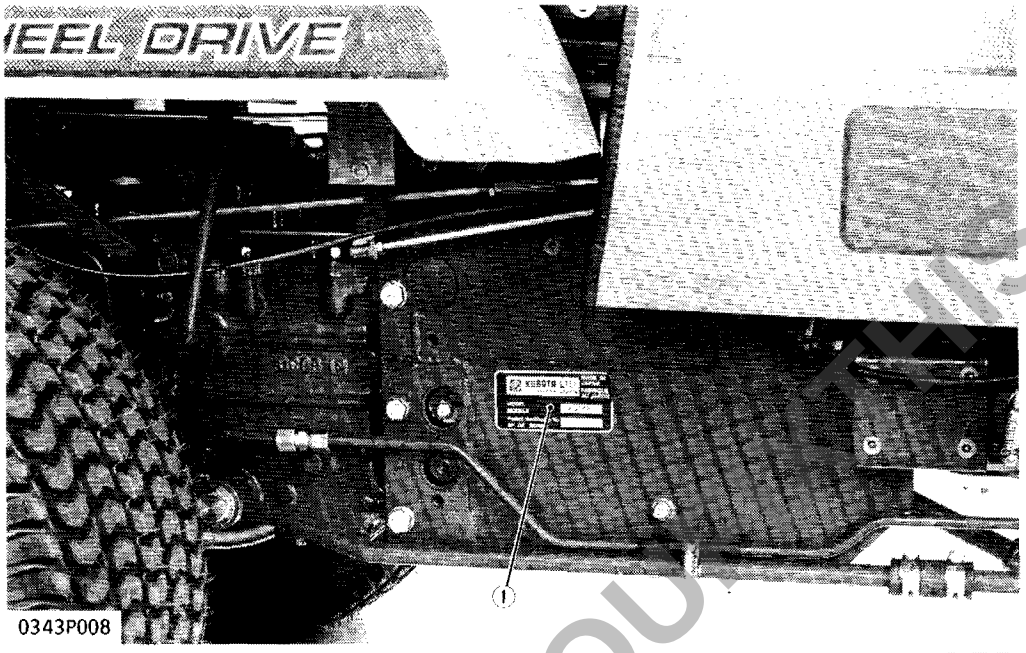
G GENERAL

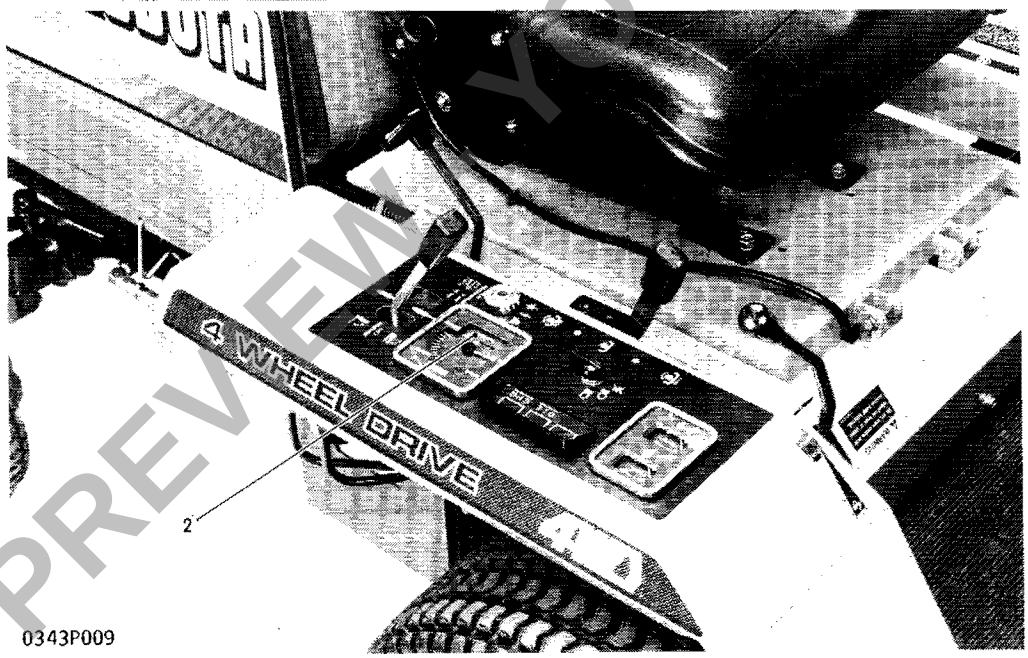
[1] FRONT MOWER IDENTIFICATION

When contacting your local KUBOTA distributor, always specify "Front Mower Product Identification Number" and hourmeter reading.



