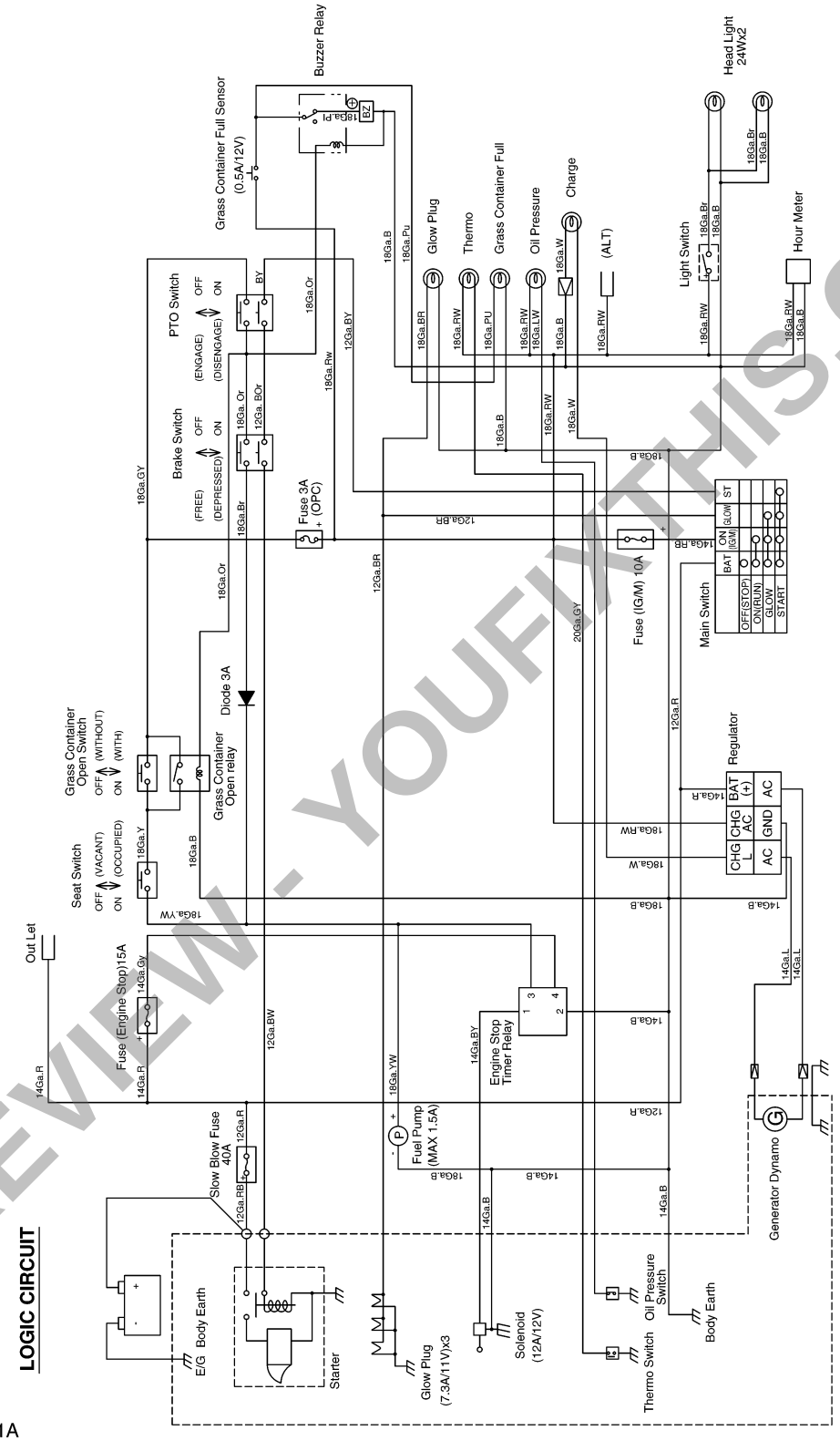
1. WIRING DIAGRAM



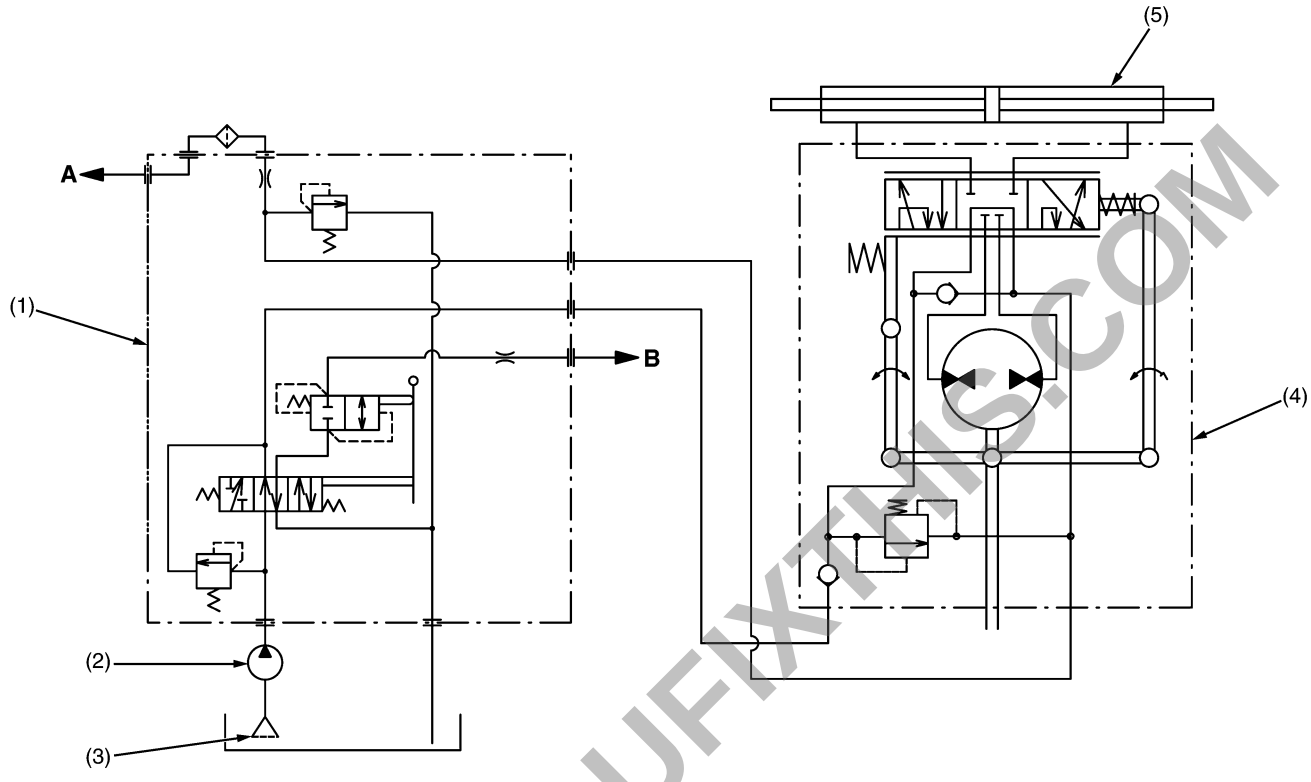
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1. HYDRAULIC CIRCUIT



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(1) Hydraulic Control Valve Assembly
(2) Hydraulic Pump
(3) Oil Strainer
(4) Steering Controller
(5) Steering Cylinder
A : To HST
B : To Mower Lift Cylinder

This machine is provided with a full hydrostatic power steering.

In the full hydrostatic power steering, the steering controller (4) is connected to the steering cylinder (5) with only the hydraulic piping. Accordingly, it does not have mechanical transmitting parts such as steering gear, pitman arm, drag link, etc. Therefore, it is simple in construction. This steering system consists of the oil strainer (3), hydraulic pump (2), hydraulic control valve assembly (1), steering controller (4), steering cylinder (5), etc..

