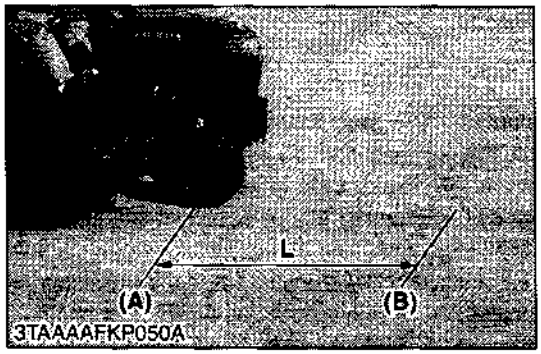
4. LUBRICANTS FUEL AND COOLANT

No.	Place	Capacity	Lubricants, fuel and coolant
		BX25	
1	Fuel tank	25.0 L 6.6 U.S.gals 5.5 Imp.gals	No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below –10 °C (14 °F)
2	Cooling system with recovery tank	3.1 L 3.3 U.S.qts 2.7 Imp.qts	Fresh clean water with anti-freeze
3	Engine crankcase	3.1 L 3.3 U.S.qts 2.7 Imp.qts	Engine oil : API Service CD, CE or CF Below 0 °C (32 °F) : SAE10W, 10W-30 or 10W-40 0 to 25 °C (32 to 77 °F): SAE20, 10W-30 or 10W-40 Above 25 °C (77 °F): SAE30, 10W-30 or 10W-40
4	Transmission case	11.6 L 3.1 U.S.gals 2.6 Imp.gals	KUBOTA SUPER UDT fluid*
5	Front axle case	4.7 L 5.0 U.S.qts 4.1 Imp.qts	KUBOTA SUPER UDT fluid or SAE80, SAE90 gear oil

Greasing				
	Place	No. of greasing point	Capacity	Type of grease
6	Battery terminal	2	Moderate amount	Multipurpose type Grease NLGI-2 or NLGI-1 (GC-LG)
7	Speed control pedal	1	Until grease overflows	

* KUBOTA original transmission hydraulic fluid.



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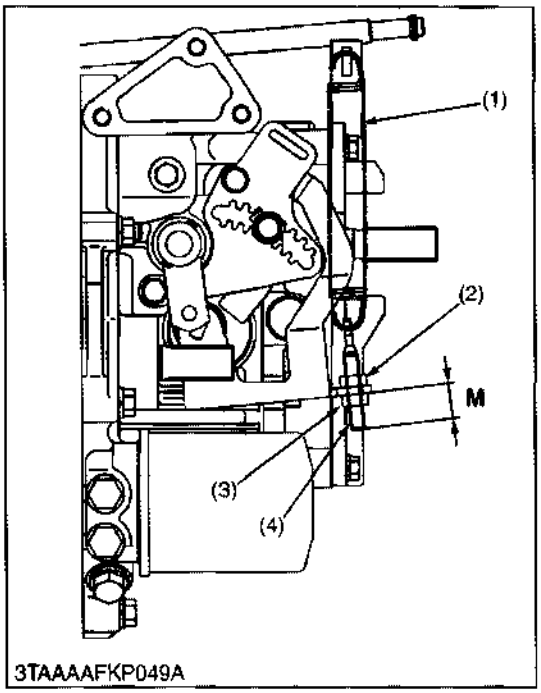

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Checking and Adjusting HST Neutral Spring (for Dynamic Braking)

WARNING

- **Do not operate if tractor move on level ground with foot off speed control pedal.**
- **If tractor moves on level ground with foot off the pedal, or, if the pedal is too slow in returning to "NEUTRAL" position when removing the foot from the pedal, adjust the HST neutral spring.**

The HST neutral spring located under the front right side of the fender can adjust returning speed of speed control pedal.

Since the HST neutral spring tension is weakened, the HST tension should be checked and adjusted every 100 hours.

1. Checking the HST neutral spring tension : Dynamic braking
   - Start the engine and hold the maximum engine speeds.
   - Operate the machine on the concrete level ground.
   - Shift the range gear shift lever to "**High**" position.
   - Depress the speed control pedal to "**Forward**".
   - Release the foot from the speed control pedal.
   - Check the distance between the foot releasing point and the machine stopping point.
   - If the distance is more than approximately 3 m (9.8 feet), strengthen the HST neutral spring tension so that the machine will stop in approximately 3 m (9.8 feet) after releasing the foot from the speed control pedal.

(Reference)

Distance (**L**) between the foot releasing point and the machine stopping point	Reference	Approximately 3 m (9.8 feet)

2. Remove the step from the machine.
   - Loosen the lock nut (2).
   - Turn the adjusting nut (3) half turn to pull the HST neutral spring (1).
   - Tighten and lock the lock nut (2).
   - Start the engine and check dynamic brake as mentioned former.
   - If the machine will not stop with dynamic brake in approximately 3 m (9.8 feet), adjust the neutral spring again.

(Reference)

