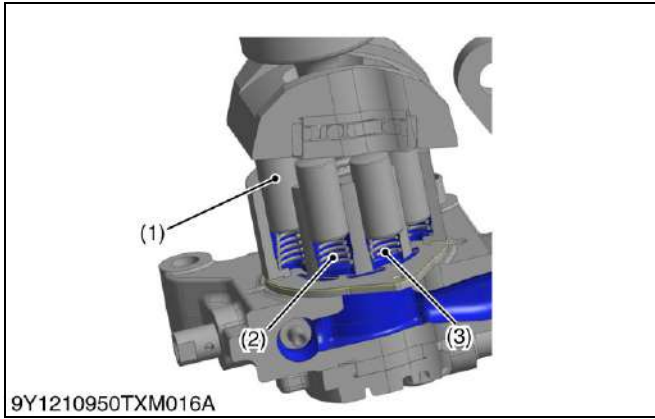


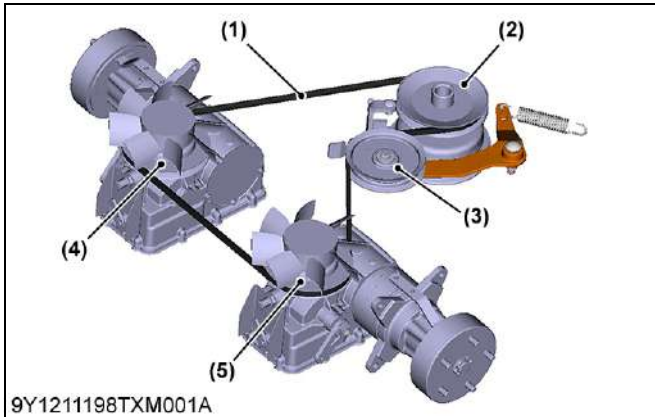


Fluid passing through the port plate fills the return side cylinder bores (3) as the pistons (1) are retracted by the springs (2).

As each piston (1) reaches TDC, it moves off of the return side of the port plate and on to the supply side of the port plate. At this point the cycle is complete, and the fluid is ready to be pumped through the supply loop.

- | | |
|------------|-------------------|
| (1) Piston | (3) Cylinder Bore |
| (2) Spring | |

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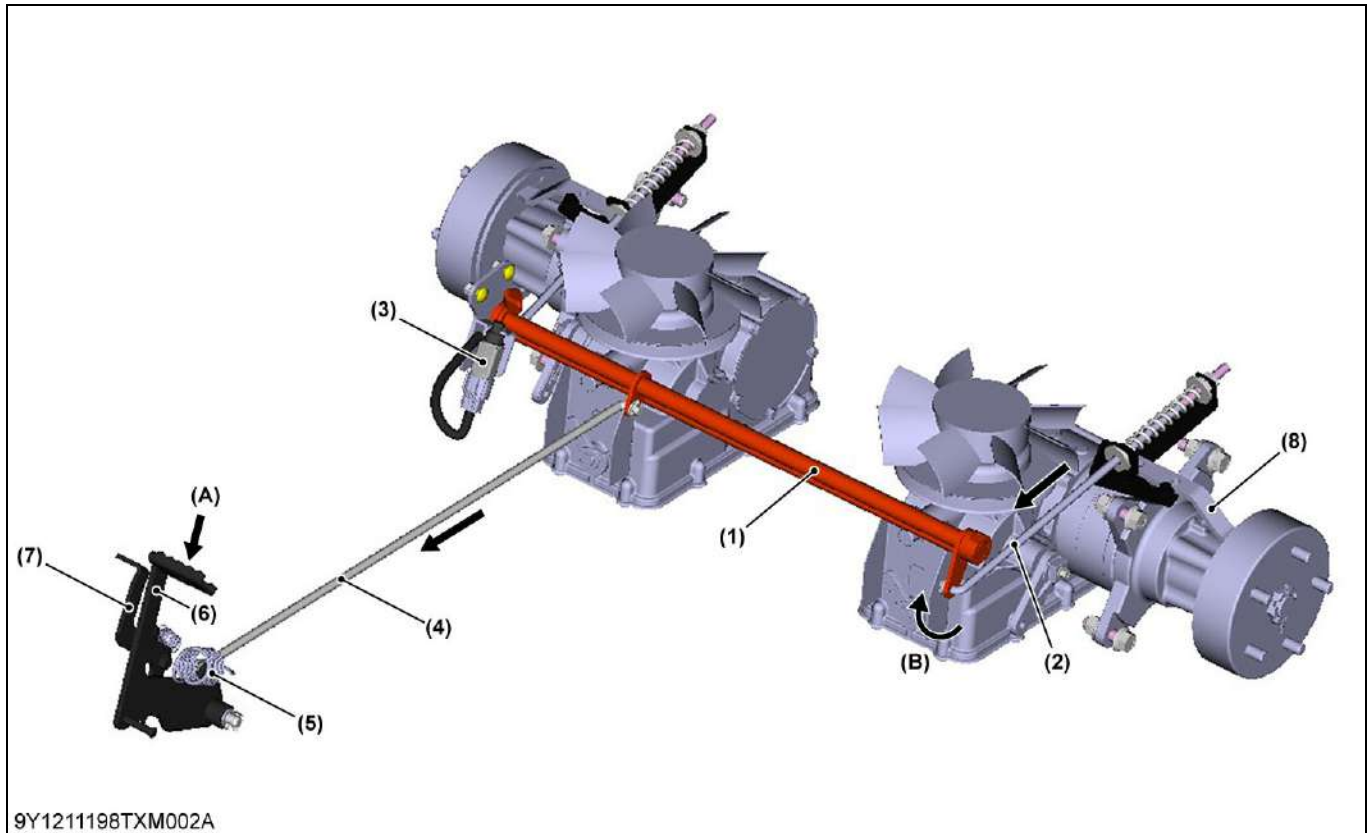
V Belt Routing

V belt routing routed as shown in the figure started from transaxle left hand fan pulley to HST pulley, tension pulley to transaxle right hand fan pulley.

- | | |
|--------------------|---------------------------|
| (1) V Belt | (4) Left Hand Fan Pulley |
| (2) HST Pulley | (5) Right Hand Fan Pulley |
| (3) Tension Pulley | |

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[5] OPERATION OF PARKING BRAKE



- | | | | |
|--|--------------------------|------------------------------|--|
| (1) Arbre de frein | (1) Brake Shaft | (5) Brake Pedal Spring | (A) Operator force on brake pedal |
| (2) Tige de frein arrière | (2) Rear Brake Rod | (6) Brake Pedal | (B) Front brake shaft rotation |
| (3) Contacteur de frein de stationnement | (3) Parking Brake Switch | (7) Parking Brake Lock Pedal | |
| (4) Front Brake Rod | | (8) Brake Cam Lever | |

The parking brake is used to keep the vehicle stationary while the machine is not in use.

To engage the parking brake, press the parking brake pedal (6) and lock with the parking brake lock pedal (7).

The parking brake consists of a brake pedal (6), parking lock pedal (7), brake pedal spring (5), brake shaft (1), front brake rod (4), brake rods (2), and brake cam lever (8) (mounted to the transaxles).

When the operator applies force (A) to the brake pedal, the brake shaft rotates clockwise (B).

The front brake rod (4) is attached to the brake shaft (1).

When the operator applies force to brake pedal (6), it pulls the front brake rod (4). When the brake rod is pulled, the brake shaft (1) is rotated simultaneously with the rear brake rod (2). The rear brake rod pulls the brake cam lever (8).

The brake rods (2) connect the rear brake shaft and brake arms on the transaxles.

When the rear brake shaft is rotated, the brake rods are pulled. This causes the brake arms to rotate.

When the brake arms are rotated, the parking brake is set.

9Y1211198TXM0018US0

SERVICING

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1. TROUBLESHOOTING



WARNING

- Do not try any servicing or adjustments with the engine operating. Use extreme caution while inspecting the drive belt assembly and all machine linkage!

In many cases, problems with a transaxle are not related to a damaged transaxle, but are caused by slipping drive belts, partially engaged bypass valves, and loose or damaged control linkages. Be sure to perform all operational checks and adjustments outlined in Service and Maintenance, before assuming the transaxle is malfunctioning. The table below provides a troubleshooting checklist to help determine the cause of operational problems.

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Unit Operates In One Direction Only	1. Control linkage bent or out of adjustment	Repair or replace	2-S6 to 2-S14
	2. Drive belt slipping or pulley damaged	Repair or replace drive belt or pulley	2-M8, 2-S10
Machine Does Not Drive / Track Straight	1. Machine tires improperly inflated	Inflate	G-20
	2. Control linkage bent or out of adjustment	Repair or replace linkage	2-S6 to 2-S14
	3. Bypass assembly sticking	Repair or replace bypass	2-S22
	4. Brake assembly sticking	Disengage brake, replace broken or missing brake return spring	G-29, 2-S11, 2-S17, 2-S25
Unit Is Noisy	1. Oil level low or contaminated oil	Fill to proper level or change oil	G-40, 2-S16
	2. Excessive loading	Reduce machine loading	—
	3. Loose parts	Repair or replace loose parts	—
	4. Bypass assembly sticking	Repair or replace linkage	2-S22
	5. Air trapped in hydraulic system	Purge hydraulic system	G-39
	6. Brake partially engage	Disengage brake, replace broken or missing brake return spring	G-29, 2-S11, 2-S17, 2-S25
Unit Has No / Low Power	1. Engine speed low	Adjust to correct setting	—
	2. Control linkage bent or out of adjustment	Repair or replace linkage	2-S6, 2-S14
	3. Drive belt slipping or pulley damaged	Repair or replace drive belt or pulley	2-M8, 2-S10
	4. Oil level low or contaminated oil	Fill to proper level or change oil	G-40, 2-S16
	5. Excessive loading	Reduce machine loading	—
	6. Bypass assembly sticking	Repair or replace linkage	2-S22
	7. Air trapped in hydraulic system	Purge hydraulic system	G-39
	8. Brake partially engage	Disengage brake, replace broken or missing brake return spring	G-29, 2-S11, 2-S17, 2-S25

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Unit Is Operating Hot	1. Debris buildup around transaxle	Clean off debris	–
	2. Cooling fan damaged	Repair or replace cooling fan	2-S19
	3. Oil level low or contaminated oil	Fill to proper level or change oil	G-40, 2-S16
	4. Excessive loading	reduce machine loading	–
	5. Air trapped in hydraulic system	Purge hydraulic system	G-39
	6. Brake partially engage	Disengage brake, replace broken or missing brake return spring	G-29, 2-S11, 2-S17, 2-S25
Transaxle Leaks Oil	1. Damaged seals, housing, or gaskets	Replace damaged components	2-S18, 2-S20
	2. Air trapped in hydraulic system	Purge hydraulic system	G-39

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2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
HST Neutral at Maximum Engine Speed	Rear Wheel Rotation	Rear wheel does not rotate with the motion control lever in "NEUTRAL LOCK"	—
Maximum Speed at Maximum Engine rpm	Rear Wheel Rotation	157 to 171 rpm 16.9 to 18.9 km/h 10.5 to 11.8 mph	Difference between L.H. and R.H. Less than 2 rpm (0.2 km/h, 0.1 mph)
Motion Control Lever Alignment	Gap	0 to 2 mm 0 to 0.08 in.	—
Brake Shoe	O.D.	151.9 to 152.1 mm 5.980 to 5.990 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
Bolt (Front, rear)	23.5 to 27.4	2.40 to 2.79	17.4 to 20.2
Lock nut (HST rod)	23.5 to 27.4	2.40 to 2.79	17.4 to 20.2
Bolt (Speed adjust plate)	23.5 to 27.4	2.40 to 2.79	17.4 to 20.2
Flange nut (Brake)	23.5 to 27.4	2.40 to 2.79	17.4 to 20.2
Flange bolt (Frame)	77.4 to 90.2	7.90 to 9.19	57.1 to 66.5
Flange nut (Frame)	48.0 to 55.9	4.90 to 5.70	35.4 to 41.2
Flange bolt (Transmission connection plate)	48.0 to 55.9	4.90 to 5.70	35.4 to 41.2
Flange bolt (Connector bracket)	155.0 to 189.0	15.81 to 19.27	114.4 to 139.3
Oil filter	13.0 to 15.2	1.33 to 1.54	9.60 to 11.2
Drain plug	30 to 40	3.1 to 4.0	23 to 29
Breather port plug	11.3 to 13.5	1.16 to 1.37	8.34 to 9.95
Nut (Brake drum)	271 minimum	27.6 minimum	200 minimum
Bolt (Brake assembly)	34 to 37	3.5 to 3.7	25 to 27
Screw (Side cover)	11.3 to 13.5	1.16 to 1.37	8.34 to 9.95
Bolt (Motor)	61 to 74.5	6.2 to 7.6	45 to 55
Nut (Fan)	75 to 95	7.7 to 9.6	56 to 70
Screw (Bottom cover)	11.3 to 13.5	1.16 to 1.37	8.34 to 9.95
Bolt (Pump cover)	10 to 11	1.0 to 1.2	7.4 to 8.1
Valve cap	54 to 61	5.5 to 6.2	40 to 44
Bolt (End block)	32 to 33	3.2 to 3.4	23.6 to 24.3
Rear tires bolts	108.5 to 130.2	11.07 to 13.27	80.03 to 96.03
Bolt (Motion control lever)	23.5 to 27.4	2.40 to 2.79	17.4 to 20.2
Upper ROPS bolt and locking nut	50.0 to 60.0	5.1 to 6.1	37.2 to 44.0
Lower ROPS bolt and flange nut	48.0 to 55.9	4.90 to 5.70	35.4 to 41.2
Separator rolling thread bolt	6.0 to 8.0	0.62 to 0.81	4.5 to 5.9

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4. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING

(1) Motion Control Lever



WARNING

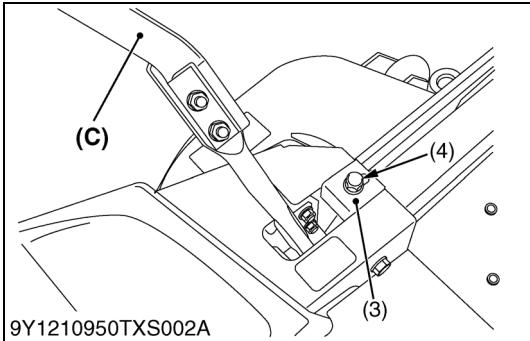
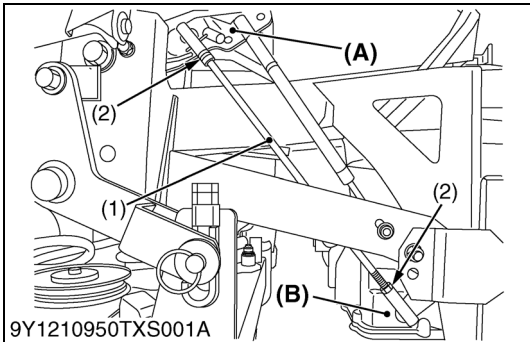
To avoid serious injury or death:

- Park the machine on a firm and level surface.
- If it is necessary to operate the engine in an enclosed area, use a gas tight exhaust pipe extension to remove the fumes.
- Always try to work in a wall-ventilated area.
- Lift up and secure with jack stands or blocking the rear of the machine, do not operate the machine while adjusting. Remove rear wheels.
- Do not adjust only one of the following adjustments; exclude "Motion Control Lever Alignment". They are interlinked.

■ IMPORTANT

- Right and left motion control levers can be adjusted independently.

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HST Neutral

1. Lift-up and secure the machine with jack stands or blocking the rear of the machine frame.
2. Remove both rear wheels.
3. Start the engine, and operate at maximum speed.
4. Place the motion control lever in "NEUTRAL LOCK" position.
5. If the rear axle is still turning, follow the following steps to adjust the neutral position.
6. Put weight on the seat cushion.
7. Lengthen or shorten the rod (1) by 1/2 turn and then tighten the lock nuts (2).
8. Place the motion control lever to the reverse position, then move it forward slowly.
Place the lever in the "NEUTRAL LOCK" position, and check that the rear axle does not rotate.
If the axle does not stop rotating, adjust the "HST NEUTRAL" again.
9. Adjust the other side "HST NEUTRAL" equally.
10. After adjustment, make sure to stop the engine immediately.
11. Push the motion control lever until it contacts the speed adjust plate (3) and reaches the end of its range of motion. Then move the speed adjust plate 2-3 mm (0.08-0.1 in.) backward and tighten the bolt (4) securely.

Tightening torque	Lock nut (HST rod)	23.5 to 27.4 N·m 2.40 to 2.79 kgf·m 17.4 to 20.2 lbf·ft
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12. If at full speed the machine pulls one direction or the other, it is an indication that one wheel is turning faster than the other.
To adjust the condition, proceed as follows:
 - (1) Park the machine on a firm and level surface.
 - (2) Stop the engine.
 - (3) Loosen the front bolt of faster side.
 - (4) Move the speed adjust plate to backward.
 - (5) Tighten the front bolt securely.

Tightening torque	Bolt (Rear, front)	23.5 to 27.4 N·m 2.40 to 2.79 kgf·m 17.4 to 20.2 lbf·ft
-------------------	--------------------	---

- | | |
|------------------------|--------------------------|
| (1) Rod | (A) Lever |
| (2) Lock Nut | (B) Transaxle |
| (3) Speed Adjust Plate | (C) Motion Control Lever |
| (4) Bolt | |

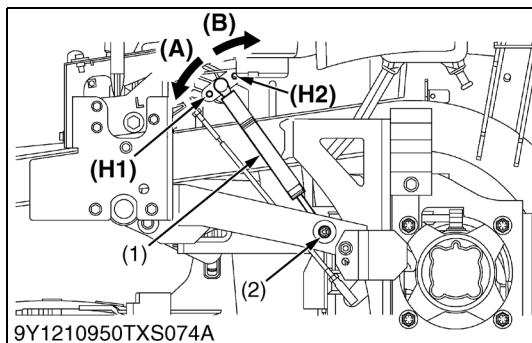
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Motion Control Lever Force

The force required to move the motion control levers can be adjusted to one of three levels depending on operator preference.

- **IMPORTANT**
- **Adjust the dampers after adjusting HST neutral.**
 - **Adjusting the motion control lever force will affect the maneuverability.**

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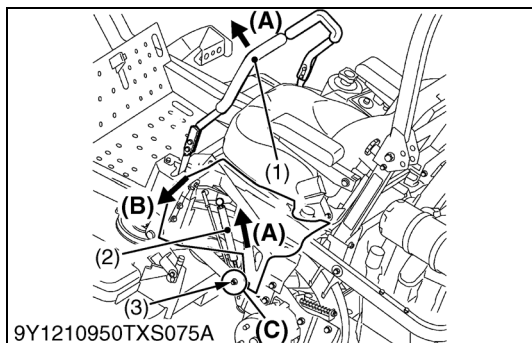
Top Side

1. Change the upper side of the damper (1) to the desired hole location.
Tighten the upper side damper nut (2).

- (1) Damper
(2) Nut

- (A) "LIGHTER"
(B) "HEAVIER"
(H1) Hole for lighter setting
(H2) Hole for heavier setting

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Bottom Side

1. Loosen the nut (3) on the bottom side of damper (2).
2. Move the motion control lever (1) to the rear most position and release the motion control lever.
3. After the motion control lever and damper have stopped moving, place motion control lever in "NEUTRAL LOCK" position.
4. Tighten the nut on the bottom side of damper.
5. Perform steps 1 through 5 for both motion control levers.

- (1) Motion Control Lever
(2) Damper
(3) Nut

- (A) "IT STOPS MOVING"
(B) "NEUTRAL LOCK" position
(C) "TIGHTEN"

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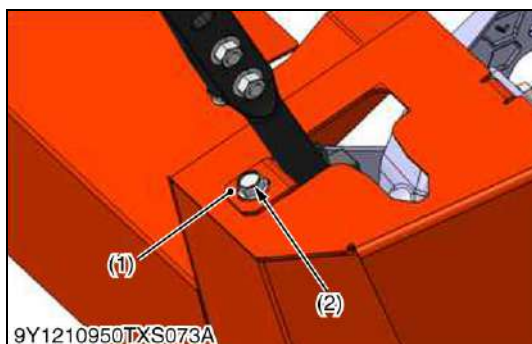
Adjusting Maximum Speed



WARNING

To avoid serious injury or death:

- Be careful of the turning wheel when you measure the speed.
1. Lift-up and secure with jack stands or blocking the rear of the machine frame.
 2. Start the engine, and operate at maximum speed.
 3. Push the throttle lever all the way forward.
 4. Move the motion control lever forward and adjust position of speed adjust plate (1).
 5. Tighten bolt (2) at correct forward speed position.
(Make sure a positive contact between the lever and stopper when you tighten.)
 6. Check forward max speed again.
 7. Repeat the step No.4 and 5 if forward max speed is not correct.
 8. Move the motion control lever to full reverse and check the reverse max speed.
(Reverse max speed is not adjustable)
 9. Adjust the other side equally. Difference between L.H. and R.H. must be less than 2 rpm (0.2 km/h, 0.1 mph).

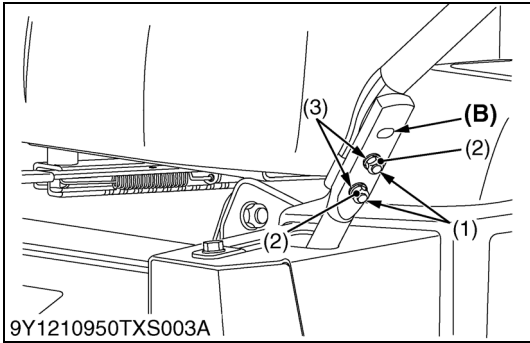
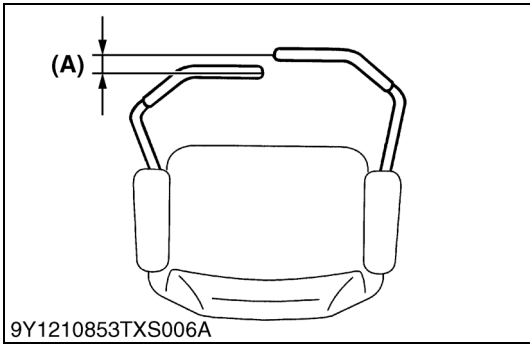


Maximum speed	Factory specification	157 to 171 rpm 16.0 to 17.4 km/h 10.5 to 11.8 mph
	Allowable limit	Difference between L.H. and R.H. Less than 2 rpm (0.2 km/h, 0.1 mph)
Tightening torque	Bolt (Speed adjust plate)	23.5 to 27.4 N·m 2.40 to 2.79 kgf·m 17.4 to 20.2 lbf·ft

(1) Speed Adjust Plate

(2) Bolt

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Motion Control Lever Alignment

Check the gap and space between the levers, at the maximum forward position.

Recommendation	Gap	0 to 2 mm 0 to 0.08 in.
----------------	-----	----------------------------

If positions of the control levers are unequal, an adjustment is necessary.

⚠ WARNING

To avoid serious injury or death:

- Park the machine on a firm and level surface.
- Stop the engine, remove the key and apply the parking brake.

■ Aligning the control levers

1. Stop the engine and apply the parking brake.

Lever position (High or Low)

2. Remove the bolts (1) and flange nuts (2) and select the motion control lever position, high or low.
3. Tighten the bolts and nuts.

Lever alignment (Right and Left)

4. Loosen the bolts and nuts.
5. Slide both levers forward or rearward to the desired position within tab slots (3) until levers are aligned.
6. Tighten the bolts and nuts.

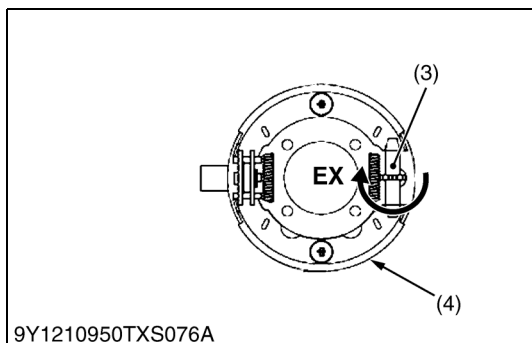
Tightening torque	Bolt (Motion control lever)	23.5 to 27.4 N·m 2.40 to 2.79 kgf·m 17.4 to 20.2 lbf·ft
-------------------	-----------------------------	---

- (1) Bolt
(2) Flange Nut
(3) Tab Slot

- (A) GAP
(B) High Position

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(2) Brake



Adjusting Brake Shoe

■ NOTE

- **No need to remove the brake drum (1).**
1. Remove the rubber plug (2) at the position of the star adjuster (3).
 2. Turn the star adjuster to increase the outer diameter of brake shoe (4) until the brake shoes touch the brake drum.
 3. Turn the star adjuster 3 'clicks' to decrease the brake shoe outer diameter.

- (1) Brake Drum
- (2) Rubber Plug
- (3) Star Adjuster
- (4) Brake Shoe

EX: Expand

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[2] DISASSEMBLING AND ASSEMBLING

(1) Separating Transaxle



Removing the Rear Wheel



WARNING

To avoid serious injury or death:

- Park the machine on a hard and level surface.
- Lift up and hold with jack stands or blocking the rear of the machine, do not operate the machine during the work.

