

WSM

WORKSHOP MANUAL
**TRACTOR, MOWER,
FRONT LOADER**

**BX1870, BX2370, BX2670,
RCK48-18BX, RCK54-23BX,
RCK60B-23BX,
RCK48P-18BX, RCK54P-23BX,
LA203A, LA243A**

Kubota

TO THE READER

This Workshop Manual tells the servicing personnel about the mechanism, servicing and maintenance of KUBOTA Tractor BX1870D, BX2370D, BX2670D, KUBOTA Rotary Mower RCK48-18BX, RCK54-23BX, RCK60B-23BX, RCK48P-18BX, RCK54P-23BX and KUBOTA Front Loader LA203A, LA243A. It contains 4 parts: "**Information**", "**General**", "**Mechanism**" and "**Servicing**".

■ **Information**

This section primarily contains information below.

- Safety First
- Safety Decal
- Specifications
- Dimensions

■ **General**

This section primarily contains information below.

- Engine Identification
- Model Identification
- General Precautions
- Maintenance Check List
- Check and Maintenance
- Special Tools

■ **Mechanism**

This section contains information on the structure and the function of the unit. Before you continue with the subsequent sections, make sure that you read this section.

Refer to the latest version of Workshop Manual (Code No. 9Y021-01870 / 9Y021-18200) for the diesel engine / tractor mechanism that this workshop manual does not include.

■ **Servicing**

This section primarily contains information below.

- Troubleshooting
- Servicing Specifications
- Tightening Torques
- Checking, Disassembling and Servicing

All illustrations, photographs and specifications contained in this manual are of the newest information available at the time of publication.

KUBOTA reserves the right to change all information at any time without notice.

Since this manual includes many models, information or illustrations and photographs can show more than one model.

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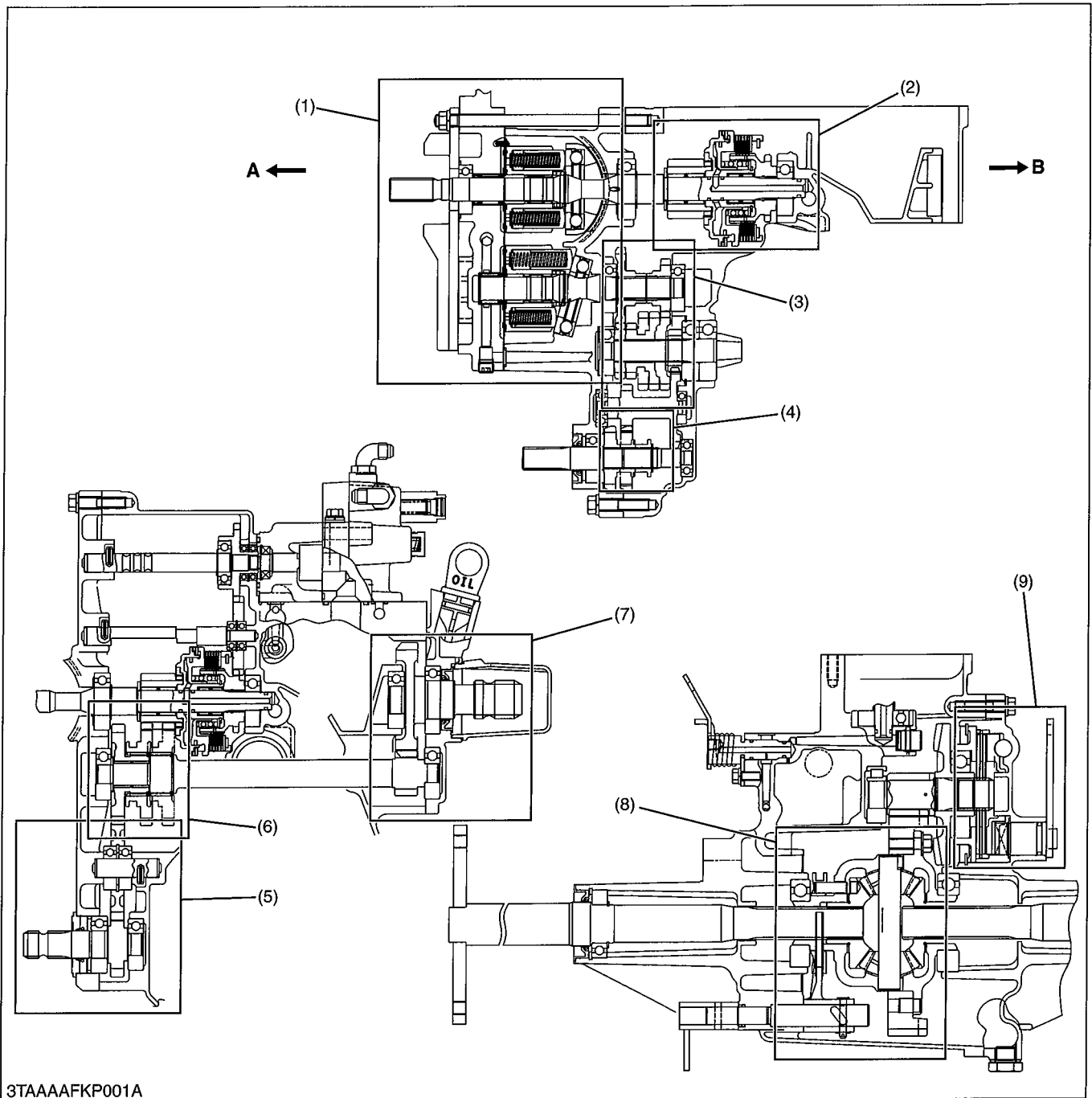
2 TRANSAXLE

MECHANISM

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1. STRUCTURE



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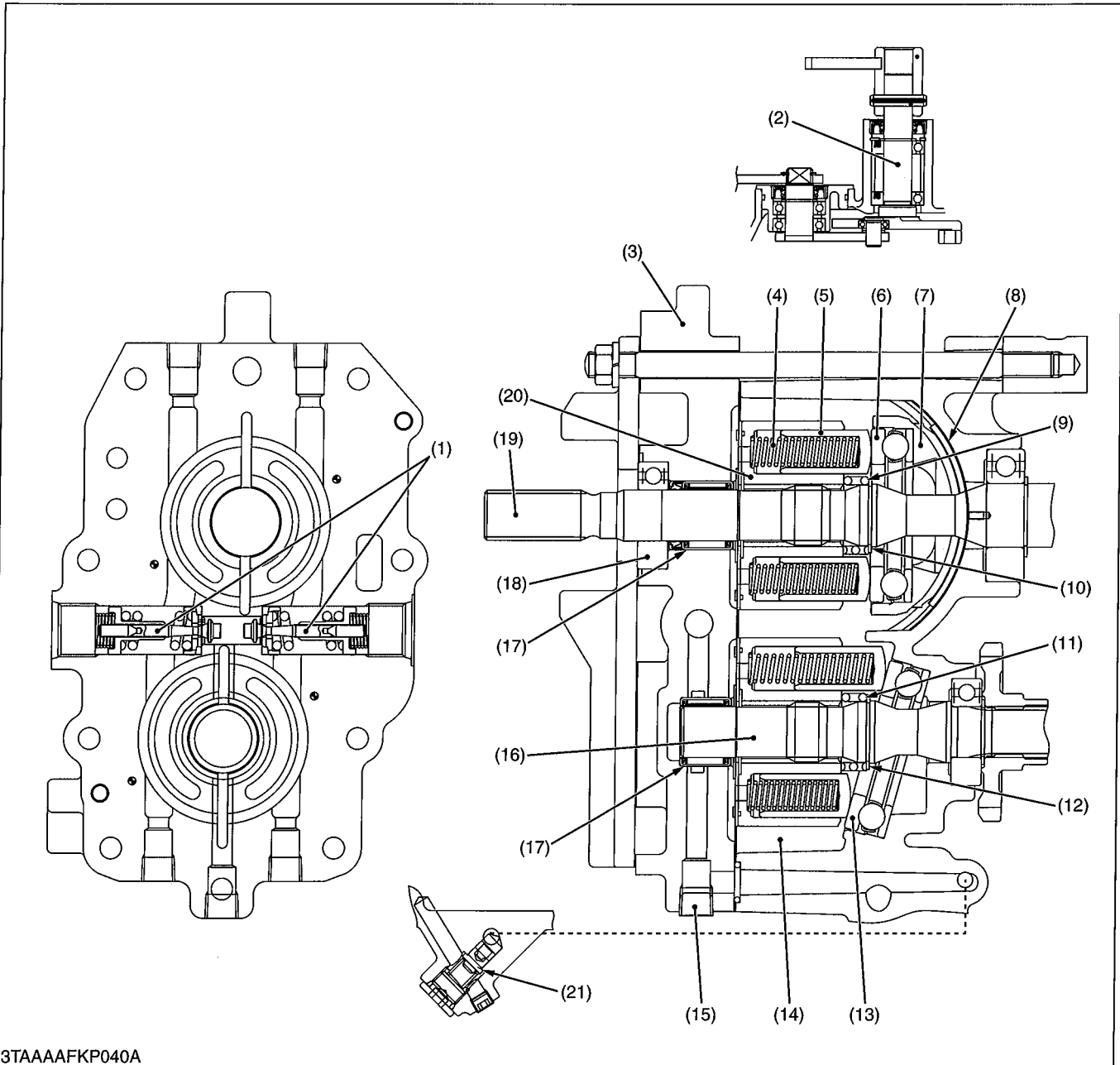
- | | | | |
|------------------------------|------------------------------------|-------------------------------|----------------------|
| (1) Hydrostatic Transmission | (4) Front Wheel Drive Gear Section | (6) PTO Gear Shift Section | A: Front Side |
| (2) PTO Clutch Section | (5) Mid-PTO Section | (7) Rear PTO Section | B: Rear Side |
| (3) Range Gear Shift Section | | (8) Differential Gear Section | |
| | | (9) Brake Section | |

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2. TRAVELING SYSTEM

[1] HYDROSTATIC TRANSMISSION

(1) Structure



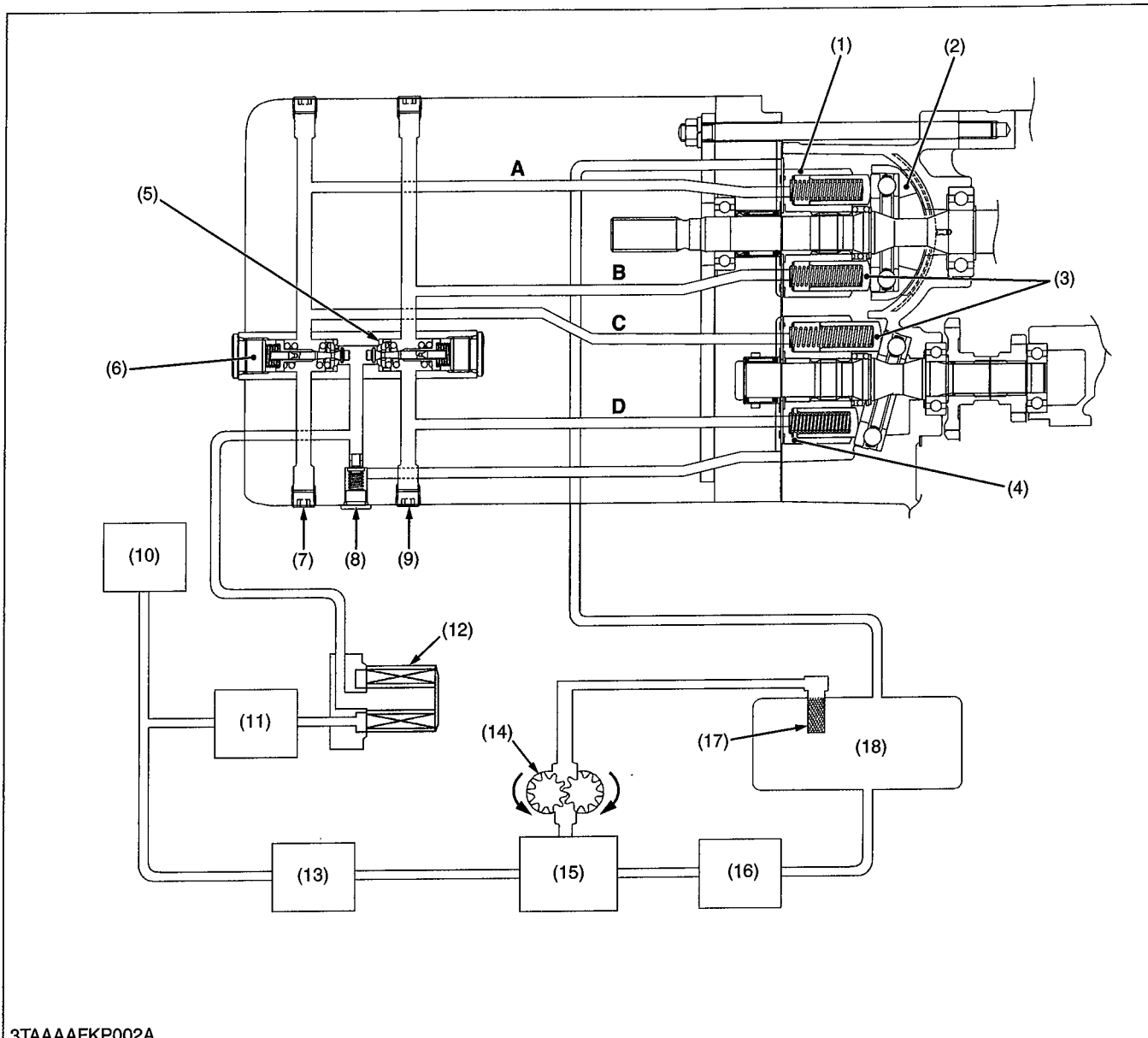
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- | | | | |
|--|-------------------------|-----------------------------|----------------------------|
| (1) Check and High Pressure Relief Valve | (6) Thrust Ball Bearing | (12) Circlip | (17) Needle Bearing |
| (2) Trunnion Arm | (7) Swashplate | (13) Thrust Ball Bearing | (18) Ball Bearing |
| (3) Center Section | (8) Cradle Bearing | (14) Cylinder Block (Motor) | (19) Pump Shaft |
| (4) Piston Spring | (9) Spring | (15) Plug | (20) Cylinder Block (Pump) |
| (5) Piston | (10) Circlip | (16) Motor Shaft | (21) Charge Relief Valve |
| | (11) Spring | | |

The hydrostatic transmission consists of variable displacement piston pump, fixed displacement piston motor and valve system.

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(2) Oil Flow



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- | | | | |
|--|--|--|-----------|
| (1) Cylinder Block (Pump) | (7) High Pressure Relief Port Plug (Forward) | (13) Power Steering Controller | A: A Port |
| (2) Swashplate | (8) Charge Relief Valve | (14) Hydraulic Pump | B: B Port |
| (3) Piston | (9) High Pressure Relief Port Plug (Reverse) | (15) Flow Priority Valve (Hydraulic Control Valve) | C: C Port |
| (4) Cylinder Block (Motor) | (10) PTO Clutch Valve | (16) Position Control Valve | D: D Port |
| (5) Check and High Pressure Relief Valve (Forward) | (11) PTO Relief Valve | (17) Oil Strainer | |
| (6) Check and High Pressure Relief Valve (Reverse) | (12) Oil Filter Cartridge | (18) Transmission Case | |

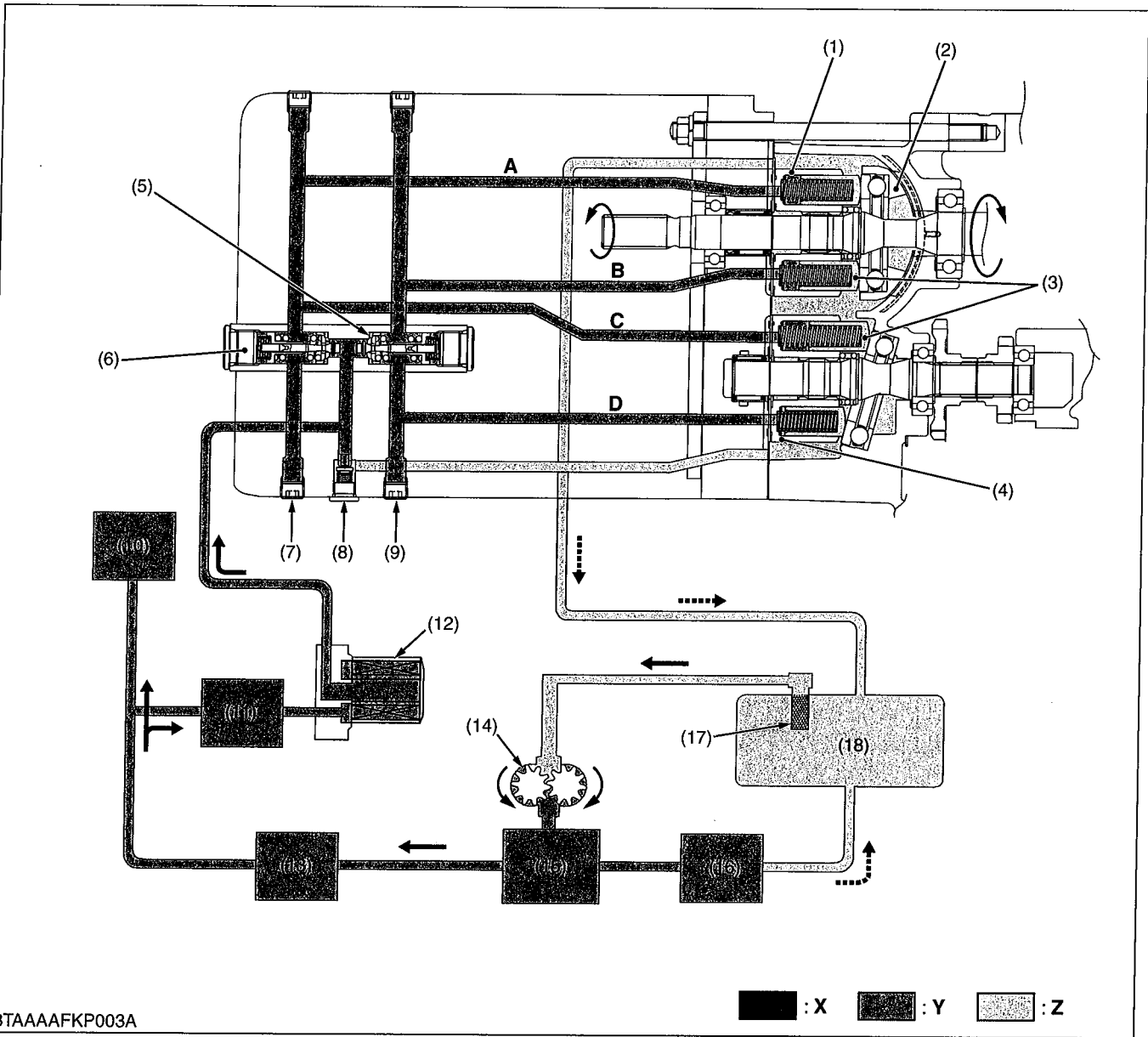
The pump and motor are joined in a closed hydraulic loop and most of oil circulates within the main oil circuit. A little oil lubricates and oozes out from the clearance between the moving parts of the case. Then oil in the main oil circuit of the HST needs to be supplied a want.

The oil from the power steering circuit flows into the HST for charging.

The charge oil aids smooth operation of pistons for pump and motor. The charge oil passes through the oil filter cartridge to charge relief valve port. The rest of oil passes through the charge relief valve into the HST housing. And overflow oil from HST housing return to the transmission case.

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Neutral



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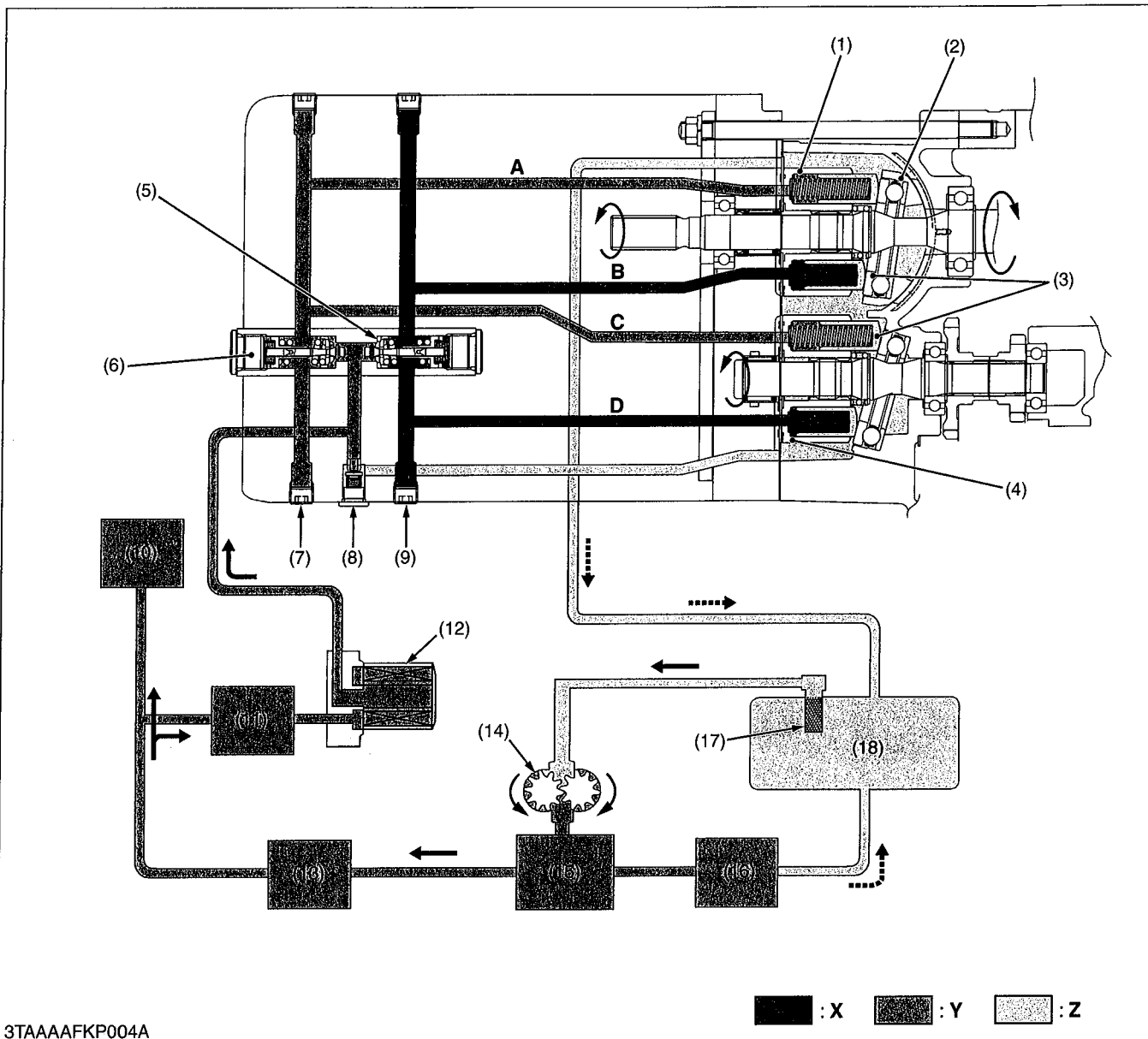
■ : X ■ : Y ■ : Z

- | | | | |
|--|--|--|-------------------------|
| (1) Cylinder Block (Pump) | (7) High Pressure Relief Port Plug (Forward) | (13) Power Steering Controller | A: A Port |
| (2) Swashplate | (8) Charge Relief Valve | (14) Hydraulic Pump | B: B Port |
| (3) Piston | (9) High Pressure Relief Port Plug (Reverse) | (15) Flow Priority Valve (Hydraulic Control Valve) | C: C Port |
| (4) Cylinder Block (Motor) | (10) PTO Clutch Valve | (16) Position Control Valve | D: D Port |
| (5) Check and High Pressure Relief Valve (Forward) | (11) PTO Relief Valve | (17) Oil Strainer | X: High Pressure |
| (6) Check and High Pressure Relief Valve (Reverse) | (12) Oil Filter Cartridge | (18) Transmission Case | Y: Low Pressure |
| | | | Z: Free Oil |

When the speed control pedal is in neutral, the variable swashplate is not tilted as shown in figure above. The pump pistons only rotate with cylinder block without reciprocating. Since the oil is not being pumped to the motor, the cylinder block in the motor is stationary and the output shaft does not move.

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Forward



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- | | | | |
|--|--|--|------------------|
| (1) Cylinder Block (Pump) | (7) High Pressure Relief Port Plug (Forward) | (13) Power Steering Controller | A: A Port |
| (2) Swashplate | (8) Charge Relief Valve | (14) Hydraulic Pump | B: B Port |
| (3) Piston | (9) High Pressure Relief Port Plug (Reverse) | (15) Flow Priority Valve (Hydraulic Control Valve) | C: C Port |
| (4) Cylinder Block (Motor) | (10) PTO Clutch Valve | (16) Position Control Valve | X: High Pressure |
| (5) Check and High Pressure Relief Valve (Forward) | (11) PTO Relief Valve | (17) Oil Strainer | Y: Low Pressure |
| (6) Check and High Pressure Relief Valve (Reverse) | (12) Oil Filter Cartridge | (18) Transmission Case | Z: Free Oil |

When the speed control pedal is stepped on and in forward, the variable swashplate is tilted as shown in figure above.

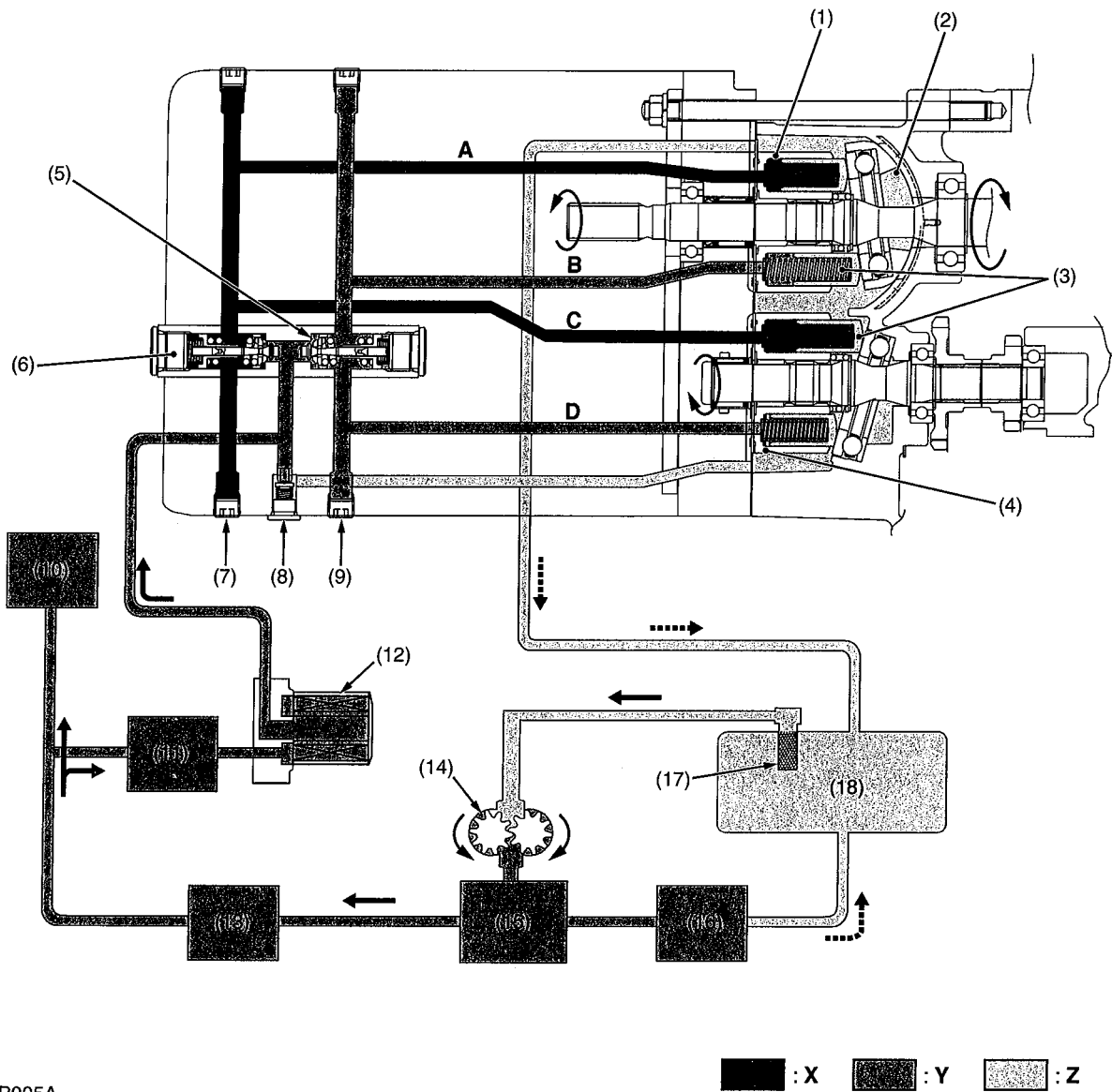
As the pump cylinder block rotates with the input shaft, oil is forced out of pump port B at high pressure. As pressure oil enters motor port D, the pistons, which align with port D, are pushed against the swashplate and slide down the inclined surface.

Then the output shaft rotates with the motor cylinder block. This drives the machine forward and the angle of pump swashplate determines the output shaft speed.

As the motor cylinder block continues to rotate, oil is forced out of motor port C at low pressure and returns to the pump.

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Reverse



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■ : X ■ : Y ■ : Z

- | | | | |
|--|--|--|-------------------------|
| (1) Cylinder Block (Pump) | (7) High Pressure Relief Port Plug (Forward) | (13) Power Steering Controller | A: A Port |
| (2) Swashplate | (8) Charge Relief Valve | (14) Hydraulic Pump | B: B Port |
| (3) Piston | (9) High Pressure Relief Port Plug (Reverse) | (15) Flow Priority Valve (Hydraulic Control Valve) | C: C Port |
| (4) Cylinder Block (Motor) | (10) PTO Clutch Valve | (16) Position Control Valve | D: D Port |
| (5) Check and High Pressure Relief Valve (Forward) | (11) PTO Relief Valve | (17) Oil Strainer | X: High Pressure |
| (6) Check and High Pressure Relief Valve (Reverse) | (12) Oil Filter Cartridge | (18) Transmission Case | Y: Low Pressure |
| | | | Z: Free Oil |

When the speed control pedal is stepped on and in reverse, the variable swashplate is tilted as shown in figure above.

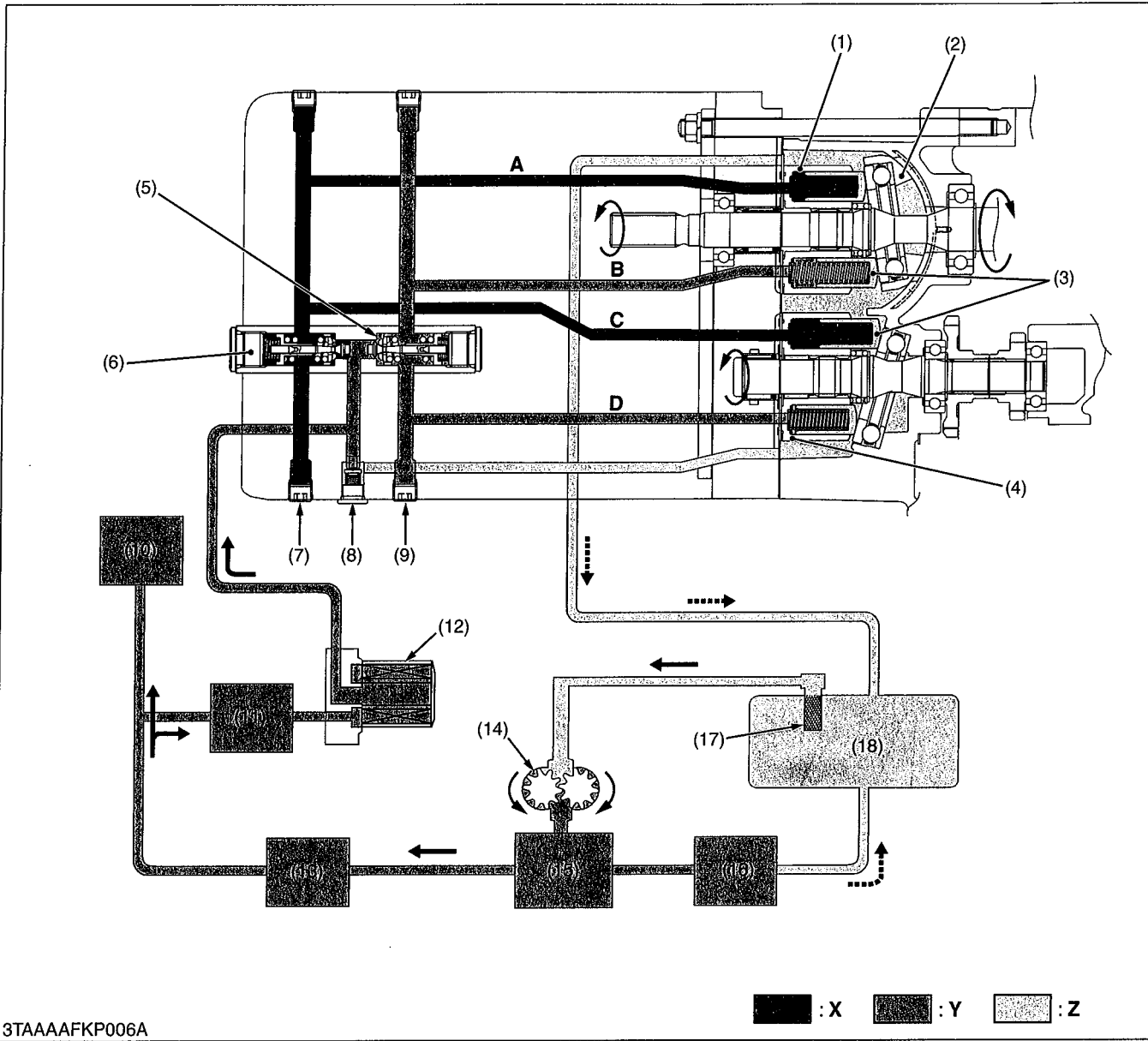
As the pump cylinder block rotates with the input shaft, oil is forced out of pump port A at high pressure. As pressure oil enters motor port C, the pistons, which align with port C, are pushed against the swashplate and slide down the inclined surface.

Then the output shaft rotates with the motor cylinder block. This drives the machine rearward and the angle of pump swashplate determines the output shaft speed.

As the motor cylinder block continues to rotate, oil is forced out of motor port D at low pressure and returns to the pump.

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Relief (Reverse)



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- | | | | |
|--|--|--|------------------|
| (1) Cylinder Block (Pump) | (7) High Pressure Relief Port Plug (Forward) | (13) Power Steering Controller | A: A Port |
| (2) Swashplate | (8) Charge Relief Valve | (14) Hydraulic Pump | B: B Port |
| (3) Piston | (9) High Pressure Relief Port Plug (Reverse) | (15) Flow Priority Valve (Hydraulic Control Valve) | C: C Port |
| (4) Cylinder Block (Motor) | (10) PTO Clutch Valve | (16) Position Control Valve | D: D Port |
| (5) Check and High Pressure Relief Valve (Forward) | (11) PTO Relief Valve | (17) Oil Strainer | X: High Pressure |
| (6) Check and High Pressure Relief Valve (Reverse) | (12) Oil Filter Cartridge | (18) Transmission Case | Y: Low Pressure |
| | | | Z: Free Oil |

When the speed control pedal is in reverse, the variable swashplate is tilted as shown in figure above.

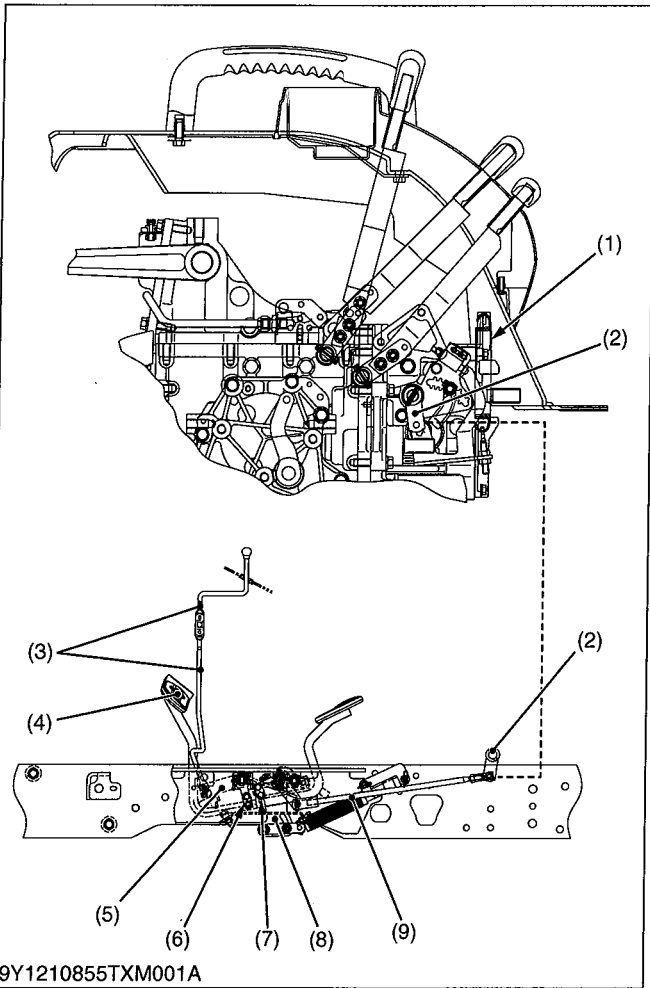
As the pump cylinder block rotates with the input shaft, oil is forced out of pump port A at high pressure. As pressure oil enters motor port C, the pistons, which align with port C, are pushed against the swashplate and slide down the inclined surface. Since the oil pressure in the check and high pressure relief valve (Reverse) increase, the high oil pressure opens the check and high pressure relief valve (Reverse) and the flows through the charge relief valve to the transmission case.

Then the output shaft rotates with the motor cylinder block. This drives the machine rearward and the angle of pump swashplate determines the output shaft speed.

As the motor cylinder block continues to rotate, oil is forced out of motor port D at low pressure and returns to the pump.

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(3) HST Control Linkage



The speed control pedal (4) and the trunnion arm are linked with the HST pedal link (8) and the speed change rod (9). As the front of the pedal is depressed, the swashplate connected to the trunnion arm (2) rotates and forward travelling speed increases. Depressing the rear end increases reverse speed.

The trunnion arm (2) is returned to neutral position by the neutral arm and the tension of neutral spring. At the same time, the swashplate is returned to neutral, when the pedal is released. The damper (10) connected to the HST pedal link (8) restricts the movement of the linkage to prevent abrupt operation or reversing.

Moreover, the feeling of the dynamic braking can be adjusted by changing the arm (11) position of damper (10).

(Reference)

[A] Force of the damper is large.

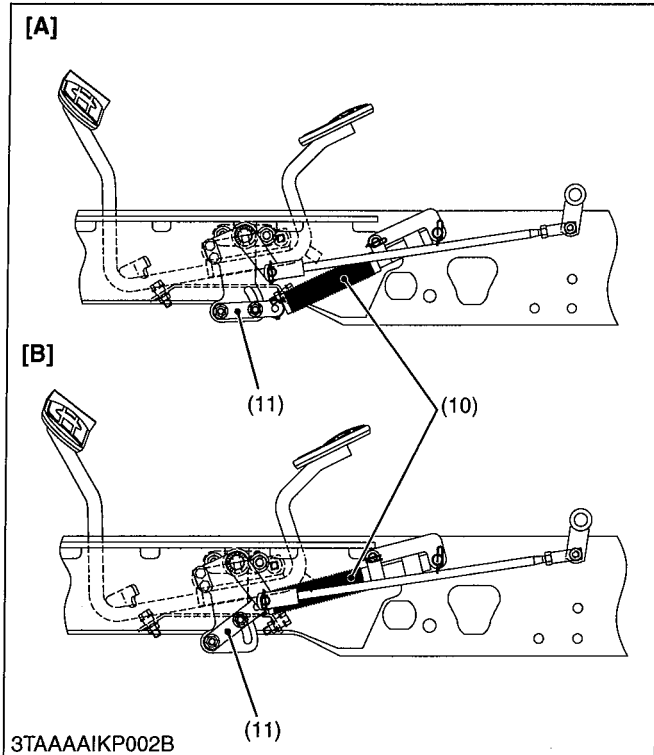
[B] Force of the damper is small.

NOTE

- The cruise control system is an optional for BX1870D.

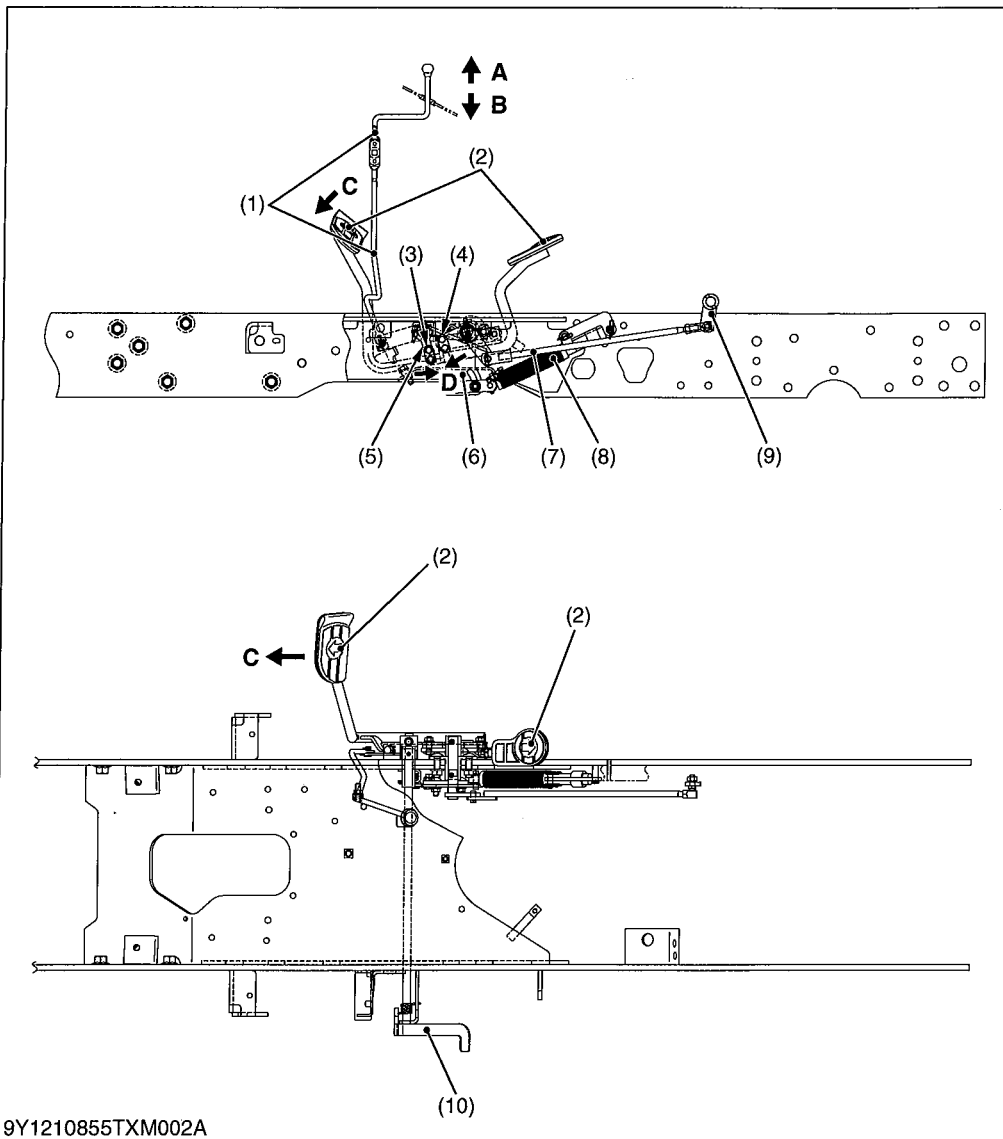
- | | |
|-------------------------|----------------------|
| (1) Neutral Spring | (7) Cruise Lock |
| (2) Trunnion Arm | (8) HST Pedal Link |
| (3) Cruise Rod | (9) Speed Change Rod |
| (4) Speed Control Pedal | (10) Damper |
| (5) Cruise Arm | (11) Arm |
| (6) Cruise Lock | |

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(4) Speed Set Linkage

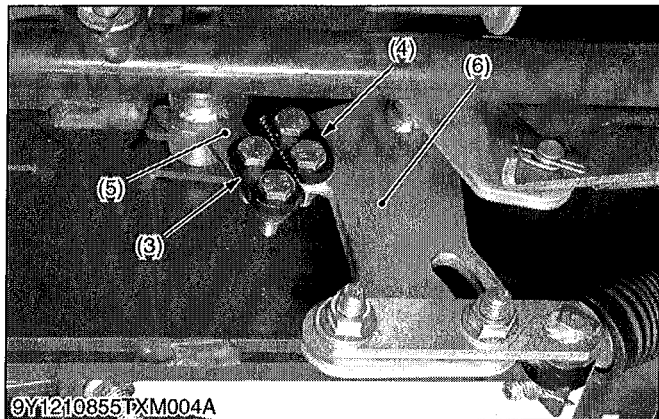
Speed Set



- (1) Speed Set Rod
- (2) Speed Control Pedal
- (3) Cruise Lock
- (4) Cruise Lock
- (5) Cruise Plate
- (6) HST Pedal Link
- (7) Speed Change Rod
- (8) Damper
- (9) Trunnion Arm
- (10) Release Plate

- A:** Speed Set Rod "OFF"
- B:** Speed Set Rod "ON"
- C:** Speed Control Pedal "Forward"
- D:** Cruise Lock "Locked"

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When pushing and holding the speed set rod (1) and depressing the speed control pedal (2), the desired speed is set.

When pushing the speed set rod (1), the cruise plate (5) is rotated counter clockwise.

When depressing the speed control pedal (2) forward, the HST pedal link clockwise.

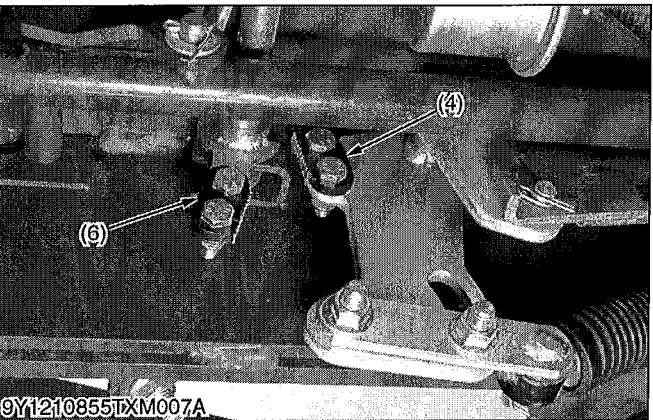
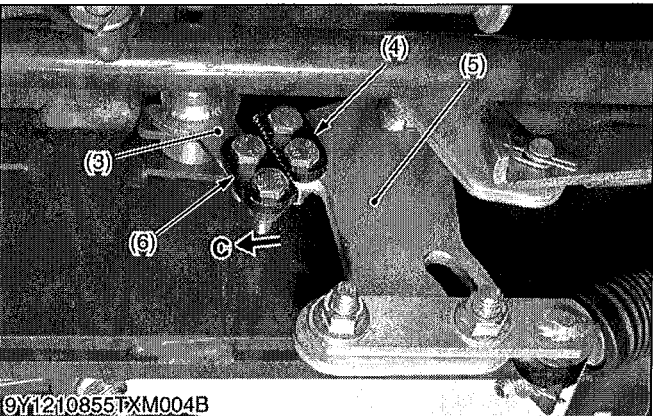
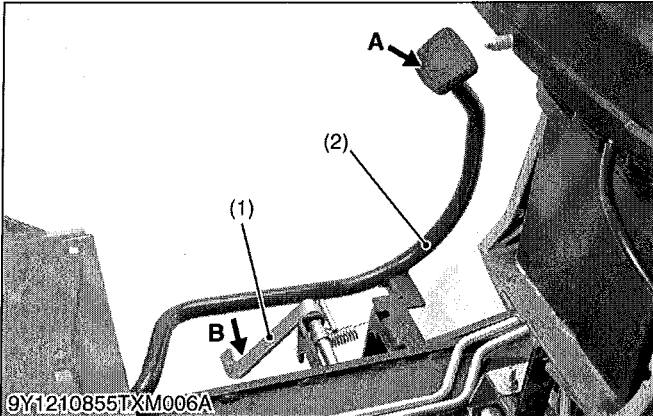
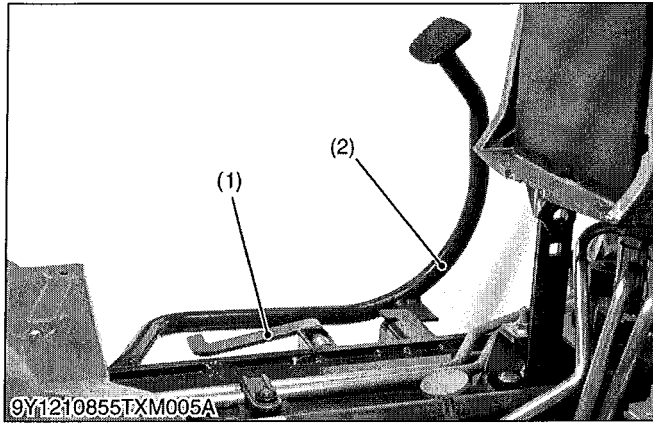
Since both the cruise lock (3) of the cruise plate (5) and the cruise lock (4) of HST pedal link (6) are locked, the speed control pedal (2) is held at a selected position.

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When the Brake Pedal is Depressed

When the brake pedal (2) is depressed, the release plate (1) located under the brake pedal (2) is pushed down.

Since the cruise plate (3) rotates, the cruise lock (4) and (6) between the cruise plate (3) and the HST pedal link (5) are released.

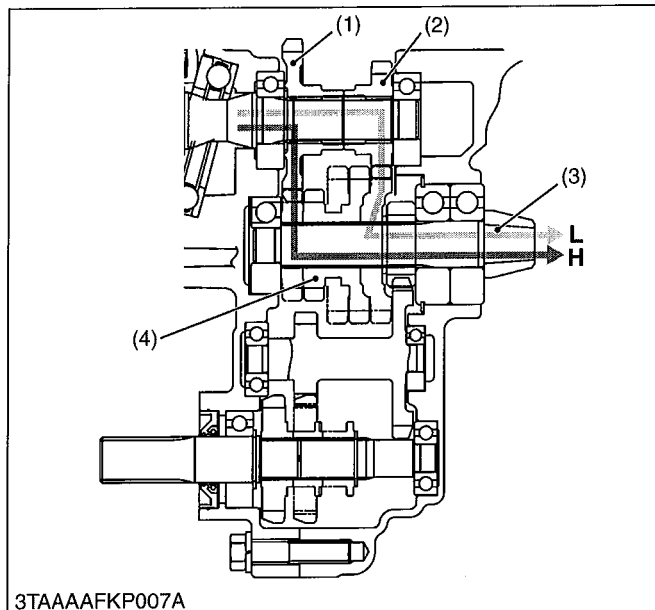


- (1) Release Plate
- (2) Brake Pedal
- (3) Cruise Plate
- (4) Cruise Lock
- (5) HST Pedal Link
- (6) Cruise Lock

- A: Brake Pedal "Depressed"
- B: Release Plate "Pushed Down"
- C: Cruise Plate "Rotates Clockwise" and Release the Cruise Locks

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[2] RANGE GEAR SHIFT SECTION



Two kinds of power flow are selected by operating the range gear shift lever to shift the 16T-24T shifter gear (4) on the spiral bevel gear shaft (3).

■ **Low Range**

17T Gear Shaft (2) → Shifter Gear (24T) (4) → Spiral Bevel Pinion Shaft (3).

■ **High Range**

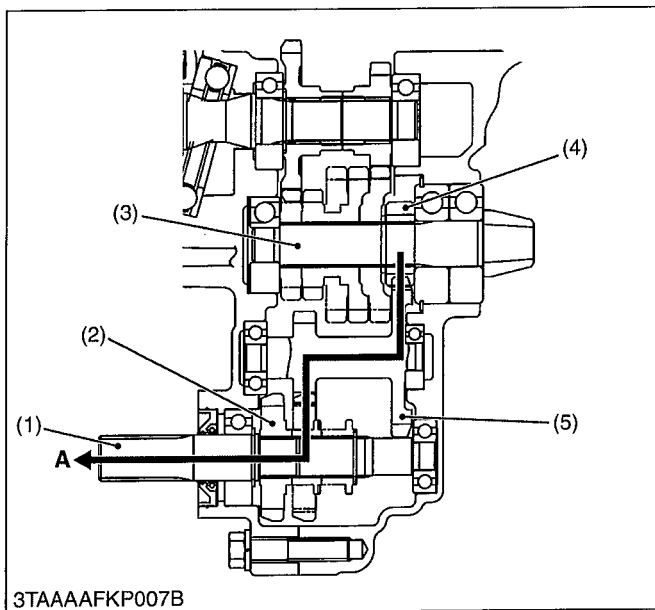
25T Gear (1) → Shifter Gear (16T) (4) → Spiral Bevel Pinion Shaft (3).

- (1) 25T Gear
- (2) 17T Gear
- (3) Spiral Bevel Pinion Shaft
- (4) 16T-24T Shifter Gear

L: Low Range
H: High Range

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[3] FRONT WHEEL DRIVE SECTION



2-wheel drive or 4-wheel drive is selected by changing the position of 19T shifter gear (2) with the front wheel drive lever.

■ **Front Wheel Drive "Disengaged"**

When the front wheel drive lever is set to "Disengaged" position, the 19T shifter gear (2) is neutral and power is not transmitted to the front wheel drive shaft (1).

■ **Front Wheel Drive "Engaged"**

When the front wheel drive lever is set to "Engaged" position, the 19T shifter gear (2) slides to the right to engage with 13T-25T gear shaft (5). Therefore, the power from spiral bevel pinion shaft (3) is transmitted to the front wheel drive shaft (1) through the gears.

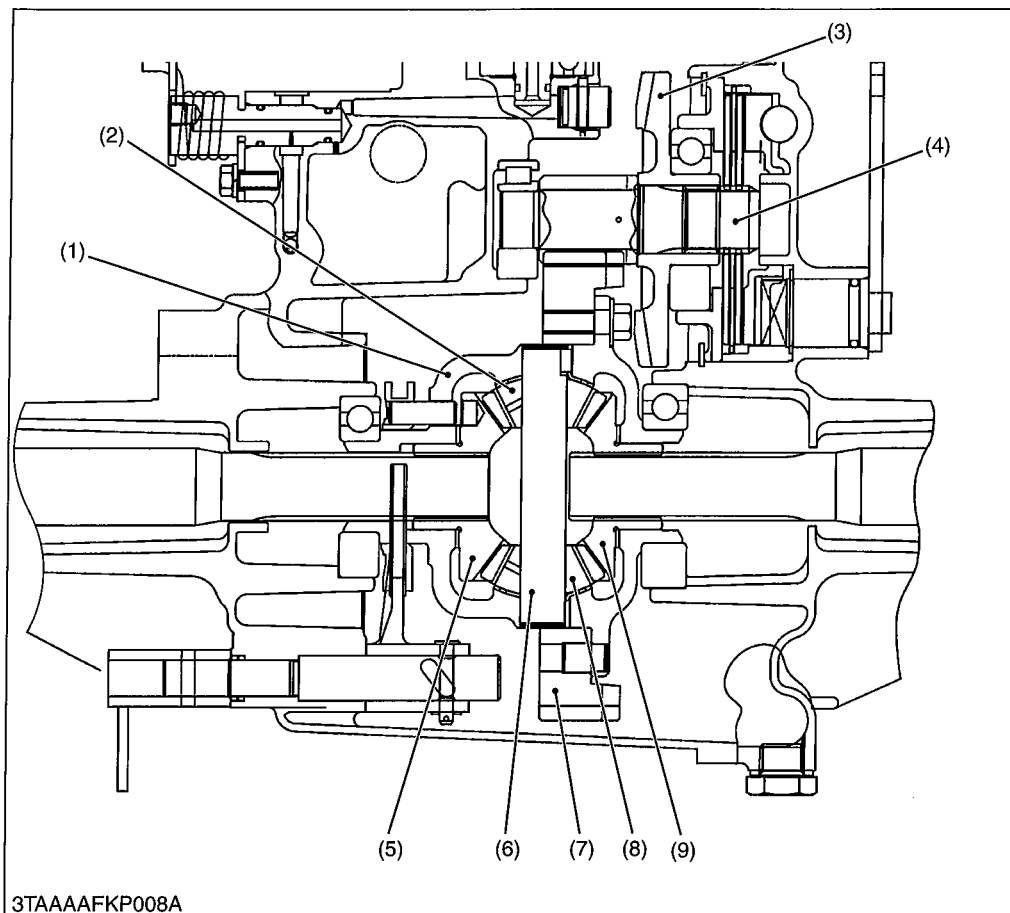
- (1) Front Wheel Drive Shaft
- (2) 19T Shifter Gear
- (3) Spiral Bevel Pinion Shaft
- (4) 12T Gear
- (5) 13T-25T Gear Shaft

A: Front Wheel Drive "Engaged"

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[4] DIFFERENTIAL GEAR SECTION

(1) Differential Gears



- (1) Differential Case
- (2) Differential Pinion
- (3) 37T Spiral Bevel Gear
- (4) 10T Final Gear Shaft
- (5) Differential Side Gear
- (6) Differential Pinion Shaft
- (7) 66T Final Gear
- (8) Differential Pinion
- (9) Differential Side Gear

1. During Straight Running

Rotation of the spiral bevel pinion is transmitted to the 37T spiral bevel gear (3), 10T final gear shaft (4), 66T final gear (7) and differential case (1). When road resistance to the right and left wheels are equal, differential pinions (2), (8) and differential side gears (5), (9) all rotate as a unit. Both rear axles received equal input, and both wheels turn at the same speed, allowing the tractor to go straight ahead.

