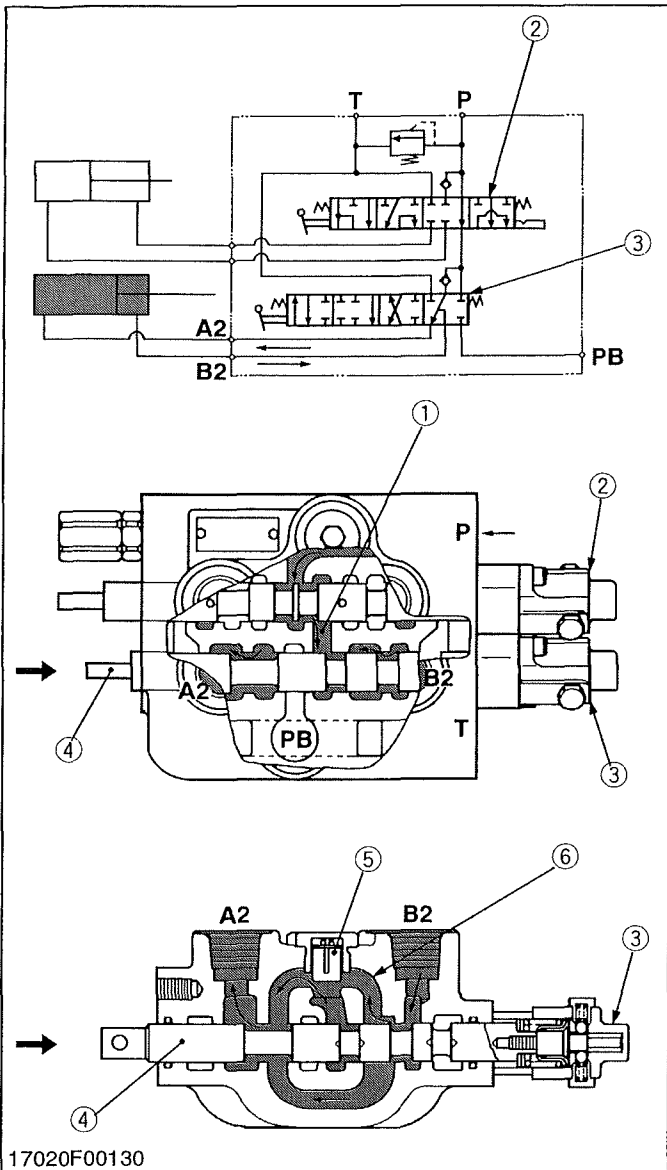
17020F00120

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 | |

17020M00090

■ 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.

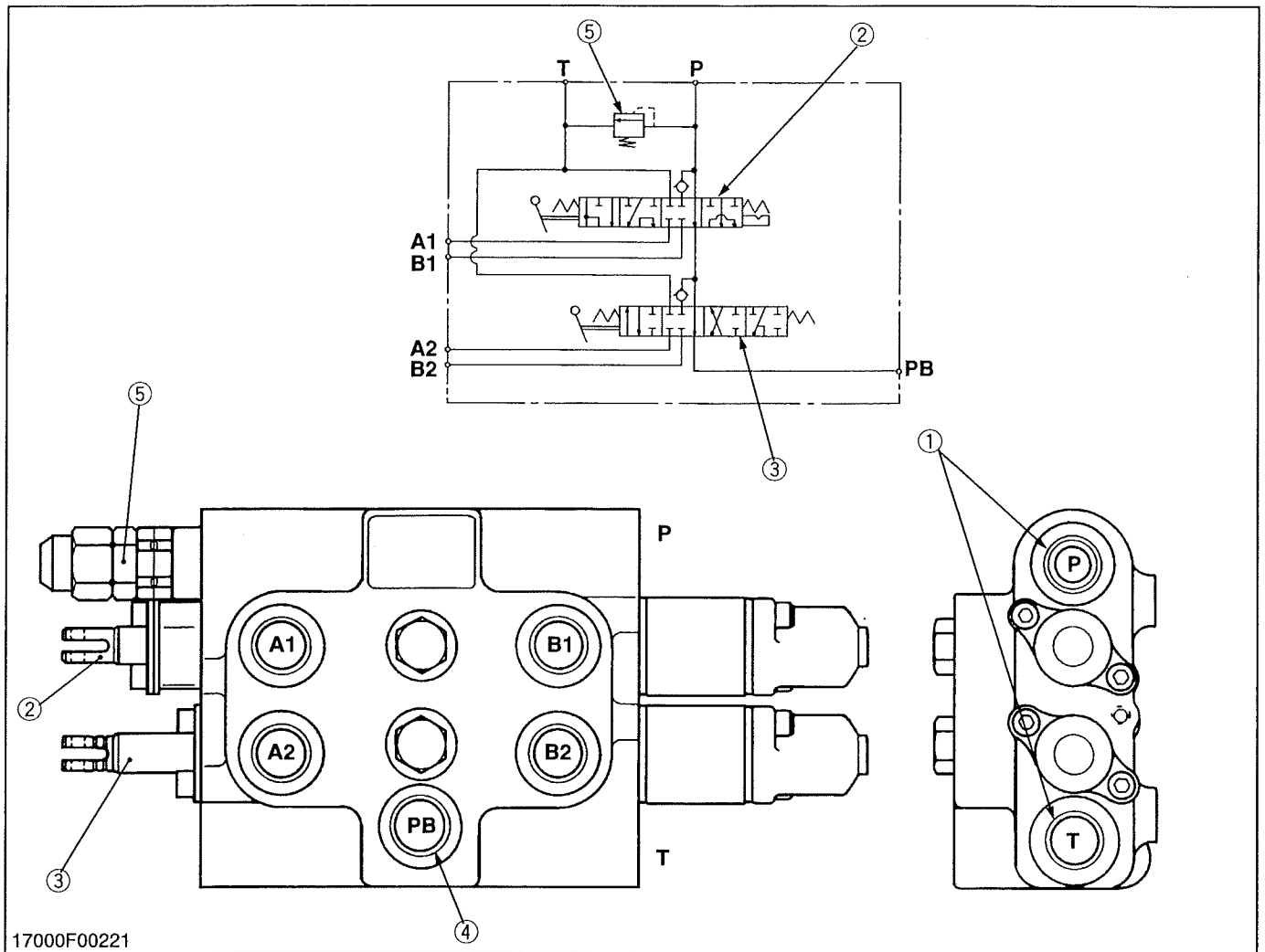
(Reference)

- 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 | 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 1 | |

17020M00100

**(2) LA271 • LA301 • LA351 (New Type Valve) and
LA401 • LA272 • LA302 • LA352 • LA402 (4 Position Bucket Control)**



17000F00221

- | | | | |
|------------------------------|------------|--------------|--------------|
| (1) Inlet and Outlet Section | P : P Port | A1 : A1 Port | B1 : B1 Port |
| (2) Boom Control Valve | T : T Port | A2 : A2 Port | B2 : B2 Port |
| (3) Bucket Control Valve | | | PB : PB Port |
| (4) Power Beyond | | | |
| (5) Relief Valve | | | |

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

(1) Inlet and Outlet Section

This section has **P** and **T** ports.
The **P** port is connected to the pump port of hydraulic block by the hydraulic hose.
The **T** port is connected to the return port of transmission case by the hydraulic hose.

(2) Boom Control Section

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

(3) Bucket Control Section

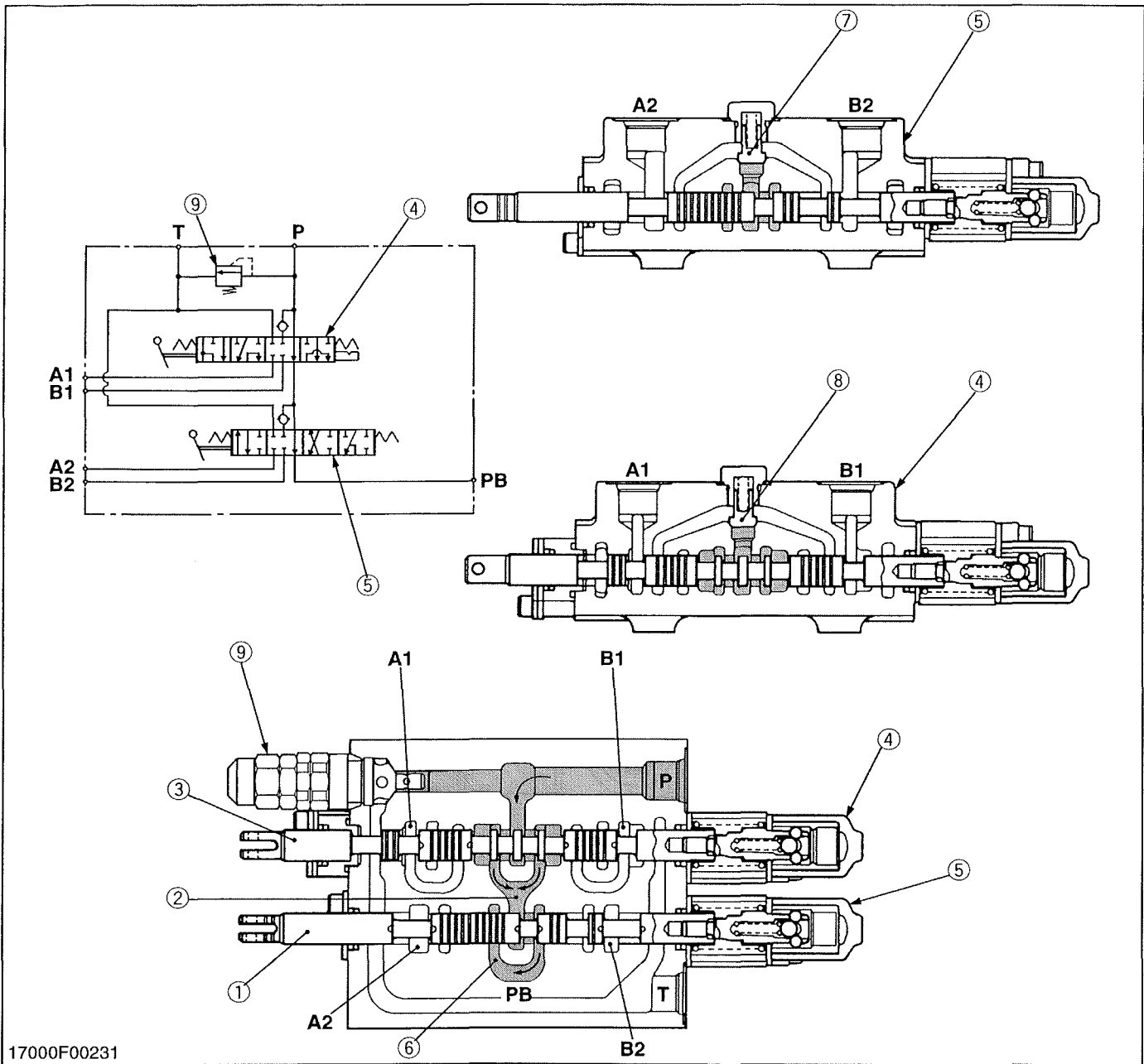
The bucket control valve is of 4-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has **A2** and **B2** ports and controls oil flow to the bucket cylinder.

