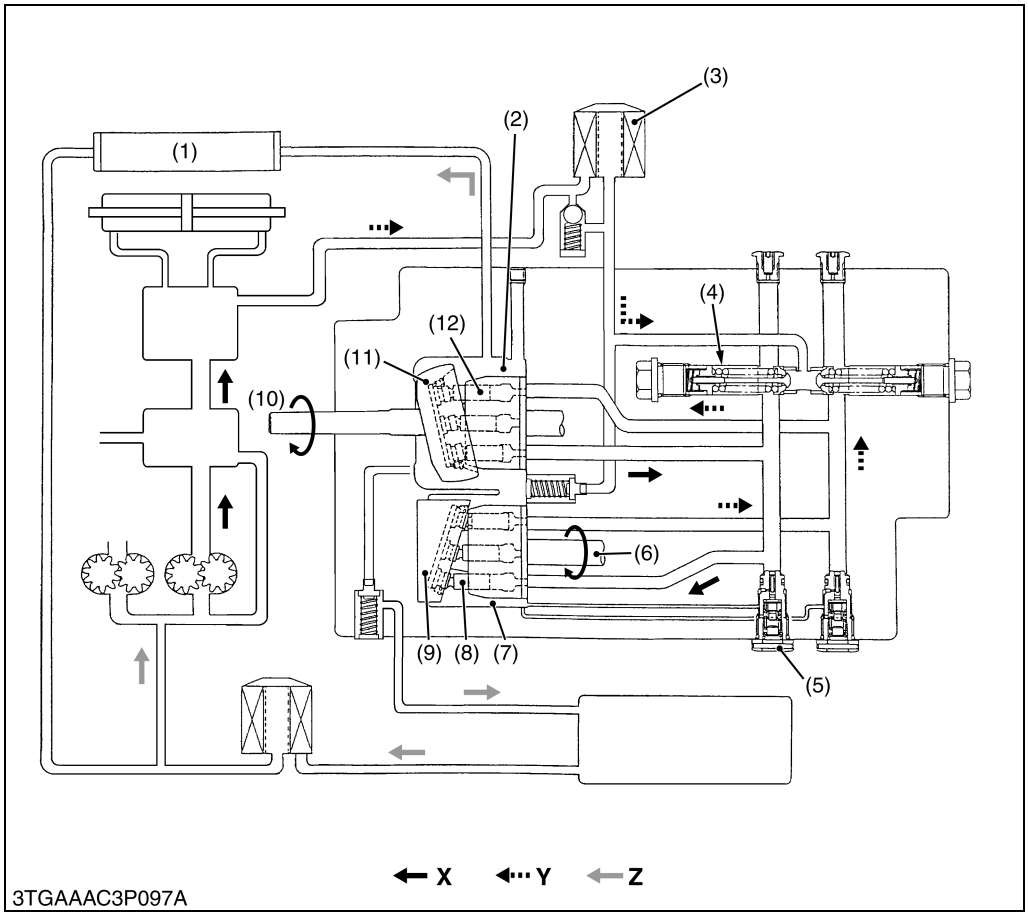
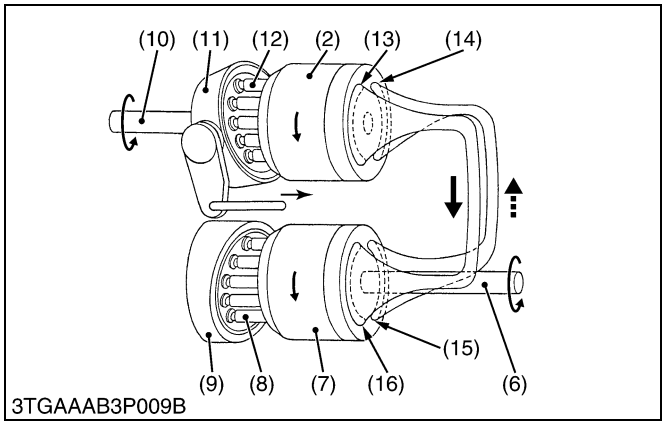
Forward Position



3TGAAAC3P097A

(1) Oil Cooler
(2) Cylinder Block (Pump)
(3) HST Oil Filter (10 μ)
(4) Check and High Pressure Relief Valve (Forward)
(5) Neutral Valve (Forward)
(6) Output Shaft
(7) Cylinder Block (Motor)
(8) Piston (Motor)
(9) Fixed Swashplate
(10) Input Shaft
(11) Variable Swashplate
(12) Piston (Pump)
(13) Pump Kidney Port **A**
(14) Pump Kidney Port **B**
(15) Motor Kidney Port **D**
(16) Motor Kidney Port **C**

X: High Pressure Oil
Y: Low Pressure Oil
Z: Suction or Drain Oil



3TGAAAB3P009B

When the speed control pedal is stepped on and in forward, the variable swashplate (11) is tilted as shown in figure above.

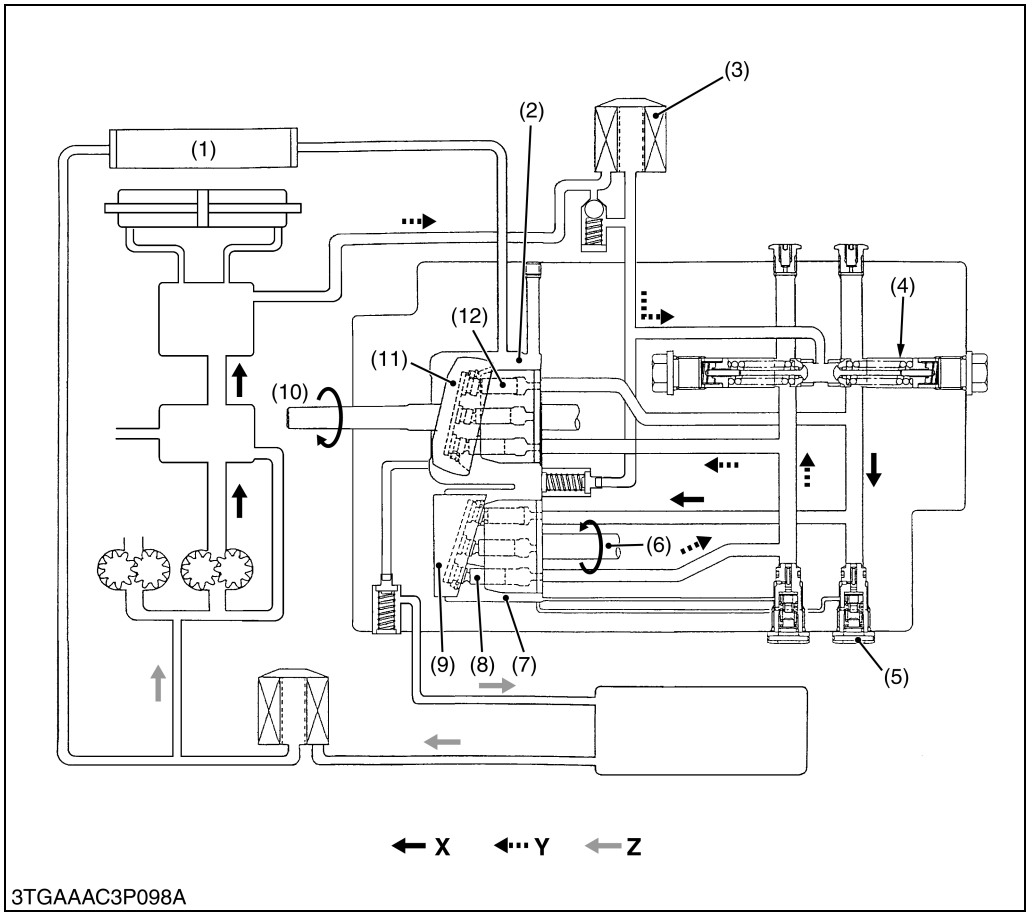
As the pump cylinder block (2) rotates with the input shaft (10), oil is forced out of pump kidney port **A** (13) at high pressure. As pressure oil enters motor kidney port **C** (16). the pistons (8), which align with port **C** (16), are pushed against the swashplate (9) and slide down the inclined surface.

Then the output shaft (6) rotates with the motor cylinder block (7). This drives the machine forward and the angle of pump swashplate (11) determines the output shaft speed.

As the motor cylinder block (7) continued to rotate, oil is forced out of motor kidney port **D** (15) at low pressure and returns to the pump.

9Y1211109TRM0006US0

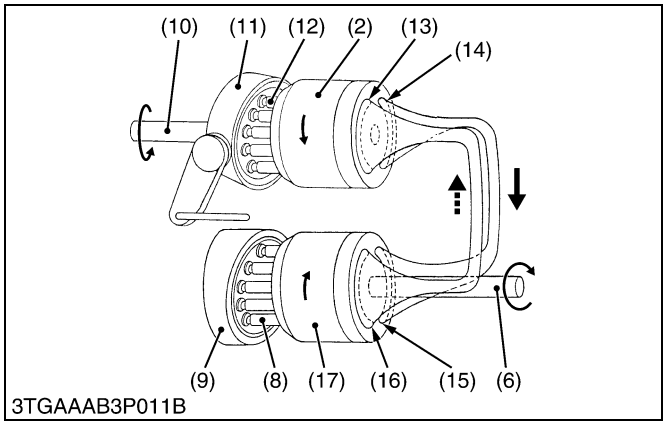
Reverse Position



3TGAAAC3P098A

(1) Oil Cooler
(2) Cylinder Block (Pump)
(3) HST Oil Filter (10 μ)
(4) Check and High Pressure Relief Valve (Reverse)
(5) Neutral Valve (Reverse)
(6) Output Shaft
(7) Cylinder Block (Motor)
(8) Piston (Motor)
(9) Fixed Swashplate
(10) Input Shaft
(11) Variable Swashplate
(12) Piston (Pump)
(13) Pump Kidney Port **A**
(14) Pump Kidney Port **B**
(15) Motor Kidney Port **D**
(16) Motor Kidney Port **C**
(17) Cylinder Block (Motor)

X: High Pressure Oil
Y: Low Pressure Oil
Z: Suction or Drain Oil



3TGAAAB3P011B

When the speed control pedal is stepped on and in reverse, the variable swashplate (11) is tilted as shown in figure above.

As the pump cylinder block (2) rotates with the input shaft (10), oil is forced out of pump kidney port **B** (14) at high pressure. As pressure oil enters motor kidney port **D** (15), the pistons (8), which align with port **D** (15), are pushed against the swashplate (9) and slide down the inclined surface.

Then the output shaft (6) rotates with the motor cylinder block (7). This drives the machine rearward and the angle of pump swashplate (11) determines the output shaft speed.

As the motor cylinder block (7) continued to rotate, oil is forced out of motor kidney port **C** (16) at low pressure and returns and returns to the pump.

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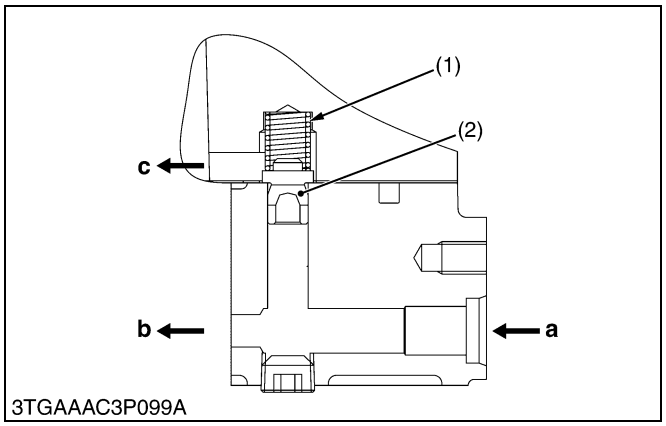


3TGAAAC3P099A

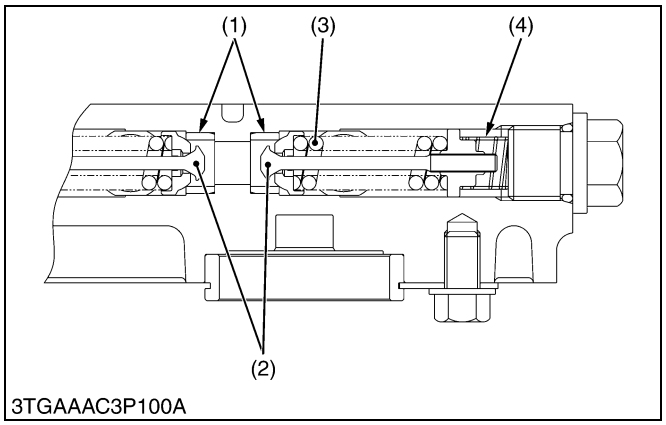
Charge Relief Valve

The charge oil flow the steering controller flows into the main oil circuit through the check valves, excessive oil passes to the case through the charge relief valve.

(1) Spring
(2) Poppet

a: From the Steering Controller and HST Oil Filter
b: To the Check and High Pressure Relief Valve
c: To the Case

9Y1211109TRM0008US0



3TGAAAC3P100A

Check and High Pressure Relief Valve

The check and high pressure relief valves monitor the oil pressure in each line of the main oil circuit.

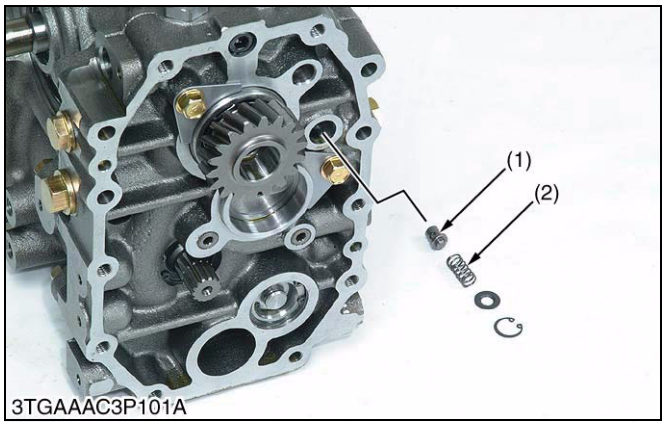
In neutral, both valves are open and charging oil enters into the main oil circuit through the valves.

At normal operation, the check valve in the high pressure side is closed and it pushes and opens the another one.

When excessively high pressure is built up in one line, the high pressure relief valve located in this line is open and the oil flows into another line.

(1) Check Valve Sheet
(2) Relief Poppet
(3) Relief Spring
(4) Check Spring

9Y1211109TRM0009US0



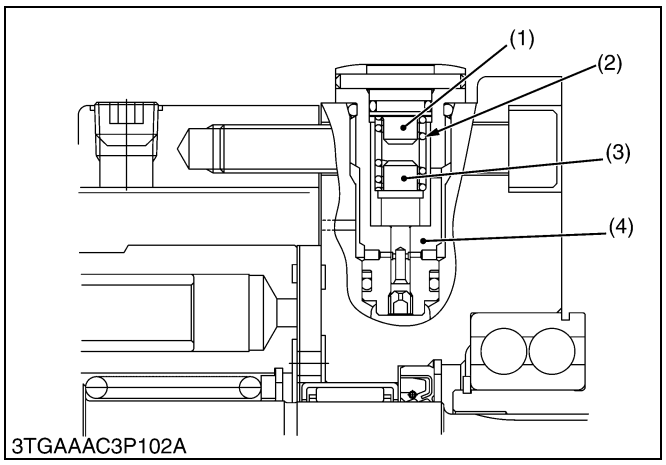
3TGAAAC3P101A

Case Relief Valve

The case relief valve monitors the oil pressure in the hydrostatic transmission case. When the oil pressure rises, it opens and flows the oil directly to the transmission case, so that the oil may not leak against the sealing.

(1) Poppet
(2) Spring

9Y1211109TRM0010US0



3TGAAAC3P102A

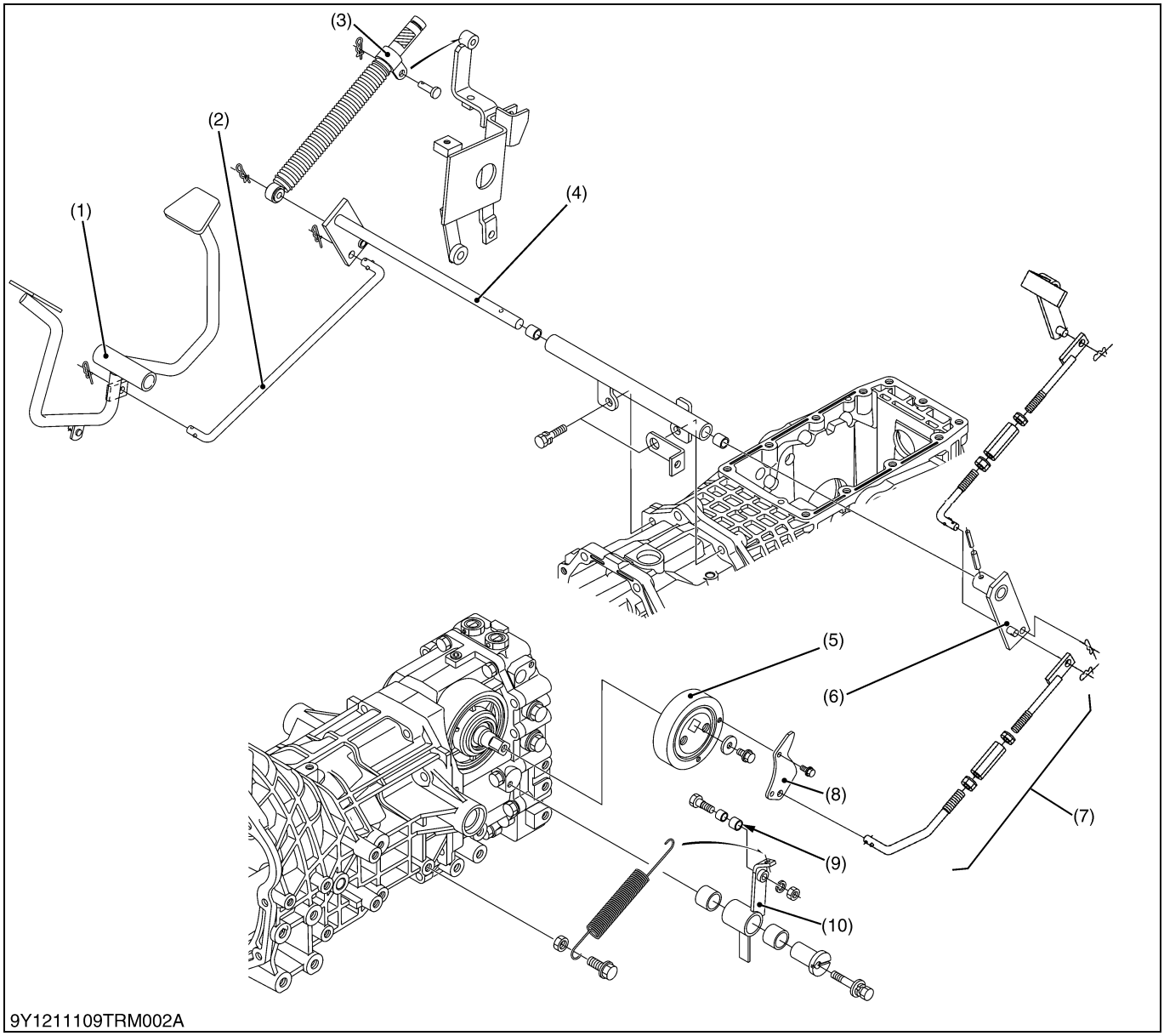
Neutral Valve

The neutral valves in the main oil circuit lines are open and pass the oil to the case when in neutral, and the oil pressure in their lines becomes low. And when the oil pressure in the high pressure line increases to a specified pressure, the neutral valve closes.

(1) Spring Holder
(2) Spring
(3) Poppet **N**
(4) Valve Body

9Y1211109TRM0011US0

(5) Control Linkage

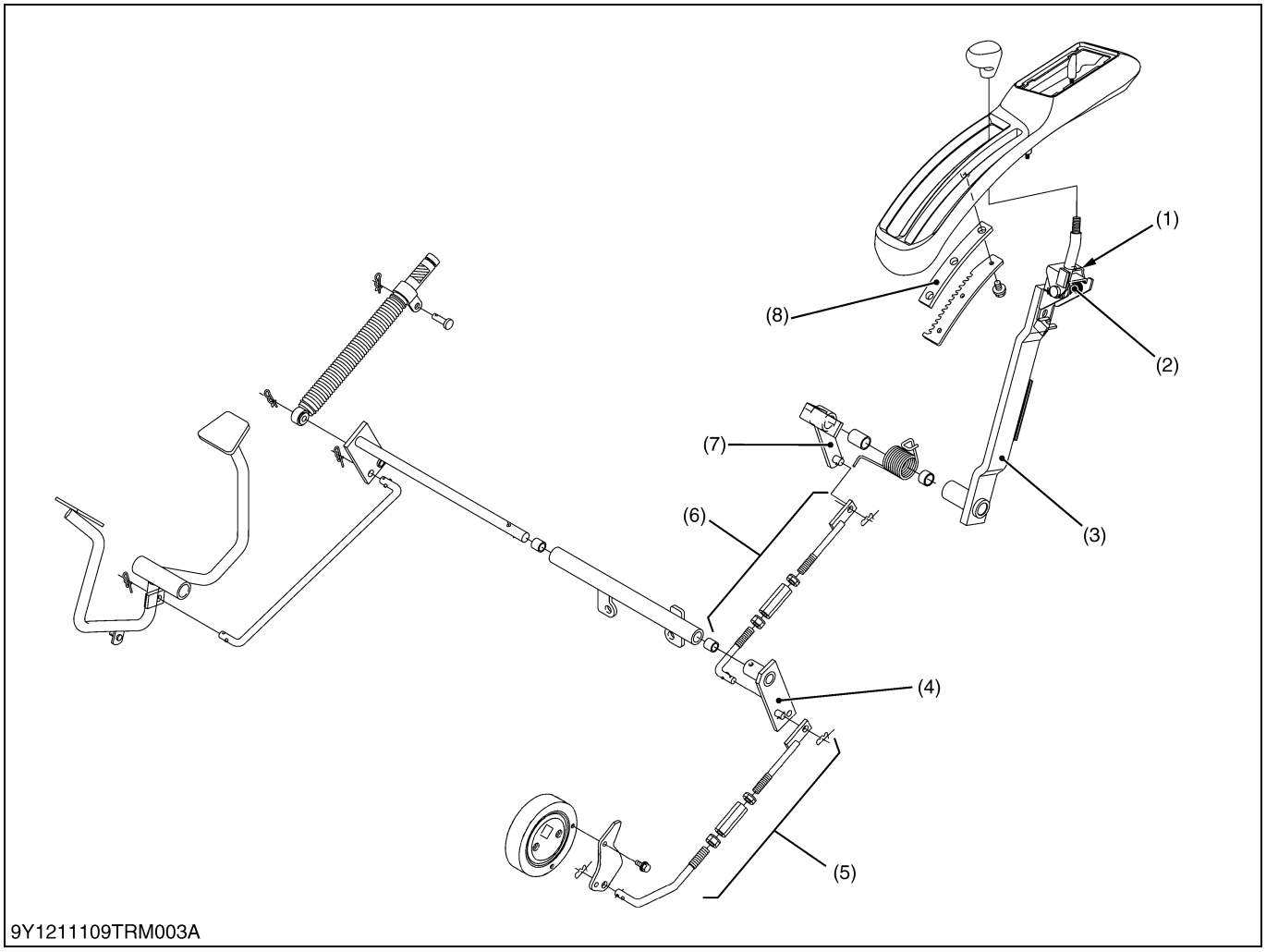


(1) Speed Control Pedal
(2) HST Pedal Rod
(3) Damper
(4) HST Lever R.H.
(5) Trunnion Wheel
(6) HST Lever L.H.
(7) HST Link Rod
(8) Neutral Cam
(9) Roller
(10) Neutral Holder

The speed control pedal (1) and trunnion wheel (5) of variable swashplate are linked with the HST pedal rod (2), HST lever R.H. (4) L.H. (6), HST link rod (7) and neutral cam (8). As the front footrest of pedal is depressed, the swashplate rotates and forward travelling speed increases. Depressing the rear footrest increases reverse speed. The roller (9) on the neutral holder (10) is held with spring seats the detent of the neutral cam (8) so that the neutral cam (8) returns to neutral. Then, the swashplate is returned to neutral with the neutral cam, when the pedal is released.The damper (3) connected to the HST lever R.H. (4) restricts the movement of the linkage to prevent abrupt operation or reversing.

9Y1211109TRM0012US0

(6) Cruise Control Linkage



(1) Release Lever
(2) Spring
(3) Cruise Control Lever Assembly
(4) HST Lever L.H.
(5) HST Link Rod
(6) Cruise Rod
(7) Cruise Link
(8) Lever Guide

When the cruise control lever (3) is shifted forward, the claw portion of the release lever (1) engages with the lever guide (8) by the spring (2) and the position of the cruise control lever (3) is kept.

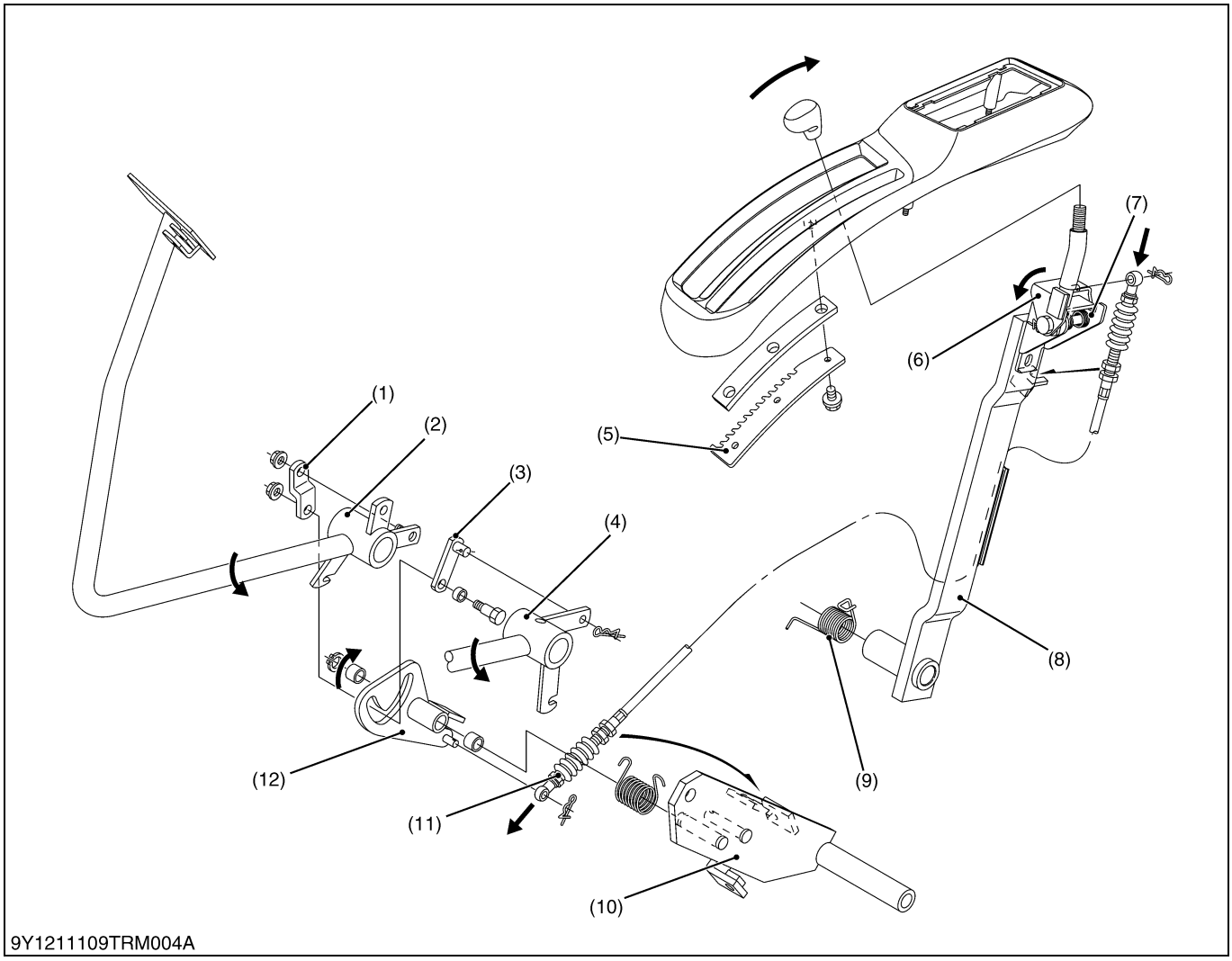
The cruise link (7), cruise rod (6) and HST link rod (5) move in the direction of the arrow of figure, and the HST starts the forward operation at the same time.

■ **NOTE**

- **The forward speed increases if the speed control pedal is depressed to the forward side further while the cruise control lever is set.**
- **However, do not depress the speed control pedal to the backward while the cruise control lever is set. (The link mechanics might be damaged.)**

9Y1211109TRM0013US0

(7) Cruise Control Release System



9Y1211109TRM004A

(1) Brake Link 1
(2) Brake Pedal R.H.
(3) Brake Link 2
(4) Brake Pedal L.H.
(5) Lever Guide
(6) Release Lever
(7) Spring
(8) Cruise Control Lever Assembly
(9) Spring
(10) HST Pedal Support
(11) Release Wire
(12) Lever 1

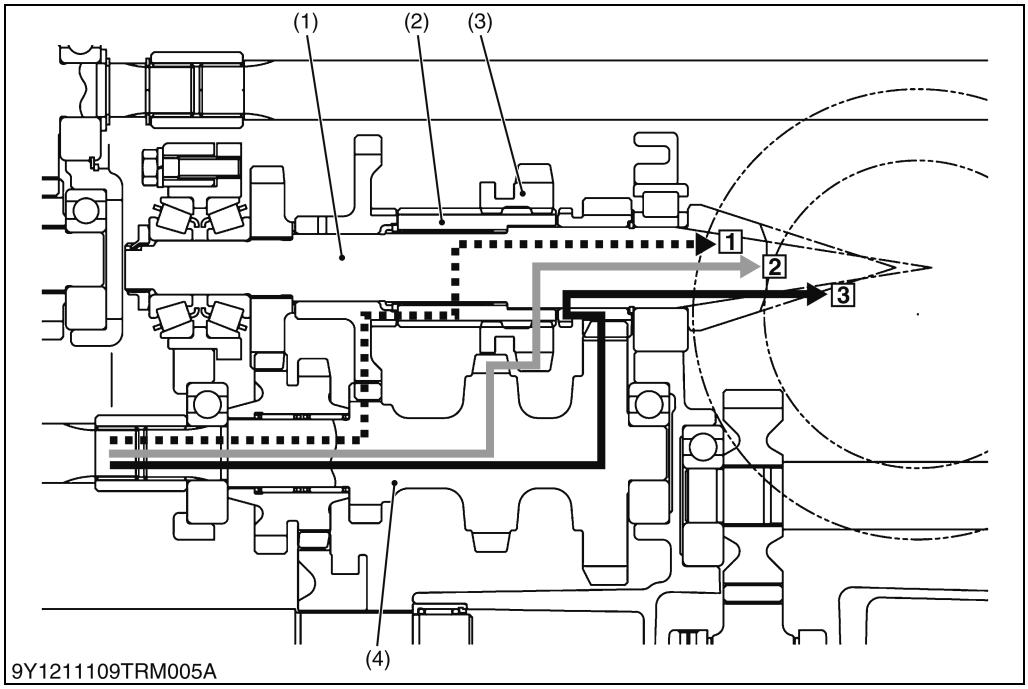
The claw portion of the release lever (6) engages with the lever guide (5) by the spring (7) when the cruise control lever is set.

When the right and left brake pedal (2), (4) is depressed at the same time, the lever 1 (12) rotates in the direction of the arrow of figure by the brake link 1 (1) and 2 (3). Then, the inner wire of release wire (11) is pulled, and release lever (6) rotates in the direction of the arrow of figure. The claw portion of the release lever (6) comes off from lever guide (5), and after all, the cruise control lever (8) returns to home position by spring (9).

When one of the brake pedal is depressed, the brake link 1 (1) and 2 (3) move along the ditch part of the lever (12), and the lever 1 (12) does not rotate.

9Y1211109TRM0014US0

[2] RANGE GEAR SHIFT SECTION

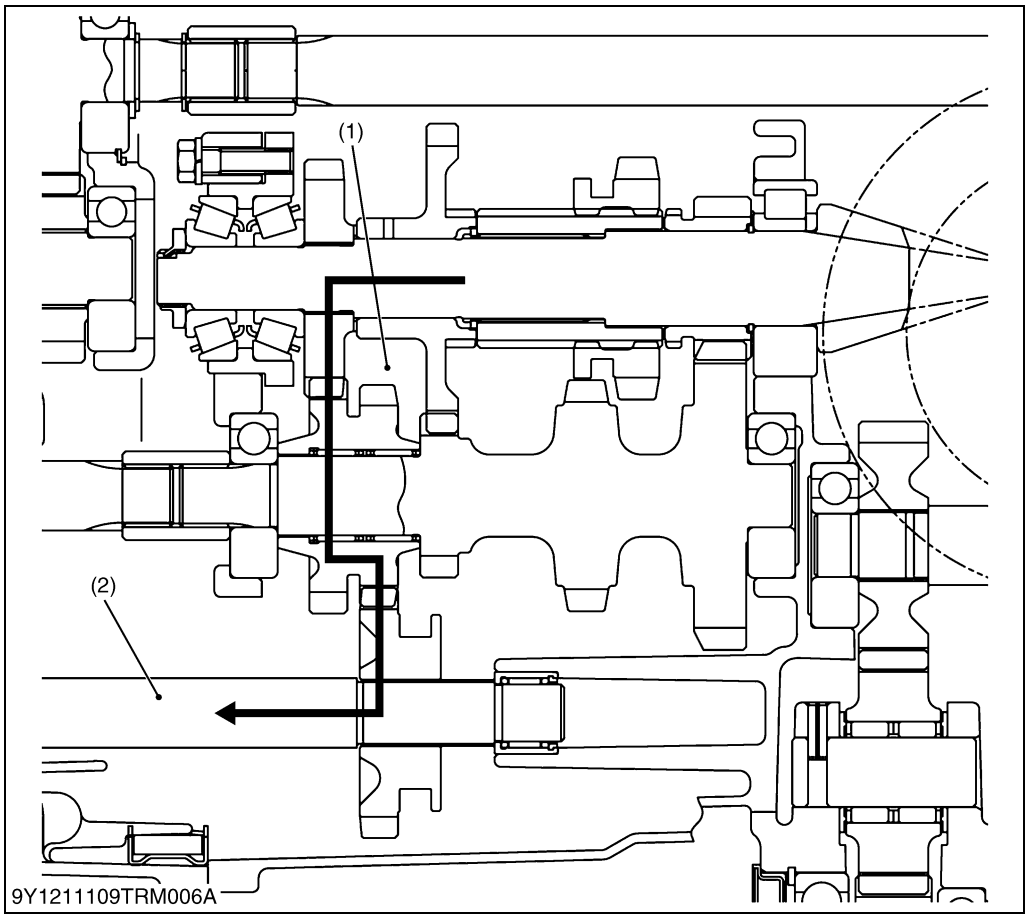


(1) Hypoid Pinion Shaft
(2) Spline Boss
(3) 22T Shifter Gear
(4) Rear Counter Shaft

1: 1st Speed
2: 2nd Speed
3: 3rd Speed

9Y1211109TRM0015US0

[3] FRONT WHEEL DRIVE SECTION



(1) Hypoid Pinion Shaft
(2) Front Drive Shaft

9Y1211109TRM0016US0

[4] BI-SPEED TURN SYSTEM

(1) Feature

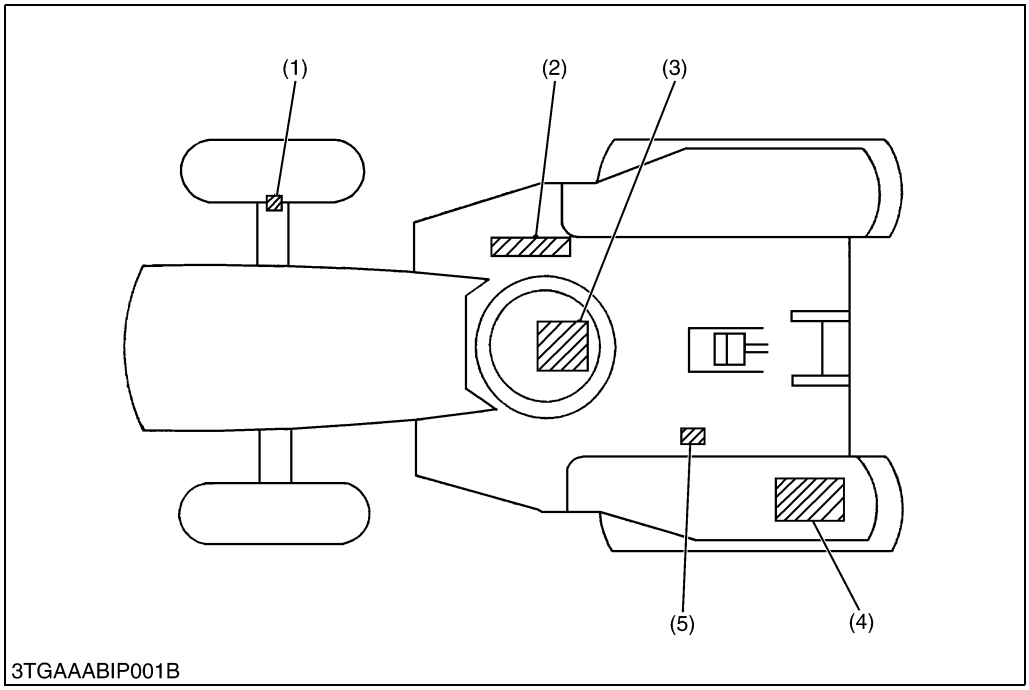
It is used hydraulic and electrical control type bi-speed turn system.

The front wheel rotates by 1.5 times the speed compared with normal 4WD when the following conditions become complete.

- Engine running
- 4WD mode
- Turned on the bi-speed switch
- Front wheel is steered to 0.61 rad (35 °) or more.
- The travelling speed within 0.2 to 9.0 km/h (0.13 to 5.62 mph)

9Y1211109TRM0017US0

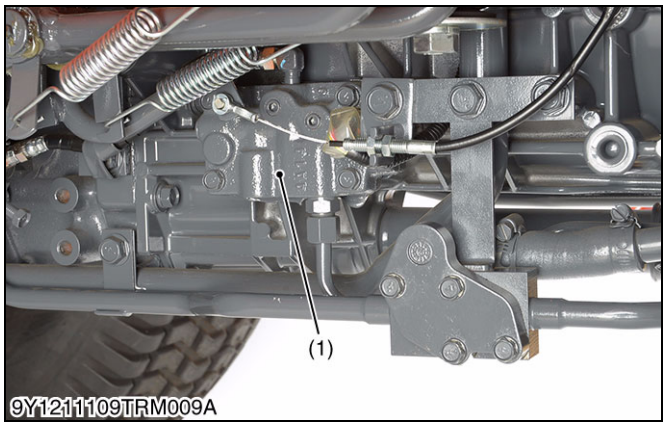
(2) Related Parts and Arrangement



3TGAAABIP001B

(1) Front Wheel Turning Angle Sensor
(2) Bi-speed Valve
(3) Hydraulic Clutch (Bi-speed)
(4) Bi-speed Controller
(5) Travelling Speed Sensor

9Y1211109TRM0018US0



9Y1211109TRM009A

Bi-speed Valve

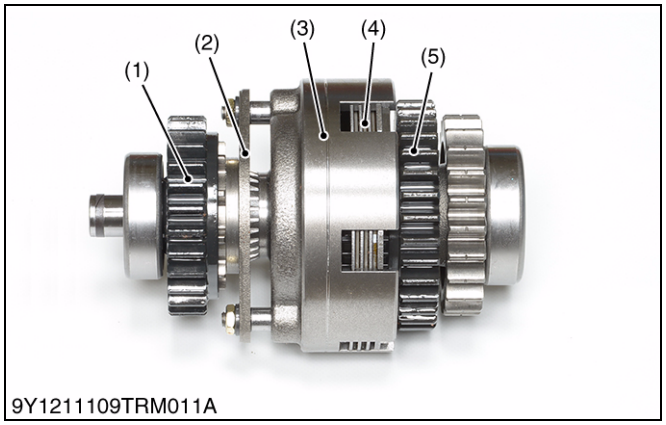
The bi-speed solenoid valve is built in the bi-speed valve (1) and opens and shuts the oil passage to the hydraulic clutch by an electric signal from bi-speed controller.

(Reference)

- The PTO solenoid valve is also built in the bi-speed valve.

(1) Bi-speed Valve

9Y1211109TRM0021US0



9Y1211109TRM011A

Hydraulic Clutch (Bi-speed)

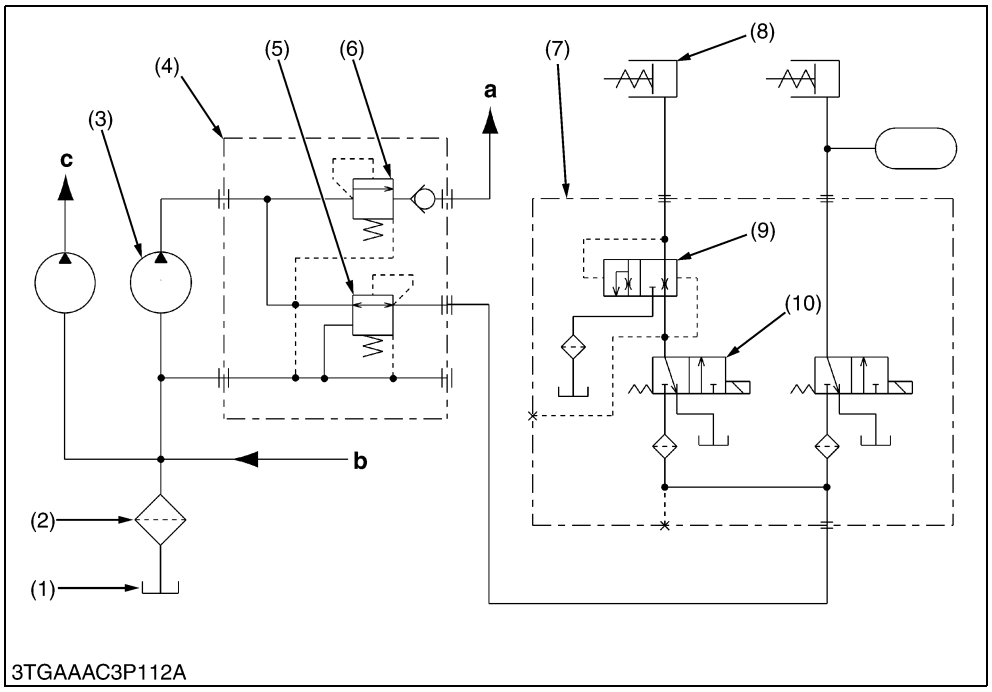
When the pressurized oil enter to the hydraulic clutch, the piston (3) moves to the right in the figure and presses clutch disc and plate (4). Then the power is transmitted to the 32T gear (5).

When oil runs away, the piston (3) and shifter (2) moves to the left in the figure by the spring force. Then the power is transmitted to the 27T gear (1).

(1) 27T Gear
(2) Shifter
(3) Piston
(4) Clutch Disc and Plate
(5) 32T Gear

9Y1211109TRM0023US0

(3) Hydraulic Oil Flow



3TGAAAC3P112A

(1) Transmission Case
(2) Oil Filter
(3) Hydraulic Pump (Power Steering)
(4) Regulator Valve
(5) Pressure Reducing Valve
(6) Regulating Valve
(7) Bi-speed Valve
(8) Hydraulic Clutch (for Bi-speed)
(9) Orifice Valve
(10) Solenoid Valve (for Bi-speed)

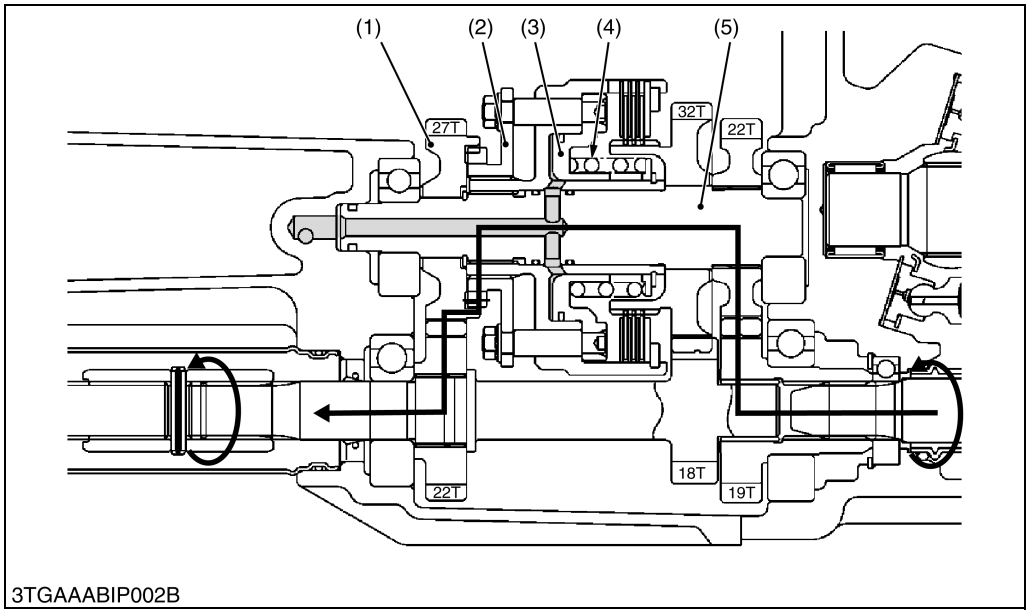
a: To Steering Controller
b: From Oil Cooler
c: To 3P Hydraulic System

The oil from the hydraulic pump (3) is adjusted with the regulator valve (4) to the pressure of 18.5 kgf/cm^2, and enters the bi-speed valve (7). When the solenoid valve (10) opens by the bi-speed controller, pressurized oil enters the hydraulic clutch (8) through the orifice valve (9).

9Y1211109TRM0024US0

(4) Power Train of Hydraulic Clutch Section

4WD Position



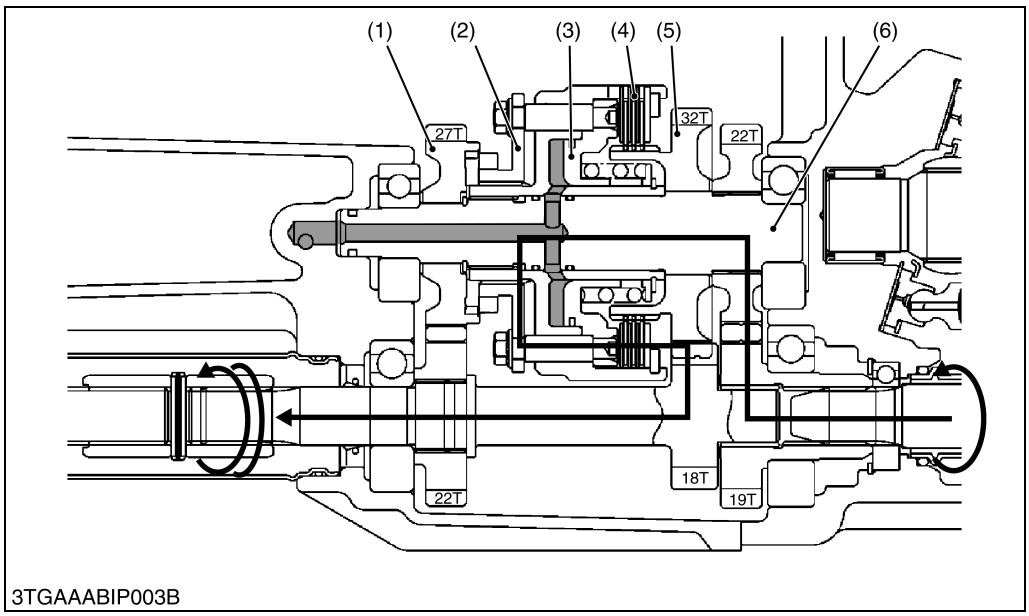
3TGAAABIP002B

(1) 27T Gear
(2) Shifter
(3) Piston
(4) Spring
(5) Counter Shaft

When the hydraulic clutch is not operated, the piston (3) is pushed by the spring (4) and shifter (2) is engaged to the 27T gear (1) with spline. Power is transmitted as shown in the figure.

9Y1211109TRM0025US0

Bi-speed Turn Position



3TGAAABIP003B

(1) 27T Gear
(2) Shifter
(3) Piston
(4) Clutch Disc and Plate
(5) 32T Gear
(6) Counter Shaft

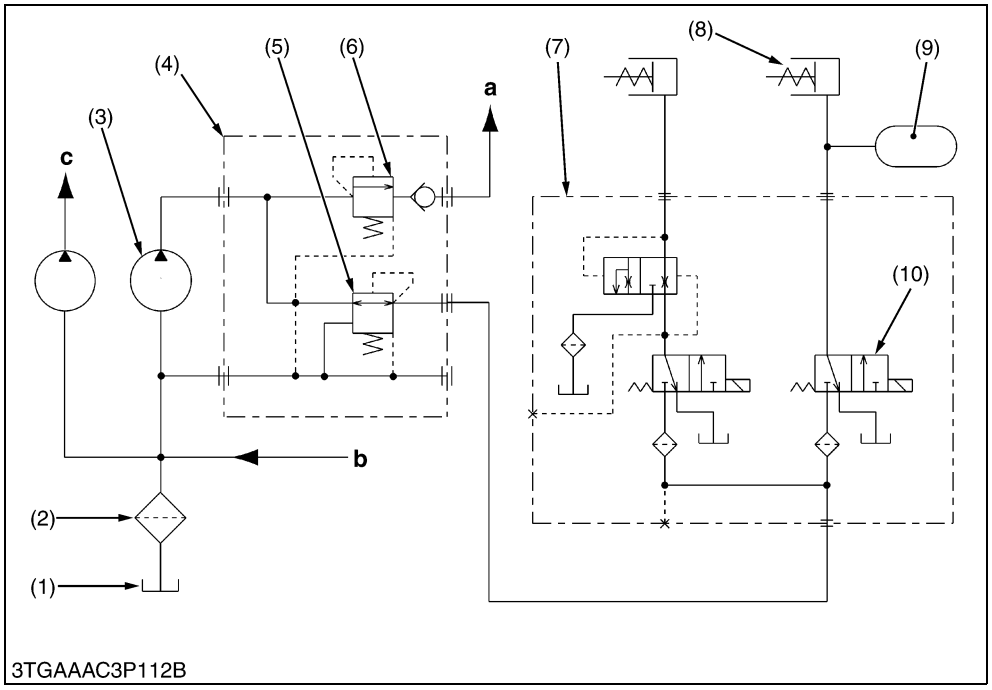
When the bi-speed solenoid valve is actuated, the piston (3) moves in the direction of arrow by hydraulic pressure. The clutch disc and plate (4) is pressed and the shifter (2) is disengaged from the 27T gear (1). Power is transmitted as shown in the figure. The front wheel rotates by 1.5 times the speed for smooth turning.

9Y1211109TRM0026US0

3. POWER TRAIN FOR PTO SYSTEM

[1] INDEPENDENT PTO SYSTEM

(1) Hydraulic Oil Flow



(1) Transmission Case
(2) Oil Filter
(3) Hydraulic Pump (for Power Steering)
(4) Regulator Valve
(5) Pressure Reducing Valve
(6) Regulating Valve
(7) Bi-speed Valve
(8) Hydraulic Clutch (for PTO)
(9) Accumulator
(10) Solenoid Valve (for PTO)

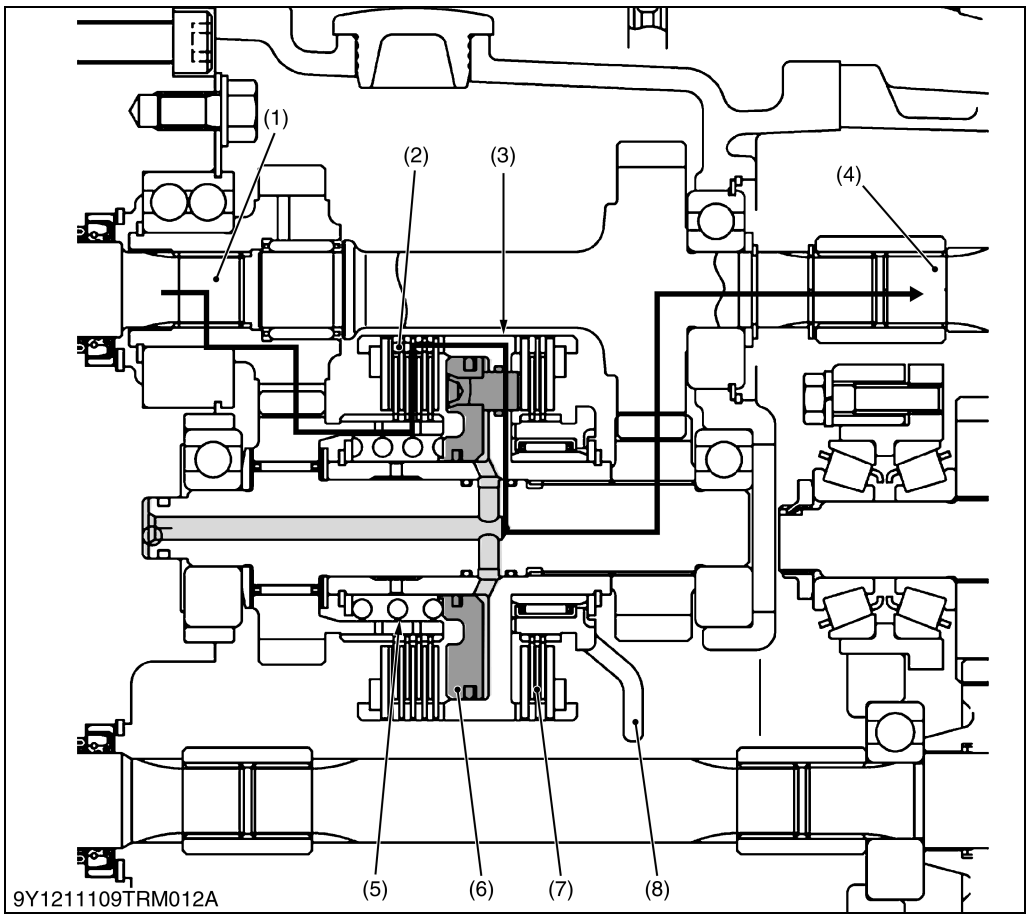
a: To Steering Controller
b: From Oil Cooler
c: To 3P Hydraulic System

This tractor is equipped with the independent PTO system. The hydraulic circuit is as shown above.

The oil from the hydraulic pump (3) is adjusted with the regulator valve (4) to the pressure of 18.5 kgf/cm^2, and enters the bi-speed valve (7). The solenoid valve (10), which is built in the bi-speed valve (7) and operated by the PTO clutch control switch, opens and shuts the oil circuit to the hydraulic clutch (8).

9Y1211109TRM0027US0

(2) Power Train of PTO Clutch Section



(1) Input Shaft
(2) Clutch Disc and Plate (PTO Side)
(3) Clutch Body
(4) PTO Drive Shaft
(5) Spring
(6) Piston
(7) Clutch Disc and Plate (Brake Side)
(8) Brake Hub

■ **PTO Engaged**

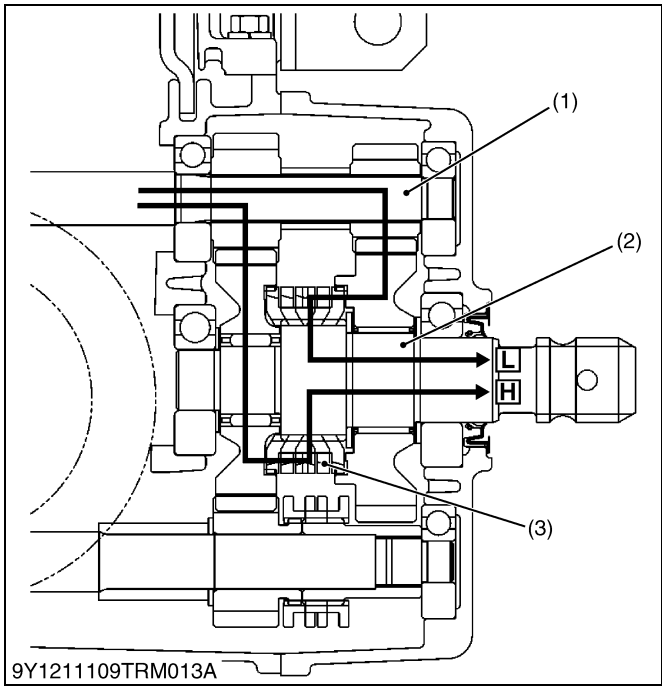
The piston (6) moves to the left in the figure by oil pressure and presses the clutch disc and plate (2). Then, the power is transmitted to the PTO drive shaft (4) as shown in figure.

■ **PTO Disengaged**

The piston (6) moves to the right in the figure by spring force and presses the clutch disc and plate (7). Then, the rotation of the PTO drive shaft (4) stops because the brake hub (8) hits the stopper inside the transmission case.

9Y1211109TRM0028US0

[2] REAR PTO GEAR SHIFT SECTION

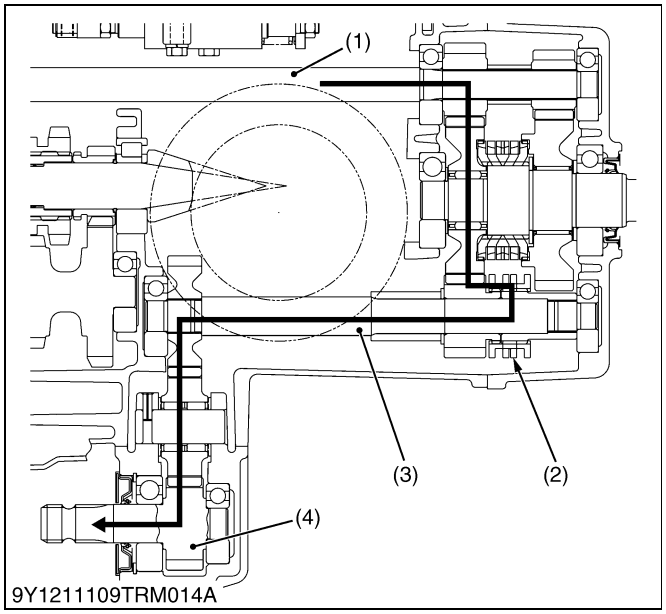


(1) PTO Drive Shaft
(2) PTO Shaft
(3) Shifter

H: 800 min^{-1} (rpm) (Engine 2717 min^{-1} (rpm))
L: 540 min^{-1} (rpm) (Engine 2670 min^{-1} (rpm))

9Y1211109TRM0029US0

[3] MID PTO GEAR SHIFT SECTION



■ **Mid PTO Speed: 2500 min^{-1} (rpm) (Engine 2734 min^{-1} (rpm))**

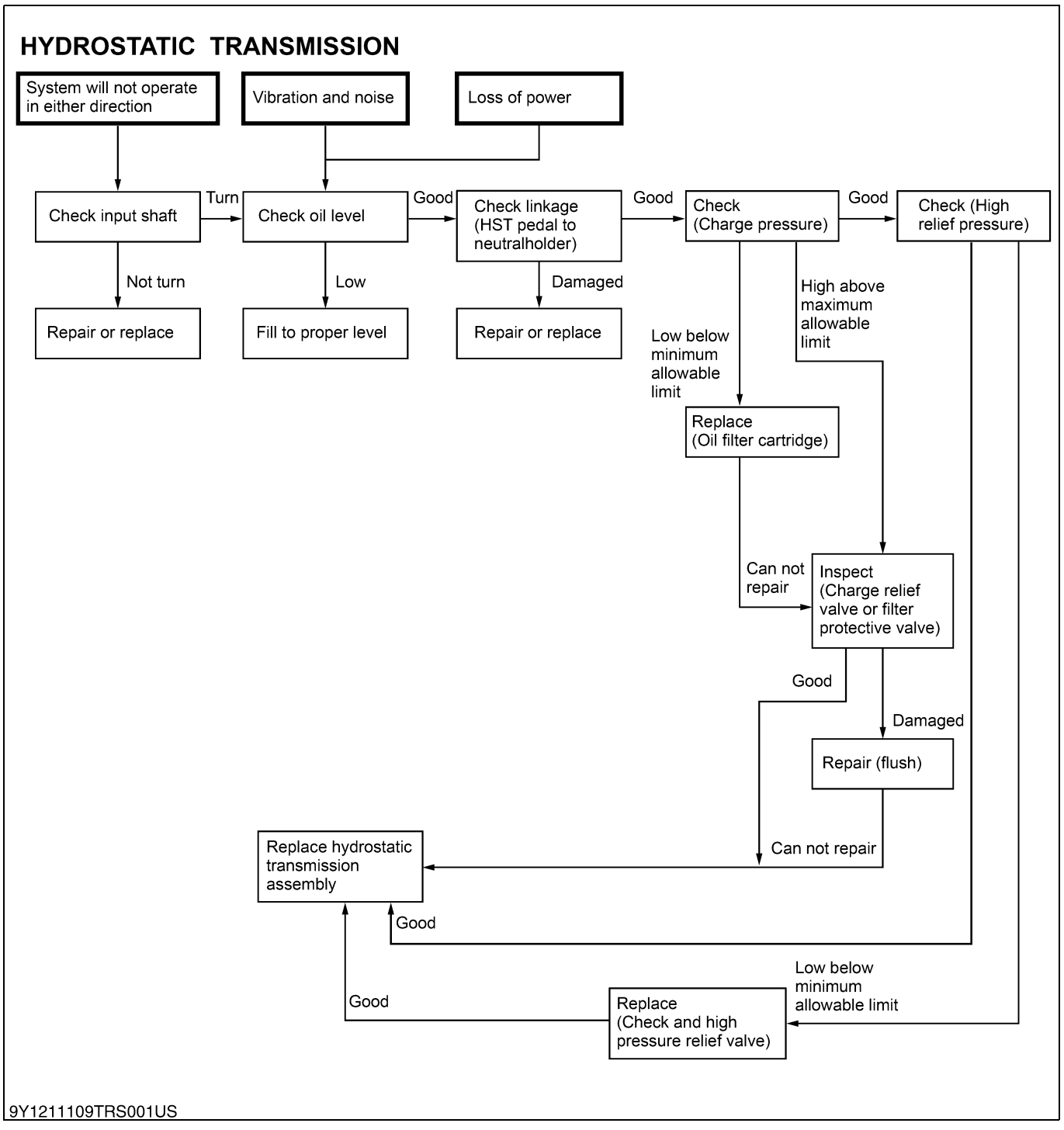
(1) PTO Drive Shaft
(2) Shifter
(3) Mid PTO Drive Shaft
(4) Mid PTO Shaft

9Y1211109TRM0030US0

SERVICING

CONTENTS

1. TROUBLESHOOTING



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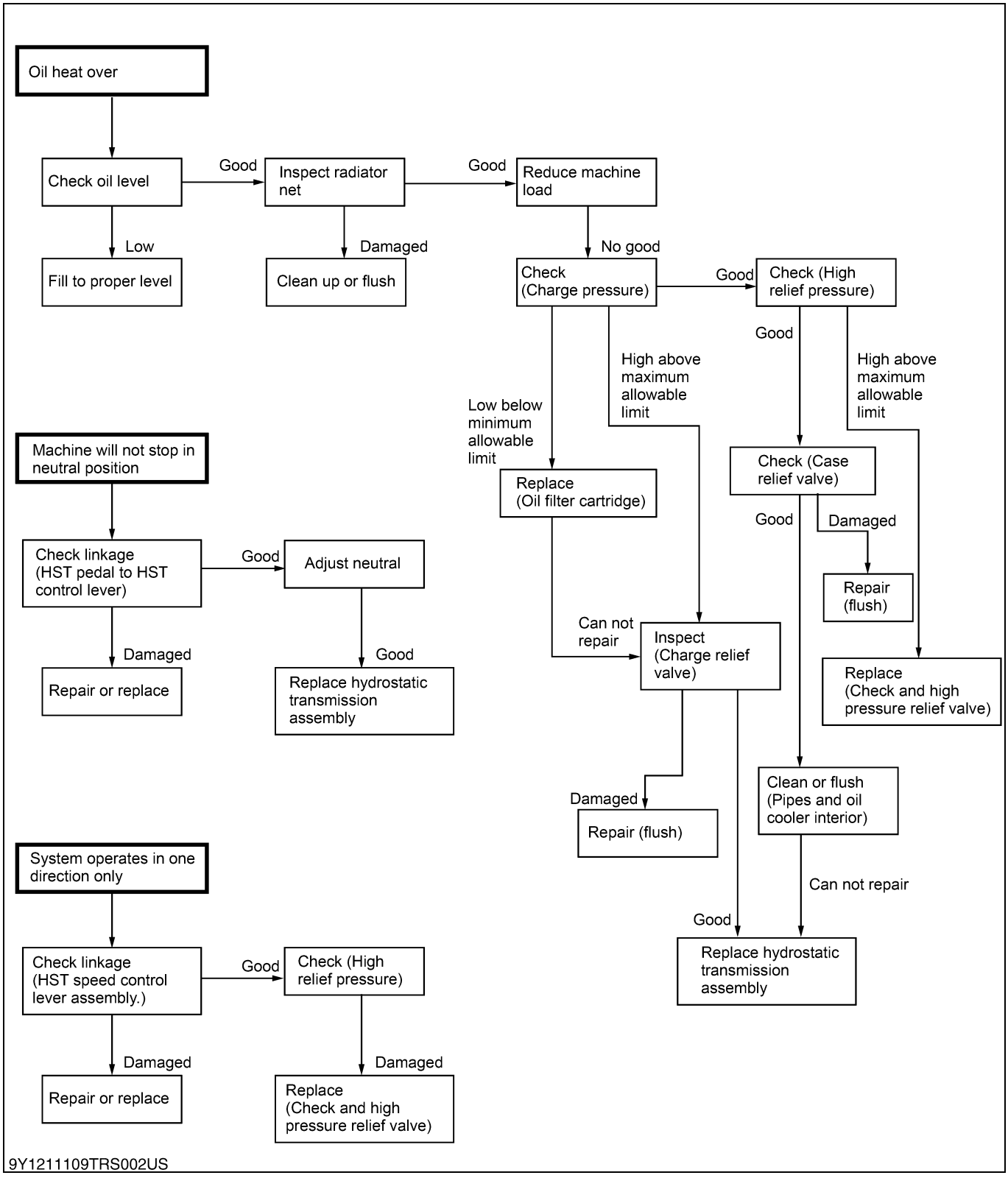

9Y1211109TRS0002US0

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Excessive Transmission Noise	1. Transmission fluid is insufficient.	Fill transmission fluid.	3-S16, 3-S30
	2. Gear is worn or backlash is improper.	Replace gear and adjust backlash to the factory specification.	–
	3. Bearings are worn or damaged.	Replace bearings.	–
	4. Shift fork is worn.	Replace shift fork.	–
	5. Backlash between spiral bevel pinion and spiral bevel gear is improper.	Adjust backlash between spiral bevel pinion and spiral bevel gear.	3-S73
	6. Backlash between differential pinion and differential side gear is improper.	Adjust backlash between differential pinion and differential side gear.	3-S71
	7. Bi-speed turn clutch is damaged.	Replace or repair bi-speed turn clutch.	3-S51
	8. PTO clutch is damaged.	Replace or repair PTO clutch.	3-S57
Gear Slip Out of Mesh	1. Shift linkages are rusted.	Repair shift linkages.	–
	2. Shifter or shift fork is worn or damaged.	Replace shifter or shift fork.	–
	3. Gears are worn or damaged.	Replace gears.	–
Differential Lock Can Not Be Engaged	1. Differential lock shift fork is damaged.	Replace differential lock shift fork.	3-S64
	2. Differential lock shift fork mounting spring pin is damaged.	Replace differential lock shift fork mounting spring pin.	3-S64
	3. Differential lock shifter pin is bent or damaged.	Replace differential lock shifter pin.	3-S64
	4. Differential lock fork shaft is bent or damaged.	Replace differential lock fork shaft.	3-S64
Differential Lock Pedal Does Not Return	1. Differential lock pedal return spring is weaken or damaged.	Replace differential lock pedal return spring.	–
	2. Differential lock shifter pin is bent or damaged.	Replace differential lock shifter pin.	3-S64
	3. Differential lock fork shaft is bent.	Replace differential lock fork shaft.	3-S64

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Excessive or Unusual Noise at All Time	1. Backlash between spiral bevel pinion and spiral bevel gear is improper.	Adjust backlash between spiral bevel pinion and spiral bevel gear to the factory specification.	3-S73
	2. Backlash between differential pinion and differential side gear is improper.	Adjust backlash between differential pinion and differential side gear to the factory specification.	3-S71
	3. Bearings are worn.	Replace bearings.	–
	4. Transmission fluid level is insufficient and improper type of transmission fluid is used.	Fill or replace transmission fluid.	3-S16, 3-S30
Noise While Turning	1. Differential pinions or differential side gears are worn or damaged.	Replace differential pinions or differential side gears.	3-S61, 3-S66
	2. Differential lock is binding. (does not disengage)	Replace differential lock.	3-S64
	3. Bearing is worn.	Replace bearing.	–

9Y1211109TRS0003US0

2. SERVICING SPECIFICATIONS

HYDROSTATIC TRANSMISSION (HST) AND LINKAGE

Item		Factory Specification	Allowable Limit
Speed Control Pedal to Frame (Forward)	Clearance	5 to 10 mm 0.20 to 0.39 in.	–
Maximum Traveling Speed (Reverse)	–	70 to 80 % of forward speed	–
Claw to Lever Guide (Cruise control)	Clearance	0 to 1 mm 0.0 to 0.039 in.	–
	Projection height	More than 2 mm 0.079 in.	–
High Pressure Relief Valve	Setting pressure	26.4 to 29.4 MPa 270 to 299 kgf/cm^2 3830 to 4260 psi	–
Charge Relief Valve	Setting pressure	0.4 to 0.8 MPa 4 to 8 kgf/cm^2 60 to 100 psi	–

BI-SPEED HYDRAULIC CLUTCH AND GEARS

Item		Factory Specification	Allowable Limit
Clutch Disc	Thickness	1.915 to 2.085 mm 0.1754 to 0.0821 in.	1.4 mm 0.055 in.
Steel Plate	Thickness	0.95 to 1.05 mm 0.0374 to 0.0413 in.	0.8 mm 0.031 in.
Pressure Plate	Thickness	1.95 to 2.05 mm 0.0768 to 0.0807 in.	1.8 mm 0.071 in.
Piston Return Spring	Free Length	44.0 mm 1.73 in.	–
	Load / Length	638.7 N / 26 mm 65.13 kgf / 26 mm 143.6 lbf / 1.02 in.	539.4 N / 26 mm 55 kgf / 26 mm 121.3 lbf / 1.02 in.
Counter Shaft B to 27T Gear	Clearance	0.040 to 0.082 mm 0.00157 to 0.00323 in.	0.1 mm 0.004 in.
• Counter Shaft B	O.D.	24.959 to 24.980 mm 0.98264 to 0.98346 in.	–
• 27T Gear	I.D.	25.020 to 25.041 mm 0.98504 to 0.98587 in.	–
Counter Shaft B to 32T Gear	Clearance	0.040 to 0.082 mm 0.00157 to 0.00323 in.	0.1 mm 0.004 in.
• Counter Shaft **B**	O.D.	28.459 to 28.480 mm 1.12043 to 1.12126 in.	–
• 32T Gear	I.D.	28.520 to 28.541 mm 1.12283 to 1.12366 in.	–
18T Gear Shaft to Bushing	Clearance	0.000 to 0.062 mm 0.000 to 0.00244 in.	0.1 mm 0.004 in.
• 18T Gear Shaft	O.D.	17.989 to 18.000 mm 0.70823 to 0.70866 in.	–
• Bushing	I.D.	18.000 to 18.051 mm 0.70866 to 0.71067 in.	–

HYDRAULIC PTO CLUTCH AND GEARS

Item		Factory Specification	Allowable Limit
Clutch Disc	Thickness	1.70 to 1.90 mm 0.067 to 0.075 in.	1.55 mm 0.061 in.
Steel Plate	Thickness (Without Hole)	0.95 to 1.05 mm 0.0374 to 0.0413 in.	0.8 mm 0.031 in.
	Thickness (With Hole)	1.15 to 1.25 mm 0.045 to 0.049 in.	1.10 mm 0.043 in.
Pressure Plate	Thickness	1.95 to 2.05 mm 0.0768 to 0.0807 in.	1.8 mm 0.071 in.
Piston Return Spring	Free Length	44.0 mm 1.73 in.	–
	Load / Length	638.7 N / 26 mm 65.13 kgf / 26 mm 143.6 lbf / 1.02 in.	539.4 N / 26 mm 55 kgf / 26 mm 121.3 lbf / 1.02 in.
Counter Shaft to 21T Gear	Clearance	0.009 to 0.040 mm 0.0004 to 0.0016 in.	0.1 mm 0.0039 in.
• Counter Shaft	O.D.	29.991 to 30.000 mm 1.1807 to 1.1811 in.	–
• 21T Gear	I.D.	35.009 to 35.025 mm 1.3783 to 1.3789 in.	–
• Needle Bearing	O.D.	2.497 to 2.500 mm 0.0983 to 0.0984 in.	–

TRANSMISSION CASE

Item		Factory Specification	Allowable Limit
Shift Fork to Shifter Groove	Clearance	0.1 to 0.4 mm 0.0039 to 0.0157 in.	0.8 mm 0.031 in.
Hypoid pinion Shaft to 29T Gear	Clearance	0.020 to 0.051 mm 0.0008 to 0.0020 in.	0.1 mm 0.0039 in.
• 29T Gear	I.D.	25.000 to 25.018 mm 0.9843 to 0.9850 in.	–
• Hypoid Pinion Shaft	O.D.	24.967 to 24.980 mm 0.9830 to 0.9835 in.	–
Hypoid pinion Shaft to 13T Gear	Clearance	0.020 to 0.051 mm 0.0008 to 0.0020 in.	0.1 mm 0.0039 in.
• 13T Gear	I.D.	30.000 to 30.018 mm 1.1811 to 1.1818 in.	–
• Hypoid Pinion Shaft	O.D.	29.967 to 29.980 mm 1.1798 to 1.1803 in.	–
Differential Pinion to Differential Side Gear	Backlash	0.10 to 0.30 mm 0.0039 to 0.0118 in.	0.5 mm 0.020 in.

Item		Factory Specification	Allowable Limit
Differential case to Differential Side Gear	Clearance	0.05 to 0.10 mm 0.0020 to 0.0039 in.	0.4 mm 0.016 in.
• Differential Case Ring Gear	I.D.	32.000 to 32.025 mm 1.25984 to 1.26083 in.	–
• Differential Side Gear Boss	O.D.	31.925 to 31.950 mm 1.25689 to 1.25787 in.	–
Differential Pinion to Differential Pinion Shaft	Clearance	0.048 to 0.084 mm 0.00189 to 0.00331 in.	0.2 mm 0.008 in.
• Differential Pinion	I.D.	18.032 to 18.050 mm 0.70992 to 0.71063 in.	–
• Differential Pinion Shaft	O.D.	17.966 to 17.984 mm 0.70732 to 0.70803 in.	–
Hypoid pinion	Motive Force	10.8 to 16.7 N 1.1 to 1.7 kgf 2.43 to 3.75 lbf	–
	Motive Torque	0.520 to 0.559 N·m 0.053 to 0.057 kgf·m 0.383 to 0.412 lbf·ft	–
Hypoid pinion to Hypoid Ring Gear	Backlash	0.1 to 0.3 mm 0.004 to 0.01 in.	–
	Tooth Contact	–	More than 25 %
	Center of Tooth Contact	–	3/10 to 4/10 of the entire width from the small end
Mid PTO Drive Shaft to 15T Gear	Clearance	0.040 to 0.074 mm 0.0016 to 0.0029 in.	0.1 mm 0.0039 in.
• 15T Gear	I.D.	22.520 to 22.541 mm 0.8866 to 0.8874 in.	–
• Mid PTO Drive Shaft	O.D.	22.467 to 22.480 mm 0.8845 to 0.8850 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-10.)

