WSM

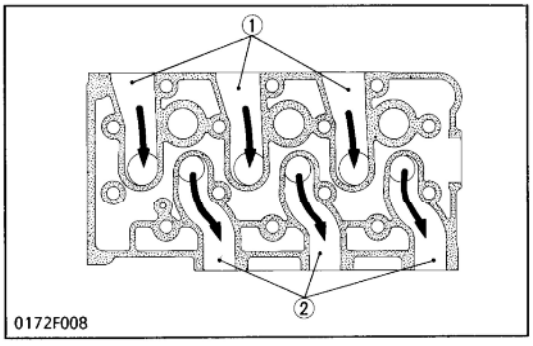
WORKSHOP MANUAL

G1700, G1800, G1900, G2000

Kubota

KiSC issued 12, 2017 A

(2) Cylinder Head



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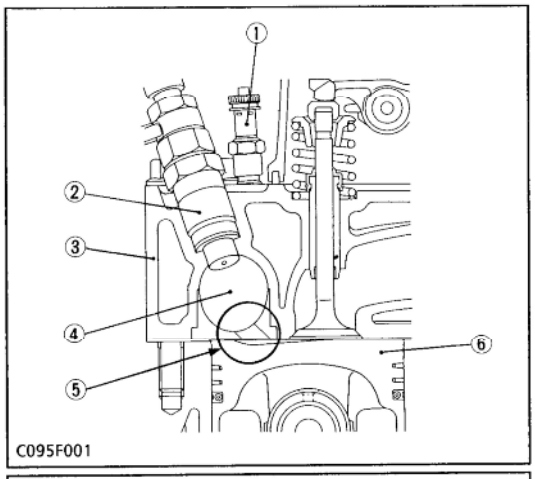
■ Intake and Exhaust Port

The cross-flow type intake / exhaust ports, which lower the heat conduction from the exhaust port to the intake port. The low heat conduction keeps the intake air from being heated and expanded by the exhaust gas.

(1) Intake Port
(2) Exhaust Port



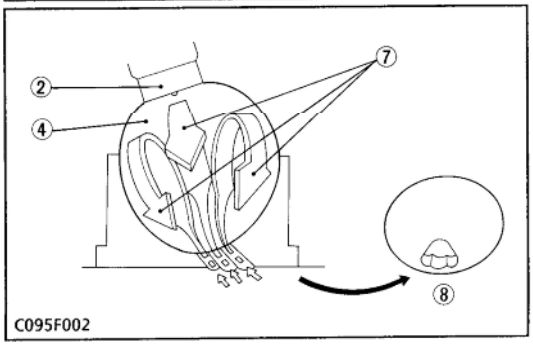
C095F001

■ Combustion System

These engine use the "NTVCS" (New Three Vortex Combustion System) to achieve perfect combustion for maximum power. The NTVCS combustion system provides unique shape of throat in the air inlet (8) for combustion chamber, to produce three streams (7) of air in the chamber (4) when compressing, giving an ideal mixture of air and fuel.

In addition, a fan-shaped concave (5) is provided on top of the piston (6) to allow a smooth ejection of the exhaust gas, offering highly efficient combustion.

(1) Glow Plug
(2) Injection Nozzle
(3) Cylinder Head
(4) Combustion Chamber
(5) Fan-shaped Concave
(6) Piston
(7) Stream
(8) Air Inlet



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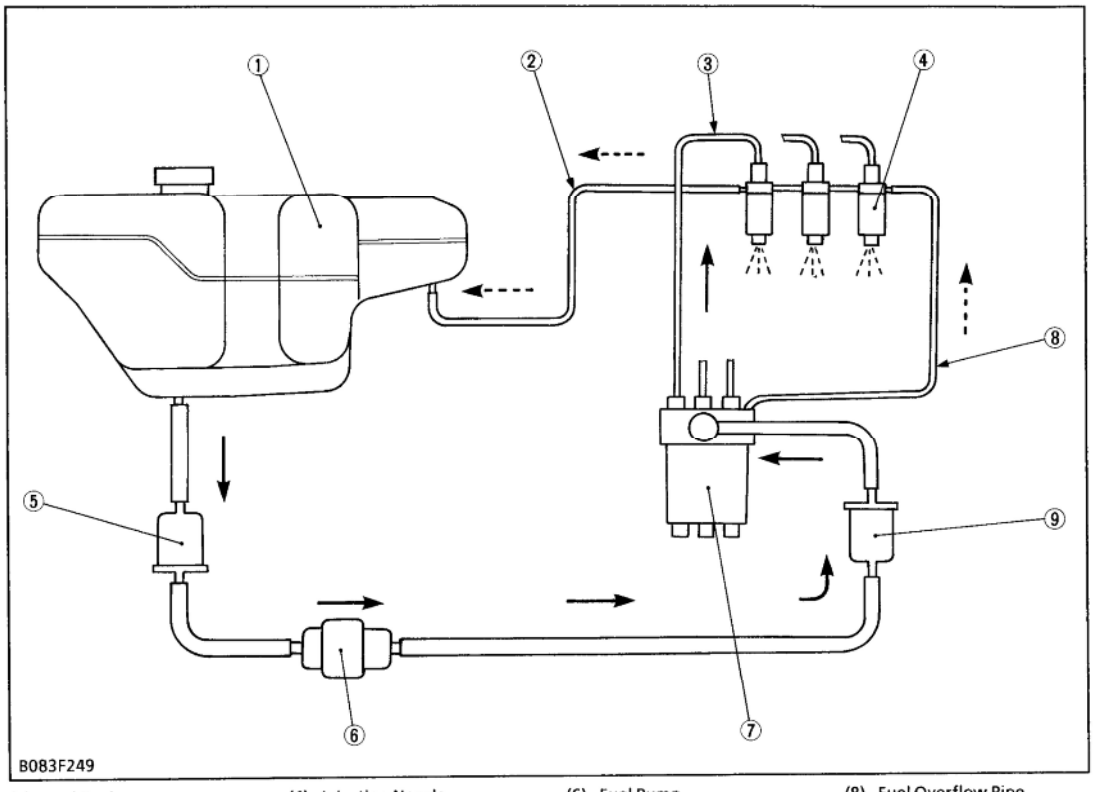
[5] FUEL SYSTEM



(1) Fuel Tank
(2) Fuel Return Pipe
(3) Injection Pipe
(4) Injection Nozzle
(5) Fuel Filter
(6) Fuel Pump
(7) Fuel Injection Pump
(8) Fuel Overflow Pipe
(9) Fuel Filter

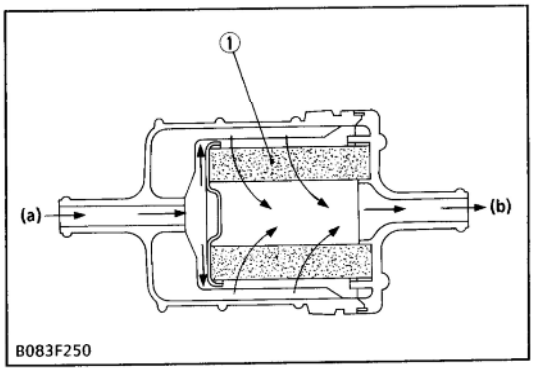
The fuel system consists of a fuel tank (1), fuel filters (5), (9), a fuel pump (6), a fuel injection pump (7) and injection nozzles (4).

When the main switch is turned **"ON"**, the fuel pump starts to feed the fuel to the fuel injection pump through the filters.

While the engine is running, the fuel injection pump pressure-feeds the fuel to the injection nozzles through the injection pipe, then the fuel is injected to the combustion chamber.

Any fuel leaking from the nozzles returns to the fuel tank through the fuel return pipe (2).

(1) Fuel Filter



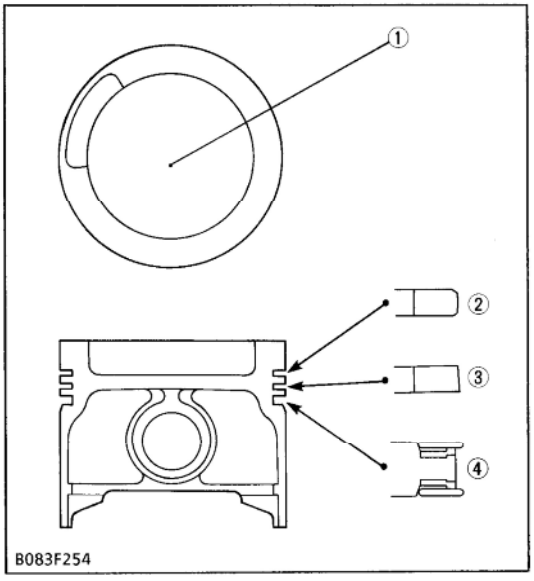
The fuel filter is installed in the fuel line between the fuel tank and fuel injection pump.

As the fuel flows from the inlet **(a)** through the filter element (1), the dirt and impurities in the fuel are filtered, allowing only clean fuel to enter the inside of the filter element. The cleaned fuel flows out from the outlet **(b)**.

Type of filter element	Accordion-pleated paper type
Material of filter element	Cotton fiber
Filter mesh	15 µm (0.00059 in.)

(1) Filter Element
(a) Inlet
(b) Outlet

(4) Piston and Piston Ring



The piston (1) is made of an aluminum alloy. This piston has a slightly oval shape when cold (in consideration of thermal expansion) and a concave head.

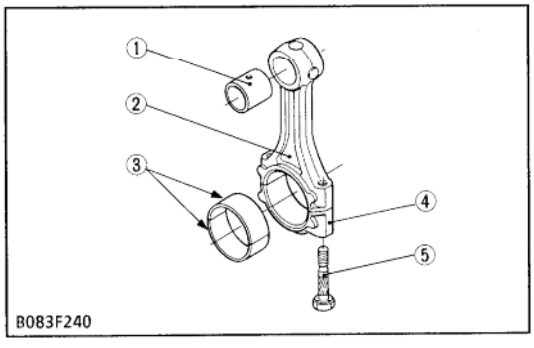
The top compression ring (2) is of the barrel faced type.

The second compression ring (3) is of the taper faced type.

The oil ring (4) is of the combined steel type.

(1) Piston
(2) Top Compression Ring
(3) Second Compression Ring
(4) Oil Ring

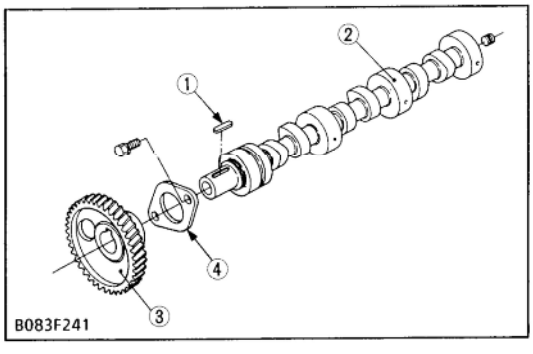
(5) Connecting Rod



The connecting rod (2) is used to connect the piston with the crankshaft. The big end of the connecting rod has a crank pin bearing (3) (split type) and the small end has a small end bushing (1) (solid type).

(1) Small End Bushing
(2) Connecting Rod
(3) Crank Pin Bearing
(4) Connecting Rod Cap
(5) Connecting Rod Screw

(6) Camshaft

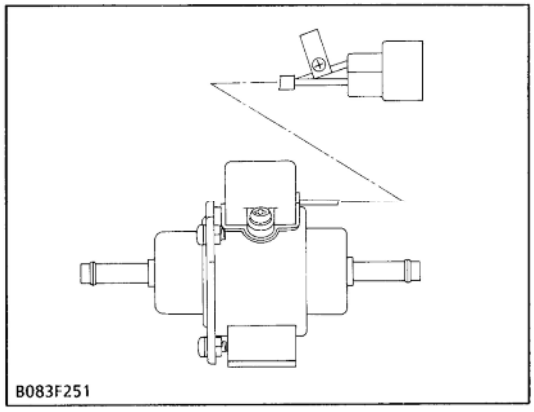


The camshaft (2) is made of special cast iron, and the journal and cam sections are chilled to resist wear.

The cams on the camshaft cause the intake and exhaust valves to open as the camshaft rotates. The bearing and journals are force-lubricated.

(1) Feather Key
(2) Camshaft
(3) Cam Gear
(4) Camshaft Stopper

(2) Fuel Pump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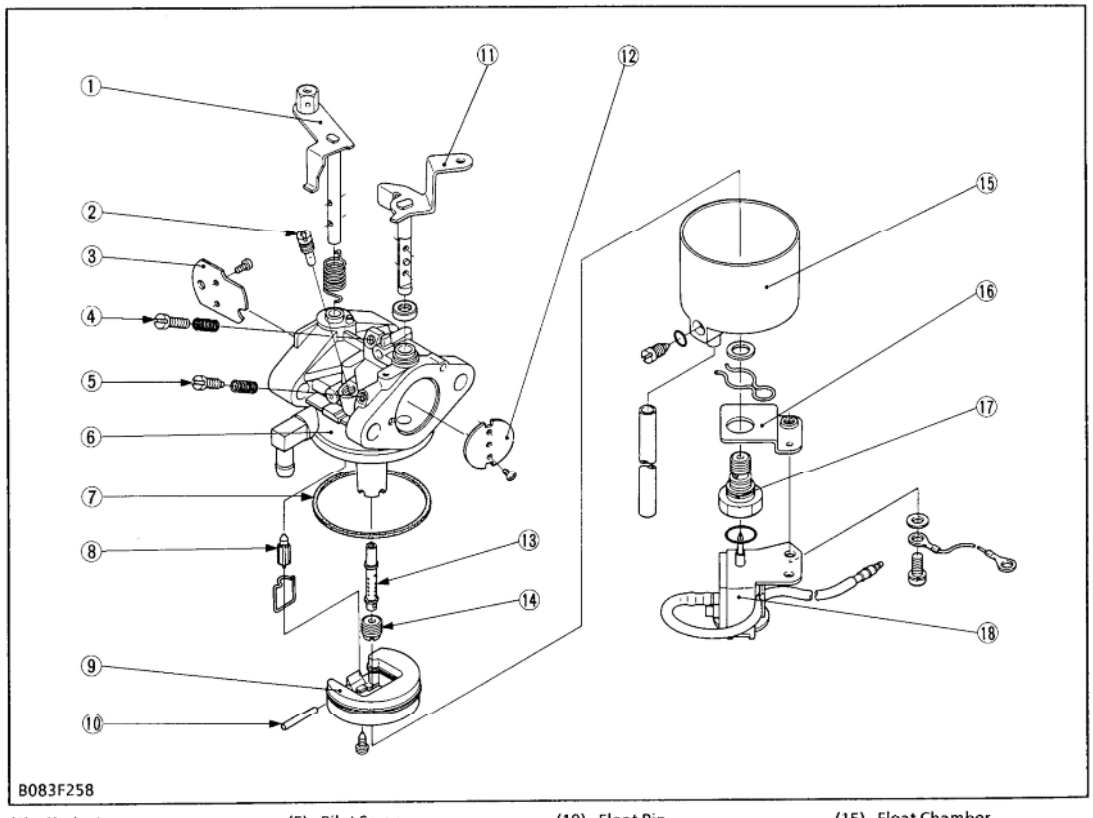
An electro magnetic fuel pump uses a transistor that causes the pump to start pumping fuel when the main switch is turned to the **"ON"** position.