The oil is supplied to the steering controller (4) through the hydraulic control valve assembly (1) by the hydraulic pump (2). With the steering wheel at neutral, the oil returns through the steering controller (4) to the hydraulic control valve assembly (1). Turn the steering wheel, and just a required amount of oil is sent to the steering cylinder (5). The oil at the side opposite to the cylinder flows back to the hydraulic control valve assembly (1).

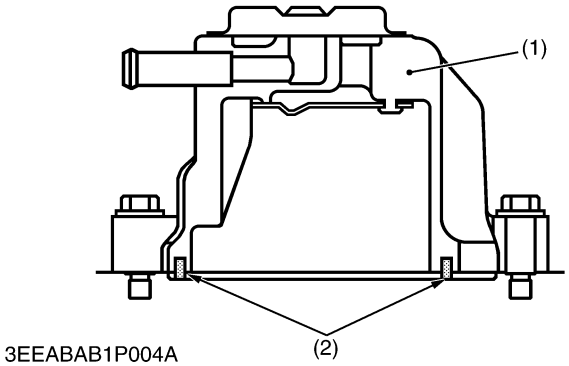
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1. ENGINE BODY

[1] HALF-FLOATING HEAD COVER



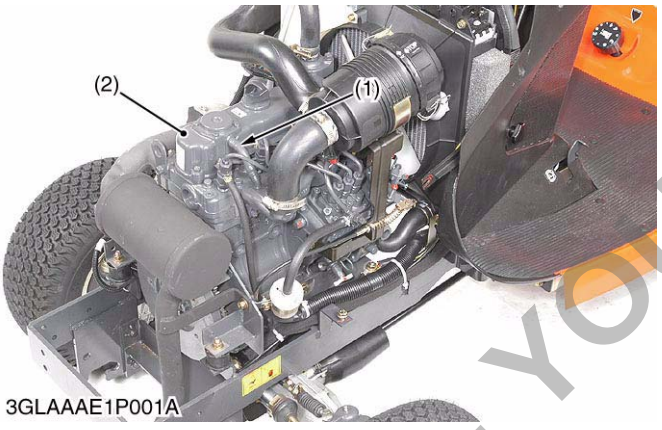
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The rubber packing is fitting in to maintain the head cover 0.5 mm (0.02 in.) or so off the cylinder head. This arrangement helps reduce noise coming from the cylinder head.

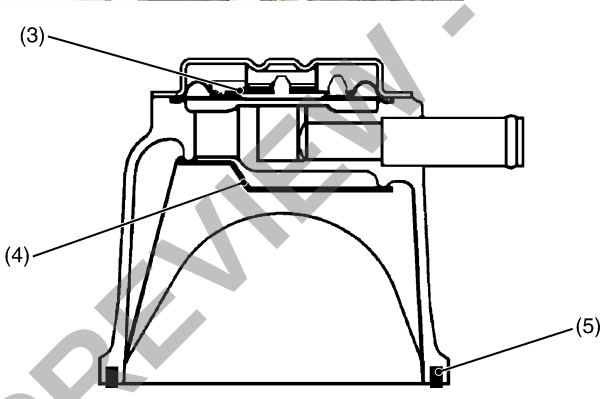
(1) Cylinder Head Cover (2) Rubber Packing

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[2] CLOSED BREATHER



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Closed breather system has been adopted to prevent the release of blowby gas into the atmosphere.

After its oil content is filtered by oil shield (4), the blowby gas is fed back to the intake manifold through breather valve (3) to be used for re-combustion.

(1) Breather Hose (4) Oil Shield
(2) Cylinder Head Cover (5) Rubber Packing
(3) Breather Valve

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3. TIGHTENING TORQUES

Tightening torques of screws and nuts on the table below are especially specified.
(For general use screws and nuts : See page G-9.)