At this time, differential pinions (2), (8) do not rotate around the differential pinion shaft (6).

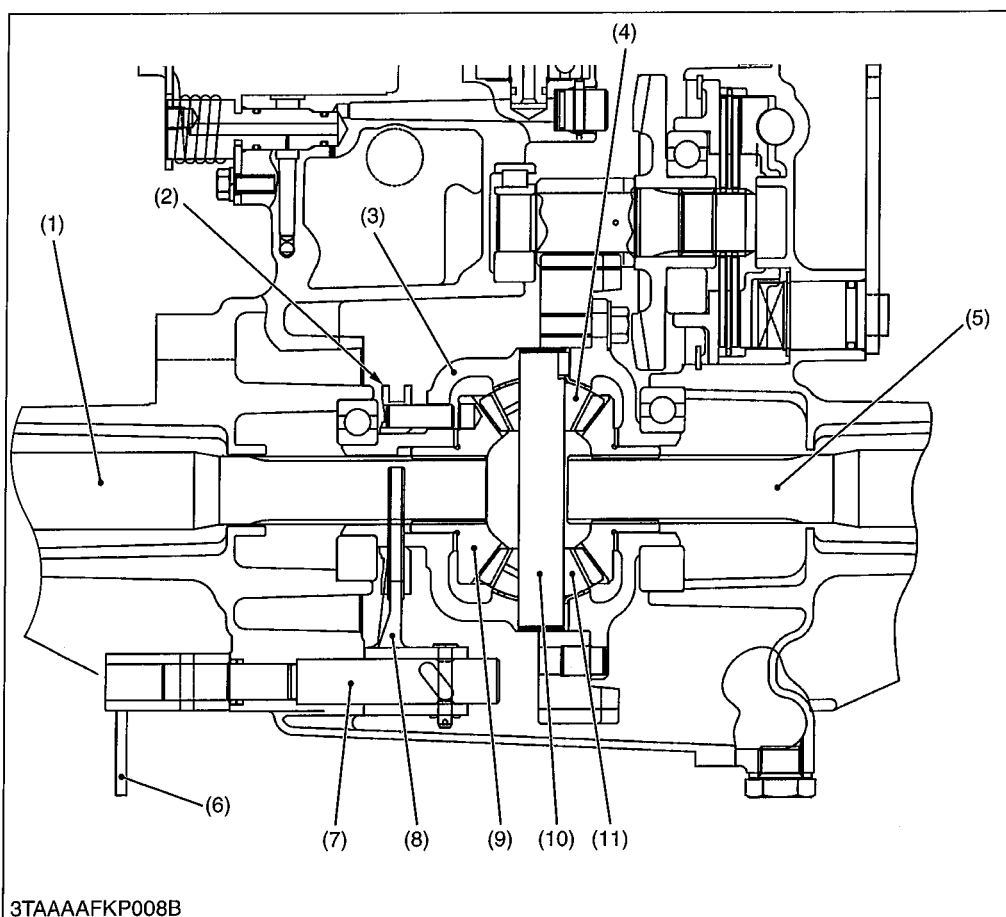
2. During Turning

When the tractor turns, the road resistance to the inside tire increases. In other words, if one of tires slows down, revolution difference is generated in the differential side gears (5), (9). When rotation of one differential side gear becomes lower than the other, differential pinions (2), (8) begin rotating around differential pinion shaft (6). The other differential side gear is increased in speed by the speed increment of differential pinion shaft (6). This means that rotation of one rear axle is slowed down and that of the other rear axle is increased. Thus, the tractor turn smoothly without power loss.

The combined number of revolutions of the right and left differential side gears is always twice that of the spiral bevel gear (3). When spiral bevel gear revolution is 100 min^{-1} (rpm), and if one of the differential side gears stops moving, the revolution of the other differential side gear becomes 200 min^{-1} (rpm) and if one rotates at 50 min^{-1} (rpm), the other rotates at 150 min^{-1} (rpm).

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(2) Differential Lock



- (1) Rear Axle
- (2) Differential Lock Shifter
- (3) Differential Case
- (4) Differential Pinion
- (5) Rear Axle
- (6) Differential Lock Arm
- (7) Differential Lock Shaft
- (8) Differential Lock Shift Fork
- (9) Differential Side Gear
- (10) Differential Pinion Shaft
- (11) Differential Pinion

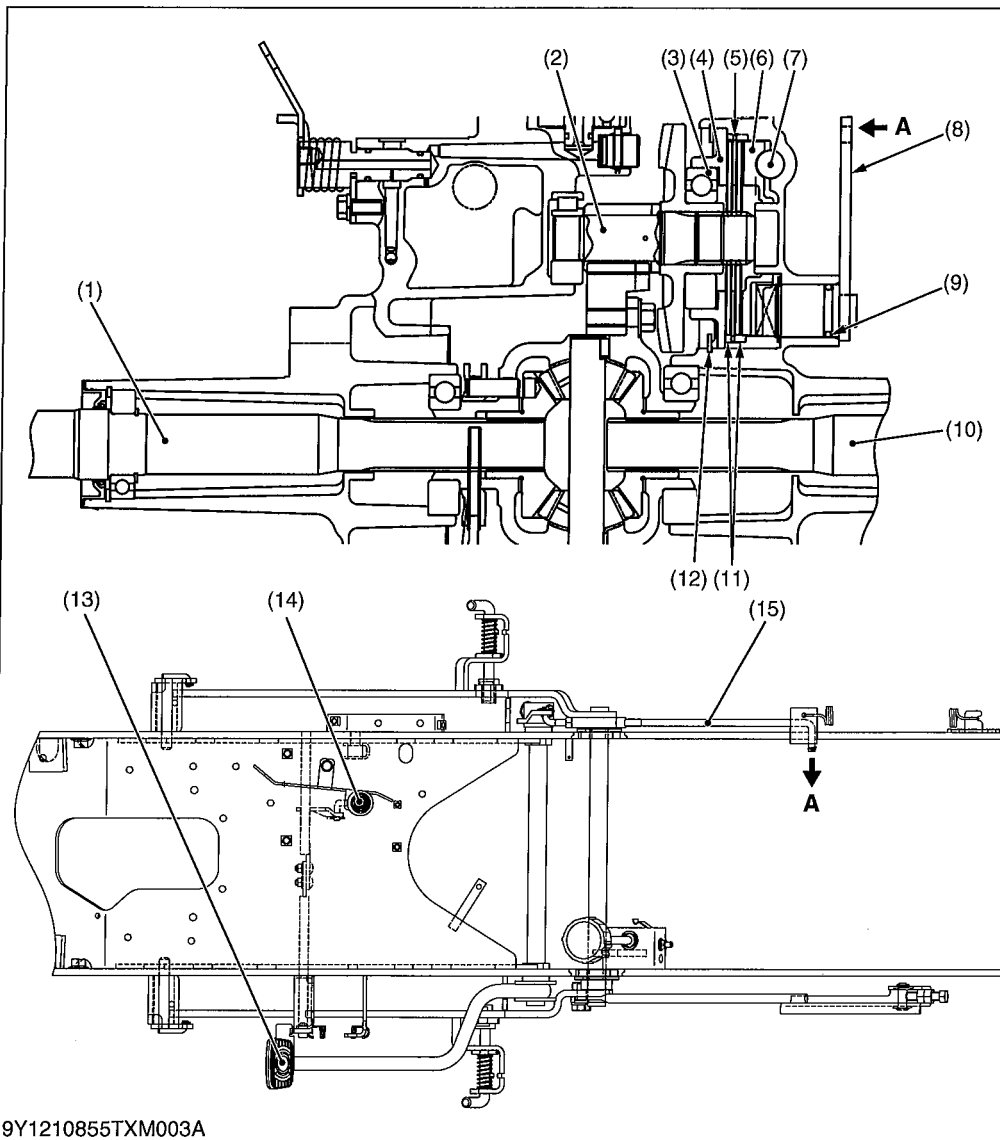
When resistance to the right and left tires are greatly different due to ground conditions or type of work, the tire with less resistance slips and prevents the tractor from moving ahead. To compensate for this drawback, the differential lock restricts the differential action and causes both rear axles to rotate as a unit.

When the differential lock pedal is stepped on, it causes the differential lock arm (6) and differential lock shaft (7) to rotate, which will move the differential lock shift fork (8) and the differential lock shifter (2) toward the differential side gear (9). The pins on the differential lock shifter (2) go into the holes in the differential case (3) to cause the differential case (3), differential lock shifter (2) and differential side gear (9) to rotate as a unit.

Therefore, differential pinions (4), (11) are unable to rotate around differential pinion shaft (10) and identical revolutions are transmitted to the right and left rear axle (1), (5).

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[5] BRAKE SECTION



- (1) Rear Axle LH
- (2) Final Gear Shaft
- (3) Shim
- (4) Bearing Holder
- (5) Friction Plate
- (6) Actuator
- (7) Steel Ball
- (8) Cam Lever
- (9) O-ring
- (10) Rear Axle RH
- (11) Brake Disc
- (12) Internal Circlip
- (13) Brake Pedal
- (14) Parking Brake Lock Pedal
- (15) Brake Rod

A: Connects with Brake Cam Lever and Brake Rod

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The mechanical wet disc brakes are used for the travelling brake. The brake is operated by the brake pedal (13) through the mechanical linkages and provide stable braking and require little adjustment.

The brake body is incorporated in the transmission case and axle cover filled with transmission oil.

For greater braking force, four brake discs (11) are provided at the brake shaft, and the friction plates (5) fixed to the transmission case is arranged between the brake discs (11).

■ **Travelling Brake**

When the brake pedal (13) is depressed, the brake rod (15) pulls the brake cam lever (8).

Therefore, the cam plates also moves and rides on the steel balls set in the grooves of the transmission case to press the brake disc, the final gear shaft is braked by the frictional force generated by the cam plate and brake disc.

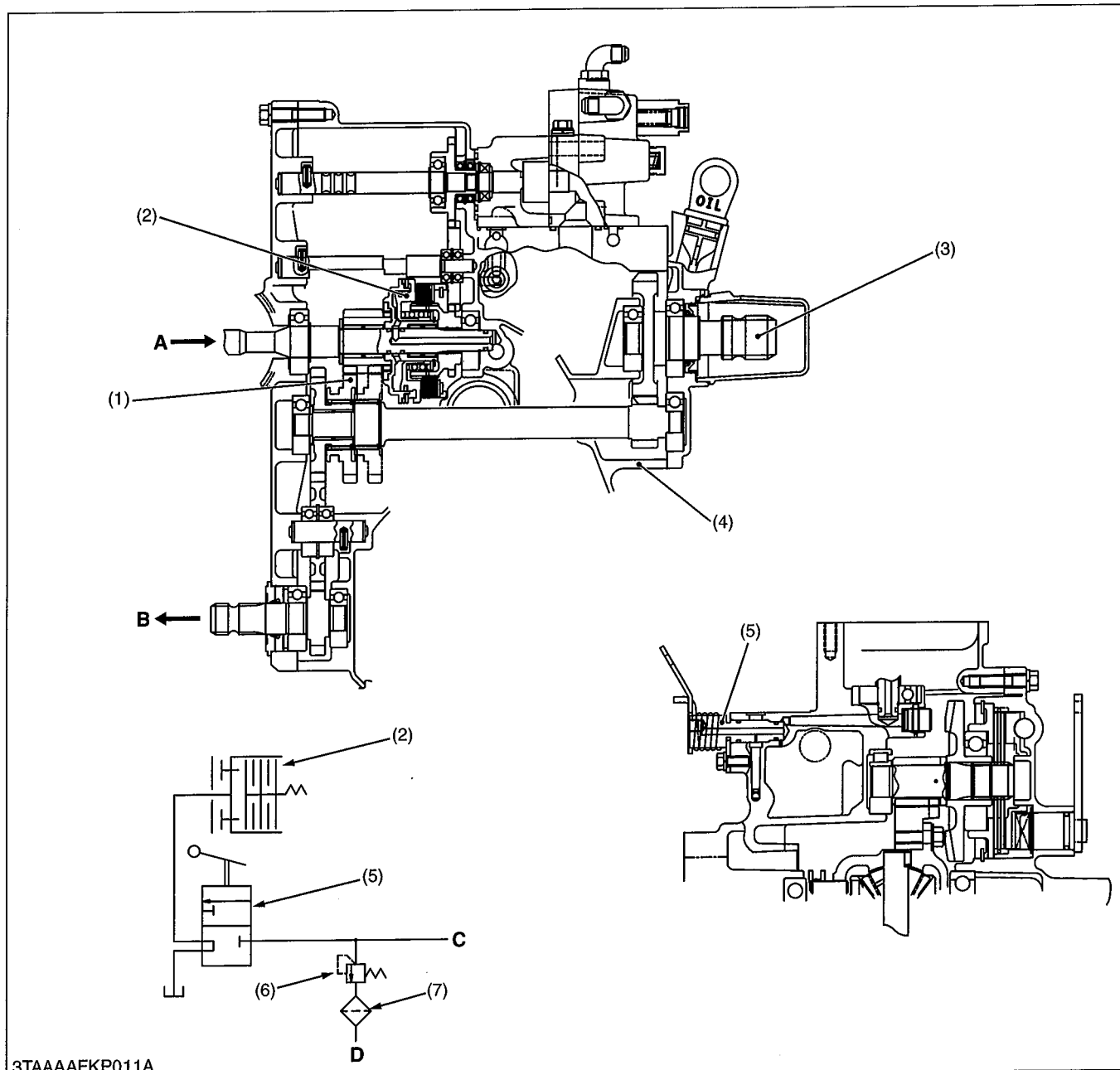
■ **Parking Brake**

When the parking brake is applied, the brake pedal (13) is locked by the parking brake lock pedal (14).

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3. PTO SYSTEM

[1] PTO CLUTCH AND VALVE



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- (1) PTO Select Gear
- (2) PTO Clutch Pack
- (3) Rear PTO Shaft
- (4) Transmission Case

- (5) PTO Clutch Valve
- (6) PTO Clutch Relief Valve
- (7) Oil Filter Cartridge

- A: From HST Pump Shaft
- B: To Mid-PTO

- C: From Power Steering Controller
- D: To Hydrostatic Transmission

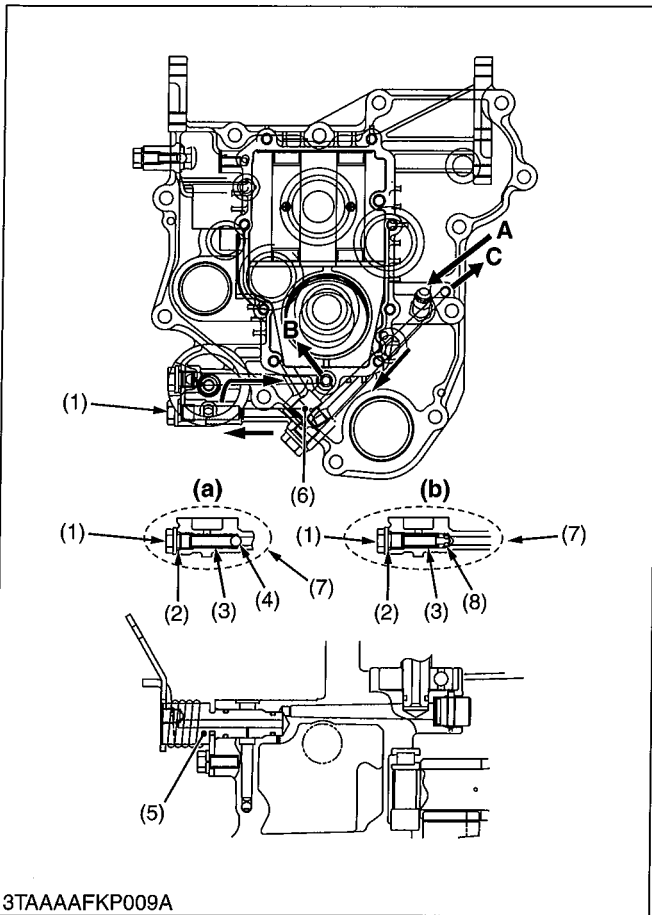
The BX 70 series equipped with hydraulic independent PTO clutch (wet multi-plates type). Therefore, the engine power engages or disengages to the PTO shafts without stopping the tractor movement.

The PTO clutch pack (2) has four clutch discs, four drive plates, pressure plate, clutch piston and so on.

The clutch piston is actuated by hydraulic oil flow from the power steering controller.

The PTO clutch valve (5) controls the hydraulic oil flow from power steering controller to the PTO clutch pack (2) by operating the PTO clutch lever through the linkage.

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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.

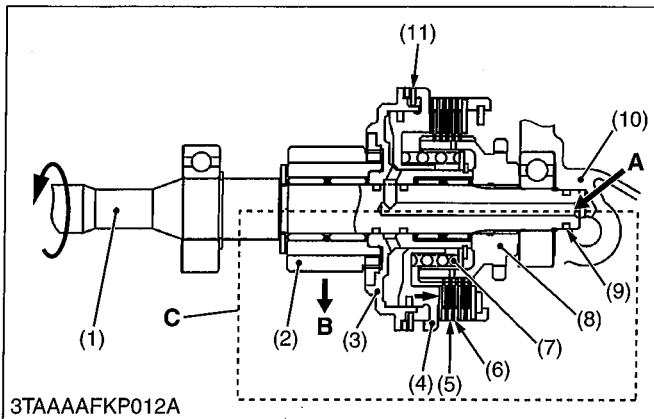
(Reference)

- Relief valve setting pressure:
 - 490 kPa
 - 5.0 kgf/cm²
 - 71.2 psi

- | | |
|-----------------------------|-----------------------------------|
| (1) Plug | A: From Power Steering Controller |
| (2) O-ring | B: To Hydrostatic Transmission |
| (3) Spring | C: To PTO Clutch Valve |
| (4) Steel Ball | |
| (5) PTO Clutch Valve | (a) Old Type |
| (6) HST Charge Relief Valve | (b) New Type |
| (7) PTO Clutch Relief Valve | |
| (8) Poppet | |

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PTO Clutch "Engaged"

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

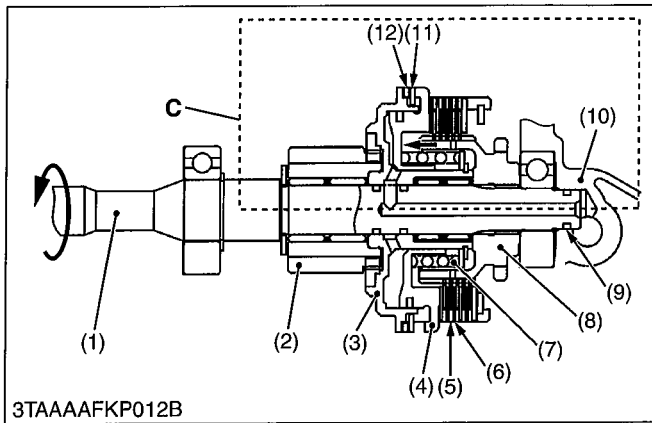
When the PTO clutch lever is set at the "Engaged" position, the PTO clutch valve rotates. Oil flows from the oil line through transmission case to the PTO clutch pack.

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 | (9) O-ring |
| (2) Clutch Gear | (10) Transaxle Case |
| (3) Clutch Case | (11) Brake Disc |
| (4) Clutch Piston | |
| (5) Clutch Plate | A: From PTO Clutch Valve |
| (6) Clutch Disc | B: Power to PTO Shaft |
| (7) Spring | C: PTO Clutch "Engaged" |
| (8) Spline Boss | |

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PTO Clutch "Disengaged"

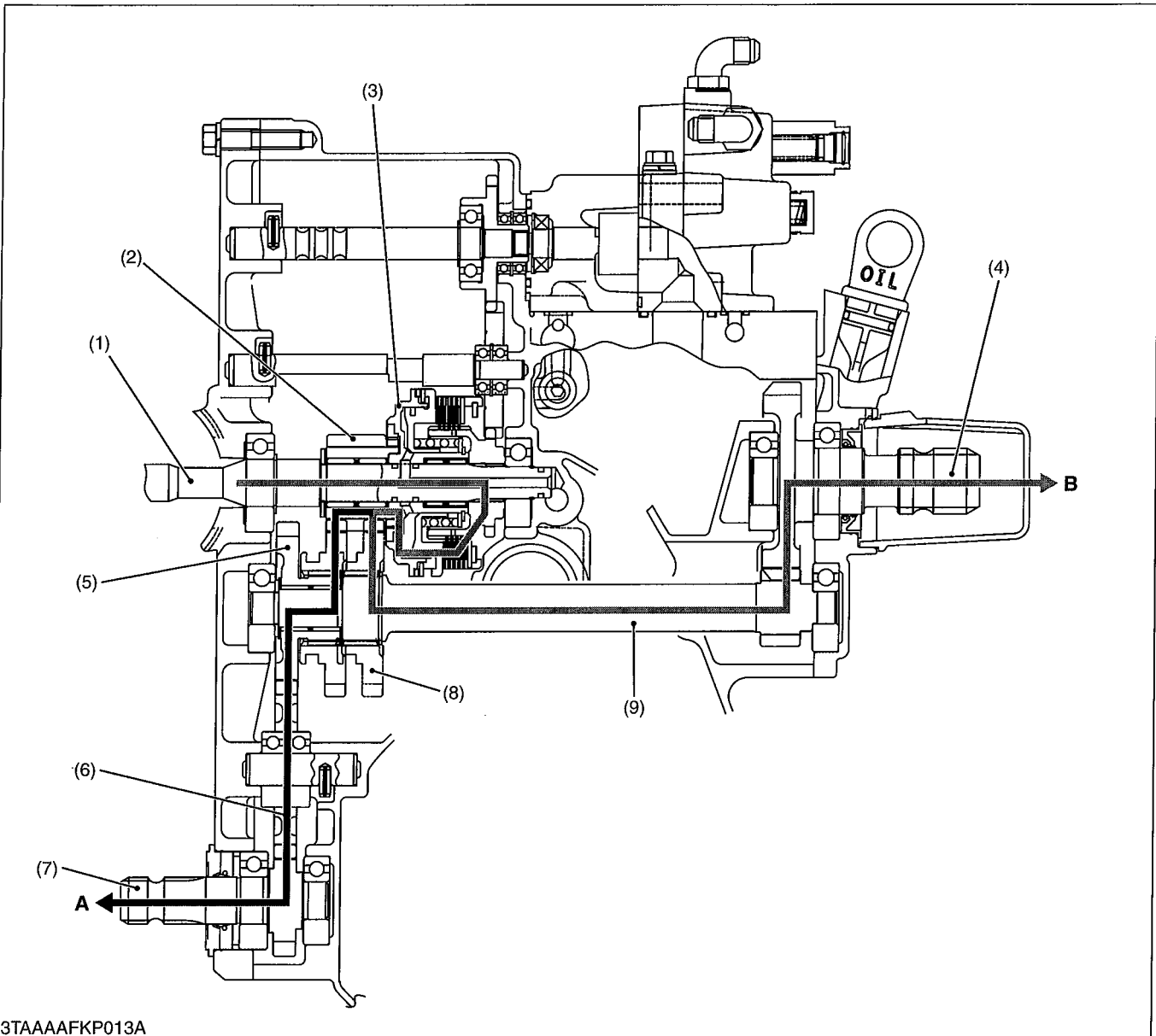
When the PTO clutch lever is set at the "Disengaged" position, the PTO clutch valve closes the oil passage to the PTO clutch pack. The oil in the PTO clutch pack drain into the transaxle case (10). Thus the clutch piston (4) is pushed back by the spring (7).

When the clutch piston (4) is pushed back by the spring (7), the brake plate (11) is also moved to contract the brake disc (12) so as to stop the rotation and drag of the PTO shafts.

- | | |
|--------------------|---------------------|
| (1) HST Pump Shaft | (8) Spline Boss |
| (2) Clutch Gear | (9) O-ring |
| (3) Clutch Case | (10) Transaxle Case |
| (4) Clutch Piston | (11) Brake Plate |
| (5) Clutch Plate | (12) Brake Disc |
| (6) Clutch Disc | |
| (7) Spring | |
- C: PTO Clutch "Disengaged"**

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[2] MID AND REAR PTO SECTION



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- | | | | |
|---------------------|----------------------|---------------------------|-------------------------|
| (1) HST Pump Shaft | (4) Rear PTO Shaft | (6) 24T Mid PTO Idle Gear | (8) 28T PTO Select Gear |
| (2) 12T Clutch Gear | (5) 23T Mid PTO Gear | (7) Mid-PTO Shaft | (9) 11T Gear Shaft |
| (3) PTO Clutch Pack | | | |

Three kinds of power flow are selected by operating the PTO select lever to shift the 28T PTO select gear (8) on the 11T gear shaft (9).

■ **Mid-PTO Position "A"**

PTO Clutch Pack (3) → 12T Gear Clutch (2) → 28T PTO Select Gear (8) → 23T Mid PTO Gear (5) → 24T Mid PTO Idle Gear (6) → Mid-PTO Shaft (7).

■ **Rear PTO Position "B"**

PTO Clutch Pack (3) → 12T Gear Clutch (2) → 28T PTO Select Gear (8) → 11T Gear Shaft (9) → Rear PTO Shaft (4).

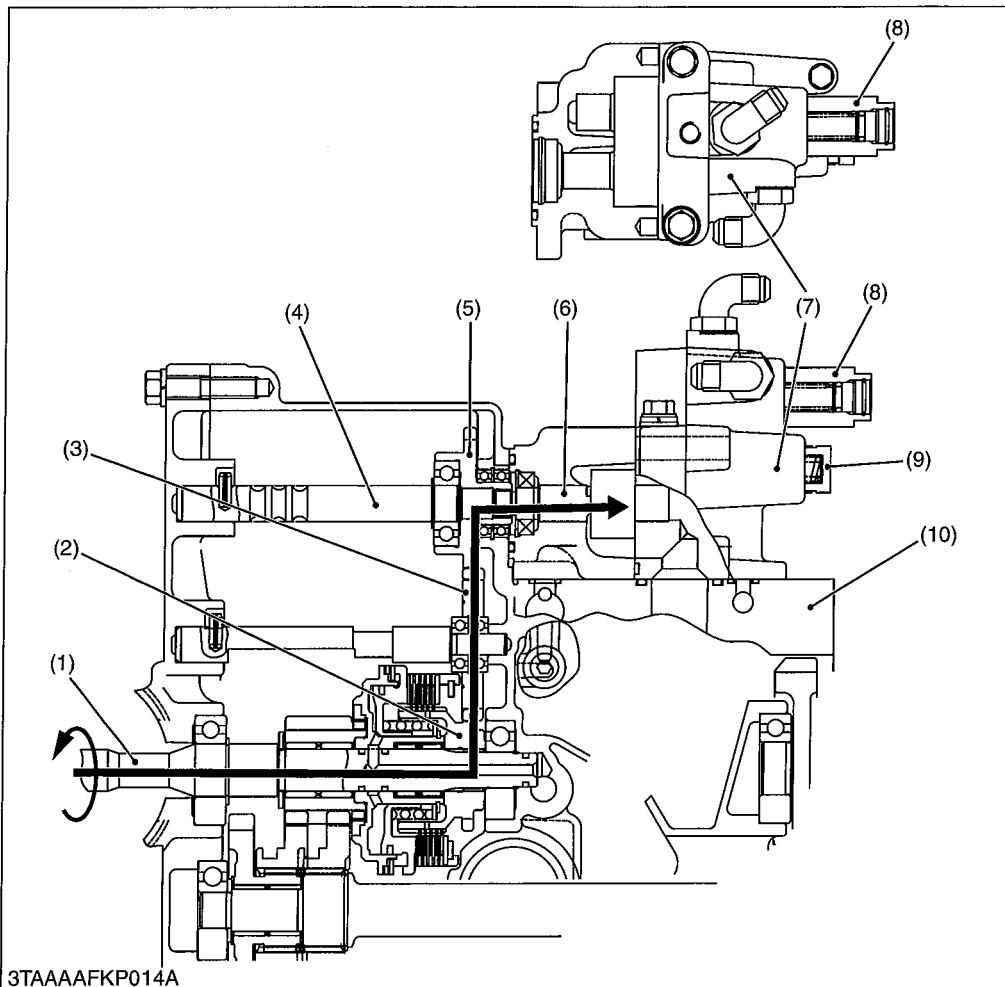
■ **Mid and Rear PTO Position**

"A" and "B" at the same time.

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4. OTHERS

[1] HYDRAULIC PUMP DRIVE GEAR SECTION



- (1) HST Pump Shaft
- (2) Spline Boss
- (3) Idle Gear
- (4) Hydraulic Pump Drive Gear Shaft
- (5) Hydraulic Pump Drive Gear
- (6) Hydraulic Pump Drive Gear Shaft
- (7) Hydraulic Pump
- (8) Flow Priority Valve
- (9) Relief Valve (3P Hitch)
- (10) Transmission Case

The hydraulic pump (7) is mounted to the transmission case (10) and driven by the hydraulic pump drive gear (5). The spline boss (2) mounted on the HST pump shaft drives the hydraulic pump drive gear (5) mounted on the hydraulic pump drive gear shaft (4) through the idle gear (3).

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SERVICING

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1. TROUBLESHOOTING

HYDROSTATIC TRANSMISSION

Symptom	Probable Cause	Solution	Reference Page
System Will Not Operate in Either Direction	Oil level is low	Check oil level or fill oil to proper level	G-32
	Speed control pedal linkage damaged	Repair linkage	2-S22
	Charge pressure is too low	Solution order 1. Replace oil filter cartridge	G-22
		2. Check charge pressure	2-S12
		3. Inspect or flush charge relief valve	2-S40
	Check and high pressure relief valve does not move smoothly	Inspect or replace check and high pressure relief valve	2-S40
Component parts damaged	Replace hydrostatic transmission assembly	2-S23	
Vibration and Noise	Oil level is low	Check oil level or fill oil to proper level	G-32
	Speed control pedal linkage damaged	Repair linkage	2-S22
	Charge pressure is too low	Solution order 1. Replace oil filter cartridge	G-22
		2. Check charge pressure	2-S12
		3. Inspect or flush charge relief valve	2-S40
	Check and high pressure relief valve does not move smoothly	Inspect or replace check and high pressure relief valve	2-S40
Component parts damaged	Replace hydrostatic transmission assembly	2-S23	
Loss of Power	Oil level is low	Check oil level or fill oil to proper level	G-32
	Speed control pedal linkage damaged	Repair linkage	2-S22
	Charge pressure is too low	1. Replace oil filter cartridge	G-22
		2. Check charge pressure	2-S12
		3. Inspect or flush charge relief valve	2-S40
	Check and high pressure relief valve does not move smoothly	Inspect or replace check and high pressure relief valve	2-S40
Component parts damaged	Replace hydrostatic transmission assembly	2-S23	

Symptom	Probable Cause	Solution	Reference Page	
Transmission Oil Over Heats	Low transmission oil level	Fill transmission oil level up to proper level	G-32	
	Radiator net clogged	Clean radiator net	-	
	Excessive machine load	Reduce machine load	-	
	Improper charge pressure	1. Check high relief pressure		2-S12
		2. Replace transmission oil filter cartridge		2-S22
		3. Replace check and high pressure relief valve		2-S40
		4. Inspect and replace charge relief valve		2-S12, 2-S40
Machine Will Not Stop in Neutral Position	Speed control linkage is out of adjustment or sticking	Repair or replace linkage	2-S22	
		Adjust neutral position	2-S10	
System Operates in One Direction Only	Speed control linkage damaged	Repair or replace linkage	2-S22	
	Check and high pressure relief valve damaged	Replace check and high pressure relief valve	2-S40	

TRAVELLING GEAR SHIFT SECTION

Symptom	Probable Cause	Solution	Reference Page
Noise from Transmission	Transmission oil insufficient	Refill	2-S16
	Gear worn or broken	Replace	–
	Bearings worn	Replace	–
Gear Slip Out of Mesh	Shift fork spring tension insufficient	Replace	2-S38
	Shift fork or shifter worn	Replace	2-S38
	Shift fork bent	Replace	2-S38

DIFFERENTIAL GEAR SECTION

Symptom	Probable Cause	Solution	Reference Page
Excessive or Unusual Noise at All Time	Improper backlash between spiral bevel pinion and bevel gear	Adjust	2-S44
	Improper backlash between differential pinion and differential side gear	Adjust	2-S44
	Bearing worn	Replace	–
	Insufficient or improper type of transmission fluid used	Fill or change	G-9, 2-S16
Noise while Turning	Differential pinions or differential side gears worn or damaged	Replace	2-S35
	Differential lock binding (does not disengaged)	Replace	2-S35
	Bearing worn	Replace	–
Differential Lock Can Not Be Set	Differential lock shift fork damaged	Replace	2-S35
	Differential lock shifter mounting pin damaged	Replace	2-S35
	Differential lock pin damaged	Replace	2-S35
Differential Lock Pedal Does Not Return	Differential lock pedal return spring weaken or damaged	Replace	2-S22
	Differential lock fork shaft rusted	Repair	2-S35

BRAKE SECTION

Symptom	Probable Cause	Solution	Reference Page
Brake Drags	Brake pedal free travel too small	Adjust	G-29
	Ball holes of actuator for uneven wear	Replace	2-S46
	Brake pedal return spring weaken or broken	Replace	2-S21
	Brake cam rusted	Repair	2-S36
Poor Braking Force	Brake pedal free travel excessive	Adjust	G-29
	Brake disc worn	Replace	2-S36
	Actuator warped	Replace	2-S36
	Brake cam or lever damaged	Replace	2-S36
	Transmission fluid improper	Change	2-S16

PTO SECTION

Symptom	Probable Cause	Solution	Reference Page
PTO Clutch Slip	Operating pressure is low	Check	2-S15
	PTO clutch valve malfunctioning	Repair or replace	2-S23
	Clutch disc or drive plate excessively worn	Replace	2-S37
	Deformation of clutch piston	Replace	2-S37
PTO Shaft Does Not Rotate	PTO clutch malfunctioning	Repair or replace	2-S37
PTO Clutch Operating Pressure is Low	Transmission oil improper or insufficient	Fill or change	2-S16
	Relief valve malfunctioning	Check or replace	2-M16
PTO Clutch Drags	Brake plate excessive worn	Replace	2-S36
	Clutch spring weaken or broken	Replace	2-S36
	Deformation of pressure plate or steel plate	Replace	2-S36

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2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Charge Relief Valve [Oil temperature at 50 °C (122 °F)]	Setting Pressure	0.55 to 0.75 MPa 5.6 to 7.7 kgf/cm ² 80 to 100 psi	–
High Pressure Relief Valve (Forward and Reverse) [Oil temperature at 50 °C (122 °F)]	Setting Pressure	20.1 to 21.1 MPa 205 to 215 kgf/cm ² 2920 to 3060 psi	–
PTO Clutch	Operating Pressure	1.0 to 1.3 MPa 11 to 13 kgf/cm ² 150 to 180 psi	–
PTO Clutch Disc	Thickness	1.50 to 1.70 mm 0.0591 to 0.0669 in.	1.35 mm 0.0531 in.
Separate Plate	Thickness	0.9450 to 1.055 mm 0.03721 to 0.04153 in.	0.80 mm 0.031 in.
Back Plate	Thickness	1.9 to 2.1 mm 0.075 to 0.082 in.	1.85 mm 0.0728 in.
Clutch Piston	Flatness	–	0.15 mm 0.0059 in.
Pressure Plate and Steel Plate	Flatness	–	0.20 mm 0.0079 in.
Clutch Spring	Free Length	38.5 mm 1.52 in.	34.5 mm 1.36 in.
PTO Brake Disc	Thickness	2.90 to 3.10 mm 0.115 to 0.122 in.	2.70 mm 0.11 in.
PTO Brake Plate	Thickness	1.9 to 2.1 mm 0.075 to 0.082 in.	1.85 mm 0.0728 in.
Differential Case to Differential Side Gear	Clearance	0.0500 to 0.151 mm 0.00197 to 0.00594 in.	0.30 mm 0.012 in.
• Differential Case	I.D.	38.000 to 38.062 mm 1.4961 to 1.4985 in.	–
• Differential Side Gear	O.D.	37.911 to 37.950 mm 1.4926 to 1.4940 in.	–
Differential Pinion Shaft to Differential Pinion	Clearance	0.0800 to 0.122 mm 0.00315 to 0.00480 in.	0.30 mm 0.012 in.
• Differential Pinion	I.D.	20.060 to 20.081 mm 0.78977 to 0.79059 in.	–
• Differential Pinion Shaft	O.D.	19.959 to 19.980 mm 0.78579 to 0.78661 in.	–
Differential Pinion to Differential Side Gear	Backlash	0.15 to 0.30 mm 0.0059 to 0.011 in.	0.40 mm 0.016 in.
Spiral Bevel Pinion Shaft to Spiral Bevel Gear	Backlash	0.10 to 0.30 mm 0.0040 to 0.011 in.	–
Actuator and Bearing Holder	Flatness	–	0.30 mm 0.012 in.
Cam Plate and Ball	Height	22.89 to 22.99 mm 0.9012 to 0.9051 in.	22.40 mm 0.8819 in.

Item		Factory Specification	Allowable Limit
Brake Disc	Thickness	3.30 to 3.50 mm 0.130 to 0.137 in.	3.0 mm 0.12 in.
Friction Plate	Thickness	1.92 to 2.08 mm 0.0756 to 0.0818 in.	1.52 mm 0.0598 in.

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3. TIGHTENING TORQUES

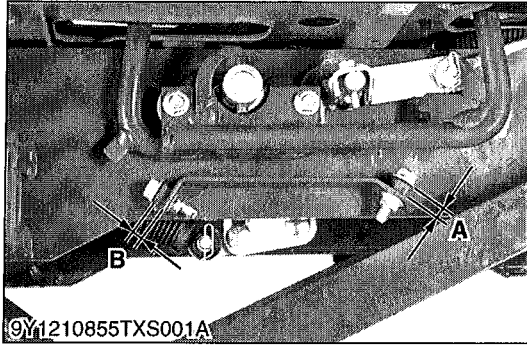
Tightening torques of screws, bolts and nuts on the table below are especially specified.
 (For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-13.)

Item	N·m	kgf·m	lbf·ft
Charge relief valve checking plug (R 1/4)	30 to 44	3.0 to 4.5	22 to 32
Hexagon socket head plug (R 1/4)	30 to 44	3.0 to 4.5	22 to 32
Hexagon socket head screw	25 to 29	2.5 to 3.0	18 to 21
PTO clutch operating pressure plug (R 1/8)	13 to 21	1.3 to 2.2	9.4 to 15
ROPS mounting nut	124 to 147	12.6 to 15.0	91.2 to 108
Fuel tank stay mounting bolt and nut	48 to 55	4.9 to 5.7	36 to 41
Fender bracket mounting bolt and nut	124 to 147	12.6 to 15.0	91.2 to 108
Rear wheel mounting screw	109 to 129	11.1 to 13.2	80.3 to 95.4
Hitch plate mounting bolt and nut	124 to 147	12.6 to 15.0	91.2 to 108
Transaxle assembly mounting screw (M12)	63 to 72	6.4 to 7.4	47 to 53
Transaxle assembly mounting screw (M14)	124 to 147	12.6 to 15.0	91.2 to 108
Rear coupling mounting screw (M8)	24 to 27	2.4 to 2.8	18 to 20
Front coupling mounting screw (M8)	24 to 27	2.4 to 2.8	18 to 20
HST fan mounting screw (M8)	9.8 to 11	1.0 to 1.2	7.3 to 8.6
Hydraulic control lever mounting bolt and nut	18 to 20	1.8 to 2.1	13 to 15
HST front cover mounting bolt and nut	18 to 20	1.8 to 2.1	13 to 15
Check and high pressure relief valve plug	59 to 78	6.0 to 8.0	44 to 57
Hydraulic cylinder mounting screw	40 to 44	4.0 to 4.5	29 to 32
Transaxle case front cover mounting bolt (M10)	39 to 44	4.0 to 4.4	29 to 32
Hydraulic pump assembly mounting bolt (M6)	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5
Hydraulic pump assembly mounting bolt (M8)	18 to 20	1.8 to 2.1	13 to 15
Rear PTO cover mounting bolt (M8)	18 to 20	1.8 to 2.1	13 to 15
Rear axle case (RH) mounting bolt (M8)	18 to 20	1.8 to 2.1	13 to 15
66T final gear mounting screw	61 to 70	6.2 to 7.2	45 to 52

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4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING



Adjusting Maximum Speed

1. Lift up the rear wheels safely by the rigid jacks.
2. Shift the front wheel drive lever to "OFF" position.
3. Depress the speed control pedal to the forward all the way and lengthen the stopper bolt (for the forward) until it touches the speed control pedal.
4. Adjust the stopper bolt (for the forward) length "A" to 17.0 mm (0.669 in.) and lock it securely.
5. Adjust the stopper bolt (for the reverse) length "B" to 17.5 mm (0.689 in.) and lock it securely.
6. Finally check the travelling speed or rear axle shaft rotation speed.
7. If the measurement is not within the references, check the adjusting bolt length "A", "B".

■ IMPORTANT

- Speed control pedal should contact with adjusting bolt "A" and/or "B", when depress the speed control pedal fully.

Stopper bolt length	Reference	Forward	17.0 mm 0.669 in.
		Reverse	17.5 mm 0.689 in.

Maximum rear axle shaft speed (at engine maximum speed and low range)	Reference	52.2 min ⁻¹ 52.2 rpm
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Maximum travelling speed (at engine maximum speed)	Reference [BX1870D]	Forward	12.0 to 13.0 km/h 7.46 to 8.07 mph
		Reverse	9.00 to 10.0 km/h 5.60 to 6.21 mph
	Reference [BX2370D and BX2670D]	Forward	13.0 to 14.0 km/h 8.08 to 8.69 mph
		Reverse	10.0 to 11.0 km/h 6.22 to 6.83 mph

A: Stopper Bolt Length (Forward) B: Stopper Bolt Length (Reverse)

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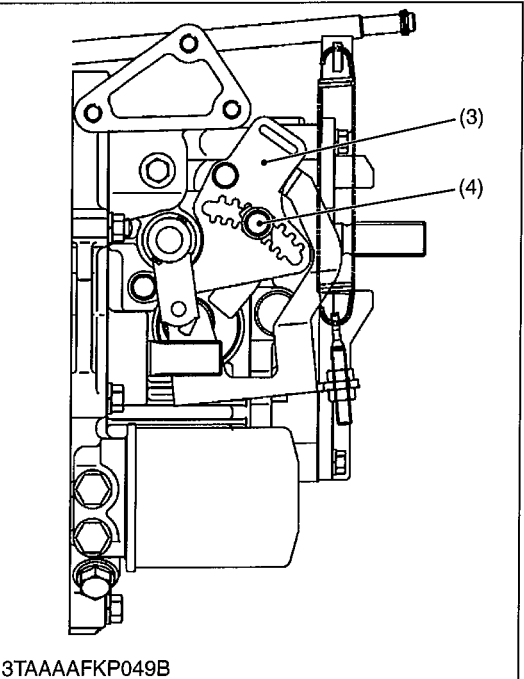
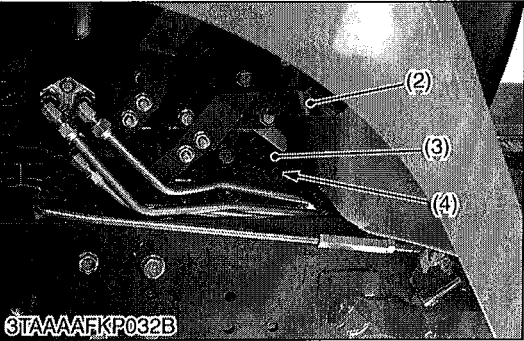
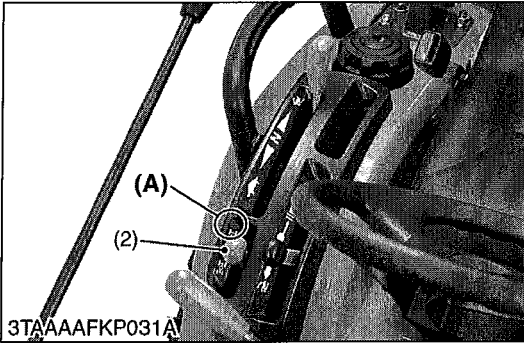
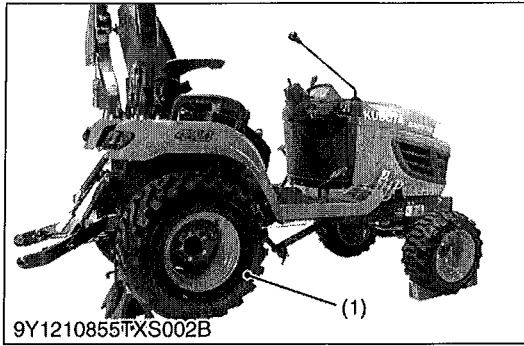
Preparation before HST Adjustment

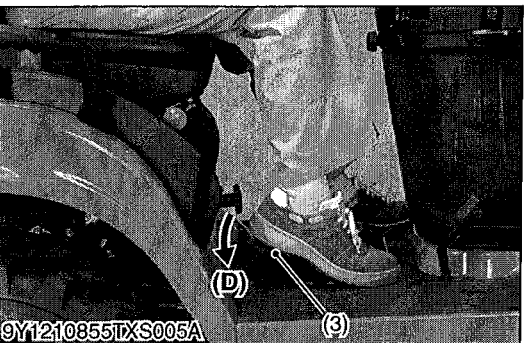
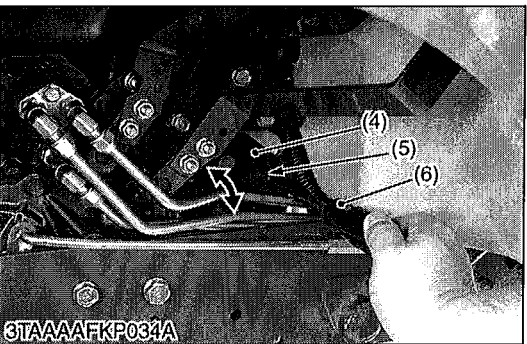
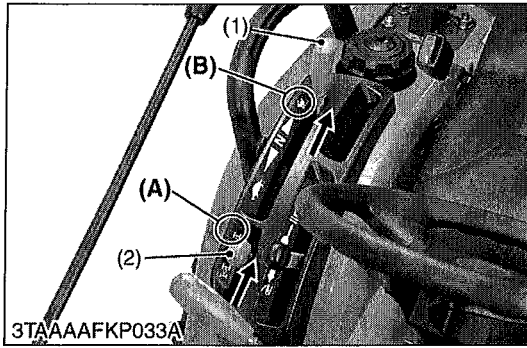
⚠ CAUTION

- **Park the machine on a firm and level ground.**
- 1. Place the wooden blocks at the front and the rear side of the wheels not to move the tractor.
- 2. Lift up the rear wheels (1) safely by the rigid jacks.
- 3. Shift the front wheel drive lever (2) to "OFF" position (A).
- 4. Remove the rear right wheel from the tractor.

- (1) Rear Wheel
 - (2) Front Wheel Drive Lever
 - (3) Neutral Adjuster
 - (4) Lock Screw
- (A) "OFF" Position

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Adjustment of HST Neutral Position

1. Start the engine.
2. Keep the engine at the maximum revolution.
3. Shift the range shift lever (1) to "Hi" position (B).
4. Loosen the locking screw (5).

■ **NOTE**

- When adjusting the HST neutral position, loosen the locking screw approximately 2 turns counterclockwise not to drop the nut inside.
- Make sure 4WD lever is set to 2WD before making adjustment.

(Forward to Neutral Position)

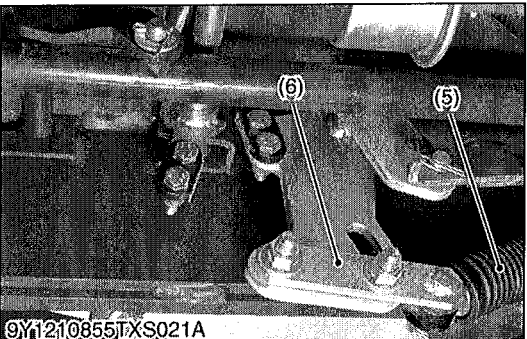
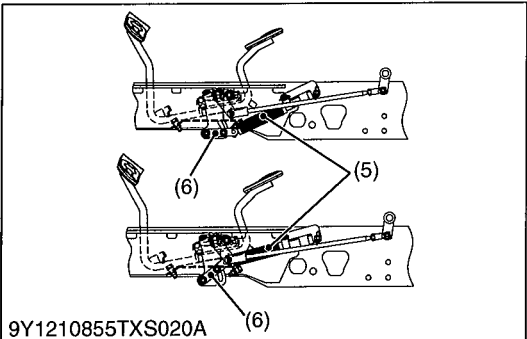
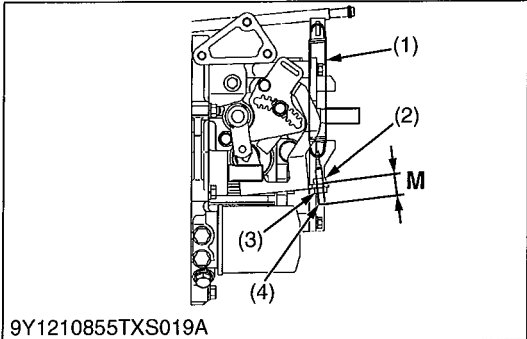
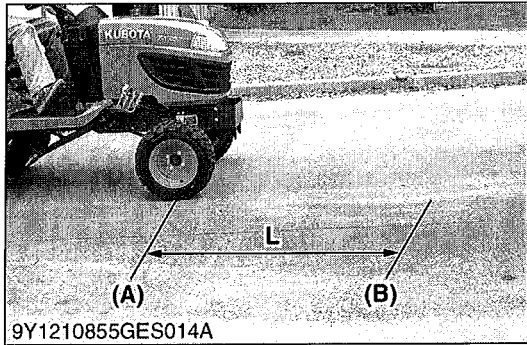
5. Depress the speed control pedal (3) to "Forward" speed position, and release the foot from the speed control pedal (3). Check that the rear axle (or the wheel) stops rotating. If the rear axle (or the wheel) does not stop rotating, move the position of the locking screw (5) to the machine front side to stop rotating.

(Reverse to Neutral Position)

6. Depress the speed control pedal (3) to "Reverse" speed position, and release the foot from the speed control pedal (3). Check the rear axle (or the wheel) stops rotating. If the rear axle (or the wheel) does not stop rotating, adjust the locking screw (5) to stop rotating.
7. After adjusting the neutral position, tighten the lock screw (5) securely.

- | | |
|-----------------------------|------------------------|
| (1) Range Gear Shift Lever | (A) 4WD "OFF" Position |
| (2) Front Wheel Drive Lever | (B) "Hi" Position |
| (3) Speed Control Pedal | (C) FORWARD |
| (4) Neutral Adjust Lever | (D) REVERSE |
| (5) Locking Screw | |
| (6) Screw Driver | |

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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 "Hi" 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 (10 feet), strengthen the HST neutral spring tension so that the machine will stop in approximately 3 m (10 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 (10 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 (10 feet), adjust the neutral spring again.

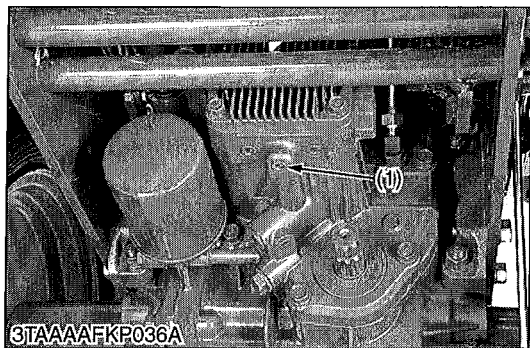
(Reference)

- The feeling of dynamic braking can be adjusted by changing the arm (6) position of damper (5).

Length "M" of adjusting rod at shipping the machine from the factory	Reference	10 mm 0.39 in.
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- | | |
|------------------------|---|
| (1) HST Neutral Spring | (A) Foot Releasing Point |
| (2) Lock Nut | (B) Machine Stopping Point |
| (3) Adjusting Nut | L: Distance between Foot Releasing Point and the Machine Stopping Point |
| (4) Adjusting Rod | M: Length of Adjusting Rod from Stay |
| (5) Damper | |
| (6) Arm | |

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Charge Relief Pressure

⚠ CAUTION

- When checking, park the tractor on flat ground, and apply the parking brake.
1. Remove the plug (R 1/4) (1) from the front cover, then install the adaptor (R 1/4) and pressure gauge.
 2. Set the range gear shift lever to "Neutral" position.
 3. Start the engine and run it at the maximum speed.
 4. Read the pressure gauge to measure the charge relief pressure.
 5. If the measurement is not within the factory specifications, check the charge relief valve and related hydraulic components.

■ NOTE

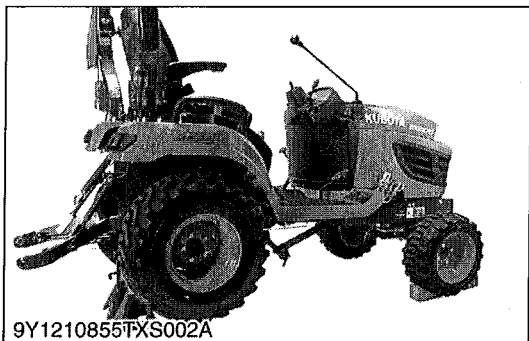
- When reinstalling the hexagon socket head plug, apply liquid lock (Three Bond 1324 or its equivalent) to the plug.

Charge relief pressure (Oil temperature at 50 °C, 122 °F)	Factory specification	0.55 to 0.75 MPa 5.6 to 7.7 kgf/cm ² 80 to 100 psi
---	-----------------------	---

Tightening torque	Charge relief valve checking plug (R 1/4)	30 to 44 N·m 3.0 to 4.5 kgf·m 22 to 32 lbf·ft
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(1) Plug

9Y1210855TXS0008US0



9Y1210855TXS002A

High Relief Pressure (Forward)

⚠ CAUTION

- When checking, park the tractor on flat ground, and apply the parking brake.
1. Remove the hexagon socket head plug (R 1/4) from P2 (2), then install the adaptor, cable and pressure gauge.
 2. Start the engine and run it at maximum speed.
 3. Set the range gear shift lever to "Hi" position.
 4. Depress the speed control pedal to "Forward", and read the pressure gauge to measure the high relief pressure.
 5. If the measurement is not same as factory specification, check the high pressure relief valve and related hydraulic components.

High relief pressure (Forward) (Oil temperature at 50 °C, 122 °F)	Factory specification	20.1 to 21.1 MPa 205 to 215 kgf/cm ² 2920 to 3060 psi
--	-----------------------	--

Tightening torque	Hexagon socket head plug (P1 and P2 port)	30 to 44 N·m 3.0 to 4.5 kgf·m 22 to 32 lbf·ft
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■ IMPORTANT

- Measure quickly the high relief pressure within about 10 seconds.