Therefore, fuel is supplied to the carburetor regardless of engine speed. This pump is driven by the battery. It can therefore be operated even with the engine being stopped.

(3) Carburetor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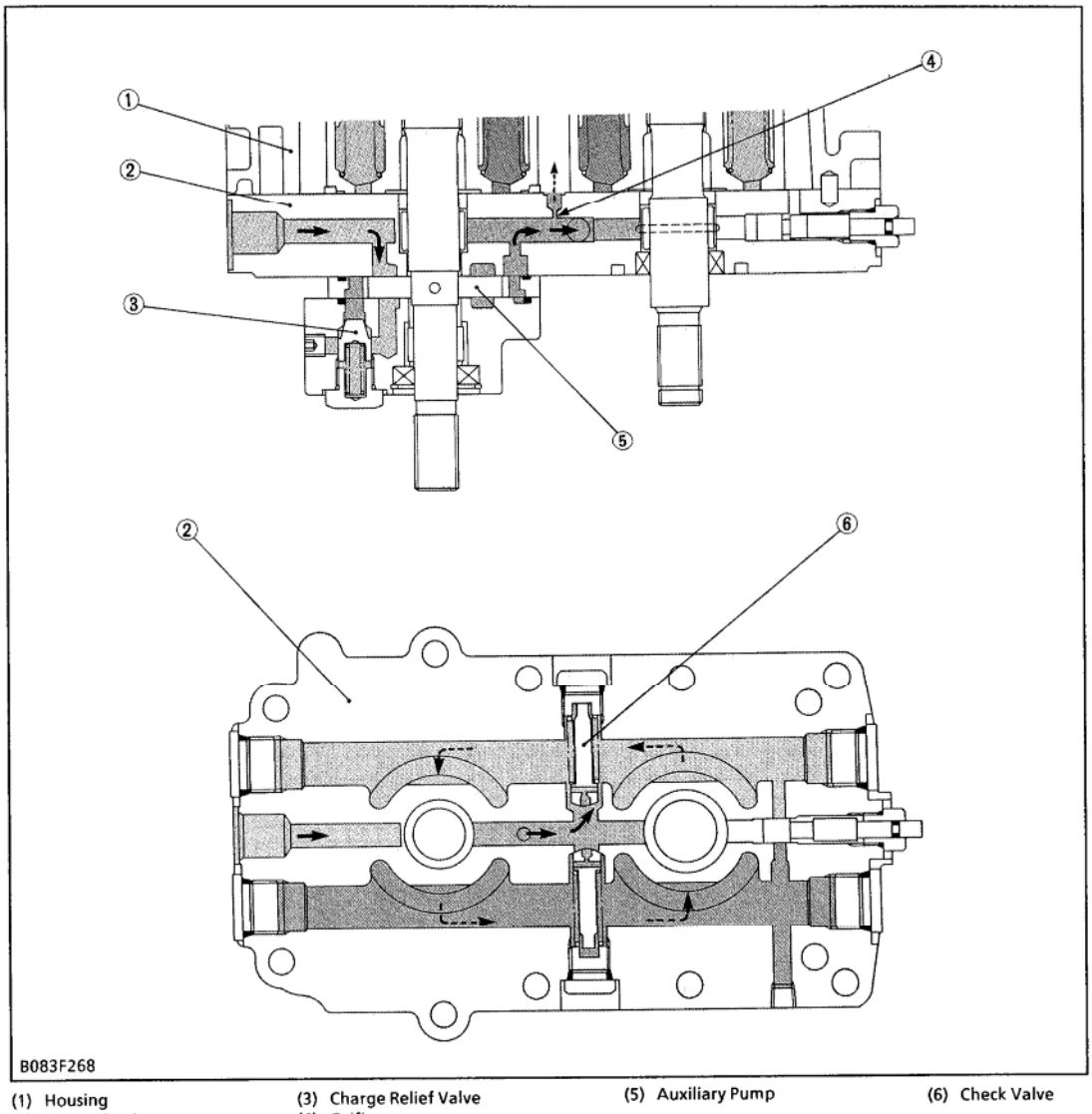
(1) Choke Lever
(2) Pilot Jet
(3) Choke Valve
(4) Throttle Stopper Adjusting Screw
(5) Pilot Screw
(6) Carburetor Body
(7) Gasket
(8) Needle Valve
(9) Float
(10) Float Pin
(11) Throttle Lever
(12) Throttle Valve
(13) Main Nozzle
(14) Main Jet
(15) Float Chamber
(16) Plate
(17) Screw
(18) Fuel Cut Off Solenoid

The carburetor provides engine with the ideal fuel-air mixture for all speed ranges.

(6) Charge Circuit



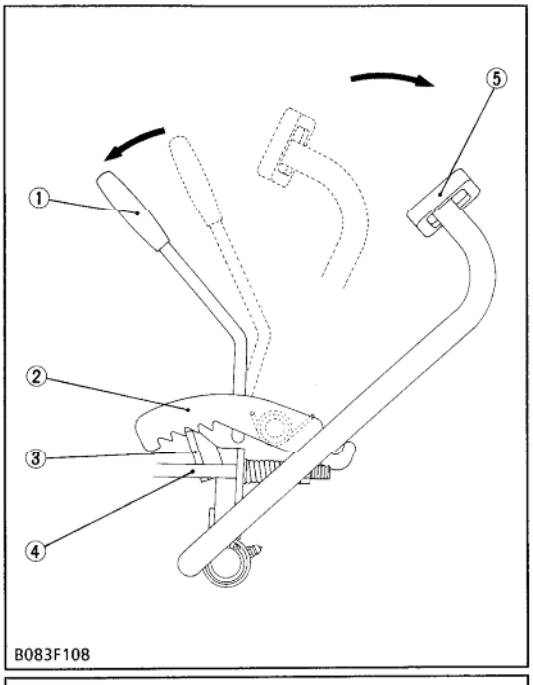
(1) Housing
(2) Center Section
(3) Charge Relief Valve
(4) Orifice
(5) Auxiliary Pump
(6) Check Valve

Oil that is sucked from the transmission case by the auxiliary pump (5) is fed through the discharge port to the implement lifting circuit, activating the lift cylinder.

The return oil from the implement lifting circuit is used to charge a leak of the closed circuit from the low-pressure side of the check valve (6).

About 1.5 ℓ/min. (1.6 U.S.qts./min., 1.32 Imp.qts./min.) of oil in this charging stream flows through the orifice (4) of the center section (2) into the housing (1), thereby flushing and cooling the cylinder blocks. Excess oil is returned through the charge relief valve (3) back to the suction side of the auxiliary pump (5).

■ Parking Brake



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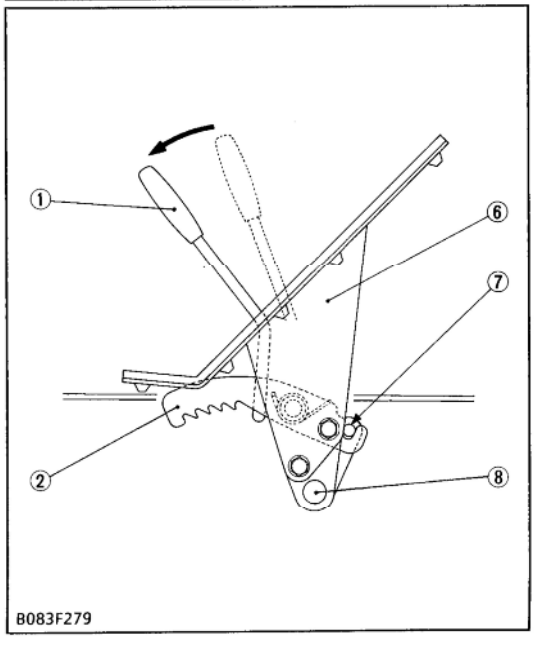

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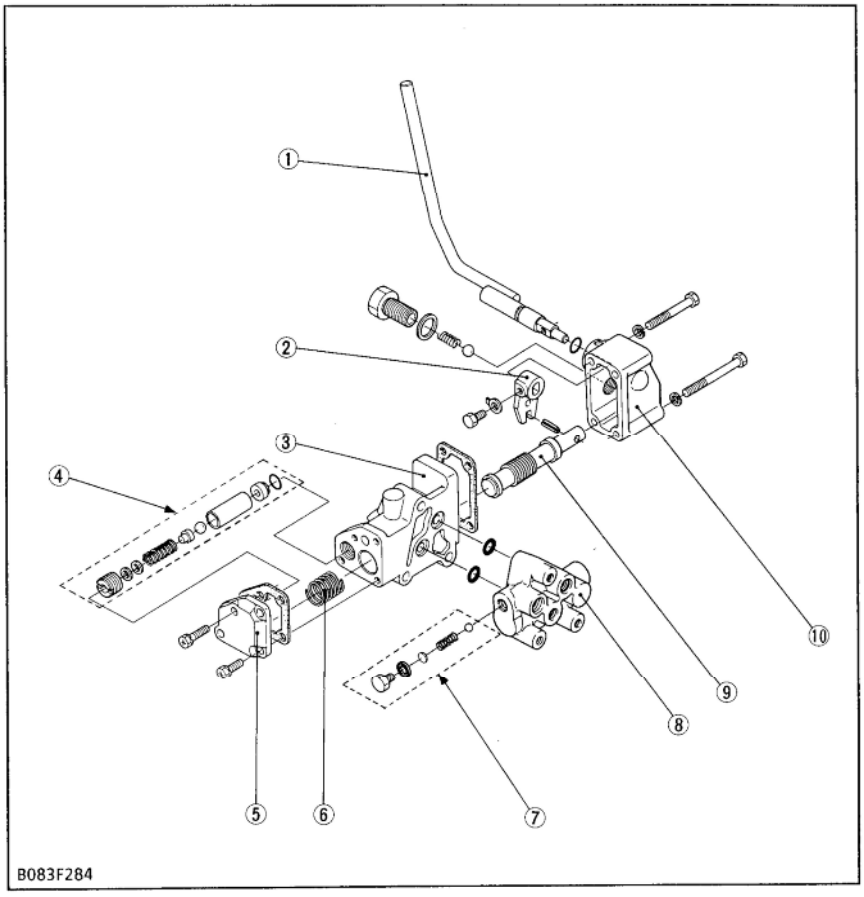
The parking brake is designed to actuate the traveling brake by the brake lock (2).

As the brake pedal (5) is pressed and the parking brake knob (1) is pulled, the brake will be applied and locked.

To prevent the brake from dragging when the parking brake is applied, the speed change pedal (6) is locked so that the groove of brake lock (2) engages with the pin (7) of HST pedal shaft (8).

(1) Parking Brake Knob
(2) Brake Lock
(3) Stopper
(4) Brake Rod 1
(5) Brake Pedal
(6) Speed Change Pedal
(7) Pin
(8) HST Pedal Shaft

[1] CONTROL VALVE AND CONTROL VALVE ADAPTOR



(1) Control Lever
(2) Valve Guide Arm
(3) Valve Body
(4) Relief Valve
(5) Relief Cover
(6) Spool Return Spring
(7) Relief Valve
(8) Control Valve Adaptor
(9) Spool
(10) Valve Cover

The control valve is constructed as shown above. When the control lever (1) is operated, the spool (9) is actuated by the valve guide arm (2) in the valve cover (10) and controls the direction of oil flow among auxiliary pump, lift cylinder and reservoir (transmission case).

A relief valve (4), which is built in the control valve, protects the hydraulic system from excessive pressure due to heavy load.

A relief valve (7), which is built in the control valve adaptor, protects the hydraulic components from excessive pressure due to oil filter cartridge clogged.