0343P008

(1) Front Mower Product Identification Number



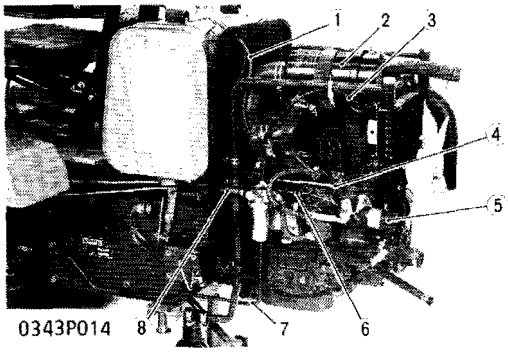
0343P009

(2) Hour Meter

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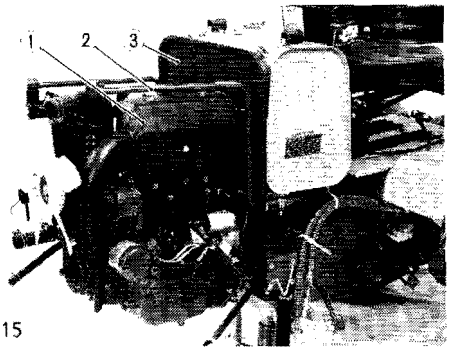
[3] SEPARATING ENGINE



(1) Fuel Pipe
(2) Air Cleaner
(3) Hour Meter Cable
(4) Accelerator Rod
(5) Solenoid
(6) Engine Stop Wire
(7) Delivery Pipe
(8) Fuel Pipe

Rod, Wires, Pipes and Air Cleaner

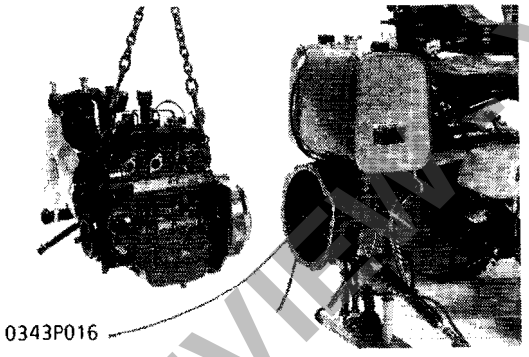
1. Remove the accelerator rod (4).
2. Disconnect the hour meter cable (3).
3. Disconnect the engine stop wire (6).
4. Disconnect the wiring from the engine stop solenoid (5).
5. Loosen the clamp and disconnect the fuel pipe (1), (8).
6. Remove the delivery pipe (7) and the air cleaner (2).



(1) Muffler
(2) Pipe
(3) Shutter Plate

Starter, Wiring, Muffler and Shutter Plate

1. Disconnect the wiring from the dynamo, starter, glow plug, oil switch and coolant temperature gauge.
2. Remove the starter from the engine.
3. Loosen the clamp and disconnect the oil cooler pipe (2).
4. Remove the muffler (1) and the shutter plate (3).



Separating Engine

1. Remove the mounting screws, and separate the engine from the clutch housing.

(When reassembling)

Tightening torque	Engine mounting screw	23.6 to 27.4 N·m 2.4 to 2.8 kgf·m 17.4 to 20.2 ft-lbs

[4] SEPARATING CLUTCH HOUSING



(1) Seat Switch

Fuel Tank and Seat

1. Disconnect the fuel tank band and remove the fuel tank.
2. Disconnect the wiring from seat switch (1).
3. Remove the joint pin and remove the seat.