Item	N·m	kgf·m	lbf·ft
Brake link retaining nut	7.8 to 9.3	0.8 to 0.95	5.8 to 6.9
Steering wheel mounting nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Delivery hose R.H. retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Delivery hose L.H. retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Return hose retaining nut	34.3 to 44.1	3.5 to 4.5	25.3 to 32.5
Delivery hose joint screw	45.1 to 53.0	4.60 to 5.40	33.3 to 39.0
Bi-speed delivery pipe joint (pump side)	34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Bi-speed delivery pipe retaining nut (valve side) for ROPS	29 to 49	3.0 to 5.0	21.7 to 36.2
Rear wheel mounting screw and nut	196.1 to 225.6	20.0 to 23.0	145 to 166
ROPS mounting bolt and nut	167 to 197	17.0 to 20.0	123 to 144
Fender mounting screw	197 to 225	20.0 to 23.0	145 to 166 psi
Hydraulic hoses **PB**, **P** and **T** retaining nuts for ROPS	30 to 40	3.0 to 4.0	21.7 to 28.9
Bi-speed delivery pipe retaining nut (valve side) for ROPS	30 to 49	30 to 5.0	21.7 to 36.2
Engine mounting screw and nut (M10) for ROPS	48.1 to 55.9	4.9 to 5.7	35.5 to 41.2
Engine mounting nut (M12)	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5
Rear cross bar mounting screw	103 to 117	10.5 to 12.0	76.0 to 86.7
Rubber mount screw	196.0 to 225.0	20.0 to 23.0	144.7 to 166.4
Rear frame mounting screw (M12)	63 to 72	6.4 to 7.4	47 to 53
Hydraulic hose **PB**, **P** and **T** retaining nuts for CABIN	30 to 40	3.1 to 4.0	23 to 29
Outer roof mounting screw	3.5 to 4.0	0.36 to 0.40	2.6 to 2.9
Cabin mounting bolt and nut	124 to 147	12.6 to 15.0	91.1 to 108
Muffler mounting screw	32 to 37	3.2 to 3.8	24 to 27
Bi-speed delivery pipe joint screw (Pump side)	34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Bi-speed delivery pipe retaining nut (Bi-speed valve side)	29 to 49	3.0 to 5.0	21.7 to 36.2
Engine mounting screw, bolt and nut (M10)	48.1 to 55.9	4.9 to 5.7	35.5 to 41.2
Engine mounting nut (M12)	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5
Filter bracket mounting screw	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5
Charge hose retaining nut (Controller side)	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
3P delivery pipe retaining nut	88.2 to 117.6	9.0 to 12.0	65.1 to 86.8
Clutch housing mounting screw and nut	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
HST mounting screw and nut	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Mid case mounting screw and nut	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Top link bracket mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Hydraulic cylinder mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Lever stay mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Brake stay mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Brake case mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5

Item	N·m	kgf·m	lbf·ft
Clutch piston mounting nuts	12 to 14	1.2 to 1.5	8.7 to 10
Check and high-pressure relief valve plug	58.8 to 68.6	6.0 to 7.0	43.4 to 50.6
Port block mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Rear PTO case mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Mid PTO case mounting screw	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
Detent plug	19.6 to 24.5	2.0 to 2.5	14.5 to 18.1
Hypoid ring gear mounting UBS screws	60.8 to 70.6	6.2 to 7.2	44.8 to 52.1

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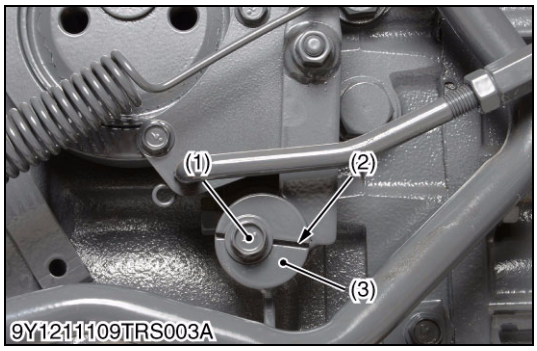
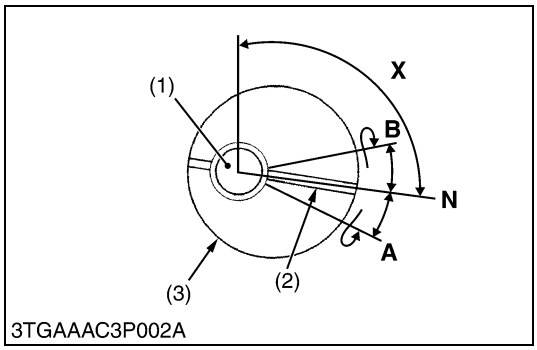
4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING





Adjusting Neutral

1. Disengage the front wheel drive lever. (Drive only rear wheels.)
2. Set the range gear shift lever at 3rd speed position.
3. Lift the rear of the tractor so that the rear wheels are off the ground and operate the engine at low idling and drive only rear wheels.
4. Slightly loosen the holder shaft mounting screw (1).
5. Rotate the holder shaft (4) clockwise with a screw-driver, so that the rear wheels turn reverse.
6. Then rotate it counterclockwise until wheels stop completely.
7. Put a mark aligning the groove (2) on neutral holder (Position **"A"**).
8. Rotate the holder shaft (4) counterclockwise so that the rear wheels turn forward.
9. Then rotate it clockwise until wheels stop completely.
10. Put mark aligning the groove (2) on neutral holder (Position **"B"**).
11. Set the holder shaft (4), where it is in the center between the position **"A"** and **"B"**, and tighten the holder shaft mounting screw firmly (Position **"N"**).

■ **NOTE**

- **Operate the engine at maximum speed when checking, and operate the engine at low idling speed when adjusting.**
- **When the wheels tend to turn forward, rotate neutral holder clockwise.**
- **When the wheels tend turn reverse, rotate neutral holder counterclockwise.**

Groove angle in neutral **"X"**	Reference value	Approx. 1.80 rad 103 °

(1) Holder Shift Mounting Screw
(2) Groove
(3) Neutral Holder
(4) Holder Shaft

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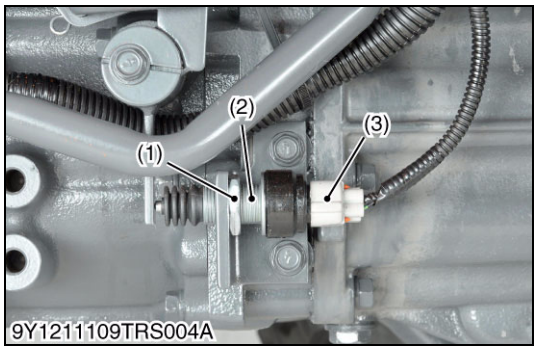

HST Safety Switch

1. After adjusting the HST neutral position, be sure to adjust the HST safety switch (2).
2. Set the HST at neutral position.
3. Disconnect the connector (3) and remove the HST safety switch (2) once.
4. Connect the leads of an ohmmeter to the HST safety switch lead terminal.
5. Screw in the HST safety switch (2) until the ohmmeter begins to show 0 ohm.
6. Further screw in the HST safety switch 1/2 turn, and tighten the lock nut (1).

■ **IMPORTANT**

- **Be sure to check, the ohmmeter indicates infinity when the speed control pedal is depressed for both forward and reverse.**

(1) Lock Nut
(2) HST Safety Switch
(3) Connector

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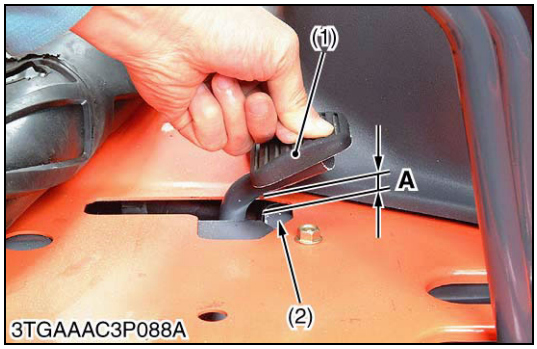

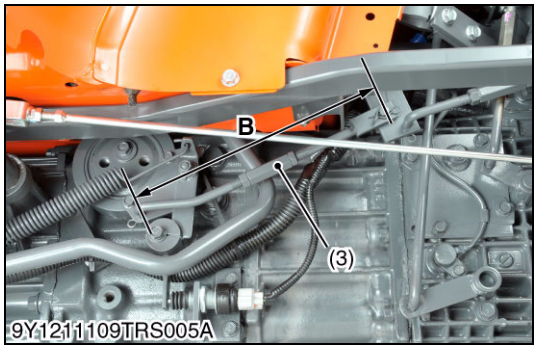

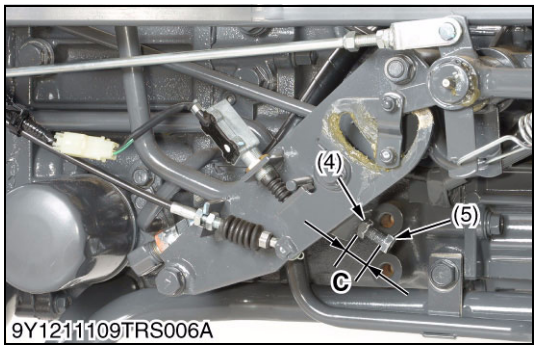

Adjusting Maximum Traveling Speed

■ **NOTE**
- **Do this adjustment after the HST neutral adjustment.**

(Forward)
1. Fully press down the speed control pedal (forward) (1), and measure the clearance **"A"** between the pedal (1) and the frame (2).
2. If the measurement is not within the factory specifications, change the length **"B"** of the HST link rod (3) to adjust.

Clearance **"A"**	Factory specification	5 to 10 mm 0.20 to 0.39 in.
Length **"B"** of HST link rod	Reference value [ROPS]	263 mm 10.4 in.
	Reference value [CABIN]	260 mm 10.2 in.

(Reverse)
3. Put the tractor on a flat ground made of concrete.
4. Set the range gear shift lever at 3rd speed position and operate the engine at maximum speed.
5. Measure the maximum traveling speed (reverse).
6. If the measurement is not within the factory specifications, change the length **"C"** of the adjusting screw (5).

Maximum traveling speed (reverse)	Factory specification	70 to 80 % of forward speed
Length **"C"** of adjusting screw	Reference value	20 mm 0.79 in.

■ **NOTE**
- **Install the standard turf tires or farm tires.**

(1) Speed Control Pedal (Forward)
(2) Frame
(3) HST Link Rod
(4) Lock Nut
(5) Adjusting Screw

A: Clearance
B: Length
C: Length

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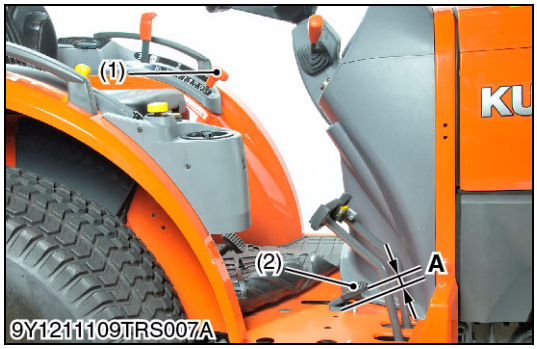

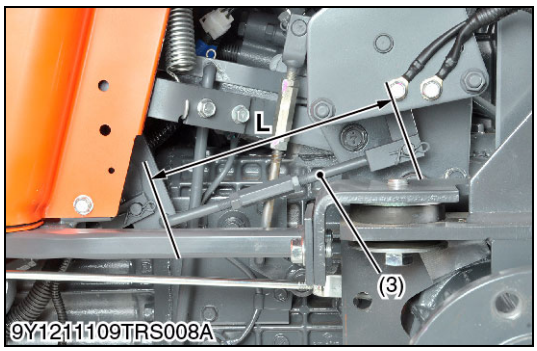

Cruise Control Linkage

■ **NOTE**
- **Do this adjustment after the adjustment of maximum traveling speed.**

1. Engage the cruise control lever (1) to the most forward position, and measure the clearance **"A"** between the pedal (2) and the frame.
2. If the measurement is not within the factory specifications, change the length **"L"** of the cruise control rod (3) to adjust.

Clearance **"A"**	Factory specification	5 to 10 mm 0.20 to 0.39 in.
Length **"L"**	Reference value	216 mm 8.50 in.

(1) Cruise Control Lever
(2) Speed Control Pedal (Forward)
(3) Cruise Control Rod

A: Clearance
L: Length

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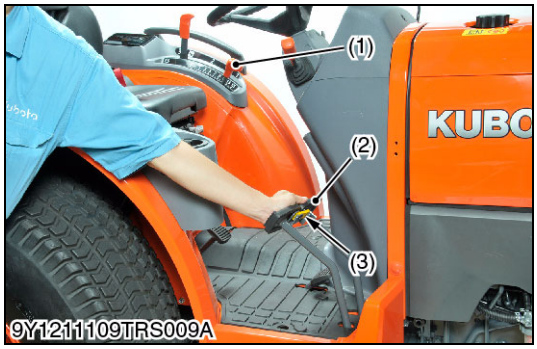

Operation Check of Cruise Control Automatic Release

1. Engage the cruise control lever (1) and make sure the following operations.
2. The cruise control lever (1) should return to the home position, when right and left brake pedals are pressed at the same time.
3. The cruise control lever (1) must not return when only one of brake pedals is pressed.
4. When not operating like the above-mentioned, do the following checks "**1)** Lever Setting Position", "**2)** Release Wire" and "**3)** Brake Link".

(1) Cruise Control Lever
(2) Brake Pedal
(3) Pedal Lock

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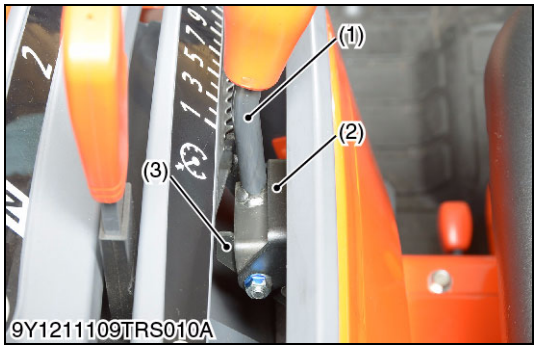
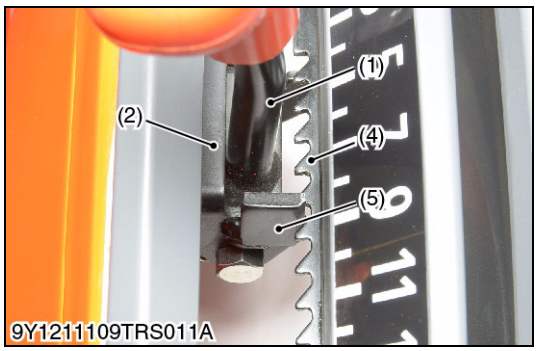
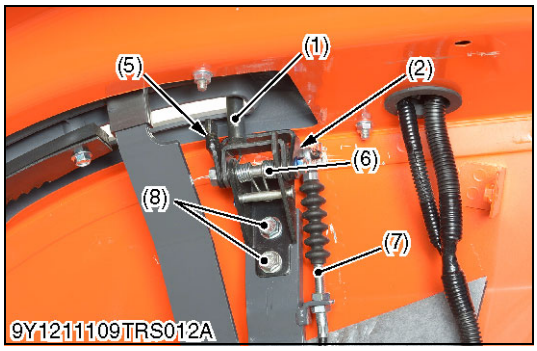


1) Lever Setting Position (Cruise Control)

1. Engage the cruise control lever (1).
2. Make sure the release lever (2) touches the cruise control lever (1) by the spring (6), and the cruise control lever (1) touches the stopper (3).
3. When not becoming like the above mentioned, check the release wire (7) and damage of the spring (6). (See 3-S14 "Release Wire".)
4. Check the clearance **"A"** between the claw (5) and lever guide (4).
5. Check the projection height **"H"** of the claw (5) from the lever guide (4).
6. If the clearance A is not within the factory specifications, remove the left rear wheel and the fender cover, and adjust it with the shim (7).
7. If the projection height **"H"** is not within the factory specifications, loosen the screws (8) and move the cruise lever assembly.



Clearance **"A"** between the claw and lever guide	Factory specification	0 to 1 mm 0 to 0.039 in.
Projection height **"H"** from the lever guide	Factory specification	More than 2 mm 0.079 in.



(1) Cruise Control Lever
(2) Release Lever
(3) Stopper
(4) Lever Guide
(5) Claw
(6) Spring
(7) Release Wire
(8) Screw

A: Clearance between the claw and lever guide
H: Projection height from the lever guide

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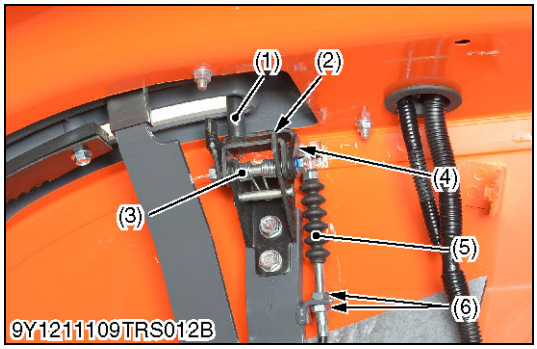

2) Release Wire (Cruise Control)

1. Remove the left rear wheel and the fender cover.
2. Engage the cruise control lever (1).
3. Check the inner wire in the release wire (5) does not slacken.
4. Check the release lever (4) touches the cruise control lever (1) by the spring (3), and the cruise control lever (1) touches the stopper (2).
5. When not becoming like the above-mentioned, adjust with the adjusting nut (6).

(Reference)

- If the inner wire is too tight, the cruise control lever (1) does not touch the stopper (2).

(1) Cruise Control Lever
(2) Stopper
(3) Spring
(4) Release Lever
(5) Release Wire
(6) Adjusting Nut

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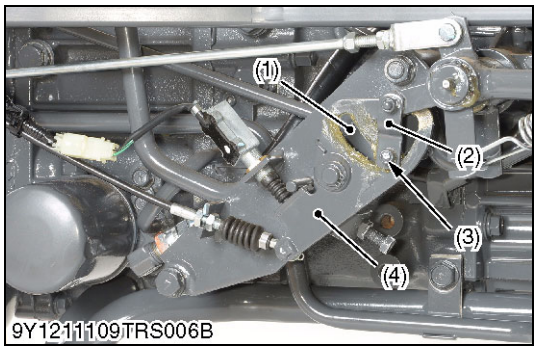

3) Brake Link (Cruise Control)

1. Check the following operation of the brake link (2) by operating the brake pedals.
2. The joint bolt (3) should move along the ditch and the lever (4) must not rotate when one of brake pedals is pressed.
3. The joint bolt (3) must not move and the lever (4) should rotate when right and left brake pedals are pressed at the same time.
4. If the operation is not normal, remove the brake link (2) and check the damage and distortion of the link (2) and ditch (1).

Tightening torque	Brake link retaining nut	7.8 to 9.3 N·m 0.8 to 0.95 kgf·m 5.8 to 6.9 lbf·ft

■ **NOTE**

- **When reassembling the link, apply grease to the moving portion.**

(1) Ditch
(2) Brake Link
(3) Joint Bolt
(4) Lever

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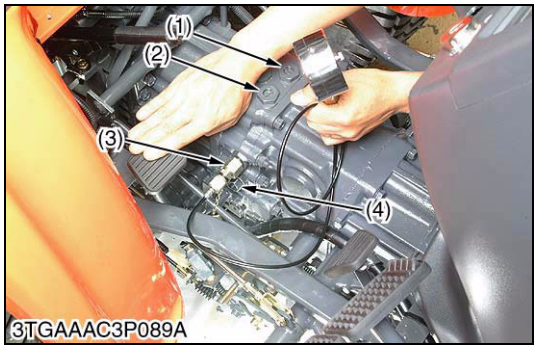

Checking High-pressure Relief Valve

1. Start the engine to warm up the transmission oil until to reach 50 °C (122 °F).
2. Remove the seat under cover and the step.
3. Install adaptor **C** (Code No.: 07916-50371) (3) and pressure gauge (49.0 MPa, 500 kgf/cm^2, 7110 psi) after removing forward or reverse high-pressure checking port plugs.
4. Depress the brake pedals and set the engine rpm with 1500 min^{-1} (rpm).
5. Shift the auxiliary shift lever to **"3"**.
6. Depress the HST pedal to forward or reverse until relief valve functioning. Then measure the pressure for each one.If the measurement is not within the factory specification, check the check and high-pressure relief valve, neutral valve and HST.

■ **NOTE**

- **High-pressure checking port and high-pressure relief plug for forward are on the left side of the HST.**

High pressure relief valve pressure	Factory specification	26.4 to 29.4 MPa 270 to 300 kgf/cm^2 3840.2 to 4266.9 psi

Condition

- Engine speed:
  1500 min^{-1} (rpm)
- Oil temperature:
  40 to 60 °C (104 to 140 °F)

(1) Neutral Valve (Forward)
(2) Neutral Valve (Reverse)
(3) Adaptor **C**
(4) High-pressure Relief Valve (Reverse)

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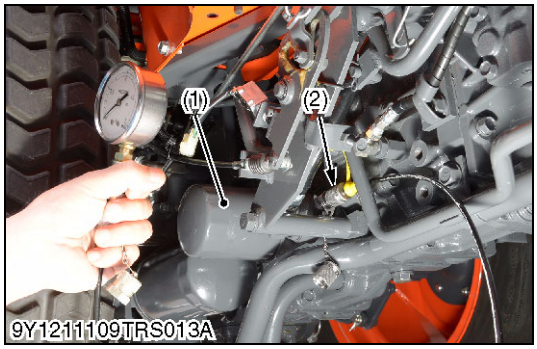


Checking Charge Relief Valve

1. Start the engine to warm up the transmission oil until to reach 40 °C (104 °F)
2. Remove the plug from the oil filter bracket.
3. Connect the adaptor **58** (2) and pressure gauge.
4. Measure the pressure with speed control pedal to be neutral at engine 1500 min^{-1} (rpm). If the measurement is not within factory specification, check charge relief valve.

Charge relief pressure	Factory specification	0.4 to 0.8 MPa 4 to 8 kgf/cm^2 56.9 to 113.8 psi

Condition

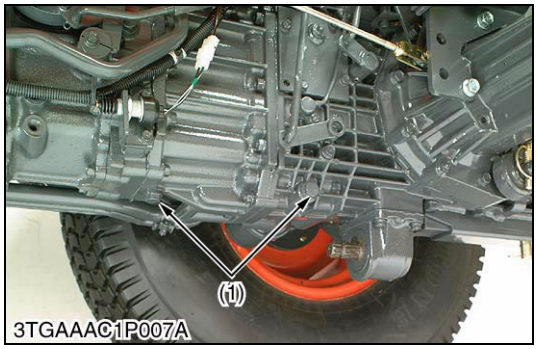
- Engine speed:
  1500 min^{-1} (rpm)
- Oil temperature:
  40 to 60 °C (104 to 140 °F)

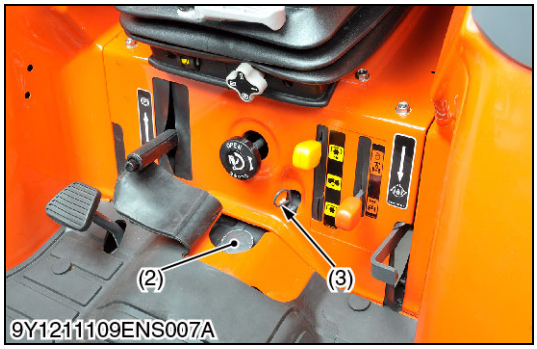
(1) HST Oil Filter Cartridge
(2) Adaptor **58**

9Y1211109TRS0015US0

[2] PREPARATION

(1) Separating Engine and Clutch Housing for ROPS





Draining Transmission Fluid

1. Place an oil pan underneath the transmission case, and remove the drain plugs (1).
2. Drain the transmission fluid.
3. Reinstall the drain plugs (1).

(When reassembling)

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

■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8**
- **Never work the tractor immediately after changing the transmission oil. Keeping the engine at medium speed for a few minutes to prevents damage to the transmission.**
- **Do not mix different brands oil together.**

Transmission fluid	Capacity	24 L 6.3 U.S.gals 5.3 Imp.gals

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

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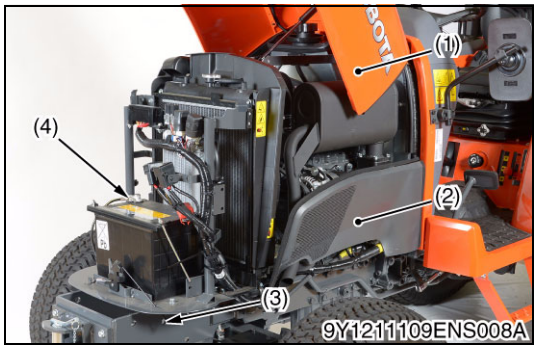

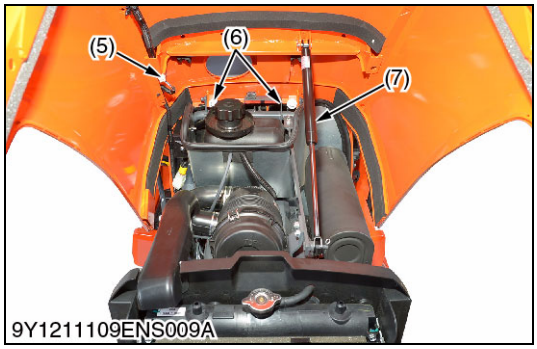

Hood, Side Cover and Battery Cord

1. To open the hood (1), hold the hood (1) and pull the release lever (3) and open the hood (1).
2. Remove the bolt from each of the side covers and remove the side covers (2).
3. Disconnect the battery negative cable (4).
4. Disconnect the head light connector (5) and damper (7).
5. Remove the two screws (6), and then remove the hood (1).

(When reassembling)

■ **NOTE**

- **When disconnecting the battery cords, disconnect the grounding cord first. When connecting, positive cord first.**

(1) Hood
(2) Side Cover
(3) Release Lever
(4) Battery Negative Cable
(5) Head Light Connector
(6) Screw
(7) Damper

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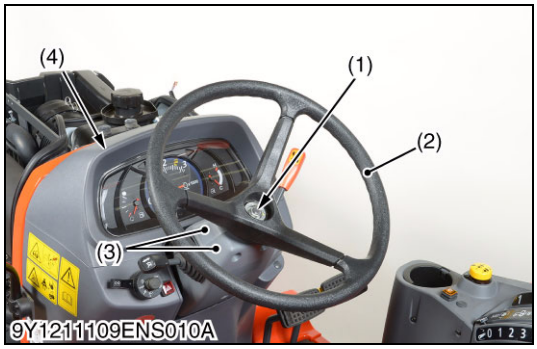

Steering Wheel and Panel Under Cover

1. Remove the covers (3).
2. Remove the steering wheel cap.
3. Remove the steering wheel mounting nut (1) and remove the steering wheel (2) with a steering wheel puller (Code No. 07916-51090).
4. Remove the panel cover (4).

(When reassembling)

Tightening torque	Steering wheel mounting nut	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 lbf·ft

(1) Nut
(2) Steering Wheel
(3) Cover
(4) Panel Cover

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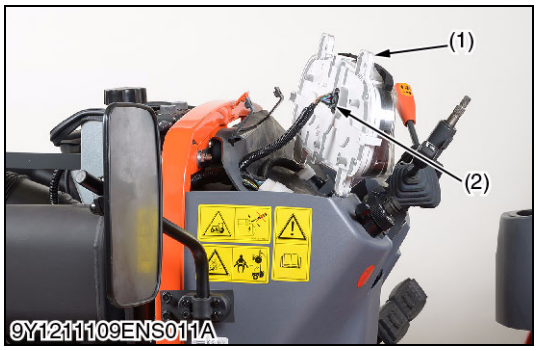

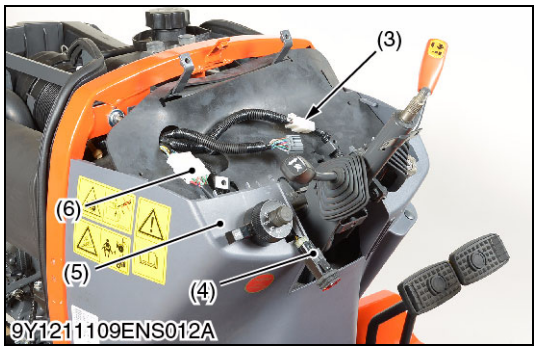

Instrument Panel

1. Remove the instrument panel mounting screws and disconnect the instrument panel connector (2). Then remove the instrument panel (1).
2. Disconnect the combination switch connector (6), main switch connector (3) and hazard switch connector (4).
3. Remove the under cover (5).

(1) Instrument Panel
(2) Instrument Panel Connector
(3) Main Switch Connector
(4) Hazard Switch Connector
(5) Under Cover
(6) Combination Switch Connector

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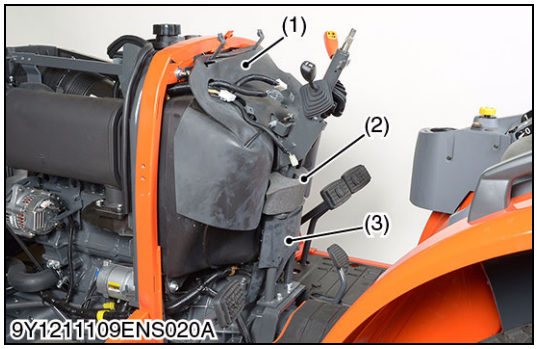

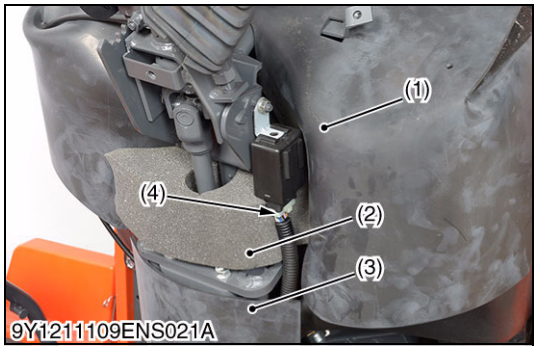

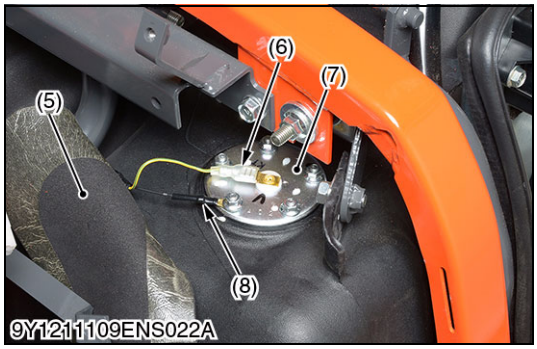

Rubber and Wiring Harness

1. Remove the fuel tank cover (1)
2. Disconnect the OPC controller connector (4).
3. Remove the steering controller cover (3).
4. Remove the sponge (2).
5. Turn over the fuel sensor cover (5), and disconnect the grounding wire (8) and **1P** connector (6) from the fuel level sensor (7).

(1) Fuel Tank Cover
(2) Sponge
(3) Steering Controller Cover
(4) OPC Controller Connector
(5) Fuel Sensor Cover
(6) **1P** Connector
(7) Fuel Sensor
(8) Grounding Wire

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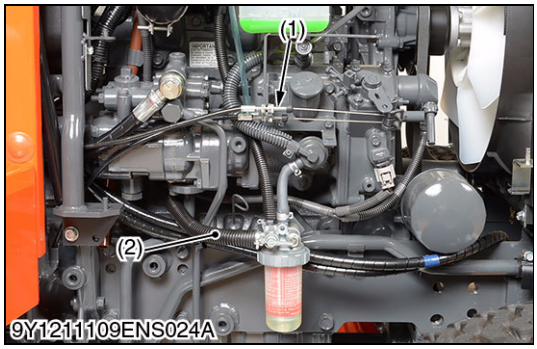

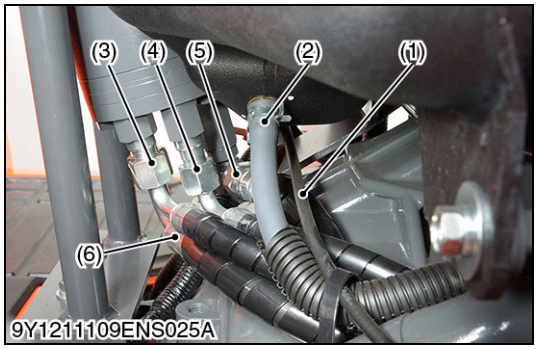

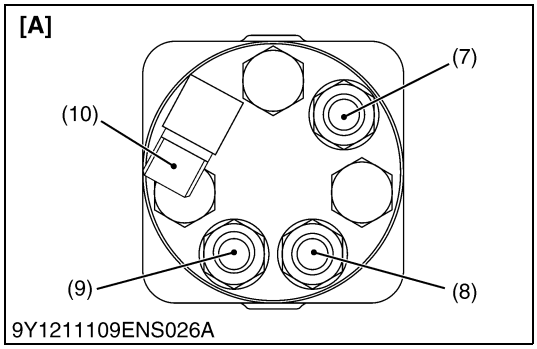

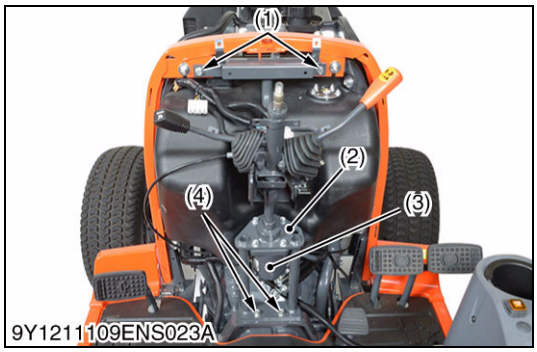

Power Steering Hoses and Accelerator Wire (Right Side)

1. Disconnect the accelerator wire (1) from the engine.
2. Disconnect the fuel hose (2).
3. Disconnect the delivery hose L.H. (3) and delivery hose R.H. (4) from the steering controller.
4. Disconnect the power steering delivery hose (6) from the steering controller.
5. Disconnect the power steering return hose (5) from the steering controller.

(When reassembling)

- Be sure to connect the each hose to original position.
- Be sure to check the hose joints do not interfere in other joints.

Tightening torque	Delivery hose R.H. (4) retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft
	Delivery hose L.H. (3) retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft
	Return hose retaining nut	34.3 to 44.1 N·m 3.5 to 4.5 kgf·m 25.3 to 32.5 lbf·ft
	Delivery hose joint screw	45.1 to 53.0 N·m 4.60 to 5.40 kgf·m 33.3 to 39.0 lbf·ft

(1) Accelerator Wire
(2) Fuel Hose
(3) Delivery Hose L.H.
(4) Delivery Hose R.H.
(5) Power Steering Return Hose
(6) Power Steering Delivery Hose
(7) **P** Port
(8) **LT** Port
(9) **RT** Port
(10) **T** Port

[A] Viewed from Bottom Side

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Steering Support

1. Remove the screws (1).
2. Remove the screws (4).
3. Remove the steering support (2) with steering controller (3).

(1) Screw
(2) Steering Support
(3) Steering Controller
(4) Screw

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Panel Under Frame

1. Remove the foot covers (1).
2. Remove the screws (2) and nuts (4), and pull up the panel under frame (3).

(1) Foot Cover
(2) Screw
(3) Panel Under Frame
(4) Nut

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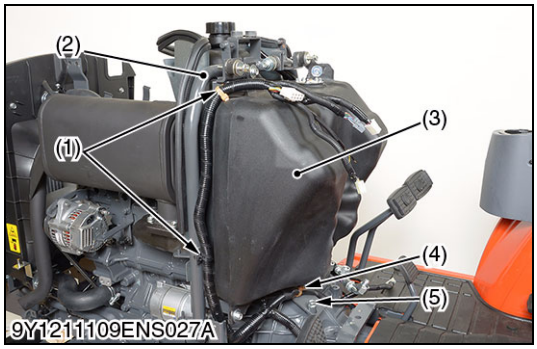

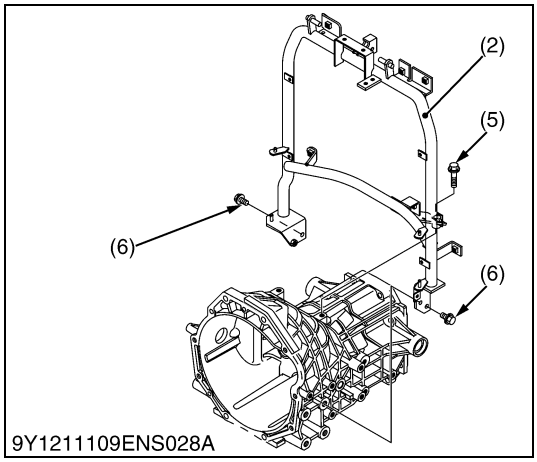

Fuel Tank

1. Pull out the clamps (1), (4).
2. Disconnect the overflow hoses from fuel tank (3).
3. Remove the screws (5), (6) and then remove the fuel tank (3) with pillar (2).

(1) Clamp
(2) Pillar
(3) Fuel Tank
(4) Clamp
(5) Screw
(6) Screw

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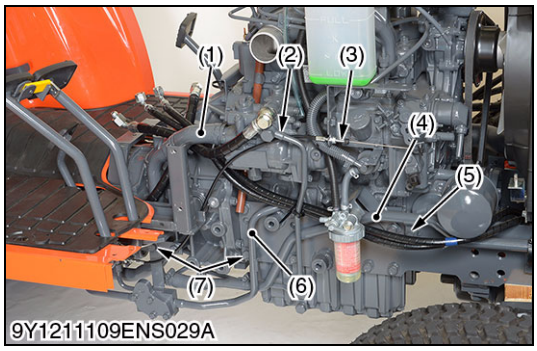

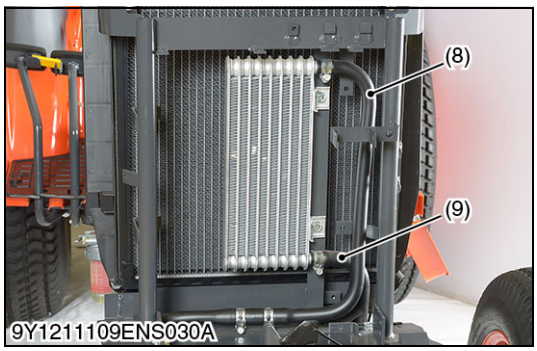

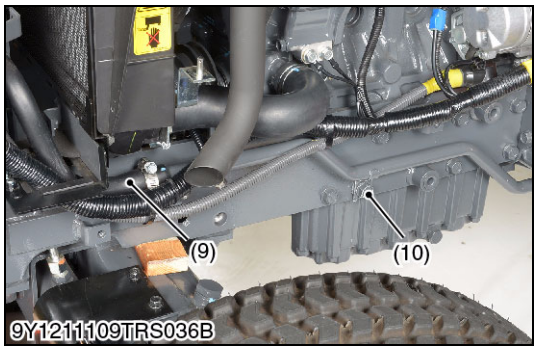

Hydraulic Pipe and Hose

1. Disconnect the accelerator wire (3) from the engine.
2. Remove the retaining screws (7) and separate the **3P** hydraulic delivery pipe (6) from the hydraulic pump.
3. Disconnect the bi-speed delivery pipe (2) from the hydraulic pump.
4. Disconnect the oil cooler inlet hose (9) and outlet hose (8).
5. Remove the retaining screws (5), (10) and then disconnect the oil cooler pipe (4).
6. Disconnect the suction hose (1).

Tightening torque	Bi-speed delivery pipe joint screw (Pump side)	30 to 40 N·m 3.1 to 4.0 kgf·m 23 to 29 lbf·ft
	Bi-speed delivery pipe retaining nut (Bi-speed valve side)	29 to 49 N·m 3.0 to 5.0 kgf·m 21.7 to 36.2 lbf·ft

(1) Suction Hose
(2) Bi-speed Delivery Pipe
(3) Accelerator Wire
(4) Oil Cooler Pipe
(5) Retaining Screw
(6) **3P** Hydraulic Delivery Pipe
(7) Retaining Screw
(8) Oil Cooler Outlet Hose
(9) Oil Cooler Inlet Hose
(10) Retaining Screw

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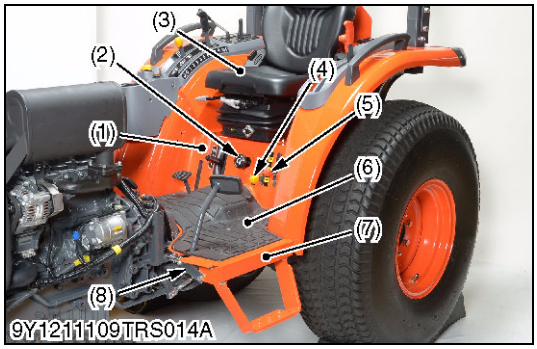

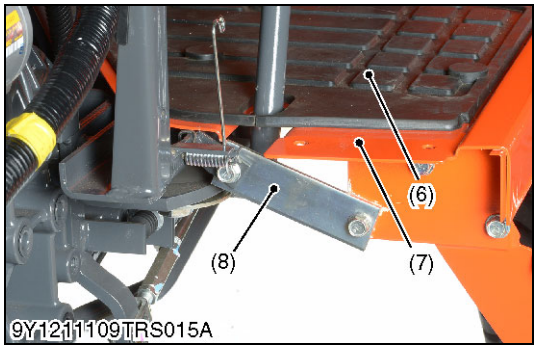

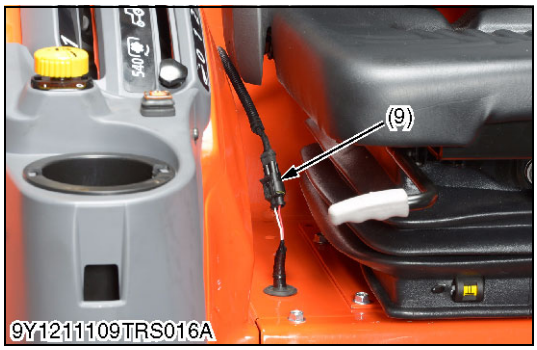

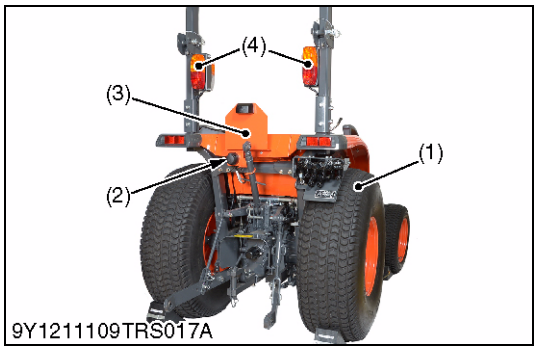

Seat, Seat Under Cover and Step

1. Disconnect the seat switch connector (9) and then remove the seat (3).
2. Remove the step mat (6).
3. Remove the grips of the mid PTO lever (4) and front wheel drive lever (5).
4. Remove the lowering speed adjusting knob (2).
5. Remove the seat under cover (1).
6. Remove the stay (8).
7. Remove the step (7).

(When reassembling)

- Do not confuse the grips.
  - Grip (yellow) for the mid PTO lever.
  - Grip (red) for the front wheel drive lever.

(1) Seat Under Cover
(2) Lowering Speed Adjusting Knob
(3) Seat
(4) Mid PTO Lever
(5) Front Wheel Driver Lever
(6) Step Mat
(7) Step
(8) Stay
(9) Seat Switch Connector

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Rear Wheel

1. Place the disassembling stand under the rear axles.
2. Remove the rear wheels (1).
3. Remove the Registration plate (3) with trailer electrical outlet (2).
4. Remove the combination lights (4)

Tightening torque	Rear wheel mounting screw and nut	196.1 to 225.6 N·m 20.0 to 23.0 kgf·m 145 to 166 lbf·ft

(1) Rear Wheel
(2) Trailer Electrical Outlet
(3) Registration Plate
(4) Combination Light

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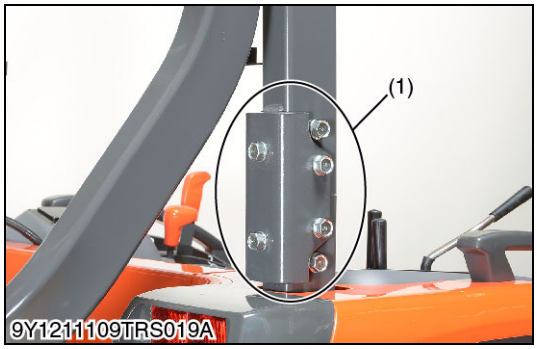

ROPS

1. Fold the ROPS and support it with the lift strap.
2. Remove the ROPS mounting bolts (1).
3. Pull out the ROPS.

Tightening torque	ROPS mounting bolt	167 to 197 N·m 17.0 to 20.0 kgf·m 123 to 144 lbf·ft

(1) ROPS Mounting Bolt

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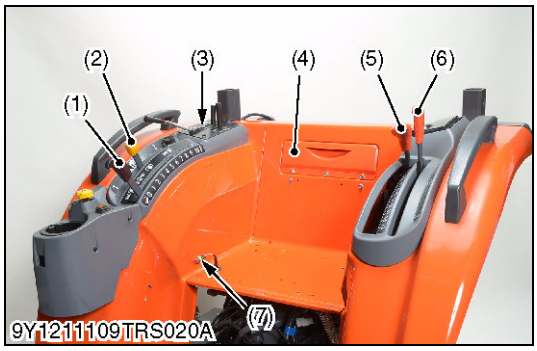

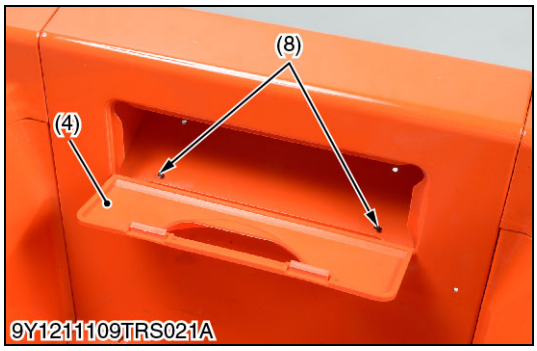

Lever Grip and Wiring Harness

1. Remove the grips of the rear PTO shift lever (2), position control lever (1), cruise control lever (5) and range gear shift lever (6).
2. Remove the remote control valve lever guide (3)
3. Pull out the seat switch connector (7).
4. Open the tool box (4).
5. Disconnect the clamps (8).

(When reassembling)

- Do not confuse the grips.
  - Grip (yellow) for the rear PTO shift lever (2).
  - Grip (red) for the range gear shift lever (6).

(1) Position Control Lever
(2) Rear PTO Shift Lever
(3) Remote Control Valve Lever Guide
(4) Tool Box
(5) Cruise Control Lever
(6) Range Gear Shift Lever
(7) Seat Switch Connector
(8) Clamp

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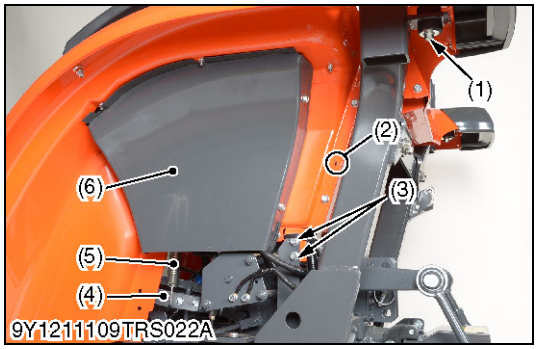

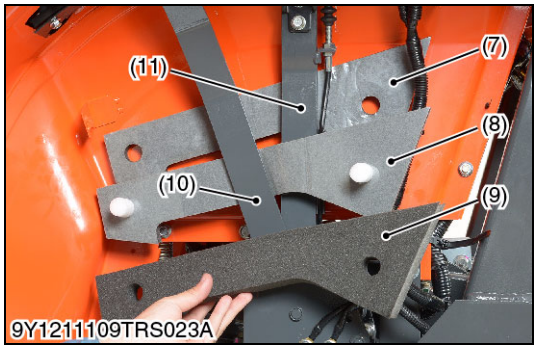

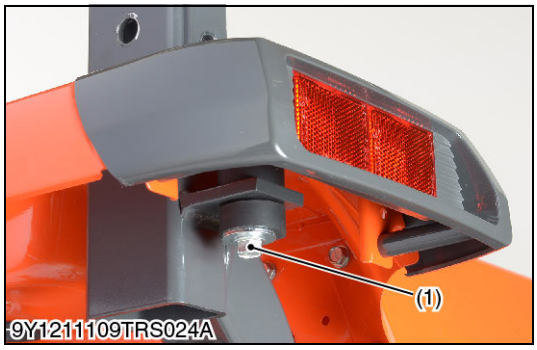

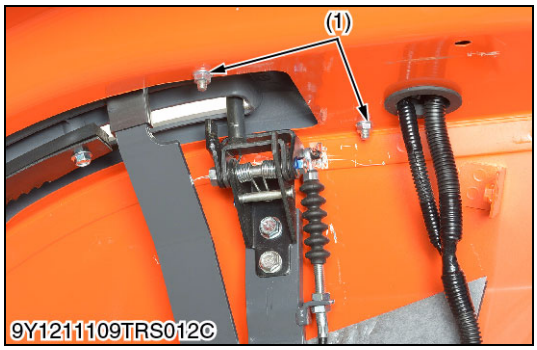

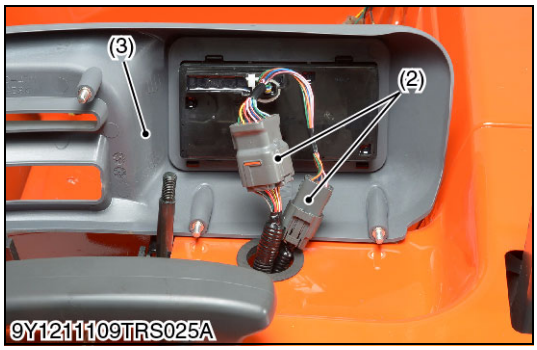

Fender (Left Side)

1. Remove the fender covers (6) and the sponges (8), (9).
2. Remove the differential lock pedal (4) with the spring (5).
3. Remove the screws (3).
4. Remove the fender mounting screw (1).
5. Disconnect the clamp (2).

(When reassembling)

- Assemble the sponge (center) (8) between the cruise control lever (11) and range gear shift lever (10).

Tightening torque	Fender mounting screw (1)	197 to 225 N·m 20.0 to 23.0 kgf·m 145 to 166 psi

(1) Fender Mounting Screw
(2) Clamp
(3) Screw
(4) Differential Lock Pedal
(5) Spring
(6) Fender Cover
(7) Sponge (Inner)
(8) Sponge (Center)
(9) Sponge (Outer)
(10) Range Gear Shift Lever
(11) Cruise Control Lever

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Lever Guide and Bi-speed Controller Connector

1. Remove the lever guide mounting screws (1).
2. Open the lever guide (3).
3. Disconnect the bi-speed controller connectors (2) and then remove the lever guide (3).

(1) Screw
(2) Bi-speed Controller Connector
(3) Lever Guide

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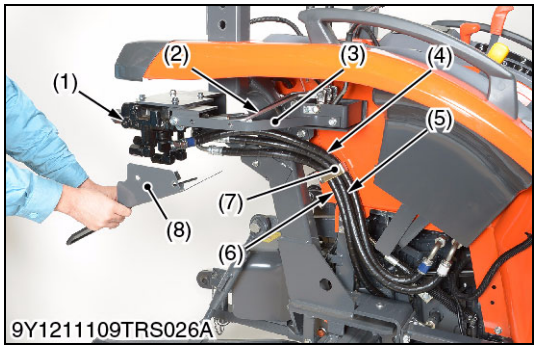
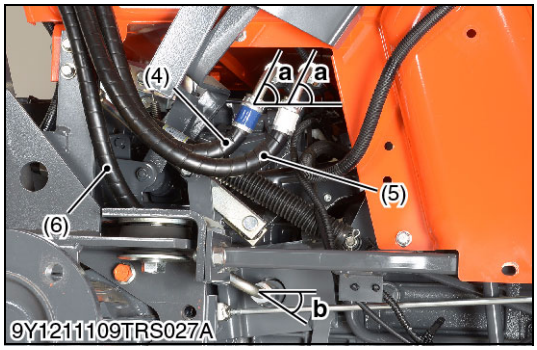
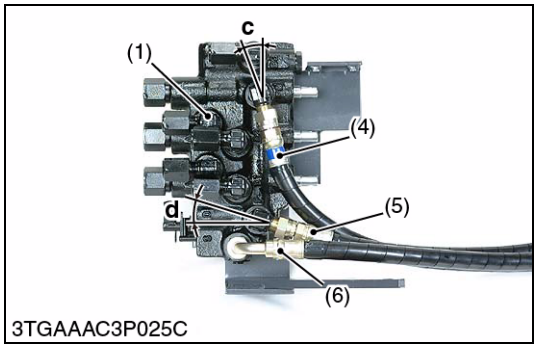
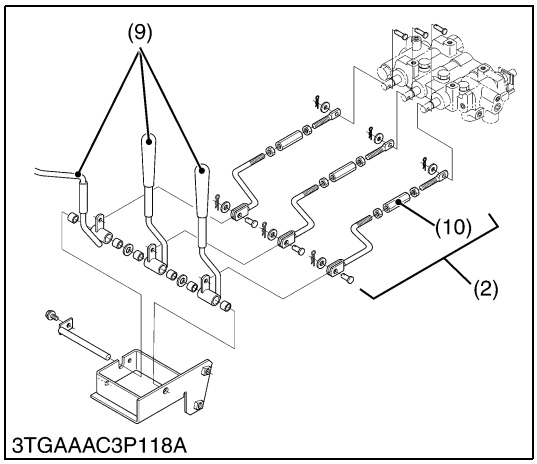








Auxiliary Control Valve

1. Remove the valve cover (8).
2. Remove the valve stay (3).
3. Remove the connecting rods (2).

(When reassembling)

- Reassemble the connecting rods (2) as shown in the figure.
- After reassembling the valve stay (3), adjust to locate the control lever (9) at a central position of the guide slot with the turnbuckle (10).

4. Remove the hose clamp (7).

(When reassembling)

- Clamp the hydraulic hoses in order of hydraulic hose **PB** (4), hydraulic hose **P** (5) and hydraulic hose **T** (6) from the front side.

5. Disconnect the hydraulic hoses (4), (5), (6) from the tractor body.
6. Remove the auxiliary control valve (1) with the hydraulic hoses (4), (5), (6).

(When reassembling)

- Assemble the hose joints to appropriate positions referring to the table below.

(Distinction and installation angle of the hose joints)

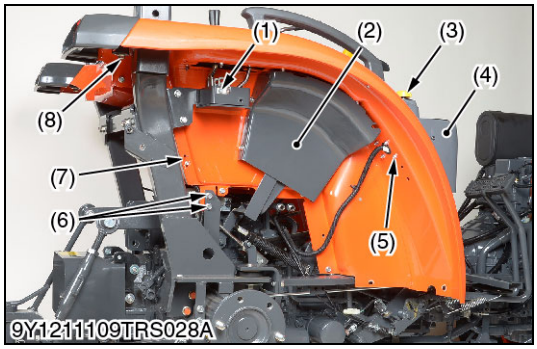
Hydraulic Hose	Hose joint (Valve side)	Hose joint (Tractor body side)
P (5)	Straight joint 0.26 rad (15 °)	Bent joint with white tape 0.785 rad (45 °)
PB (4)	Straight joint with blue tape 0.26 rad (15 °)	Bent joint with blue tape 0.785 rad (45 °)
T (6)	Bent joint 1.57 rad (90 °)	Bent joint 0.349 to 0.523 rad (20 ° to 30 °)

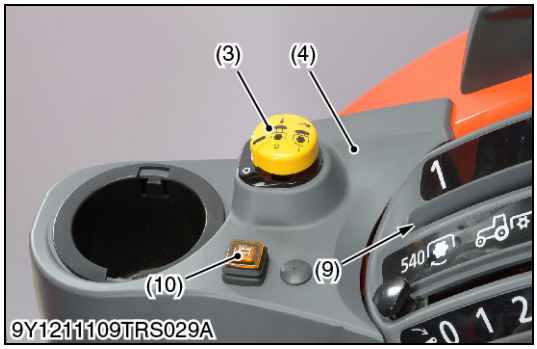
Tightening torque	Hydraulic hoses **PB**, **P** and **T** retaining nuts	30 to 40 N·m 3.0 to 4.0 kgf·m 21.7 to 28.9 lbf·ft

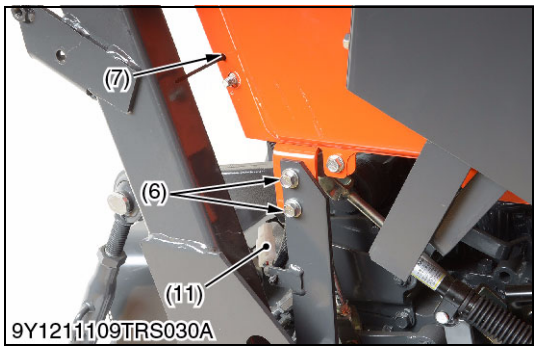
(1) Auxiliary Control Valve
(2) Connecting Rods
(3) Valve Stay
(4) Hydraulic Hose **PB**
(5) Hydraulic Hose **P**
(6) Hydraulic Hose **T**
(7) Hose Clamp
(8) Valve Cover
(9) Control Lever
(10) Turnbuckle

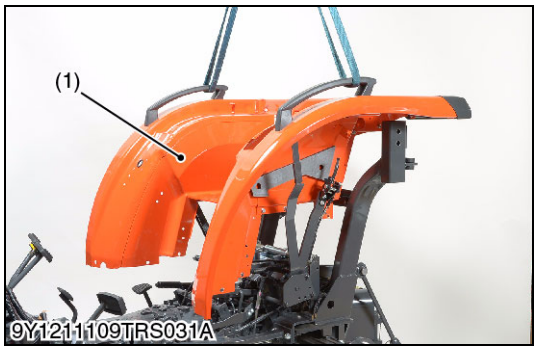
a: 0.785 rad (45 °)
b: 0.349 to 0.523 rad (20 ° to 30 °)
c: 0.26 rad (15 °)
d: 0.26 rad (15 °)
Pb: Power Beyond Port
P: Pump Port
T: Tank Port

9Y1211109TRS0022US0









Fender (Right Side)

1. Remove the fender cover (2).
2. Remove the loader lever guide mounting nuts (5) and then open the loader lever guide (4).
3. Disconnect the connectors for PTO switch (3) and beacon switch (9).
4. Disconnect the clamp (7).
5. Remove the remote control valve lever bracket (1) with the remote control valve lever.
6. Remove the lever guide (9).
7. Remove the screws (6).
8. Remove the fender mounting screw (8).
9. Disconnect the rear PTO switch connector (11).

(When reassembling)

Tightening torque	Fender mounting screw	197 to 225 N·m 20.0 to 23.0 kgf·m 145 to 166 psi

(1) Remote Control Valve Lever Bracket
(2) Fender Cover
(3) PTO Switch
(4) Loader Lever Guide
(5) Loader Lever Guide Mounting Nut
(6) Screw
(7) Clamp
(8) Screw
(9) Lever Guide
(10) Beacon Switch
(11) Rear PTO Switch Connector

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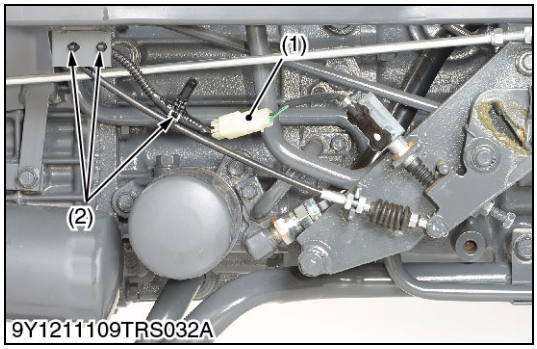
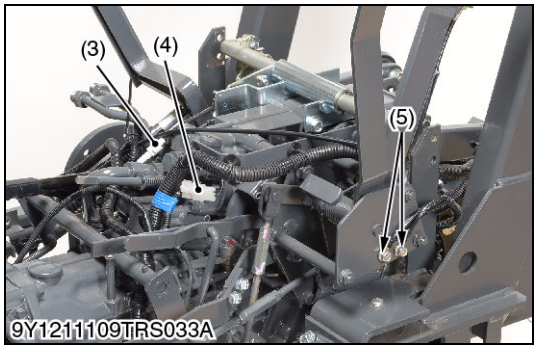
Fender Assembly

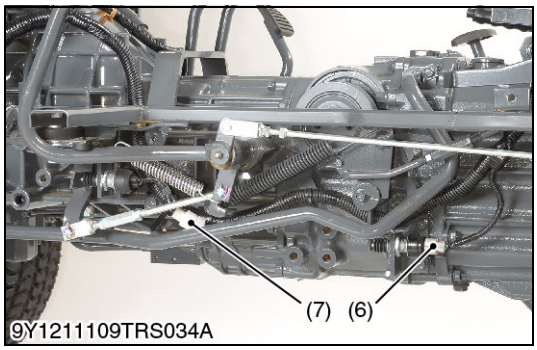
1. Dismount the fender assembly (1) after checking whether there is forgetting to disconnecting wiring.

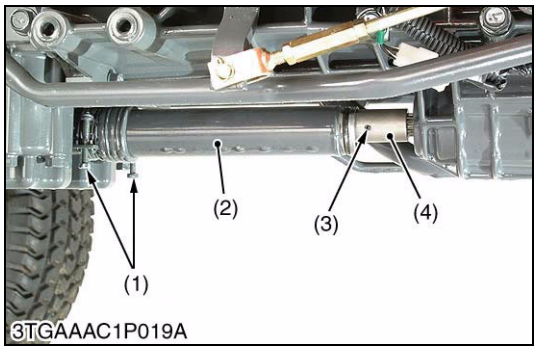
(1) Fender Assembly

9Y1211109TRS0024US0









Wiring Harness

1. Disconnect the brake light switch connector (1).
2. Remove the clamps (2).
3. Disconnect the connectors for parking brake switch (3) and Mid PTO switch (4).
4. Disconnect the grounding cable (5)
5. Disconnect the safety switch for clutch pedal (7) and HST pedal (6).
6. Set aside the main harness to the front.

(1) Brake Light Switch
(2) Clamp
(3) Parking Brake Switch
(4) Mid PTO Switch
(5) Grounding Cable
(6) Safety Switch for HST Pedal
(7) Safety Switch for Clutch Pedal

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Propeller Shaft

1. Loosen the clamp screws (1) and slide the propeller shaft cover (2).
2. Tap out the spring pin (3) and then slide the coupling (4).
3. Remove the propeller shaft with the cover.

(When reassembling)

- Apply grease to the spline portion of the propeller shaft and couplings.
- When inserting the spring pins (3), face their splits in the direction parallel to the propeller shaft.
- Tighten the clamp screws (1) upward from the bottom side.

(1) Clamp Screw
(2) Propeller Shaft Cover
(3) Spring Pin
(4) Coupling

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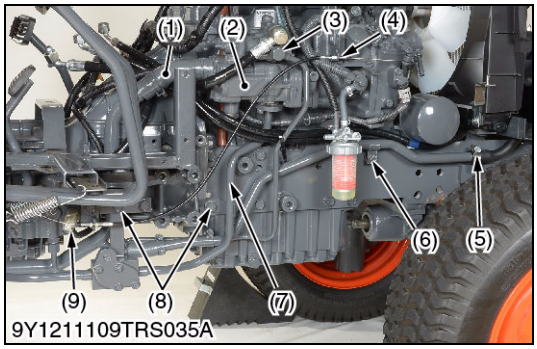

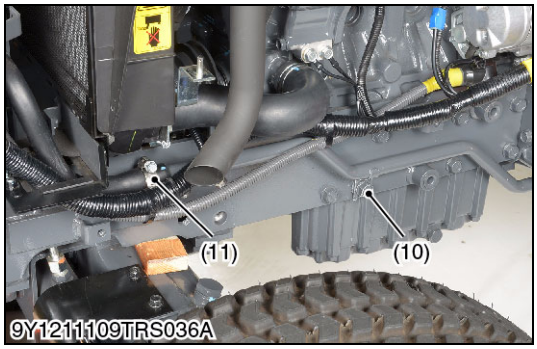

Hydraulic Pipes and Bi-Speed Valve Connector

1. Disconnect the bi-speed valve connector (9).
2. Loosen the clamp and separate the hydraulic suction hose (1) from the hydraulic pump (2).
3. Remove the joints and disconnect the bi-speed delivery pipe (3) from the bi-speed valve and hydraulic pump (2).
4. Remove the pipe retaining screws (8) and separate the **3P** delivery pipe (7) from the hydraulic pump (2).
5. Loosen the pipe retaining screws (6), (10)
6. Loosen the hose clamps (5), (11).
7. Disconnect the accelerator wire (4).

(When reassembling)

TIghtening torque	Bi-speed delivery pipe retaining nut (valve side)	30 to 49 N·m 30 to 5.0 kgf·m 21.7 to 36.2 lbf·ft
	Bi-speed delivery pipe joint (pump side)	34.3 to 39.2 N·m 3.5 to 4.0 kgf·m 25.3 to 28.9 lbf·ft

(1) Hydraulic Suction Hose
(2) Hydraulic Pump
(3) Bi-speed Delivery Pipe
(4) Accelerator Wire
(5) Hose Clamp
(6) Retaining Screw
(7) **3P** Delivery Pipe
(8) Retaining Screw
(9) Bi-speed Valve Connector
(10) Retaining Screw
(11) Hose Clamp

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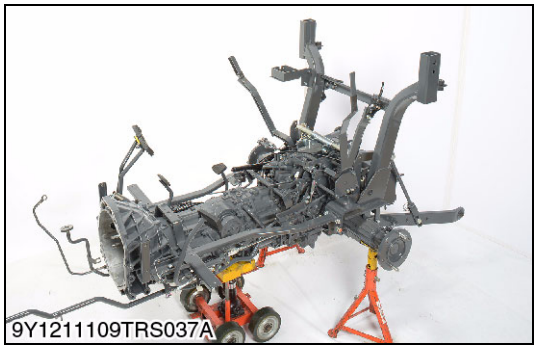

Separating the Engine from Clutch Housing

1. Place the disassembling stands under the clutch housing and engine oil pan.
2. Remove the starter.
3. Remove the engine mounting screws and nuts
4. Separate the engine from the clutch housing.

(When reassembling)

- Apply liquid gasket (Three Bond 1211 or equivalent) to joint face of the starter and rear end plate.
- Apply liquid gasket (Three Bond 1206C or equivalent) to joint face of the engine and clutch housing.

TIghtening torque	Engine mounting screw, bolt and nut (M10)	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 lbf·ft
	Engine mounting nut (M12)	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 lbf·ft

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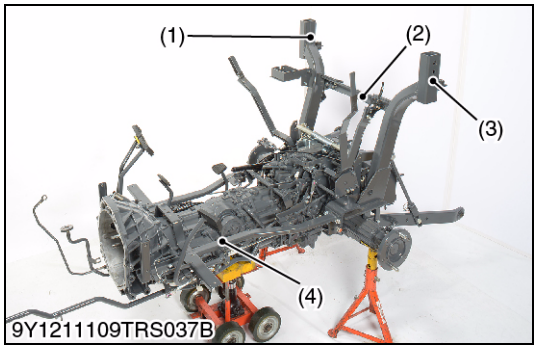


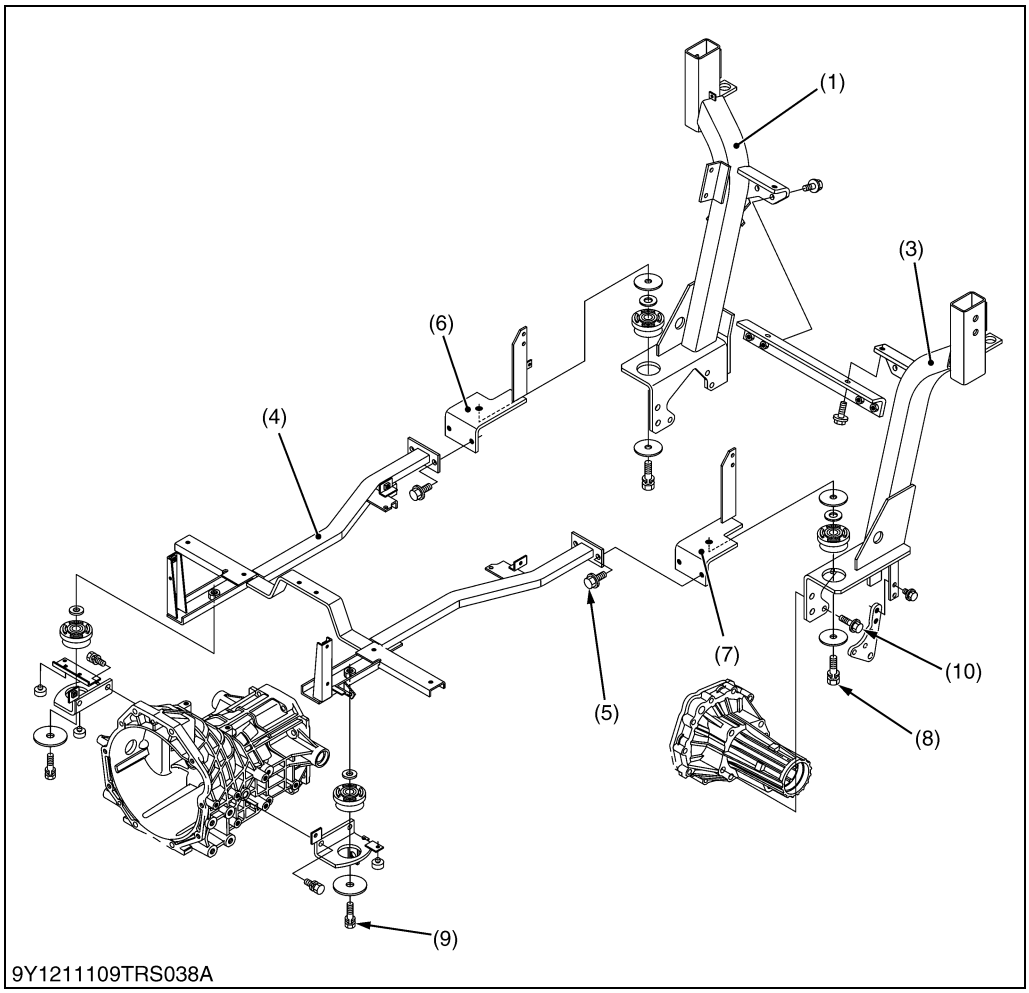
Rear Frame and Under Frame

1. Remove the rubber mount screws (9) and rear frame mounting screws (5) then remove the rear frame (4).
2. Remove the rear cross bar (2).
3. Remove the rubber mount screw (8) and remove the rear bracket (6), (7).
4. Remove the under frame (1), (3).

(When reassembling)

- Apply liquid lock (Three Bond 1372D or equivalent) to the rear frame mounting screw (M12) (10).

Tightening torque	Rear cross bar mounting screw	103 to 117 N·m 10.5 to 12.0 kgf·m 76.0 to 86.7 lbf·ft
	Rubber mount screw (8), (9)	196.0 to 225.0 N·m 20.0 to 23.0 kgf·m 144.7 to 166.4 lbf·ft
	Rear frame mounting screw (M12) (10)	63 to 72 N·m 6.4 to 7.4 kgf·m 47 to 53 lbf·ft



(1) Under Frame R.H.
(2) Rear Cross Bar
(3) Under Frame L.H.
(4) Rear Frame
(5) Rear Frame Mounting Screw
(6) Rear Bracket R.H.
(7) Rear Bracket L.H.
(8) Rubber Mount Screw
(9) Rubber Mount Screw
(10) Flange Bolt

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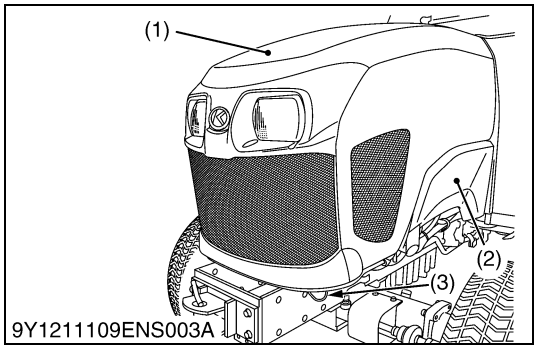
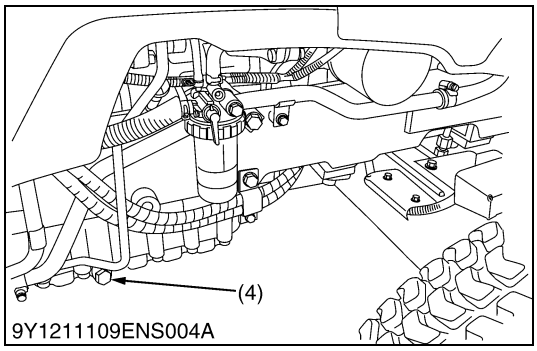
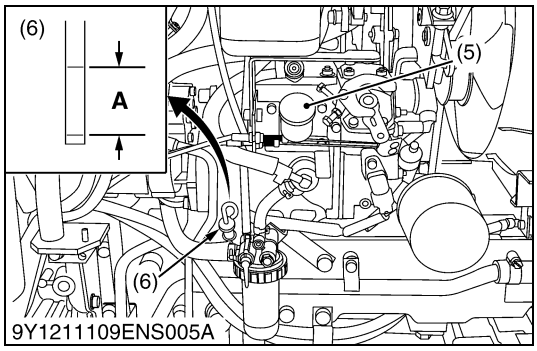
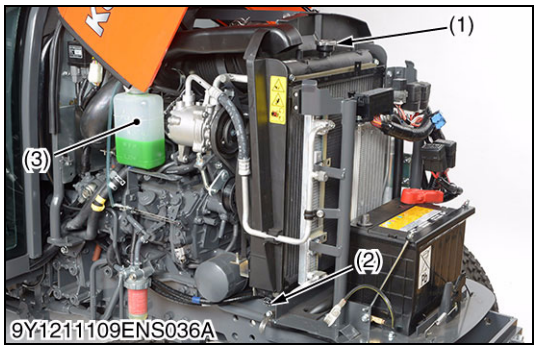
(2) Separating Engine and Clutch Housing Case









Draining Engine Oil

1. Place an oil pan underneath the engine.
2. To open the hood (1), hold the hood (1) and pull the release lever (3) and open the hood (1).
3. Remove the bolt from each of the side covers (2) and remove the side covers (2).
4. To drain the oil, remove the both drain plugs (4) at the bottom of the engine and drain the oil completely into the oil pan.
5. After draining, reinstall the both drain plugs (4).

(When reassembling)

- Fill with the new engine oil up to the upper notch on the dipstick (6).

■ **IMPORTANT**

- **When using an oil of different manufacture or viscosity from the previous one, remove all of the old oil.**
- **Never mix two different types of oil.**
- **Use the proper SAE Engine Oil according to ambient temperatures.**
- **Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8.**

Engine Oil	Capacity	STW34	5.7 L 6.0 U.S.qts 5.0 Imp.qts
		STW37, STW40	6.7 L 7.1 U.S.qts 5.9 Imp.qts

(1) Hood
(2) Side Cover
(3) Release Lever
(4) Drain Plug
(5) Oil Inlet
(6) Dipstick
A: Oil level is acceptable within this range.

9Y1211109ENS0018US0

Draining Coolant

WARNING

To avoid personal injury or death:

- **Do not remove the radiator cap while coolant is hot. When cool, slowly rotate cap to the first stop and allow sufficient time for express pressure to escape before removing the cap completely.**

1. Stop the engine and let it cool down.
2. To drain the coolant, open the radiator drain plug (2) and remove radiator cap (1). The radiator cap (1) must be removed to completely drain the coolant.
3. After all coolant is drained, reinstall the drain plug (2).

Coolant (with recovery tank)	Capacity	7.1 L 7.5 U.S.qts 6.2 Imp.qts

(1) Radiator Cap
(2) Drain Plug
(3) Recovery Tank

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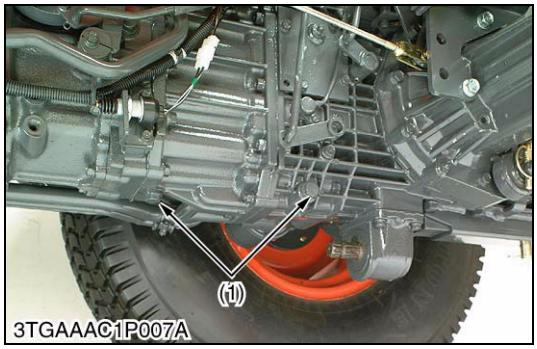

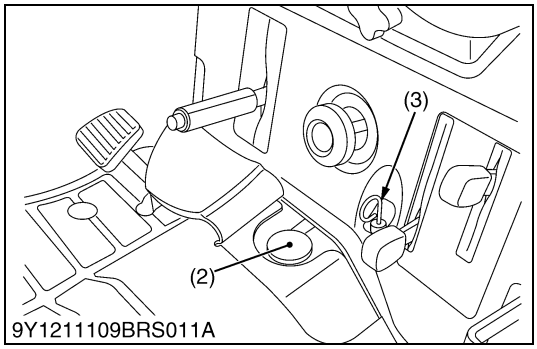

Draining Transmission Fluid

1. Place an oil pan underneath the transmission case, and remove the drain plugs (1).
2. Drain the transmission fluid.
3. Reinstall the drain plugs (1).

(When reassembling)

- 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 prescribed level.

■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8.**
- **Never work the tractor immediately after changing the transmission oil. Keeping the engine at medium speed for a few minutes to prevents damage to the transmission.**
- **Do not mix different brands oil together.**

Transmission fluid	Capacity	24 L 6.3 U.S.gals 5.3 Imp.gals

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

9Y1211109ENS0131US0

Rear Wheel and 3-Point Linkage

1. Place the disassembling stand under the transmission case.
2. Remove the rear wheels (1).
3. Remove the top link (2), lift rods (3) and lower links (4).
4. Remove the drawbar (5).

Tightening torque	Rear wheel mounting screw and nut	196.1 to 225.6 N·m 20.0 to 23.0 kgf·m 145 to 166 lbf·ft

(1) Rear Wheel
(2) Top Link
(3) Lift Rod
(4) Lower Link
(5) Drawbar

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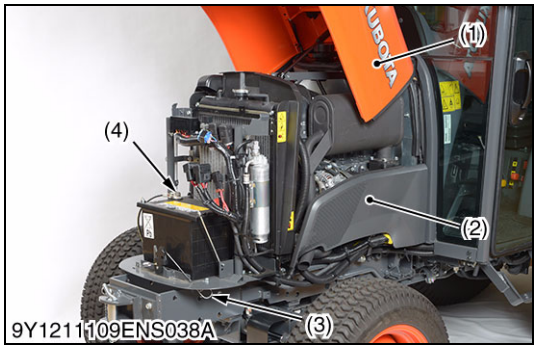

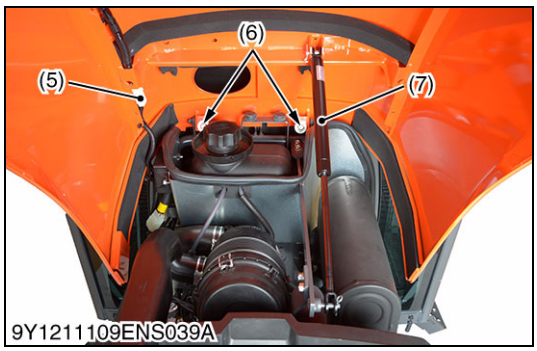

Hood, Side Cover and Battery Cord

1. To open the hood (1), hold the hood (1) and pull the release lever (3) and open the hood (1).
2. Remove the bolt from each of the side covers (2) and remove the side covers (2).
3. Disconnect the battery negative cable (4).
4. Disconnect the head light connector (5) and damper (7).
5. Remove the two screws (6) and then remove the hood (1).