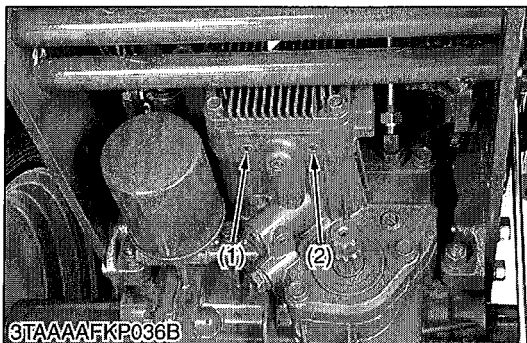
■ NOTE

- When reinstalling the hexagon socket head plug, apply liquid lock (Three Bond 1324 or its equivalent) to the plug.

(1) P1 Port (Reverse)

(2) P2 Port (Forward)

9Y1210855TXS0009US0



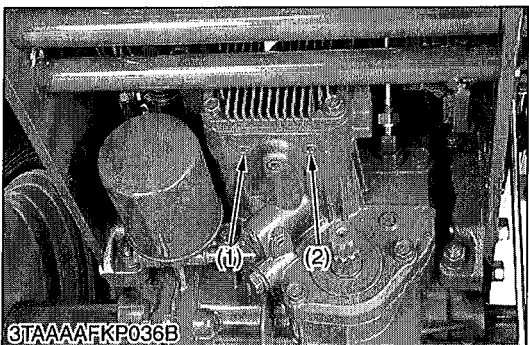
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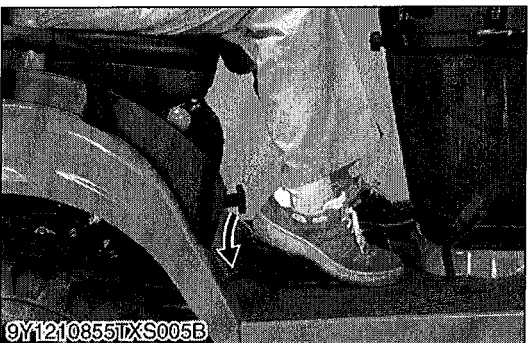
9Y1210855TXS003A



9Y1210855TXS002A



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9Y1210855TXS005B

High Relief Pressure (Reverse)

CAUTION

- When checking, park the tractor on flat ground, and apply the parking brake.
1. Remove the hexagon socket head plug (R 1/4) from P1 (1), then install the adaptor, cable and pressure gauge.
 2. Start the engine and run it at maximum speed.
 3. Set the range gear shift lever to "Hi" position.
 4. Depress the speed control pedal to "Reverse", and read the pressure gauge to measure the high relief pressure.
 5. If the measurement is not same as factory specification, check the high pressure relief valve and related hydraulic components.

High relief pressure (Reverse) (Oil temperature at 50 °C, 122 °F)	Factory specification	20.1 to 21.1 MPa 205 to 215 kgf/cm ² 2920 to 3060 psi
--	-----------------------	--

Tightening torque	Hexagon socket head plug (P1 and P2 port)	30 to 44 N·m 3.0 to 4.5 kgf·m 22 to 32 lbf·ft
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■ IMPORTANT

- Measure quickly the high relief pressure within about 10 seconds.

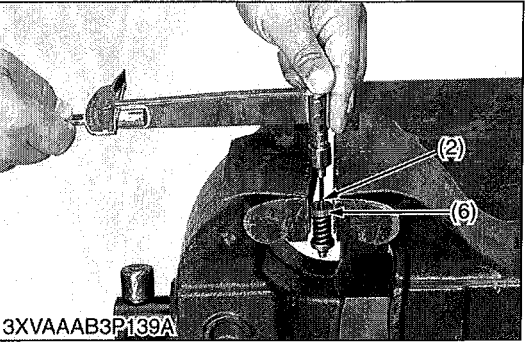
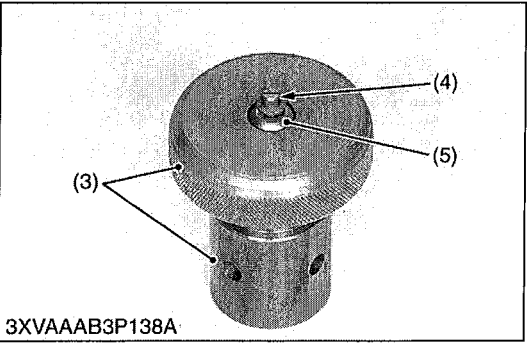
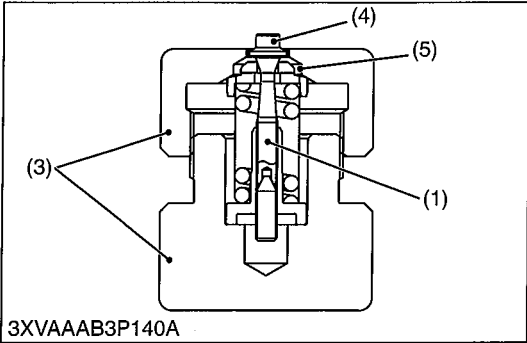
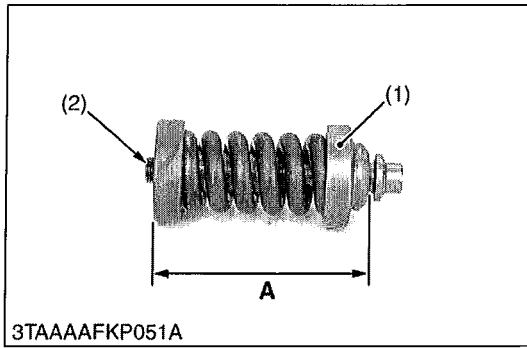
■ NOTE

- When reinstalling the hexagon socket head plug, apply liquid lock (Three Bond 1324 or its equivalent) to the plug.

(1) P1 Port (Reverse)

(2) P2 Port (Forward)

9Y1210855TXS0010US0



Readjustment of Relief Valve (When the HST does not Work Due to its Loose Hexagon Socket Head Screw)

■ **IMPORTANT**

- KUBOTA does not recommend the readjustment of relief valve. KUBOTA recommends with genuine parts.
- As the HST may be damaged if the pressure is set to high by mistake, be careful when adjusting it.

■ **NOTE**

- The relief pressure is set in between 20.1 to 21.1 MPa (205 to 215 kgf/cm², 2920 to 3060 psi) when shipped from the factory. But, for the purpose of after-sales services, as it is impossible to reset the pressure precisely as set in the factory, its setting range is defined as a slightly wider range between 15.0 to 20.0 MPa (153 to 203 kgf/cm², 2180 to 2900 psi).

1. Measure the pre-adjustment distance "A".
2. Compress the spring of the relief valve with a relief valve assembling tool (3).
3. Then, find the distance "A" by turning the poppet (4) with a screwdriver.

Reference: The distance "A" changes by about 0.5 mm (0.02 in.) per one turn of the poppet (4).

4. Repeat the same operation a few times to find the distance "A" as it is difficult to acquire at the first time.
5. After finding the distance "A", hold the setscrew (6) to a vice and fasten the hexagon socket head screw (2) with specified torque. On this occasion, use a copper plate, etc. for the vice jaws not to damage the setscrew (6).
6. Install the relief valve in the HST.
7. Check the relief pressure as indicated in page 2-S12 and 2-S13. The distance "A" is for refresh only. Make sure to check the relief pressure after readjustment.

8. If the relief pressure does not fall within the readjustment pressure range, repeat the processes of the above.

Reference: The pressure changes by 1.5 MPa (15 kgf/cm², 210 psi) per 0.1 mm (0.004 in.) in distance "A".

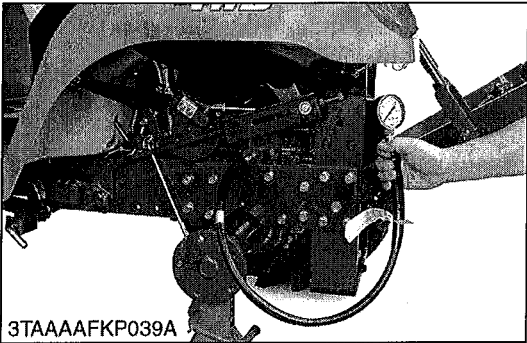
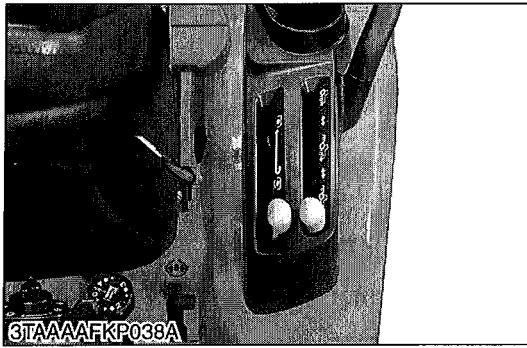
Tightening torque	Hexagon socket head screw	25 to 29 N·m 2.5 to 3.0 kgf·m 18 to 21 lbf·ft
-------------------	---------------------------	---

Relief valve readjusting pressure	Factory specification	15.0 to 20.0 MPa 153 to 203 kgf/cm ² 2180 to 2900 psi
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Distance "A" of relief valve (Forward)	Reference value	39.10 to 39.20 mm 1.540 to 1.543 in.
Distance "A" of relief valve (Reverse, φ1.5 mm orifice)	Reference value	38.60 to 38.70 mm 1.520 to 1.523 in.

- | | |
|----------------------------------|--------------------|
| (1) Relief Valve Assembly | (5) Valve Seat |
| (2) Hexagon Socket Head Screw | (6) Setscrew |
| (3) Relief Valve Assembling Tool | |
| (4) Poppet | A: Distance |

9Y1210855TXS0011US0



PTO Clutch Operating Pressure

⚠ CAUTION

- **When checking, park the tractor on flat ground, apply the parking brake.**
- 1. Lift the rear of the tractor and remove the left rear wheel.
- 2. Remove the plug (R 1/8), then install the adaptor (R 1/8), cable and pressure gauge.
- 3. Start the engine and set at maximum speed.
- 4. Move the PTO clutch lever to "**Engaged**" position, and measure the pressure.
- 5. If the measurement is not same as factory specifications, check the PTO relief valve and related hydraulic components.

■ IMPORTANT

- **Do not connect the universal joint of the implement to the mid and rear PTO shaft.**

■ NOTE

- **When reinstall the hexagon socket head plug, apply liquid lock (Three Bond 1324 or its equivalent) to the plug.**

PTO clutch operating pressure	Factory specification	1.0 to 1.3 MPa 11 to 13 kgf/cm ² 150 to 180 psi
-------------------------------	-----------------------	--

Tightening torque	PTO clutch valve plug (R 1/8)	13 to 21 N·m 1.3 to 2.2 kgf·m 9.4 to 15 lbf·ft
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Condition

- Engine speed:
Maximum
- Oil temperature:
45 to 55 °C (113 to 131 °F)

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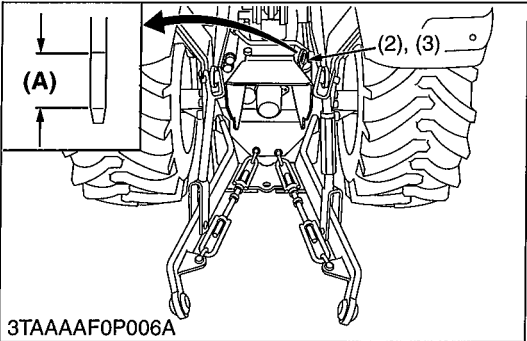
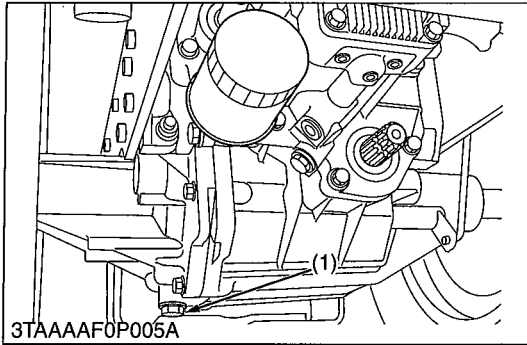
Brake Pedal Free Travel

1. See page G-29.

9Y1210855TXS0013US0

[2] PREPARATION

(1) Separating Transaxle



Draining Transmission Fluid

CAUTION

- Be sure to stop the engine before checking and changing the transmission fluid.
1. Place oil pan under the tractor.
 2. Remove the drain plug (1) at the bottom of the transmission case.
 3. Drain the transmission fluid and reinstall the drain plug.

(When refilling)

- Fill new oil from filling port after removing the filling plug (2) up to the upper notch on the dipstick (3).
- After running the engine for few minutes, stop it and check the oil level again, if low, add oil to prescribed level.

IMPORTANT

- Do not operate the tractor immediately after changing the transmission fluid.
- Run the engine at medium speed for a few minutes to prevent damage to the transmission.
- Do not mix different brands oil together.

Transmission fluid	Capacity	11.6 L 3.1 U.S.gals 2.6 Imp.gals
--------------------	----------	--

- (1) Drain Plug
- (2) Filling Plug
- (3) Dipstick

(A) Oil level is acceptable within this range.

9Y1210855TXS0014US0

Battery

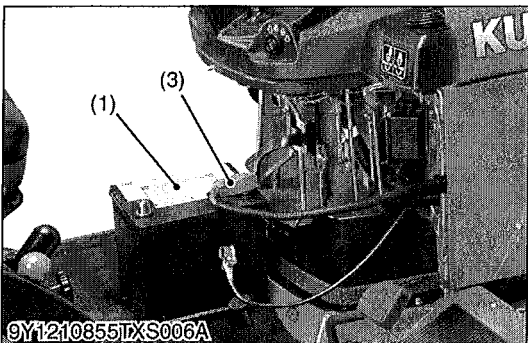
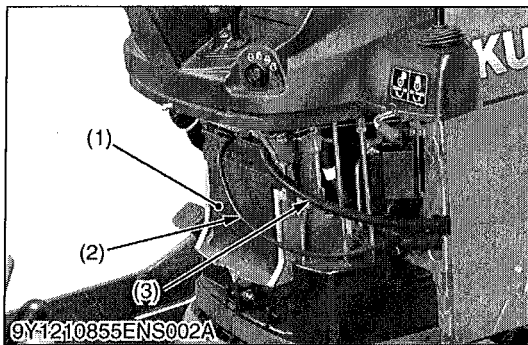
CAUTION

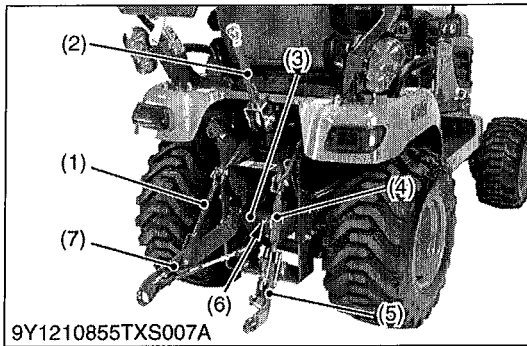
- When disconnecting the battery cables, disconnect the negative cable from the battery first. When connecting, connect the positive cable to the battery first.
1. Remove the under panel.
 2. Disconnect the negative cable (2) from the battery (1).
 3. Disconnect the positive cable (3) from the battery (1) and remove the battery (1).

- (1) Battery
- (2) Negative Cable

(3) Positive Cable

9Y1210855TXS0015US0



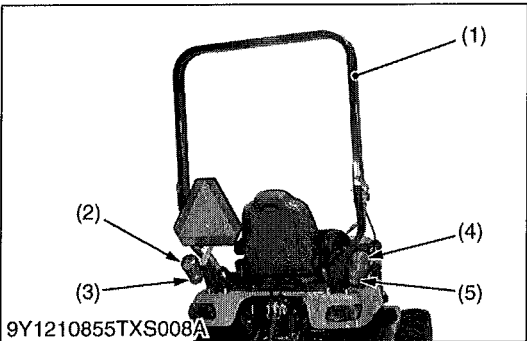
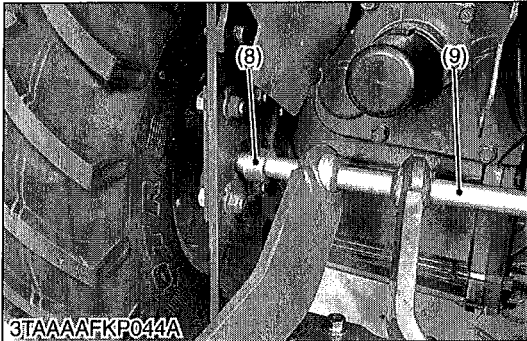


Lift Rod and Lower Link

1. Remove the top link (2).
2. Remove the stopper pin (6) and remove the check chain plate (3).
3. Move the bushes (8) to inside.
4. Move the shaft (9) to right side and remove the lower link as a unit.

- | | |
|-----------------------|-------------------|
| (1) Lift Rod LH | (6) Stopper Pin |
| (2) Top Link | (7) Lower Link LH |
| (3) Check Chain Plate | (8) Bush |
| (4) Lift Rod RH | (9) Shaft |
| (5) Lower Link RH | |

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Roll-Over Protective Structures (ROPS)

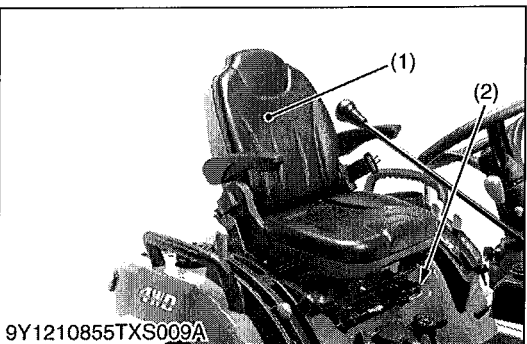
1. Disconnect the lead wires from the hazard lamp (2), (4) and turn signal lights (3), (5).
2. Remove the ROPS mounting nuts, and remove the ROPS (1).

(When reassembling)

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

- | | |
|--------------------------|--------------------------|
| (1) ROPS | (4) Hazard Lamp RH |
| (2) Hazard Lamp LH | (5) Turn Signal Light RH |
| (3) Turn Signal Light LH | |

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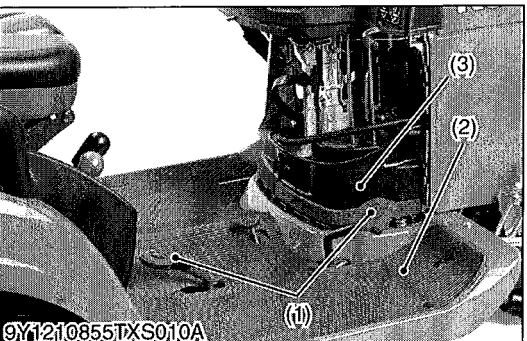


Seat

1. Disconnect the seat switch connectors.
2. Remove the snap pins (2) to remove the seat (1).

- | | |
|----------|--------------|
| (1) Seat | (2) Snap Pin |
|----------|--------------|

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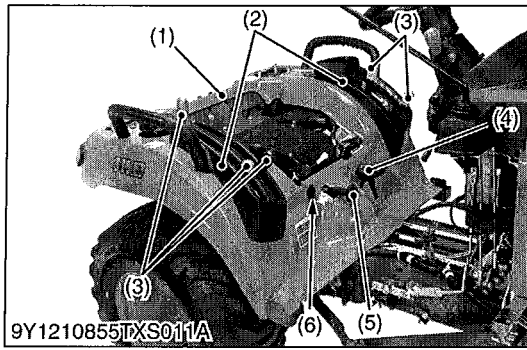


Speed Control Pedal and Step

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

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

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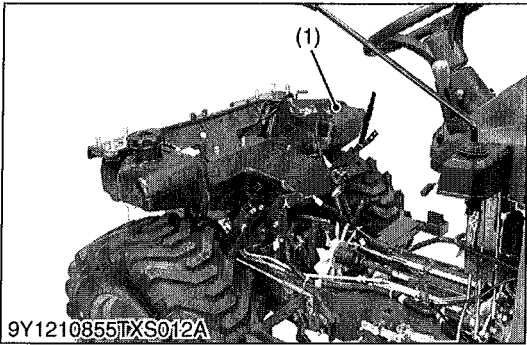
9Y1210855TXS011A

Lever Grips and Fender

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

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

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9Y1210855TXS012A

Fuel Tank

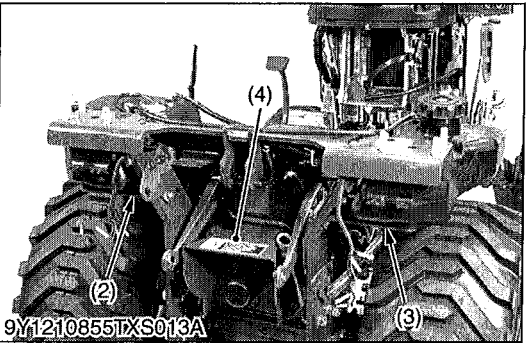
1. Drain the fuel.
2. Disconnect the lead wire from fuel level sensor and fuel hoses from the fuel tank (1).
3. Remove the fuel tank stays (2), (3) and cushions, then remove the fuel tank (1).
4. Remove the PTO cover (4).

(When reassembling)

Tightening torque	Fuel tank stay mounting bolt and nut	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft
-------------------	--------------------------------------	---

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

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Fender Center Stay

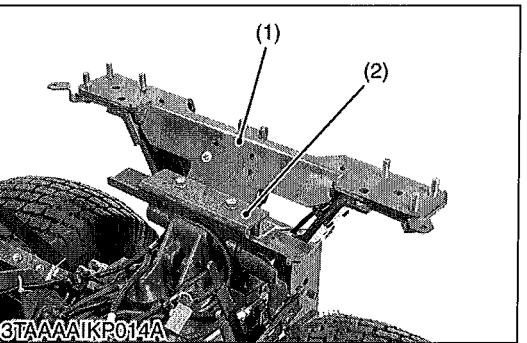
1. Remove the fender bracket (2).
2. Remove the fender center stay (1).

(When reassembling)

Tightening torque	Fender bracket mounting bolt	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft
-------------------	------------------------------	--

- | | |
|------------------------|--------------------|
| (1) Fender Center Stay | (2) Fender Bracket |
|------------------------|--------------------|

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Rear Wheel

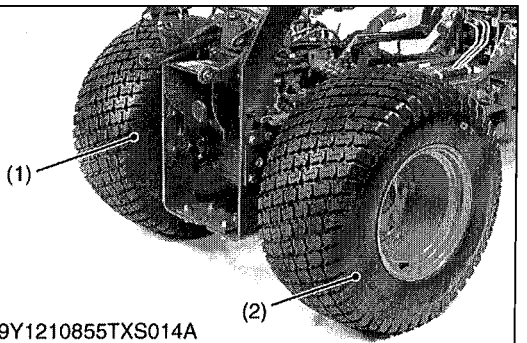
1. Remove the rear wheels (1) and (2).

(When reassembling)

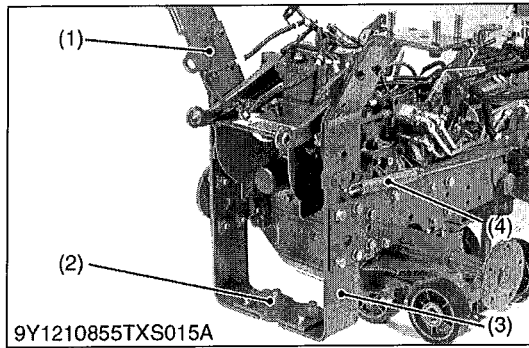
Tightening torque	Rear wheel mounting bolt	109 to 129 N·m 11.1 to 13.2 kgf·m 80.3 to 95.4 lbf·ft
-------------------	--------------------------	---

- | | |
|-------------------|-------------------|
| (1) Rear Wheel LH | (2) Rear Wheel RH |
|-------------------|-------------------|

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9Y1210855TXS014A



Fender Bracket, Hitch Plate

1. Remove the hitch plate (2).
2. Remove the parking brake return spring (4) and the fender brackets (1), (3).

(When reassembling)

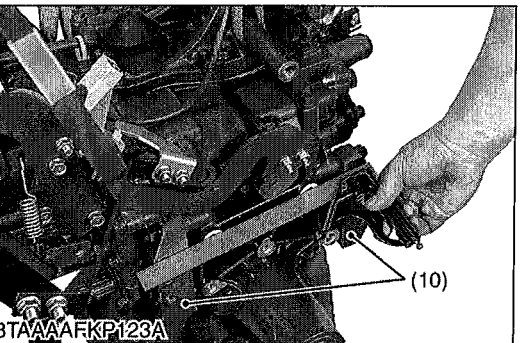
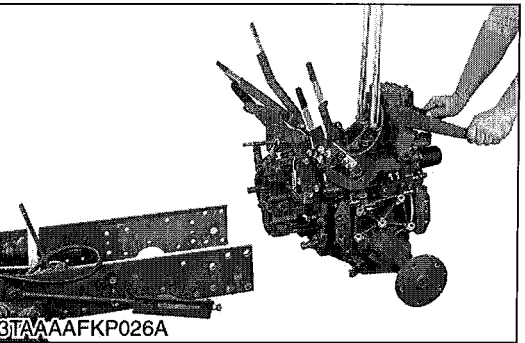
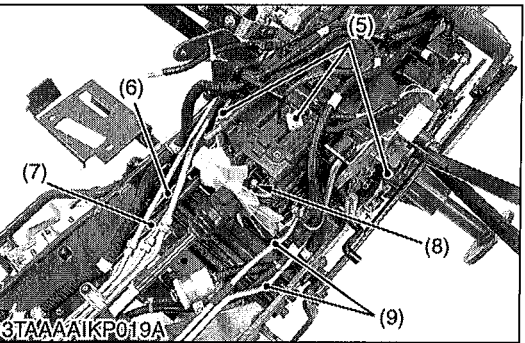
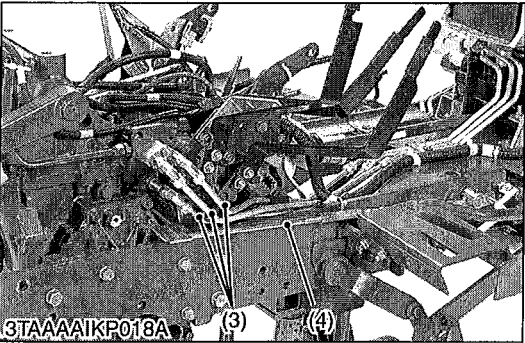
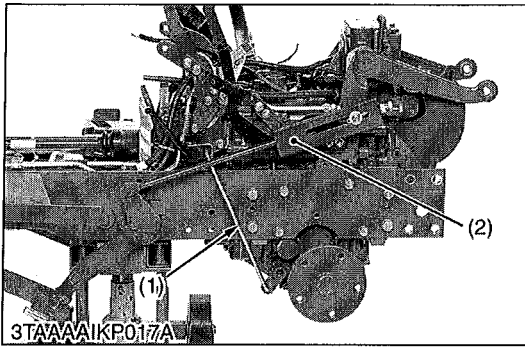
- Do not firmly tighten all screws, bolts and nuts until most components are attached.

Tightening torque	Hitch plate mounting bolt and nut (M14)	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft
	Fender bracket mounting bolt and nut (M14)	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft

- (1) Fender Bracket LH
(2) Hitch Plate

- (3) Fender Bracket RH
(4) Return Spring

9Y1210855TXS0024US0



Transaxle Assembly

1. Remove the differential lock rod (1) and disconnect the mower link (2).
2. Remove the brake rod (4).
3. Disconnect the pipes (3). (If equipped.)
4. Disconnect the connector (5).
5. Remove the rear coupling mounting bolt (8).
6. Disconnect the power steering pipes (9).
7. Remove the speed control rod (7).
8. Remove the wire harness clamps
9. Remove the frame brackets (10).

(When reassembling)

- Tighten the smaller bolt (M12) first.
- Before mounting the transaxle assembly on the tractor main frame, check the flatness of the frame brackets with a straight edge securely.

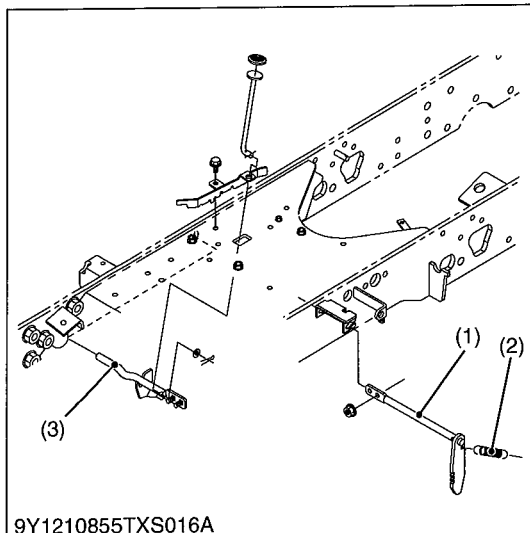
Tightening torque	Transaxle assembly mounting bolt (M12)	63 to 72 N·m 6.4 to 7.4 kgf·m 47 to 53 lbf·ft
	Transaxle assembly mounting bolt (M14)	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft
	Rear coupling mounting bolt (M8)	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

(Reference)

- Speed control rod length (7):
371 mm (14.6 in.)

- | | |
|---------------------------|---------------------------------|
| (1) Differential Lock Rod | (6) Front Wheel Drive Shaft |
| (2) Mower Link | (7) Speed Control Rod |
| (3) Pipe | (8) Rear Coupling Mounting Bolt |
| (4) Brake Rod | (9) Power Steering Pipe |
| (5) Connector | (10) Frame Bracket |

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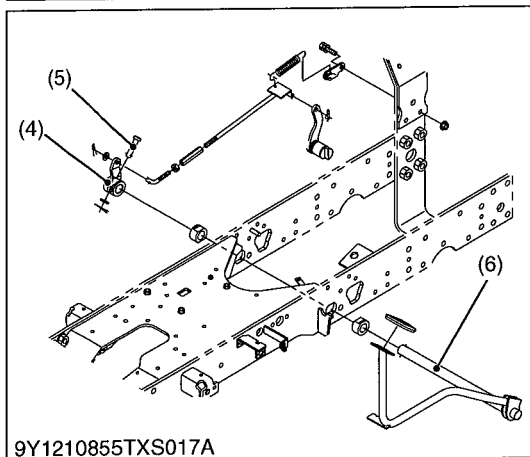


Brake Pedal

1. Unhook the spring (2) and remove the parking lock (1).
2. Removing the split pin then remove pin (5) from the brake arm (4).
3. Remove the brake pedal (6).

- | | |
|------------------|-----------------|
| (1) Parking Lock | (4) Brake Arm |
| (2) Spring | (5) Pin |
| (3) Parking Arm | (6) Brake Pedal |

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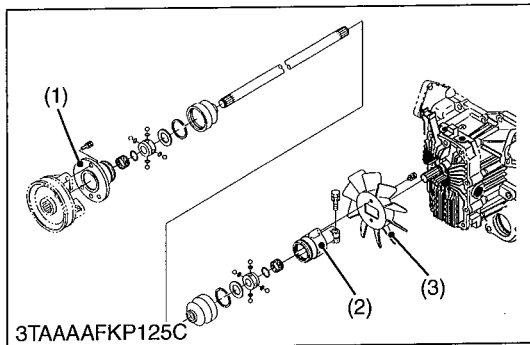


Propeller Shaft

1. Disconnect the front coupling (1) from the engine.
2. Remove the propeller shaft assembly.
3. Remove the HST fan from the propeller shaft.

(When reassembling)

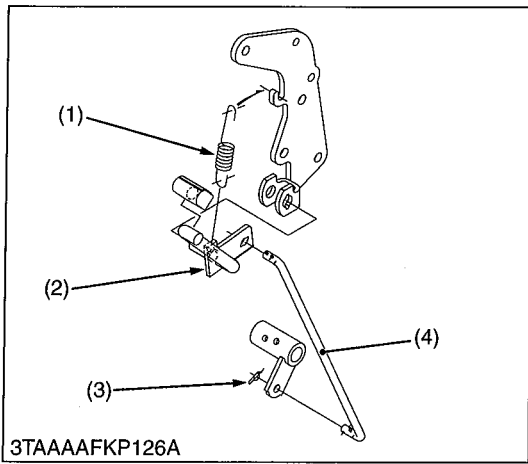
- Apply grease to inside of the front coupling and the rear coupling.



Tightening torque	Front coupling mounting bolt (M8)	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
	HST fan mounting bolt (M8)	9.8 to 11 N·m 1.0 to 1.2 kgf·m 7.3 to 8.6 lbf·ft

- | | |
|--------------------|-------------|
| (1) Front Coupling | (3) HST Fan |
| (2) Rear Coupling | |

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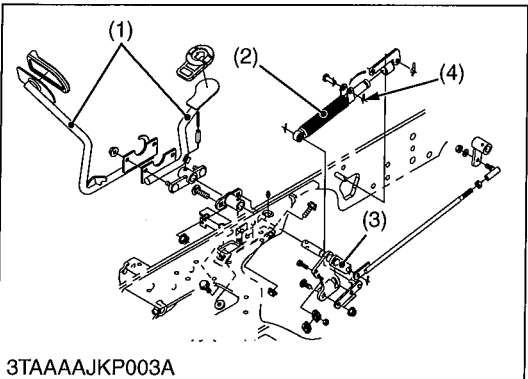


Differential Lock Pedal

1. Remove the differential lock return spring (1).
2. Remove the rue ring cotter (3).
3. Turn and remove the differential lock pedal (2).

- | | |
|-----------------------------|---------------------------|
| (1) Spring | (3) Rue Ring Cotter |
| (2) Differential Lock Pedal | (4) Differential Lock Rod |

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Speed Control Pedal, HST Damper and Cruise Rod

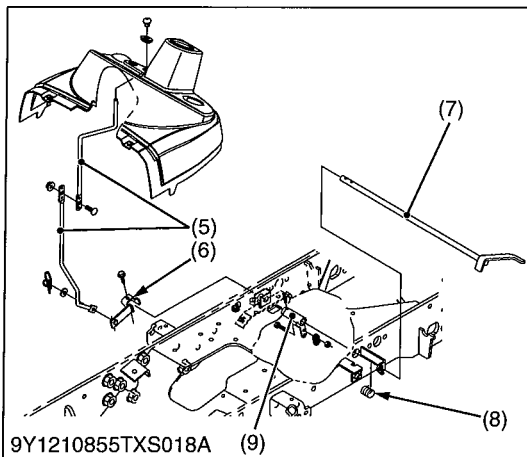
1. Remove the speed control pedal (1).
2. Remove the rue ring cotter (4).
3. Remove the HST dumper (2).
4. Remove the cruise arm (6).
5. Remove the cruise rod (5).
6. Remove the spring pin then remove the release arm (7) and cruise plate (9).

(When reassembling)

- Be sure to assemble the cruise spring (8) properly.

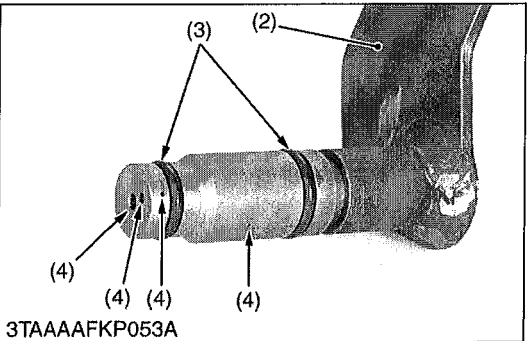
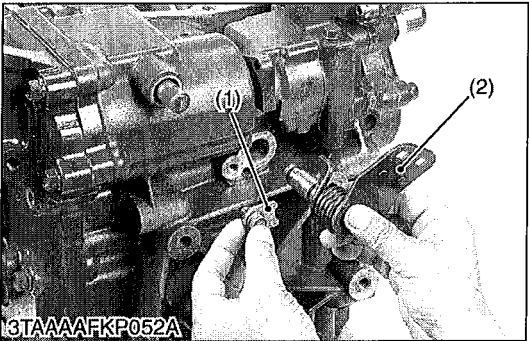
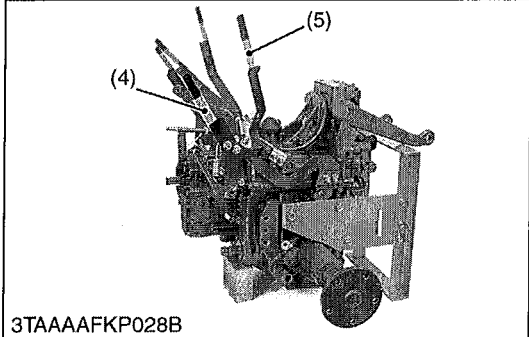
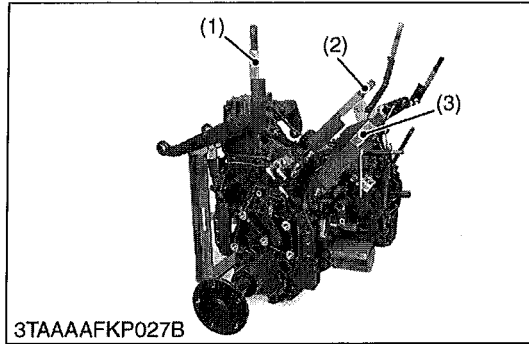
- | | |
|-------------------------|-------------------|
| (1) Speed Control Pedal | (6) Cruise Arm |
| (2) HST Damper | (7) Release Arm |
| (3) HST Pedal Link | (8) Cruise Spring |
| (4) Rue Ring Cotter | (9) Cruise Plate |
| (5) Cruise Rod | |

9Y1210855TXS0029US0



[3] DISASSEMBLING AND ASSEMBLING

(1) Hydrostatic Transmission



Levers and Mower Lift Arm

1. Tap out the spring pin from the range gear shift lever (1) and front wheel drive lever (3), then remove the both levers.
2. Remove the hydraulic control lever (2).
3. Remove the PTO select lever (4) and PTO clutch control lever (5).

(When reassembling)

- Apply grease to inside of the front coupling and rear mounting.

Tightening torque	Hydraulic control lever mounting bolt and nut	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft
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- | | |
|-----------------------------|------------------------------|
| (1) Range Gear Shift Lever | (4) PTO Select Lever |
| (2) Hydraulic Control Lever | (5) PTO Clutch Control Lever |
| (3) Front Wheel Drive Lever | |

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PTO Clutch Valve

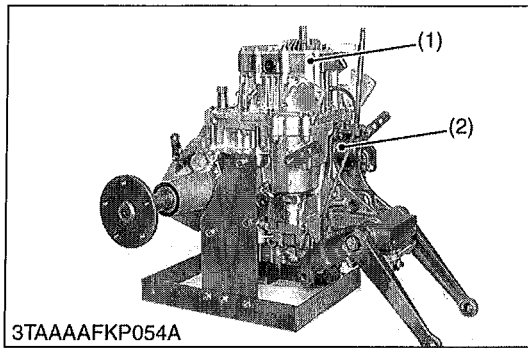
1. Remove the stopper (1).
2. Draw out the PTO clutch valve (2) from the transaxle assembly.

(When reassembling)

1. Clean the oil passages (4).
2. Apply the transmission fluid to the O-rings (3).

- | | |
|----------------------|-----------------|
| (1) Stopper | (3) O-ring |
| (2) PTO Clutch Valve | (4) Oil Passage |

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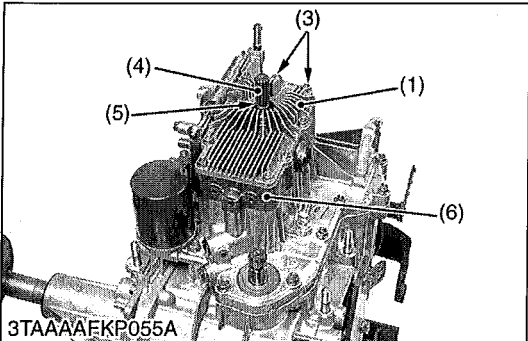
Oil Cooler Cover

1. Remove the HST front cover.
2. Remove the HST front cover (1) not to damage the oil seal (5).
3. Remove the center section (6).

(When reassembling)

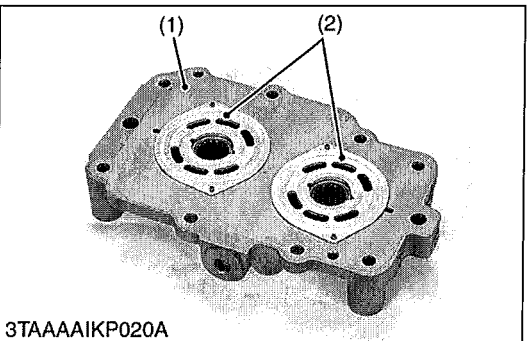
1. Do not damage the oil seal (5).
2. Tighten the HST mounting bolts and the nut to the factory specifications.

Tightening torque	Oil cooler cover mounting bolt (M8)	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft
	Oil cooler cover mounting nut (M8)	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft



- | | |
|------------------------|----------------------|
| (1) HST Front Cover | (4) Internal Circlip |
| (2) Transaxle Assembly | (5) Oil Seal |
| (3) Bolt | (6) Center Section |

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Center Section and Valve Plates

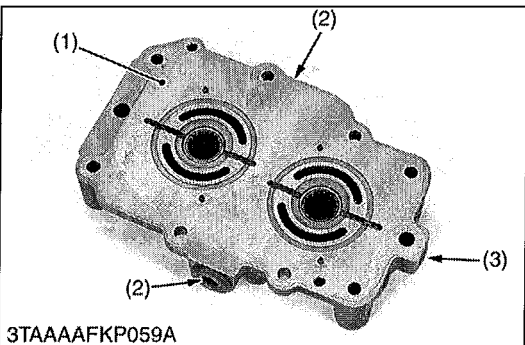
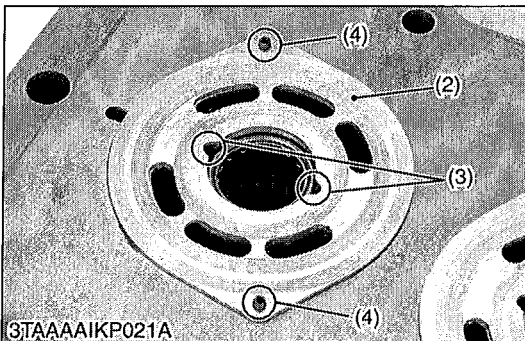
1. Remove the valve plates (2).

(When reassembling)

1. Check the direction of the groove (3).
2. Install the valve plates (2) to the anchor pins (4) securely.
3. Install the groove of the valve plate (pump plate) to the engine side.

- | | |
|--------------------|----------------|
| (1) Center Section | (3) Groove |
| (2) Valve Plate | (4) Anchor Pin |

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Check and High Pressure Relief Valve Plug

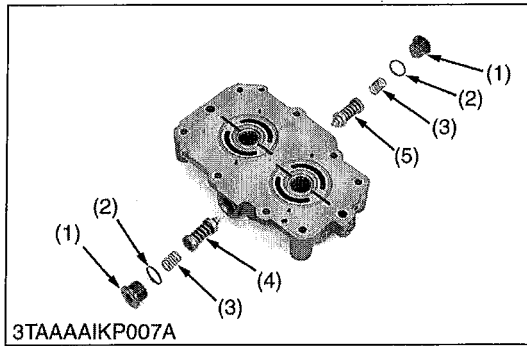
1. Remove the check and high pressure relief plug (G 1/2).

(When reassembling)

Tightening torque	Check and high pressure relief valve plug (G 1/2)	59 to 78 N·m 6.0 to 8.0 kgf·m 44 to 57 lbf·ft
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- | | |
|--------------------|----------|
| (1) Center Section | (3) Plug |
| (2) Plug | |

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Check and High Pressure Relief Valve

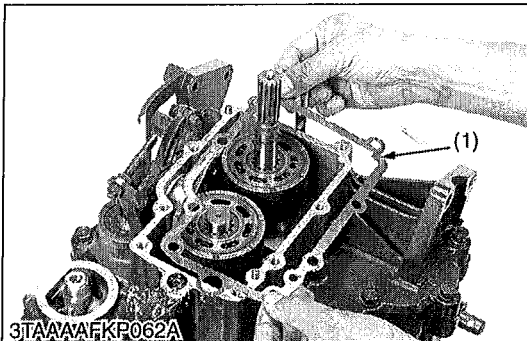
1. After removing the plug (1), draw out the spring (3) and the check and high pressure relief valve assembly (4), (5).

(When reassembling)

- Be careful not to damage the O-ring (2) on the plug (1).
- Since there is an orifice (1.5 mm, 0.059 in.) in the check and relief valve body (reverse) (5), re-install the check and relief valve (4), (5) to their original positions.

- | | |
|------------|--------------------------------------|
| (1) Plug | (4) Check and Relief Valve (Forward) |
| (2) O-ring | (5) Check and Relief Valve (Reverse) |
| (3) Spring | |

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Cylinder Block

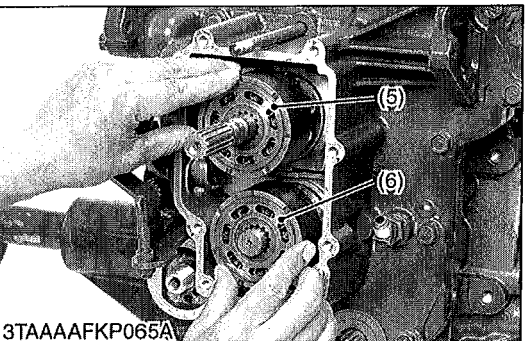
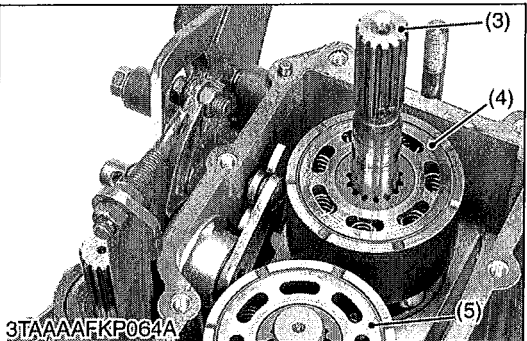
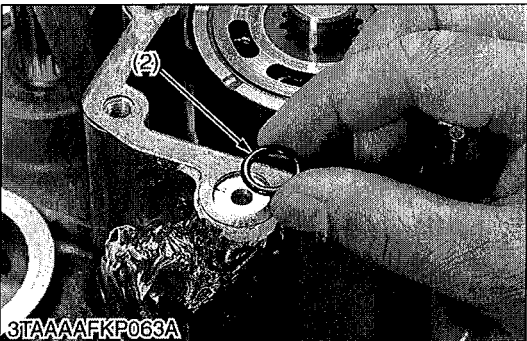
1. Remove the gasket (1).
2. Remove the O-ring (2).
3. Remove the cylinder block assembly (4), (5) from the transaxle.

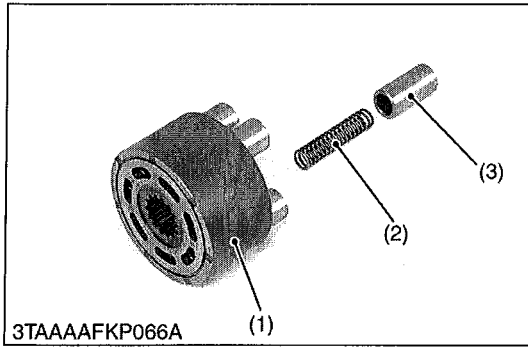
(When reassembling)

- Turn the disassembling and the assembling stand vertically.
- Install the cylinder block assembly (4), (5) to the shafts not to drop the pistons from the cylinder block assembly (4), (5) carefully.

- | | |
|---|--|
| (1) Gasket | (5) Cylinder Block Assembly (Pump Side) |
| (2) O-ring | (6) Cylinder Block Assembly (Motor Side) |
| (3) Pump Shaft | |
| (4) Cylinder Block Assembly (Pump Side) | |

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Cylinder Block and Piston

1. Remove the piston (3) and the spring (2) from the cylinder block (1).

(When reassembling)

- Apply clean transmission oil to the cylinder block and the piston.

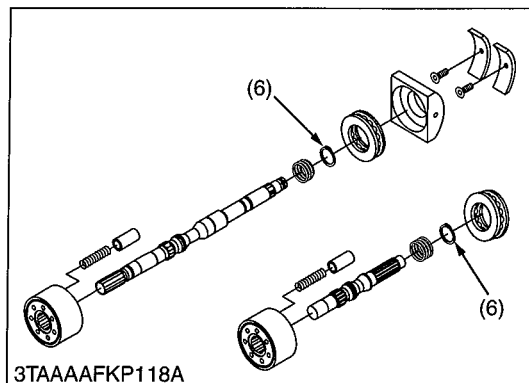
NOTE

- **Be careful not to damage the surface of the cylinder block and the piston.**

- (1) Cylinder Block
(2) Spring

- (3) Piston

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Swashplate and Thrust Roller Bearing

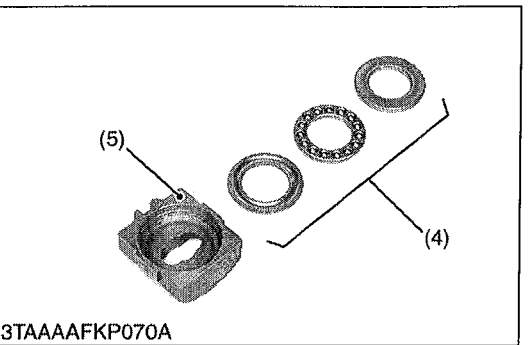
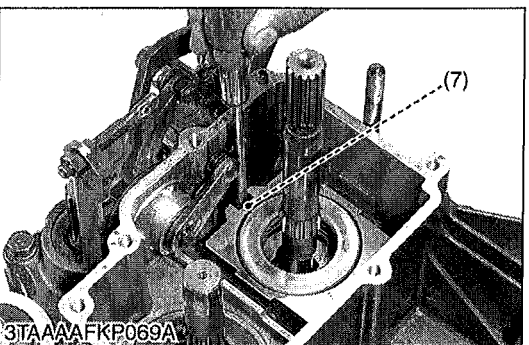
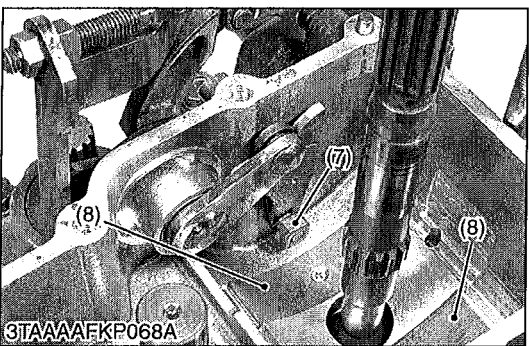
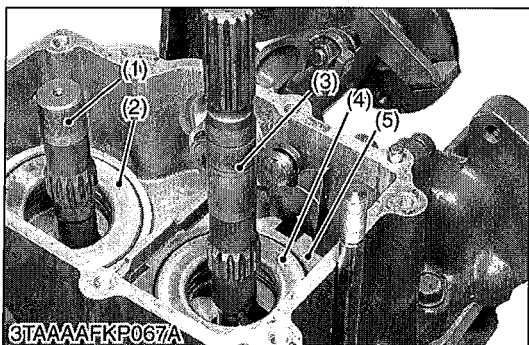
1. Remove the circlip (6) from the pump shaft (3) and the motor shaft (1).
2. Remove the thrust bearing (2).
3. Remove the swashplate (5) and the thrust roller bearing (4).

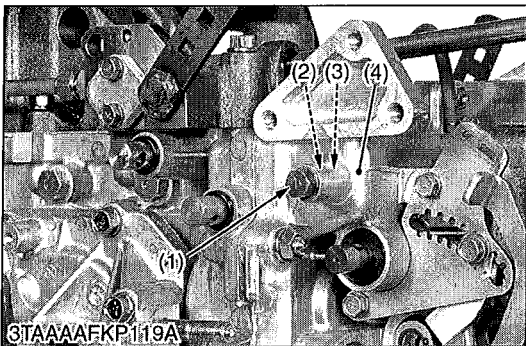
(When reassembling)

- Apply clean transmission oil to the cradle bearing and the trunnion arm.
- Hold the slot guide with a minus screw driver.
- Apply clean transmission oil to the thrust roller bearing.

- | | |
|---------------------------|--------------------|
| (1) Motor Shaft | (5) Swashplate |
| (2) Thrust Bearing | (6) Circlip |
| (3) Pump Shaft | (7) Slot Guide |
| (4) Thrust Roller Bearing | (8) Cradle Bearing |

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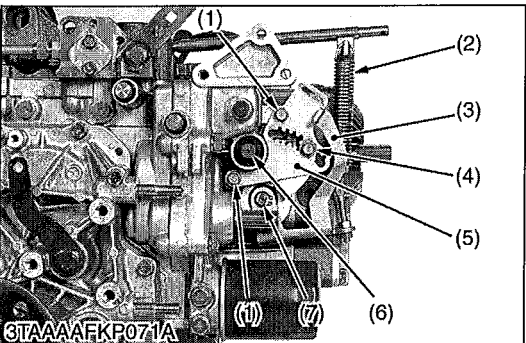


4WD Detent Ball

1. Remove the 4WD detent bolt (1), the detent spring (2) and the detent ball (3) before removing the transaxle front case, not to drop the detent ball (3) into the transaxle case.

- | | |
|---------------------|--------------------------|
| (1) 4WD Detent Bolt | (3) Detent Ball |
| (2) Detent Spring | (4) Transaxle Front Case |

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Neutral Arm and Trunnion Arm

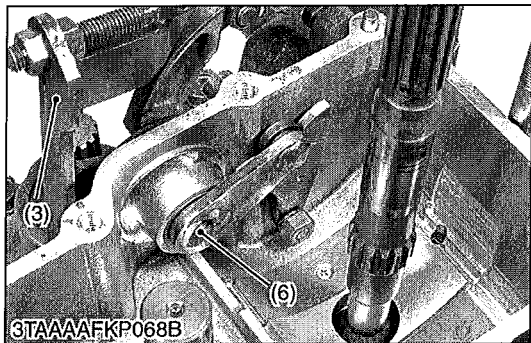
1. Disconnect the neutral spring (2) from the HST front cover.
2. Loosen the neutral adjuster (5).
3. Remove the external circlip (7).
4. Remove the bolts (1).
5. Remove the neutral adjuster (5) and the neutral arm (3).
6. Remove the trunnion arm (6).

(When reassembling)

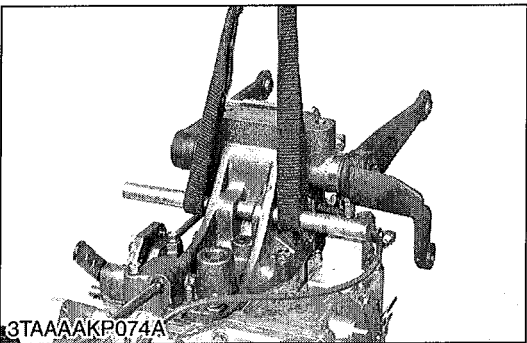
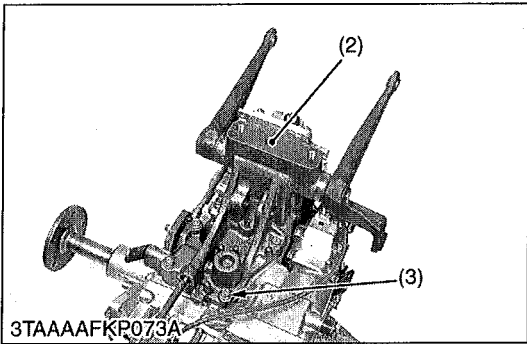
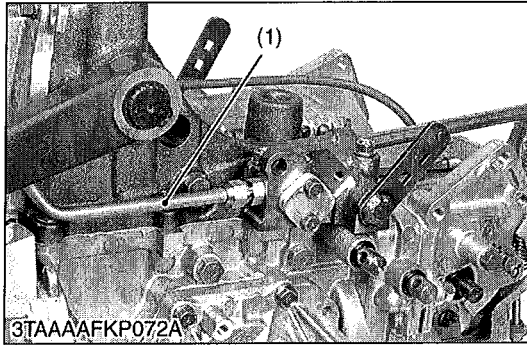
- Adjust the HST neutral position. Refer to "Checking and Adjusting" section.

- | | |
|--------------------|----------------------|
| (1) Bolt | (5) Neutral Adjuster |
| (2) Neutral Spring | (6) Trunnion Arm |
| (3) Neutral Arm | (7) External Circlip |
| (4) Lock Screw | |

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(2) Hydraulic Cylinder



Hydraulic Cylinder

1. Disconnect the delivery pipe (1).
2. Remove the hydraulic cylinder mounting bolts (3).
3. Remove the hydraulic cylinder (2).

