# WSM

## WORKSHOP MANUAL

# GR1600EC2

Kubota

KiSC issued 07, 2007 A

| Model | | | RCK42GREC2 |
|---|---|---|---|
| Mower | Cutting width | | 1067 mm (42.0 in.) |
| | Cutting height | | 25 to 102 mm (1 to 4 in.) |
| | Adjustment of cutting height | | Dual gauge |
| | Mounting method | | Quick joint, Parallel linkage |
| | Weight (Approx.) | | 75 kg (165 lbs) |
| | Dimensions | Total length | 965 mm (38.0 in.) |
| | | Total width | 1110 mm (43.7 in.) |
| | | Total height | 295 mm (11.6 in.) |
| | Discharge direction | | Rear |
| | Gear box oil | | 0.33 L (0.35 U.S.qts, 0.29 Imp.qts) |

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| Model | | GCK370GREC2 |
|---|---|---|
| Grass catcher | Container capacity | 370 L (97.7 U.S.gals, 81.4 Imp.gals) |
| | Weight (Approx.) | 40 kg (88.2 lbs) |

NOTE: *Manufacture's estimate
The company reserves the right to change the specifications without notice.

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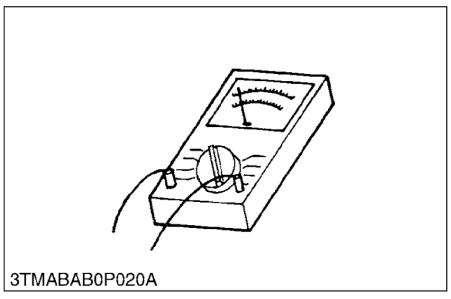
# [5] HANDLING OF CIRCUIT TESTER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- Use tester correctly following manual provided with tester.
- Check for polarity and range.

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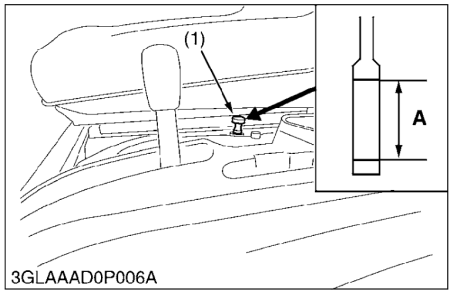


## Checking Transmission Fluid Level

1. Park the machine on a flat surface, lower the implement to the ground and shut off engine and remove the key.
2. Raise the operator's seat.
3. To check the oil level, draw out the dipstick (1), wipe it clean, reinsert it, and draw it out again. Check to see that the oil level lies between the two notches. If the level is too low, add new oil to the prescribed level at the oil inlet. (Refer to "**4. LUBRICANTS, FUEL AND COOLANT**" in this section.)

**IMPORTANT**

- **If oil level is low, do not run engine.**

(1) Oil Level Dipstick

**A : Oil level is acceptable within this range.**

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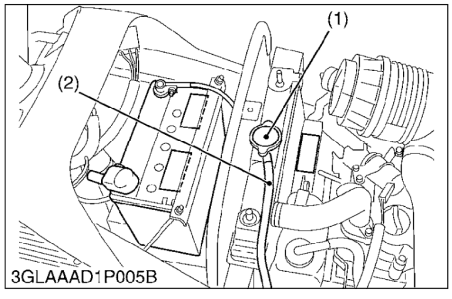


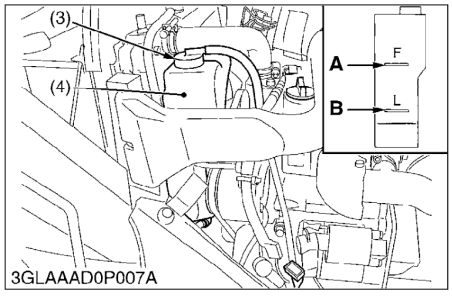


## Checking Coolant Level

**CAUTION**

- **Do not remove the radiator cap when the engine is hot. Loosen cap slightly, to the stop, to relieve any excess pressure before removing cap completely.**

Check the coolant level daily both the radiator and the recovery tank (4) before starting engine.

1. Remove the radiator cap (1) and check to see that the coolant level is just below the fill port.
2. Check to see that the coolant level is between the **"FULL"** and **"LOW"** marks of recovery tank (4).
3. When the coolant level drops due to evaporation, add water only up to just below the fill port of the radiator and the full level of the recovery tank (4).
   In case of leakage, add coolant and water in the specified mixing ratio up to the full level. (Refer to "**Flushing Cooling System and Changing Coolant**" of "**7. CHECK AND MAINTENANCE**" in this section.)

**IMPORTANT**

- **If the radiator cap has to be removed, follow the caution above and securely retighten the cap.**
- **Use clean, distilled coolant and water to fill the radiator and recovery tank.**

(1) Radiator Cap
(2) Overflow Pipe
(3) Recovery Tank Cap
(4) Recovery Tank

**A : FULL**
**B : LOW**

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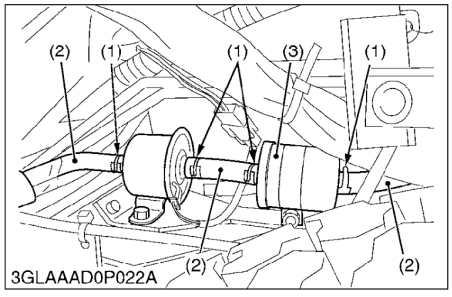


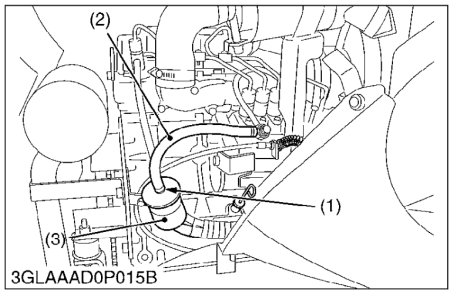


## Checking Fuel Line and Fuel Filter

**CAUTION**

- **Be sure to stop the engine and remove the key when attempting to make the following checks and changes.**
- **Never fail to check the fuel lines periodically. The fuel lines are subject to wear and aging. Fuel may leak out onto the running engine, causing a fire.**

The fuel line connections should be checked annually or every 100 service hours, whichever comes first.

1. The fuel line (2) is made of rubber and ages regardless of service period.
2. If the fuel line (2) and clamps (1) are found to be damaged or deteriorated, replace them.
3. Check fuel filter (3), if it is clogged by debris or contaminated with water, replace it.

**IMPORTANT**

- **When the fuel line is disconnected for maintenance or repair, close both ends of the fuel line with a piece of clean cloth or paper to prevent dust and dirt from entering. In addition, particular care must be take not to admit dust and dirt into the fuel pump. Entrance of even a small amount of dust or dirt cause premature wear and malfunction of the fuel pump and injector components.**

(1) Pipe Clamp
(2) Fuel Line
(3) Fuel Filter

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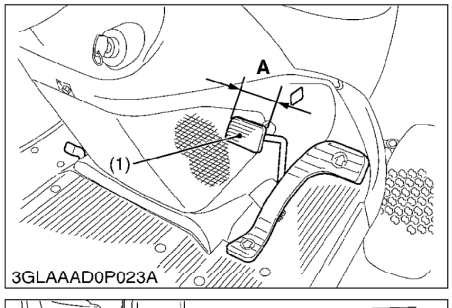


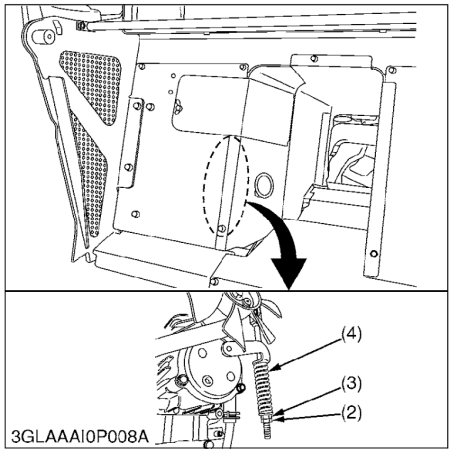


## Checking Brake

**CAUTION**

- **When making adjustments, park the machine on a flat area, block wheels, stop the engine and remove the key.**