1. Remove the rear wheel from the transaxle on the side you do your work.

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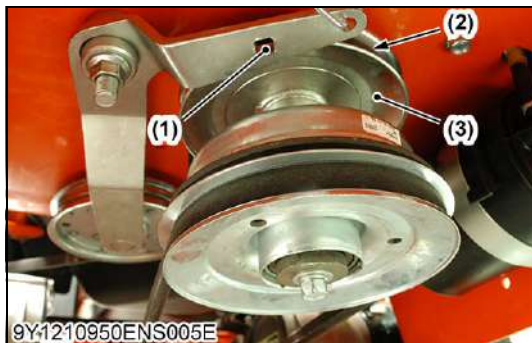


Disconnecting the Hydraulic Hose

1. Disconnect the hydraulic hose (1) from the transaxle on the side you do your work.

- (1) Hydraulic Hose

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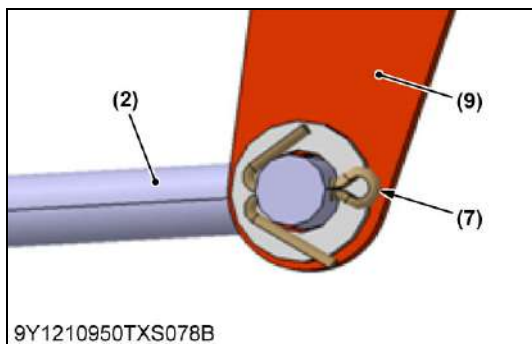
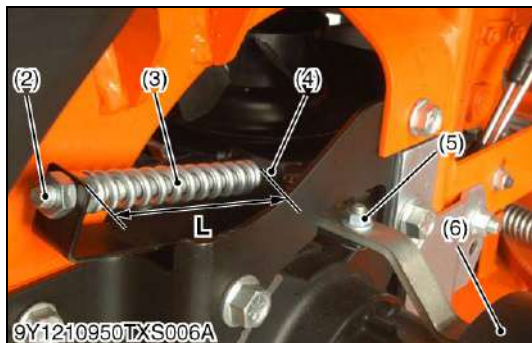
Loosening the HST Belt

1. Turn the HST tension arm (1) with a square wrench and remove the HST belt (2) from the pulley (3).

- (1) HST Tension Arm
(2) HST Belt

- (3) Pulley

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Removing the Brake Rod

1. Disconnect the HST rod (1) from the transaxle arm (8).
2. Remove the flange nuts (5).
3. Remove the brake rod assembly (2), (3) with brake plate (4) from the brake assembly (6).

(When reassembling)

■ IMPORTANT

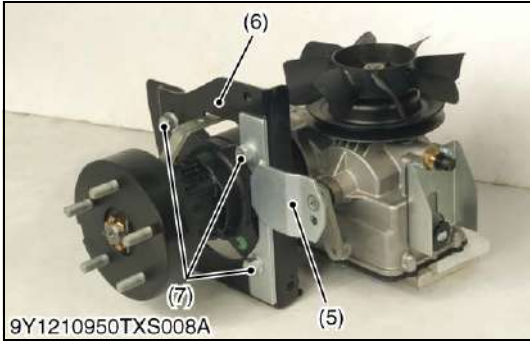
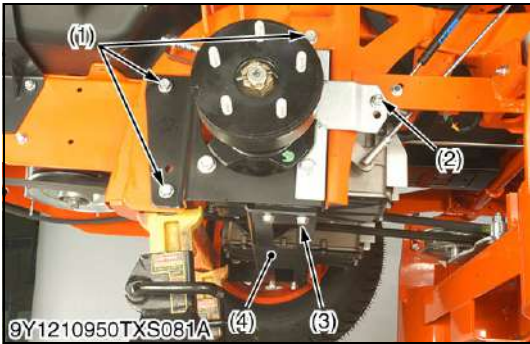
- Use a new split pin (7). Attach the brake rod (2) with the pin inside. Bend the split pin both sides.
 - Obey the tightening torque.
 - Refer to G-29 to adjust the brake spring length.
 - You must adjust the brake spring (3) length.
- With the brake applied to the lock position, "L" must be 114 to 115 mm (4.49 to 4.53 in.).

Tightening torque	Flange nut (Brake)	23.5 to 27.4 N·m 2.40 to 2.79 kgf·m 17.4 to 20.2 lbf·ft
-------------------	--------------------	---

- (1) HST Rod
- (2) Brake Rod
- (3) Brake Spring
- (4) Brake Plate
- (5) Flange Nut (Brake)
- (6) Brake Assembly
- (7) Split Pin
- (8) Transaxle Arm
- (9) Brake Shaft

L: Brake spring length

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Separating Transaxle

■ IMPORTANT

- Set a floor jack under the transaxle before removing.
1. Remove the flange bolts (3) and remove the transmission connection plate (4).
 2. Remove the flange bolts (1) and flange nut (2).
 3. Hold the transaxle with both hands to keep it balanced on the jack and lower the transaxle.
 4. Remove the transmission bracket (5) and the connector bracket (6).

(When reassembling)

■ IMPORTANT

- Obey the tightening torque below.

Tightening torque	Flange bolt (Frame)	77.4 to 90.2 N·m 7.90 to 9.19 kgf·m 57.1 to 66.5 lbf·ft
	Flange nut (Frame)	48.0 to 55.9 N·m 4.90 to 5.70 kgf·m 35.4 to 41.2 lbf·ft
	Flange bolt (Transmission connection plate)	48.0 to 55.9 N·m 4.90 to 5.70 kgf·m 35.4 to 41.2 lbf·ft
	Flange bolt (Connector bracket)	155.0 to 189.0 N·m 15.81 to 19.27 kgf·m 114.4 to 139.3 lbf·ft

- (1) Flange Bolt (Frame)
(2) Flange Nut (Frame)
(3) Flange bolt (Transmission Connection Plate)

(4) Transmission Connection Plate
(5) Transmission Bracket
(6) Connector Bracket
(7) Flange Bolt (Connector Bracket)
- 9Y1211198TXS0016US0

(2) Removing Fuel Tank



! WARNING

To avoid serious injury or death:

- Do not smoke when you fill the fuel tank or do servicing of the fuel system.

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Removing Seat and Step

! WARNING

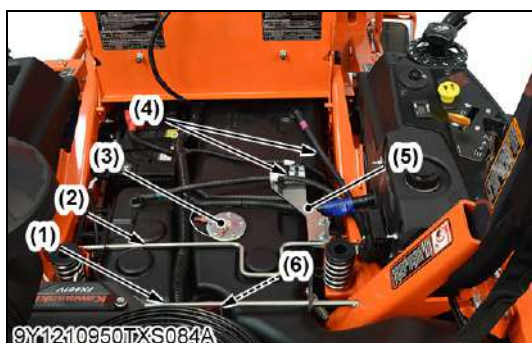
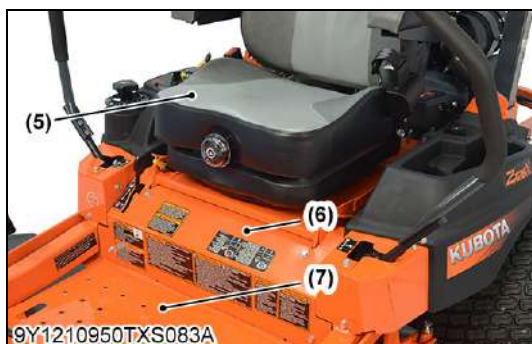
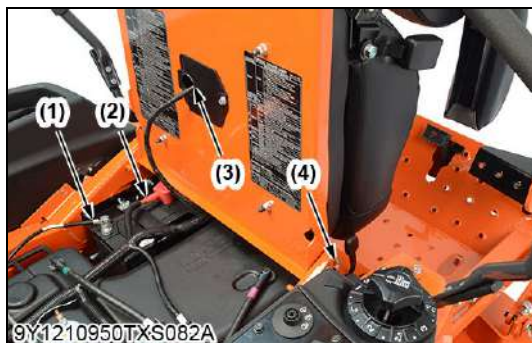
To avoid serious injury or death:

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

1. Disconnect the negative cable (1). Disconnect the positive cable (2).
2. Remove the seat safety switch cover and disconnect the seat safety switch (3).
3. Remove the seat bolts (4) and remove the seat (5).
4. Remove the center cover (6).
5. Remove the step (7).

- | | |
|------------------------|------------------|
| (1) Negative Cable | (5) Seat |
| (2) Positive Cable | (6) Center Cover |
| (3) Seat Safety Switch | (7) Step |
| (4) Seat Bolts | |

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Disconnecting Fuel Hoses

1. Remove the seat lock (1).
2. Remove the fuel tank stay (2).
3. Disconnect the evaporation hoses (4) from the top of the fuel tank.
4. Disconnect the fuel hose (6) from the fuel tank.
5. Disconnect the 2 way valve from the side of the fuel tank.
6. Disconnect the fuel level sensor (3).
7. Remove the hose stay (5).

- | | |
|-----------------------|-----------------------|
| (1) Seat Lock | (4) Evaporation Hoses |
| (2) Fuel Tank Stay | (5) Hose Stay |
| (3) Fuel Level Sensor | (6) Fuel Hose |

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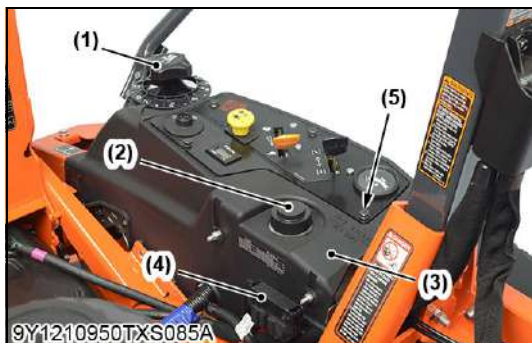


Removing the Rear Guard

1. Remove the muffler cover (3).
2. Remove the fuel tank cover (4).
3. Remove the rear cover (5).
4. Disconnect the R.H. and L.H. fenders (1) from the rear guard.
5. Remove the rear guard (2).

- | | |
|--------------------------|---------------------|
| (1) R.H. and L.H. Fender | (4) Fuel Tank Cover |
| (2) Rear Guard | (5) Rear Cover |
| (3) Muffler Cover | |

9Y1211198TXS0020US0



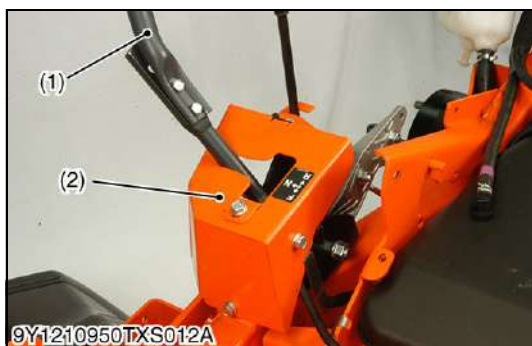
Removing the Fender R.H.

1. Remove a fuse box (4) from the fender R.H. (3).
2. Remove three bolts holding the fender R.H. to the frame.
3. Remove the adjusting dial (1).
4. Remove the rear wheel R.H..
5. Disconnect the transmission oil tank (2) from the fender.
6. Disconnect the wire harness from the panel.
7. Remove the control panel four bolts (5).
8. Remove the R.H. fender.
9. Disconnect the brake switch.
10. Remove the fuel tank.

- | | |
|---------------------------|--------------|
| (1) Adjusting Dial | (4) Fuse Box |
| (2) Transmission Oil Tank | (5) Bolt |
| (3) Fender R.H. | |

9Y1211198TXS0021US0

(3) Removing Motion Control Lever



Removing Motion Control Lever

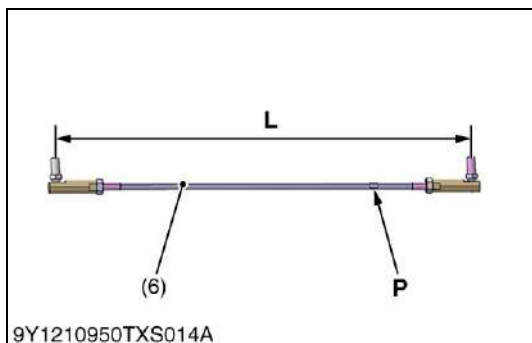
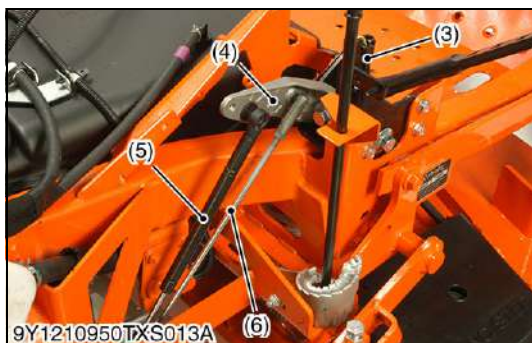
1. Remove the control lever (1).
2. Remove the lever cover (2).
3. Remove the rear wheel.
4. Disconnect the control rod assembly (3) from the speed arm (4).
5. Disconnect the damper (5) from the speed arm.
6. Remove the speed arm (4) assembly.

(When reassembling)

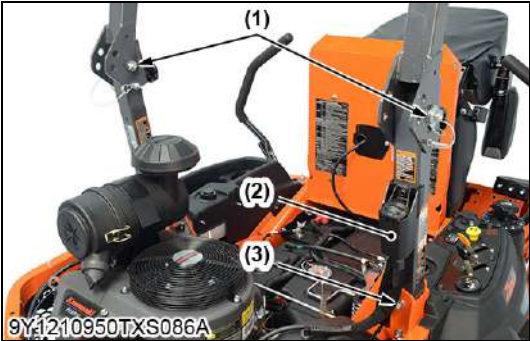
- Install the control rod (6) with the pressed portion "P" up.

- | | |
|--------------------------|--|
| (1) Control Lever | L: 418 to 422 mm (16.5 to 16.6 in.) |
| (2) Lever Cover | (Reference) |
| (3) Control Rod Assembly | P: Pressed portion |
| (4) Speed Arm | |
| (5) Damper | |
| (6) Control Rod | |

9Y1211198TXS0022US0



(4) Removing ROPS



Removing ROPS

- 1. Remove the upper ROPS bolts and nuts (1).
- 2. Disconnect the separator (2) from the ROPS.
- 3. Remove the Lower ROPS bolts and nuts (3).
- 4. Remove the ROPS.

(When reassembling)

■ IMPORTANT

- Tighten the nut to the value below.

Tightening torque	Upper ROPS bolt and locking nut	50 to 60 N·m 5.1 to 6.1 kgf·m 37.2 to 44 lbf·ft
	Lower ROPS bolt and flange nut	48.0 to 55.9 N·m 4.90 to 5.70 kgf·m 35.4 to 41.2 lbf·ft
	Separator rolling thread bolt	6.0 to 8.0 N·m 0.62 to 0.81 kgf·m 4.5 to 5.9 lbf·ft

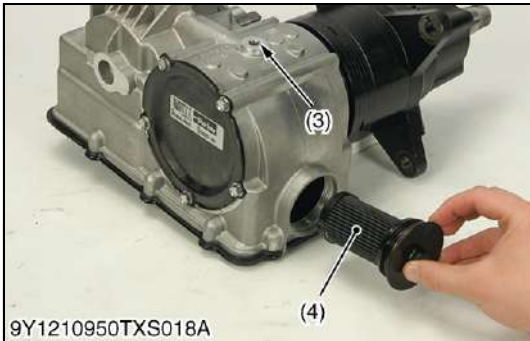
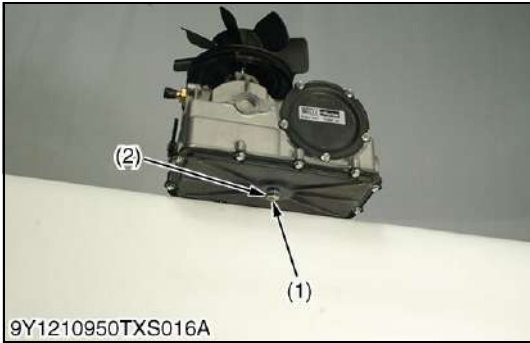
- (1) Upper (ROPS) Bolt and Locking Nut (3) Lower (ROPS) Bolt and Flange Nut
(2) Separator

9Y1211198TXS0023US0

(5) Transaxle

The photos are of transaxle R.H..

9Y1211198TXS0024US0



Oil Filter

1. Clean any loose debris from around the oil filter and oil drain plug.
2. Place an oil drain pan beneath the oil filter and oil drain plug.
3. Remove the oil drain plug (1) and washer (2). Inspect the washer for damage and replace if necessary. Allow the oil to completely drain.
4. Once the oil stopped draining, remove the oil filter (4) and discard it. Drain the remaining oil from the filter opening.

(When reassembling)

- Install the oil drain plug (1) with the drain plug washer (2). Torque the drain plug to the specifications shown in the table below.
- Install the new oil filter (4). Torque the filter to the specifications shown in the table below.
- Loosen breather port plug (3) by 3 turns.

■ IMPORTANT

- **Always loosen the breather port plug when adding oil. If breather port plug is not loosened, air can remain in the transaxle and reduce performance.**
- Fill the transmission with oil. Continue until oil just comes out from the breather port plug.
- Install the breather port plug. Torque the plug to the specifications shown in the table below.
- Make sure to purge before operating the machine. See page G-39.

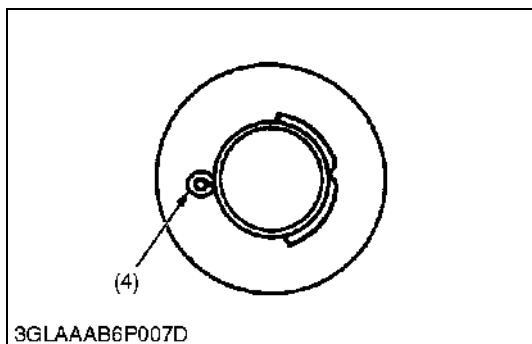
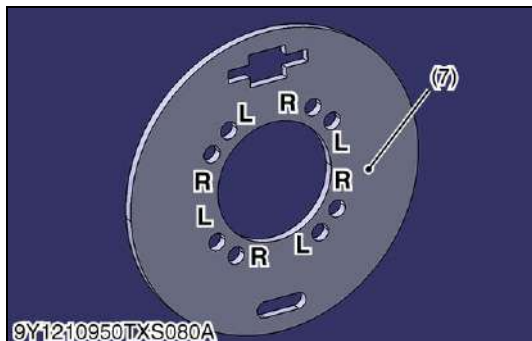
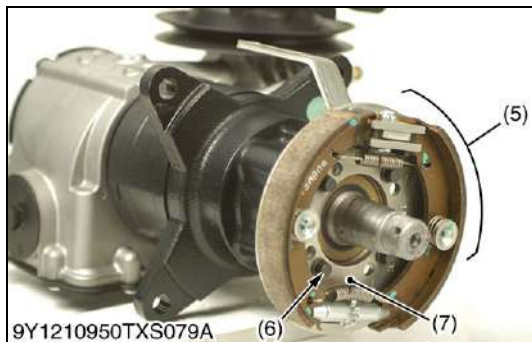
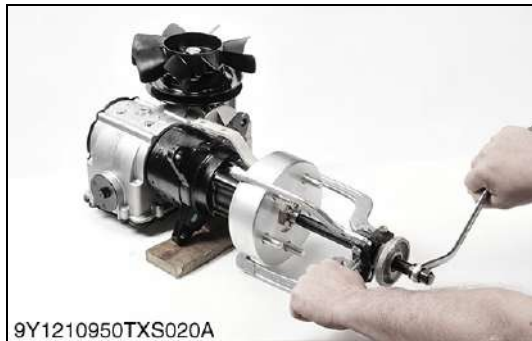
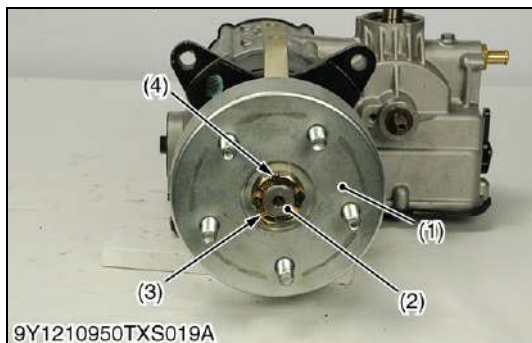
Tightening torque	Drain plug	30 to 40 N·m 3.1 to 4.0 kgf·m 23 to 29 lbf·ft
	Oil filter	13.0 to 15.2 N·m 1.33 to 1.54 kgf·m 9.60 to 11.2 lbf·ft
	Breather port plug	11.0 to 13.5 N·m 1.13 to 1.37 kgf·m 8.12 to 9.95 lbf·ft
Oil	Capacity (Both sides with filter, hose and tank (R.H. and L.H.))	6.0 L 6.3 U.S.qts 5.3 Imp.qts

- (1) Oil Drain Plug

(2) Drain Plug Washer
- (3) Breather Port Plug

(4) Oil Filter

9Y1211198TXS0025US0



Brake Assembly R.H.

1. Remove the pin (4) from the axle shaft (2).
2. Loosen the nut (3).



CAUTION

- Do not completely remove the nut (3). This prevents the brake drum from rapidly releasing when brake drum is removed.
3. With an approved puller, place the jaws of the puller on the outer edges of the brake drum.
 4. Break the drum loose from the axle shaft and remove the puller.

NOTE

- **Make sure the jaws of the puller are just on the brake drum and not the brake assembly.**
5. Remove the nut (3) and brake drum (1).
 6. Remove the four bolts (6) holding the brake assembly (5) to the motor. Remove the brake assembly.

(When reassembling)

IMPORTANT

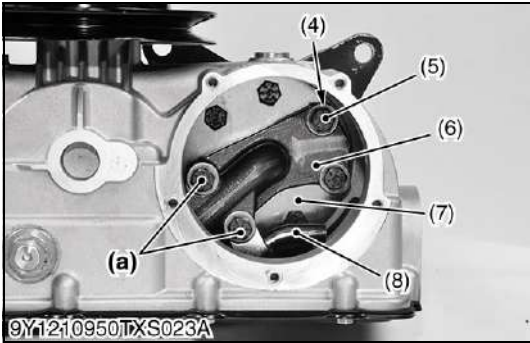
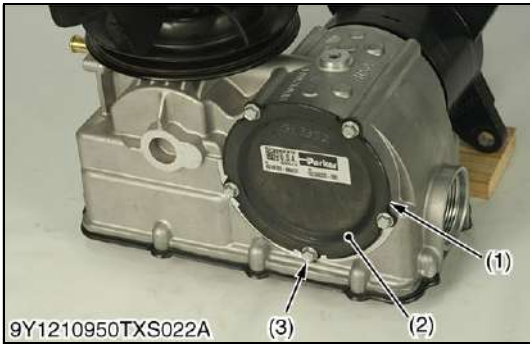
- The brake plate (7) has two sets of bolt holes. One is for R.H. and the other is for L.H. See the illustration of brake plate (7). When you install the brake assembly (5) onto the R.H. transaxle, use the holes marked "R". When you install the brake assembly onto the L.H. transaxle, use the holes marked "L".
1. Install the brake assembly (5) onto the motor. You must install brake assembly using the proper holes for correct orientation. Tighten the bolt (6). Obey the tightening torque in the table below.
 2. Line up the woodruff key on the axle shaft (2) to the slot in the brake drum (1) and install the drum.
 3. Install the nut (3). Torque the nut to the specifications shown in the table below.
 4. Install the pin (4) and bend to make an anchor around the nut. See the illustration. Make sure that the pin is not damaged.

Tightening torque	Nut (Brake drum)	271 N·m minimum 27.6 kgf·m minimum 200 lbf·ft minimum
	Bolt (Brake assembly)	34 to 37 N·m 3.5 to 3.7 kgf·m 25 to 27 lbf·ft

- (1) Brake Drum
(2) Axle Shaft
(3) Nut
(4) Pin

- (5) Brake Assembly
(6) Bolt
(7) Brake Plate

9Y1211198TXS0026US0



Motor

1. Remove the five screws (3) holding the side cover (2) to the housing. Remove the side cover.
2. Remove the side cover gasket (1) and discard it.
3. Remove the four bolts (5) and washers (4) holding the motor to the end block and housing.

■ **NOTE**

- **Two (a) of the four bolts that connect the motor to the housing are longer. Make note of the longer bolts location for reassembly.**

4. Remove the motor (7) from the housing.

(When reassembling)

1. Insert the motor (7) into the housing. Set the tab (T) up.
2. Align the bolt holes in the motor with the holes in the end block.
3. Set the charge pump pickup tube (8) to the correct bolt location.
4. Install the four bolts (5) and washers (4) as removed. Torque the bolts to the specifications shown in the table below.
5. Install the side cover (2) and side cover gasket (1). Refer to the tightening order numbers on the side cover. Torque the screws to the specifications shown in the table below.

Tightening torque	Screw (Side cover)	11.3 to 13.5 N·m 1.16 to 1.37 kgf·m 8.34 to 9.95 lbf·ft
	Bolt (Motor)	61 to 74.5 N·m 6.2 to 7.6 kgf·m 45 to 55 lbf·ft

- (1) Gasket

(2) Side Cover

(3) Screw

(4) Washer

(5) Bolt

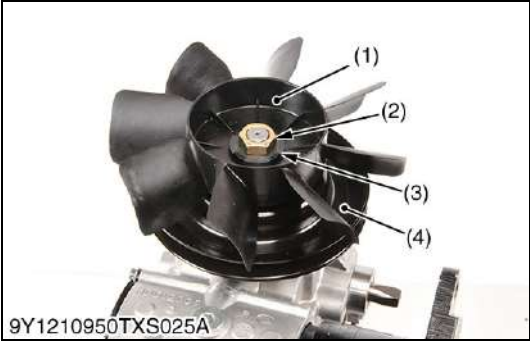
(6) End Block
- (7) Motor

(8) Pump Pickup Tube

(a) Longer Bolt

(T) Tab

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Fan and Pulley

1. Remove the nut (2). Inspect the nut for damage and replace if necessary.
2. Remove the fan spacer (3).
3. Remove the fan (1).

NOTE

- Be careful not to bend or damage the pulley with the puller during removal.

4. With an approved puller, remove the pulley (4).

(When reassembling)

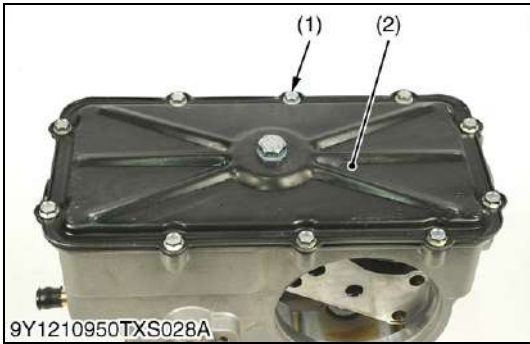
1. Install the pulley (4) onto the shaft.
2. Install the fan (1) onto the pulley.
3. Install the fan spacer (3) over the shaft and onto the fan.
4. Install the nut (2) and torque to the specifications shown in the table below.