(When reassembling)

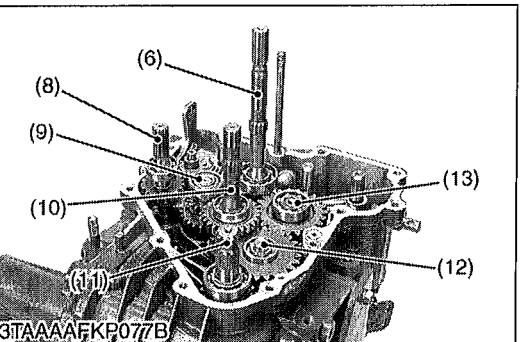
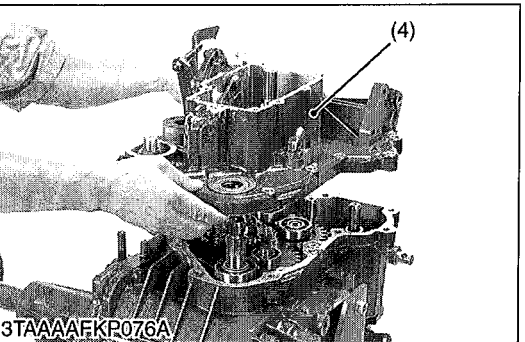
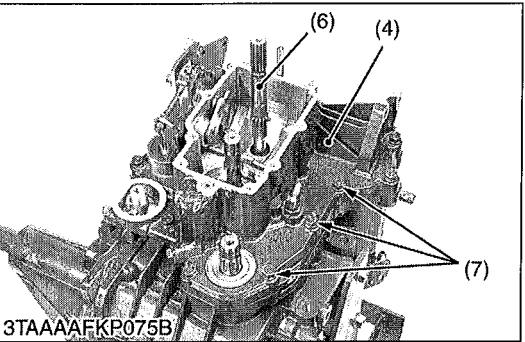
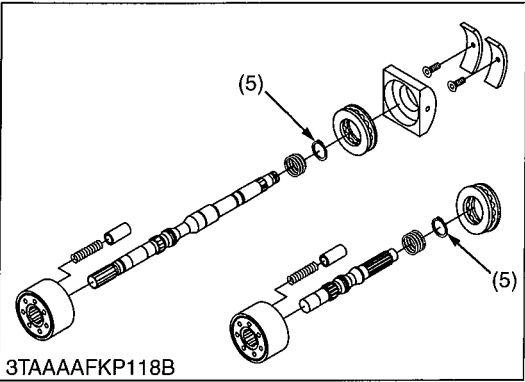
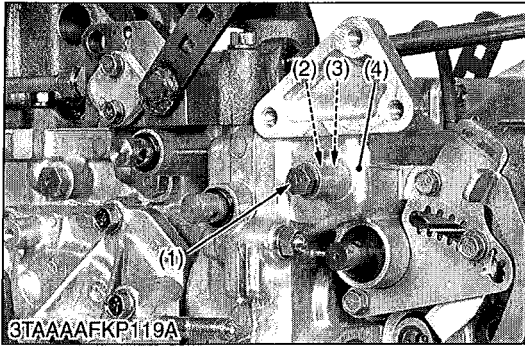
- Apply liquid gasket (Three Bond 1208D or equivalent) to the joint surface of the transaxle case to the hydraulic cylinder.

Tightening torque	Hydraulic cylinder mounting bolt	40 to 44 N·m 4.0 to 4.5 kgf·m 29 to 32 lbf·ft
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- (1) Delivery Pipe (3) Bolt
(2) Hydraulic Cylinder

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(3) Transaxle Shafts



Transaxle Case Front Cover

■ NOTE

- Before removing the transaxle case front cover (4), remove the 4WD detent bolt (1), the detent spring (2) and the detent ball (3) from the transaxle case front cover (4).
- Remove the circlip (5) from the HST pump shaft (PTO shaft) from the HST pump shaft (6) and the HST motor shaft securely.

1. Remove the transaxle case front cover mounting bolts (7).
2. Remove the transaxle case front cover (4) as an unit.

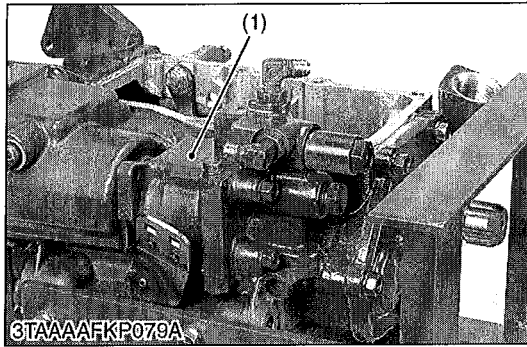
(When reassembling)

- Apply liquid gasket (Three Bond 1208D or equivalent) to the joint surface of the transaxle case to the front cover.

Tightening torque	Transaxle case front cover mounting bolt (M10)	39 to 44 N·m 4.0 to 4.4 kgf·m 29 to 32 lbf·ft
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- | | |
|--------------------------------|-------------------------------|
| (1) 4WD Detent Bolt | (8) Front Wheel Drive Shaft |
| (2) Detent Spring | (9) Spiral Bevel Pinion Shaft |
| (3) Detent Ball | (10) HST Motor Shaft |
| (4) Transaxle Case Front Cover | (11) Mid-PTO Shaft |
| (5) Circlip | (12) Mid-PTO Idle Gear Shaft |
| (6) HST Pump Shaft (PTO Shaft) | (13) PTO Select Shaft |
| (7) Front Cover Mounting Bolt | |

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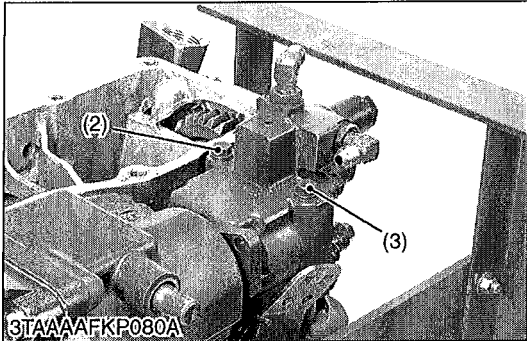


Hydraulic Pump Assembly

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)

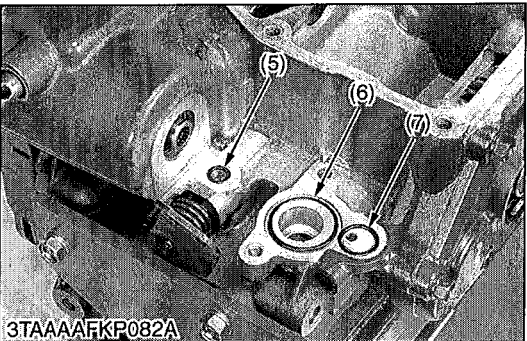
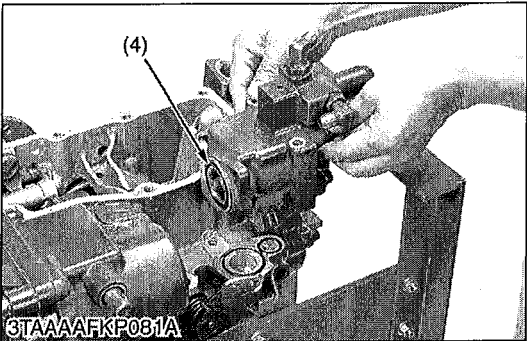
- Apply transmission oil to the O-rings.
- Since the mounting bolt (2) is installed through the hydraulic pump to the transaxle case, bind the sealing tape to the mounting bolt (2) securely.



Tightening torque	Hydraulic pump assembly mounting bolt (M6)	7.9 to 8.8 N·m 0.80 to 0.90 kgf·m 5.8 to 6.5 lbf·ft
	Hydraulic pump assembly mounting bolt (M8)	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft

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

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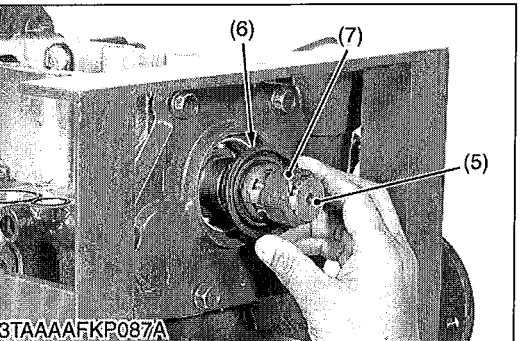
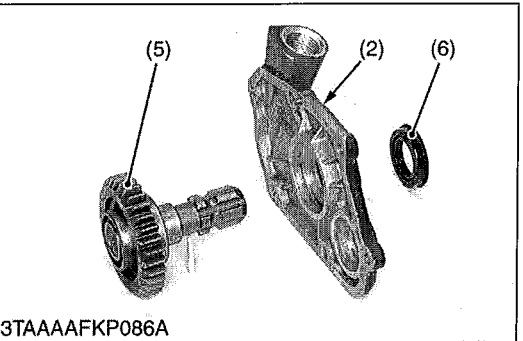
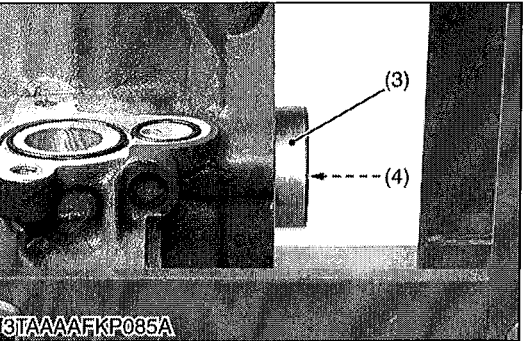
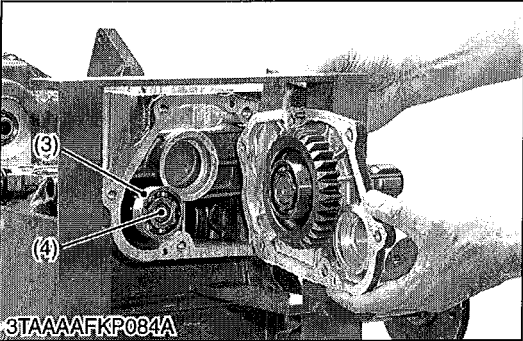
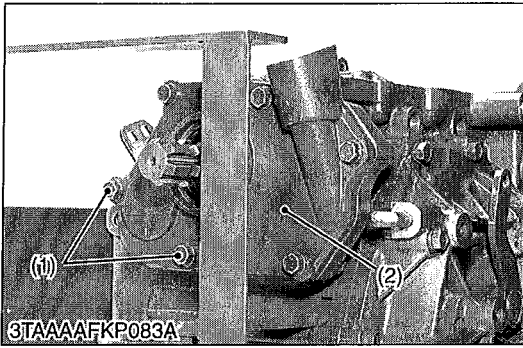


Rear PTO Cover Assembly

1. Remove the rear PTO cover mounting bolts (1).
2. Remove the rear PTO cover (2).
3. Remove the rear PTO shaft (5) from the rear PTO cover (2).

(When reassembling)

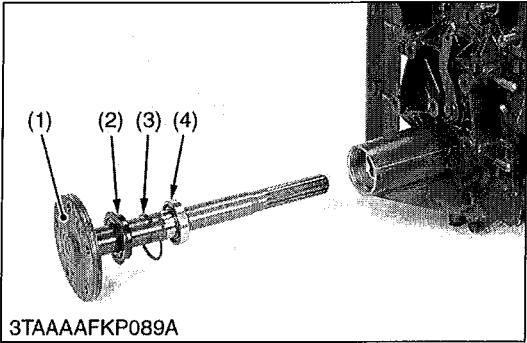
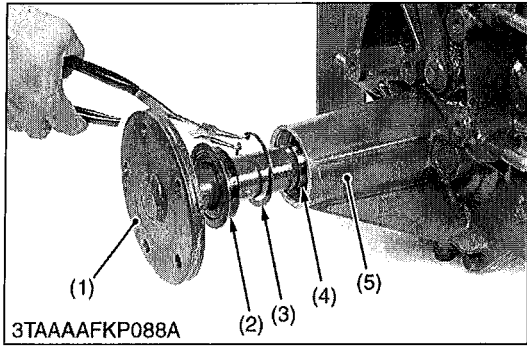
- Pull the 11T PTO select shaft with the bearing approximately the bearing thickness.
- Apply liquid gasket (Three Bond 1208D or equivalent) to the joint surface of transaxle case to the rear PTO cover.
- Bind the vinyl tape to the rear PTO shaft not to damage the oil seal.



Tightening torque	Rear PTO cover mounting bolt (M8)	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft
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- | | |
|--------------------------|--------------------|
| (1) Bolt | (5) Rear PTO Shaft |
| (2) Rear PTO Cover | (6) Oil Seal |
| (3) Bearing | (7) Vinyl Tape |
| (4) 11T PTO Select Shaft | |

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Rear Axle (LH)

■ **NOTE**

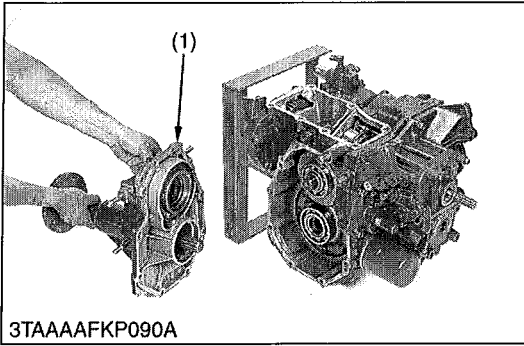
- **Prepare a specially bent snap ring pillar.**
- 1. Draw out the oil seal with a screw driver.
- 2. Remove the internal circlip from the rear axle case.
- 3. Draw out the rear axle from the rear axle case.

(When reassembling)

- Do not damage the oil seal.

- | | |
|----------------------|--------------------|
| (1) Rear Axle | (4) Ball Bearing |
| (2) Oil Seal | (5) Rear Axle Case |
| (3) Internal Circlip | |

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Rear Axle Case (RH)

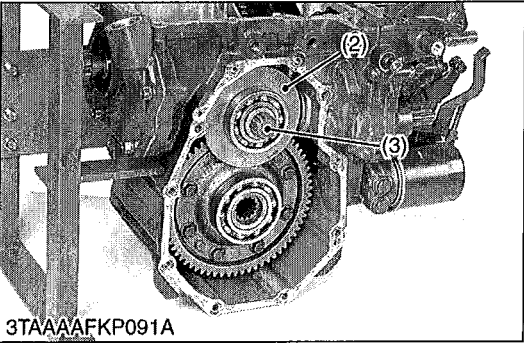
1. Remove the rear axle case (RH) mounting bolts.
2. Remove the rear axle case (RH) (1) as an assembly from the transaxle case.

■ **NOTE**

- **Since the adjusting shims are installed behind the 37T spiral bevel gear, check the shims.**
3. Remove the 37T spiral bevel gear (2).
 4. Remove the 10T final gear shaft (3).
 5. Remove the 66T final gear with the differential lock shift fork.

(When reassembling)

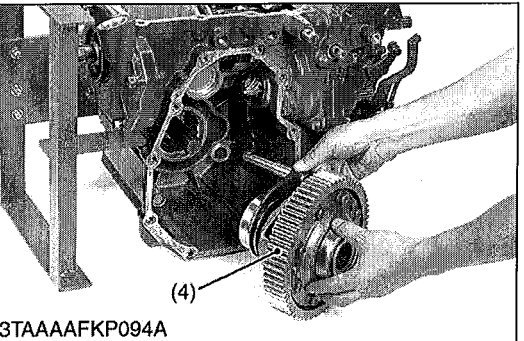
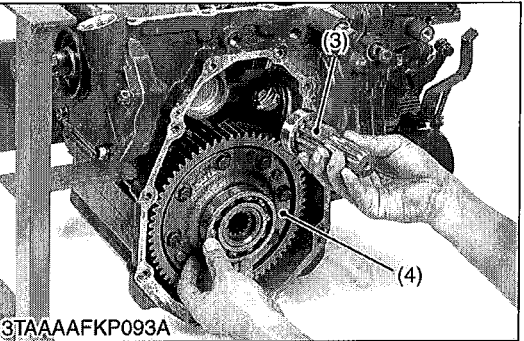
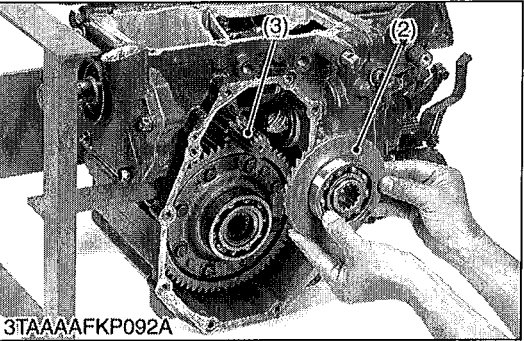
- Apply liquid gasket (Three Bond 1208D or equivalent) to the joint surface of transaxle case to the rear axle (RH) case.

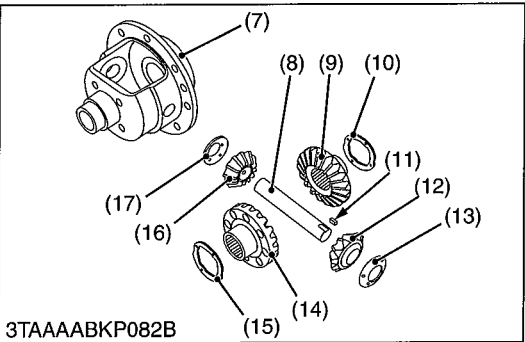
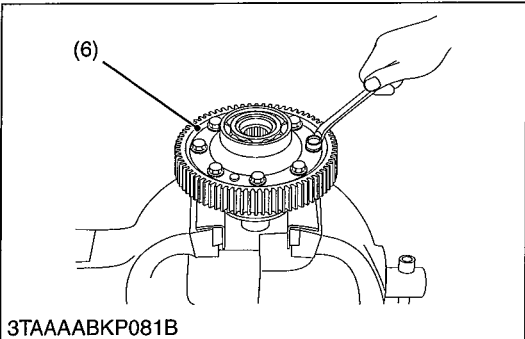
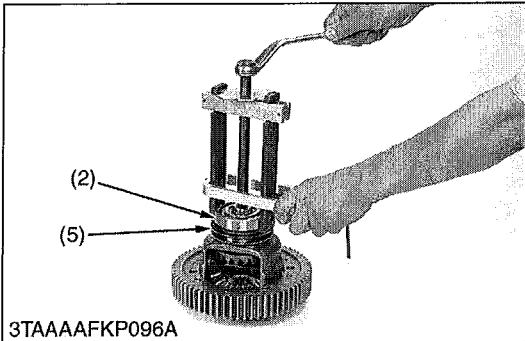
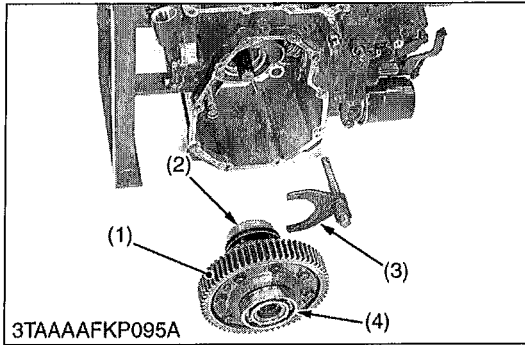


Tightening torque	Rear axle case (RH) mounting bolt (M8)	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft
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- | | |
|---------------------------|--|
| (1) Rear Axle Case (RH) | (3) 10T Final Gear Shaft (Brake Shaft) |
| (2) 37T Spiral Bevel Gear | (4) 66T Final Gear |

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66T Final Gear

1. Remove the bearing (2) with a puller.
2. Remove the bearing (4) with a puller.
3. Remove the differential lock shifter (5) and 66T final gear (6).
4. Put parting marks on the differential pinions (12), (16) and the differential side gears (9), (14).
5. Tap out the differential pinion shaft (8).
6. Remove the differential pinions (12), (16), the differential pinion washers (13), (17), differential side gears (9), (14) and the differential side gear washers (10), (15).

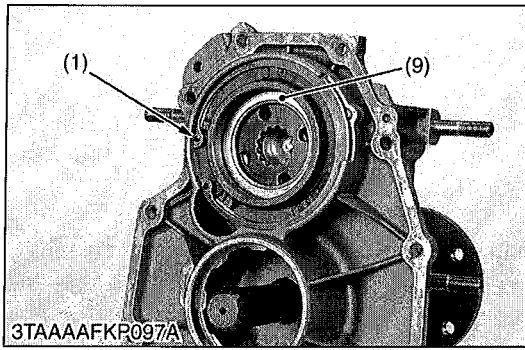
(When reassembling)

- Install the differential pinion and differential gear, aligning the parting marks.
- Lock the differential pinion shaft (8) by setting the key (11).

Tightening torque	66T final gear mounting bolt	61 to 70 N·m 6.2 to 7.2 kgf·m 45 to 52 lbf·ft
-------------------	------------------------------	---

- | | |
|----------------------------------|------------------------------------|
| (1) 66T Final Gear | (10) Differential Side Gear Washer |
| (2) Bearing | (11) Key |
| (3) Differential Lock Shift Folk | (12) Differential Pinion |
| (4) Bearing | (13) Differential Pinion Washer |
| (5) Differential Lock Shifter | (14) Differential Side Gear |
| (6) 66T Final Gear | (15) Differential Side Gear Washer |
| (7) Differential Case | (16) Differential Pinion |
| (8) Differential Pinion Shaft | (17) Differential Pinion Washer |
| (9) Differential Side Gear | |

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Rear Axle Case, RH and Brake

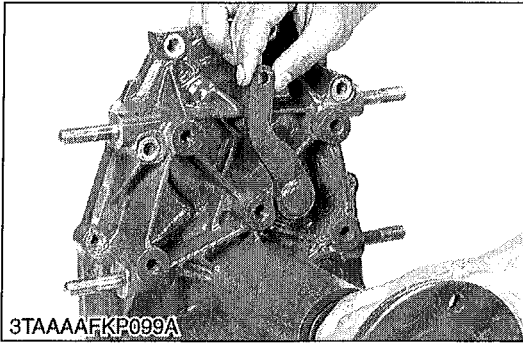
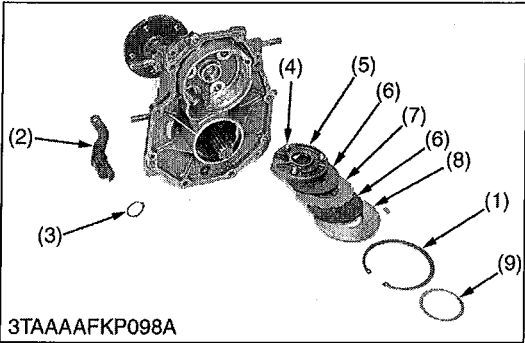
1. Remove the internal circlip (1).
2. Remove the shim (9), the bearing holder (8) and the other brake parts from the brake case.

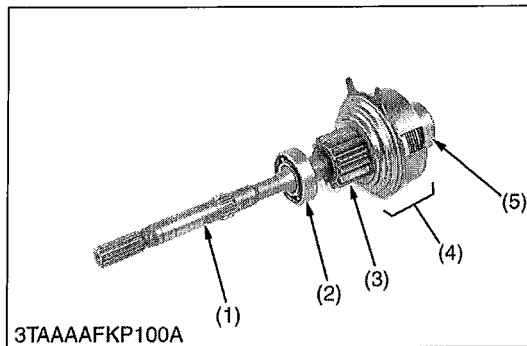
(When reassembling)

- Apply grease to the steel balls.
- Be careful not to damage the O-ring on the brake cam lever.
- Check that the brake cam lever moves smoothly.

- | | |
|----------------------|--------------------|
| (1) Internal Circlip | (6) Brake Disc |
| (2) Brake Cam Lever | (7) Friction Plate |
| (3) External Circlip | (8) Bearing Holder |
| (4) Steel Ball | (9) Shim |
| (5) Actuator | |

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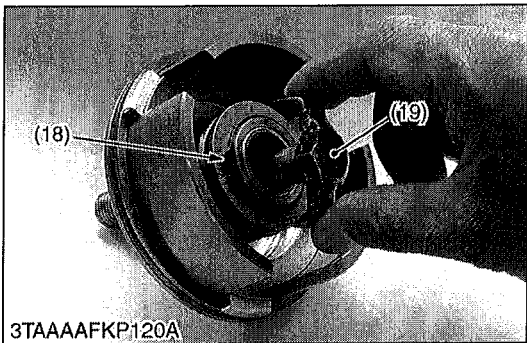
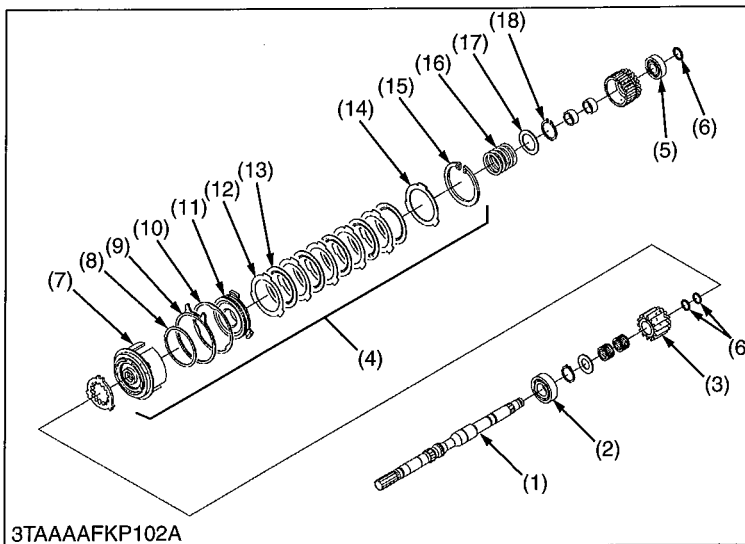
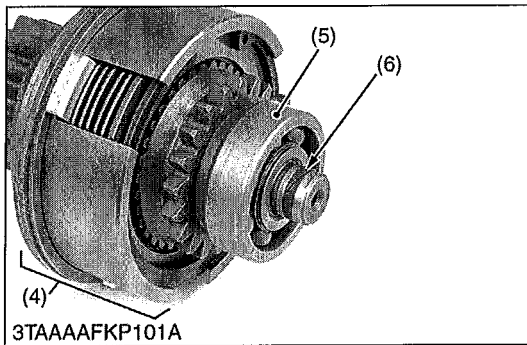


PTO Clutch Assembly

1. Remove the bearing (2).
2. Remove the external circlip and the clutch gear (3).
3. Remove the seal rings (6).
4. Remove the bearing (5).
5. Remove the external circlip (18) using a clutch spring compressor.
6. Disassembling the clutch pack inner parts as show in the figure.

(When reassembling)

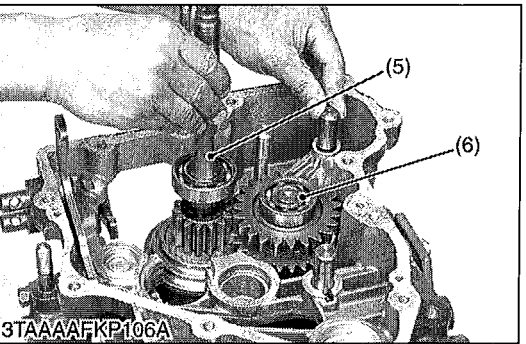
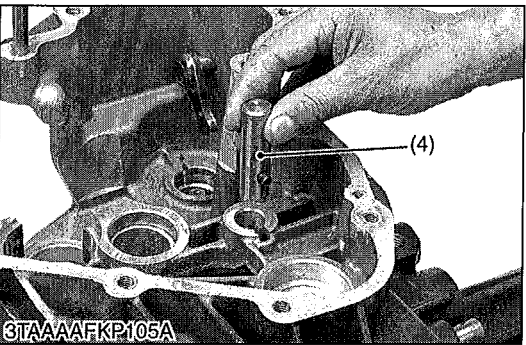
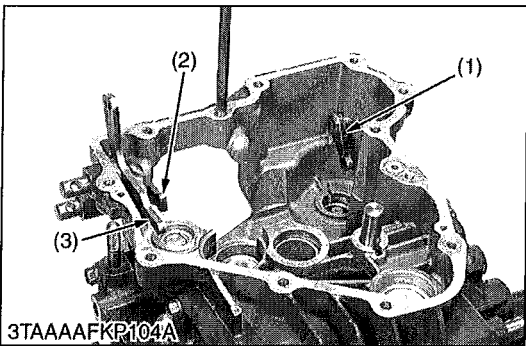
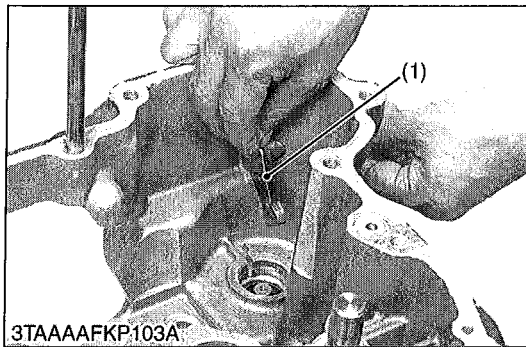
- Change the seal rings (6) with a new one.



- | | |
|-----------------------------------|-------------------------------|
| (1) Pump Shaft (PTO Clutch Shaft) | (11) Clutch Piston |
| (2) Bearing | (12) Separate Plate |
| (3) Clutch Gear | (13) Disc Plate |
| (4) Clutch Pack | (14) Backing Plate |
| (5) Bearing | (15) Internal Circlip |
| (6) Seal Ring | (16) Brake Spring |
| (7) Clutch Case | (17) Washer |
| (8) O-ring | (18) External Circlip |
| (9) Brake Disc | (19) Clutch Spring Compressor |
| (10) Brake Plate | |

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(4) Assembling Shafts



Assembling Select Arms and HST Pump Shaft (PTO Clutch Shaft)

1. Install the PTO select arm (1).
2. Install the range shift arm (2) and the front wheel drive shift arm (3).
3. Install the idle gear shaft.

■ **NOTE**

- **Install the rear PTO cover and the PTO select gear shaft before installing HST pump shaft assembly.**
4. After installing the rear PTO cover to the transaxle case, install the PTO select gear shaft (6).
 5. Install the HST pump shaft (PTO clutch shaft) (5).

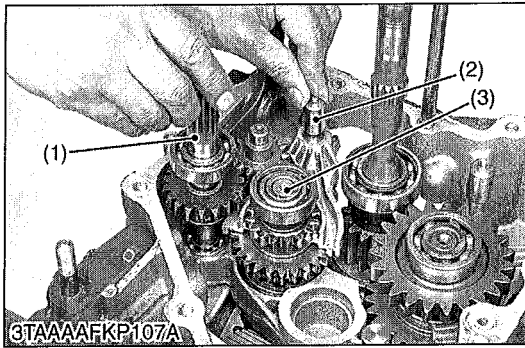
(When reassembling)

- Be careful not to damage the O-rings on the arms.

- | | |
|---------------------------------|--|
| (1) PTO Select Arm | (5) HST Pump Shaft
(PTO Clutch Shaft) |
| (2) Range Shift Arm | (6) PTO Select Gear Shaft |
| (3) Front Wheel Drive Shift Arm | |
| (4) Mid-PTO Idle Gear Shaft | |

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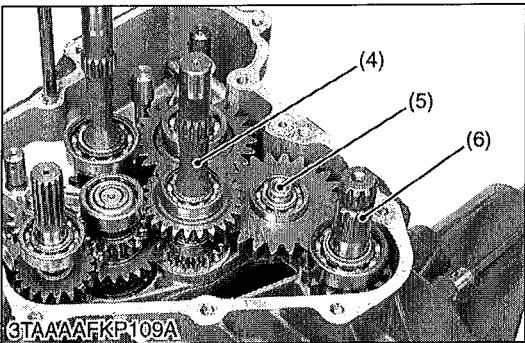
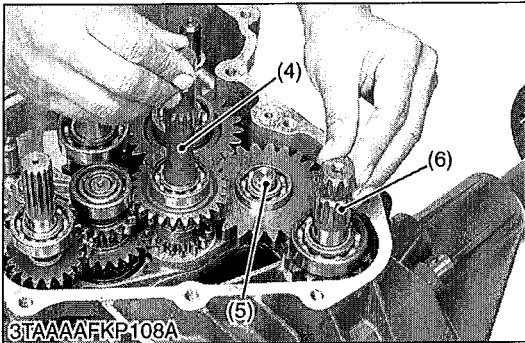
Front Wheel Drive Shaft, Shifter, Spiral Bevel Pinion Shaft and Mid-PTO Shaft



1. Install the front drive shaft (1).
2. Install the shifter (2) and the spiral bevel pinion shaft (3) together.
3. Install the mid-PTO idle gear shaft (5) and the mid-PTO shaft (6) and the HST motor shaft (4) together.

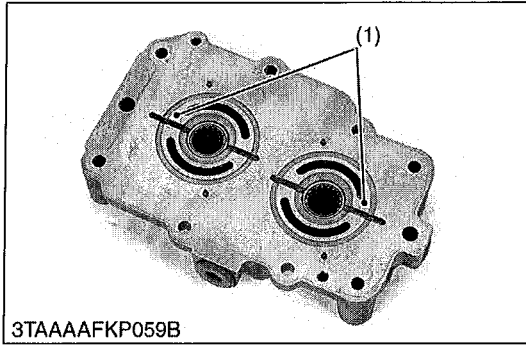
- | | |
|-------------------------------|-----------------------------|
| (1) Front Wheel Drive Shaft | (4) HST Motor Shaft |
| (2) Shifter | (5) Mid-PTO Idle Gear Shaft |
| (3) Spiral Bevel Pinion Shaft | (6) Mid-PTO Shaft |

9Y1210855TXS0051US0



[4] SERVICING

(1) Hydrostatic Transmission

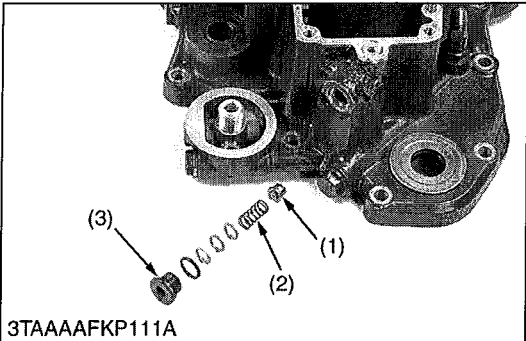


Center Section

1. Check the center section surface (1) for scratches or wear.
2. If deep scratch or excessive wear is found, replace the hydrostatic transmission assembly.

(1) Center Section Surface

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Charge Relief Valve

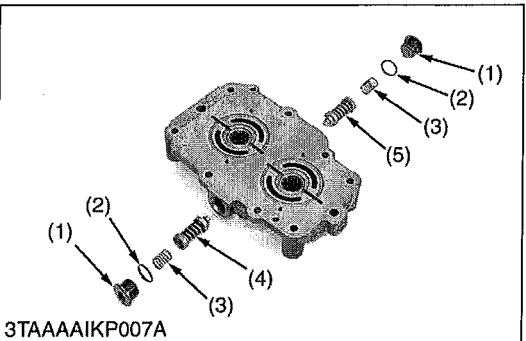
1. Check the charge relief valve (1) and the spring (2).
2. If damaged are found, replace it.

(1) Charge Relief Valve

(3) Plug

(2) Spring

9Y1210855TXS0053US0



Check and High Pressure Relief Valve

1. Check the check and high pressure relief valve (4), (5) for scratches and damage.
2. Check the spring (3) for breakage and wear.
3. If anything are unusual, replace the check and high pressure relief valve as complete assembly.

NOTE

- Check and high pressure relief valve (reverse) has a pin hole (1.5 mm, 0.059 in.).

(1) Plug

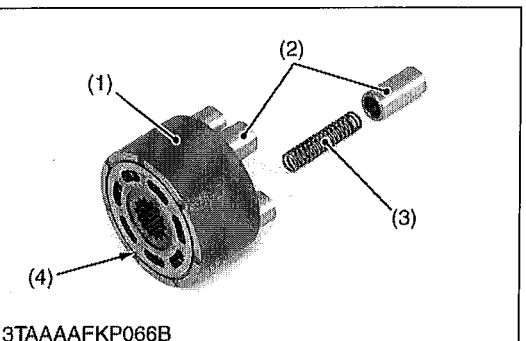
(4) Check and High Pressure Relief Valve (Forward)

(2) O-ring

(5) Check and High Pressure Relief Valve (Reverse)

(3) Spring

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Cylinder Block Assembly

1. Check the cylinder blocks (1) and the pistons (2) for scratches and wear.
2. If there are scratch or worn, replace the cylinder block assembly.
3. Check the pistons for their free movement in the cylinder block bores.
4. If the piston or the cylinder block is scored, replace the cylinder block assembly.
5. Check the polished face (4) of the cylinder block for scoring. If it is scored, replace the cylinder block assembly.

IMPORTANT

- Do not interchange the pistons between the pump cylinder block and the motor cylinder block. Pistons and cylinder blocks are matched.

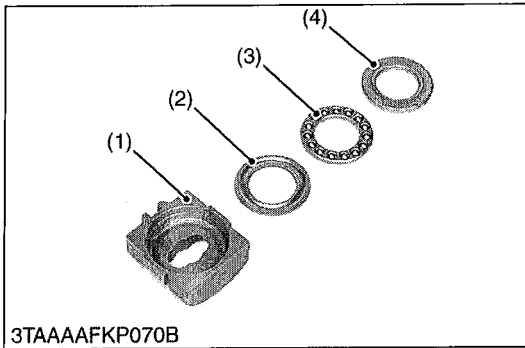
(1) Cylinder Block

(3) Spring

(2) Piston

(4) Polished Face

9Y1210855TXS0055US0

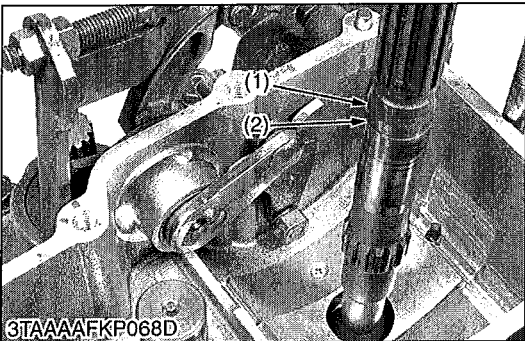
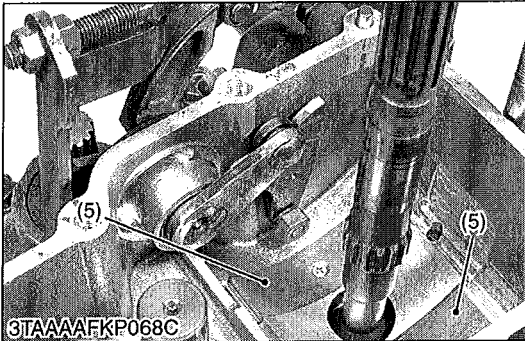


Thrust Washer, Thrust Roller Bearing, Thrust Plate and Cradle Bearing

1. Check the thrust bearing (3) for scratches and excessive wear.
2. If it is worn, replace it.
3. Check the thrust plate (4) for scratches and excessive wear. If it is worn or scored, replace it.
4. Check the cradle bearing (5) for excessive wear. If it is worn, replace it.

- | | |
|--------------------|--------------------|
| (1) Swashplate | (4) Thrust Plate |
| (2) Thrust Washer | (5) Cradle Bearing |
| (3) Thrust Bearing | |

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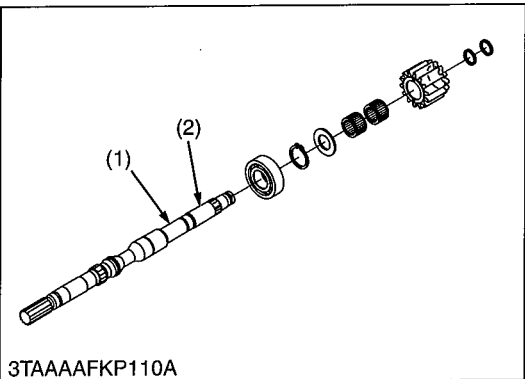


Pump Shaft (PTO Clutch Shaft)

1. Check the seal surface (1) and the bearing surface.
2. If the pump shaft is rough or grooved, replace it.
3. If the ball bearing or the needle bearing is worn, replace it.

- | | |
|------------------|---------------------|
| (1) Seal Surface | (2) Bearing Surface |
|------------------|---------------------|

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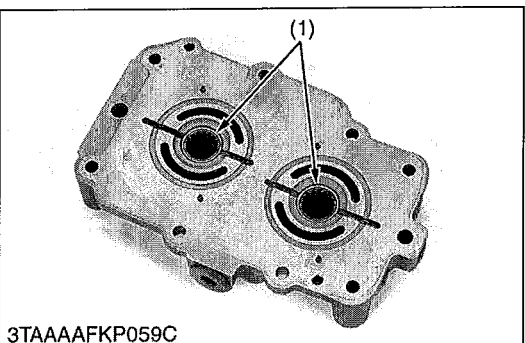


Needle Bearing

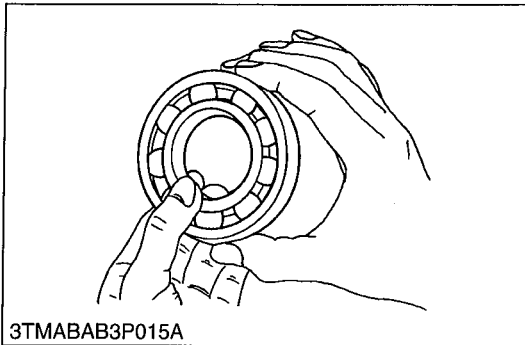
1. Check the needle bearing (1) for wear.
2. If the needle bearing (1) are worn, replace them.

- | |
|--------------------|
| (1) Needle Bearing |
|--------------------|

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(2) Transaxle Case

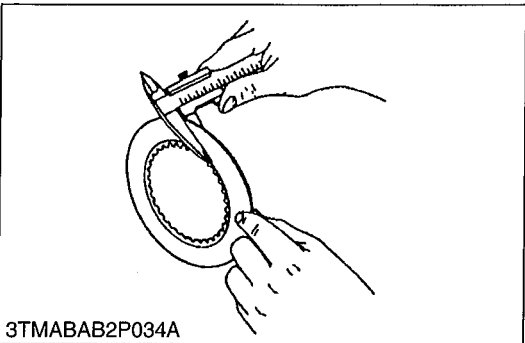


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Bearing

1. Hold the inner race, and push and pull the outer race in all directions to check wear and roughness.
2. Apply the transmission oil to the bearing, and hold the inner race.
And turn the outer race to check rotation.
3. If there are any damaged, replace the bearing.

9Y1210855TXS0059US0



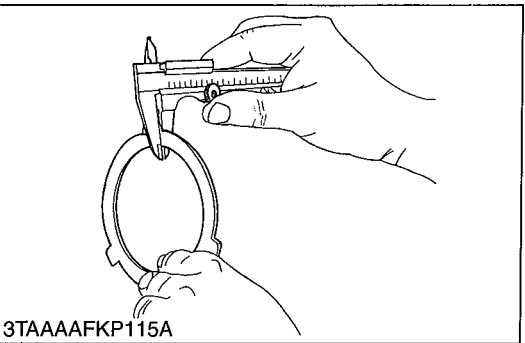
3TMABAB2P034A

PTO Clutch Disc Wear

1. Measure the thickness of PTO clutch disc with vernier calipers.
2. If the thickness is less than the allowable limit, replace it.

Thickness of PTO clutch disc	Factory specification	1.50 to 1.70 mm 0.0591 to 0.0669 in.
	Allowable limit	1.35 mm 0.0531 in.

9Y1210855TXS0060US0



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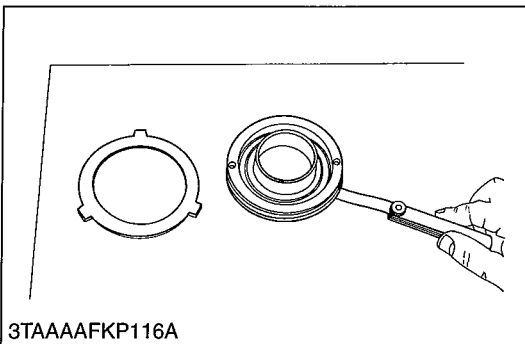
Separate Plate and Back Plate Wear

1. Measure the thickness of pressure plate and steel back with vernier calipers.
2. If the thickness is less than the allowable limit, replace it.

Thickness of separate plate	Factory specification	0.9450 to 1.055 mm 0.03721 to 0.04153 in.
	Allowable limit	0.80 mm 0.031 in.

Thickness of back plate	Factory specification	1.9 to 2.1 mm 0.075 to 0.082 in.
	Allowable limit	1.85 mm 0.0728 in.

9Y1210855TXS0061US0



3TAAAFKP116A

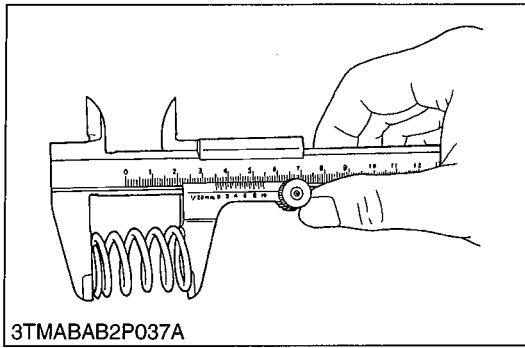
Flatness of Clutch Piston, Pressure Plate and Steel Plate

1. Place the part on a surface plate.
2. Check the flatness by inserting a feeler gauge (allowable limit size) underneath it at least four points.
3. If the gauge can be inserted, replace it.

Flatness of clutch piston	Allowable limit	0.15 mm 0.0059 in.
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Flatness of pressure plate and steel plate	Allowable limit	0.20 mm 0.0079 in.
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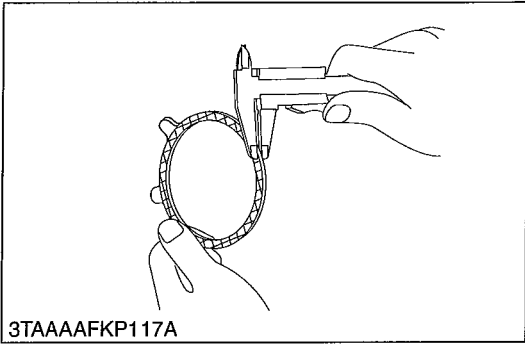


Clutch Spring Free Length

1. Measure the free length of spring with vernier calipers.
2. If the measurement is less than the allowable limit, replace it.

Clutch spring free length	Factory specification	38.5 mm 1.52 in.
	Allowable limit	34.5 mm 1.36 in.

9Y1210855TXS0063US0

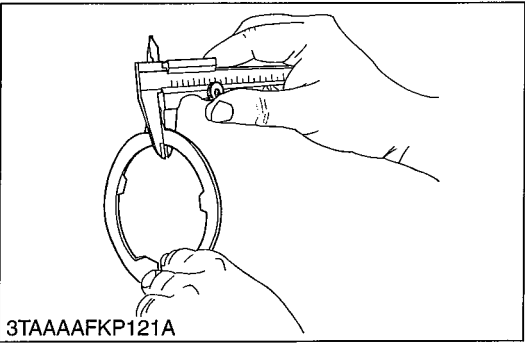


PTO Brake Disc Wear

1. Measure the PTO brake disc thickness with a vernier caliper.
2. If the thickness is less than allowable limit, replace it.

PTO brake disc thickness	Factory specification	2.90 to 3.10 mm 0.115 to 0.122 in.
	Allowable limit	2.70 mm 0.11 in.

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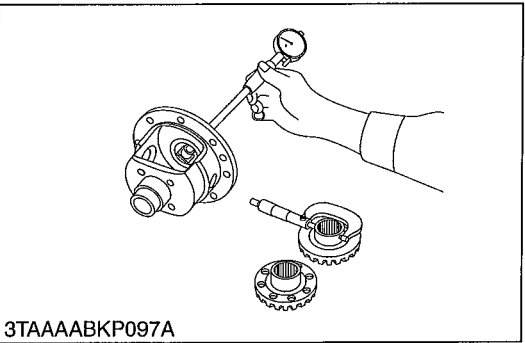


PTO Brake Plate

1. Measure the PTO brake plate thickness with a vernier caliper.
2. If the thickness is less than allowable limit, replace it.

PTO brake plate thickness	Factory specification	1.9 to 2.1 mm 0.075 to 0.082 in.
	Allowable limit	1.85 mm 0.0728 in.

9Y1210855TXS0065US0



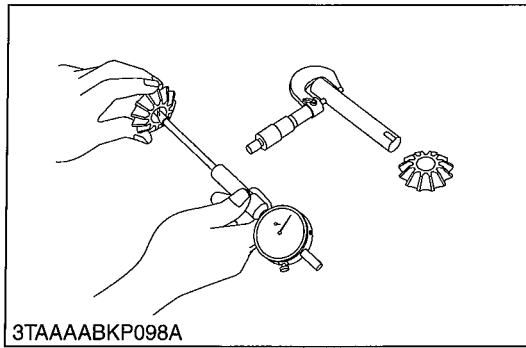
Clearance between Differential Case and Differential Side Gear

1. Measure the differential side gear boss O.D. with an outside micrometer.
2. Measure the differential case I.D. with a cylinder gauge and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential case and differential side gear	Factory specification	0.0500 to 0.151 mm 0.00197 to 0.00594 in.
	Allowable limit	0.30 mm 0.012 in.

Differential case I.D.	Factory specification	38.000 to 38.062 mm 1.4961 to 1.4985 in.
Differential side gear O.D.	Factory specification	37.911 to 37.950 mm 1.4926 to 1.4940 in.

9Y1210855TXS0066US0



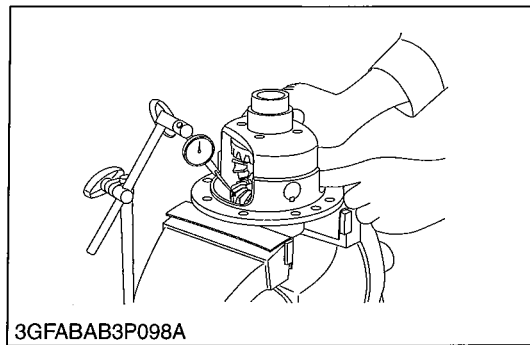
Clearance between Differential Pinion Shaft and Differential Pinion

1. Measure the differential pinion shaft O.D. with an outside micrometer.
2. Measure the differential pinion I.D. with a cylinder gauge, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential pinion shaft and differential pinion	Factory specification	0.0800 to 0.122 mm 0.00315 to 0.00480 in.
	Allowable limit	0.30 mm 0.012 in.

Differential pinion I.D.	Factory specification	20.060 to 20.081 mm 0.78977 to 0.79059 in.
Differential pinion shaft O.D.	Factory specification	19.959 to 19.980 mm 0.78579 to 0.78661 in.

9Y1210855TXS0067US0



Backlash between Differential Pinion and Differential Side Gear

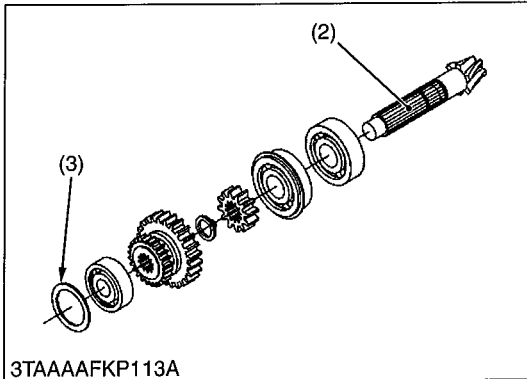
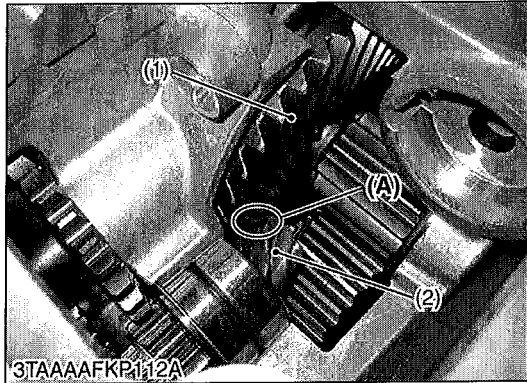
1. Secure the differential case with a vise.
2. Set the dial indicator (lever type) with its finger on the tooth of the differential side gear.
3. Press differential pinion and side gear against the differential case.
4. Hold the differential pinion and move the differential side gear to measure the backlash.
5. If the backlash exceeds the allowable limit, adjust with differential side gear shims.

Backlash between differential pinion and differential side gear	Factory specification	0.15 to 0.30 mm 0.0059 to 0.011 in.
	Allowable limit	0.40 mm 0.016 in.

(Reference)

- Thickness of shims:
1.5 mm (0.059 in.)
1.6 mm (0.063 in.)
1.7 mm (0.067 in.)

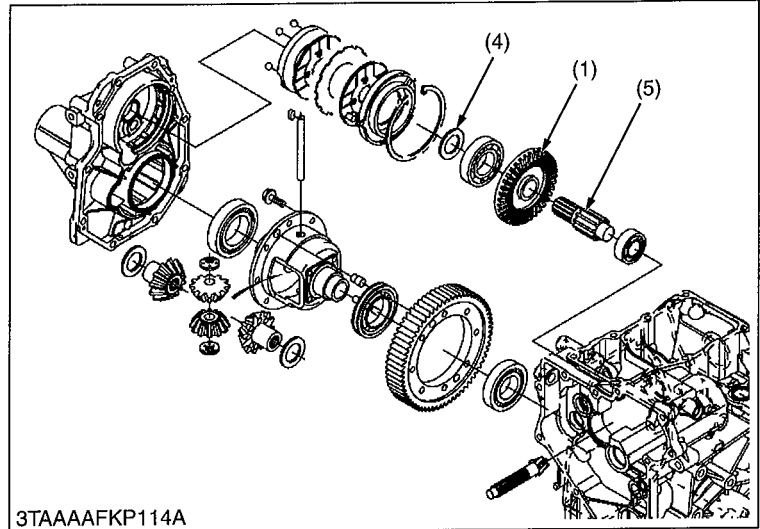
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Backlash between Spiral Bevel Pinion Gear and Bevel Gear

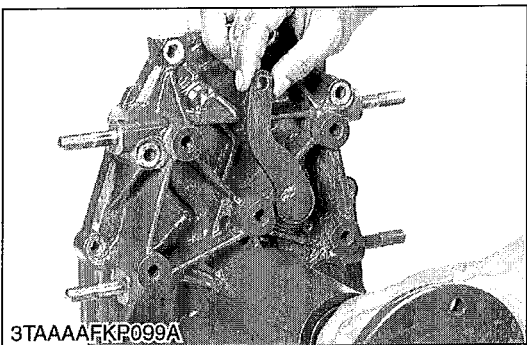
1. Temporarily assemble the spiral bevel pinion gear (2) and the bevel gear (1) in the transaxle case.
2. Hold the wire of solder or plastigauge on the bevel gear teeth upper surface (A).
3. Turn the front drive shaft one turn clockwise by hands.
4. Measure the backlash between the spiral bevel pinion gear and the bevel gear.
5. If the backlash exceeds the factory specifications, adjust the shims (3), (4).

Backlash between spiral bevel pinion and bevel gear	Factory specification	0.10 to 0.30 mm 0.0040 to 0.011 in.
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- (1) Bevel Gear
 - (2) Spiral Bevel Pinion Gear
 - (3) Shim
 - (4) Shim
 - (5) Final Gear Shaft (Brake Shaft)
- (A) Bevel Gear Teeth Upper Surface

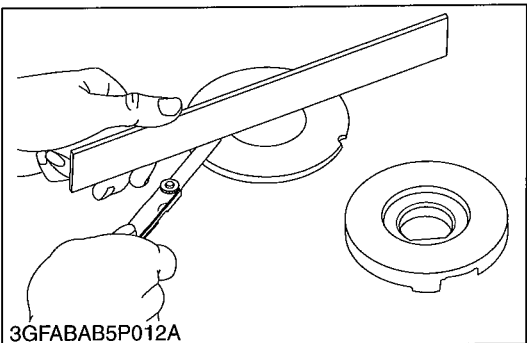
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Brake Cam Lever Movement

1. Move the brake cam lever by hand to check its movement.
2. If its movement is heavy, refine the brake cam with a emery paper.

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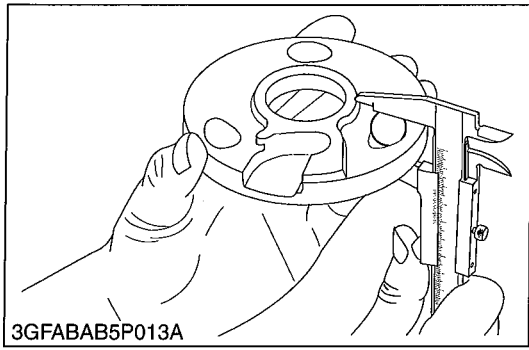


Flatness of Actuator and Bearing Holder

1. Place a straightedge of 150 mm (5.91 in.) or more in length on the contacting surface of the actuator and the bearing holder.
2. Inspect the friction surface of the actuator and the bearing holder with the straightedge, and determine if a 0.30 mm (0.0118 in.) feeler gauge will fit on the part of wear.
3. If it will fit, resurface.