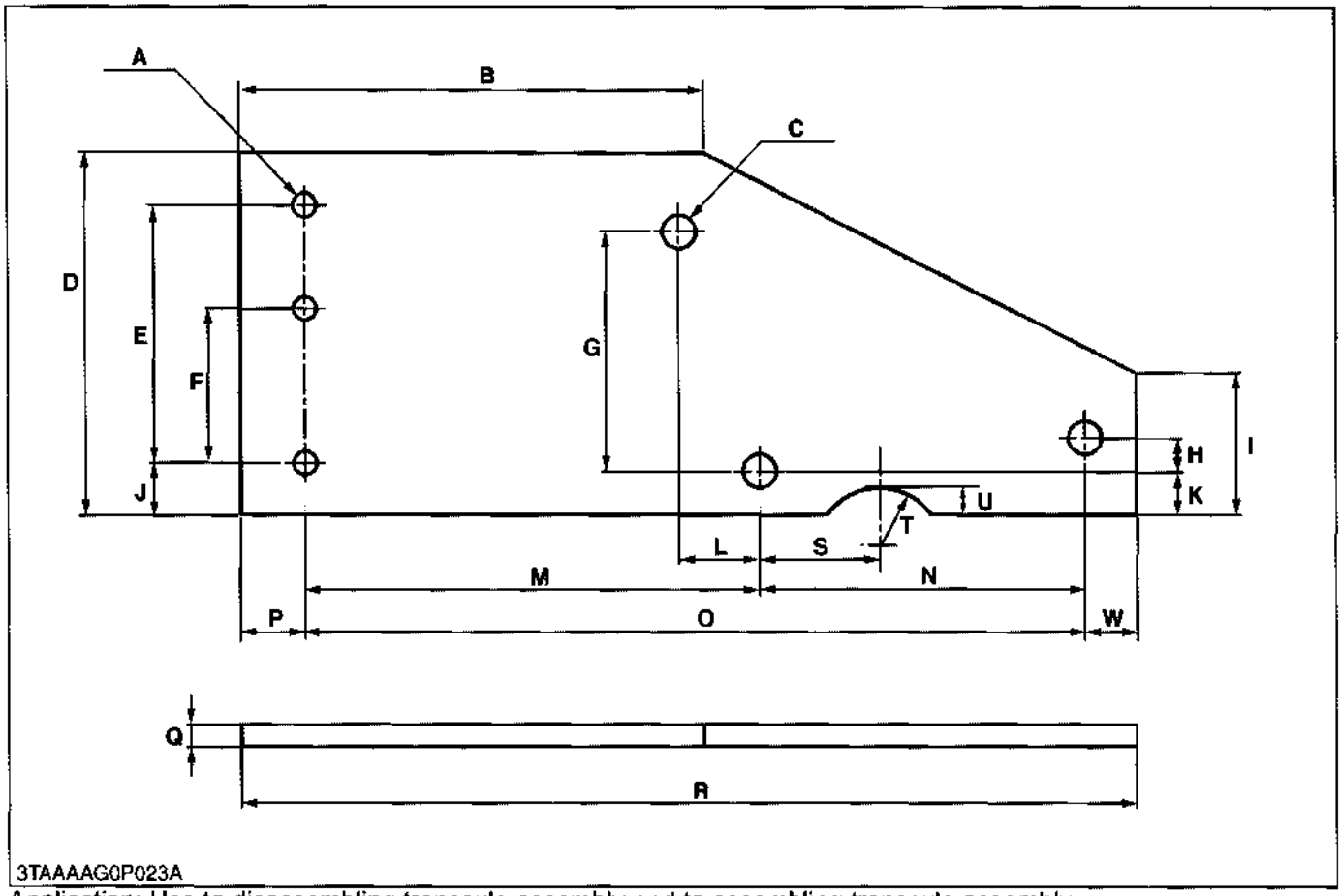
Length (**M**) of adjusting rod at shipping the machine from the factory	Reference	10 mm 0.39 in.

(1) HST Neutral Spring
(2) Lock Nut
(3) Adjusting Nut
(4) Adjusting Rod

(A) Foot Releasing Point
(B) Machine Stopping Point
L : Distance between Foot Releasing Point and the Machine Stopping Point
M : Length of Adjusting Rod from Stay

W1079634

Disassembling and Assembling Stand (1/2)



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Application: Use to disassembling transaxle assembly and to assembling transaxle assembly.

A	ϕ 9 mm (ϕ 0.35 in.) 3 Holes	L	30.5 to 31.5 mm (1.21 to 1.24 in.)
B	225 mm (8.86 in.)	M	226 mm (8.90 in.)
C	ϕ 13 mm (ϕ 0.51 in.) 3 Holes	N	125.5 to 126.5 mm (4.95 to 4.98 in.)
D	140 mm (5.51 in.)	O	352 mm (13.86 in.)
E	99.5 to 100.5 mm (3.92 to 3.95 in.)	P	25 mm (0.98 in.)
F	59.5 to 60.5 mm (2.35 to 2.38 in.)	Q	9.5 mm (0.37 in.)
G	92.5 to 93.5 mm (3.65 to 3.68 in.)	R	397 mm (15.63 in.)
H	12.5 to 13.5 mm (0.50 to 0.53 in.)	S	46 mm (1.81 in.)
I	55 mm (2.17 in.)	T	R 25 mm (0.98 in.)
J	20 mm (0.79 in.)	U	11 mm (0.43 in.)
K	17 mm (0.67 in.)	W	20 mm (0.79 in.)

ENGINE BODY (Continued)

Item		Factory Specification	Allowable Limit
Rocker Arm Shaft to Rocker Arm	Clearance	0.016 to 0.045 mm 0.00063 to 0.00177 in.	0.15 mm 0.0059 in.
Rocker Arm Shaft	O.D.	10.473 to 10.484 mm 0.41232 to 0.41276 in.	–
Rocker Arm	I.D.	10.500 to 10.518 mm 0.41339 to 0.41410 in.	–
Push Rod	Alignment	–	0.25 mm 0.0098 in.
Tappet to Tappet Guide	Oil Clearance	0.016 to 0.052 mm 0.00063 to 0.00205 in.	0.10 mm 0.0039 in.
Tappet	O.D.	17.966 to 17.984 mm 0.70732 to 0.70803 in.	–
Tappet Guide	I.D.	18.000 to 18.018 mm 0.70866 to 0.70937 in.	–
Timing Gear Crank Gear to Idle Gear	Backlash	0.043 to 0.124 mm 0.00169 to 0.00488 in.	0.15 mm 0.0059 in.
Idle Gear to Cam Gear	Backlash	0.047 to 0.123 mm 0.00185 to 0.00484 in.	0.15 mm 0.0059 in.
Idle Gear to Injection Pump Gear	Backlash	0.046 to 0.124 mm 0.00181 to 0.00488 in.	0.15 mm 0.0059 in.
Crank Gear to Oil Pump Drive Gear	Backlash	0.041 to 0.123 mm 0.00161 to 0.00484 in.	0.15 mm 0.0059 in.
Idle Gear	Side Clearance	0.20 to 0.51 mm 0.0079 to 0.0201 in.	0.80 mm 0.0315 in.
Camshaft	Side Clearance	0.15 to 0.31 mm 0.0059 to 0.0122 in.	0.50 mm 0.0197 in.
	Alignment	–	0.01 mm 0.0004 in.
Cam Height	Intake and Exhaust	26.88 mm 1.0583 in.	26.83 mm 1.0563 in.
Camshaft Journal to Cylinder Block Bore	Oil Clearance	0.050 to 0.091 mm 0.00197 to 0.00358 in.	0.15 mm 0.0059 in.
Camshaft Journal	O.D.	32.934 to 32.950 mm 1.29661 to 1.29724 in.	–
Cylinder Block Bore	I.D.	33.000 to 33.025 mm 1.29921 to 1.30020 in.	–

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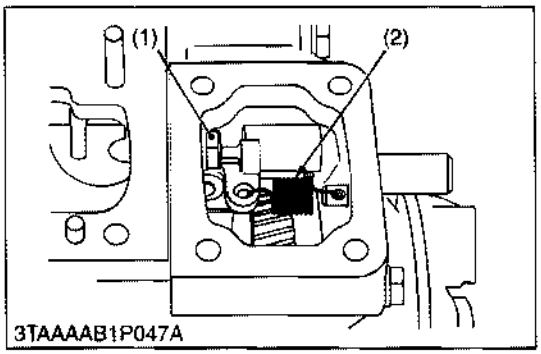

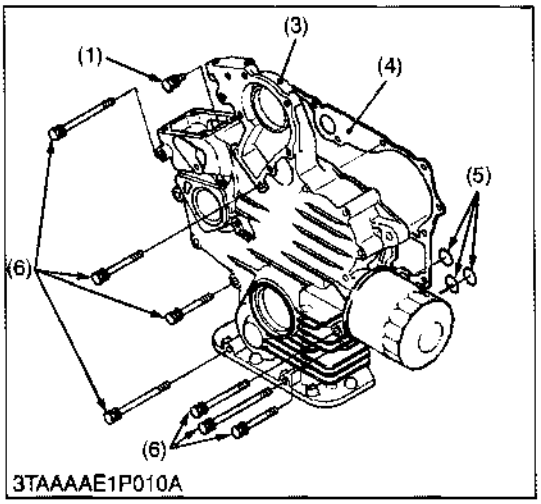

Gear Case

1. Remove the screw (1) of inside the gear case and outside screws (6).
2. Disconnect the start spring (2) from the fork lever 1.
3. Remove the gear case (4).