(When reassembling)

■ **NOTE**

- **When disconnecting the battery cords, disconnect the grounding cord first. When connecting, positive cord first.**

(1) Hood
(2) Side Cover
(3) Release Lever
(4) Battery Negative Cable
(5) Head Light Connector
(6) Screw
(7) Damper

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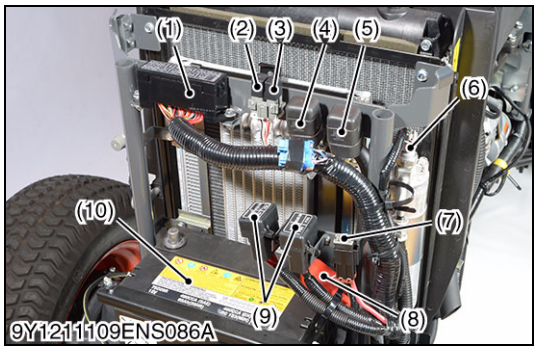

Wiring Harness

1. Remove the slow blow fuses (7), (9).
2. Disconnect the battery positive cable (8) from the battery (10).
3. Remove the fuse box (1).
4. Disconnect the relays (2), (3).
5. Remove the electrical outlet relay (4).
6. Remove the key stop relay (5).
7. Disconnect the pressure switch (6).
8. Remove the battery (10).

(1) Fuse Box
(2) Head Light Relay
(3) Flasher Relay
(4) Electrical Outlet Relay
(5) Key Stop Relay
(6) Pressure Switch
(7) Slow Blow Fuse For Defogger
(8) Battery Positive Cable
(9) Slow Blow Fuse
(10) Battery

9Y1211109ENS0132US0

Steering Wheel

1. Remove the covers (3).
2. Remove the steering wheel cap.
3. Remove the steering wheel mounting nut (1) and remove the steering wheel (2) with a steering wheel puller (Code No. 07916-51090).

(When reassembling)

Tightening torque	Steering wheel mounting nut	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 lbf·ft

(1) Steering Wheel Mounting Nut
(2) Steering Wheel
(3) Cover

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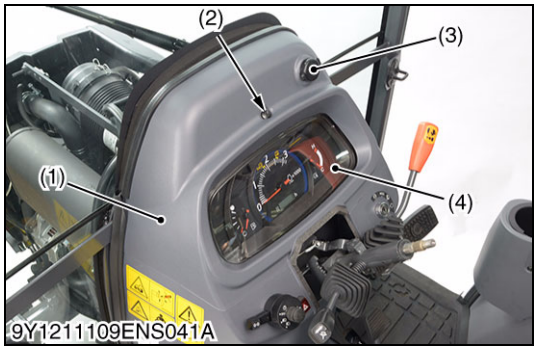

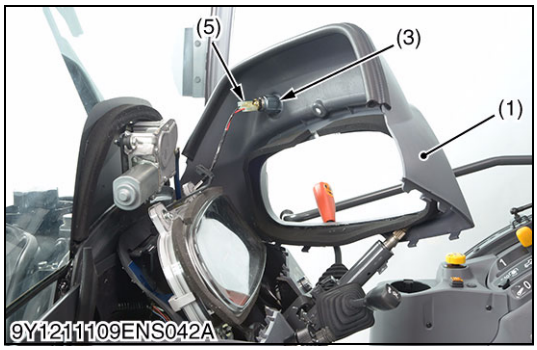

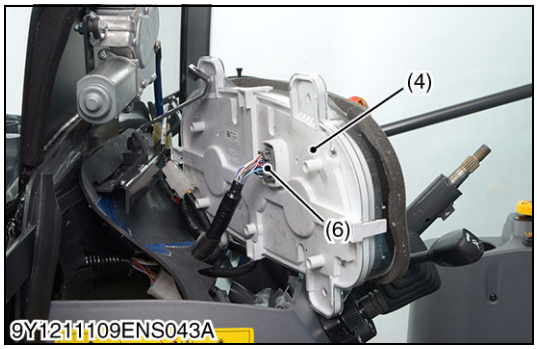

Instrument Panel and Panel Under Cover

1. Remove the screw (2).
2. Open the panel cover (1) and disconnect the electrical outlet connector (5).
3. Open the instrument panel (4) and disconnect the instrument panel connector (6). Then remove the instrument panel (4).

(1) Panel Cover
(2) Screw
(3) Electrical Outlet
(4) Instrument Panel
(5) Electrical Outlet Connector
(6) Instrument Panel Connector

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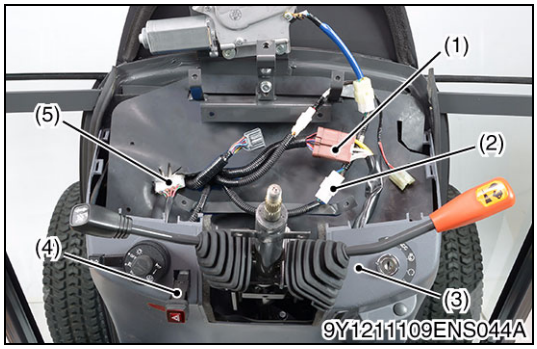

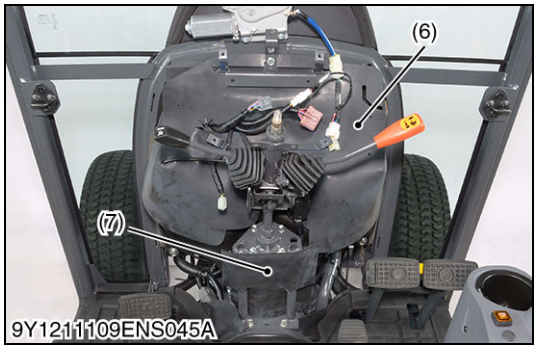

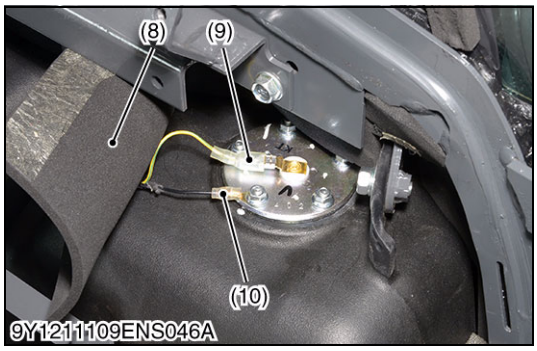

Wiring Harness

1. Disconnect the combination switch connector (5), main switch connector (1), hazard switch connector (4) and wiper motor connector (2).
2. Remove the panel under cover (3).
3. Remove the rubbers (6), (7).
4. Turn over the fuel level sensor cover (8).
5. Disconnect the grounding wire (10) and **1P** connector (9) from the fuel level sensor.

(1) Main Switch Connector
(2) Wiper Motor Connector
(3) Panel Under Cover
(4) Hazard Switch Connector
(5) Combination Switch Connector
(6) Rubber
(7) Rubber
(8) Fuel Level Sensor Cover
(9) **1P** Connector
(10) Grounding Wire

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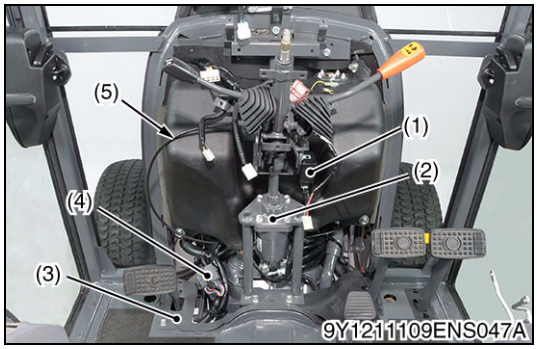

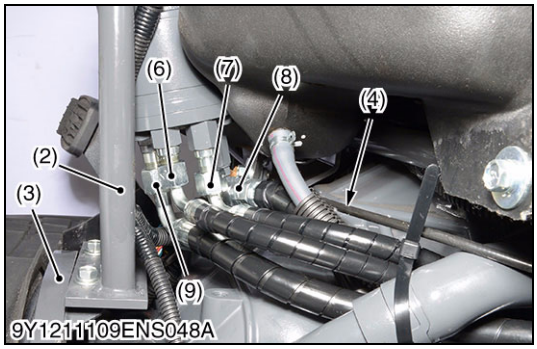

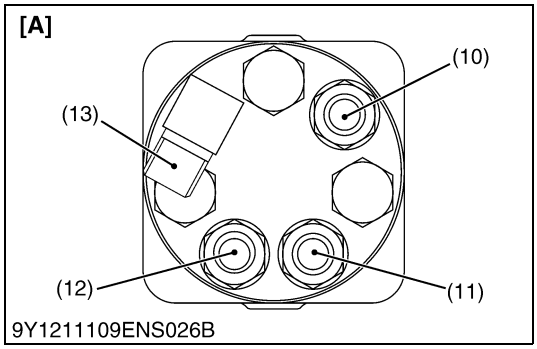

Power Steering Hoses and Steering Support

1. Disconnect the accelerator wire (5) from the engine.
2. Disconnect the OPC controller connector (1) and CABIN joint connectors (4).
3. Remove the step cover (3).
4. Disconnect the delivery hose L.H. (6) and delivery hose R.H. (7) from the steering controller.
5. Disconnect the power steering delivery hose (9) from the steering controller.
6. Disconnect the power steering return hose (8) from the steering controller.
7. Remove the steering support (2) with the steering controller.

(When reassembling)

- Be sure to connect the each hose to original position.
- Be sure to check the hose joints do not interfere in other joints.

Tightening torque	Delivery hose R.H. (4) retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft
	Delivery hose L.H. (3) retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft
	Return hose retaining nut	34.3 to 44.1 N·m 3.5 to 4.5 kgf·m 25.3 to 32.5 lbf·ft
	Delivery hose joint screw	45.1 to 53.0 N·m 4.60 to 5.40 kgf·m 33.3 to 39.0 lbf·ft

(1) OPC Controller Connector
(2) Steering Support
(3) Step Cover
(4) CABIN Joint Connector
(5) Accelerator Wire
(6) Delivery Hose L.H.
(7) Delivery Hose R.H.
(8) Power Steering Return Hose
(9) Power Steering Delivery Hose
(10) **P** Port
(11) **LT** Port
(12) **RT** Port
(13) **T** Port
[A] Viewed from Bottom Side

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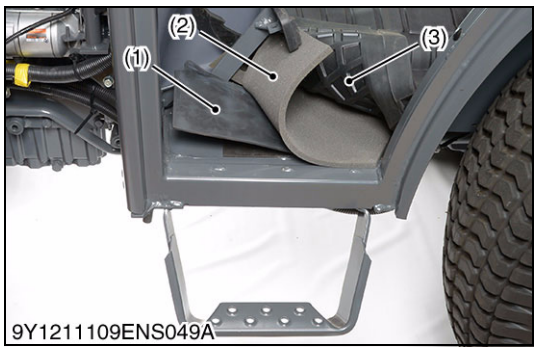

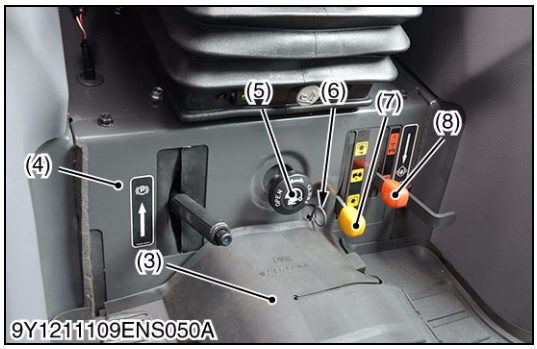

Step Mat and Seat Under Cover

1. Remove the step mat (3), sound absorber (2) and rubber (1).
2. Remove the grips of the mid PTO lever (7) and front wheel drive lever (8).
3. Remove the dipstick (6).
4. Remove the lowering speed adjusting knob (5).
5. Remove the seat under cover (4).

(When reassembling)

- Do not confuse the grips.
  - Grip (yellow) for the mid PTO lever (7).
  - Grip (red) for the front wheel drive lever (8).

(1) Rubber
(2) Sound Absorber
(3) Step Mat
(4) Seat Under Cover
(5) Lowering Speed Adjusting Knob
(6) Dipstick
(7) Mid PTO Lever
(8) Front Wheel Drive Lever

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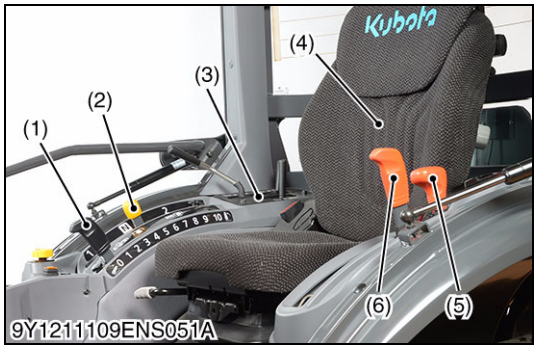

Seat and Lever Grip

1. Disconnect the seat switch connector (7) and remove the seat (4).
2. Remove the grips of the rear PTO shift lever (2), position control lever (1), cruise control lever (5) and range gear shift lever (6).
3. Remove the remote control lever guide (3).

(When reassembling)

- Do not confuse the grips.
  - Grip (yellow) for the rear PTO shift lever (2).
  - Grip (red) for the range gear shift lever (6).

(1) Position Control Lever Grip
(2) Rear PTO Shift Lever Grip
(3) Remote Control Lever Guide
(4) Seat
(5) Cruise Control Lever Grip
(6) Range Gear Shift Lever Grip
(7) Seat Switch Connector

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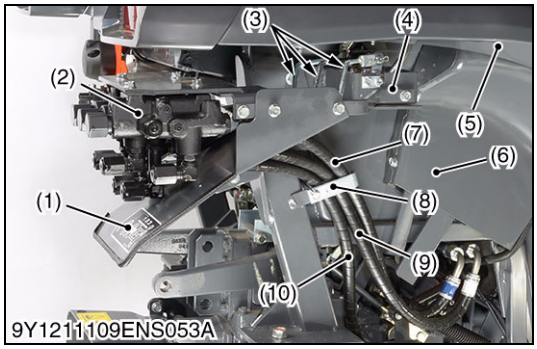

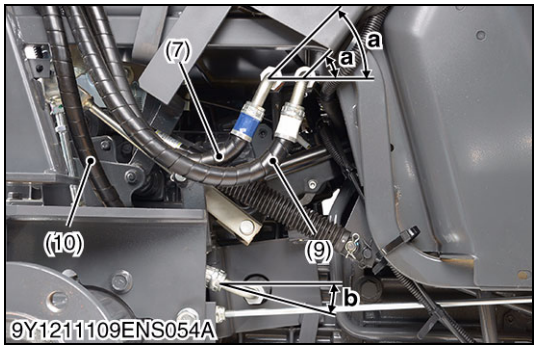

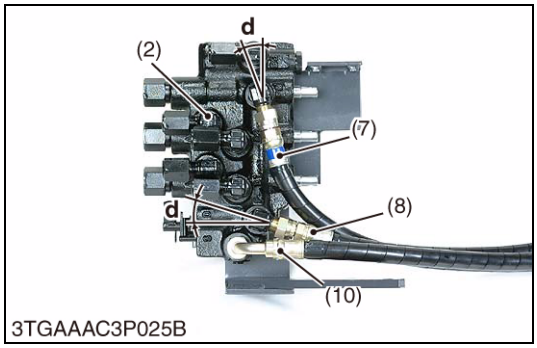

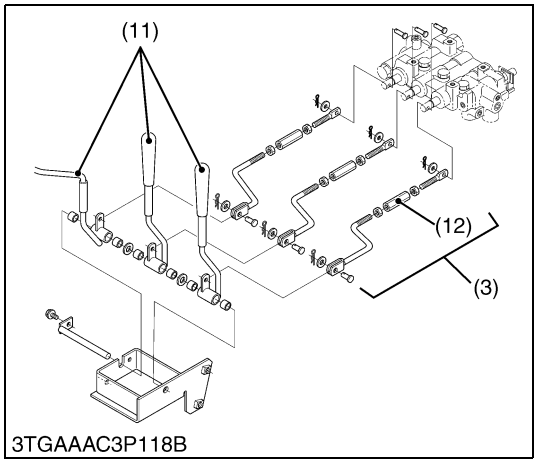

Auxiliary Control Valve and Covers

1. Remove the valve cover (1).
2. Remove the valve stay (4).
3. Remove the connecting rods (3).

(When reassembling)

- Reassemble the connecting rods (3) as shown in the figure.
- After reassembling the valve stay (4), adjust to locate the control lever (11) at a central position of the guide slot with the turnbuckle (12).

4. Remove the hose clamp (8).

(When reassembling)

- Clamp the hydraulic hoses in order of hydraulic hose **PB** (7), hydraulic hose **P** (9) and hydraulic hose **T** (10) from the front side.

5. Disconnect the hydraulic hoses (7), (9), (10) from the tractor body.
6. Remove the auxiliary control valve (2) with the hydraulic hoses (7), (9), (10).
7. Remove the remote control lever bracket with the remote control lever (11).

(When reassembling)

- Assemble the hose joints to appropriate positions referring to the table below.

8. Remove the fender under cover (5) and fender cover (6).

(Distinction and installation angle of the hose joints)

Hydraulic Hose	Hose Joint (Valve side)	Hose Joint (Tractor body side)
P (9)	Straight joint 0.26 rad (15 °)	Bent joint with white tape 0.785 rad (45 °)
PB (7)	Straight joint with blue tape 0.26 rad (15 °)	Bent joint with blue tape 0.785 rad (45 °)
T (10)	Bent joint 1.57 rad (90 °)	Bent joint 0.349 to 0.523 rad (20 to 30 °)

Tightening torque	Hydraulic hose **PB**, **P** and **T** retaining nuts	30 to 40 N·m 3.1 to 4.0 kgf·m 23 to 29 lbf·ft

(1) Valve Cover
(2) Auxiliary Control Valve
(3) Connecting Rod
(4) Valve Stay
(5) Fender Under Cover
(6) Fender Cover
(7) Hydraulic Hose **PB**
(8) Hose Clamp
(9) Hydraulic Hose **P**
(10) Hydraulic Hose **T**
(11) Remote Control Lever
(12) Turnbuckle

a: 0.785 rad (45 °)
b: 0.349 to 0.523 rad (20 to 30 °)
c: 0.26 rad (15 °)
d: 0.26 rad (15 °)

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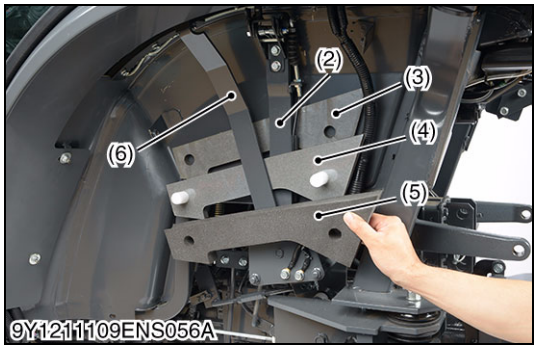

Fender Assembly

1. Remove the fender cover (1).
2. Remove the sponges (4), (5).

(When reassembling)

- Assemble the sponge (center) (4) between the cruise control lever (2) and range gear shift lever (6).

(1) Fender Cover
(2) Cruise Control Lever
(3) Sponge (Inner)
(4) Sponge (Center)
(5) Sponge (Outer)
(6) Range Gear Shift Lever

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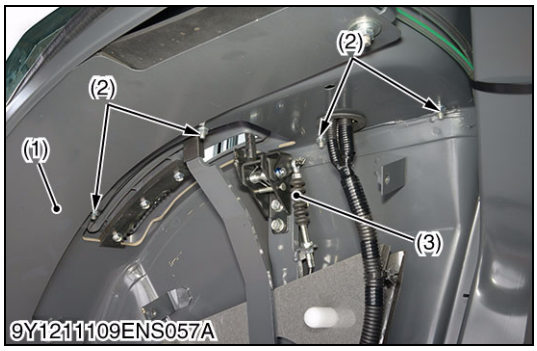

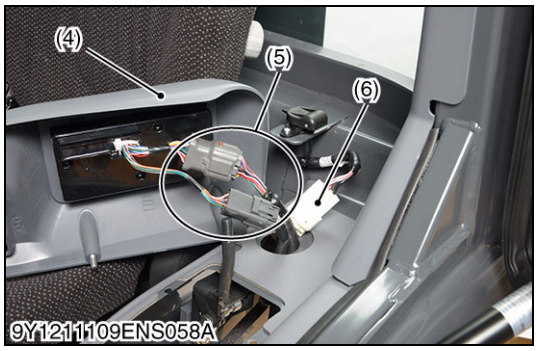

Release Wire and Wiring Harness (Left Side)

1. Remove the fender under cover (1).
2. Remove the release wire (3).
3. Remove the lever guide mounting screws (2), and then open the lever guide (4).
4. Disconnect the wiring connectors for the bi-speed controller connectors (5) and electrical outlet connector (6).
5. Remove the lever guide (4) with bi-speed controller.

(1) Fender Under Cover
(2) Lever Guide Mounting Screw
(3) Release Wire (Cruise Control)
(4) Lever Guide
(5) Bi-speed Controller Connector
(6) Electrical Outlet Connector

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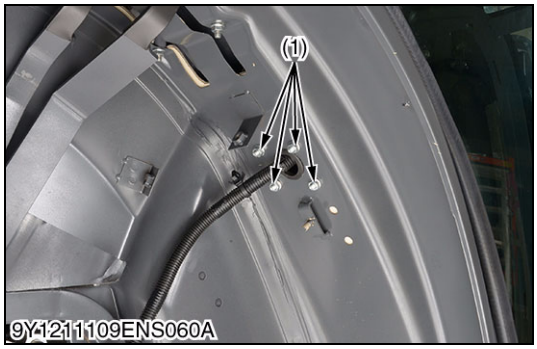

Wiring Harness (Right Side)

1. Remove the loader lever guide mounting screws (1).
2. Open the loader lever guide (2) and then disconnect the connectors for PTO switch (4) and beacon switch (3).

(1) Loader Lever Guide Mounting Screw
(2) Loader Lever Guide
(3) Beacon Switch
(4) PTO Switch

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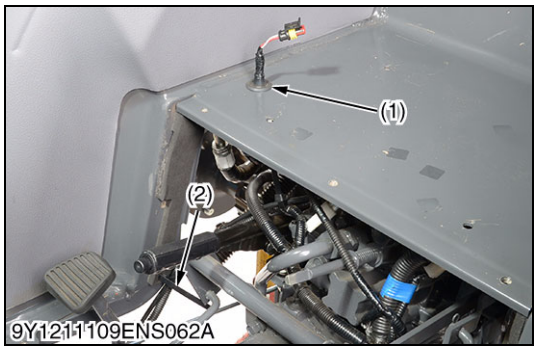

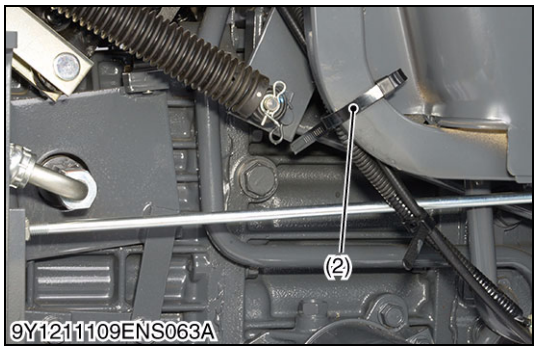

WIring Harness

1. Pull down the grommet (1) for seat switch connector.
2. Remove the clamp (2).

(1) Grommet
(2) Clamp

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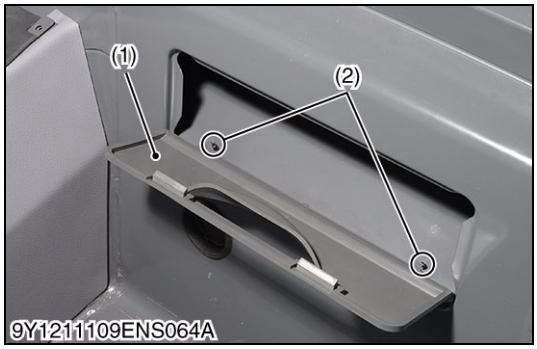

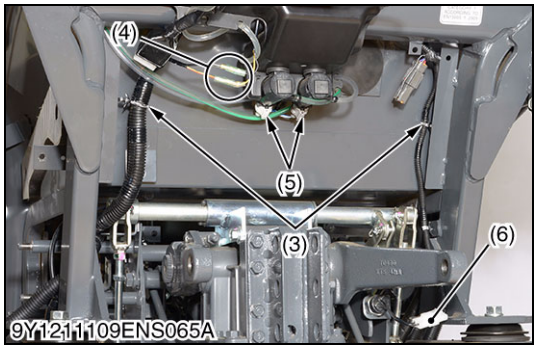

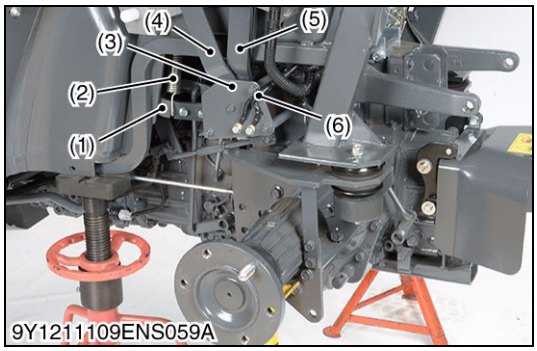

Wiring Harness (Rear Side)

1. Open the tool box (1).
2. Remove the clamps (2), (3) from the Cabin.
3. Disconnect the registration lamp connectors (4).
4. Disconnect the washer motor connectors (5).
5. Disconnect the PTO switch connector (6).

(When reassembling)

- Do not confuse the connectors.
  - Connector (white) for the front washer motor.
  - Connector (gray) for the rear washer motor.

(1) Tool Box
(2) Clamp
(3) Clamp
(4) Registration Lamp Connector
(5) Washer Motor Connector
(6) PTO Switch Connector

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Differential Lock Pedal and Levers

1. Remove the differential lock pedal (1) with the spring (2).
2. Remove the grounding cable (6) mounting screws.
3. Remove the plate (3).
4. Remove the range gear shift lever (4) and cruise control lever (5).

(1) Differential Lock Pedal
(2) Spring
(3) Plate
(4) Range Gear Shift Lever
(5) Cruise Control Lever
(6) Grounding Cable

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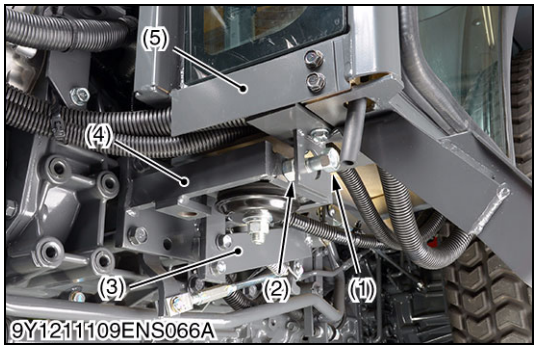

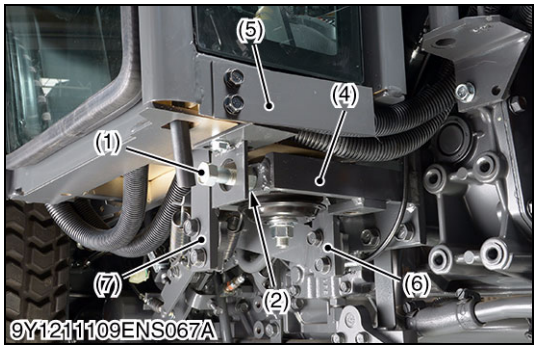

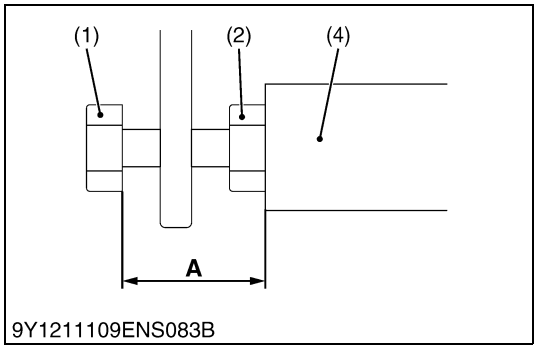

Clutch Pedal, Brake Pedal and Cabin Stopper Bolt

1. Remove the both sides of hose plate (5).
2. Remove the clutch pedal (3).
3. Remove the brake pedal L.H. (6) and R.H. (7)
4. Loosen the both sides of lock nut (2), and then remove the both sides of stopper bolt (1)

(When reassembling)

- Be sure to install the stopper bolt to the original positions.

(1) Stopper Bolt
(2) Lock Nut
(3) Clutch Pedal
(4) Front Bracket
(5) Hose Plate
(6) Brake Pedal L.H.
(7) Brake Pedal R.H.
A: 38 to 42 mm (1.5 to 1.6 in.)

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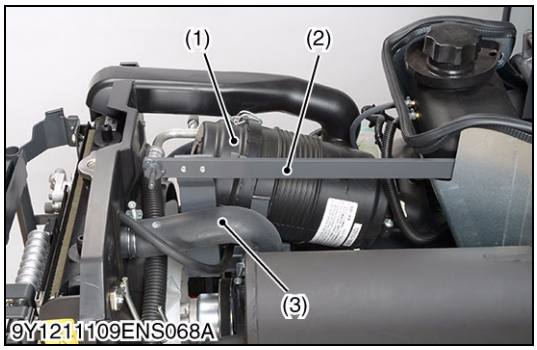

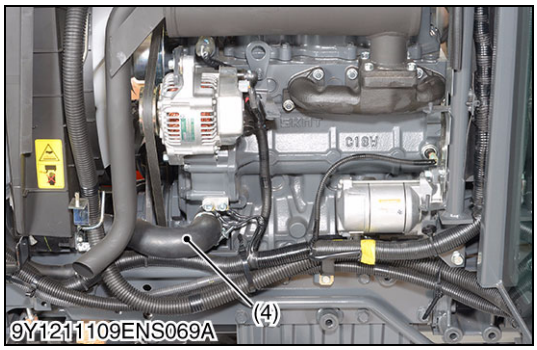

Air Cleaner and Radiator Hoses

1. Remove the air cleaner (1) with air cleaner hose.
2. Remove the damper stay (2)
3. Remove the radiator upper hose (3) and lower hose (4).

(1) Air Cleaner
(2) Damper Stay
(3) Radiator Upper Hose
(4) Radiator Lower Hose

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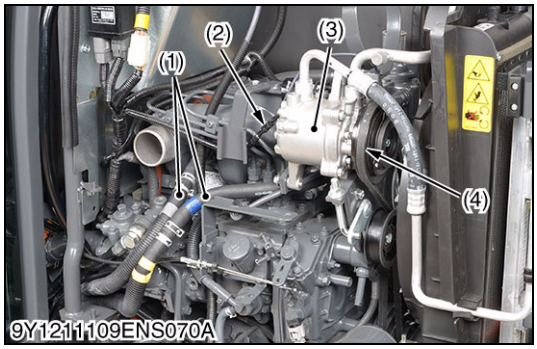

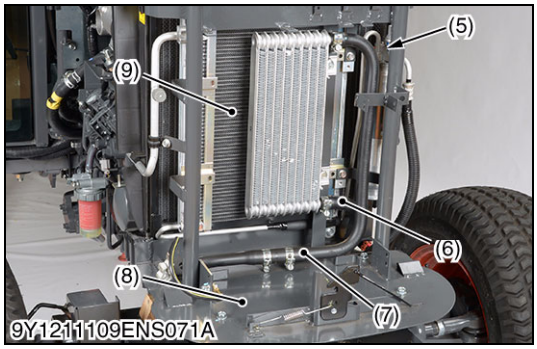

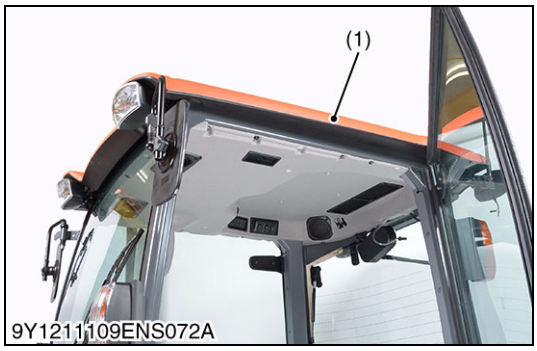

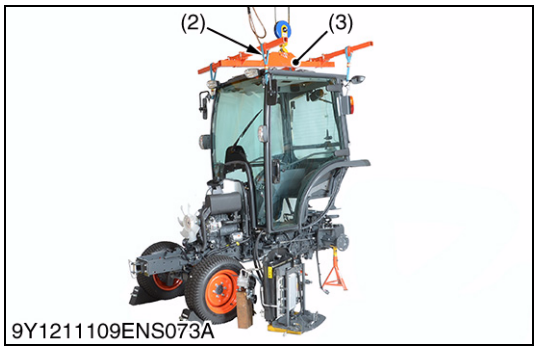

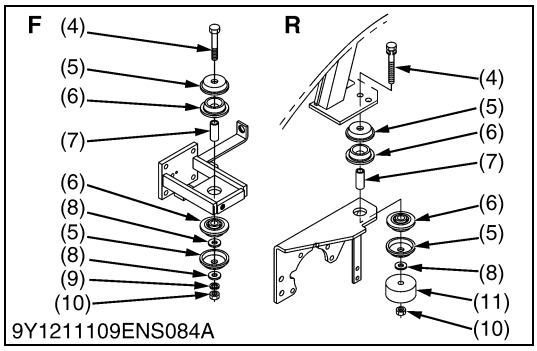

Air Compressor and Oil Hoses

1. Disconnect the heater hoses (1), and then reconnect their hoses to make loop.

■ **NOTE**

- **Put a mark to the each heater hose before disconnecting.**

2. Remove the air conditioner belt (4).
3. Disconnect the compressor **1P** connector (2).
4. Disconnect the oil cooler inlet hose (6) and outlet hose (7).
5. Remove the battery stay mounting bolt.
6. Remove the compressor mounting screws.
7. Remove the compressor (3), condenser (9), receiver (5), battery stay (8) and etc. as a unit.

(When reassembling)

- After reassembling the compressor, be sure to adjust the air conditioner belt tension. (See page G-31.)

(1) Heater Hose
(2) Compressor **1P** Connector
(3) Compressor
(4) Air Conditioner Belt
(5) Receiver
(6) Oil Cooler Inlet Hose
(7) Oil Cooler Outlet Hose
(8) Battery Stay
(9) Condenser

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Cabin Assembly

1. Remove the outer roof (1) of cabin.
2. Support the cabin with nylon straps (2), cabin dismounting tool (3) and hoists.
3. Loosen and remove the cabin mounting screw (4) and nuts (10).
4. Dismounting the cabin from tractor body.

■ **NOTE**

- **Lift the cabin while making sure it does not catch on anything.**

(When reassembling)

- Be sure to install the washers and mount rubbers, etc. in their original positions.

Tightening torque	Outer roof mounting screw	3.5 to 4.0 N·m 0.36 to 0.40 kgf·m 2.6 to 2.9 lbf·ft
	Cabin mounting bolt and nut	124 to 147 N·m 12.6 to 15.0 kgf·m 91.1 to 108 lbf·ft

(1) Outer Roof
(2) Nylon Strap
(3) Cabin Dismounting Tool
(4) Screw
(5) Plate
(6) Mount Rubber
(7) Collar
(8) Plane Washer
(9) Spring Washer
(10) Nut
(11) Collar

F: Front Side
R: Rear Side

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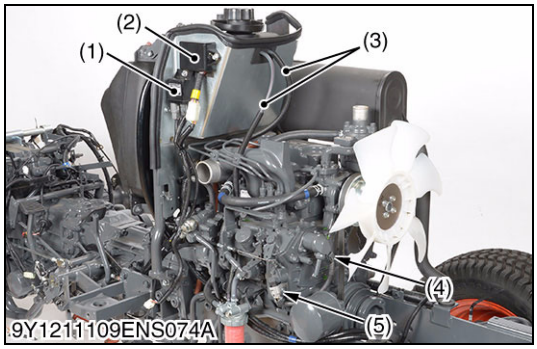

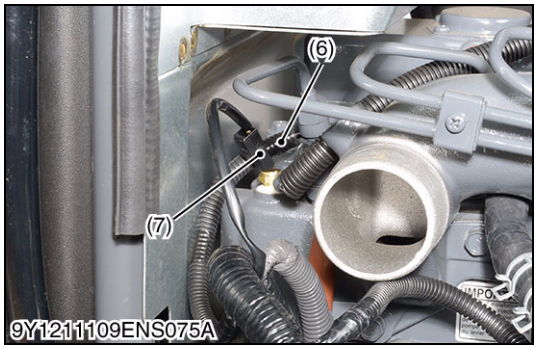

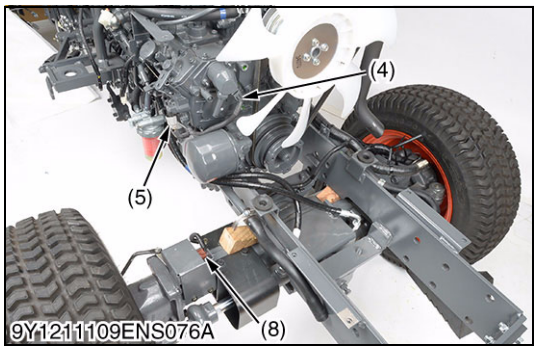

Wiring Harness (Right Side)

1. Disconnect the connectors for QGS controller (1) and flasher unit (2).
2. Disconnect the coolant temperature sensor connector (7) and glow plug cable (6).
3. Disconnect the connector for key stop solenoid (4), engine revolution sensor (5) and front wheel angle sensor (8).
4. Disconnect the fuel return hoses (3) from the fuel tank.

(1) QGS Controller
(2) Flasher Unit
(3) Fuel Return Hose
(4) Key Stop Solenoid
(5) Engine Revolution Sensor
(6) Glow Plug Cable
(7) Coolant Temperature Sensor
(8) Front Wheel Angle Sensor

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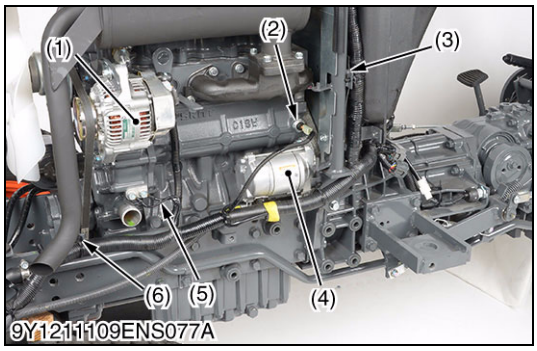

Wiring Harness (Left Side)

1. Disconnect the connectors from the alternator (1), starter (4), coolant temperature sensor and oil switch (2).
2. Disconnect the grounding terminal (5).
3. Remove the clamps (3), (6).
4. Set aside the main harness to the rear.

(1) Alternator
(2) Oil Switch
(3) Clamp
(4) Starter
(5) Grounding Terminal
(6) Clamp

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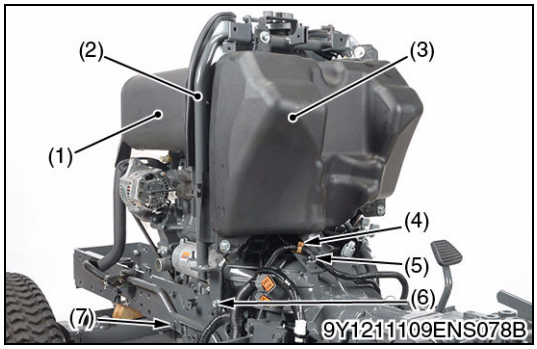

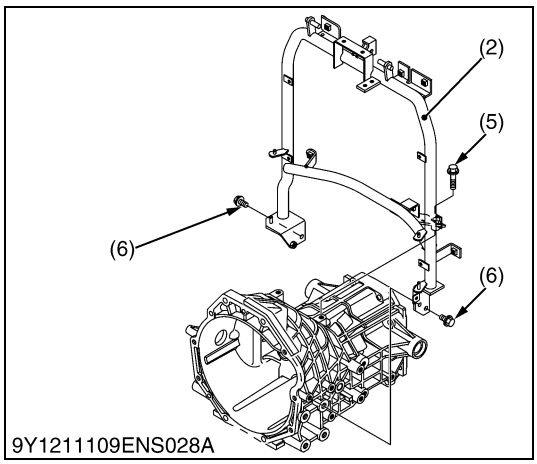

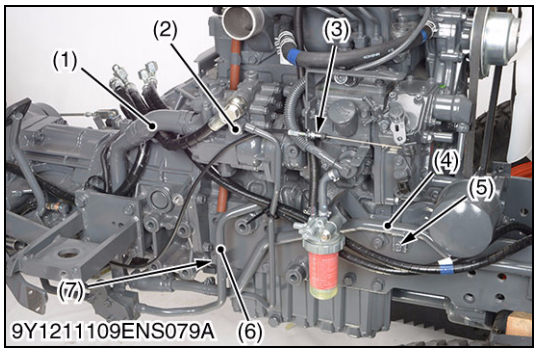

Fuel Tank and Muffler

1. Remove the muffler (1).
2. Pull out the clamps (4).
3. Remove the screws (5), (6) and then remove the fuel tank (3) with pillar (2).
4. Remove the retaining screw (7).

(When reassembling)

Tightening torque	Muffler mounting screw	32 to 37 N·m 3.2 to 3.8 kgf·m 24 to 27 lbf·ft

(1) Muffler
(2) Pillar
(3) Fuel Tank
(4) Clamp
(5) Screw
(6) Screw
(7) Retaining Screw

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Hydraulic Pipe and Hose

1. Disconnect the accelerator wire (3) from the engine.
2. Remove the retaining screws (7) and separate the **3P** hydraulic delivery pipe (6) from the hydraulic pump.
3. Disconnect the bi-speed delivery pipe (2) from the hydraulic pump.
4. Remove the retaining screw (5), and then remove the oil cooler pipe (4).
5. Disconnect the suction hose (1).

Tightening torque	Bi-speed delivery pipe joint screw (Pump side)	34.3 to 39.2 N·m 3.5 to 4.0 kgf·m 25.3 to 28.9 lbf·ft
	Bi-speed delivery pipe retaining nut (Bi-speed valve side)	29 to 49 N·m 3.0 to 5.0 kgf·m 21.7 to 36.2 lbf·ft

(1) Suction Hose
(2) Bi-speed Delivery Pipe
(3) Accelerator Wire
(4) Oil Cooler Pipe
(5) Retaining Screw
(6) **3P** Hydraulic Delivery Pipe
(7) Retaining Screw

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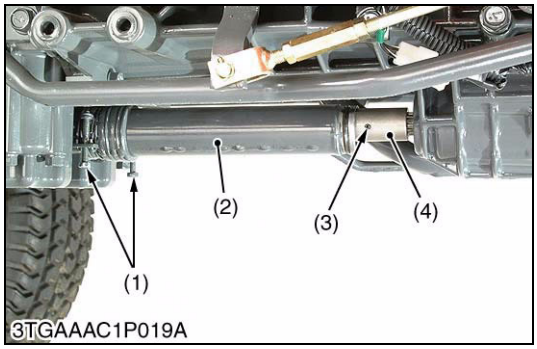

Propeller Shaft

1. Loosen the clamp screws (1) and slide the propeller shaft cover (2).
2. Tap out the spring pin (3) and then slide the coupling (4).
3. Remove the propeller shaft with the cover.

(When reassembling)

- Apply grease to the spline portion of the propeller shaft and couplings.
- When inserting the spring pins (3), face their splits in the direction parallel to the propeller shaft.
- Tighten the clamp screws (1) upward from the bottom side.

(1) Clamp Screw
(2) Propeller Shaft Cover
(3) Spring Pin
(4) Coupling

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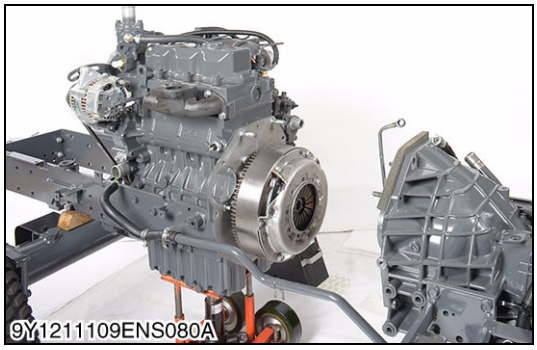

Separating the Engine from Clutch Housing

1. Place the disassembling stands under the clutch housing and engine oil pan.
2. Remove the starter.
3. Remove the engine mounting screws and nuts, and separate the engine from the clutch housing.

(When reassembling)

- Apply liquid gasket (Three Bond 1211 or equivalent) to joint face of the starter and rear end plate.
- Apply liquid gasket (Three Bond 1206C or equivalent) to joint face of the engine and clutch housing.

Tightening torque	Engine mounting screw and nut (M10)	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.5 to 41.2 lbf·ft
	Engine mounting nut (M12)	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 lbf·ft

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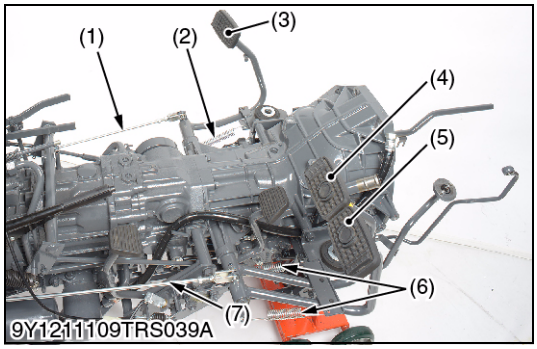
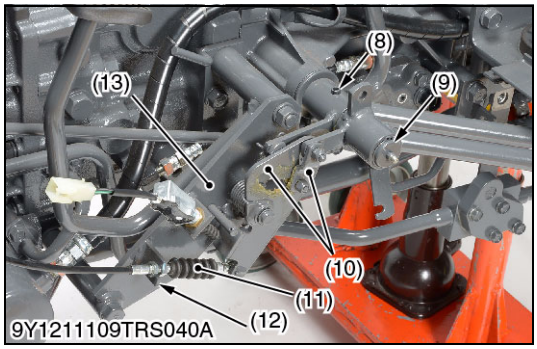
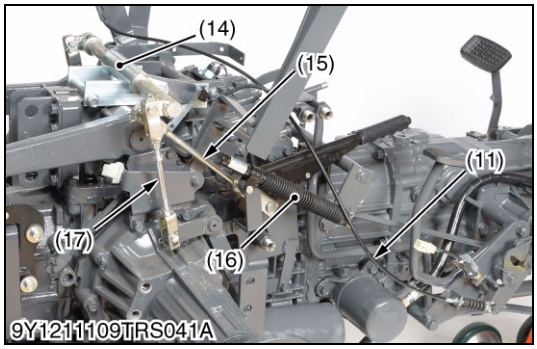
(3) Separating Clutch Housing Case







Clutch and Brake Linkage

1. Remove the brake rods (1), (7) and brake springs (6).
2. Remove the release wire (11).
3. Remove the brake link (10).
4. Remove the spring pin (8) and external snap ring (9), and remove the brake pedals (4), (5).
5. Remove the pedal support assembly (13) with the brake switch.
6. Remove the clutch rod and spring (2), and draw out the clutch pedal (3) with the brake shaft.
7. Remove the damper (16).
8. Remove the parking brake stay assembly (14) with the parking brake rod 1 (15) and parking brake rod 2 (17).

(When reassembling)

- Reassemble the release wire (11) to the guide plate (12) so that the guide plate (12) comes to the center of the threaded portion.
- Apply grease to the brake link (10).
- After reassembling the brake link (10), do the check of "**3)** Brake Link (Cruise Control)" (See page 3-S14).
- Adjust the clutch pedal free travel (See page 2-S4).
- Adjust the brake pedal free travel (See page 5-S4).
- Adjust the parking brake lever free travel (See page 5-S4).

Clutch pedal free travel	Factory specification	20 to 30 mm 0.78 to 1.18 in.
Brake pedal free travel	Factory specification	20 to 30 mm 0.78 to 1.18 in.
Parking brake lever free travel	Factory specification	The brake works when the lever is raised until the rachet sound is heard twice.

Tightening torque	Brake link retaining nut	7.8 to 9.3 N·m 0.8 to 0.95 kgf·m 5.8 to 6.9 lbf·ft
	Parking brake stay assembly	48 to 55 N·m 4.9 to 5.7 kgf·m 36 to 41 lbf·ft

(1) Brake Rod (Left)
(2) Clutch Spring
(3) Clutch Pedal
(4) Brake Pedal (Left)
(5) Brake Pedal (Right)
(6) Brake Spring
(7) Brake Rod (Right)
(8) Spring Pin
(9) External Snap Ring
(10) Brake Link
(11) Release Wire (Cruise Control)
(12) Guide Plate
(13) Pedal Support Assembly
(14) Parking Brake Stay Assembly
(15) Parking Brake Rod 1
(16) Damper
(17) Parking Brake Rod 2

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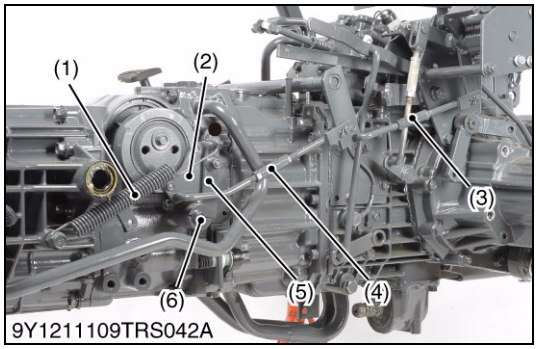

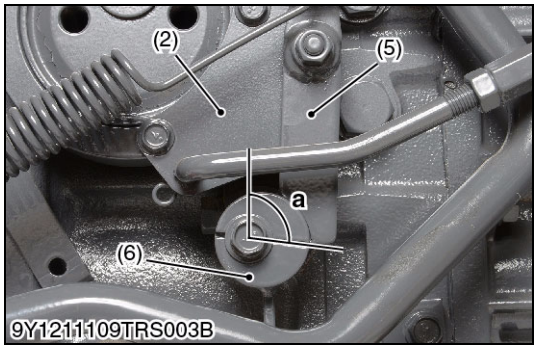

HST Linkage

1. Remove the return spring (1).
2. Remove the neutral holder (5) and holder shaft (6).
3. Remove the neutral cam (2) and HST link rod (4).
4. Remove the cruise control rod (3).

(When reassembling)

- Assemble the holder shaft (6) temporarily so that the angle **"a"** of the groove becomes a reference value.
- Do "Adjusting Neutral" (See page 3-S11) after all assemblies ends.

Angle of the groove **"a"**	Reference Value	1.80 rad 103 °

(1) Return Spring
(2) Neutral Cam
(3) Cruise Control Rod
(4) HST Link Rod
(5) Neutral Holder
(6) Holder Shaft
a: Groove Angle

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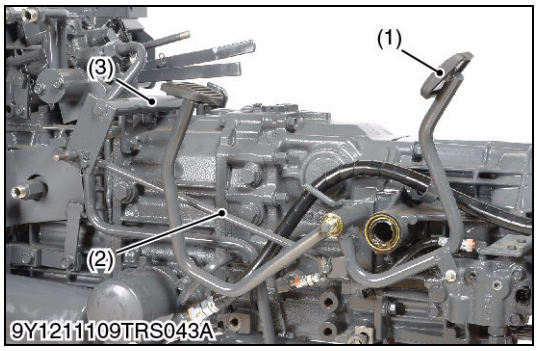

HST Pedal and Pedal Support

1. Remove the HST pedal rod (2).
2. Remove the link support (3).
3. Remove the speed control pedal (1).

(1) Speed Control Pedal
(2) HST Pedal Rod
(3) Link Support

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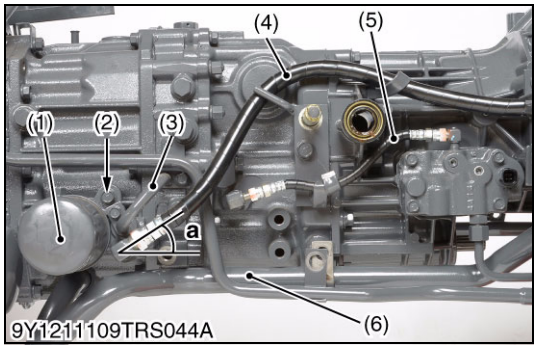


Hydraulic Pipe and HST Filter Bracket

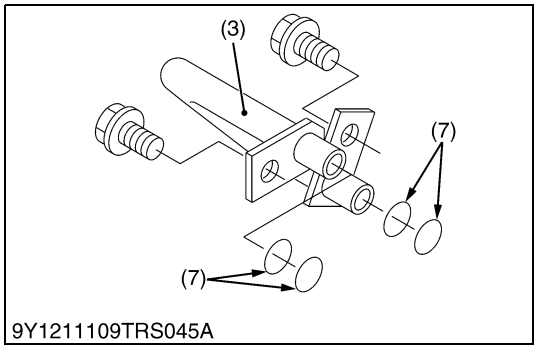
1. Remove the charge hose (4) and PTO delivery hose (5).
2. Remove the charge pipe (3).
3. Remove the filter bracket (2) with the filter (1).
4. Disconnect the suction pipe (6).

(When reassembling)

- Be sure to fit four O-rings (7) to the charge pipe (3).

Tightening torque	Filter bracket mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.2 to 66.5 lbf·ft
	Charge hose retaining nut (Controller side)	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft
	3P delivery pipe retaining nut	88.2 to 117.6 N·m 9.0 to 12.0 kgf·m 65.1 to 86.8 lbf·ft
	PTO delivery hose retaining nut (Valve side)	15 to 17 N·m 1.5 to 1.75 kgf·m 10.8 to 12.7 lbf·ft

Installation angle of charge hose (4): **"a"**	Factory specification	0.52 rad 30 °



(1) HST Oil Filter
(2) Filter Bracket
(3) Charge Pipe
(4) Charge Hose
(5) PTO Delivery Hose
(6) **3P** Delivery Pipe
(7) O-ring
a: Installation Angle of Charge Hose (4)

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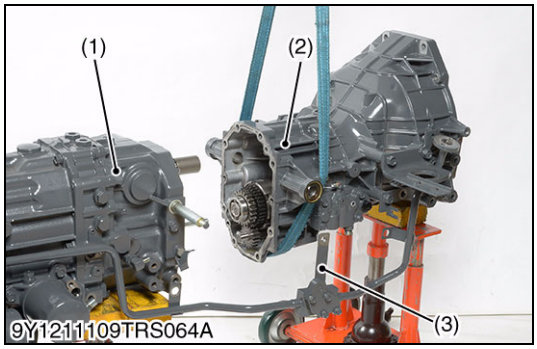

Separating Clutch Housing Case from Hydrostatic Transmission (HST)

1. Place a disassembly stand under the clutch housing (2) and HST (1).
2. Support the clutch housing (2) with the lift strap.
3. Remove the clutch housing mounting screws and nuts to separate the clutch housing (2) from the HST (1).
4. Remove the **3P** delivery pipe (3).

(When reassembling)

- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the clutch housing and HST.

Tightening torque	Clutch housing mounting screw and nut	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) HST (Hydrostatic Transmission)
(2) Clutch Housing
(3) **3P** Delivery Pipe

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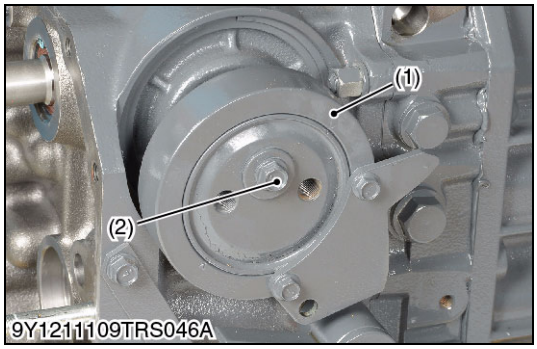
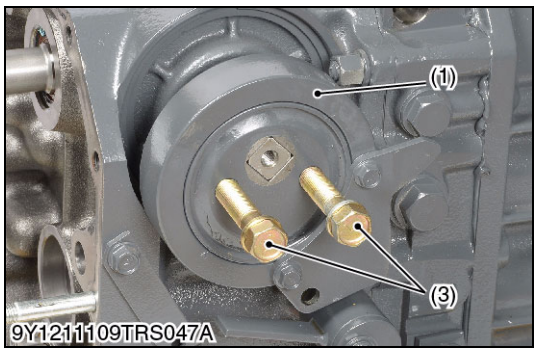
(4) Separating HST (Hydrostatic Transmission)





Trunnion Wheel

1. Remove the trunnion wheel mounting screw (2).
2. Pull out the trunnion wheel (1) by using two jack screws M12 × 1.25 (3).

(1) Trunnion Wheel
(2) Trunnion Wheel Mounting Screw
(3) Jack Screw

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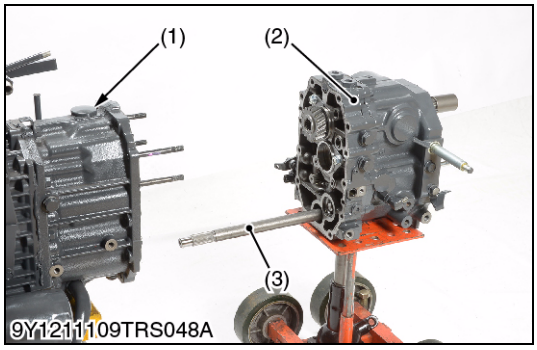


Separating HST (Hydrostatic Transmission)

1. Place a disassembly stand under the HST (2) and mid case (1).
2. Remove the HST mounting screw and nuts to separate the HST (2) from the mid case (1).

■ **NOTE**

- **Do not pull out the front drive shaft (3) when you do not separate the mid case (1).**

(When reassembling)

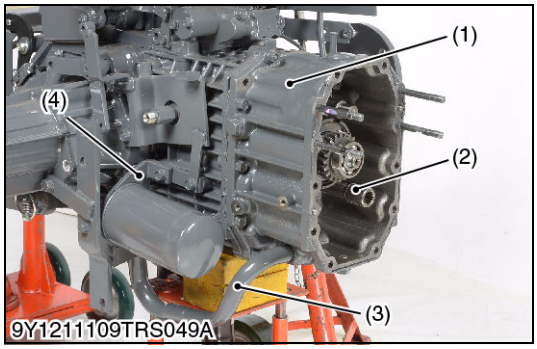
- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the HST and mid case.

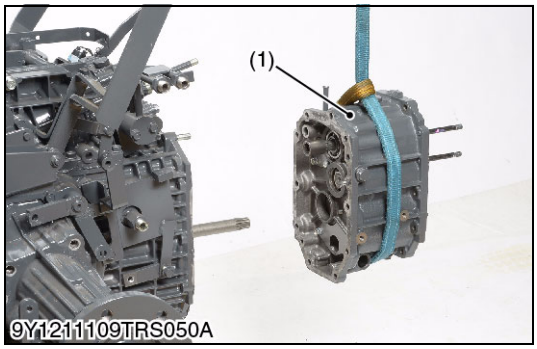
Tightening torque	HST mounting screw and nut	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) Mid Case
(2) HST
(3) Front Drive Section

9Y1211109TRS0035US0

(5) Separating Mid Case





Separating Mid Case

1. Remove the transmission oil filter bracket (4) with suction pipe (3).
2. Remove the counter shaft and coupling (2).
3. Remove the mid case mounting screws and nuts to separate the mid case (1) from the transmission case.

(When reassembling)

- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the mid case and transmission case.

Tightening torque	Mid case mounting screw and nut	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) Mid Case
(2) Counter Shaft and Coupling
(3) Suction Pipe
(4) Oil Filter Bracket

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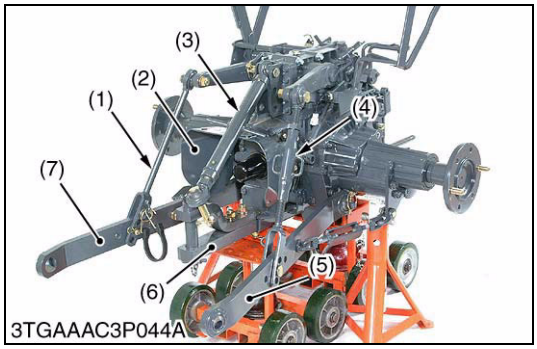
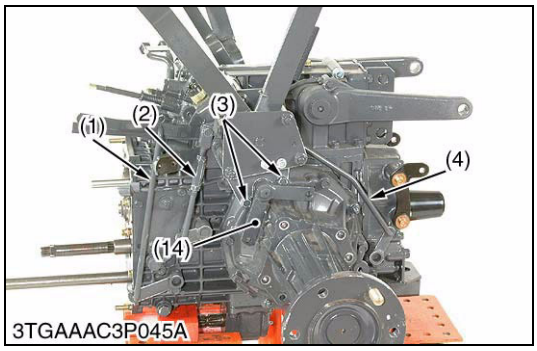
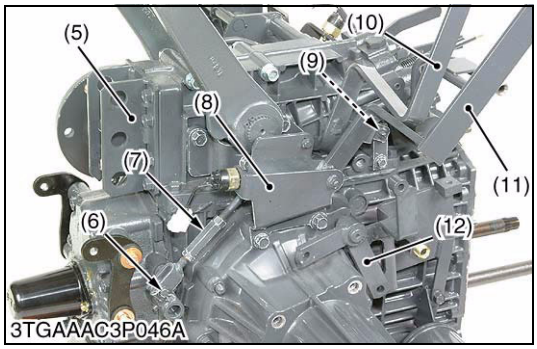
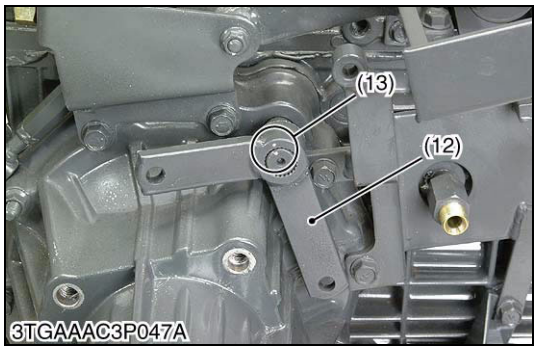
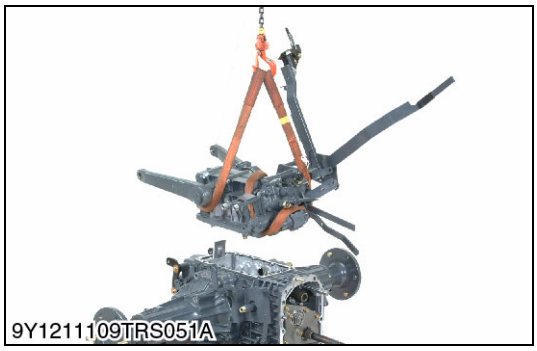
(6) Separating Transmission Case











3 Points Linkage and Drawbar

1. Remove the lifting rods (1), (4).
2. Remove the top link (3) and PTO shaft cover (2).
3. Remove the lower links (5), (7) with the check chains.
4. Pill out the drawbar (6).

(1) Lifting Rod (Left)
(2) PTO Shaft Cover
(3) Top Link
(4) Lifting Rod (Right)
(5) Lower Link (Right)
(6) Drawbar
(7) Lower Link (Left)

9Y1211109TRS0037US0

Hydraulic Cylinder

1. Remove the front drive rod (1), range gear shift rod (2) and mid PTO rod (4).
2. Remove external snap ring and remove the brake lever (14), (12).
3. Remove the stay mounting screws (3).
4. Remove the spring pin (6) to separate the rear PTO rod (7).
5. Remove the spring pin (9) to separate the position control lever (10) from the hydraulic cylinder.
6. Remove the position control lever (10) and rear PTO lever (11) with the lever stay (8).
7. Remove the top link bracket (5).
8. Remove the hydraulic cylinder mounting screws and separate the hydraulic cylinder.

(When reassembling)

- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the hydraulic cylinder and transmission case.
- Replace the coating screw (M10) with the new one at the center of the rear side of the hydraulic cylinder.
- Be sure to fix the differential lock pedal and the groove of the differential lock fork rod.
- When reassembling the brake lever (12), (14), align the punch mark (13) of the brake lever.

Tightening torque	Top link bracket mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft
	Hydraulic cylinder mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft
	Lever stay mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) Front Drive Rod
(2) Range Gear Shift Rod
(3) Stay Mounting Screw
(4) Mid PTO Rod
(5) Top LInk Bracket
(6) Spring Pin
(7) Rear PTO Rod
(8) Lever Stay
(9) Spring Pin
(10) Position Control Lever
(11) Rear PTO Lever
(12) Brake Lever (Right)
(13) Punch Mark
(14) Brake Lever (Left)

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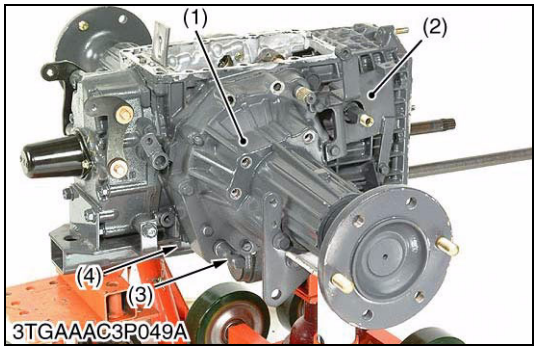

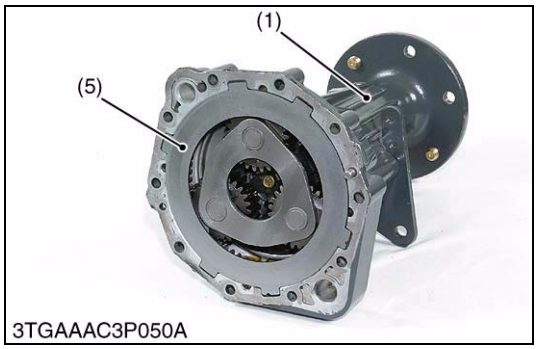

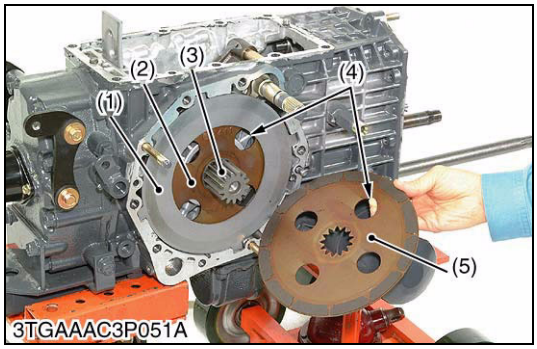

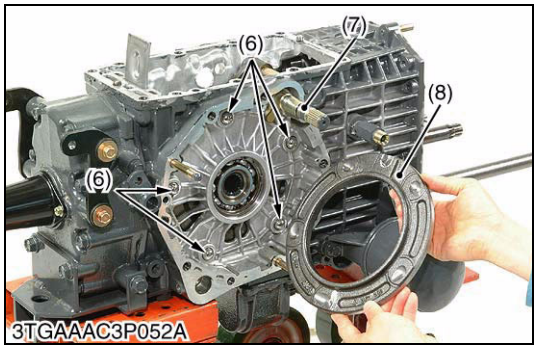

Rear Axle

1. Remove the brake stay (2).
2. Remove the setting screw (4) and pull out the lower link pin (3).
3. Place the disassembling stand under the rear axle case.
4. Remove the rear axle mounting screws and nuts, and separate the rear axle (1).

(When reassembling)

- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the rear axle case and transmission case.
- Fix the brake plate 2 (5) to the rear axle case (1) with the liquid gasket.

Tightening torque	Brake stay mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft
	Brake case mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) Rear Axle
(2) Brake Stay
(3) Lower Link Pin
(4) Setting Screw
(5) Brake Plate 2

9Y1211109TRS0039US0

Brake Disc and Brake Cam

1. Remove the brake disc (5), brake shaft (3), brake plate 1 (1) and brake disc (2).
2. Remove the cam plate (8) and steel balls (6).
3. Remove the brake cam (7).

(When reassembling)

- Apply grease to the steel ball seats. (Do not apply the grease excessively.)
- Place the brake disc (5) so that the brake disc hole (4) should be overlapped 50 % or more.
- Apply grease to the O-ring on the brake cam (7).
- Be sure to fix the brake cam (7) and cam plate (8).

(1) Brake Plate 1
(2) Brake Disc
(3) Brake Shaft
(4) Brake Disc Hole
(5) Brake Disc
(6) Steel Ball
(7) Brake Cam
(8) Cam Plate

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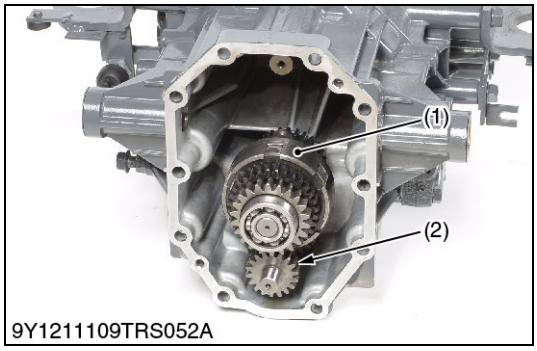
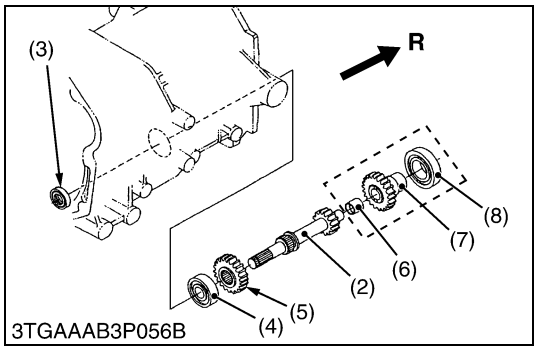
[3] DISASSEMBLING AND ASSEMBLING

(1) Clutch Housing Case





18T Gear Shaft

1. Remove the bi-speed turn hydraulic clutch assembly (1) with 18T gear shaft (2) from the clutch housing case.

(When reassembling)

- Apply grease to the oil seal (3) of the clutch housing.

(1) Bi-speed Turn Hydraulic Clutch Assembly
(2) 18T Gear Shaft
(3) Oil Seal
(4) Ball Bearing
(5) 22T Gear
(6) Bushing
(7) 19T Gear
(8) Ball Bearing

R: Rear Side

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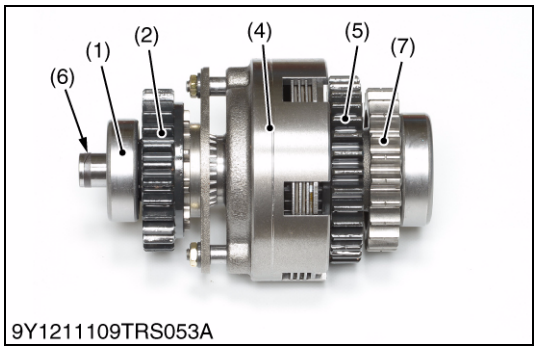

Bi-speed Turn Hydraulic Clutch

1. Remove the seal ring (6) from the counter shaft B (7).
2. Remove the bearing (1) with a puller, then remove the 27T gear (2).
3. Remove the external snap ring (3), then remove the bi-speed turn hydraulic clutch (4) and 32T gear (5).

(When reassembling)

- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumference of the 27T gear (2) and 32T gear (5).
- Install the new seal ring to the counter shaft B (7) firmly.

(1) Bearing
(2) 27T Gear
(3) External Snap Ring
(4) Bi-speed Turn Hydraulic Clutch
(5) 32T Gear
(6) Seal Ring
(7) Counter Shaft B

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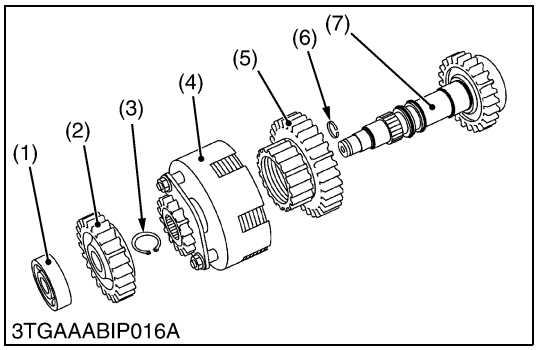

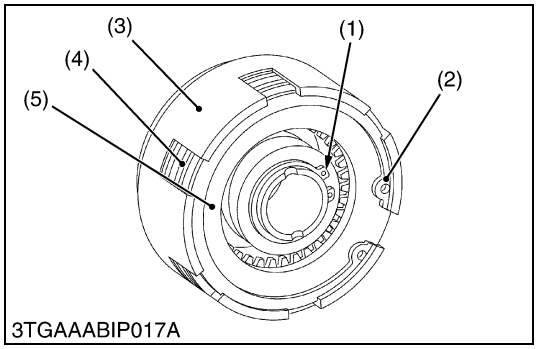

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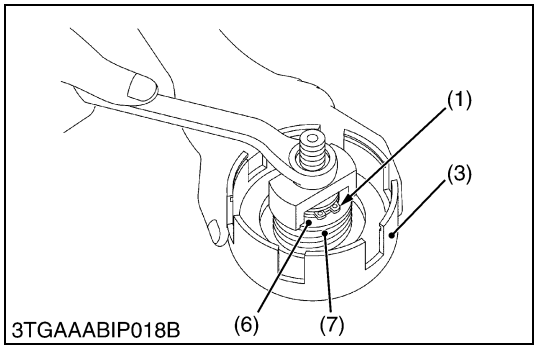

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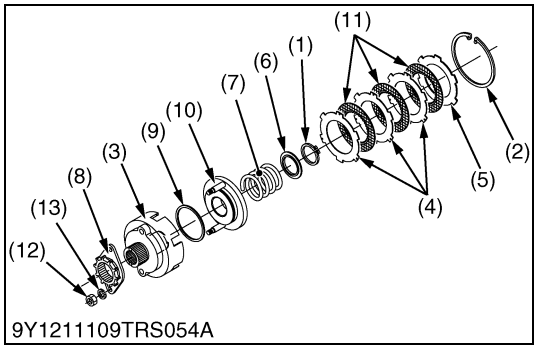

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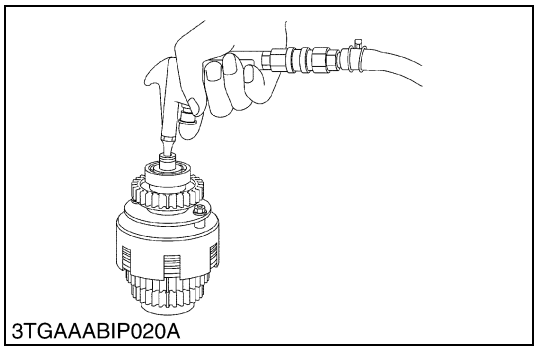
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Disassembling Bi-speed Turn Hydraulic Clutch

1. Remove the internal snap ring (2), then remove the pressure plate (5), three clutch discs (11) and three steel plates (4).
2. Remove the external snap ring (1) with clutch pack disassembling tool (Code No.: 07916-53741), then remove the collar (6) and spring (7).
3. Remove the piston (10).

(When reassembling)

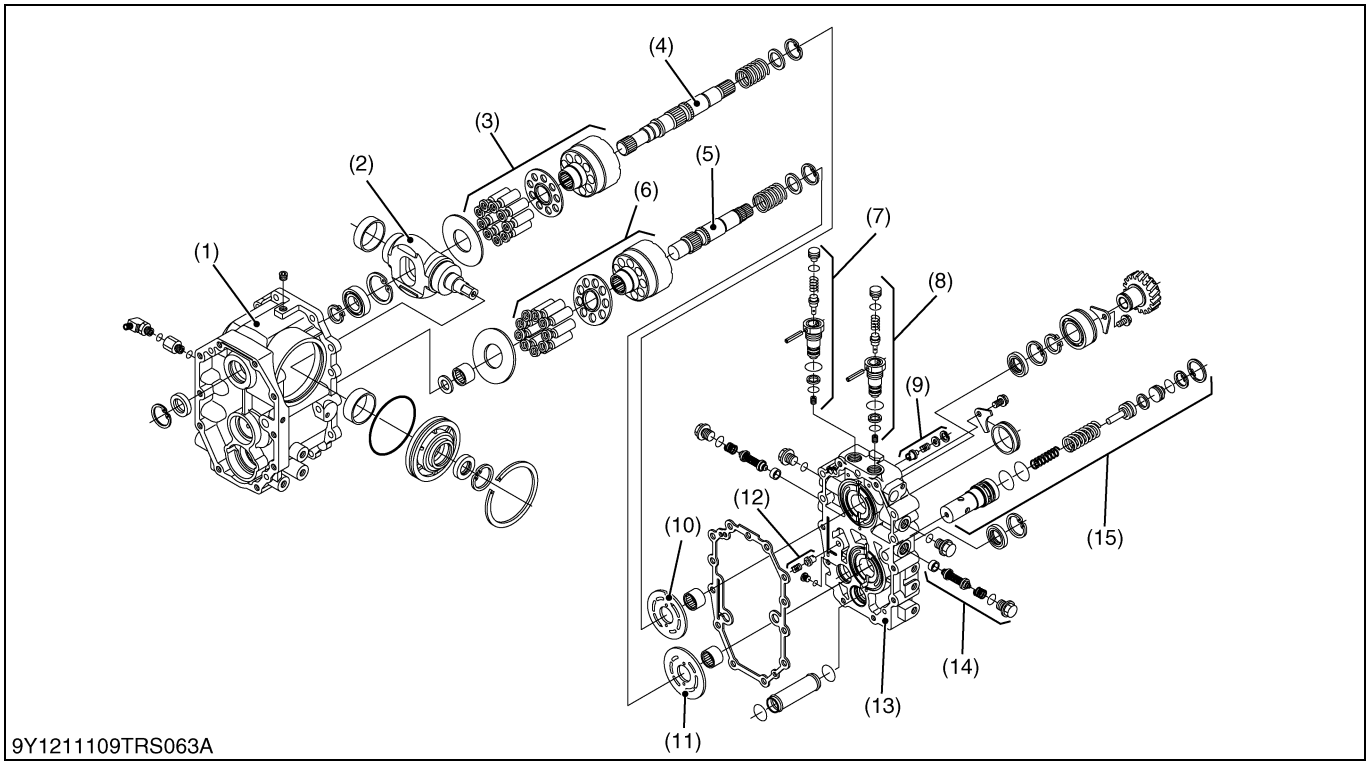
- Apply transmission oil to the D-ring (9), and be careful not to damage it.
- Direct the convex side of collar (6) to the spring (7) side.
- Install the external snap ring (1) so that its sharp edge comes outside.
- Make sure the bi-speed turn hydraulic clutch is in position. Now feed compressed air (about 5 kgf/cm^2) through the bi-speed turn port of the counter shaft B to see if the piston (10) moves smoothly. (See figure.)
- Install the internal snap ring (2) with its catch fitting the groove of the clutch case (3). Be sure also that the sharp edge comes outside.
- Stake the clutch piston mounting nuts firmly with punch, after tightening them.
- Apply lock tight (Three Bond 1372D or equivalent) to the threaded portion of clutch piston mounting nut.