Flatness of actuator and bearing holder	Allowable limit	0.30 mm 0.012 in.
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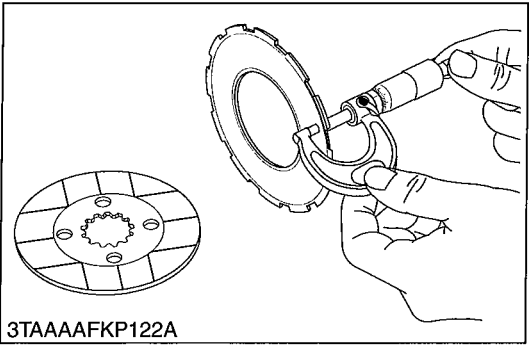


Height of Cam Plate and Ball

1. Measure the height of the cam plate with the ball installed.
2. If the measurement is less than the allowable limit, replace the cam plate and balls.
3. Inspect the ball holes of cam plate for uneven wear.
4. If the uneven wear is found, replace it.

Height of cam plate and ball	Factory specification	22.89 to 22.99 mm 0.9012 to 0.9051 in.
	Allowable limit	22.40 mm 0.8819 in.

9Y1210855TXS0072US0



Brake Disc and Friction Plate Wear

1. Measure the brake disc thickness and the friction plate thickness with an outside micrometer.
2. If the thickness is less than the allowable limit, replace it.

Brake disc thickness	Factory specification	3.30 to 3.50 mm 0.130 to 0.137 in.
	Allowable limit	3.0 mm 0.12 in.

Friction plate thickness	Factory specification	1.92 to 2.08 mm 0.0756 to 0.0818 in.
	Allowable limit	1.52 mm 0.0598 in.

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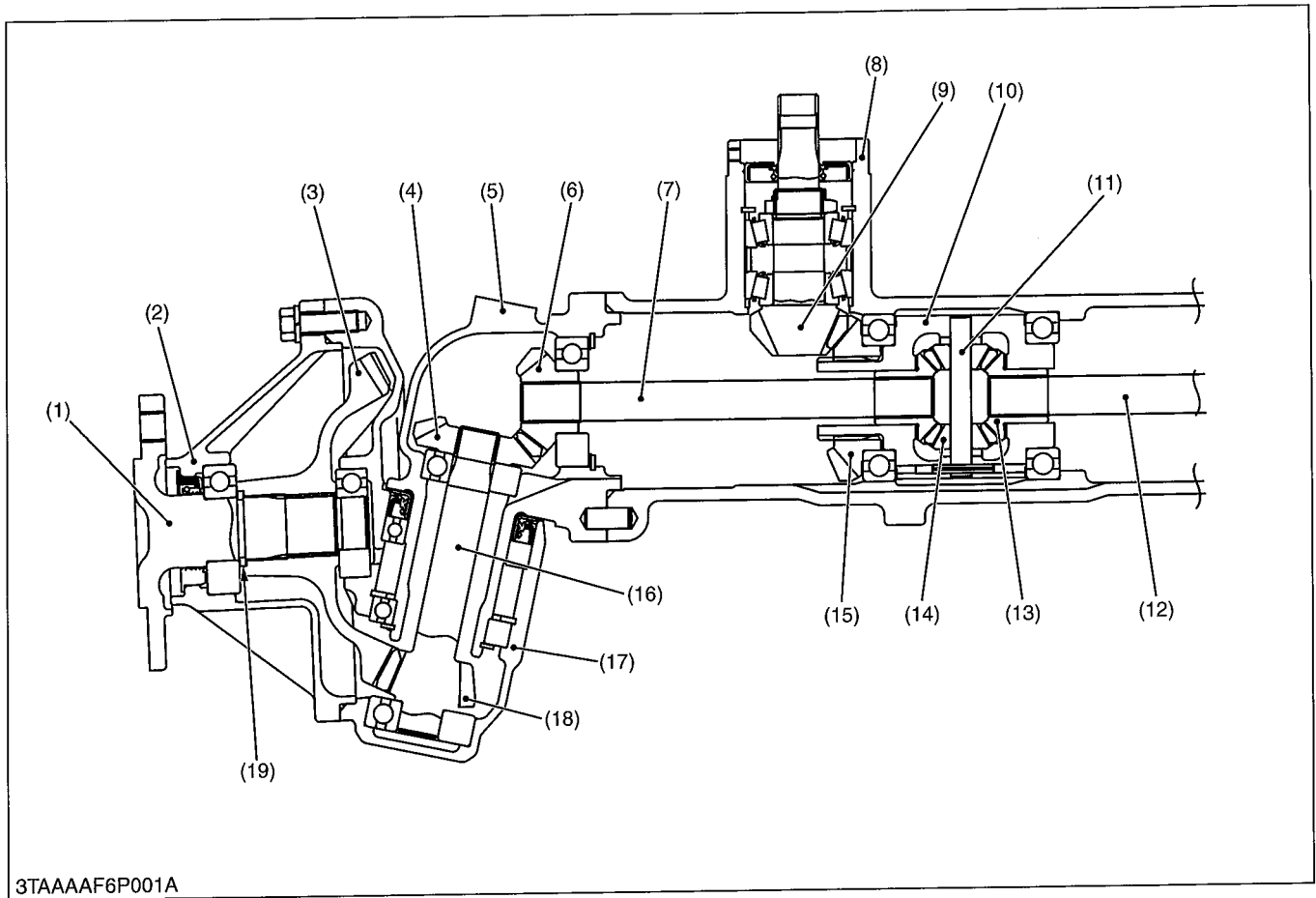
3 FRONT AXLE

MECHANISM

CONTENTS

1. STRUCTURE.....	3-M1
2. FRONT WHEEL ALIGNMENT.....	3-M2

1. STRUCTURE



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- | | | | |
|---------------------|---------------------------------|----------------------------------|-----------------------|
| (1) Axle | (6) Bevel Gear | (11) Differential Pinion Shaft | (16) Bevel Gear Shaft |
| (2) Axle Flange | (7) Differential Yoke Shaft, RH | (12) Differential Yoke Shaft, LH | (17) Front Gear Case |
| (3) Bevel Gear | (8) Front Axle Case | (13) Differential Side Gear | (18) Bevel Gear |
| (4) Bevel Gear | (9) Bevel Pinion Shaft | (14) Differential Pinion Gear | (19) Collar |
| (5) Bevel Gear Case | (10) Differential Gear Assembly | (15) Bevel Gear | |

The front axle of the 4WD is constructed as shown above. Power is transmitted from the transmission through the propeller shaft to the bevel pinion shaft (9), then to the bevel gear (15) and to the differential side gear (13).

The power through the differential side gear is transmitted to the differential yoke shaft (7), (12), and to the bevel gear shaft (16) through the bevel gears (4), (6) in the bevel gear case (5).

The revolution is greatly reduced by the bevel gears (18), (3), then the power is transmitted to the axle (1).

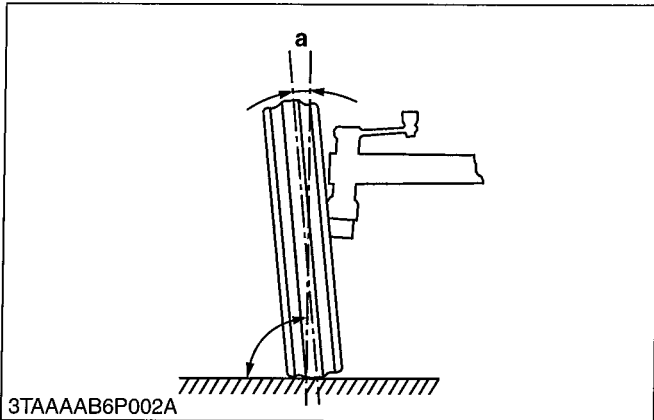
The differential system allows each wheel to rotate at a different speed to make turning easier.

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2. FRONT WHEEL ALIGNMENT

To assure smooth mobility or maneuverability and enhance stable and straight running, the front wheels are mounted at an angle to the right, left and forward directions. This arrangement is referred to as the Front Wheel Alignment.

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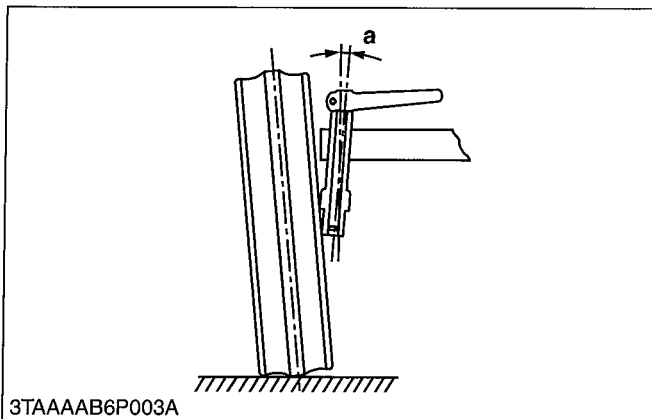
Camber

The front wheels are tilted from the vertical as viewed from the front, upper wheels are spreader than lower ones.

This inclination is called camber "a". Camber reduces bending or twisting of the front axle caused by vertical load or running resistance, and also keeps the stability in running.

Camber	0.035 rad 2°
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Kingpin Angle

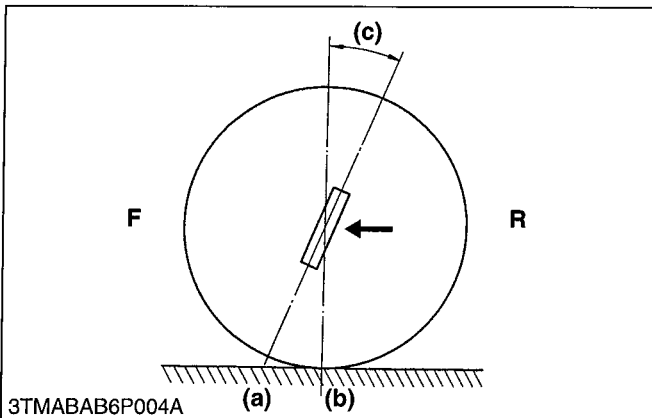
The Kingpin is titled from the vertical as viewed from the front.

This angle is called kingpin angle "a". As with the camber, kingpin angle reduces rolling resistance of the wheels, and prevents any shimmy motion of the steering wheel.

It also reduces steering effort.

Kingpin Angle	0.209 rad 12°
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Caster

The kingpin is titled forward as viewed from the side.

The point (b) of the wheel center line is behind the point (a) of the kingpin shaft center line.

This inclination is called caster (c). Caster helps provide steering stability.

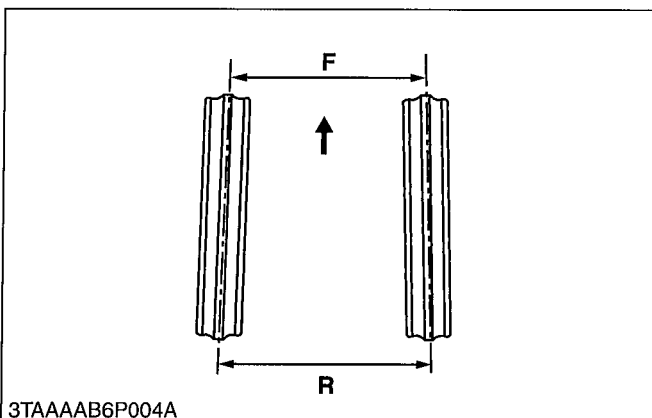
As with the kingpin inclination, caster reduces steering effort.

Caster	0 rad 0°
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F: Front

R: Rear

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Toe-in

Viewing the front wheels from above reveals that the distance between the toes of the front wheels is smaller than that between the heels.

It is called toe-in. The front wheels tend to roll outward due to the camber, but toe-in offsets it and ensures parallel rolling of the front wheels. Another purpose of toe-in is to prevent excessive and uneven wear of tires.

Toe-in	0 to 5 mm 0 to 0.19 in.
--------	----------------------------

F: Front

R: Rear

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SERVICING

CONTENTS

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Front Wheels Wander to Right or Left	Tire pressure uneven	Adjust	G-60
	Improper toe-in adjustment (improper alignment)	Adjust	3-S4
	Clearance between center pin and pin support bushing excessive	Replace	3-S14
	Front axle rocking force too small	Adjust	3-S4
	Tie-rod end loose	Tighten	4-S8
	Air sucked in power steering circuit	Bleed	-
Front Wheels Can Not Be Driven	Front wheel driving gears in front axle gear case broken	Replace	3-S11
	Universal joint broken	Replace	3-S7
	Front wheel drive gears in transmission broken	Replace	-
	Front differential gear broken	Replace	3-S11
Noise	Gear backlash excessive	Adjust or replace	3-S12, 3-S13
	Oil insufficient	Fill	3-S5
	Bearings damaged or broken	Replace	-
	Gears damaged or broken	Replace	-
	Spiral bevel pinion shaft turning force improper	Adjust	3-S13

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2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Front Wheel Alignment	Toe-in	0 to 5 mm 0 to 0.2 in.	—
Front Axle	Rocking Force	49.1 to 117 N 5.00 to 12.0 kgf 11.1 to 26.4 lbf	—
Differential Case to Differential Side Gear	Clearance	0.040 to 0.082 mm 0.0016 to 0.0032 in.	0.17 mm 0.0067 in.
• Differential Case	I.D.	26.000 to 26.021 mm 1.0237 to 1.0244 in.	—
• Differential Side Gear	O.D.	25.939 to 25.960 mm 1.0213 to 1.0220 in.	—
Differential Pinion Shaft to Differential Pinion	Clearance	0.025 to 0.055 mm 0.0009 to 0.0021 in.	0.25 mm 0.0098 in.
• Differential Pinion Shaft	I.D.	9.960 to 9.975 mm 0.3922 to 0.3927 in.	—
• Differential Pinion	O.D.	10.000 to 10.015 mm 0.39370 to 0.39429 in.	—
Differential Pinion to Differential Side Gear	Backlash	0.1 to 0.3 mm 0.004 to 0.01 in.	—
Bevel Pinion Shaft	Turning Torque	0.80 to 1.0 N·m 0.082 to 0.10 kgf·m 0.59 to 0.73 lbf·ft	—
Bevel Pinion Shaft to Bevel Gear	Backlash	0.1 to 0.3 mm 0.004 to 0.01 in.	—
12T Bevel Gear to 15T Bevel Gear	Backlash	0.1 to 0.3 mm 0.004 to 0.01 in.	—
Center Pin to Pin Support Bushing	Clearance	0 to 0.231 mm 0 to 0.00909 in.	0.70 mm 0.028 in.
• Center Pin	I.D.	19.850 to 20.000 mm 0.78150 to 0.78740 in.	—
• Bushing	O.D.	20.000 to 20.081 mm 0.78741 to 0.79059 in.	—

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3. TIGHTENING TORQUES

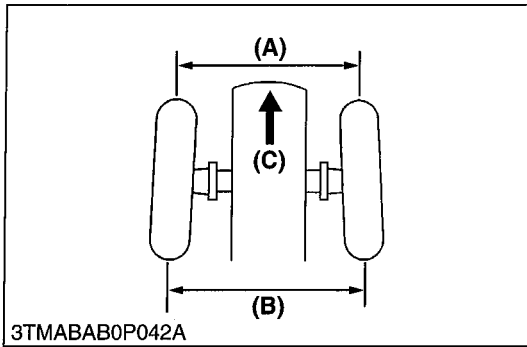
Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-13.)

Item	N·m	kgf·m	lbf·ft
Front wheel mounting screw	149 to 179	15.2 to 18.3	110 to 132
Tie-rod slotted nut	18 to 34	1.8 to 3.5	13 to 25
Power steering cylinder mounting screw	48 to 55	4.9 to 5.7	36 to 41
Power steering hose	24 to 27	2.4 to 2.8	18 to 20
Bevel gear case mounting screw (M10)	48 to 55	4.9 to 5.7	36 to 41
Bevel gear case mounting screw (M12)	78 to 90	7.9 to 9.2	58 to 66
Front gear case cover mounting screw	48 to 55	4.9 to 5.7	36 to 41

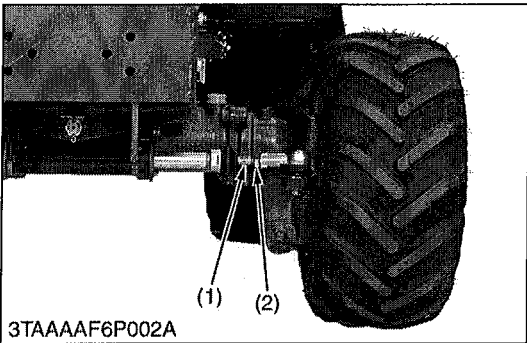
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4. CHECKING, DISASSEMBLING AND SERVICING

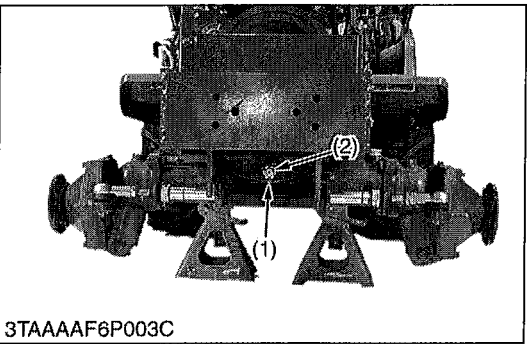
[1] CHECKING AND ADJUSTING



3TMABAB0P042A



3TAAAAF6P002A



3TAAAAF6P003C

Toe-in

1. Inflate the tires to the specified pressure.
2. Turn the front wheels straight ahead.
3. Measure the toe-in ((B) - (A)).
4. If the measurement is not within the factory specifications, adjust the tie-rod length.

Toe-in ((B) - (A))	Factory specification	0 to 5 mm 0 to 0.2 in.
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Adjusting procedure

1. Loosen the lock nuts and turn the tie-rod to adjust the rod length until the proper toe-in measurement is obtained.
2. Retighten the lock nuts.

- (1) Tie-rod
- (2) Lock Nut
- (A) Wheel to Wheel Distance at Front
- (B) Wheel to Wheel Distance at Rear
- (C) Front

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Front Axle Rocking Force

1. Jack up the front side of tractor and remove the front wheel.
2. Set a spring balance to the front gear case cover.
3. Measure the front axle rocking force.
4. If the measurement is not within the factory specifications, adjust as following.

Adjusting procedure

1. Remove the cotter pin (1).
2. Tighten or loosen the adjusting nut (2) so that the measurement of rocking force comes to factory specifications.
3. If the slot and pin hole do not meet, align the nut until they do meet within factory specifications.
4. Install the new cotter pin.

(When reassembling)

- Be sure to split the cotter pin like an anchor.

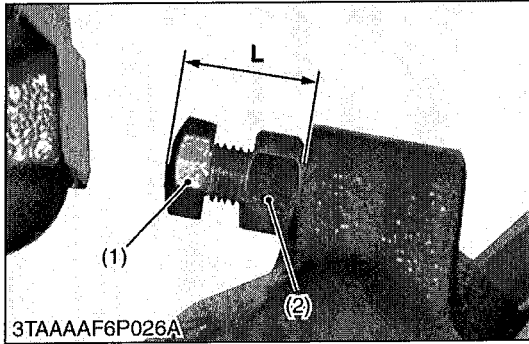
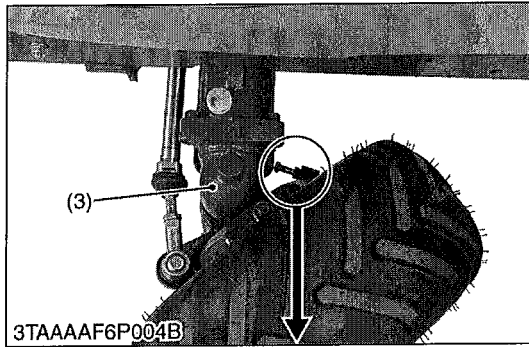
(Reference)

- Tightening torque of adjusting nut:
20 N·m (2.0 kgf·m, 14 lbf·ft)

Front axle rocking force	Factory specification	49.1 to 117 N 5.00 to 12.0 kgf 11.1 to 26.4 lbf
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- (1) Cotter Pin
- (2) Adjusting Nut

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Front Wheel Steering Angle

1. Inflate the tires to the specified pressure.
2. Loosen the lock nut and shorten the length of stopper bolt LH (1).
3. Steer the wheels to the extreme left.
4. Lengthen the length of stopper bolt (1) until the stopper bolt contacts with the bevel gear case (3).
5. Return the steering wheel to straight ahead and lengthen the stopper bolt 1/2 turns from above position further.
6. Lock the stopper bolt by lock nut (2).
7. For adjusting the right steering angle, perform the same procedure as mentioned in left steering angle.

(Reference)

Steering angle	Right side	0.84 to 0.87 rad 48 to 50 °
	Left side	0.93 to 0.95 rad 53 to 55 °

Length of adjusting bolt "L"	BX1870D	Right side	22 mm 0.87 in.
		Left side	19 mm 0.75 in.
	BX2370D and BX2670D	Right side	23 mm 0.91 in.
		Left side	16 mm 0.63 in.

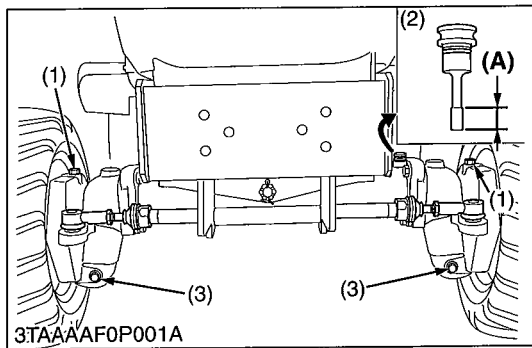
- (1) Stopper Bolt LH
- (2) Lock Nut

- (3) Bevel Gear Case

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[2] PREPARATION

(1) Separating Front Axle Assembly



Draining Front Axle Case Oil

1. Place the oil pans underneath the front axle case.
2. Remove both right and left hand side drain plugs (3) and filling plug (2) to drain the oil.
3. After draining, reinstall the drain plugs (3).

(When reassembling)

- When re-filling, remove the right and left breather plugs (1).

■ IMPORTANT

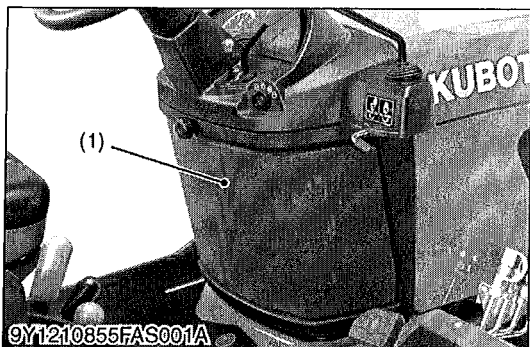
- **After ten minutes, check the oil level again, add oil to prescribed level.**
- **Use KUBOTA SUPER UDT fluid or SAE80, 90 gear oil. Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-9.**

Front axle case oil	Capacity	BX1870D	2.3 L 2.4 U.S.qts 2.0 Imp.qts
		BX2370D and BX2670D	4.7 L 5.0 U.S.qts 4.1 Imp.qts

- (1) Breather Plug
- (2) Filling Plug with Dipstick
- (3) Drain Plug

(A) Oil level is acceptable within this range.

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Battery

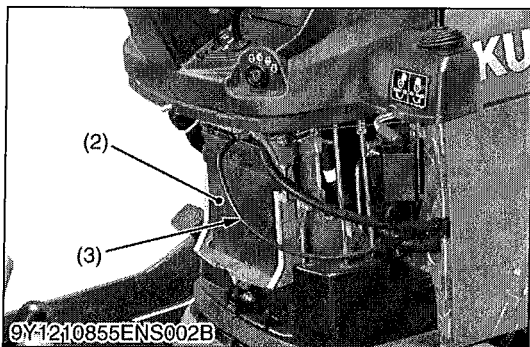
CAUTION

- 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 (3) from the battery.

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

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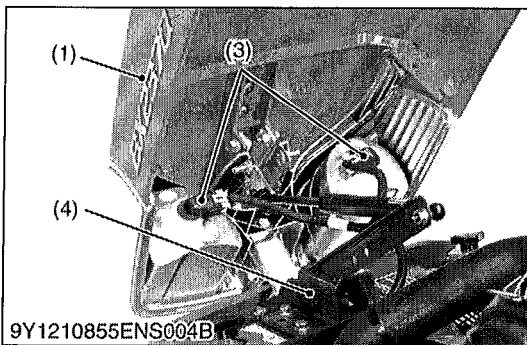
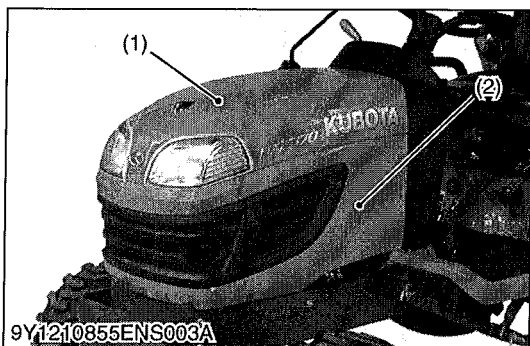


Bonnet and Under Cover

1. Open the bonnet (1), disconnect the connectors (3) for the head lights, then remove the bonnet with the bonnet bracket (4).
2. Remove the under cover (2).

- (1) Bonnet
- (2) Under Cover
- (3) Connector
- (4) Bonnet Bracket

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Front Wheel and Propeller Shaft Cover

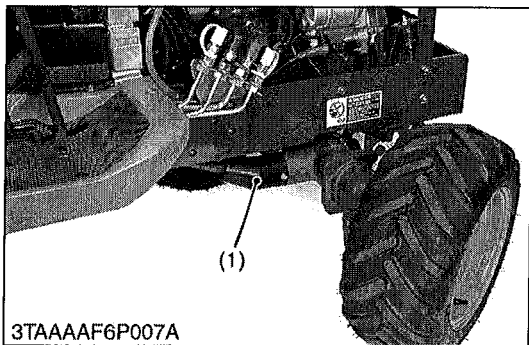
1. Lift up the front of tractor and place the disassembling stand under the front axle frame.
2. Remove the front wheels.
3. Remove the propeller shaft cover mounting bolt and slide the propeller shaft cover (1).

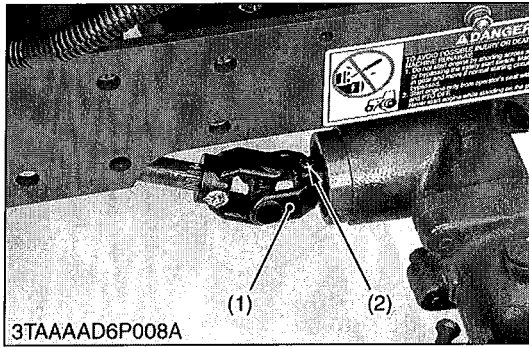
(When reassembling)

Tightening torque	Front wheel mounting screw	149 to 179 N·m 15.2 to 18.3 kgf·m 110 to 132 lbf·ft
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- (1) Propeller Shaft Cover

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Disconnecting Propeller Shaft

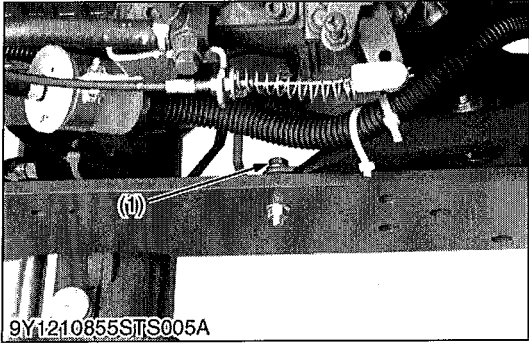
1. Tap out the spring pins (2) and disconnect the universal joint (1) and spiral bevel pinion shaft.

(When reassembling)

- Apply grease to the splines of the propeller shaft and universal joint.

- (1) Universal Joint (2) Spring Pin

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Front Axle Assembly

1. Remove the power steering hose clamp (1).
2. Place the garage jack under the front axle.
3. Remove the cotter pin (3).
4. Remove the slotted nut (2) of center pin and separate the front axle from the frame.
5. Disconnect the power steering hoses (4).

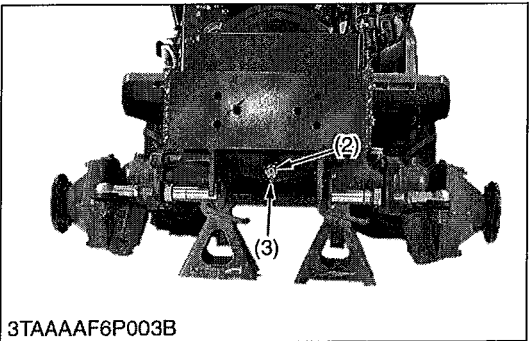
(When reassembling)

- After mounting the front axle assembly to the frame, be sure to adjust the front axle rocking force. (See page 3-S4.)
- Installing the cotter pin, be sure to split the cotter pin like an anchor.

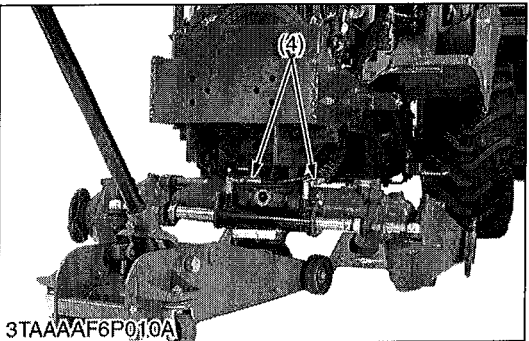
Tightening torque	Power steering hose	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
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- (1) Hose Clamp (3) Cotter Pin
 (2) Slotted Nut (Adjusting Nut for Front Axle Rocking Force) (4) Power Steering Hose

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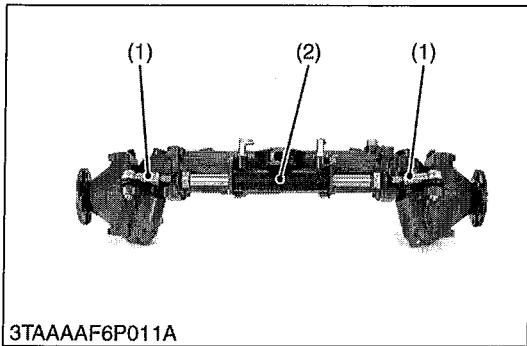
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3TAAAF6P010A

[3] DISASSEMBLING AND ASSEMBLING

(1) Front Axle Assembly



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

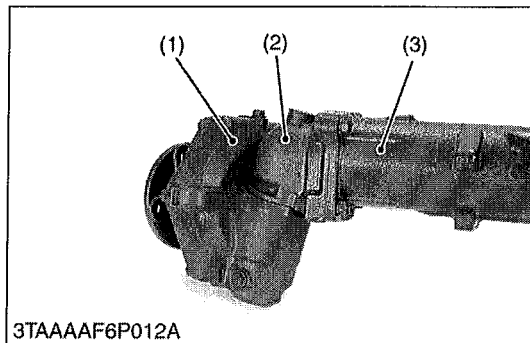
- Tighten the slotted nut to 18 N·m (1.8 kgf·m, 13 lbf·ft). If the slot and pin hole do not meet, tighten the nut until they do meet, and install the cotter pin.
- Be sure to split the cotter pin like an anchor.

Tightening torque	Tie-rod slotted nut	18 to 34 N·m 1.8 to 3.5 kgf·m 13 to 25 lbf·ft
	Power steering cylinder mounting screw	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft

(1) Tie-rod

(2) Power Steering Cylinder

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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 be careful not to damage it.
- Do not interchange right and left bevel gear case assemblies and right and left gear case assemblies.

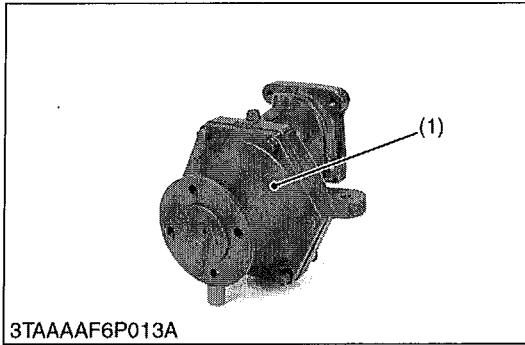
Tightening torque	Bevel gear case mounting screw (M10)	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft
	Bevel gear case mounting screw (M12)	78 to 90 N·m 7.9 to 9.2 kgf·m 58 to 66 lbf·ft

(1) Front Gear Case

(3) Front Axle Case

(2) Bevel Gear Case

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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)

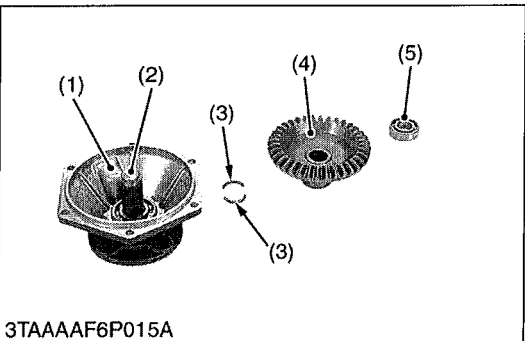
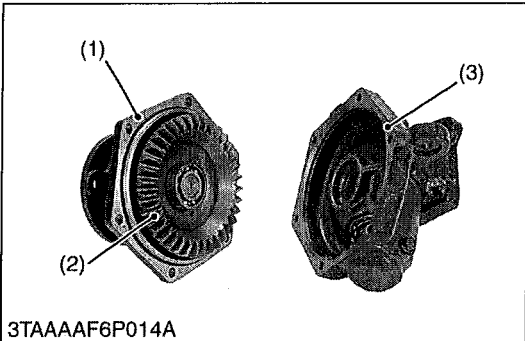
- Apply grease to the O-ring and be careful not to damage it.

Tightening torque	Front gear case cover mounting screw	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft
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- (1) Front Gear Case Cover
(2) Bevel Gear

- (3) Front Gear Case

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36T Bevel Gear and Front Axle Shaft

1. Remove the ball bearing (5).
2. Remove the 36T bevel gear (4).
3. Remove the collar (3).
4. Tap out the axle shaft (2).

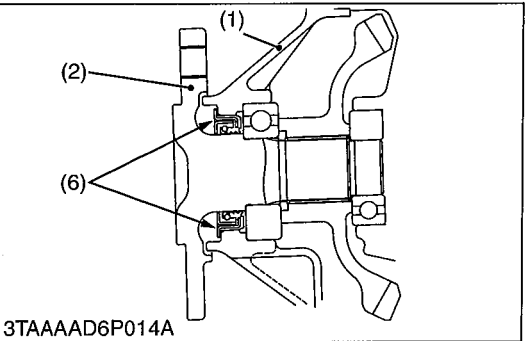
(When reassembling)

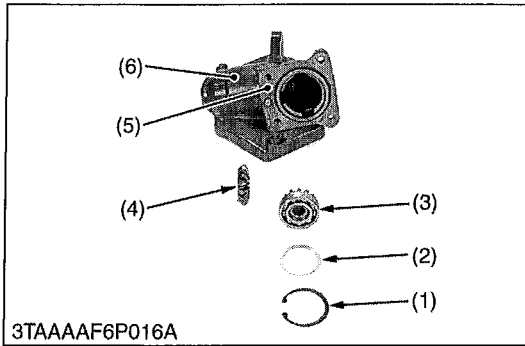
- Install the oil seal (6) of front gear case cover (1), noting its direction as shown in the figure.

- (1) Front Gear Case Cover
(2) Axle Shaft
(3) Collar

- (4) 36T Bevel Gear
(5) Ball Bearing
(6) Oil Seal

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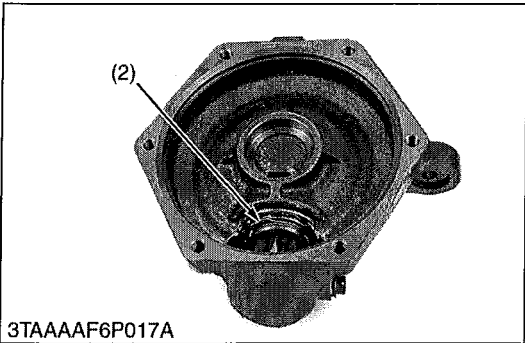


Front Gear Case and Bevel Gear Case

1. Remove the internal snap ring (1).
2. Remove the bevel gear with ball bearing (3) and shim (2).
3. Remove the bevel gear (4).
4. Remove the external snap ring (7).
5. Remove the bevel gear case (5) from front gear case (6).
6. Remove the oil seal (12) and the ball bearing (11).
7. Remove the internal snap ring (10) and remove the ball bearing (9).
8. Remove the bevel gear shaft (8) with ball bearing.

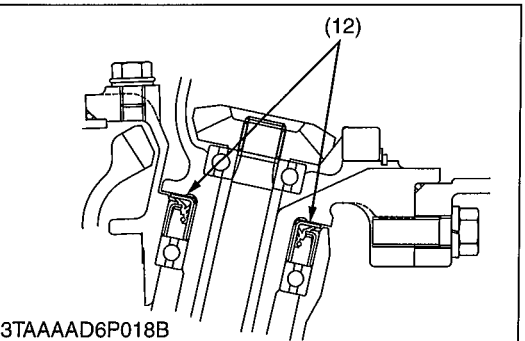
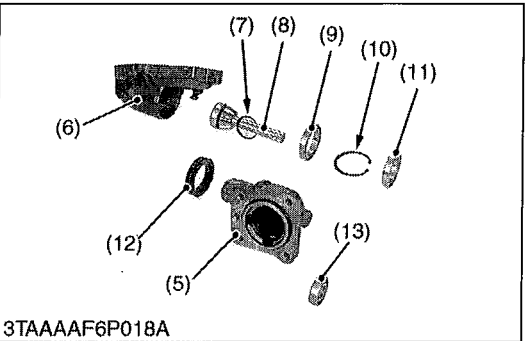
(When reassembling)

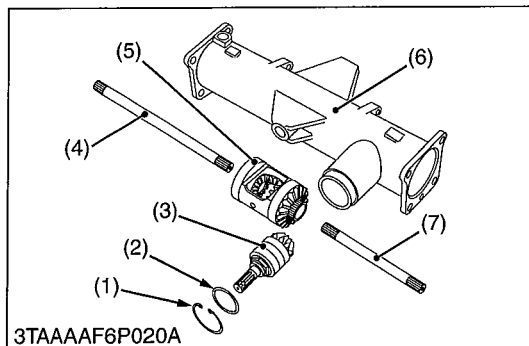
- Install the oil seal (12) of bevel gear case, noting its direction as shown in the figure.
- Install the adjusting shims (2) to their original position.



- | | |
|------------------------|-------------------------|
| (1) Internal Snap Ring | (8) Bevel Gear Shaft |
| (2) Shim | (9) Ball Bearing |
| (3) Ball Bearing | (10) Internal Snap Ring |
| (4) Bevel Gear | (11) Ball Bearing |
| (5) Bevel Gear Case | (12) Oil Seal |
| (6) Front Gear Case | (13) Ball Bearing |
| (7) External Snap Ring | |

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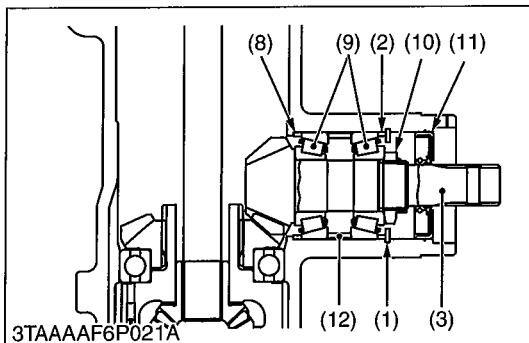


Bevel Pinion Shaft and Differential Gear Assembly

1. Remove the differential yoke shaft (4), (7).
2. Remove the oil seal (11).
3. Remove the internal snap ring (1).
4. Pull out the bevel pinion shaft (3).
5. Remove the differential gear assembly (5), from right side of front axle case (6).
6. Remove the stake of lock nut (10), and then remove the lock nut (10).
7. Remove the taper roller bearing (9).

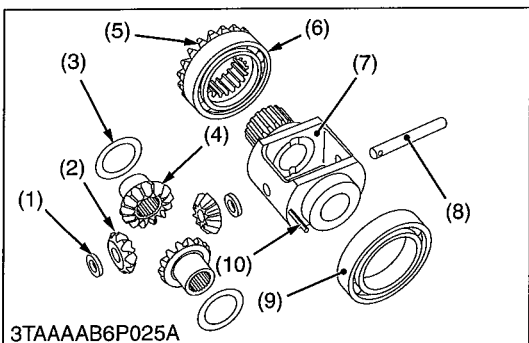
(When reassembling)

- Apply gear oil to the taper roller bearings (9) and install them correctly, noting their direction.
- Replace the lock nut (10) and oil seal (11) with new ones.
- After tighten the lock nut (10) to the specified torque, stake it firmly.
- Install the adjusting collars (2), (8) to their original position.



- | | |
|--------------------------------|--------------------------------|
| (1) Internal Snap Ring | (7) Differential Yoke Shaft RH |
| (2) Adjusting Collar | (8) Adjusting Collar |
| (3) Bevel Pinion Shaft | (9) Taper Roller Bearing |
| (4) Differential Yoke Shaft LH | (10) Lock Nut |
| (5) Differential Gear Assembly | (11) Oil Seal |
| (6) Front Axle Case | (12) Collar |

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Differential Gear

1. Remove the bevel gear (5) with bearing (6) and bearing (9) by puller.
2. Remove the spring pin (10).
3. Remove the differential pinion shaft (8).
4. Remove the differential pinions (2), differential side gears (4) and shims (1), (3).

NOTE

- Arrange the parts to know their original position.

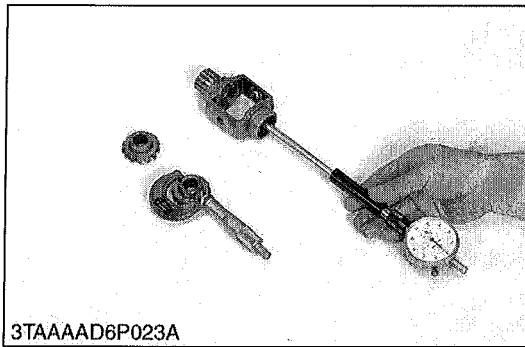
(When reassembling)

- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumferential surface of the differential side gears, differential pinions and shims.

- | | |
|----------------------------|-------------------------------|
| (1) Shim | (6) Bearing |
| (2) Differential Pinion | (7) Differential Gear Case |
| (3) Shim | (8) Differential Pinion Shaft |
| (4) Differential Side Gear | (9) Ball Bearing |
| (5) Bevel Gear | (10) Spring Pin |

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[4] SERVICING



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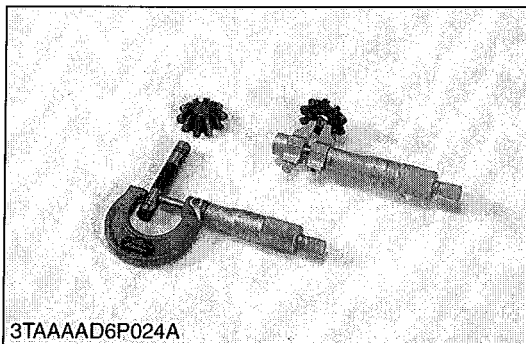
Clearance between Differential Case and Differential Side Gear

1. Measure the differential side gear boss O.D..
2. Measure the differential case bore I.D., and calculate the clearance.
3. Measure the differential case cover bore I.D., and calculate the clearance.
4. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential case and differential side gear	Factory specification	0.040 to 0.082 mm 0.0016 to 0.0032 in.
	Allowable limit	0.17 mm 0.0067 in.

Differential case bore I.D.	Factory specification	26.000 to 26.021 mm 1.0237 to 1.0244 in.
Differential side gear O.D.	Factory specification	25.939 to 25.960 mm 1.0213 to 1.0220 in.

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3TAAAD6P024A

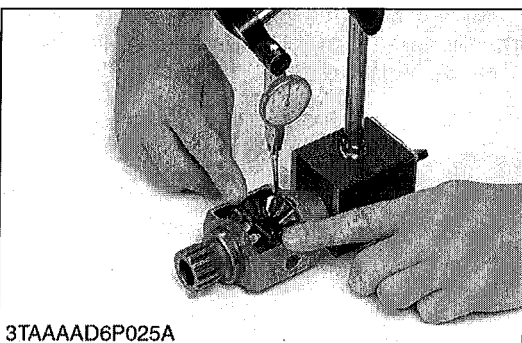
Clearance between Differential Pinion Shaft and Differential Pinion

1. Measure the differential pinion shaft O.D..
2. Measure the differential pinion I.D., and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace faulty parts.

Clearance between differential pinion shaft and differential pinion	Factory specification	0.025 to 0.055 mm 0.00099 to 0.0021 in.
	Allowable limit	0.25 mm 0.0098 in.

Differential pinion shaft O.D.	Factory specification	9.960 to 9.975 mm 0.3922 to 0.3927 in.
Differential pinion I.D.	Factory specification	10.000 to 10.015 mm 0.39370 to 0.39429 in.

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Backlash between Differential Pinion and Differential Side Gear

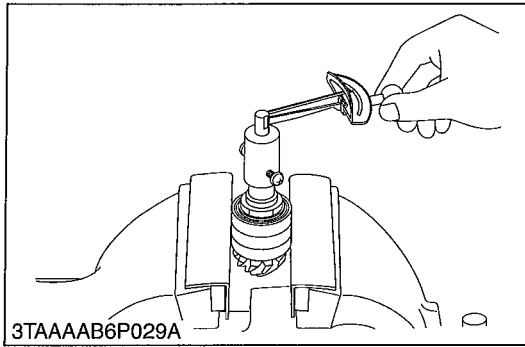
1. Set a dial gauge (lever type) on a tooth of the differential pinion.
2. Fix the differential side gear, and move the differential pinion to measure the backlash.
3. If the measurement exceeds the factory specifications, adjust with the differential side gears shims.

Backlash between differential pinion and differential side gear	Factory specification	0.1 to 0.3 mm 0.004 to 0.01 in.
---	-----------------------	------------------------------------

(Reference)

- Thickness of adjusting shims:
 - For side gear:
 - 0.80 mm (0.031 in.)
 - 1.0 mm (0.039 in.)
 - 1.2 mm (0.047 in.)
 - For pinion:
 - 3.30 mm (0.130 in.)
 - 3.50 mm (0.138 in.)
 - 3.70 mm (0.146 in.)
 - 3.90 mm (0.154 in.)

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Turning Torque of Bevel Pinion Shaft

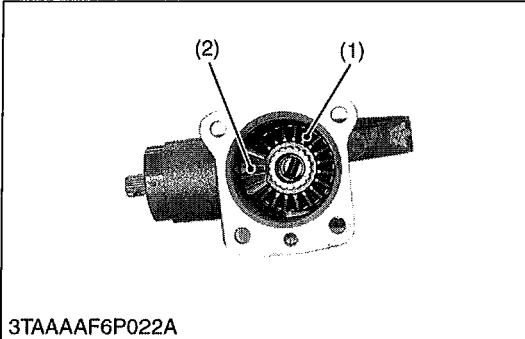
1. Clamp the spiral bevel pinion shaft assembly to the vise and tighten the staking nut.
2. Measure the turning torque of bevel pinion shaft.
3. If the turning torque is not within the factory specifications, adjust with the lock nut.

Turning torque	Factory specification	0.80 to 1.0 N·m 0.082 to 0.10 kgf·m 0.59 to 0.73 lbf·ft
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■ **NOTE**

- After turning force adjustment, be sure to stake the lock nut.

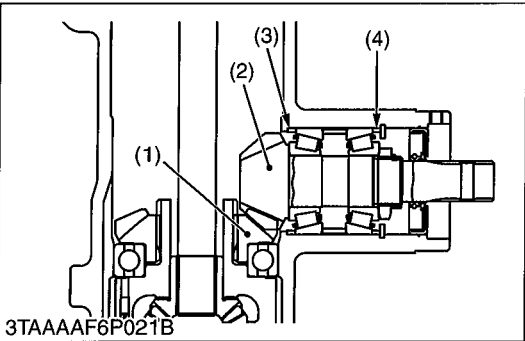
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Backlash between Bevel Pinion Shaft and Bevel Gear

1. Put the wire of solder (0.5 mm (0.02 in.) thickness) or plastigauge on the position where the tooth proper contact of bevel pinion shaft.
2. Fix the bevel gear and rotate the bevel pinon shaft carefully.
3. Measure the backlash.
4. If the backlash is not within the factory specifications, change the adjusting collar (3) and (4). For example change the adjusting collar (4) to 0.1 mm (0.004 in.) smaller size, and change the adjusting collar (3) to 0.1 mm (0.004 in.) larger size.
5. Adjust the backlash properly by repeating the above procedures.

Backlash between bevel pinion shaft and bevel gear	Factory specification	0.1 to 0.3 mm 0.004 to 0.01 in.
--	-----------------------	------------------------------------



(Reference)

- Thickness of adjusting collars (3), (4):
 - 3.40 mm (0.134 in.)
 - 3.60 mm (0.142 in.)
 - 3.80 mm (0.150 in.)
 - 3.90 mm (0.154 in.)
 - 4.00 mm (0.157 in.)
 - 4.10 mm (0.161 in.)
 - 4.20 mm (0.165 in.)
 - 4.40 mm (0.173 in.)
 - 4.50 mm (0.177 in.)
 - 4.60 mm (0.181 in.)

- (1) Bevel Gear
- (2) Bevel Pinion Shaft
- (3) Adjusting Collar
- (4) Adjusting Collar

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4 STEERING

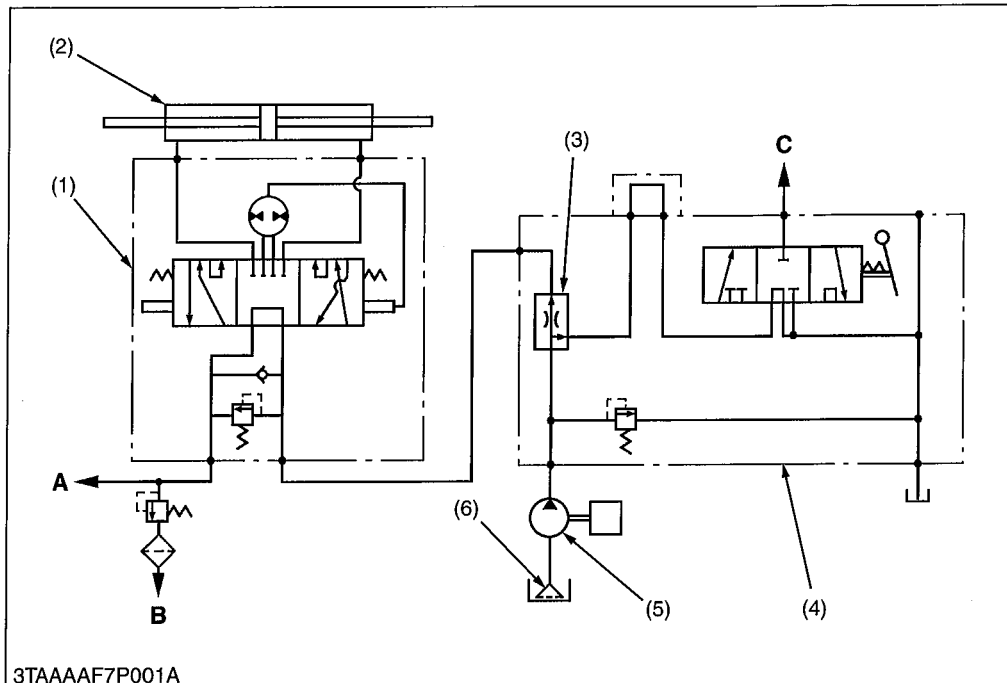


MECHANISM

CONTENTS

1. HYDRAULIC CIRCUIT	4-M1
2. STEERING CONTROLLER.....	4-M2
3. STEERING CYLINDER	4-M3

1. HYDRAULIC CIRCUIT



- (1) Steering Controller
- (2) Steering Cylinder
- (3) Flow Priority Valve
- (4) Hydraulic Control Valve Assembly
- (5) Hydraulic Pump
- (6) Oil Strainer

- A: To PTO Clutch Valve
- B: To HST
- C: To Hydraulic Cylinder

This model is provided with a full hydrostatic power steering.

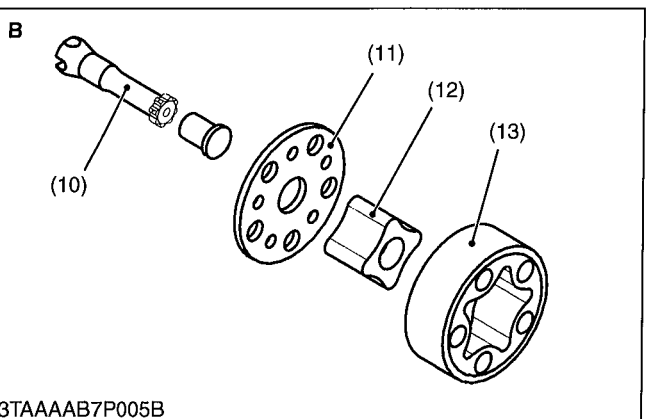
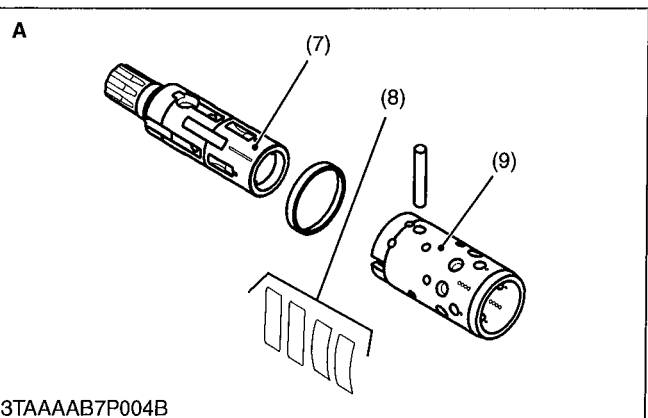
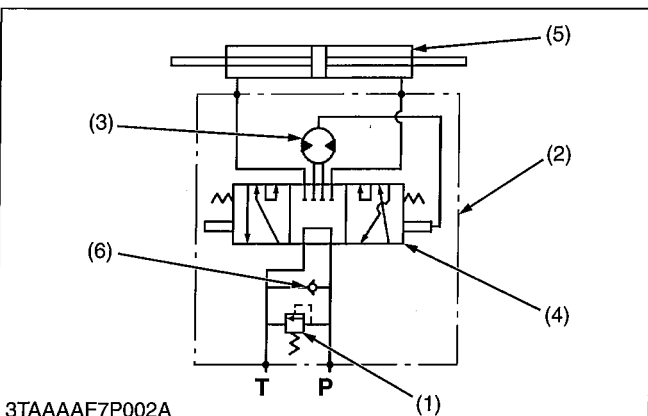
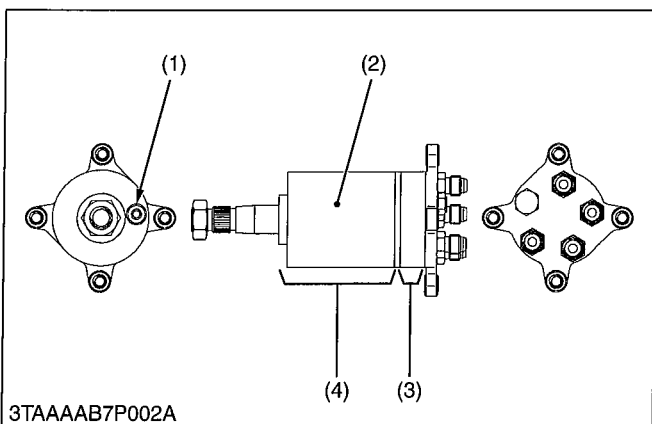
In the full hydrostatic power steering, the steering controller is connected to the steering cylinder with only the hydraulic piping. Accordingly, it does not have mechanical transmitting parts such as steering gear, pitman arm, drag link, etc.. Therefore, it is simple in construction. This steering system consists of the oil strainer (6), hydraulic pump (5), flow priority valve (3), steering controller (1), steering cylinder (2), etc..