(4) Power Beyond

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

17020M00110

■ Neutral



17000F00231

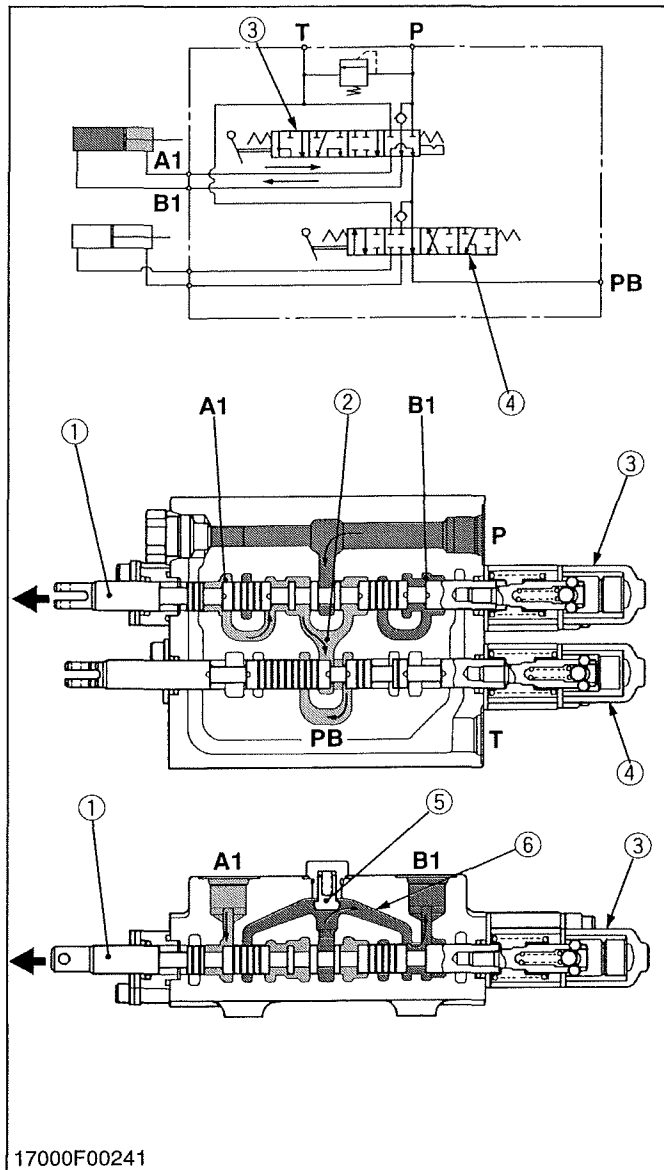
- | | | | |
|----------------------------|----------------------|---|---------------------|
| (1) Spool | (6) PB Passage 2 | P : P Port (From Pump Port of Hydraulic Block) | A2 : A2 Port |
| (2) PB Passage 1 | (7) Load Check Valve | | B1 : B1 Port |
| (3) Spool | (8) Load Check Valve | T : T Port (To Return Port of Transmission Case) | B2 : B2 Port |
| (4) Boom Control Section | (9) Relief Valve | PB : PB Port (To Power Beyond Port of Hydraulic Block) | |
| (5) Bucket Control Section | | 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.

17020M00120

■ Up

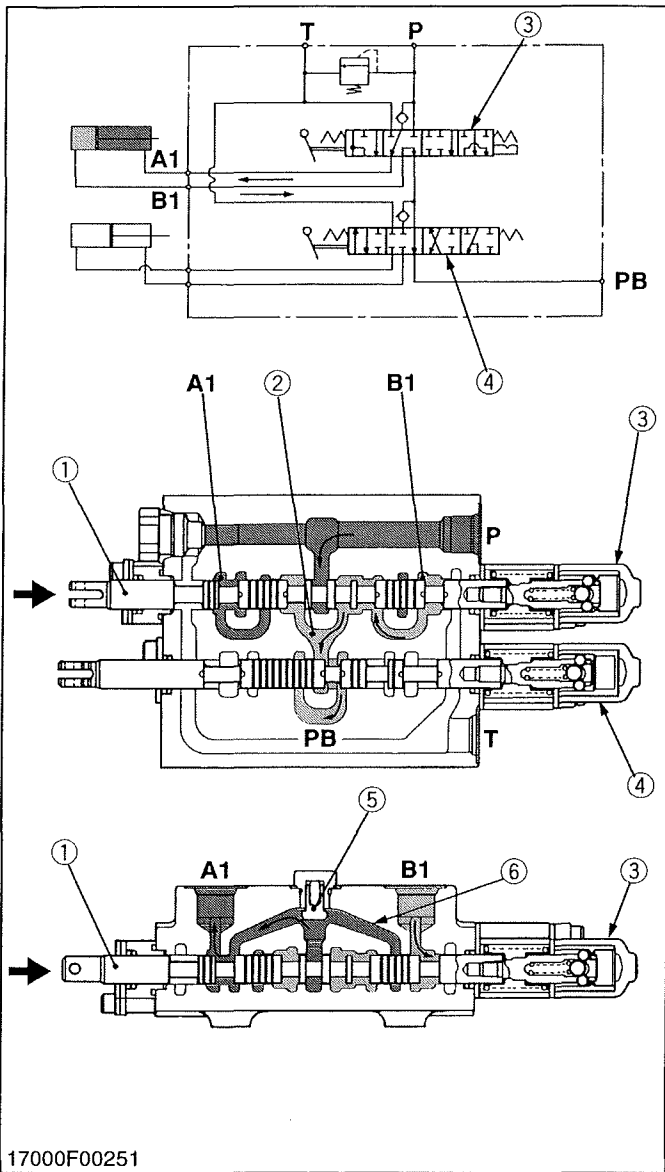


1. When the hydraulic control lever is set to the "UP" position, the spool (1) of the boom control section (3) moves to the left, which forms oil passages between passage 1 (6) and **B1** port, and between **A1** port and **PB** passage 1 (2).
2. The pressure-fed oil from the **P** port opens the load 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 | |

17020M00130

■ Down



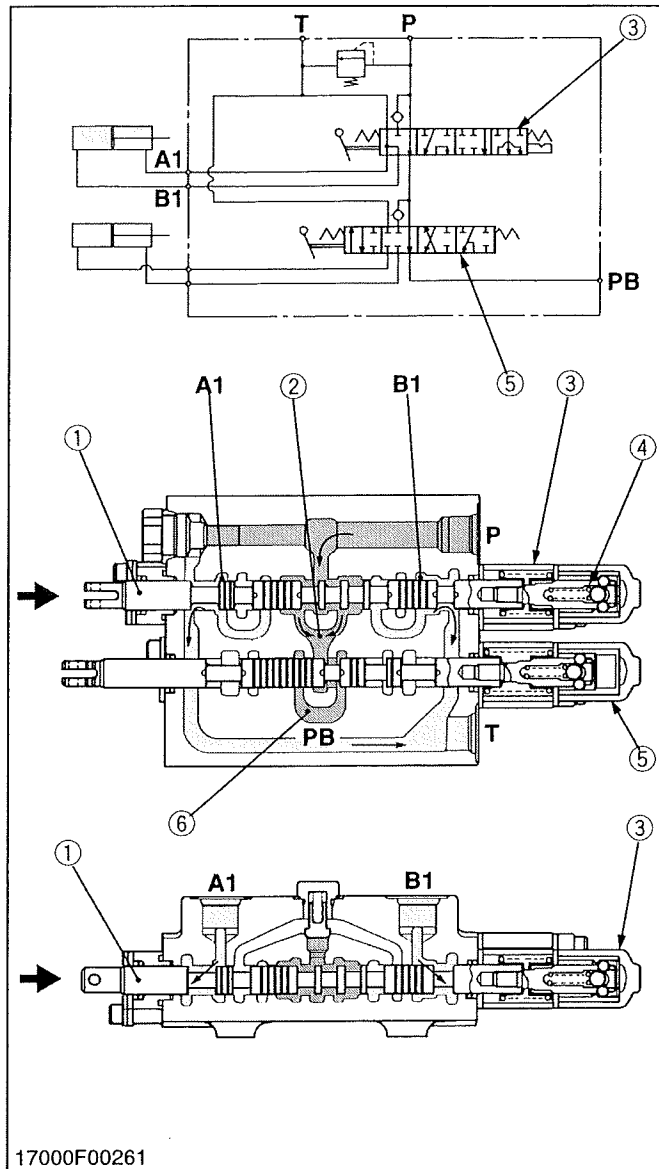
1. When the hydraulic control lever is set to the "DOWN" position, the spool (1) moves to the right, which forms oil passages between passage 1 (6) and **A1** port, and between **B1** port and **PB** passage 1 (2).
2. The pressure-fed oil from the **P** port opens the load check valve (5) and flows through 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 | P : P Port |
| (2) PB Passage 1 | T : T Port |
| (3) Boom Control Section | A1 : A1 Port (To Boom Cylinder) |
| (4) Bucket Control Section | B1 : B1 Port (From Boom Cylinder) |
| (5) Load Check Valve | PB : PB Port |
| (6) Passage 1 | |

17000F00251

17020M00140

■ Floating



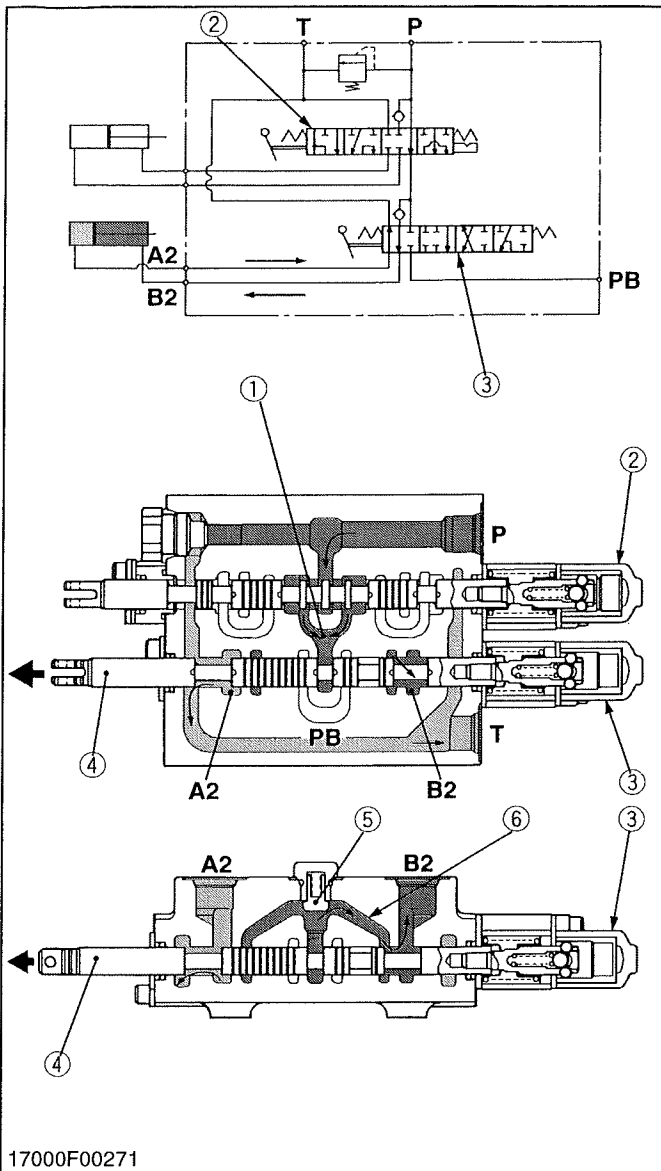
1. When the hydraulic control lever is set to the "FLOAT" position, the spool (1) moves to the right from the "DOWN" position and is retained by the detent mechanism (4).
2. This forms oil passages among the A1 port, B1 port and T port. As a result, oil in the boom cylinder flows freely from the A1 port 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 | P : P Port |
| (2) PB Passage 1 | T : T Port |
| (3) Boom Control Section | A1 : A1 Port (From Boom Cylinder) |
| (4) Detent Mechanism | B1 : B1 Port (From Boom Cylinder) |
| (5) Bucket Control Section | PB : PB Port |
| (6) PB Passage 2 | |

17000F00261

17020M00150

■ Roll-back



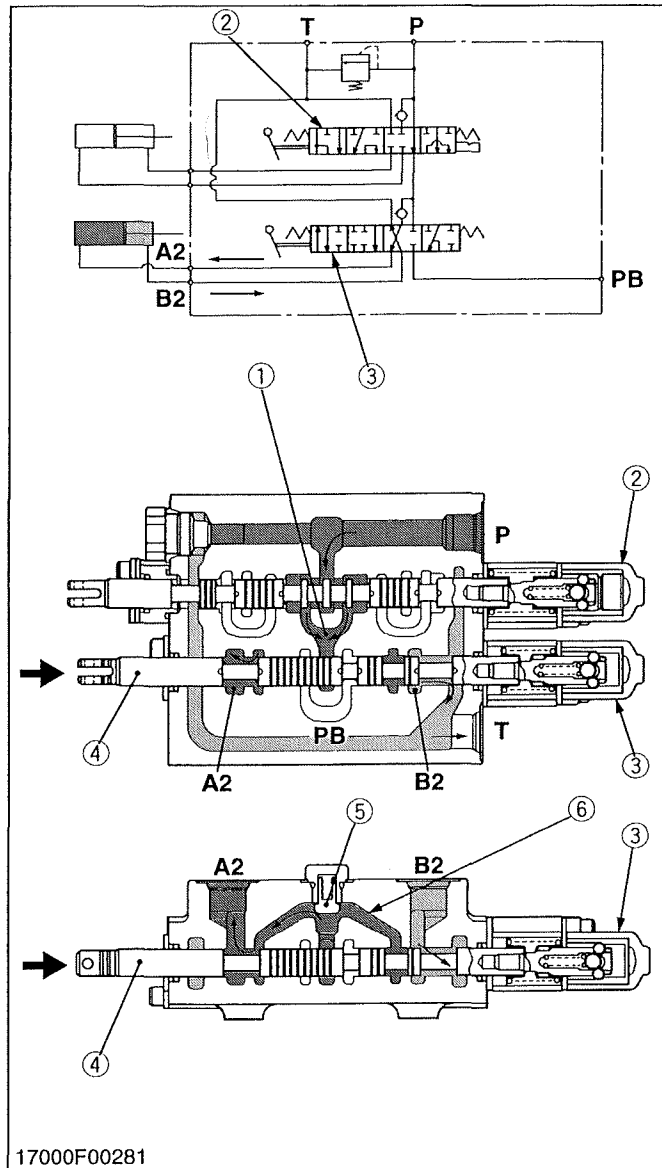
1. When the hydraulic control lever is set to the “**ROLL-BACK**” position, the spool (4) of the bucket control section (3) moves to the left, which forms oil passages between passage 2 (6) and **B2** port, and between **A2** port and **T** port.
2. The pressure-fed oil from the **P** port flows through 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 | |