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[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	* No-grade or 4T SS41, S20C			* 7T S43C, S48C (Quenched and Tempered)			* 9T SCr435, SCM435 (Quenched and Tempered)		
Nominal Diameter / Unit	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs	N·m	kgf·m	ft-lbs
M 6 (6 mm, 0.24 in.)	7.84 to 9.31	0.80 to 0.95	5.79 to 6.87	9.80 to 11.2	1.00 to 1.15	7.24 to 8.32	12.3 to 14.2	1.25 to 1.45	9.05 to 10.5
M 8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.0 to 15.2	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	29.4 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.2 to 45.0	4.0 to 4.6	29.0 to 33.2	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	60.8 to 70.5	6.2 to 7.2	44.9 to 52.1
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5	103 to 117	10.5 to 12.0	76.0 to 86.8
M14 (14 mm, 0.55 in.)	108 to 125	11.0 to 12.8	79.6 to 92.5	124 to 147	12.6 to 15.0	91.2 to 108	167 to 196	17.0 to 20.0	123 to 144
M16 (16mm, 0.63 in.)	167 to 191	17.0 to 19.5	123 to 141	196 to 225	20.0 to 23.0	145 to 166	260 to 303	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	245 to 284	25.0 to 29.0	181 to 210	275 to 318	28.0 to 32.5	203 to 235	343 to 401	35.0 to 41.0	254 to 297
M20 (20mm, 0.79 in.)	334 to 392	34.0 to 40.0	246 to 289	368 to 431	37.5 to 44.0	272 to 318	490 to 568	50.0 to 58.0	362 to 420

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

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1 ENGINE

TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	• No fuel	Replenish fuel	–
	• Air in the fuel system	Vent air	–
	• Water in the fuel system	Replace fuel and repair or replace fuel system	–
	• Fuel pipe clogged	Clean	S.G-9
	• Fuel filter clogged	Clean or replace	S.G-8
	• Excessive high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil	–
	• Fuel with low cetane number	Use the specified fuel	–
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	S.1-11
	• Incorrect injection timing	Adjust	S.1-31
	• Fuel camshaft worn	Replace	S.1-18
	• Injection nozzle clogged	Clean	–
	• Injection pump malfunctioning	Repair or replace	S.1-15
	• Fuel lift pump malfunctioning	Repair or replace	S.1-14
	• Seizure of crankshaft, camshaft, piston, cylinder liner or bearing	Repair or replace	S.1-17, 21, 22
	• Compression leak from cylinder	Check compression pressure	S.1-24
	• Improper valve seat alignment, valve spring broken, valve seized	Repair or replace	S.1-25
	• Improper valve timing	Correct or replace timing gear	S.1-17
	• Piston ring and liner worn	Replace	S.1-35,38
	• Excessive valve clearance	Adjust	S.1-28
[Starter Does Not Run]	• Battery discharged	Charge	S.9-4
	• Starter malfunctioning	Repair or replace	S.9-3,4
	• PTO switch malfunctioning	Adjust or replace	S.9-4
	• Controller malfunctioning	Replace	M.9-9
	• Wiring disconnected	Connect	M.9-1
	• Safety switch malfunctioning	Replace	S.9-4
Engine Revolution Is Not Smooth	• Fuel filter clogged or dirt	Clean or replace	S.G-8
	• Air cleaner clogged	Clean or replace	S.G-8
	• Fuel leak due to loose injection pipe retaining nut	Tighten nut	S.1-11
	• Injection pump malfunctioning	Repair or replace	S.1-15
	• Incorrect nozzle opening pressure	Adjust	S.1-29
	• Injection nozzle stuck or clogged	Repair or replace	S.1-29
	• Fuel over flow pipe clogged	Clean	–
	• Governor malfunctioning	Repair	S.1-16,18

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SERVICING SPECIFICATIONS

[1] ENGINE BODY

CYLINDER HEAD

Item		Factory Specification	Allowable Limit
Cylinder Head Surface	Flatness	–	0.05 mm 0.0020 in.
Top Clearance Cylinder Head Gasket Shim	 Thickness	0.65 to 0.85 mm 0.0256 to 0.0335 in. 0.2 mm 0.0079 in.	– –
Cylinder Head Gasket	Thickness	Free 1.15 to 1.30 mm 0.0453 to 0.0512 in. Tightened 1.05 to 1.15 mm 0.0413 to 0.0453 in.	– –
Compression Pressure		3.09 MPa 31.5 kgf/cm^2 465 psi	2.32 MPa 23.7 kgf/cm^2 337 psi