Flow priority valve (3) which located in the hydraulic control valve assembly (4) divides the oil into two direction. One is the control flow to power steering (constantly 9.5 L/min., 2.5 U.S.gals/min., 2.1 Imp.gals/min.), and the other is excessive flow to control valve of implement lift control.

By operating the power steering body, the required amount of oil is fed to the steering cylinder (2).

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2. STEERING CONTROLLER



The steering controller consists of a control valve (4) and a metering device (3).

■ Control Valve

The control valve is a rotating spool type.

When the steering wheel is not turned, the position of the spool (7) and sleeve (9) is kept neutral by the centering spring (8). This causes the forming of a "Neutral" oil circuit.

When the steering wheel is turned either clockwise or counterclockwise, the position of the spool and sleeve changes in relation to the centering spring. This allows the forming of a "Right Turning" or "Left Turning" oil circuit. At the same time, the gear pump (Metering device) rotates with the spool and sends the oil to the cylinder corresponding to the rotation of the steering wheel.

■ Metering Device

Oil sent from the hydraulic pump to the steering cylinder, passes through the metering device (3).

Namely, when the rotor is driven, two chambers suck in oil due to volumetric change in the pump chambers formed between the rotor (12) and the stator (13), while oil is discharged from other two chambers. On the other hand, rotation of the steering wheel is directly transmitted to the rotor through the spool (7), drive shaft (10), etc.

Accordingly, the metering device serves to supply the steering cylinder with oil, amount of which corresponds to the rotation of the steering wheel. The wheels are thus turned by the angle corresponding to the rotation of the steering wheel.

When the engine stops or the hydraulic pump malfunctions, the metering device functions as a manual trochoid pump, which makes manual steering possible.

■ Relief Valve

The relief valve (1) is located in the steering controller. It controls the maximum pressure of the power steering system.

Its setting pressure is as follows.

8.33 to 8.83 MPa

85 to 90 kgf/cm²

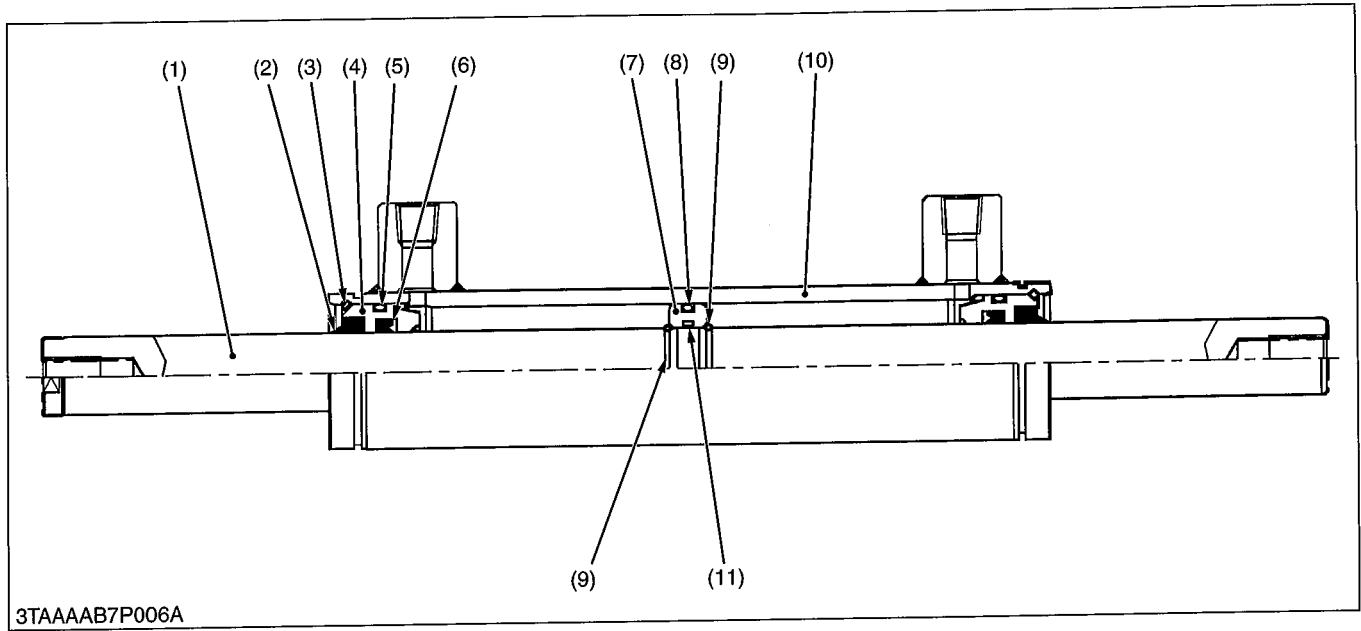
1209 to 1280 psi

- | | |
|-------------------------|------------------------|
| (1) Relief Valve | (11) Distributor Plate |
| (2) Steering Controller | (12) Rotor |
| (3) Metering Device | (13) Stator |
| (4) Control Valve | |
| (5) Steering Cylinder | |
| (6) Check Valve | |
| (7) Spool | |
| (8) Centering Spring | |
| (9) Sleeve | |
| (10) Drive Shaft | |

- A: Control Valve**
B: Metering Device
P: P Port
(From flow priority valve)
T: T Port (To PTO clutch valve and HST circuit)

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3. STEERING CYLINDER



3TAAAAB7P006A

- | | | | |
|------------------------|---------------|------------------------|--------------------|
| (1) Rod | (4) Guide | (7) Center Piston | (10) Cylinder Tube |
| (2) Wiper Seal | (5) O-ring | (8) Piston O-ring | (11) Rod O-ring |
| (3) Internal Snap Ring | (6) Seal Ring | (9) External Snap Ring | |

The steering cylinder is single piston both rod double-acting type. This steering cylinder is installed parallel to the front axle and connected to tie-rods.

The tie-rods connected to both knuckle arm guarantees equal steering movement to both front wheels.

The steering cylinder provide force in both directions. Depending upon direction the steering wheel is turned pressure oil enters at one end of the cylinder to extend, or the other end to retract it, thereby turning front wheel of the tractor.

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SERVICING

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1. TROUBLESHOOTING.....	4-S1
2. SERVICING SPECIFICATIONS.....	4-S2
3. TIGHTENING TORQUES.....	4-S3
4. CHECKING, DISASSEMBLING AND SERVICING.....	4-S4
[1] CHECKING.....	4-S4
(1) Relief Valve.....	4-S4
[2] PREPARATION.....	4-S4
(1) Separating Power Steering Controller.....	4-S4
(2) Separating Power Steering Cylinder.....	4-S6
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(1) Power Steering Cylinder.....	4-S8
[4] SERVICING.....	4-S9

1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Cannot Be Steered	Steering controller malfunctioning	Replace	4-S6
Hard Steering	Power steering oil improper (Transmission fluid)	Change with specified oil	G-9
	Hydraulic pump malfunctioning	Replace	5-S11
	Flow priority valve malfunctioning	Repair or replace	5-M6
	Steering controller malfunctioning	Replace	4-S6
Steering Force Fluctuates	Steering controller malfunctioning	Replace	4-S6
	Flow priority valve malfunctioning	Replace	5-M6
	Air sucked in pump due to lack of oil	Fill	G-32
	Air sucked in pump from suction circuit	Repair	-
Steering Wheel Turns Spontaneously When Released	Steering controller malfunctioning	Replace	4-S6
Front Wheels Wander to Right and Left	Steering controller malfunctioning	Replace	4-S6
	Air sucked in pump due to lack of oil	Fill	G-32
	Air sucked in pump from suction circuit	Repair	-
	Insufficient bleeding	Bleed	G-39
	Cylinder malfunctioning	Repair or replace	4-S8
	Improper toe-in adjustment	Adjust	3-S4
	Tire pressure uneven	Inflate	G-60
Wheels Are Turned to a Direction Opposite to Steering Direction	Cylinder piping connected in reverse	Repair	4-S6
Steering Wheel Turns Idle in Manual Steering	Insufficient bleeding	Bleed	G-39
	Air sucked in due to lack of oil	Fill	G-32
Noise	Air sucked in pump due to lack of oil	Fill	G-32
	Air sucked in pump from suction circuit	Repair	-
	Pipe deformed	Replace	-
Oil Temperature Increases Rapidly	Steering controller (relief valve) malfunctioning	Replace	4-S6

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2. SERVICING SPECIFICATIONS

POWER STEERING BODY

Item		Factory Specification	Allowable Limit
Relief Valve	Operating Pressure	8.34 to 8.82 MPa 85.0 to 90.0 kgf/cm ² 1210 to 1280 psi	—

STEERING CYLINDER

Item		Factory Specification	Allowable Limit
Steering Cylinder	I.D.	40.000 to 40.062 mm 1.5748 to 1.5772 in.	40.100 mm 1.5787 in.
Piston Rod to Guide	Clearance	0.020 to 0.070 mm 0.00079 to 0.0027 in.	0.200 mm 0.00787 in.

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3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
 (For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-13.)

Item	N·m	kgf·m	lbf·ft
Steering wheel mounting nut	20 to 25	2.0 to 2.6	15 to 18
Power steering hose	24 to 27	2.4 to 2.8	18 to 20
Power steering cylinder mounting screw	48 to 55	4.9 to 5.7	36 to 41
Tie-rod slotted nut	18 to 34	1.8 to 3.5	13 to 25
Tie-rod screw	74 to 84	7.5 to 8.6	55 to 62

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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 (1.0 kgf, 2.2 lbf) of outer.

■ NOTE

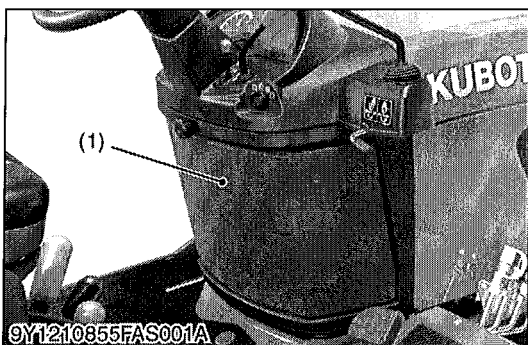
- After set a pressure gauge, be sure to bleed air.
- Note that the pressure value changes by the pump action of the power steering controller when the steering operation is continued after the steering wheel is lightly locked and accurate relief valve pressure cannot be measured.

Relief valve operating pressure	Factory specification	8.34 to 8.82 MPa 85.0 to 90.0 kgf/cm ² 1210 to 1280 psi
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[2] PREPARATION

(1) Separating Power Steering Controller



Battery

⚠ CAUTION

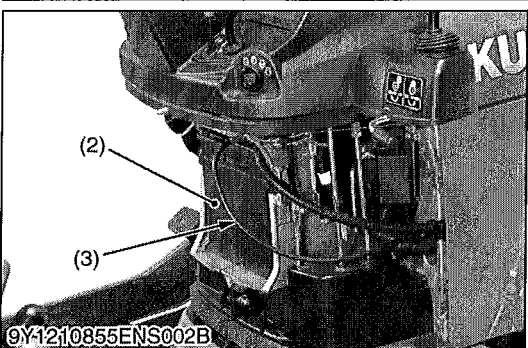
- When disconnecting the battery cables, disconnect the negative cable from the battery first. When connecting, connect the positive cable to the battery first.

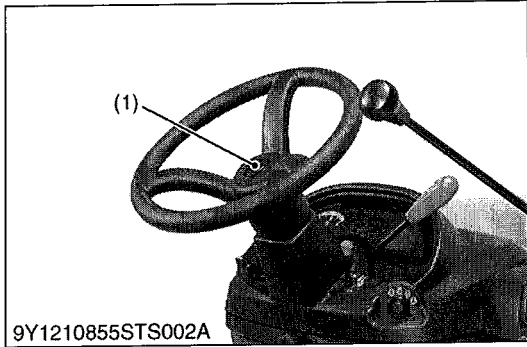
1. Remove the under panel (1).
2. Disconnect the negative cable (3) from the battery.

- (1) Under Panel
(2) Battery

- (3) Negative Cable

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Steering Wheel

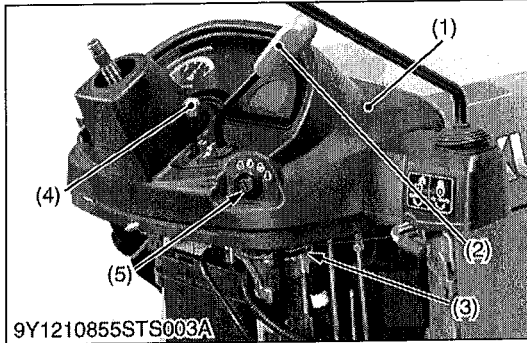
1. Remove the steering wheel cap (1).
2. Remove the steering wheel mounting nut and remove the steering wheel.

(When reassembling)

Tightening torque	Steering wheel mounting nut	20 to 25 N·m 2.0 to 2.6 kgf·m 15 to 18 lbf·ft
-------------------	-----------------------------	---

(1) Steering Wheel Cap

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Meter Panel

1. Disconnect the main switch connector and combination switch connector (7).
2. Remove the hand accelerator lever grip and cruise control lever knob.
3. Disconnect the hand accelerator wire (3) and then turn the hand accelerator lever (2) to the operator seat side.
4. Open the bonnet, remove the panel mounting screws and dismount the meter panel.

(1) Meter Panel

(5) Main Switch

(2) Hand Accelerator Lever

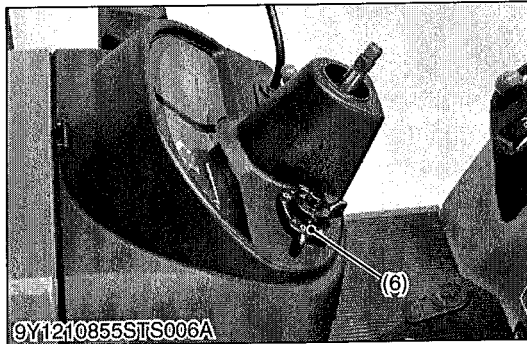
(6) Combination Switch

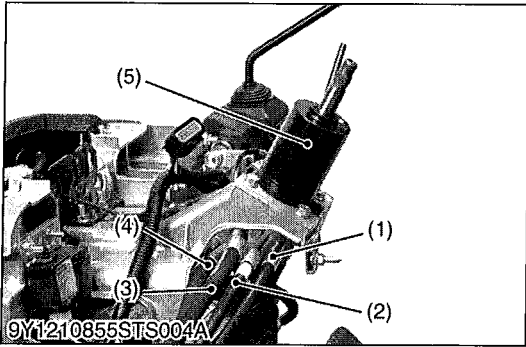
(3) Hand Accelerator Wire

(7) Connector for Combination Switch

(4) Cruise Control Lever

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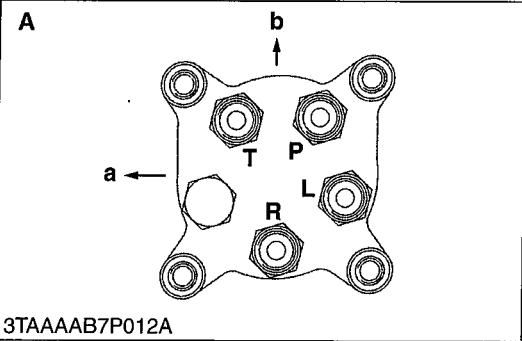
Steering Controller

1. Disconnect the power steering hoses (1), (2), (3), (4).
2. Remove the steering controller mounting screws and remove the steering controller (5).

(When reassembling)

- Be sure to connect the power steering hoses to their original position, and tighten them to the specified torque.

Tightening torque	Power steering hose	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
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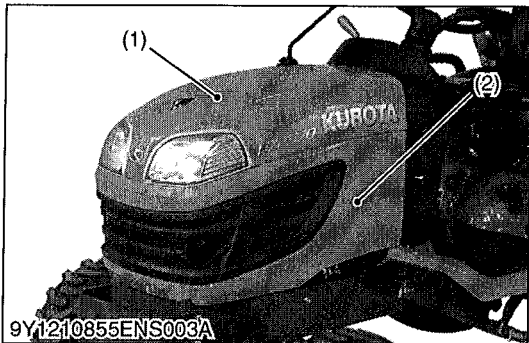


- (1) Cylinder Hose RH
- (2) Cylinder Hose LH
- (3) Delivery Hose
- (4) Return Hose
- (5) Steering Controller

- A: Bottom View
- P: Pump Port
(Connect to Delivery Hose)
- T: Tank Port
(Connect to Return Hose)
- L: L Port
(Connect to Cylinder LH Hose)
- R: R Port
(Connect to Cylinder RH Hose)
- a: Right
- b: Front

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(2) Separating Power Steering Cylinder

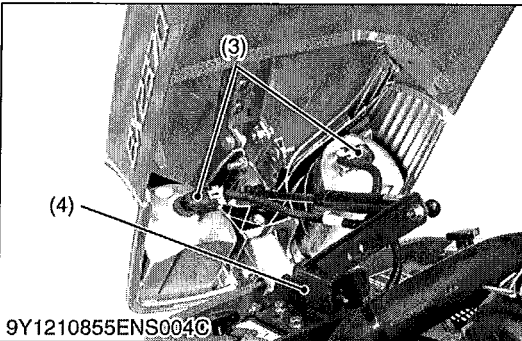


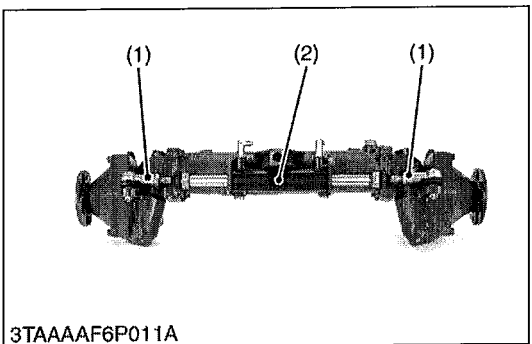
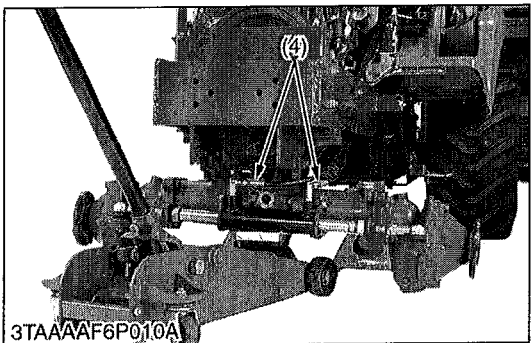
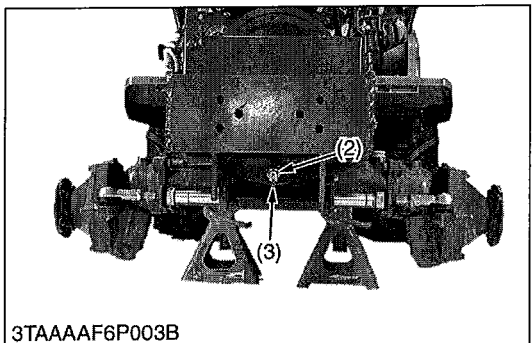
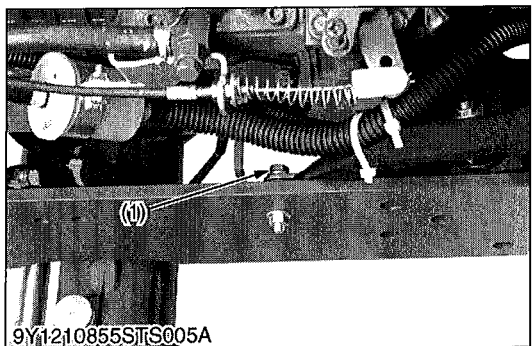
Bonnet and Under Cover

1. Open the bonnet (1), and then loosen the knob bolts and pull forward to remove the under cover (2).
2. Disconnect the connectors (3) for head light and remove the bonnet bracket (4) with bonnet.

- (1) Bonnet
- (2) Under Cover
- (3) Connector
- (4) Bonnet Bracket

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Front Axle Assembly

1. Remove the power steering hose clamp (1).
2. Place the garage jack under the front axle.
3. Remove the cotter pin (3).
4. Remove the slotted nut (2) of center pin and separate the front axle from the frame.
5. Disconnect the power steering hoses (4).

(When reassembling)

- After mounting the front axle assembly to the frame, be sure to adjust the front axle rocking force. (See page 3-S4.)
- Installing the cotter pin, be sure to split the cotter pin like an anchor.

Tightening torque	Power steering hose	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
-------------------	---------------------	---

- (1) Hose Clamp (3) Cotter Pin
 (2) Slotted Nut (Adjusting Nut for Front Axle Rocking Force) (4) Power Steering Hose

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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 18 N·m (1.8 kgf·m, 13 lbf·ft). 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.**

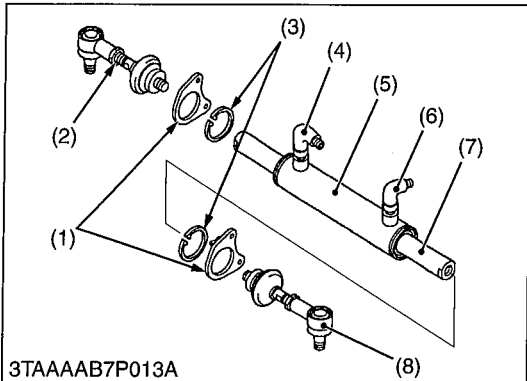
Tightening torque	Tie-rod slotted nut	18 to 34 N·m 1.8 to 3.5 kgf·m 13 to 25 lbf·ft
	Power steering cylinder mounting screw	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft

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

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[3] DISASSEMBLING AND ASSEMBLING

(1) Power Steering Cylinder



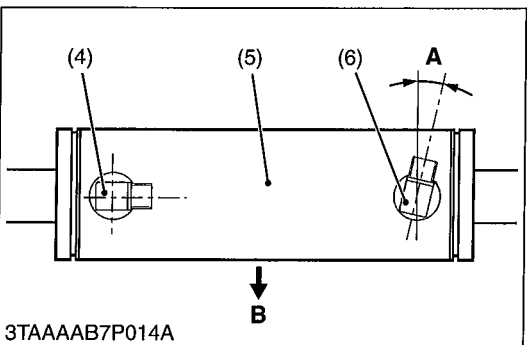
Adaptor and Tie-rod

1. Remove the cylinder hose adaptors (4), (6).
2. Remove the tie-rods (2), (8) from piston rod (7).
3. Remove the cylinder holder (1) and internal snap ring (3).

(When reassembling)

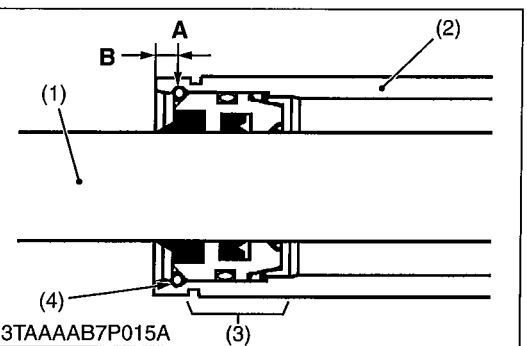
- Be sure to install the hose adaptors (4), (6) as shown figure left.
- After reassembling the tie-rod, be sure to adjust the toe-in. (See page to 3-S4.)

Tightening torque	Tie-rod screw	74 to 84 N·m 7.5 to 8.6 kgf·m 55 to 62 lbf·ft
-------------------	---------------	---



- | | |
|------------------------|---------------------------|
| (1) Cylinder Holder | (7) Piston Rod |
| (2) Tie-rod RH | (8) Tie-rod LH |
| (3) Internal Snap Ring | |
| (4) Hose Adaptor RH | A: 0.26 rad (15 °) |
| (5) Cylinder | B: Front |
| (6) Hose Adaptor LH | |

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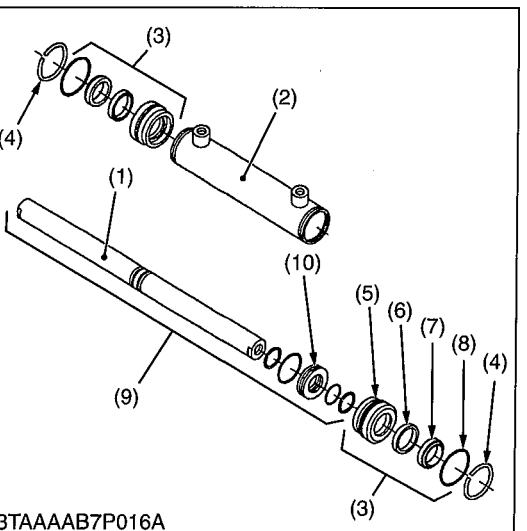
Steering Cylinder

1. Carefully clamp the cylinder in a vise.
2. Push one of the guide assembly (3) to inside of cylinder tube (2).
3. Drill a hole (2.5 mm dia., 0.098 in. dia.) on the cylinder tube (2) just over the snap ring (4) as shown figure left.
4. Take a little screwdriver and lift off the snap ring (4) from its groove. Simultaneous support this action by pushing from the outside of the cylinder tube with another little screwdriver or another tool.
5. Push out the piston rod assembly (9) and take off the guide assembly (3).

(When reassembling)

NOTE

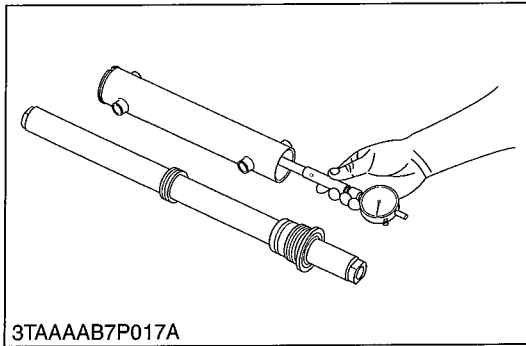
- **Seals must be exchanged after disassembling.**
- **Apply transmission fluid to the exchanged seals.**
- **Enter the piston rod and block the guide assemblies with the snap rings.**



- | | |
|--------------------|-------------------------------|
| (1) Piston Rod | (8) O-ring |
| (2) Cylinder Tube | (9) Piston Rod Assembly |
| (3) Guide Assembly | (10) Center Piston |
| (4) Snap Ring | |
| (5) Guide | A: Drill a Hole |
| (6) Seal Ring | B: 5.25 mm (0.207 in.) |
| (7) Wiper Ring | |

9Y1210855STS0010US0

[4] SERVICING

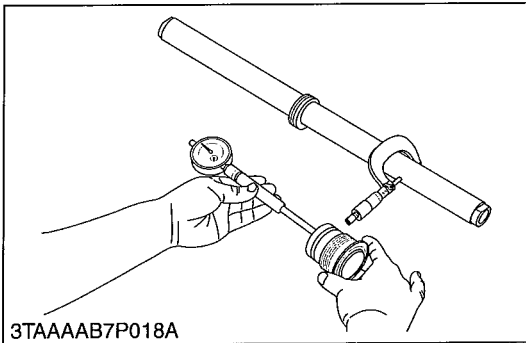


Steering Cylinder I.D.

1. Measure the steering cylinder I.D. with a cylinder gauge.
2. If the cylinder I.D. exceed the allowable limit, replace the cylinder barrel.

Steering cylinder I.D.	Factory specification	40.000 to 40.062 mm 1.5748 to 1.5772 in.
	Allowable limit	40.100 mm 1.5787 in.

9Y1210855STS0011US0



Clearance between Rod and Guide

1. Measure the rod guide I.D. with a cylinder gauge.
2. Measure the rod O.D. with an outside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace as a unit.

Clearance between rod and guide	Factory specification	0.020 to 0.070 mm 0.00079 to 0.0027 in.
	Allowable limit	0.200 mm 0.00787 in.

9Y1210855STS0012US0

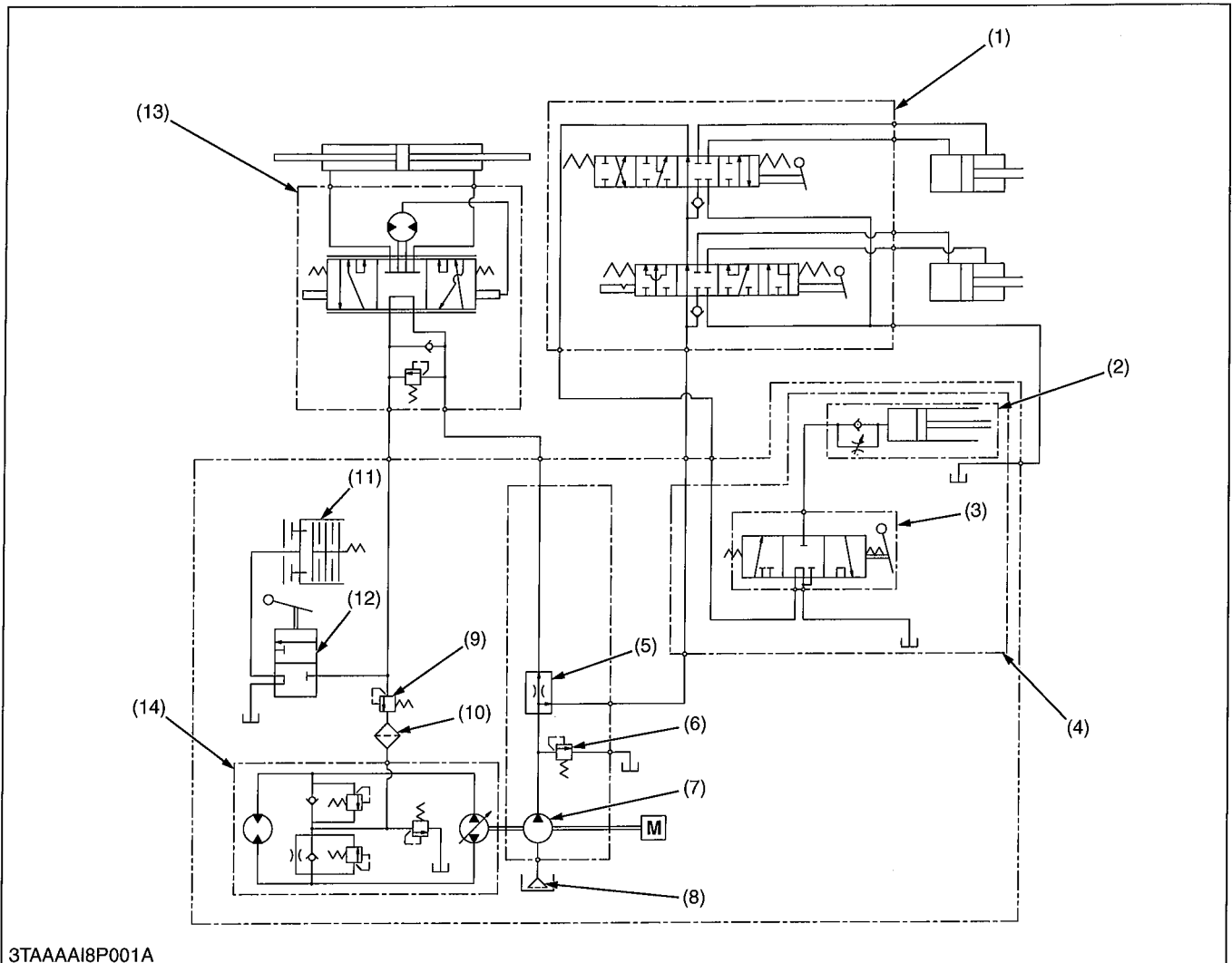
5 HYDRAULIC SYSTEM

MECHANISM

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1. HYDRAULIC CIRCUIT



3TAAAAI8P001A

- | | | | |
|--|--------------------------|-----------------------------|--------------------------------|
| (1) Auxiliary Hydraulic Control Valve Assembly (If equipped) | (4) 3 Point Hitch System | (8) Oil Strainer | (12) PTO Clutch Valve |
| (2) Hydraulic Cylinder | (5) Flow Priority Valve | (9) PTO Clutch Relief Valve | (13) Power Steering Controller |
| (3) Control Valve | (6) Relief Valve | (10) Oil Filter | (14) Hydrostatic Transmission |
| | (7) Hydraulic Pump | (11) PTO Clutch | |

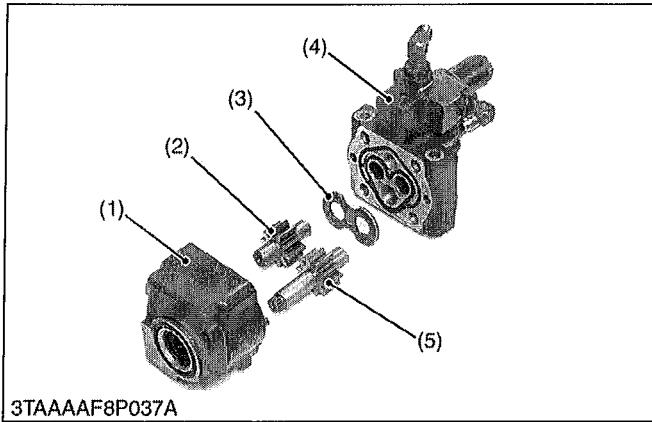
The hydraulic system of this tractor consists of a hydraulic pump, control valve for front loader, 3 point hitch system and other components.

This system has the following functions:

1. Oil is supplied by hydraulic pump which is driven by pump drive shaft in the transmission case. As the pump drive shaft is connected to the propeller shaft, hydraulic pump starts running when engine is started.
2. The hydraulic pump supplies the high pressured oil to auxiliary hydraulic control valve for front loader, control valve for 3 point hitch system, power steering controller, PTO clutch valve and hydrostatic transmission after dividing oil flow by flow priority valve.

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2. HYDRAULIC PUMP



The hydraulic pump consists of the casing (1), cover (4), side plate (3), and two spur gears (drive gear (5) and driven gear (2)) that are in mesh.

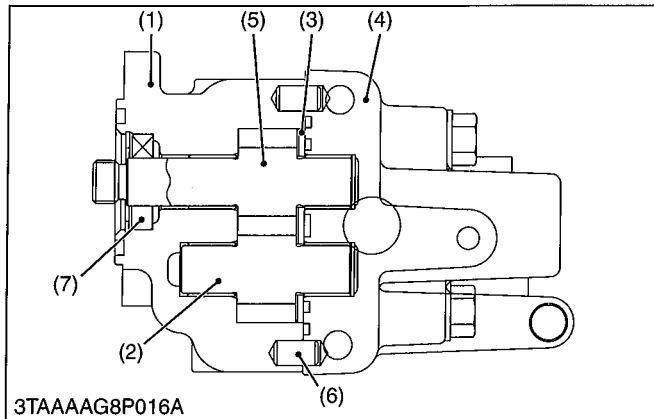
Hydraulic pump is driven by the pump drive shaft in the transmission case.

Maximum displacement is as follows.

Displacement	Engine speed	Condition
23.5 L/min. 6.2 U.S.gals/min. 5.2 Imp.gals/min.	At 3200 min ⁻¹ (rpm)	at no load

- (1) Casing
- (2) Driven Gear
- (3) Side Plate
- (4) Cover
- (5) Drive Gear
- (6) Pin
- (7) Oil Seal

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3. CONTROL VALVE

This position control valve is located under the hydraulic cylinder.

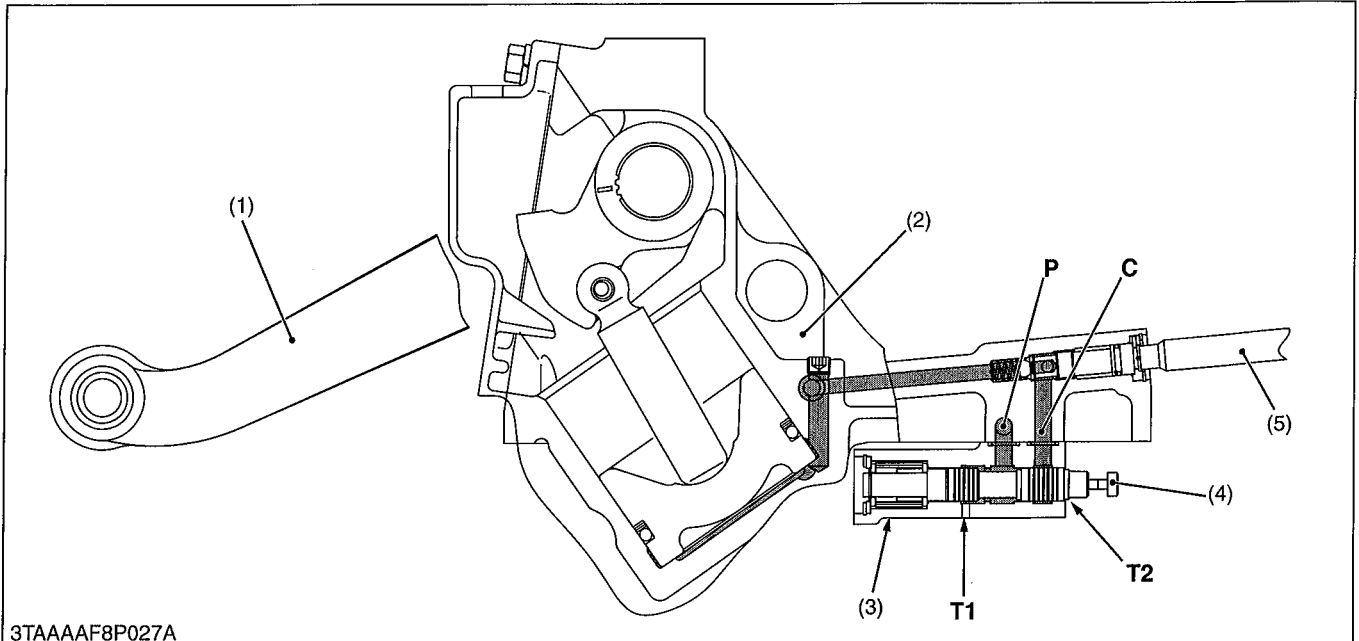
This control valve is mechanically connected to the position control lever.

Since the feedback rod is not equipped to the lift arm, the neutral position adjustment is adjusted by controlling the position control lever.

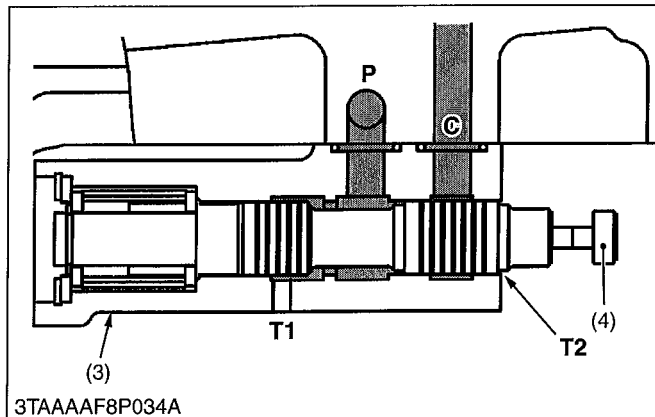
The control valve controls the oil flow forced from the hydraulic pump and the oil returned back from the hydraulic cylinder.

9Y1210855HYM0003US0

Neutral



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3TAAAF8P034A

When stopping the position control lever, the spool is stopped.

The spool closes the oil flow from passage between P port and C port.

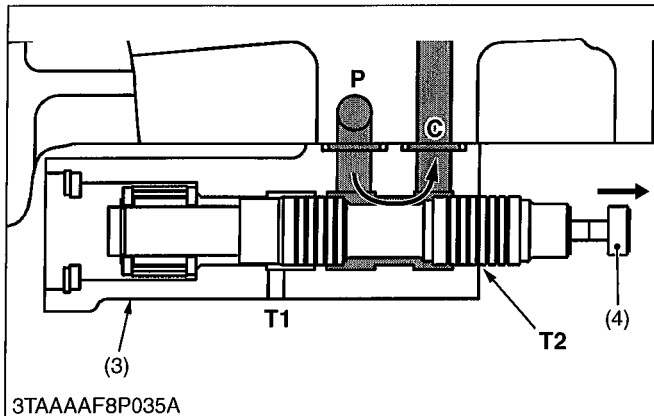
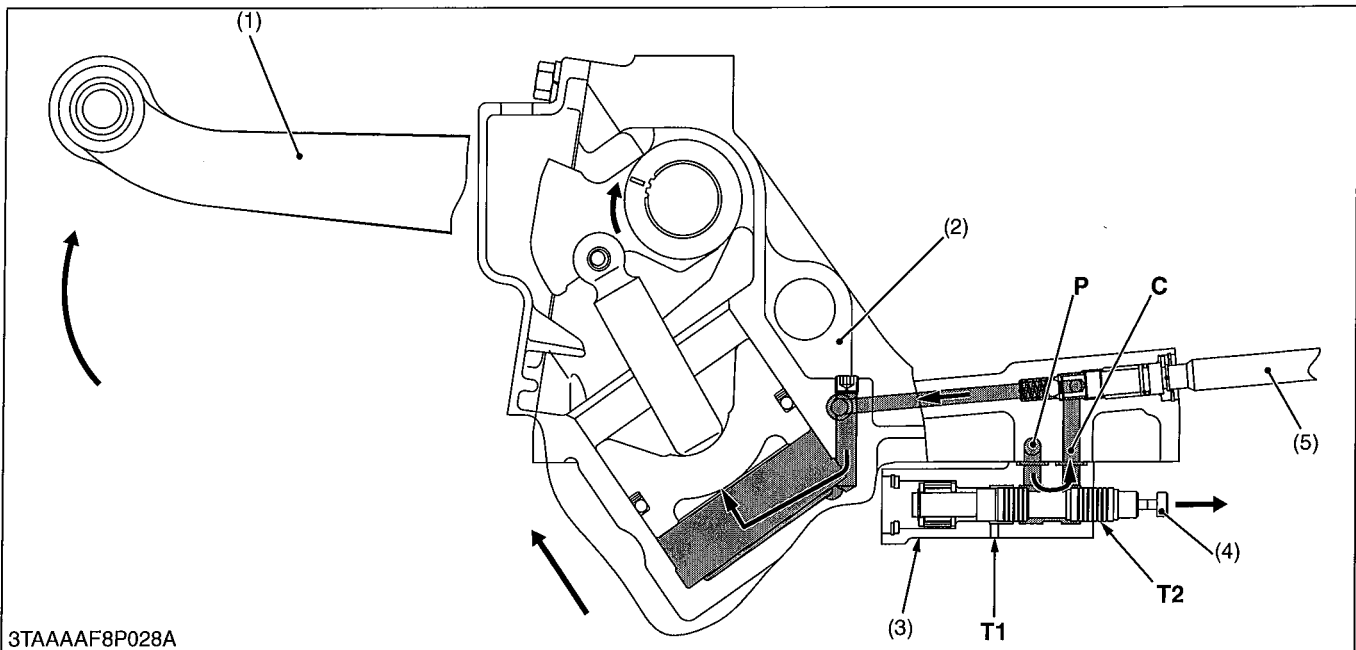
Since the oil in the hydraulic cylinder is not drained to T2 port, "Neutral" position is kept.

- (1) Lift Arm
- (2) Hydraulic Cylinder
- (3) Control Valve Body
- (4) Spool
- (5) Lowering Adjusting Shaft

- P: Pump Port
- C: Cylinder Port
- T1: Tank Port
- T2: Tank Port

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Lift



When the control lever is set to the "Lift" position, the spool (4) moves to the right.

The oil forced into the control valve flows through P port to C port and the hydraulic cylinder.

The oil pushes the hydraulic piston in the hydraulic cylinder to lift the implement.

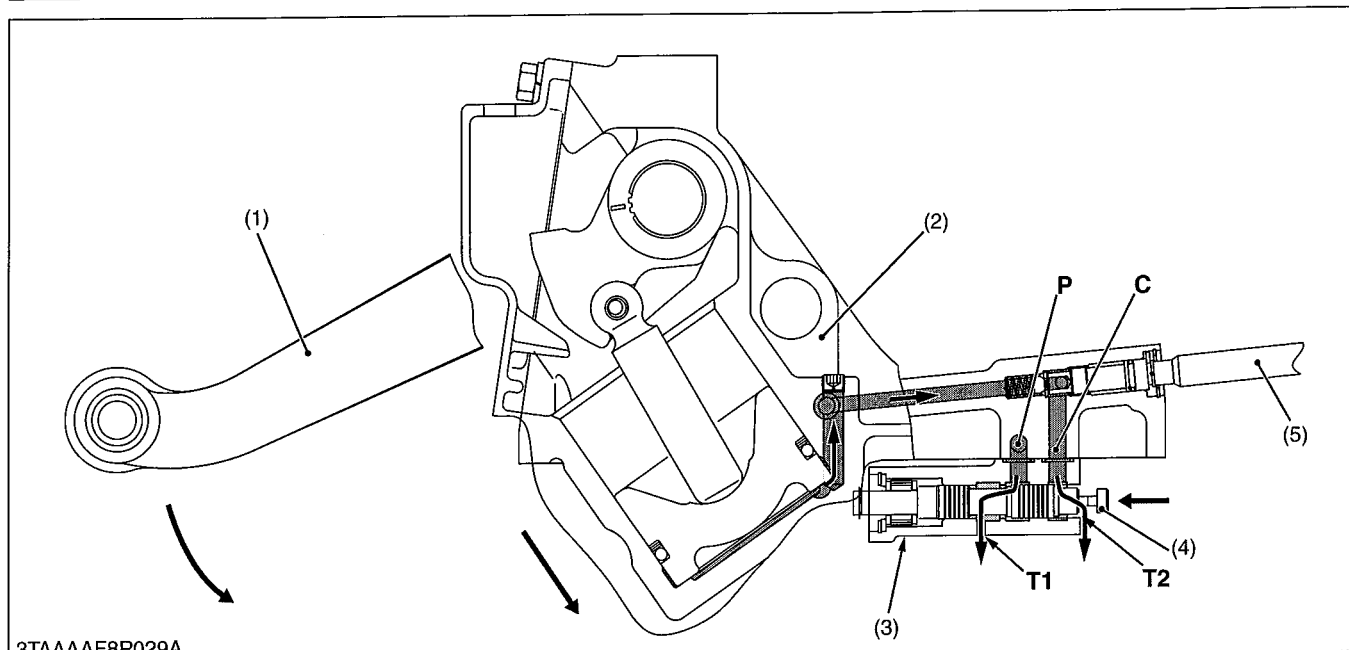
Since the spool shape is step down structure, oil passes slowly through the gap between the control valve body (3) and the spool (4) to C port.

In this tractor, when setting the control lever to the "Slow up", implement lifts up with ease in increments of approximately 1/4 inches at lower link end.

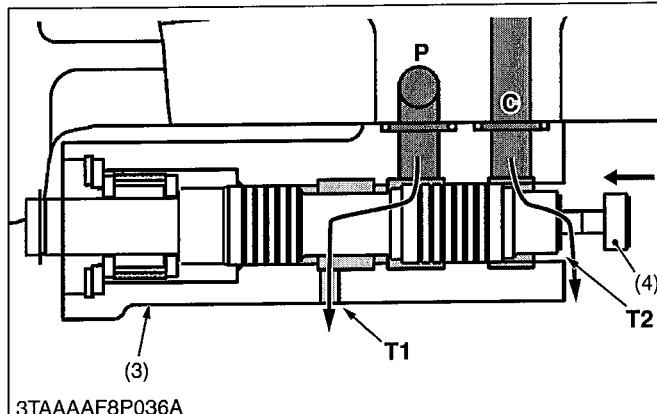
- | | |
|------------------------------|------------------|
| (1) Lift Arm | P: Pump Port |
| (2) Hydraulic Cylinder | C: Cylinder Port |
| (3) Control Valve Body | T1: Tank Port |
| (4) Spool | T2: Tank Port |
| (5) Lowering Adjusting Shaft | |

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Down



3TAAAF8P029A



3TAAAF8P036A

When the control lever is set to the **"Down"** position, the spool (4) moves to the left.

The oil forced from the **P** port flows through the gap between the control valve body and the spool to the **T1** port.

The oil in the hydraulic cylinder flows through the gap between the control valve body (3) and the spool (4) to the **T2** port.

Since the oil in the hydraulic cylinder drains to the transmission case, the implement lowers.

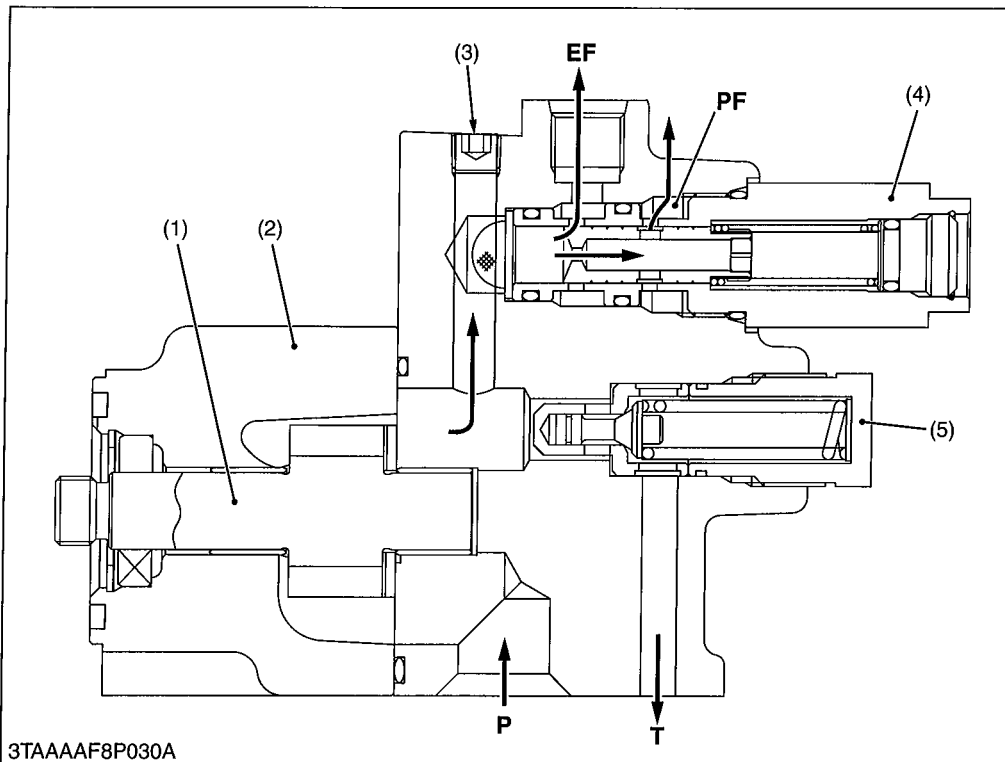
Since the spool shape is step down structure, oil pass slowly from **C** port through the gap between the control valve body (3) and the spool (4) to **T2** port.

In this tractor, when setting the control lever to the **"Slow down"** position, implement lowers down with ease in increments of approximately 1/4 inches at lower link end.

- | | |
|------------------------------|-------------------------|
| (1) Lift Arm | P: Pump Port |
| (2) Hydraulic Cylinder | C: Cylinder Port |
| (3) Control Valve Body | T1: Tank Port |
| (4) Spool | T2: Tank Port |
| (5) Lowering Adjusting Shaft | |

9Y1210855HYM0006US0

4. FLOW PRIORITY VALVE



- (1) Hydraulic Pump Gear
- (2) Hydraulic Pump Case
- (3) Plug
- (4) Flow Priority Valve
- (5) Relief Valve

EF: EF Port (To 3 Point Hitch Control Circuit)

PF: PF Port (To Power Steering, PTO Clutch and HST Circuit)

P: Pump Port (Suction)

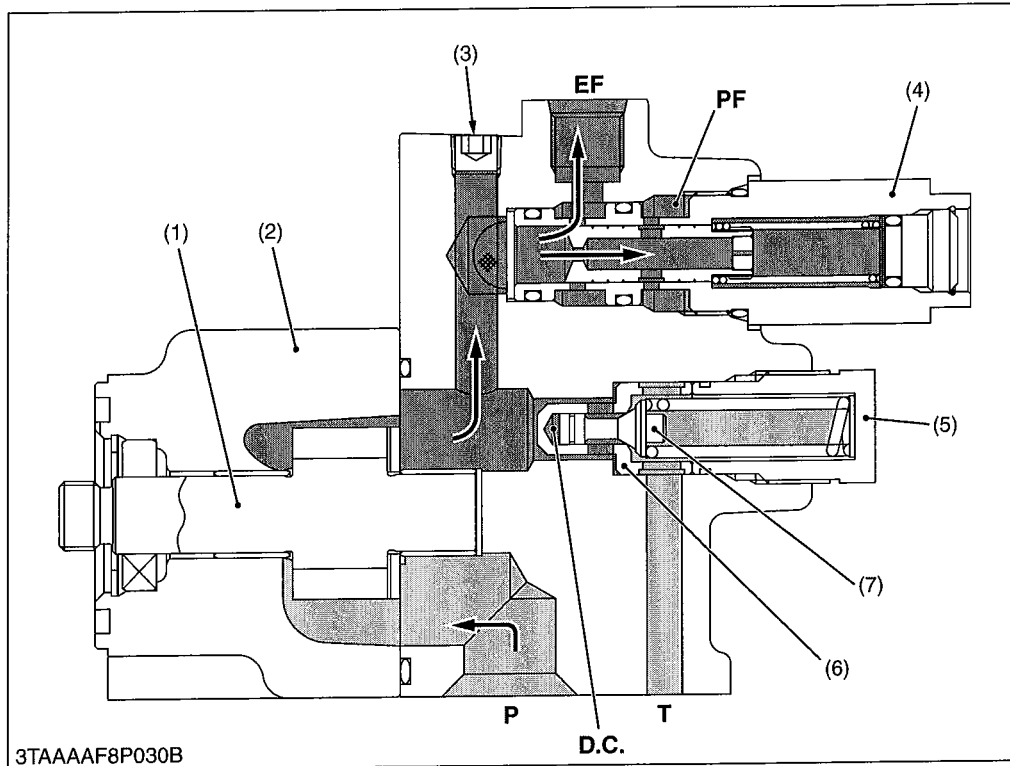
T: Tank Port

The flow priority valve is a flow divider that divides single hydraulic source (hydraulic pump) to actuates two circuits simultaneously.

This valve feeds fixedly controlled flow (8.0 L/min., 2.1 U.S.gals/min., 1.8 Imp.gals/min.) to the PF port with priority and excessive flow to the EF port.

9Y1210855HYM0007US0

5. RELIEF VALVE



- (1) Hydraulic Pump Gear
- (2) Hydraulic Pump Case
- (3) Plug
- (4) Flow Priority Valve
- (5) Relief Valve
- (6) Seat
- (7) Poppet

- EF: EF Port (To 3 Point Hitch Control Circuit)
- PF: PF Port (To Power Steering, PTO Clutch and HST Circuit)
- D.C.: Damping Chamber
- P: Pump Port (Suction)
- T: Tank Ports

3TAAAF8P030B

The implement control system circuit has a relief valve to restrict the maximum pressure in the circuit. The relief valve is located in the hydraulic control valve assembly.

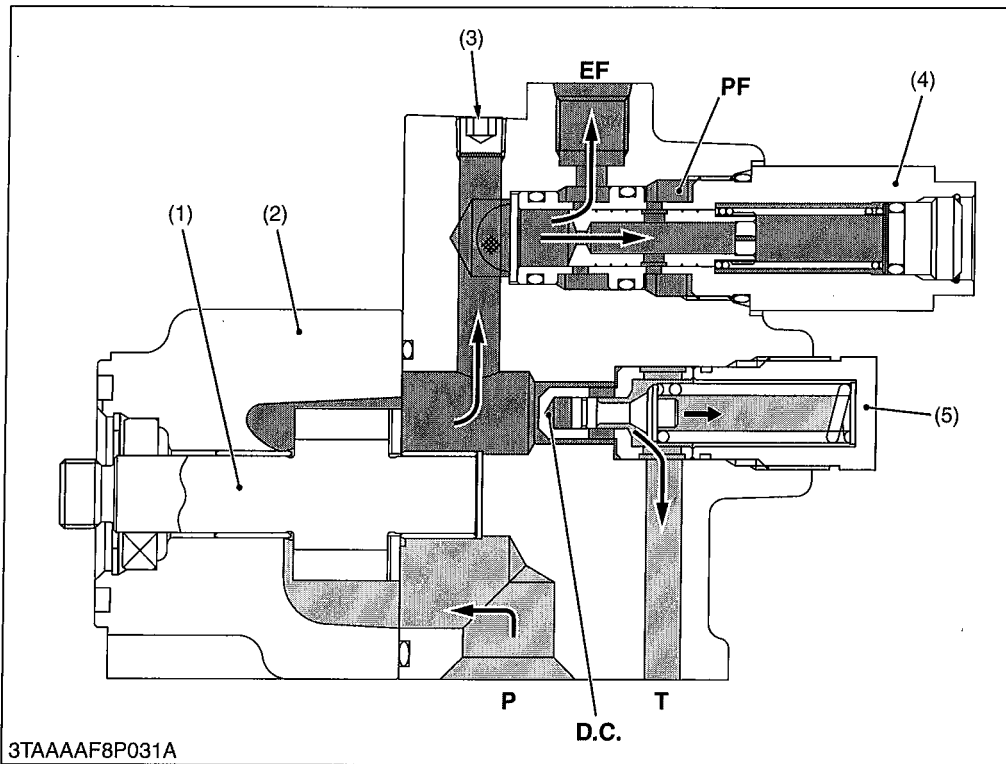
The relief valve is a guide piston type with damping effect.