17000F00271

17020M00160

■ Dump 1

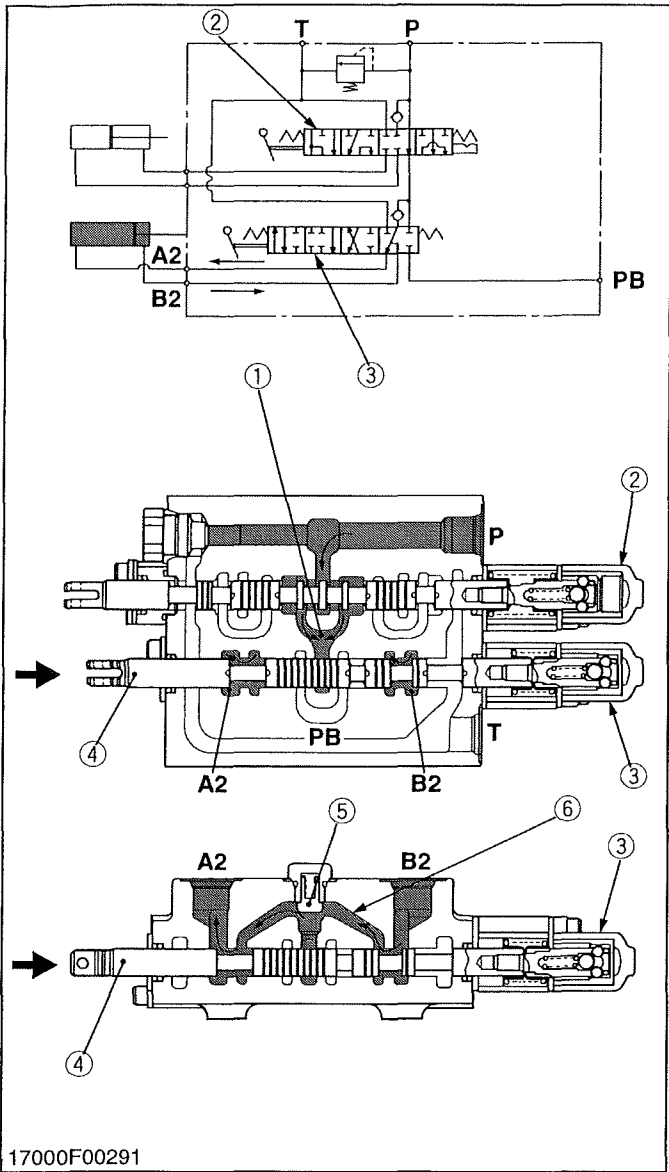


1. When the hydraulic control lever is set to the "DUMP 1" position, the spool (4) of the bucket control section (3) moves to the right, which forms oil passages between passage 2 (6) and A2 port, and between B2 port and T port.
2. The pressure-fed oil from the P port flows through the boom control section (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 | |

17020M00170

■ 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)

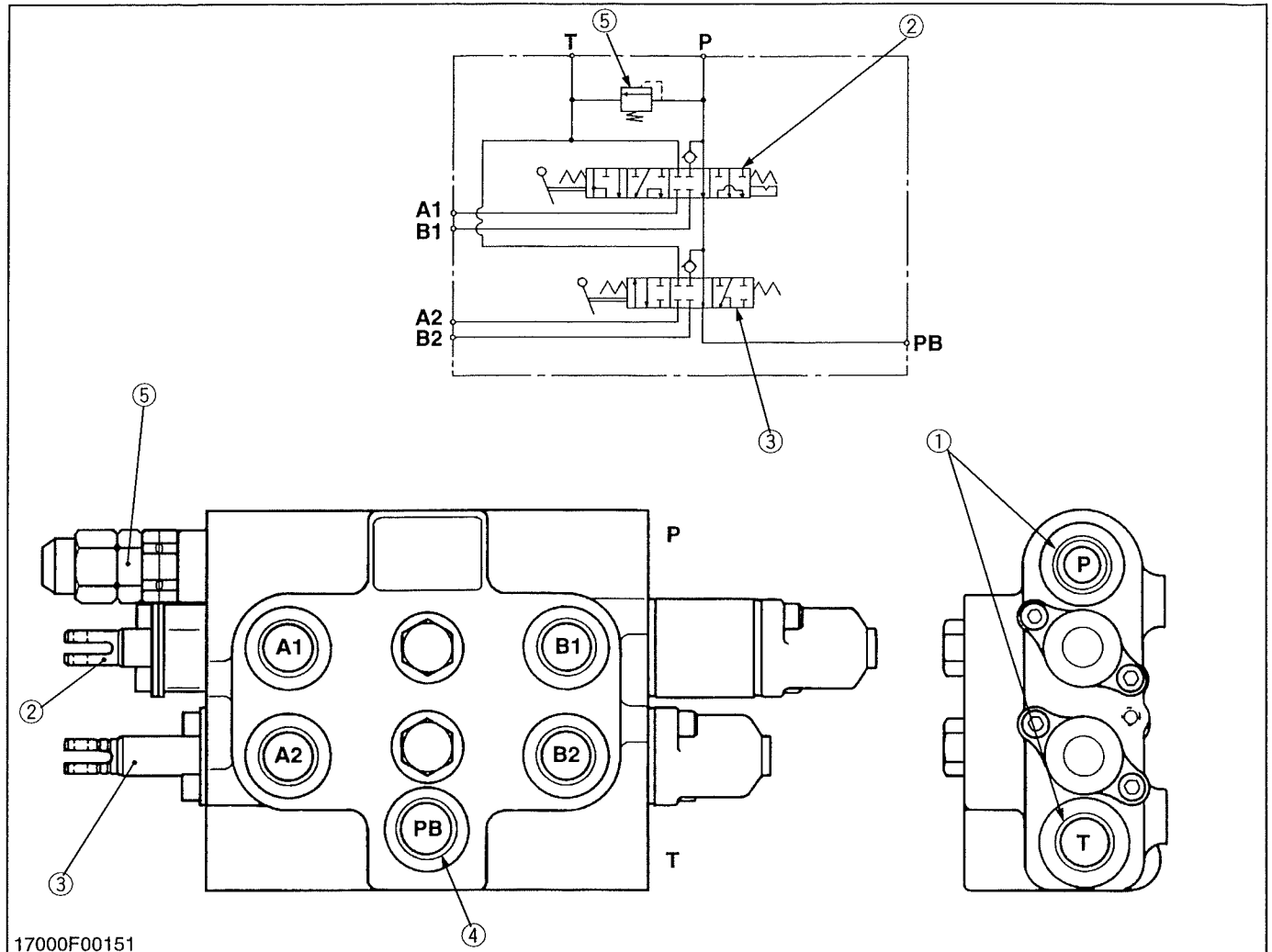
- The oil pressure of the A2 port and B2 port is identical, but the bucket cylinder extend by the difference of received pressure area (cylinder rod part).

- | | |
|----------------------------|-------------------------------------|
| (1) PB Passage 1 | 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 1 | |

17000F00291

17020M00180

(3) LA401 • LA272 • LA302 • LA352 • LA402 (3 Position Bucket Control)



17000F00151

- | | | | |
|------------------------------|------------|--------------|--------------|
| (1) Inlet and Outlet Section | P : P Port | A1 : A1 Port | B1 : B1 Port |
| (2) Boom Control Valve | T : T Port | A2 : A2 Port | B2 : B2 Port |
| (3) Bucket Control Valve | | | PB : PB Port |
| (4) Power Beyond | | | |
| (5) Relief Valve | | | |

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

(1) Inlet and Outlet Section

This section has **P** and **T** ports.
 The **P** port is connected to the pump port of hydraulic block by the hydraulic hose.
 The **T** port is connected to the return port of transmission case by the hydraulic hose.

(2) Boom Control Section

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

(3) Bucket Control Section

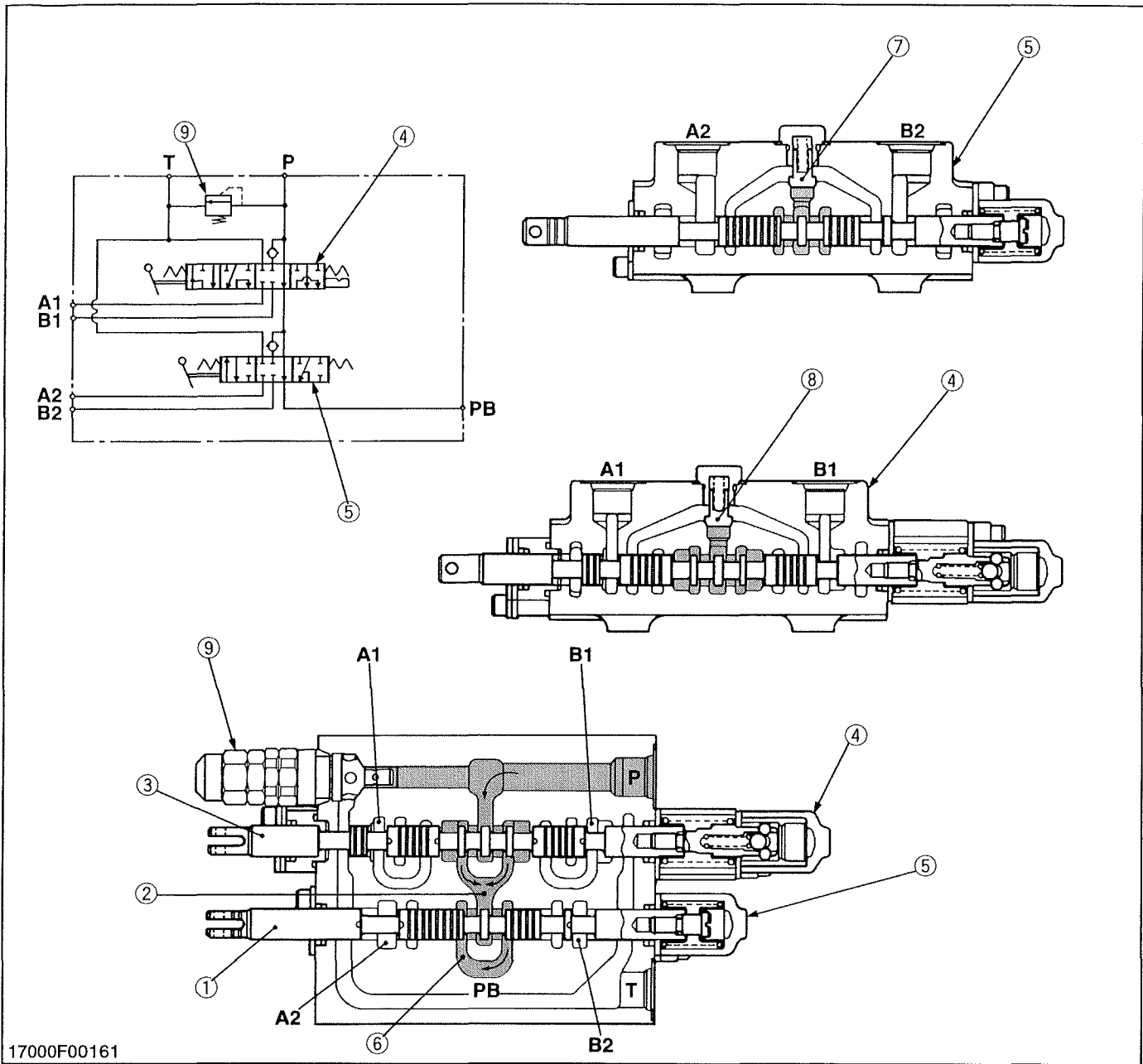
The bucket control valve is of 3-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has **A2** and **B2** ports and controls oil flow to the bucket cylinder.

(4) Power Beyond

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

17020M00190

■ Neutral



17000F00161

- | | | | |
|----------------------------|----------------------|--|--|
| (1) Spool | (6) PB Passage 2 | P : P Port (From Pump Port of Hydraulic Block) | A2 : A2 Port |
| (2) PB Passage 1 | (7) Load Check Valve | T : T Port (To Return Port of Transmission Case) | B1 : B1 Port |
| (3) Spool | (8) Load Check Valve | | B2 : B2 Port |
| (4) Boom Control Section | (9) Relief Valve | | PB : PB Port (To Power Beyond Port of Hydraulic Block) |
| (5) Bucket Control Section | | 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.