1. Correct play ranges from 15 to 25 mm (0.59 to 0.98 in.). If it is not correct, loosen the lock nut (2) and turn the nut (3) in the desired direction until the proper play is achieved. After adjustment, retighten lock nut securely.

| | | |
|---|---|---|
| Play (**A**) | Factory spec. | 15 to 25 mm<br>0.59 to 0.98 in. |

(1) Brake Pedal
(2) Lock Nut
(3) Nut
(4) Spring

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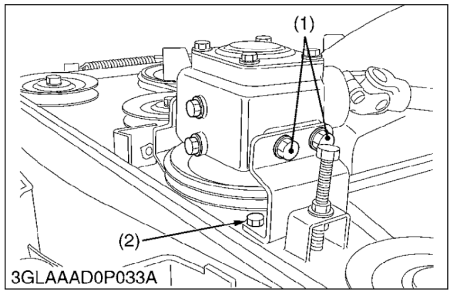


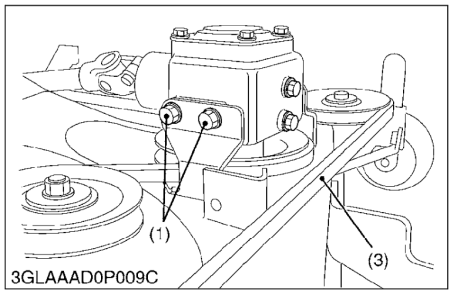


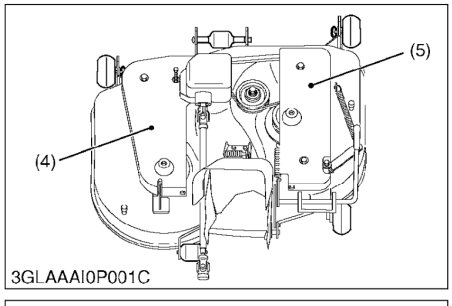


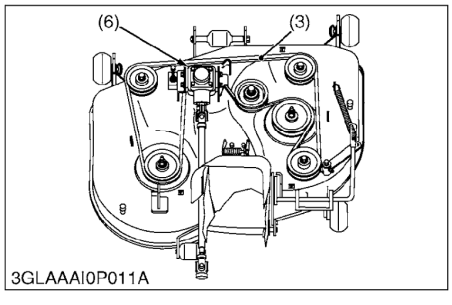


## Replacing Mower Belt

1. Remove the mower deck from the machine.
2. Remove the left and right hand shield (4), (6) from the mower deck.
3. Clean around the pulleys to remove the belt (3) from the pulleys. Slip the belt (3) over the top of the left side pulley.
4. Remove the both brackets which mounts the gear box to the mower deck.
5. To install a new belt, reverse the above procedure.

| | | |
|---|---|---|
| Tightening torque | Bolt (1) | 77.5 to 90.2 N·m<br>7.9 to 9.2 kgf·m<br>57.2 to 66.5 ft-lbs |
| | Bolt and Nut (2) | 48.1 to 55.8 N·m<br>4.9 to 5.7 kgf·m<br>35.5 to 41.2 ft-lbs |

(1) Bolt
(2) Bolt, Nut
(3) Belt
(4) Left Hand Shield
(5) Right Hand Shield
(6) Mower Gear Box

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## Bleeding Fuel System

**Air must be removed :**

1. When the fuel filter or lines are removed.
2. When tank is completely empty.
3. After the machine has not been used for a long period of time.

**Bleeding procedure is as follows :**

1. Fill the fuel tank with fuel.
2. Start the engine and run for about 30 seconds, and then stop the engine.

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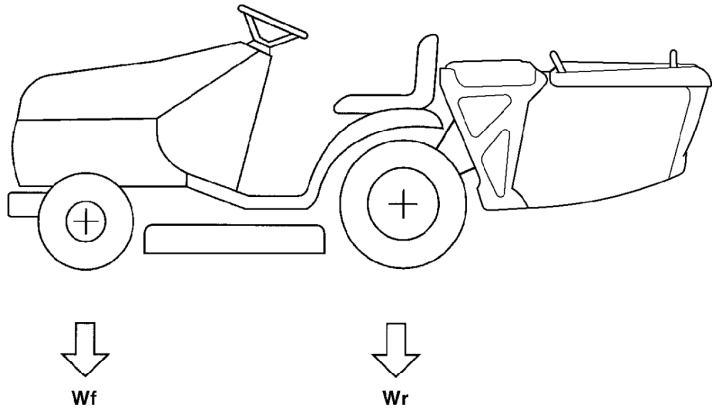
# 10. IMPLEMENT LIMITATIONS

The KUBOTA Machine has been thoroughly tested for proper performance with implements sold or approved by KUBOTA. Use of implements which are not sold or approved by KUBOTA and which exceed the maximum specifications listed below, or which are otherwise unfit for use with the KUBOTA Machine may result in malfunctions or failures of the machine, damage to other property and injury to the operator or others. [Any malfunctions or failures of the machine resulting from use with improper implements are not covered by the warranty.]

| Maximum axle loading weight | | |
|---|---|---|
| Front axle Wf | Rear axle Wr | Total gross weight |
| 250 kg (551 lbs) | 450 kg (992 lbs) | 600 kg (1323 lbs) |

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| Symptom | Probable Cause | Solution | Reference Page |
|---|---|---|---|
| **Water Mixed into Lubricant Oil** | Head gasket defective | Replace | 1-S23 |
| | Cylinder block or cylinder head flawed | Replace | – |
| **Low Oil Pressure** | Engine oil insufficient | Replenish | G-8, 14 |
| | Oil strainer clogged | Clean | – |
| | Oil filter clogged | Replace | G-28 |
| | Relief valve stuck with dirt | Clean | – |
| | Relief valve spring weaken or broken | Replace | – |
| | Excessive oil clearance of crankshaft bearing | Replace | 1-S48 |
| | Excessive oil clearance of crankpin bearing | Replace | 1-S46 |
| | Excessive oil clearance of rocker arm | Replace | 1-S39 |
| | Oil passage clogged | Clean | – |
| | Different type of oil | Use specified type of oil | G-8 |
| | Oil pump defective | Repair or replace | 1-S27 |
| **High Oil Pressure** | Different type of oil | Use specified type of oil | G-8 |
| | Relief valve defective | Replace | – |
| **Engine Overheated** | Engine oil insufficient | Replenish | G-8 |
| | Fan belt broken or tensioned improperly | Replace or adjust | G-28, 1-S13 |
| | Coolant insufficient | Replenish | G-8 |
| | Radiator net and radiator fin clogged with dust | Clean | – |
| | Inside of radiator corroded | Clean or replace | G-32, 1-S21 |
| | Coolant flow route corroded | Clean or replace | G-32 |
| | Radiator cap defective | Replace | 1-S14 |
| | Radiator hose damaged | Replace | G-30 |
| | Overload running | Reduce the load | – |
| | Head gasket defective | Replace | 1-S23 |
| | Incorrect injection timing | Adjust | 1-S15 |
| | Unsuitable fuel used | Use specified fuel | G-8 |

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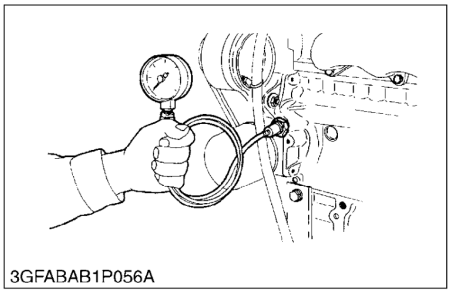
## (2) Lubricating System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**Engine Oil Pressure**

1. Remove the engine oil pressure switch, and set an oil pressure tester (Code No.: 07916-32032).
2. Start the engine. After warming up, measure the oil pressure of both idling and rated speeds.
3. If the oil pressure is less than the allowable limit, check the following.