(When reassembling)

- Apply a liquid gasket (Three Bond 1215 or equivalent) to both sides of the gear case gasket (4).
- Be sure to set three O-rings (5) inside the gear case.

(1) Screw (Inside)
(2) Start Spring
(3) Gear Case
(4) Gear Case Gasket
(5) O-ring
(6) Screw

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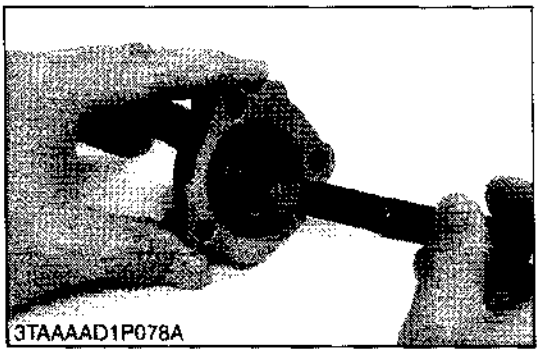
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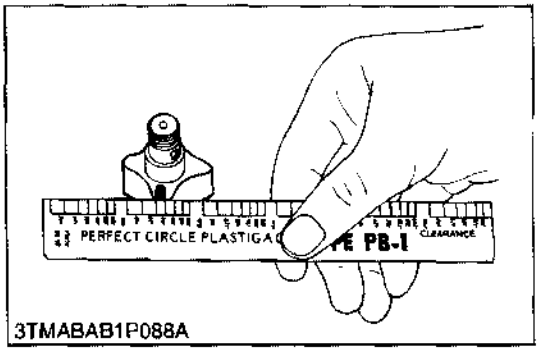

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Clearance between Outer Rotor and Pump Body

1. Measure the clearance between the outer rotor and the pump body with a thickness gauge.
2. If the clearance exceeds the factory specifications, replace the oil pump rotor assembly.

Clearance between outer rotor and pump body	Factory spec.	0.07 to 0.15 mm 0.0028 to 0.0059 in.

W10381420

Clearance between Rotor and Cover

1. Put a strip of plastigage onto the rotor face with grease.
2. Install the cover and tighten the screws.
3. Remove the cover carefully, and measure the amount of the flattening with the scale and get the clearance.
4. If the clearance exceeds the factory specifications, replace oil pump rotor assembly.

Clearance between rotor and cover	Factory spec.	0.075 to 0.135 mm 0.00295 to 0.00531 in.

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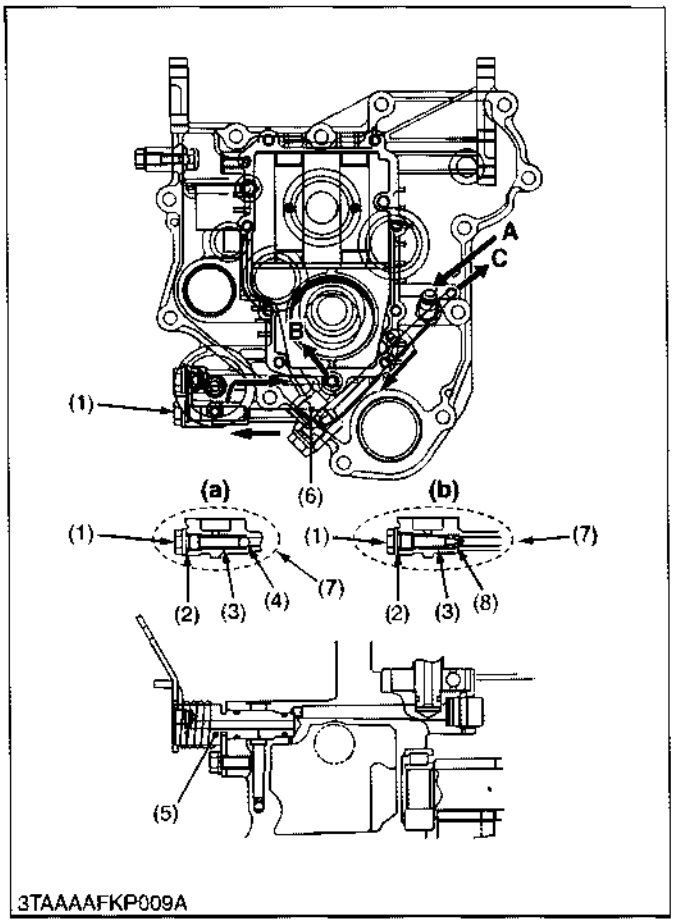

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■ PTO Clutch Relief Valve

The PTO clutch relief valve is provided to control the PTO operating pressure. When the oil pressure exceed the relief valve setting pressure, relief valve opens and the oil flows into PTO clutch and hydrostatic transmission.

(Reference)

- Relief valve setting pressure : 490 kPa
  5.0 kgf/cm^2
  71.2 psi

(1) Plug
(2) O-ring
(3) Spring
(4) Steel Ball
(5) PTO Clutch Valve
(6) HST Charge Relief Valve
(7) PTO Clutch Relief Valve
(8) Poppet

A : From Power Steering Controller
B : To Hydrostatic Transmission
C : To PTO Clutch Valve

(a) Old Type
(b) New Type

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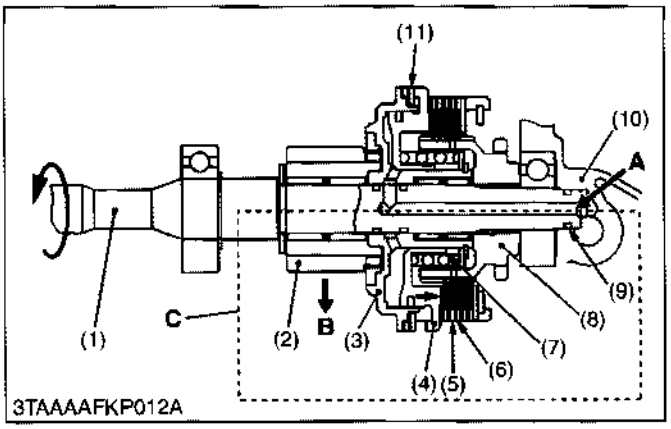

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■ PTO Clutch "Engaged"

The oil from power steering controller flows into the PTO clutch valve.