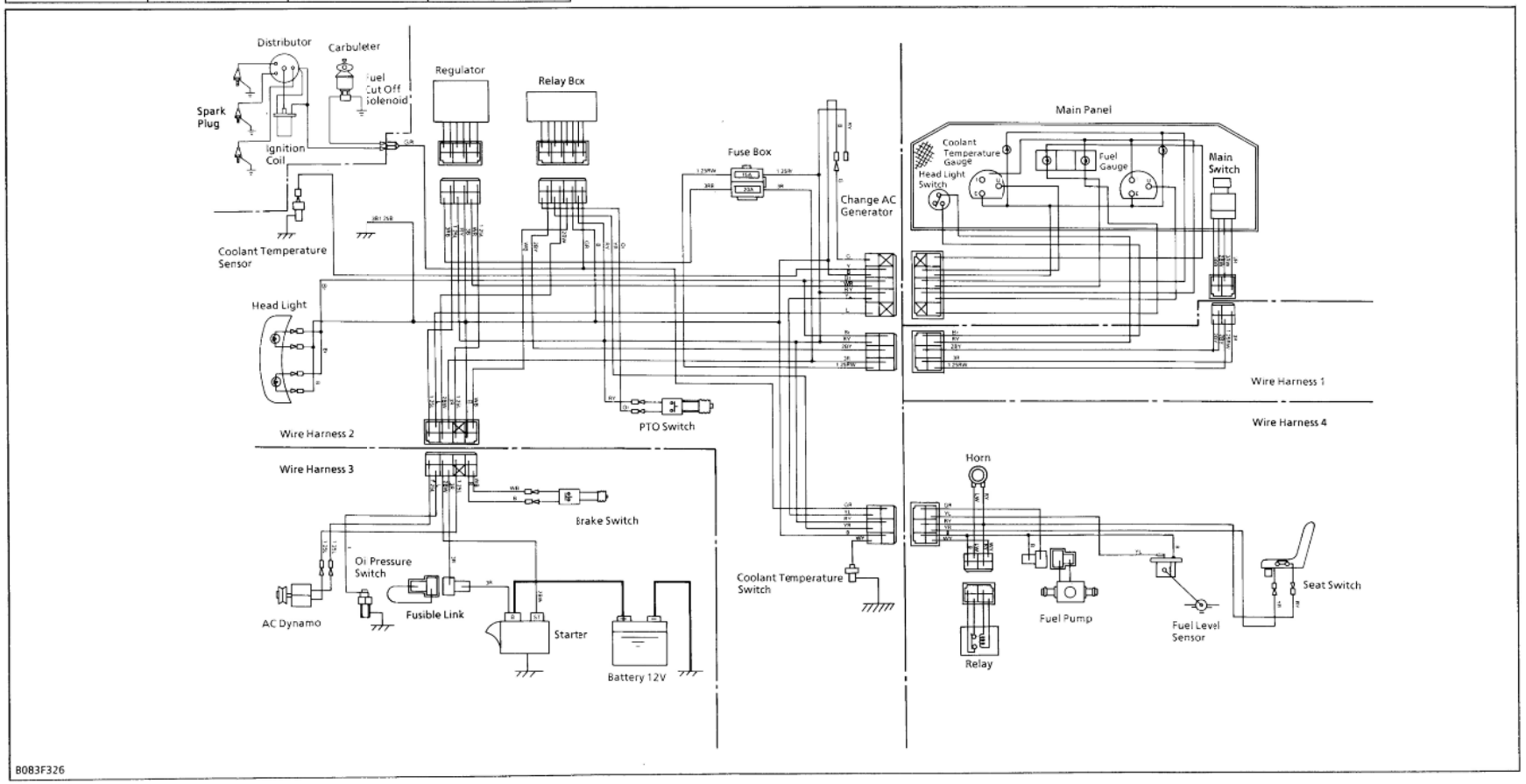
■ G2000 [AC DYNAMO TYPE] [G2000 : above 10585, G2000S : above 10724]

• **Color of Wiring**

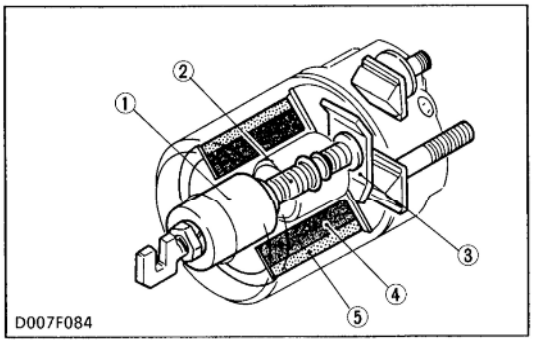
B ---------- Black	R ---------- Red	BY ---------- Black / Yellow	RY ---------- Red / Yellow	WY ---------- White / Yellow
Br ---------- Brown	W ---------- White	BrR ---------- Brown / Red	WB ---------- White / Black	LW ---------- Blue / White
G ---------- Green	Y ---------- Yellow	GR ---------- Green / Red	WR ---------- White / Red	
L ---------- Blue	BR ---------- Black / Red	RB ---------- Red / Black	YL ---------- Yellow / Blue	
Or ---------- Orange	BW ---------- Black / White	RW ---------- Red / White	YR ---------- Yellow / Red	

• **Main Switch Table**

Key Position \ Terminal	30	AC	19	50
OFF	●			
ON	●	●		
START	●	●	●	
—	●	●	●	●



(2)-2 Solenoid Switch



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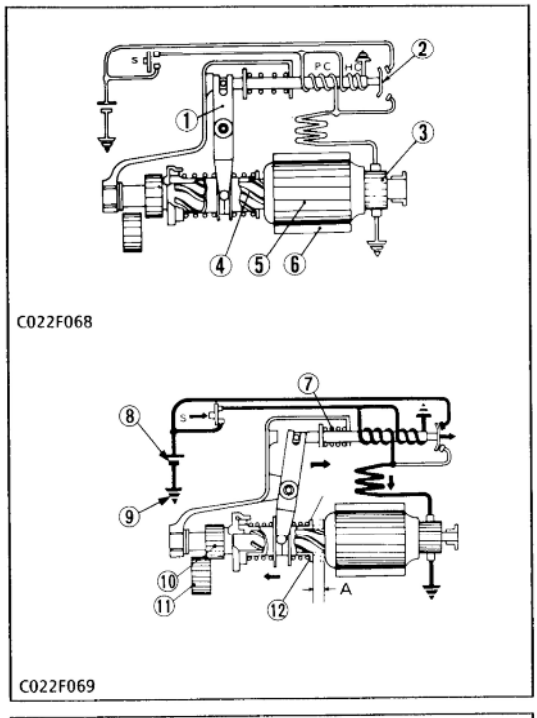
The solenoid switch forces out the pinion for engaging with the ring gear, and operates as a relay to drive the armature.

It consists of a pull-in coil, a holding coil and a plunger.

(1) Plunger
(2) Spring
(3) Contact Plate
(4) Pull-in Coil
(5) Holding Coil

(2)-3 Operation of Starter



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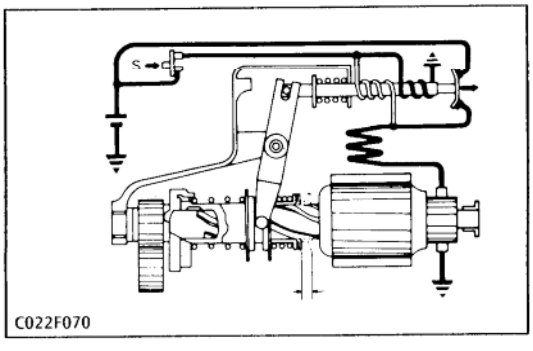
■ When Main Switch Is Turned to Starting Position

Current from the battery flows through the pull-in coil and holding coil, producing the magnetism in the windings to pull the plunger in.

At this time, the drive lever moves the pinion to engage with the ring gear.

(1) Drive Lever
(2) Contact Plate
(3) Commutator
(4) Screw
(5) Armature
(6) Pole Core
(7) Return Spring
(8) Battery
(9) Ground
(10) Pinion
(11) Ring Gear
(12) Spline Tube
A: Operated by Lever
PC: Pull-in Coil
HC: Holding Coil
S: Switch



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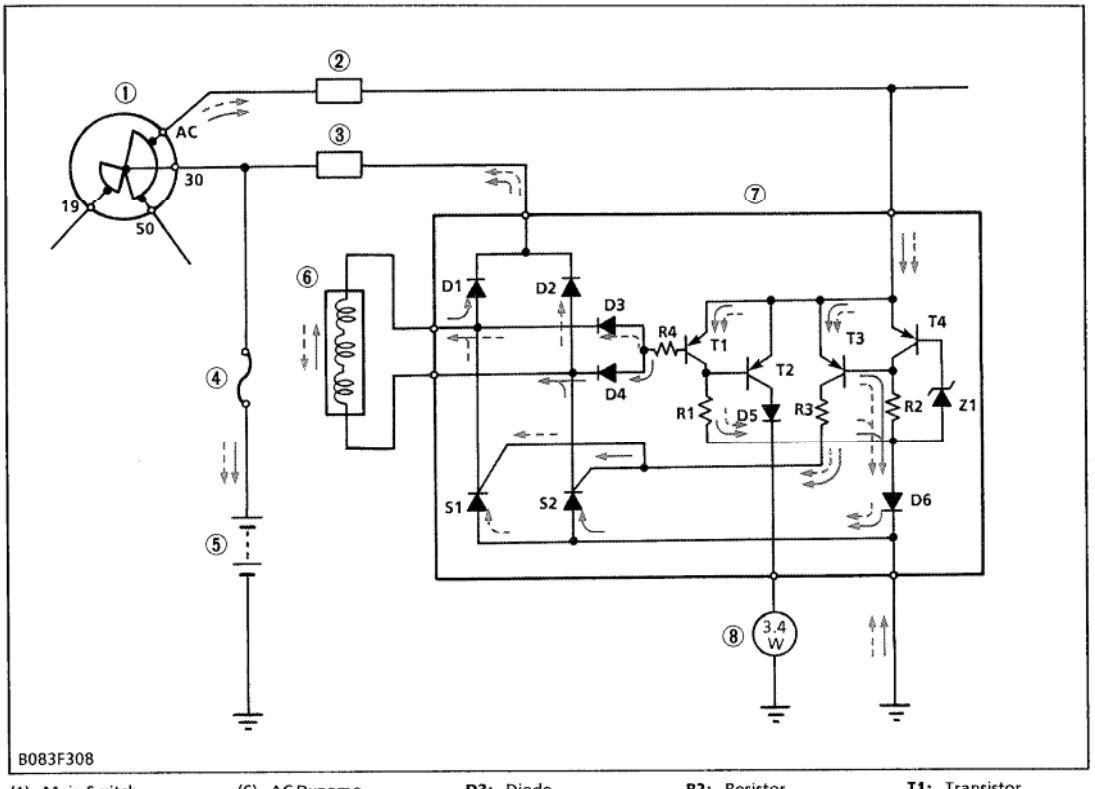
■ When Contact Plate Is Closed

Large current flows through the motor section to operate the motor.

At this time, the pinion is moved forward by the screw for more contact.

Since the pull-in coil ends are short-circuited by the contact plate, the plunger is held only by the magnetism of the holding coil.

■ In Charging



(1) Main Switch	(6) AC Dynamo	**D3:** Diode	**R2:** Resistor	**T1:** Transistor
(2) Fuse	(7) Regulator	**D4:** Diode	**R3:** Resistor	**T2:** Transistor
(3) Fuse	(8) Charge Lamp	**D5:** Diode	**R4:** Resistor	**T3:** Transistor
(4) Fusible Link	**D1:** Diode	**D6:** Diode	**S1:** SCR	**T4:** Transistor
(5) Battery	**D2:** Diode	**R1:** Resistor	**S2:** SCR	**Z1:** Zener Diode

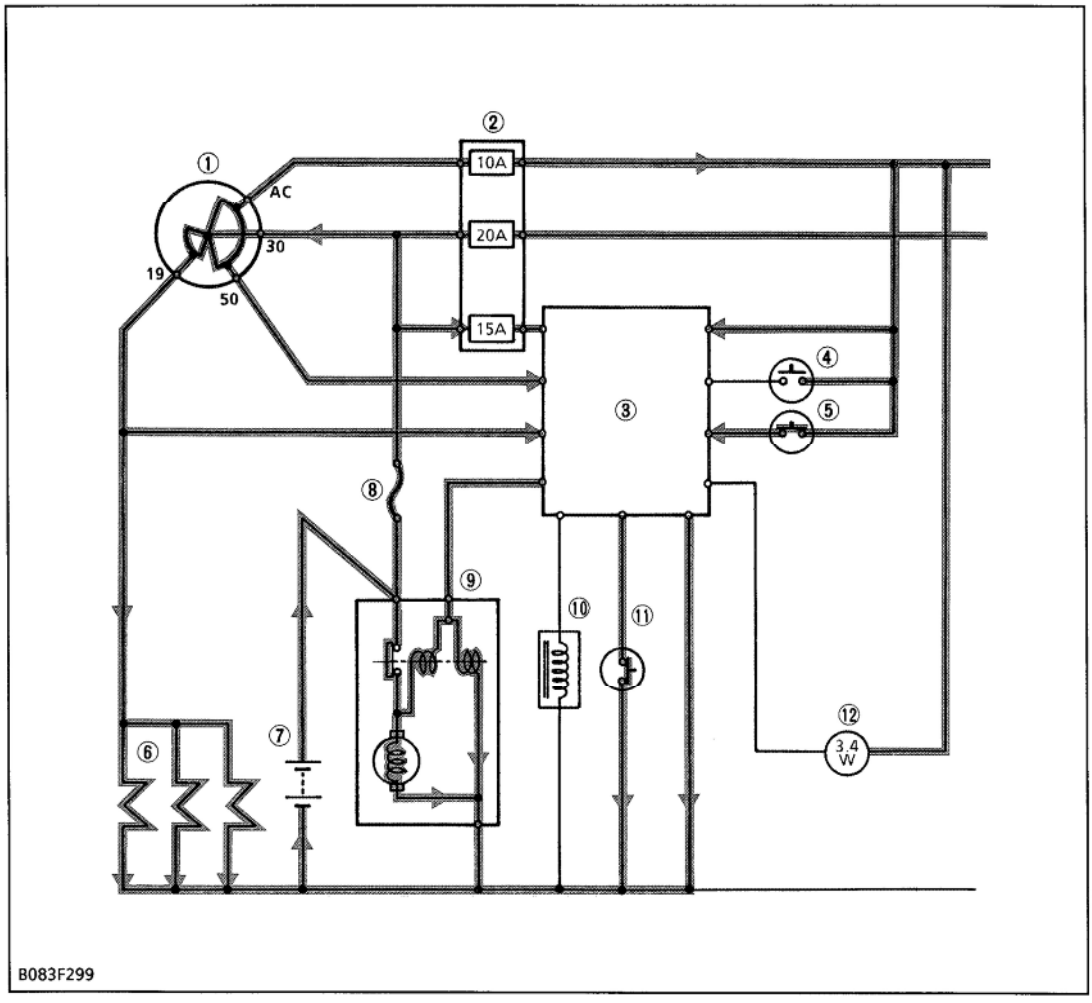
Because battery terminal voltage just after engine start is lower than setting value (14 to 15 V), or lower than zener level of **Z1**, current is not supplied to base of **T4** and **T4** is off. **T3** is on with base current which flows through the route of battery (5) (battery ⋯▸ emitter / base of **T3** ⋯▸ **R2** ⋯▸ **D6** ⋯▸ battery), and gate current is supplied to **S1** or **S2** through the route of AC dynamo (6) (AC dynamo → **D1** → emitter / collector of **T3** → **R3** → gate / cathode of **S2** → AC dynamo, or AC dynamo ⋯▸ **D2** ⋯▸ emitter / collector of **T3** ⋯▸ **R3** ⋯▸ gate / cathode of **S1** ⋯▸ AC dynamo).