Among direct acting relief valves, this type is suited to higher pressure and has large capacity. Furthermore, this type is free from unstable operation, such as chattering, which occurs often in direct acting relief valves.

As shown in the figure, the guide is attached to the poppet (7) and a valve chamber **D.C.** (called the damping chamber) is formed at the top of the guide piston. The inlet of the valve leads to the chamber via a clearance between the sliding portion of the guide and the seat (6), minimizing valve vibration with the damping effect of the chamber.

9Y1210855HYM0008US0

Relief Valve Operating



- (1) Hydraulic Pump Gear
- (2) Hydraulic Pump Case
- (3) Plug
- (4) Flow Priority Valve
- (5) Relief Valve

EF: EF Port (To 3 Point Hitch Control Circuit)
 PF: PF Port (To Power Steering, PTO Clutch and HST Circuit)
 D.C.: Damping Chamber
 P: Pump Port (Suction)
 T: Tank Ports

3TAAAAF8P031A

When the oil pressure in the circuit is lower than the setting pressure of the relief valve, the relief valve is not operated and the oil fed to the relief valve from the hydraulic pump flows into the implement control valve.

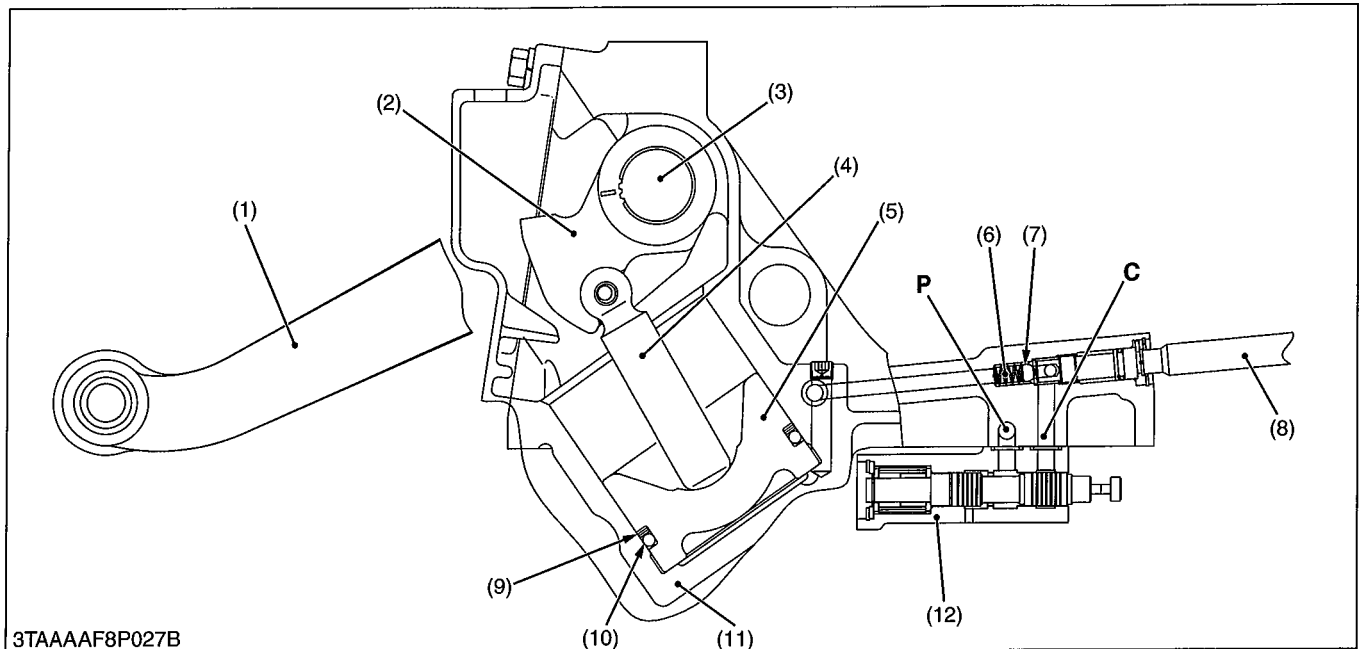
As the oil pressure in the circuit increases, so does the pressure in the damping chamber **D.C.**. When the pressure rises above the valve setting and overcomes the spring force, the valve opens. Oil then flows out to the transmission case through T port, preventing any further rise in pressure. The valve closes again when enough oil is released to drop pressure below the valve setting.

(Reference)

- Relief valve setting pressure:
12.3 to 12.7 MPa (125 to 130 kgf/cm², 1780 to 1840 psi)
- Engine speed:
Maximum
- Oil temperature:
40 to 50 °C (104 to 122 °F)

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6. HYDRAULIC CYLINDER



3TAAAF8P027B

- | | | | |
|-------------------------|------------------------------------|-------------------------|-------------------------|
| (1) Lift Arm | (6) Spring | (9) Back-up Ring | P: Pump Port |
| (2) Hydraulic Arm | (7) Ball | (10) O-ring | C: Cylinder Port |
| (3) Hydraulic Arm Shaft | (8) Lowering Speed Adjusting Shaft | (11) Hydraulic Cylinder | |
| (4) Hydraulic Rod | | (12) Control Valve | |
| (5) Piston | | | |

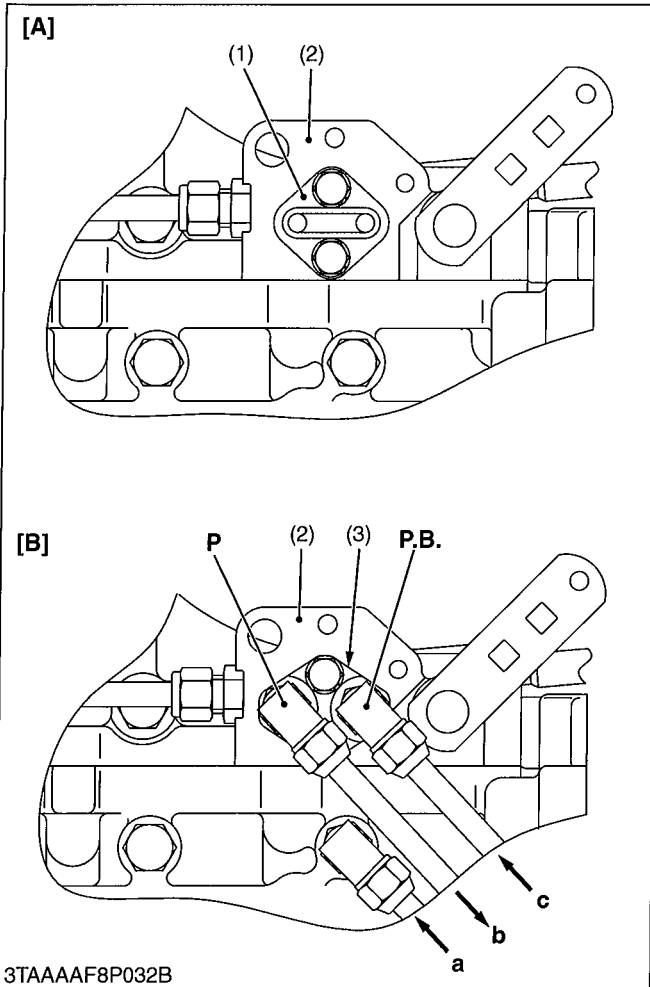
The main components of the hydraulic cylinder are shown in the figure above.

While the lift arm (1) is rising, oil from the hydraulic pump flows into the hydraulic cylinder through the hydraulic control valve (12) and cylinder port **C**. Then oil pushes out the piston (5).

While the lift arm (1) is lowering, oil in the hydraulic cylinder is discharged to the transmission case through the hydraulic control valve by the weight of the implement. At this time, the lowering speed of the implement can be controlled by the ball (7) attached to the hydraulic cylinder (11). Turning the lowering speed adjusting knob clockwise decreases the lowering speed, and counterclockwise increases lowering speed. When the lowering speed adjusting valve is completely closed, the lift arm (1) is held at its position since oil in the hydraulic cylinder is sealed between the piston (5) and ball (7).

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7. HYDRAULIC BLOCK TYPE OUTLET



The hydraulic block type outlet is located on the hydraulic cylinder assembly.

This hydraulic block type outlet is provided to take power out from the tractor to operate the hydraulic cylinders on the implement, such as front end loader, front snow blade and so on.

■ **NOTE**

- **This hydraulic block outlet uses for front loader hydraulic system on standard specification.**

- (1) Block Cover
- (2) Hydraulic Cylinder
- (3) Hydraulic Block

[A] When auxiliary control valve is not attached.

[B] When auxiliary control valve is attached.

P: P Port (Pump)

P.B.: P.B. Port (Power Beyond)

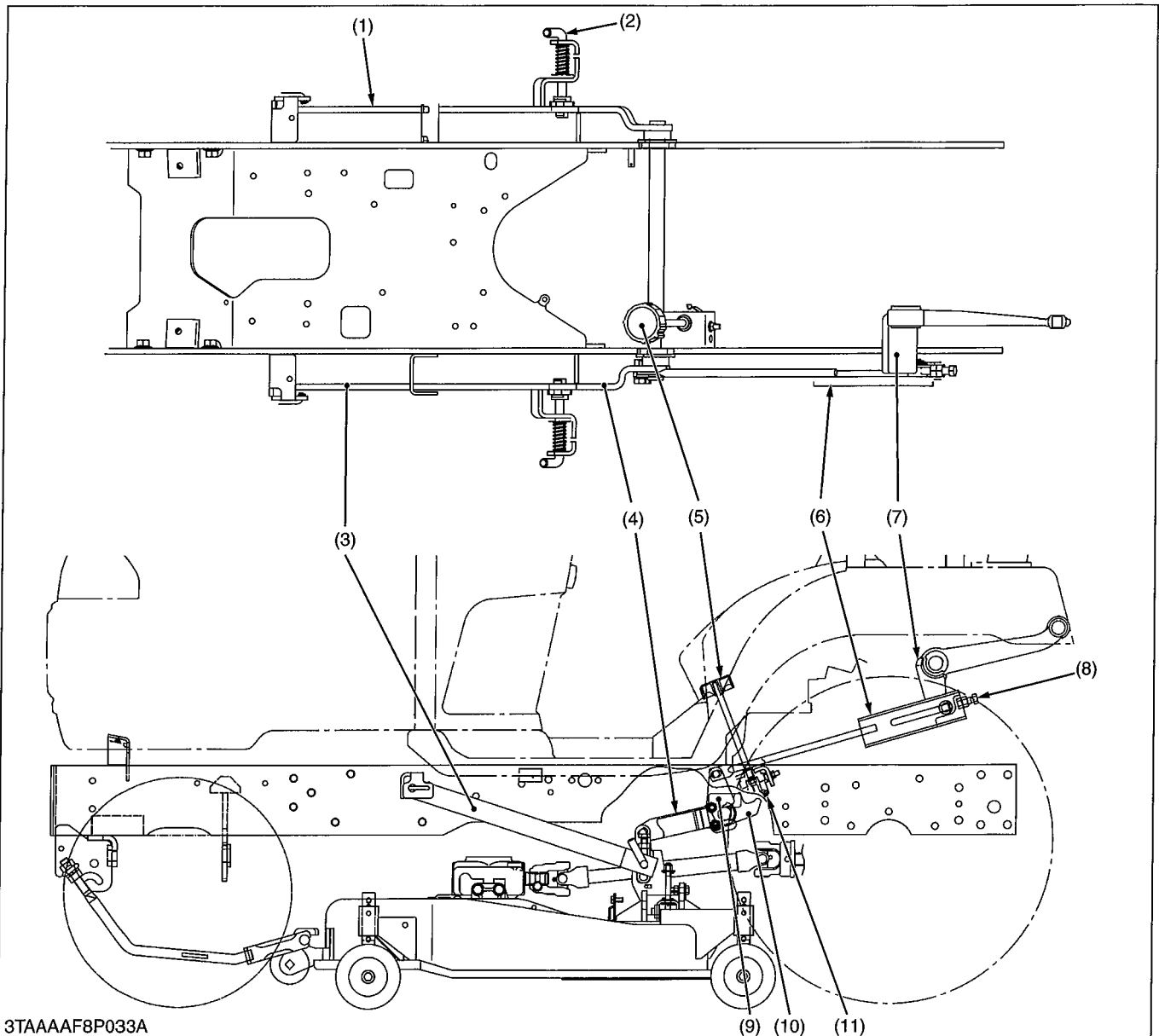
a: To Transmission Case

b: To Implement

c: From Implement

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8. MOWER LINKAGE



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- | | | | |
|------------------------|-----------------------------------|---------------------|----------------------|
| (1) Mower Rear Link RH | (4) Rear Lift Link LH | (7) Lift Arm | (10) Lift Lower Boss |
| (2) Lift Pin | (5) Cutting Height Adjusting Dial | (8) Adjusting Bolt | (11) Cam |
| (3) Mower Rear Link LH | (6) Rear Lift Link LH | (9) Lift Upper Boss | |

The mower rear link (1), (3) and the lift arm (7) are linked with the rear lift link LH (4), the lift upper boss (9) and the lift lower boss (10).

As the hydraulic control lever moves to lift position, lift arm (7) is raised and the rear lift link LH (6) is pulled to pull the lift links to the rearward. As a result, mower rear link (1), (3) are lifted.

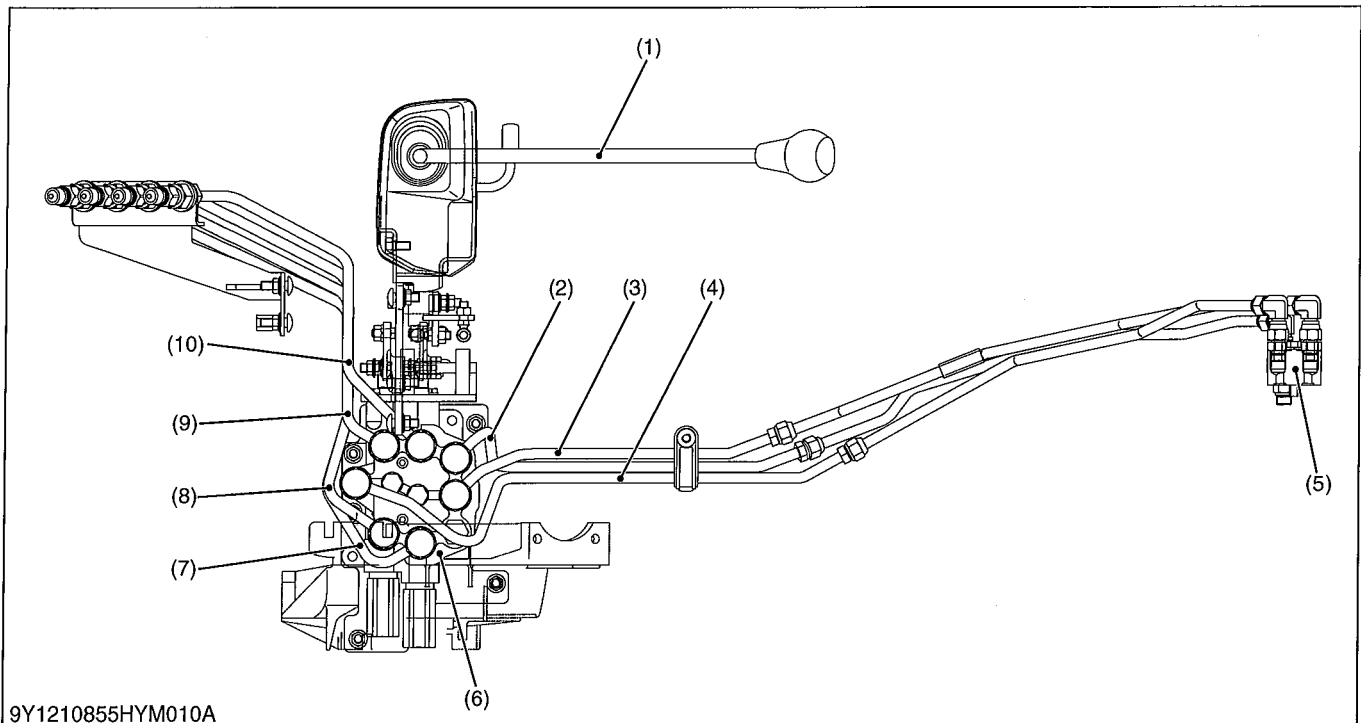
The cutting height adjusting dial (5) adjusts cutting height of mower by rotating the adjusting cam (11). The position of mower rear link (1), (3) are adjusted by changing the length of the adjusting bolt (8).

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9. FRONT LOADER VALVE

[1] STRUCTURE

(1) Structure for Front Loader Valve and Pipe

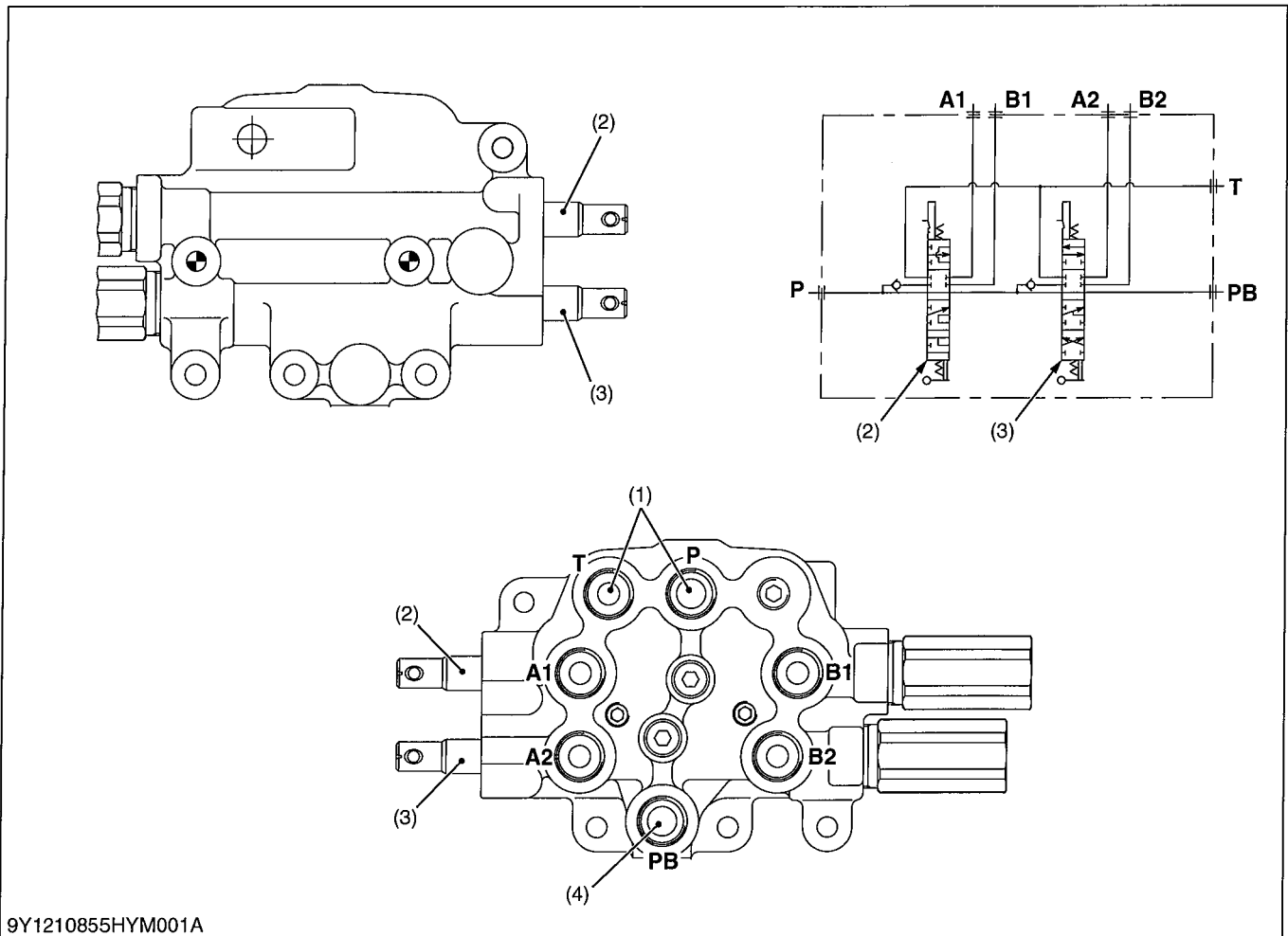


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- | | | | |
|---------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| (1) Control Lever | (4) Pipe (Power Beyond) | (7) Pipe (B1) for Boom Cylinder | (9) Pipe (A2) for Bucket Cylinder |
| (2) Pipe (Return) | (5) Hydraulic Outlet (Block Type) | (8) Pipe (B2) for Bucket Cylinder | (10) Pipe (A1) for Boom Cylinder |
| (3) Pipe (Pressure) | (6) Front Loader Control Valve | | |

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(2) Structure for Front Loader Control Valve



9Y1210855HYM001A

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

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

(1) Inlet and Outlet Section

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

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

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

(2) Boom Control Section

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

(3) Bucket Control Section

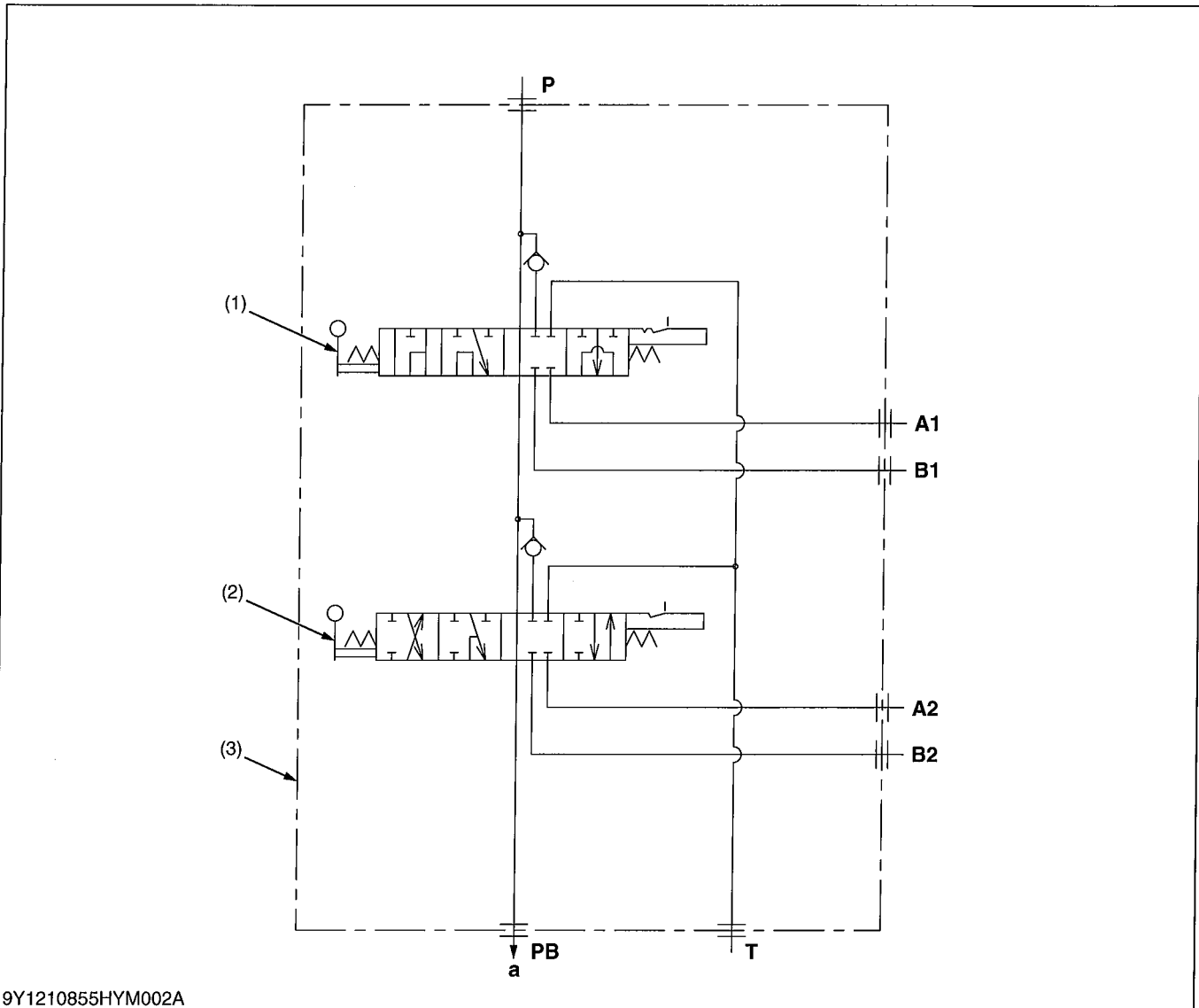
The bucket control valve is of 4-position, 6-connection, no detent, spring center type, consisting of a mono block valve housing, spool, load check valve, etc. This valve has **A2** and **B2** ports and controls oil flow to the bucket cylinder.

(4) Power Beyond

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

9Y1210855HYM0014US0

[2] FRONT LOADER HYDRAULIC CIRCUIT



9Y1210855HYM002A

- (1) Boom Control Valve
- (2) Bucket Control Valve
- (3) Front Loader Control Valve

P: Pump Port
T: Tank Port

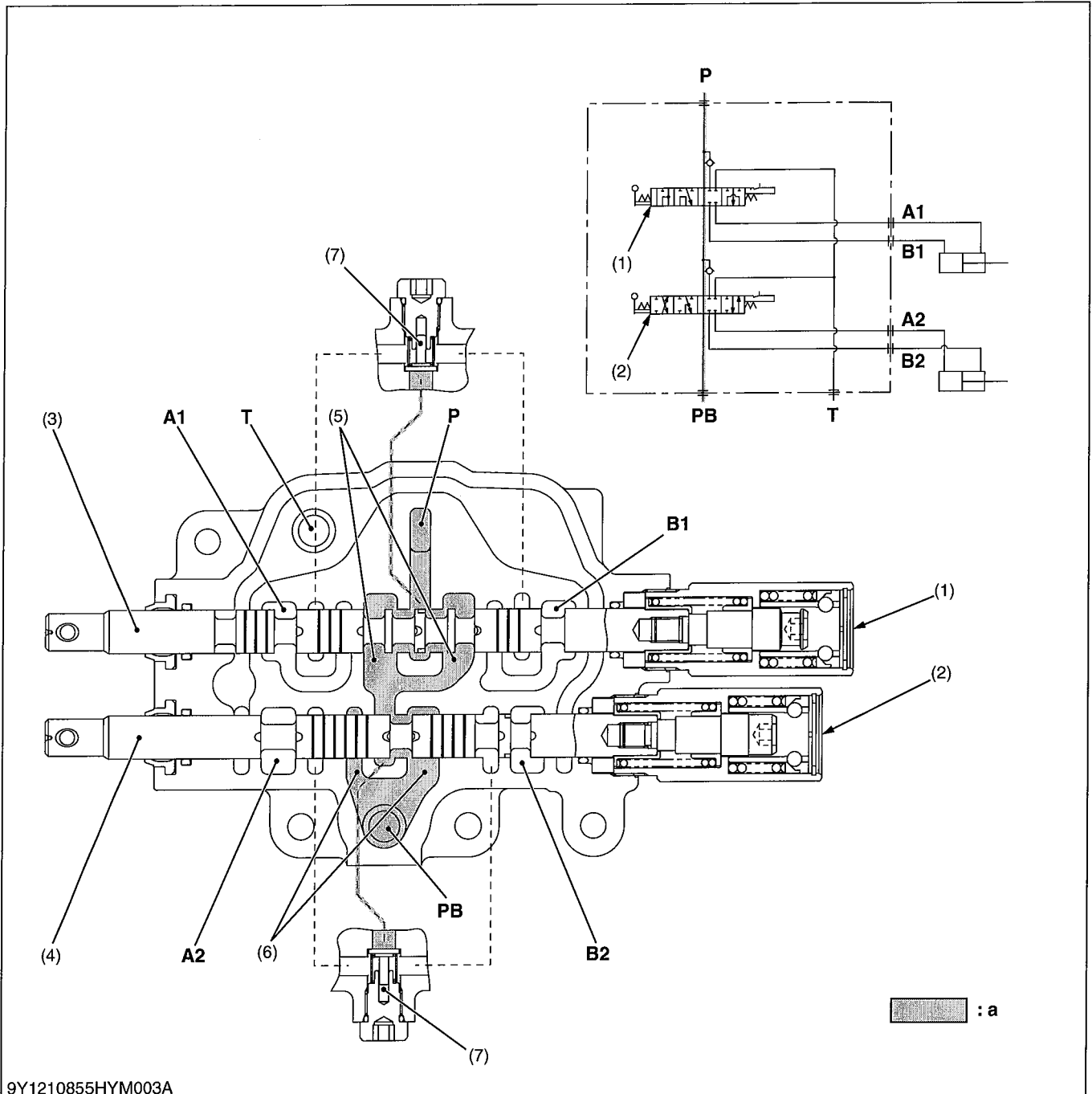
A1: A1 Port
A2: A2 Port
B1: B1 Port
B2: B2 Port
PB: Power Beyond Port

a: To Hydraulic Block

9Y1210855HYM0015US0

[3] OPERATION

Neutral



9Y1210855HYM003A

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

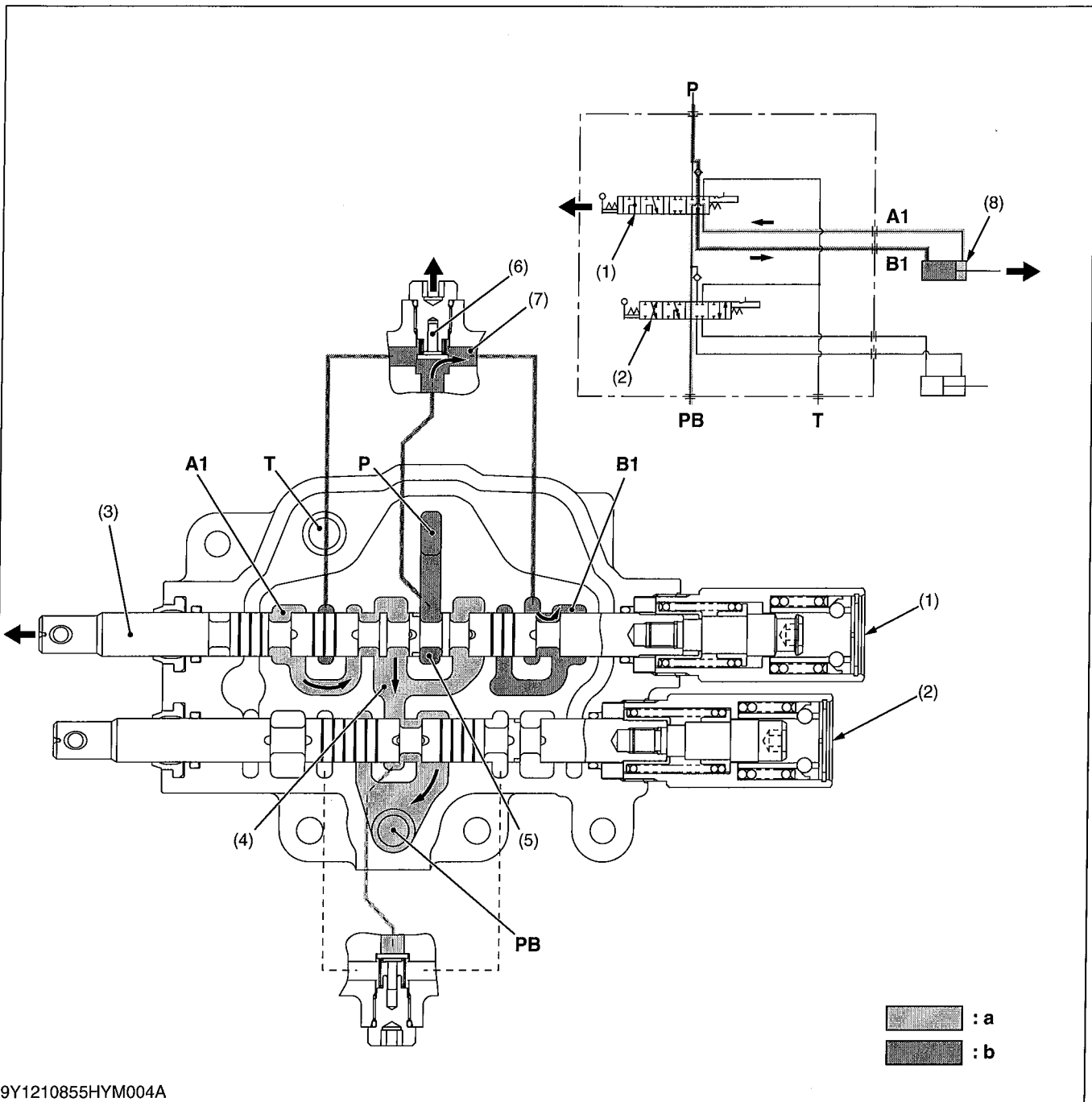
- (5) PB Passage 1
- (6) PB Passage 2
- (7) Load Check Valve

- T: Tank Port
- P: Pump Port
- A1: A1 Port
- A2: A2 Port

- B1: B1 Port
- B2: B2 Port
- PB: Power Beyond Port

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Up



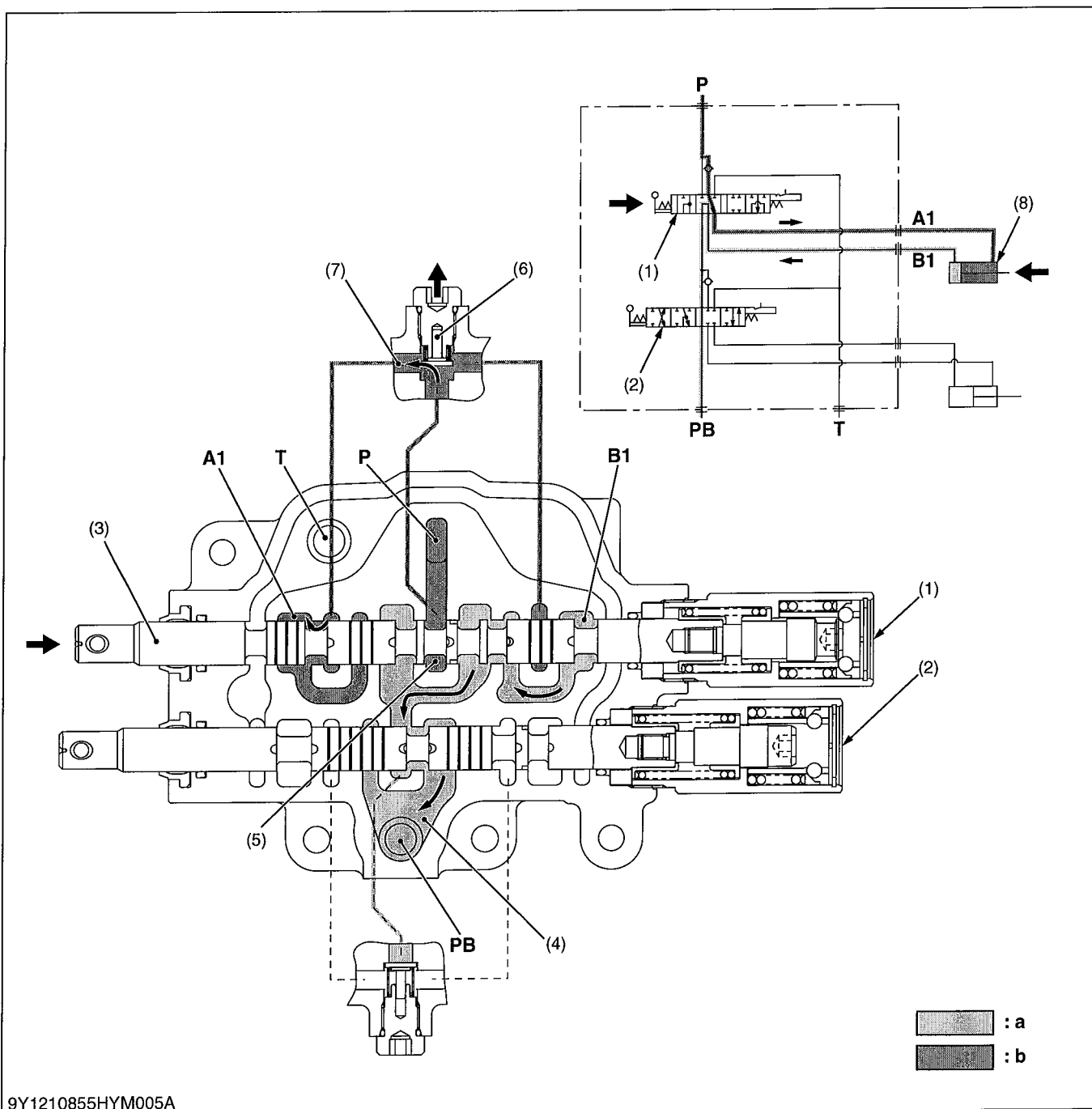
9Y1210855HYM004A

- | | | | |
|----------------------------|-----------------------|---------------------|------------------------------|
| (1) Boom Control Section | (5) Neutral Passage 1 | P: Pump Port | A1: A1 Port |
| (2) Bucket Control Section | (6) Load Check Valve | T: Tank Port | (From Boom Cylinder) |
| (3) Spool | (7) Passage 1 | | B1: B1 Port |
| (4) PB Passage 1 | (8) Boom Cylinder | | (To Boom Cylinder) |
| | | | PB: Power Beyond Port |
| | | | a: Low Pressure |
| | | | b: High Pressure |

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

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Down



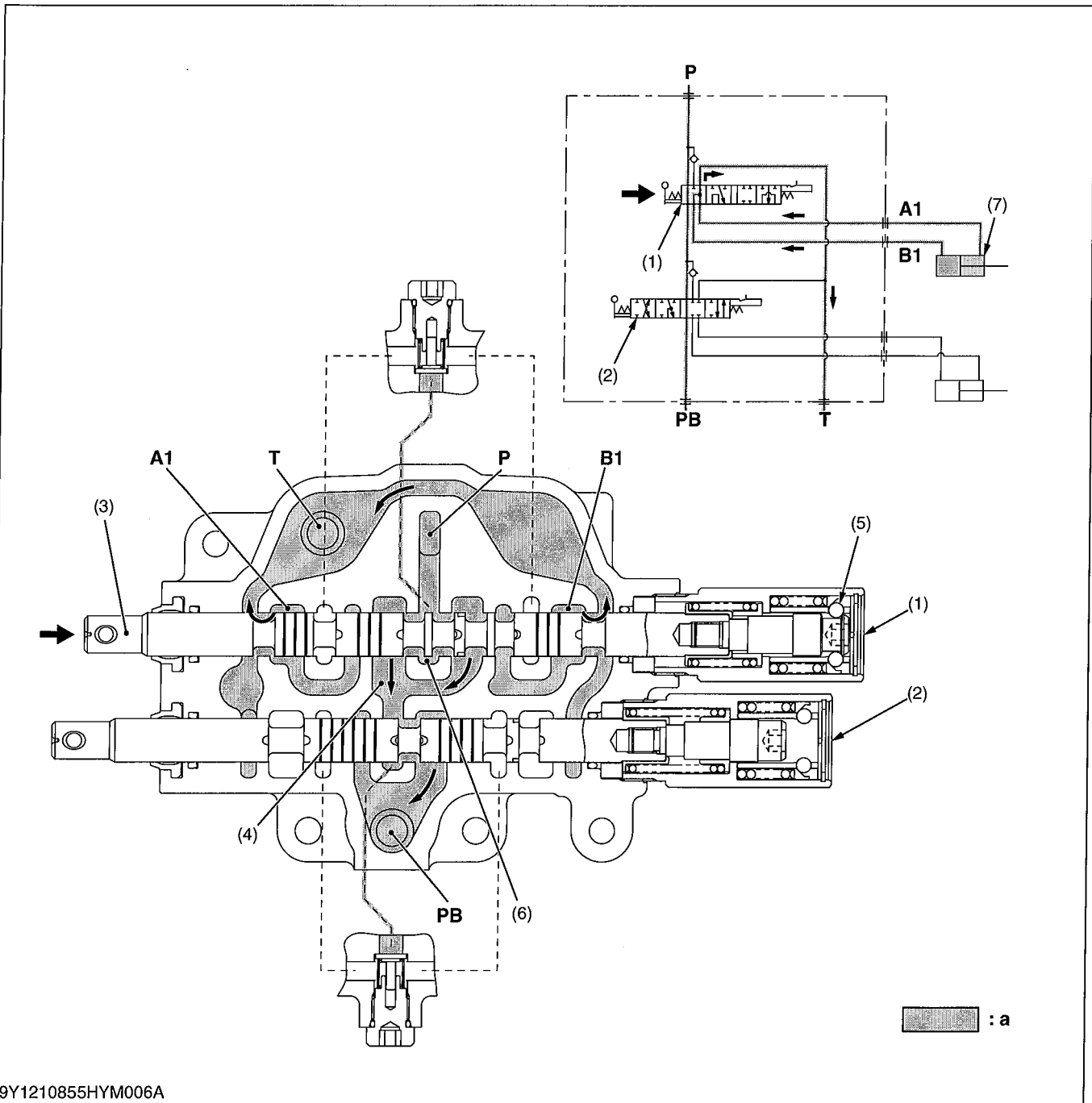
9Y1210855HYM005A

- | | | | |
|----------------------------|-----------------------|---------------------|--|
| (1) Boom Control Section | (5) Neutral Passage 1 | P: Pump Port | A1: A1 Port
(To Boom Cylinder) |
| (2) Bucket Control Section | (6) Load Check Valve | T: Tank Port | B1: B1 Port
(From Boom Cylinder) |
| (3) Spool | (7) Passage 1 | | PB: Power Beyond Port |
| (4) PB Passage 1 | (8) Boom Cylinder | | a: Low Pressure |
| | | | b: High Pressure |

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

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Floating

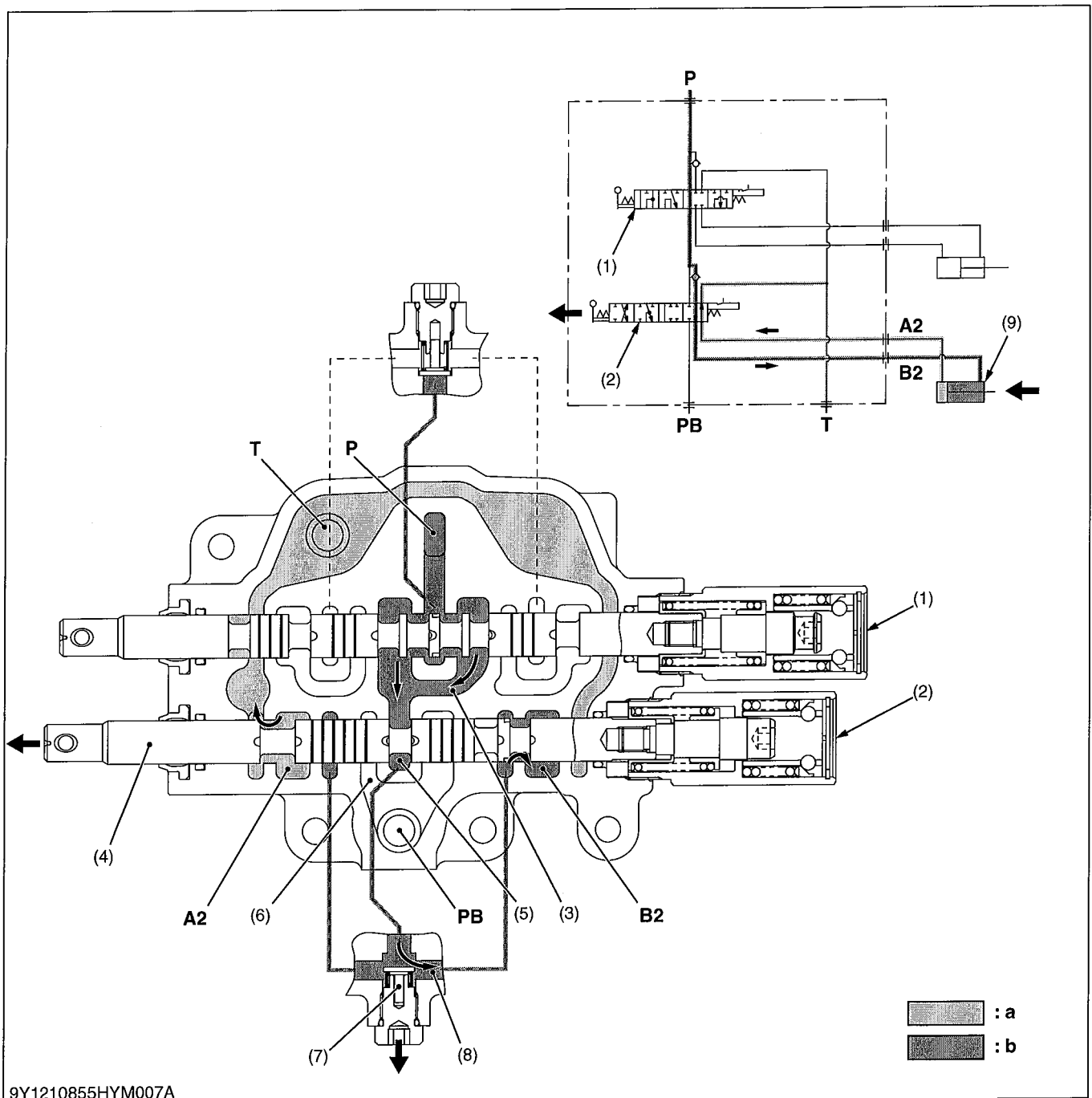


- | | | | |
|----------------------------|-----------------------|---------------------|------------------------------|
| (1) Boom Control Section | (5) Detent Mechanism | P: Pump Port | A1: A1 Port |
| (2) Bucket Control Section | (6) Neutral Passage 1 | T: Tank Port | B1: B1 Port |
| (3) Spool | (7) Boom Cylinder | | PB: Power Beyond Port |
| (4) PB Passage 1 | | | a: Low Pressure |

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

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Roll-back



9Y1210855HYM007A

- (1) Boom Control Section
- (2) Bucket Control Section
- (3) PB Passage 1
- (4) Spool
- (5) Neutral Passage 2

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

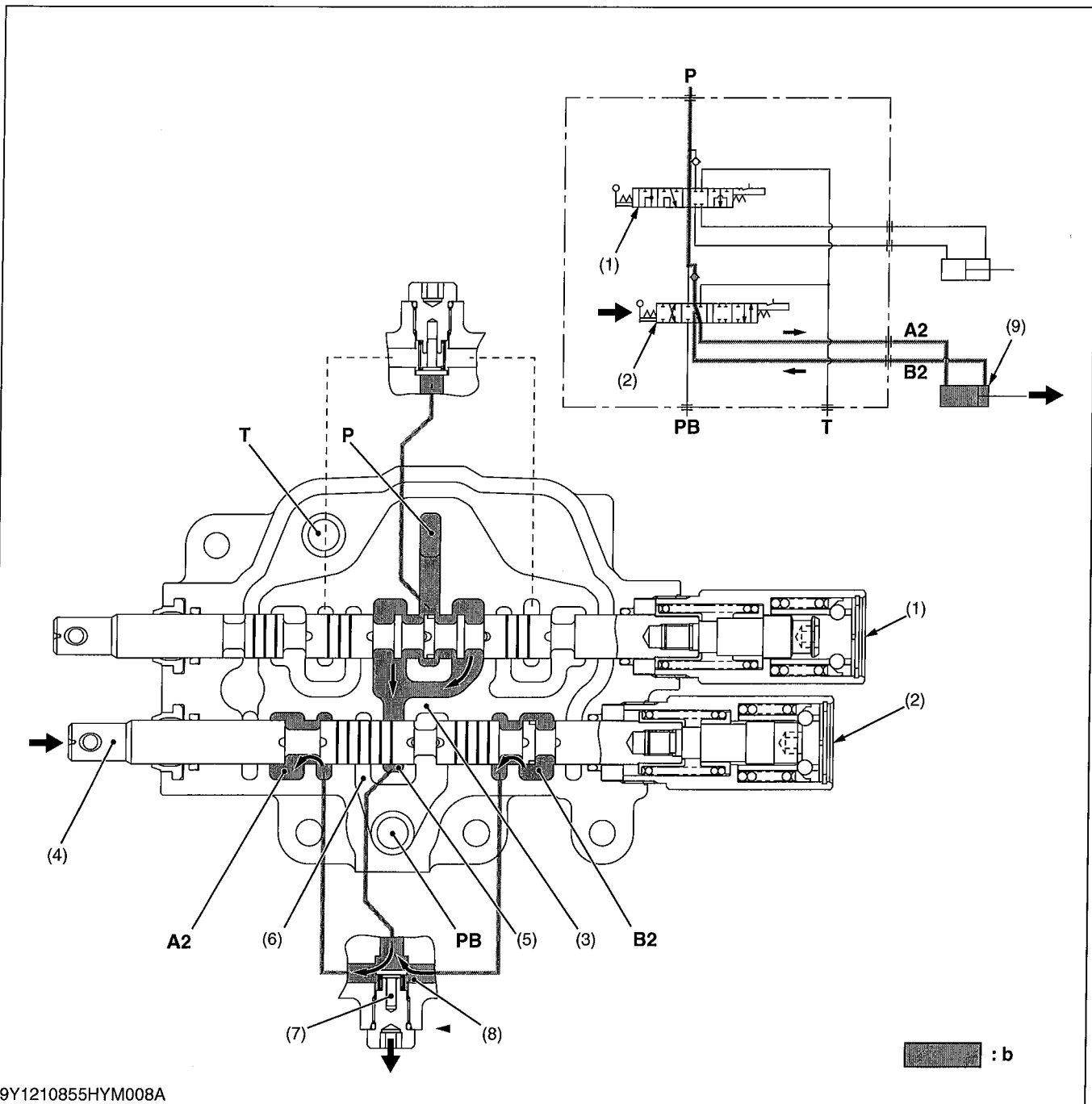
- P: Pump Port
- T: Tank Port
- PB: Power Beyond Port
- A2: A2 Port
(From Bucket Cylinder)

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

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

9Y1210855HYM0020US0

Dump 1



9Y1210855HYM008A

- | | | | |
|----------------------------|----------------------|------------------------------|--|
| (1) Boom Control Section | (6) PB Passage 2 | P: Pump Port | A2: A2 Port
(To Bucket Cylinder) |
| (2) Bucket Control Section | (7) Load Check Valve | T: Tank Port | B2: B2 Port
(From Bucket Cylinder) |
| (3) PB Passage 1 | (8) Passage 2 | PB: Power Beyond Port | b: High Pressure |
| (4) Spool | (9) Bucket Cylinder | | |
| (5) Neutral Passage 2 | | | |

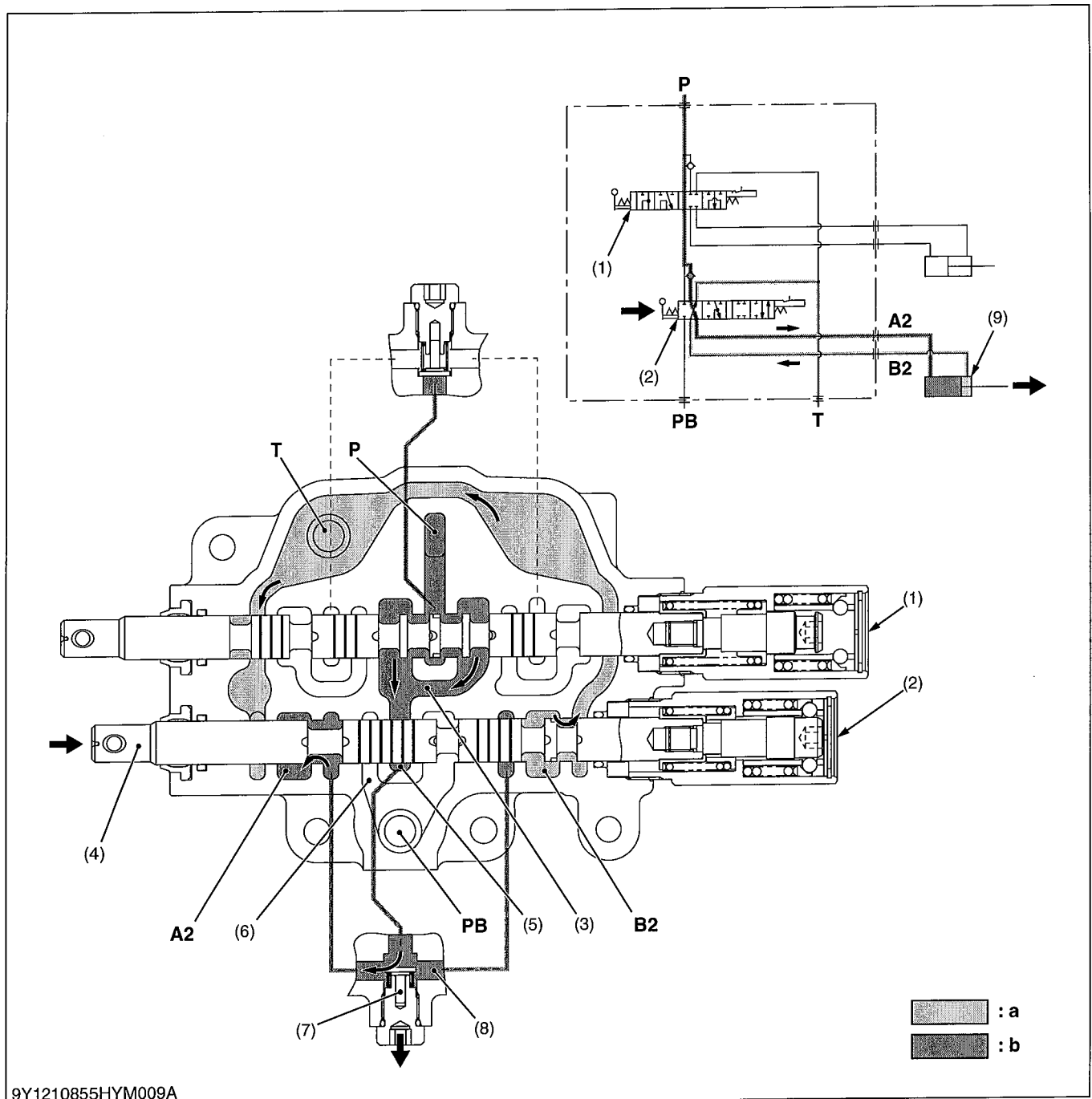
1. When the hydraulic control lever is set to the "DUMP 1" position, the spool (4), which forms oil passages among passage 2 (8), A2 port and B2 port moves to the right.
2. The pressure-fed oil from the P port flows through the boom control valve, opens the load check valve, and flows to the bracket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

(Reference)

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

9Y1210855HYM0021US0

Dump 2



9Y1210855HYM009A

- | | | | |
|----------------------------|----------------------|------------------------------|--|
| (1) Boom Control Section | (6) PB Passage 2 | P: Pump Port | A2: A2 Port
(To Bucket Cylinder) |
| (2) Bucket Control Section | (7) Load Check Valve | T: Tank Port | B2: B2 Port
(From Bucket Cylinder) |
| (3) PB Passage 1 | (8) Passage 2 | PB: Power Beyond Port | a: Low Pressure |
| (4) Spool | (9) Bucket Cylinder | | b: High Pressure |
| (5) Neutral Passage 2 | | | |

- 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.
- The pressure-fed oil from the P port flows to the neutral passage 2 (5) through the boom control section (1) and PB passage 1 (3). As the oil passage from the neutral passage 2 (5) to the PB passage 2 (6) is closed by the spool (4), this oil opens the load check valve (7) and flows through the notched section of the spool (4) and B2 port to extend the bucket cylinder (9).
- Return oil from the bucket cylinder (9) flows to the transmission case through the B2 port and T port.