When the PTO clutch lever is set at the **"Engaged"** position, the PTO clutch valve rotates. Oil flows from the oil line through transmission case to the PTO clutch pack.

Oil entering the clutch pack pushes the clutch piston (4) to engage the clutch pack. Power is transmitted from the HST pump shaft (1) through the PTO clutch to the clutch gear (2) and the PTO shafts.

(1) HST Pump Shaft
(2) Clutch Gear
(3) Clutch Case
(4) Clutch Piston
(5) Clutch Plate
(6) Clutch Disc
(7) Spring
(8) Spline Boss
(9) O-ring
(10) Transaxle Case
(11) Brake Disc

A : From PTO Clutch Valve
B : Power to PTO Shaft
C : PTO Clutch "Engaged"

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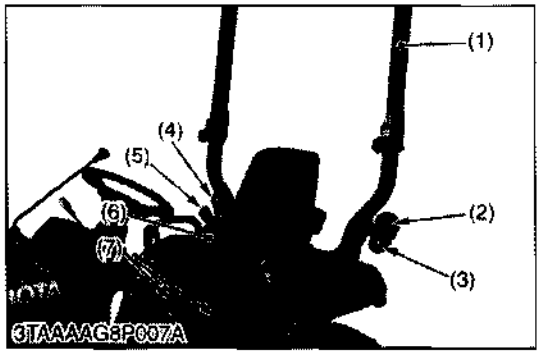

Roll-Over Protective Structures (ROPS) and Seat

1. Disconnect the lead wires from the hazard lights (2), (4) and turn signal lights (3), (5).
2. Remove the ROPS mounting nuts, and remove the ROPS (1).
3. Disconnect the seat switch connectors.
4. Remove the snap pin (7) and remove the seat (6).

(When reassembling)

Tightening torque	ROPS mounting nut	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 ft-lbs

(1) ROPS
(2) Hazard Light LH
(3) Turn Signal Light LH
(4) Hazard Light RH
(5) Turn Signal Light RH
(6) Seat
(7) Snap Pin

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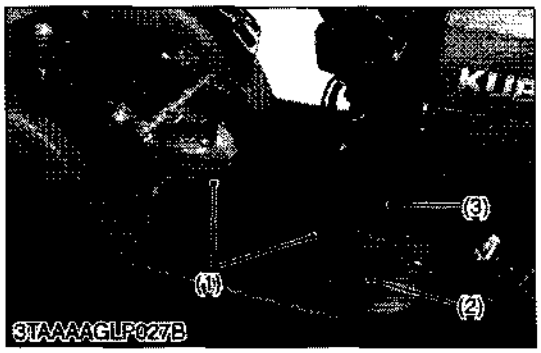
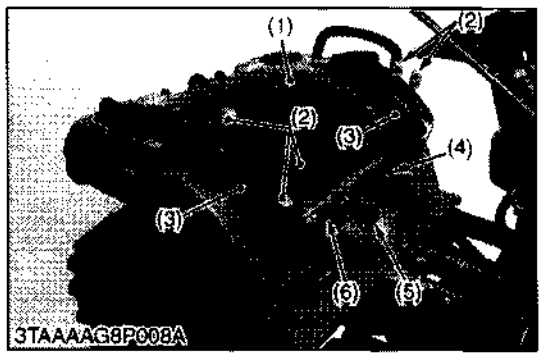


Speed Control Pedal and Step

1. Remove the valve covers (3).
2. Remove the speed control pedals (1) and step (2).

(1) Speed Control Pedal
(2) Step
(3) Valve Cover

W1025389



Lever Grips and Fender

1. Disconnect the electric outlet connector (6).
2. Remove the lowering speed adjusting knob (5) and cutting height adjusting dial knob (4).
3. Remove the lever grips (2).
4. Remove the fender (1) with lever guide (3).

(1) Fender
(2) Lever Grip
(3) Lever Guide
(4) Cutting Height Adjusting Dial Knob
(5) Lowering Speed Adjusting Knob
(6) Electric Outlet

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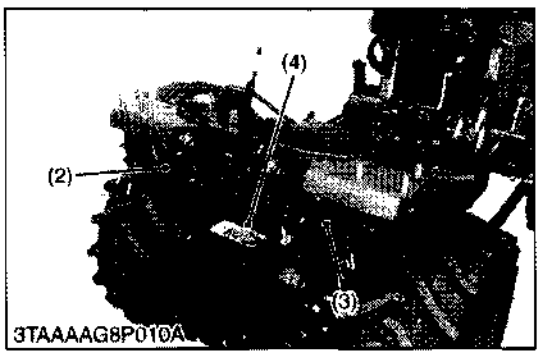

Fuel Tank

1. Drain the fuel.
2. Disconnect the lead wire from fuel level sensor and fuel hoses from the fuel tank (1).
3. Remove the fuel tank stays (2), (3) and cushions, then remove the fuel tank (1).
4. Remove the PTO cover (4).

(When reassembling)

Tightening torque	Fuel tank stay mounting bolt and nut	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs

(1) Fuel Tank
(2) Fuel Tank Stay LH
(3) Fuel Tank Stay RH
(4) PTO Cover

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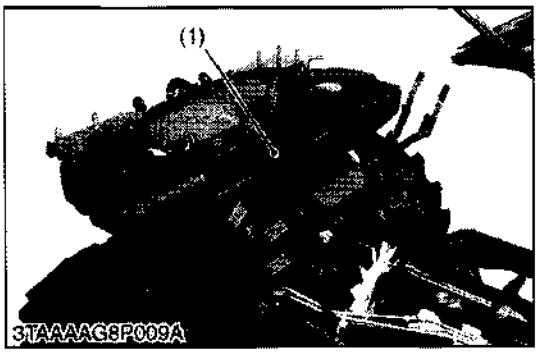