When engine speed is increased so that AC dynamo generation voltage becomes higher than battery terminal voltage, **S1** or **S2** is turned on and, as shown in the figure, charge current is supplied to battery through the route of AC dynamo (AC dynamo → **D1** → battery → anode / cathode of **S2** → AC dynamo, or AC dynamo ⋯▸ **D2** ⋯▸ battery ⋯▸ anode / cathode of **S1** ⋯▸ AC dynamo).

After **S1** or **S2** is turned on, collector current of **T1** and base current of **T3** are supplied by AC dynamo, not battery.

When the main switch is returned to **"ON"** position after engine is started, battery is charged, if battery terminal voltage is lower than the setting value, or zener level of **Z1**.

■ "START" Position



(1) Main Switch
(2) Fuse Box
(3) Combination Box
(4) Seat Switch
(5) PTO Switch
(6) Glow Plug
(7) Battery
(8) Fusible Link
(9) Starter
(10) Engine Stop Solenoid
(11) Brake Switch
(12) Glow Lamp

When the main switch (1) is turned to the **"START"** position, terminal **30** is connected to terminal **AC, 19** and **50**. Electric current flows to the combination box (3) from terminal **50**.

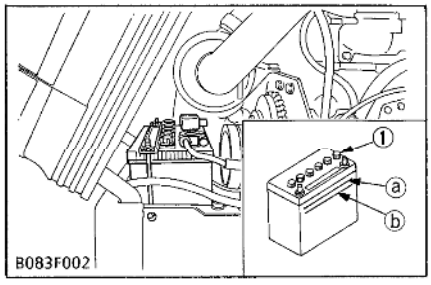
Under the following condition, a start signal flows to the starter (9) and starts the engine.

(Starting Condition)

- Brake switch is **"ON"** (Brake pedal is depressed).
- PTO switch is **"ON"** (PTO clutch lever is **"DISENGAGE"** position).

[7] CHECK AND MAINTENANCE

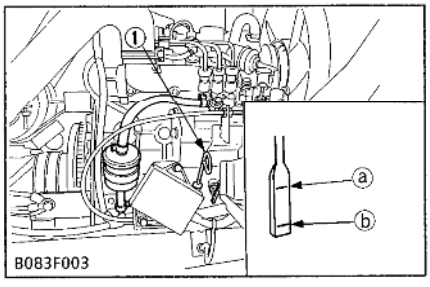
(1) Check Points of Daily or Each Use



Checking Battery Electrolyte Level

1. Make sure the battery electrolyte level is between the upper (a) and lower (b) levels.
2. If insufficient, add distilled water.

(1) Plug
(a) Upper Level
(b) Lower Level



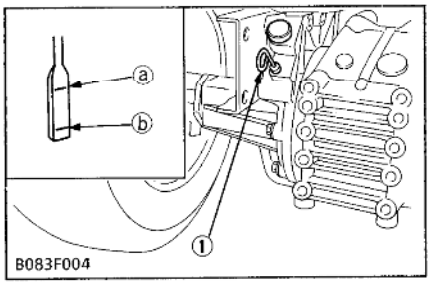
Checking Engine Oil Level

1. Place the machine on level ground.
2. Check the oil level before starting the engine or wait at least 5 minutes after stopping the engine.
3. Remove the oil level dipstick (1), wipe it clean, then install it.
4. Remove the dipstick again, and check that the oil level is between the upper (a) and lower (b) levels.
5. If the level is too low, supply fresh oil until the specified level is reached.

■ IMPORTANT

- **Use the specified engine oil. Refer to "LUBRICANTS, FUEL AND COOLING WATER". (See page S.G-2)**
- **When using new oil of a different maker or viscosity from the previous one, drain all used oil. Never mix two different types of oil.**

(1) Oil Level Dipstick
(a) Upper Level
(b) Lower Level



Checking Transmission Oil Level

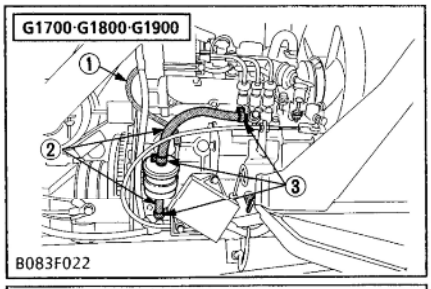
1. Place the machine on level ground.
2. Remove the oil level dipstick (1), wipe it clean, then install it.
3. Remove the dipstick again, and check that the oil level is between the upper (a) and lower (b) levels.
4. If the level is too low, supply fresh oil until the specified level is reached.

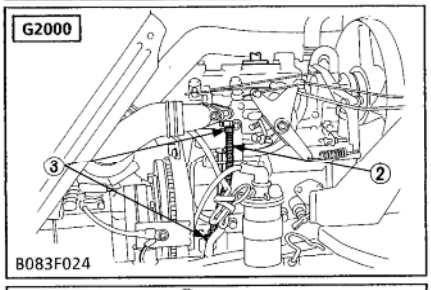
■ IMPORTANT

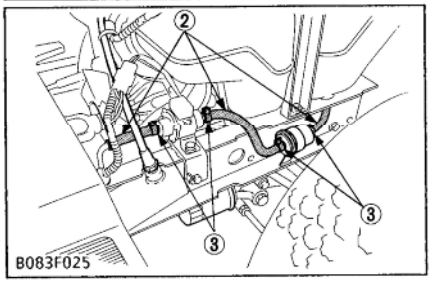
- **Use the specified transmission oil. Refer to "LUBRICANTS, FUEL AND COOLING WATER". (See page S.G-2).**

(1) Oil Level Dipstick
(a) Upper Level
(b) Lower Level

(12) Check Points of Every 2 Years







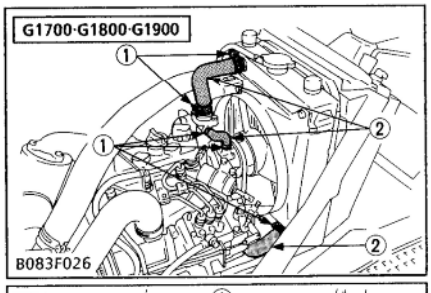
Changing Fuel Line

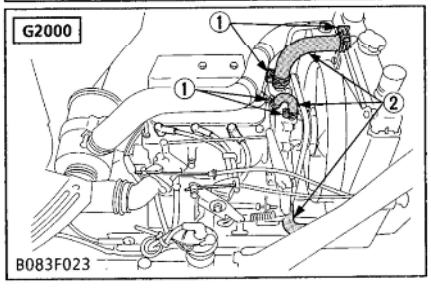
CAUTION

- **Stop the engine when attempting to check the fuel line.**
- **Never fail to check the fuel line periodically.**
  The fuel line is subject to wear and aging, fuel may leak out onto the running engine, causing a fire.

1. Change the fuel pipes (2) together with pipe clamps (3) every 2 years, or whenever they are found to be damaged.
2. After changing the fuel line, bleed the air. [G1700·G1800·G1900 only]

(1) Fuel Return Pipe
(2) Fuel Pipe
(3) Pipe Clamp





Changing Radiator Hose and Clamp

CAUTION

- **Before changing the coolant, be sure to stop the engine.**
- **Never open the pressure cap while the engine is running under heavy loads or immediately after the engine has stopped. Otherwise, hot water may spray out, scalding the operator.**
  So make it a habit to wait for about 10 minutes before opening the cap.

1. To drain the coolant, open the drain cock and remove radiator cap.
2. Change the radiator hoses (2) and clamps (1).

(1) Radiator Hose Clamp
(2) Radiator Hose

Symptom	Probable Cause	Solution	Reference Page
Low Oil Pressure	• Engine oil insufficient	Replenish	S.G-5
	• Oil strainer clogged	Clean	S.1-20
	• Oil filter cartridge clogged	Replace	S.G-7
	• Relief valve stuck with dirt	Clean	S.1-37
	• Relief valve spring weaken or broken	Replace	–
	• Excessive oil clearance of crankshaft bearing	Replace	S.1-34, 35
	• Excessive oil clearance of rocker arm boss	Replace	S.1-27
	• Oil passage clogged	Clean	–
	• Different type of oil	Use specified type of oil	S.G-2
	• Oil pump defective	Repair or replace	S.1-37, 38
High Oil Pressure	• Different type of oil	Use specified type of oil	S.G-2
	• Relief valve defective	Replace	–
Engine Overheated	• Engine oil insufficient	Replenish	S.G-5
	• Fan belt broken or tensioned improperly	Replace or adjust	S.1-38
	• Coolant insufficient	Replenish	S.G-6
	• Radiator net and radiator fin clogged with dust	Clean	S.G-6, 11
	• Inside of radiator corroded	Clean or replace	S.G-14
	• Coolant flow route corroded	Clean or replace	S.G-14
	• Radiator cap defective	Replace	S.1-39
	• Radiator hose damaged	Replace	S.G-15
	• Thermostat defective	Replace	S.1-39
	• Water pump defective	Replace	S.1-40
	• Overload running	Lessen load	–

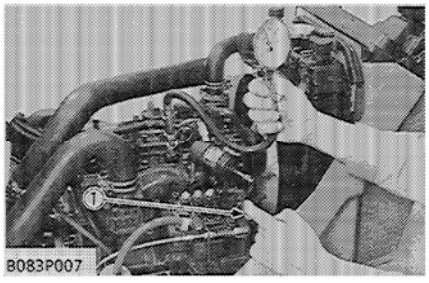
SERVICING SPECIFICATIONS

ENGINE BODY

Item		Factory Specification	Allowable Limit
Top Clearance		0.50 to 0.65 mm 0.0197 to 0.0256 in.	–
Compression Pressure		2.84 to 3.24 MPa 29 to 33 kgf/cm^2 412 to 469 psi	2.26 MPa 23 kgf/cm^2 327 psi
Difference among Cylinders		Within 10%	–
Valve Clearance (Cold)		0.145 to 0.185 mm 0.0059 to 0.0073 in.	–
Valve Recessing		– 0.10 to 0.10 mm – 0.0039 to 0.0039 in.	0.30 mm 0.0118 in.
Valve Seat	Width	2.12 mm 0.0835 in.	–
	Angle	0.785 rad. 45.0°	–
Cylinder Head Surface	Flatness	–	0.05 mm 0.0020 in.

[2] ENGINE BODY

CHECKING AND ADJUSTING



(1) Engine Stop Lever

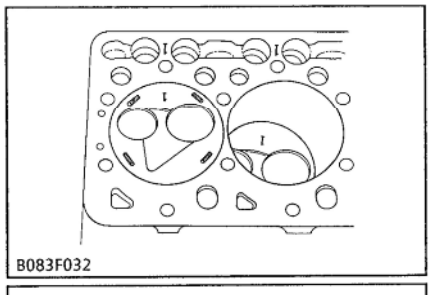
Compression Pressure

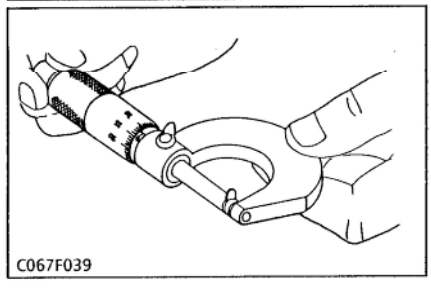
1. Run the engine until it is warmed up.
2. Stop the engine, and disconnect the 2P connector from the fuel pump.
3. Remove the injection nozzles from all cylinders, and set a compression tester (Code No. 07909-30207) with the adaptor to the nozzle hole.
4. Keep the engine stop lever (1) at **"Stop Position"**.
5. While cranking the engine with cell starter, measure the compression pressure.
6. Repeat steps 3 through 5 for each cylinder.
7. If the measurement does not reach the allowable limit, apply a small amount of oil to the cylinder wall through the nozzle hole and measure the compression pressure again.
8. If the compression pressure is still less than the allowable limit, check the top clearance, valve and cylinder head.
9. If the compression pressure increases after applying oil, check the cylinder wall and piston rings.