17020M00200

■ Up

See page M-13.

17020M00210

■ Down

See page M-14.

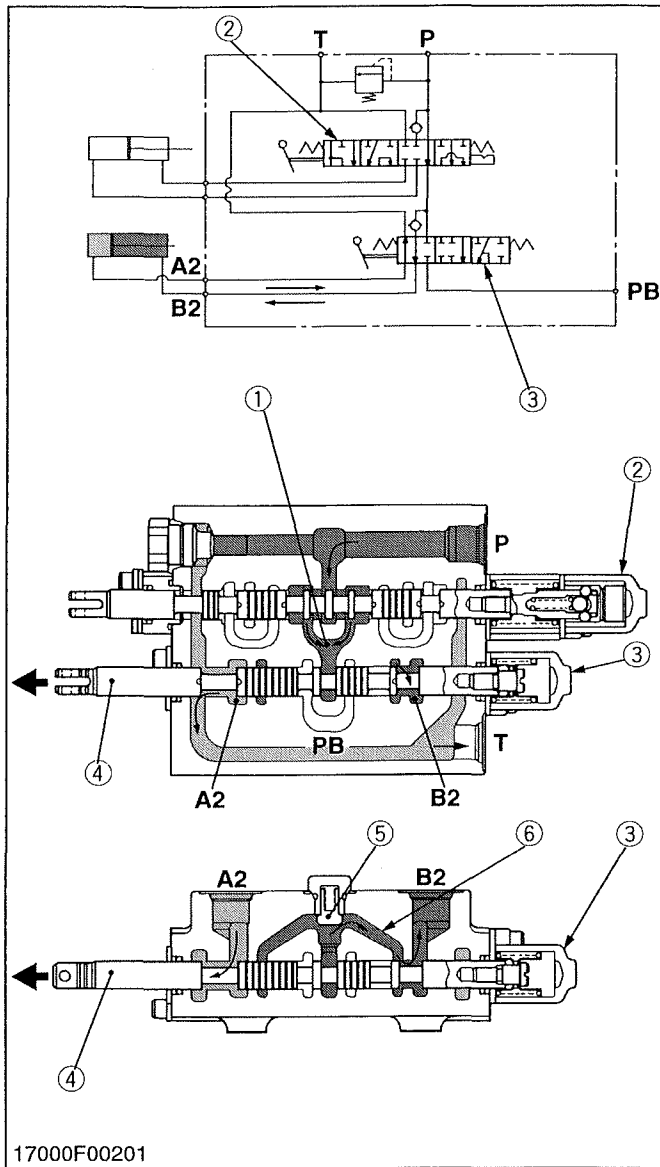
17020M00220

■ Floating

See page M-15.

17020M00230

■ Roll-back



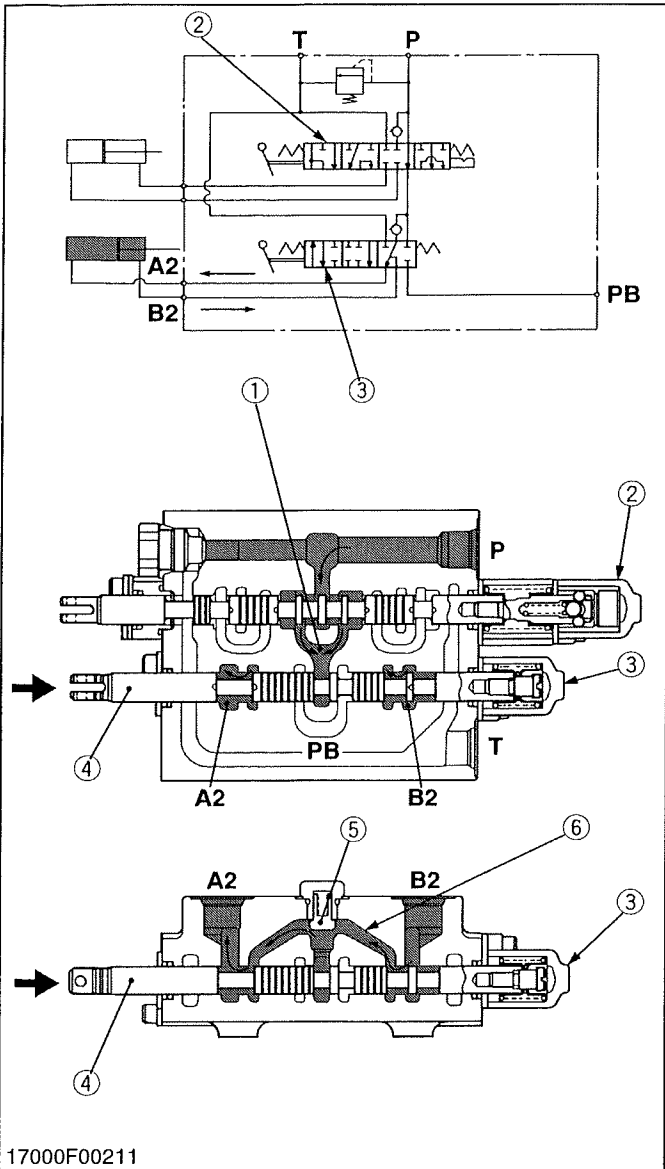
1. When the hydraulic control lever is set to the “**ROLL-BACK**” position, the spool (4) of the bucket control section (3) moves to the left, which forms oil passages between passage 2 (6) and **B2** port, and between **A2** port and **T** port.
2. The pressure-fed oil from the **P** port flows through 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 | |

17000F00201

17020M00240

■ 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).

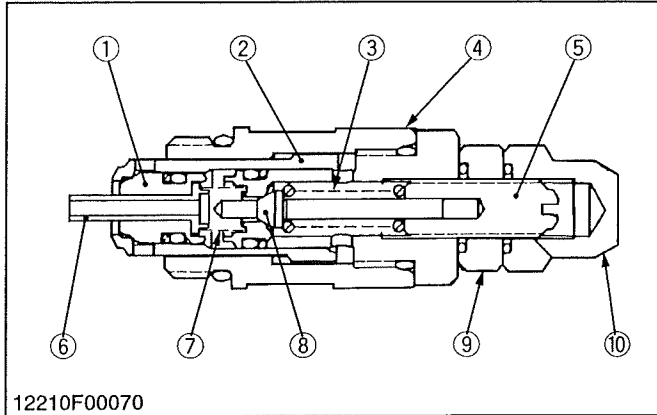
- (1) PB Passage 1
- (2) Boom Control Section
- (3) Bucket Control Section
- (4) Spool
- (5) Load Check Valve
- (6) Passage 2

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

17020M00250

[4] RELIEF VALVE

■ LA271 • LA301 • LA351 (New Type Valve) and LA401 • LA272 • LA302 • LA352 • LA402



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

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

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

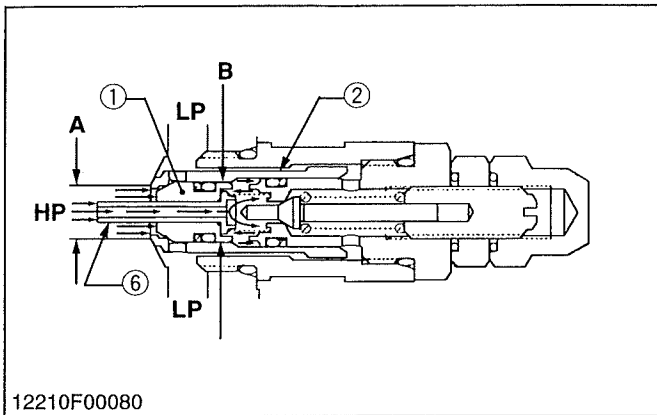
17021M00030

■ Relief Operation

[Step 1]

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

- | | |
|-------------------------|------------|
| (1) Relief Valve Poppet | (6) Poppet |
| (2) Check Valve Poppet | |

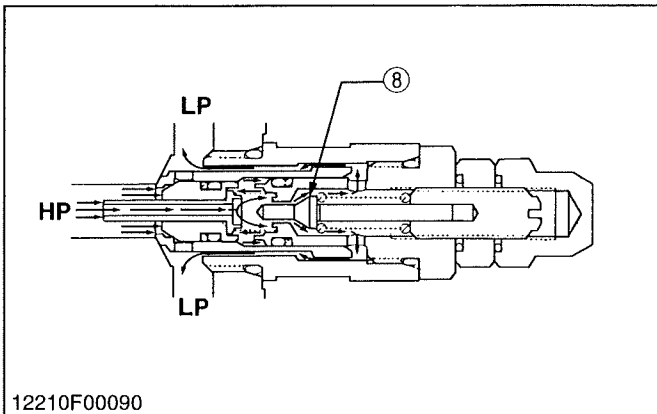


12210M00070

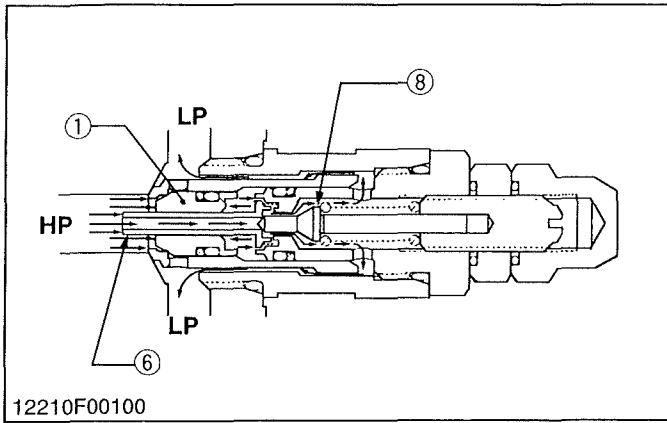
[Step 2]

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

- | |
|------------------|
| (8) Pilot Poppet |
|------------------|



12210M00080

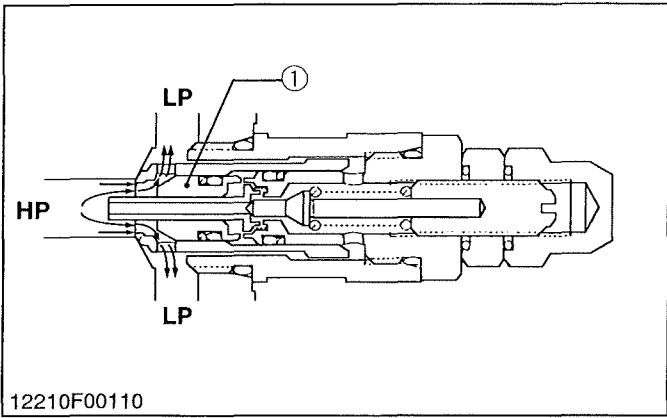


[Step 3]

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

- (1) Relief Valve Poppet
- (6) Poppet
- (8) Pilot Poppet

12210M00090



[Step 4]

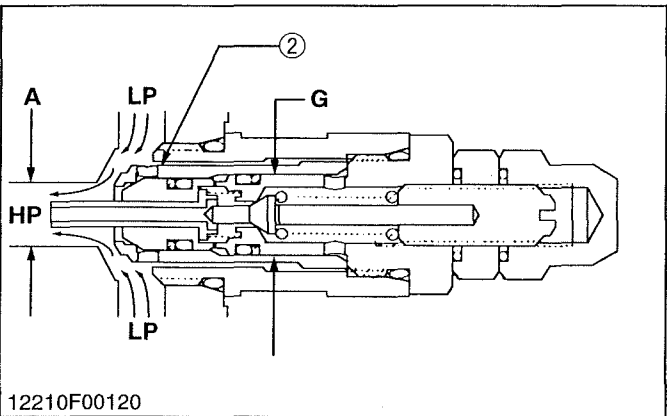
The imbalance of pressure on the inside as compared to that of the high pressure port **HP**, forces the relief valve poppet (1) to open and relieve the oil directly to the low pressure chamber **LP** in the valve.