Tightening torque	Nut (Fan)	75 to 95 N·m 7.7 to 9.6 kgf·m 56 to 70 lbf·ft
-------------------	-----------	---

- (1) Fan
(2) Nut

- (3) Fan Spacer
(4) Pulley

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Bottom Cover

1. Remove the ten screws (1) holding the bottom cover (2) to the housing.
2. Remove the bottom cover (2).
3. Remove the bottom cover gasket (3) and discard.

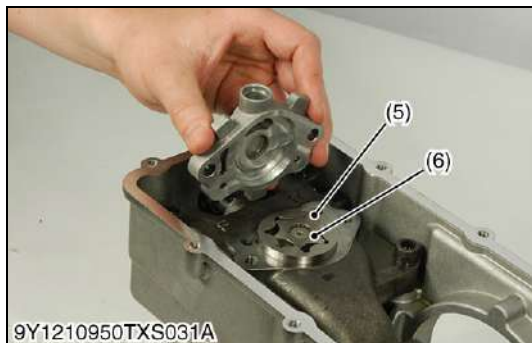
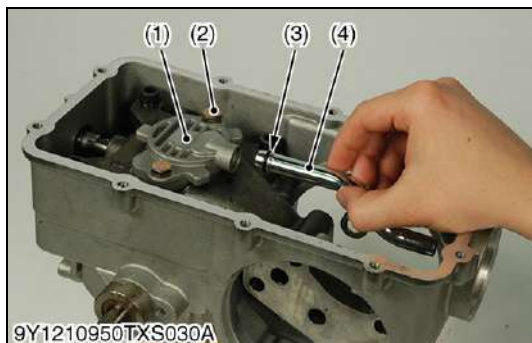
(When reassembling)

1. Set the gasket (3) onto the housing. Align the holes in the gasket with the bolt holes in the housing.
2. Set the bottom cover (2) onto the gasket. Align the holes in the cover with the bolt holes in the housing.
3. Thread each of the ten attaching screws (1) down half way.
4. Following the numbered sequence shown on the bottom cover, torque each screw to the specifications shown in the table below.

Tightening torque	Screw (Bottom cover)	11.3 to 13.5 N·m 1.16 to 1.37 kgf·m 8.34 to 9.95 lbf·ft
-------------------	----------------------	---

- (1) Screw (3) Gasket
(2) Bottom Cover

9Y1211198TXS0029US0



Charge Pump

1. Remove the charge pump pickup tube (4) and O-ring (3) from the charge pump cover (1). Inspect O-ring for damage and replace if necessary.
2. Remove the two bolts (2) holding the charge pump cover to the charge pump.
3. Remove the charge pump cover. Inspect the inside of the cover for any scoring.
4. Remove the stator (5).
5. Remove the rotor (6) from the splined shaft.
6. Inspect the lobes of the rotor and stator for any damage.

(When reassembling)

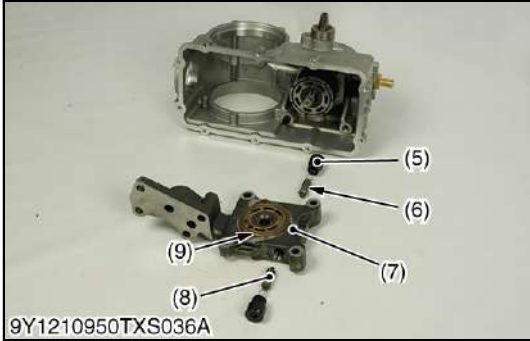
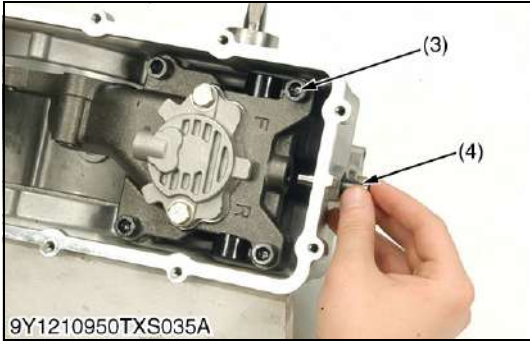
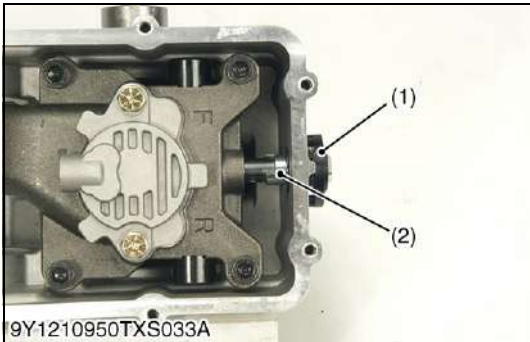
1. Apply synthetic oil to the face of the end block.
2. Install the rotor (6) onto the splined shaft.
3. Install the stator (5) over the rotor onto the face of the end block.
4. Install the charge pump cover (1). Torque the bolts (2) to the specifications shown in the table below.
5. Install the pickup tube (4) and O-ring (3) into the charge pump cover.

Tightening torque	Bolt (Pump cover)	10 to 11 N·m 1.0 to 1.2 kgf·m 7.38 to 8.11 lbf·ft
-------------------	-------------------	---

- (1) Charge Pump Cover
(2) Bolt
(3) O-ring

- (4) Pickup Tube
(5) Stator
(6) Rotor

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End Block

1. Remove the clip (2) holding the bypass lever to the housing.
2. Remove the bypass lever (1).
3. Remove the bypass valve (4) from the end block (7).
4. Remove the four bolts (3) holding the end block to the housing.

■ **NOTE**

- **The port plate (9) may stick to the face of the end block when the end block is removed.**

5. Remove the end block (7).
6. Remove the port plate (9) from the end block.
7. Remove the valve caps (5) from the end block.

■ **NOTE**

- **Make sure to tag the each valve after removal. You must install the relief valve into the side of the end block they were originally removed from.**

8. Remove the relief valves (6), (8) from the end block.

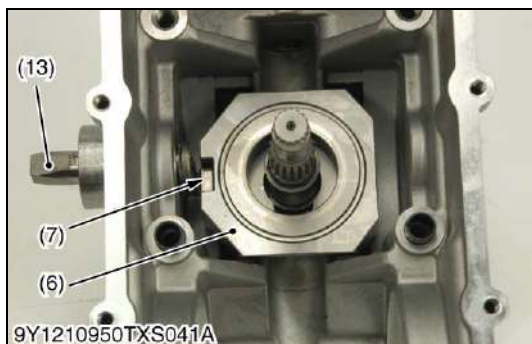
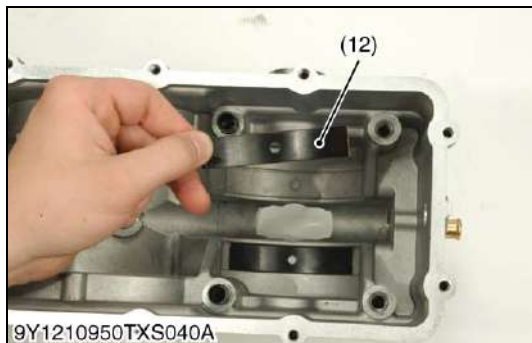
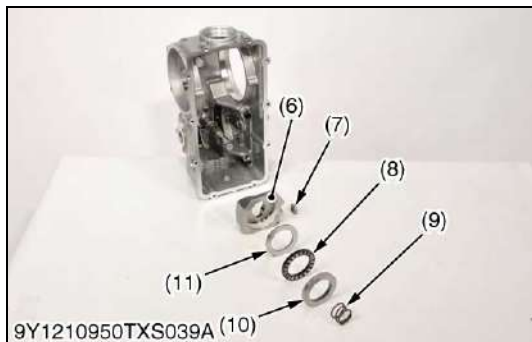
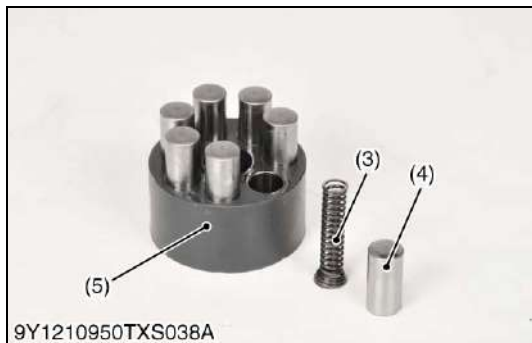
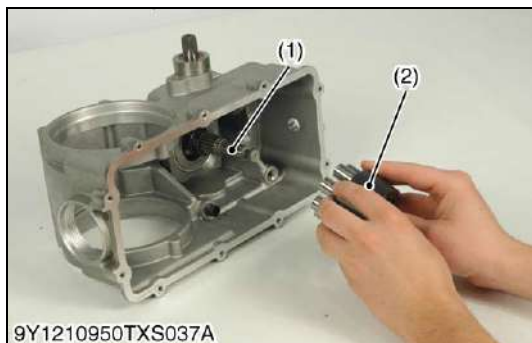
(When reassembling)

1. Install the relief valves (6), (8) into the end block with the springs facing out.
2. Install the valve caps (5). Torque the caps to the specifications shown in the table below.
3. Apply synthetic oil to the face of the end block. This will allow the port plate to stick.
4. Set the port plate (9) onto the end block with the bronze side facing up. Align the holes in the port plate with the dowel pins in the end block.
5. Install the end block (7) into the housing. Torque the bolts (3) to the specifications shown in the table below.
6. Install the bypass valve (4) into the end block.
7. Install the bypass lever (1) onto the bypass relief valve.
8. Install the clip (2) onto the bypass lever.
9. Set the bypass lever to the bypass valve closed position.

Tightening torque	Valve cap	54 to 61 N·m 5.5 to 6.2 kgf·m 40 to 44 lbf·ft
	Bolt (End block)	32 to 33 N·m 3.2 to 3.4 kgf·m 23.6 to 24.3 lbf·ft

- | | |
|------------------|----------------------------|
| (1) Bypass Lever | (6) Relief Valve (Reverse) |
| (2) Clip | (7) End Block |
| (3) Bolt | (8) Relief Valve (Forward) |
| (4) Bypass Valve | (9) Port Plate |
| (5) Valve Cap | |

9Y1211198TXS0031US0



Swash Block

NOTE

- When removing and installing the piston assembly, place your fingers firmly around each piston to ensure they do not fall out of the barrel. The pistons and springs have to stay in their original location within the barrel.

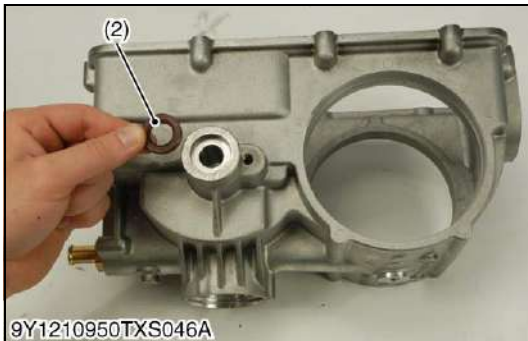
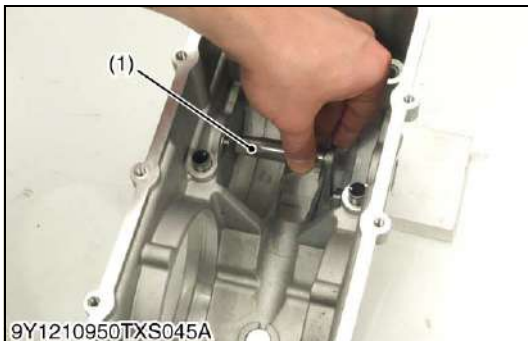
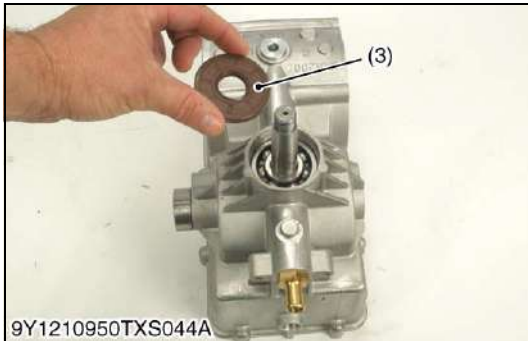
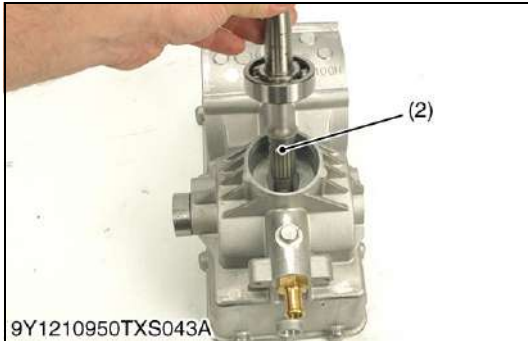
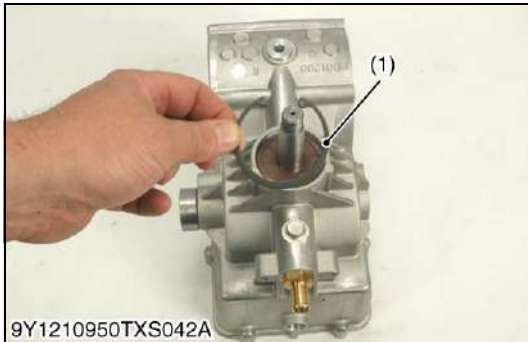
- Remove the piston assembly (2) from the pump shaft (1).
- Remove the pistons (4) and springs (3) from the barrel (5) one at a time and inspect for excessive wear shown by scoring or scratch marks. Inspect the bores of the barrel (5) for signs or scoring.
- Remove the central spring (9) from the pump shaft.
- Remove the thick top thrust washer (10). Inspect for pitting or wear to either side.
- Remove the thrust bearing. Inspect the bearing rollers for pitting or wear.
- Remove the thin bottom thrust washer (11). Inspect for pitting or wear to either side.
- Remove the swash block (6). Inspect the top and bottom surfaces for excessive wear.
- Remove the control block (7) from the trunnion arm (13).
- Remove the cradle bushings (12). Inspect both cradle bushings for excessive wear, pitting, or scoring. Light visual wear or the coating is allowed.

(When reassembling)

- Install the cradle bushings (12) into the housing. Apply synthetic oil to the top of each bushing.
- Install the control block (7) onto the trunnion arm (13).
- Install the swash block (6) onto the pump shaft (1) and cradle bushings (12). Align the control block with the slot in the swash block. Apply synthetic oil to the face of swash block.
- Install the thin bottom thrust washer (11) into the swash block.
- Install the thrust bearing (8) into the swash block.
- Install the thick top thrust washer (10) into the swash block. Apply synthetic oil to the top of the washer.
- Install the central spring (9) onto the pump shaft.
- Install the piston assembly (2) onto the pump shaft. Press down on the barrel to make sure the pistons and springs compress freely.

- | | |
|---------------------|---------------------|
| (1) Pump Shaft | (8) Thrust Bearing |
| (2) Piston Assembly | (9) Central Spring |
| (3) Spring | (10) Thrust Washer |
| (4) Piston | (11) Thrust Washer |
| (5) Barrel | (12) Cradle Bushing |
| (6) Swash Block | (13) Trunnion Arm |
| (7) Control Block | |

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Shaft Assembly

1. Remove the shaft seal snap ring (1).
2. Gently tap the splined end of the shaft assembly (2) to loosen it from the housing.
3. Remove the shaft assembly from the housing.
4. Remove the seal (3) from the shaft. Inspect the seal for damage and replace if necessary.

(When reassembling)

1. Install the shaft assembly (2) into the housing. Seat the bearing into the top housing.
2. Install the seal (3) onto the shaft and into the housing with the seal lip towards the bearing. Seat the seal into the housing until it is below the snap ring groove.
3. Install the snap ring (1) into the housing.

- (1) Snap Ring
(2) Shaft Assembly

- (3) Seal

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Trunnion Arm

1. Remove the trunnion arm (1) from the inside of the housing.
2. Remove the trunnion arm seal (2). Inspect the seal for damage and replace if necessary.

(When reassembling)

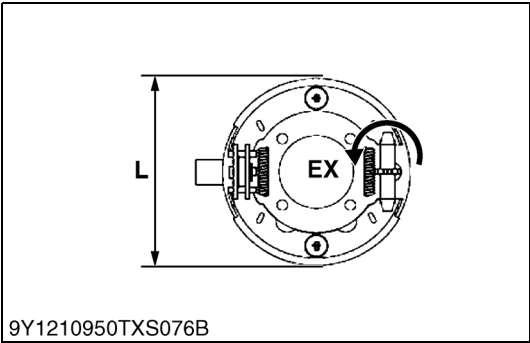
1. Clean the seal area of any burrs or other intrusions.
2. Install the seal (2) into the housing with the lip towards the housing. The seal should be slightly below the face of the housing.
3. Apply synthetic oil to the trunnion arm.
4. Install the trunnion arm (1) into the seal from the inside of the housing.

- (1) Trunnion Arm

- (2) Seal

9Y1211198TXS0034US0

[3] SERVICING



Brake Shoe Wear

- 1. Measure the brake shoe outside diameter "L".
- 2. Turn the star adjuster.
- 3. If the outside diameter is less than the allowable limit, replace it.

Brake shoe outside diameter "L"	Factory specification	151.9 to 152.1 mm 5.980 to 5.990 in.
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L: Brake Shoe Outside Diameter EX: Expand

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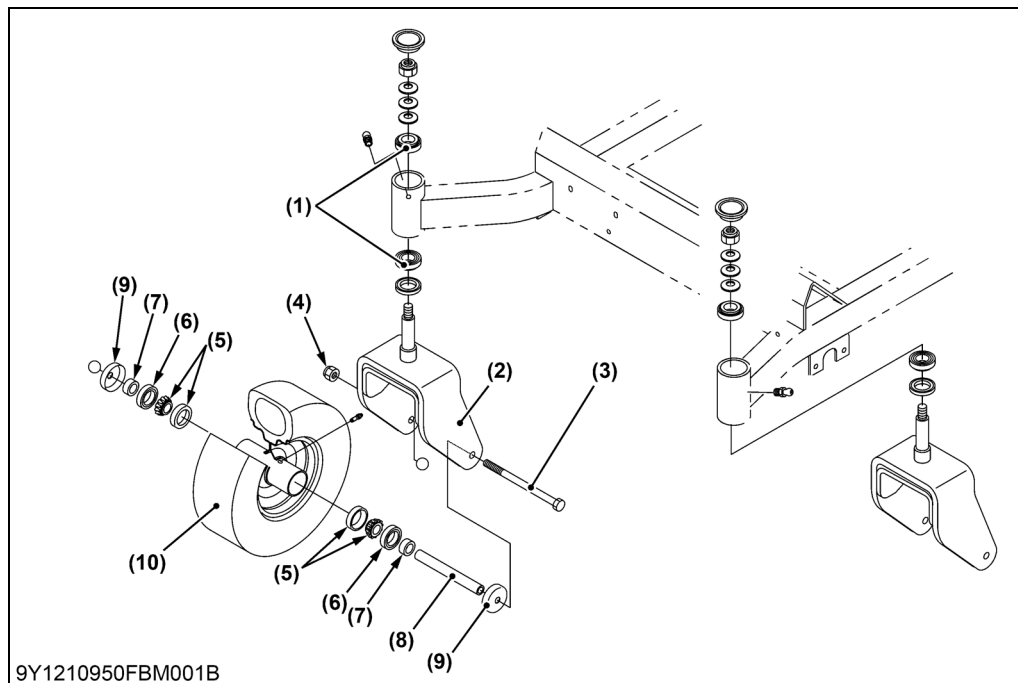
3 FRONT AXLE

MECHANISM

CONTENTS

1. STRUCTURE.....	3-M1
-------------------	------

1. STRUCTURE



- (1) Taper Roller Bearing
- (2) Wheel Bracket
- (3) Bolt
- (4) Locking Nut
- (5) Taper Roller Bearing
- (6) Oil Seal
- (7) Spacer
- (8) Sleeve
- (9) Cover
- (10) Front Wheel

The front wheel assemblies are fixed and are mounted to the R.H. and L.H. frame rails. The bearings (1) support the wheel brackets (2).

The front R.H. wheel (10) is offset from the machine center for better mower cutting.

9Y1211198FAM0001US0

SERVICING

CONTENTS

- 1. TROUBLESHOOTING.....3-S1
- 2. CHECKING, DISASSEMBLING AND SERVICING3-S2
 - [1] DISASSEMBLING AND ASSEMBLING3-S2
 - (1) Separating Front Wheel and Wheel Bracket3-S2

1. TROUBLESHOOTING

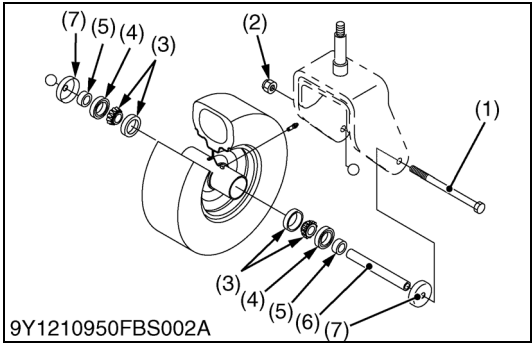
Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Front Wheels Wander to Right or Left	1. Clearance between machine frame and wheel bracket excessive	Repair	3-S3
	2. Wheel bracket nut tightening torque not enough	Tighten up	3-S3

9Y1211198FAS0001US0

2. CHECKING, DISASSEMBLING AND SERVICING

[1] DISASSEMBLING AND ASSEMBLING

(1) Separating Front Wheel and Wheel Bracket



Remove the Front Wheel

1. Inspect all parts for wear or damage. Replace the parts if necessary.

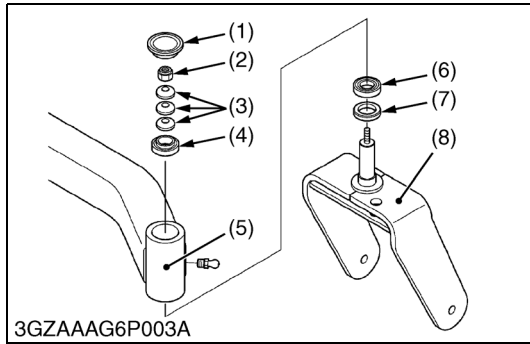
(When reassembling)

- Install the bolt (1) from the outside so the locking nut (2) is on the inside of the wheel bracket.
- Apply grease to grease fittings.
- Tighten locking nut until wheel rotation is in service specification.

Wheel rotation	Service specification	Wheel should rotate freely by hand for 1.0 to 3.0 seconds
----------------	-----------------------	---

- | | |
|--------------------------|------------|
| (1) Bolt | (5) Spacer |
| (2) Locking Nut | (6) Sleeve |
| (3) Taper Roller Bearing | (7) Cover |
| (4) Oil Seal | |

9Y1211198FAS0003US0



Remove the Wheel Bracket

1. Remove the cap (1).
2. Remove the locking nut (2) and wheel bracket (8).
3. Inspect all parts for wear or damage. Replace the parts if necessary.

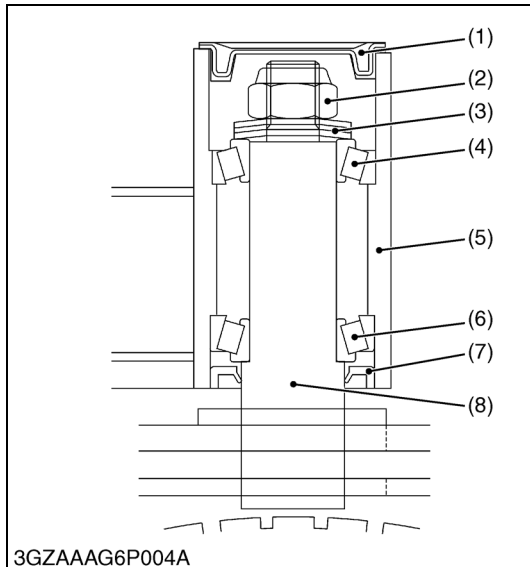
(When reassembling)

- Make sure the direction when reassembling the plate spring (3), taper roller bearing (4), (6) and oil seal (7).
- Tighten the locking nut (2) to get the push load.