VALVES

Valve Clearance (Cold)		0.145 to 0.185 mm 0.0057 to 0.0073 in.	–
Valve Seat	Width	IN. 2.1 mm 0.083 in. EX. 2.1 mm 0.083 in.	– –
	Angle	IN. 0.785 rad. 45° EX. 0.785 rad. 45°	– –
Valve Face	Angle	IN. 0.794 rad. 45.5° EX. 0.794 rad. 45.5°	– –
Valve Recessing		0.9 to 1.1 mm 0.036 to 0.043 in.	1.3 mm 0.051 in.
Valve Stem to Valve Guide	Clearance	0.035 to 0.065 mm 0.0014 to 0.0025 in.	0.1 mm 0.0039 in.
Valve Stem	O.D.	6.960 to 6.975 mm 0.2741 to 0.2746 in.	–
Valve Guide	I.D.	7.010 to 7.025 mm 0.2760 to 0.2765 in.	–

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[5] MAINTENANCE CHECK LIST

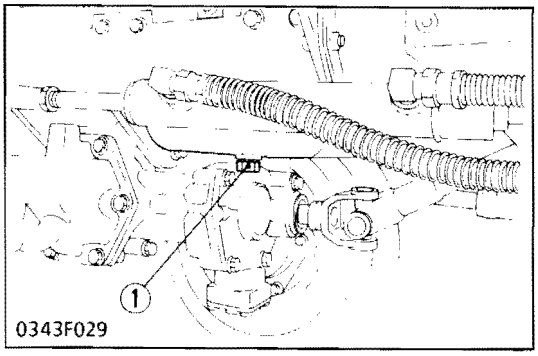
Frequency of Checks	Check Points	Reference Pages
Initial operation (Initial 60 hours)	During this period, pay special attention to the following. (1) After the initial 35 hours of use, change the engine oil. (2) After the initial 50 hours of use, change the transmission fluid and oil filter cartridge and clean the transmission strainer. (3) Quick starts or sudden braking should be avoided.	S.G-6 S.G-6,7 –
Every 75 hours	Change engine oil.	S.G-7
Every 100 hours	Lubricate the following points. Brake pedal shaft, Lift link arm shaft, Clutch release hub.	S.G-7
	Check the following points to be connected securely. Hydraulic inlet pipe clamps, Fuel line clamps.	S.G-8
	Clean air cleaner element.	S.G-8
	Clean fuel filter.	S.G-8
	Check battery electrolyte level.	S.G-9
	Check fuel line.	S.G-9
	Check fan drive belt tension.	S.G-9
	Check clutch pedal play.	S.G-9
	Check brake pedal play.	S.G-10
Every 150 hours	Change engine oil filter cartridge.	S.G-10
	Check radiator hose.	S.G-10
Every 200 hours	Change transmission oil filter cartridges.	S.G-10
Every 300 hours	Change transmission fluid. Transmission case, rear axle differential case, front axle gear case (right and left). • Clean transmission strainer.	S.G-10 S.G-11
Every 400 hours	Change fuel filter element.	S.G-11
Every 500 hours	Flush radiator.	S.G-11
Every one to two months	Recharge battery if necessary.	S.G-11
Every 3 months	Change scale inhibitor and coolant.	S.G-12
Every year or every 6 times of cleaning	Change air cleaner element.	S.G-12
Every year	Change anti-freeze and coolant.	S.G-13
Every 2 year	Change battery, if necessary.	S.G-13
	Change radiator hose and clamps, if necessary.	S.G-14
	Change fuel line and clamps, if necessary.	S.G-14
	Change hydraulic hoses and clamps, if necessary.	S.G-14

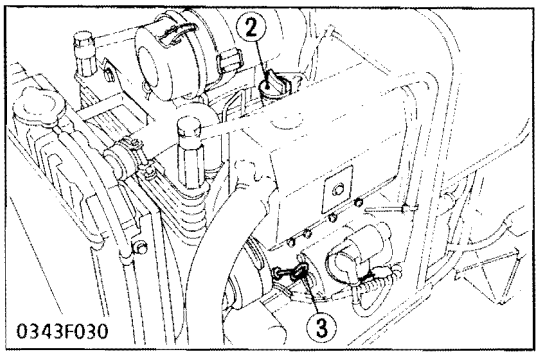
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[6] CHECK AND MAINTENANCE