(Reference)

Oil temperature	Valve opening pressure	
45 to 55°C (113 to 131°F)	LA271 / LA272 LA351 / LA352 LA401 / LA402	13.1 to 13.8 MPa 133.5 to 140.5 kgf/cm ² 1900 to 2000 psi
	LA301 / LA302	14.5 to 15.2 MPa 147.5 to 154.6 kgf/cm ² 2100 to 2200 psi

- (1) Relief Valve Poppet

17021M00040



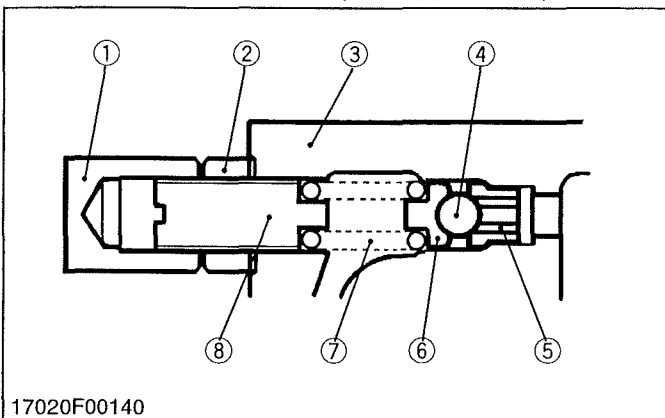
■ Anti-cavitation Operation

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

- (2) Check Valve Poppet

12210M00110

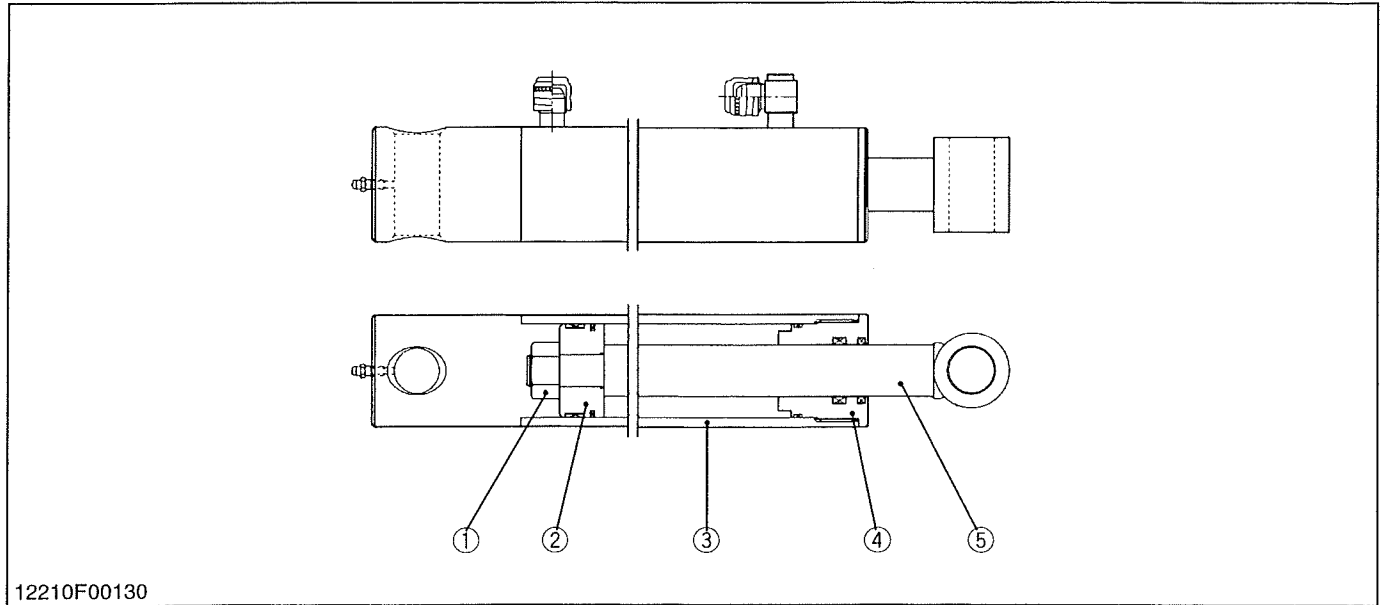
■ LA271 • LA301 • LA351 (Old Type Valve)



- (1) Acorn Nut
- (2) Jam Nut
- (3) Control Valve Body
- (4) Ball
- (5) Relief Seat
- (6) Ball Retainer
- (7) Spring
- (8) Adjusting Screw

17020M00270

[5] BOOM CYLINDER AND BUCKET CYLINDER



12210F00130

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

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

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

Cylinder Specifications

		LA271 / LA272	LA301 / LA302	LA351 / LA352	LA401 / LA402
Boom Cylinder	Cylinder I.D.	38.1 mm (1.50 in.)	38.1 mm (1.50 in.)	44.5 mm (1.75 in.)	44.5 mm (1.75 in.)
	Rod O.D.	25.4 mm (1.00 in.)	25.4 mm (1.00 in.)	25.4 mm (1.00 in.)	25.4 mm (1.00 in.)
	Stroke	307 mm (12.10 in.)	307 mm (12.10 in.)	289 mm (11.40 in.)	435 mm (17.13 in.)
Bucket Cylinder	Cylinder I.D.	38.1 mm (1.50 in.)	38.1 mm (1.50 in.)	44.5 mm (1.75 in.)	44.5 mm (1.75 in.)
	Rod O.D.	25.4 mm (1.00 in.)	25.4 mm (1.00 in.)	25.4 mm (1.00 in.)	25.4 mm (1.00 in.)
	Stroke	330 mm (13.00 in.)	330 mm (13.00 in.)	330 mm (13.00 in.)	450 mm (17.72 in.)

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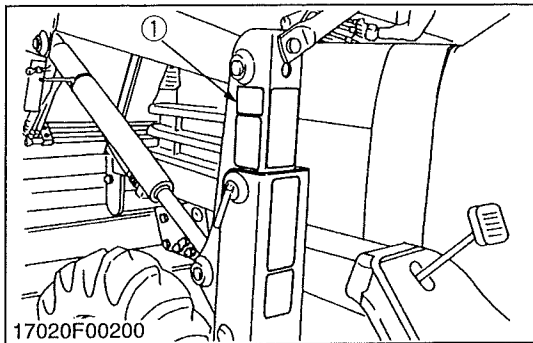
SERVICING

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GENERAL

[1] IDENTIFICATION

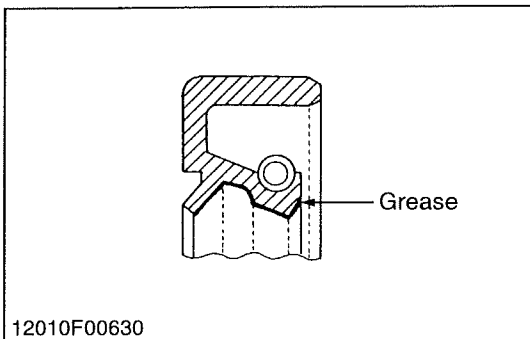


When contacting your local KUBOTA distributor, always specify front loader model and serial number.

(1) Model / Serial Number

17020G00010

[2] GENERAL PRECAUTION



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

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[3] LUBRICANTS

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

Place	Capacities					Lubricants
	B7300	B1700	B2100	B2400	B2710 *2	
Transmission Case (Front loader is not attached)	(for Gear) 11 L 2.91 U.S.gals. 2.42 Imp.gals.		(for HST) 12 L 3.17 U.S.gals. 2.64 Imp.gals.		14 L 3.70 U.S.gals. 3.08 Imp.gals.	KUBOTA UDT or SUPER UDT Fluid *1
Grease fittings	Until grease overflows					Multi-purpose type grease

Place	Capacities				Lubricants
	B7400	B7500	B2410	B2710 *3 B2910	
Transmission Case (Front loader is not attached)	11.2 L 2.96 U.S.gals. 2.46 Imp.gals.	(for Gear) 11.5 L 3.04 U.S.gals. 2.53 Imp.gals.	(for HST) 12.5 L 3.30 U.S.gals. 2.75 Imp.gals.	14.5 L 3.83 U.S.gals. 3.19 Imp.gals.	KUBOTA UDT or SUPER UDT Fluid *1
Grease fittings	Until grease overflows				Multi-purpose type grease

NOTE :

*1 KUBOTA UDT or SUPER UDT Fluid KUBOTA original transmission hydraulic fluid

*2 B2710 Serial No.: ~15496

*3 B2710 Serial No.: 50101 ~

17021G00010

[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-3 S-3
Every 10 hours	<ul style="list-style-type: none"> • Grease all grease fittings • Lubricate joints of control lever linkage 	S-3 S-3

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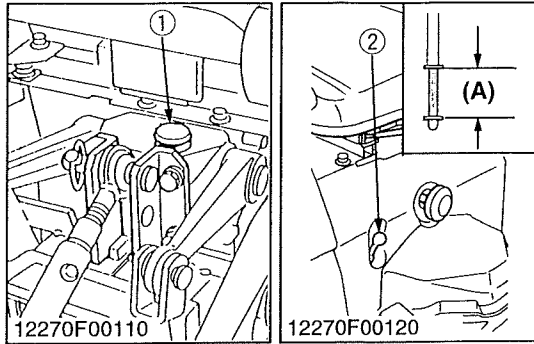
[5] CHECK AND MAINTENANCE

 **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.

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(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.

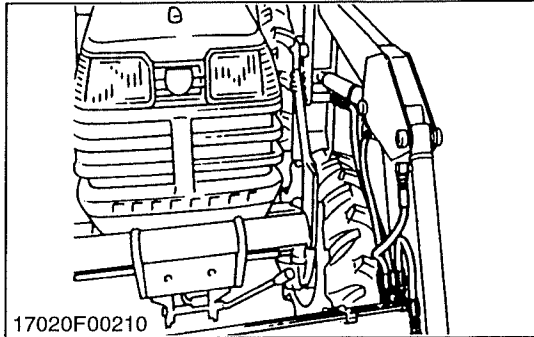
■ IMPORTANT

- 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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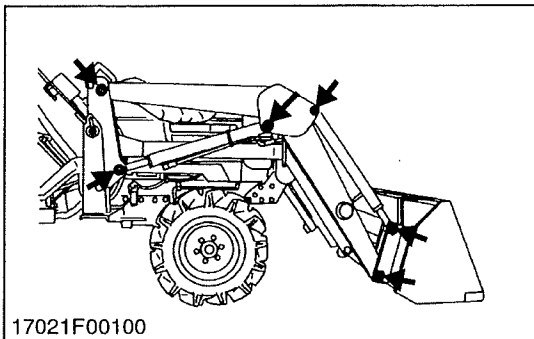


Checking Hydraulic Hoses

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

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(2) Check Points of Every 10 Hours



Greasing

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

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Lubricating

1. Lubricate joints of control lever linkage.

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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 • Relief valve spring damaged • Hydraulic hose damaged • Relief valve dirty or stuck 	Repair or replace Repair or replace Repair or replace Repair or replace Clean or replace Replace Replace Clean	S-9 S-12 – – – – – –
Boom Does Not Lower	<ul style="list-style-type: none"> • Control valve malfunctioning 	Repair or replace	S-9
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-12 S-13 – S-9 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-9 S-12 – – – – – –
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 • Relief valve setting pressure too low • Insufficient transmission fluid • Dirty relief valve 	Replace Replace Repair Adjust Refill Clean	S-12 S-13 – S-9 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-12 S-13 – –

17020S00010

SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Relief Valve Condition <ul style="list-style-type: none"> • Engine Speed Maximum • Oil Temperature 45 to 55 °C 113 to 131 °F 	Setting Pressure LA271 / LA272 LA351 / LA352 LA401 / LA402	13.1 to 13.8 MPa 133.5 to 140.5 kgf/cm ² 1900 to 2000 psi	—
	LA301 / LA302	14.5 to 15.2 MPa 147.5 to 154.6 kgf/cm ² 2100 to 2200 psi	—
Piston Rod	Bend	—	0.25 mm 0.0098 in.

17021S00010

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

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[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.

12210S00120

[3] TIGHTENING TORQUES OF SCREWS, BOLTS AND NUTS ON THE TABLE BELOW ARE ESPECIALLY SPECIFIED

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

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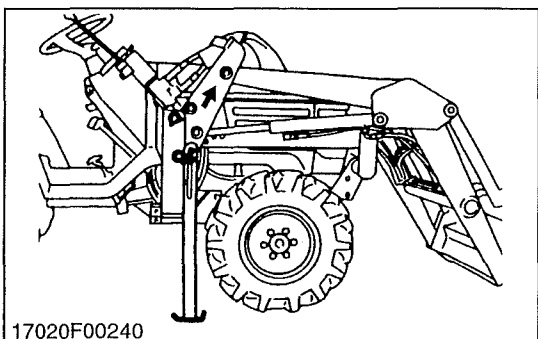
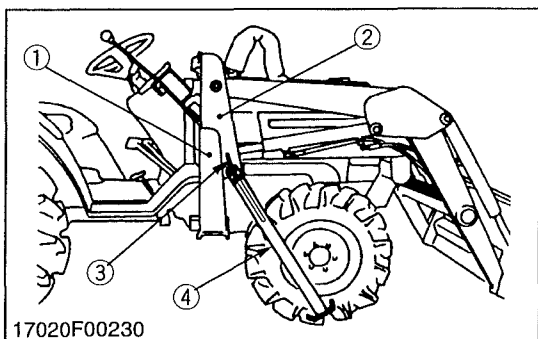
DISMOUNTING FRONT LOADER FROM TRACTOR

■ 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.