- | | |
|--------------------------|-------------------|
| (1) Cap | (7) Oil Seal |
| (2) Locking Nut | (8) Wheel Bracket |
| (3) Plate Spring | |
| (4) Taper Roller Bearing | |
| (5) Front Axle | |
| (6) Taper Roller Bearing | |

P: Push load 15 to 20 N
(1.6 to 2.0 kgf, 3.3 to 4.4 lbs)
with "L1" = "L2"

9Y1211198FAS0004US0



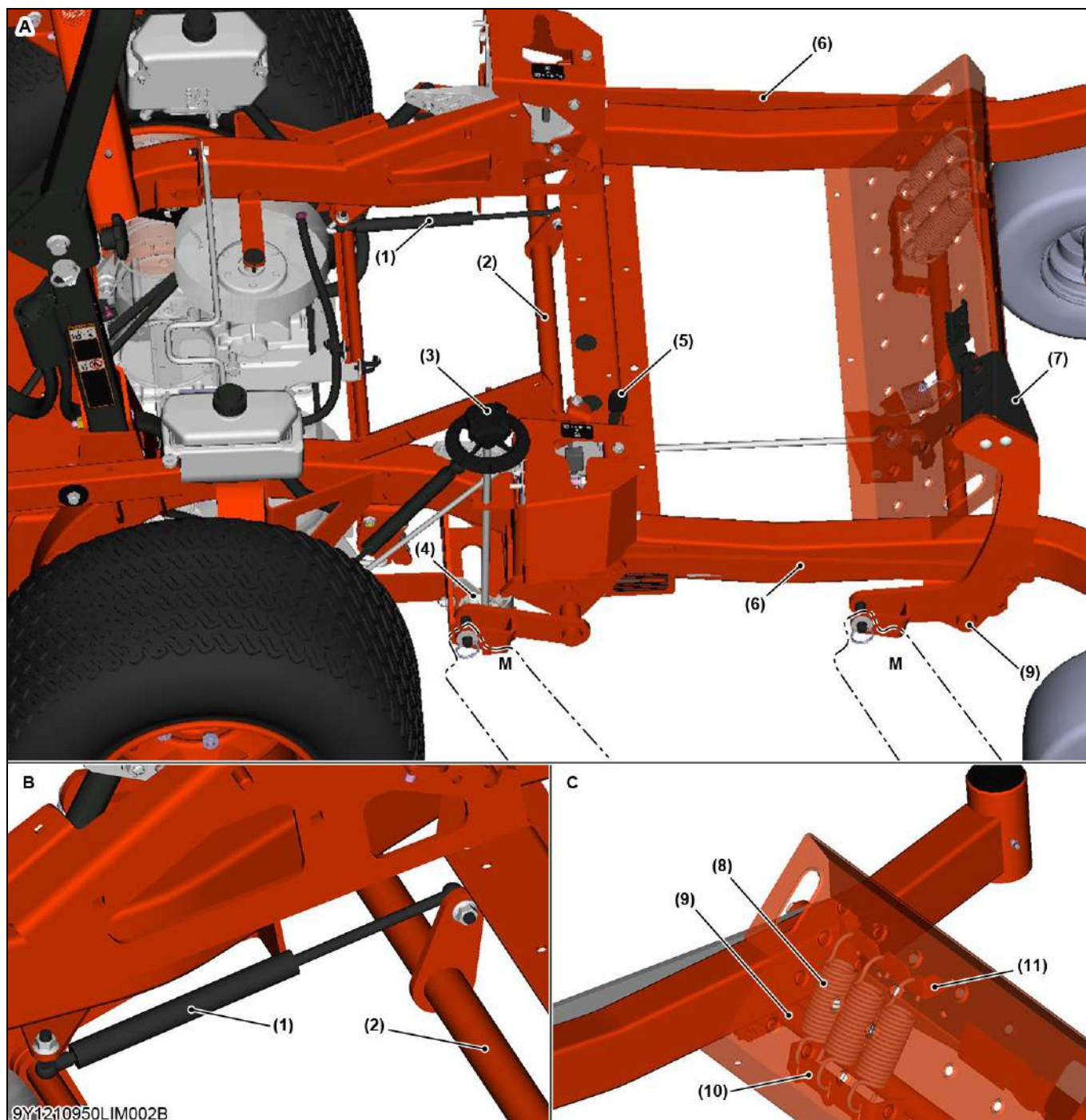
4 LIFT SYSTEM

MECHANISM

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

1. STRUCTURE



- (1) Gas Spring
- (2) Rear Lift Shaft
- (3) Cam Dial

- (4) Cam
- (5) Mower Lock Lever
- (6) Connecting Link

- (7) Lift Pedal
- (8) Spring
- (9) Front Lift Shaft

- (10) Hook (Shaft)
- (11) Hook (Frame)
- M: Mower**

A: Front lift shaft (9) and rear lift shaft (2) are held in the frame. They are connected by the connecting links (6) on each side. Front lift shaft (9) has a lift pedal (7) and a hook (shaft) (10) welded on the front lift shaft (9) in the front part of step.

C: Hook (shaft) (10) is turned up by 3 springs (8) hung from the hook (frame) (11). This tension helps the front lift shaft (9) turn and lift the mower.

B: Also to help the lift movement, a gas spring (1) is attached to the rear lift shaft.

Push the lift pedal (7), the front lift shaft turns clockwise. With this movement, rear lift shaft connected by the connecting links also turns. The mower attached to each shaft lifts up. This way you can lift the mower and adjust the cutting height to meet the ground undulation.

9Y1211198LIM0001US0

SERVICING

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- 1. TROUBLESHOOTING.....4-S1
- 2. TIGHTENING TORQUES.....4-S2
- 3. CHECKING, DISASSEMBLING AND SERVICING4-S3
 - [1] CHECKING AND ADJUSTING.....4-S3
 - [2] DISASSEMBLING AND ASSEMBLING4-S3
 - (1) Removing Link Shafts.....4-S3

1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Mower Does Not Lift	1. Mower linkage, gas spring, or lift springs damaged.	Replace	4-S3
Mower Does Not Lower	1. Mower linkage damaged	Repair or replace	4-S3

9Y1211198LIS0001US0

2. TIGHTENING TORQUES

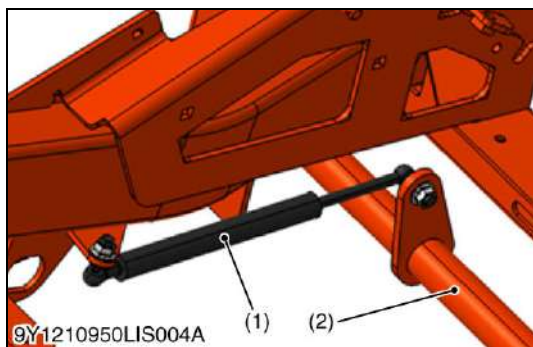
Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-10.)

Item	N·m	kgf·m	lbf·ft
Flange nut (Bushing plate)	48.0 to 60.0	4.90 to 6.11	35.4 to 41.2
Bolt (Lift link)	77.4 to 90.2	7.90 to 9.19	57.1 to 66.5
Flange nut (Cam)	39.3 to 45.1	1.4 to 4.59	29.0 to 33.2
Flange nut (Gas spring)	23.5 to 27.4	2.40 to 2.79	17.4 to 20.2

9Y1211198LIS0002US0

3. CHECKING, DISASSEMBLING AND SERVICING

[1] CHECKING AND ADJUSTING



Checking Gas Spring

1. Remove the mower.
2. Check the gas spring rod for damage or deformation. If damage is found, replace it.
3. Check the operation of the gas spring (1) by pushing the lift pedal. If the spring force is not enough, replace it.

(Reference)

- If the inner high-pressure gas leaks, the rod's pushing force becomes zero.

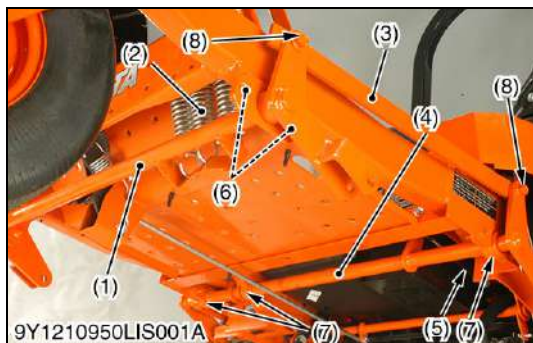
(1) Gas Spring

(2) Rear Lift Shaft

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[2] DISASSEMBLING AND ASSEMBLING

[1] Removing Link Shafts



Removing the Mower

1. Remove the mower.

9Y1211198LIS0004US0

Removing Link Shafts

1. Remove the lift springs (2).
2. Remove the gas spring (5).
3. Remove the R.H. and L.H. lift links (3).
4. Remove the front lift shaft (1).
5. Remove the rear lift shaft (4).
6. Replace the bushings (7) if there are signs of wear.

(When reassembling)

- Install the gas spring with the rod to front side.
- Tighten the flange nuts (6) for front lift shaft to the specified torque.

Tightening torque	Flange nut (Bushing plate)	48.0 to 60.0 N·m 4.80 to 5.70 kgf·m 35.5 to 41.2 lbf·ft
	Bolt (Lift link)	77.4 to 90.2 N·m 7.80 to 9.20 kgf·m 57.2 to 66.5 lbf·ft
	Flange nut (Gas spring)	23.5 to 27.4 N·m 2.40 to 2.79 kgf·m 17.4 to 20.2 lbf·ft

(1) Front Lift Shaft

(2) Lift Spring

(3) Lift Link

(4) Rear Lift Shaft

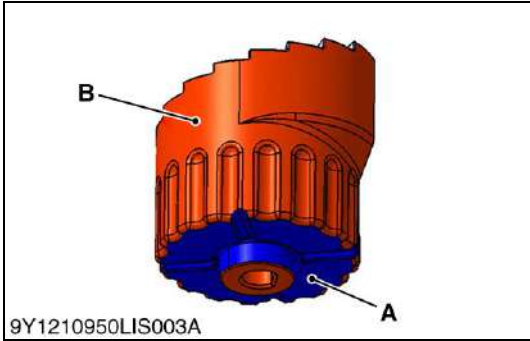
(5) Gas Spring

(6) Flange Nut (Bushing Plate)

(7) Bushing

(8) Bolt (Lift Link)

9Y1211198LIS0005US0



Removing Cam

- Fender is not shown.
1. Lower the mower deck.
 2. Remove the flange nut (3) from the cam rod.
 3. Lift the mower and lock to release the load on the cam.
 4. Remove the cam dial and cam rod (1).
 5. Remove the cam (2).

(When reassembling)

- Fill completely grease to the area "A" and 4 grooves to prevent rust.
- Do not apply grease to the side "B" of cam for correct cam dial force.
- Tighten the flange nut to the specified torque.

Tightening torque	Flange nut (cam)	39.3 to 45.1 N·m 4.01 to 4.59 kgf·m 29.0 to 33.2 lbf·ft
-------------------	------------------	---

- (1) Cam Rod (3) Flange Nut
(2) Cam

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5 ELECTRICAL SYSTEM

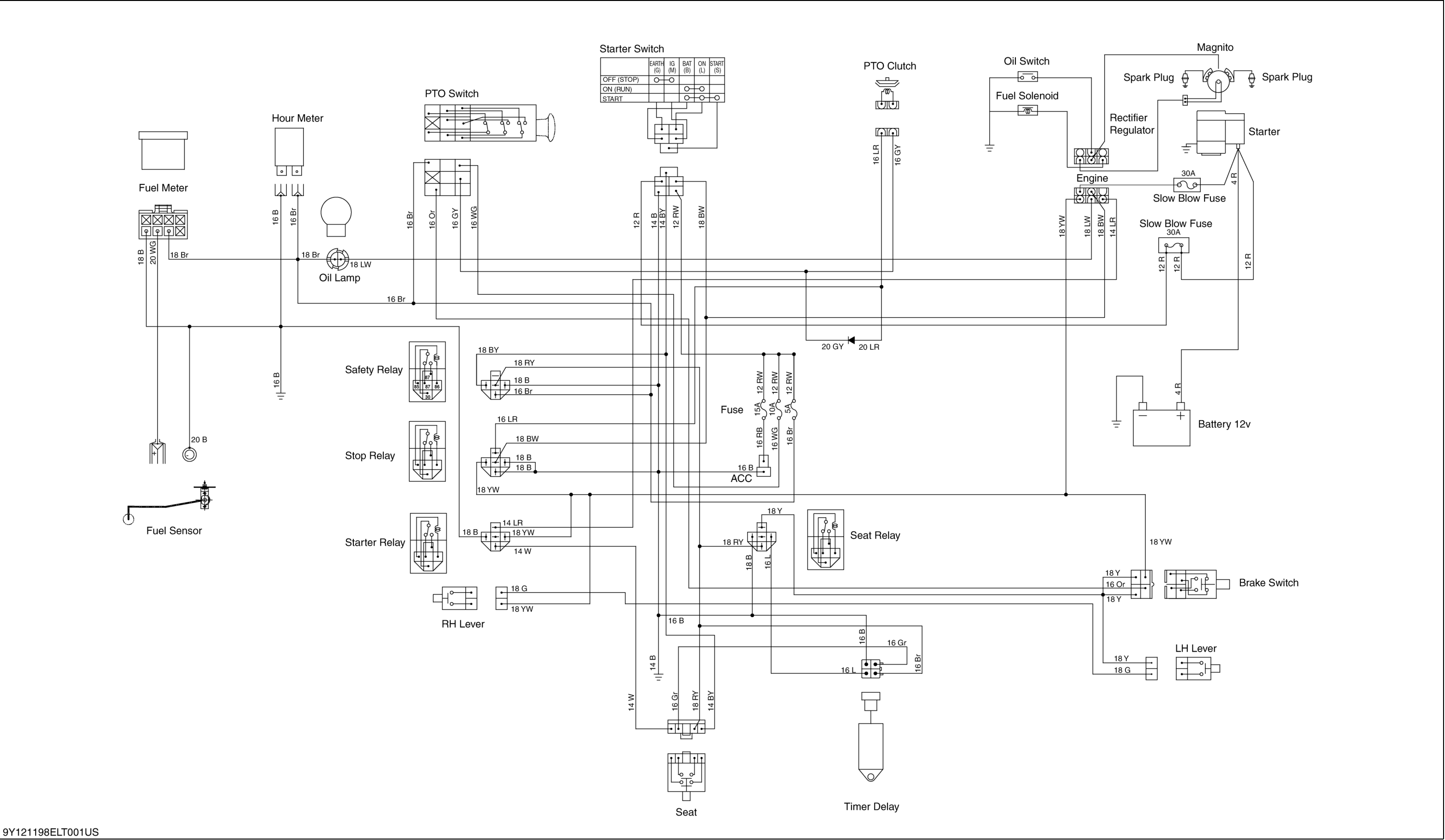
MECHANISM

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2. START SYSTEM AND OPC.....	5-M3
[1] START SYSTEM.....	5-M3
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1. WIRING DIAGRAM

[1] Z724XKW, Z726XKW



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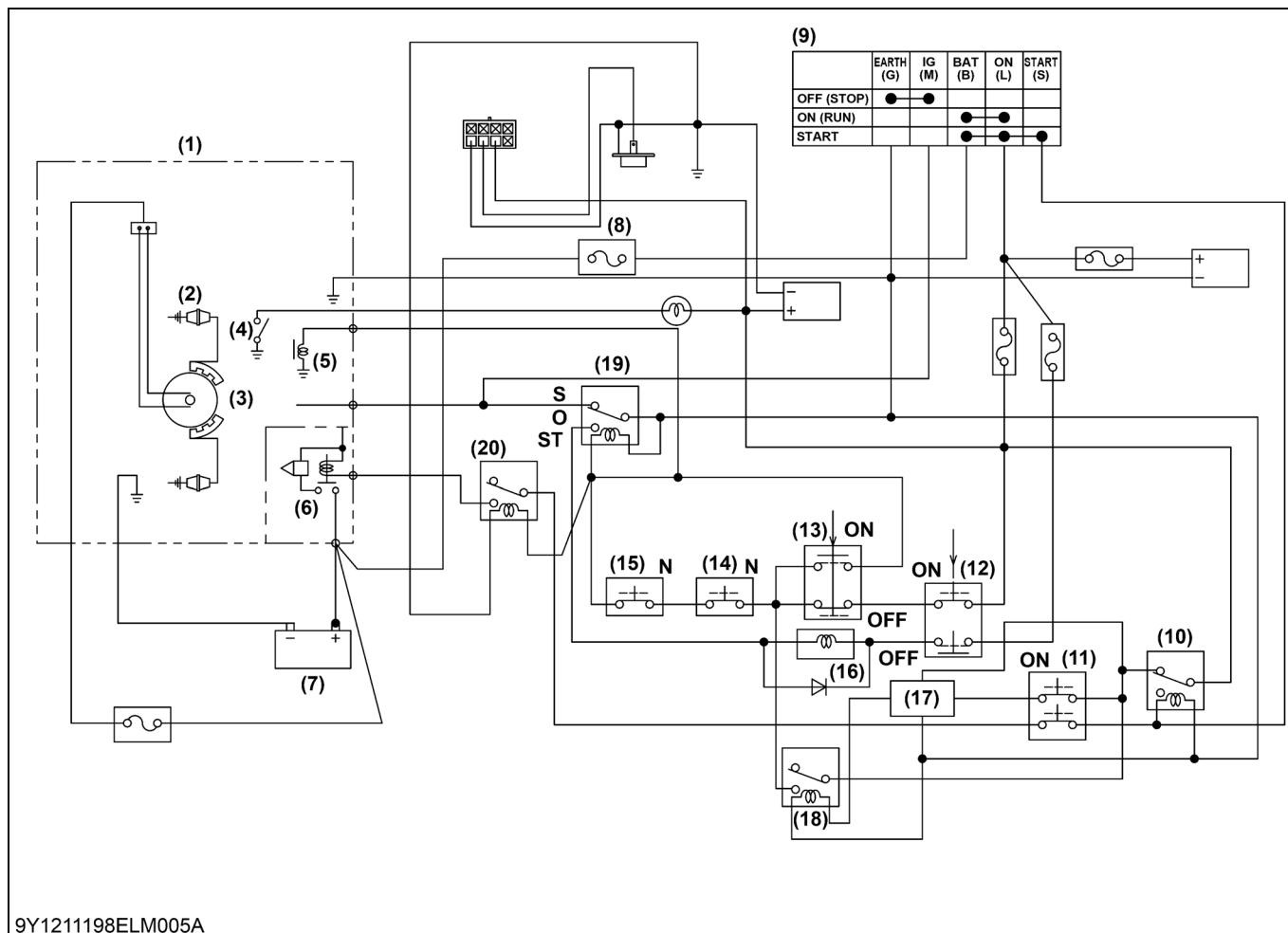
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2. START SYSTEM AND OPC

[1] START SYSTEM

(1) Z724XKW, Z726XKW



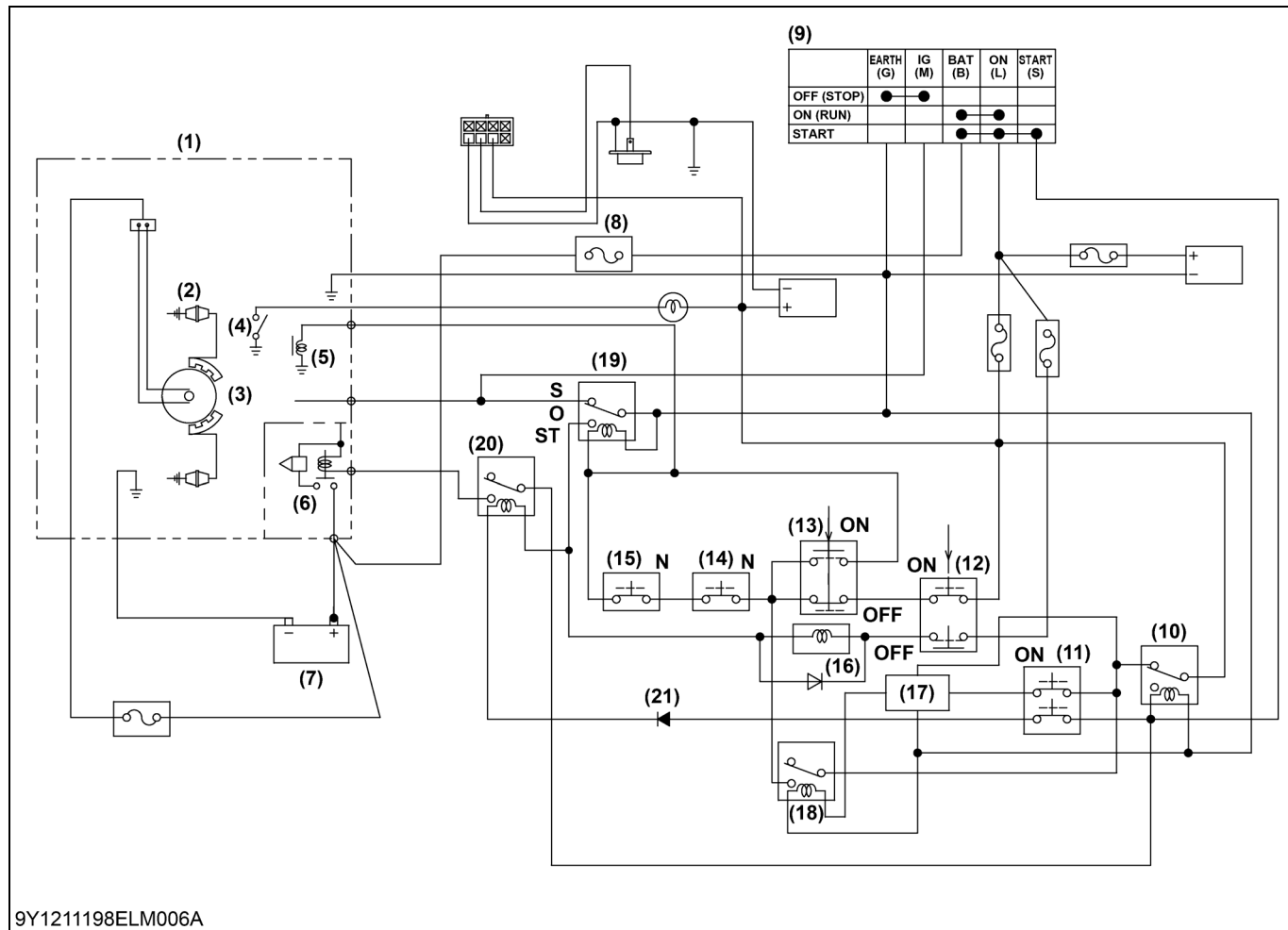
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- | | | | |
|----------------------------------|---|---|-------------------|
| (1) Engine | (9) Main Switch | (15) Motion Control Lever Switch (R.H.) | S: Stop |
| (2) Spark Plug | (10) Safety Relay | (16) PTO Clutch | O: Operate |
| (3) Ignition Coil | (11) Seat Switch | (17) Unit | ST: Start |
| (4) Oil Switch | (12) PTO Switch | (18) Seat Relay | N: Neutral |
| (5) Fuel Solenoid | (13) Brake Switch | (19) Stop Relay | OFF: OFF |
| (6) Starter and Starter Solenoid | (14) Motion Control Lever Switch (L.H.) | (20) Starter Relay | ON: ON |
| (7) Battery | | | |
| (8) Slow Blow Fuse | | | |

To start the engine, current must flow from battery (7) to starter (6).

1. With the main switch (9) **ON**, current flows from the battery to main switch.
2. If the PTO switch (12), brake switch (13), motion control lever switch (L.H.) (14), motion control lever switch (R.H.) (15) are in contact, current flows to the stop relay (19) and the starter relay (20) to turn **O**, **ST**.
3. The current also goes to the fuel solenoid (5) to supply fuel.
4. With the main switch (9) **START** and seat switch **ON**, current flows from the main switch "S" (9) to the starter relay (20) to operate the starter (6).
5. The spark plugs (2) make ignition spark.
Then the engine can start.

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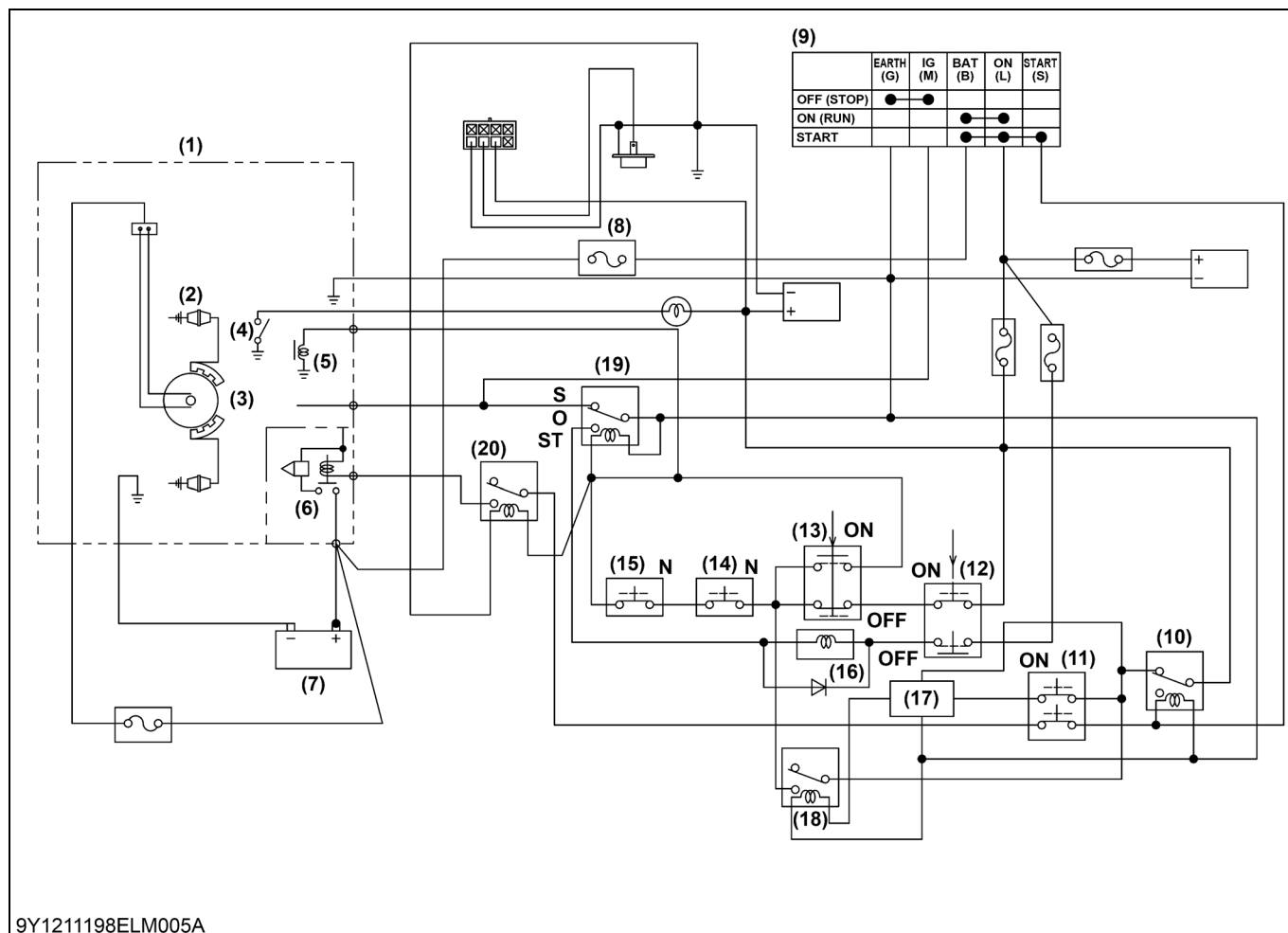
(2) Z724XKW-2, Z726XKW-2 (Serial Number 50001 and Higher)