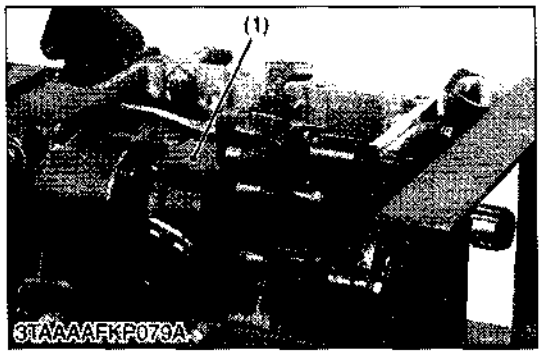

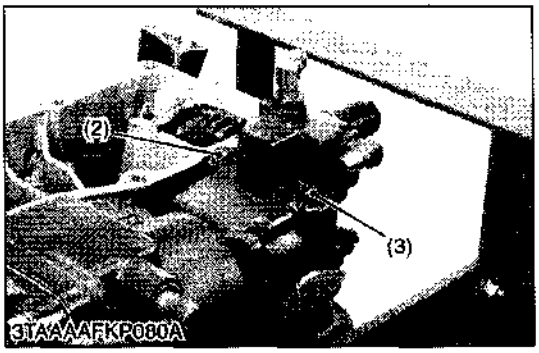

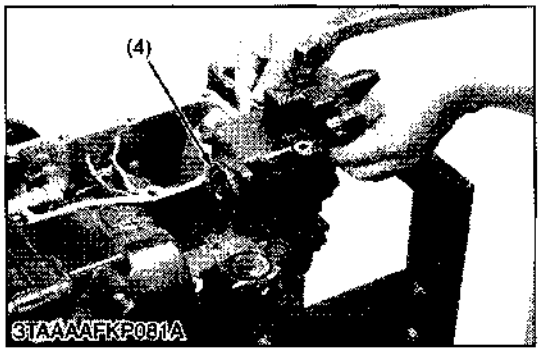

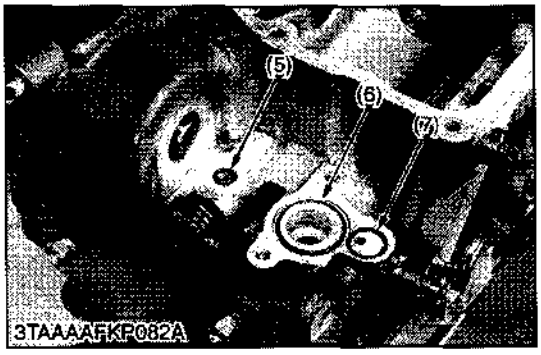

Hydraulic Pump Assembly

1. Remove the hydraulic pump assembly mounting bolt (2), (3).
2. Remove the hydraulic pump assembly (1) as an unit from the transaxle case.

(When reassembling)

- Apply transmission oil to the O-rings.
- Since the mounting bolt (2) is installed through the hydraulic pump to the transaxle case, bind the sealing tape to the mounting bolt (2) securely.

Tightening torque	Hydraulic pump assembly mounting bolt (M6)	8.0 to 9.0 N·m 0.8 to 0.9 kgf·m 5.9 to 6.6 ft-lbs
	Hydraulic pump assembly mounting bolt (M8)	18.0 to 21.0 N·m 1.8 to 2.1 kgf·m 13.3 to 15.5 ft-lbs

(1) Hydraulic Pump
(2) Bolt (Through Bolt)
(3) Bolt
(4) O-ring
(5) O-ring
(6) O-ring
(7) O-ring

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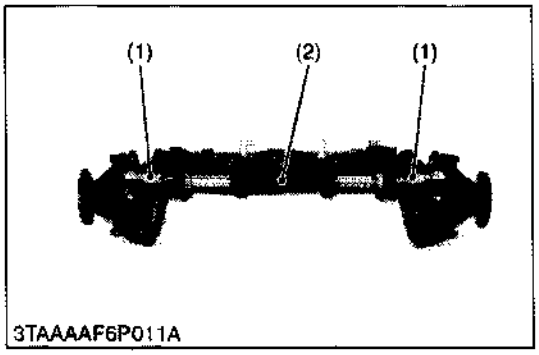
[3] DISASSEMBLING AND ASSEMBLING

(1) Front Axle Assembly



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Power Steering Cylinder

1. Remove the cotter pin and remove the slotted nut for tie-rod (1).
2. Remove the power steering cylinder mounting screws and remove the power steering cylinder (2) with tie-rod.

(When reassembling)

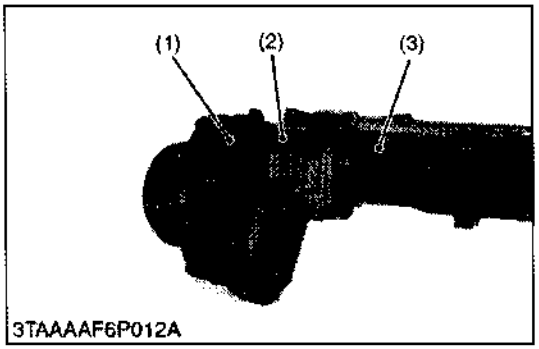
■ **NOTE**

- **Tighten the slotted nut to 17.7 N·m (1.8 kgf·m, 13 ft-lbs). If the slot and pin hole do not meet, tighten the nut until they do meet, and install the cotter pin.**
- **Be sure to split the cotter pin like an anchor.**

Tightening torque	Tie-rod slotted nut	17.7 to 34.3 N·m 1.8 to 3.5 kgf·m 13.0 to 25.3 ft-lbs
	Power steering cylinder mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs

(1) Tie-rod (2) Power Steering Cylinder

W1013368



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Bevel Gear Case and Front Gear Case

1. Remove the bevel gear case mounting screws.
2. Remove the bevel gear case (2) and front gear case (1) as a unit from the front axle case (3).

(When reassembling)

- Apply grease to the O-ring and take care not to damage it.
- Do not interchange right and left bevel gear case assemblies and right and left gear case assemblies.

Tightening torque	Bevel gear case mounting screw (M12)	77.5 to 90.1 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs

(1) Front Gear Case (3) Front Axle Case
(2) Bevel Gear Case

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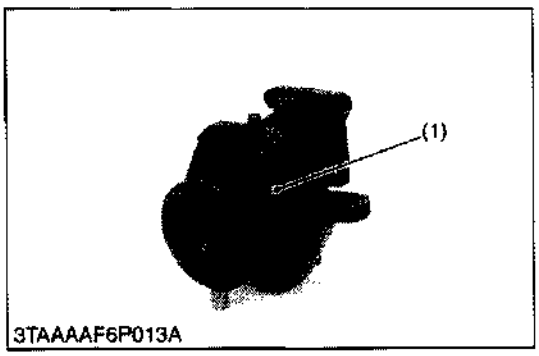

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Front Gear Case Cover

1. Remove the front gear case mounting screws and remove the front gear case cover (1) with bevel gear (2).

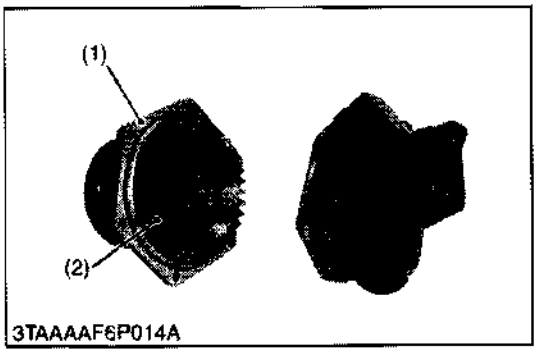
(When reassembling)

- Apply grease to the O-ring and take care not to damage it.