(1) Check Points of Initial 35 Hours



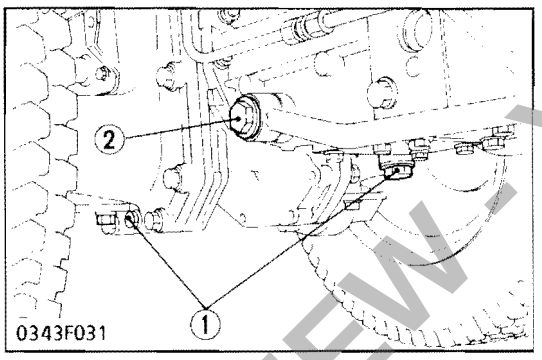


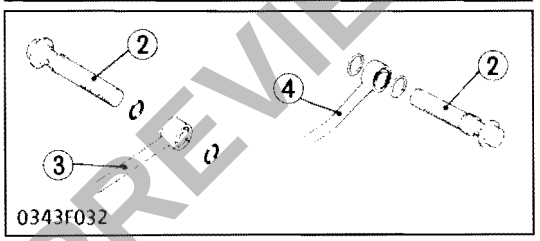
Changing Engine Oil

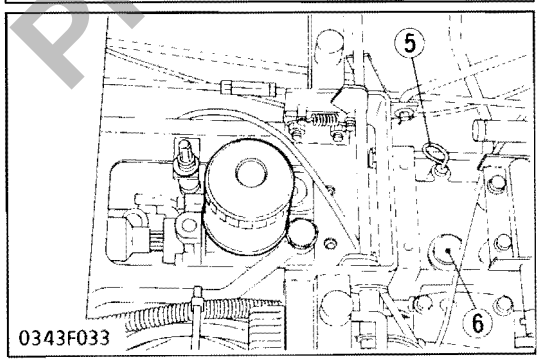
1. Start and warm up the engine for approx. 5 minutes.
2. Remove the drain plug (1) to drain oil.
3. Screw in the drain plug.
4. Fill new oil up to the upper line on the dipstick (3). Refer to "**LUBRICANTS**". (See page S.G-3)

(1) Drain Plug
(2) Oil Port Plug
(3) Dipstick

(2) Check Points of Initial 50 Hours







Changing Transmission Fluid and Clean the Transmission Oil Strainer

1. Remove the drain plugs (1) to drain transmission oil.
2. After draining, disassemble and clean the transmission oil strainers (2).
3. Reassemble the transmission oil strainers.
4. Screw in the drain plugs.
5. Fill new oil up to the upper line on the dipstick (5).

■ **IMPORTANT**

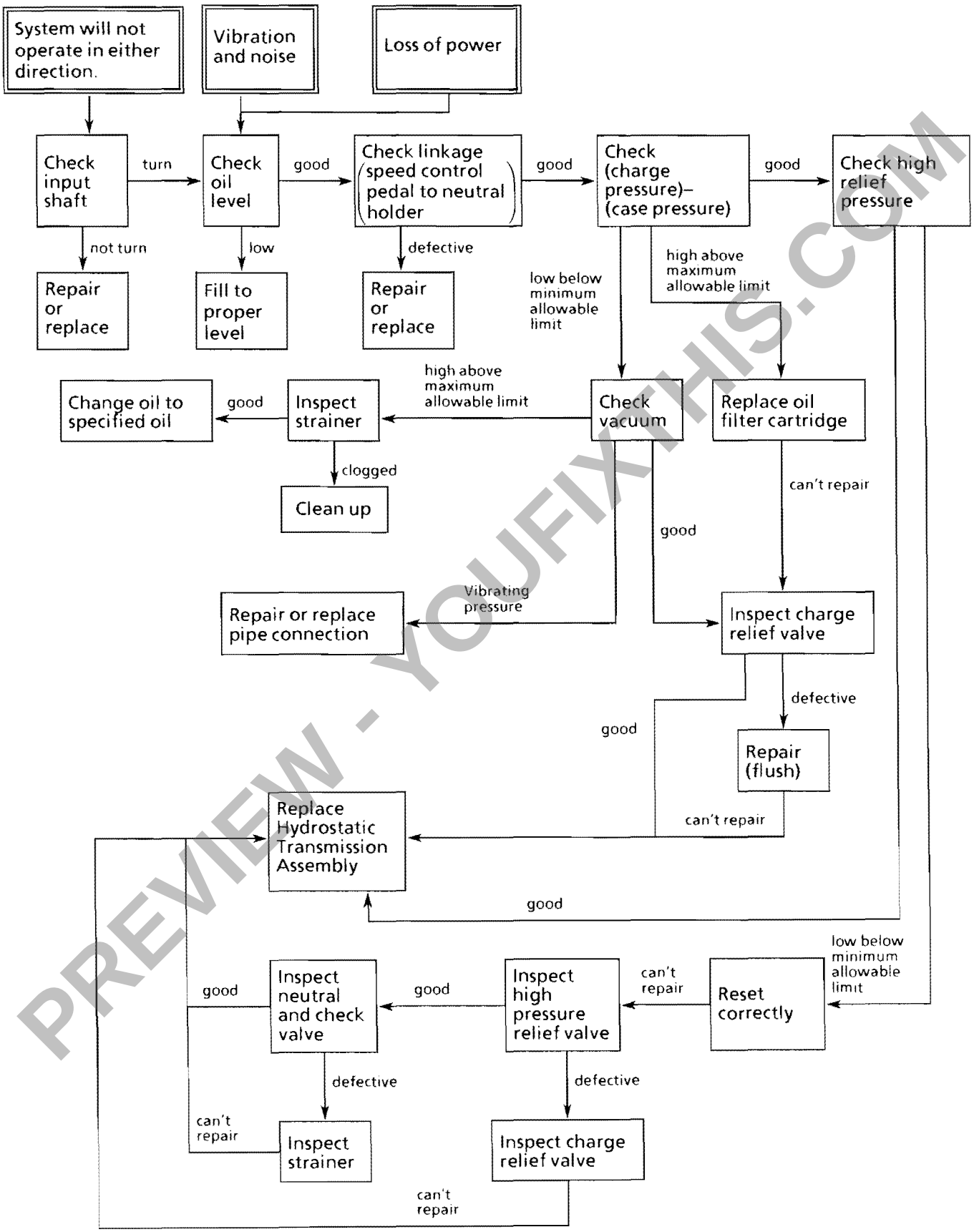
- **Use only multi-grade transmission fluid. Use of other oils may damage the transmission or hydraulic system. Refer to "LUBRICANTS". (See page S.G-3)**