- | | | | |
|----------------------------------|---|---|-------------------|
| (1) Engine | (9) Main Switch | (15) Motion Control Lever Switch (R.H.) | S: Stop |
| (2) Spark Plug | (10) Safety Relay | (16) PTO Clutch | O: Operate |
| (3) Ignition Coil | (11) Seat Switch | (17) OPC Timer | ST: Start |
| (4) Oil Switch | (12) PTO Switch | (18) Seat Relay | N: Neutral |
| (5) Fuel Solenoid | (13) Brake Switch | (19) Stop Relay | OFF: OFF |
| (6) Starter and Starter Solenoid | (14) Motion Control Lever Switch (L.H.) | (20) Starter Relay | ON: ON |
| (7) Battery | | (21) Diode | |
| (8) Slow Blow Fuse | | | |

9Y1211198ELM0013US0

[2] OPERATOR'S PRESENCE CONTROL

(1) Z724XKW, Z726XKW



- | | | | |
|----------------------------------|---|---|-------------------|
| (1) Engine | (9) Main Switch | (15) Motion Control Lever Switch (R.H.) | S: Stop |
| (2) Spark Plug | (10) Safety Relay | (16) PTO Clutch | O: Operate |
| (3) Ignition Coil | (11) Seat Switch | (17) Unit | ST: Start |
| (4) Oil Switch | (12) PTO Switch | (18) Seat Relay | N: Neutral |
| (5) Fuel Solenoid | (13) Brake Switch | (19) Stop Relay | OFF: OFF |
| (6) Starter and Starter Solenoid | (14) Motion Control Lever Switch (L.H.) | (20) Starter Relay | ON: ON |
| (7) Battery | | | |
| (8) Slow Blow Fuse | | | |

Operation

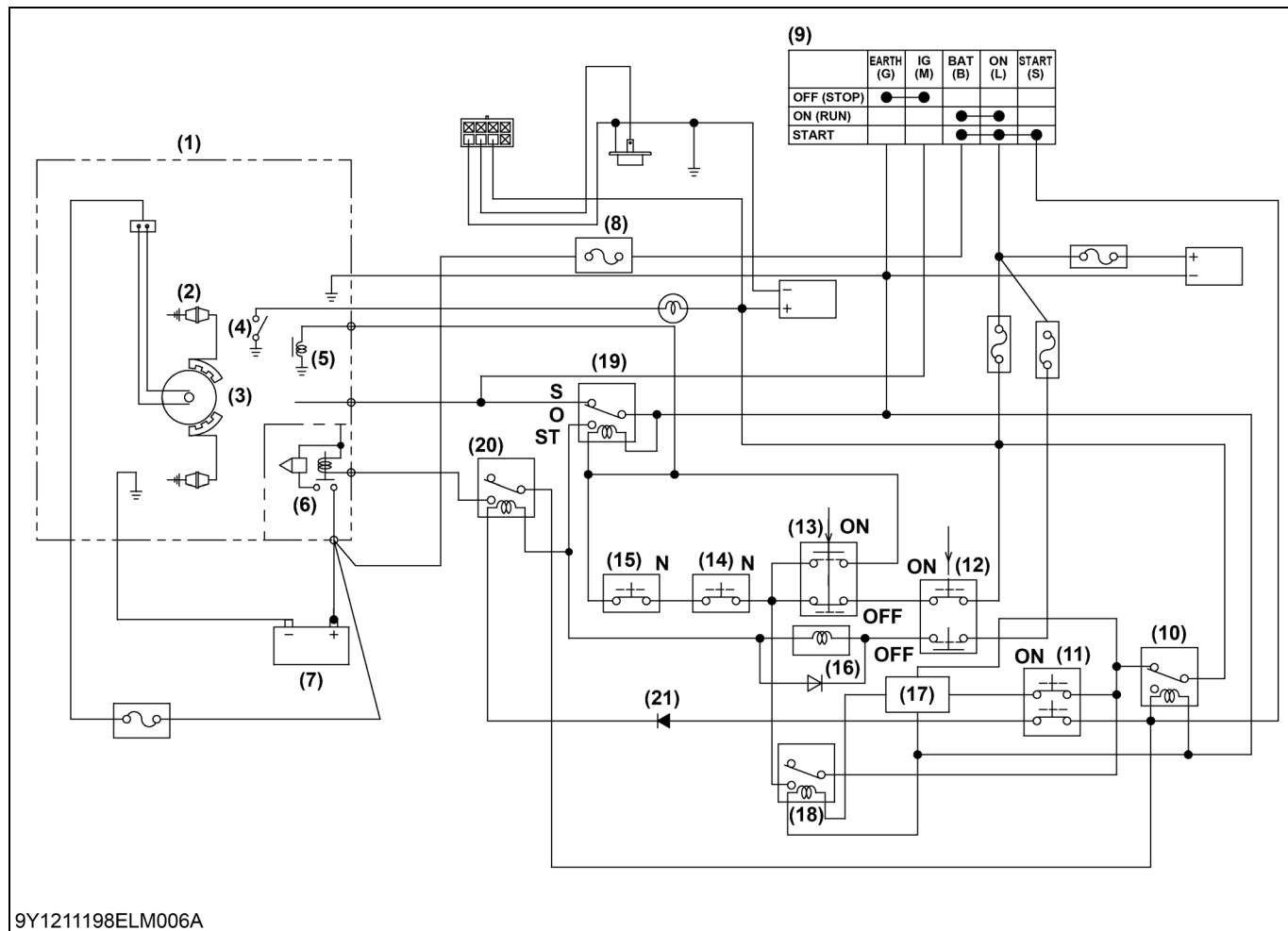
When the engine is in operation, current flows to the fuel solenoid (5). During the operation, if you stand up from the seat with the parking brake disengaged, the engine stops.

(Example)

Refer to 5-M8.

- Current flows from the battery (7) to main switch (9).
- Then current flows from main switch "L" to the safety relay (10), seat switch (11), unit (17), seat relay (18), brake switch (13) and to fuel solenoid (5).
- If you stand up, the seat switch turns "OFF" and the fuel solenoid (5) stops fuel.
- The engine will stop.

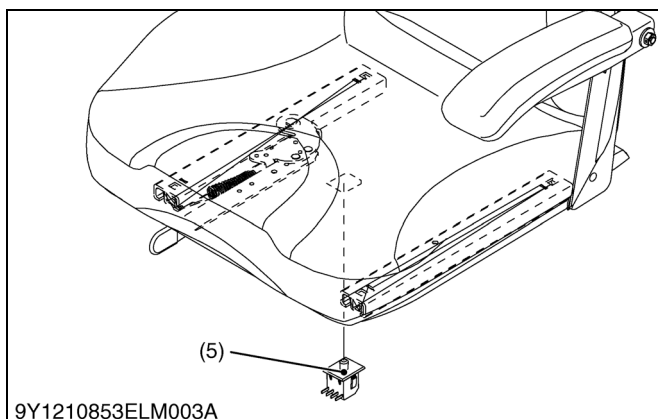
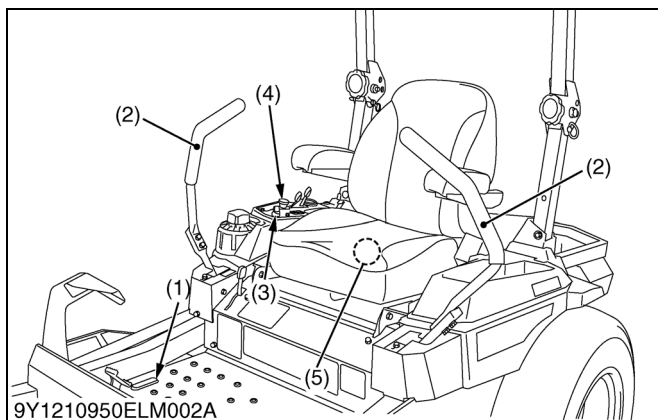
9Y1211198ELM0003US0

(2) Z724XKW-2, Z726XKW-2 (Serial Number 50001 and Higher)

- | | | | |
|----------------------------------|---|---|-------------------|
| (1) Engine | (9) Main Switch | (15) Motion Control Lever Switch (R.H.) | S: Stop |
| (2) Spark Plug | (10) Safety Relay | (16) PTO Clutch | O: Operate |
| (3) Ignition Coil | (11) Seat Switch | (17) OPC Timer | ST: Start |
| (4) Oil Switch | (12) PTO Switch | (18) Seat Relay | N: Neutral |
| (5) Fuel Solenoid | (13) Brake Switch | (19) Stop Relay | OFF: OFF |
| (6) Starter and Starter Solenoid | (14) Motion Control Lever Switch (L.H.) | (20) Starter Relay | ON: ON |
| (7) Battery | | (21) Diode | |
| (8) Slow Blow Fuse | | | |

9Y1211198ELM0014US0

[3] SAFETY SWITCHES



Safety switches are:

- Seat switch (5)
- PTO switch (4)
- Parking brake switch (6) near the transaxle R.H.,
- Motion control lever switch (7) (L.H.), (R.H.)

Function of switch is to control current from main switch to relay.

Switches change to **"CLOSE"** or **"OPEN"** electrically by changing the motion control levers, or sitting on the operator's seat or engaging the parking brake.

PTO switch has 2 functions:

- to turn on the PTO clutch. (**"PULL"**)
- to start the engine. (**"PUSH"**)

By selecting either normally open or normally closed contact, the switch function is determined.

Safety switch	Type
Seat switch	Normally open
PTO switch	Normally open, normally close
Parking brake switch	Normally close
Motion control lever (L.H.) switch	Normally open
Motion control lever (R.H.) switch	Normally open

- (1) Parking Brake Pedal
(2) Motion Control Lever
(3) Main Switch
(4) PTO Switch

- (5) Seat Switch
(6) Parking Brake Switch
(7) Motion Control Lever Switch (R.H.)

9Y1211198ELM0004US0

(1) Engine Start Condition

Engine starts in only 1 case below.

Seat	On the seat								Absent							
PTO	Engaged				Disengaged				Engaged				Disengaged			
Brake	Engaged		Disengaged		Engaged		Disengaged		Engaged		Disengaged		Engaged		Disengaged	
HST Neutral	○	X	○	X	○	X	○	X	○	X	○	X	○	X	○	X
Engine	–	–	–	–	Start	–	–	–	–	–	–	–	–	–	–	–

○: Neutral lock, X: Not neutral

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(2) Engine Stop Condition: Operator Presence Control

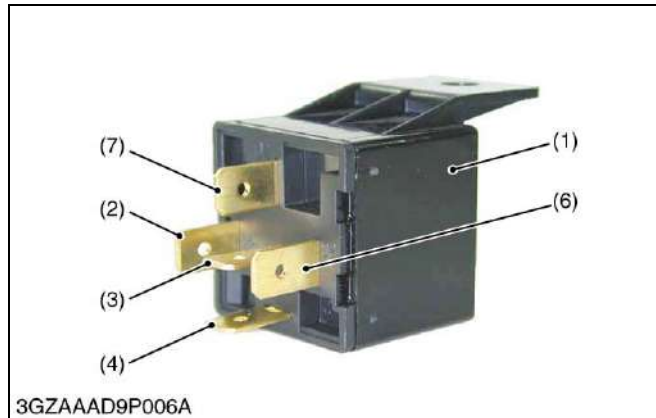
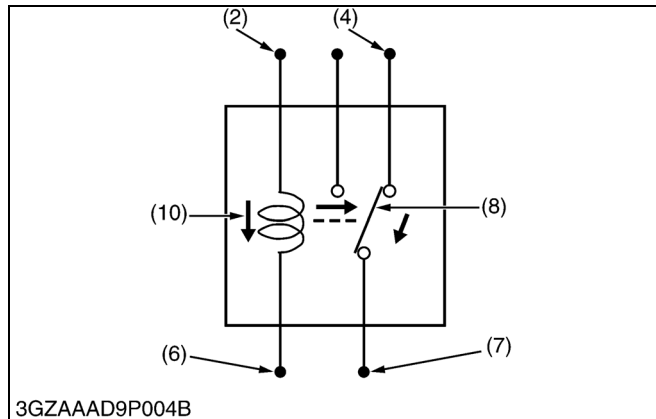
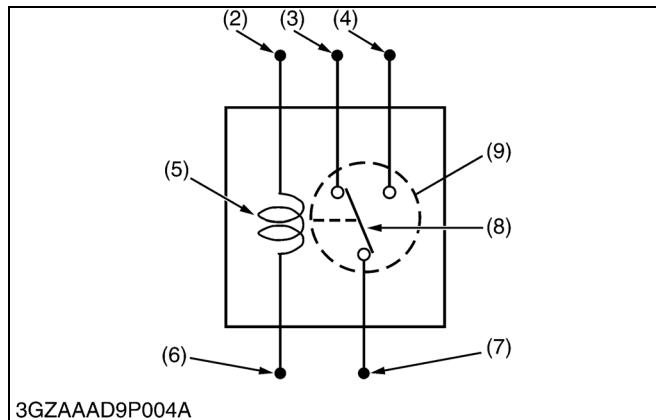
Engine stops in 2 cases while an operator is on the seat. Also 7 cases while an operator stands up.

Seat	On the seat								Stand up							
PTO	Engaged				Disengaged				Engaged				Disengaged			
Brake	Engaged		Disengaged		Engaged		Disengaged		Engaged		Disengaged		Engaged		Disengaged	
HST Neutral	○	X	○	X	○	X	○	X	○	X	○	X	○	X	○	X
Engine	Op- erate	Stop	Op- erate	Op- erate	Op- erate	Stop	Op- erate	Op- erate	Stop	Stop	Stop	Stop	Op- erate	Stop	Stop*	Stop

○: Neutral lock, X: Not neutral, *: Example position. See page 5-M5.

9Y1211198ELM0006US0

[4] RELAY



Relay

Relay (1) basically consists of relay winding (5) and mechanical contact points (9).

Current flowing from switch to relay winding (5) cause **"ON (Close)"** or **"OFF (Open)"** of mechanical contact points (9).

When current is applied to the winding (energized) (10), a magnetic field pushes the contact lever (8) and normally open terminal is connected.

Function of relay (1) is:

- to control current in the circuit from distant place (switch location place).
- to control large current by small current.

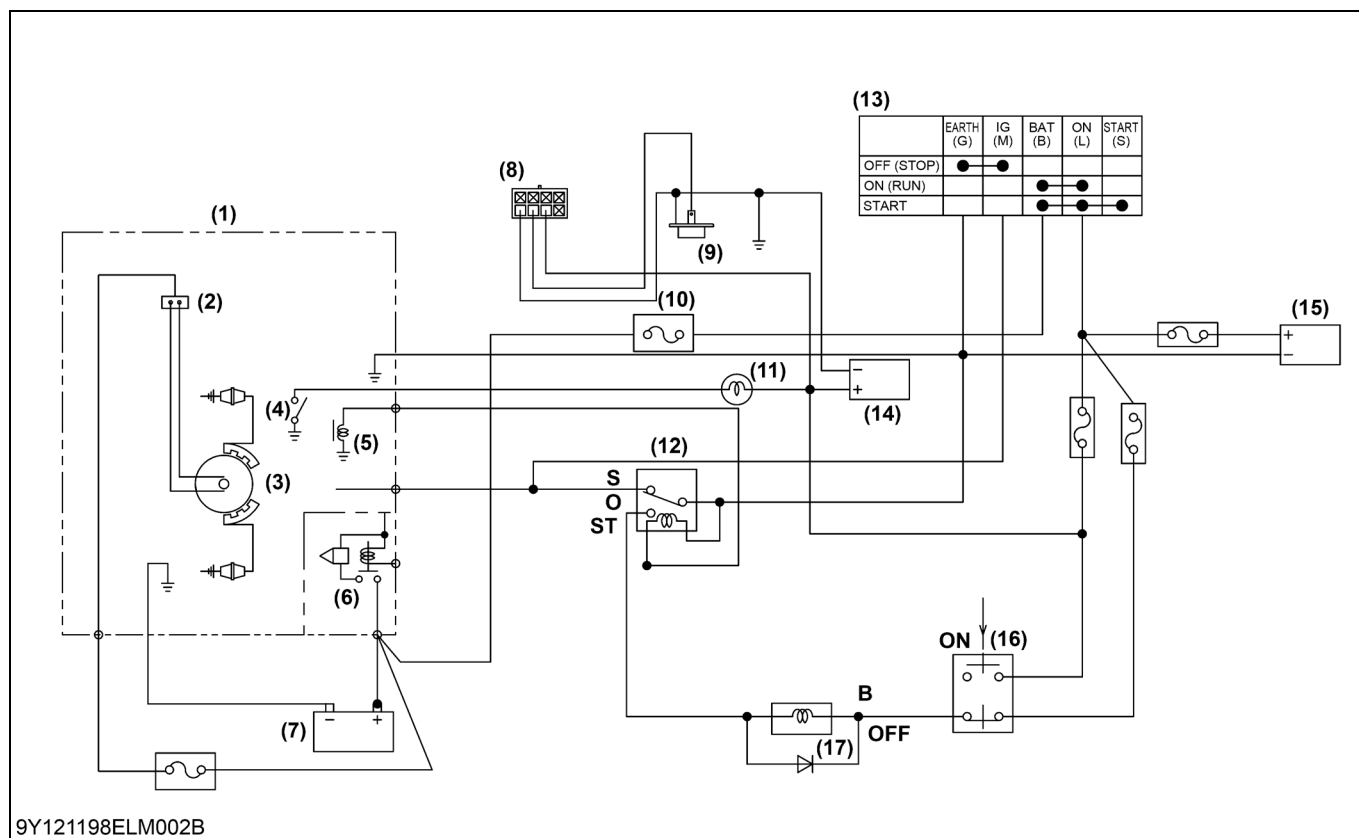
In this machine:

- Relay 1: Relay to start engine (starter relay)
- Relay 2: Relay to stop engine (solenoid relay)

- | | |
|------------------------|-------------------------------|
| (1) Relay | (6) Terminal 86 |
| (2) Terminal 85 | (7) Terminal 30 |
| (3) Terminal 87 | (8) Contact Lever |
| (4) Terminal 87 | (9) Mechanical Contact Points |
| (5) Relay Winding | (10) Winding (Energized) |

9Y1211198ELM0007US0

3. CHARGING SYSTEM, HOUR METER, FUEL GAUGE AND PTO CLUTCH



- | | |
|---------------------|-----------------------|
| (1) Engine | (7) Battery |
| (2) Regulator | (8) Fuel Gauge |
| (3) Flywheel-Stator | (9) Fuel Level Sensor |
| (4) Oil Switch | (10) Slow Blow Fuse |
| (5) Fuel Solenoid | (11) Oil Lamp |
| (6) Starter | (12) Stop Relay |

- | |
|------------------|
| (13) Main Switch |
| (14) Hour Meter |
| (15) Outlet |
| (16) PTO Switch |
| (17) PTO Clutch |

ON: ON
OFF: OFF
S: Stop
O: Operate
ST: Start

The charging system supplies electric power for hour meter (14), fuel gauge (8) and PTO clutch (17).

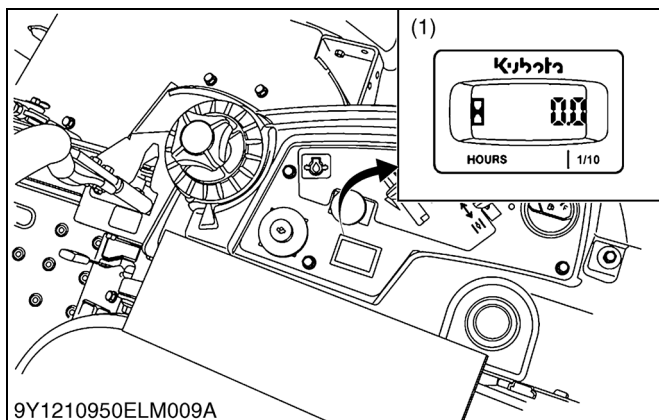
The system also charges the battery (7) while the engine operates.

The system consists of a stator, alternator magnets in the flywheel and a regulator (2).

For ignition system, refer to the Kohler manual.

9Y1211198ELM0008US0

[1] ELECTRICAL EQUIPMENTS



Hour Meter

The hour meter (1) gives readings for the number of hours the engine has been operating. For this, the hour meter is connected to the oil switch.

(1) Hour Meter

9Y1211198ELM0009US0



PTO Electric Clutch

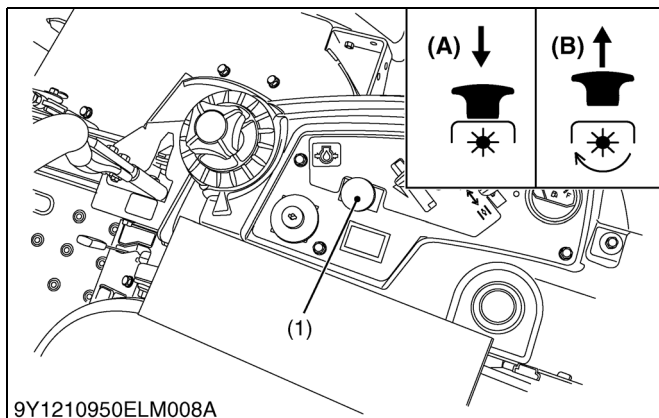
The PTO electric clutch (1) serves two functions in the operation of the mower.

- To start and stop the power flow to the cutter blades,
- As a brake to assist in stopping blade rotation when the PTO turns off or the operator presence control is interrupted.

Made by Warner Electric.

(1) PTO Electric Clutch

9Y1211198ELM0010US0



PTO Switch

To engage the PTO, pull the PTO switch (1) to the "ENGAGED" (ON) position.

If you get off the seat while the PTO is operating, the engine will stop automatically. (Operator presence control)

Before starting the engine, push the PTO switch to the "DISENGAGED" (OFF) position. If it is at the "ENGAGED" (ON) position, the engine will not start.

NOTE

- These interlock features are built-in.

(1) PTO Switch (A) OFF
"ENGAGED" (ON) (B) ON
"DISENGAGED" (OFF)

9Y1211198ELM0011US0

SERVICING

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 - (7) Fuel Gauge.....5-S16
 - (8) OPC Timer.....5-S17

1. TROUBLESHOOTING

For alternator and starter, refer to Z724XKW, Z726XKW, Z724XKW-2, Z726XKW-2, KAWASAKI ENGINE SERVICE MANUAL.

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
All Electrical Equipment Do Not Operate	1. Battery discharged or damaged	Recharge or replace	G-31, G-32, 5-S5
	2. Battery positive cable disconnected or improperly connected	Repair or replace	1-S5
	3. Battery negative cable disconnected or improperly connected	Repair or replace	1-S5
	4. Slow blow fuse blown	Replace	G-45
Fuse Blown Frequently	1. Short-circuited	Repair or replace	G-45

BATTERY

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Battery Discharges Too Quickly	1. Battery damaged	Replace	G-31, 5-S5
	2. Alternator damaged	Replace	KAWASAKI MANUAL
	3. Regulator damaged	Replace	KAWASAKI MANUAL
	4. Wiring harness disconnected or improperly connected (between battery positive terminal and regulator B terminal)	Repair or replace	—

STARTING SYSTEM

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Starter Motor Does Not Operate	1. Battery discharged or damaged	Recharge or replace	G-31, G-32, 5-S5
	2. Slow blow fuse blown	Replace	G-45
	3. Safety switch damaged	Test and replace	G-23, 5-S8 to 5-S12
	4. Wiring harness disconnected or improperly connected (between main switch terminal 5 and safety switches, between safety switches and starter motor, between battery positive terminal and starter motor)	Repair or replace	–
	5. Starter motor damaged	Repair or replace	KAWASAKI MANUAL
	6. Main switch damaged	Replace	5-S6
Engine Does Not Stop When Main Switch Is Turned OFF	1. Fuse blown (10 A)	Replace	G-45
	2. Wiring harness disconnected or improperly connected (between main switch terminal 4 and engine stop solenoid)	Repair or replace	–
	3. Fuel cut off solenoid damaged	Replace	KAWASAKI MANUAL
	4. Main switch, relay damaged	Replace	5-S6, 5-S15
Engine Does Not Start	1. Fuel cut off solenoid damaged	Replace	KAWASAKI MANUAL
	2. Main switch, relay damaged	Check and replace	5-S6, 5-S15

PTO CLUTCH

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Power Loss (PTO Belt Tension Weak)	1. Weak or broken PTO tension spring	Replace	6-S10
Power Loss (PTO Belt Tension Normal)	1. Worn or damaged PTO belt	Replace	G-47, 6-S10
Noise from PTO System	1. Worn tension pulley bearing	Replace	6-S14
	2. Worn or damaged PTO belt	Repair or replace	G-47, 6-S10
Blade Does Not Turn	1. Clearance too big	Adjust	G-41

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Blade Does Not Turn (PTO Clutch Clearance Proper)	1. Wiring harness disconnected or improperly connected	Repair or replace	—
	2. Broken electric PTO Clutch	Repair or replace	G-41, 1-S6, 5-S13
	3. Broken PTO switch	Repair or replace	5-S10

GAUGE

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Fuel Gauges Does Not Operate	1. Fuel gauge damaged	Replace	5-S16
	2. Fuel level sensor damaged	Replace	5-S16
	3. Wiring harness disconnected or improperly connected (between fuel gauge and fuel level sensor)	Repair or replace	5-M10

9Y1211198ELS0001US0

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Battery	Voltage	More than 12 V	—
	Potential Difference	Less than 0.1 V	—

PTO CLUTCH

Item		Factory Specification	Allowable Limit
Electric PTO Clutch	Resistance	1.74 to 1.94 Ω	—
	Clearance "A"	0.25 to 2.5 mm 0.010 to 0.10 in.	—

9Y1211198ELS0002US0

3. CHECKING, DISASSEMBLING AND SERVICING



WARNING

- To avoid accidental short circuit, be sure to attach the positive cable to the positive terminal before the negative cable is attached to the negative terminal.
- Never remove the battery cap while the engine is operating.
- Keep electrolyte away from eyes, hands and clothes. If you are splattered with it, wash it away completely with water immediately.
- Keep open sparks and flames away from the battery at all times. Hydrogen gas mixed with oxygen becomes very explosive.

IMPORTANT

- If the machine is to be operated for a short time without battery (using a slave battery for starting), use additional current (lights) while engine is operating and insulate terminal of battery. If this advice is disregarded, damage to alternator and regulator may result.