- Engine oil insufficient
- Oil pump defective
- Oil strainer clogged
- Oil filter cartridge clogged
- Oil gallery clogged
- Excessive oil clearance
- Foreign matter in the relief valve

| | | | |
|---|---|---|---|
| Engine oil pressure | At idle speed | Factory spec. | More than 49 kPa<br>0.5 kgf/cm$^2$<br>7 psi |
| | At rated speed | Factory spec. | 196 to 441 kPa<br>2.0 to 4.5 kgf/cm$^2$<br>28 to 64 psi |
| | | Allowable limit | 147 kPa<br>1.5 kgf/cm$^2$<br>21 psi |

**(When reassembling)**

- After checking the engine oil pressure, tighten the engine oil pressure switch to the specified torque.

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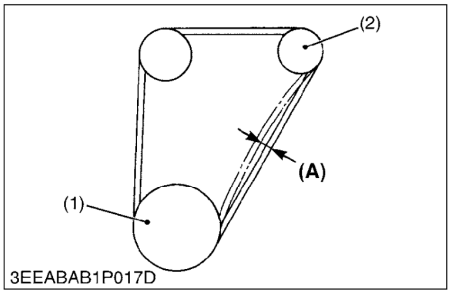
## (3) Cooling System



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**Checking Fan Drive Belt Tension**

**CAUTION**

- **Be sure to stop the engine and remove the key before checking belt tension.**

1. Measure the deflection **(A)**, depressing the belt halfway between the fan drive pulley (1) and dynamo pulley (2) at specified force 98 N (10 kgf, 22 lbs).
2. If the measurement is not within the factory specifications, loosen the dynamo mounting screws and relocate the dynamo to adjust.

| | | |
|---|---|---|
| Deflection **(A)** | Factory spec. | 7.0 to 9.0 mm<br>0.28 to 0.35 in. |

(1) Fan Drive Pulley (2) Dynamo pulley

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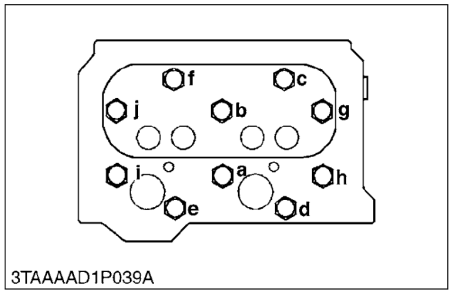

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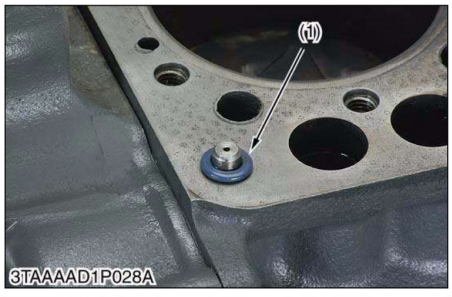

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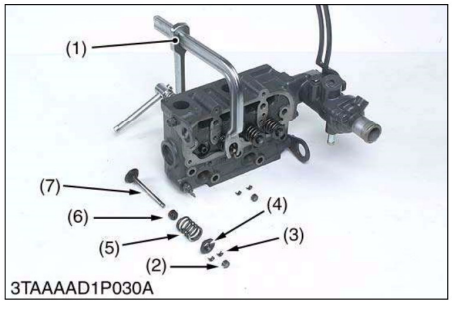

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## Cylinder Head

1. Loosen the pipe clamp, and remove the water return pipe.
2. Remove the cylinder head screw in the order of (**j**) to (**a**).
3. Lift up the cylinder head to detach.
4. Remove the cylinder head gasket and O-ring (1).

**(When reassembling)**

- Replace the cylinder head gasket with a new one.
- Securely fit the O-ring (1) to the pipe pin.
- Tighten the cylinder head screws after applying sufficient oil.
- Tighten the cylinder head screws diagonal sequence starting from the centre.
- Tighten them uniformly, or the head may deform in the long run.
- Retighten the cylinder head screws after running the engine for 30 minutes.

| | | |
|---|---|---|
| Tightening torque | Cylinder head screw | 37.3 to 42.2 N·m<br>3.8 to 4.3 kgf·m<br>27.5 to 31.1 ft-lbs |

**(j) to (a) : To Loosen**
**(a) to (j) : To Tighten**

(1) O-ring

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## Tappets

1. Remove the tappets (1) from the crankcase.

**(When reassembling)**

- Visually check the contact between tappets and cams for proper rotation. If defect is found, replace tappets.
- Before installing the tappets, apply engine oil thinly around them.

**IMPORTANT**

- **Do not change the combination of tappet and tappet guide.**

(1) Tappet

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## Valves

1. Remove the valve caps (2).
2. Remove the valve spring collet (3), pushing the valve spring retainer (4) by valve spring replacer (1).
3. Remove the valve spring retainer (4), valve spring (5) and valve stem seal (6).
4. Remove the valve (7).

**(When reassembling)**

- Wash the valve stem seal and valve guide hole, and apply engine oil sufficiently.
- After installing the valve spring collets, lightly tap the stem to assure proper fit with a plastic hammer.

**IMPORTANT**

- **Do not change the combination of valve and valve guide.**

(1) Valve Spring Replacer
(2) Valve Cap
(3) Valve Spring Collet
(4) Valve Spring Retainer
(5) Valve Spring
(6) Valve Stem Seal
(7) Valve

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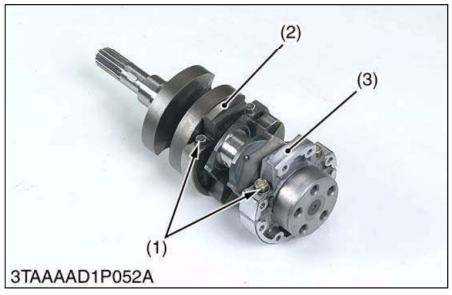

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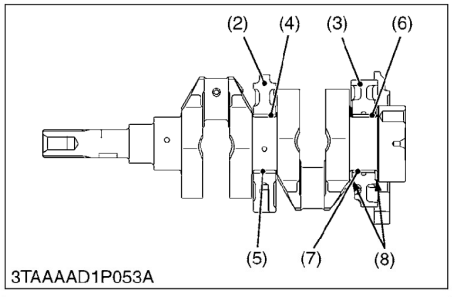

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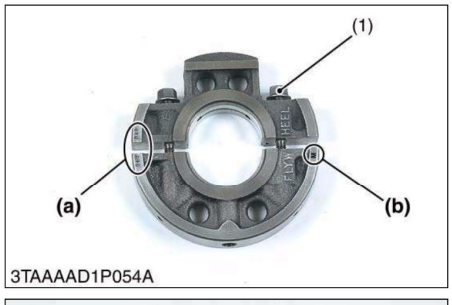

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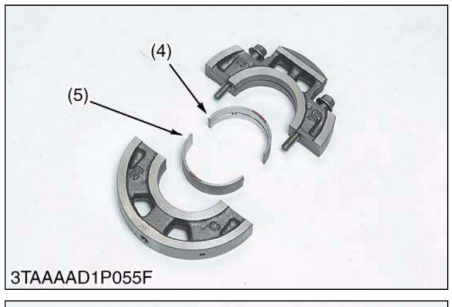

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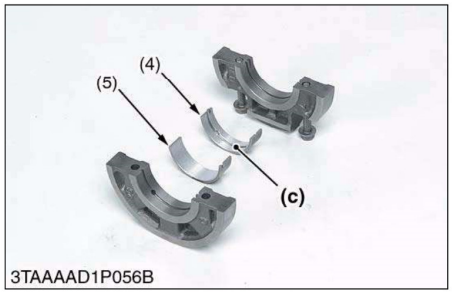

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## Main Bearing Case Assembly

1. Remove the two main bearing case screws 1 (1), and remove the main bearing case assembly 1 (2), being careful with crankshaft bearing 3 (4), (5).
2. Remove the main bearing case assembly (3) as above. Keep in mind, however, that the thrust bearing (8) is installed in the main bearing case assembly (3).