■ **NOTE**

- **Check the compression pressure with the specified valve clearance.**
- **Always use a fully charged battery for performing this test.**
- **Variances in cylinder compression values should be under 10%.**

Compression pressure	Factory spec.	2.84 to 3.24 MPa 29 to 33 kgf/cm² 412 to 469 psi
	Allowable limit	2.26 MPa 23 kgf/cm² 327 psi





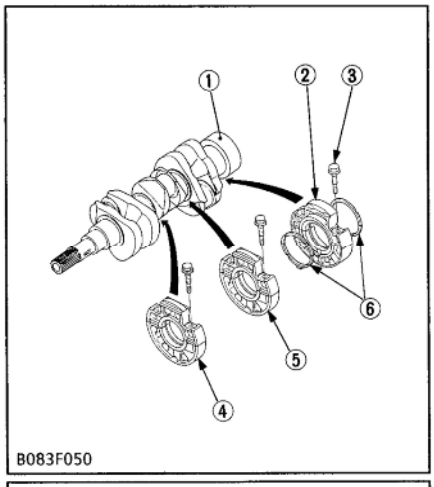
Top Clearance

1. Remove the cylinder head (Do not remove the cylinder head gasket).
2. Move the piston up and stick four strips of fuse [diameter: 1.5 mm (0.059 in.), length: 5 to 10 mm (0.197 to 0.394 in.)] on the piston head (see figure) with grease.
3. Lower the piston, and install the cylinder head and tighten the cylinder head screws to the specified torque (37.3 to 42.2 N·m, 3.8 to 4.3 kgf·m, 27.5 to 31.1 ft-lbs).
4. Turn the flywheel until the piston is raised and lowered again.
5. Remove the cylinder head and measure the thickness of the fuses.
6. If the measurement is not within the factory specifications, check the oil clearance between the crank pin and crank pin bearing, and the oil clearance between the piston pin and small end bushing.

Top clearance	Factory spec.	0.50 to 0.65 mm 0.0197 to 0.0256 in.

■ **NOTE**

- **When reassembling the cylinder head, be sure to replace the cylinder head gasket with a new one.**



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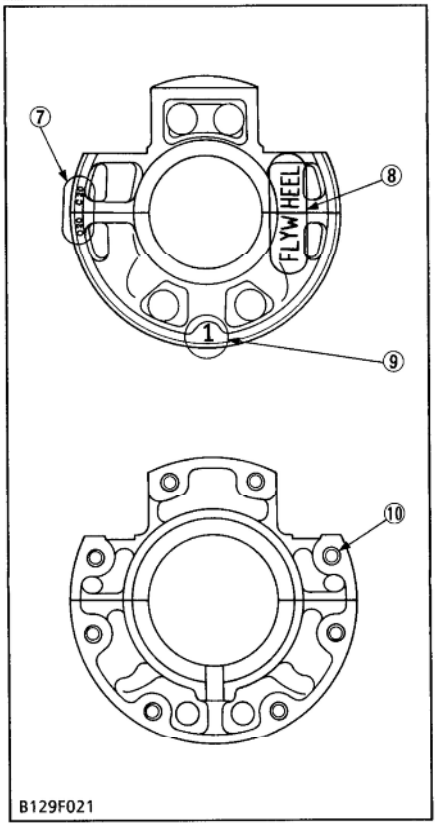


B129F021

Main Bearing Case Assembly

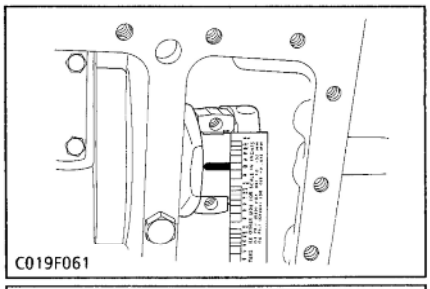
1. Unscrew the bearing case screws 1 (3), and remove the main bearing case assemblies (2), (4), (5).

(When reassembling)

- Be sure to install the thrust bearings (6) with their oil groove facing outward.
- Apply clean engine oil to the crankshaft bearing 2, 3 and thrust bearings.
- Since diameters of main bearing case assemblies vary, install them to the crankshaft in order of stamps (9) from the gear case side.
- Align the alignment marks (7) on the main bearing case assemblies (2), (4), (5).
- Install the main bearing case assembly (2) to the crankshaft (1) so that the screw holes (10) face the flywheel.
- Install the main bearing case assemblies 1 (4) and 2 (5) to the crankshaft (1) so that their casting mark **" FLYWHEEL "** (8) face the flywheel.

Tightening torque	Bearing case screw 1	12.7 to 15.7 N·m 1.3 to 1.6 kgf·m 9.4 to 11.6 ft-lbs

(1) Crankshaft
(2) Main Bearing Case Assembly
(3) Bearing Case Screw 1
(4) Main Bearing Case Assembly 1 (Stamped **"1"**)
(5) Main Bearing Case Assembly 2 (Stamped **"2"**)
(6) Thrust Bearing
(7) Alignment Mark
(8) Casting Mark **" FLYWHEEL "**
(9) Stamp
(10) Screw Hole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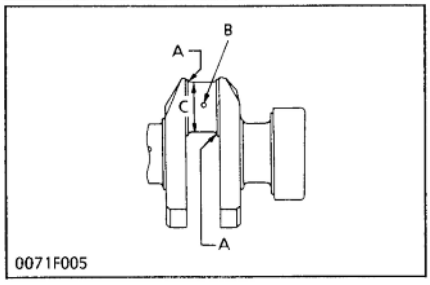


0071F005

Oil Clearance between Crank Pin and Crank Pin Bearing

1. Clean the crank pin and crank pin bearing.
2. Put a strip of press gauge (Code No. 07909-30241) on the center of the crank pin.

■ IMPORTANT

- **Never insert the press gauge into the crank pin oil hole.**

3. Install the connecting rod cap and tighten the connecting rod screws to the specified torque (26.5 to 30.4 N·m, 2.7 to 3.1 kgf·m, 19.5 to 22.4 ft-lbs), and remove the cap again.

■ NOTE

- **Be sure not to move the crankshaft while the connecting rod screws are tightened.**

4. Measure the amount of the flattening with the scale, and get the oil clearance.
5. If the oil clearance exceeds the allowable limit, replace the crank pin bearing.
6. If the same size bearing is useless because of the crank pin wear, replace it with an undersize one referring to the table and figure.

Oil clearance between crank pin and crank pin bearing	Factory spec	0.019 to 0.081 mm 0.00075 to 0.00319 in.
	Allowable limit	0.15 mm 0.0059 in.
Crank pin O.D.	Factory spec.	33.959 to 33.975 mm 1.33697 to 1.33760 in.
Crank pin bearing I.D.	Factory spec.	33.994 to 34.040 mm 1.33835 to 1.34016 in.

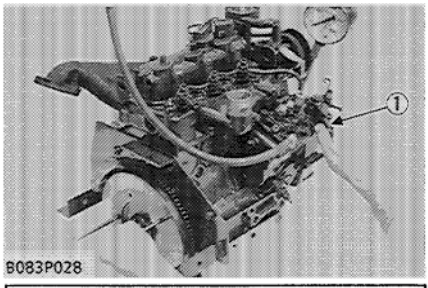
(Reference)

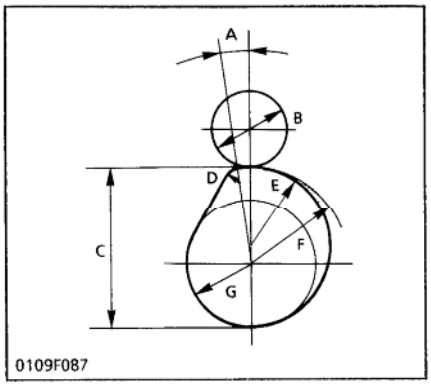
- Undersize crank pin bearing

Undersize	Bearing	Code Number	Marking
0.2 mm 0.008 in.	Crank pin bearing 02	15861-22971	020 US
0.4 mm 0.016 in.	Crank pin bearing 04	15861-22981	040 US

- Undersize dimensions of crank pin

Undersize / Dimension	0.2 mm 0.008 in.	0.4 mm 0.016 in.
A	2.3 to 2.7 mm radius 0.091 to 0.106 in. radius	2.3 to 2.7 mm radius 0.091 to 0.106 in. radius
B	4 mm dia. 0.16 in. dia.	4 mm dia. 0.16 in. dia.
C	33.759 to 33.775 mm 1.32910 to 1.32973 in.	33.559 to 33.575 mm 1.32122 to 1.32185 in.
The crank pin must be fine-finished to higher than ▽▽▽▽ (0.4S).		





(1) Speed Control Lever

(A) 0.35 rad. (20°)
(B) 14 mm (0.551 in.)
(C) 30 mm (1.181 in.)
(D) 3 mm (0.118 in.)
(E) 15 mm (0.591 in.)
(F) 18 mm (0.709 in.)
(G) 12 mm (0.472 in.)

Pump Element Fuel Tightness

1. Remove the injection pipes and injection nozzles.
2. Install the pressure tester (see page S.G-19) to the injection pump.
3. Set the speed control lever (1) to the maximum fuel discharge position.
4. Turn the flywheel counterclockwise to raise the fuel pressure.
5. If the fuel pressure can not reach the allowable limit, replace the pump element or injection pump assembly.

Pump element fuel tightness (Fuel pressure)	Allowable limit	14.71 MPa 150 kgf/cm² 2133 psi

■ IMPORTANT

- **After replacing the pump element, be sure to adjust the amount of the fuel injection using a pump tester and a test bench [DIESEL KIKI CO.LTD : Code No. 105760-0010 (50 Hz) or 105760-0020 (60Hz)].**

[Test Condition]

Driving stand	Code No. 105781-4160 [DIESEL KIKI CO.LTD]
Nozzle	DN12SD12T
Opening pressure	11.77 MPa, 120 kgf/cm², 1707 psi
Injection pipe	6 mm dia. x 2 mm dia. x 600 mm long 0.24 in. dia. x 0.08 in. dia. x 23.62 in long
Fuel feed pressure	49 kPa, 0.5 kgf/cm², 7 psi
Test fuel	Diesel fuel No.2-D
Pre-stroke	1.85 to 1.95 mm (with valve) 0.0728 to 0.0768 in. (with valve)
Cam profile	PFM-TE-00 (See figure)

[Data for Adjustment]

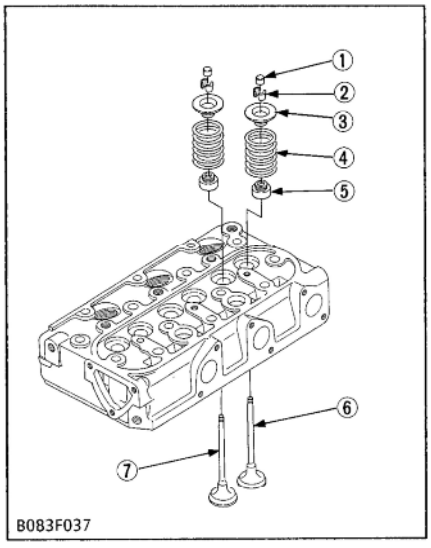
Control rack position (from stop position)	Camshaft speed	Amount of fuel
5.0 mm 0.1969 in.	1800 rpm	1.17 to 1.23 cc / 100 st. 0.0714 to 0.0751 cu.in. / 100 st.
1.5 mm 0.0591 in.	1800 rpm	less than 0.1 cc / 100 st. less than 0.006 cu.in. / 100 st.

ENGINE BODY (Continued)

Item		Factory Specification	Allowable Limit
Undersize Crankshaft Journal to Undersize Crankshaft Bearing 2	Oil Clearance (0.2 US, 0.4 US)	0.034 to 0.092 mm 0.00134 to 0.00362 in.	0.20 mm 0.0079 in.
Undersize Crankshaft Journal	O.D. (0.2 US)	43.734 to 43.750 mm 1.72181 to 1.72244 in.	–
	O.D. (0.4 US)	43.534 to 43.550 mm 1.71394 to 1.71457 in.	–
Undersize Crankshaft Bearing 2	I.D. (0.2 US)	43.784 to 43.826 mm 1.72378 to 1.72543 in.	–
	I.D. (0.4 US)	43.584 to 43.626 mm 1.71590 to 1.71756 in.	–
Crankshaft Journal to Crankshaft Bearing 3	Oil Clearance	0.034 to 0.092 mm 0.00134 to 0.00362 in.	0.20 mm 0.0079 in.
Crankshaft Journal	O.D.	39.934 to 39.950 mm 1.57221 to 1.57284 in.	–
Crankshaft Bearing 3	I.D.	39.984 to 40.026 mm 1.57418 to 1.57583 in.	–
Undersize Crankshaft Journal to Undersize Crankshaft Bearing 3	Oil Clearance (0.2 US, 0.4 US)	0.034 to 0.092 mm 0.00134 to 0.00362 in.	0.20 mm 0.0079 in.
Undersize Crankshaft Journal	O.D. (0.2 US)	39.734 to 39.750 mm 1.56433 to 1.56496 in.	–
	O.D. (0.4 US)	39.534 to 39.550 mm 1.55646 to 1.55709 in.	–
Undersize Crankshaft Bearing 3	I.D. (0.2 US)	39.784 to 39.826 mm 1.56630 to 1.56795 in.	–
	I.D. (0.4 US)	39.584 to 39.626 mm 1.55842 to 1.56008 in.	–
Cylinder	I.D.	68.000 to 68.019 mm 2.67716 to 2.67791 in.	Maximum wear 0.15 mm (0.0059 in.)
Oversize Cylinder	I.D.	68.500 to 68.519 mm 2.69685 to 2.69759 in.	Maximum wear 0.15 mm (0.0059 in.)