9Y1211198ELS0003US0

[1] CHECKING

(1) Battery



9Y1210950ENS001B

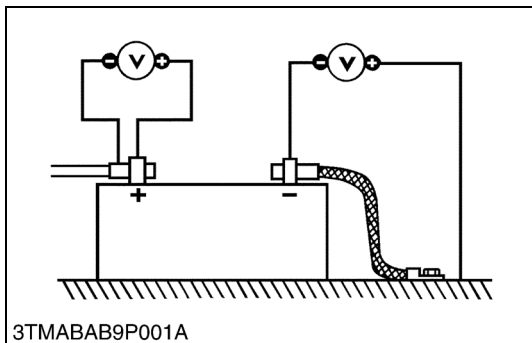
Battery Voltage

1. Stop the engine and turn the main switch off.
2. Connect the COM (–) lead of the voltmeter to the battery's negative terminal post and the (+) lead to the positive terminal post, and measure the battery voltage.
3. If the battery voltage is less than the factory specification, check the battery specific gravity and recharge the battery.

Battery voltage	Factory specification	More than 12 V
-----------------	-----------------------	----------------

(1) Battery

9Y1211198ELS0004US0



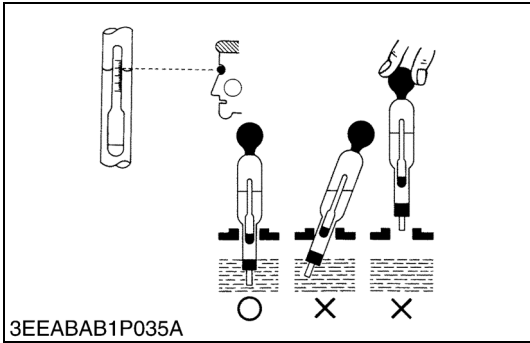
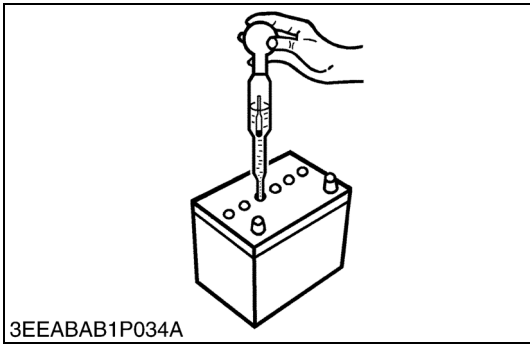
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Battery Terminal Connection

1. Turn the main switch on, and turn on the head light.
2. Measure the voltage with a voltmeter across the battery's positive terminal post and the cable terminal, and the voltage across the battery's negative terminal post and the chassis.
3. If the measurement exceeds the factory specification, clean the battery terminal posts and cable clamps, and tighten them firmly.

Potential difference	Factory specification	Less than 0.1 V
----------------------	-----------------------	-----------------

9Y1211198ELS0005US0



Battery Specific Gravity

1. Check the specific gravity of the electrolyte in each cell with a hydrometer.
2. When the electrolyte temperature differs from that at which the hydrometer was calibrated, correct the specific gravity reading following the formula mentioned in **(Reference)**.
3. If the specific gravity is less than 1.215 (after it is corrected for temperature), charge or replace the battery.
4. If the specific gravity differs between any two cells by more than 0.05, replace the battery.

■ **NOTE**

- **Hold the hydrometer tube vertical without removing it from the electrolyte.**
- **Do not suck too much electrolyte into the tube.**
- **Allow the float to move freely and hold the hydrometer at eye level.**
- **The hydrometer reading must be taken at the highest electrolyte level.**

Reference)

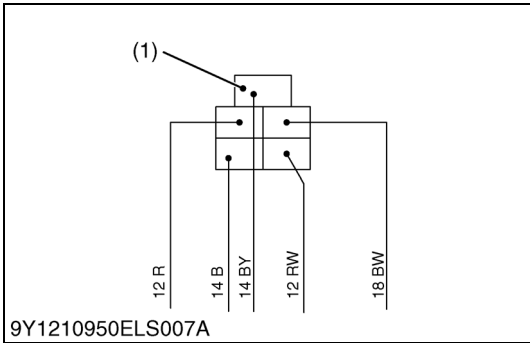
- Specific gravity slightly varies with temperature. To be exact, the specific gravity decreases by 0.0007 with an increase of 1 °C (0.0004 with an increase of 1 °F) in temperature, and increases by 0.0007 with a decreases of 1 °C (0.0004 with a decrease of 1 °F).
Therefore, using 20 °C (68 °F) as a reference, the specific gravity reading must be corrected by the following formula:
 - Specific gravity at 20 °C = Measured value + 0.0007 × (electrolyte temperature –20 °C)
 - Specific gravity at 68 °F = Measured value + 0.0004 × (electrolyte temperature –68 °F)

Specific Gravity	State of Charge
1.260 Up. Gr.	100 % Charged
1.230 Up. Gr.	75 % Charged
1.200 Up. Gr.	50 % Charged
1.170 Up. Gr.	25 % Charged
1.140 Up. Gr.	Very Little Useful Capacity
1.110 Up. Gr.	Discharged

At an electrolyte temperature of 20 °C (68 °F)

9Y1211198ELS0006US0

(2) Main Switch



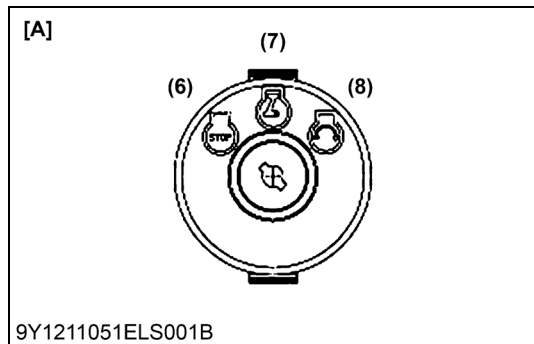
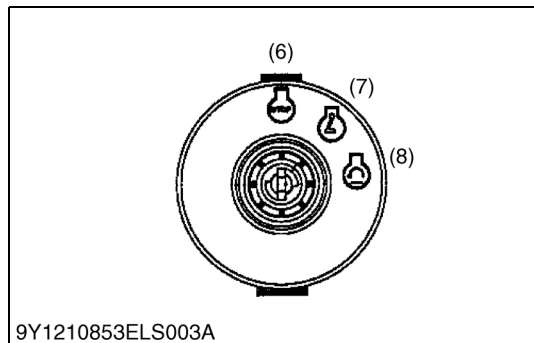
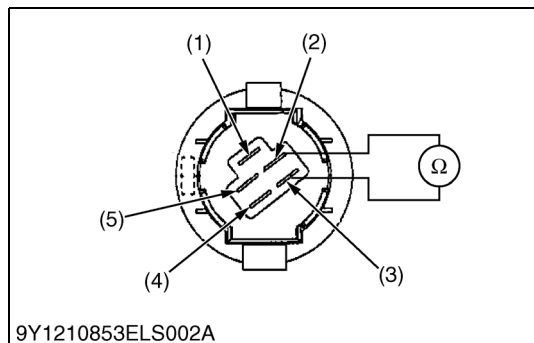
Connector Voltage

1. Turn the main switch off.
2. Disconnect the **5P** connector (1) from the main switch.
3. Measure the voltage with a voltmeter across the connector **R** terminal and chassis.
4. If the voltage differs from battery voltage, the wiring harness is damaged.

Voltage	R terminal – Chassis	Battery voltage
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(1) **5P** Connector

9Y1211198ELS0007US0



Terminal Continuity

1. Remove the main switch from the instrument panel.
2. Measure the resistance with an ohmmeter across terminals when the main switch is set at "OFF", "ON" and "START" position.
3. If the resistance values specified below are not indicated, the main switch is damaged.

1) Main switch is set at "OFF" position

	GND terminal	IGN terminal	B terminal	ON terminal	ST terminal
GND terminal	–	●	Infinity	Infinity	Infinity
IGN terminal	●	–	Infinity	Infinity	Infinity
B terminal	Infinity	Infinity	–	Infinity	Infinity
ON terminal	Infinity	Infinity	Infinity	–	Infinity
ST terminal	Infinity	Infinity	Infinity	Infinity	–

●: Continuity

2) Main switch is set at "ON" position

	GND terminal	IGN terminal	B terminal	ON terminal	ST terminal
GND terminal	–	Infinity	Infinity	Infinity	Infinity
IGN terminal	Infinity	–	Infinity	Infinity	Infinity
B terminal	Infinity	Infinity	–	●	Infinity
ON terminal	Infinity	Infinity	●	–	Infinity
ST terminal	Infinity	Infinity	Infinity	Infinity	–

●: Continuity

3) Main switch is set at "START" position

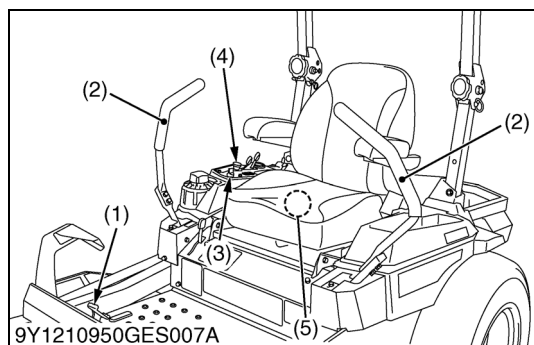
	GND terminal	IGN terminal	B terminal	ON terminal	ST terminal
GND terminal	–	Infinity	Infinity	Infinity	Infinity
IGN terminal	Infinity	–	Infinity	Infinity	Infinity
B terminal	Infinity	Infinity	–	●	●
ON terminal	Infinity	Infinity	●	–	●
ST terminal	Infinity	Infinity	●	●	–

●: Continuity

- (1) Start
- (2) B Terminal
- (3) Ground
- (4) ON Terminal
- (5) IGN (Start) Terminal
- (6) OFF
- (7) ON
- (8) Start

[A] Serial Number:
Z724XKW-2: 70001,
Z726XKW-2: 70001

(3) Safety Switches



Method of Inspecting Each Control

To find damaged switches, check the function of each safety switch one by one as shown in the table below.

(Reference)

- Type of Safety Switch
 - Parking Brake Switch: Normal Close
 - Motion Control Lever: Normal Open
 - PTO switch: Normal Open and Normal Close
 - Operator's Seat: Normal Open

- (1) Parking Brake Pedal
- (2) Motion Control Lever
- (3) Main Switch
- (4) PTO Switch
- (5) Seat Switch

9Y1211198ELS0009US0

How to Find Damaged Switches (If the Engine Starts in Combination 1 to 5)

Combination	State of set such as operation levers					Engine	Damaged switch		
	Motion control lever (L.H.)	Motion control lever (R.H.)	PTO switch	Parking brake	Operator's seat				
1	Parking position (Neutral lock)	Parking position (Neutral lock)	Off position	Engaged position	Leave the seat*	Start	Seat switch		
2				Disengaged Position			Parking brake switch		
3		Operating position*	On position*	Engaged position	On the seat		PTO switch		
4							Motion control lever switch (R.H.)		
5	Operating position*	Parking position	Off position				Motion control lever switch (L.H.)		

* In this part, the safety switch is a damaged.

9Y1211198ELS0010US0

How to read meaning from table above.

- If the engine starts in combination 1 to 5, one switch is damaged.
 - If the engine starts in combination 1 when leaving the seat, the seat safety switch is damaged.
 - If the engine starts with the parking brake released at combination 2, the parking brake safety switch is damaged.
 - If the engine starts in combination 3 when the PTO is **ON** position, the PTO switch is damaged.
 - If the engine starts in combinations 4 and 5 when the motion control lever is in the Operating position, the motion control lever safety switch is damaged.

9Y1211198ELS0011US0

Continuity Test

If the engine does not start in the normal start condition, plural switches can be damaged.

You cannot tell which switch is damaged.

Do continuity test to each switch from here.

9Y1211198ELS0012US0

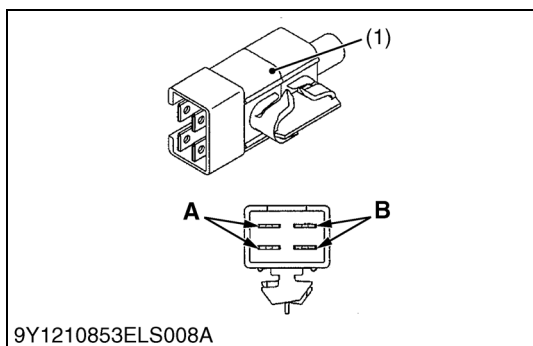
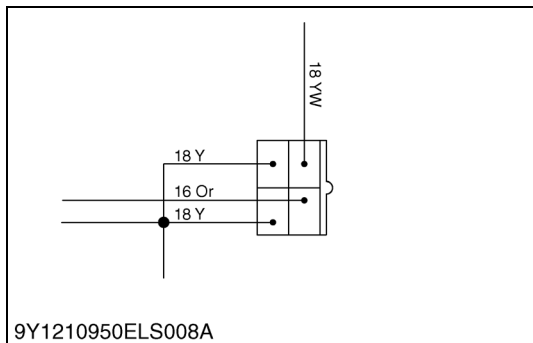


Motion Control Lever Switch Continuity

Resistance (Across switch terminal)	When switch push is pushed	0 Ω
	When switch push is released	Infinity

- (1) Motion Control Lever Switch

9Y1211198ELS0013US0



Parking Brake Switch Harness

1. Disconnect the connector from brake switch.
2. Turn the main switch **"ON"** and have a seat.
3. Measure the voltage across the terminal **Or** and chassis.
4. If the voltage differs from battery voltage, the wiring harness is damaged.

Y terminal – Chassis	Factory specification	Battery voltage
----------------------	-----------------------	-----------------

(1) Parking Brake Switch

9Y1211198ELS0014US0

Parking Brake Switch

1. Disconnect the connector from the brake switch.
2. Measure the resistance between the terminals.
3. If the resistance is out of the specification, the switch is damaged.

1) Brake switch is pushed "Brake Disengaged" position

Terminal	A	B
A	Infinity	–
B	–	●

●: Continuity

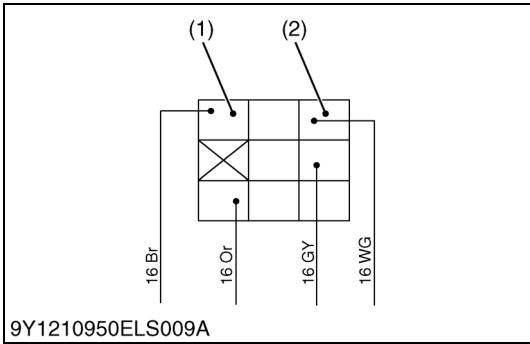
2) Brake switch is released "Brake Engaged" position

Terminal	A	B
A	●	–
B	–	Infinity

●: Continuity

(1) Parking Brake Switch

9Y1211198ELS0015US0



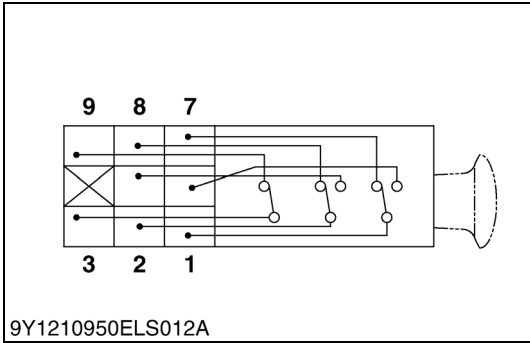
PTO Switch Harness

- 1. Disconnect the connector from PTO switch (3).
- 2. Turn the main switch **"ON"**.
- 3. Measure the voltage across the terminal (1) and chassis.
- 4. Measure the voltage across the terminal (2) and chassis.
- 5. If the voltage differs from battery voltage, the wiring harness is damaged.

Terminal – Chassis	Factory specification	Battery voltage
--------------------	-----------------------	-----------------

- (1) Terminal
- (2) Terminal
- (3) PTO Switch

9Y1211198ELS0016US0



PTO Switch Terminal Continuity

- 1. Remove the PTO switch from the instrument panel.
- 2. Measure the resistance with an ohmmeter across terminals when the PTO switch is set at **"OFF"** and **"ON"** position.
- 3. If the resistance values specified below are not indicated, the PTO switch is damaged.

1) PTO switch is at "ON" position

Terminal	7	9
C	●	–
3	–	Infinity

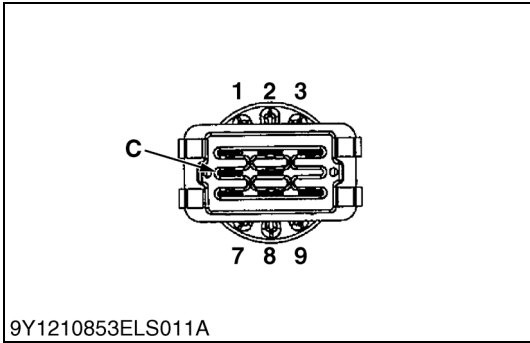
●: Continuity

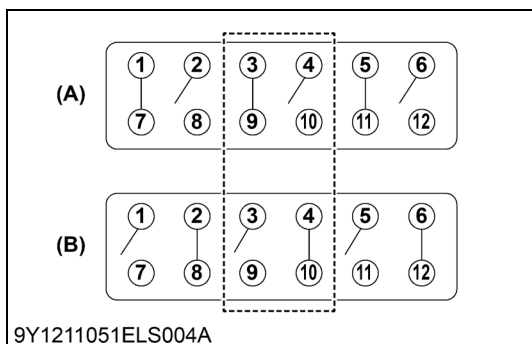
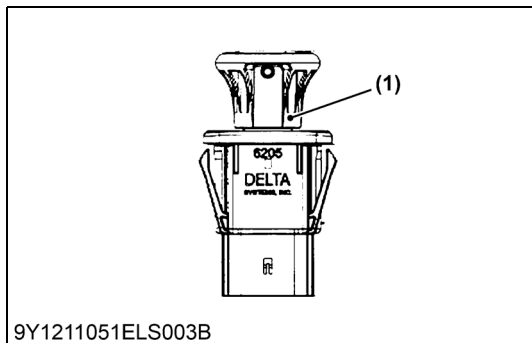
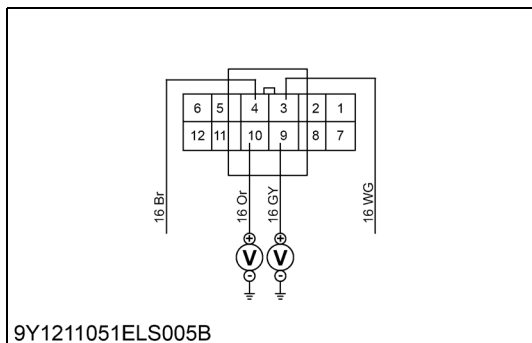
2) PTO switch is at "OFF" position

Terminal	7	9
C	Infinity	–
3	–	●

●: Continuity

9Y1211198ELS0017US0





PTO Switch Harness [Serial Number: Z724XKW-2: 70001, Z726XKW-2: 70001]

1. Disconnect the connector from PTO switch (1).
2. Turn the main switch **"ON"**.
3. Measure the voltage across the terminal **9** and chassis.
4. Measure the voltage across the terminal **10** and chassis.
5. If the voltage differs from battery voltage, the wiring harness is damaged.

Terminal – Chassis	Factory specification	Battery voltage
--------------------	-----------------------	-----------------

(1) PTO Switch

9Y1211198ELS0031US0

PTO Switch Terminal Continuity [Serial Number: Z724XKW-2: 70001, Z726XKW-2: 70001]

1. Remove the PTO switch from the instrument panel.
2. Measure the resistance with an ohmmeter across terminals when the PTO switch is set at **"OFF"** and **"ON"** position.
3. If the resistance values specified below are not indicated, the PTO switch is damaged.

1) PTO switch is at "ON" position

Terminal	9	10
3	●	–
4	–	Infinity

●: Continuity

2) PTO switch is at "OFF" position

Terminal	9	10
3	Infinity	–
4	–	●

●: Continuity

(A) ON

(B) OFF

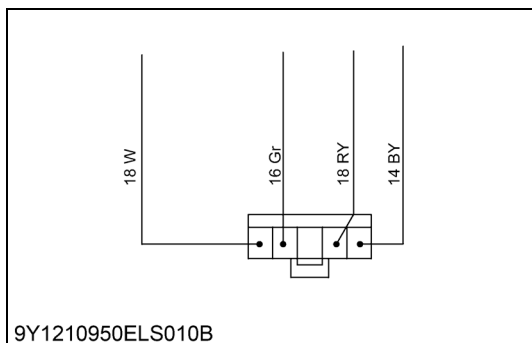
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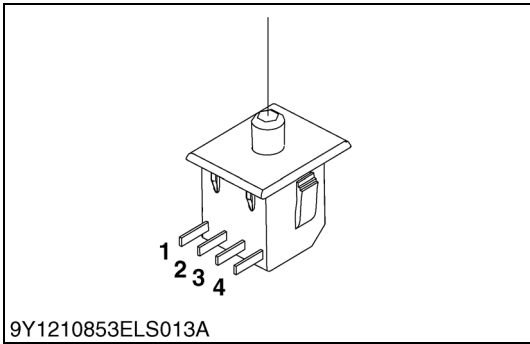
Seat Switch Harness

1. Disconnect the connector from seat switch (3).
2. Turn the main switch **"ON"**.
3. Measure the voltage across the terminal **RY** and chassis.
4. If the voltage differs from battery voltage, the wiring harness is damaged.

RY terminal – Chassis	Factory specification	Battery voltage
-----------------------	-----------------------	-----------------

9Y1211198ELS0018US0





Seat Switch Terminal Continuity

- 1. Remove the seat switch from the seat.
- 2. Measure the resistance with an ohmmeter across terminals when the seat switch is set at "OFF" and "ON" position.
- 3. If the resistance values specified below are not indicated, the seat switch is damaged.

1) Seat switch is at "ON" position

Terminal	1	2
4	●	–
3	–	●

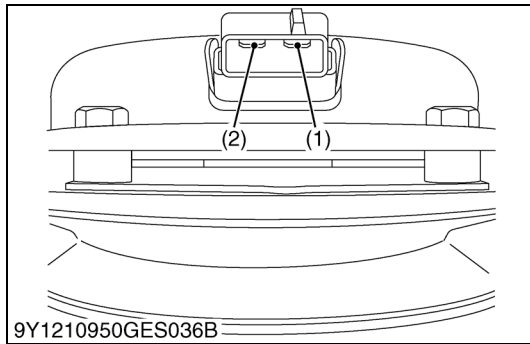
●: Continuity

2) Seat switch is at "OFF" position

Terminal	1	2
4	Infinity	–
3	–	Infinity

9Y1211198ELS0019US0

(4) Electric PTO Clutch



Electric PTO Clutch (Coil Resistance)

1. Disconnect **2P** connector from the electric PTO clutch.
2. Measure the coil resistance with an ohmmeter between the connector terminals.
3. If the resistance value specified below is not indicated the electric PTO clutch is damaged.

Resistance	Factory specification	1.74 to 1.94 Ω
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(1) Connector Terminal (+)

(2) Connector Terminal (-)

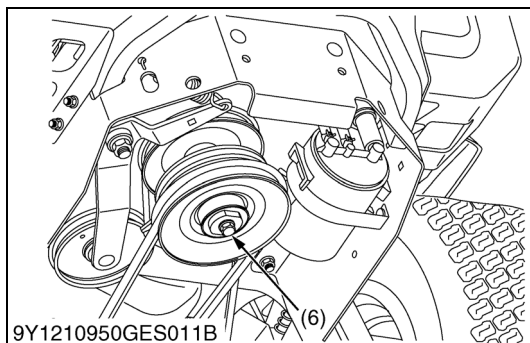
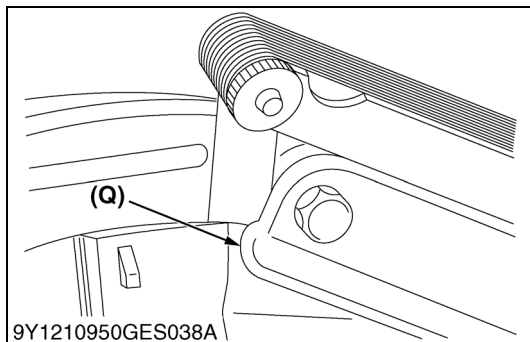
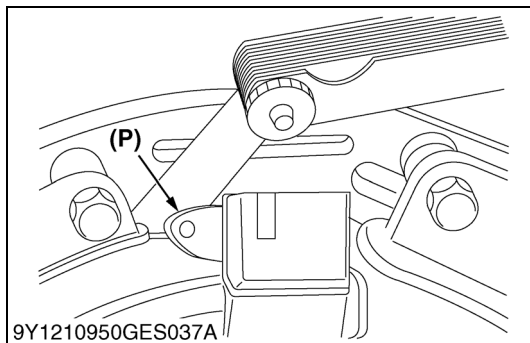
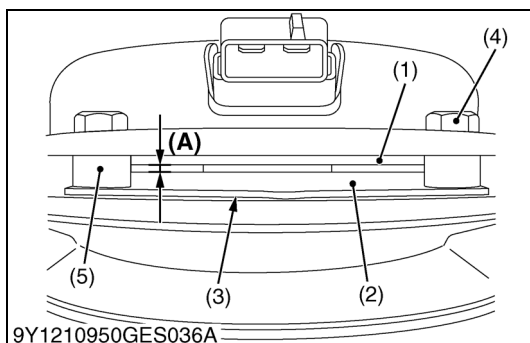
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Electric PTO Clutch (Electromagnetic Action)

■ NOTE

- **Before this test, make sure the battery is fully charged.**
 - **Use 12 V battery.**
1. Disconnect **2P** connector from the main wire harness.
 2. Remove the electric PTO clutch from the engine shaft.
 3. Connect the jumper leads from the battery positive terminal to the connector terminal (+) and from the battery negative terminal to the connector terminal (-).
 4. Put a metal across the field coil.
 5. If a metal is not attracted to field coil, replace it.

9Y1211198ELS0021US0



Electric Clutch Adjustment

WARNING

To avoid serious injury or death:

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Stop the engine and remove the key before adjusting the electric clutch.

The electric clutch serves 2 functions in the operation of the mower.

- Starting and stopping the power flow to the cutter blades.
- The clutch also acts as a brake to assist in stopping blade rotation when the PTO is switched off or the operator presence control is interrupted.