**(When reassembling)**

- Clean the oil passage in the main bearing cases.
- Apply clean engine oil on the bearings.
- Install the main bearing case assemblies in original positions. Since diameters of main bearing cases vary, install them in order to marking **(b)** from the gear case side. (Refer to the figure.).
- Match the alignment numbers **(a)** on the main bearing case assembly 1.
- Do the same for the main bearing case assembly (3) too.
- When installing the main bearing case 1, face the mark **"FLYWHEEL"** to the flywheel.
- Install the thrust bearing (8) with its oil groove facing outward.
- Confirm that the main bearing case moves smoothly after tightening the main bearing case screw 1 to the specified torque.

| | | |
|---|---|---|
| Tightening torque | Main bearing case screw 1 | 12.7 to 15.7 N·m<br>1.3 to 1.6 kgf·m<br>9.4 to 11.6 ft-lbs |

(1) Main Bearing Case Screw 1
(2) Main Bearing Case Assembly 1
(3) Main Bearing Case Assembly
(4) Crankshaft Bearing 3 (Upper, with oil groove)
(5) Crankshaft Bearing 3 (Lower)
(6) Crankshaft Bearing 2 (Upper, with oil groove)
(7) Crankshaft Bearing 2 (Lower)
(8) Thrust Bearing

**(a) Alignment Number**
**(b) Marking**
**(c) Oil Groove**

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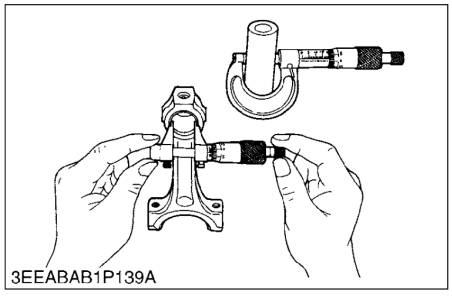
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**Oil Clearance between Piton Pin and Small End Bushing**

1. Measure the piston pin O.D. where it contacts the bushing with an outside micrometer.
2. Measure the small end bushing I.D. with an inside micrometer, and calculate the oil clearance.
3. If the oil clearance exceeds the allowable limit, replace the bushing. If it still exceeds the allowable limit, replace the piston pin.

| | | |
|---|---|---|
| Oil clearance between piston pin and small end bushing | Factory spec. | 0.014 to 0.038 mm<br>0.00055 to 0.00150 in. |
| | Allowable limit | 0.10 mm<br>0.0039 in. |

| | | |
|---|---|---|
| Piston pin O.D. | Factory spec. | 20.002 to 20.011 mm<br>0.78748 to 0.78783 in. |
| Small end bushing I.D. | Factory spec. | 20.025 to 20.040 mm<br>0.78839 to 0.78897 in. |

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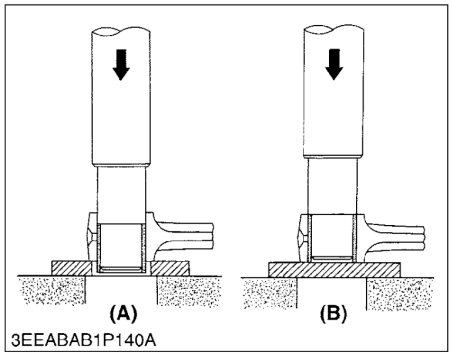

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**Replacing Small End Bushing**

**(When removing)**

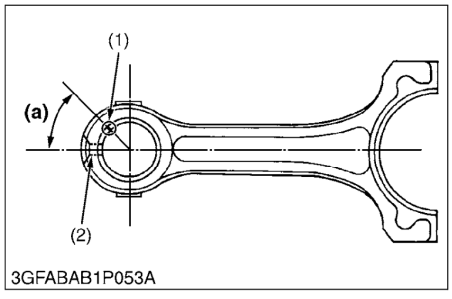
1. Press out the used bushing using a small end bushing replacing tool.

**(When installing)**

1. Clean a new small end bushing and bore, and apply engine oil to them.
2. Insert a new bushing onto the tool and press-fit it with a press so that the seam (1) of bushing positions as shown in the figure, until it is flush with the connecting rod.
3. Drill a hole to the bushing with aligning the oil hole (2) of connecting rod. (Refer to the figure.)

**NOTE**

- **Be sure to chamfer the oil hole circumference with an oil stone.**



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| | | |
|---|---|---|
| Oil clearance between piston pin and small end bushing (Spare parts) | Factory spec. | 0.015 to 0.075 mm<br>0.00059 to 0.00295 in. |
| | Allowable limit | 0.15 mm<br>0.0059 in. |

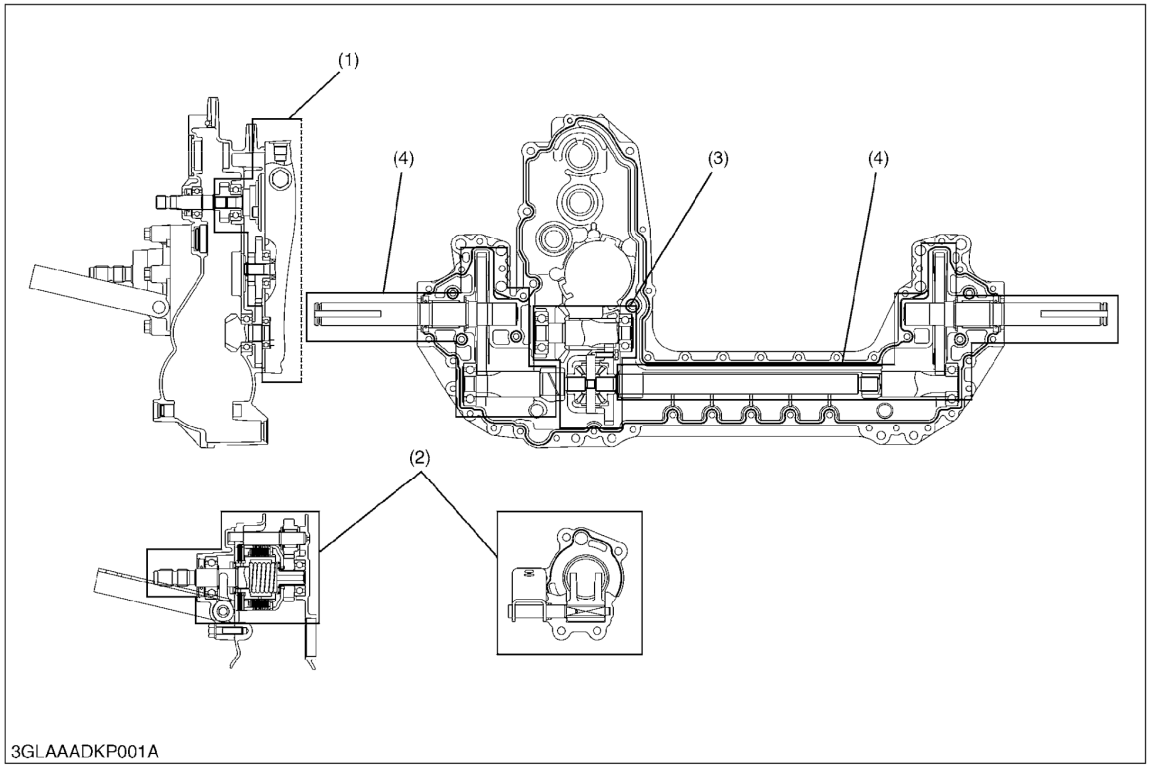
| | | |
|---|---|---|
| Small end bushing I.D. (Spare parts) | Factory spec. | 20.026 to 20.077 mm<br>0.78845 to 0.79043 in. |

(1) Seam
(2) Oil Hole

**(A) When removing**
**(B) When installing**
**(a) 0.785 rad. (45°)**

W11437590

# 1. STRUCTURE

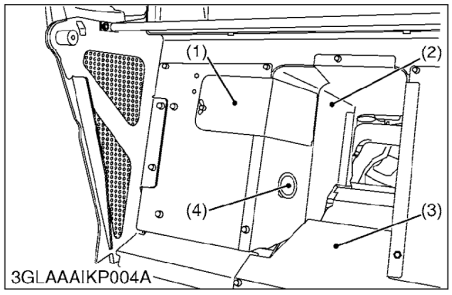



(1) Hydraulic Transmission Section
(2) Mower PTO Section
(3) Differential Gear Section
(4) Rear Axle Section

The transaxle of this machine is constructed as shown above.