LUBRICATING SYSTEM

Engine Oil Pressure	At Idle Speed	More than 69 kPa 0.7 kgf/cm² 10 psi	–
	At Rated Speed	196 to 441 kPa 2.0 to 4.5 kgf/cm² 28 to 64 psi	69 kPa 0.7 kgf/cm² 10 psi
Inner Rotor to Outer Rotor	Clearance	–	0.25 mm 0.0098 in.
Outer Rotor to Pump Body	Clearance	0.07 to 0.15 mm 0.0028 to 0.0059 in.	0.30 mm 0.0118 in.
Rotor to Cover	Clearance	0.075 to 0.135 mm 0.0029 to 0.0053 in.	0.20 mm 0.0079 in.



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Valves

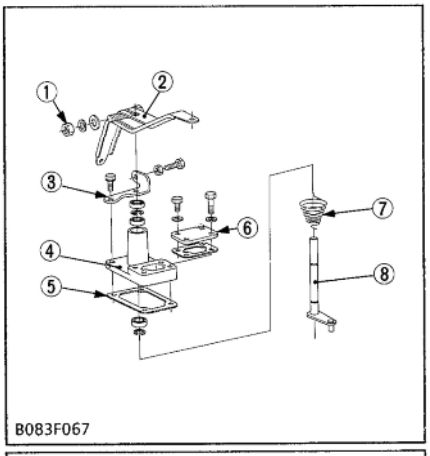
1. Remove the valve cap (1) .
2. Remove the valve spring collet (2), compressing the valve spring (4) by a valve spring replacer.
3. Remove the valve spring retainer (3), valve spring (4) and valve stem seal (5).
4. Pull out the exhaust valve (6).
5. Remove the intake valve (7) as above.

■ **IMPORTANT**
- **Don't change the combination of the valve and valve guide.**

(When reassembling)
- Clean the valve stem section and valve guide hole, and apply engine oil to them.
- After reassembling the valves, be sure to adjust the valve clearance. (See page S.1-58)

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

(3) Governor Lever and Distributor

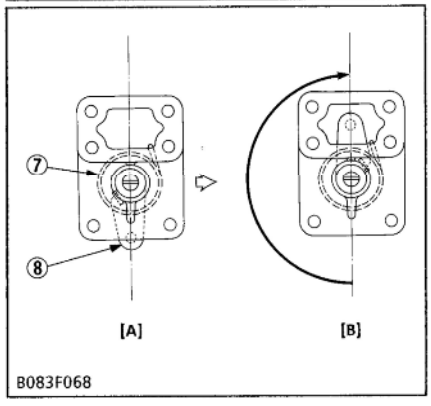


B083F067

Governor Lever and Governor Lever Shaft Support

1. Loosen the governor lever mounting nut (1), and remove the governor lever (2).
2. Unscrew the mounting screws, and remove the governor lever shaft support (4) with the governor lever shaft (8).

(When reassembling)
- Apply liquid-type gasket (Three Bond 1215 or its equivalent) to the upside (governor lever shaft support side) of a new gasket (5).
- Turn the governor lever shaft (8) clockwise to ensure a returning force of the governor lever spring (7) as shown in the figure.
- When installing the governor lever shaft support (4), insert the pin (9) on the governor lever shaft (8) firmly into the slot (10) on the fork lever (11).



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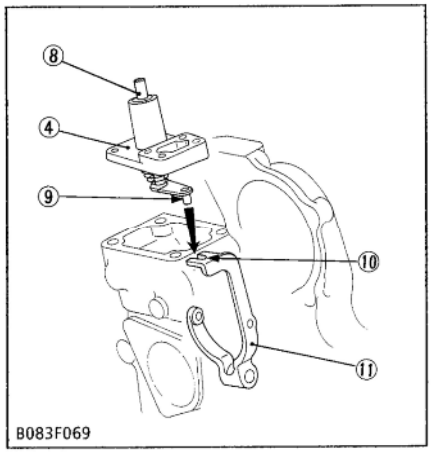
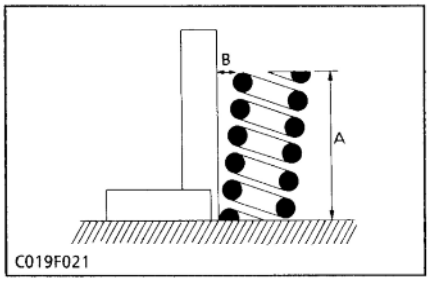


B083F069

(1) Governor Lever Mounting Nut
(2) Governor Lever
(3) Stopper
(4) Governor Lever Shaft Support
(5) Governor Lever Shaft Support Gasket
(6) Cover
(7) Governor Lever Spring
(8) Governor Lever Shaft
(9) Pin
(10) Slot
(11) Fork Lever

[A] Governor Lever Shaft Is Free.
[B] Governor Lever Shaft Is Turned.

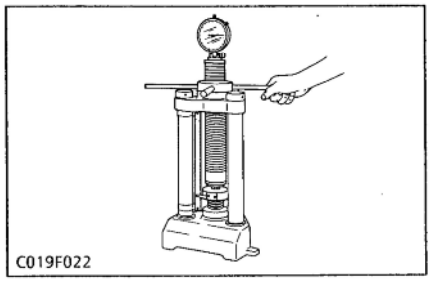


C019F021

Free Length and Tilt of Valve Spring

1. Measure the length **A** with varnier calipers. If the measurement is less than the allowable limit, replace it.
2. Put the spring on a surface plate, place a square on the side of the spring.
3. Check to see if the entire side is in contact with the square. Rotate the spring and measure the maximum **B**. If the measurement exceeds the allowable limit, replace it.
4. Check the entire surface of the spring for scratches. Replace it, if any.

Free length **A**	Factory spec	31.6 mm 1.244 in
	Allowable limit	28.4 mm 1.118 in
Tilt **B**	Allowable limit	1.2 mm 0.047 in.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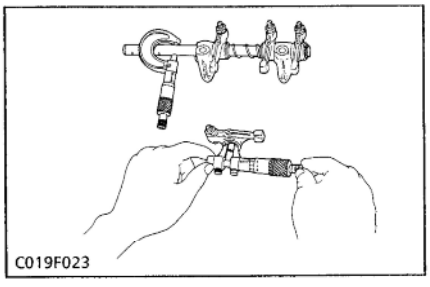
Valve Spring Setting Load

1. Place the spring on a tester and compress it to the same length it is actually compressed in the engine.
2. Read the compression load on the gauge.
3. If the measurement is less than the allowable limit, replace it.

Setting load / Setting length	Factory spec.	64.7 N / 27 mm 6.6 kgf / 27 mm 14.6 lbs / 1.063 in.
	Allowable limit	54.9 N / 27 mm 5.6 kgf / 27 mm 12.3 lbs / 1.063 in.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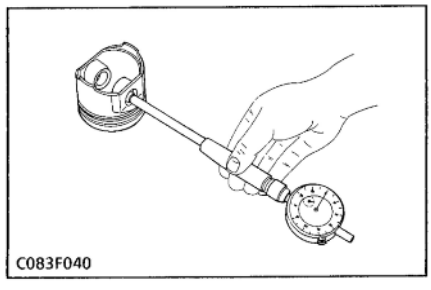
Oil Clearance between Rocker Arm and Rocker Arm Shaft

1. Measure the rocker arm I.D. with an inside micrometer.
2. Measure the rocker arm shaft O.D. with an outside micrometer, and then calculate the oil clearance.
3. If the clearance exceeds the allowable limit, replace the rocker arm and measure the oil clearance again. If it still exceeds the allowable limit, replace also the rocker arm shaft.

Oil clearance between rocker arm and rocker arm shaft	Factory spec.	0.016 to 0.045 mm 0.00063 to 0.00177 in.
	Allowable limit	0.15 mm 0.0059 in.

Rocker arm shaft O.D	Factory spec	10.473 to 10.484 mm 0.41233 to 0.41276 in.
Rocker arm I.D.	Factory spec.	10.500 to 10.518 mm 0.41339 to 0.41410 in.

(2) Piston and Connecting Rod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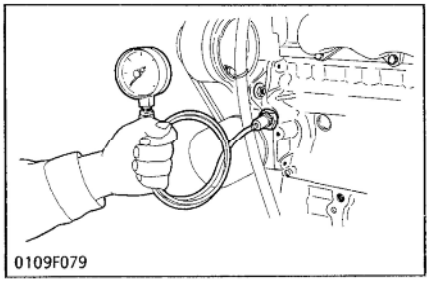
Piston Pin-Bore I.D.

1. Measure the I.D. of the piston pin-bore in both the horizontal and vertical directions with a cylinder gauge.
2. If the measurement exceeds the allowable limit, replace the piston.

Piston pin-bore I.D.	Factory spec	18.000 to 18.011 mm 0.70866 to 0.70910 in.
	Allowable limit	18.05 mm 0.7106 in.

[3] LUBRICATING SYSTEM

CHECKING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Engine Oil Pressure

1. Unscrew the oil pressure switch, and install the engine oil pressure tester (Code No. 07916-32032). (Adaptor screw size: PT1/8).
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.	69 kPa 0.7 kgf/cm² 10 psi
	At rated speed	Factory spec	196 to 441 kPa 2.0 to 4.5 kgf/cm² 28 to 64 psi
		Allowable limit	69 kPa 0.7 kgf/cm² 10 psi

(When reassembling)

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

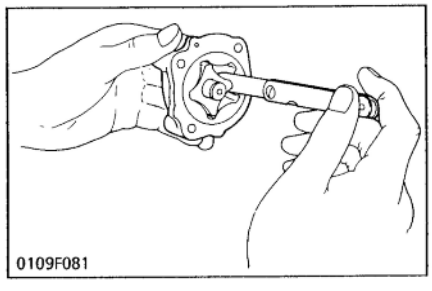
Tightening torque	Oil pressure switch	14.7 to 19.6 N·m 1.5 to 2.0 kgf·m 10.8 to 14.5 ft-lbs

DISASSEMBLING AND ASSEMBLING

Oil Pump

1. See page S.1-63.

SERVICING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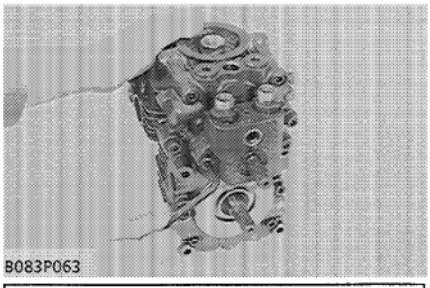
Rotor Lobe Clearance

1. Measure the clearance between lobes of the inner rotor and the outer rotor with a feeler gauge.
2. If the clearance exceeds the allowable limit, replace the oil pump rotor assembly.

Rotor lobe clearance	Allowable limit	0.25 mm 0.0098 in.

TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Vehicle Will Not Stop in Neutral Position	• Improper neutral adjustment	Adjust neutral	S.2-6
	• Improper speed change rod adjustment	Adjust	S.2-6
	• Neutral arm return spring defective	Replace	S.2-8
Vehicle Jerky and Noisy When Starting	• Transmission oil insufficient	Replenish	S.G-5
	• Air entering from suction pipe	Retighten	–
	• Oil strainer clogged	Clean	S.G-12
	• Transmission oil filter cartridge clogged	Replace	S.G-8
	• Hydrostatic transmission defective	Replace	–
Loss of Power	• Control linkage defective	Repair or replace	–
	• Transmission oil insufficient	Replenish	S.G-5
	• Oil strainer clogged	Clean	S.G-12
	• Transmission oil filter cartridge clogged	Replace	S.G-8
	• Auxiliary pump defective	Replace	S.2-11
	• Relief valve in control valve adaptor defective	Replace	S.6-4, 5
	• Hydrostatic transmission defective	Replace	–
System Operating Hot	• Transmission oil insufficient	Replenish	S.G-5
	• Oil strainer clogged	Clean	S.G-12
	• Transmission oil filter cartridge clogged	Replace	S.G-8
	• HST fan defective	Replace	S.2-10
Noise from Transmission	• Transmission oil insufficient	Replenish	S.G-5
	• Gear worn	Replace	–
	• Improper backlash between 6T bevel pinion shaft and 37T bevel gear	Adjust	S.2-25
	• Improper backlash between differential pinion and differential side gear	Adjust	S.2-25
	• Bearing worn	Replace	–

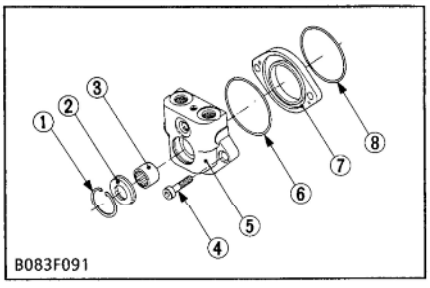

B083P063

Auxiliary Pump Housing and Auxiliary Pump Spacer

1. Unscrew the hex socket cap screws (4), and remove the auxiliary pump housing (5).
2. Remove the O-ring (6) from the housing.
3. Remove the auxiliary pump spacer (7).
4. Remove the O-ring (8) from the spacer.
5. Remove the internal snap ring (1), and pry the oil seal (2) off with a screw driver.