Tightening torque	Front gear case cover mounting screw	48.1 to 55.8 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 ft-lbs

(1) Front Gear Case Cover (3) Front Gear Case
(2) Bevel Gear

W1013952



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4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING

(1) Relief Valve

Relief Valve Operating Pressure

1. Disconnect the power steering hose L (or R) from steering controller, and set a pressure gauge and hose.

(Reference)

- Hose and adaptor size : 9/16-18UNF, 37 ° flare

2. Start the engine and set at maximum speed.
3. Fully turn the steering wheel to the left (or right) to check the feeling which the steering wheel lightly locks. Read the relief valve operating pressure when the steering wheel to the above-mentioned lock position by operation force at approximately 9.8 N (1 kgf, 2.2 lbs) of outer.

■ **NOTE**

- **After set a pressure gauge, be sure to bleed air.**
- **Note that the pressure value changes by the pump action of the power steering controller when the steering operation is continued after the steering wheel is lightly locked and accurate relief valve pressure cannot be measured.**

Relief valve operating pressure	Factory spec.	8.33 to 8.83 MPa 85 to 90 kgf/cm^2 1209 to 1280 psi

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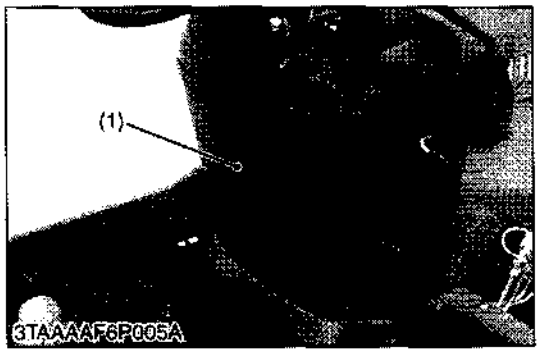
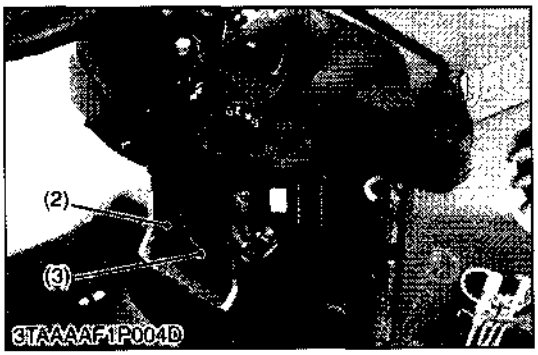
[2] PREPARATION

(1) Separating Power Steering Controller





Battery

⚠ CAUTION

- **When disconnecting the battery cables, disconnect the negative cable from the battery first. When connecting, connect the positive cable to the battery first.**

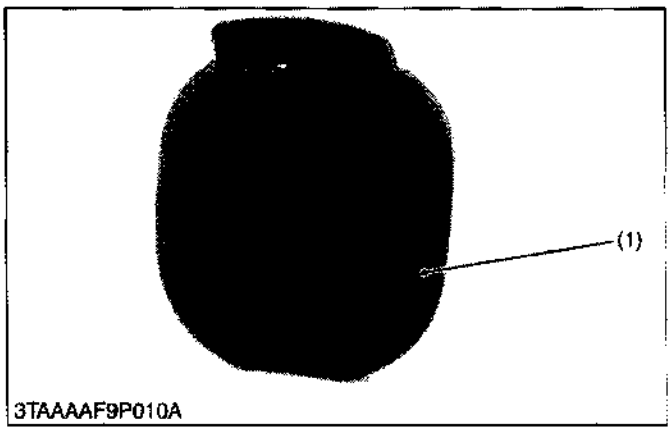
1. Remove the under panel (1).
2. Disconnect the negative cable (2) from the battery.

(1) Under Panel
(2) Battery
(3) Negative Cable

W1014990

6. OTHERS

[1] DC OUTLET



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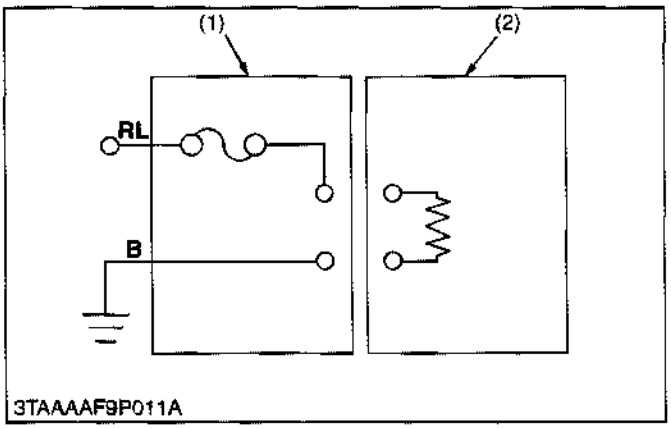

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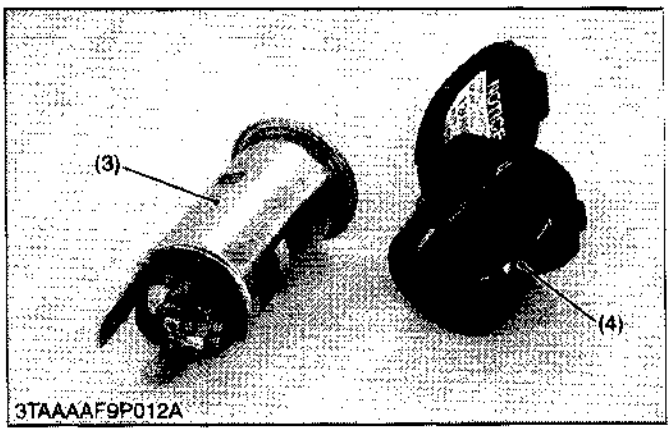

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DC outlet is equipped to this machine.

The capacity of the DC outlet is 12 V / 120 W.

The electrical device as a CD player, a mobile phone battery charger can be used to the DC outlet.

The DC outlet (1) consists of the DC outlet body (3) and the cover (4).