# SERVICING

## CONTENTS

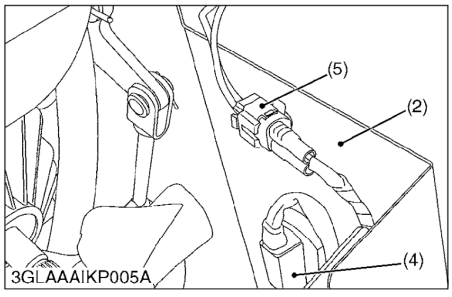


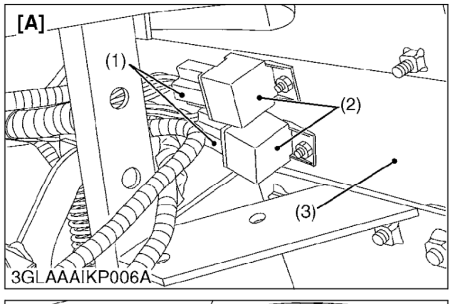

## Discharge Duct

1. Remove the filter cover (1) and the duct plate (3).
2. Disconnect the connector (5) from the grass container full switch (4).
3. Remove the discharge duct (2).

(1) Filter Cover
(2) Discharge Duct
(3) Duct Plate
(4) Grass Container Full Switch
(5) Connector

W1012965



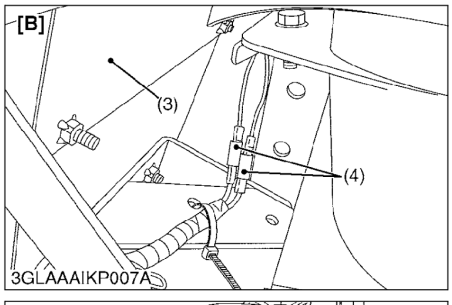



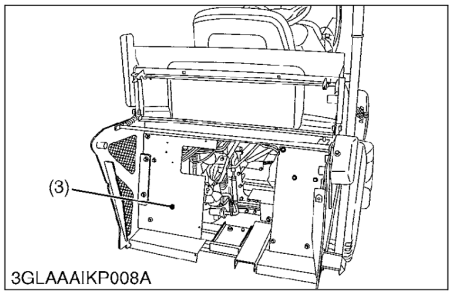

## Container Base

1. Disconnect the couplers (1) from the relays (2).
2. Disconnect the connector (4).
3. Remove the container base (3).

(1) Coupler
(2) Relay
(3) Container Base
(4) Connector
**[A] Left Side**
**[B] Right Side**

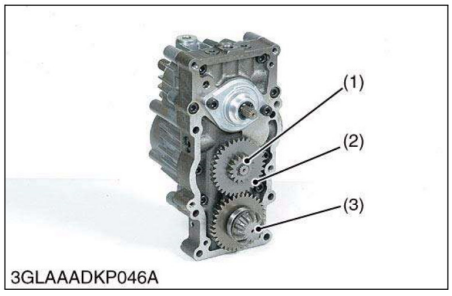
W1013019



# [3] DISASSEMBLING AND ASSEMBLING

## (1) Hydrostatic Transmission

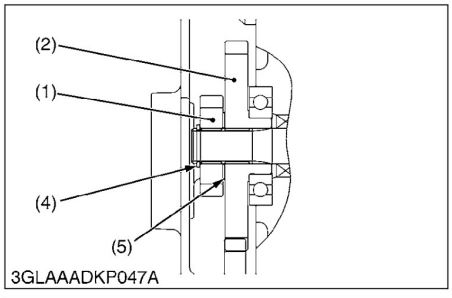


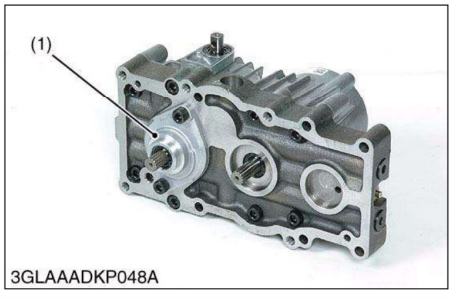

### 15T Gear, 34T Gear and Bevel Gear Shaft

1. Remove the external snap ring (4). And pull out the 15T gear (1) and 34T gear (2).
2. Remove the bevel gear shaft (3).

(1) 15T Gear
(2) 34T Gear
(3) Bevel Gear Shaft
(4) External Snap Ring
(5) Shim

W1017904




### Charge Pump Housing and Charge Relief Valve

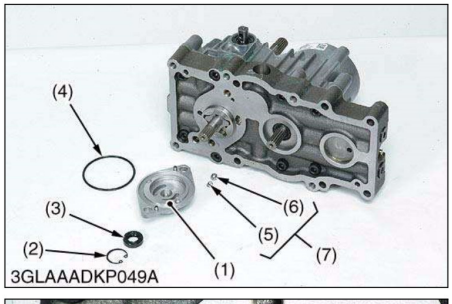
1. Remove the charge pump housing (1).
2. Remove the spring (5) and the steel ball (6).
3. Remove the O-ring (4) from the charge pump housing (1).
4. Remove the internal snap ring (2) and the oil seal (3).

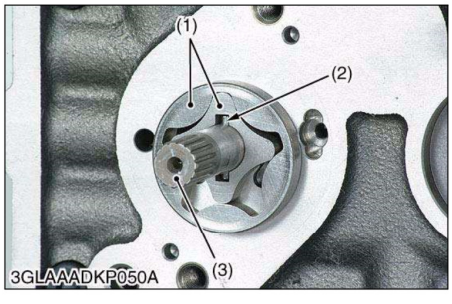
**NOTE**

- **When removing the oil seal (3), take care not to damage the charge pump housing (1).**
- **Take care not to damage the O-ring (4).**

(1) Charge Pump Housing
(2) Internal Snap Ring
(3) Oil Seal
(4) O-ring
(5) Spring
(6) Steel Ball
(7) Charge Relief Valve

W1018141




### Gerotor

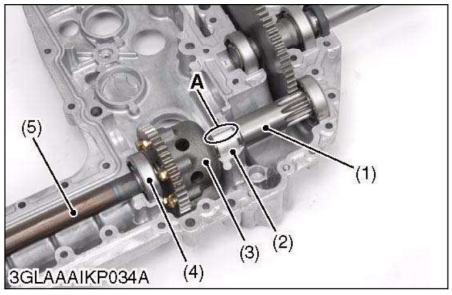
1. Remove the gerotor (1).
2. Draw out the drive pin (2) on the pump shaft (3).