Tightening torque	Clutch piston mounting nuts	12 to 14 N·m 1.2 to 1.5 kgf·m 8.7 to 10 lbf·ft

(1) External Snap Ring
(2) Internal Snap Ring
(3) Clutch Case
(4) Steel Plate
(5) Pressure Plate
(6) Collar
(7) Spring
(8) Shifter
(9) D-ring
(10) Piston
(11) Clutch Disc
(12) Clutch Piston Mounting Nut
(13) Spring Washer

9Y1211109TRS0043US0

(2) Hydrostatic Transmission (HST)



(1) Case
(2) Trunnion Shaft
(3) Variable Displacement Piston Pump
(4) Input Shaft
(5) Output Shaft
(6) Fixed Displacement Piston Motor
(7) Neutral Valve (Reverse)
(8) Neutral Valve (Forward)
(9) Case Relief Valve
(10) Valve Plate (Pump)
(11) Valve Plate (Motor)
(12) Charge Relief Valve
(13) Port Block
(14) Check and High Pressure Relief Valve (Forward)
(15) Accumulator (for PTO Clutch)

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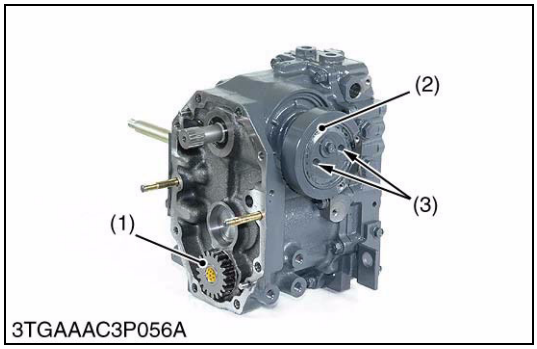

Trunnion Wheel and 19T Gear

1. Remove the trunnion wheel mounting screw.
2. Remove the trunnion wheel while screw in the screw (M12 × Pitch 1.25 mm) to the screw hole (3).
3. Remove the 19T gear (1).

(1) 19T Gear
(2) Trunnion Wheel
(3) Screw Hole

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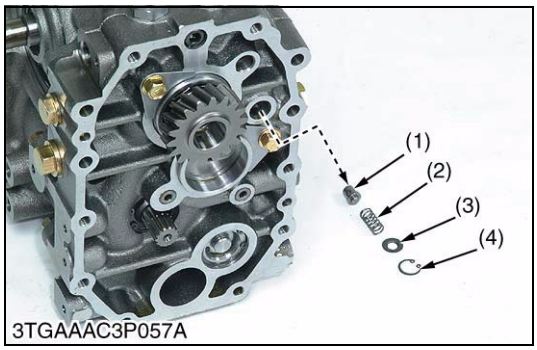

Case Relief Valve

1. Remove the washer (3), spring (2) and poppet (1) after removing the internal snap ring (4).

(When reassembling)

- Apply transmission oil to the poppet (1) before reassembling.

(1) Poppet
(2) Spring
(3) Washer
(4) Internal Snap Ring

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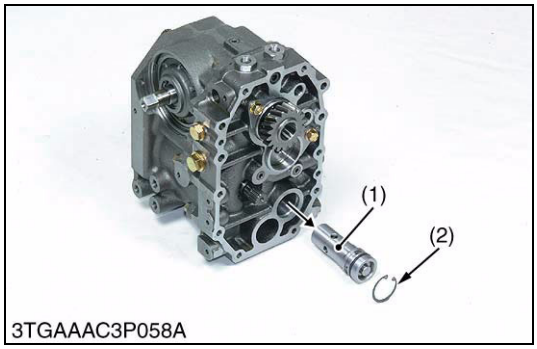

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Accumulator (for PTO Clutch)

1. Remove the internal snap ring and pull out the accumulator assembly (1).

(When reassembling)

- Apply transmission oil to the O-ring (4), (9) and the seal (8).

(1) Accumulator Assembly
(2) Internal Snap Ring
(3) Case
(4) O-ring
(5) Spring
(6) Spring
(7) Piston
(8) Seal
(9) O-ring
(10) Cover
(11) Internal Snap Ring

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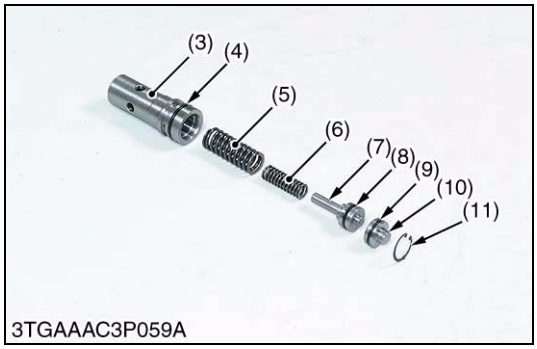

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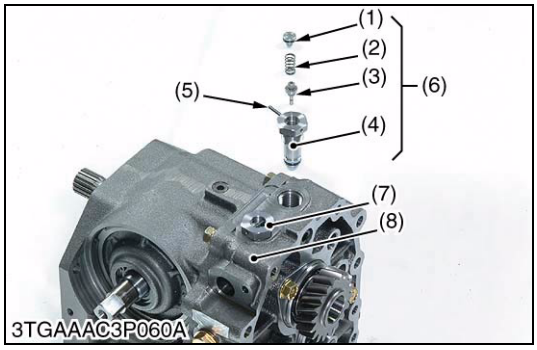
Neutral Valve

1. Remove the neutral valve assembly (6), (7) from the port block (8).
2. Remove the spring holder (1), spring (2) and poppet N (3) after tapping out the spring pin (5).

(When reassembling)

- Apply transmission oil to the O-rings.



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(1) Spring Holder
(2) Spring
(3) Poppet **N**
(4) Valve Body
(5) Spring Pin
(6) Neutral Valve Assembly (Reverse)
(7) Neutral Valve Assembly (Forward)
(8) Port Block

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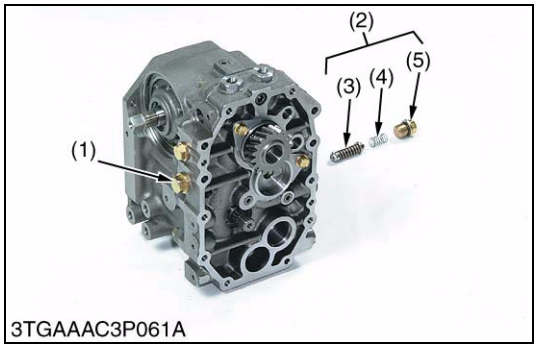
Check and High-Pressure Relief Valve

1. Remove the check spring (4) and the relief valve assembly (3) after removing the plug (5).

(When reassembling)

- Apply transmission oil to the O-rings and relief valve assembly (3).



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Tightening torque	Check and high-pressure relief valve plug	58.8 to 68.6 N·m 6.0 to 7.0 kgf·m 43.4 to 50.6 lbf·ft

■ **NOTE**

- **It is impossible to disassemble relief valve assembly.**
- **The check and high-pressure relief valve for forward and for reverse are interchangeable.**

(1) Check and High-Pressure Relief Valve for Forward
(2) Check and High-Pressure Relief Valve for Reverse
(3) Relief Valve Assembly
(4) Check Spring
(5) Plug

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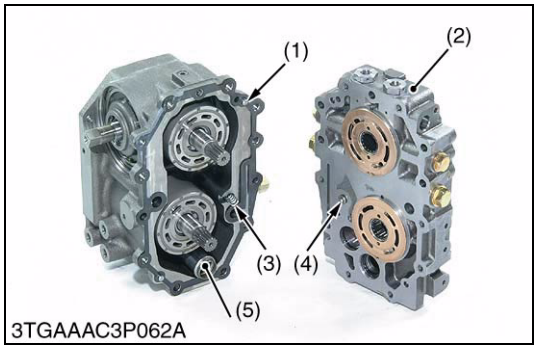

Port Block and Charge Relief Valve

1. Separate the port block (2) after removing the mounting screws.
2. Remove the spring (3) and poppet L (4).
3. Remove the gasket (1) and the pipe (5).

(When reassembling)

- Tighten the port block (2) mounting screws diagonally.
- Be sure to fix the O-ring.
- Apply transmission oil to the O-ring and poppet L.

Tightening torque	Port block mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) Gasket
(2) Port Block
(3) Spring
(4) Poppet L
(5) Pipe

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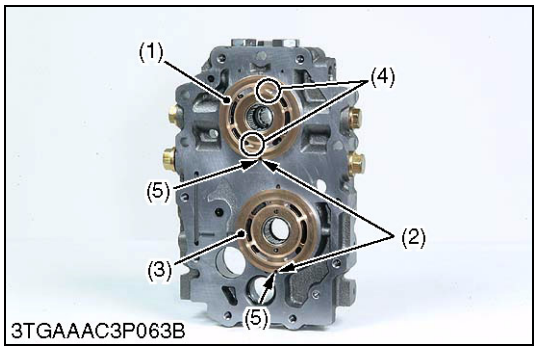

Valve Plates for Pump and Motor

1. Remove the valve plates (1), (3).

(When reassembling)

- Set the grooves (2) of valve plates to spring pins (5) firmly.

■ **IMPORTANT**

- **Valve plates (1), (3) are not interchangeable. Valve plate (1) of pump has two fish tails (4) and the valve plate (3) of motor has not it.**

(1) Valve Plate (Pump)
(2) Grooves
(3) Valve Plate (Motor)
(4) Fish Tail
(5) Spring Pin

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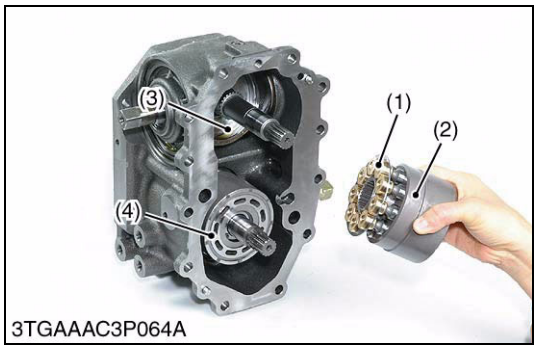

Cylinder Block

1. Pull out the cylinder block (2) with piston (1) as a unit.

■ **IMPORTANT**

- **Make alignment mark on the piston and cylinder when removing the piston from cylinder block.**

(When reassembling)

- Apply transmission oil to the thrust plate (3) and pistons.
- Be sure to align the marks when assembling pistons to the cylinder block.

(1) Piston
(2) Cylinder Block (Pump)
(3) Thrust Plate
(4) Cylinder Block (Motor)

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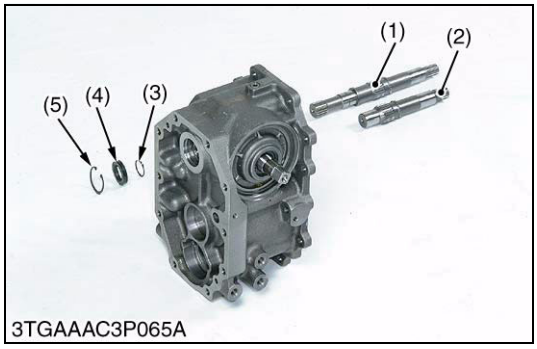

Pump Shaft and Motor Shaft

1. Remove the internal snap ring (5) then remove the oil seal (4).
2. Remove the external snap ring (3) and draw out the pump shaft (1).
3. Draw out the motor shaft (2).

(When reassembling)

- Apply transmission oil to the oil seal.
- Replace oil seal with new one.

(1) Pump Shaft
(2) Motor Shaft
(3) External Snap Ring
(4) Oil Seal
(5) Internal Snap Ring

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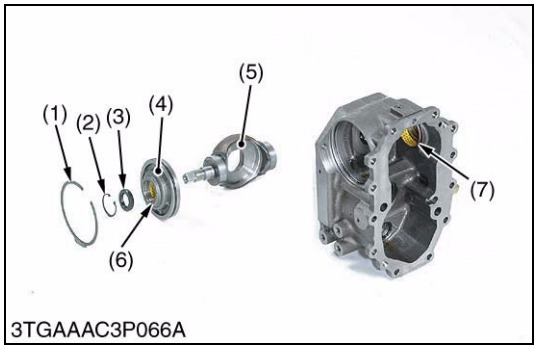

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Trunnion

1. Remove the internal snap ring (1) then tap out the trunnion (5) lightly with cover (4).

(When reassembling)

- Apply transmission oil to the O-rings and apply grease to the bushing (6) and (7).

(1) Internal Snap Ring
(2) External Snap Ring
(3) Oil Seal
(4) Cover
(5) Trunnion
(6) Bushing
(7) Bushing

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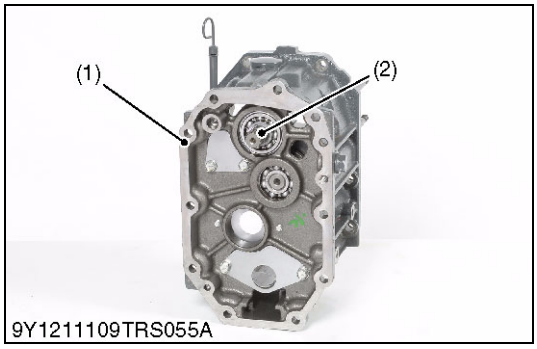
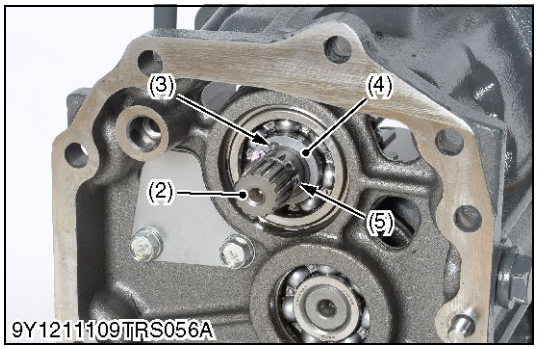
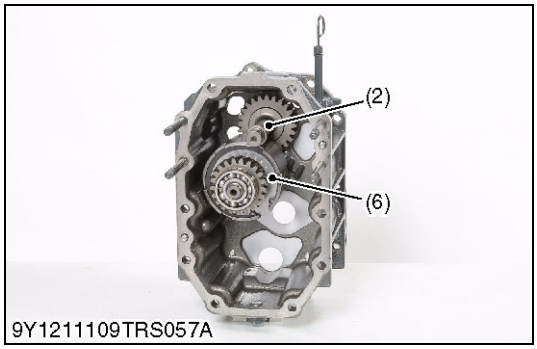
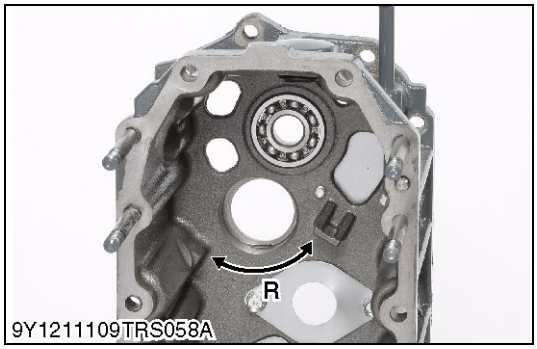
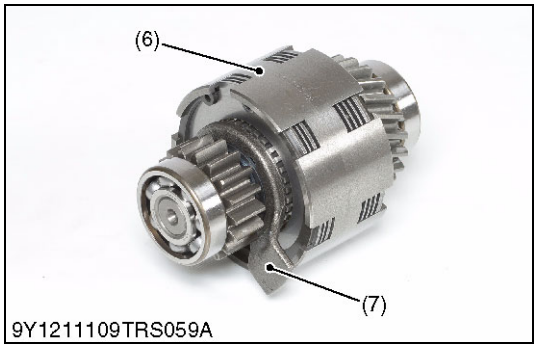
(3) Mid Case











Removing Hydraulic PTO Clutch

1. Remove the external snap rings (3), (5) and collar (4) on the 24T gear shaft (2).
2. Tap out the 24T gear shaft (2) with the hydraulic PTO clutch assembly (6).

(When reassembling)

- • Install the hydraulic clutch assembly (6) so that the stopper (7) enters a range **"R"**.

(1) Mid Case
(2) 24T Gear Shaft
(3) External Snap Ring
(4) Collar
(5) External Snap Ring
(6) Hydraulic Clutch Assembly
(7) Stopper

R: Range

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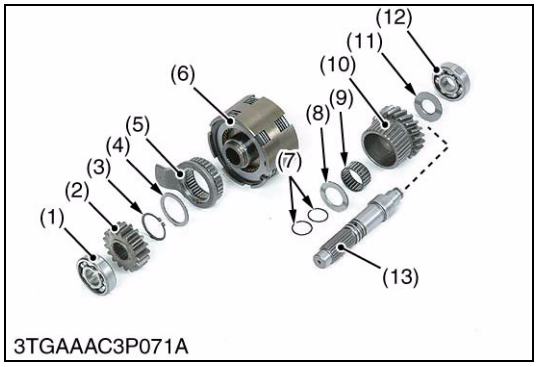

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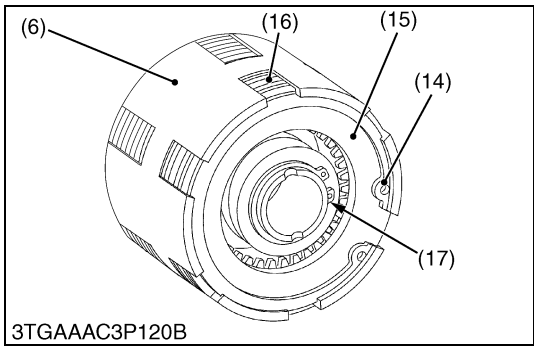
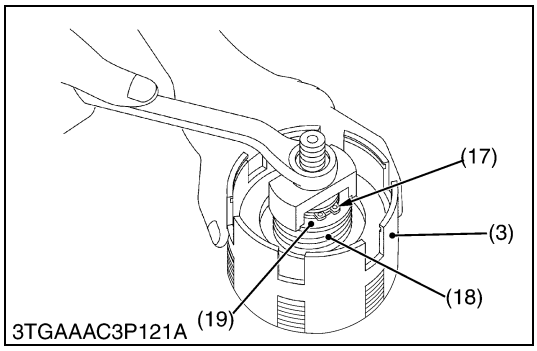


3TGAAAC3P120B



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Hydraulic PTO Clutch

1. Remove the bearing (1) and 17T gear (2).
2. Pull out the counter shaft (13), collar (11), bearing (12), 21T gear (10), needle bearing (9) and collar (8).
3. Remove the external snap ring (3) and pull put the collar (4) and stopper (5).
4. Remove the internal snap ring (14) and remove the pressure plate (15) steel plate and clutch disc (16).
5. Remove the external snap ring (17) with clutch pack disassembling tool, and remove the collar (19) and spring (18).

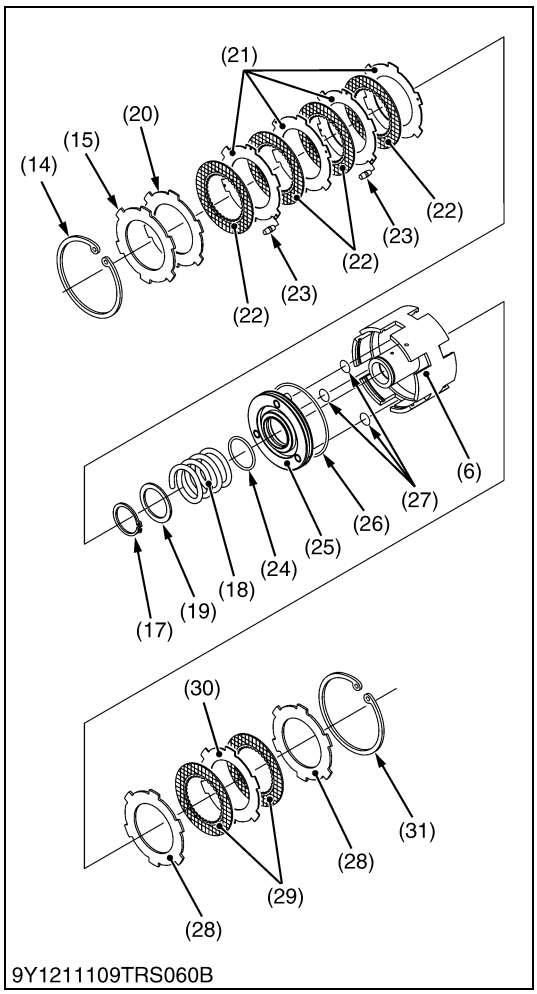
(When reassembling)

- Apply transmission oil to the needle bearing (9).

(1) Bearing
(2) 17T Gear
(3) External Snap Ring
(4) Collar
(5) Stopper (with Needle Bearing)
(6) Clutch Body
(7) O-rings
(8) Collar
(9) Needle Bearing
(10) 21T Gear
(11) Collar
(12) Bearing
(13) Counter Shaft
(14) Internal Snap Ring
(15) Pressure Plate
(16) Steel Plate and Clutch Disc
(17) External Snap Ring
(18) Spring
(19) Collar

(To be continued)

(Continued)



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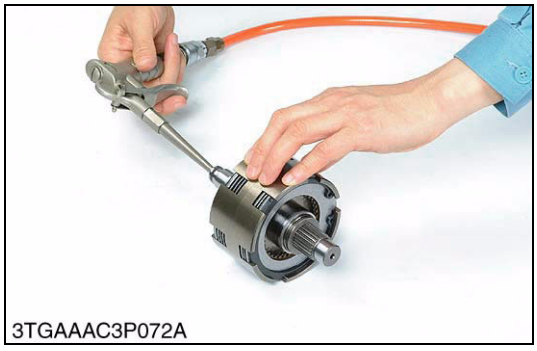
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1. Remove the internal snap ring (31) and remove the pressure plate (28), steel plate (30) and clutch disc (29).
2. Hydraulic clutch pack can be disassembled as shown in figure.

(When reassembling)

- Apply transmission oil to the clutch disc (22), (29).
- Apply transmission oil to the D-ring and O-ring on the piston (25).
- Replace the D-ring and O-ring with new one.
- Install the internal snap rings (14), (31) with their catches fitting the groove of the clutch case (6). Be sure also that the sharp edges come outside.
- Do not confuse the 3 types of steel plates, one is steel plate, another is steel plate with holes, and the remainder is the plate with holes and rubber plugs.
- Install the steel plates in order of "steel plate with holes", "steel plate with holes and rubber plugs", "steel plate with holes", "steel plate with holes and rubber plugs" and "steel plate without hole" from the inside.
- The hole position should not correspond to the hole position of adjacent plate. (See figure.)
- After finishing reassembling, feed compressed air (about 5 kgf/cm^2) through the counter shaft to see if the piston (25) moves smoothly.

(Reference)

- Thickness of steel plate and pressure plate
  Steel plate (20), (30):
  1.0 mm (0.039 in.)
  Steel plate (with hole), (21):
  1.2 mm (0.047 in.)
  Pressure plate (15), (28):
  2.0 mm (0.079 in.)

(6) Clutch Case
(14) Internal Snap Ring
(15) Pressure Plate
(17) External Snap Ring
(18) Spring
(19) Collar
(20) Steel Plate
(21) Steel Plate (with Holes)
(22) Clutch Disc
(23) Rubber Plug
(24) D-ring
(25) Piston
(26) D-ring
(27) O-rings
(28) Pressure Plate
(29) Clutch Disc
(30) Steel Plate
(31) Internal Snap Ring

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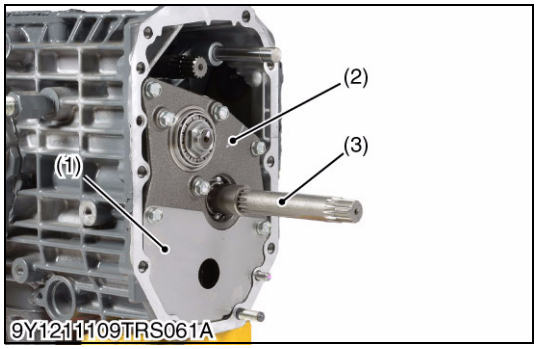
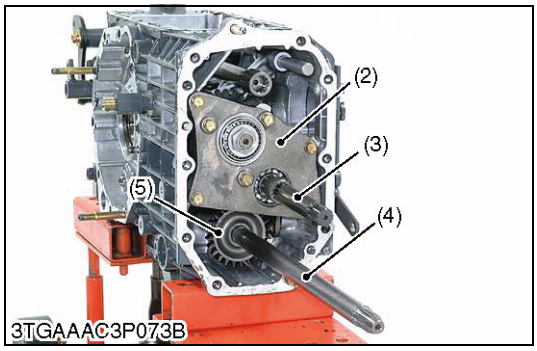
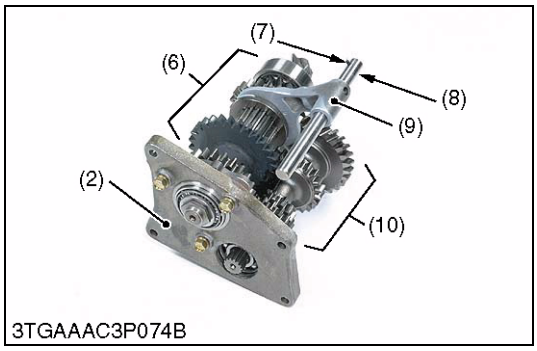
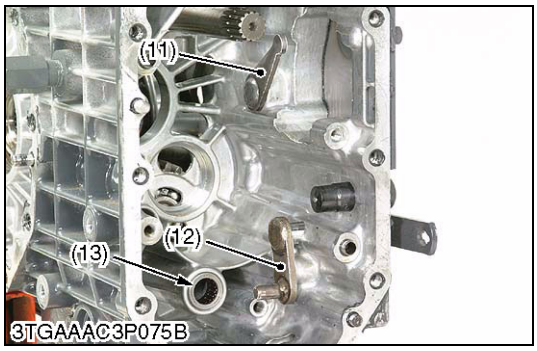
(4) Transmission Case









Front Drive Shaft and Mid Cover

1. Remove the cover (1).
2. Remove the joint shaft (3) and coupling.
3. Remove the front drive shaft (4) and 24T gear (5).
4. Remove the mid cover mounting screws and remove the hypoid pinion assembly (6), counter shaft assembly (10), mid cover (2) and shift fork (8) at the same time.

(When reassembling)

- Make sure that the spring pin (7) on the fork rod (8) is set in the groove of the transmission case.
- Make sure that the shift arm (12) is set in the groove of the 24T gear (1).
- Make sure that the shift arm (11) is set in the groove of the shift fork (9).
- Make sure that the manufactures' stamp on the needle bearing (13) faces HST side.
- Be sure to check the backlash and tooth contact between hypoid pinion and hypoid ring gear (See page 3-S73).
- Make sure that the counter shaft assembly (10) can be rotated by hand lightly.

(1) Cover
(2) Mid Cover
(3) Joint Shaft
(4) Front Drive Shaft
(5) 24T Gear
(6) Hypoid Pinion Assembly
(7) Spring Pin
(8) Fork Rod
(9) Shift Fork (Range Gear Shift)
(10) Counter Shaft Assembly
(11) Shift Arm (Range Gear Shift)
(12) Shift Arm (Front Wheel Drive)
(13) Needle Bearing

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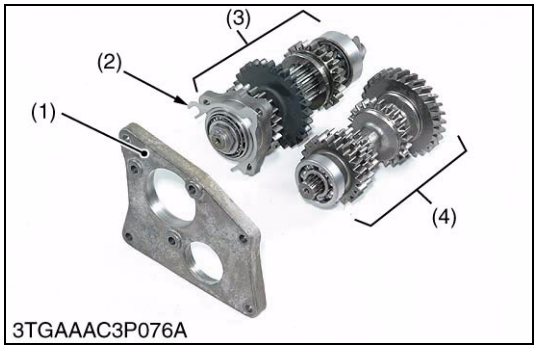

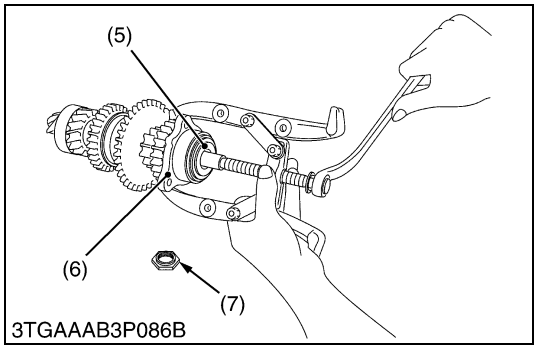

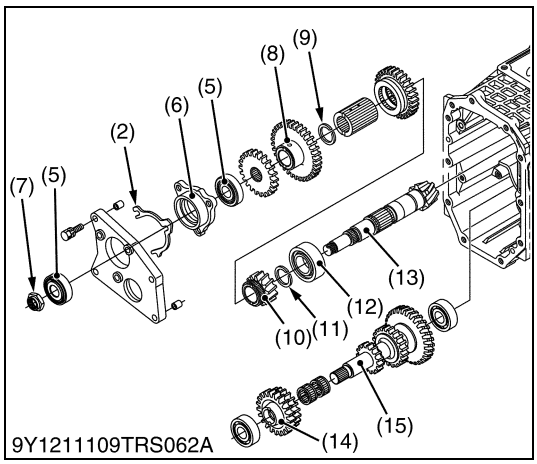

Hypoid Pinion Assembly and Rear Counter Shaft Assembly

1. Remove the hypoid pinion assembly (3), shim (2) and counter shaft assembly (4) from the mid cover (1).
2. Remove the stake of the lock nut (7) and remove it.
3. Remove the bearing holder (6) and taper roller bearing (5) from hypoid pinion as a unit.
4. Remove the gears.

(When reassembling)

- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the 29T gear (8) and 13T gear (10).
- Assemble the roller bearing (12) with applying the oil for inner race.
- Install the external snap rings (9), (11) with their direction of sharp edge faces HST side.
- Make sure that the 22-21T gear can be rotated by hand lightly.

■ **IMPORTANT**

- **Adjust the hypoid pinion turning torque by the tightening torque of lock nut (7). (See page 3-S73).**
- **Adjust the backlash and tooth contact of hypoid gears. (See page 3-S73).**

(Reference)

- Thickness of shim (2)
  0.4 mm (0.016 in.)
  0.5 mm (0.020 in.)
  0.6 mm (0.024 in.)
  0.7 mm (0.028 in.)
  0.8 mm (0.031 in.)
  0.9 mm (0.035 in.)
  1.0 mm (0.039 in.)
  1.2 mm (0.047 in.)
  1.4 mm (0.055 in.)

(1) Mid Cover
(2) Shim
(3) Hypoid Pinion Assembly
(4) Counter Shaft Assembly
(5) Taper Roller Bearing
(6) Bearing Holder
(7) Lock Nut
(8) 29T Gear
(9) External Snap Ring
(10) 13T Gear
(11) External Snap Ring
(12) Roller Bearing
(13) Hypoid Pinion
(14) 22-21T Gear
(15) Counter Shaft

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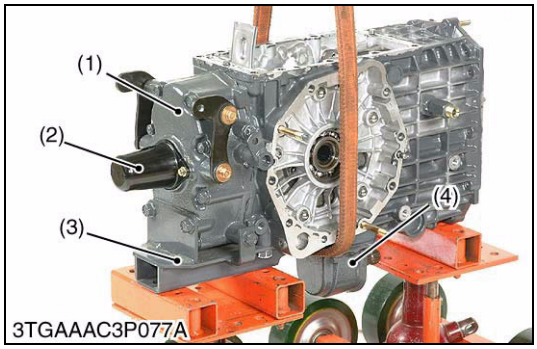
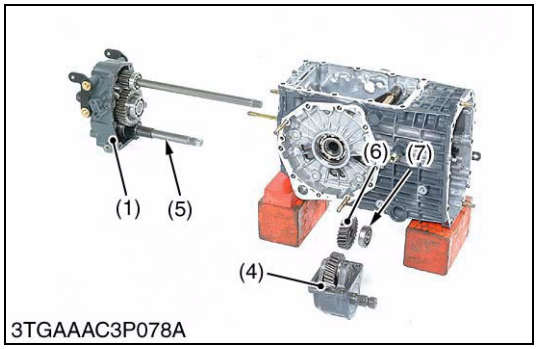




Separating Rear PTO Case and Mid PTO Case

1. Remove the drawbar bracket (3).
2. Remove the mounting screws and pull out the rear PTO case (1) with the gears and shafts on it.
3. Remove the mid PTO case (4).
4. Remove the 24T gear (6) and bearing (7) from the transmission case.

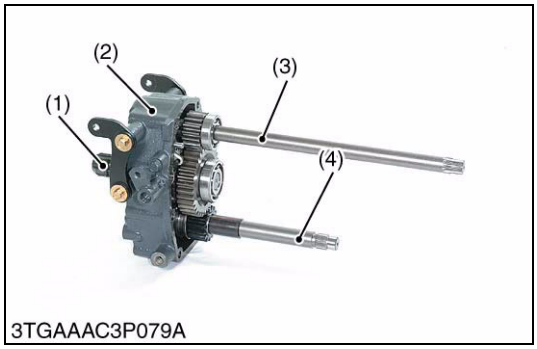
(When reassembling)

- Install the rear PTO case (1) while inserting the mid PTO drive shaft (5) into the 24T gear (6) and bearing (7).
- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the transmission case, rear PTO case (1) and mid PTO case (4).

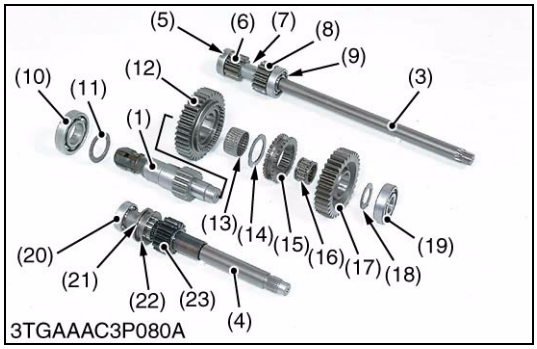
Tightening torque	Rear PTO case mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft
	Mid PTO case mounting screw	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 21.7 to 25.3 lbf·ft

(1) Rear PTO Case
(2) PTO Shaft Cover
(3) Drawbar Bracket
(4) Mid PTO Case
(5) Mid PTO Drive Shaft
(6) 24T Gear
(7) Bearing

9Y1211109TRS0059US0



3TGAAAC3P079A



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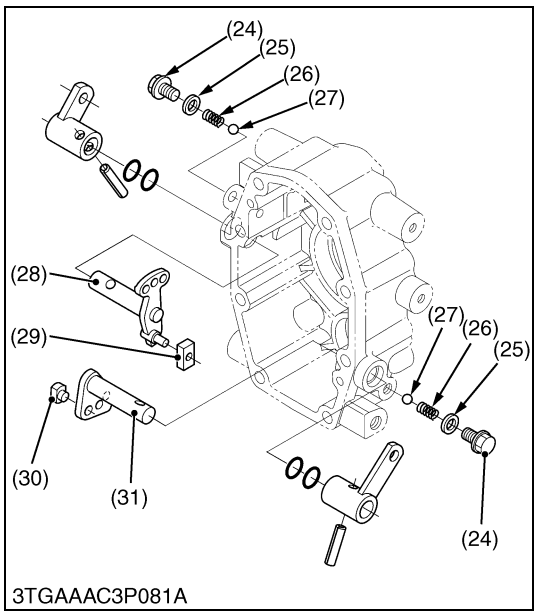

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Rear PTO Case

1. Pull out the PTO drive shaft (3) and mid PTO drive shaft (4) with gears while tapping out the PTO shaft (1).
2. Remove the gears and bearings on the PTO drive shaft (3), PTO shaft (1) and mid PTO drive shaft (4).
3. Shift levers and shift arms can be removed as shown in the figure.

■ **NOTE**

- **Do not lose the detent balls.**

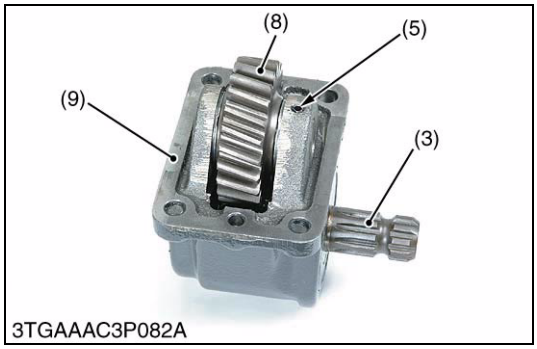
(When reassembling)

- Make sure that the shift head (29), (30) is installed proper positions.
- After installing the PTO shaft (1) to the rear PTO case, install the oil seal on the PTO shaft.

Tightening torque	Detent plug (24)	19.6 to 24.5 N·m 2.0 to 2.5 kgf·m 14.5 to 18.1 lbf·ft

(1) PTO Shaft
(2) Rear PTO Case
(3) PTO Drive Shaft
(4) Mid PTO Drive Shaft
(5) Bearing
(6) 12T Gear
(7) Collar
(8) 16T Gear
(9) Bearing
(10) Bearing
(11) Collar
(12) 36T Gear
(13) Needle Bearing
(14) Collar
(15) Shifter
(16) Needle Bearing
(17) 33T Gear
(18) Collar
(19) Bearing
(20) Shift Lever
(21) Coupling
(22) Shifter
(23) 15T Gear
(24) Detent Plug
(25) Gasket
(26) Spring
(27) Detent Ball
(28) Shift Arm
(29) Shift Head
(30) Shift Head
(31) Shift Arm

9Y1211109TRS0060US0



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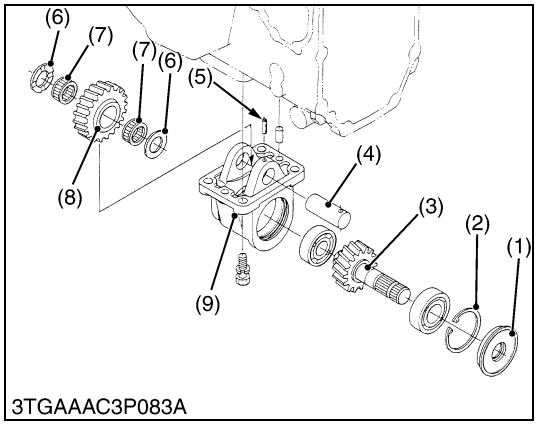

3TGAAAC3P083A

Mid-PTO Case and Shaft

1. Remove the oil seal (1) and internal snap ring (2).
2. Pull out the mid-PTO shaft (3).
3. Tap in the spring pin (5) to idle shaft (4), and pull out the idle shaft (4).

(When reassembling)

- Direct the grooved sides of the thrust collars (6) to the needle bearing side.
- Apply grease to the oil seal (1).

(1) Oil Seal
(2) Internal Snap Ring
(3) Mid-PTO Shaft
(4) Idle Shaft
(5) Spring Pin
(6) Thrust Collar
(7) Needle Bearing
(8) 23T Gear
(9) Mid-PTO Case

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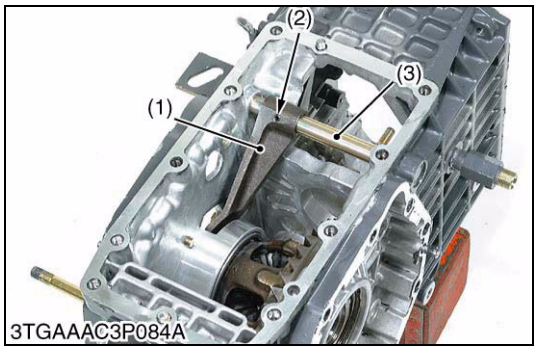


3TGAAAC3P084A

Differential Lock Shift Fork

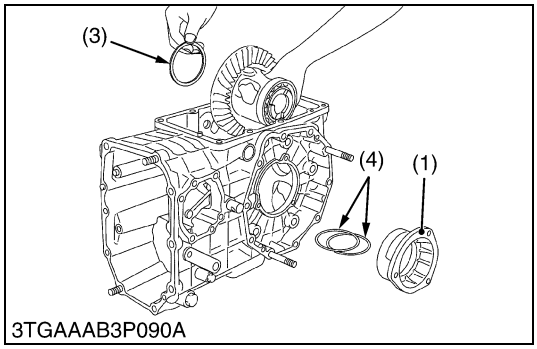
1. Tap out the spring pin (2).
2. Set the shift fork (1) at differential lock positions.
3. Pull out the shift fork (1) and remove the fork rod (3).

(When reassembling)

- Apply the grease to the oil seal of the fork rod (3).

(1) Shift Fork
(2) Spring Pin
(3) Fork Rod

9Y1211109TRS0062US0



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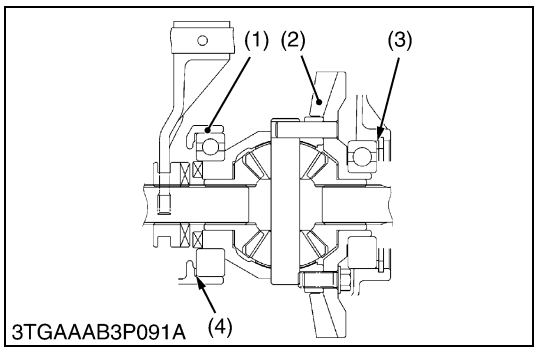

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Differential Gear Assembly

1. Remove the differential bearing holder (1), noting the number of shims **L** (4).
2. Remove the differential gear as an assembly and the shims **R** (3).

(When reassembling)

- Install same number of shims as before disassembling.

■ **IMPORTANT**

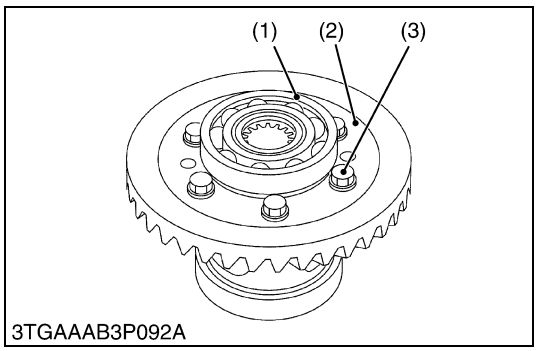
- **Adjust the backlash and the tooth contact after assembling the differential gear assembly. (See page 3-S73).**

(Reference)

- Increase the shim **R** (3) thickness until to get backlash between hypoid pinion and hypoid ring gear (2). After that adjust the correct backlash with the shim **L** (4) and the shim **R** (3).
- Thickness of shims **L**:
  0.4 mm (0.016 in.)
  0.5 mm (0.020 in.)
  0.6 mm (0.024 in.)
  0.7 mm (0.028 in.)
  0.8 mm (0.031 in.)
  0.9 mm (0.035 in.)
  1.0 mm (0.039 in.)
  1.2 mm (0.047 in.)
  1.4 mm (0.055 in.)
- Thickness of shims **R**:
  1.4 mm (0.055 in.)
  1.5 mm (0.059 in.)
  1.6 mm (0.063 in.)
  1.7 mm (0.067 in.)
  1.8 mm (0.071 in.)
  1.9 mm (0.075 in.)

(1) Bearing Holder
(2) Hypoid Ring Gear
(3) Shim **R**
(4) Shim **L**

9Y1211109TRS0063US0



3TGAAAB3P092A

Hypoid Ring Gear

1. Remove the bearing (1) with special use puller set.
2. Loosen and remove the UBS screws (3), then remove the hypoid ring gear (2).

■ **NOTE**

- **When loosening and tightening the UBS screws (3), use a hexagonal socket wrench to protect the screw heads from damage.**

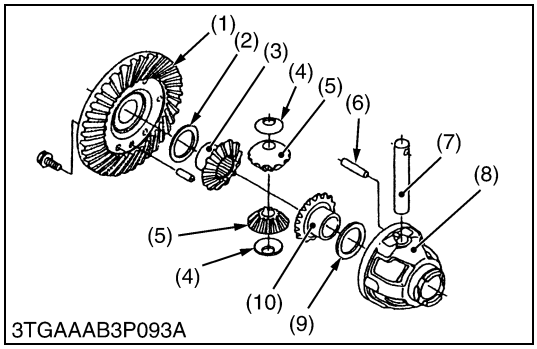
(When reassembling)

- Apply liquid lock (Three Bond 1372D or equivalent) to the UBS screws, and tighten diagonally them with correct tightening torque.

Tightening torque	Hypoid ring gear mounting UBS screws (3)	60.8 to 70.6 N·m 6.2 to 7.2 kgf·m 44.8 to 52.1 lbf·ft

(1) Bearing
(2) Hypoid Ring Gear
(3) UBS Screw

9Y1211109TRS0064US0



Differential Pinion Shaft, Differential Pinion and Differential Side Gear

1. Remove the differential side gear (3) and shim (2).
2. Tap out the dowel pin (6).
3. Pull out the differential pinion shaft (7), then remove the differential pinions (5), thrust collars (4), differential side gear (10) and shim (9).

■ **NOTE**

- **Arrange the parts to know their original positions.**

(When reassembling)

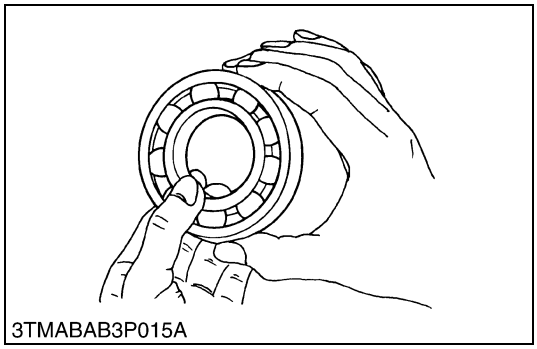
- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumferential surface of the differential side gears (3), (10) and differential pinions (5).
- Apply grease to the outer surface of the pinion thrust collars (4).

(1) Ring Gear
(2) Shim
(3) Differential Side Gear
(4) Thrust Collar
(5) Differential Pinion
(6) Dowel Pin
(7) Differential Pinion Shaft
(8) Differential Case
(9) Shim
(10) Differential Side Gear

9Y1211109TRS0065US0

[4] SERVICING

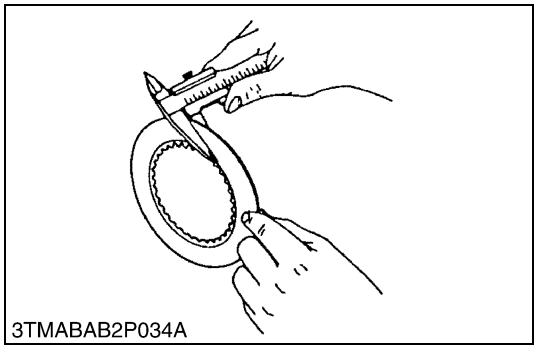
(1) Bi-speed Hydraulic Clutch and Gears


3TMABAB3P015A

Checking Bearing

1. Hold the inner race, and push and pull the outer race in all directions to check for wear and roughness.
2. Apply transmission fluid to the bearing, and hold the inner race. Then, turn the outer race to check rotation.
3. If there is any problem, replace it.

9Y1211109TRS0066US0

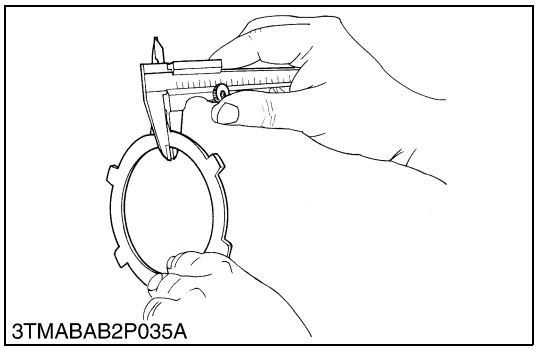

3TMABAB2P034A

Clutch Disc Wear

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

Clutch disc wear	Factory specification	1.915 to 2.085 mm 0.0754 to 0.0821 in.
	Allowable limit	1.4 mm 0.055 in.

9Y1211109TRS0067US0


3TMABAB2P035A

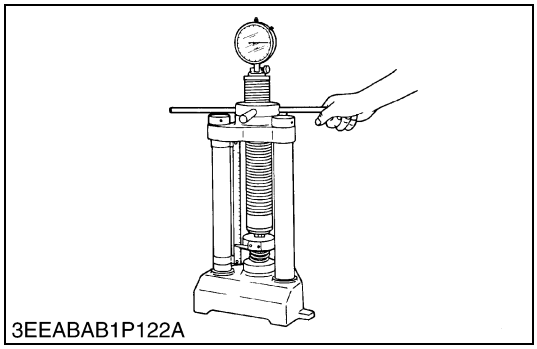
Steel Plate and Pressure Plate Wear

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

Steel plate wear	Factory specification	0.95 to 1.05 mm 0.0374 to 0.0413 in.
	Allowable limit	0.8 mm 0.031 in.

Pressure plate wear	Factory specification	1.95 to 2.05 mm 0.0768 to 0.0807 in.
	Allowable limit	1.8 mm 0.071 in.

9Y1211109TRS0068US0


3EEABAB1P122A

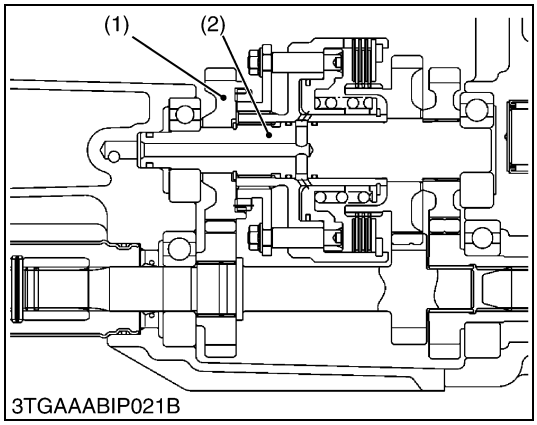
Piston Return Spring Free Length and Tension

1. Measure the free length of the piston return spring with vernier calipers.
2. Place the piston return spring on a spring compression tester and compress to the specified length, and read the gauge.
3. If the measurement is less than the allowable limit, replace.

Piston / return spring free length	Factory specification	44.0 mm 1.73 in.

Piston return spring tension	Factory specification	638.7 N / 26 mm 65.13 kgf / 26 mm 143.6 lbf / 1.02 in.
	Allowable limit	539.4 N / 26 mm 55 kgf / 26 mm 121.3 lbf / 1.02 in.

9Y1211109TRS0069US0



Clearance between Counter Shaft B and 27T Gear

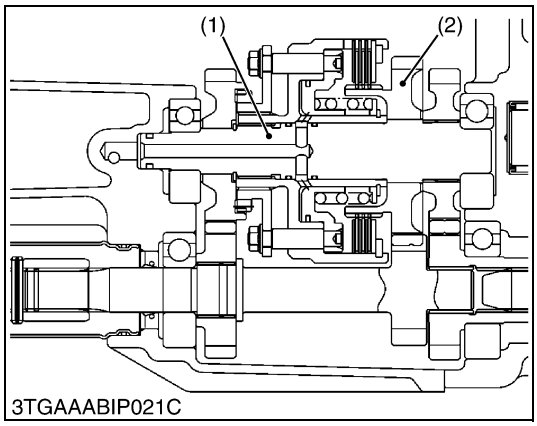
1. Measure the counter shaft B O.D. with an outside micrometer.
2. Measure the 27T gear I.D. with an inside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between counter shaft B and 27T gear	Factory specification	0.040 to 0.082 mm 0.00157 to 0.00323 in.
	Allowable limit	0.1 mm 0.004 in.

Counter shaft B O.D.	Factory specification	24.959 to 24.980 mm 0.98264 to 0.98346 in.
27T gear I.D.	Factory specification	25.020 to 25.041 mm 0.98504 to 0.98587 in.

(1) 27T Gear (2) Counter Shaft B

9Y1211109TRS0070US0



Clearance between Counter Shaft B and 32T Gear

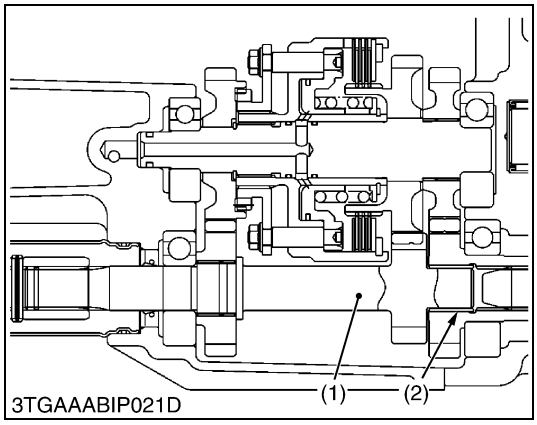
1. Measure the counter shaft B O.D. with an outside micrometer.
2. Measure the 32T gear I.D. with an inside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between counter shaft B and 32T gear	Factory specification	0.040 to 0.082 mm 0.00157 to 0.00323 in.
	Allowable limit	0.1 mm 0.004 in.

Counter shaft B O.D.	Factory specification	28.459 to 28.480 mm 1.12043 to 1.12126 in.
32T gear I.D.	Factory specification	28.520 to 28.541 mm 1.12283 to 1.12366 in.

(1) Counter Shaft B (2) 32T Gear

9Y1211109TRS0071US0



Clearance between 18T Gear Shaft and Bushing

1. Measure the 18T gear shaft O.D. with an outside micrometer.
2. Measure the bushing I.D. with an inside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between 18T gear shaft and bushing	Factory specification	0.000 to 0.062 mm 0.00000 to 0.00244 in.
	Allowable limit	0.1 mm 0.004 in.

18T gear shaft O.D.	Factory specification	17.989 to 18.000 mm 0.70823 to 0.70866 in.
Bushing I.D.	Factory specification	18.000 to 18.051 mm 0.70866 to 0.71067 in.

(1) 18T Gear Shaft (2) Bushing

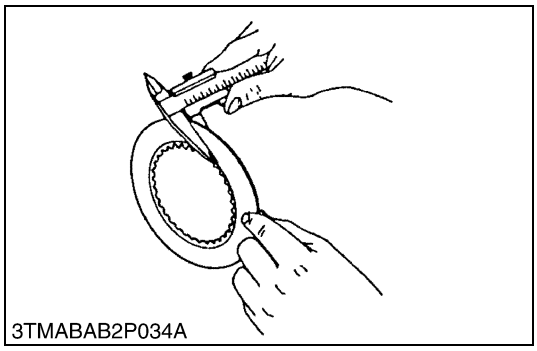
9Y1211109TRS0072US0

(2) Hydraulic PTO Clutch and Gears

Checking Bearing

- See page 3-S70.

9Y1211109TRS0073US0

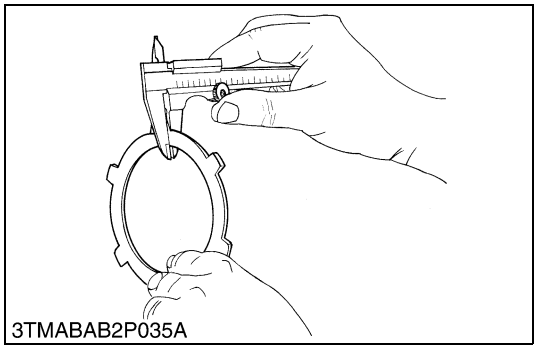

3TMABAB2P034A

Clutch Disc Wear

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

Clutch disc wear	Factory specification	1.70 to 1.90 mm 0.067 to 0.075 in.
	Allowable limit	1.55 mm 0.061 in.

9Y1211109TRS0074US0


3TMABAB2P035A

Steel Plate and Pressure Plate Wear

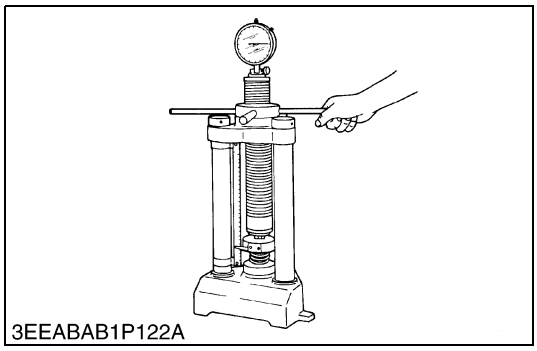
1. Measure the steel plate thickness with vernier calipers.
2. Measure the pressure plate thickness with vernier calipers.
3. If the thickness is less than the allowable limit, replace.

Steel plate wear (without hole)	Factory specification	0.95 to 1.05 mm 0.0374 to 0.0413 in.
	Allowable limit	0.8 mm 0.031 in.

Steel plate wear (with holes, with holes and rubber plugs)	Factory specification	1.15 to 1.25 mm 0.045 to 0.049 in.
	Allowable limit	1.10 mm 0.043 in.

Pressure plate wear	Factory specification	1.95 to 2.05 mm 0.0768 to 0.0807 in.
	Allowable limit	1.8 mm 0.071 in.

9Y1211109TRS0075US0


3EEABAB1P122A

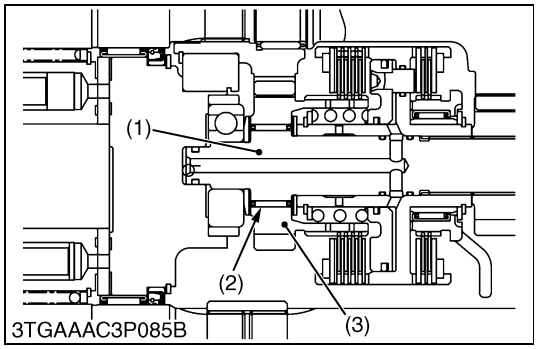
Piston Return Spring Free Length and Tension

1. Measure the free length of the piston return spring with vernier calipers.
2. Place the piston return spring on a spring compression tester and compress to the specified length, and read the gauge.
3. If the measurement is less than the allowable limit, replace.

Piston / return spring free length	Factory specification	44.0 mm 1.73 in.

Piston return spring tension	Factory specification	638.7 N / 26 mm 65.13 kgf / 26 mm 143.6 lbf / 1.02 in.
	Allowable limit	539.4 N / 26 mm 55 kgf / 26 mm 121.3 lbf / 1.02 in.

9Y1211109TRS0069US0



Clearance between 21T Gear and Counter Shaft

1. Measure the 21T gear I.D. and counter shaft O.D..
2. Measure the O.D. of two needles installed diagonally in the needle bearing.
3. Calculate the clearance.
4. If the clearance exceeds the allowable limit, replace.

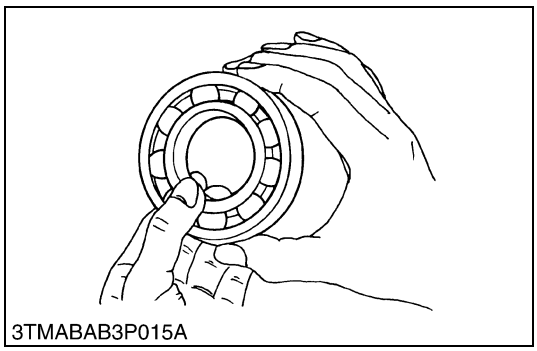
Clearance between 21T gear and counter shaft	Factory specification	0.009 to 0.040 mm 0.0004 to 0.0016 in.
	Allowable limit	0.1 mm 0.0039 in.

21T Gear I.D.	Factory specification	35.009 to 35.025 mm 1.3783 to 1.3789 in.
Counter shaft O.D.	Factory specification	29.991 to 30.000 mm 1.1807 to 1.1811 in.
Needle O.D.	Factory specification	2.497 to 2.500 mm 0.0983 to 0.0984 in.

(1) Counter Shaft
(2) Needle Bearing
(3) 21T Gear

9Y1211109TRS0076US0

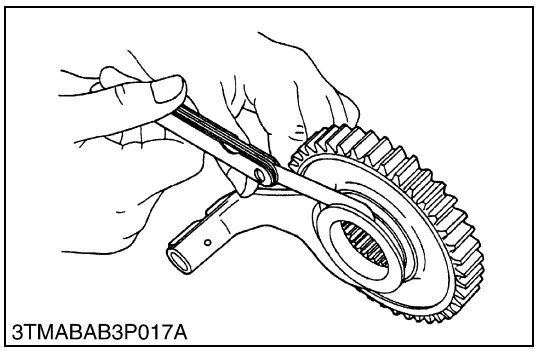
(3) Transmission Case



Checking Bearing

1. Hold the inner race, and push and pull the outer race in all directions to check for wear and roughness.
2. Apply transmission fluid to the bearing, and hold the inner race. Then, turn the outer race to check rotation.
3. If there is any problem, replace it.

9Y1211109TRS0066US0

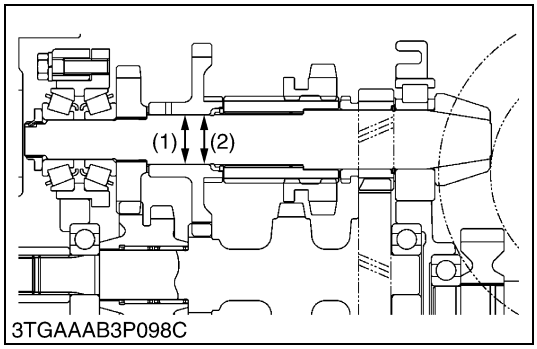


Clearance between Shift Fork and Shifter Groove

1. Place for in the groove to check clearance with feeler gauge.
2. If the clearance exceeds allowable limit, replace.

Clearance between shift fork and shifter groove	Factory specification	0.1 to 0.40 mm 0.004 to 0.016 in.
	Allowable limit	0.80 mm 0.031 in.

9Y1211109TRS0077US0



Clearance between Hypoid Pinion Shaft and 29T Gear

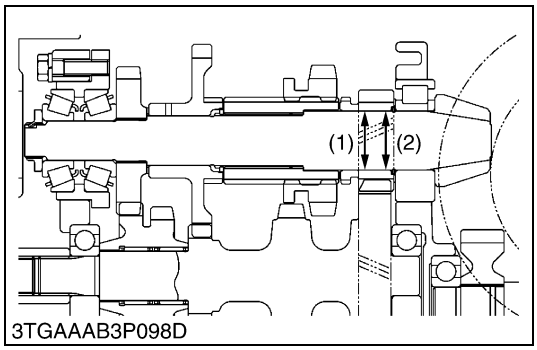
1. Measure the 29T gear I.D. and hypoid pinion O.D..
2. Calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between hypoid pinion shaft and 29T gear	Factory specification	0.020 to 0.051 mm 0.0008 to 0.0020 in.
	Allowable limit	0.1 mm 0.0039 in.

29T gear I.D.	Factory specification	25.000 to 25.018 mm 0.9843 to 0.9850 in.
Hypoid pinion shaft O.D.	Factory specification	24.967 to 24.980 mm 0.9830 to 0.9835 in.

(1) 29T Gear I.D. (2) Hypoid Pinion O.D.

9Y1211109TRS0078US0



Clearance between Hypoid Pinion Shaft and 13T Gear

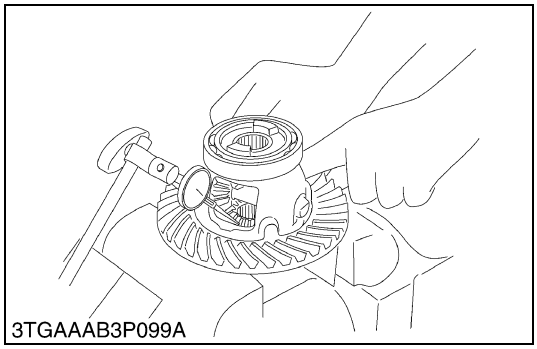
1. Measure the 13T gear I.D. and hypoid pinion O.D..
2. Calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between hypoid pinion shaft and 13T gear	Factory specification	0.020 to 0.051 mm 0.0008 to 0.0020 in.
	Allowable limit	0.1 mm 0.0039 in.

13T gear I.D.	Factory specification	30.000 to 30.018 mm 1.1811 to 1.1818 in.
Hypoid pinion shaft O.D.	Factory specification	29.967 to 29.980 mm 1.1798 to 1.1803 in.

(1) 13T Gear I.D. (2) Hypoid Pinion O.D.

9Y1211109TRS0079US0



Backlash between Differential Pinion and Differential Side Gear

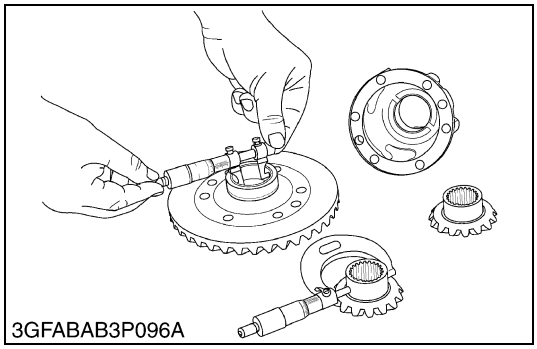
1. Set a dial indicator (lever type) on the tooth of differential pinion.
2. Hold the differential side gear and move the differential pinion to measure the backlash.
3. If the measurement exceeds the allowable limit, adjust with the differential side gear shim.

Backlash between differential pinion and differential side gear	Factory specification	0.10 to 0.30 mm 0.0039 to 0.0118 in.
	Allowable limit	0.5 mm 0.020 in.

(Reference)

- Thickness of differential side gear shims:
  0.8 mm (0.031 in.)
  1.0 mm (0.039 in.)
  1.2 mm (0.047 in.)

9Y1211109TRS0080US0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Clearance between Differential Case and Differential Side Gear

1. Measure the differential case I.D. and ring gear I.D. with an inside micrometer.
2. Measure the differential side gear boss O.D. with an outside micrometer and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between differential case and differential side gear	Factory specification	0.05 to 0.10 mm 0.0020 to 0.0039 in.
	Allowable limit	0.4 mm 0.016 in.

Differential case I.D.	Factory specification	32.000 to 32.025 mm 1.25984 to 1.26083 in.
Differential side gear boss O.D.	Factory specification	31.925 to 31.950 mm 1.25689 to 1.25787 in.

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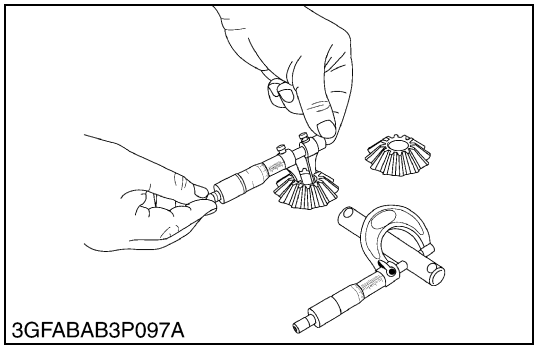
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Clearance between Differential Pinion and Differential Pinion Shaft

1. Measure the differential pinion I.D. with on inside micrometer.
2. Measure the differential pinion shaft O.D. with an outside micrometer and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between differential pinion and differential pinion shaft	Factory specification	0.048 to 0.084 mm 0.00189 to 0.00331 in.
	Allowable limit	0.2 mm 0.008 in.

Differential pinion I.D.	Factory specification	18.032 to 18.050 mm 0.70992 to 0.71063 in.
Differential pinion shaft O.D.	Factory specification	17.966 to 17.984 mm 0.70732 to 0.70803 in.

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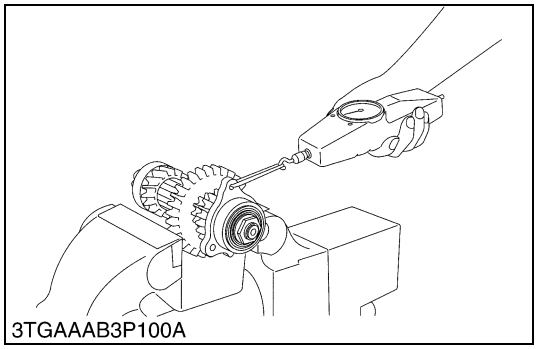
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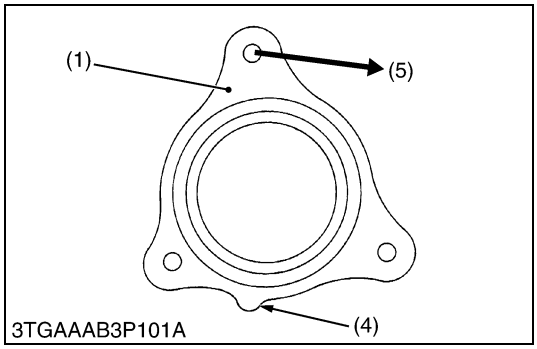

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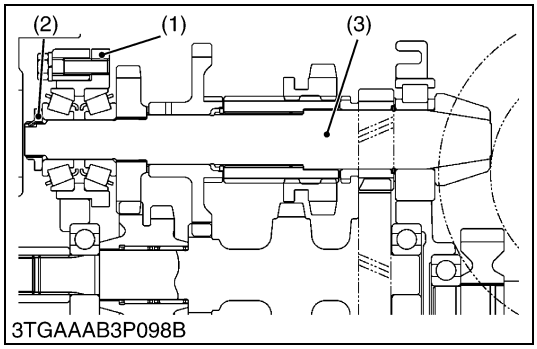

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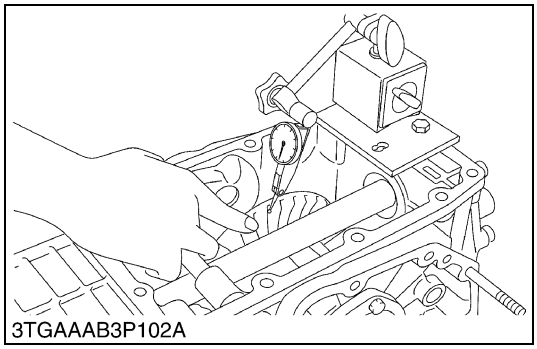
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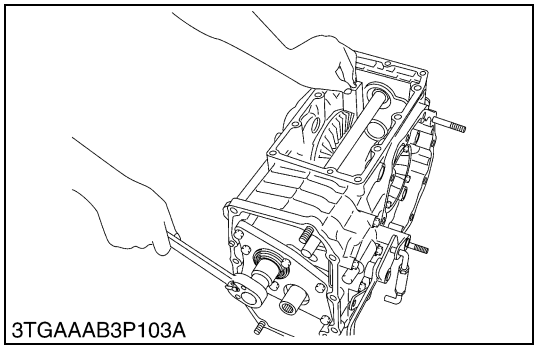
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Adjusting of Hypoid Pinion Motive Force

1. Assemble the hypoid pinion assembly and tighten the lock nut (2) lightly with new one.
2. Rotate the hypoid pinion with applying the transmission oil to the bearings after tapping the hypoid pinion to front and rear direction by the soft hammer.
3. Tighten the lock nut (2) until the motive force (hypoid pinion start to rotate) of hypoid pinion to be factory specification.
4. Stake the lock nut (2) firmly.

Motive force	Factory specification	10.8 to 16.7 N 1.1 to 1.7 kgf 2.43 to 3.75 lbf
Motive torque	Factory specification	0.520 to 0.559 N·m 0.053 to 0.057 kgf·m 0.383 to 0.412 lbf·ft

(1) Bearing Holder
(2) Lock Nut
(3) Hypoid Pinion
(4) Convex Part
(5) Pulling Direction

9Y1211109TRS0083US0

Backlash and Tooth Contact between Hypoid Pinion and Hypoid Ring Gear

1. Set a dial gauge with its finger on the tooth surface of hypoid ring gear.
2. Measure the backlash by fixing the hypoid pinion and moving hypoid ring gear by hand.
3. If the backlash exceeds the factory specification, change the collar to chick it, and change the shims to thin it.
   If the backlash is less than factory specification, change the collars and the shims as an opposite.
4. Apply red lead lightly over several teeth at three positions equally spaced on the hypoid ring gear.
5. Turn the hypoid pinion while pressing a wooden piece against the periphery of the bevel gear.
6. Check the tooth contact, if not proper, adjust according to the following instruction.

Backlash between hypoid pinion and hypoid ring gear	Factory specification	0.1 to 0.3 mm 0.004 to 0.001 in.
Tooth contact	Factory specification	More than 25 % red lead contact area on the gear tooth surface
The position of tooth contact point	Factory specification	The center of tooth contact at 3/10 to 4/10 of the entire width from the small end

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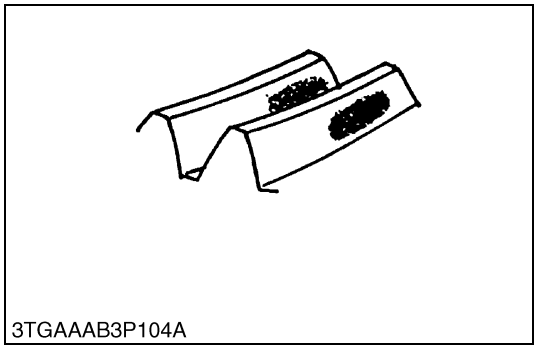
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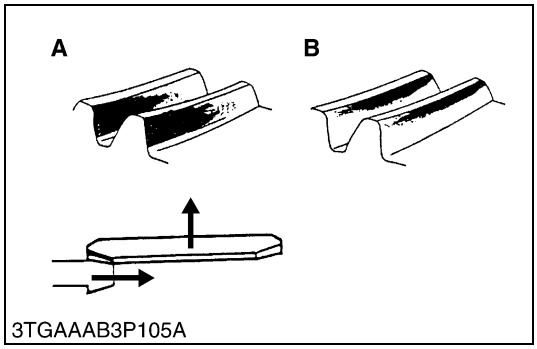

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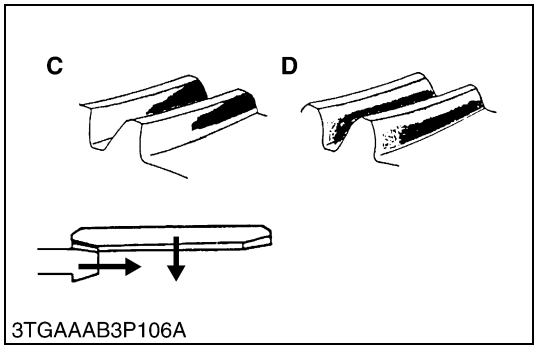

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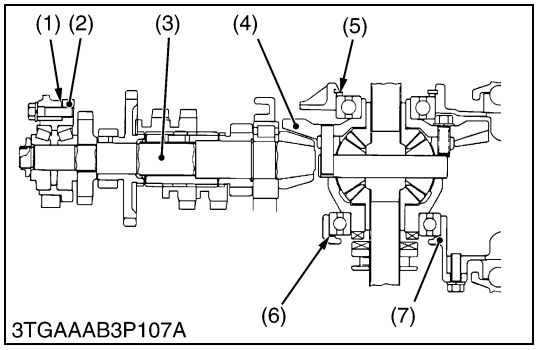

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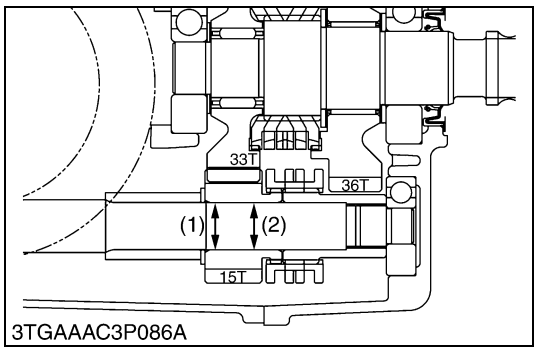

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Correcting of Tooth Contact

1. Proper contact.
   - No adjustment.
2. Correcting of the heel contact and shallow contact.
   - Change the bearing holder shim (1) to thick it.
   - Repeat above until the proper tooth contact and backlash are achieved.
3. Correcting of the toe contact and deep contact.
   - Change the differential bearing holder shim **L** (6) to thin it.
   - Change the differential bearing holder shim **R** (5) to thick it.
   - Change the bearing holder shim (1) to thin it.
   - Repeat above until the proper tooth contact and backlash are achieved.

(Reference)

- Thickness of the shim (1), shim **L** (6):
  0.4 mm (0.016 in.)
  0.5 mm (0.020 in.)
  0.6 mm (0.024 in.)
  0.7 mm (0.028 in.)
  0.8 mm (0.031 in.)
  0.9 mm (0.035 in.)
  1.0 mm (0.039 in.)
  1.2 mm (0.047 in.)
  1.4 mm (0.055 in.)
- Thickness of the shim **R** (5):
  1.4 mm (0.055 in.)
  1.5 mm (0.059 in.)
  1.6 mm (0.063 in.)
  1.7 mm (0.067 in.)
  1.8 mm (0.071 in.)
  1.9 mm (0.075 in.)

(1) Shim
(2) Bearing Holder
(3) Hypoid Pinion
(4) Hypoid Ring Gear
(5) Shim **R**
(6) Shim **L**
(7) Differential Bearing Holder

A: Heel Contact
B: Shallow Contact
C: Toe Contact
D: Deep Contact
L1: 3/10 to 4/10
L2: Entire Width

9Y1211109TRS0085US0

Clearance between Mid-PTO Drive Shaft to 15T Gear

1. Measure the 15T gear I.D. (1) and mid-PTO drive shaft O.D. (2).
2. Calculate the clearance.
3. If the clearance exceeds the allowable limit, replace.