(1) DC Outlet
(2) Electrical Device
(3) DC Outlet Body
(4) Cover

RL : Red / Blue Lead
B : Black Lead

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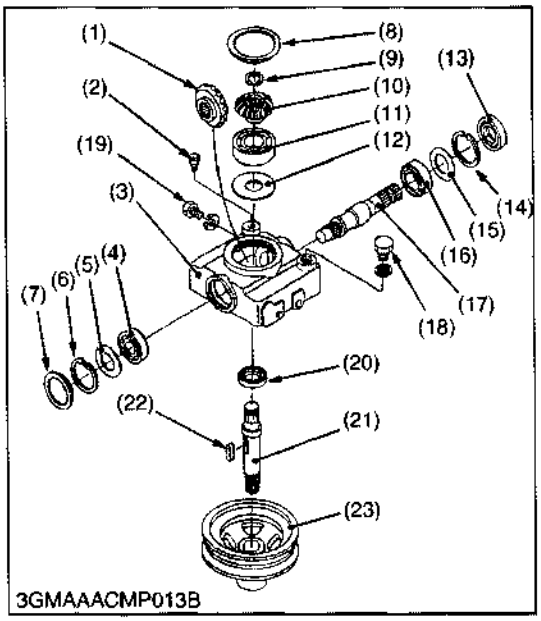

Disassembling Gear Box (RCK54-23BX, RCK60B-23BX)

1. Unscrew the drain plug (19), and drain the gear box oil.
2. Remove the center pulley (23) with a puller, and remove the feather key (22) on the bevel gear shaft.
3. Remove the gear box caps (7), (8).
4. Remove the oil seal (13), internal snap ring (14) and shim (15).
5. Tap out the pinion shaft (17) with the ball bearing (16), and remove the bevel gear (1).
6. Remove the internal snap ring (6), shims (5) and ball bearing (4).
7. Remove the external snap ring (9), and draw out the bevel gear shaft (21).
8. Remove the bevel gear (10), ball bearing (11), shim (12) and oil seal (20).

(When reassembling)

- Replace the oil seals (13), (20) and gear box caps (7), (8) with new ones.
- Check the backlash and turning torque.
  If not proper, adjust with the shims (5), (12), (15).
  (See page S-11, 12)

(1) 19T Bevel Gear (RCK54-23BX)
18T Bevel Gear (RCK60B-23BX)
(2) Breather
(3) Gear Box
(4) Ball Bearing
(5) Shim
(6) Internal Snap Ring
(7) Gear Box Cap
(8) Gear Box Cap
(9) External Snap Ring
(10) 16T Bevel Gear (RCK54-23BX)
17T Bevel Gear (RCK60B-23BX)
(11) Ball Bearing
(12) Shim
(13) Oil Seal
(14) Internal Snap Ring
(15) Shim
(16) Ball Bearing
(17) Pinion Shaft
(18) Oil Filler Plug
(19) Drain Plug
(20) Oil Seal
(21) Bevel Gear Shaft
(22) Feather Key
(23) Center Pulley

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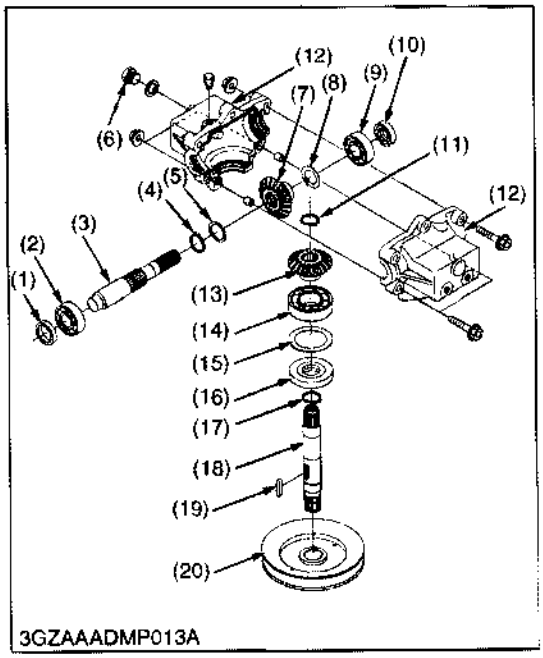

Disassembling Gear Box (RCK54P-23BX)

1. Unscrew the drain plug (6), and drain the gear box oil.
2. Remove the center pulley (20) with a puller.
3. Remove the gear box.
4. Open the gear box.
5. Remove the input shaft (3) and the blade shaft (18).
6. Disassembling the input shaft (3) and the blade shaft (18).

(When reassembling)

- Replace the oil seals (1), (10), (16) and gear box caps with new ones.
- Check the backlash and turning torque.
  If not proper, adjust with the shims.
- After cleaning dirty and gear box oil and the gear box surface, apply the liquid gasket.

Tightening torque	Gear box screw	23.5 to 27.4 N·m 2.4 to 2.8 kgf·m 17.4 to 20.2 ft-lbs

(1) Oil Seal
(2) Ball Bearing
(3) Input Shaft
(4) External Cir Clip
(5) Shim
(6) Drain Plug
(7) Bevel Gear
(8) Shim
(9) Ball Bearing
(10) Oil Seal
(11) External Cir Clip
(12) Bevel Gear Case
(13) Bevel Gear
(14) Ball Bearing
(15) Shim
(16) Oil Seal
(17) External Cir Clip
(18) Blade Shaft
(19) Feather Key
(20) Center Pulley

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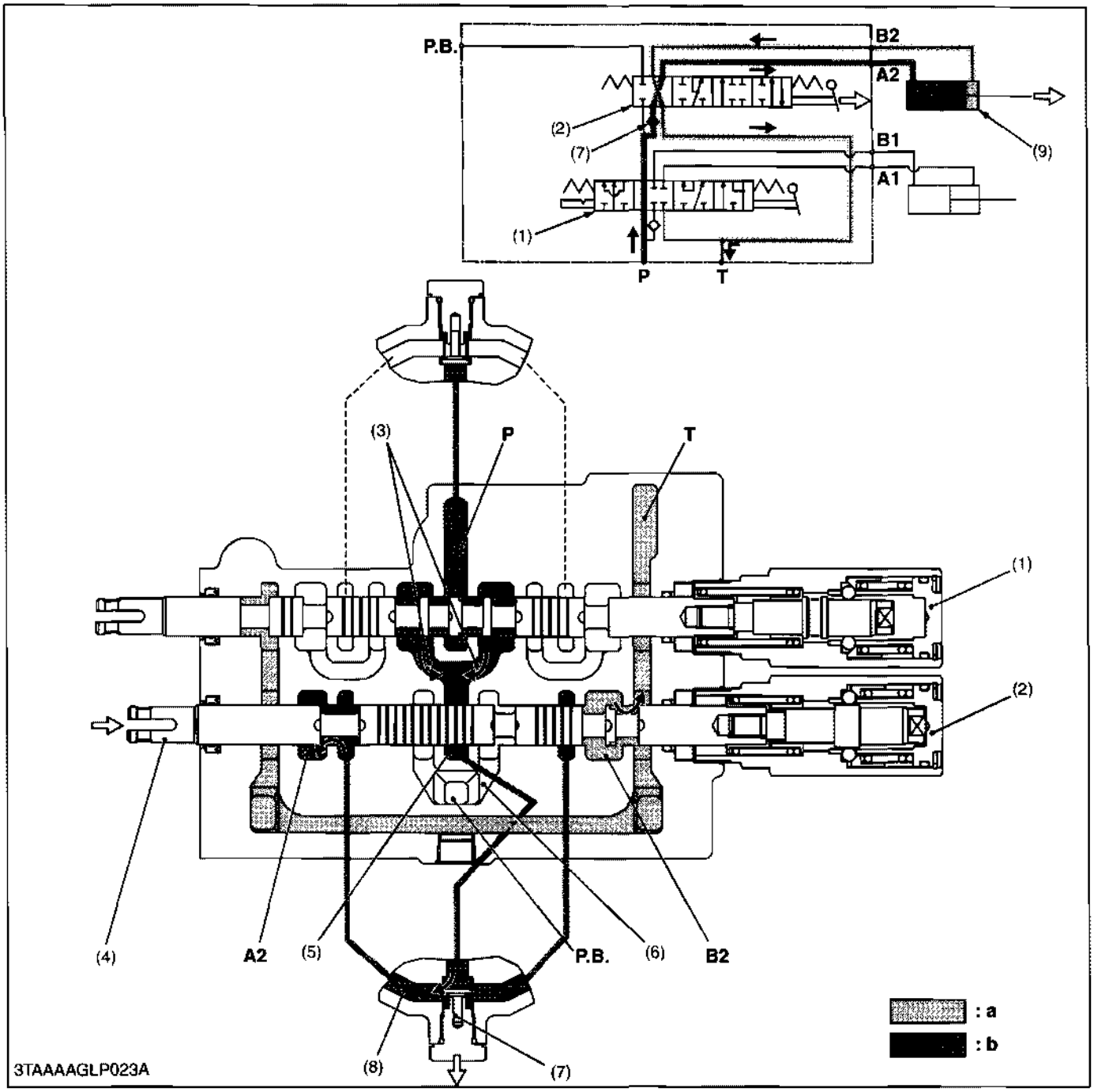
■ Dump 2