(1) Drain Plug
(2) Strainer
(3) Suction Pipe to Gear Pump
(4) Suction Pipe to HST
(5) Dipstick
(6) Oil Port Plug

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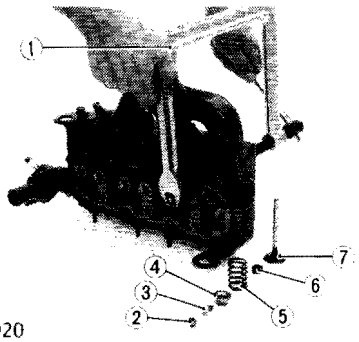
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HYDROSTATIC TRANSMISSION



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0076P020

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

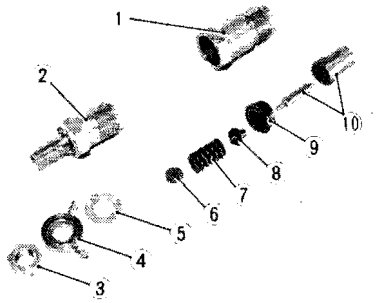
Valves

1. Remove the valve caps.
2. Remove the valve spring collet, pushing the valve spring retainer by valve spring replacer.
3. Remove the valve spring retainer, valve spring and valve stem seal.
4. Remove the valve.

■ IMPORTANT

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

[2] NOZZLE HOLDER



0075P015

(1) Retaining Nut
(2) Nozzle Holder Body
(3) Nut
(4) Eye Joint
(5) Plain Washer
(6) Adjusting Washer
(7) Nozzle Spring
(8) Push Rod
(9) Distance Piece
(10) Nozzle Piece

Nozzle Holder

1. Secure the retaining nut with a vise.
2. Remove the nut, the eye joint and the plain washer.
3. Remove the nozzle holder body and take out parts inside.

(When reassembling)

- When disassembling and reassembling the nozzle piece, dip it in clean fuel.
- Install the push rod, noting its direction (upside down).
- Do not tighten it too much, or the needle valve will not slide easily and the injection performance will be decreased.

Tightening torque	Speed change cover mounting bolt	78.5 to 98.1 N·m 8.0 to 10.0 kgf·m 57.9 to 72.3 ft-lbs

[3] FUEL PUMP



0076P021

(1) Fuel Pump Assembly

Fuel Pump

1. Remove the two fuel pump mounting nuts.
2. Detach the fuel pump.

(When reassembling)

- Be careful about the installation direction of the fuel pump.
- Install the fuel pump gasket after applying a non-drying adhesive to it.