Clearance between mid-PTO drive shaft and 15T gear	Factory specification	0.040 to 0.074 mm 0.0016 to 0.0029 in.
	Allowable limit	0.1 mm 0.0039 in.

15T gear I.D.	Factory specification	22.520 to 22.541 mm 0.8866 to 0.8874 in.
Mid-PTO drive shaft O.D.	Factory specification	22.467 to 22.480 mm 0.8845 to 0.8850 in.

(1) 15T Gear I.D.
(2) Mid-PTO Drive Shaft O.D.

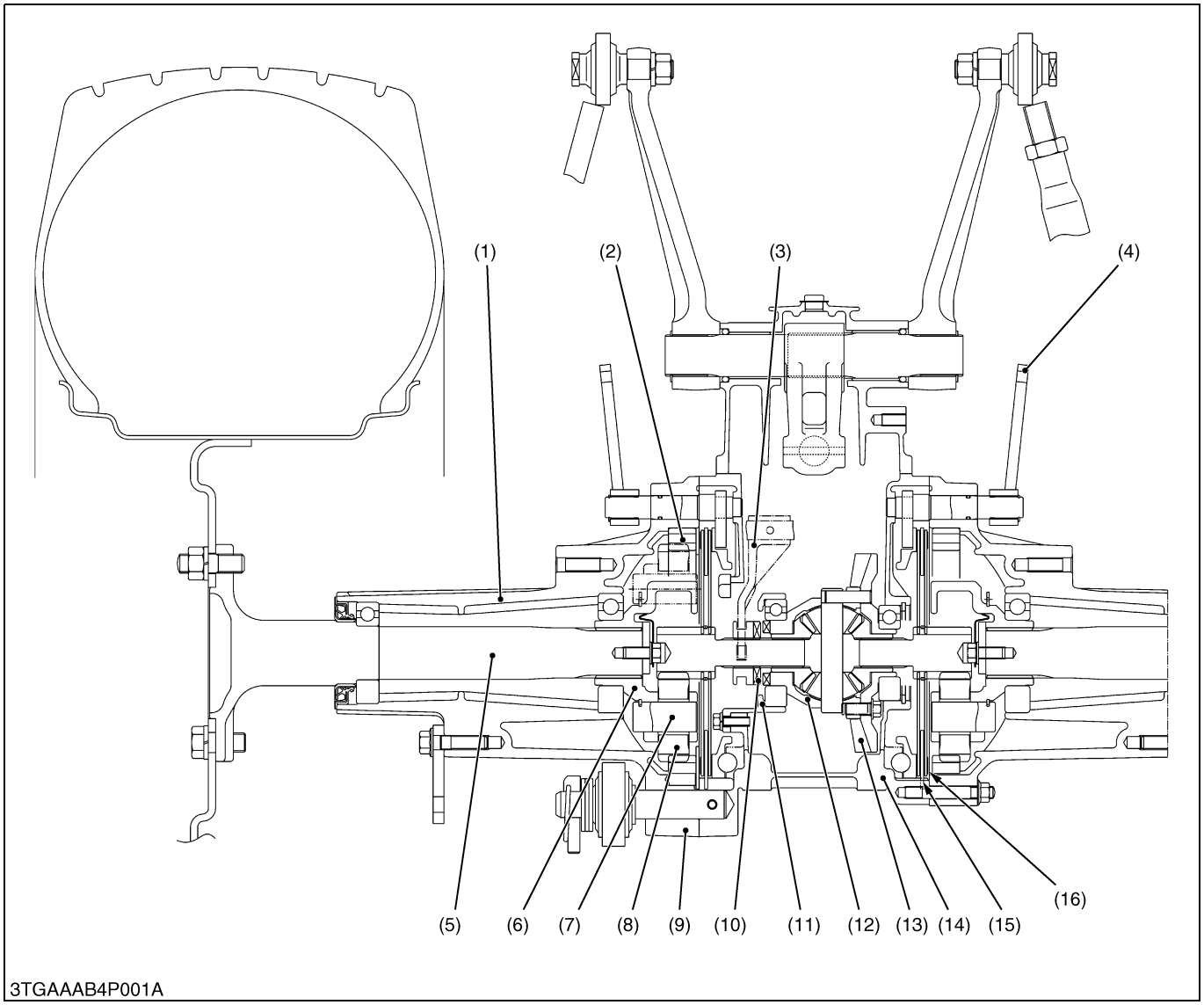
9Y1211109TRS0086US0

4 REAR AXLE

MECHANISM

CONTENTS

1. STRUCTURE



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(1) Rear Axle Case
(2) Internal Gear
(3) Differential Lock Fork
(4) Brake Lever
(5) Rear Axle Shaft
(6) Planetary Carrier
(7) Planetary
(8) Planetary Gear
(9) Brake Case
(10) Differential Lock Clutch
(11) Differential Bearing Holder
(12) Differential Gear Comp.
(13) Hypoid Ring Gear
(14) Transmission Case
(15) Steel Plate
(16) Brake Disk

The rear axle are the final mechanism which transmit power from the transmission to the rear wheels. Direction of power transmitted is changed at a right angle by the differential gear and, at the same time, speed is reduced. It is further reduced by the planetary gear to drive the rear axle shaft (5).

The rear axles (5) are semi-floating type with the ball bearing between the rear axle (5) and rear axle case (1), which support the rear wheel load as well as transmitting power to the rear wheel. They withstand all the forces caused by tire rotation and side skidding.

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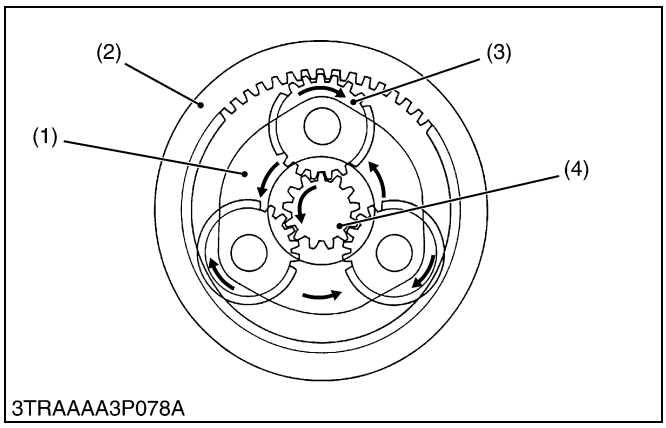
2. FINAL REDUCTION SYSTEM



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The final reduction system has a planetary gear system. It is compact, and is durable under heavy loads since torque loads are spread over three gears, decreasing the load on each tooth. And this system also spreads the load evenly around the circumference of the system, eliminating the sideways stress on the shafts.

Power, transmitted from the differential side gear to the brake shaft (4), drives the three planetary gears (3). Since the internal gear (2) is fixed to the rear axle case, the planetary gears (3) move around the teeth of the internal gear (2) while rotating on their axles. The movement of the planetary gears around the internal gear is transmitted to the rear axle through the planetary carrier (1). As a result, the planetary carrier (1) and rear axle rotate in the same direction as the brake shaft (4), but at a reduced speed and increased torque.

(1) Planetary Carrier
(2) Internal Gear
(3) Planetary Gear
(4) Brake SHaft

9Y1211109RAM0002US0

SERVICING

CONTENTS

1. TROUBLESHOOTING

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Excessive or Unusual Noise at All Time	1. Backlash between internal gear and planetary gear is improper.	Replace or adjust backlash between internal gear and planetary gear.	4-S16
	2. Bearing is worn.	Replace bearing.	4-S15
	1. Transmission fluid level is insufficient and improper type of transmission fluid is used.	Fill or change transmission fluid.	4-S4, 4-S10
Noise while Turning	1. Brake shaft, planetary gears and internal gear is worn or damaged.	Replace brake shaft, planetary gears and internal gear.	4-S16

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2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Internal Gear to Planetary Gear	Backlash	0.1 to 0.2 mm 0.0039 to 0.0079 in.	0.5 mm 0.020 in.
Planetary Gear	I.D.	30.009 to 30.025 mm 1.1815 to 1.1821 in.	30.05 mm 1.1831 in.
Planetary Gear Pin	O.D.	24.967 to 24.980 mm 0.9830 to 0.9835 in.	24.95 mm 0.9823 in.
Needle Bearing	O.D.	2.494 to 2.500 mm 0.0982 to 0.0984 in.	–

9Y1211109RAS0004US0

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-10.)

Item	N·m	kgf·m	lbf·ft
Rear wheel mounting screw and nut	196.1 to 225.6	20.0 to 23.0	145 to 166
ROPS mounting bolt and nut	167 to 197	17.0 to 20.0	123 to 144
Fender mounting screw	197 to 225	20.0 to 23.0	145 to 166
Hydraulic hoses **PB**, **P** and **T** retaining nuts	30 to 40	3.0 to 4.0	21.7 to 28.9
Joint stay mounting screw (M12)	103.0 to 117.7	10.51 to 12.00	75.97 to 86.81
Rear frame mounting screw (M12)	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Bracket mounting screw M12	63 to 72	6.4 to 7.4	47 to 53
Cabin mounting bolt and nut	124 to 147	12.6 to 15.0	91.1 to 108
Brake case mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5
Stopper mounting screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2

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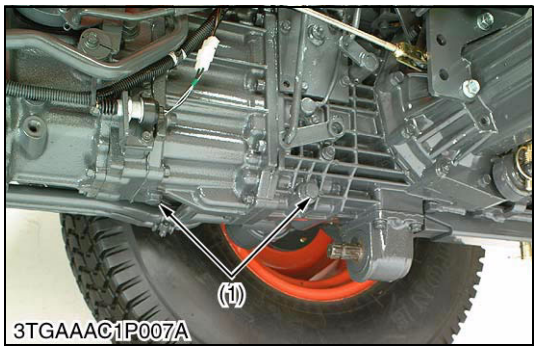
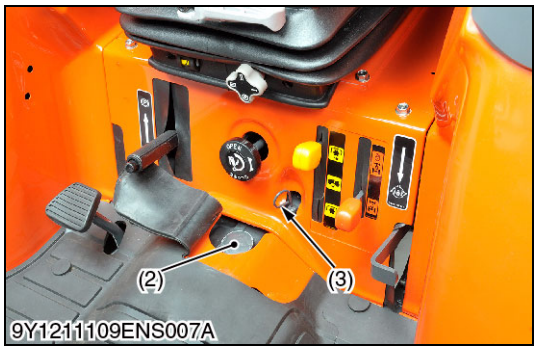
4. DISASSEMBLING AND SERVICING

[1] PREPARATION

(1) Separating Rear Axle for ROPS





Draining Transmission Fluid

1. Place an oil pan underneath the transmission case, and remove the drain plugs (1).
2. Drain the transmission fluid.
3. Reinstall the drain plugs (1).

(When reassembling)

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

■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8**
- **Never work the tractor immediately after changing the transmission oil. Keeping the engine at medium speed for a few minutes to prevents damage to the transmission.**
- **Do not mix different brands oil together.**

Transmission fluid	Capacity	24 L 6.3 U.S.gals 5.3 Imp.gals

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

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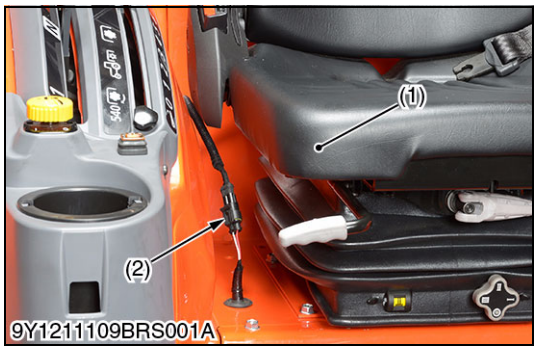

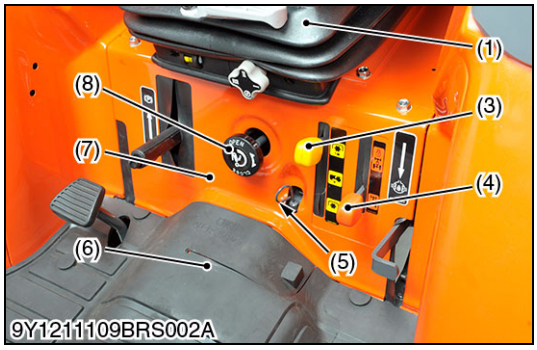

Seat and Seat Under Cover

1. Disconnect the seat switch connector (2).
2. Remove the seat (1).
3. Remove the step mat (6).
4. Remove the dipstick (5).
5. Remove the grips of the mid PTO lever (3) and front wheel drive lever (4).
6. Remove the lowering speed adjusting knob (8).
7. Remove the seat under cover (7).

(1) Seat
(2) Seat Switch Connector
(3) Mid PTO Lever
(4) Front Wheel Drive Lever
(5) Dipstick
(6) Step Mat
(7) Seat Under Cover
(8) Lowering Speed Adjusting Knob

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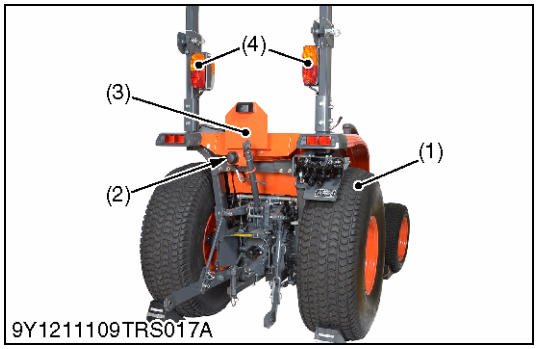

Rear Wheel

1. Place the disassembling stand under the rear axles.
2. Remove the rear wheels (1).
3. Remove the Registration plate (3) with trailer electrical outlet (2).
4. Remove the combination lights (4)

Tightening torque	Rear wheel mounting screw and nut	196.1 to 225.6 N·m 20.0 to 23.0 kgf·m 145 to 166 lbf·ft

(1) Rear Wheel
(2) Trailer Electrical Outlet
(3) Registration Plate
(4) Combination Light

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ROPS

1. Fold the ROPS and support it with the lift strap.
2. Remove the ROPS mounting bolts (1).
3. Pull out the ROPS.

Tightening torque	ROPS mounting bolt	167 to 197 N·m 17.0 to 20.0 kgf·m 123 to 144 lbf·ft

(1) ROPS Mounting Bolt

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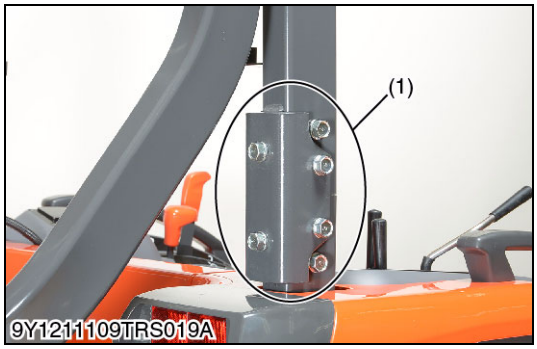

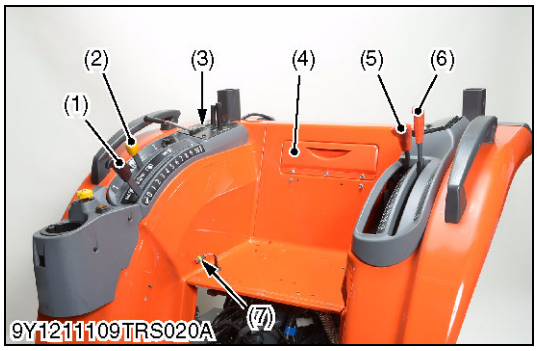

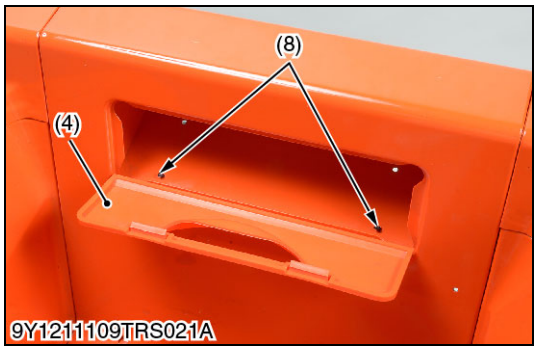

Lever Grip and Wiring Harness

1. Remove the grips of the rear PTO shift lever (2), position control lever (1), cruise control lever (5) and range gear shift lever (6).
2. Remove the remote control valve lever guide (3)
3. Pull out the seat switch connector (7).
4. Open the tool box (4).
5. Disconnect the clamps (8).

(When reassembling)

- Do not confuse the grips.
  - Grip (yellow) for the rear PTO shift lever (2).
  - Grip (red) for the range gear shift lever (6).

(1) Position Control Lever
(2) Rear PTO Shift Lever
(3) Remote Control Valve Lever Guide
(4) Tool Box
(5) Cruise Control Lever
(6) Range Gear Shift Lever
(7) Seat Switch Connector
(8) Clamp

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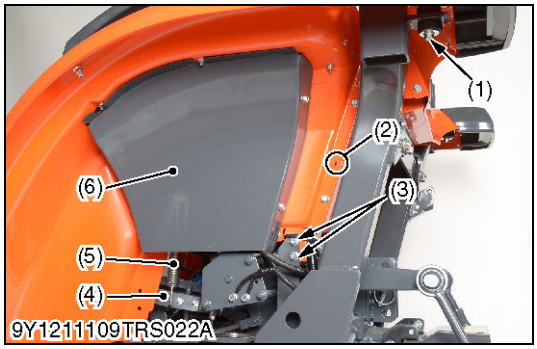

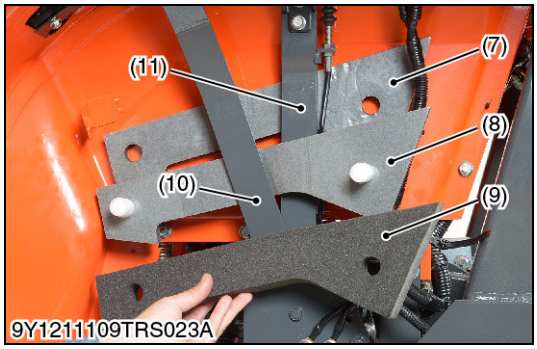

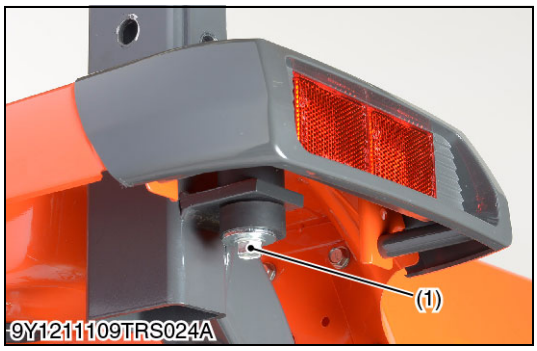

Fender (Left Side)

1. Remove the fender covers (6) and the sponges (8), (9).
2. Remove the differential lock pedal (4) with the spring (5).
3. Remove the screws (3).
4. Remove the fender mounting screw (1).
5. Disconnect the clamp (2).

(When reassembling)

- Assemble the sponge (center) (8) between the cruise control lever (11) and range gear shift lever (10).

Tightening torque	Fender mounting screw (1)	197 to 225 N·m 20.0 to 23.0 kgf·m 145 to 166 psi

(1) Fender Mounting Screw
(2) Clamp
(3) Screw
(4) Differential Lock Pedal
(5) Spring
(6) Fender Cover
(7) Sponge (Inner)
(8) Sponge (Center)
(9) Sponge (Outer)
(10) Range Gear Shift Lever
(11) Cruise Control Lever

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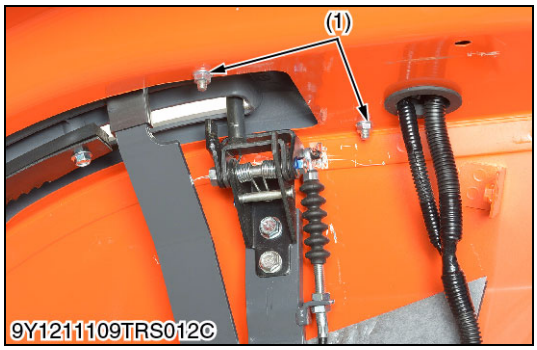

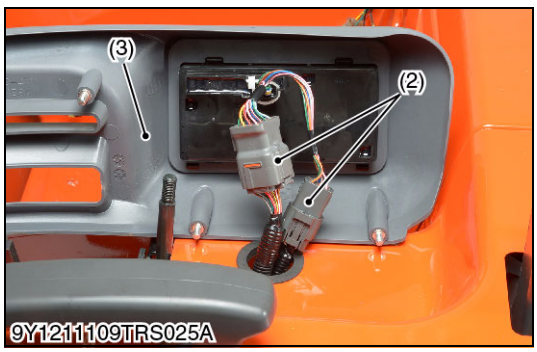

Lever Guide and Bi-speed Controller Connector

1. Remove the lever guide mounting screws (1).
2. Open the lever guide (3).
3. Disconnect the bi-speed controller connectors (2) and then remove the lever guide (3).

(1) Screw
(2) Bi-speed Controller Connector
(3) Lever Guide

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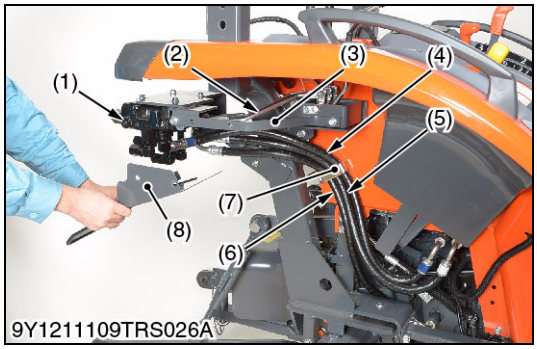

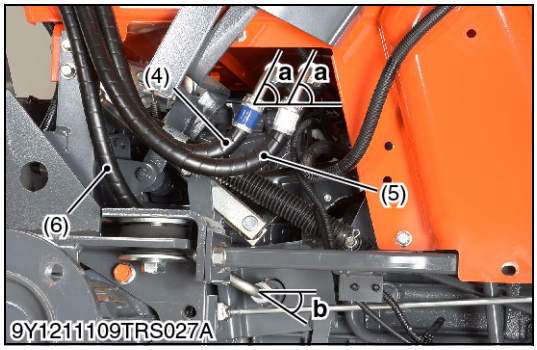

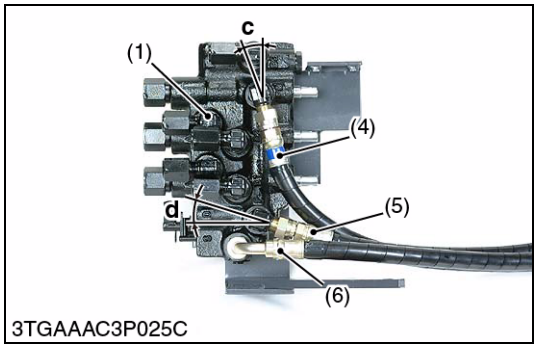

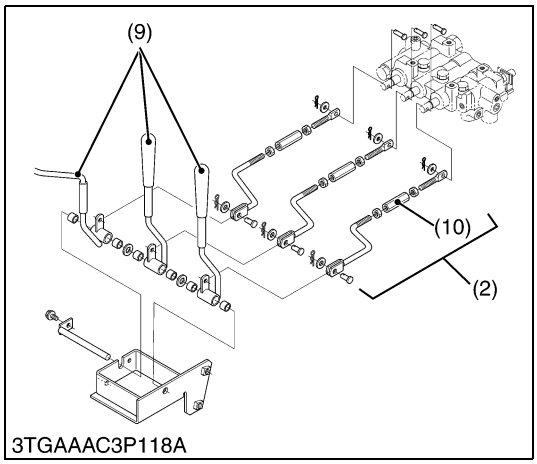

Auxiliary Control Valve

1. Remove the valve cover (8).
2. Remove the valve stay (3).
3. Remove the connecting rods (2).

(When reassembling)

- Reassemble the connecting rods (2) as shown in the figure.
- After reassembling the valve stay (3), adjust to locate the control lever (9) at a central position of the guide slot with the turnbuckle (10).

4. Remove the hose clamp (7).

(When reassembling)

- Clamp the hydraulic hoses in order of hydraulic hose **PB** (4), hydraulic hose **P** (5) and hydraulic hose **T** (6) from the front side.

5. Disconnect the hydraulic hoses (4), (5), (6) from the tractor body.
6. Remove the auxiliary control valve (1) with the hydraulic hoses (4), (5), (6).

(When reassembling)

- Assemble the hose joints to appropriate positions referring to the table below.

(Distinction and installation angle of the hose joints)

Hydraulic Hose	Hose joint (Valve side)	Hose joint (Tractor body side)
P (5)	Straight joint 0.26 rad (15 °)	Bent joint with white tape 0.785 rad (45 °)
PB (4)	Straight joint with blue tape 0.26 rad (15 °)	Bent joint with blue tape 0.785 rad (45 °)
T (6)	Bent joint 1.57 rad (90 °)	Bent joint 0.349 to 0.523 rad (20 ° to 30 °)

Tightening torque	Hydraulic hoses **PB**, **P** and **T** retaining nuts	30 to 40 N·m 3.0 to 4.0 kgf·m 21.7 to 28.9 lbf·ft

(1) Auxiliary Control Valve
(2) Connecting Rods
(3) Valve Stay
(4) Hydraulic Hose **PB**
(5) Hydraulic Hose **P**
(6) Hydraulic Hose **T**
(7) Hose Clamp
(8) Valve Cover
(9) Control Lever
(10) Turnbuckle

a: 0.785 rad (45 °)
b: 0.349 to 0.523 rad (20 ° to 30 °)
c: 0.26 rad (15 °)
d: 0.26 rad (15 °)
Pb: Power Beyond Port
P: Pump Port
T: Tank Port

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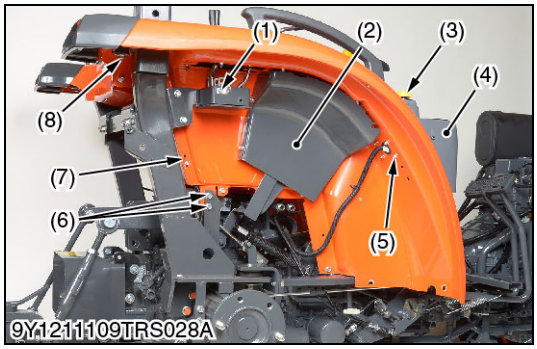

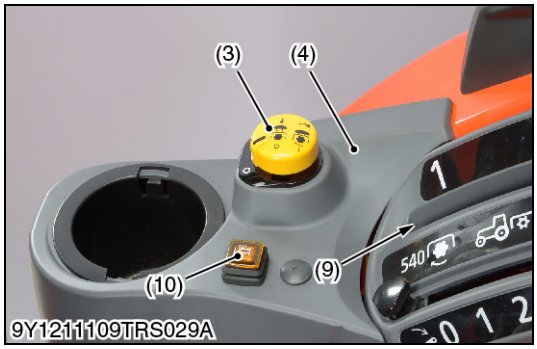

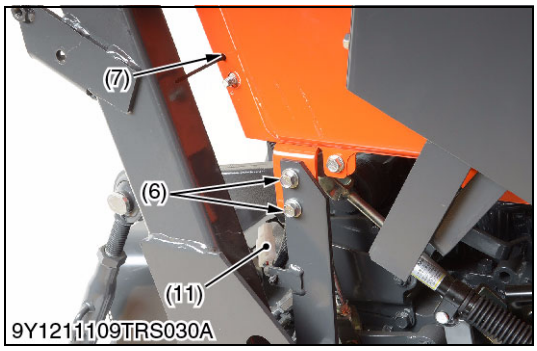

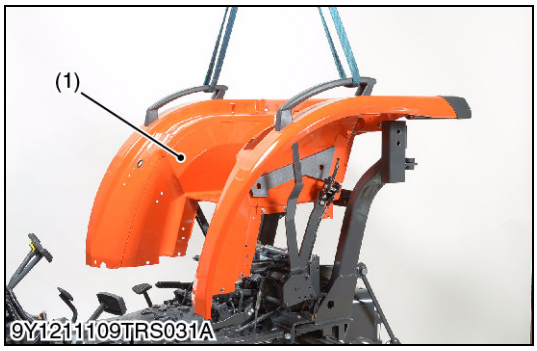

Fender (Right Side)

1. Remove the fender cover (2).
2. Remove the loader lever guide mounting nuts (5) and then open the loader lever guide (4).
3. Disconnect the connectors for PTO switch (3) and beacon switch (9).
4. Disconnect the clamp (7).
5. Remove the remote control valve lever bracket (1) with the remote control valve lever.
6. Remove the lever guide (9).
7. Remove the screws (6).
8. Remove the fender mounting screw (8).
9. Disconnect the rear PTO switch connector (11).

(When reassembling)

Tightening torque	Fender mounting screw	197 to 225 N·m 20.0 to 23.0 kgf·m 145 to 166 psi

(1) Remote Control Valve Lever Bracket
(2) Fender Cover
(3) PTO Switch
(4) Loader Lever Guide
(5) Loader Lever Guide Mounting Nut
(6) Screw
(7) Clamp
(8) Screw
(9) Lever Guide
(10) Beacon Switch
(11) Rear PTO Switch Connector

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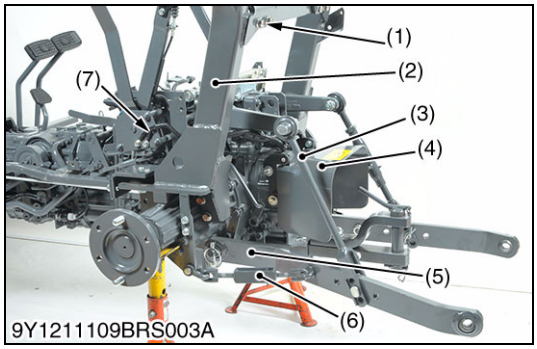
Fender Assembly

1. Dismount the fender assembly (1) after checking whether there is forgetting to disconnecting wiring.

(1) Fender Assembly

9Y1211109TRS0024US0



3-Point Linkage and ROPS Under Frame

1. Remove the lifting rods (3).
2. Remove the lower links (5) with the check chains (6).
3. Remove the PTO shaft cover (4).
4. Remove the joint stay (1).
5. Remove the ROPS under frame (2).
6. Remove the grounding cable (7).

(When reassembling)

Tightening torque	Joint stay mounting screw (M12) (1)	103.0 to 117.7 N·m 10.51 to 12.00 kgf·m 75.97 to 86.81 lbf·ft
	Rear frame mounting screw (M12) (2)	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 lbf·ft

(1) Joint Stay
(2) ROPS Under Frame
(3) Lifting Rod
(4) PTO Shaft Cover
(5) Lower Link
(6) Check Chain
(7) Grounding Cable

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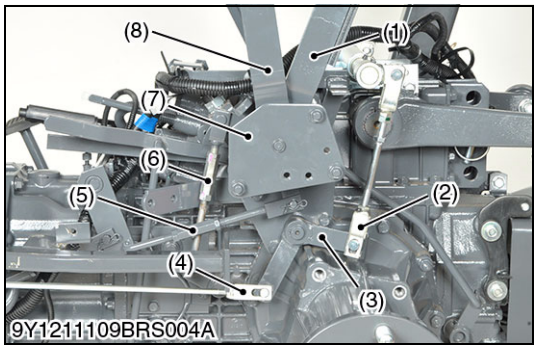

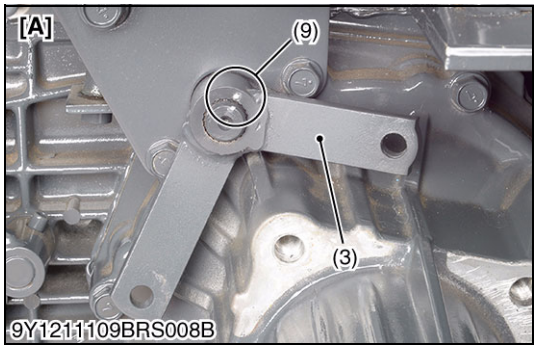

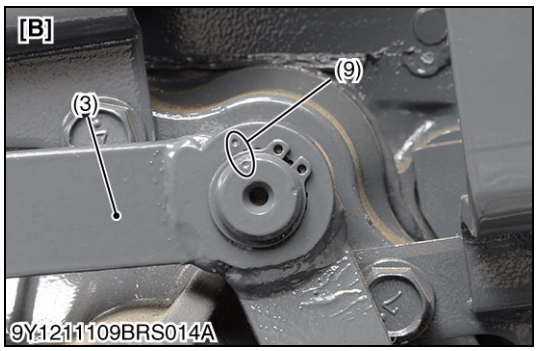

Brake Linkage

1. Remove the brake rod (4) and parking brake rod (2).
2. Remove external snap ring and remove the brake lever (3).
3. Remove the cruise control rod (5).
4. Remove the range gear shift rod (6).
5. Remove the plate (7).
6. Remove the range gear shift lever (8) and cruise control lever (1).

(When reassembling)

- When reassembling the brake lever (3), align the punch mark (9) of the brake lever (3).

(1) Cruise Control Lever
(2) Parking Brake Rod
(3) Brake Lever
(4) Brake Rod
(5) Cruise Control Rod
(6) Range Gear Shift Rod
(7) Plate
(8) Range Gear Shift Lever
(9) Punch Mark

[A] Left Side
[B] Right Side

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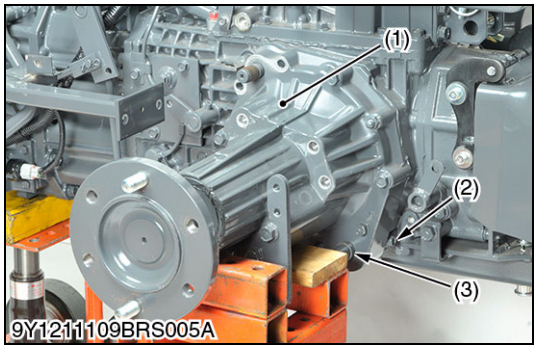
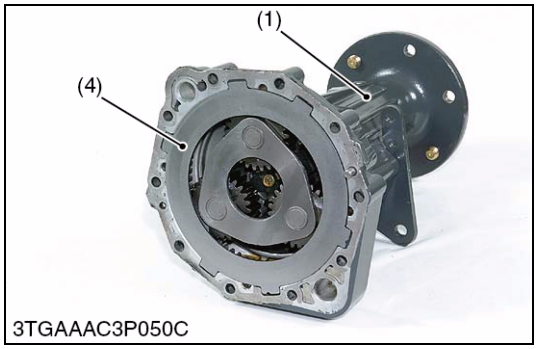




Rear Axle

1. Remove the setting screw (2) and pull out the lower link pin (3).
2. Place the disassembling stand under the rear axle case.
3. Remove the rear axle mounting screws and nuts, and separate the rear axle (1).

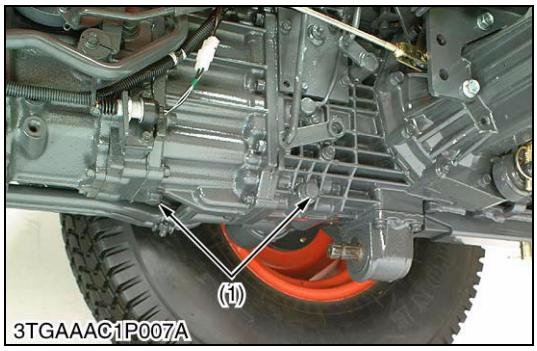
(When reassembling)

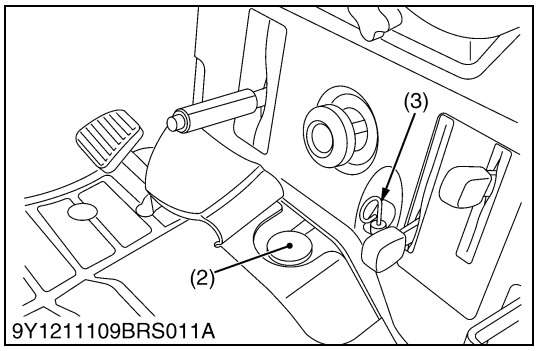
- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the rear axle case and transmission case.

(1) Rear Axle
(2) Setting Screw
(3) Lower Link Pin
(4) Brake Plate 2

9Y1211109RAS0008US0

(2) Separating Rear Axle for CABIN





Draining Transmission Fluid

1. Place an oil pan underneath the transmission case, and remove the drain plugs (1).
2. Drain the transmission fluid.
3. Reinstall the drain plugs (1).

(When reassembling)

- 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 prescribed level.

■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8.**
- **Never work the tractor immediately after changing the transmission oil. Keeping the engine at medium speed for a few minutes to prevents damage to the transmission.**
- **Do not mix different brands oil together.**

Transmission fluid	Capacity	24 L 6.3 U.S.gals 5.3 Imp.gals

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

9Y1211109ENS0131US0

Rear Wheel and 3-Point Linkage

1. Place the disassembling stand under the transmission case.
2. Remove the rear wheels (1).
3. Remove the top link (2), lift rods (3) and lower links (4).
4. Remove the drawbar (5).

Tightening torque	Rear wheel mounting screw and nut	196.1 to 225.6 N·m 20.0 to 23.0 kgf·m 145 to 166 lbf·ft

(1) Rear Wheel
(2) Top Link
(3) Lift Rod
(4) Lower Link
(5) Drawbar

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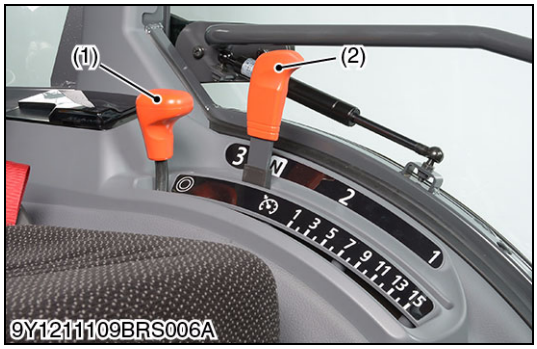

Lever Grip

1. Remove the cruise control lever grip (1).
2. Remove the range gear shift lever grip (2).

(1) Cruise Control Lever Grip
(2) Range Gear Shift Lever Grip

9Y1211109RAS0009US0

Fender Assembly

1. Remove the fender cover (1).
2. Remove the sponges (4), (5).

(When reassembling)

- Assemble the sponge (center) (4) between the cruise control lever (2) and range gear shift lever (6).

(1) Fender Cover
(2) Cruise Control Lever
(3) Sponge (Inner)
(4) Sponge (Center)
(5) Sponge (Outer)
(6) Range Gear Shift Lever

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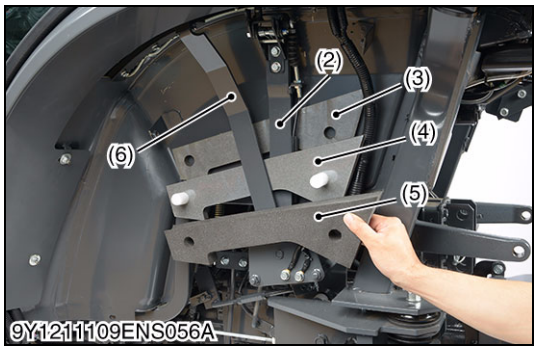

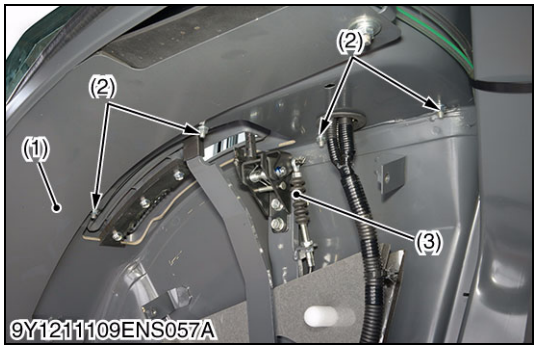

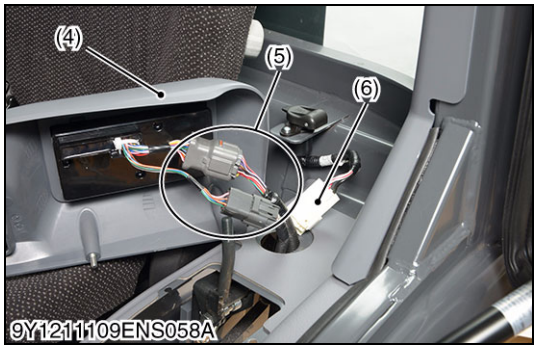

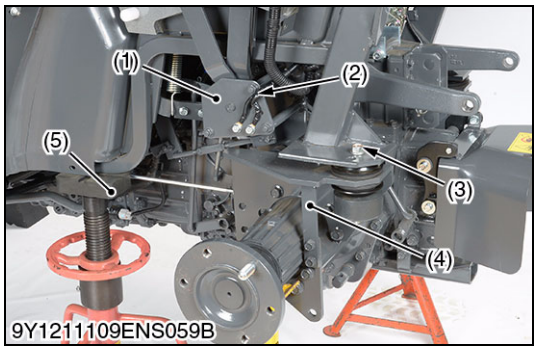

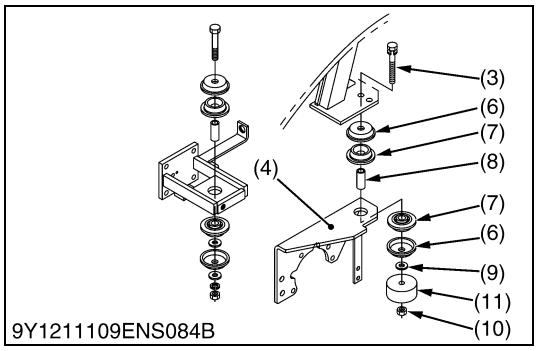

Release Wire and Wiring Harness (Left Side)

1. Remove the fender under cover (1).
2. Remove the release wire (3).
3. Remove the lever guide mounting screws (2), and then open the lever guide (4).
4. Disconnect the wiring connectors for the bi-speed controller connectors (5) and electrical outlet connector (6).
5. Remove the lever guide (4) with bi-speed controller.

(1) Fender Under Cover
(2) Lever Guide Mounting Screw
(3) Release Wire (Cruise Control)
(4) Lever Guide
(5) Bi-speed Controller Connector
(6) Electrical Outlet Connector

9Y1211109ENS0047US0

Cabin Mount Screw

1. Remove the grounding cable (2) mounting screws.
2. Remove the plate (1).
3. Place a stand (5) under the cabin frame.
4. Remove the cabin mount bracket mounting screw (3) and nut.
5. Remove the bracket (4).

(When reassembling)

- Be sure to install the washers, plate and mount rubbers, etc. in their original positions.

Tightening torque	Bracket mounting screw M12	63 to 72 N·m 6.4 to 7.4 kgf·m 47 to 53 lbf·ft
	Cabin mounting bolt and nut	124 to 147 N·m 12.6 to 15.0 kgf·m 91.1 to 108 lbf·ft

(1) Plate
(2) Grounding Cable
(3) Cabin Mounting Screw
(4) Bracket
(5) Stand
(6) Plate
(7) Mount Rubber
(8) Collar
(9) Plane Washer
(10) Nut
(11) Collar

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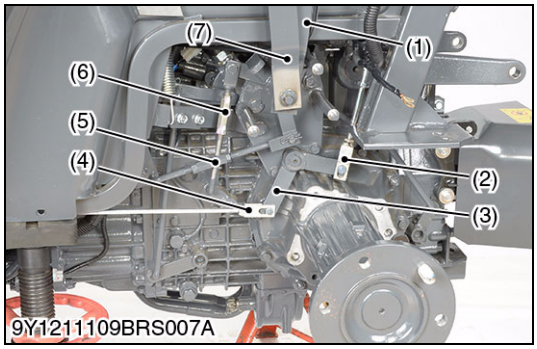

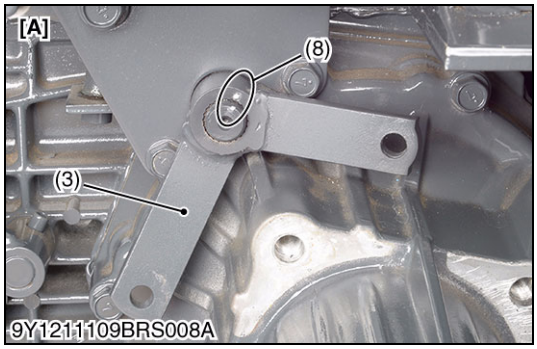

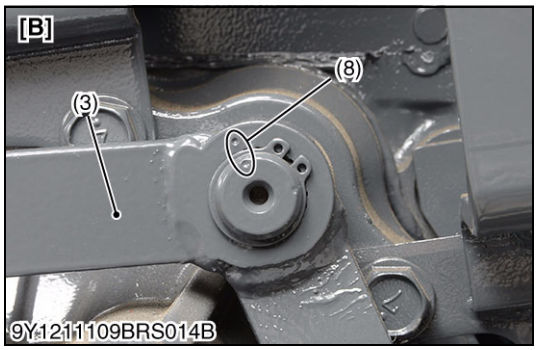

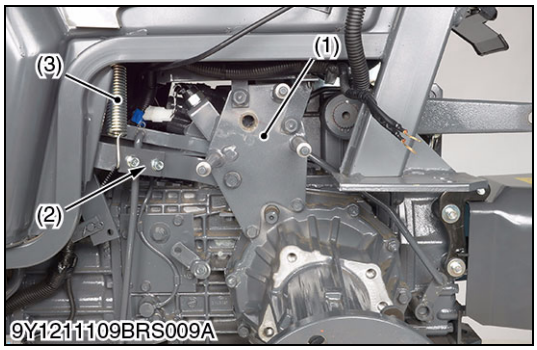

Brake Linkage

1. Remove the brake rod (4).
2. Remove the parking brake rod (2).
3. Remove external snap ring and remove the brake lever (3).
4. Remove the cruise control rod (5).
5. Remove the range gear shift rod (6).
6. Remove the range gear shift lever (7) and cruise control lever (1).

(When reassembling)

- When reassembling the brake lever (3), align the punch mark (8) of the brake lever (3).

(1) Cruise Control Lever
(2) Parking Brake Rod
(3) Brake Lever
(4) Brake Rod
(5) Cruise Control Rod
(6) Range Gear Shift Rod
(7) Range Gear Shift Lever
(8) Punch Mark

[A] Left Side
[B] Right Side

9Y1211109RAS0011US0

Differential Lock Pedal and Spring spring

1. Remove the spring (3).
2. Remove the differential lock pedal (2).
3. Remove the bracket (1).

(1) Bracket
(2) Differential Lock Pedal
(3) Spring

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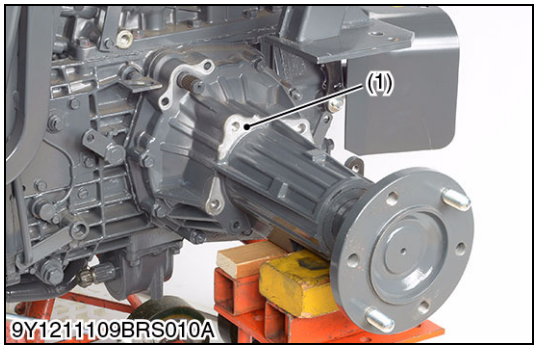

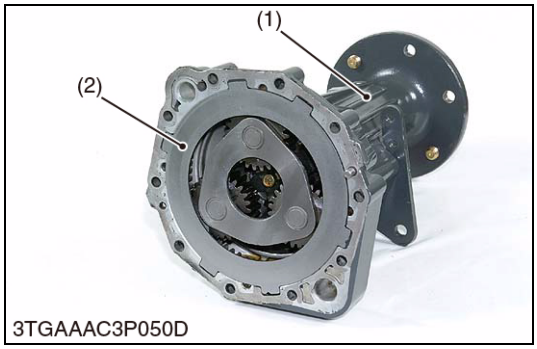

Rear Axle

1. Remove the setting screw and pull out the lower link pin.
2. Place the disassembling stand under the rear axle case.
3. Remove the rear axle mounting screws and nuts, and separate the rear axle (1).

(When reassembling)

- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the rear axle case (1) and transmission case.
- Fix the brake plate (2) to the rear axle case (1) with the liquid gasket.

Tightening torque	Brake case mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) Rear Axle (2) Brake Plate

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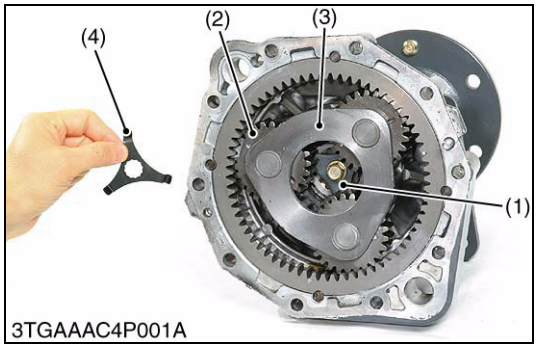
[2] DISASSEMBLING AND ASSEMBLING



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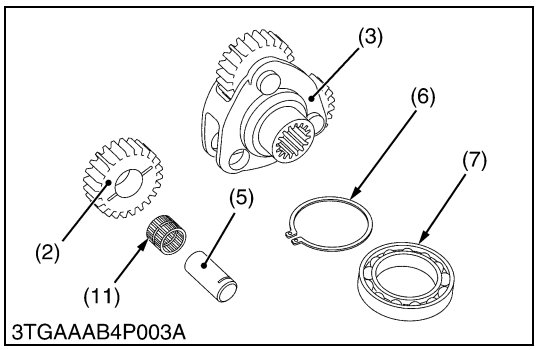

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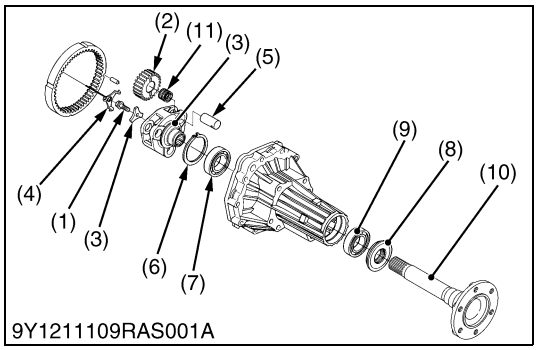

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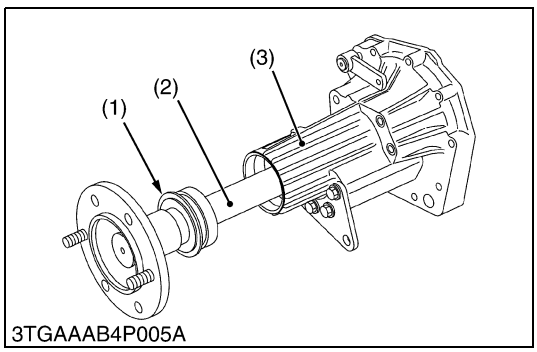

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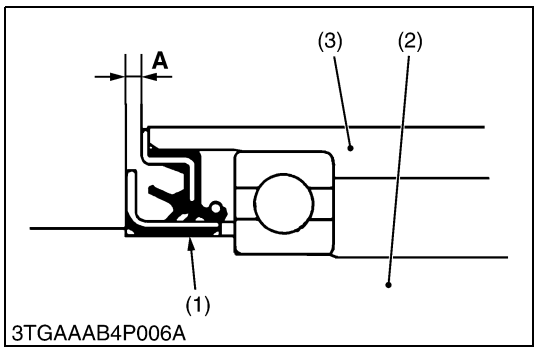

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Planetary Gear

1. Remove the stopper (4), then remove the screw and washer (1).
2. Remove the planetary carrier (3) and planetary gears (2) as a unit.
3. Remove the bearing (7) with special use puller set (Code No.: 07916-09032).
4. Open the internal snap ring (6) of the planetary carrier. Remove the planetary gear pins (5) and the internal snap ring (6) at once, and remove the planetary gears (2).

(When reassembling)

- Assemble the fingernail of the stopper (4) to the ditch part securely.

Tightening torque	Stopper mounting screw	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 lbf·ft

(1) Washer
(2) Planetary Gear
(3) Planetary Carrier
(4) Stopper
(5) Planetary Gear Pin
(6) Internal Snap Ring
(7) Bearing
(8) Oil Seal
(9) Bearing
(10) Rear Axle
(11) Needle Bearing

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Rear Axle

1. Tap out the rear axle.

(When reassembling)

- Apply grease to the oil seal.
- Do not allow any gap **"A"** between the inner and outer surfaces of the oil seal (1). (Refer to figure left)

(1) Oil Seal
(2) Rear Axle
(3) Rear Axle Case

A: Gap

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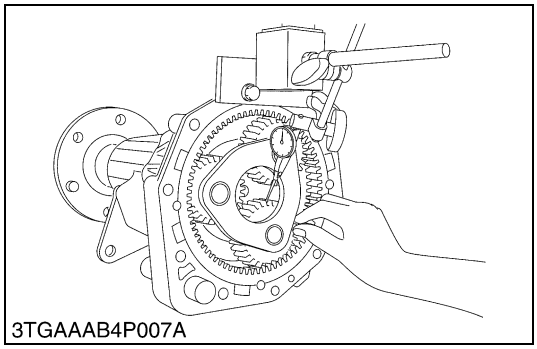
[3] SERVICING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Backlash between Internal Gear and Planetary Gear

1. Set a dial indicator (lever type) on the tooth of the planetary gear.
2. Hold the planetary carrier and move the planetary gear to measure the backlash.
3. If the measurement exceeds the allowable limit, check the next items.

Backlash between internal ear and planetary gear	Factory specification	0.1 to 0.2 mm 0.0039 to 0.0079 in.
	Allowable limit	0.5 mm 0.020 in.

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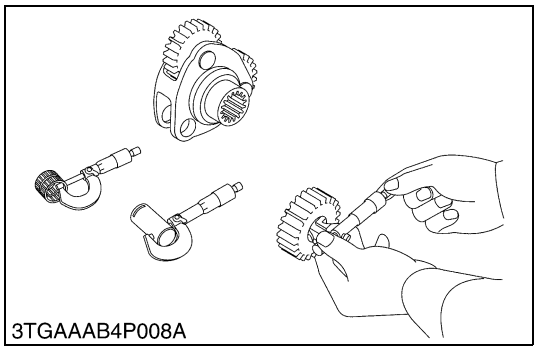

3TGAAAB4P008A

Planetary Gear I.D., Planetary Gear Pin O.D. and Needle Bearing O.D.

1. Measure the planetary gear I.D. with an inside micrometer.
2. Measure the planetary gear pin O.D. with an outside micrometer.
3. Measure the needle bearing O.D. with an outside micrometer.
4. If the measurement exceeds the allowable limit or factory specification, replace them.

Planetary gear I.D.	Factory specification	30.009 to 30.025 mm 1.1815 to 1.1821 in.
	Allowable limit	30.05 mm 1.1831 in.

Planetary gear pin O.D.	Factory specification	24.967 to 24.980 mm 0.9830 to 0.9835 in.
	Allowable limit	24.95 mm 0.9823 in.

Needle Bearing O.D.	Factory specification	2.494 to 2.500 mm 0.0982 to 0.0984 in.

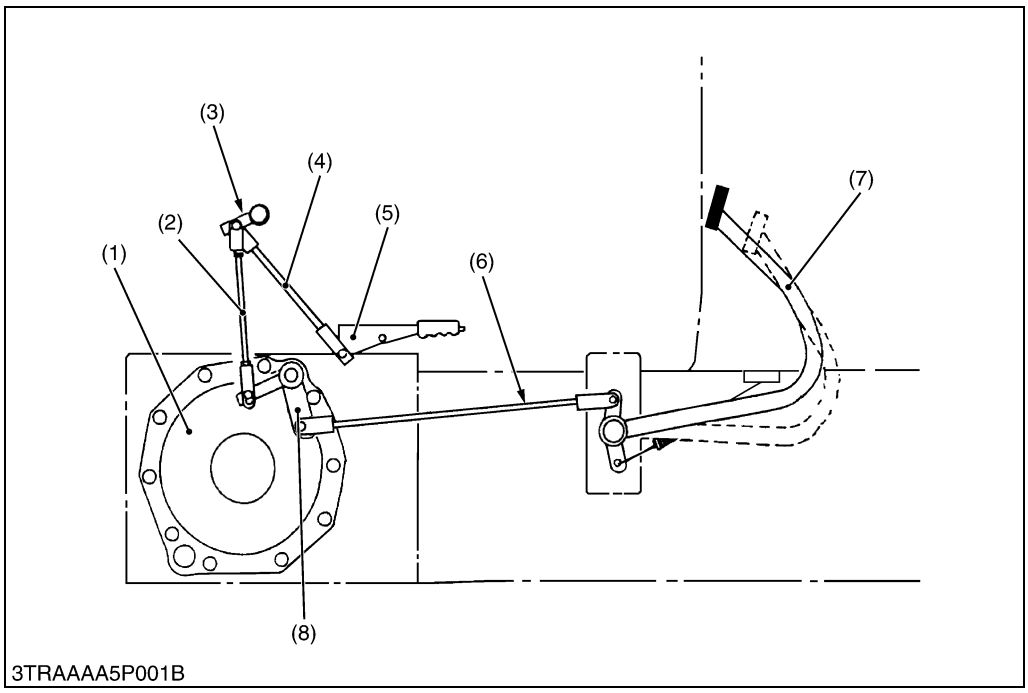
9Y1211109RAS0018US0

5 BRAKES

MECHANISM

CONTENTS

1. BRAKE LINKAGE



3TRAAAA5P001B

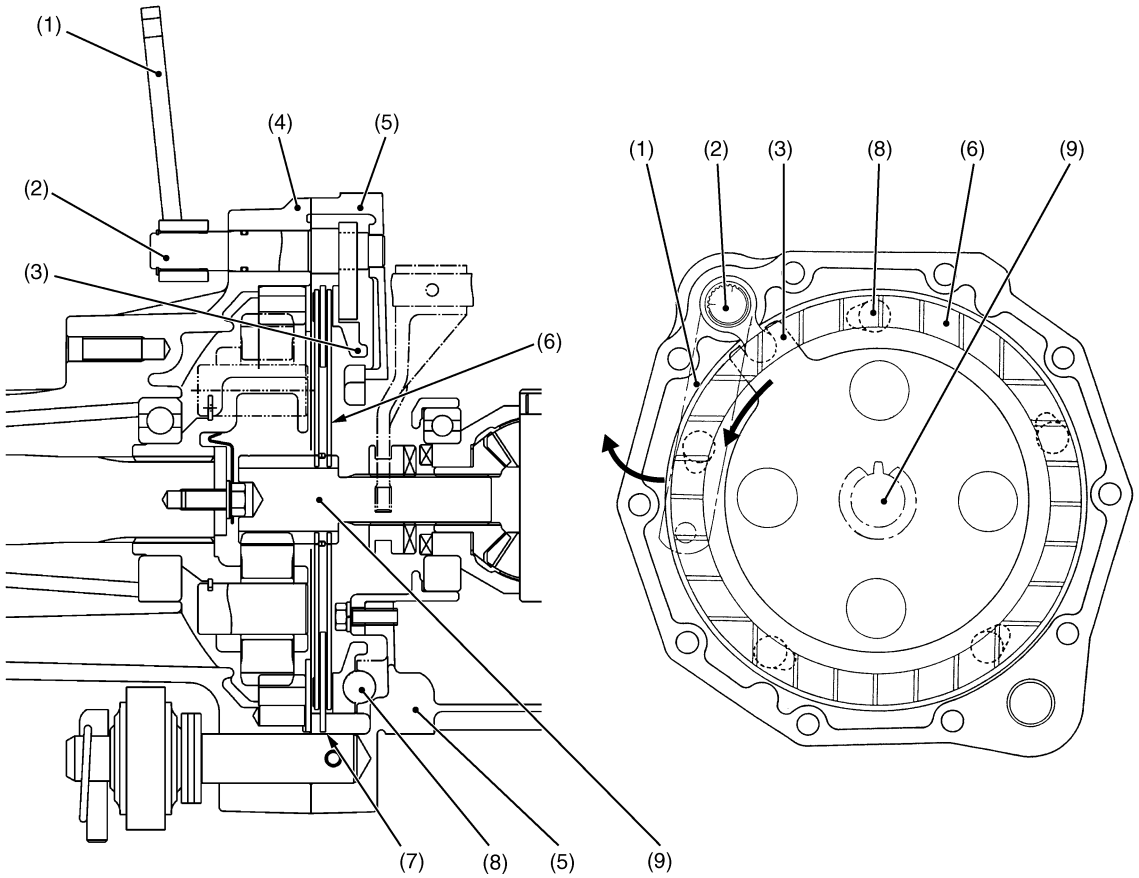
(1) Rear Axle Case
(2) Parking Brake Rod 2
(3) Parking Brake Shaft Assembly
(4) Parking Brake Rod 1
(5) Parking Brake Lever
(6) Brake Rod
(7) Brake Pedal
(8) Brake Lever

Independent mechanical wet disc brakes are used for the right and left travelling brakes. They are operated by the brake pedals through the mechanical linkages and provide stable braking and require little adjustment.

The parking brake is mechanical type which is connected to the brake lever by the rod linkages.

9Y1211109BRM0001US0

2. OPERATION



3TGAAAB5P002B

(1) Brake Lever
(2) Brake Cam
(3) Cam Plate
(4) Rear Axle Case
(5) Transmission Case
(6) Brake Disc
(7) Brake Plate
(8) Steel Ball
(9) Brake Shaft

■ **During Braking**

When the brake pedal depressed, the linkage causes the brake lever (1) and brake cam (2) to turn into the direction of arrow shown in the above diagram. Therefore, the cam plate (3) also moves the direction of arrow. At this time, since the cam plate (3) rides on the steel balls (8) set in the grooves of the transmission case (5) to press the brake disc (6), the brake shaft (9) is braked by the frictional force generated by the cam plate (3) and brake disc (6).

9Y1211109BRM0002US0

SERVICING

CONTENTS

1. TROUBLESHOOTING

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Uneven Braking Force	1. Brake pedal free travel is unevenly adjusted.	Adjust brake pedal free travel.	5-S4
	2. Brake disc is worn.	Replace brake disc.	5-S15
	3. Cam plate is warped.	Replace cam plate.	5-S15
Brake Drags	1. Little free travel in brakes.	Adjust brake pedal free travel to factory specification.	5-S4
	2. Little free play in parking brake lever.	Adjust parking brake lever free play to factory specification.	5-S4
	3. Ball holes of cam plate is unevenly worn.	Replace cam plate.	5-S15
	4. Brake pedal return spring is weaken or broken.	Replace brake pedal return spring.	–
	5. Brake cam is rusted.	Remove rust from brake cam or replace brake cam with a new one.	5-S10, 5-S14
Poor Braking Force	1. Brake pedal free travel is too much.	Adjust brake pedal free travel to the factory specification.	5-S4
	2. Brake disc is worn.	Replace brake disc.	5-S15
	3. Cam plate is warped.	Replace cam plate.	5-S15
	4. Brake cam or lever is damaged.	Replace brake cam or lever.	5-S10, 5-S14
	5. Improper type of transmission fluid is used.	Use the proper type of transmission fluid.	5-S5, 5-S11

9Y1211109BRS0001US0

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Brake Pedal	Free Travel	20 to 30 mm 0.79 to 1.18 in.	–
	Difference of Stroke (R.H. and L.H.)	Less than 5 mm 0.19 in.	–
Parking Brake Lever	Free Travel	The brake works when the lever is raised until the rachet sound is heard twice	–
Cam Plate and Ball	Height	20.95 to 21.05 mm 0.8248 to 0.8287 in.	20.5 mm 0.807 in.
Cam Plate	Flatness	–	0.3 mm 0.012 in.
Brake Disc	Thickness	3.4 to 3.6 mm 0.1339 to 0.1417 in.	3.0 mm 0.118 in.
Brake Plate 1	Thickness	2.54 to 2.66 mm 0.1000 to 0.1047 in.	2.1 mm 0.083 in.
Brake Plate 2	Thickness	2.52 to 2.68 mm 0.0992 to 0.1055 in.	2.1 mm 0.083 in.
Brake Pedal Shaft to Brake Pedal	Clearance	0.000 to 0.136 mm 0.0000 to 0.0054 in.	0.5 mm 0.020 in.
• Brake Pedal Shaft	O.D.	24.916 to 25.000 mm 0.9809 to 0.9843 in.	–
• Brake Pedal	I.D.	25.000 to 25.052 mm 0.9843 to 0.9863 in.	–

9Y1211109BRS0002US0

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-10.)

Item	N·m	kgf·m	lbf·ft
Rear wheel mounting screw and nut	196.1 to 225.6	20.0 to 23.0	145 to 166
ROPS mounting bolt and nut	167 to 197	17.0 to 20.0	123 to 144
Fender mounting screw	197 to 225	20.0 to 23.0	145 to 166
Hydraulic hoses **PB**, **P** and **T** retaining nuts	30 to 40	3.0 to 4.0	21.7 to 28.9
Joint stay mounting screw (M12)	103.0 to 117.7	10.51 to 12.00	75.97 to 86.81
Rear frame mounting screw (M12)	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Bracket mounting screw M12	63 to 72	6.4 to 7.4	47 to 53
Cabin mounting bolt and nut	124 to 147	12.6 to 15.0	91.1 to 108
Brake case mounting screw	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5

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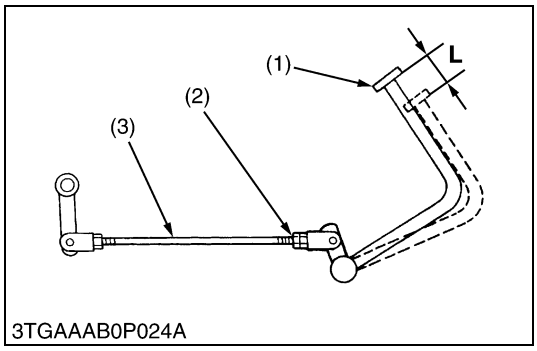
4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING



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Brake Pedal Free Travel

CAUTION

- **Stop the engine and chock the wheels before checking brake pedal.**
- **The difference between the right and left pedal plays must be less than 5.0 mm (0.19 in.).**

1. Release the parking brake.
2. Slightly depress the brake pedals (1) and measure free travel **"L"** at top of pedal stroke.
3. If the measurement is not within the factory specifications, loosen the lock nut (2) and turn the brake rod (3).
4. Retighten the lock nut (2) securely.

Brake pedal free travel **"L"**	Factory specification	20 to 30 mm 0.79 to 1.18 in.

(1) Brake Pedal
(2) Lock Nut
(3) Brake Rod

L: Free Travel

9Y1211109BRS0003US0

3TGAAAC5P001A

Parking Brake Lever Free Play

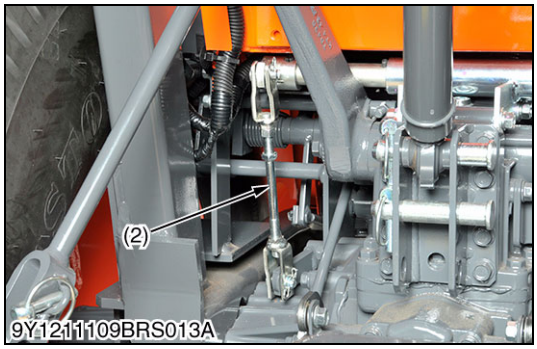
1. Support the rear axle with the disassembling stand to separate the rear wheels from the ground.
2. Shift the range gear shift lever to the neutral position, and disengage the front wheel drive lever.
3. Raise the parking brake lever (1) until the ratchet sound is heard once.
4. Check right and left rear wheels. Right and left rear wheels should be free.
5. Next, raise the parking brake lever (1) until the ratchet sound is heard twice.
6. Check right and left rear wheels. Right and left rear wheels should be locked.
7. If it is not, adjust with the parking brake rod 2 (2).

Parking brake lever free play	Factory specification	The brake works when the lever is raised until the ratchet sound is heard twice


9Y1211109BRS012A

IMPORTANT

- **Check the brake pedal free play after adjusting the parking brake.**



9Y1211109BRS013A

(1) Parking Brake Lever
(2) Parking Brake Rod 2 (Left)

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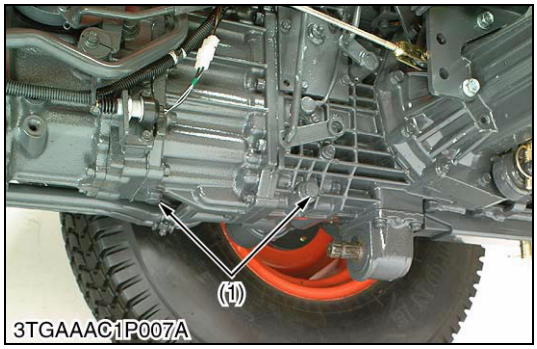
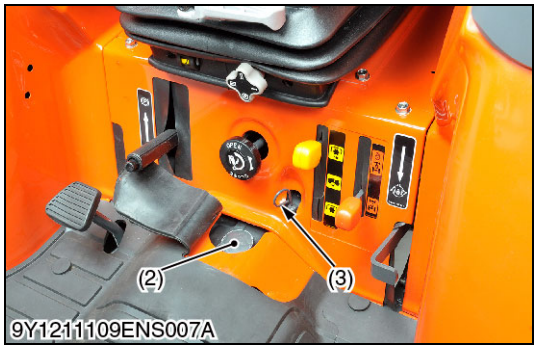
[2] PREPARATION

(1) Separating Rear Axle for ROPS





Draining Transmission Fluid

1. Place an oil pan underneath the transmission case, and remove the drain plugs (1).
2. Drain the transmission fluid.
3. Reinstall the drain plugs (1).

(When reassembling)

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

■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8**
- **Never work the tractor immediately after changing the transmission oil. Keeping the engine at medium speed for a few minutes to prevents damage to the transmission.**
- **Do not mix different brands oil together.**

Transmission fluid	Capacity	24 L 6.3 U.S.gals 5.3 Imp.gals

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

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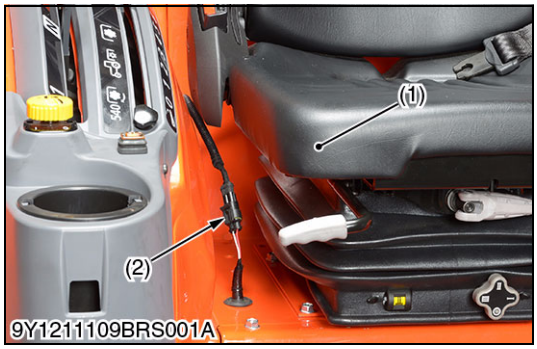

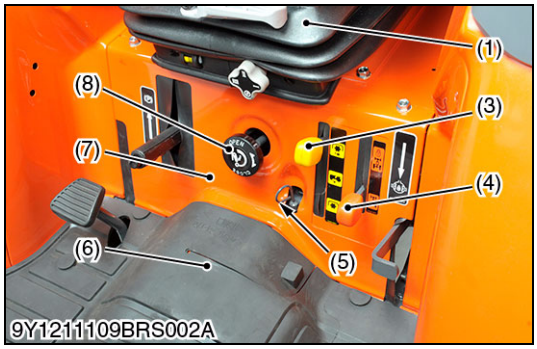

Seat and Seat Under Cover

1. Disconnect the seat switch connector (2).
2. Remove the seat (1).
3. Remove the step mat (6).
4. Remove the dipstick (5).
5. Remove the grips of the mid PTO lever (3) and front wheel drive lever (4).
6. Remove the lowering speed adjusting knob (8).
7. Remove the seat under cover (7).

(1) Seat
(2) Seat Switch Connector
(3) Mid PTO Lever
(4) Front Wheel Drive Lever
(5) Dipstick
(6) Step Mat
(7) Seat Under Cover
(8) Lowering Speed Adjusting Knob

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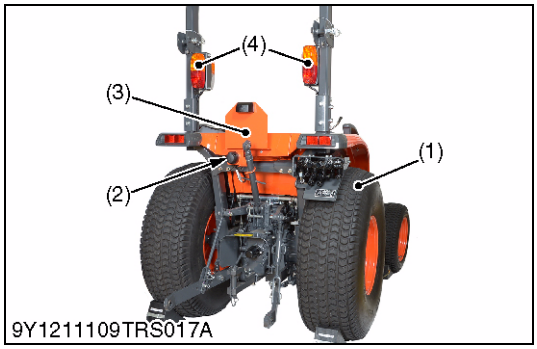

Rear Wheel

1. Place the disassembling stand under the rear axles.
2. Remove the rear wheels (1).
3. Remove the Registration plate (3) with trailer electrical outlet (2).
4. Remove the combination lights (4)

Tightening torque	Rear wheel mounting screw and nut	196.1 to 225.6 N·m 20.0 to 23.0 kgf·m 145 to 166 lbf·ft

(1) Rear Wheel
(2) Trailer Electrical Outlet
(3) Registration Plate
(4) Combination Light

9Y1211109TRS0017US0

ROPS

1. Fold the ROPS and support it with the lift strap.
2. Remove the ROPS mounting bolts (1).
3. Pull out the ROPS.

Tightening torque	ROPS mounting bolt	167 to 197 N·m 17.0 to 20.0 kgf·m 123 to 144 lbf·ft

(1) ROPS Mounting Bolt

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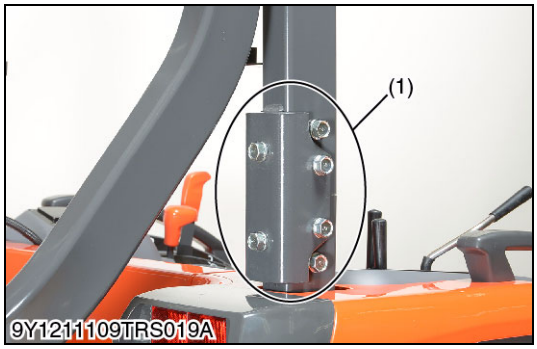

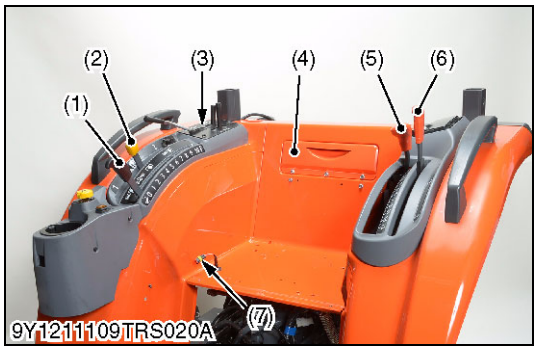

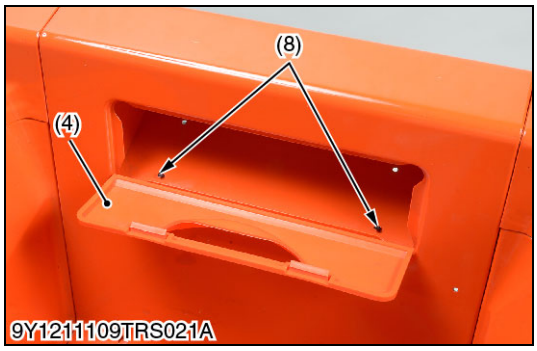

Lever Grip and Wiring Harness

1. Remove the grips of the rear PTO shift lever (2), position control lever (1), cruise control lever (5) and range gear shift lever (6).
2. Remove the remote control valve lever guide (3)
3. Pull out the seat switch connector (7).
4. Open the tool box (4).
5. Disconnect the clamps (8).

(When reassembling)

- Do not confuse the grips.
  - Grip (yellow) for the rear PTO shift lever (2).
  - Grip (red) for the range gear shift lever (6).

(1) Position Control Lever
(2) Rear PTO Shift Lever
(3) Remote Control Valve Lever Guide
(4) Tool Box
(5) Cruise Control Lever
(6) Range Gear Shift Lever
(7) Seat Switch Connector
(8) Clamp

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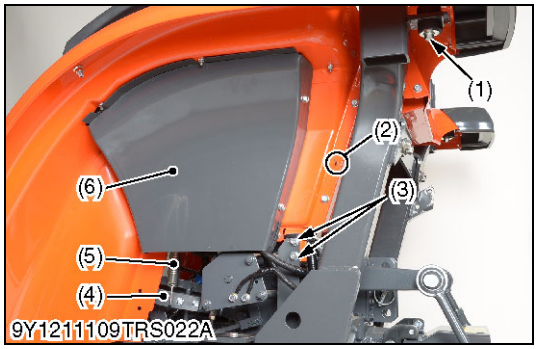

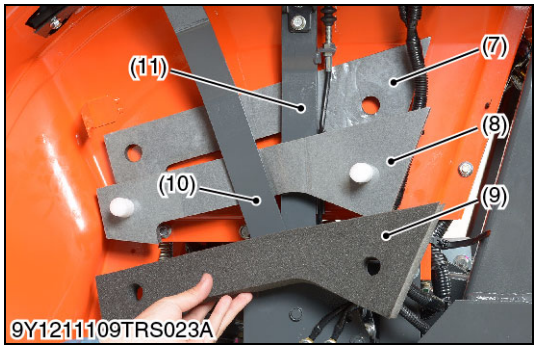

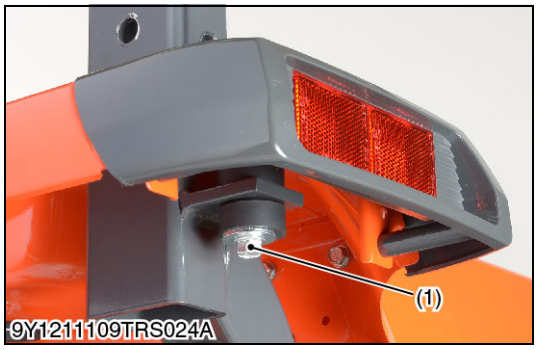

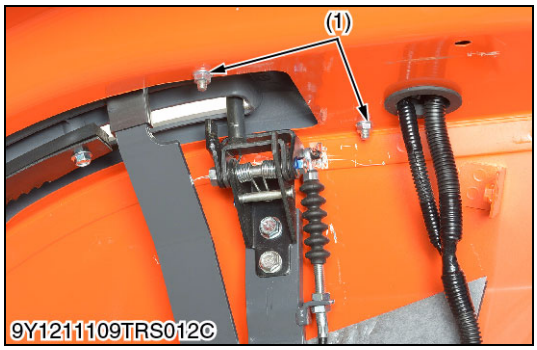

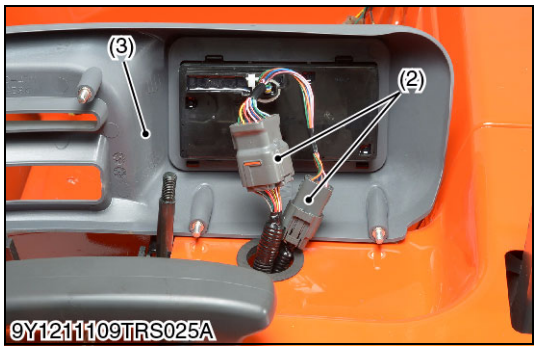

Fender (Left Side)

1. Remove the fender covers (6) and the sponges (8), (9).
2. Remove the differential lock pedal (4) with the spring (5).
3. Remove the screws (3).
4. Remove the fender mounting screw (1).
5. Disconnect the clamp (2).