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

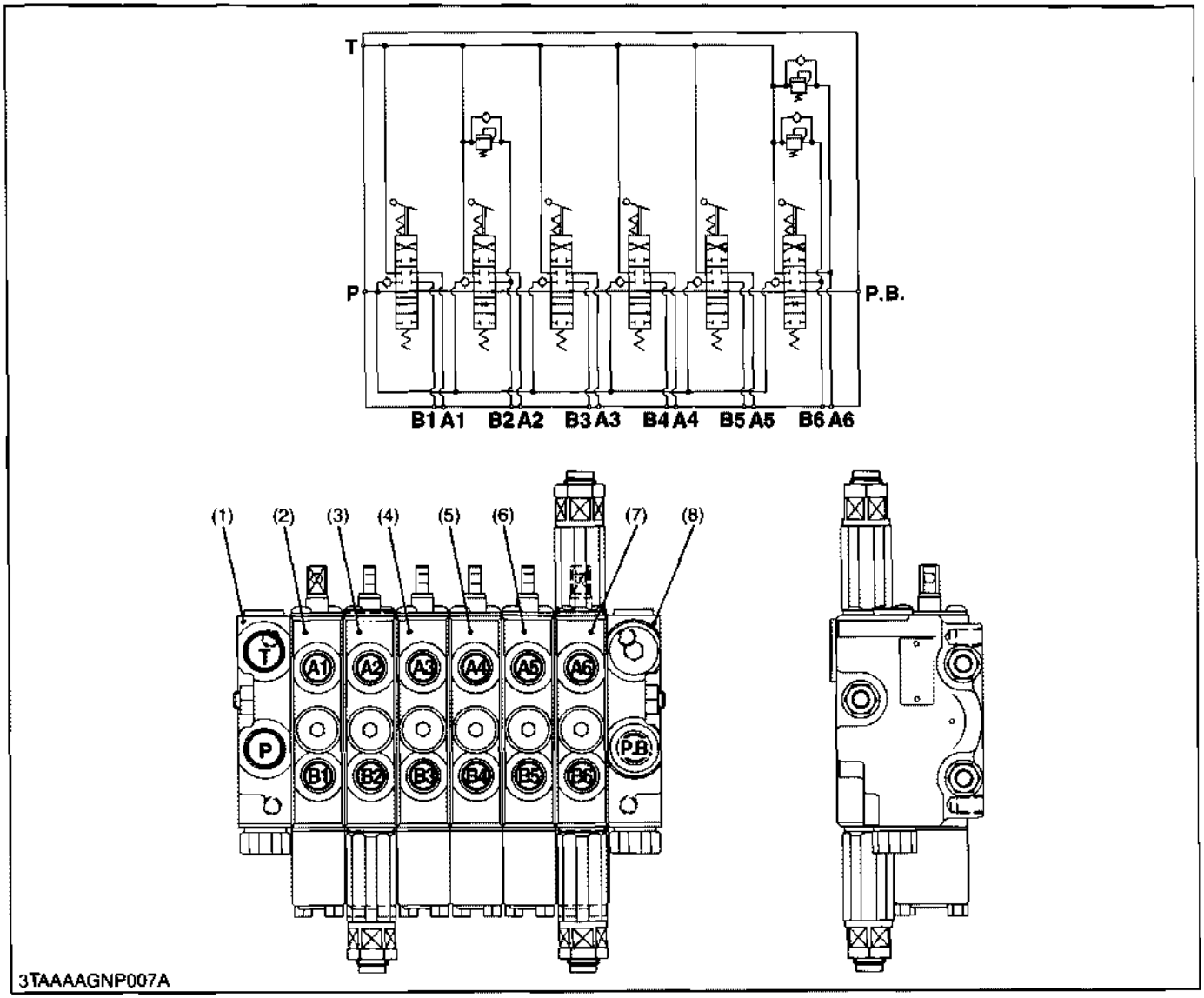
P : P Port (From Pump)
T : T Port (To Tank)
P.B. :P.B. Port (To 3 Hitch)

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

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

[2] CONTROL VALVE

(1) Structure



(1) Inlet Section
(2) Bucket Control Valve
(3) Dipperstick Control Valve
(4) Stabilizer RH Control Valve
(5) Stabilizer LH Control Valve
(6) Boom Control Valve
(7) Swing Control Valve
(8) Outlet Section
P : Pump Port
T : Tank Port
P.B. :Power Beyond Port
A1 :A1 Port
A2 :A2 Port
A3 :A3 Port
A4 :A4 Port
A5 :A5 Port
A6 :A6 Port
B1 :B1 Port
B2 :B2 Port
B3 :B3 Port
B4 :B4 Port
B5 :B5 Port
B6 :B6 Port

(1) Inlet

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

The **P** port is connected to the **OUTLET** port of tractor connected by the quick coupler.

The **T** port is connected to the transaxle case by the quick coupler.

(2) Control Valve Section

The control valves are of 3 positions, 6 connections, no detent, spring center type. These valves have **A** and **B** ports and control oil flow to each cylinders.

These are consisting of a valve housing, spool, load check valve, overload relief valve, etc..

(3) Outlet Section

This section has **P.B.** port which is connected to the **INLET** port of hydraulic block or front loader control valve.