9Y1210855HYM0022US0

SERVICING

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Implement Does Not Rise (No Noise)	Control valve broken	Replace	5-S12
	Control valve improperly assembled	Repair	5-S12
	Relief valve spring damaged	Replace	5-S4
	Spool sticks	Repair	5-S12
	Piston O-ring or cylinder damaged	Replace	5-S12
Implement Does Not Rise (Noise)	Oil filter cartridge clogged	Replace	G-22
	Suction pipe loosen or broken	Repair or replace	-
	Suction pipe connecting hose loosen or broken	Repair or replace	-
	Suction pipe O-ring broken	Replace	-
	Insufficient transmission oil	Refill	G-32
	Relief valve setting pressure too low	Adjust or replace	5-S4
	Hydraulic pump broken	Replace	-
Implement Does Not Lower	Control valve malfunctioning	Repair or replace	5-S12
Implement Drops by Its Weight	Hydraulic cylinder worn or damaged	Replace	5-S19
	Piston O-ring worn or damaged	Replace	5-S12
	Control valve malfunctioning	Replace	5-S12

9Y1210855HYS0001US0

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Relief Valve (Condition) • Engine Speed: Maximum • Oil Temperature: 45 to 55 °C (113 to 131 °F)	Setting Pressure	12.3 to 12.7 MPa 125 to 130 kgf/cm ² 1780 to 1840 psi	—
Hydraulic Pump (Condition) • Engine Speed: 1500 min ⁻¹ (rpm) • Oil Temperature: 45 to 55 °C (113 to 131 °F)	Power Steering Oil Flow	Above 8.0 L/min. 2.1 U.S.gals/min. 1.8 Imp.gals/min.	—
Mower Linkage	Clearance "L2"	0 to 0.5 mm 0 to 0.01 in.	—
[Hydraulic Pump] Gear to Casing • Gear • Case	Clearance	—	0.15 mm 0.0059 in.
	O.D.	33.520 to 33.530 mm 1.3197 to 1.3200 in.	—
	I.D.	33.570 to 33.577 mm 1.3217 to 1.3219 in.	—
	Gear Shaft to Bushing	Clearance	0.020 to 0.091 mm 0.00079 to 0.0035 in.
• Gear Shaft • Bushing	O.D.	14.970 to 14.980 mm 0.58937 to 0.58976 in.	—
	I.D.	15.000 to 15.061 mm 0.59056 to 0.59295 in.	—
Side Plate	Thickness	2.48 to 2.50 mm 0.0977 to 0.0984 in.	2.40 mm 0.094 in.
Hydraulic Cylinder	I.D.	80.05 to 80.15 mm 3.152 to 3.155 in.	80.20 mm 3.157 in.
Hydraulic Arm Shaft	O.D. (LH)	31.925 to 31.950 mm 1.2569 to 1.2578 in.	—
	O.D. (RH)	29.925 to 29.950 mm 1.1782 to 1.1791 in.	—

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3. TIGHTENING TORQUES

Tightening torques of screws, bolts and nuts on the table below are especially specified.
 (For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-13.)

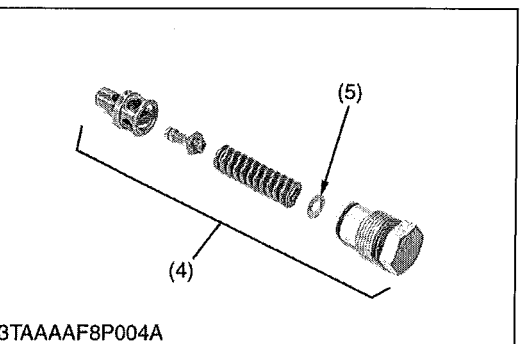
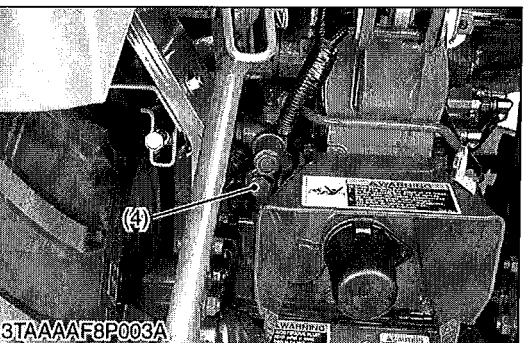
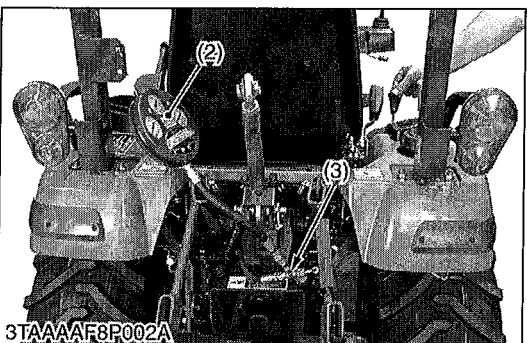
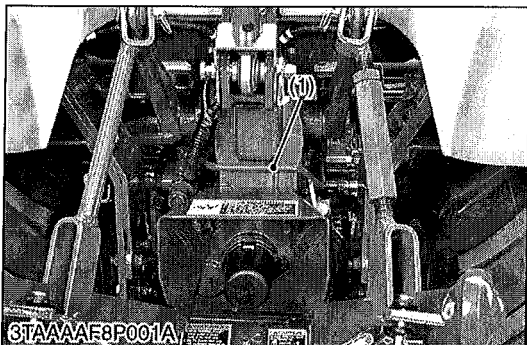
Item	N·m	kgf·m	lbf·ft
ROPS mounting nut	124 to 147	12.6 to 15.0	91.2 to 108
Fuel tank stay mounting bolt and nut	48 to 55	4.9 to 5.7	36 to 41
Fender bracket mounting bolt	124 to 147	12.6 to 15.0	91.2 to 108
Hydraulic cylinder block mounting bolt	40 to 44	4.0 to 4.5	29 to 32
Hydraulic pump mounting bolt (M6)	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8
Hydraulic pump mounting bolt (M8)	18 to 20	1.8 to 2.1	13 to 15

9Y1210855HYS0003US0

4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING

(1) Relief Valve



Relief Valve Setting Pressure

1. Remove the hydraulic pipe (1).
2. Install the hose and adaptor A (3) with pressure gauge (2).
3. Start the engine and set at maximum speed.
4. Move the control lever all way up to operate the relief valve and read the gauge.
5. If the pressure is not within the factory specifications, adjust with the adjusting shim (5).

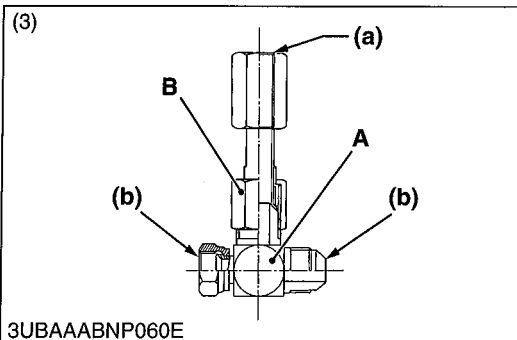
Relief valve setting pressure	Factory specification	12.3 to 12.7 MPa 125 to 130 kgf/cm ² 1780 to 1840 psi
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Condition

- Engine speed:
Maximum
- Oil temperature:
45 to 55 °C (113 to 131 °F)

(Reference)

- Thickness of shim (5):
0.1 mm (0.004 in.)
0.2 mm (0.008 in.)
0.4 mm (0.02 in.)
- 0.269 MPa (2.74 kgf/cm², 39.0 psi) pressure is increased whenever the thickness of adjusting shim is increased by 0.1 mm (0.004 in.).

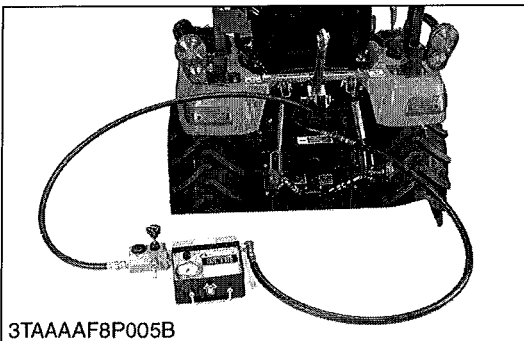
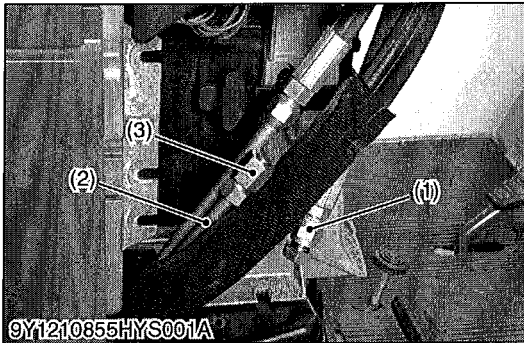
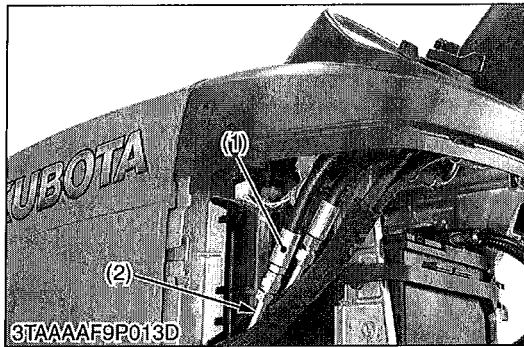


- (1) Hydraulic Pipe
- (2) Pressure Gauge
- (3) Adaptor Tee, Swivel (9/16-18)
- (4) Relief Valve
- (5) Shim

- A: Adaptor Tee, Swivel (9/16-18)
- B: Adaptor B
- (a) Connect Pressure Gauge
- (b) Connect Hydraulic Hose

9Y1210855HYS0004US0

(2) Pump and Priority Valve



Checking Hydraulic Pump Oil Flow

■ **IMPORTANT**

- Use the instruction with the flowmeter when you use the flowmeter.
 - While testing, do not close the flowmeter loading valve completely.
 - To measure the flow volume of pump, oil flow on the power steering system side should be stopped.
1. Disconnect the power steering controller hose (Inlet) (1) from the power steering pipe (2).
 2. Cap the power steering pipe (2) with plug (3).
 3. Remove the hydraulic pipe behind the hydraulic cylinder and fix the flow meter hose and the flow (meter) inlet as shown in the photo.
 4. Remove the transmission fluid filling plug, then fix the flow meter hose and the flowmeter (outlet).
 5. If the flow volume is insufficient, replace the pump.
 6. After measuring the flow volume, remove the flow meter then reassembling the hydraulic pipe to the original position.

(Reference)

- Pump Oil Flow

Hydraulic pump delivery at no pressure	Factory specification	Above 24.9 L/min. 6.6 U.S.gals/min. 5.5 Imp.gals/min.
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Condition

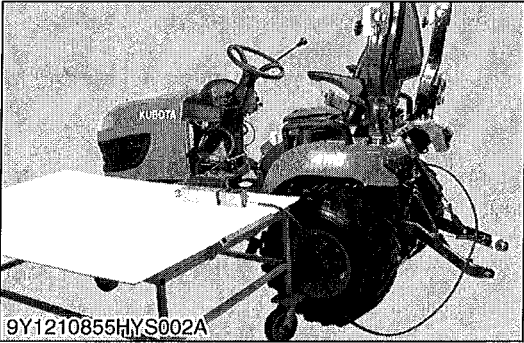
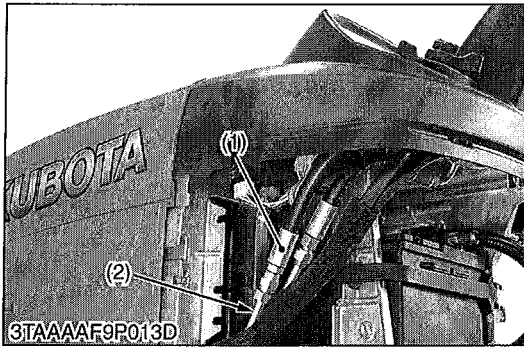
- Engine speed:
Maximum
- Oil temperature:
45 to 55 °C (113 to 131 °F)

■ **NOTE**

- **Plug size:**
9/16-18 UNF
SAE 37 ° Flare

- | | |
|--|-------------------------|
| (1) Power Steering Controller Hose (Inlet) | (2) Power Steering Pipe |
| | (3) Plug |

9Y1210855HYS0005US0



Checking Power Steering Oil Flow

■ **IMPORTANT**

- Use the instruction with the flowmeter when you use the flowmeter.
 - While testing, do not close the flowmeter loading valve completely.
1. Disconnect the power steering controller hose (Inlet) (1) from the power steering pipe (2).
 2. Fix the inlet flow meter hose to the power steering pipe (2) and the flow meter as shown in the photo.
 3. Fix the flow meter return hose to the transmission fluid filling port and the flow meter as shown in the photo.
 4. Measure the flow volume of power steering.
The flow volume of pump is 10 L (2.6 U.S.gals, 2.2 Imp.gals) or higher and verify the content below when the engine revolution is 1500 min⁻¹ (rpm).
 5. If the flow volume varies from the specification, replace the priority valve then take measurement again.
 6. After measuring the flow volume, remove the flow meter then reassembling the hydraulic pipe to the original position.

Condition

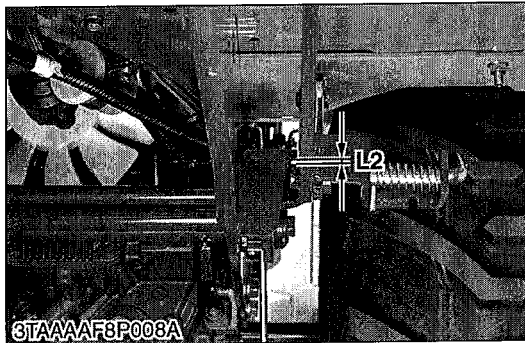
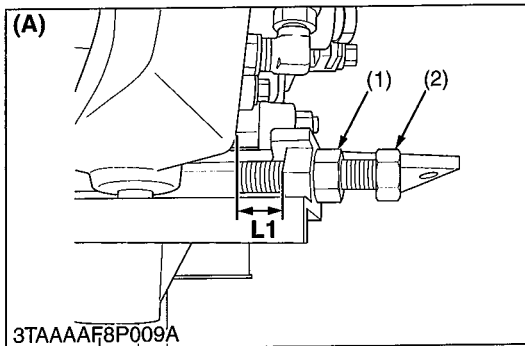
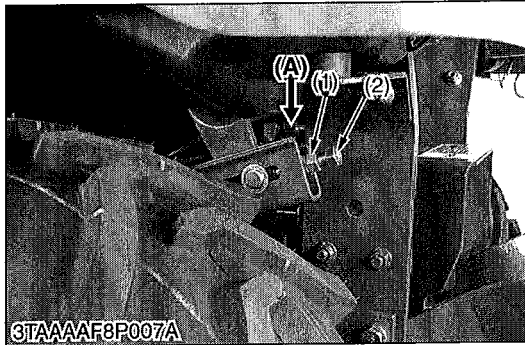
- Engine speed:
1500 min⁻¹ (rpm)
- Oil temperature:
45 to 55 °C (113 to 131 °F)

Power steering oil flow	Factory specification	Above 8.0 L/min. 2.1 U.S.gals/min. 1.8 Imp.gals/min.
-------------------------	-----------------------	---

- (1) Power Steering Controller Hose (Inlet) (2) Power Steering Pipe

9Y1210855HYS0006US0

(3) Mower Lift Linkage



Mower Lift Linkage

After reassembling the mower lift linkage, be sure to adjust it as follows.

1. Check the lift arm free play.
2. Loosen the adjusting nut (1) and start the engine.
3. Move the hydraulic control lever to **Lift** position until the relief valve operating. (**Uppermost** position)
4. Adjusting bolt (2) until the clearance between stopper and mower rear link **LH** gets 0 to 0.5 mm (0 to 0.01 in.).
5. Secure the lock nut (1).

Clearance "L2"	Factory specification	0 to 0.5 mm 0 to 0.01 in.
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(Reference)

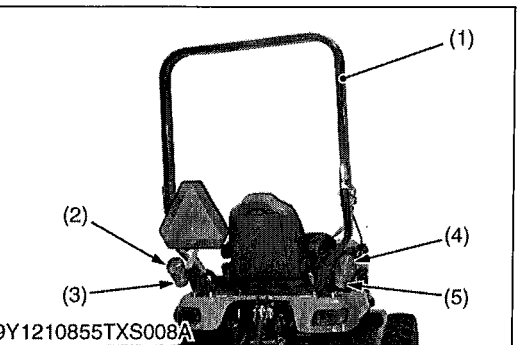
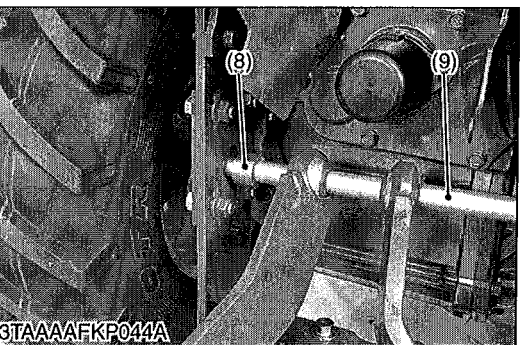
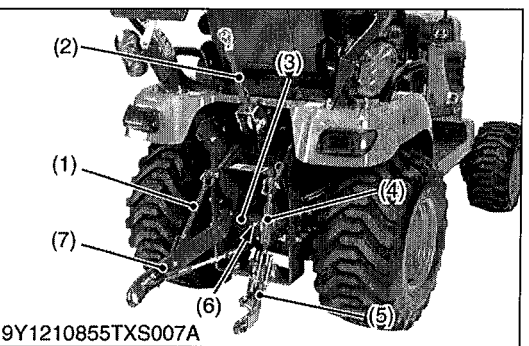
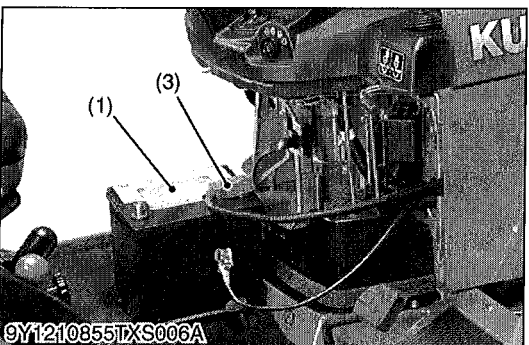
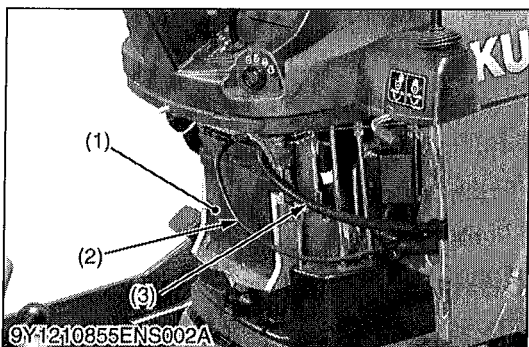
Length "L1"	Factory specification	17 mm 0.67 in.
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- (1) Nut
- (2) Bolt

(A) Upper View
L1: Length
L2: Clearance

9Y1210855HYS0007US0

[2] PREPARATION



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.

- Remove the under panel.
- Disconnect the negative cable (2) from the battery (1).
- Disconnect the positive cable (3) from the battery (1) and remove the battery (1).

- (1) Battery (3) Positive Cable
(2) Negative Cable

9Y1210855TXS0015US0

Lift Rod and Lower Link

- Remove the top link (2).
- Remove the stopper pin (6) and remove the check chain plate (3).
- Move the bushes (8) to inside.
- Move the shaft (9) to right side and remove the lower link as a unit.

- (1) Lift Rod LH (6) Stopper Pin
(2) Top Link (7) Lower Link RH
(3) Check Chain Plate (8) Bush
(4) Lift Rod RH (9) Shaft
(5) Lower Link RH

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Roll-Over Protective Structures (ROPS)

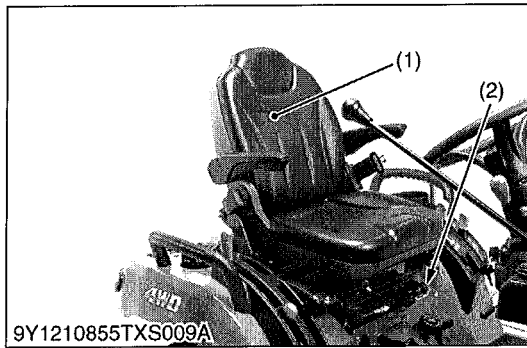
- Disconnect the lead wires from the hazard lamp (2), (4) and turn signal lights (3), (5).
- Remove the ROPS mounting nuts, and remove the ROPS (1).

(When reassembling)

Tightening torque	ROPS mounting nut	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft
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- (1) ROPS (4) Hazard Lamp RH
(2) Hazard Lamp LH (5) Turn Signal Light RH
(3) Turn Signal Light LH

9Y1210855TXS0017US0

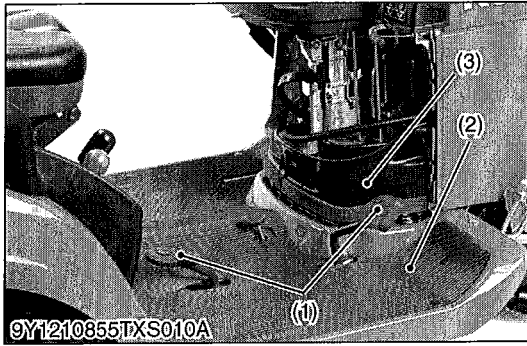


Seat

1. Disconnect the seat switch connectors.
2. Remove the snap pins (2) to remove the seat (1).

- (1) Seat (2) Snap Pin

9Y1210855TXS0018US0

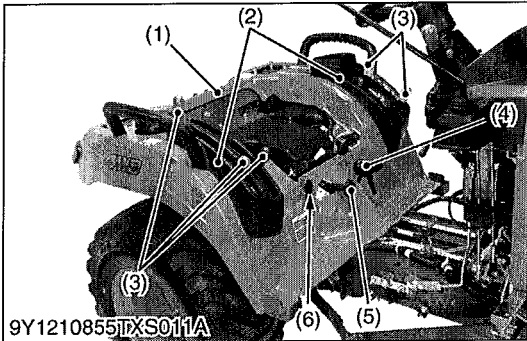


Speed Control Pedal and Step

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

9Y1210855TXS0019US0

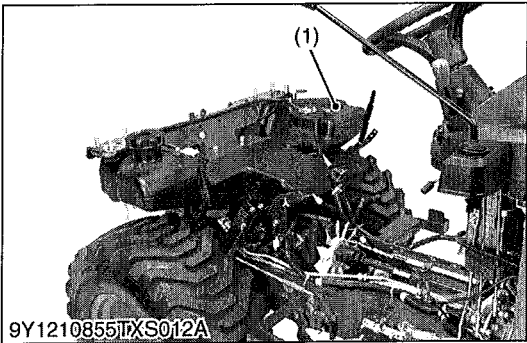


Lever Grips and Fender

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

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

9Y1210855TXS0020US0

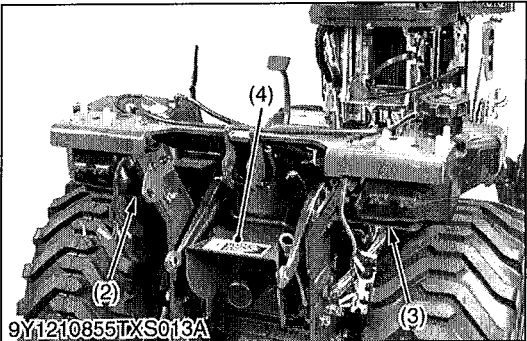


Fuel Tank

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).

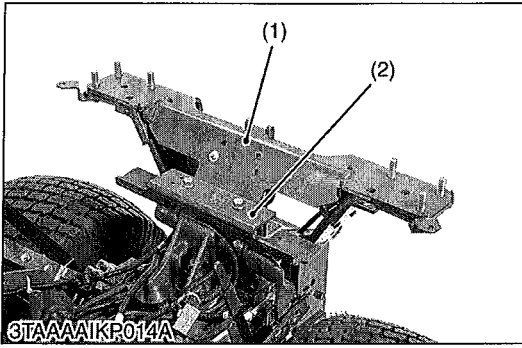
(When reassembling)

Tightening torque	Fuel tank stay mounting bolt and nut	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft
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- (1) Fuel Tank (2) Fuel Tank Stay LH (3) Fuel Tank Stay RH (4) PTO Cover

9Y1210855TXS0021US0



Fender Center Stay

1. Remove the fender bracket (2).
2. Remove the fender center stay (1).

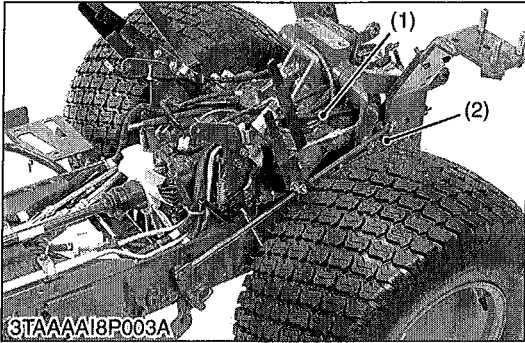
(When reassembling)

Tightening torque	Fender bracket mounting bolt	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft
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(1) Fender Center Stay

(2) Fender Bracket

9Y1210855TXS0022US0



Mower Linkage and Wire Harness

1. Disconnect the mower linkage (2).
2. Remove the wire harness clamp and wire harness (1) move to the front side.

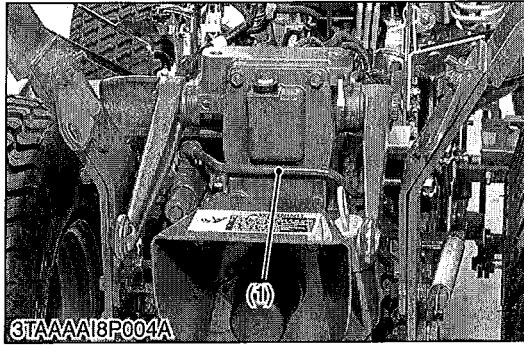
(1) Wire Harness

(2) Mower Linkage

9Y1210855HYS0009US0

[3] SEPARATING

(1) Hydraulic Cylinder Block



Hydraulic Cylinder Block

1. Remove the hydraulic pipe (1).
2. Remove the hydraulic cylinder block mounting bolt.
3. Remove the hydraulic cylinder block (2).

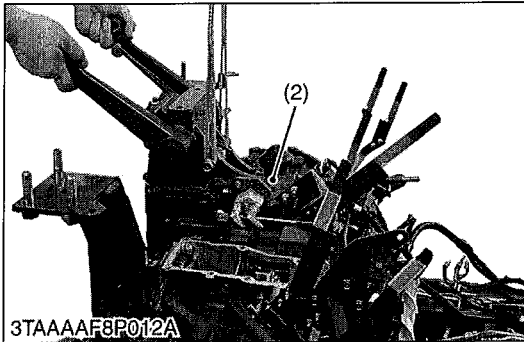
(When reassembling)

Tightening torque	Hydraulic cylinder block mounting bolt	40 to 44 N·m 4.0 to 4.5 kgf·m 29 to 32 lbf·ft
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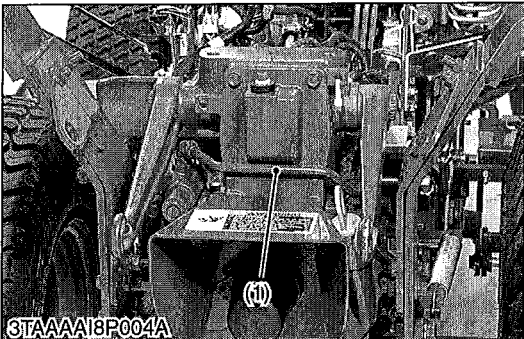
(1) Hydraulic Pipe

(2) Hydraulic Cylinder Block

9Y1210855HYS0010US0



(2) Hydraulic Pump



Hydraulic Pump

1. Disconnect the mower linkage (4).
2. Remove the lift arm LH (2).
3. Remove the hydraulic pipes (1).
4. Remove the hydraulic pump (3).

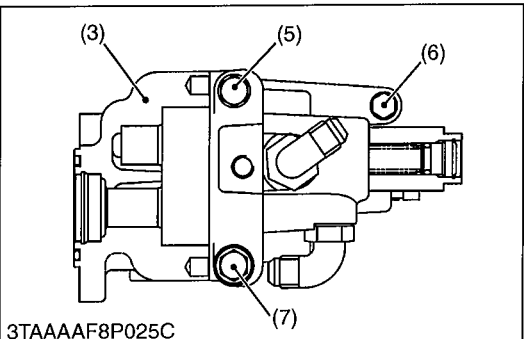
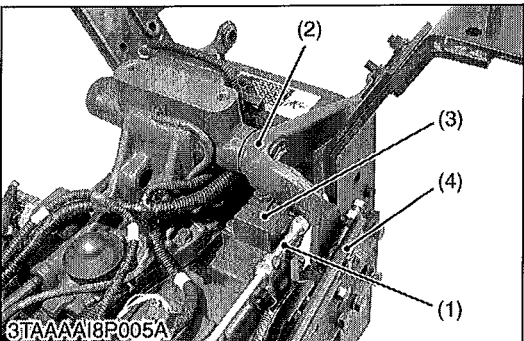
Tightening torque	Hydraulic pump mounting bolt (M6)	7.9 to 9.3 N·m 0.80 to 0.95 kgf·m 5.8 to 6.8 lbf·ft
	Hydraulic pump mounting bolt (M8)	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft

(When reassembling)

- Since the mounting bolt (5) is installed through the transaxle case to the transmission oil tank, seal the sealing tape to the mounting bolt (5) securely.

- (1) Hydraulic Pipe
- (2) Lift Arm LH
- (3) Hydraulic Pump
- (4) Mower Linkage

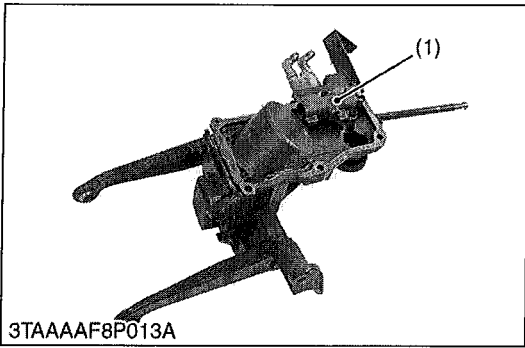
- (5) Bolt (M8) (Through Bolt)
- (6) Bolt (M6)
- (7) Bolt (M8)



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[4] DISASSEMBLING AND ASSEMBLING

(1) Hydraulic Cylinder and Control Valve

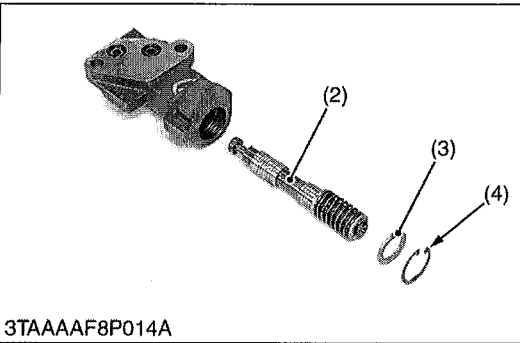


Control Valve

1. Remove the control valve (1).
2. Remove the internal snap ring (4) and draw out the spool (2).

- | | |
|-------------------|------------------------|
| (1) Control Valve | (3) Plain Washer |
| (2) Spool | (4) Internal Snap Ring |

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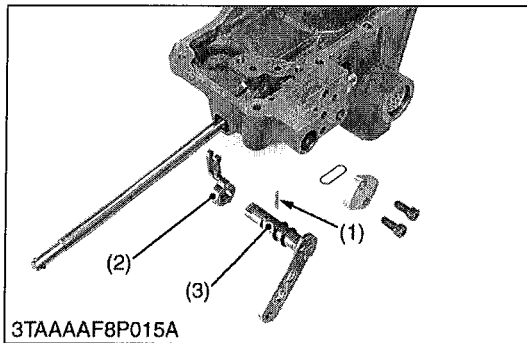


Control Valve Lever

1. Pull out the pin (1).
2. Remove the control valve lever (3) and arm (2).

- | | |
|---------|-------------------------|
| (1) Pin | (3) Control Valve Lever |
| (2) Arm | |

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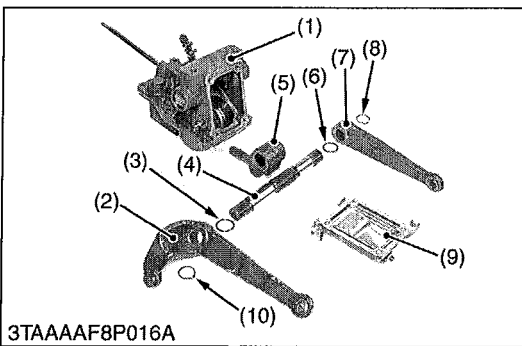


Lift Arm, Hydraulic Arm Shaft and Hydraulic Arm

1. Remove the external snap rings (8), (10), and remove the lift arms (2), (7).
2. Draw out the hydraulic arm shaft (4).

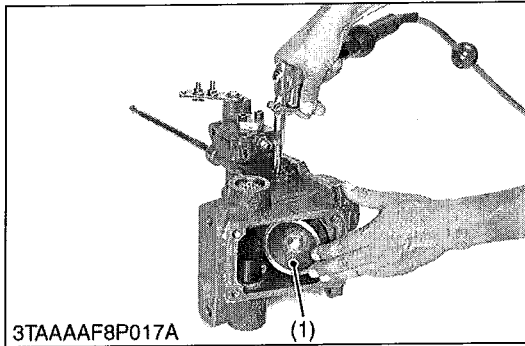
(When reassembling)

- Align the alignment marks of the hydraulic arm (5) and hydraulic arm shaft (4).
- Align the alignment marks of the lift arms (2), (7) and hydraulic arm shaft (4).
- Apply grease to the right and left bushings and O-rings.
- Be careful not to damage the O-ring.



- | | |
|------------------------------|-------------------------|
| (1) Hydraulic Cylinder Block | (6) O-ring |
| (2) Lift Arm LH | (7) Lift Arm RH |
| (3) O-ring | (8) External Snap Ring |
| (4) Hydraulic Arm Shaft | (9) Cover |
| (5) Hydraulic Arm | (10) External Snap Ring |

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Hydraulic Piston

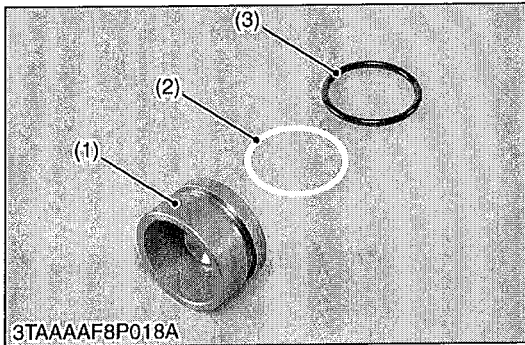
1. Inject the compressed air into the hydraulic cylinder, and remove the hydraulic piston (1).

(When reassembling)

- Be careful not to damage the O-ring (3) and back-up ring (2).
- Apply transmission fluid to the O-ring.
- Replace the O-ring if it is damaged, worn or scratched, which may cause oil leakage.

- | | |
|----------------------|------------|
| (1) Hydraulic Piston | (3) O-ring |
| (2) Back-up Ring | |

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Lowering Speed Adjusting Valve

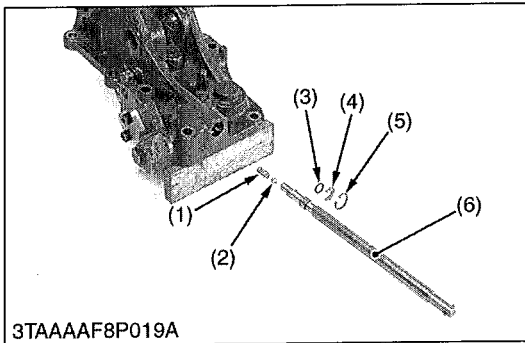
1. Remove the internal snap ring (5) and remove the lowering speed adjusting shaft (6).
2. Remove the ball (2) and spring (1).

(When reassembling)

- Be careful not to damage the O-rings.

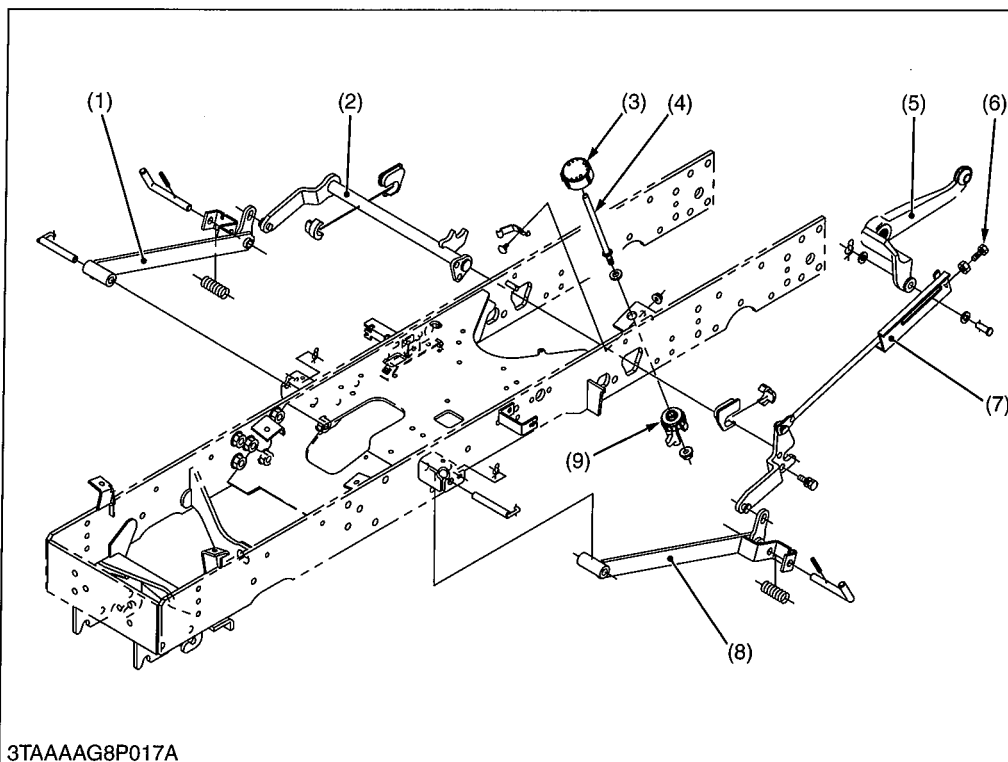
- | | |
|------------|------------------------------------|
| (1) Spring | (4) Stopper |
| (2) Ball | (5) Internal Snap Ring |
| (3) O-ring | (6) Lowering Speed Adjusting Shaft |

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(2) Mower Lift Linkage

Disassembling Mower Linkage



- (1) Mower Rear Link, RH
- (2) Lift Link Rear, RH
- (3) Cutting Height Adjusting Dial Knob
- (4) Cutting Height Adjusting Rod
- (5) Lift Arm, LH
- (6) Link Adjusting Bolt
- (7) Lift Link Rear, LH
- (8) Mower Rear Link, LH
- (9) Adjusting Cam

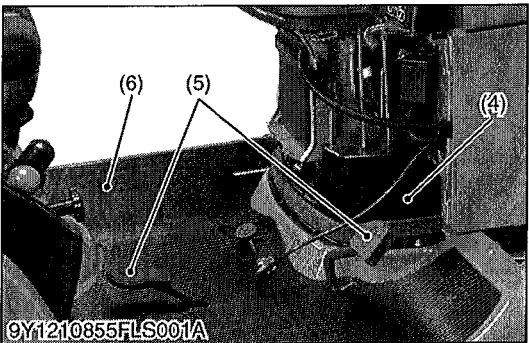
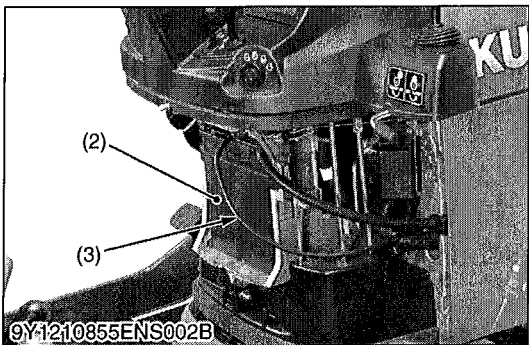
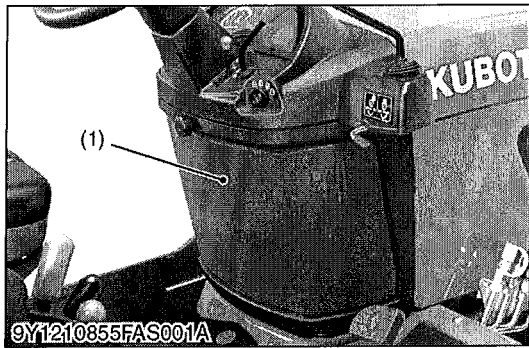
1. Remove the clevis pin and remove the lift link rear LH (7).
2. Remove the pin and remove the mower rear links (1), (8).
3. Remove both side of boss and remove the lift link rear RH (2).
4. Remove the cutting height adjusting dial knob (3).
5. Remove the nut and remove the adjusting cam (9) and cutting height adjusting rod (4).

(When reassembling)

- Adjust the length of the link adjusting bolt. (See page 5-S7.)

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(3) Control Valve (Front Loader)



Step and Battery

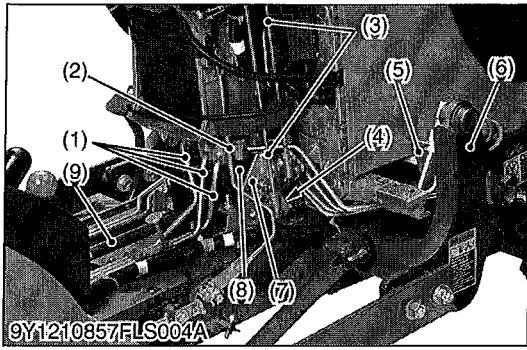
⚠ CAUTION

- 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 (3) from the battery (2).
3. Remove the valve covers (4).
4. Remove the HST pedal (5) and the step (6).

- | | |
|--------------------|-----------------|
| (1) Under Panel | (4) Valve Cover |
| (2) Battery | (5) HST Pedal |
| (3) Negative Cable | (6) Step |

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Control Valve

1. Remove the loader frame (6).
2. Disconnect the cruise control rod (2).
3. Disconnect the front loader control rods (3).
4. Remove the brake spring.
5. Remove the arms (4) from spool end.
6. Remove the stay bolt (5).
7. Remove the valve stay (7).
8. Disconnect the pipes (1).
9. Remove the control valve (8) with pipes.

(When reassembling)

- After reassembling a valve, check for oil leakage by starting up engine.

■ **IMPORTANT**

- **When starting up engine, watch out for the rotating propeller shaft (9).**

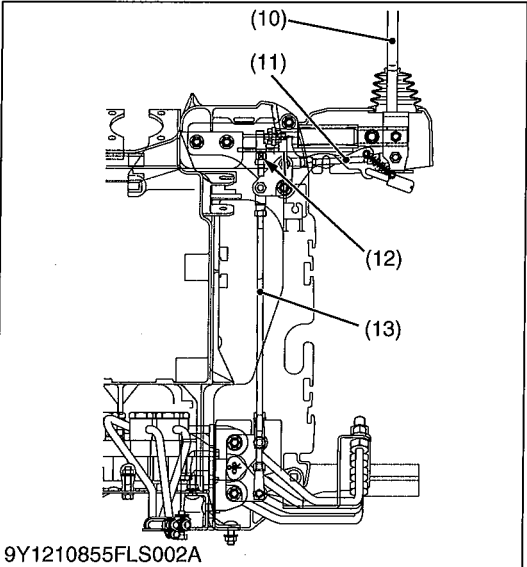
(Reference)

- When adjusting the length of rods, make the lever come to the neutral position.

A: 145 mm (5.71 in.)

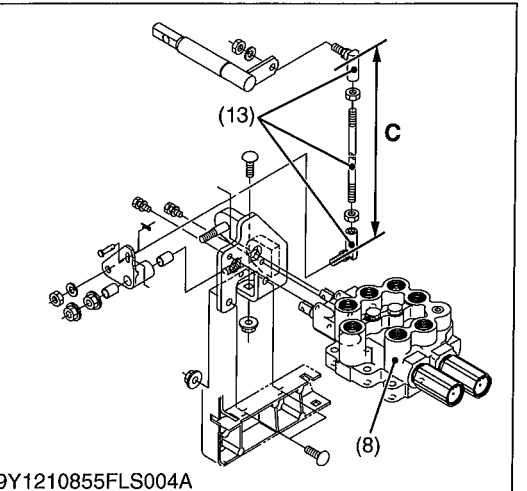
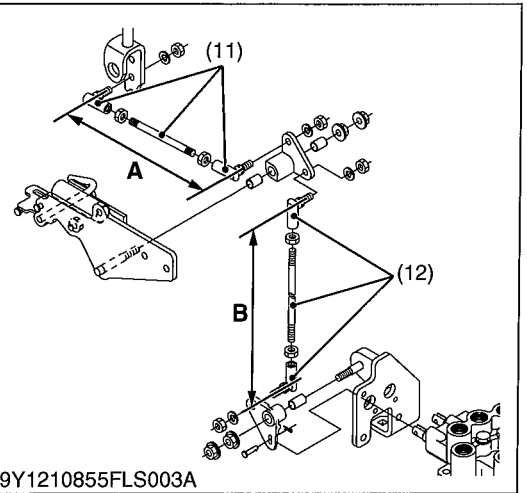
B: 315 mm (12.4 in.)

C: 448 mm (17.6 in.)

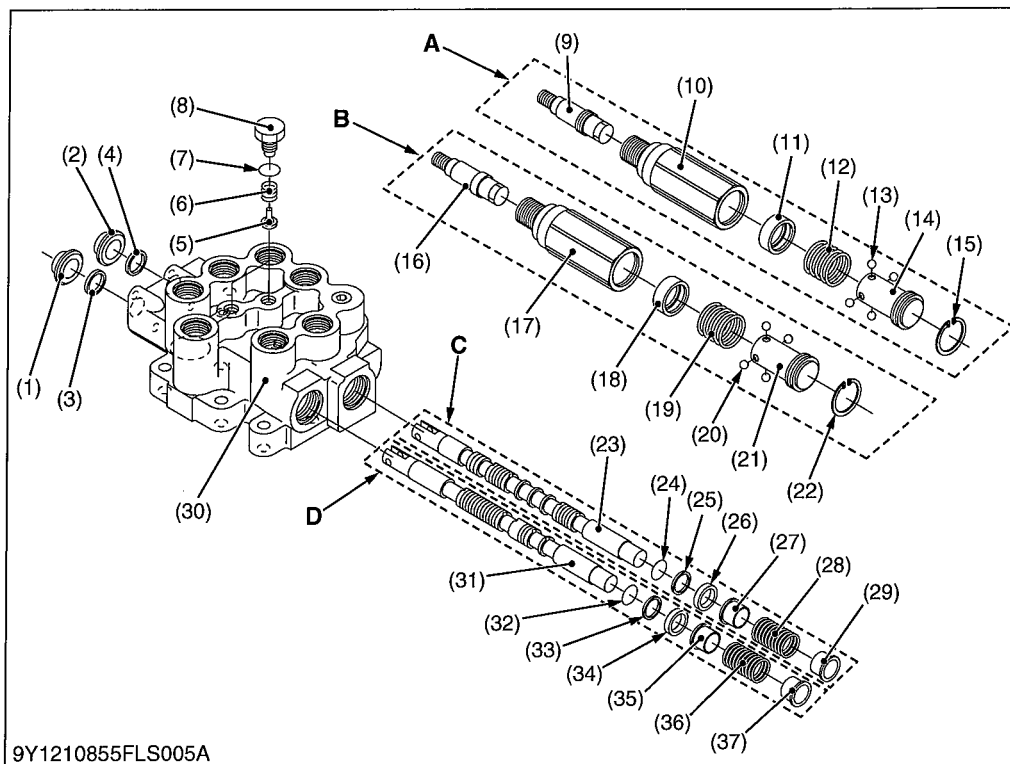


- | | |
|------------------------------|---------------------------------|
| (1) Pipe | (8) Control Valve |
| (2) Cruise Control Rod | (9) Propeller Shaft |
| (3) Front Loader Control Rod | (10) Front Loader Control Lever |
| (4) Arm | (11) Rod 1 |
| (5) Stay | (12) Rod 2 |
| (6) Loader Frame | (13) Rod 3 |
| (7) Valve Stay | |

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Disassembling Control Valve



9Y1210855FLS005A

- (1) Seal
 - (2) Seal
 - (3) Dust Seal
 - (4) Dust Seal
 - (5) Load Check Valve
 - (6) Spring
 - (7) O-ring
 - (8) Plug
 - (9) Bolt
 - (10) Plug
 - (11) Seat
 - (12) Spring
 - (13) Ball
 - (14) Stopper
 - (15) Ring
 - (16) Bolt
 - (17) Plug
 - (18) Seat
 - (19) Spring
 - (20) Ball
 - (21) Stopper
 - (22) Ring
 - (23) Spool
 - (24) O-ring
 - (25) Back-up Ring
 - (26) Collar
 - (27) Spring Holder
 - (28) Spring
 - (29) Spring Holder
 - (30) Valve Body
 - (31) Spool
 - (32) O-ring
 - (33) Back-up Ring
 - (34) Collar
 - (35) Spring Holder
 - (36) Spring
 - (37) Spring Holder
- A, C: Boom Control Section**
B, D: Bucket Control Section

1. Remove the plugs (8) and the spring (6) and load check valve (5).
2. Remove the plug (10) and (17) with other parts inside plug "C", "D".
3. Draw out the spools (23), (31) with other component parts "A", "B" from the valve body (30).

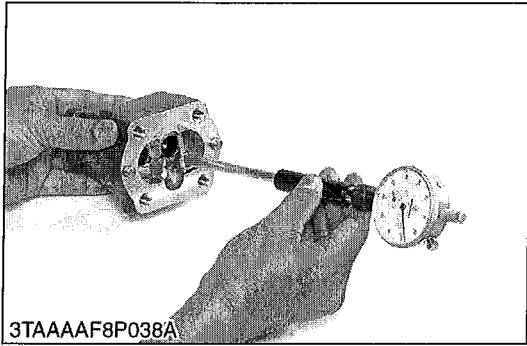
(When reassembling)

- Clean all parts with a suitable solvent, and dry with a lint-free cloth or air.
- Visually inspect all parts for damage,
- Install the spools to the valve body, not to damage the O-ring.

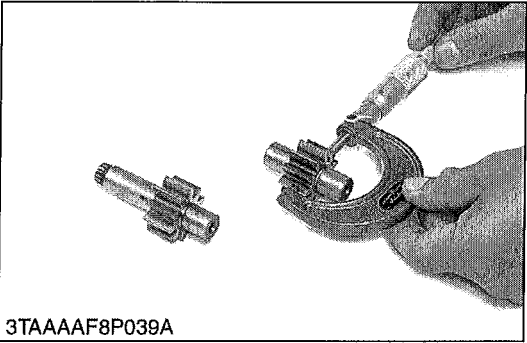
9Y1210855HYS0020US0

[5] SERVICING

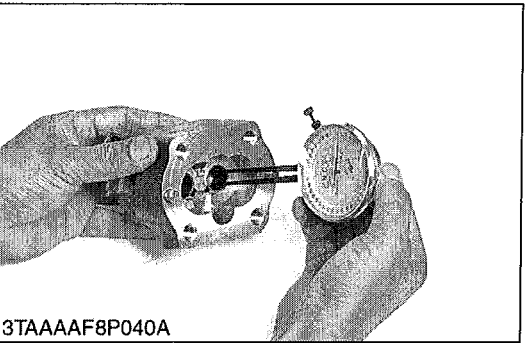
(1) Hydraulic Pump



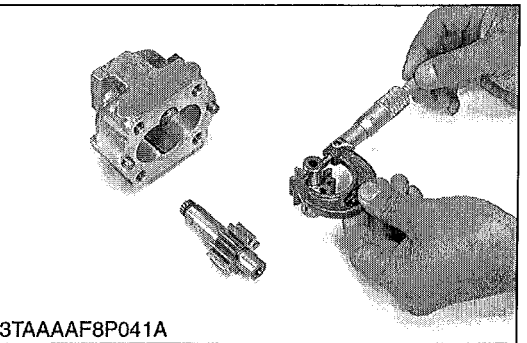
3TAAAF8P038A



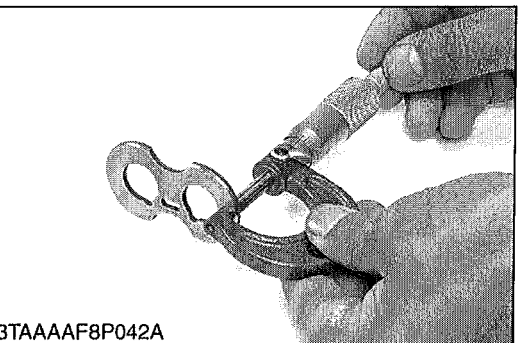
3TAAAF8P039A



3TAAAF8P040A



3TAAAF8P041A



3TAAAF8P042A

Clearance between Tip of Gear Tooth and Casing

1. Measure the gear O.D. with an outside micrometer.
2. Measure the casing I.D. with a cylinder gauge and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace the assembly.

Clearance between tip of gear tooth and casing	Allowable limit	0.15 mm 0.0059 in.
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Gear O.D.	Factory specification	33.520 to 33.530 mm 1.3197 to 1.3200 in.
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Case I.D.	Factory specification	33.570 to 33.577 mm 1.3217 to 1.3219 in.
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Clearance between Bushing and Shaft

1. Measure the gear shaft O.D. with an outside micrometer.
2. Measure the bushing I.D. with a cylinder gauge and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace it.

Clearance between bushing and shaft	Factory specification	0.020 to 0.091 mm 0.00079 to 0.0035 in.
	Allowable limit	0.12 mm 0.0047 in.

Shaft O.D.	Factory specification	14.970 to 14.980 mm 0.58937 to 0.58976 in.
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Bushing I.D.	Factory specification	15.000 to 15.061 mm 0.59056 to 0.59295 in.
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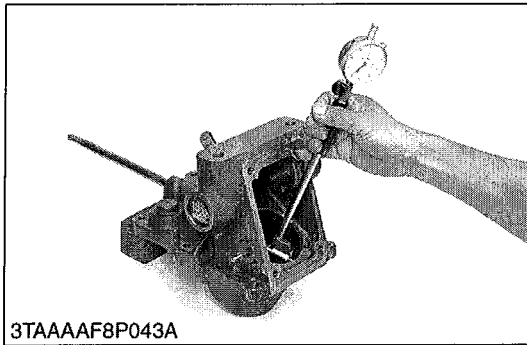
Side Plate Thickness

1. Measure the side plate thickness with an outside micrometer.
2. If the thickness is less than the allowable limit, replace it.

Side plate thickness	Factory specification	2.48 to 2.50 mm 0.0977 to 0.0984 in.
	Allowable limit	2.40 mm 0.094 in.

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(2) Hydraulic Cylinder

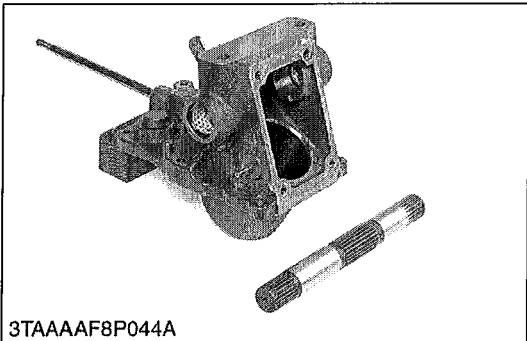


Hydraulic Cylinder Bore

1. Check the cylinder internal surface for scoring or damage.
2. Measure the cylinder I.D. with a cylinder gauge.
3. If the measurement exceeds the allowable limit, replace the hydraulic cylinder block.

Cylinder I.D.	Factory specification	80.05 to 80.15 mm 3.152 to 3.155 in.
	Allowable limit	80.20 mm 3.157 in.

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Hydraulic Arm Shaft Bushing

1. Visually inspect the DX bushings for signs of wear or damage. (The DX bushing tends to show concentrated wear.)
2. If the DX bushing is worn beyond the alloy thickness "A", replace it.

(Reference)

Hydraulic arm shaft bushing	Alloy thickness "A"	0.57 mm 0.022 in.
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Hydraulic arm shaft O.D.	Factory specification	LH	31.925 to 31.950 mm 1.2569 to 1.2578 in.
		RH	29.925 to 29.950 mm 1.1782 to 1.1791 in.

A: Alloy Thickness

L: Outside Diameter

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