(When reassembling)

- Assemble the sponge (center) (8) between the cruise control lever (11) and range gear shift lever (10).

Tightening torque	Fender mounting screw (1)	197 to 225 N·m 20.0 to 23.0 kgf·m 145 to 166 psi

(1) Fender Mounting Screw
(2) Clamp
(3) Screw
(4) Differential Lock Pedal
(5) Spring
(6) Fender Cover
(7) Sponge (Inner)
(8) Sponge (Center)
(9) Sponge (Outer)
(10) Range Gear Shift Lever
(11) Cruise Control Lever

9Y1211109TRS0020US0

Lever Guide and Bi-speed Controller Connector

1. Remove the lever guide mounting screws (1).
2. Open the lever guide (3).
3. Disconnect the bi-speed controller connectors (2) and then remove the lever guide (3).

(1) Screw
(2) Bi-speed Controller Connector
(3) Lever Guide

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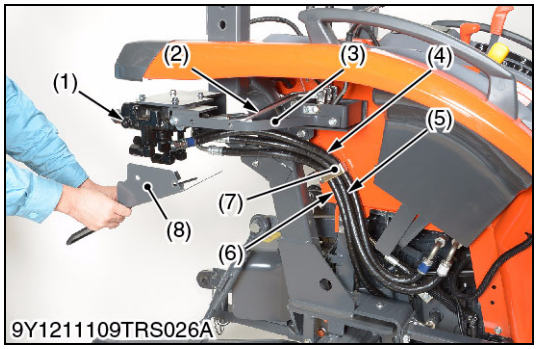

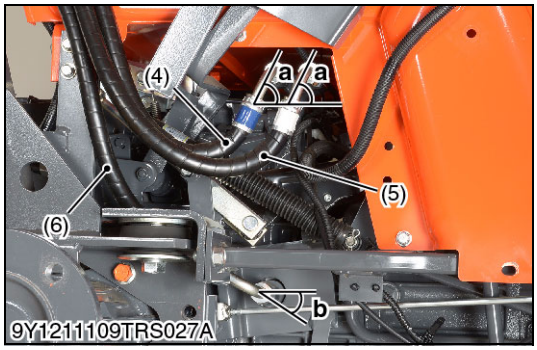

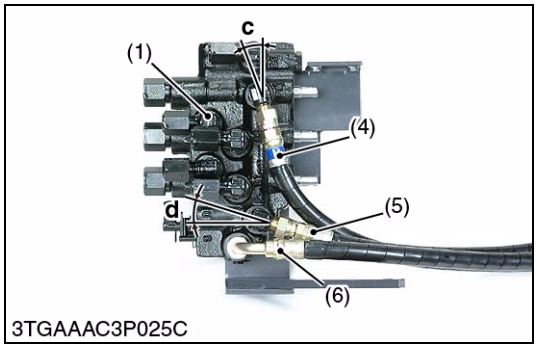

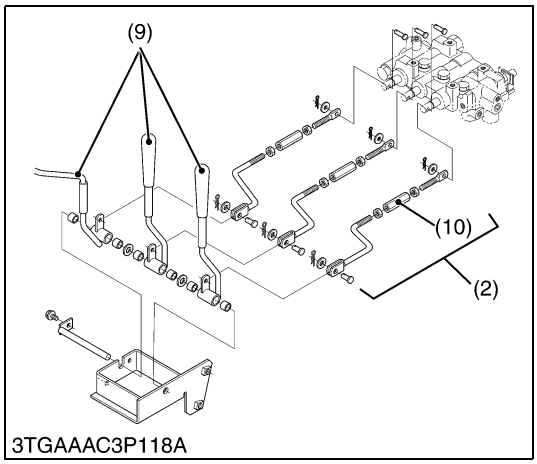

Auxiliary Control Valve

1. Remove the valve cover (8).
2. Remove the valve stay (3).
3. Remove the connecting rods (2).

(When reassembling)

- Reassemble the connecting rods (2) as shown in the figure.
- After reassembling the valve stay (3), adjust to locate the control lever (9) at a central position of the guide slot with the turnbuckle (10).

4. Remove the hose clamp (7).

(When reassembling)

- Clamp the hydraulic hoses in order of hydraulic hose **PB** (4), hydraulic hose **P** (5) and hydraulic hose **T** (6) from the front side.

5. Disconnect the hydraulic hoses (4), (5), (6) from the tractor body.
6. Remove the auxiliary control valve (1) with the hydraulic hoses (4), (5), (6).

(When reassembling)

- Assemble the hose joints to appropriate positions referring to the table below.

(Distinction and installation angle of the hose joints)

Hydraulic Hose	Hose joint (Valve side)	Hose joint (Tractor body side)
P (5)	Straight joint 0.26 rad (15 °)	Bent joint with white tape 0.785 rad (45 °)
PB (4)	Straight joint with blue tape 0.26 rad (15 °)	Bent joint with blue tape 0.785 rad (45 °)
T (6)	Bent joint 1.57 rad (90 °)	Bent joint 0.349 to 0.523 rad (20 ° to 30 °)

Tightening torque	Hydraulic hoses **PB**, **P** and **T** retaining nuts	30 to 40 N·m 3.0 to 4.0 kgf·m 21.7 to 28.9 lbf·ft

(1) Auxiliary Control Valve
(2) Connecting Rods
(3) Valve Stay
(4) Hydraulic Hose **PB**
(5) Hydraulic Hose **P**
(6) Hydraulic Hose **T**
(7) Hose Clamp
(8) Valve Cover
(9) Control Lever
(10) Turnbuckle

a: 0.785 rad (45 °)
b: 0.349 to 0.523 rad (20 ° to 30 °)
c: 0.26 rad (15 °)
d: 0.26 rad (15 °)
Pb: Power Beyond Port
P: Pump Port
T: Tank Port

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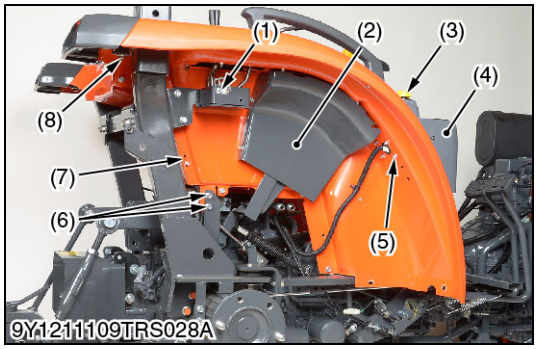
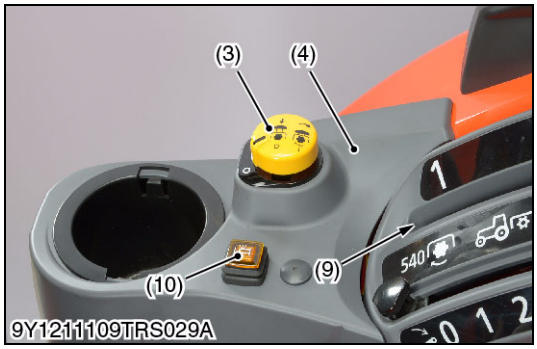
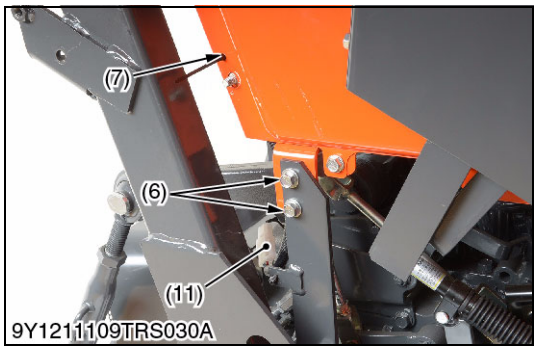
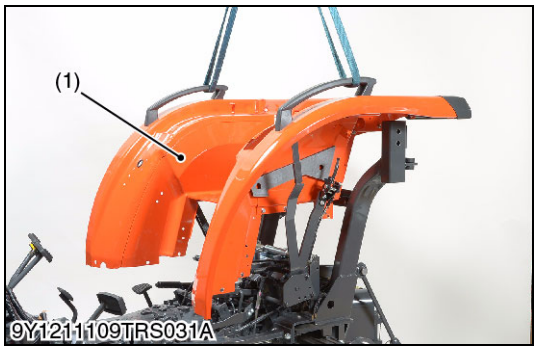








Fender (Right Side)

1. Remove the fender cover (2).
2. Remove the loader lever guide mounting nuts (5) and then open the loader lever guide (4).
3. Disconnect the connectors for PTO switch (3) and beacon switch (9).
4. Disconnect the clamp (7).
5. Remove the remote control valve lever bracket (1) with the remote control valve lever.
6. Remove the lever guide (9).
7. Remove the screws (6).
8. Remove the fender mounting screw (8).
9. Disconnect the rear PTO switch connector (11).

(When reassembling)

Tightening torque	Fender mounting screw	197 to 225 N·m 20.0 to 23.0 kgf·m 145 to 166 psi

(1) Remote Control Valve Lever Bracket
(2) Fender Cover
(3) PTO Switch
(4) Loader Lever Guide
(5) Loader Lever Guide Mounting Nut
(6) Screw
(7) Clamp
(8) Screw
(9) Lever Guide
(10) Beacon Switch
(11) Rear PTO Switch Connector

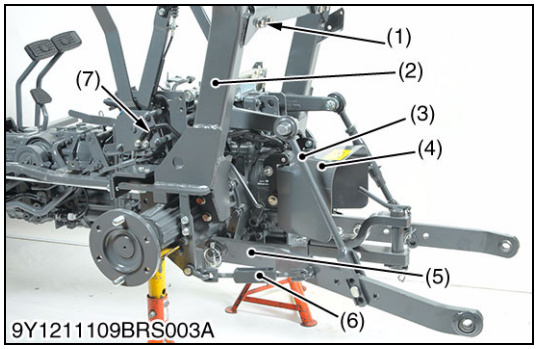
9Y1211109TRS0023US0

Fender Assembly

1. Dismount the fender assembly (1) after checking whether there is forgetting to disconnecting wiring.

(1) Fender Assembly

9Y1211109TRS0024US0



3-Point Linkage and ROPS Under Frame

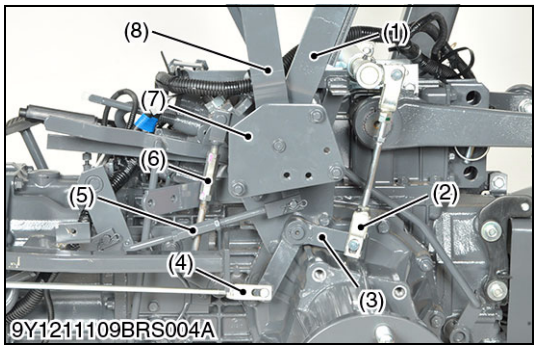
1. Remove the lifting rods (3).
2. Remove the lower links (5) with the check chains (6).
3. Remove the PTO shaft cover (4).
4. Remove the joint stay (1).
5. Remove the ROPS under frame (2).
6. Remove the grounding cable (7).

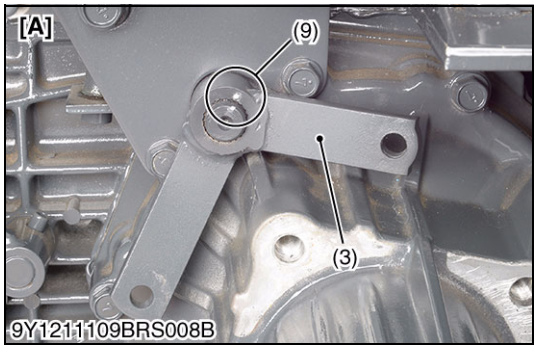
(When reassembling)

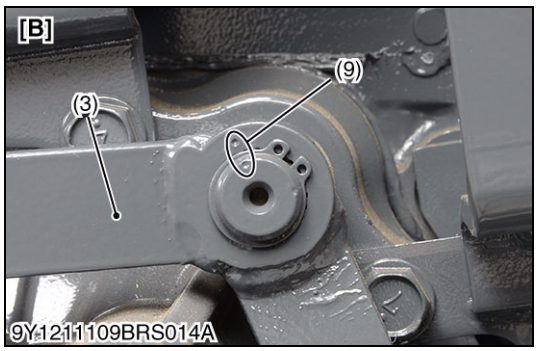
Tightening torque	Joint stay mounting screw (M12) (1)	103.0 to 117.7 N·m 10.51 to 12.00 kgf·m 75.97 to 86.81 lbf·ft
	Rear frame mounting screw (M12) (2)	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 lbf·ft

(1) Joint Stay
(2) ROPS Under Frame
(3) Lifting Rod
(4) PTO Shaft Cover
(5) Lower Link
(6) Check Chain
(7) Grounding Cable

9Y1211109RAS0006US0







Brake Linkage

1. Remove the brake rod (4) and parking brake rod (2).
2. Remove external snap ring and remove the brake lever (3).
3. Remove the cruise control rod (5).
4. Remove the range gear shift rod (6).
5. Remove the plate (7).
6. Remove the range gear shift lever (8) and cruise control lever (1).

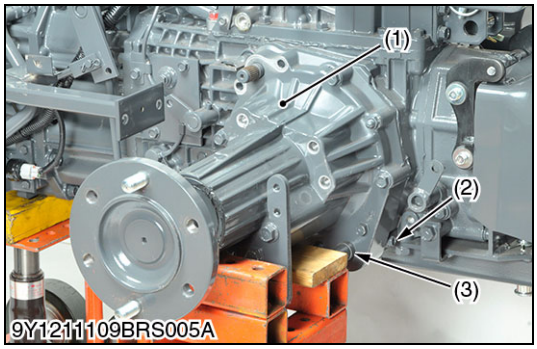
(When reassembling)

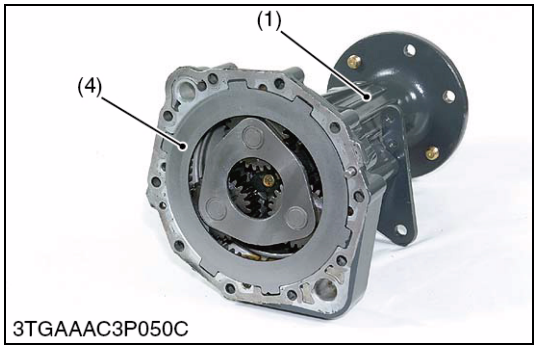
- When reassembling the brake lever (3), align the punch mark (9) of the brake lever (3).

(1) Cruise Control Lever
(2) Parking Brake Rod
(3) Brake Lever
(4) Brake Rod
(5) Cruise Control Rod
(6) Range Gear Shift Rod
(7) Plate
(8) Range Gear Shift Lever
(9) Punch Mark

[A] Left Side
[B] Right Side

9Y1211109RAS0007US0





Rear Axle

1. Remove the setting screw (2) and pull out the lower link pin (3).
2. Place the disassembling stand under the rear axle case.
3. Remove the rear axle mounting screws and nuts, and separate the rear axle (1).

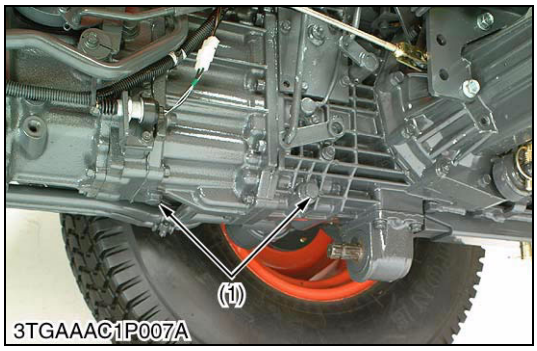
(When reassembling)

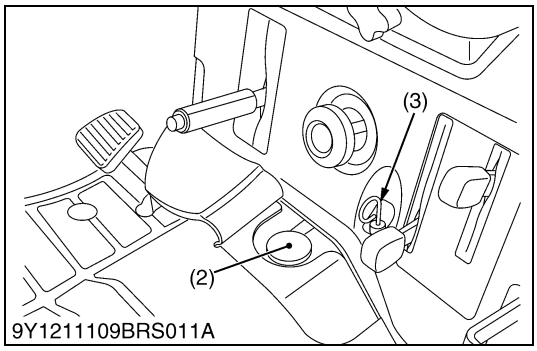
- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the rear axle case and transmission case.

(1) Rear Axle
(2) Setting Screw
(3) Lower Link Pin
(4) Brake Plate 2

9Y1211109RAS0008US0

(2) Separating Rear Axle for CABIN





Draining Transmission Fluid

1. Place an oil pan underneath the transmission case, and remove the drain plugs (1).
2. Drain the transmission fluid.
3. Reinstall the drain plugs (1).

(When reassembling)

- 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 prescribed level.

■ **IMPORTANT**

- **Use only KUBOTA SUPER UDT fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "4. LUBRICANTS, FUEL AND COOLANT" on page G-8.**
- **Never work the tractor immediately after changing the transmission oil. Keeping the engine at medium speed for a few minutes to prevents damage to the transmission.**
- **Do not mix different brands oil together.**

Transmission fluid	Capacity	24 L 6.3 U.S.gals 5.3 Imp.gals

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

9Y1211109ENS0131US0

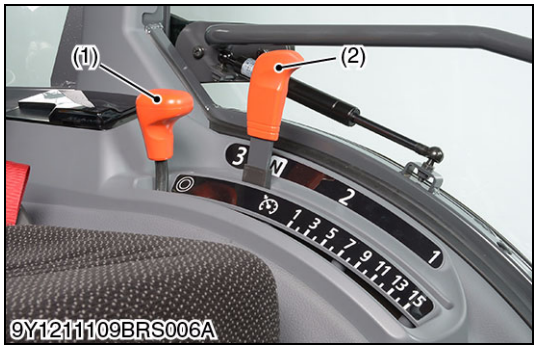
Rear Wheel and 3-Point Linkage

1. Place the disassembling stand under the transmission case.
2. Remove the rear wheels (1).
3. Remove the top link (2), lift rods (3) and lower links (4).
4. Remove the drawbar (5).

Tightening torque	Rear wheel mounting screw and nut	196.1 to 225.6 N·m 20.0 to 23.0 kgf·m 145 to 166 lbf·ft

(1) Rear Wheel
(2) Top Link
(3) Lift Rod
(4) Lower Link
(5) Drawbar

9Y1211109ENS0037US0



Lever Grip

1. Remove the cruise control lever grip (1).
2. Remove the range gear shift lever grip (2).

(1) Cruise Control Lever Grip
(2) Range Gear Shift Lever Grip

9Y1211109RAS0009US0

Fender Assembly

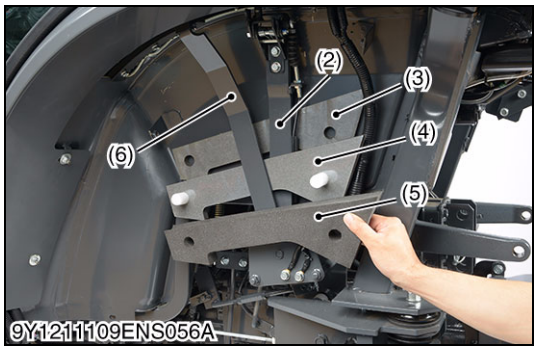
1. Remove the fender cover (1).
2. Remove the sponges (4), (5).

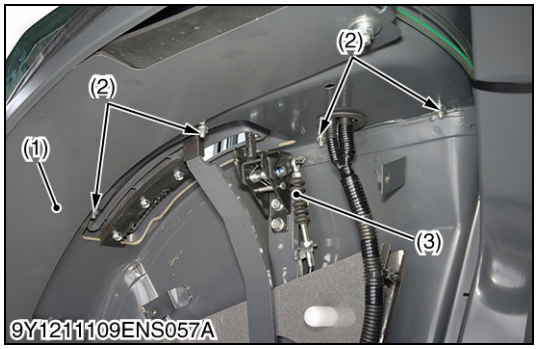
(When reassembling)

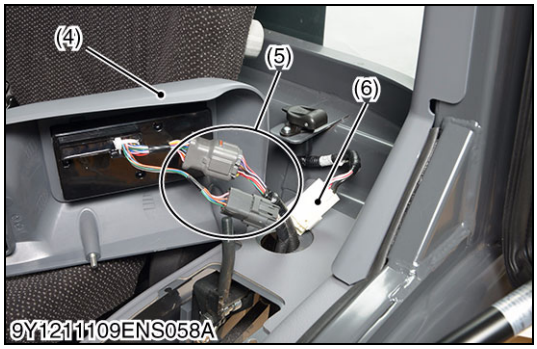
- Assemble the sponge (center) (4) between the cruise control lever (2) and range gear shift lever (6).

(1) Fender Cover
(2) Cruise Control Lever
(3) Sponge (Inner)
(4) Sponge (Center)
(5) Sponge (Outer)
(6) Range Gear Shift Lever

9Y1211109ENS0046US0





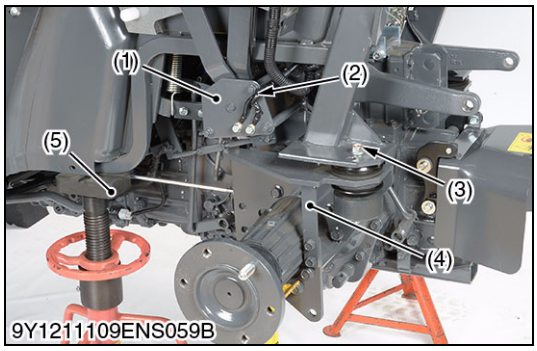


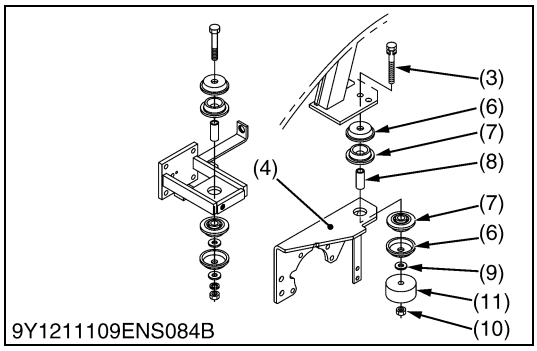
Release Wire and Wiring Harness (Left Side)

1. Remove the fender under cover (1).
2. Remove the release wire (3).
3. Remove the lever guide mounting screws (2), and then open the lever guide (4).
4. Disconnect the wiring connectors for the bi-speed controller connectors (5) and electrical outlet connector (6).
5. Remove the lever guide (4) with bi-speed controller.

(1) Fender Under Cover
(2) Lever Guide Mounting Screw
(3) Release Wire (Cruise Control)
(4) Lever Guide
(5) Bi-speed Controller Connector
(6) Electrical Outlet Connector

9Y1211109ENS0047US0





Cabin Mount Screw

1. Remove the grounding cable (2) mounting screws.
2. Remove the plate (1).
3. Place a stand (5) under the cabin frame.
4. Remove the cabin mount bracket mounting screw (3) and nut.
5. Remove the bracket (4).

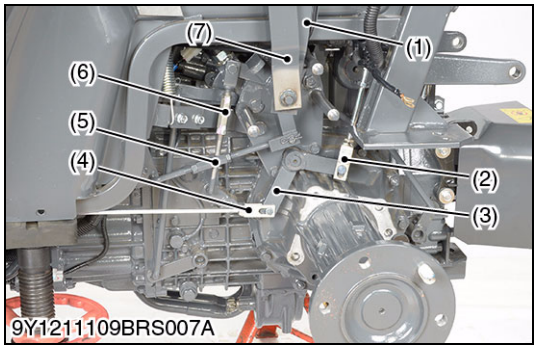
(When reassembling)

- Be sure to install the washers, plate and mount rubbers, etc. in their original positions.

Tightening torque	Bracket mounting screw M12	63 to 72 N·m 6.4 to 7.4 kgf·m 47 to 53 lbf·ft
	Cabin mounting bolt and nut	124 to 147 N·m 12.6 to 15.0 kgf·m 91.1 to 108 lbf·ft

(1) Plate
(2) Grounding Cable
(3) Cabin Mounting Screw
(4) Bracket
(5) Stand
(6) Plate
(7) Mount Rubber
(8) Collar
(9) Plane Washer
(10) Nut
(11) Collar

9Y1211109RAS0010US0

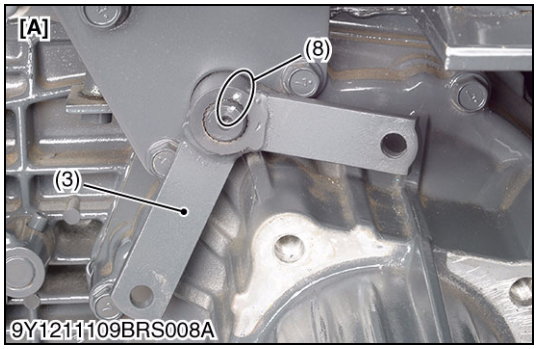


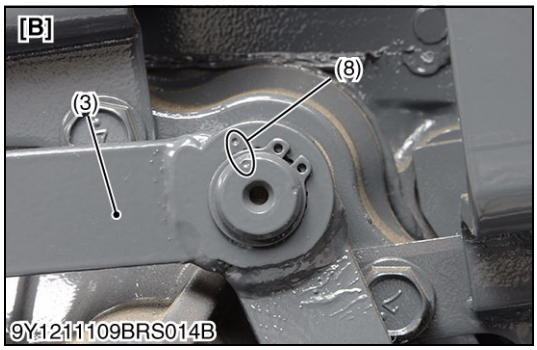
Brake Linkage

1. Remove the brake rod (4).
2. Remove the parking brake rod (2).
3. Remove external snap ring and remove the brake lever (3).
4. Remove the cruise control rod (5).
5. Remove the range gear shift rod (6).
6. Remove the range gear shift lever (7) and cruise control lever (1).

(When reassembling)

- When reassembling the brake lever (3), align the punch mark (8) of the brake lever (3).





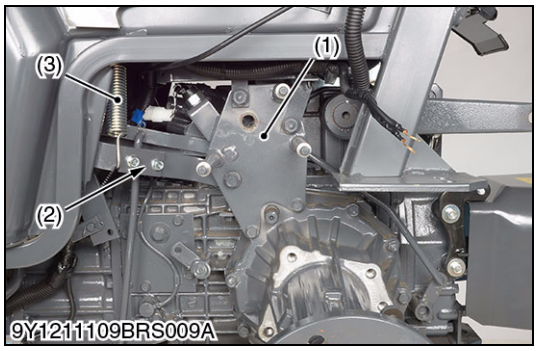
(1) Cruise Control Lever
(2) Parking Brake Rod
(3) Brake Lever
(4) Brake Rod
(5) Cruise Control Rod
(6) Range Gear Shift Rod
(7) Range Gear Shift Lever
(8) Punch Mark

[A] Left Side
[B] Right Side

9Y1211109RAS0011US0

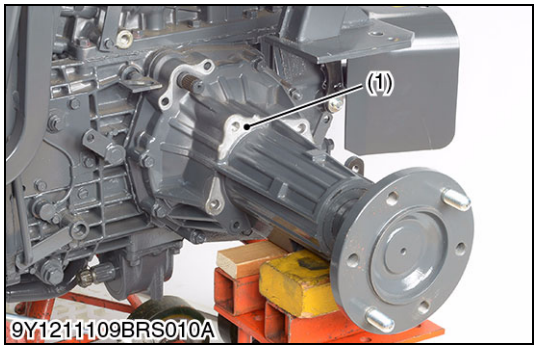
Differential Lock Pedal and Spring spring

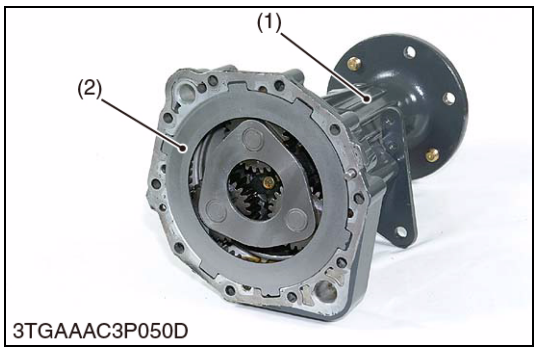
1. Remove the spring (3).
2. Remove the differential lock pedal (2).
3. Remove the bracket (1).



(1) Bracket
(2) Differential Lock Pedal
(3) Spring

9Y1211109RAS0012US0





Rear Axle

1. Remove the setting screw and pull out the lower link pin.
2. Place the disassembling stand under the rear axle case.
3. Remove the rear axle mounting screws and nuts, and separate the rear axle (1).

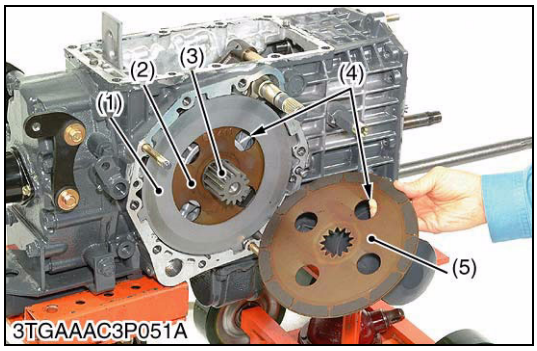
(When reassembling)

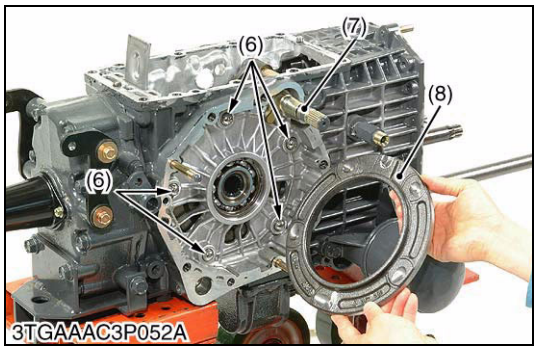
- Apply liquid gasket (Three Bond 1206C or equivalent) to the joint face of the rear axle case (1) and transmission case.
- Fix the brake plate (2) to the rear axle case (1) with the liquid gasket.

Tightening torque	Brake case mounting screw	39.3 to 44.1 N·m 4.0 to 4.5 kgf·m 29.0 to 32.5 lbf·ft

(1) Rear Axle
(2) Brake Plate

9Y1211109RAS0013US0





Brake Disc, Brake Plate and Brake Cam

1. Remove the brake disc (5), brake shaft (3), brake plate (1).
2. Remove the cam plate (8) and steel balls (6).
3. Remove the brake cam (7).

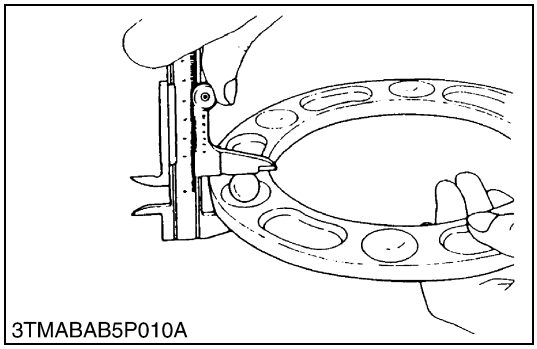
(When reassembling)

- Place the brake disc (5) so that the brake disc hole (4) should be overlapped 50 % or more.
- Apply grease to the O-ring on the brake cam (7).
- Be sure to fix the brake cam (7) and cam plate (8).

(1) Brake Plate
(2) Brake Disc
(3) Brake Shaft
(4) Brake Disc Hole
(5) Brake Disc
(6) Steel Ball
(7) Brake Cam
(8) Cam Plate

9Y1211109BRS0011US0

[3] SERVICING


3TMABAB5P010A

Height of Cam Plate and Ball

1. Measure the dimensions 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. If the uneven wear is found, replace it.

Height of cam plate and ball	Factory specification	20.95 to 21.05 mm 0.8248 to 0.8287 in.
	Allowable limit	20.5 mm 0.807 in.

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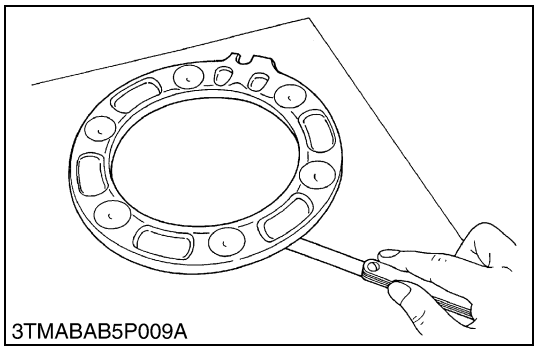
3TMABAB5P009A

Cam Plate Flatness

1. Place the cam plate on the surface plate.
2. Use a feeler gauge of 0.3 mm (0.012 in.) thick for judgement of the cam plate flatness. Measure the flatness diagonally at more than four locations.
3. If the measurement is above the allowable limit, replace it.

Cam plate flatness	Allowable limit	0.3 mm 0.012 in.

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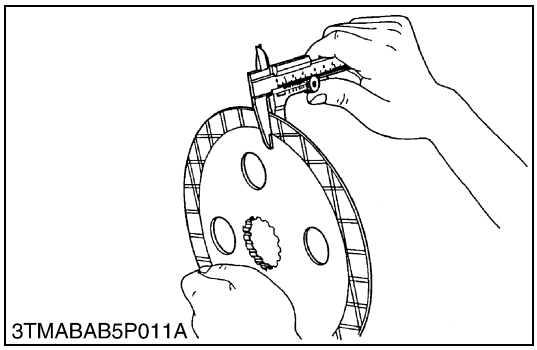
3TMABAB5P011A

Brake Disc Wear

1. Measure the brake disc thickness with vernier calipers.
2. If the measurement is less than the allowable limit, replace it.

Brake disc wear	Factory specification	3.4 to 3.6 mm 0.1339 to 0.1417 in.
	Allowable limit	3.0 mm 0.118 in.

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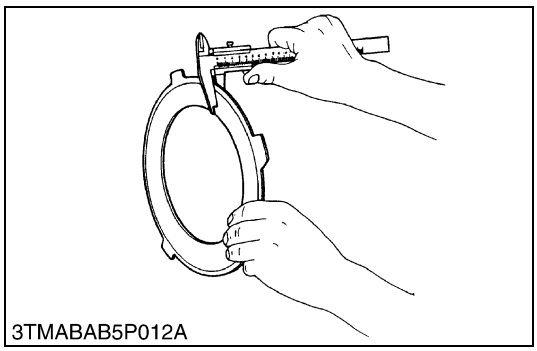

3TMABAB5P012A

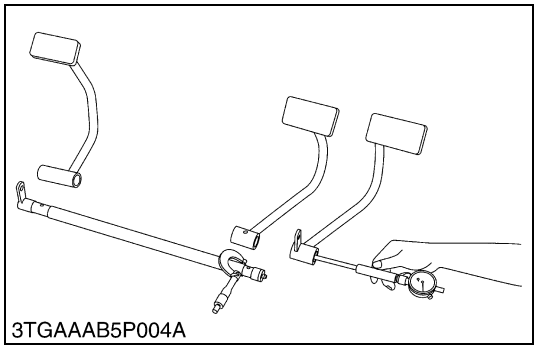
Brake Plate Wear

1. Measure the brake plate thickness.
2. If the thickness is less than the allowable limit, replace it.

Brake plate 1	Factory specification	2.54 to 2.66 mm 0.1000 to 0.1047 in.
	Allowable limit	2.1 mm 0.083 in.

Brake plate 2 thickness	Factory specification	2.52 to 2.68 mm 0.0992 to 0.1055 in.
	Allowable limit	2.1 mm 0.083 in.

9Y1211109BRS0008US0


3TGAAAB5P004A

Clearance between Brake Pedal Shaft and Brake Pedal

1. Measure the brake pedal shaft O.D. (bearing surface) with an outside micrometer.
2. Measure the brake pedal I.D. with a cylinder gauge.
3. Calculate the clearance.
4. If the clearance exceeds the allowable limit, replace them.

Clearance between brake pedal shaft and brake pedal	Factory specification	0.000 to 0.136 mm 0.0000 to 0.0054 in.
	Allowable limit	0.5 mm 0.020 in.

Brake pedal shaft O.D.	Factory specification	24.916 to 25.000 mm 0.9809 to 0.9843 in.
Brake pedal I.D.	Factory specification	25.000 to 25.052 mm 0.9843 to 0.9863 in.

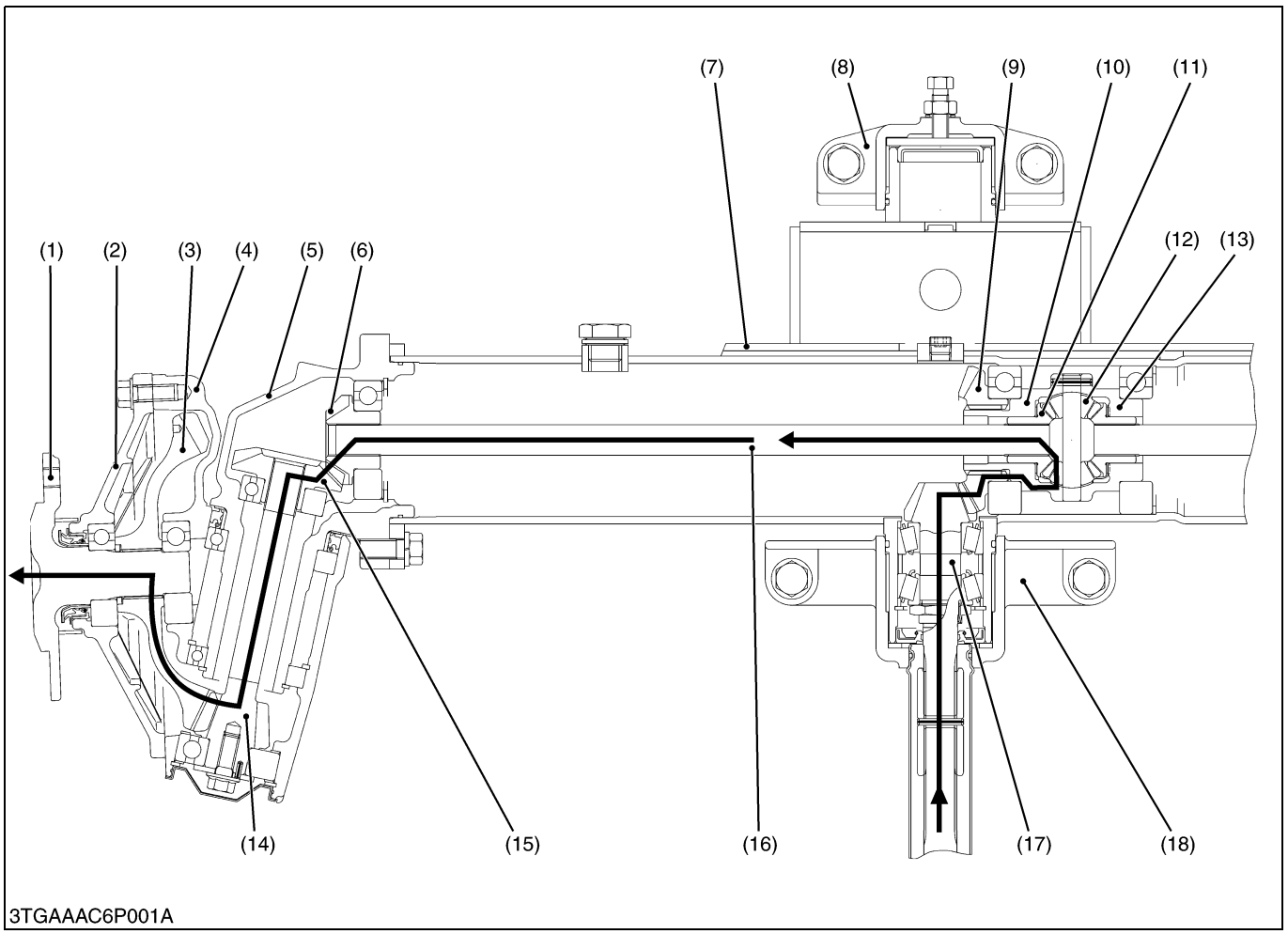
9Y1211109BRS0009US0

6 FRONT AXLE

MECHANISM

CONTENTS

1. STRUCTURE



3TGAAAC6P001A

(1) Front Axle
(2) Gear Case Cover
(3) 41T Bevel Gear
(4) Front Gear Case
(5) Bevel Gear Case
(6) 11T Bevel Gear
(7) Front Axle Case
(8) Front Axle Bracket, (Front)
(9) 24T Bevel Gear
(10) Differential Case Cover
(11) Differential Side Gear
(12) Differential Pinion
(13) Differential Case
(14) 7T Pinion Shaft
(15) 16T Bevel Gear
(16) Differential Gear Shaft
(17) 10T Bevel Pinion Shaft
(18) Front Axle Bracket, (Rear)

The structure of the front axle is constructed as shown above.

The differential system allows each wheel to rotate at a different speed to make turn easier. It is designed compact type to install in the front axle case (7) for getting high minimum ground clearance.

9Y1211109FAM0001US0

SERVICING

CONTENTS

1. TROUBLESHOOTING

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Front Wheels Wander to Right or Left	1. Tire pressure is uneven.	Adjust tire pressure.	G-50
	2. Toe-in is improper.	Adjust toe-in.	6-S4
	3. Clearance between front axle case boss and front axle bracket (front, rear) bushing is excessive.	Replace front axle case boss and front axle bracket (front, rear) bushing.	6-S14
	4. Front axle rocking force is too small.	Adjust front axle rocking force.	6-S4
	5. Tie-rod end is loose.	Tighten tie-rod end.	6-S4
Front Wheels Can Not Be Driven	1. Propeller shaft is damaged.	Replace the propeller shaft.	6-S5
	2. Front differential gear is damaged.	Replace the front differential gear.	6-S10
	3. Shift fork is damaged.	Replace the shift fork.	–
Noise Occurs	1. Gear backlash is excessive.	Adjust the gear backlash or replace the gears.	–
	2. Front axle case oil is insufficient.	Fill front axle case oil to the proper level.	6-S5
	3. Bearings are damaged.	Replace bearings.	–
	4. Gears are damaged.	Replace gears.	–
	5. Spiral bevel pinion shaft turning force is improper.	Adjust spiral bevel pinion shaft turning force.	6-S11

9Y1211109FAS0001US0

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Front Wheel Alignment	Toe-in	2 to 8 mm 0.079 to 0.315 in.	–
Front Axle	Rocking Force	49.0 to 117.7 N 5.0 to 12.0 kgf 11.0 to 26.5 lbf	–
Front Axle Case Bosses to Bracket Bushings	Clearance	0.030 to 0.150 mm 0.0012 to 0.0059 in.	0.25 mm 0.0098 in.
• Front Axle Case Bosses	O.D.	61.940 to 61.970 mm 2.4386 to 2.4398 in.	–
• Bracket Bushing	I.D.	62.000 to 62.090 mm 2.44094 to 2.4445 in.	–
Differential Case to Differential Side Gear	Clearance	0.040 to 0.082 mm 0.0016 to 0.0032 in.	0.20 mm 0.0079 in.
• Differential Case Cover	I.D.	28.000 to 28.021 mm 1.1024 to 1.1032 in.	–
• Differential Side Gear	O.D.	27.939 to 27.960 mm 1.1000 to 1.1008 in.	–
Differential Pinion Shaft to Differential Pinion	Clearance	0.048 to 0.084 mm 0.0019 to 0.0033 in.	0.20 mm 0.0079 in.
• Differential Pinion Shaft	O.D.	10.966 to 10.984 mm 0.4317 to 0.4324 in.	–
• Differential Pinion	I.D.	11.032 to 11.050 mm 0.4343 to 0.4350 in.	–
Differential Pinion to Differential Side Gear	Backlash	0.1 to 0.3 mm 0.004 to 0.012 in.	–
Spiral Bevel Pinion Shaft (Pinion Shaft Only)	Turning Force	58.8 to 78.4 N 6.0 to 8.0 kgf 13.2 to 17.6 lbf	–
Spiral Bevel Pinion Shaft to Spiral Bevel Gear	Backlash	0.1 to 0.3 mm 0.004 to 0.012 in.	–
11T Bevel Gear to 16T Bevel Gear	Backlash	0.15 to 0.35 mm 0.0059 to 0.0138 in.	–
7T Pinion Shaft to 41T Bevel Gear	Backlash	0.15 to 0.35 mm 0.0059 to 0.0138 in.	–

9Y1211109FAS0002US0

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-10.)

Item	N·m	kgf·m	lbf·ft
Tie-rod lock nut	117 to 137	12 to 14	86.8 to 101.3
Adjusting screw lock nut	39.2 to 45.1	4.0 to 4.6	28.9 to 33.3
Front wheel mounting screws and nuts	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Delivery hose retaining nut	25 to 30	2.5 to 3.0	18.1 to 21.7
Front axle brackets mounting bolt	124 to 147	12.6 to 15.0	91.2 to 108
Tie-rod end nut (Power steering cylinder)	34.3 to 44.1	3.5 to 4.5	25.3 to 32.5
Steering cylinder mounting reamer screw	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Bevel gear case mounting screws	77.5 to 90.2	7.9 to 9.2	57.1 to 66.5
Gear case cover mounting screws	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
7T pinion shaft UBS screw	60.8 to 70.6	6.2 to 7.2	44.8 to 52.1
Differential case cover mounting screws	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3

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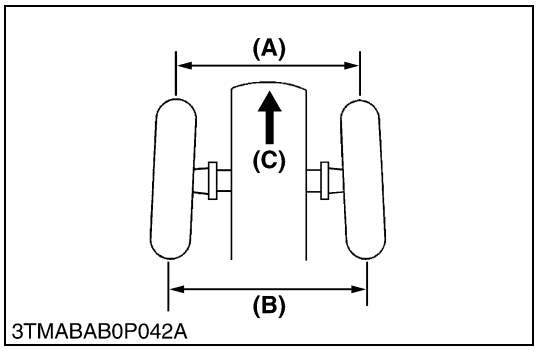
4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING



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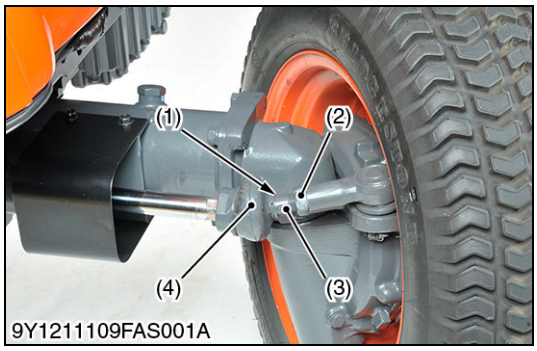

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Adjusting Toe-in

1. Park the tractor on the flat place.
2. Inflate the tires to the specified pressure.
3. Turn the steering wheel so that the front wheels are in the straight ahead position.
4. Lower the implement, lock the parking brake and stop the engine.
5. Measure distance between tire beads at front of tire, hub height.
6. Measure distance between tire beads at rear of tire, hub height.
7. Front distance should be 2 to 8 mm (0.079 to 0.315 in.) less than rear distance.
8. If the measurement is not within the factory specifications, adjust by changing the tie-rod length.

Toe-in **((B)-(A))**	Factory specification	2 to 8 mm 0.079 to 0.315 in.

■ **Adjusting**

1. Remove the snap ring (1) from the dust cover (4).
2. Loosen the tie-rod lock nut (2) and turn the tie-rod joint (3) to adjust the tie-rod length until the proper toe-in measurement is obtained.
3. Retighten the tie-rod lock nut (2).
4. Attach the snap ring (1) to the dust cover (4).

Tightening torque	Tie-rod lock nut	117 to 137 N·m 12 to 14 kgf·m 86.8 to 101.3 lbf·ft

■ **IMPORTANT**

- **A right and left tie-rod joint is adjusted to the same length.**

(1) Snap Ring
(2) Tie-rod Lock Nut
(3) Tie-rod Joint
(4) Dust Cover

(A) Wheel-to-wheel Distance at Front
(B) Wheel-to-wheel Distance at Rear
(C) Front

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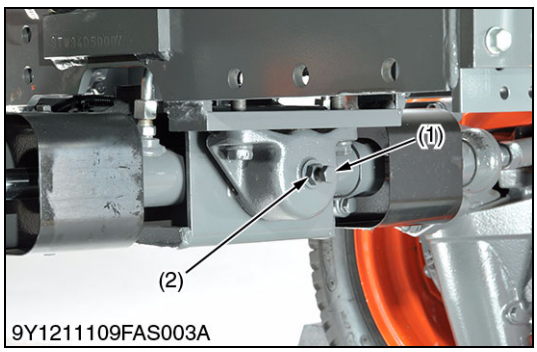

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Front Axle Rocking Force

1. Jack up the front side of tractor.
2. Remove the front wheels.
3. Set a spring balance to the front wheel mounting stud bolt with nut.
4. Measure the front axle rocking force.
5. If the measurement is not within the factory specifications, adjust with the adjusting screw (1).
6. After adjustment, tighten the lock nut (2) firmly.

Front axle rocking force	Factory specification	49.0 to 117.7 N 5.0 to 12.0 kgf 11.0 to 26.5 lbf

(When reassembling)

Tightening torque	Adjusting screw lock nut	39.2 to 45.1 N·m 4.0 to 4.6 kgf·m 28.9 to 33.3 lbf·ft
	Front wheel mounting screws and nuts	77.5 to 90.2 N·m 57.1 to 66.5 lbf·ft

(1) Adjusting Screw (2) Lock Nut

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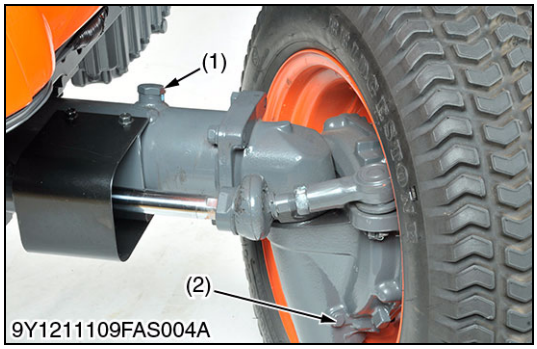
[2] DISASSEMBLING AND ASSEMBLING

(1) Separating Front Axle Assembly



Draining Front Axle Case Oil

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

(When refilling)

- Pour new oil with specified amount.

Front axle case oil	Capacity	4.5 L 4.8 U.S.qts 4.0 Imp.qts

(1) Filling Plug (2) Drain Plug

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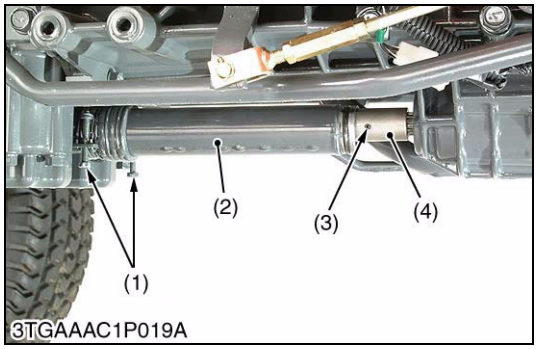

Propeller Shaft

1. Loosen the clamp screws (1) and slide the propeller shaft cover (2).
2. Tap out the spring pin (3) and then slide the coupling (4).
3. Remove the propeller shaft with the cover.

(When reassembling)

- Apply grease to the spline portion of the propeller shaft and couplings.
- When inserting the spring pins (3), face their splits in the direction parallel to the propeller shaft.
- Tighten the clamp screws (1) upward from the bottom side.

(1) Clamp Screw (3) Spring Pin
(2) Propeller Shaft Cover (4) Coupling

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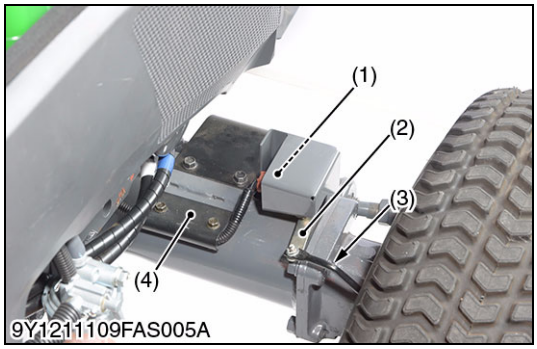

Front Wheel Turning Angle Sensor

1. Remove the wire harness clamp (4).
2. Disconnect the connector (1).
3. Remove the cotter pin and disconnect the arm (3) from the sensor lever (2).

■ **IMPORTANT**

- **Route the wire harness under the both power steering hoses.**

(1) Connector (3) Arm
(2) Lever (4) Clamp

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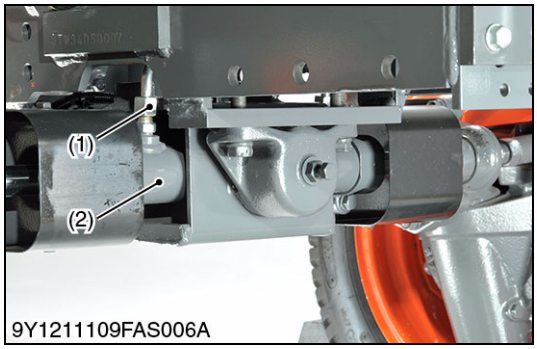

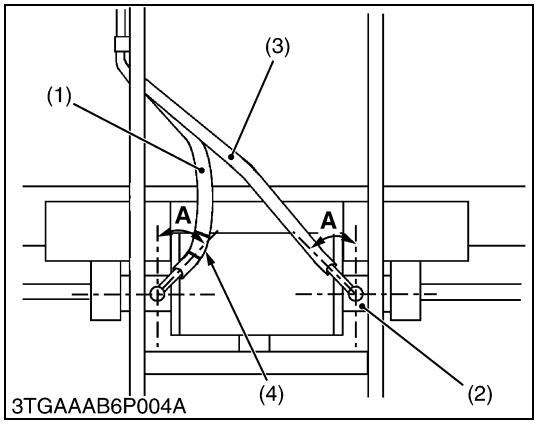

Front Wheels and Steering Cylinder Hoses

1. Lift up the front side of tractor and place the disassembling stand under the front axle frame.
2. Remove the front wheels.
3. Disconnect the delivery hoses (1), (3).

■ **NOTE**

- **After disconnecting the delivery hoses, do not steer the front axle so that the steering oil may come out from the delivery hoses.**

■ **IMPORTANT**

- **Connect the delivery hoses to the original position.**

(When reassembling)

- The power delivery hose R.H. (1) with white tape (4) to connect the right side connector of steering cylinder (2).
- Be sure to assemble the delivery hose R.H. and L.H. as shown in figure.

Tightening torque	Front wheel mounting screw and nut	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 lbf·ft
	Delivery hose retaining nut	25 to 30 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft

(1) Delivery Hose R.H.
(2) Steering Cylinder
(3) Delivery Hose L.H.
(4) White Tape

A: 0.785 rad (45 °)

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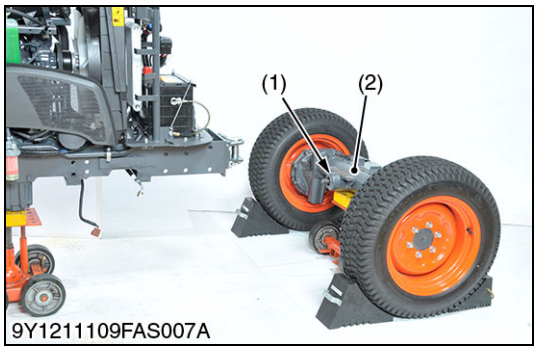

Front Axle Assembly

1. Place the disassembling stand under the front axle.
2. Remove the mounting screws of the rear axle bracket (1) and the front axle bracket.
3. Separate the front axle (2) from the front axle frame.

(When reassembling)

- After mounting the front axle assembly to the front axle frame, be sure to adjust the front axle rocking force. (See page 6-S4.)

Tightening torque	Front axle bracket mounting screw	124 to 147 N·m 12.6 to 15.0 kgf·m 91.2 to 108 lbf·ft

(1) Rear Axle Bracket
(2) Front Axle

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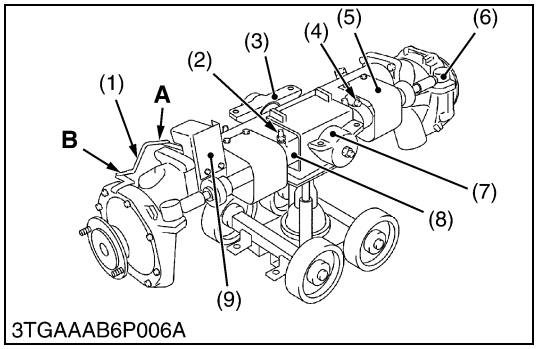
(2) Disassembling Front Axle Assembly



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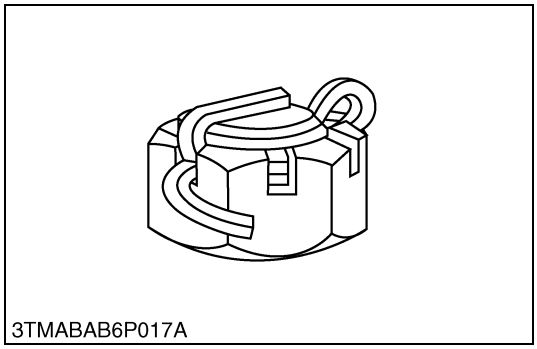
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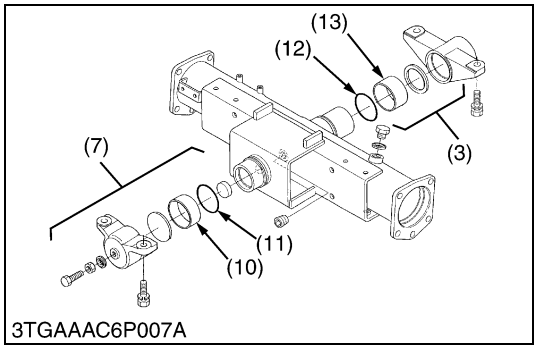

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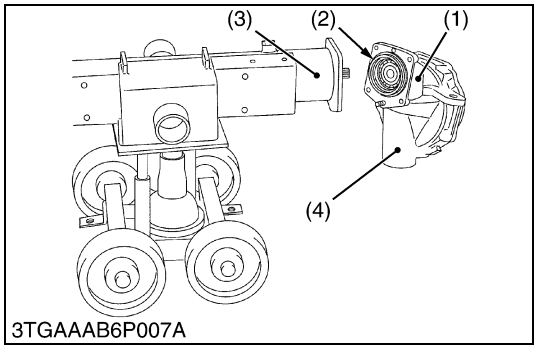

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Steering Cylinder, Axle Bracket and Front Wheel Turning Angle Sensor

1. Remove the slotted nut and remove the both R.H. and L.H. tie-rod (6).
2. Remove the front axle brackets (3), (7).
3. Remove the cylinder cover (5).
4. Remove the hydraulic connector (2) R.H. or L.H. to slide out the steering cylinder (8).
5. Remove the steering cylinder mounting reamer screw (4) and remove the cylinder (8).
6. Remove the front wheel turning angle sensor (9).

(When reassembling)

- Apply grease to the O-rings (11), (12) and bushings (10), (13) of front axle bracket.
- After tightening the slotted nut to the specified torque, install the cotter pin as shown in the figure.
- Apply seal tape to thread portion of hydraulic connector.
- Assemble the sensor arm, longer side **"A"** fix to the bi-speed sensor as figure.

Tightening torque	Tie-rod end nut (Power steering cylinder)	34.3 to 44.1 N·m 3.5 to 4.5 kgf·m 25.3 to 32.5 lbf·ft
	Steering cylinder mounting reamer screw	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 lbf·ft

(1) Sensor Arm
(2) Hydraulic Connector
(3) Front Axle Bracket (Rear)
(4) Reamer Screw
(5) Cylinder Cover
(6) Tie-rod
(7) Front Axle Bracket (Front)
(8) Steering Cylinder
(9) Front Wheel Turning Angle Sensor
(10) Bushing
(11) O-ring
(12) O-ring
(13) Bushing

A: Longer Side
B: Shorter Side

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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 (1) and front gear case (4) as a unit from the front axle case (3).

(When reassembling)

- Apply grease to the O-ring (2) and be careful not to damage it.
- Do not interchange right and left bevel gear case assemblies and right and left gear case assemblies.
- Be sure to fix the turning angle sensor arm holder.

Tightening torque	Bevel gear case mounting screw	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 lbf·ft

(1) Bevel Gear Case
(2) O-ring
(3) Front Axle Case
(4) Front Gear Case

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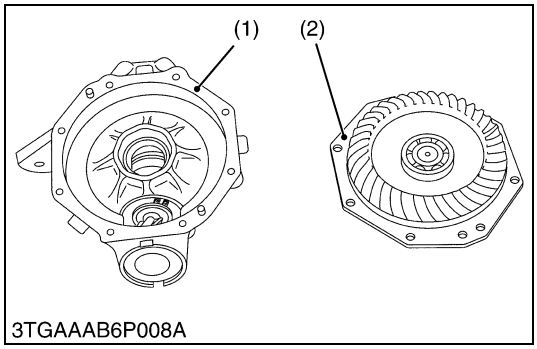

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Gear Case Cover and Front Axle

1. Remove the gear case cover (2) from the front gear case (1).
2. Remove the bearing (6) with special use puller set (Code No.: 07916-09032).
3. Remove the 41T bevel gear (5).
4. Remove the divided collar (4).
5. Tap out the front axle (3).

(When reassembling)

- Be sure to adjust the backlash between the 41T bevel gear (5) and 7T pinion shaft. (See page 6-S14.)
- Apply liquid gasket (Three Bond 1206C or equivalent) to joint face of the front gear case (1) and gear case cover (2), after eliminate the water, oil and stuck liquid gasket.

Tightening torque	Gear case cover mounting screws	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 lbf·ft

(1) Front Gear Case
(2) Gear Case Cover
(3) Front Axle
(4) Divided Collar
(5) 41T Bevel Gear
(6) Bearing

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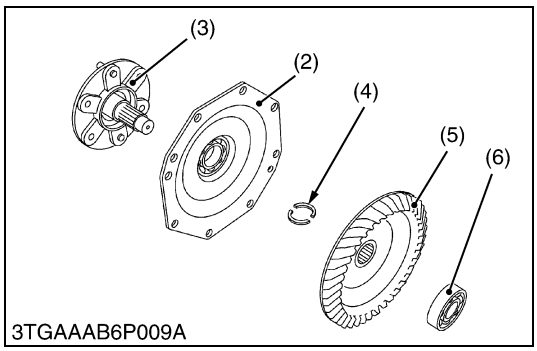

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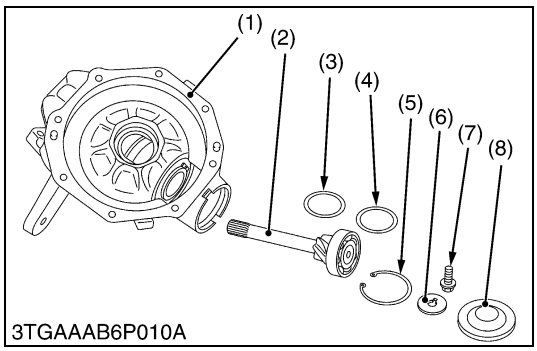
7T Pinion Shaft

1. Remove the cap (8).
2. Remove the UBS screw (7).
3. Remove the internal snap ring (5), and remove the shims (3). (4).
4. Tap out the 7T pinion shaft (2).

(When reassembling)

- Replace the cap (8) with new one.

Tightening torque	UBS screw	60.8 to 70.6 N·m 6.2 to 7.2 kgf·m 44.8 to 52.1 lbf·ft



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(1) Front Gear Case
(2) 7T Pinion Shaft
(3) Shim
(4) Shim
(5) Internal Snap Ring
(6) Washer
(7) UBS Screw
(8) Cap

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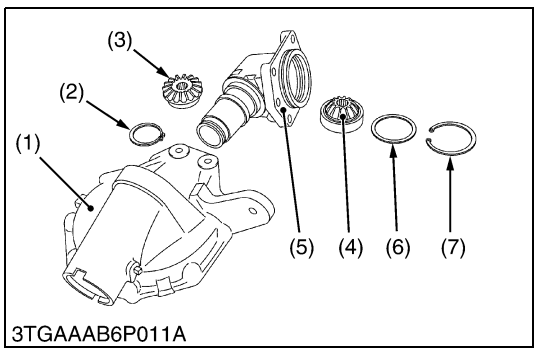

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Separating Gear Case

1. Remove the internal snap ring (7).
2. Remove the shim (6), 11T bevel gear (4) and 16T bevel gear (3) from bevel gear case (5).
3. Remove the external snap ring (2) from bevel gear case (5).
4. Tap out the front gear case (1).

(When reassembling)

- Install the oil seal of front gear case (1), noting it direction, and apply grease to it.
- Be sure to adjust the backlash between the bevel gears (3) and (4). (See page 6-S13.)

(1) Front Gear Case
(2) External Snap Ring
(3) 16T Bevel Gear
(4) 11T Bevel Gear
(5) Bevel Gear Case
(6) Shim
(7) Internal Snap Ring

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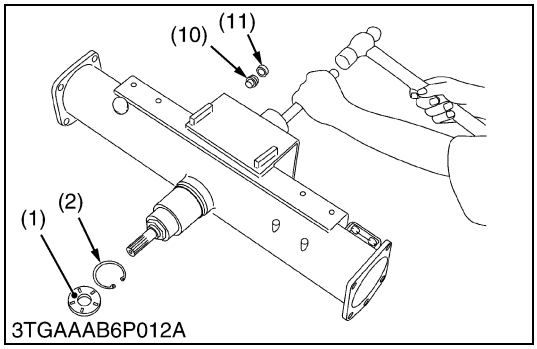

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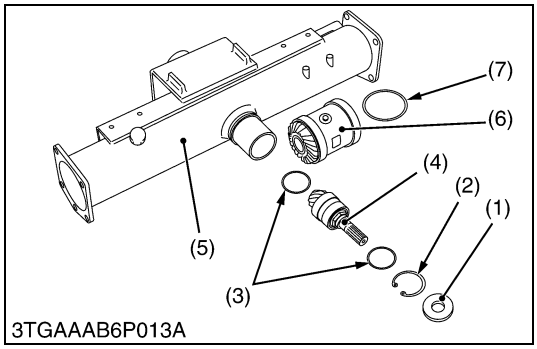

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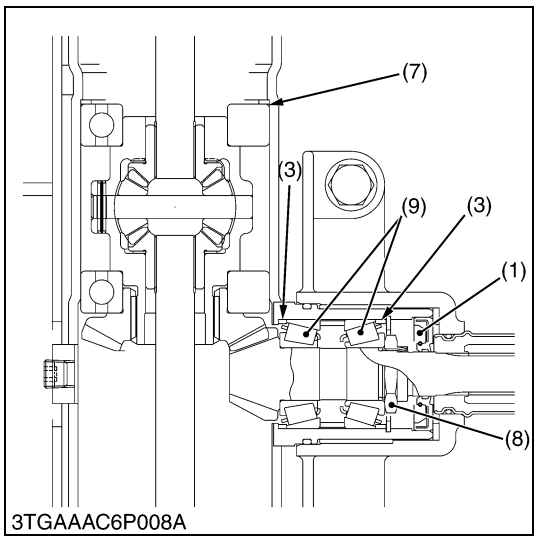

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Spiral Bevel Pinion Shaft and Differential Gear Assembly

1. Remove the oil seal (1) and internal snap ring (2).
2. Remove the collar (3).
3. Remove the plug (10), (11).
4. Tap out the spiral bevel pinion shaft (4) to the rear side.
5. Remove the differential gear assembly (6) and shim (7) from left side of front axle case (5).
6. Remove the stake of lock nut (8) and then remove the lock nut (8).
7. Remove the taper roller bearings (9).

(When reassembling)

- Tighten up the lock nut (8) until the turning force of the spiral bevel pinion shaft reaches the factory specification. (See page 6-S11).
- Replace the lock nut (8) and oil seal (1) with new one.
- Apply grease to the oil seal (1).
- Install the same shims and collars before they are removed.
- Install the taper roller bearings correctly, noting their direction, and apply gear oil to them.
- Stake the lock nut (8) firmly.

(1) Oil Seal
(2) Internal Snap Ring
(3) Collar
(4) Spiral Bevel Pinion Shaft
(5) Front Axle Case
(6) Differential Gear Assembly
(7) Shim
(8) Lock Nut
(9) Taper Roller Bearing
(10) Plug (Screw)
(11) Plug

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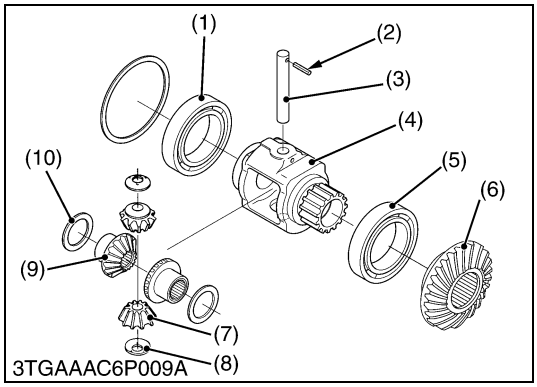

Differential Gear

1. Remove the spiral bevel gear (6) with bearing (5) and bearing (1) with the puller.
2. Tap out the spring pin (2) and pull out the differential pinion shaft (3).
3. Remove the differential pinion (7) and differential side gear (9).

■ **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 (9) and differential pinions (7).
- When inserting the spring pin (2), face its split in the direction right-angled to the differential pinion shaft (3).

Tightening torque	Differential case cover mounting screws	29.4 to 34.3 N·m 3.0 to 3.5 kgf·m 21.7 to 25.3 lbf·ft

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

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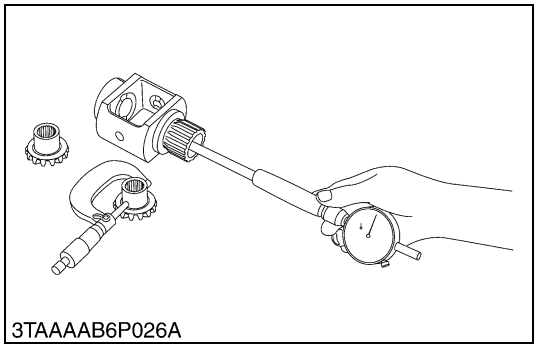
[3] SERVICING



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. If the clearance exceeds the allowable limit, replace damaged 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	0.20 mm 0.0079 in.

Differential case bore I.D.	Factory specification	28.000 to 28.021 mm 1.1024 to 1.1032 in.
Differential side gear O.D.	Factory specification	27.939 to 27.960 mm 1.1000 to 1.1008 in.

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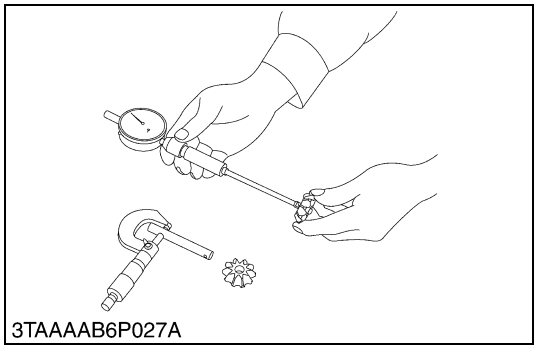

Clearance between Differential Pinion Shaft and Differential Pinion

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

Clearance between pinion shaft and differential pinion	Factory specification	0.048 to 0.084 mm 0.0019 to 0.0033 in.
	Allowable limit	0.20 mm 0.0079 in.

Differential Pinion shaft O.D.	Factory specification	10.966 to 10.984 mm 0.4317 to 0.4324 in.
Differential pinion I.D.	Factory specification	11.032 to 11.050 mm 0.4343 to 0.4350 in.

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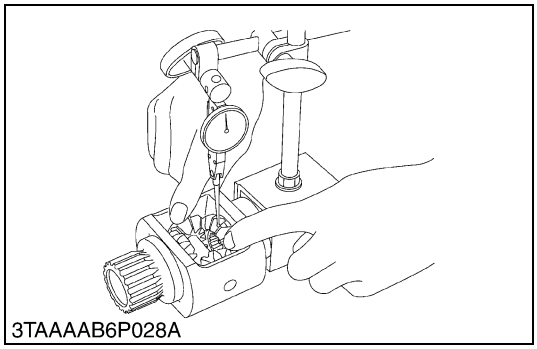
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Backlash between Differential Pinion and Differential Side Gear

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 and differential pinion gear shims.

Backlash between differential pinion and differential side gear	Factory specification	0.1 to 0.3 mm 0.004 to 0.012 in.

(Reference)

- Thickness of differential side gear shims:
  0.8 mm (0.031 in.)
  1.0 mm (0.039 in.)
  1.2 mm (0.047 in.)
  1.4 mm (0.055 in.)
  1.6 mm (0.063 in.)
- Thickness of differential pinion gear shims:
  0.8 mm (0.031 in.)
  1.0 mm (0.039 in.)
  1.2 mm (0.047 in.)

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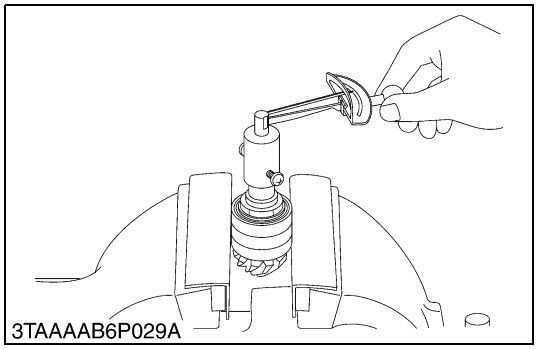
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Turning Force of Spiral Bevel Pinion Shaft (Pinion Shaft Only)

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 force is not within the factory specifications, adjust with the lock nut.

■ **NOTE**

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

Turning force	Factory specification	58.8 to 78.4 N·m 6.0 to 8.0 kgf·m 13.2 to 17.6 lbf·ft

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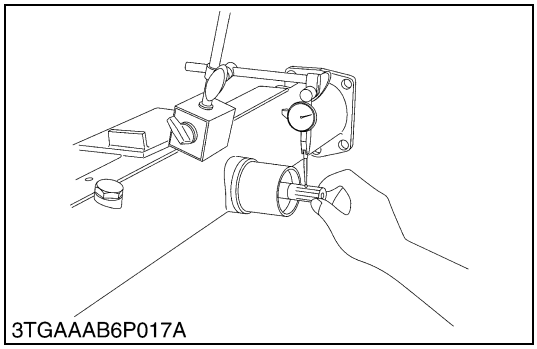
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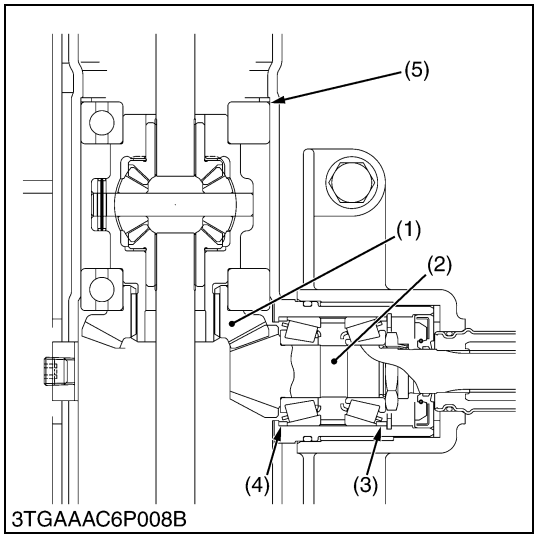

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Adjusting Backlash and Tooth Contact between Spiral Bevel Pinion Shaft and Spiral Bevel Gear

1. Set a dial gauge (lever type) with its finger on the spline of spiral bevel pinion shaft.
2. Measure the backlash by moving the spiral bevel pinion shaft by hand lightly.
3. If the backlash is not within the factory specification, change the adjusting collars (3), (4). 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.
4. Adjust the backlash properly by repeating the above procedures.
5. Apply red lead lightly over several teeth at three positions equally spaced on the spiral bevel gear (1).
6. Turn the spiral bevel pinion shaft (2).
7. Check the tooth contact. If not proper, adjust with shim (5) and adjusting collars (3), (4) according to the instructions below:

Backlash between spiral bevel pinion shaft and spiral bevel gear	Factory specification	0.1 to 0.3 mm 0.004 to 0.012 in.

(Reference)

- Thickness of adjusting collars (3), (4):
  4.7 mm (0.185 in.)
  4.8 mm (0.189 in.)
  4.9 mm (0.193 in.)
  5.0 mm (0.197 in.)
  5.1 mm (0.201 in.)
  5.2 mm (0.205 in.)
  5.3 mm (0.209 in.)
  5.4 mm (0.213 in.)
- Thickness of adjusting shims (5):
  1.6 mm (0.063 in.)
  1.7 mm (0.067 in.)
  1.8 mm (0.071 in.)
  1.9 mm (0.075 in.)
  2.0 mm (0.079 in.)
  2.1 mm (0.083 in.)
  2.2 mm (0.087 in.)