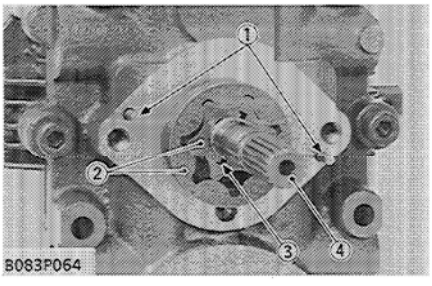
■ **NOTE**

- **When removing the oil seal (2), take care not to damage the housing.**



B083F091

(1) Internal Snap Ring
(2) Oil Seal
(3) Needle Bearing
(4) Hex Socket Cap Screw
(5) Auxiliary Pump Housing
(6) O-ring
(7) Auxiliary Pump Spacer
(8) O-ring

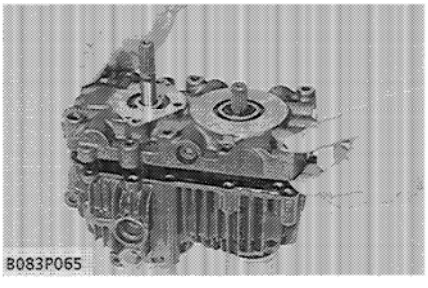


B083P064

Gerotor

1. Remove the gerotor (2).
2. Draw out the drive pin (3) on the pump shaft (4).
3. Draw out the dowel pins (1).

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


B083P065

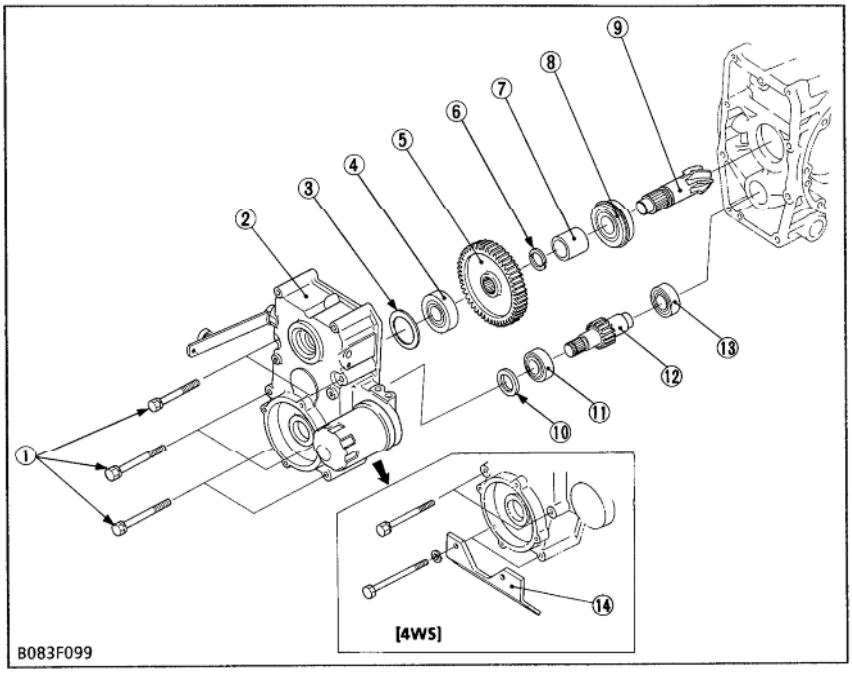
Center Section

1. Unscrew the hex socket cap screws.
2. Lift the center section off the housing.
3. Remove the gasket.
4. Draw out the dowel pins.

■ **NOTE**

- **Take care not to damage the surface of the center section and cylinder blocks.**

Front Cover, 6T Bevel Pinion Shaft and Brake Shaft



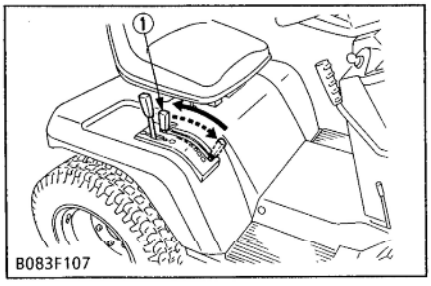
(1) Front Cover Mounting Screw
(2) Front Cover
(3) Shim
(4) Ball Bearing
(5) 53T Gear
(6) Stop Collar
(7) Collar
(8) Ball Bearing
(9) 6T Bevel Pinion Shaft
(10) Oil Seal
(11) Ball Bearing
(12) Brake Shaft
(13) Ball Bearing
(14) Protector

1. Unscrew the front cover mounting screws (1), and remove the front cover (2) from the transmission case. [2WS type]
2. Unscrew the front cover mounting screws (1), and remove the front cover (2) and protector (14) from the transmission case. [4WS type]
3. Remove the 6T bevel pinion shaft assembly.
4. Remove the brake shaft assembly.

(When reassembling)

- Be sure to check the backlash between 6T bevel pinion shaft and 37T bevel gear. (See page S.2-25)
- Apply grease to the oil seal lip (10), and take care that it is not rolled when installing the front cover.
- Apply liquid gasket (Three Bond 1208D or its equivalent) to the front cover, and assemble it within nine minutes.

Tightening torque	Front cover mounting screw	36.3 to 51.0 N·m 3.7 to 5.2 kgf·m 26.8 to 37.6 ft-lbs



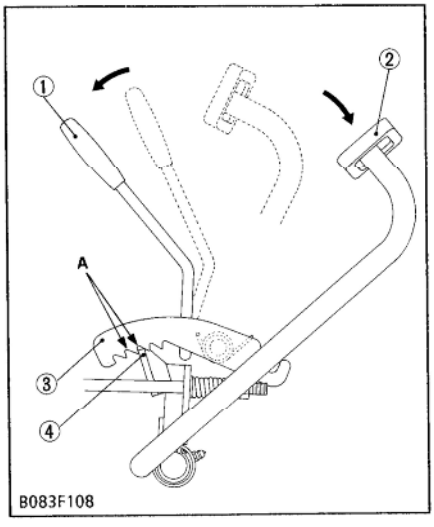
Automatic Release System

■ **IMPORTANT**

- **After adjusting the brake pedal travel and play, be sure to check the automatic release system.**

1. Set the cruise control lever (1) to the Hi-speed position.
2. Check that the cruise control lever release automatically when the brake pedal is depressed fully.
3. If the lever cannot release automatically, readjust the brake pedal travel and play.

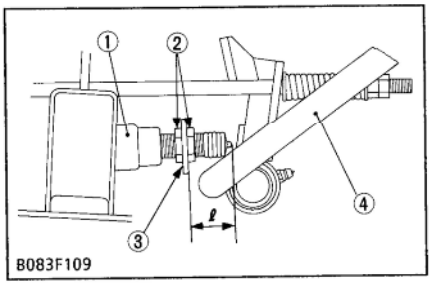
(1) Cruise Control Lever



Parking Brake

1. Depress the brake pedal (2) fully, and pull the parking brake knob (1).
2. Check that the stopper (4) of the brake pedal hooks on the brake lock (3) as shown in the figure.
3. If the hooked position is not good, readjust the brake pedal travel.

(1) Parking Brake Knob
(2) Brake Pedal
(3) Brake Lock
(4) Stopper
A: Hooked Position



Brake Switch Setting Length

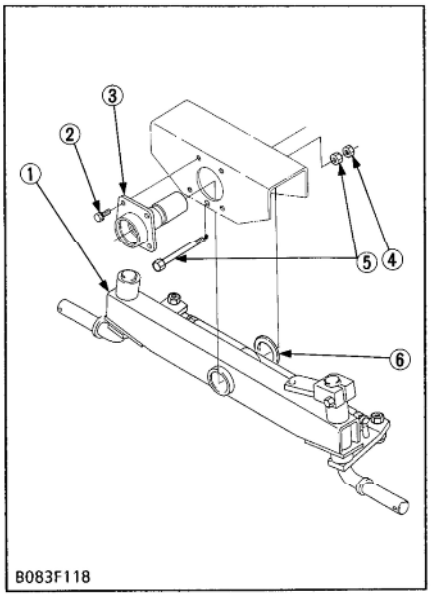
1. Depress the brake pedal (4) fully, and measure the setting length (ℓ) between the brake switch mounting plate (3) and the tip of brake switch (1).
2. If the measurement is not factory specification, adjust with the brake switch mounting nuts (2).

Brake switch setting length	Factory spec.	Approx. 32 mm 1.26 in.

■ **IMPORTANT**

- **After adjustment, be sure to check the brake switch continuity. (See page S.8-26)**

(1) Brake Switch
(2) Brake Switch Mounting Nut
(3) Brake Switch Mounting Plate
(4) Brake Pedal



Separating Front Axle

1. Support the frame with jack.
2. Unscrew the bolt (5).
3. Unscrew the front axle support mounting screws (2).
4. Tap out the front axle support (3) forward and separate the front axle (1) from the frame, noting the adjusting shim (6) between the frame and front axle.

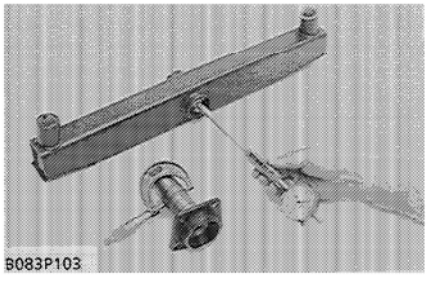
(When reassembling)

- Be sure to install the adjusting shim (6).
- After tightening the bolt (5) to the specified torque, secure the bolt with the lock nut (4).
- After reassembling the front axle, inject grease until it comes out.

Tightening torque	Bolt (5)	7.8 N·m 0.8 kgf·m 5.8 ft-lbs
	Front axle support mounting screw	39.2 to 49.0 N·m 4.0 to 5.0 kgf·m 28.9 to 36.2 ft-lbs

(1) Front Axle
(2) Front Axle Support Mounting Screw
(3) Front Axle Support
(4) Lock Nut
(5) Bolt
(6) Adjusting Shim

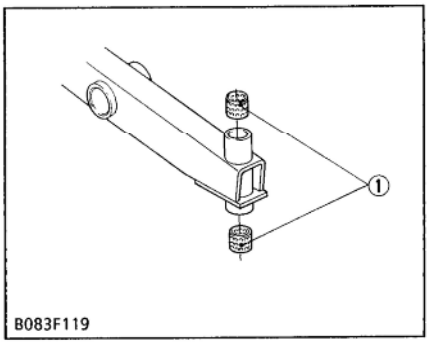
SERVICING



Clearance between Front Axle and Front Axle Support

1. Measure the front axle I.D. with a cylinder gauge.
2. Measure the front axle support O.D. with an outside micrometer, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace them.

Clearance between front axle and front axle support	Factory spec.	0.025 to 0.089 mm 0.00099 to 0.00350 in.
	Allowable limit	0.30 mm 0.0118 in.
Front axle I.D.	Factory spec.	40.000 to 40.039 mm 1.57480 to 1.57634 in.
Front axle support O.D.	Factory spec.	39.950 to 39.975 mm 1.57283 to 1.57382 in.

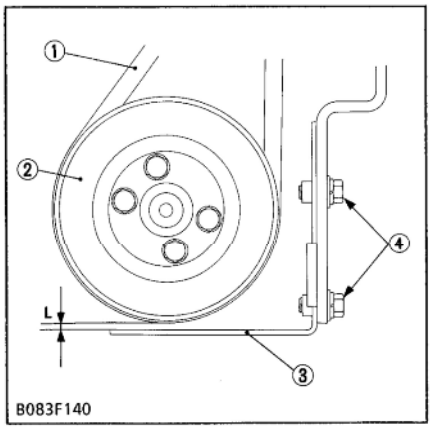


Dry Bearing Wear

1. Visually inspect the dry bearing (1) for signs of wear or damage.
2. If defects are found, replace it.

(1) Dry Bearing

CONTENTS



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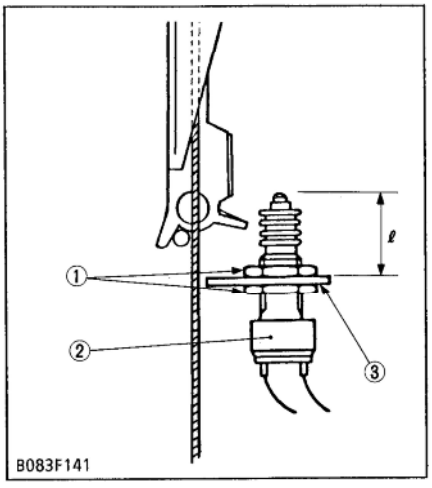
Adjusting Belt Stay

1. Place the machine on level ground, and stop the engine.
2. Set the PTO clutch lever to **"ENGAGE"** position, and measure the clearance (L) between the belt stay (3) and front PTO belt (1).
3. If the measurement is not within the factory specifications, loosen the belt stay mounting screws (4) and move the belt stay (3) to adjust.

Clearance (L) between belt stay and front PTO belt	Factory spec.	1.0 to 2.5 mm 0.039 to 0.098 in.

(1) Front PTO Belt
(2) Front PTO Pulley
(3) Belt Stay
(4) Belt Stay Mounting Screw



B083F141

PTO Switch Setting Length

1. Place the machine on level ground, and stop the engine.
2. Remove the panel rear cover.
3. Set the PTO clutch lever to **"ENGAGE"** position, and measure the setting length (ℓ) between PTO switch mounting plate (3) and the tip of PTO switch (2).
4. If the measurement is not within the factory specifications, adjust with the PTO switch mounting nuts (1).

PTO switch setting length (ℓ)	Factory spec.	29 to 31 mm 1.14 to 1.22 in.