When the clutch is disengaged, the air gap between the armature and rotor should be **less than 2.5 mm (0.100 in.) and more than 0.25 mm (0.01 in.)**. Perform the following procedure to check the electric clutch function.

1. Using a pneumatic line, blow out any debris from under the brake pole and around the aluminum spacers.
2. Check air gap between rotor and armature face on both sides of the brake pole. If air gap is 2.5 mm (0.10 in.) or greater, or if clutch is having trouble engaging when hot, proceed to Step 3. Otherwise, skip to Step 9.
3. Loosen both brake mounting bolts 1 full turn.
4. Use pliers or hand to remove the shim. Do not discard shim until proper clutch function has been confirmed.
5. Using a pneumatic line, blow out any debris from under the brake pole and around the aluminum spacers.
6. Tighten each brake mounting bolt. Torque to 13.0 to 14.2 N·m (1.33 to 1.44 kgf·m, 9.5 to 10.5 lbf·ft).
7. Using a 0.25 mm (0.010 in.) thick feeler gage, verify that a gap is present between the rotor and armature face on both sides of the brake pole.
8. If gap is greater than 0.25 mm (0.010 in.), proceed to next step.
9. Verify tightness of clutch mounting bolt. Torque to 74.6 to 81.3 N·m (7.61 to 8.29 kgf·m, 55.1 to 59.9 lbf·ft).
10. With the engine running, verify clutch function by engaging and disengaging the clutch 10 consecutive times.

This adjustment should be done every 500 hours of operation or annually, whichever comes first. In cases where the machine is heavily used, air gap should be checked more often.

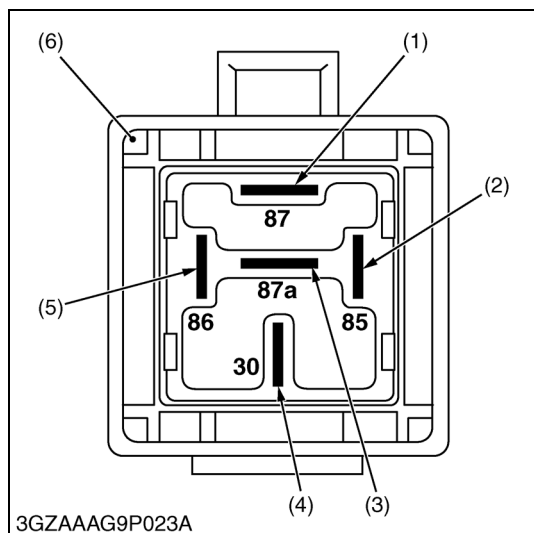
If the air gap is too narrow, the clutch armature may drag when disengaged, resulting in premature failure.

- (1) Rotor
- (2) Armature
- (3) Shim
- (4) Brake Mounting Bolt
- (5) Aluminum Spacer
- (6) Clutch Mounting Bolt

- (A) Air Gap
- (P) Check gap on one side.
- (Q) Check gap on other side.

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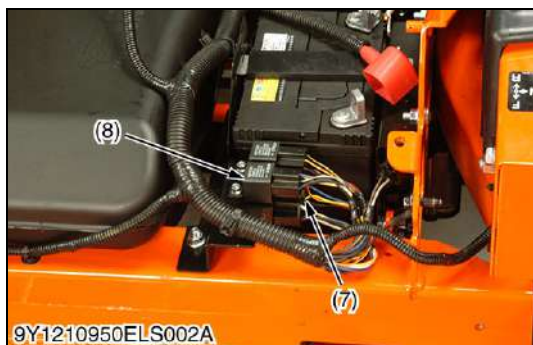
(5) Relay



Relay

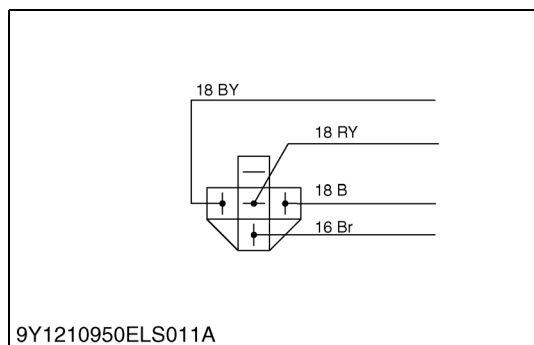
1. Disconnect the relay (6) from the connector after turning the main switch off.
2. Remove the relay from bracket.
3. Measure the resistance with an ohmmeter across:
 - Terminal **85** (2) to terminal **86** (5)
 - Terminal **87** (1) to terminal **87a** (3)
 - Terminal **87** (1) to terminal **30** (4)
4. If the resistance differs from the factory specifications, the relay is damaged.

Resistance	Terminal 85 (2) – Terminal 86 (5)	Approx. 90 Ω
	Terminal 87 (1) – Terminal 87a (3)	0 Ω
	Terminal 87 (1) – Terminal 30 (4)	Infinity



- | | |
|-------------------------|--|
| (1) Terminal 87 | (6) Relay (Ignition, Solenoid and Starter) |
| (2) Terminal 85 | (7) Seat Relay Connector |
| (3) Terminal 87a | (8) Starter Relay Connector |
| (4) Terminal 30 | |
| (5) Terminal 86 | |

9Y1211198ELS0023US0



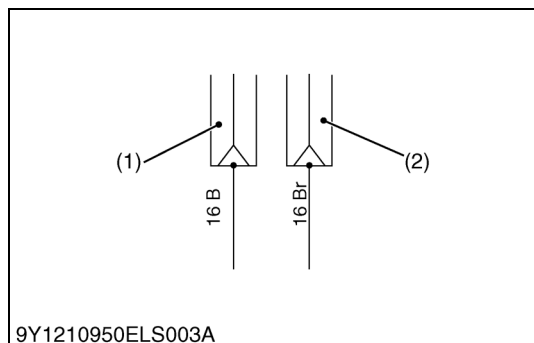
9Y1210950ELS011A

Relay Harness

1. Disconnect the connector from relay **1**.
2. Turn the main switch "**ON**".
3. Measure the voltage across the terminal **Br** and chassis.
4. If the voltage differs from battery voltage, the wiring harness is damaged.

9Y1211198ELS0024US0

(6) Hour Meter

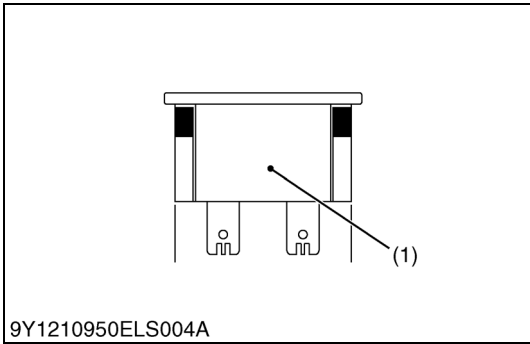


Hour Meter Harness

1. Disconnect the connectors (1), (2) from hour meter.
2. Turn the main switch "**ON**".
3. Measure the voltage across the connectors (1), (2).
4. If the voltage differs from battery voltage, the wiring harness is damaged.

- | | |
|---------------|---------------|
| (1) Connector | (2) Connector |
|---------------|---------------|

9Y1211198ELS0025US0



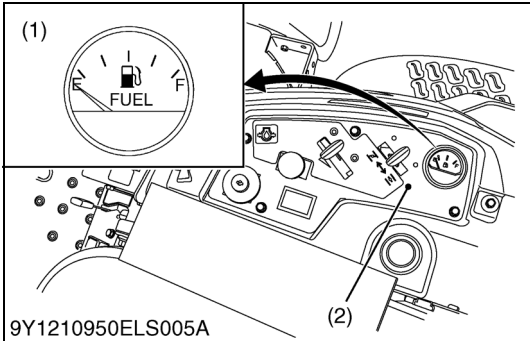
Hour Meter Terminal Continuity

- 1. Disconnect the connectors from hour meter (1).
- 2. Measure the resistance with an ohmmeter across terminals of the hour meter (1).
- 3. If there is no continuity, the hour meter is damaged.

(1) Hour Meter

9Y1211198ELS0026US0

(7) Fuel Gauge



Fuel Gauge

- 1. Remove the panel.
- 2. Turn the main switch to **ON** position. Measure the voltage with a voltmeter across the **I** terminal (5) and **GND** terminal (3) of the gauge.
- 3. If approx. battery voltage is indicated, the ignition and ground lead connections are good.
- 4. Turn the main switch to **OFF** position. Connect a jumper lead between **S** terminal (4) and **GND** terminal (3) of the gauge.
- 5. Turn the main switch to **ON** position. If the gauge resisters a full scale reading under those conditions, the gauge is good. If less than full scale reading is indicated, the gauge is damaged and should be replaced.

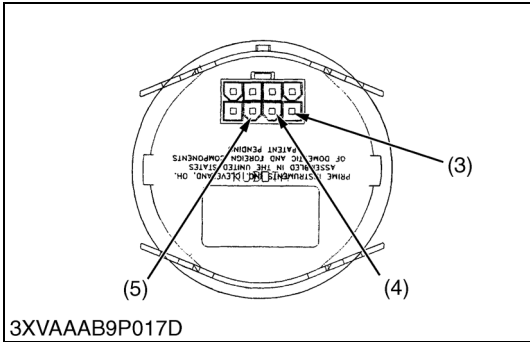
- (1) Fuel Gauge

(2) Panel

(3) **GND** Terminal
- (4) **S** Terminal

(5) **I** Terminal

9Y1211198ELS0027US0



Fuel Level Sensor

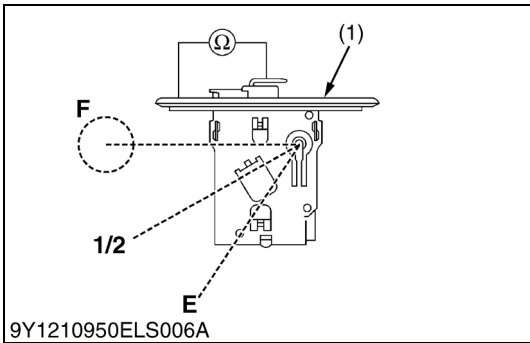
- 1. Remove the fuel level sensor from the fuel tank.
- 2. Measure the resistance with an ohmmeter across the sensor terminal and its body.
- 3. If the reference values are not indicated, the sensor is damaged.

Resistance (Sensor terminal – its body)	Reference value	Front at upper-most position	1 to 5 Ω
		Front at lower-most position	103 to 117 Ω

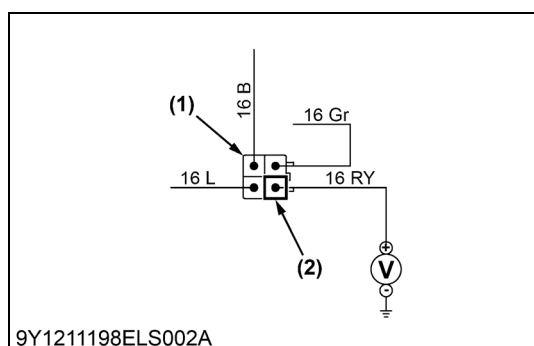
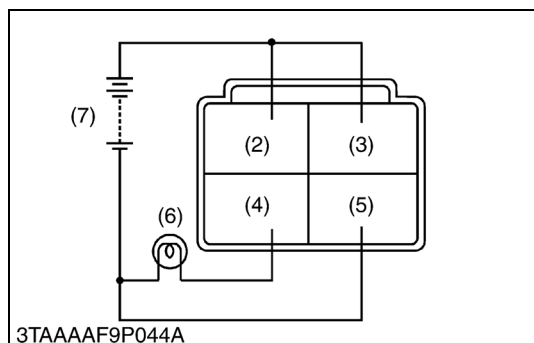
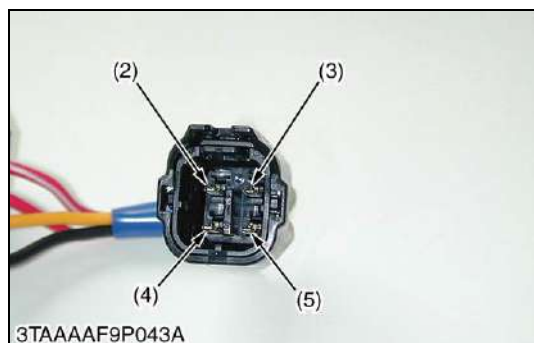
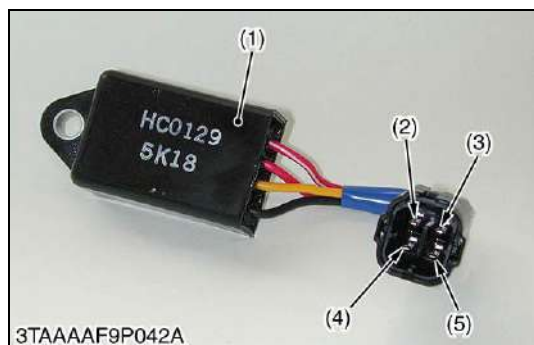
(1) Fuel Level Sensor

E: Empty
F: Full

9Y1211198ELS0028US0



(8) OPC Timer



Checking OPC Timer

1. Remove the OPC timer (1).
2. Connect jumper leads across the battery positive terminal and the Red / White terminal (2), and across the battery positive terminal and the Yellow terminal (3).
3. Connect the jumper lead across the battery negative terminal and the Black terminal (5), and across the battery negative terminal and the Blue terminal.
4. Connect the jumper lead across the Red terminal (4) and the bulb terminal.
5. If the bulb lights up when disconnecting the jumper lead from the Red / White terminal (2) 0.7 to 1.3 seconds, the OPC timer (1) is good.

- | | |
|---|-------------------------------------|
| (1) OPC Timer | (5) Black Terminal (To Frame Earth) |
| (2) Red / White Terminal (From Battery) | (6) Bulb (Load) |
| (3) Yellow Terminal (From OPC Switch) | (7) Battery |
| (4) Red Terminal (To Key Stop Solenoid) | |

9Y1211198ELS0033US0

OPC Timer Harness

1. Turn the main switch "ON".
2. Disconnect the 4P connector (1) from the OPC timer.
3. Measure the voltage with an ohmmeter across the 4P connector terminal (2) and the chassis.
4. If the voltage differs from battery voltage, the wiring harness is damaged.

Voltage	Connector terminal (2) – Chassis	Approx. battery voltage
---------	----------------------------------	-------------------------

- | | |
|------------------|--------------|
| (1) 4P connector | (2) Terminal |
|------------------|--------------|

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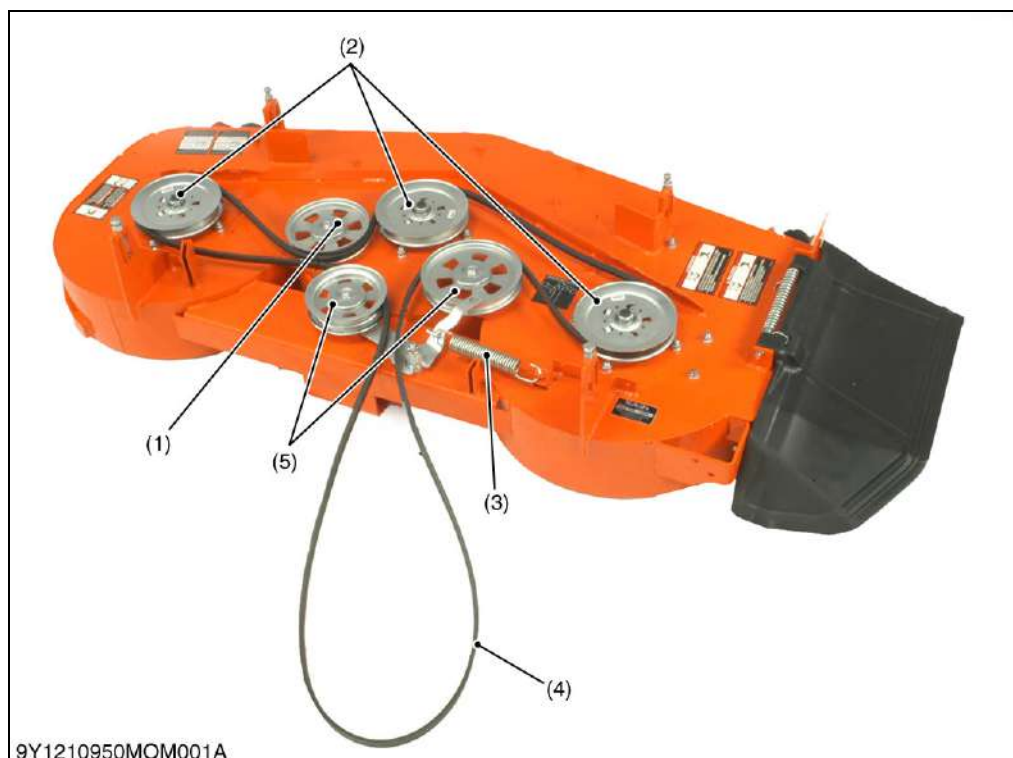
6 MOWER

MECHANISM

CONTENTS

1. POWER TRANSMISSION.....	6-M1
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1. POWER TRANSMISSION



- (1) Idle Pulley
- (2) Blade Pulley
- (3) Tension Spring
- (4) Mower Belt
- (5) Tension Pulley
- (6) Electric Clutch
- (7) HST Belt



- Mower is ONE belt drive type.
- Power is transmitted by an electric clutch (6).
- Mower belt (4) is installed lower than the HST belt (7).
- Mower has 3 blades.

9Y1211198MOM0001US0



SERVICING

CONTENTS

- 1. TROUBLESHOOTING.....6-S1
- 2. SERVICING SPECIFICATIONS6-S3
- 3. TIGHTENING TORQUES.....6-S4
- 4. CHECKING, DISASSEMBLING AND ASSEMBLING6-S5
 - [1] CHECKING AND ADJUSTING.....6-S5
 - [2] DISASSEMBLING AND ASSEMBLING6-S10
 - (1) Dismounting the Mower Deck.....6-S10
 - (2) Disassembling the Mower6-S14

1. TROUBLESHOOTING

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Blade Does Not Turn	1. PTO system malfunctioning	Check electric clutch	5-S13 to 5-S14
	2. Broken mower belt	Replace mower belt	G-47
Blade Speed Is Slow	1. Loosen mower belt	Replace mower belt or tension spring	G-47, 6-S10
	2. Clogged grass	Remove grass	—
	3. Flattened out or worn cup washer	Replace cup washer	6-S15
	4. Engine rpm too low	Mow at full throttle, check and reset engine rpm	—
Mower Is Not Lifted	1. Broken linkage system	Replace linkage system	4-S3
Mower Belt Slipping	1. Weaken tension spring	Replace	6-S10
	2. Worn mower belt	Replace	G-47
	3. Mower plugged	Unplug and clean mower deck	—
	4. Debris in pulleys	Clean	—
Discharge Chute Plugged	1. Grass too wet	Wait for grass to dry	—
	2. Grass too long	Raise cutting height and cut grass twice	—
	3. Cutting too low	Raise cutting height	—
	4. Engine rpm too low	Mow at full throttle	—
	5. Ground speed too fast	Slow down	—
Streaking of Grass Uncut	1. Ground speed too fast	Slow down	—
	2. Engine rpm too low	Mow at full throttle, check and reset engine rpm	—
	3. Grass too long	Cut grass twice	—
	4. Blades dull or damaged	Replace blades or sharpen blade	6-S15
	5. Debris in mower deck	Clean mower deck	—
Uneven Cut	1. Mower deck not level	Level mower deck	6-S5, 6-S9
	2. Ground speed too fast	Slow down	—
	3. Blades dull	Sharpen blade	6-S15
	4. Blades worn or damaged	Replace blades	6-S15
	5. Low tire inflation	Add air to correct pressure	G-20
	6. Anti-scalp rollers not adjusted correctly	Adjust anti-scalp rollers	6-S5
Blades Scalping Grass	1. Cutting height too low	Raise cutting height	—
	2. Turning speed too fast	Reduce speed on turns	—
	3. Ridges in terrain	Change mowing pattern	—
	4. Rough or uneven terrain	Adjust wheels pressure and anti-scalp rollers	G-20, 6-S5
	5. Anti-scalp rollers not adjusted correctly	Adjust wheels pressure and anti-scalp rollers	G-20, 6-S5
	6. Bent blade(s)	Replace blade(s)	6-S15

Symptom	Probable Cause and Checking Procedure	Solution	Reference Page
Exclusive Vibration	1. Debris on mower deck or in pulleys	Clean mower deck and pulleys	–
	2. Damaged mower belt	Replace mower belt	G-47
	3. Damaged pulleys	Replace pulleys	6-S14, 6-S15
	4. Pulleys out of alignment	Check pulleys	6-S15
	5. Blades out of balance	Have blades balanced	6-S15
Mower Loads Down Machine	1. Engine rpm too low	Mow at full throttle, check and reset engine rpm	–
	2. Ground speed too fast	Slow down	–
	3. Debris wrapped around mower spindles	Clean mower	–
	4. Front of deck too low	Adjust mower deck	6-S9

9Y1211198MOS0001US0

2. SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Mower Deck Level	Height	19 mm 3/4 in.	—
Height of the Blade at the Flat Surface	Height	76 mm 3 in.	—
Mower Deck Level (Side to Side)	Difference	Less than 3 mm 1/8 in.	—
Mower Deck Level (Front to Rear)	Difference	Less than 6 mm 1/4 in. Front side must be lower than Rear side	—

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3. TIGHTENING TORQUES

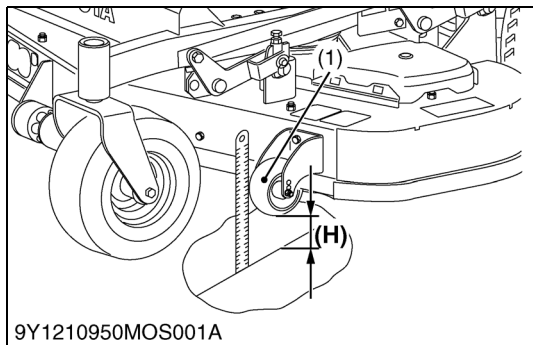
Tightening torques of screws, bolts and nuts on the table below are especially specified.
(For general use screws, bolts and nuts: Refer to "5. TIGHTENING TORQUES" on page G-10.)

Item	N·m	kgf·m	lbf·ft
Flange bolt M10 (Tension pulley)	39.3 to 45.1	4.01 to 4.59	29.0 to 33.2
Blade bolt	103 to 117	10.5 to 11.9	76.0 to 86.2
Hex nut (Blade shaft)	167 to 191	17.0 to 19.5	124 to 140
Flange nut M12 (Pulley holder)	77.5 to 90.2	7.91 to 9.19	57.2 to 66.5
Flange nut M10 (Front plate)	39.3 to 45.1	4.01 to 4.59	29.0 to 33.2
Flange bolt M10 (Front plate)	48.0 to 55.9	4.90 to 5.70	35.4 to 41.2

9Y1211198MOS0003US0

4. CHECKING, DISASSEMBLING AND ASSEMBLING

[1] CHECKING AND ADJUSTING



Mower Deck Level

■ Anti-scalp Rollers



WARNING

To avoid serious injury or death:

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Stop the engine and remove the key.
- Wait for all moving parts to stop.

■ IMPORTANT

- The flattest cut can be achieved by having the anti-scalp rollers adjusted off the ground.

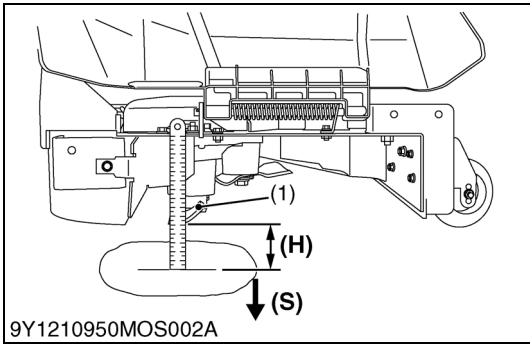
Check anti-scalp roller adjustments each time the mower deck cutting height is changed.

It is recommended that all the anti-scalp rollers be kept off the ground to minimize scuffing.

1. Check the machine tire pressure.
Inflate tires to the correct pressure. (See page G-20.)
2. Start the engine.
3. Raise up the mower deck to the transport position.
(Also the top end of the lift.)
4. Turn the cutting height control dial to adjust height.
5. Lower the mower deck.
6. Adjust the height of the front side anti-scalp roller to one of 3 positions to approximately 19 mm (3/4 in.) between rollers and the ground.
Adjust 2 rollers to the same height.
7. Install the roller with attaching hardware.

(1) Front Side Anti-scalp Roller (H) 19 mm (3/4 in.)

9Y1211198MOS0004US0



Level Mower Deck (Side-to-Side)

⚠ WARNING

To avoid serious injury or death:

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Disengage PTO (OFF).
- Stop the engine and remove the key while checking or adjusting the level of the mower deck.

■ IMPORTANT

- Check the machine tire pressure. Inflate tires to the correct pressure. (See page G-20.)

■ Checking level (Side-to-Side)

■ NOTE

- Mower deck anti-scalp rollers should not contact the ground.
1. Raise the mower deck to the transport position. (Also the top end).
 2. Turn the cutting height set dial to the 3.0 in. cutting height position.
 3. Lower the mower deck.
 4. Position the right mower blade in the Side-to-Side position.
 5. Measure from outside blade tip to the level surface with a short ruler or leveling gauge.

(Reference)

Height of the blade at the flat surface	Factory specification	76 mm 3.0 in.
---	-----------------------	------------------

■ NOTE

- There is a difference of the blade height between on the flat surface and ground.
6. Check that the left side blade is same height. The difference between both measurements should be less than 3.0 mm (1/8 in.).
 7. If the Side-to-Side adjustment is not within the given tolerance, adjustment is necessary.