■ **NOTE**

- **After checking the tooth contact, checking the backlash between spiral bevel pinion shaft and spiral bevel gear again.**

(1) Spiral Bevel Gear
(2) Spiral Bevel Pinion Shaft
(3) Adjusting Collar
(4) Adjusting Collar
(5) Shim

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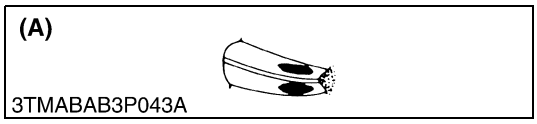

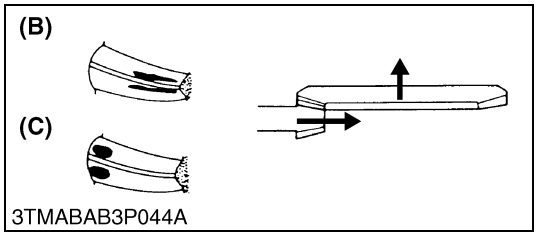

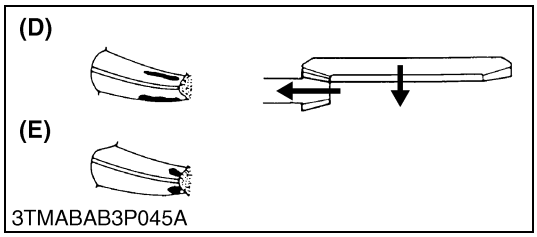

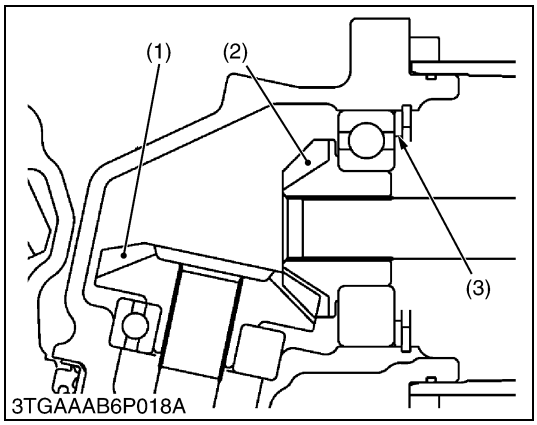

- **Proper Contact**

More than 35 % red lead contact area on the gear tooth surface.

The center of tooth contact at 1/3 of the entire width from the small end.

(A) Proper Contact

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- **Shallow or Heel Contact**

Replace the adjusting collars (3), (4) to move the bevel pinion shaft forward and replace the shim (5) with a thinner one.

Repeat this procedure until the proper tooth contact and backlash are achieved.

(B) Shallow Contact **(C) Heel Contact**

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- **Deep and Toe Contact**

Replace the adjusting collars (3), (4) to move the bevel pinion shaft backward and replace the shim (5) with a thicker one.

Repeat this procedure until the proper tooth contact and backlash are achieved.

(D) Deep Contact **(E) Toe Contact**

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Backlash between 11T Bevel Gear and 16T Bevel Gear

1. Stick a strip of fuse to three spots on the 16T bevel gear (1) with grease.
2. Install the 11T bevel gear (2) and shim (3).
3. Turn the axle.
4. Remove the 11T bevel gear (2) and measure the thickness of the strip of fuse with an outside micrometer.
5. If the backlash is not within the factory specification, adjust with shim (3).

Backlash between 11T bevel gear and 16T bevel gear	Factory specification	0.15 to 0.35 mm 0.0059 to 0.0138 in.

(Reference)

- Thickness of adjusting shims (3):
  0.8 mm (0.031 in.)
  1.0 mm (0.039 in.)
  1.2 mm (0.047 in.)

(1) 16T Bevel Gear
(2) 11T Bevel Gear
(3) Shim

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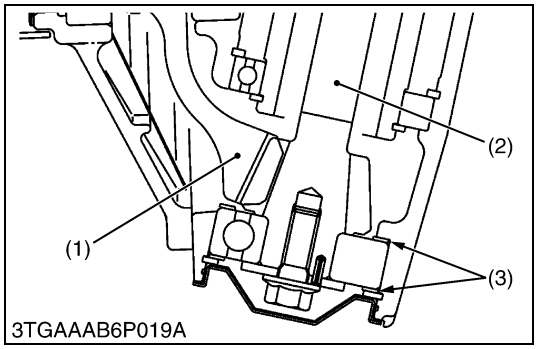

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Backlash between 7T Pinion Shaft and 41T Bevel Gear

1. Stick a strip of fuse to three spots on the 41T bevel gear (1) with grease.
2. Fix the gear case cover and gear case.
3. Turn the axle.
4. Remove the gear case cover from gear case and measure the thickness of the fuses with an outside micrometer.
5. If the backlash is not within the factory specification, adjust with shim (3).

Backlash between 7T pinion shaft and 41T bevel gear	Factory specification	0.15 to 0.35 mm 0.0059 to 0.0138 in.

(Reference)

- Thickness of adjusting shims (3):
  1.2 mm (0.047 in.)
  1.3 mm (0.051 in.)
  1.4 mm (0.055 in.)

(1) 41T Bevel Gear
(2) 7T Bevel Gear
(3) Shim

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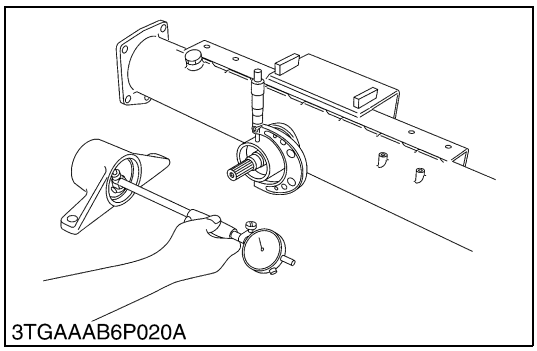
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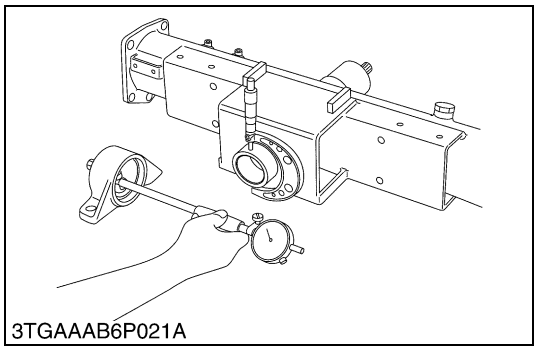
Clearance between Front Axle Case Bosses and Bracket Bushings

1. Measure the front axle case bosses O.D..
2. Measure the bracket bushing I.D. and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace the bracket bushing.
4. If the clearance still exceeds the allowable limit, replace the front axle case.

Clearance between front axle case bosses and bracket bushings	Factory specification	0.030 to 0.150 mm 0.0012 to 0.0059 in.
	Allowable limit	0.25 mm 0.0098 in.

Front axle case bosses O.D.	Factory specification	61.940 to 61.970 mm 2.4386 to 2.4398 in.
Bracket bushings I.D.	Factory specification	62.000 to 62.090 mm 2.44094 to 2.4445 in.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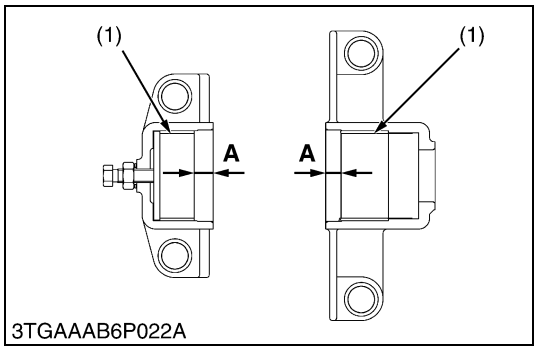
■ **Press-fitting Bushing**

- When press-fitting a new bushing, observe the dimension described in the figure.

Press-fit depth of bushing **"A"**	Reference value	12.0 mm 0.47 in.



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■ **NOTE**

- **After replacing the bushing, be sure to adjust the front axle rocking force.**

(1) Bushing **A: Depth**

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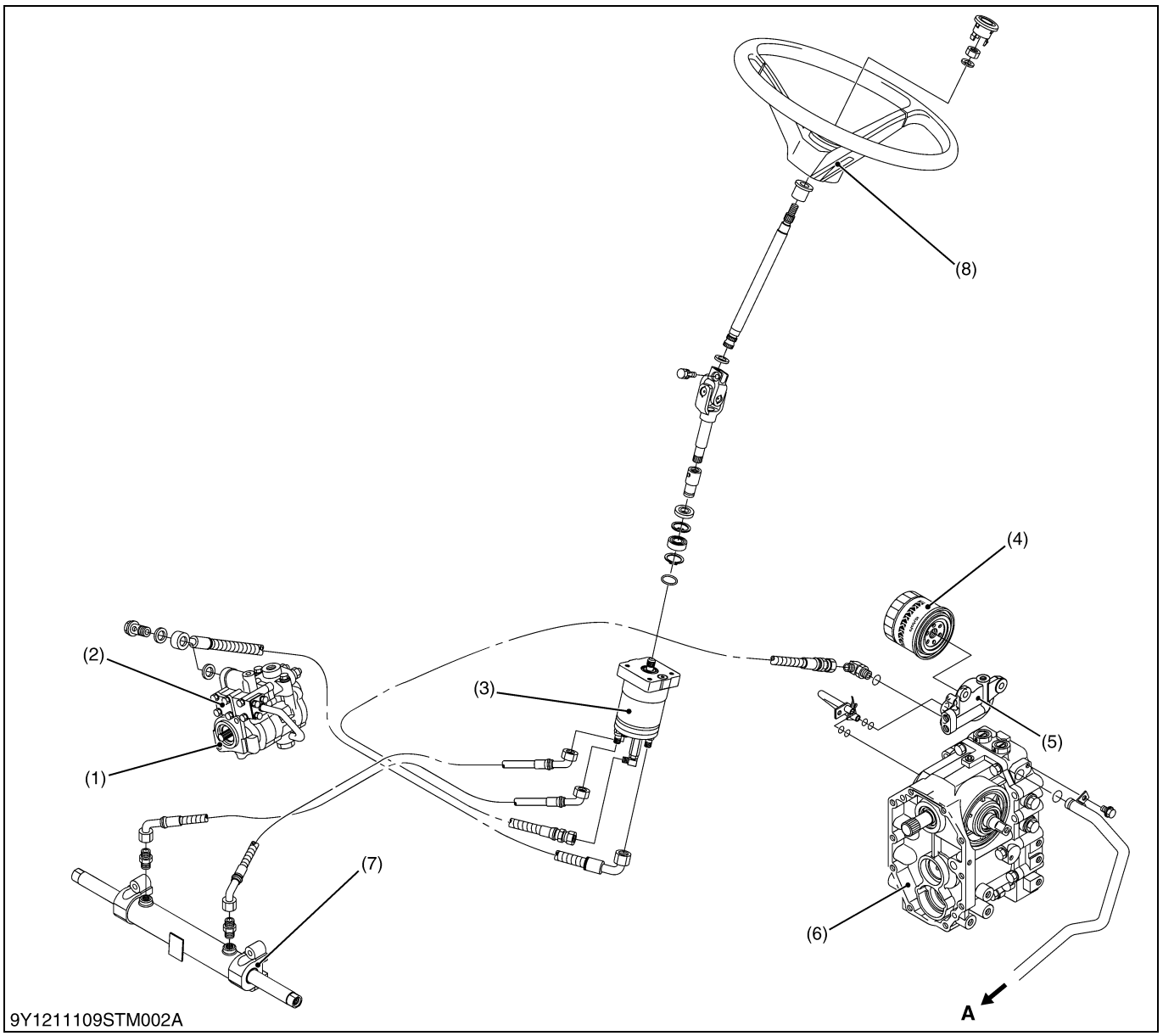
7 STEERING

MECHANISM

CONTENTS

1. STRUCTURE



(1) Hydraulic Pump
(2) Regulating Valve
(3) Steering Controller
(4) HST Oil Filter
(5) Filter Bracket
(6) HST (Hydrostatic Transmission)
(7) Steering Cylinder
(8) Steering Wheel

A: To Oil Cooler

This tractor is equipped with a full hydrostatic power steering. The steering controller (3) is connected to the steering cylinder (7) with the hydraulic hose only, therefore it is simple in construction.

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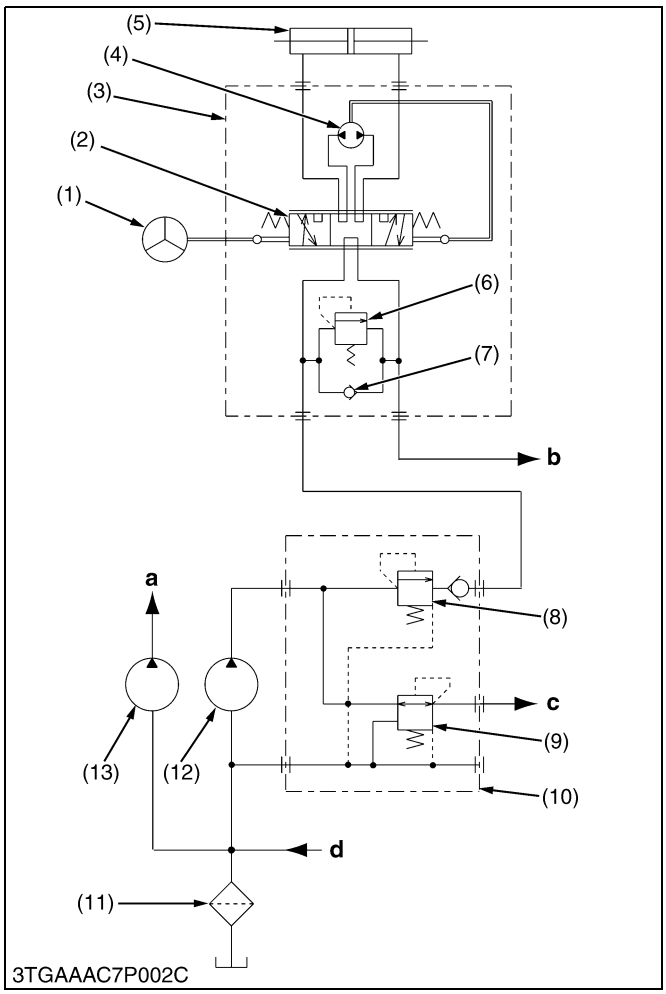
2. HYDRAULIC CIRCUIT FOR POWER STEERING



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When the engine starts, the hydraulic pump (12) pressurize oil from transmission case through the regulator valve (10) and send the oil, to the steering controller (3).

The oil which has entered steering controller (3) is directed to control valve (2).

When the steering wheel is turned, control valve (2) operates and send oil through gerotor (4) to steering cylinder (5). The cylinder rod of steering cylinder (5) moves the direction of front wheels.

Return oil from steering cylinder (5) passes through control valve (2) and is sent to the HST.

When the engine is not operating, and the steering wheel is turned, gerotor (4) rotates to supply oil to steering cylinder (5). Thus the direction of front wheel can be controlled manually.

(1) Steering Wheel
(2) Control Valve
(3) Steering Controller
(4) Gerotor
(5) Steering Cylinder
(6) Relief Valve
(7) Check Valve
(8) Regulating Valve
(9) Pressure Reducing Valve
(10) Regulator Valve
(11) Oil Filter
(12) Hydraulic Pump (Power Steering)
(13) Hydraulic Pump (**3P**)

a: To 3P Hydraulic System
b: To HST
c: To Bi-speed Valve
d: From Oil Cooler

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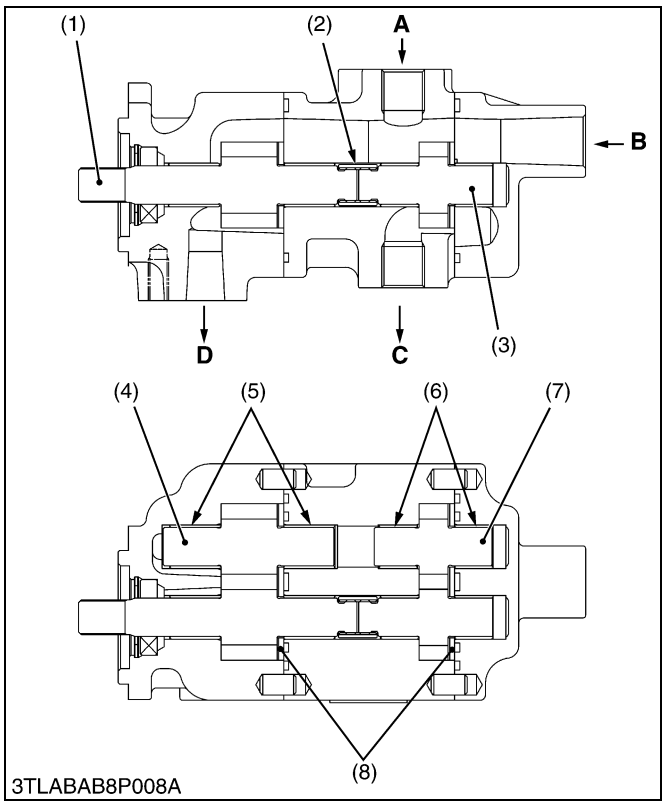
3. HYDRAULIC PUMP



The gear type hydraulic pump is adopted for these models. This pump is called as tandem type and composed two pair of gears, side plates, bushings and other components as shown in the figure.

The hydraulic pump pressurize oil from transmission case through oil filter and send the oil to power steering circuit and main hydraulic circuit.

(1) Drive Gear 1
(2) Coupling
(3) Drive Gear 2
(4) Driven Gear 1
(5) Bushing
(6) Bushing
(7) Driven Gear 2
(8) Side Plate

A: From Power Steering Controller
B: From Transmission Case
C: To Power Steering Controller
D: To Main Hydraulic Circuit

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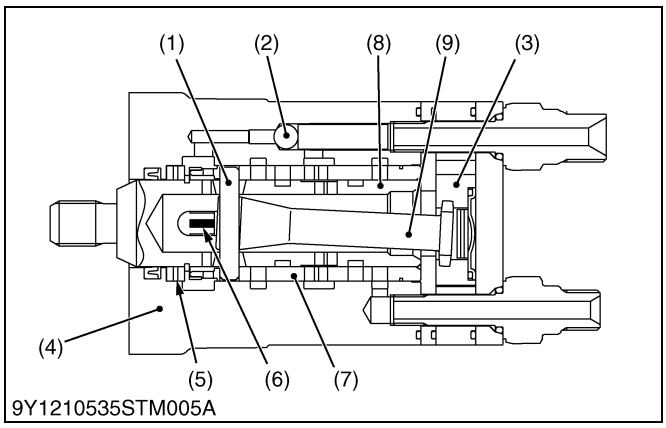
4. STEERING CONTROLLER



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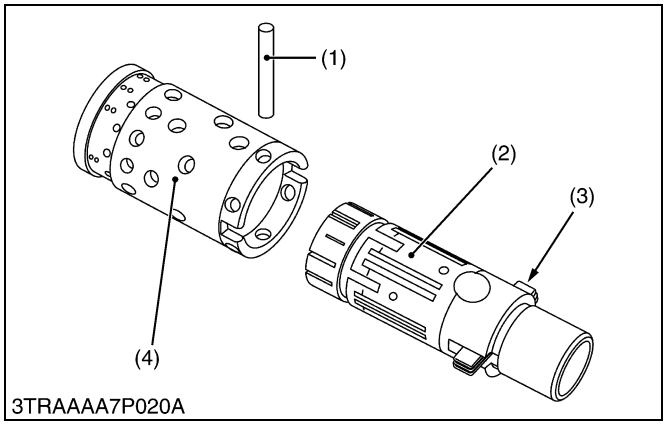
The steering controller mainly consists of a control valve, a metering device and a relief valve.

The metering device comprises a set of special gears called **"Gerotor"**.

(1) Dowel Pin
(2) Check Valve
(3) Gerotor
(4) Housing
(5) Bearing Assembly
(6) Centering Spring
(7) Sleeve
(8) Spool
(9) Centering Spring

9Y1211109STM0005US0

[1] CONTROL VALVE



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The control valve is a rotating spool type. When the steering wheel is not turned, the valve is kept in the neutral position by the centering spring (3).

Then, the oil flow from the hydraulic pump to the steering cylinder and from the steering cylinder to the transmission case is stopped. Oil from the hydraulic pump is sent to the transmission case through the control valve.

When the steering wheel is turned clockwise or counterclockwise, the control valve, together with the gerotor, changes the direction of oil flow to the steering cylinder according to the direction, the steering wheel was turned.

(1) Dowel Pin
(2) Spool
(3) Centering Spring
(4) Sleeve

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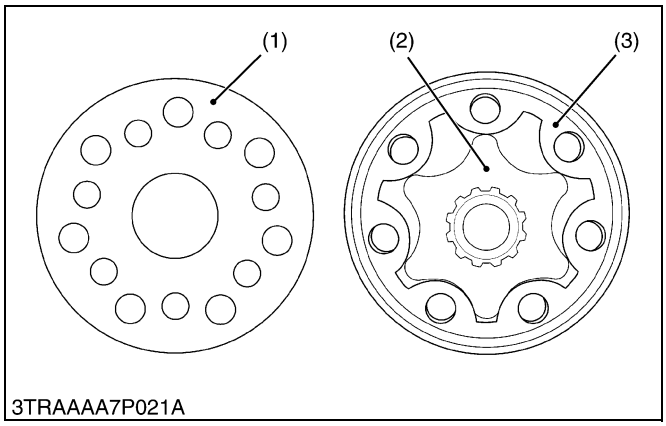
[2] METERING DEVICE (GEROTOR)



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All oil sent from the hydraulic pump to the steering cylinder, passes through the metering device (Gerotor). Namely, when the rotor is drive, three chambers suck in oil due to volumetric change in the pump chambers formed between the rotor (2) and the stator (3), while oil is discharged from other three chambers. On the other hand, rotation of the steering wheel is directly transmitted to the rotor through the steering shaft, spool, drive shaft, etc..

Accordingly, the gerotor 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 gerotor functions as a manual trochoid pump, which makes manual steering possible.

(1) Drive Plate
(2) Rotor
(3) Stator

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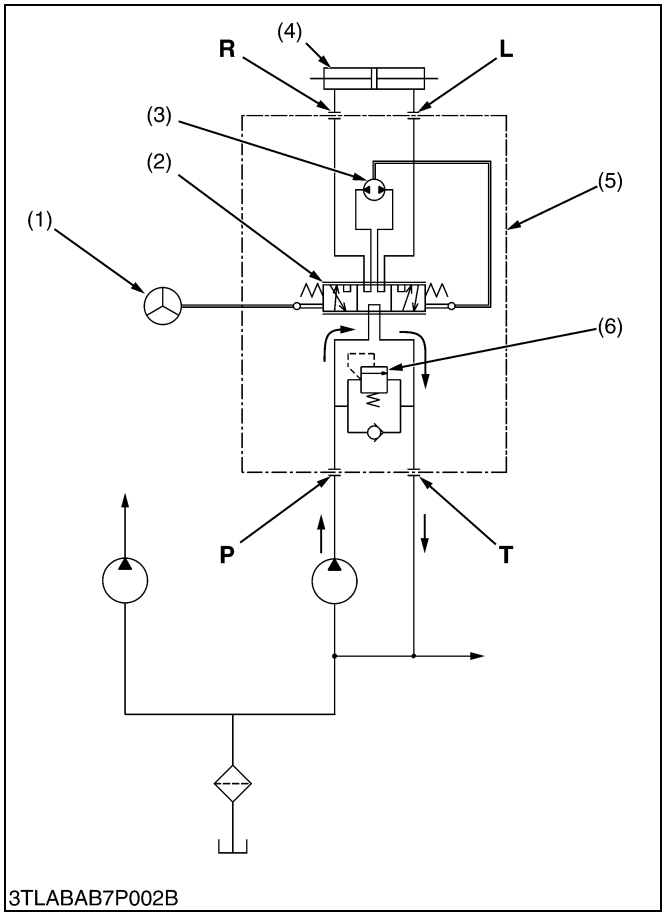
[3] OIL FLOW



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Neutral Position

When the steering wheel (1) is not being turned, valve plate (2) is held in the neutral position by centering spring. Under this condition, an oil passage is formed between **P** port (from pump) and T port (to transmission case) in the control valve, and all oil from the hydraulic pump flows to T port.

(1) Steering Wheel
(2) Valve Plate
(3) Gerotor
(4) Steering Cylinder
(5) Steering Controller
(6) Relief Valve

P: Pump Port
T: Tank Port
R: Cylinder Port R
L: Cylinder Port L

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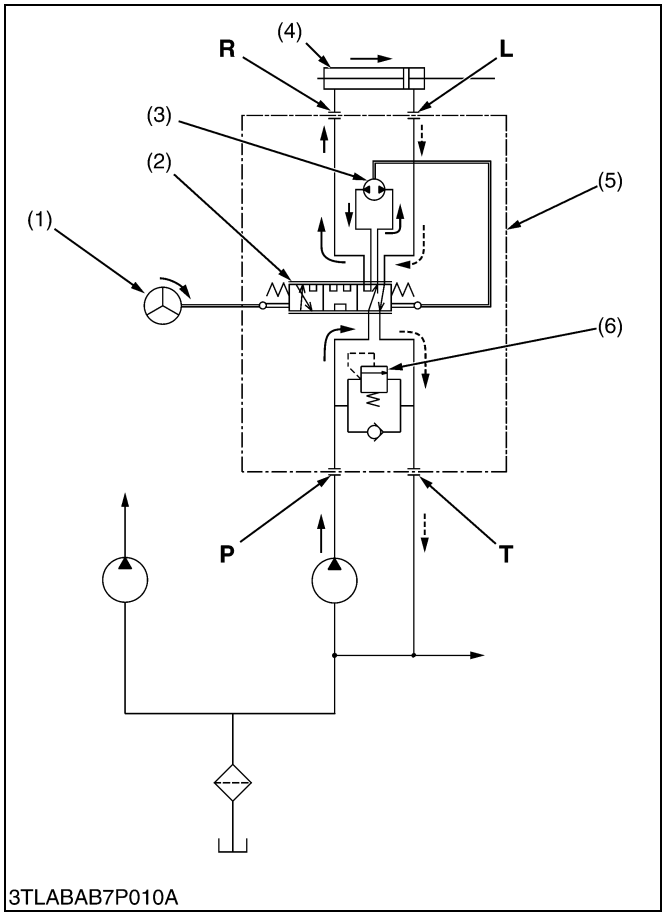

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Right Turn

When the steering wheel is turned to the right, the action is transmitted through the drive plate, gerotor, and drive link to the control valve. Valve plate (2) then rotates to the right on manifolds, located on the opposite faces of the valve plate (2). Thus, the P port passage in the control valve is connected with gerotor (3).

The stator of gerotor (3) turns by the amount corresponding to the turn of the steering wheel (1), and the gerotor performs the metering function and lets oil through it, the amount of which corresponds to the turn of the steering wheel (1).

The oil which has passed through gerotor (3) flows back to the control valve, in which it is directed to cylinder port R to operate steering cylinder (4). Consequently, the front wheels are moved to the right through the angle corresponding to the amount of the oil.

When steering cylinder (4) operates, oil returning to cylinder port **L** flows back to the transmission case through the passage connected to **T** port in the control valve.

(1) Steering Wheel
(2) Valve Plate
(3) Gerotor
(4) Steering Cylinder
(5) Steering Controller
(6) Relief Valve

P: Pump Port
T: Tank Port
R: Cylinder Port R
L: Cylinder Port L

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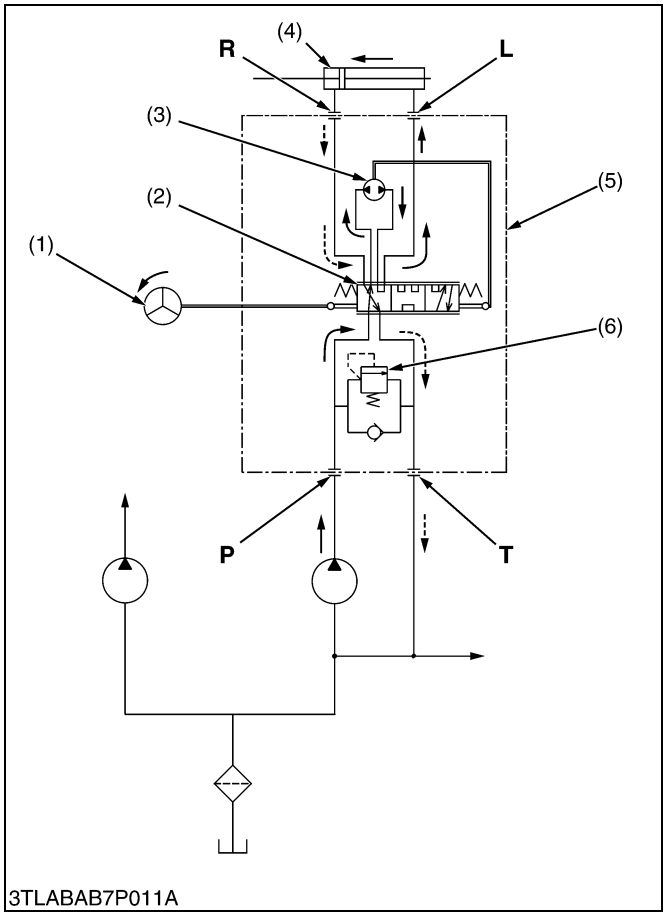

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Left Turn

The steering system operates in the same way at a left-turn as well, except that oil flows into and out of steering cylinder in the directions opposite to those at a right-turn.

(1) Steering Wheel
(2) Valve Plate
(3) Gerotor
(4) Steering Cylinder
(5) Steering Controller
(6) Relief Valve

P: Pump Port
T: Tank Port
R: Cylinder Port R
L: Cylinder Port L

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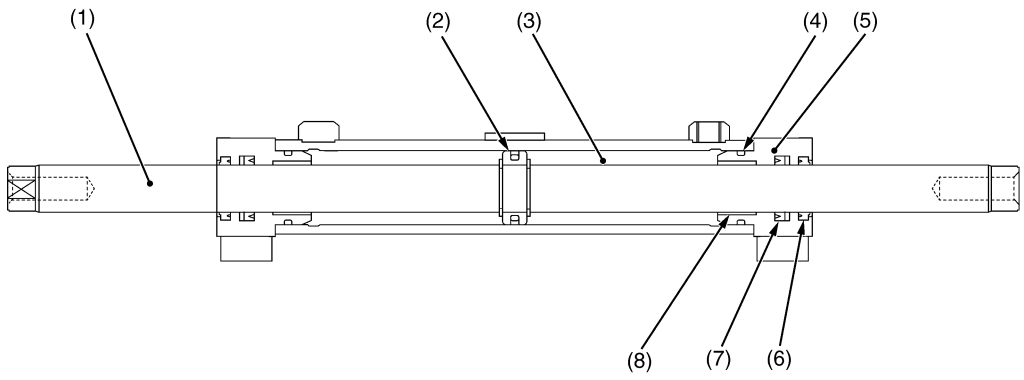
5. STEERING CYLINDER



9Y1211109STM001A

(1) Rod Assembly
(2) Packing
(3) Cylinder Tube
(4) O-ring
(5) Cover
(6) Dust Seal
(7) Rod Gasket
(8) Bushing

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 provides 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.

9Y1211109STM0003US0

SERVICING

CONTENTS

1. TROUBLESHOOTING

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Tractor Can Not Be Steered	1. Steering controller is damaged.	Replace steering controller.	7-S8
	2. Steering hose is damaged.	Replace steering hose.	7-S8
Hard Steering	1. Hydraulic pump is damaged.	Replace hydraulic pump.	8-S14
	2. Tractor is operated in overload condition.	Operate the tractor in proper conditions. Attach the proper implements to the tractor.	–
	3. Transmission fluid is improper or insufficient.	Change or fill transmission fluid.	G-8
	4. Power steering oil leaks from pipe joint.	Retighten pipe joint.	7-S8
	5. Tire pressure is insufficient.	Inflate tire pressure.	G-50
	6. Steering controller is damaged.	Replace steering controller.	7-S8
	7. Power steering relief valve is damaged.	Replace steering controller.	7-S8
Steering Force Fluctuates	1. Air is sucked in pump due to leaking or missing of oil.	Fill transmission fluid. Bleed air from the hydraulic system by steering the steering wheel to the end for two or three times.	G-8
	2. Air is sucked in pump from suction circuit.	Repair suction circuit. Bleed air from the hydraulic system by steering the steering wheel to the end for two or three times.	7-S5
Excessive Steering Wheel Free Play	1. Steering controller is damaged.	Replace steering controller.	7-S8

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Front Wheels Wander to Right or Left	1. Air is sucked in pump due to leak of oil.	Fill transmission fluid. Bleed air from the hydraulic system by steering the steering wheel to the end for two or three times.	G-8, 7-S5
	2. Air is sucked in pump from suction circuit.	Bleed air from the hydraulic system by steering the steering wheel to the end for two or three times.	7-S5
	3. Tire pressure is uneven.	Inflate tire pressure.	G-50
	4. Air bleeding is insufficient.	Bleed air from the hydraulic system by steering the steering wheel to the end for two or three times.	7-S5
	5. Toe-in adjustment is improper.	Adjust toe-in to the factory specification.	6-S4
	6. Clearance between front axle center pivots and brackets bushings is excessive.	Replace front axle center pivots and brackets bushings.	6-S4, 6-S7
	7. Tie-rod end is loose or worn.	Retighten or replace tie-rod end.	6-S4
	8. Steering controller is damaged.	Replace steering controller.	7-S8
Noise	1. Air is sucked in pump due to lack of oil.	Fill transmission fluid. Bleed air from the hydraulic system by steering the steering wheel to the end for two or three times.	G-8, 7-S5
	2. Air is sucked in pump from suction circuit.	Repair suction circuit. Bleed air from the hydraulic system by steering the steering wheel to the end for two or three times.	7-S5
	3. Hydraulic pipe is deformed.	Replace hydraulic pipe.	8-S14
Wheel Are Turned to a Direction Opposite to Steering Direction	1. Power steering hoses are connected in reverse.	Reconnect steering hoses properly.	7-S8

9Y1211109STS0001US0

2. SERVICING SPECIFICATIONS

STEERING WHEEL

Item		Factory Specification	Allowable Limit
Steering Wheel	Operating Torque	1.5 to 2.5 N·m 0.16 to 0.25 kgf·m 1.1 to 1.8 lbf·ft	–

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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-10.)

Item	N·m	kgf·m	lbf·ft
Steering wheel mounting nut	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
Delivery hose R.H. retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Delivery hose L.H. retaining nut	24.5 to 29.4	2.5 to 3.0	18.1 to 21.7
Return hose retaining nut	34.3 to 44.1	3.5 to 4.5	25.3 to 32.5
Delivery hose joint screw	45.1 to 53.0	4.60 to 5.40	33.3 to 39.0
Steering controller mounting screw	24 to 27	2.4 to 2.8	18 to 20
Rod joint screw	123.6 to 147.1	12.6 to 15.0	91.1 to 108.5

9Y1211109STS0003US0

4. CHECKING, DISASSEMBLING

[1] CHECKING AND ADJUSTING

■ **NOTE**
- **Refer to the "8. HYDRAULIC SYSTEM" for hydraulic pump and steering controller.**

■ **IMPORTANT**
- **Use only the transmission fluid (see page G-8), in no case mixture of oils of different brands.**
- **Do not disassemble the hydraulic pump and steering controller needlessly.**
- **After installing or reassembling the power steering hydraulic components, be sure to bleed air.**

(Bleeding)
- Start the engine, then turn the steering wheel slowly in both directions all the way alternately several times, and stop the engine.

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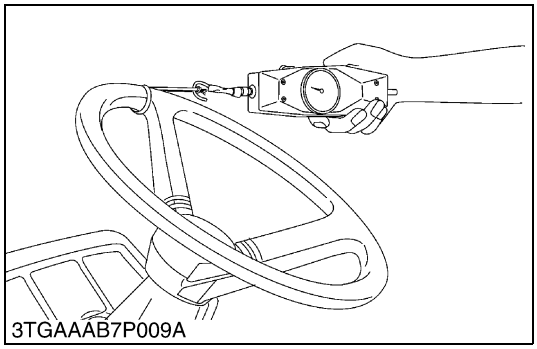
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Steering Wheel Operating Force

1. Park the tractor on flat concrete place.
2. Start the engine. After warming up, set the engine speed at maximum speed.
3. Set a spring balance to the steering wheel to measure the operating force.
4. Calculate the operating torque.
5. If the torque exceeds the factory specification, check the suction line, delivery line, and the performance of hydraulic pump. And then, check the steering controller.

Steering wheel operating torque	Factory specification	1.5 to 2.5 N·m 0.16 to 0.25 kgf·m 1.1 to 1.8 lbf·ft

Condition
- Engine speed:
  Maximum
- Oil temperature:
  40 to 60 °C (104 to 140 °F)
- Tractor by itself (without any implement and weight)

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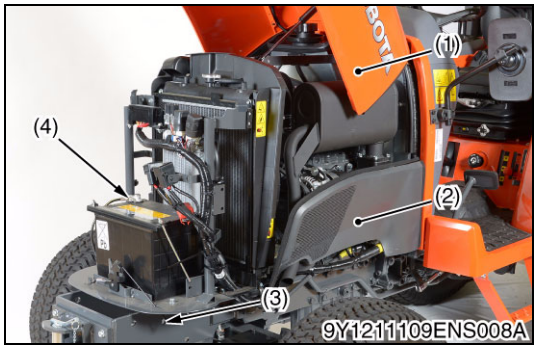
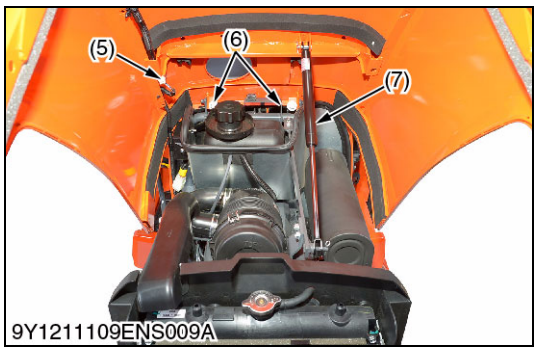
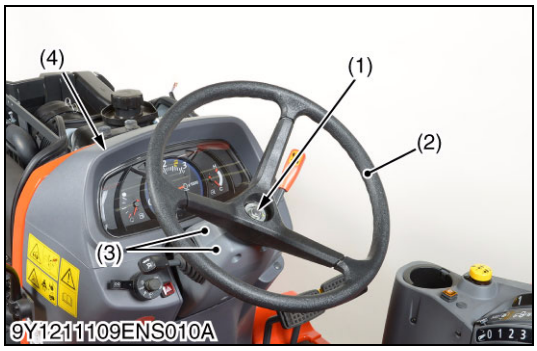
[2] DISASSEMBLING AND ASSEMBLING

(1) Steering Controller







Hood, Side Cover and Battery Cord

1. To open the hood (1), hold the hood (1) and pull the release lever (3) and open the hood (1).
2. Remove the bolt from each of the side covers and remove the side covers (2).
3. Disconnect the battery negative cable (4).
4. Disconnect the head light connector (5) and damper (7).
5. Remove the two screws (6), and then remove the hood (1).

(When reassembling)

■ **NOTE**

- **When disconnecting the battery cords, disconnect the grounding cord first. When connecting, positive cord first.**

(1) Hood
(2) Side Cover
(3) Release Lever
(4) Battery Negative Cable
(5) Head Light Connector
(6) Screw
(7) Damper

9Y1211109ENS0021US0

Steering Wheel and Panel Under Cover

1. Remove the covers (3).
2. Remove the steering wheel cap.
3. Remove the steering wheel mounting nut (1) and remove the steering wheel (2) with a steering wheel puller (Code No. 07916-51090).
4. Remove the panel cover (4).

(When reassembling)

Tightening torque	Steering wheel mounting nut	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 lbf·ft

(1) Nut
(2) Steering Wheel
(3) Cover
(4) Panel Cover

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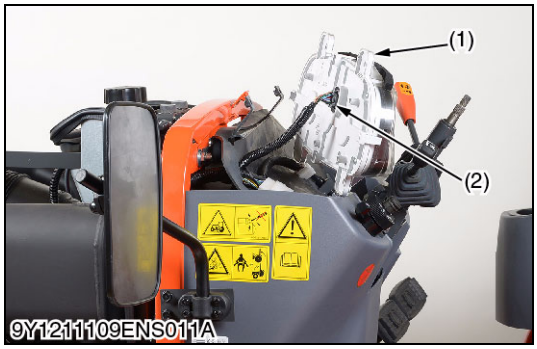

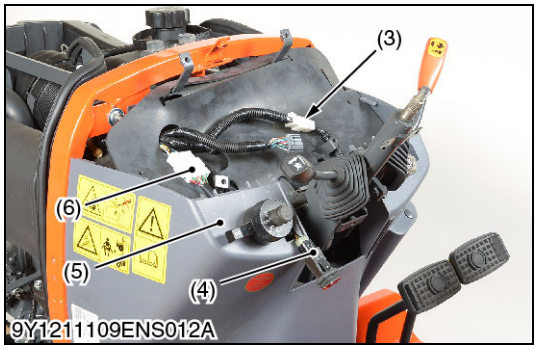

Instrument Panel

1. Remove the instrument panel mounting screws and disconnect the instrument panel connector (2). Then remove the instrument panel (1).
2. Disconnect the combination switch connector (6), main switch connector (3) and hazard switch connector (4).
3. Remove the under cover (5).

(1) Instrument Panel
(2) Instrument Panel Connector
(3) Main Switch Connector
(4) Hazard Switch Connector
(5) Under Cover
(6) Combination Switch Connector

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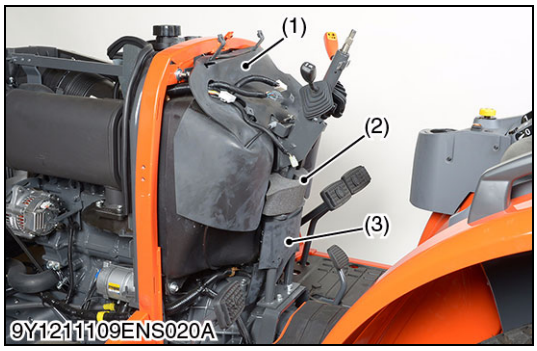

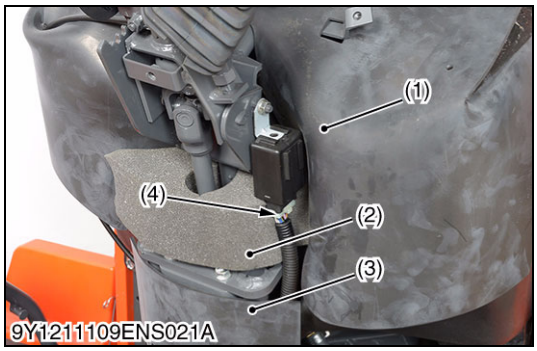

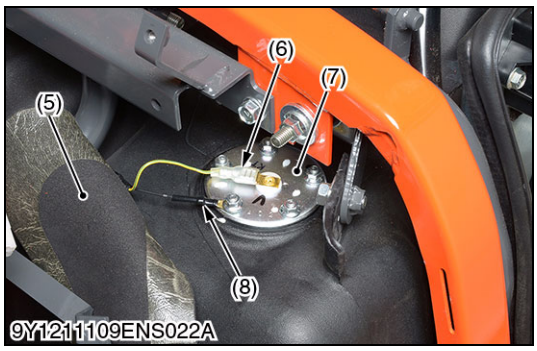

Rubber and Wiring Harness

1. Remove the fuel tank cover (1)
2. Disconnect the OPC controller connector (4).
3. Remove the steering controller cover (3).
4. Remove the sponge (2).
5. Turn over the fuel sensor cover (5), and disconnect the grounding wire (8) and **1P** connector (6) from the fuel level sensor (7).

(1) Fuel Tank Cover
(2) Sponge
(3) Steering Controller Cover
(4) OPC Controller Connector
(5) Fuel Sensor Cover
(6) **1P** Connector
(7) Fuel Sensor
(8) Grounding Wire

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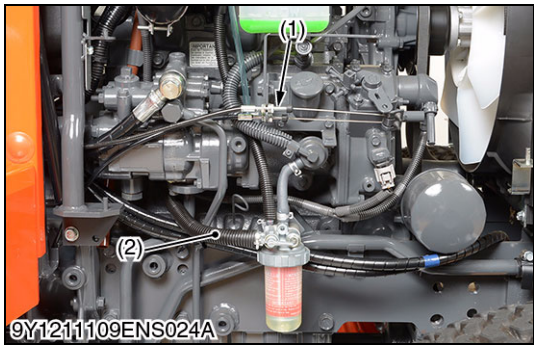

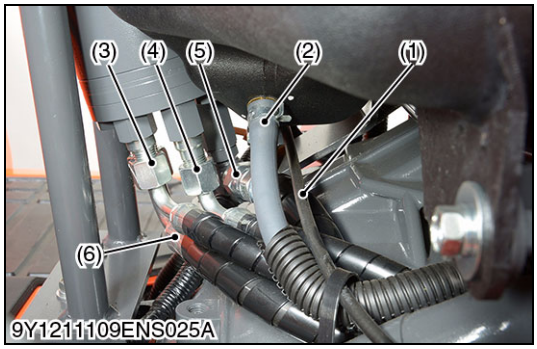

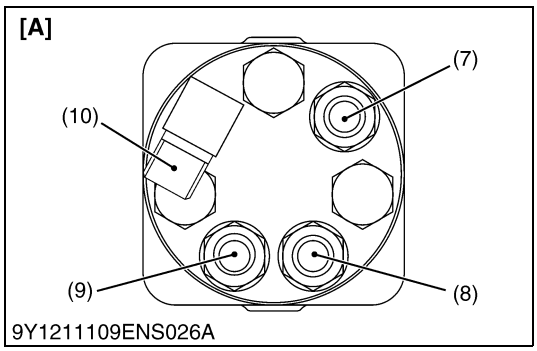

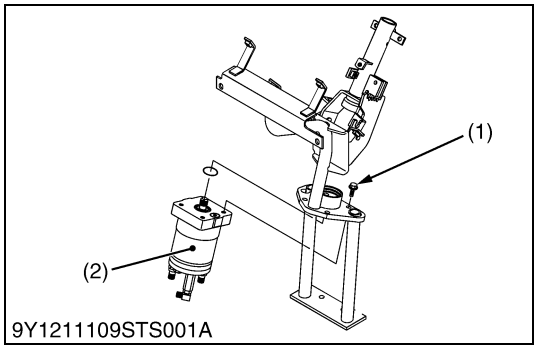

Power Steering Hoses and Accelerator Wire (Right Side)

1. Disconnect the accelerator wire (1) from the engine.
2. Disconnect the fuel hose (2).
3. Disconnect the delivery hose L.H. (3) and delivery hose R.H. (4) from the steering controller.
4. Disconnect the power steering delivery hose (6) from the steering controller.
5. Disconnect the power steering return hose (5) from the steering controller.

(When reassembling)

- Be sure to connect the each hose to original position.
- Be sure to check the hose joints do not interfere in other joints.

Tightening torque	Delivery hose R.H. (4) retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft
	Delivery hose L.H. (3) retaining nut	24.5 to 29.4 N·m 2.5 to 3.0 kgf·m 18.1 to 21.7 lbf·ft
	Return hose retaining nut	34.3 to 44.1 N·m 3.5 to 4.5 kgf·m 25.3 to 32.5 lbf·ft
	Delivery hose joint screw	45.1 to 53.0 N·m 4.60 to 5.40 kgf·m 33.3 to 39.0 lbf·ft

(1) Accelerator Wire
(2) Fuel Hose
(3) Delivery Hose L.H.
(4) Delivery Hose R.H.
(5) Power Steering Return Hose
(6) Power Steering Delivery Hose
(7) **P** Port
(8) **LT** Port
(9) **RT** Port
(10) **T** Port

[A] Viewed from Bottom Side

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Controller Assembly

1. Remove the steering controller mounting screws (1) and then remove the steering controller assembly (2).

(When reassembling)

Tightening torque	Steering controller mounting screw	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft

(1) Steering Controller Mounting Screw (2) Steering Controller Assembly

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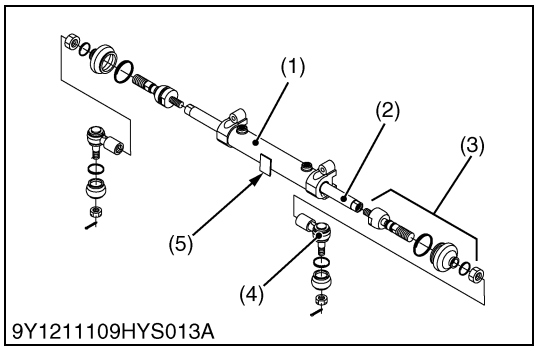
(2) Steering Cylinder



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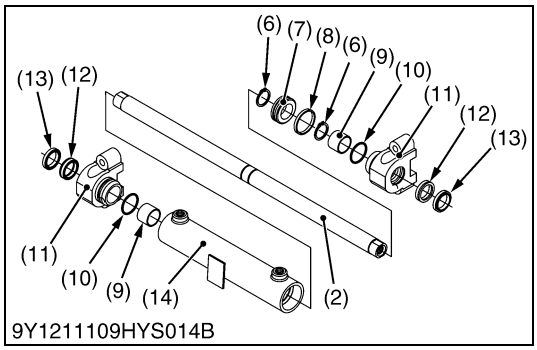

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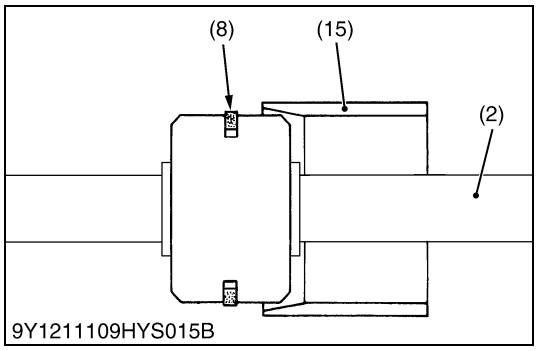

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Removing Steering Cylinder

- See page 6-S7.

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Disassembling Steering Cylinder

1. Remove the rod joint (3) from the cylinder rod (2).
2. Draw out the cylinder cover (11).
3. Draw out the cylinder rod (2).

■ **IMPORTANT**

- **Before insert the cylinder rod (2) with piston gasket (8), through the piston gasket correcting tool (15) to prevent damage the piston gasket (8).**
- **Apply clean transmission fluid to the piston gasket (8) and bushing (9).**
- **Do not spin the cylinder rod (2) while inserting.**

(When reassembling)

- Apply grease to the O-ring (10), rod gasket (12) and dust seal (13).
- The plate (5) of cylinder tube (14) direction to front.
- Apply lock tight (Three Bod 1372D or equivalent) to the rod joint (3).
- Be sure to check the toe-in after assembling. (See page 6-S4.)

Tightening torque	Rod joint screw	123.6 to 147.1 N·m 12.6 to 15.0 kgf·m 91.1 to 108.5 lbf·ft

(1) Power Steering Cylinder Assembly
(2) Cylinder Rod
(3) Rod Joint
(4) Tie Rod
(5) Plate
(6) External Snap Ring
(7) Piston
(8) Piston Gasket
(9) Bushing
(10) O-ring
(11) Cylinder Cover
(12) Rod Gasket
(13) Dust Seal
(14) Cylinder Tube
(15) Piston Gasket Correcting Tool

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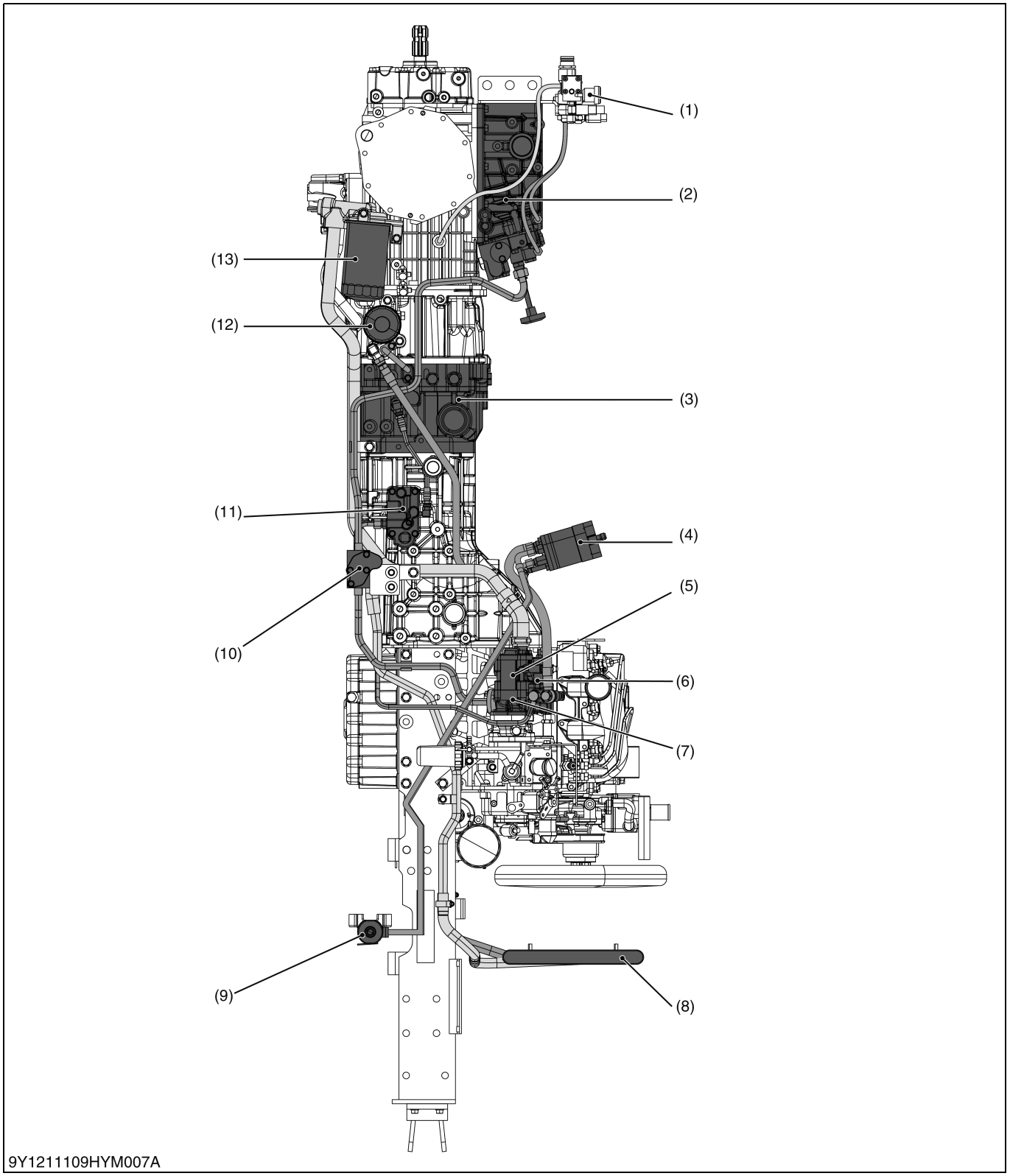
8 HYDRAULIC SYSTEM

MECHANISM

CONTENTS

1. STRUCTURE



(1) Auxiliary Control Valve
(2) Hydraulic Cylinder
(3) Hydrostatic Transmission (HST)
(4) Steering Controller
(5) Power Steering Hydraulic Pump
(6) Regulator Valve
(7) **3P** Hydraulic Pump
(8) Oil Cooler
(9) Steering Cylinder
(10) Hydraulic Block Type Outlet
(11) Bi-speed Valve
(12) HST Oil Filter
(13) Oil Filter

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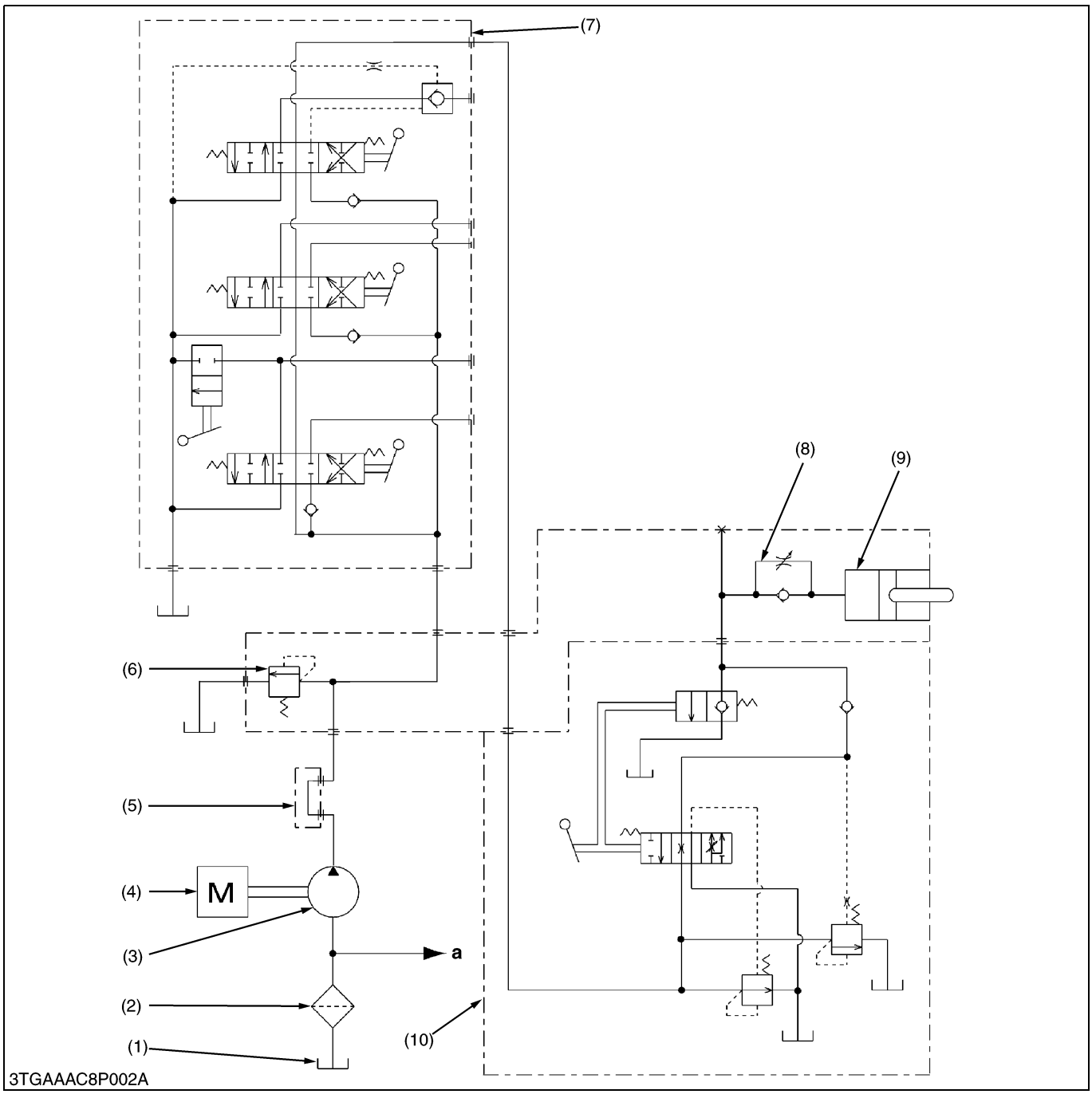
2. WHOLE HYDRAULIC CIRCUIT



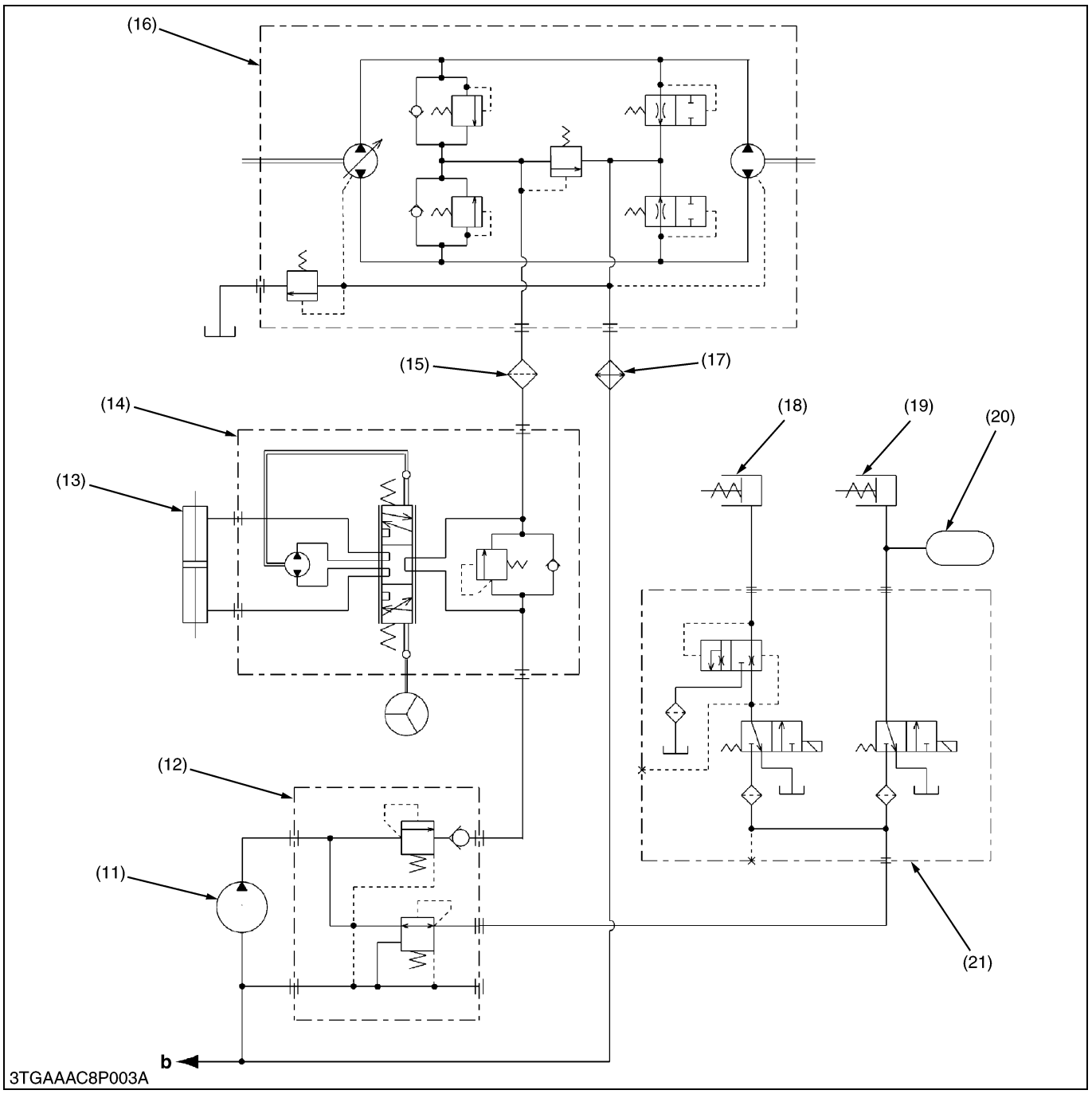
(1) Transmission case
(2) Oil Filter
(3) Hydraulic Pump (**3P** System)
(4) Engine
(5) Hydraulic Block Type Outlet
(6) Relief Valve
(7) Auxiliary Control Valve
(8) Lowering Speed Adjusting Valve
(9) Hydraulic Cylinder
(10) Position Control Valve
a: Continue to Next Page

Specification of Hydraulic Parts

(3)	Above. 30.6 L/min. (8.08 U.S.gals/min., 6.73 Imp.gals/min.)	(6)	16.7 to 17.2 MPa (170 to 175 kgf/cm^2, 2430 to 2490 psi)

(To be continued)

(Continued)



(11) Hydraulic Pump (Power Steering)
(12) Regulator Valve
(13) Steering Cylinder
(14) Steering Controller
(15) HST Oil Filter
(16) Hydrostatic Transmission (HST)
(17) Oil Cooler
(18) Hydraulic Clutch (Bi-speed)
(19) Hydraulic Clutch (PTO)
(20) Accumulator
(21) Bi-speed Valve

b: Continue to Last Page

(To be continued)

(Continued)

Specification of Hydraulic Parts

(11)	Above. 18.6 L/min. (4.91 U.S.gals/min., 4.09 Imp.gals/min.)	(21)	[I-PTO System Pressure] 1.76 to 1.86 MPa (18.0 to 18.9 kgf/cm^2, 256 to 269 psi)
(14)	[Power Steering Relief Valve] 12.5 to 13.5 MPa (128 to 137 kgf/cm^2, 1820 to 1950 psi)		[Bi-speed Turn System Pressure] 1.76 to 1.86 MPa (18.0 to 18.9 kgf/cm^2, 256 to 269 psi)
(16)	[Case Relief Valve] Less than 0.3 MPa (3 kgf/cm^2, 40 psi)		
	[Check and High Pressure Relief Valve] 26.4 to 29.4 MPa (270 to 299 kgf/cm^2, 3830 to 4260 psi)		
	[Charge Relief Valve] 0.4 to 0.8 MPa (4 to 8 kgf/cm^2, 60 to 100 psi)		

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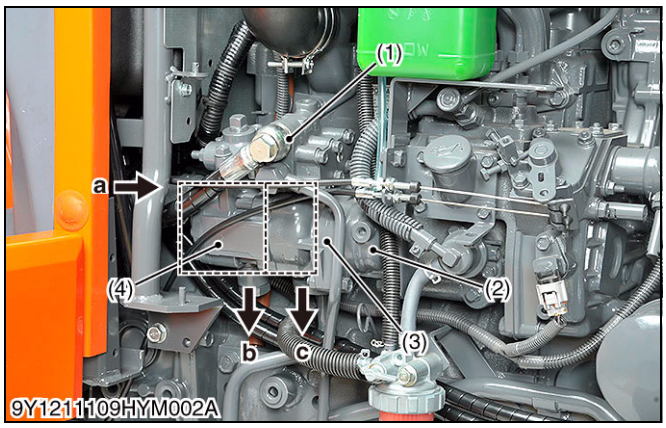
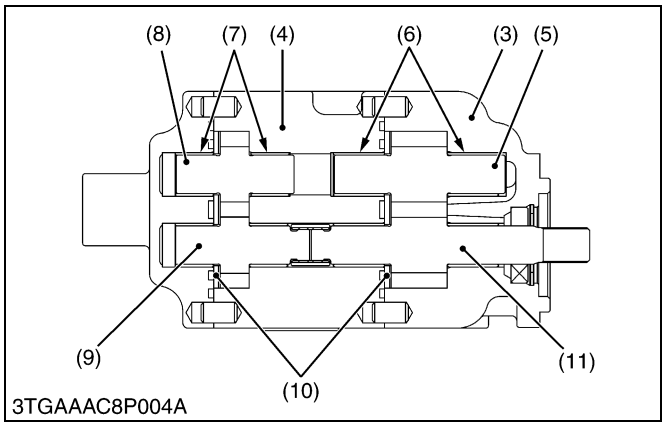
3. HYDRAULIC PUMP





The hydraulic pump is tandem type, front side is the **3P** hydraulic pump (3) and rear side is the power steering hydraulic pump (4). This pump consists of two pairs of gears, side plates, bushing and other components as shown in the figure. The hydraulic pump is driven by the fuel camshaft, and the rotation increase with the gears in the pump holder (2) by 37/21 times.

The **3P** hydraulic pump (3) pressure-feed the oil to the **3P** hydraulic system. The power steering hydraulic pump (4) pressure-feed the oil to the power steering controller, bi-speed turn clutch and hydraulic PTO clutch through the regulator valve (1) and bi-speed valve.

(Reference)

	Power steering pump	**3P hydraulic pump**
Pump discharge per revolution	6.128 cm^3/rev. (0.374 cu.in. /rev.)	10.09 cm^3/rev. (0.616 cu.in. /rev.)
Pump discharge per minute	18.6 L/m (4.91 U.S.gals/m, 4.09 Imp.gals/m) (At no load, engine 2700 min^{-1} (rpm))	30.6 L/m (8.08 U.S.gals/m, 6.73 Imp.gals/m) (At no load, engine 2700 min^{-1} (rpm))

(1) Regulator Valve
(2) Pump Holder
(3) **3P** Hydraulic Pump
(4) Power Steering Hydraulic Pump
(5) Driven Gear 1
(6) Bushing
(7) Bushing
(8) Driven Gear 2
(9) Drive Gear 2
(10) Side Plate
(11) Drive Gear 1

a: From Transmission Case
b: To Regulator Valve
c: To 3P Hydraulic System

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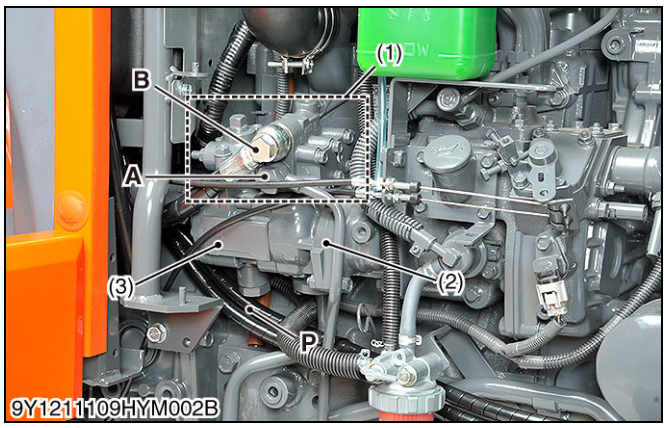
4. REGULATOR VALVE



The regulator valve (1) is installed on the power steering pump, regulating the oil pressure of the hydraulic PTO clutch and bi-speed clutch circuit.

(1) Regulator Valve
(2) **3P** Hydraulic Pump
(3) Power Steering Pump

A: A Port
B: B Port
P: P Port

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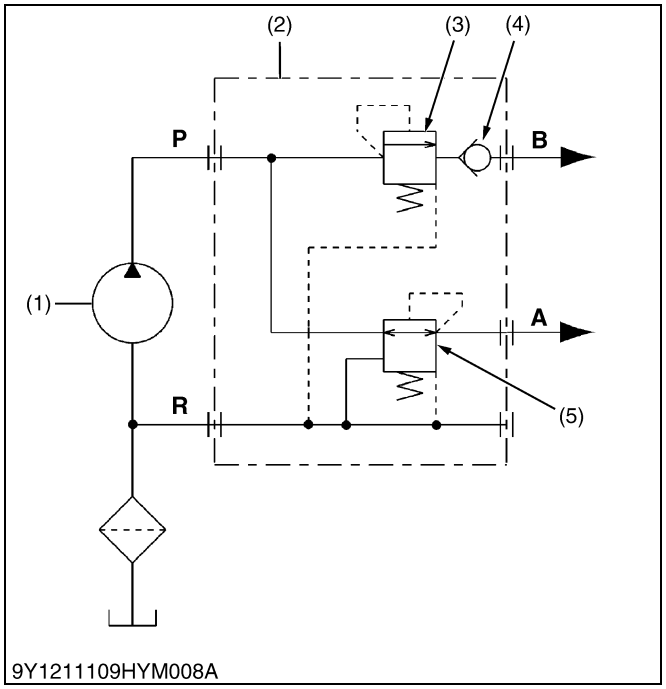

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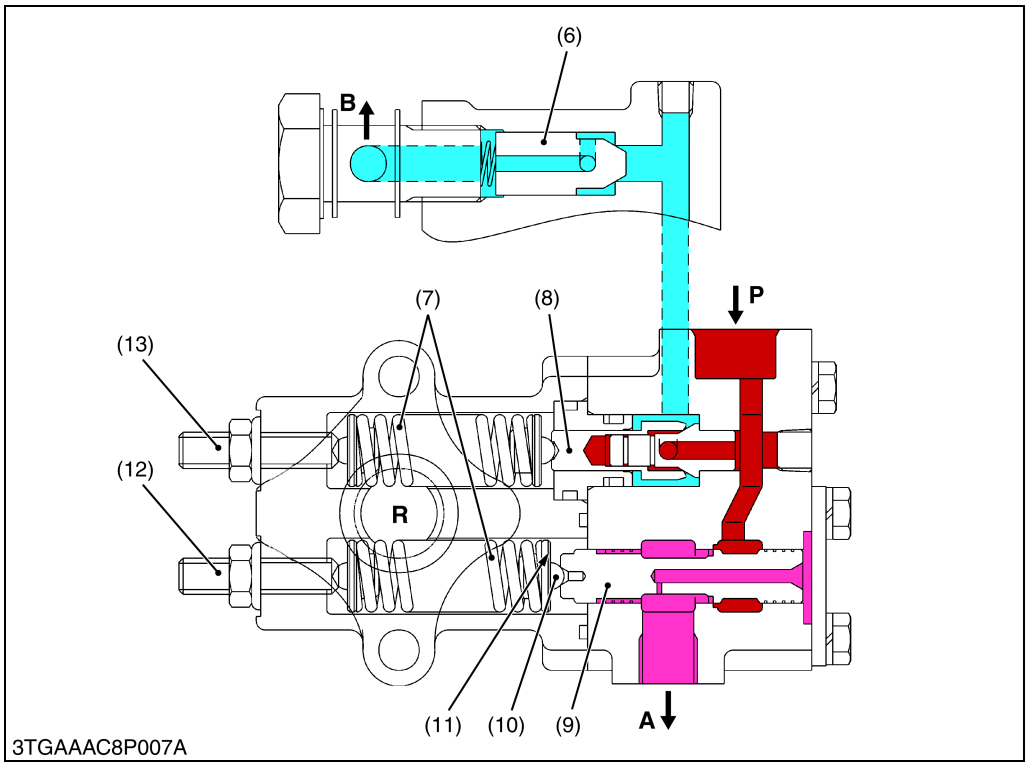
Oil Flow

The oil from the power steering pump passes through the regulating valve (3) and check valve (4), and then flows to the power steering circuit.

The regulating valve (3) is provided to keep the inlet pressure of the pressure reducing valve (5) to 30 kgf/cm^2 except when the power steering is operated.

When the bi-speed valve operates, the oil adjusted with the reducing valve (5) to 18.5 kgf/cm^2 flows to the bi-speed valve through A port.



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(1) Power Steering Pump
(2) Regulator Valve Assembly
(3) Regulating Valve
(4) Check Valve
(5) Pressure Reducing Valve
(6) Poppet (Check Valve)
(7) Spring
(8) Relief Poppet
(9) Reducing Spool
(10) Ball
(11) Spring Receiver
(12) Adjusting Screw
(13) Adjusting Screw

A: A Port (To I-speed Valve)
B: B Port (To Steering Controller)
P: P Port (From Pump)
R: R Port (To Pump)

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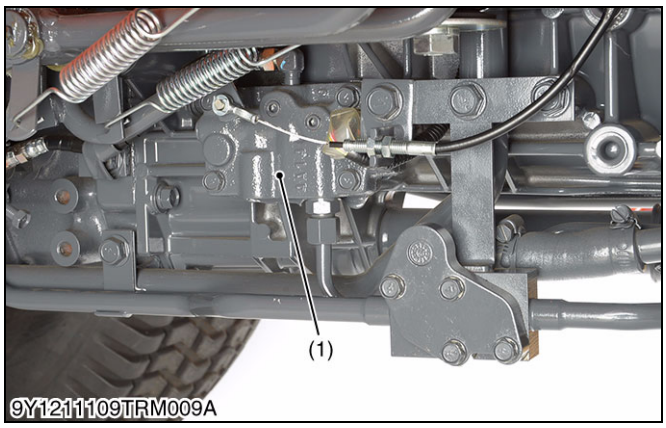
5. BI-SPEED VALVE



The bi-speed valve (1) is installed on a right side of the clutch housing into which the bi-speed clutch is built.

The solenoid valve (2) and (3) are built into the bi-speed valve (1), and they operate respectively according to the electrical signal from the PTO switch and the bi-speed controller.