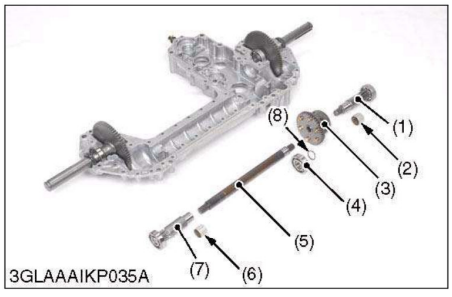
**(When reassembling)**

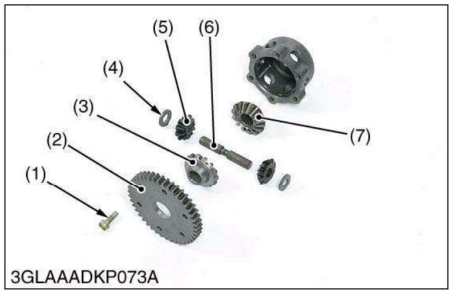
- Apply clean transmission oil to the both side of gerotors.

(1) Gerotor
(2) Drive Pin
(3) Pump Shaft

W1018461




**Rear Differential Gear, Drive Shaft and 11T Gear Shaft (RH, LH) (For Machine with Serial Number above 30001)**

1. Remove the rear differential gear assembly (3), 11T gear shafts (1), (7) and drive shaft (5).
2. Remove the external snap ring (8) and bearing (4) from drive shaft (5).

**(When reassembling)**

- When installing the bushes (2), (6) in the rear side of transaxle case, direct the splits of bush (A) to the front side.

(1) 11TGear Shaft (LH)
(2) Bush
(3) Rear Differential Gear Assembly
(4) Bearing
(5) Drive Shaft
(6) Bush
(7) 11T Gear Shaft (RH)
(8) External Snap Ring
**A : Split of Bush**

W1071079

**Rear Differential Gear Assembly**

1. Remove the 42T gear mounting screws (1).
2. Remove the 42T gear (2) and differential side gear (3).
3. Remove the differential pinion shaft (6).
4. Remove the differential pinion gears (5), differential side gear (7) and shims (4).

**NOTE**

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

**(When reassembling)**

- Apply molybdenum disulfide (Three Bond 1901 or equivalent) to the inner circumferential surface of differential pinion gears (5), differential side gears (3), (7) and shims (4).

| | | |
|---|---|---|
| Tightening torque | 42T gear mounting screw | 9.8 to 11.3 N·m<br>1.00 to 1.15 kgf·m<br>7.23 to 8.33 lbf-ft |

(1) 42T Gear Mounting Screw
(2) 42T Gear
(3) Differential Side Gear
(4) Shim
(5) Differential Pinion Gear
(6) Differential Pinion Shaft
(7) Differential Side Gear

W1025887


## PTO Brake Disc Wear

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

| | | |
|---|---|---|
| PTO brake disc thickness | Factory spec. | 3.3 to 3.5 mm<br>0.13 to 0.14 in. |
| | Allowable limit | 3.00 mm<br>0.118 in. |

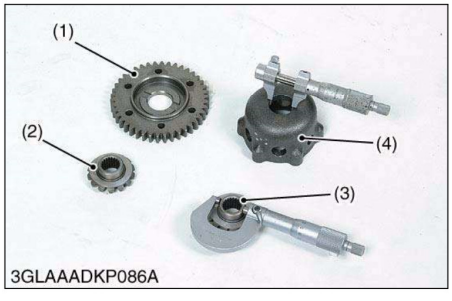
W1029677


## Friction Plate Wear

1. Measure the thickness of brake friction plate 1, 2 with vernier calipers.
2. If the thickness is less than the allowable limit, replace it.

| | | |
|---|---|---|
| Thickness of brake friction plate 1 | Factory spec. | 1.75 to 1.85 mm<br>0.069 to 0.073 in. |
| | Allowable limit | 1.60 mm<br>0.063 in. |
| Thickness of brake friction plate 2 | Factory spec. | 0.95 to 1.05 mm<br>0.037 to 0.041 in. |
| | Allowable limit | 0.80 mm<br>0.031 in. |

W1029986




## Clearance between Differential Gear Case and Differential Side Gear

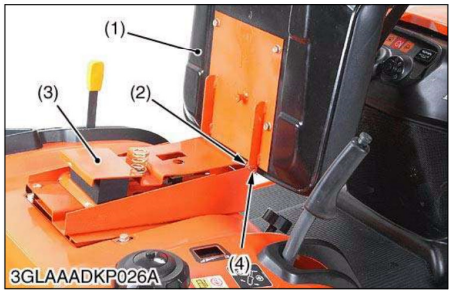
1. Measure the differential gear case (4) bore I.D..
2. Measure the differential side gear (3) boss O.D., and calculate the clearance.
3. Measure the 42T gear (1) bore I.D..
4. Measure the differential side gear (2) boss O.D., and calculate the clearance.
5. If the clearance exceeds the allowable limit, replace faulty parts.

| | | |
|---|---|---|
| Clearance between differential case and differential side gear | Factory spec. | 0.040 to 0.082 mm<br>0.0016 to 0.0032 in. |
| | Allowable limit | 0.17 mm<br>0.0067 in. |
| Clearance between 42T gear and differential side gear | Factory spec. | 0.040 to 0.082 mm<br>0.0016 to 0.0032 in. |
| | Allowable limit | 0.17 mm<br>0.0067 in. |

| | | |
|---|---|---|
| Differential case bore I.D. | Factory spec. | 22.500 to 22.521 mm<br>0.8858 to 0.8867 in. |
| Differential side gear boss O.D. | Factory spec. | 22.439 to 22.460 mm<br>0.8834 to 0.8843 in. |
| 42T gear bore I.D. | Factory spec. | 22.500 to 22.521 mm<br>0.8858 to 0.8867 in. |

(1) 42T Gear
(2) Differential Side Gear
(3) Differential Side Gear
(4) Differential Gear Case

W1030169




## Seat

1. Remove two snap pins (2), (4).
2. Remove the seat (1) and seat plate (3).

(1) Seat
(2) Snap pin
(3) Seat Plate
(4) Snap Pin

W1011458


## Fender

1. Remove the speed change pedal (5).
2. Peel the step sheet (4) halfwave.
3. Remove the fuel cap (1).
4. Remove the fender (2).

(1) Fuel Cap
(2) Fender
(3) Fender Mounting Screw
(4) Step Sheet
(5) Speed Change Pedal

W1011701


## Steering Wheel, Side Bonnet and Panel

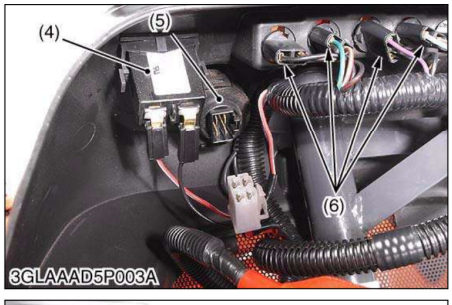
1. Remove the steering wheel (1).
2. Remove the side bonnet (3).
3. Remove the accelerator lever grip.
4. Disconnect the connectors for hour meter (4), main switch (5) and light switch.
5. Remove the indicator lamps (6).
6. Remove the fuse box (7) from the steering support.
7. Remove the panel (2).