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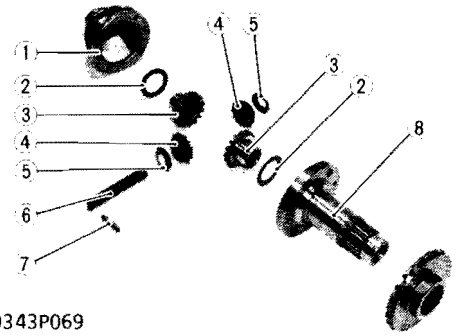
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HYDROSTATIC TRANSMISSION (Continued)

Item		Factory Specification	Allowable Limit
Case Relief Valve	Setting Pressure	167 to 226 kPa 1.7 to 2.3 kgf/cm² 24 to 33 psi (Oil temperature at 25° to 50°C 77° to 122°F)	147 or 245 kPa 1.5 or 2.5 kgf/cm² 21 or 36 psi (Oil temperature at 25° to 50°C 77° to 122°F)
Case Relief Valve Spring	Free Length	25.95 mm 1.022 in.	–
Case Relief Valve Spring	Setting Length	20.0 mm 0.787 in. (load 29.4 N 3.00 kgf 6.62 lbs)	–
		17.5 mm 0.689 in. (load 41.8 N 4.26 kgf 9.39 lbs)	–
Charge	Setting Pressure	441 to 579 kPa 4.5 to 5.9 kgf/cm² 64 to 84 psi more than case pressure (Oil temperature at 25°C, 77°F)	412 or 608 kPa 4.2 or 6.2 kgf/cm² 60 or 88 psi more than case pressure (Oil temperature at 25°C, 77°F)
		422 to 559 kPa 4.3 to 5.7 kgf/cm² 61 to 81 psi more than case pressure (Oil temperature at 50°C, 122°F)	392 or 558 kPa 4.0 or 6.0 gf/cm² 57 or 85 psi more than case pressure (Oil temperature at 50°C, 122°F)
Vacuum	Setting Pressure	120 mmHg (Oiltemperature at 25°C, 77°F)	–
		60 mmHg (Oil temperature at 50°C, 122°F)	–
		35 mmHg (Oiltemperature at 80°C, 176°F)	220 mmHg (Oiltemperature at 80°C, 176°F)

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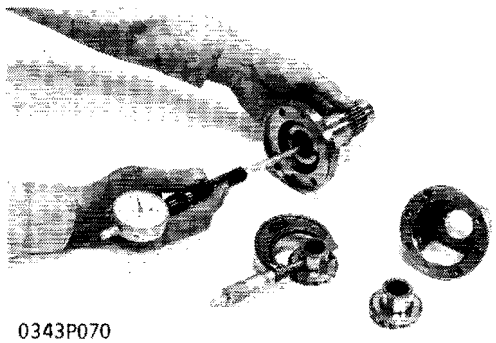
0343P069

Differential

1. For disassembling the differential, refer to [1] DIFFERENTIAL GEAR in FRONT AXLE. (See page S.4-2)

(1) Rear Differential Case
(2) Shim
(3) Differential Side Gear
(4) Differential Pinion Gear
(5) Pinion Thrust Collet
(6) Differential Pinion Shaft
(7) Straight Pin
(8) Rear Differential Shaft

SERVICING



0343P070

Clearance between Differential Side Gear Boss and Differential Case Bore

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

Clearance between differential side gear boss and differential case bore.	Factory spec.	0.05 to 0.07 mm 0.0019 to 0.0028 in.
	Allowable limit	0.25 mm 0.0098 in.
Differential side gear boss O.D.	Factory spec.	29.95 to 29.96 mm 1.1791 to 1.1795 in.
Differential case bore I.D.	Factory spec.	30.00 to 30.02 mm 1.1811 to 1.1819 in.



0303P059

Clearance between Differential Pinion Shaft and Differential Pinion Bushing

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

Clearance between differential pinion shaft and differential pinion bushing	Factory spec.	0.02 to 0.05 mm 0.0008 to 0.0020 in.
	Allowable limit	0.25 mm 0.0098 in.
Differential pinion shaft O.D.	Factory spec.	13.97 to 13.98 mm 0.5500 to 0.5504 in.
Differential pinion bushing I.D.	Factory spec.	14.00 to 14.02 mm 0.5512 to 0.5520 in.

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