(1) Bi-speed Valve
(2) Solenoid Valve (PTO)
(3) Solenoid Valve (Bi-speed)

A: A Port (To Bi-speed Hydraulic Clutch)
B: B Port (To PTO Hydraulic Clutch)
P: P Port (From Regulator Valve)

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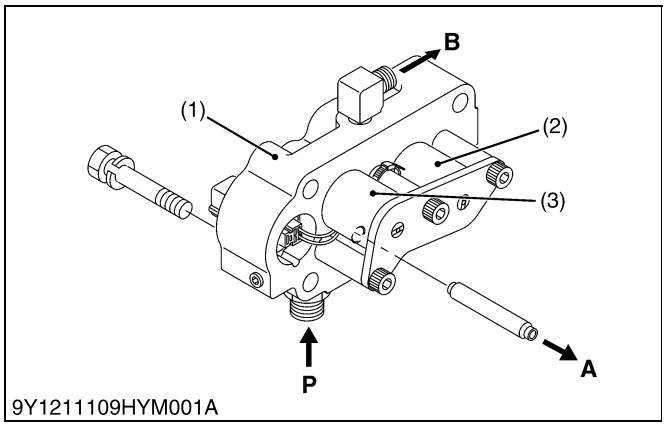
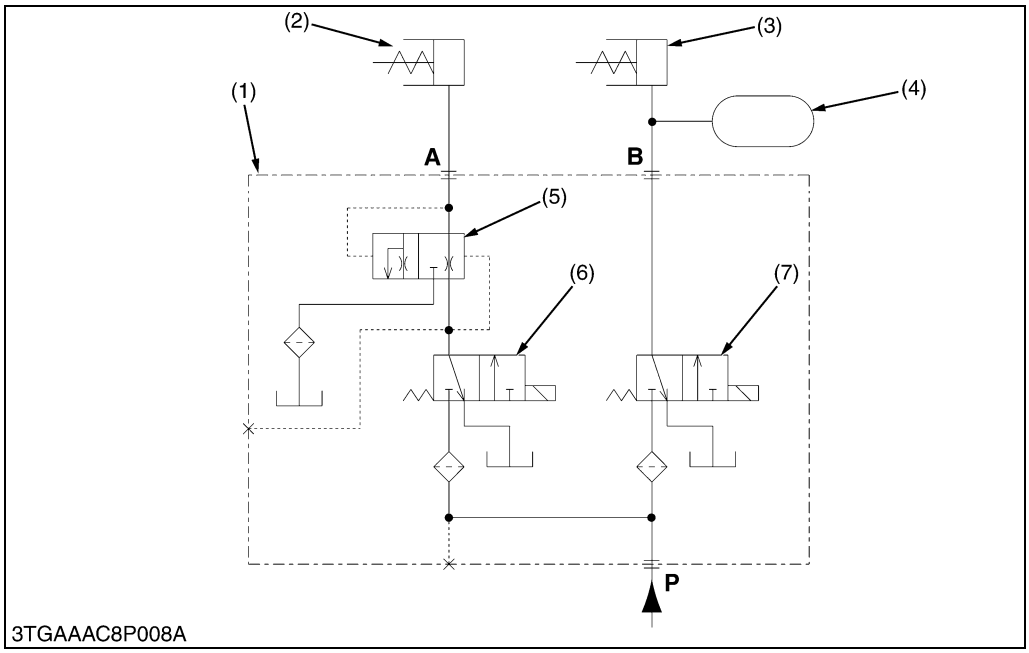


[1] HYDRAULIC CIRCUIT



(1) Bi-speed Valve
(2) Bi-speed Hydraulic Clutch
(3) PTO Hydraulic Clutch
(4) Accumulator
(5) Orifice Valve
(6) Solenoid Valve (Bi-speed)
(7) Solenoid Valve (PTO)

A: A Port (To Bi-speed Hydraulic Clutch)
B: B Port (To PTO Hydraulic Clutch)
P: P Port (From Regulator Valve)

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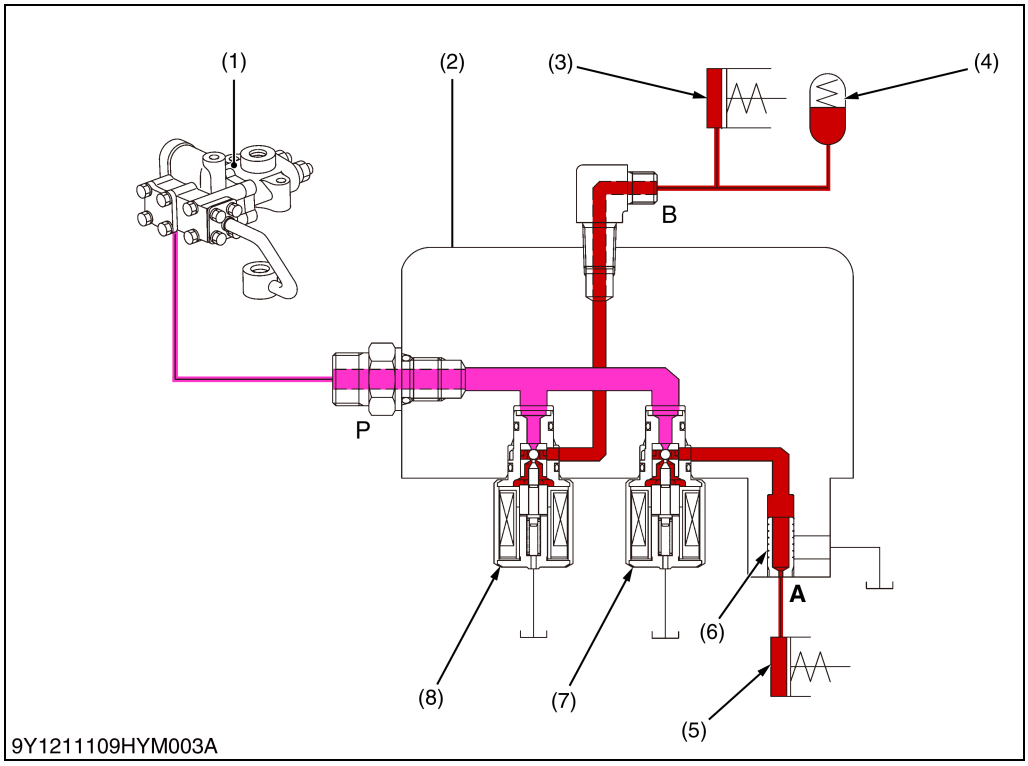
[2] OIL FLOW



(1) Regulator Valve
(2) Bi-speed Valve
(3) PTO Hydraulic Clutch
(4) Accumulator
(5) Bi-speed Hydraulic Clutch
(6) Orifice Valve
(7) Solenoid Valve (Bi-speed)
(8) Solenoid Valve (PTO)

A: A Port (To Bi-speed Hydraulic Clutch)
B: B Port (To PTO Hydraulic Clutch)
P: P Port (From Regulator Valve)

■ **When both solenoid valves are "OFF"**

When both solenoid valves (7), (8) are **"OFF"**, pressurized oil does not flow in bi-speed valve (2).

The piston in the hydraulic clutches (3), (5) are set at the left of figure by spring.

■ **When the solenoid valve (PTO) is turned "ON"**

When the solenoid valve (8) is turned on, the pressurized oil flows to the PTO hydraulic clutch (3) through the solenoid valve (8) . The clutch piston moves against the spring until the stroke end and power is transmitted to the PTO shaft. Oil in the PTO hydraulic clutch (3) is kept pressured of 18.5 kg fixed.

To make the movement of the clutch piston smooth, the accumulator (4) is prepared for. The accumulator (4) is built in HST case.

■ **When the solenoid valve (PTO) is turned "OFF"**

When the solenoid valve (8) is turned off, the oil passage in the solenoid valve (8) changes, and oil in the PTO hydraulic clutch (3) is drained to the transmission case through the solenoid valve (8) .

The clutch piston returns to left in figure by spring. The power to the PTO shaft is cut off.

■ **When the solenoid valve (Bi-speed) is turned "ON"**

When the solenoid valve (7) is turned on, the pressurized oil gradually flows to the bi-speed hydraulic clutch (5) through the solenoid valve (7) and orifice valve (6). The clutch piston moves against the spring at an appropriate speed until the stroke end, and power of bi-speed is transmitted to the front wheel.

Oil in the bi-speed hydraulic clutch (5) is kept pressured of 18.5 kg fixed.

■ **When the solenoid valve (Bi-speed) is turned "OFF"**

When the solenoid valve (7) is turned off, the oil passage in the solenoid (7) valve changes, and oil between the solenoid valve (7) and orifice valve (6) is drained to the transmission case through the solenoid valve (7). At this time, the orifice valve (6) moves up in figure by pressure difference. The oil in the bi-speed hydraulic clutch (5) is drained promptly to the transmission case.

The clutch piston returns to left in figure by spring.

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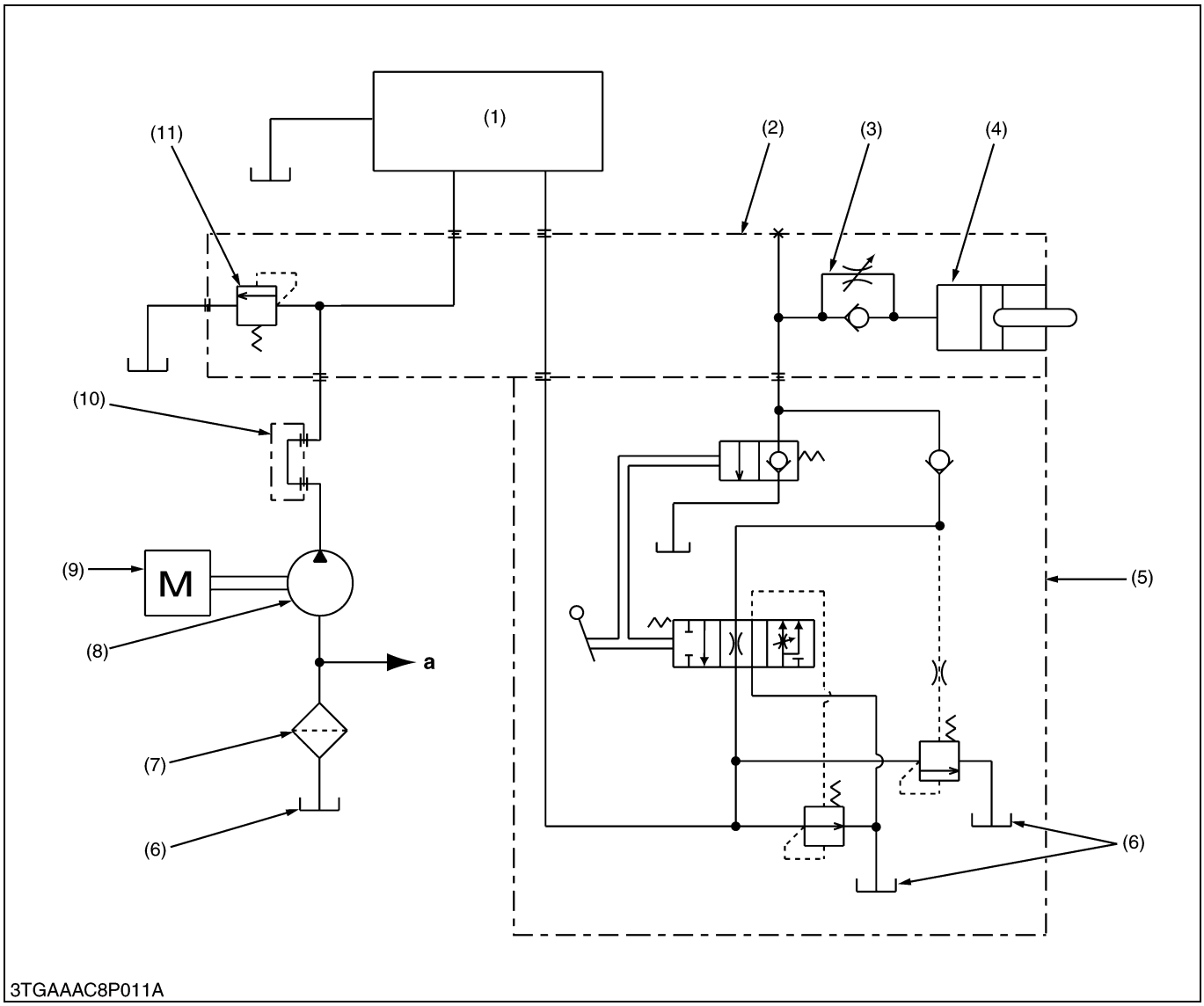
6. 3-POINT HYDRAULIC SYSTEM

[1] HYDRAULIC CIRCUIT



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(1)	Auxiliary Control Valve	(4)	Hydraulic Piston	(8)	Hydraulic Pump (**3P**)	**a:**	**To Hydraulic Pump (Power Steering)**
(2)	Hydraulic Cylinder	(5)	Position Control Valve	(9)	Engine		
(3)	Lowering Speed Adjusting Valve	(6)	Oil Tank (Transmission Case)	(10)	Hydraulic Block Type Outlet		
		(7)	Oil Filter	(11)	Relief Valve		

1. When the engine (9) is started, the hydraulic pump (8) is rotated to draw oil from the transmission case (6) trough the suction pipe. Supplied oil is filtered by the oil filter (7).
2. Filtered oil is forced out by the hydraulic pump to auxiliary control valve (1) then flow to the position control valve (5).
3. The position control valve (5) switches the oil flow, and oil is channeled to the hydraulic cylinder (4) for the 3-point hydraulic system or returned to the oil tank (6).
4. The hydraulic system has a relief valve (11) which restricts the maximum pressure in the circuit.

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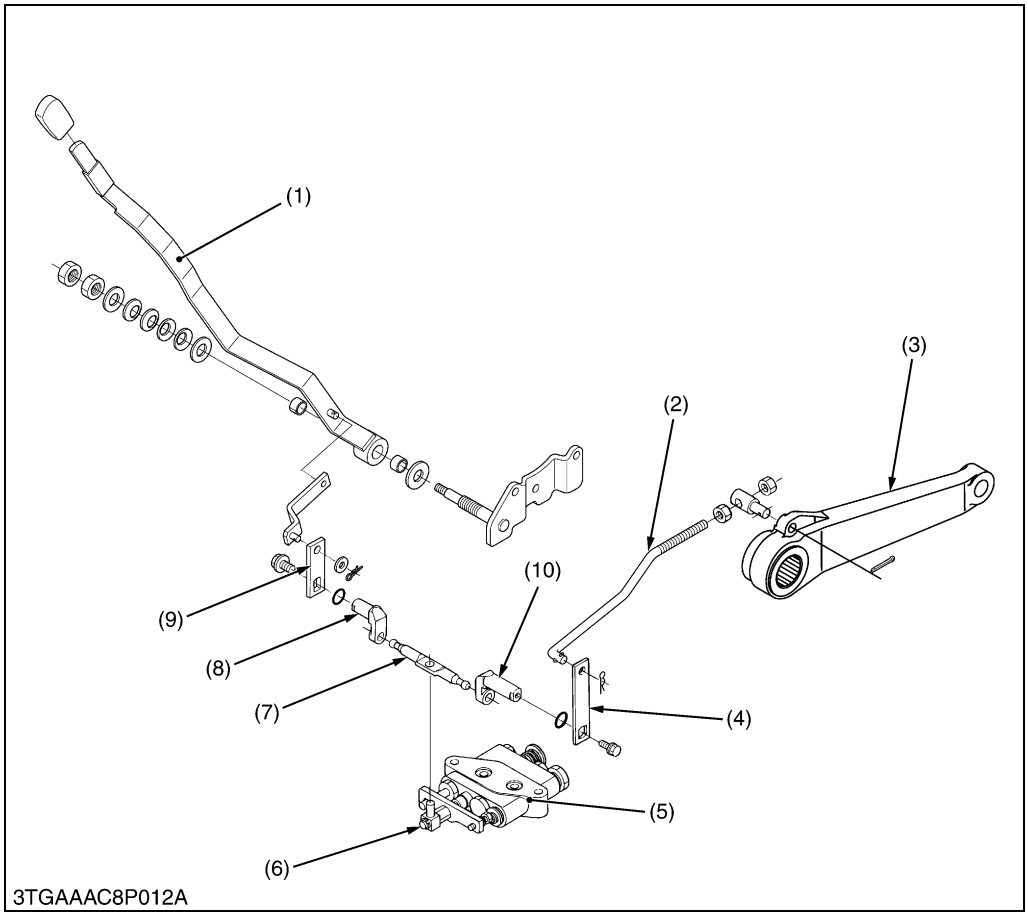
[2] FEEDBACK LINKAGE



(1) Position Control Lever
(2) Feedback Rod
(3) Lift Arm
(4) Feedback Lever
(5) Control Valve
(6) Spool
(7) Spool Drive Lever
(8) Control Arm
(9) Position Arm
(10) Feedback Arm

Position control is a mechanism to raise or lower the implement attached to the tractor in proportion to the movement of the control lever.

The implement can be set at any height by moving the position control lever. Fine position adjustment is also easy.

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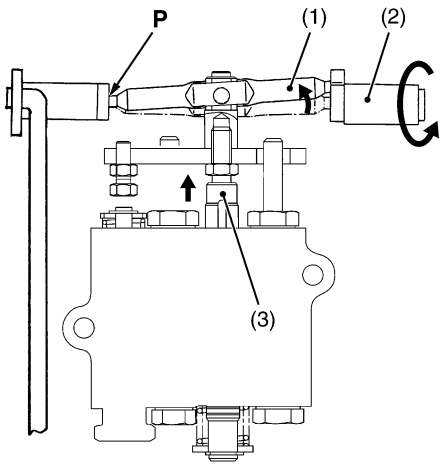
[1]



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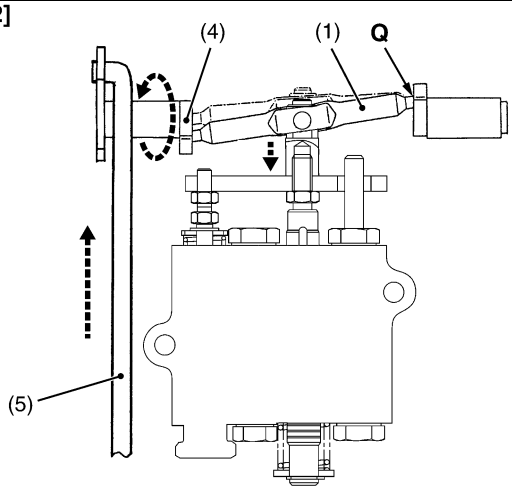
[2]



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■ Lifting

1. When the position control lever is moved to the **LIFT** position, the control arm (2) rotates to the arrow. Therefore, the spool drive lever (1) moves around the fulcrum **P** and pull the spool (3) opening the **LIFT** circuit.
2. When the lift arm moves upward, the feedback arm (4) is rotated to the arrow, since the feedback rod (5) is actuated. Therefore, the spool drive lever (1) moves around the fulcrum **Q** and pushes the spool (3).
3. The lift arm stops when the spool returns to the neutral position.

(1) Spool Drive Lever
(2) Control Arm
(3) Spool
(4) Feedback Arm
(5) Feedback Rod

[1] Lifting
[2] Lifting to Neutral
P: Fulcrum
Q: Fulcrum

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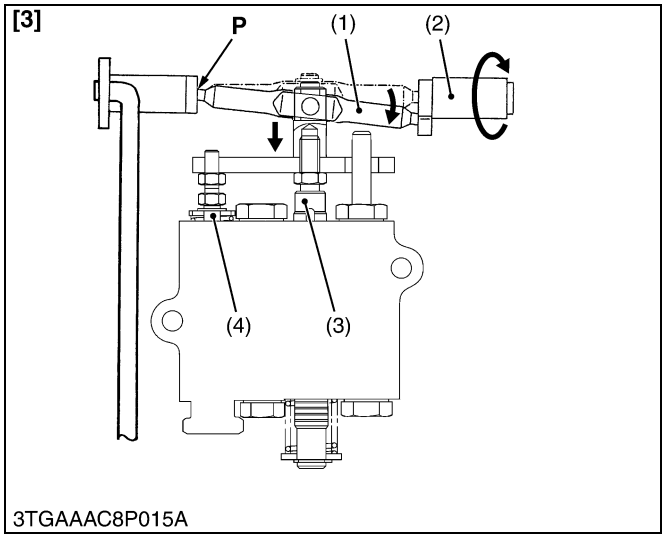
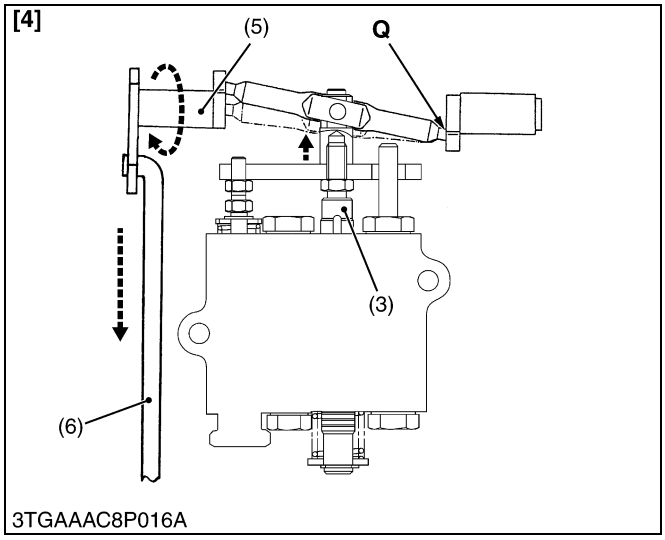
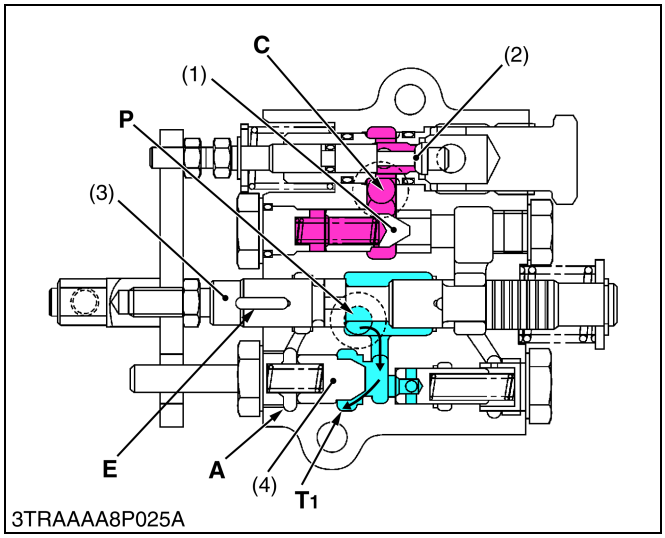




[3] POSITION CONTROL VALVE



■ Lowering

1. When the position control lever is moved to the **Lowering** position, the control arm (2) rotates to the arrow. Therefore, the spool drive lever (1) moves around the fulcrum **P** and push the spool (3) and poppet 2 (4) opening the Lowering circuit.
2. When the lift arm moves downward, the feedback arm (5) is rotated to the arrow, since the feedback rod (6) is actuated. Therefore, the spool drive lever (1) moves around the fulcrum **Q** and pull the spool (3).
3. The lift arm stops when the spool (3) returns to the neutral position.

(1) Spool Drive Lever
(2) Control Arm
(3) Spool
(4) Poppet 2
(5) Feedback Arm
(6) Feedback Rod

[3] Lowering
[4] Lowering to Neutral
P: Fulcrum
Q: Fulcrum

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■ Neutral

Pressurized oil flows at the **P** port, pushes open unload poppet 1 (4) and returns to tank from $\mathbf{T_1}$ port.

The oil in the chamber **A** behind the unload poppet 1 (4) returns to the tank through the **E** of spool (3) and control valve body. The oil in the hydraulic cylinder does not flow out because the circuit is cut off by the actions of poppet 1 (1), poppet 2 (2).

This allows the implement to be kept at a steady height.

(1) Poppet 1
(2) Poppet 2
(3) Spool
(4) Unload Poppet 1

P: Pump Port
C: Cylinder Port
T_1: Tank Port 1
E: Groove 2
A: Chamber A

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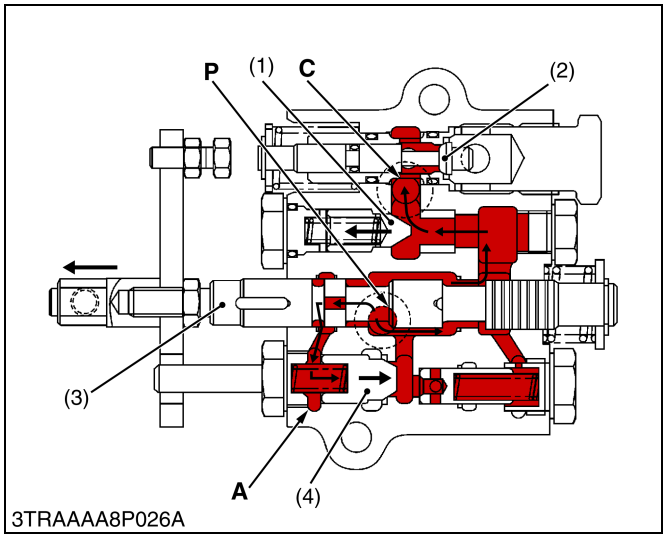

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■ Lifting

When the control lever is moved to **"UP"** position, spool (3) is pulled by the spool operating lever, forming a circuit with the P port and chamber **A**.

The pressurized oil thus flows into the chamber **A** and closes unload poppet 1 (4).

The pressure in the circuit slowly rises, pushing open poppet 1 (1), and the hydraulic oil flows into the hydraulic cylinder from the **C** port, lifting the implement.

(1)	Poppet 1	**P:**	**Pump Port**
(2)	Poppet 2	**C:**	**Cylinder Port**
(3)	Spool	**A:**	**Chamber A**
(4)	Unload Poppet 1		

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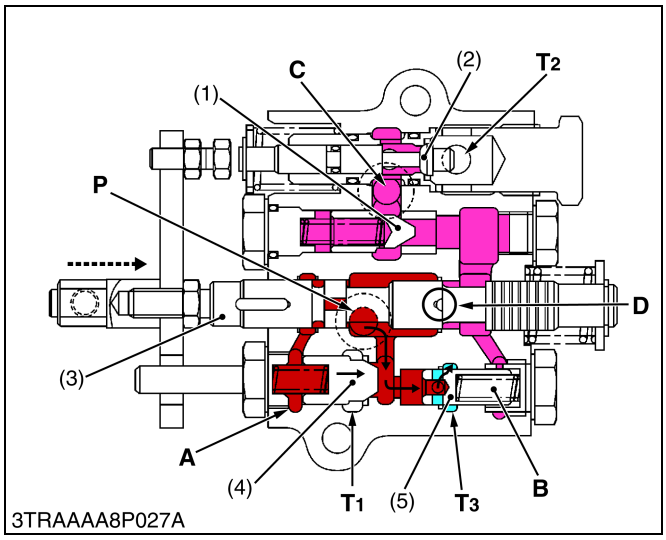

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■ Lifting to Neutral (Acting the shockless mechanism)

In returning from **Lifting** to **Neutral**, the spool (3) is pushed back to the arrow-mark direction. When the Neutral position comes near, the groove part **D** of the spool (3) makes the pressure difference at the **P** port and **C** port. Therefore, the poppet 1 (1) gradually closes, and absorbs any shock at lifting stop. In that case, since oil is remained in the chamber **A** of the unload poppet 1 (4) and closes. However, the unload poppet 2 (5) opens because of low pressure in chamber **B**, and then the oil from the pump returns to the transmission case through $\mathbf{T_3}$ port until unload poppet 1 (4) opens.

(1)	Poppet 1	**P:**	**Pump Port**
(2)	Poppet 2	**C:**	**Cylinder Port**
(3)	Spool	**A:**	**Chamber A**
(4)	Unload Poppet 1	**B:**	**Chamber B**
(5)	Unload Poppet 2	**D:**	**Groove 1**
		$\mathbf{T_1}$:	**Tank Port 1**
		$\mathbf{T_2}$:	**Tank Port 2**
		$\mathbf{T_3}$:	**Tank Port 3**

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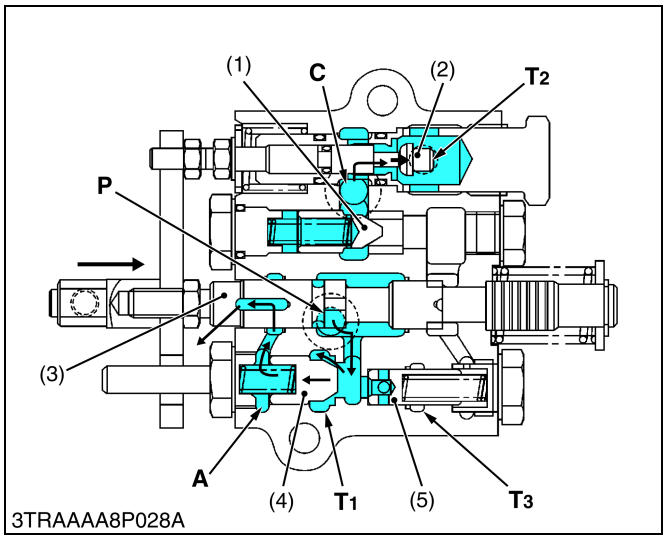

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■ Lowering

When the control lever is moved to **"DOWN"** position, spool (3) moves to arrow-mark direction, and pushes the poppet 2 (2). If forms a circuit with the **C** port and $\mathbf{T_2}$ port.

The oil in the hydraulic cylinder is forced out by the weight of the implement, and returns to the tank through the **C** port and $\mathbf{T_2}$ port, lowering the implement. The pressurized oil pushes open unload poppet 1 (4) and returns to the tank from $\mathbf{T_1}$ port.

■ Floating

When the control lever is lowest position, spool (3) and poppet 2 (2) keeps same as lowering position. The hydraulic cylinder is unloading condition. Therefore pressurized oil pushes open unload poppet 1 (4) and returns to tank.

(1)	Poppet 1	**P:**	**Pump Port**
(2)	Poppet 2	**C:**	**Cylinder Port**
(3)	Spool	$\mathbf{T_1}$:	**Tank Port 1**
(4)	Unload Poppet 1	$\mathbf{T_2}$:	**Tank Port 2**
(5)	Unload Poppet 2	$\mathbf{T_3}$:	**Tank Port 3**

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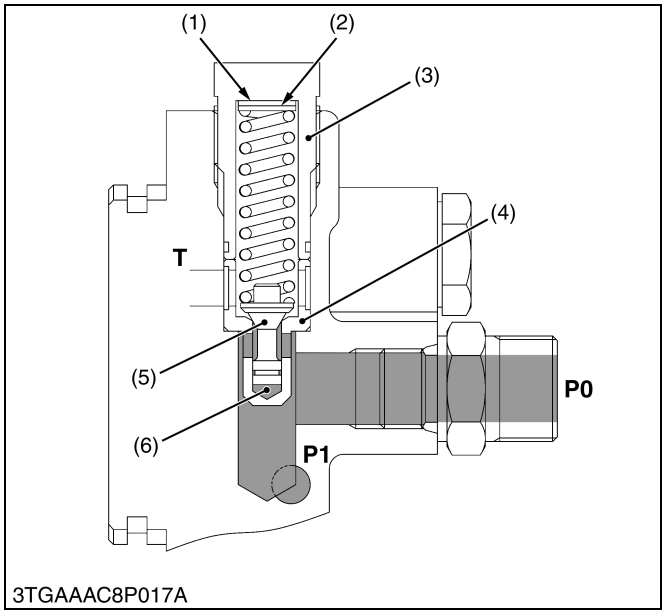
[4] RELIEF VALVE



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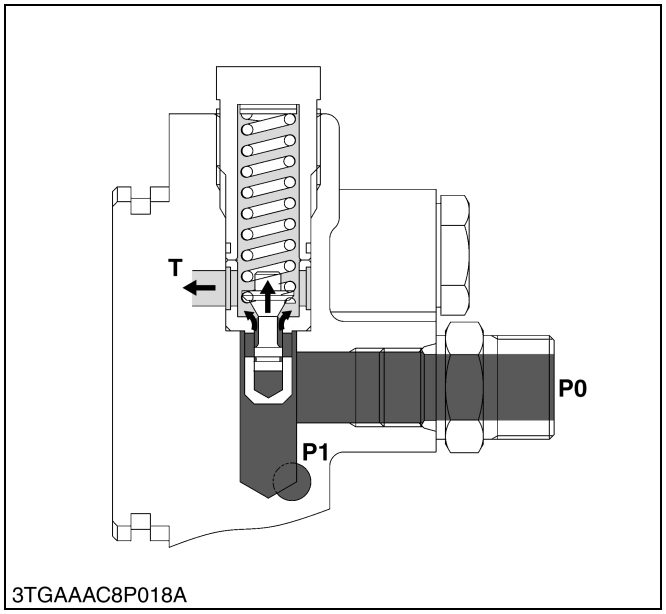

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The 3-point hydraulic circuit has a relief valve to restrict the maximum pressure in its circuit.

This is a guide piston relief valve with damper, a direct acting relief valve suitable for relatively high pressure and capacity, and constructed so as to prevent chattering and other unstableness associated with direct acting relief valves. As shown in the diagram, poppet (5) has a guide, and there is a valve chamber called a damping chamber (6) in the base of this guide piston. The valve inlet is connected to this chamber through the clearance between the guide surface and the seat so that the chamber provides a damping effect, controlling valve vibration.

When the pressure in the circuit rises, the pressure in the damping chamber also rises, and when it exceeds the relief pressure setting the spring is compressed, making a clearance between the poppet and the seat. The hydraulic oil can escape to the transmission case through this clearance, controlling the pressure rise.

(Reference)

- Relief valve setting pressure:
  16.7 to 17.2 MPa (170 to 175 kgf/cm^2, 2417.4 to 2488.5 psi)
- Engine speed:
  Maximum
- Oil temperature:
  40 to 60 °C (104 to 140 °F)

(1) Washer
(2) Shim
(3) Plug
(4) Seat
(5) Poppet
(6) Damping Chamber

T: Tank Port
P0: P0 Port (Pump Port)
P1: P1 Port (To Auxiliary Control Valve)

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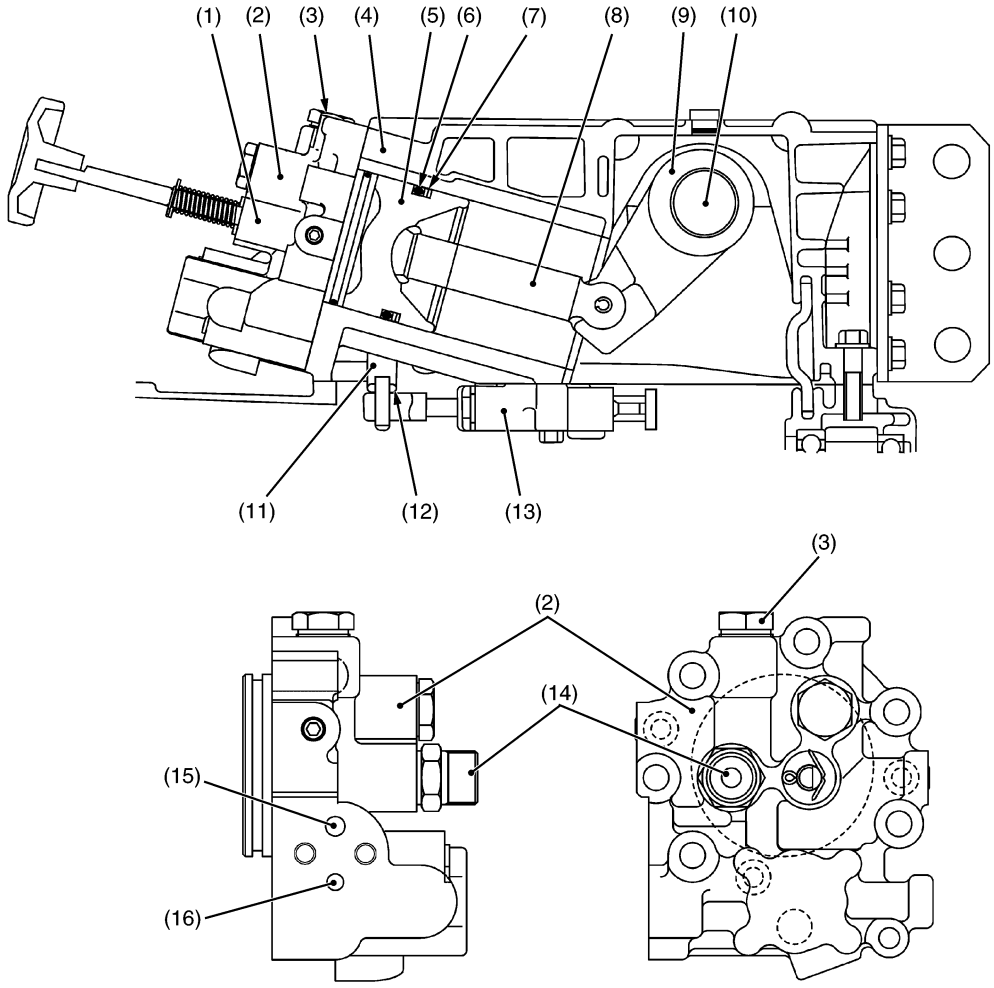
[5] HYDRAULIC CYLINDER



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(1) Lowering Speed Adjusting Valve
(2) Cylinder Head
(3) Relief Valve
(4) Hydraulic Cylinder
(5) Hydraulic Piston
(6) O-ring
(7) Back-up Ring
(8) Hydraulic Rod
(9) Hydraulic Arm
(10) Hydraulic Arm Shaft
(11) Control Arm
(12) Spool Drive Lever
(13) Control Valve
(14) **P0** Port (Pump Port)
(15) **P1** Port (To Auxiliary Control Valve)
(16) **P2** Port (From Auxiliary Control Valve)

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

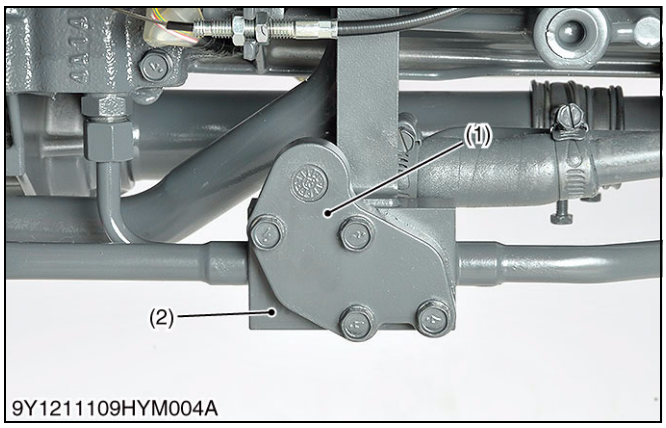
While the lift arm is rising, oil from the hydraulic pump flows into the hydraulic cylinder (4) through the control valve (13). Then oil pushes out the piston (5).

While the lift arm is lowering, oil in the hydraulic cylinder (4) is discharged to the transmission case through the control valve (13) by the weight of the implement. At this time, the lowering speed of the implement can be controlled by the lowering speed adjusting valve (1) attached to the hydraulic cylinder (4).

As for the lowering speed adjusting valve (1), refer to "Type 1" in the Workshop Manual of Tractor Mechanism (Code No. 9Y021-18200).

9Y1211109HYM0015US0

7. HYDRAULIC BLOCK TYPE OUTLET



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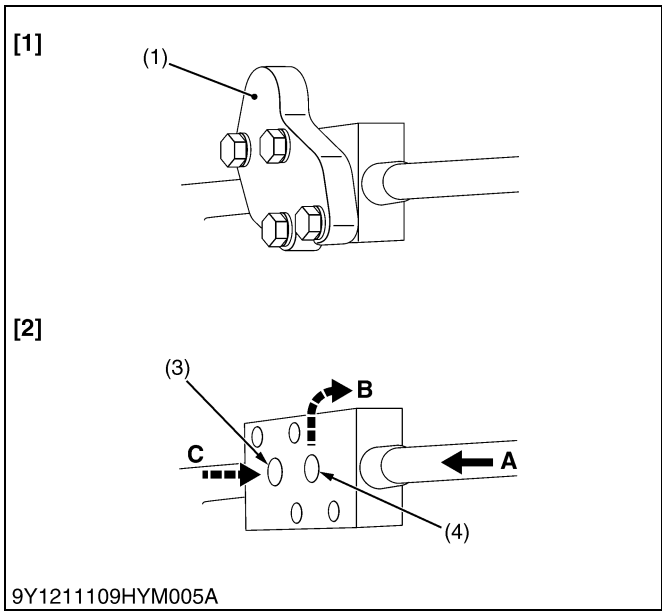

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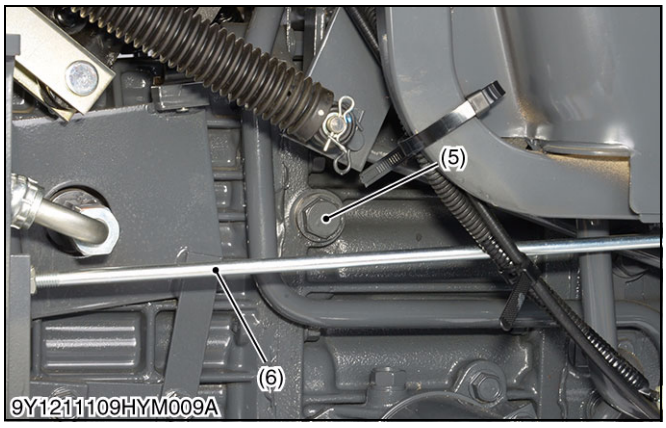


9Y1211109HYM009A

The hydraulic block type outlet is located at the right hand side of the clutch housing.

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 blade and so on.

■ **NOTE**

- **For hydraulic block type outlet, be sure to use the control valve of the "Power beyond type" with relief valve that has a third line return to tank for the operation of hydraulic block.**
- **The tank port flow from implement should be connected to the tank port (5) located on the right hand side of mid case.**

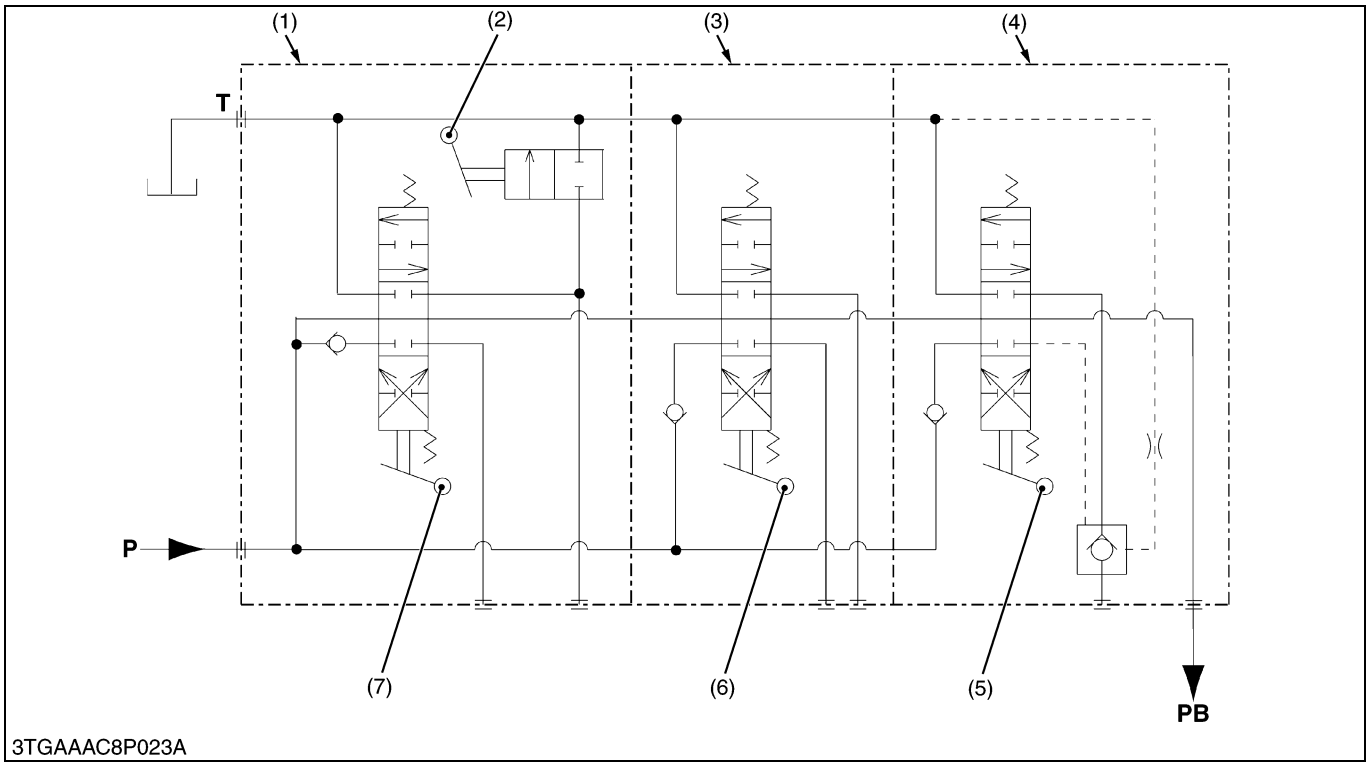
(1) Block Cover
(2) Hydraulic Block
(3) Inlet
(4) Outlet
(5) Tank Port
(6) Brake Rod (R.H.)

A: From Hydraulic Pump
B: To Implement (Outlet) Max. flow 30.6 L/min. (8.08 U.S.gal./min., 6.73 Imp.gal./min.) No relief valve in the hydraulic block.
C: From Implement (Inlet)
[1] When implement is not attached
[2] When implement is attached

9Y1211109HYM0016US0

8. AUXILIARY CONTROL VALVE

[1] HYDRAULIC CIRCUIT



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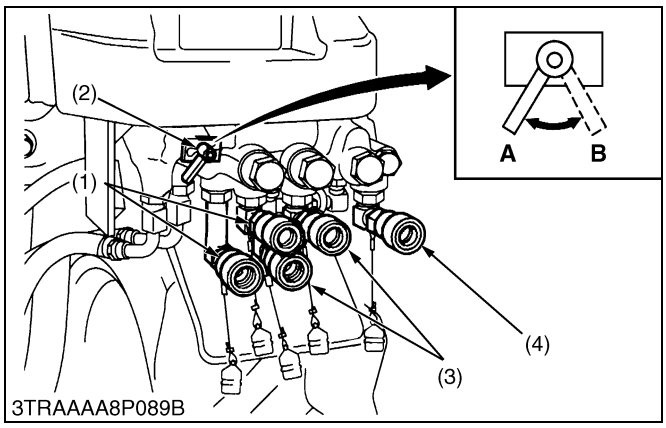

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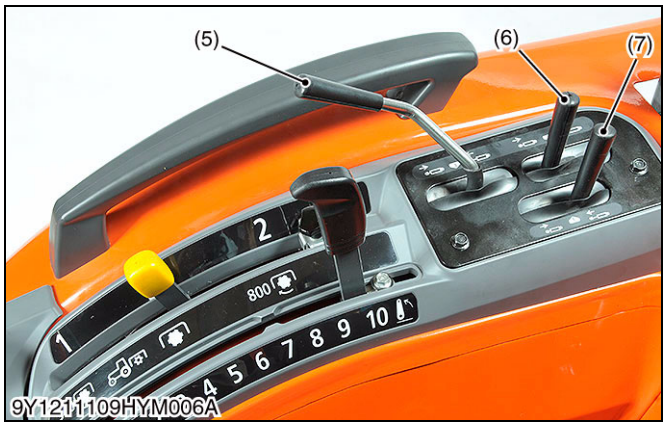

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This auxiliary control valve is a unit for three valves as single / double acting valve, double acting valve and single acting valve.

The pressured oil into the three each control valve with parallel connection through the **P** port.

The single / double acting valve (1) is changeable for single or double acting with selector lever (2).

(Reference)

- Max flow:
  30.6 L/min. (8.08 U.S.gals/min., 6.73 Imp.gals/min.)
- The maximum pressure is limited by the relief valve of **3P** hydraulic system.

(1)	Single / Double Acting Valve	**A:**	**Single Acting**
(2)	Selector Lever	**B:**	**Double Acting**
(3)	Double Acting Valve	**P:**	**P Port**
(4)	Single Acting Valve	**PB:**	**PB Port**
(5)	Remote Control Valve Lever	**T:**	**T Port**
(6)	Remote Control Valve Lever		
(7)	Remote Control Valve Lever		

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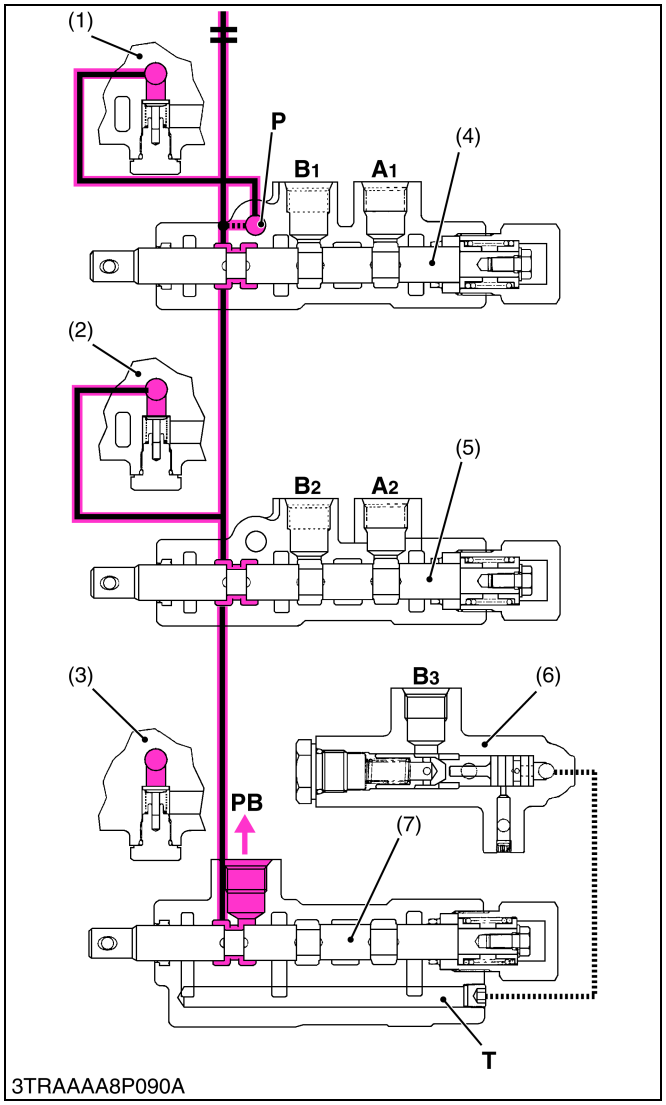

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■ Neutral

While the spools (4), (5), (7) are in neutral position, the pressure-fed oil from the hydraulic pump is delivered into the **P** port and flows to 3-point linkage control valve through **PB** port.

(1) Check Valve
(2) Check Valve
(3) Check Valve
(4) Spool
(5) Spool
(6) Unload Valve
(7) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)

A_1: A_1 Port (To or From Implement Cylinder)
A_2: A_2 Port (To or From Implement Cylinder)
B_1: B_1 Port (To or From Implement Cylinder)
B_2: B_2 Port (To or From Implement Cylinder)
B_3: B_3 Port (To or From Implement Cylinder)

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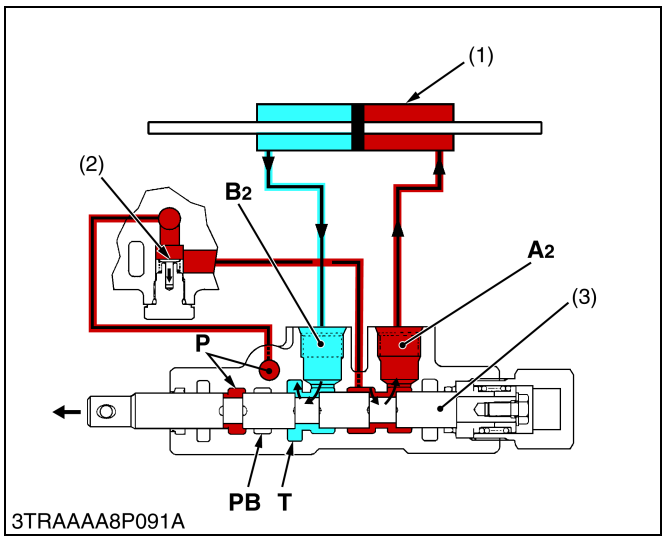

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■ Double Acting Valve – Lift

When the spool (3) moves to left, the passage from **P** port to **PB** port is closed. The pressure-fed oil opens the check valve (2) and flows to implement cylinder via **A_2** port. The return oil from implement cylinder flows from **B_2** port to transmission case through **T** port.

(1) Double Acting Cylinder
(2) Check Valve
(3) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)

A_2: A_2 Port (To Implement Cylinder)
B_2: B_2 Port (From Implement Cylinder)

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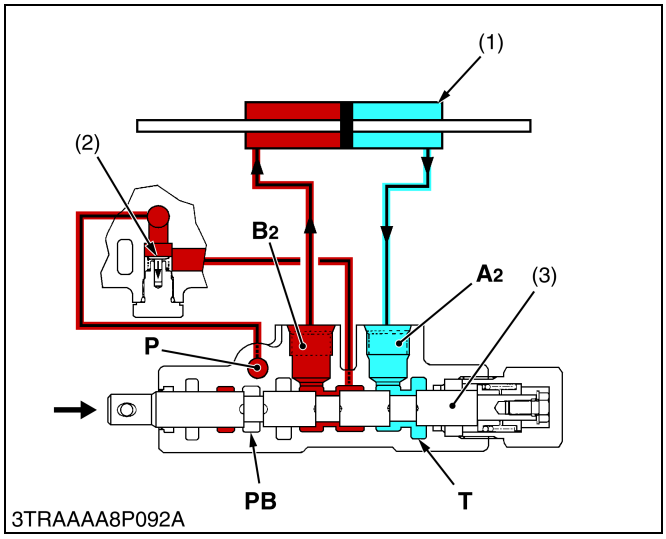

3TRAAAA8P092A

■ Double Acting Valve – Down

When the spool (3) moves to right, the passage from **P** port to **PB** port is closed. The pressure-fed oil opens the check valve (2) and flows to implement cylinder via B_2 port. The return oil from implement cylinder flows from A_2 port to transmission case through **T** port.

(1) Double Acting Cylinder
(2) Check Valve
(3) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)
A_2: A_2 Port (From Implement Cylinder)
B_2: B_2 Port (To Implement Cylinder)

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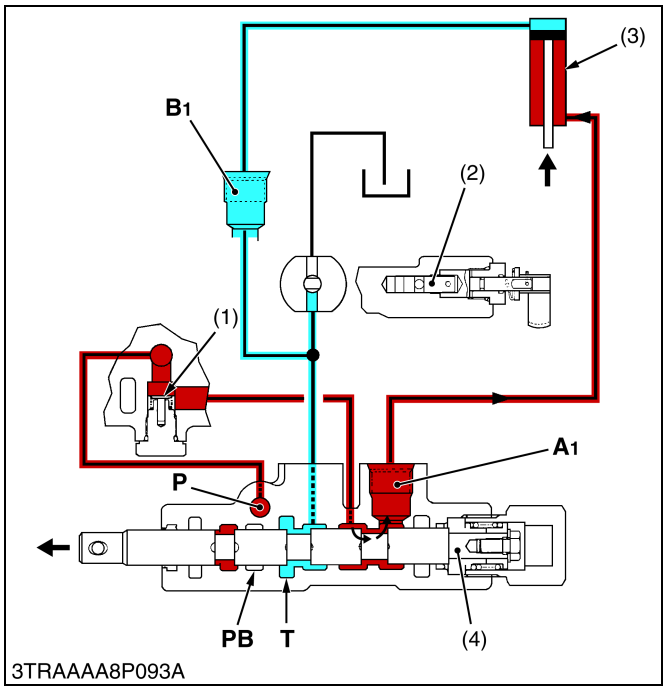

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■ Single / Double Acting Valve – Lift (Double Acting)

When this valve is used in double acting mode, the selecting valve (2) is turned counterclockwise to close the passage from selecting valve (2) to transmission case.

When the spool (4) moves to left, the oil passage from **P** port to **PB** port is blocked by the spool (4). The pressure-fed oil in the **P** port opens the check valve (1) and flows to implement cylinder via A_1 port. The return oil from implement cylinder flows from B_1 port to the transmission case through **T** port.

(1) Check Valve
(2) Selecting Valve
(3) Double Acting Cylinder
(4) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)
A_1: A_1 Port (To Implement Cylinder)
B_1: B_1 Port (From Implement Cylinder)

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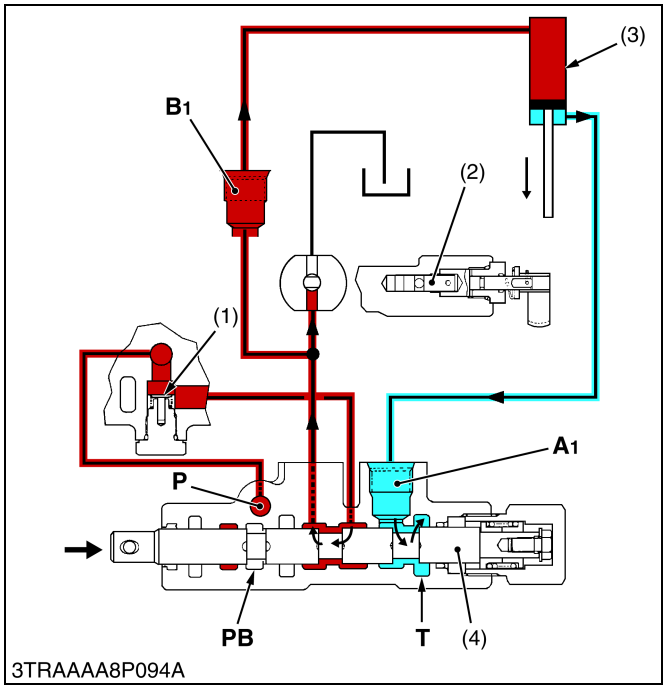

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■ Single / Double Acting Valve – Down (Double Acting)

When the spool (4) moves to right, the oil passage from **P** port to **PB** port is blocked by the spool (4). The pressure-fed oil in the **P** port opens the check valve (1) and flows to implement cylinder via B_1 port. The return oil from implement cylinder flows from A_1 port to the transmission case through **T** port.

(1) Check Valve
(2) Selecting Valve
(3) Double Acting Cylinder
(4) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)
A_1: A_1 Port (From Implement Cylinder)
B_1: B_1 Port (To Implement Cylinder)

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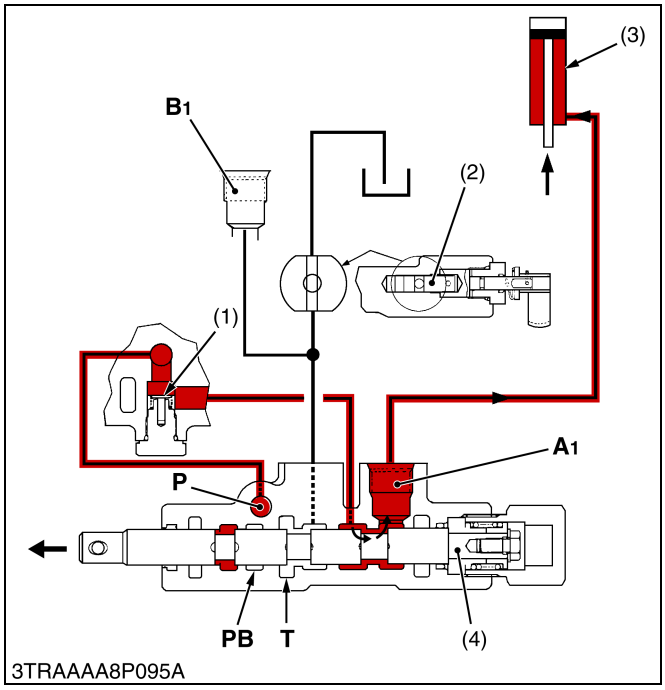

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■ **Single / Double Acting Valve – Lift (Single Acting)**

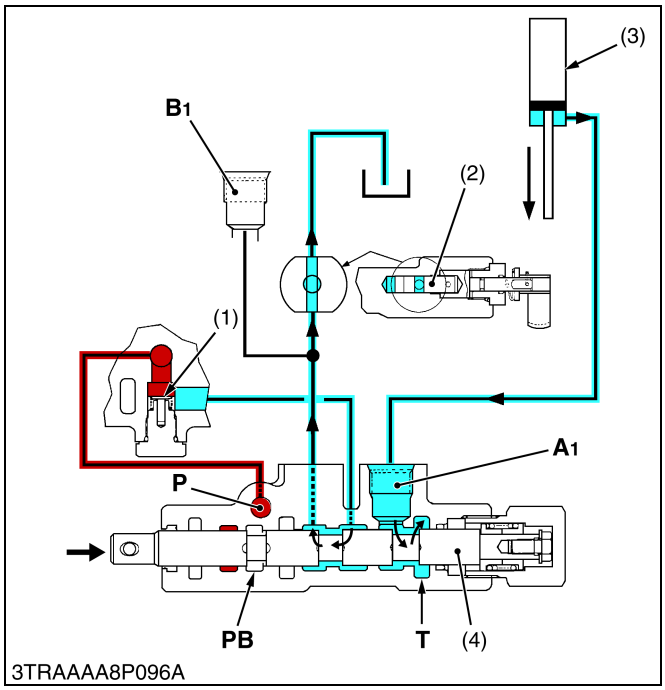
When this valve is used in single acting mode, the selecting valve (2) is turned clockwise to open the passage from selecting valve (2) to transmission case.

When the spool (4) moves to left, the oil passage from **P** port to **PB** port is blocked by the spool (4). The pressure-fed oil in the **P** port opens the check valve (1) and flows to implement cylinder via **A_1** port.

(1) Check Valve
(2) Selecting Valve
(3) Single Acting Cylinder
(4) Spool

P: P Port (From Hydraulic Pump)
T: T Port (To Transmission Case)
A_1: A_1 Port (To Implement Cylinder)
B_1: B_1 Port (Plugged)

9Y1211109HYM0027US0



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■ **Single / Double Acting Valve – Down (Single Acting)**

When the spool (4) moves to right, the oil passage from **P** port to **PB** port is blocked by the spool (4). The pressure-fed oil in the **P** port opens the check valve (1) and flows to transmission case through selecting valve (2). The return oil from implement cylinder flows from **A_1** port to the transmission case through **T** port.

(1) Check Valve
(2) Selecting Valve
(3) Single Acting Cylinder
(4) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)
A_1: A_1 Port (From Implement Cylinder)
B_1: B_1 Port (Plugged)

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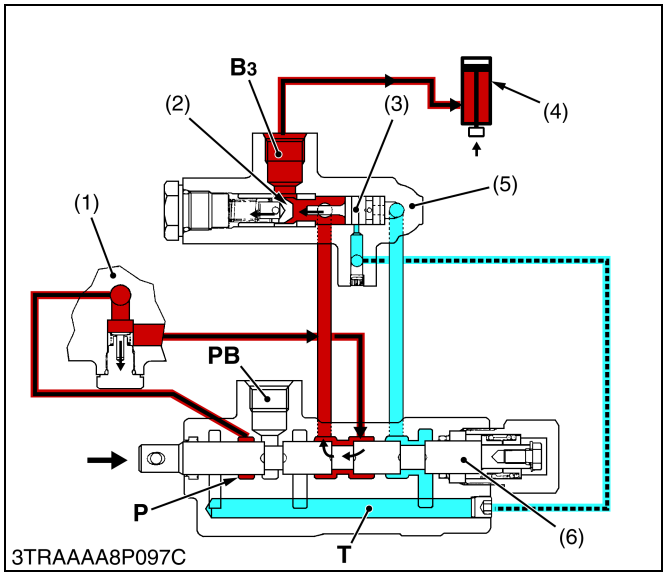

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■ Single Acting Valve – Lift

When the spool (6) moves to right, the oil passage from **P** port to **PB** port is blocked by the spool (6). The pressure-fed oil opens the check valve (1) and flows to implement cylinder via unload valve (5) and **B_3** port. The return oil from unload valve (5) flows to the transmission case through **T** port.

(1) Check Valve
(2) Poppet
(3) Pilot Valve
(4) Single Acting Cylinder
(5) Unload Valve
(6) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)
B_3: B_3 Port (To Implement Cylinder)

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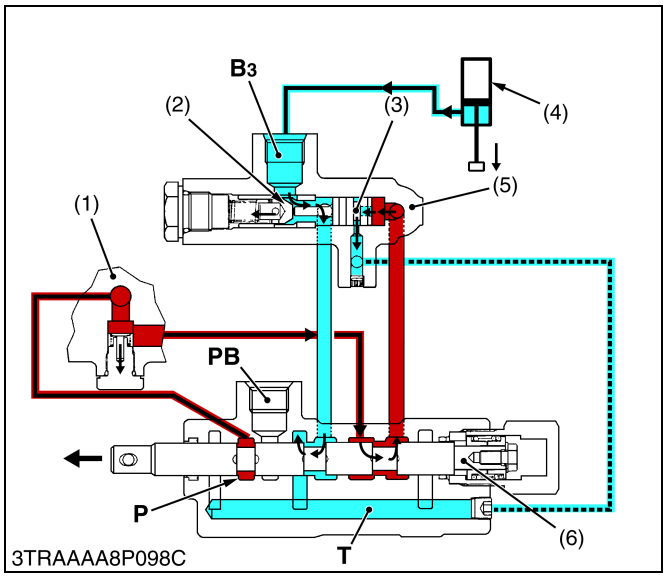

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■ Single Acting Valve – Down

When the spool (6) moves to left, the oil passage from **P** port to **PB** port is blocked by the spool (6). The pressure-fed oil in the **P** port opens the check valve (1) and flows to transmission case through pilot valve (3) and **T** port. The return oil from implement cylinder flows from **B_3** port to transmission case through unload valve and **T** port.

(1) Check Valve
(2) Poppet
(3) Pilot Valve
(4) Single Acting Cylinder
(5) Unload Valve
(6) Spool

P: P Port (From Hydraulic Pump)
PB: PB Port (To Control Valve)
T: T Port (To Transmission Case)
B_3: B_3 Port (From Implement Cylinder)

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SERVICING

CONTENTS

1. TROUBLESHOOTING

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Implement Does Not Rise (Without Relief Valve Function Noise)	1. Control linkage is adjusted improperly.	Adjust control linkage.	8-S11
	2. Control linkage improperly assembled or damaged.	Repair or replace control linkage.	8-S11
	3. Position control valve is damaged. (unload poppet, spool, popper 1, 2)	Repair or replace position control valve.	8-S17
	4. Relief valve spring is weaken or damaged.	Replace relief valve spring.	8-S12
	5. Auxiliary control valve is damaged.	Repair or replace auxiliary control valve.	3-S24, 3-S36
Implement Does Not Rise (With Relief Valve Function Noise)	1. Hydraulic piston O-ring or cylinder is damaged.	Replace hydraulic piston O-ring or cylinder.	8-S18
	2. Transmission fluid is improper or insufficient.	Change or fill transmission fluid.	G-8
	3. Hydraulic oil filter is clogged.	Replace hydraulic oil filter.	G-19
	4. Suction pipe is loosen or damaged.	Repair or replace suction pipe.	–
	5. Suction pipe O-ring is damaged.	Replace O-ring.	–
	6. Relief valve setting pressure is too low.	Adjust relief valve setting pressure.	8-S12
	7. Relief valve spring is weaken or damaged.	Replace relief valve spring.	8-S12
	8. Hydraulic pump is damaged.	Repair or replace hydraulic pump.	8-S14
Implement Does Not Reach Maximum Height	1. Position control feedback rod is adjusted improperly.	Adjust position control feedback rod.	8-S11
	2. Top link length is adjusted improperly.	Adjust top link length.	–
	3. Position control valve spool joint is adjusted improperly.	Adjust position control valve spool joint.	8-S17
	4. Hydraulic arm shaft, hydraulic arm or lift arm is assembled improperly.	Assemble the hydraulic arm shaft, the hydraulic arm and the lift arm properly.	8-S19
Implement Does Not Lower	1. Position control valve is damaged. – Spool damaged.	Replace spool.	8-S17
	2. Position control valve is damaged. – Poppet 2 or adjusting set screw is adjusted improperly.	Adjust the poppet 2 and the adjusting set screw properly.	8-S17

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Implement Drops by Weight	1. Hydraulic cylinder is worn or damaged.	Replace hydraulic cylinder.	8-S14
	2. Hydraulic piston and O-ring is worn or damaged.	Replace hydraulic piston and O-ring.	8-S18
	3. Lowering speed adjusting valve is damaged.	Replace.	8-S18
	4. Position control valve is damaged. – Poppet 1 seat surface is damaged.	Replace position control valve.	8-S17
	5. Position control valve is damaged. – Poppet 1 O-ring is damaged.	Replace position control valve.	8-S17
	6. Position control valve is damaged. – Poppet 2 seat surface is damaged.	Replace position control valve.	8-S17
	7. Position control valve is damaged. – Poppet 2 O-ring is damaged.	Replace position control valve.	8-S17
Implement Hunts (Moves Up and Down Perpetually)	1. Position control valve is damaged. – Poppet 1 seat surface is damaged.	Replace position control valve.	8-S17
	2. Position control valve is damaged. – Poppet 1 O-ring is damaged.	Replace position control valve.	8-S17
	3. Position control valve is damaged. – Poppet 2 seat surface is damaged.	Replace position control valve.	8-S17
	4. Position control valve is damaged. – Poppet 2 O-ring is damaged.	Replace position control valve.	8-S17
	5. Position control valve is damaged. – Poppet 2 or adjusting set screw is adjusted improperly.	Adjust position control valve.	8-S17

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2. SERVICING SPECIFICATIONS

HYDRAULIC PUMP

Item		Factory Specification	Allowable Limit
Hydraulic Pump (Power Steering) **Condition** • Engine Speed: Approx. 2700 min^{-1} (rpm) • Rated pressure: 0.7 to 11.7 MPa (109.1 to 119.3 kgf/cm^2, 1552 to 1697 psi) • Oil Temperature: 40 to 60 °C (104 to 140 °F)	Delivery at No Pressure Delivery at Rated Pressure	18.6 L/min. 4.91 U.S.gals/min. 4.09 Imp.gals/min. 18.2 L/min. 4.81 U.S.gals/min. 4.00 Imp.gals/min.	– 15.2 L/min. 4.02 U.S.gals/min. 3.34 Imp.gals/min.
Hydraulic Pump (**3P** Hydraulic System) **Condition** • Engine Speed: Approx. 2700 min^{-1} (rpm) • Rated Pressure: 16.67 MPa (170 kgf/cm^2, 2417.9 psi) • Oil Temperature: 40 to 60 °C (104 to 140 °F)	Delivery at No Pressure Delivery at Rated Pressure	30.6 L/min. 8.08 U.S.gals/min. 6.73 Imp.gals/min. 30.0 L/min. 7.93 U.S.gals/min. 6.60 Imp.gals/min.	– 25.2 L/min. 6.66 U.S.gals/min. 5.54 Imp.gals/min.
Housing	Depth of Scratch	–	0.09 mm 0.0035 in.
Bushing to Gear Shaft • Gear Shaft • Bushing	Clearance O.D. I.D.	0.020 to 0.081 mm 0.0008 to 0.0032 in. 14.970 to 14.980 mm 0.5894 to 0.5898 in. 15.000 to 15.051 mm 0.5906 to 0.5926 in.	0.15 mm 0.0059 in. – –
Side Plate	Thickness	2.48 to 2.50 mm 0.0976 to 0.0984 in.	2.40 mm 0.0945 in.

CONTROL LINKAGE (3P HYDRAULIC SYSTEM)

Item		Factory Specification	Allowable Limit
Position Control Lever	Operating Force	20 to 50 N 2.1 to 5.0 kgf 4.5 to 11 lbf	–
Lift Arm **Condition** • Engine Speed: Maximum • Oil Temperature: 40 to 60 °C (104 to 140 °F)	Free Play	12 to 17 mm 0.48 to 0.66 in.	–

RELIEF VALVE (3P HYDRAULIC SYSTEM)

Item		Factory Specification	Allowable Limit
Relief Valve **Condition** • Engine Speed: Maximum • Oil Temperature: 40 to 60 °C (104 to 140 °F)	Setting Pressure	16.7 to 17.2 MPa 170 to 175 kgf/cm^2 2420 to 2480 psi	–

HYDRAULIC CYLINDER (3P HYDRAULIC SYSTEM)

Item		Factory Specification	Allowable Limit
Cylinder Bore	I.D.	75.06 to 75.10 mm 2.9551 to 2.9567 in.	75.20 mm 2.9606 in.
Hydraulic Arm Shaft to Bushing	Clearance (Right)	0.120 to 0.210 mm 0.0047 to 0.0083 in.	0.30 mm 0.0118 in.
	Clearance (Left)	0.090 to 0.200 mm 0.0035 to 0.0079 in.	0.30 mm 0.0118 in.
• Hydraulic Arm Shaft (Right)	O.D.	37.795 to 37.820 mm 1.4880 to 1.4890 in.	–
• Hydraulic Arm Shaft (Left)	O.D.	34.925 to 34.950 mm 1.3750 to 1.3760 in.	–
• Bushing (Right)	I.D.	37.940 to 38.005 mm 1.4937 to 1.4963 in.	–
• Bushing (Left)	I.D.	35.040 to 35.125 mm 1.3795 to 1.3829 in.	–

REGULATOR VALVE

Item		Factory Specification	Allowable Limit
Regulating Valve **Condition** • Engine Speed: Maximum • Oil Temperature: 40 to 60 °C (104 to 140 °F)	Setting Pressure	10.7 to 11.7 MPa 110 to 119 kgf/cm^2 1560 to 1690 psi	–
Pressure Reducing Valve **Condition** • Engine Speed: Idling speed • Oil Temperature: 40 to 60 °C (104 to 140 °F)	Bi-speed / PTO System Pressure	1.76 to 1.86 MPa 18 to 19 kgf/cm^2 256 to 270 psi	–

STEERING CONTROLLER

Item		Factory Specification	Allowable Limit
Relief Valve **Condition** • Engine Speed: Maximum • Oil Temperature: 40 to 60 °C (104 to 140 °F)	Setting Pressure	12.5 to 13.5 MPa 128 to 137 kgf/cm^2 1820 to 1950 psi	–

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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-10.)

Item	N·m	kgf·m	lbf·ft
Joint screw (Power steering delivery hose)	49 to 58.8	5.0 to 6.0	36.2 to 43.4
Joint screw (Bi-speed delivery pipe)	34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Joint screw (Regulator delivery pipe)	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2
Regulator valve mounting screw	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2
Pump cover mounting screw	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5
PTO delivery hose retaining nut	15 to 17	1.5 to 1.75	10.8 to 12.7
Bi-speed delivery pipe retaining nut	30 to 49	3.0 to 5.0	21.7 to 36.2
Bi-speed valve retaining screw	23.5 to 27.5	2.4 to 2.8	17.4 to 20.3
Rod joint screw	123.6 to 147.1	12.6 to 15.0	91.1 to 108.5
Position control valve mounting screw	19.6 to 23.5	2.0 to 2.4	14.5 to 17.4
Hydraulic cylinder cover mounting screw (M10)	39.2 to 44.1	4.0 to 4.5	28.9 to 32.5
Hydraulic cylinder cover mounting screw (M8)	17.7 to 20.6	1.8 to 2.1	13.0 to 15.2
Relief valve plug	39.2 to 49.0	4.0 to 5.0	28.9 to 36.2

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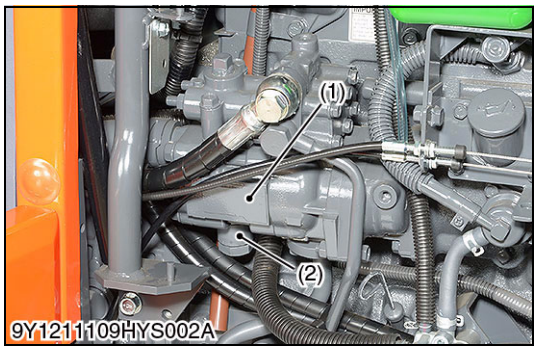
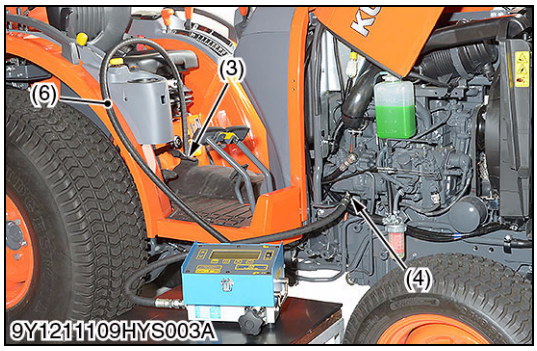
4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING

(1) Hydraulic Pump (Power Steering)





Flowmeter Connecting and Test Preparation

■ **IMPORTANT**

- **When using a flowmeter other than KUBOTA specified flowmeter (Code No.: 07916-52792), be sure to use the instructions with that flowmeter.**
- **The flowmeter does not provide relief valve. Therefore while testing, do not close the flowmeter loading valve completely.**

1. Remove the regulator delivery pipe (2) from hydraulic pump (1).
2. Set the adaptor **52** (4) to the hydraulic pump (1).
3. Connect the hydraulic test hose (6) (Code No.: 07916-52651) to the adaptor **52** and flowmeter (Code No.: 07916-52791) inlet port.
4. Connect the another hydraulic test hose (5) to flowmeter outlet port and insert to the transmission fluid inlet (3).
5. Open the flowmeter loading valve completely. (Turn counterclockwise.).
6. Start the engine and set the engine speed 2700 min^{-1} (rpm).
7. Slowly close the loading valve to generate the pressure approx. 11.2 MPa (114 kgf/cm^2, 1624 psi).
8. Hold in this condition until oil temperature reaches approx. 40 °C (104 °F).

(Reference)

- Adaptor is included in the adaptor set (Code No.: 07916-54031)

(1) Hydraulic Pump
(2) Regulator Delivery Pipe
(3) Transmission Fluid Inlet
(4) Adaptor **52**
(5) Hydraulic Test Hose
(6) Hydraulic Test Hose

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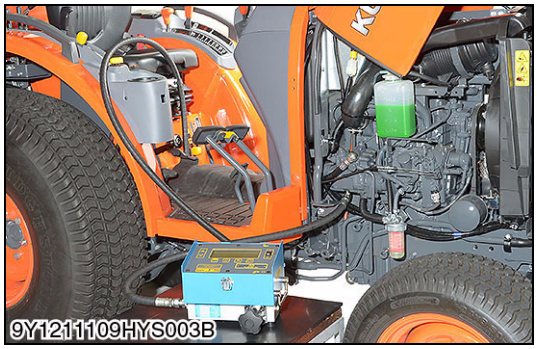

Pump Test

■ **NOTE**

- **Before pump testing, perform the flowmeter connecting and test preparation.**

1. Open the loading valve completely.
2. Start the engine and set at approx. 2700 min^{-1} (rpm).
3. Read and note the pump delivery at no pressure.
4. Slowly close the loading valve to increase pressure approx. 11.2 MPa (114 kgf/cm^2, 1624 psi).
5. Read and note the pump flow at rated pressure.
6. Open the loading valve and stop the engine.

(Reference)

Hydraulic pump delivery at no pressure	Factory specification	18.6 L/min. 4.91 U.S.gals/min. 4.09 Imp.gals/min.
Hydraulic pump delivery at rated pressure	Factory specification	18.2 L/min. 4.81 U.S.gals/min. 4.00 Imp.gals/min.
	Allowable limit	15.2 L/min. 4.02 U.S.gals/min. 3.34 Imp.gals/min.

Condition

- Engine speed:
  Approx. 2700 min^{-1} (rpm)
- Rated pressure:
  0.7 to 11.7 MPa (109.1 to 119.3 kgf/cm^2, 1552 to 1697 psi)
- Oil temperature:
  40 to 60 °C (104 to 140 °F)

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