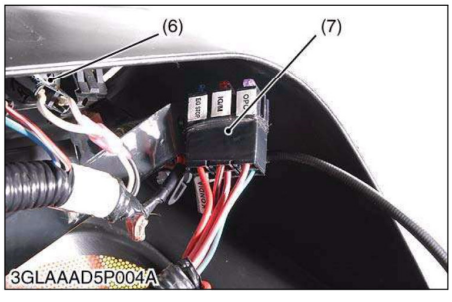
**(When reassembling)**

| | | |
|---|---|---|
| Tightening torque | Steering Wheel mounting nut | 20 to 25 N·m<br>2.0 to 2.5 kgf·m<br>14.8 to 18.4 ft-lbs |

(1) Steering Wheel
(2) Panel
(3) Side Bonnet
(4) Hour Meter
(5) Main Switch
(6) Indicator Lamp
(7) Fuse Box

W1011932



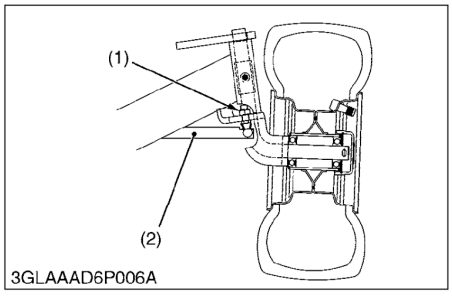

## Separating Engine

1. Refer to "**[2] PREPARATION**" of "**4. CHECKING, DISASSEMBLING AND SERVICING**" at "**1. ENGINE**" section.

W1012295

# [3] DISASSEMBLING AND ASSEMBLING

## (1) Front Axle Assembly




**Tie-rod**

1. Remove the tie-rod mounting locking nut (1).
2. Remove the tie-rod (2).

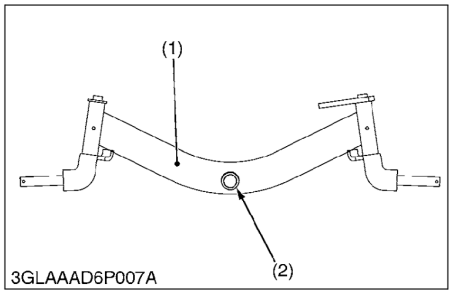
**(When reassembling)**

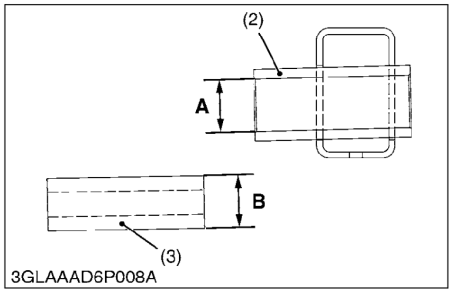
| | | |
|---|---|---|
| Tightening torque | Tie-rod mounting locking nut | 49.9 to 54.2 N·m<br>5.09 to 5.53 kgf·m<br>36.8 to 40.0 ft-lbs |

(1) Tie-rod Mounting Locking Nut (2) Tie-rod

W1012154

# [4] SERVICING




**Clearance between Center Pin Boss and Center Pin Collar**

1. Measure the center pin boss (2) I.D. with a cylinder gauge.
2. Measure the center pin collar (3) O.D. with an outside micrometer and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace them.

| | | |
|---|---|---|
| Clearance between center pin boss and center pin collar | Factory spec. | 0.109 to 0.200 mm<br>0.00430 to 0.00789 in. |
| | Allowable limit | 0.210 mm<br>0.0828 in. |

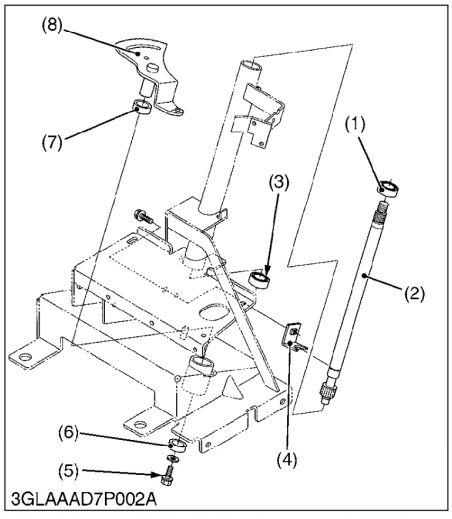
| | | |
|---|---|---|
| Center pin boss I.D. (**A**) | Factory spec. | 25.400 to 25.430 mm<br>1.00000 to 1.00118 in. |
| Center pin collar O.D. (**B**) | Factory spec. | 25.230 to 25.291 mm<br>0.99329 to 0.99570 in. |

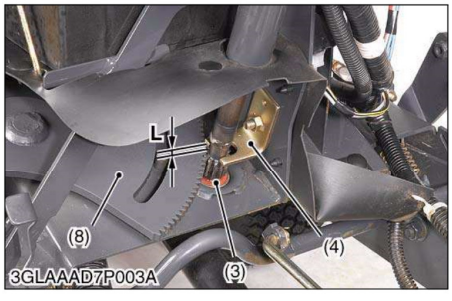
(1) Front Axle Frame (3) Center Pin Collar
(2) Center Pin Boss

W1012404

# [3] DISASSEMBLING AND ASSEMBLING

## (1) Steering Support Assembly




**Steering Shaft and Sector Gear**

1. Remove the shaft retainer (4).
2. Remove the sector gear mounting screw (5), and remove the sector gear (8).
3. Remove the steering bearing (1) and ball bearing (3).
4. Pull out the steering shaft (2).

**(When reassembling)**

- Apply to grease to the sector gear teeth.
- Apply to grease to the pinion teeth of steering shaft.
- Apply to grease to the sector bushes (6), (7).
- Apply to grease to the steering bearing.
- Adjust the clearance between the shaft retainer and the pinion gear of steering shaft.

**(Reference)**

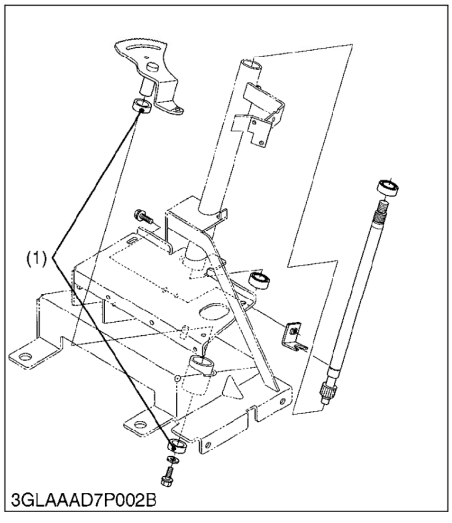
- Length (**L**) : 1 mm (0.040 in.)

| | | |
|---|---|---|
| Tightening torque | Sector gear mounting screw | 48.1 to 55.8 N·m<br>4.9 to 5.7. kgf·m<br>35.5 to 41.2 ft-lbs |

(1) Steering Bearing
(2) Steering Shaft
(3) Ball Bearing
(4) Shaft Retainer
(5) Sector Gear Mounting Screw
(6) Sector Bush
(7) Sector Bush
(8) Sector Gear

W1012713

# [4] SERVICING




**Steering Support Bushing Wear**

1. Visually inspect the sector bushes (1) for signs of wear or damage.
2. If defect are found, replace the sector bush (1).

(1) Sector Bush

W1013149

## STARTING SYSTEM

| Symptom | Probable Cause | Solution | Reference Page |
|---|---|---|---|
| **Starter Motor Does Not Operate** | Battery discharged or defective | Recharge or replace | G-24, 1-S19 |
| | Slow blow fuse blown (40 A) | Replace | G-35 |
| | Wiring harness disconnected or improperly connected (between main switch ST terminal and safety switches, between safety switches and starter motor, between battery positive terminal and starter motor) | Repair or replace | – |
| | Starter motor defective | Repair or replace | 6-S20 |
| | Main switch defective | Replace | 6-S8, 9 |
| | Seat switch defective | Replace | 6-S13 |
| | Brake switch defective | Replace | 6-S12 |
| | PTO switch defective | Replace | 6-S12 |
| | Top cover open switch defective | Replace | 6-S13 |
| | Grass container open switch defective | Replace | 6-S13 |
| **Engine Does Not Stop When Main Switch is Turned OFF** | Fuse blown (15 A) | Replace | G-35 |
| | Wiring harness disconnected or improperly connected (between main switch **ACC** terminal and engine stop solenoid) | Repair or replace | – |
| | Engine stop solenoid defective | Replace | 6-S14 |
| | Timer relay defective | Replace | 6-S15 |
| **Engine Does Not Start** | Engine stop solenoid defective | Replace | 6-S14 |
| | Timer relay defective | Replace | 6-S15 |