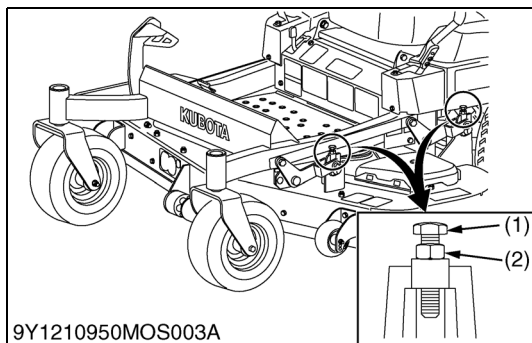
Side-to-Side adjustment	Factory specification	Less than 3 mm 1/8 in.
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(1) Blade

(S) Side

(H) Height of Blade

9Y1211198MOS0005US0

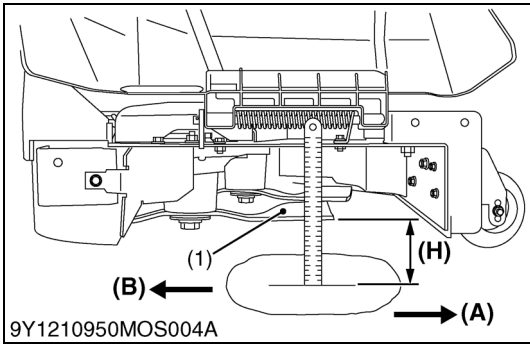


Adjusting Level (Side-to-Side)

1. Raise up the mower deck to the transport position.
(Also the top end).
2. Turn the cutting height set dial to the 3.0 in. cutting height position.
3. Place 51 mm (2.0 in.) height wood blocks under each side of the mower deck.
Anti-scalp rollers must not rest on the wood block.
4. Lower the mower deck.
5. Position mower blade in the Side-to-Side position.
6. Loosen the jam nuts of the right side of the machine.
7. Adjust the cutting height fine tuning bolts to set 76 mm (3.0 in.) blade height.
Front and rear side bolts must be adjusted.
8. Tighten the jam nuts.
9. Adjust the left side equally.
10. Check the side-to-side level and if it is not level, adjustment is necessary.

(1) Cutting Height Fine Tuning Bolt (2) Jam Nut

9Y1211198MOS0006US0



Level Mower Deck (Front-to-Rear)

⚠ WARNING

To avoid serious injury or death:

- Park the machine on a firm and level surface.
- Engage the parking brake.
- Disengage PTO.
- Stop the engine and remove the key while checking or adjusting the level of the mower deck.

■ IMPORTANT

- Check the machine tire pressure. Inflate tires to the correct pressure. (See page G-20.)

■ Checking level (Front-to-Rear)

■ NOTE

- Mower deck anti-scalp rollers should not contact the ground.
1. Raise the mower deck to the transport position. (Also the top end).
 2. Turn the cutting height set dial to the 3.0 in. cutting height position.
 3. Lower the mower deck.
 4. Position the right mower blade in the Front-to-Rear position.
 5. Measure from the right front blade tip to the level surface with a short ruler or leveling gauge.
 6. Turn the blade 180 and measure from right rear blade tip to the level surface.
 7. Check that the left side blade has the same dimension. The difference between both measurements should be less than 6.0 mm (1/4 in.). Front side must be lower than rear side.
 8. If the Front-to-Rear adjustment is not within the given tolerance, adjustment is necessary.

Front-to-Rear adjustment	Factory specification	Less than 6.0 mm 1/4 in. Front side must be lower than Rear side.
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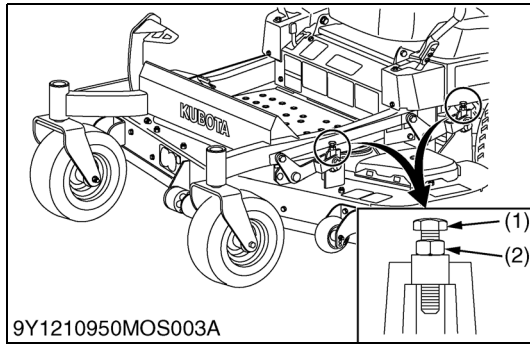
(1) Blade

(A) Front

(B) Rear

(H) Height of blade

9Y1211198MOS0007US0



Adjusting Level (Front-to-Rear)

1. Raise up the mower deck to the transport position.
(Also the top end).
2. Turn the cutting height set dial to the 3.0 in. cutting height position.
3. Place 51 mm (2.0 in.) height wood blocks under each side of the mower deck.
Anti-scalp rollers must not rest on the wood block.
4. Lower the mower deck.
5. Loosen the jam nuts of the front side of the machine.
6. Adjust the cutting height fine tuning bolts to set 76 mm (3.0 in.) blade height.
Both front side bolts must be adjusted.
7. Tighten the jam nuts.
8. Adjust the other side equally.

■ IMPORTANT

- **The difference between both measurements should be less than 6.0 mm (1/4 in.).**
Front side must be lower than rear side.
9. Check the front-to-rear level and if it is not level, adjustment is necessary.

(1) Cutting Height Fine Tuning Bolt (2) Jam Nut

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[2] DISASSEMBLING AND ASSEMBLING

(1) Dismounting the Mower Deck



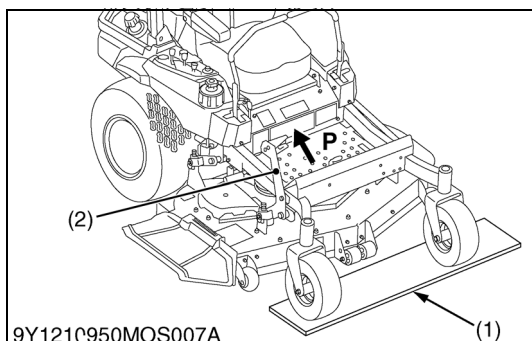
WARNING

To avoid serious injury or death:

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Stop the engine and remove the key.

Push the mower deck lift pedal with enough force. If the force is not enough, the mower link will jump up when the 14 mm (0.55 in.) shaft is removed from the right side of the machine due to the power of the spring. Keep all hands and feet clear of the mower links during this time.

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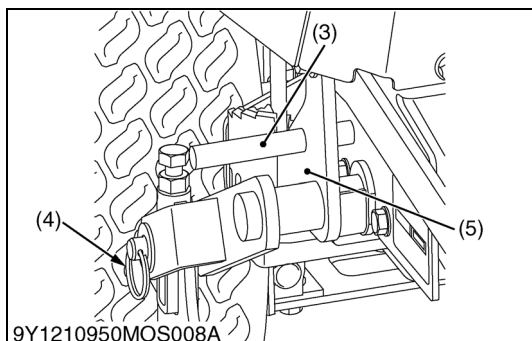


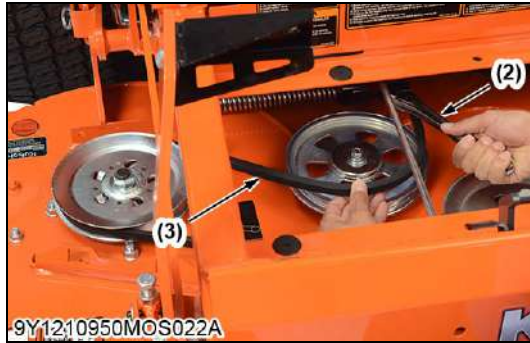
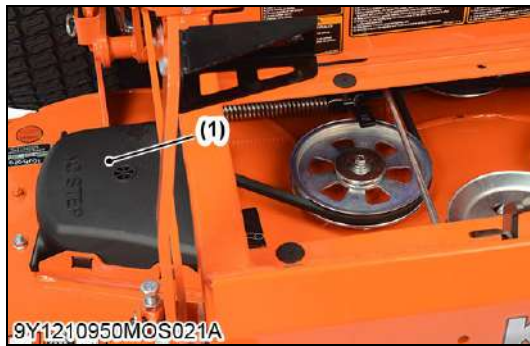
Locking Lift Link

1. Adjust the cutting height control dial to 25.4 mm (1.00 in.) position with the machine placed on the board.
2. Adjust the anti-scalp rollers to 25.4 mm (1.00 in.) position. (Refer to "ADJUSTING CUTTING HEIGHT" in "OPERATING THE MOWER" section in operator's manual.)
3. Put a $\phi 14$ mm ($\phi 0.55$ in.) $\times$ 150 mm (6.0 in.) shaft in the hole of the rear right side lift link.

- | | |
|--|----------------|
| (1) Board | (4) Clevis Pin |
| (2) Mower Lift Pedal | (5) Lift Link |
| (3) Shaft
($\phi 14$ mm ($\phi 0.55$ in.) $\times$
150 mm (6.0 in.)) | (P) "PUSH" |

9Y1211198MOS0010US0





Removing Mower Belt

1. Remove the step.
2. Remove the R.H. belt cover (1).
3. With a square wrench (2), loosen the tension on the spring and mower belt (3) by pulling the tension lever counterclockwise.
4. Remove the mower belt (3) from the mower pulley.
5. Remove the mower belt from the electric clutch pulley (4).

(1) Belt Cover
(2) Square Wrench

(3) Mower Belt
(4) Electric Clutch Pulley

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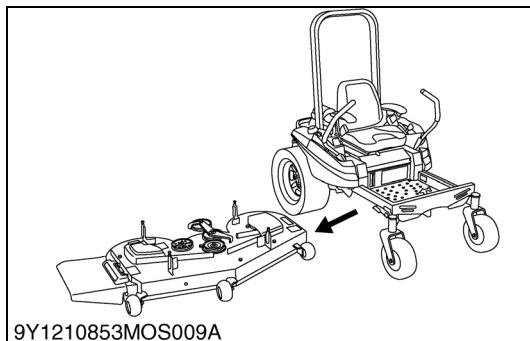
Disconnecting Lift Link

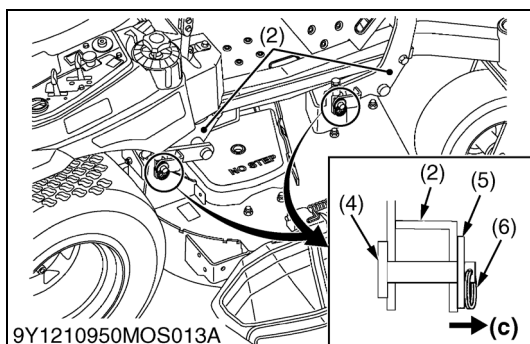
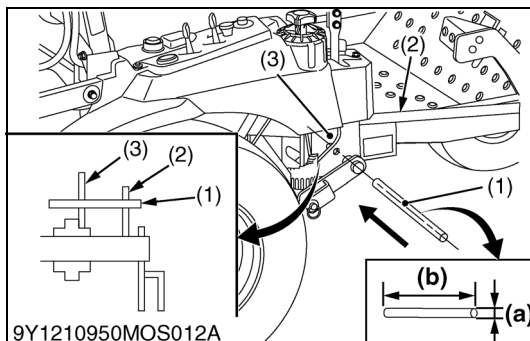
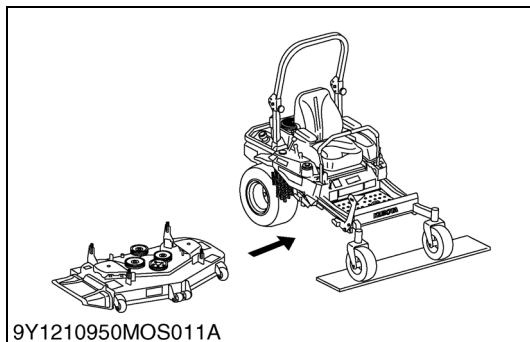
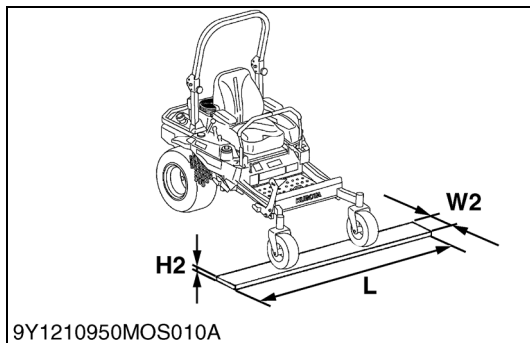
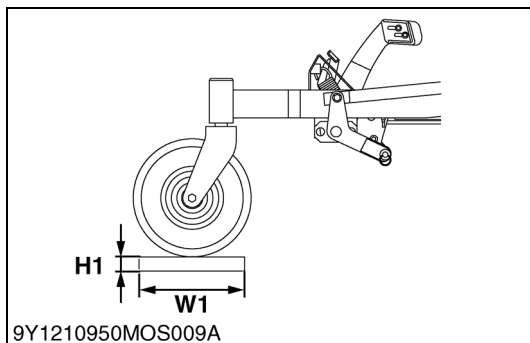
1. Remove the 4 snap pins and clevis pins (2).
2. Push the mower lift pedal toward the seat and remove the 14 mm (0.55 in.) shaft from the hole in the rear right side lift link (1).
3. Slowly let the mower lift pedal move to the full up position.
4. Slide the mower deck from under the machine to the right side of it.

(1) Lift Link

(2) Clevis Pin, Snap Pin

9Y1211198MOS0012US0





Mounting The Mower Deck

WARNING

To avoid serious injury or death:

- Park the machine on a firm and level surface.
- Apply the parking brake.
- Stop the engine and remove the key.
- Fix mower link at 25.4 mm (1.0 in.) position.

1. Before mounting the mower deck, raise the lift links to the full up position.
2. Adjust the cutting height control dial to 1.0 in. position.
3. Adjust the anti-scalp rollers to 25.4 mm (1.0 in.) position. (Refer to "ADJUSTING CUTTING HEIGHT" in "OPERATING THE MOWER" section in operator's manual.)
4. Go backward so that right and left front tires would be on the board 38.1 mm (1.50 in.) high.

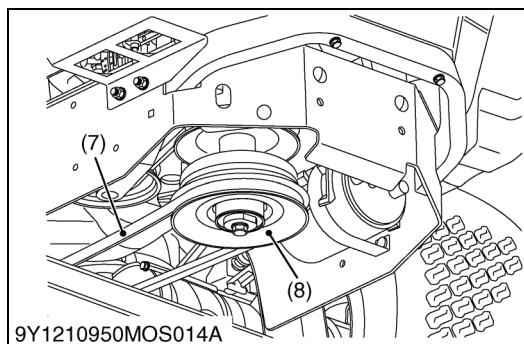
■ IMPORTANT

- Use a board more than 133 mm (5.25 in.) wide and 1600 mm (63.0 in.) long.
- Make sure that right and left front tires are firm on the board.

5. Make sure the direction of the front tires is as shown in the figure.
6. Place the mower deck at the right side of the machine.
7. Slide the mower deck under the machine, then lower mower lift links.
8. Put a $\phi 14$ mm ($\phi 0.55$ in.) shaft in the hole in the rear right side lift link.

■ IMPORTANT

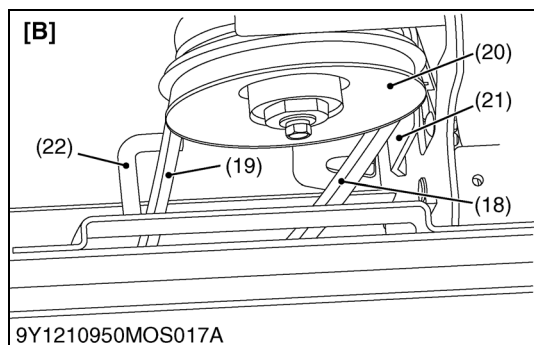
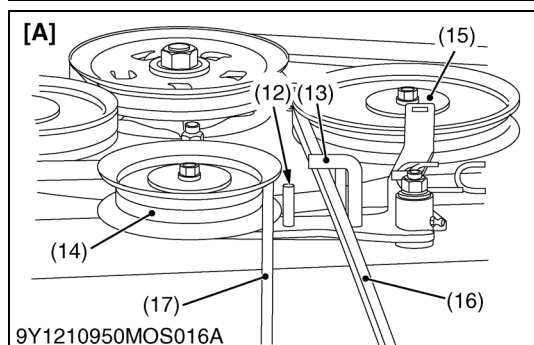
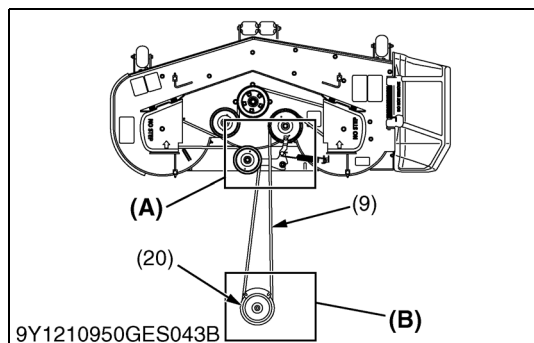
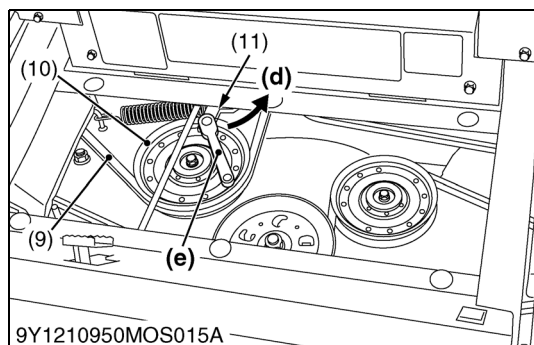
- Use a shaft more than 150 mm (6 in.) long.
- It passes through a hole in the frame.



- (1) Shaft
- (2) Lift Link
- (3) Frame
- (4) Clevis Pin
- (5) Plain Washer
- (6) Snap Ring
- (7) Mower Belt
- (8) PTO Clutch Pulley

- H1: 38.1 mm (1.50 in.)
 H2: 38.1 mm (1.50 in.)
 W1: 133 mm (5.25 in.)
 W2: 133 mm (5.25 in.)
 L: 1600 mm (63.0 in.)
 (a) $\phi 14$ mm ($\phi 0.55$ in.)
 (b) More than 150 mm (6.0 in.)
 (c) Outside

(To be continued)

(Continued)

9. Attach the lift links to the mower deck with attaching hardware.
10. Remove the $\phi 14$ mm ($\phi 0.55$ in.) shaft from the hole in the rear right side lift link.
11. Attach the mower belt to the PTO clutch pulley.
12. Remove the step.
13. Turn the tension arm counterclockwise with a square wrench.
14. Attach the mower belt to the mower pulleys.
Refer to the routing label.
15. After mounting the mower, check the mower level. If necessary, adjust the mower level and anti-scalp rollers.

NOTE

- The belt between the idler pulley and PTO clutch pulley should be to the left of pin-1 as shown in figure [A], and to the left of the PTO clutch guide as shown in figure [B].
- The belt between the tension pulley and the PTO clutch pulley must be to the left of pin-2 as shown in figure [A], and to the right of pin-3 as shown in figure [B].

(9) Mower Belt

(10) Mower Pulley

(11) Tension Arm

(12) Pin-1

(13) Pin-2

(14) Tension Pulley

(15) Idler Pulley

(16) Belt between the Idler Pulley and PTO Clutch Pulley

(17) Belt between the Tension Pulley and the PTO Clutch Pulley

(18) Belt between the Idle Pulley and PTO Clutch Pulley

(19) Belt between the Tension Pulley and the PTO Clutch Pulley

(20) PTO Clutch Pulley

(21) PTO Clutch Guide

(22) Pin-3

(d) "COUNTERCLOCK WISE"

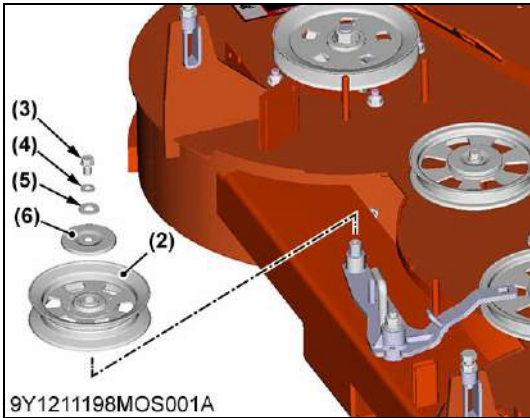
(e) Square Wrench

(A) Mower Tension Arm Area

(B) PTO Clutch Area

9Y1211198MOS0013US0

(2) Disassembling the Mower



Removing Tension Pulleys and Mower Belt

- 1. Remove the mower deck from the machine according to the procedure **"Dismounting the Mower Deck"**.
- 2. Remove the left and right hand shield from the mower deck.
- 3. Remove the belt (1).
- 4. Remove the flange bolt (3), lock washer (4), washer (5), and tension pulley (2).

(When reassembling)

- Tighten to the specified tightening torque.

Tightening torque	Flange bolt M10 (Tension pulley)	39.3 to 45.1 N·m 4.01 to 4.59 kgf·m 29.0 to 33.2 lbf·ft
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- (1) Belt

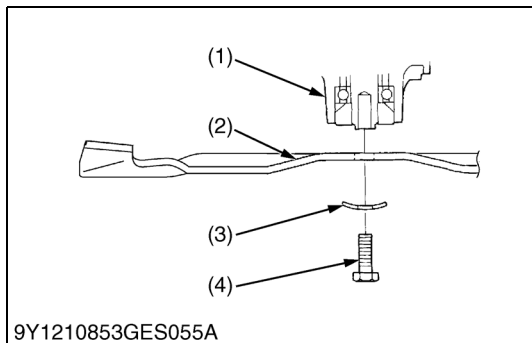
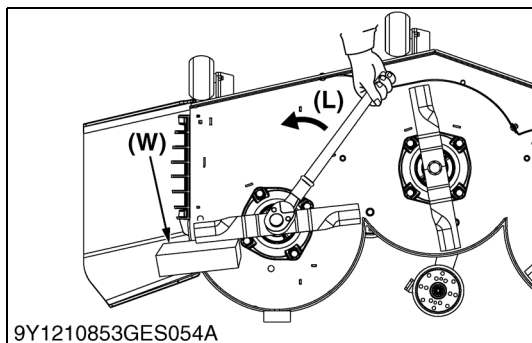
(2) Tension Pulley

(3) Flange Bolt M10
- (4) Lock Washer

(5) Washer

(6) Cover

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Replacing Blade



WARNING

To avoid serious injury or death:

- Be sure to stop the engine and remove the key.
- Blades may be sharp. When you handle blades, wear heavy gloves or wrap end of blade with a rag.
- Before checking or replacing the blade, wipe grass and mud off the top and inside of the mower.

Especially clean up the inside of the belt cover, because otherwise the belt life will be reduced.

1. Dismount the mower deck from the machine.
(See "**Dismounting the Mower Deck**" in "**MOWER**" section.) Then turn it over to expose the blades.
2. Wedge a block of wood between the blade and mower housing or use a box wrench over the pulley nut to prevent the spindle from rotating while removing the blade bolts; loosen the blade bolt (4) as illustrated.

■ IMPORTANT

- Use the proper metric size box or socket wrench to tighten or loosen the blade mounting bolt.
3. To sharpen the blades yourself, clamp the blade securely in a vise. Use a large mill file and file along the original bevel until sharp.
 4. To check the blade for balance, place a small rod through the center hole. If the blade is not balanced, file the heavy side of the blade until balance is achieved.

(When reassembling)

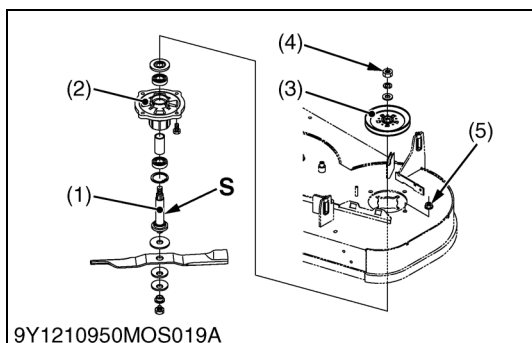
- To attach blades, be sure to install the cup washer (3) between the blade (2) and blade bolt (4) head.
- Then tighten the blade bolt (4) securely.

Tightening torque	Blade bolt	103 to 117 N·m 10.5 to 12.0 kgf·m 76.0 to 86.7 lbf·ft
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- (1) Spindle Holder
(2) Blade
(3) Cup Washer
(4) Blade Bolt

(L) "LOOSEN"
(W) WOOD

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Removing Blade Shaft and Pulley Holder

1. Remove the hex nut (4) and blade shaft (1).
2. Remove the blade pulley (3).
3. Remove the pulley holder (2).

(When reassembling)

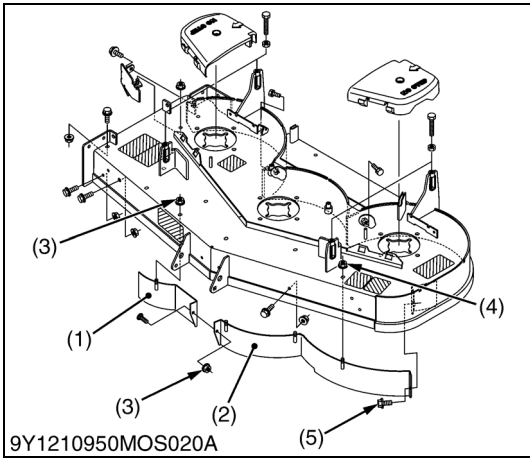
- Apply "HENKEL LOCTITE C5-A copper based anti-seize lubricant" or equivalent to the shaft side surface "S".

Tightening torque	Hex nut (Blade shaft)	167 to 191 N·m 17.0 to 19.5 kgf·m 124 to 140 lbf·ft
	Flange nut M12 (Pulley holder)	77.4 to 90.2 N·m 7.90 to 9.19 kgf·m 57.1 to 55.6 lbf·ft

- (1) Blade Shaft
(2) Pulley Holder
(3) Blade Pulley

- (4) Hex Nut (Blade Shaft)
(5) Flange Nut M12 (Pulley Holder)

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Removing Front Plate

1. Remove the front plate **"C"** (1) and front plate **"A"** (2).

Tightening torque	Flange nut M10 (Front plate)	39.3 to 45.1 N·m 4.00 to 4.60 kgf·m 29.0 to 33.2 lbf·ft
	Flange bolt M10 (Front plate)	48.0 to 55.9 N·m 4.90 to 5.70 kgf·m 35.4 to 41.2 lbf·ft

- (1) Front Plate **"C"**
- (2) Front Plate **"A"**
- (3) Flange Nut M10 (Front Plate)
- (4) Flange Nut M10 (Front Plate)
- (5) Flange Bolt M10 (Front Plate)

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