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[1] LA271 • LA301 • LA351



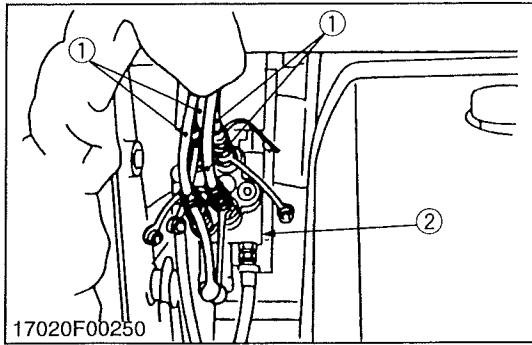
Side Frame

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

- (1) Main Frame
- (2) Side Frame

- (3) Mounting Pin
- (4) Stand

17020S00040

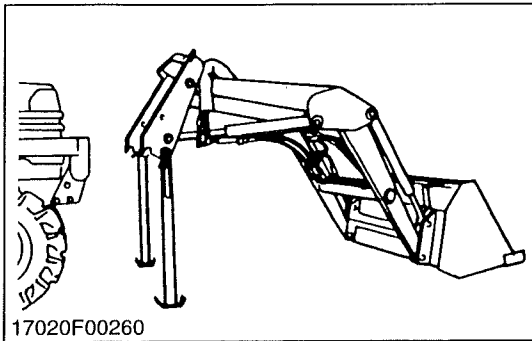


Hoses

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

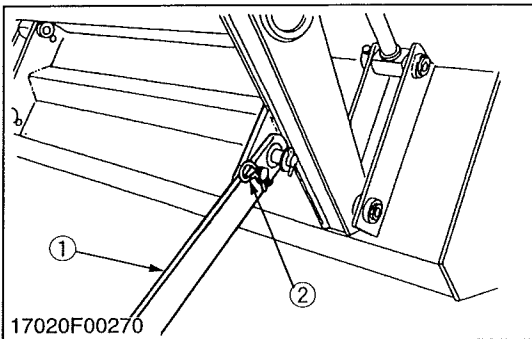
(1) Hose

(2) Control Valve



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[2] LA401 • LA272 • LA302 • LA352 • LA402

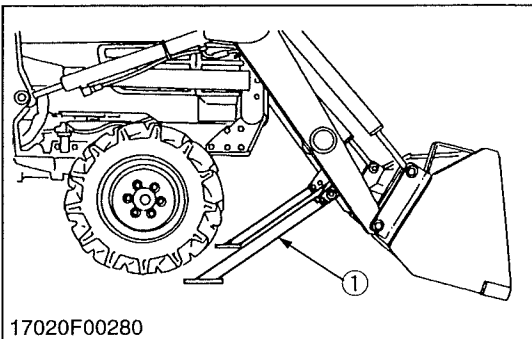


Stand

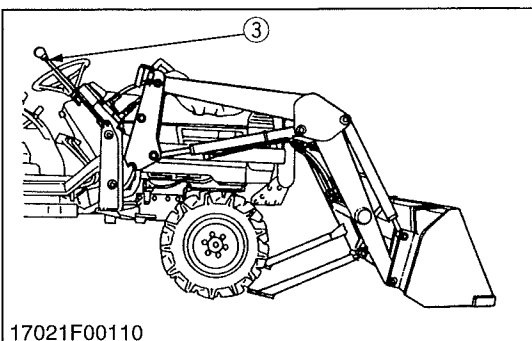
1. Start the engine and run at an idle.
2. Raise the boom until the stands (1) can be rotated.
3. Stop the engine.
4. Remove the snap pins holding the stands (1) to the boom.
5. Slide the stands (1) to outside and rotate the stand to the setting position. Then slide the stands back and set them with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

(1) Stand

(2) Snap Pin



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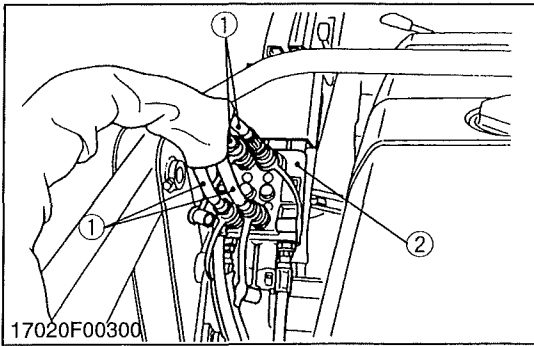


Side Frame

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

(1) Hydraulic Control Lever

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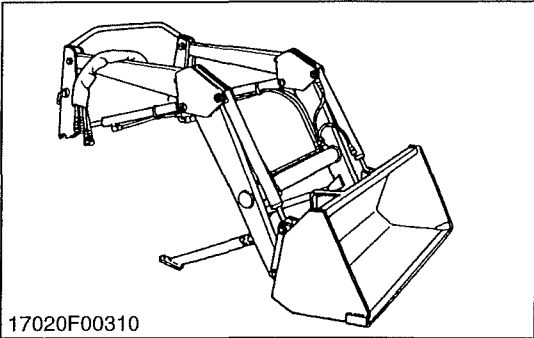


Hoses

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

(1) Hose

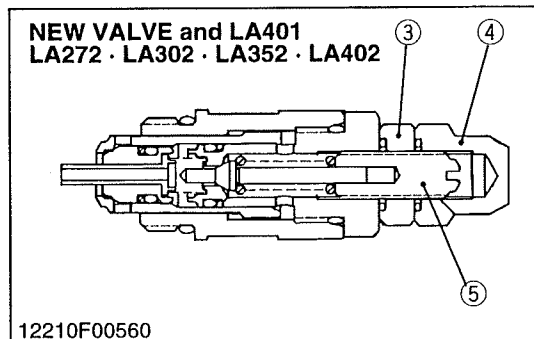
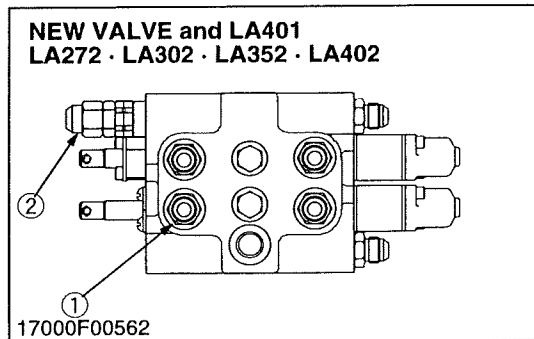
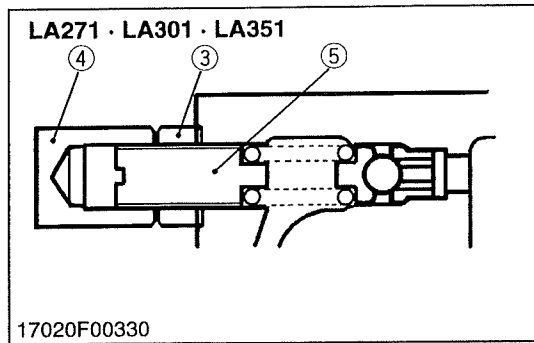
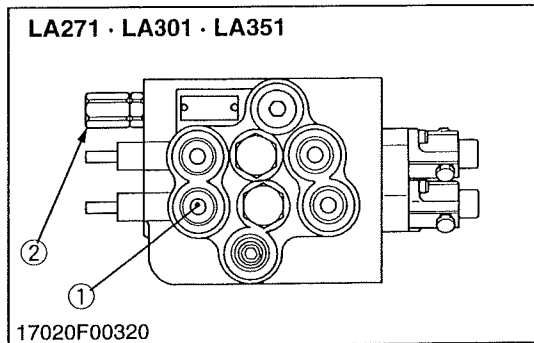
(2) Control Valve



17020S00080

CHECKING, DISASSEMBLING AND SERVICING

[1] CONTROL VALVE CHECKING AND ADJUSTING



Relief Valve Setting Pressure

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

Relief valve setting pressure	Factory spec.	LA271 / LA272 LA351 / LA352 LA401 / LA402	13.1 to 13.8 MPa 133.5 to 140.5 kgf/cm ² 1900 to 2000 psi
		LA301 / LA302	14.5 to 15.2 MPa 147.5 to 154.6 kgf/cm ² 2100 to 2200 psi

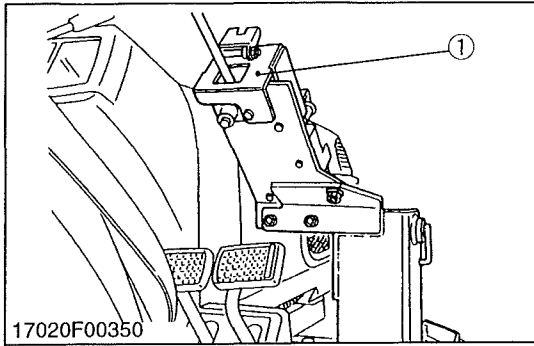
Condition

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

- | | |
|------------------|------------------|
| (1) A2 Port | (4) Acorn Nut |
| (2) Relief Valve | (5) Adjust Screw |
| (3) Jam Nut | |

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DISASSEMBLING AND ASSEMBLING



Hydraulic Hose and Control Valve Cover

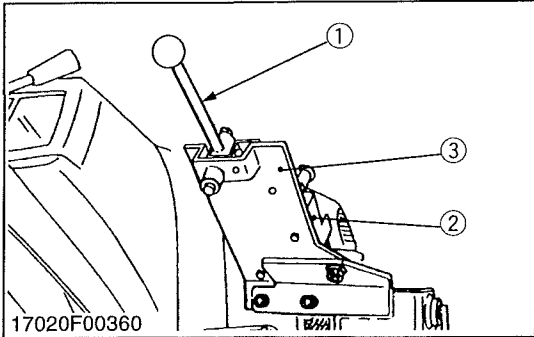
1. Disconnect the hydraulic hoses from the control valve.
2. Remove the control valve cover (1).

(When reassembling)

Tightening torque	Control valve cover mounting bolt	23.1 to 25.7 N·m 2.4 to 2.6 kgf·m 17 to 19 ft-lbs
-------------------	-----------------------------------	---

- (1) Control Valve Cover

17020S00100



Control Lever Rod and Control Valve

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

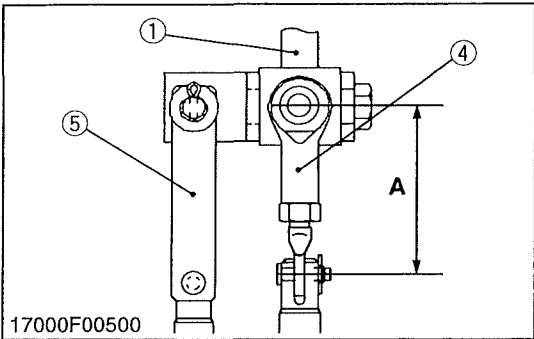
(When reassembling)

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
-------------------	-----------------------------	--

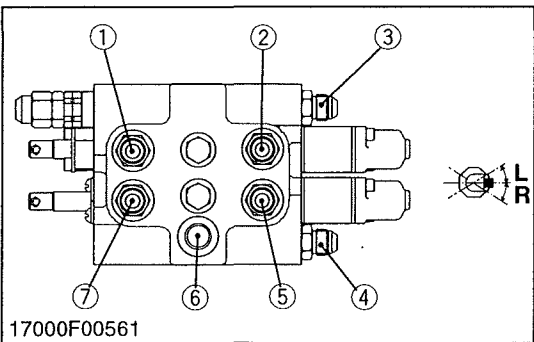
(Reference)

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

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



17021S00050



Adapter and Elbow

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

(When reassembling)

- Use care not to damage the O-ring.