■ IMPORTANT

- **After adjustment, be sure to check the PTO switch continuity. (See page S.8-27)**

(1) PTO Switch Mounting Nut
(2) PTO Switch
(3) PTO Switch Mounting Plate

SEAT SAFETY CONTROL

Engine Does Not Stop When Operator Leaves The Seat (PTO Clutch Lever Is Set at "ENGAGE" Position)	• Seat switch defective • PTO switch improperly mounted or defective • Combination box defective [G1700-G1800-G1900] • Relay box defective [G2000]	Replace Repair or replace Replace Replace	S.8-27 S.7-3, S.8-27 S.8-27 S.8-28
Engine Stops When PTO Clutch Lever Is Set at "ENGAGE" Position (Operator Is Seated)	• Seat switch defective • Combination box defective [G1700-G1800-G1900] • Relay box defective [G2000]	Replace Replace Replace	S.8-27 S.8-27 S.8-28

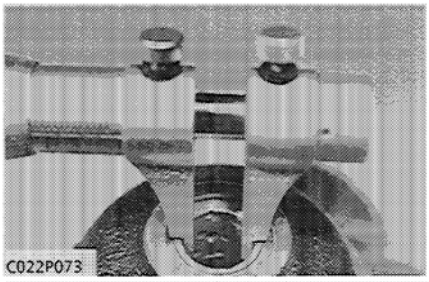
SERVICING SPECIFICATIONS

GLOW PLUG

Item	Factory Specification	Allowable Limit
Glow Plug Resistance	Approx. 0.9 Ω	–

STARTER [G1700-G1800-G1900]

Armature Shaft to Bushing (Commutator Side)	Clearance	0.03 to 0.10 mm 0.0012 to 0.0039 in.	0.20 mm 0.0079 in.
Armature Shaft	O.D.	12.50 mm 0.4921 in.	–
Bushing	I.D	12.53 to 12.60 mm 0.4933 to 0.4961 in.	–
Armature Shaft to Bushing (Drive Side)	Clearance	0.05 to 0.10 mm 0.0020 to 0.0039 in.	0.20 mm 0.0079 in.
Armature Shaft	O.D.	12.50 mm 0.4921 in.	–
Bushing	I.D	12.55 to 12.60 mm 0.4941 to 0.4961 in.	–
Commutator	O.D.	28.0 mm 1.102 in.	27.0 mm 1.063 in.
	Difference of O.D.'s	Less than 0.05 mm 0.0020 in.	0.4 mm 0.016 in.
Mica	Undercut	0.5 to 0.8 mm 0.020 to 0.031 in.	0.2 mm 0.008 in.
Brush	Length	16.0 mm 0.630 in.	10.5 mm 0.413 in.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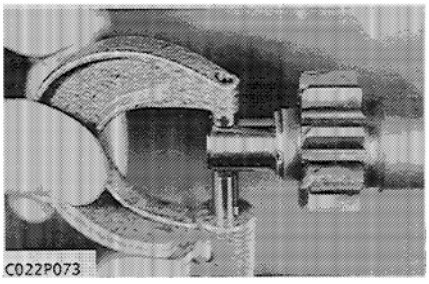
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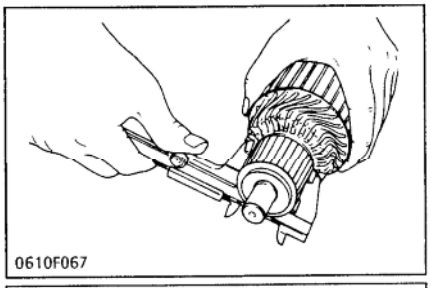
Clearance between Armature Shaft and Bushing

1. Measure the bushing I.D. of the drive side and commutator side.
2. Measure the armature shaft O.D. of the drive side and commutator side, and calculate the clearance.
3. If the clearance exceeds the allowable limit, replace the bushing.

Clearance between armature shaft and bushing	Factory spec.	Commutator side	0.03 to 0.10 mm 0.0012 to 0.0039 in.
		Drive side	0.05 to 0.10 mm 0.0020 to 0.0039 in.
	Allowable limit		0.20 mm 0.0079 in.

Armature shaft O.D.	Factory spec.	12.50 mm 0.4921 in.
Bushing I.D. (Commutator side)	Factory spec.	12.53 to 12.60 mm 0.4933 to 0.4961 in.
Bushing I.D. (Drive side)	Factory spec.	12.55 to 12.60 mm 0.4941 to 0.4961 in.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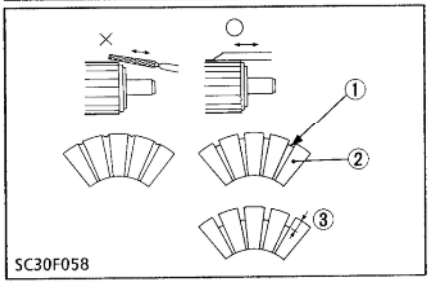


SC30F058

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

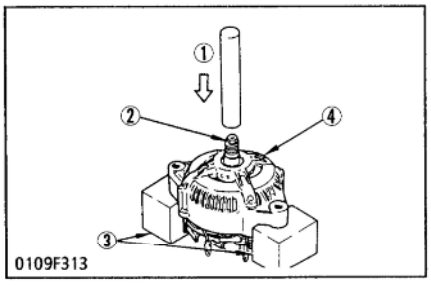
Commutator and Mica

1. If the commutator surface is dirty or dusty, clean it with a sandpaper.
2. Measure the commutator O.D. with vernier calipers at several points.
3. If the difference of the O.D.'s exceeds the allowable limit, correct the commutator on a lathe to the factory specification.
4. If the minimum O.D. is less than the allowable limit, replace the armature.
5. Measure the mica undercut depth.
6. If the undercut is less than the allowable limit, correct with a saw blade and chamfer the segment edges.

Commutator O.D	Factory spec.	28.0 mm 1.102 in.
	Allowable limit	27.0 mm 1.063 in.

Difference of O.D.'s	Factory spec.	Less than 0.05 mm 0.002 in.
	Allowable limit	0.4 mm 0.016 in.

Mica undercut	Factory spec.	0.5 to 0.8 mm 0.020 to 0.031 in.
	Allowable limit	0.2 mm 0.008 in.



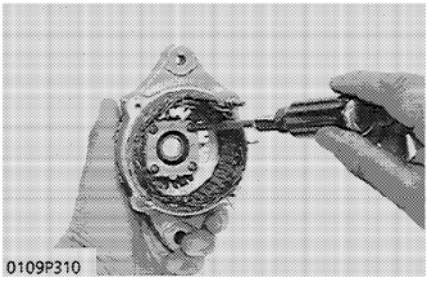
Rotor

1. With the drive end frame held level on the blocks as illustrated, press out the rotor.

■ IMPORTANT

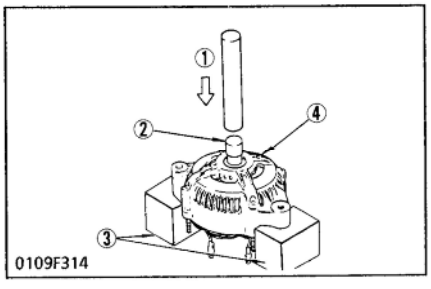
- **Take special care not to drop the rotor and damage the slip ring or fan, etc.**

(1) Press
(2) Rotor
(3) Block
(4) Drive End Frame



Retainer Plate

1. Unscrew the four screws holding the retainer plate, and remove the retainer plate.



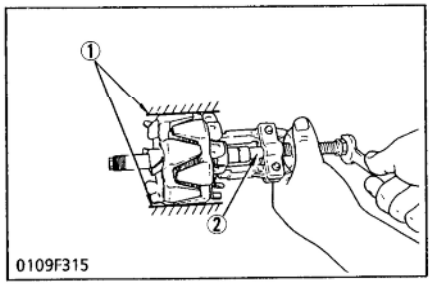
Bearing (Drive End Side)

1. With the drive end frame held level on blocks as illustrated, extract the bearings with a press and jig.

■ IMPORTANT

- **Two bearings for high-speed rotation are used. When replacing them with new ones, be sure to use genuine parts readily identified by the part number indicated. Also, take care not to strike the bearing.**

(1) Press
(2) Jig
(3) Block
(4) Drive End Frame



Bearing (Slip Ring Side)

1. Using a puller, extract the bearing in the manner shown in the figure.

(1) Lightly secure with a vise to prevent damage
(2) Press at the center

I MOWER

[3] LUBRICANTS

Place	Model	Capacity	Lubricants
Gear box	RC40-G17R RC48-G20-S RC44-G17 RC48-G20C RC44-G17-S RC48-G20C-S RC44-G17K RC48-G20K RC44-G17K-S RC48-G20K-S RC48-G20	0.3 ℓ 0.32 U.S.qts. 0.26 Imp.qts.	SAE 90 gear oil
	RC48-G20R	0.35 ℓ 0.37 U.S.qts. 0.31 Imp.qts.	
	RC54-G20 RC54-G20C RC54-G20K RC60-G20 RC60-G20K	0.4 ℓ 0.42 U.S.qts. 0.35 Imp.qts.	
Universal joint	All model	Until grease overflows	SAE multi-purpose type grease
Rear gauge wheel	All model	Until grease overflows	
Rear gauge wheel stay	RC60-G20 RC60-G20K	Until grease overflows	
Bevel gear shaft	All model	Until grease overflows	
Blade shaft (Two)	All model	Until grease overflows	
Belt tension pivot	All model	Until grease overflows	
Tension pulley	All model	Until grease overflows	

[4] TIGHTENING TORQUES (GENERAL USE SCREWS, BOLTS AND NUTS)

Screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual should be tightened according to the table below.

Grade / Unit / Nominal Diameter	No-grade or 4T * (⬡ or 4)			7T * (7)		
	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M 6	7.85 to 9.32	0.80 to 0.95	5.79 to 6.87	9.81 to 11.28	1.00 to 1.15	7.23 to 8.32
M 8	17.65 to 20.59	1.80 to 2.10	13.02 to 15.19	23.54 to 27.46	2.40 to 2.80	17.36 to 20.25
M10	39.23 to 45.11	4.00 to 4.60	28.93 to 33.27	48.05 to 55.90	4.90 to 5.70	35.44 to 41.23
M12	62.76 to 72.57	6.40 to 7.40	46.29 to 53.52	77.47 to 90.22	7.90 to 9.20	57.14 to 66.54
M14	107.9 to 125.5	11.0 to 12.8	79.56 to 92.58	123.6 to 147.1	12.6 to 15.0	91.1 to 108.5
M16	166.7 to 191.2	17.0 to 19.5	123.0 to 141.0	196.1 to 225.6	20.0 to 23.0	144.7 to 166.4
M18	245.2 to 284.4	25.0 to 29.0	180.8 to 209.8	274.6 to 318.7	28.0 to 32.5	202.5 to 235.1
M20	333.4 to 392.3	34.0 to 40.0	245.9 to 289.3	367.7 to 431.5	37.5 to 44.0	271.2 to 318.3

* The figures on the table above are indicated the top of screw or bolt.

TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Blade Does Not Rotate	• Broken mower belt • Broken front PTO belt	Replace mower belt Replace front PTO belt	G-5 S.7-5
Blade Speed Is Slow	• Loosen mower belt (Side discharge type) • Loosen mower belt (Rear discharge type) • Loosen front PTO belt • Clogged grass • Flattened out or worn cup washer	Replace mower belt or tension spring Adjust belt tension or replace mower belt Adjust front PTO belt tension or replace front PTO belt Remove grass Replace cup washer	G-5, S-17 G-5, S-14 S.7-2, 5 – –
Cutting Is Poor	• Worn or broken blade • Loosen mower blade mounting screw • Cutting height improper	Sharpen or replace blade Retighten mounting screw Adjust cutting height	G-5 G-3 S-12, 13, S-14
Mower Is Not Lifted	• Trouble of hydraulic system (lift cylinder and control valve) • Broken linkage system	Check hydraulic system Replace linkage system	S.6-2, 3, S.6-4, 5 –

SERVICING SPECIFICATIONS

Item		Factory Specification	Allowable Limit
Lift Rod	Length	155 mm 6.1 in.	–
Front Link [RC44-G17·RC48-G20·RC48-G20C]	Length	490 m 19.29 in.	–
Front Link [RC44-G17-S·RC48-G20-S·RC48-G20C-S]	Length	400 mm 15.75 in.	–
Front Link [RC44-G17K·RC48-G20K]	Length	454 mm 17.87 in.	–
Front Link [RC44-G17K-S·RC48-G20K-S]	Length	374 m 14.72 in.	–
Front Link [RC40-G17R·RC48-G20R]	Length	373 m 14.69 in.	–
Front Link [RC54-G20·RC54-G20C·RC54-G20K RC60-G20·RC60-G20K]	Length	390 mm 15.35 in.	–

CHECKING, DISASSEMBLING AND SERVICING

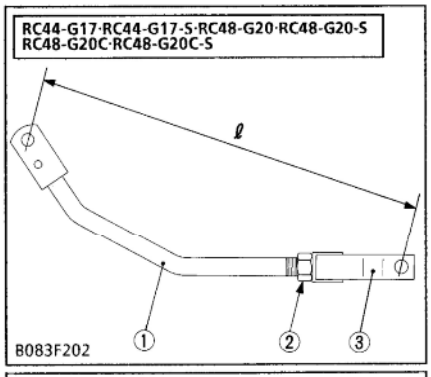
CHECKING AND ADJUSTING

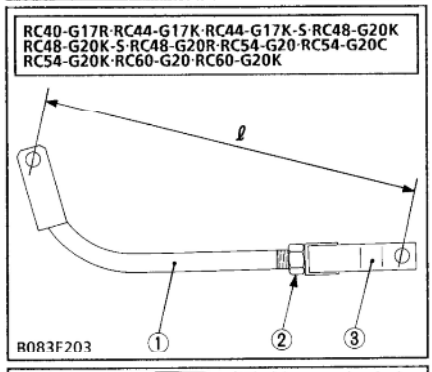
Checking Mower Blade

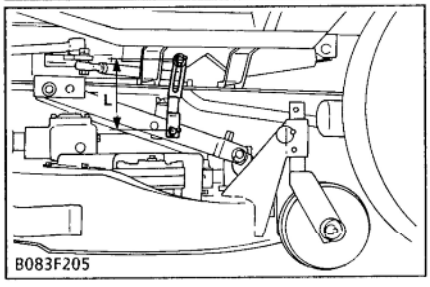
See page G-5.

Checking Mower Belt

See page G-5.







Adjusting Parallel Linkage

1. Park the vehicle on level ground, and lower the mower.
2. Adjust the length (ℓ) of both front links so that the mower blades are level. (See page S-7, 8)
3. Adjust the length (L) of both lift rods so that the mower blades are level. (See page S-7)

■ **NOTE**

- **Be sure that both rear gauge wheels height setting are equal.**