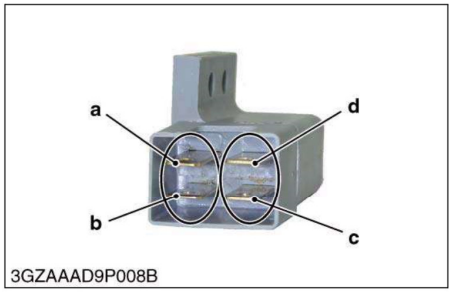
W1013580

## CHARGING SYSTEM

| | | | |
|---|---|---|---|
| **Charging Lamp Does Not Light when Main Switch is Turned ON** | Fuse blown (15 A) | Replace | G-35 |
| | Bulb blown | Replace | G-35 |
| | Wiring harness disconnected or improperly connected (between main switch **ACC** terminal and regulator connector terminal (yellow), between regulator connector terminal (green) and charge lamp) | Repair or replace | – |
| | Regulator defective | Replace | – |
| **Charging Lamp Does Not Go Off When Engine is Running** | Dynamo defective | Repair or replace | 6-S21 |
| | Regulator defective | Replace | 6-S15, 16 |

W1019547

## (5) Safety Switch


### PTO Switch

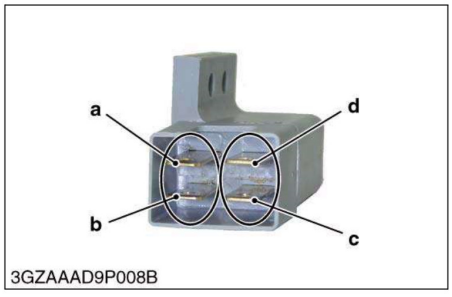
1. Remove the battery.
2. Remove the fender.
3. Disconnect the connector from the PTO switch (1).
4. Measure the resistance with an ohmmeter between the terminals.
5. If the PTO switch is defective, replace it.

| | | |
|---|---|---|
| Resistance (between terminal **a** and **b**) | When plunger is pushed | 0 Ω |
| | When plunger is released | Infinity |
| Resistance (between terminal **c** and **d**) | When plunger is pushed | 0 Ω |
| | When plunger is released | Infinity |

(1) PTO Switch
(2) PTO Lever

**a to d :Safety Switch Terminal**

W10158610


### Brake Switch

1. Remove the battery.
2. Remove the fender.
3. Disconnect the connector from the brake switch (1).
4. Measure the resistance with an ohmmeter between the terminals.
5. If the brake switch is defective, replace it.

| | | |
|---|---|---|
| Resistance (between terminal **a** and **b**) | When plunger is pushed | 0 Ω |
| | When plunger is released | Infinity |
| Resistance (between terminal **c** and **d**) | When plunger is pushed | 0 Ω |
| | When plunger is released | Infinity |

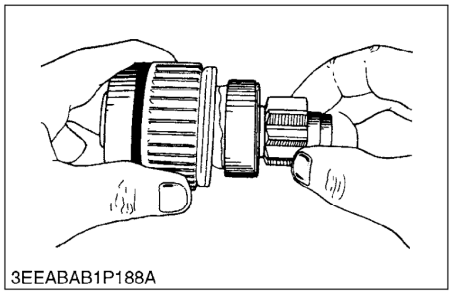
(1) Brake Switch

**a to d :Safety Switch Terminal**

W10413270

# [3] SERVICING

## (1) Starter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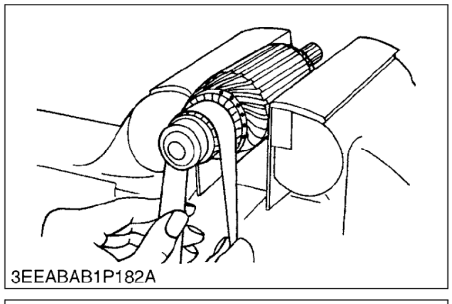
### Overrunning Clutch

1. Inspect the pinion for wear or damage.
2. If there is any defect, replace the overrunning clutch assembly.
3. Check that the pinion turns freely and smoothly in the overrunning direction and does not slip in the cranking direction.
4. If the pinion slips or does not rotate in the both directions, replace the overrunning clutch assembly.

W1016990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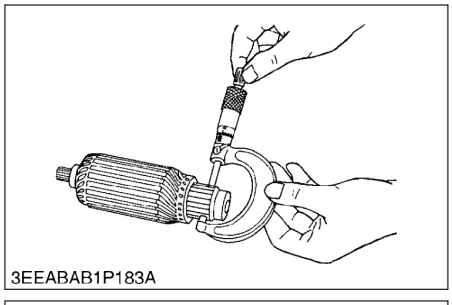
### Commutator and Mica

1. Check the contact face of the commutator for wear, and grind the commutator with emery paper if it is slightly worn.
2. Measure the commutator O.D. with an outside micrometer at several points.
3. If the minimum O.D. is less than the allowable limit, replace the armature.
4. If the difference of the O.D.'s exceeds the allowable limit, correct the commutator on a lathe to the factory specification.
5. Measure the mica undercut.
6. If the undercut is less than the allowable limit, correct it with a saw blade and chamfer the segment edges.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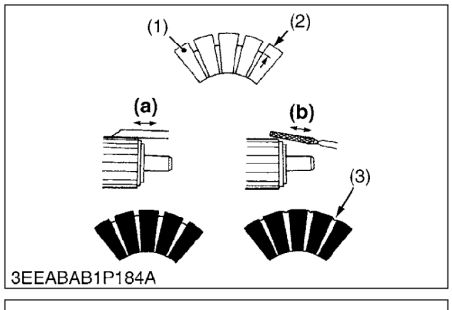
| | | |
|---|---|---|
| Commutator O.D. | Factory spec. | 28.0 mm<br>1.102 in. |
| | Allowable limit | 27.0 mm<br>1.063 in. |

| | | |
|---|---|---|
| Difference of O.D.'s | Factory spec. | Less than 0.05 mm<br>0.002 in. |
| | Allowable limit | 0.4 mm<br>0.016 in. |

| | | |
|---|---|---|
| Mica undercut | Factory spec. | 0.50 to 0.80 mm<br>0.0197 to 0.0315 in. |
| | Allowable limit | 0.20 mm<br>0.0079 in. |



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(1) Segment
(2) Undercut
(3) Mica

**(a) Correct**
**(b) Incorrect**

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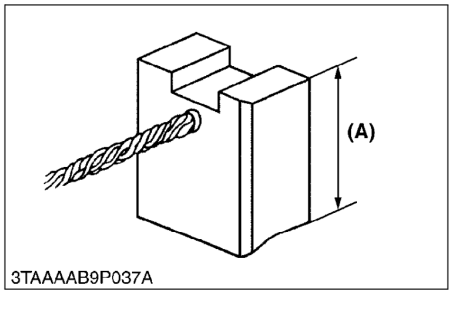

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### Brush Wear

1. If the contact face of the brush is dirty or dusty, clean it with emery paper.
2. Measure the brush length **(A)** with vernier calipers.
3. If the length is less than the allowable limit, replace the yoke assembly and brush holder.

| | | |
|---|---|---|
| Brush length **(A)** | Factory spec. | 16.0 mm<br>0.630 in. |
| | Allowable limit | 10.5 mm<br>0.413 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**" at " **G.GENERAL**" section.)

| Item | N·m | kgf·m | ft-lbs |
|---|---|---|---|
| Mower blade screw | 98 to 118 | 10.0 to 12.0 | 72.3 to 86.8 |
| Gear box mounting screw | 77.5 to 90.2 | 7.9 to 9.2 | 57.2 to 66.5 |
| Gear box bracket mounting screw and nut | 48.1 to 55.8 | 4.9 to 5.7 | 35.5 to 41.2 |
| Pulley mounting screw (gear box) | 77.5 to 90.2 | 7.9 to 9.2 | 57.2 to 66.5 |
| Pulley mounting nut (pulley holder) | 103 to 118 | 10.5 to 12.0 | 76.0 to 87.0 |
| Pulley holder mounting screw | 48.1 to 55.8 | 4.9 to 5.7 | 35.5 to 41.2 |

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