Tightening torque	Adapter and elbow	47.5 to 54.2 N·m 4.8 to 5.5 kgf·m 35 to 40 ft-lbs
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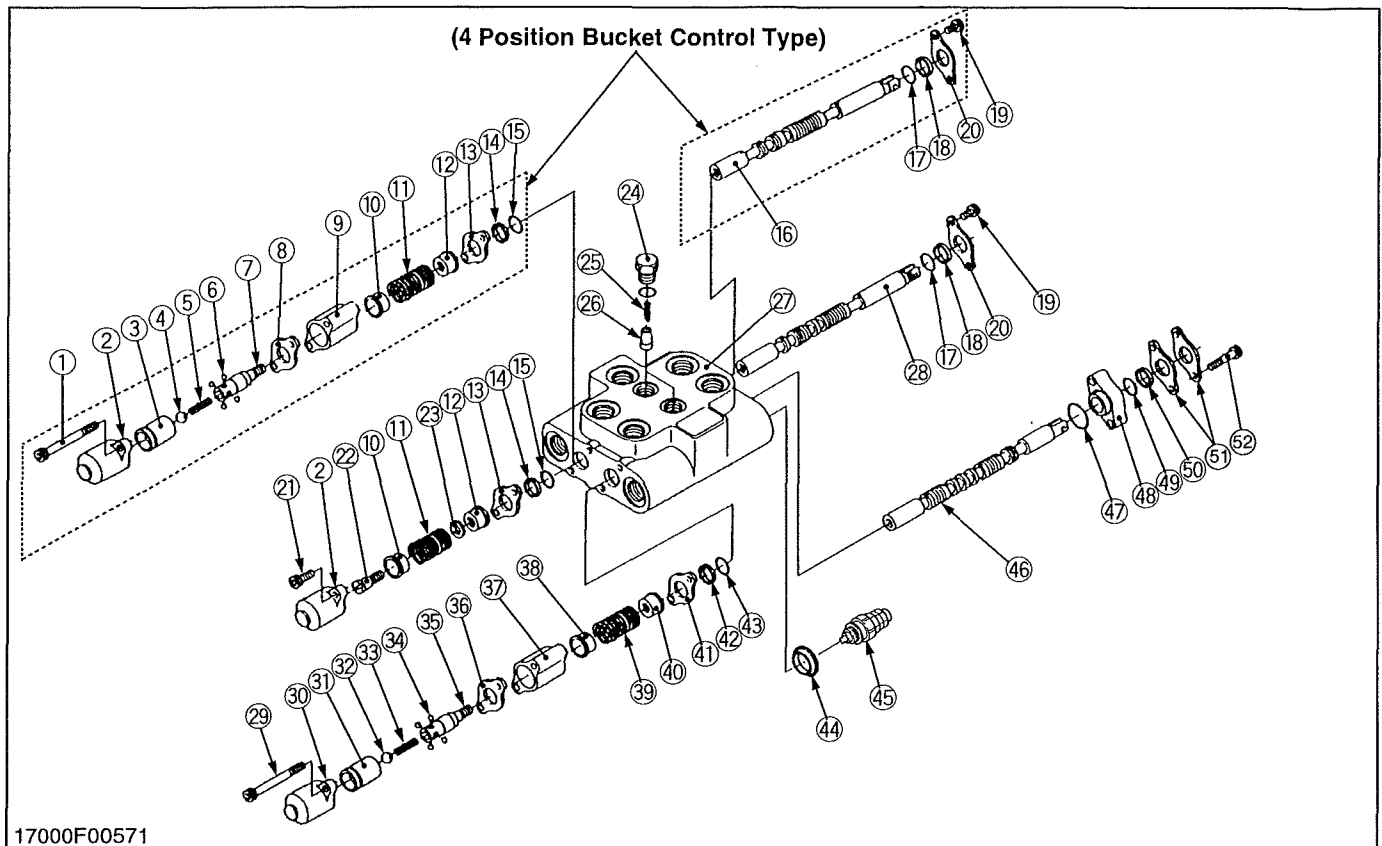
- Install the elbow angle as indicated below.

PB port : 0°

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

17020S00120

Disassembling Control Valve (For LA401 • LA272 • LA302 • LA352 • LA402 and New Valve)



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

■ Boom Control Section

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

■ Bucket Control Section

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

[3 Position Bucket Control Type]

3. Remove the cap (2), seal plate (13) and wiper ring

(14), and draw out the spool (28) with other component parts from the valve housing (27).

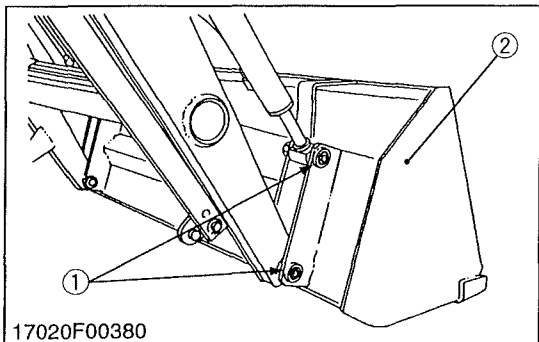
[4 Position Bucket Control Type]

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

(When reassembling)

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

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



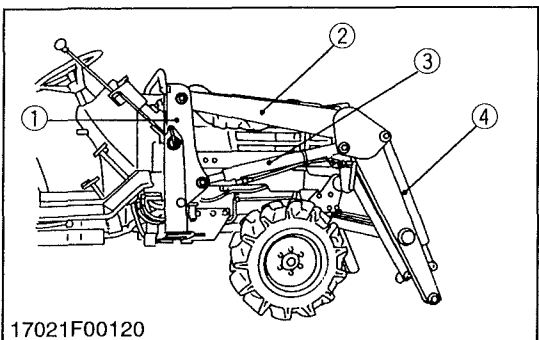
Bucket

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

(1) Pin

(2) Bucket

17020S00140



Boom and Hydraulic Cylinders

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

(When reassembling)

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

(1) Side Frame

(5) Control Valve

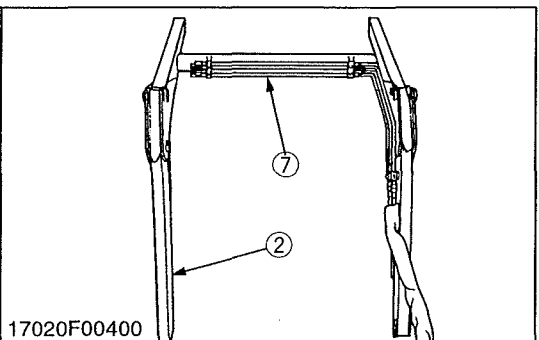
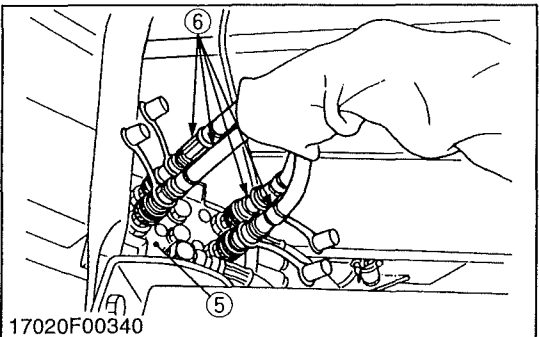
(2) Boom

(6) Hose 1 and 2

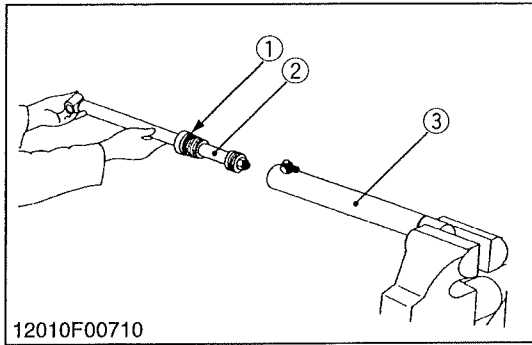
(3) Boom Cylinder

(7) Hydraulic Tubes

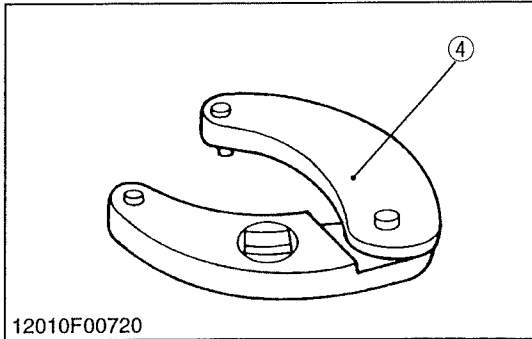
(4) Bucket Cylinder



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12010F00720

Piston Rod Assembly

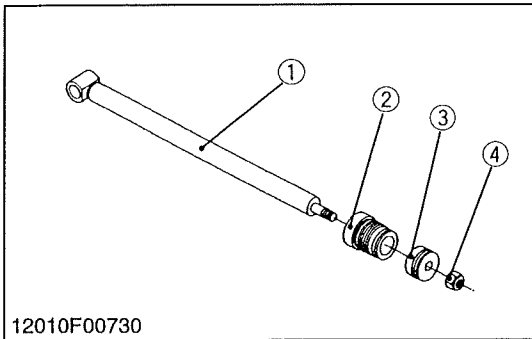
1. Drain hydraulic oil from the cylinder, and secure the tube end of the cylinder in a vise.
2. Unscrew the cylinder head (1) with the adjustable gland nut wrench (4).
3. Pull out the piston rod assembly (2) from the cylinder tube (3).

(When reassembling)

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

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

12210S00310



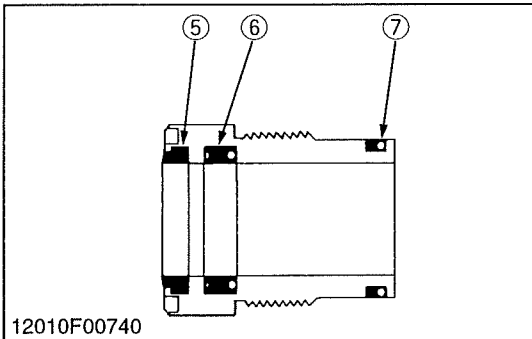
12010F00730

Cylinder Head, Piston and Nut

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

(When reassembling)

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

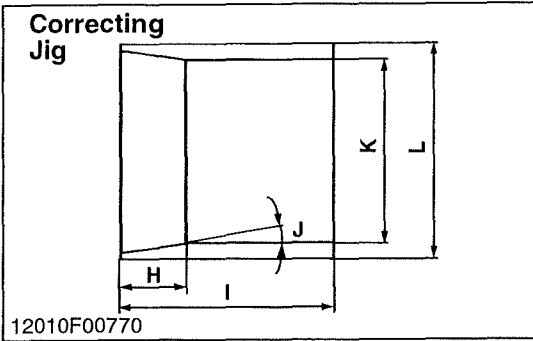
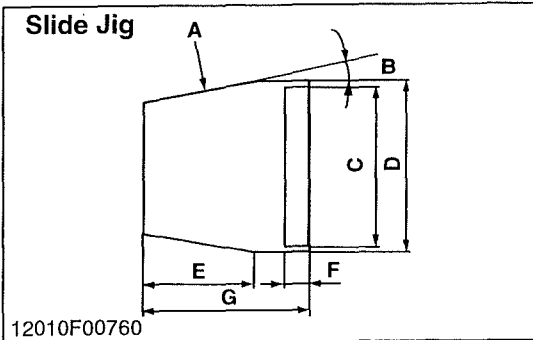
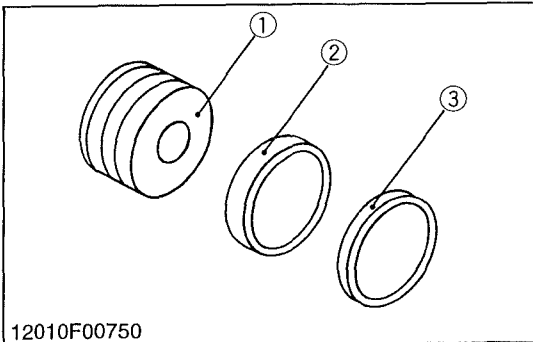


12010F00740

Tightening torque	Boom cylinder piston mounting nut	LA271 / LA272 LA301 / LA302 LA351 / LA352	170 to 183 N·m 17.3 to 18.6 kgf·m 125 to 135 ft·lbs
		LA401 / LA402	122 to 135 N·m 12.4 to 13.8 kgf·m 90 to 100 ft·lbs
	Bucket cylinder piston mounting nut	LA271 / LA272 LA301 / LA302 LA351 / LA352	170 to 183 N·m 17.3 to 18.6 kgf·m 125 to 135 ft·lbs
		LA401 / LA402	122 to 135 N·m 12.4 to 13.8 kgf·m 90 to 100 ft·lbs

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

17021S00080



Piston Seal and O-ring

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

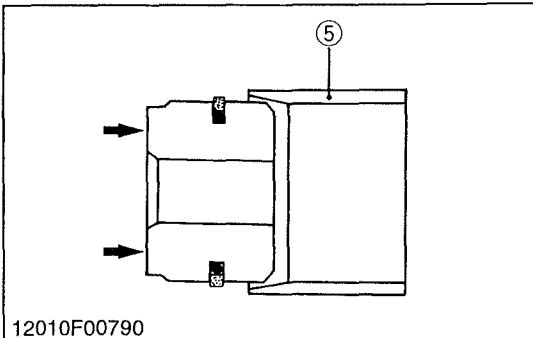
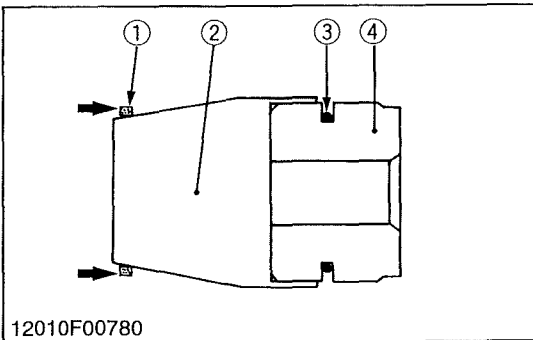
IMPORTANT

• 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.

	LA271 / LA301 / LA272 / LA302	LA351 / LA401 / LA352 / LA402
A	80 √	80 √
B	3° 0.0523 rad.	3° 0.0523 rad.
C	37.46 mm 1.475 in.	43.8 mm 1.724 in.
D	39.46 mm 1.554 in.	45.8 mm 1.803 in.
E	76.0 mm 2.992 in.	75.5 mm 2.972 in.
F	14.0 mm 0.551 in.	14.5 mm 0.571 in.
G	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.
I	110.0 mm 4.331 in.	110.0 mm 4.331 in.
J	3° 0.0523 rad.	3° 0.0523 rad.
K	38.1 mm 1.5 in.	44.45 mm 1.75 in.
L	47.63 mm 1.875 in.	55.0 mm 2.165 in.

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

17021S00090



Installing O-ring and Piston Seal

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

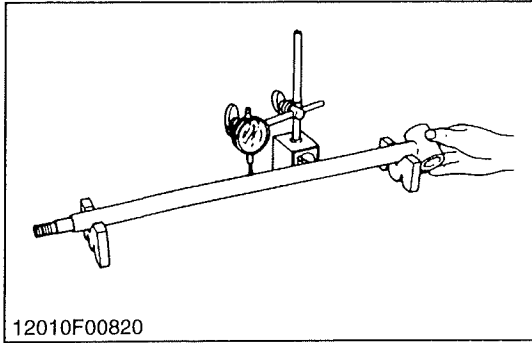
NOTE

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

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

12010S00460

SERVICING



12010F00820

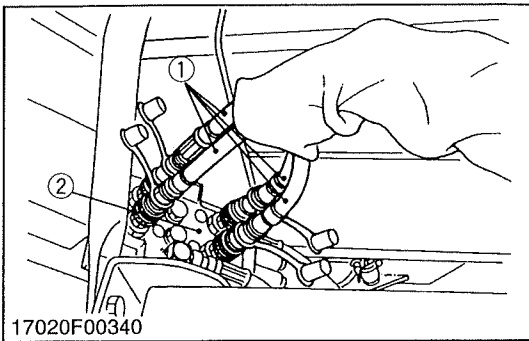
Piston Rod Bend

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



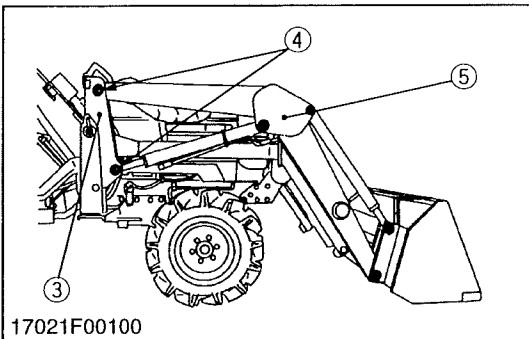
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Boom Assembly

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

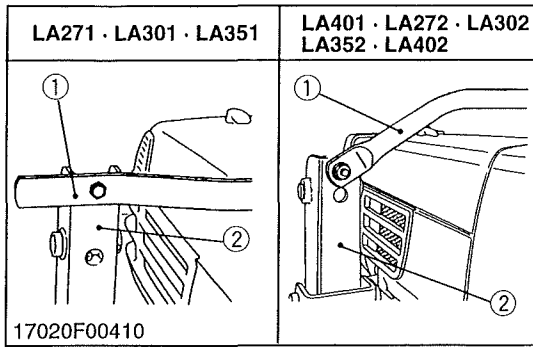
- (1) Hose 1 and 2
- (2) Control Valve
- (3) Side Frame

- (4) Mounting Pin
- (5) Boom Assembly



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17021S00100



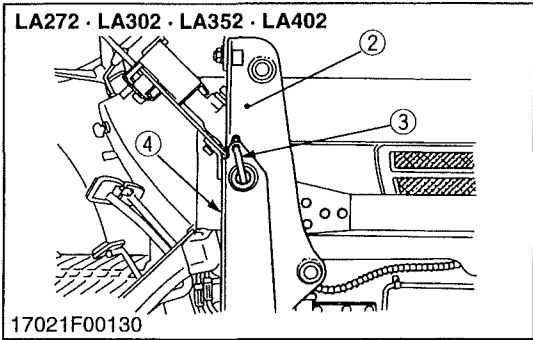
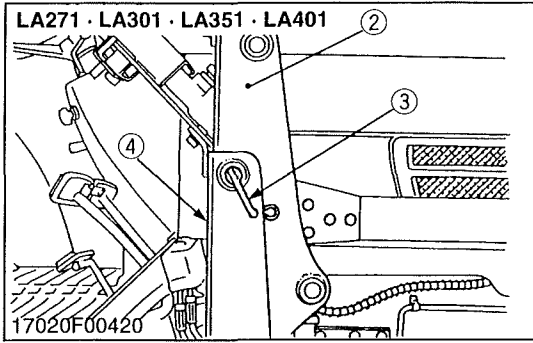
Connecting Bar and Side Frame

1. Remove the connecting bar (1) from the side frames (2).
2. Remove the mounting pins (3).
3. Remove the side frames (2) from the main frame (4).

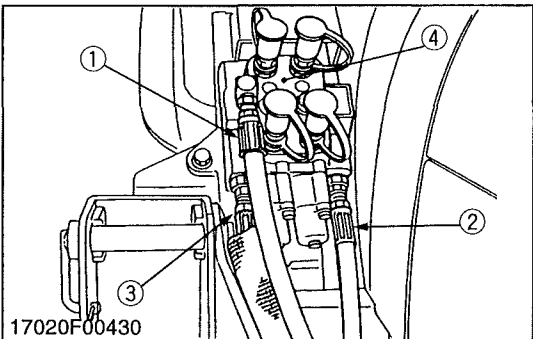
(When reassembling)

Tightening torque	Connecting bar mounting bolt and nut	147 N-m 15.0 kgf-m 108 ft-lbs
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- | | |
|--------------------|------------------|
| (1) Connecting Bar | (3) Mounting Pin |
| (2) Side Frame | (4) Main Frame |



17021S00110



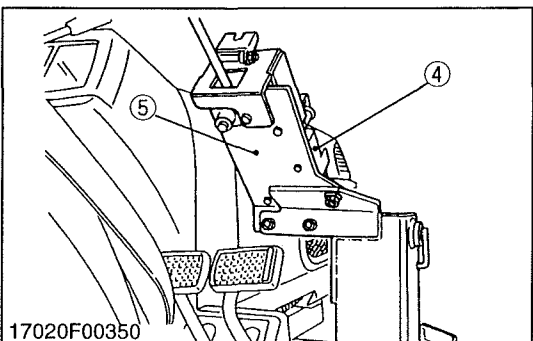
Control Valve with Stay

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

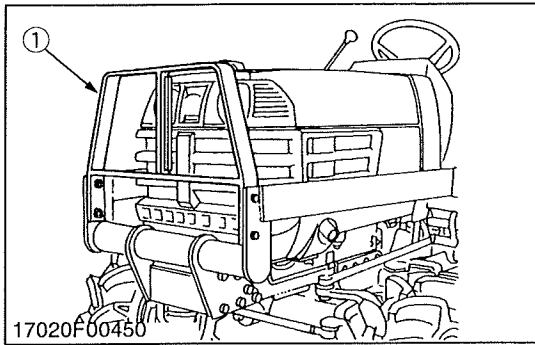
(When reassembling)

Tightening torque	Control valve stay mounting bolt and nut	83 N-m 8.5 kgf-m 61 ft-lbs
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- | | |
|-----------------|------------------------|
| (1) Hose 5 (PB) | (4) Control Valve |
| (2) Hose 6 (P) | (5) Control Valve Stay |
| (3) Hose 7 (T) | |



17020S00200



Front Guard (Option for LA271 • LA272)

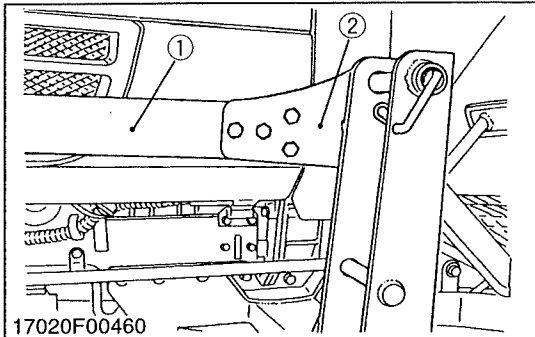
1. Remove the front guard (1).

(When reassembling)

Tightening torque	Front guard mounting bolt and nut	83 N·m 8.5 kgf·m 61 ft·lbs
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- (1) Front Guard

17021S00120



Brace

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

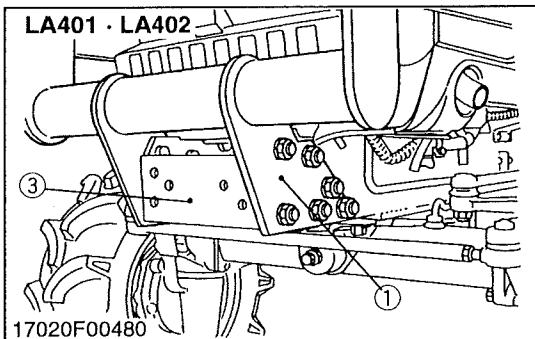
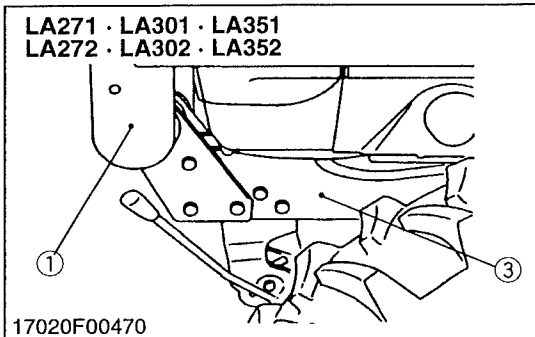
(When reassembling)

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

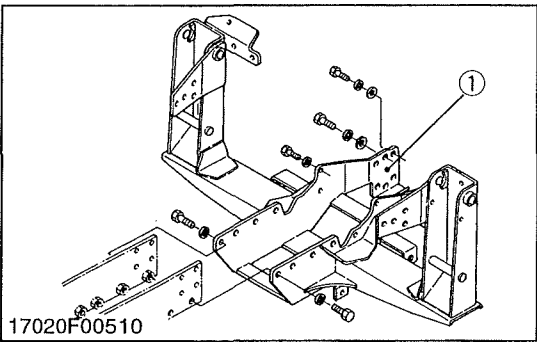
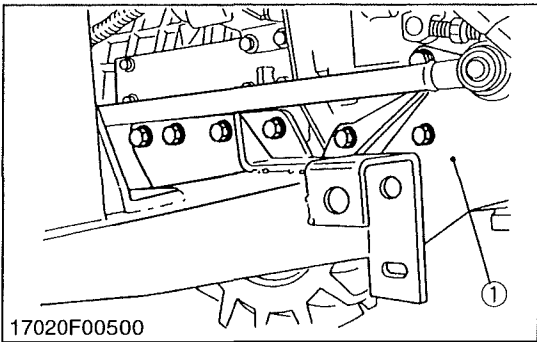
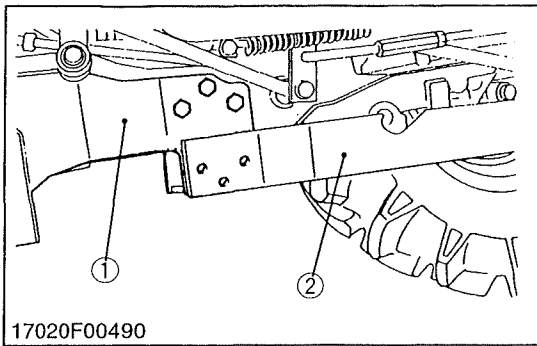
Tightening torque	Brace mounting bolt and nut	LA271 / LA272 LA301 / LA302 LA351 / LA352	135 N·m 14.0 kgf·m 100 ft·lbs
		LA401 / LA402	147 N·m 15.0 kgf·m 108 ft·lbs

- (1) Brace
- (2) Main Frame

- (3) Tractor Front Frame



17021S00130



Main Frame

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

(When reassembling)

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

Tightening torque	Main frame mounting bolt	M12	83 N-m 8.5 kgf-m 61 ft-lbs
		M14	147 N-m 15.0 kgf-m 108 ft-lbs

(1) Main Frame

(2) Sub Frame

17020S00230



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