Item	Size x Pitch	N·m	kgf·m	ft-lbs
Front coupling mounting screw	M8 x 1.25	23.5 to 27.4	2.4 to 2.8	17.4 to 20.3
Engine mounting nut	M8 x 1.25	23.5	2.4	17.4
Air cleaner stay screw	M8 x 1.25	23.5 to 27.4	2.4 to 2.8	17.4 to 20.3
Engine support screw	M10 x 1.25	48.1 to 55.9	4.9 to 5.7	35.4 to 41.2
*Cylinder head cover screw	M6 x 1.0	6.86 to 11.3	0.7 to 1.15	5.1 to 8.3
Injection pipe retaining nut	M12 x 1.5	24.5 to 34.3	2.5 to 3.5	18.1 to 25.3
Overflow pipe retaining nut	M12 x 1.5	19.6 to 24.5	2.0 to 2.5	14.5 to 18.1
Nozzle holder assembly	M20 x 1.5	49.0 to 68.6	5.0 to 7.0	36.2 to 50.6
Glow plug	M8 x 1.0	7.85 to 14.7	0.8 to 1.5	5.8 to 10.8
*Rocker arm braket screw	M6 x 1.0	9.8 to 11.3	1.00 to 1.15	7.2 to 8.3
*Cylinder head screw	M8 x 1.25	37.3 to 42.2	3.8 to 4.3	27.5 to 31.1
*Fan drive pulley screw	M12 x 1.5	98.0 to 107.8	10.0 to 11.0	72.3 to 79.5
*Idle gear shaft mounting screw	M6 x 1.0	9.8 to 11.3	1.00 to 1.15	7.2 to 8.3
*Connecting rod screw	M7 x 0.75	26.5 to 30.4	2.7 to 3.1	19.5 to 22.4
*Flywheel screw	M10 x 1.25	53.9 to 58.8	5.5 to 6.0	39.8 to 43.4
Bearing case cover mounting screw	M6 x 1.0	9.8 to 11.3	1.00 to 1.15	7.2 to 8.3
*Main bearing case screw 2	M7 x 1.0	26.5 to 30.4	2.7 to 3.1	19.5 to 22.4
*Main bearing case screw 1	M6 x 1.0	12.7 to 15.7	1.3 to 1.6	9.4 to 11.6
Nozzle holder		34.3 to 39.2	3.5 to 4.0	25.3 to 28.9
Oil pressure switch	PT1/8	14.7 to 19.6	1.5 to 2.0	10.8 to 14.5

■ NOTE

- **In removing and applying the screws and nuts marked with "*", a pneumatic wrench or similar pneumatic tool, if employed, must be used with enough care not to get them seized.**
- **For "*" marked screws and nuts on the table, apply engine oil to their threads and seats before tightening.**
- **The letter "M" in Size x Pitch means that the screw or nut dimension stands for metric. The size is the nominal outside diameter in mm of the threads. The pitch is the nominal distance in mm between two threads.**

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1. TROUBLESHOOTING

Symptom	Probable Cause	Solution	Reference Page
Engine Does Not Start	● No fuel	Replenish fuel	G-8
	● Air in the fuel system	Bleed	G-41
	● Water in the fuel system	Change fuel and repair or replace fuel system	G-27, 38
	● Fuel pipe clogged	Clean	G-27
	● Fuel filter clogged	Change	G-27, 34
	● Excessively high viscosity of fuel or engine oil at low temperature	Use specified fuel or engine oil	G-8
	● Fuel with low cetane number	Use specified fuel	G-8
	● Fuel leak due to loose injection pipe retaining nut	Tighten retaining nut	1-S24
	● Incorrect injection timing	Adjust	1-S16
	● Fuel camshaft worn	Replace	—
	● Injection nozzle clogged	Repair or replace	1-S38
	● Injection pump malfunctioning	Replace	1-S28
	● Seizure of crankshaft, camshaft, piston, cylinder or bearing	Repair or replace	—
	● Compression leak from cylinder	Replace head gasket, tighten cylinder head screw, glow plug and nozzle holder	1-S10
	● Improper valve timing	Correct or replace timing gear	1-S30
	● Piston ring and cylinder worn	Replace	1-S49, 55
	● Excessive valve clearance	Adjust	1-S12
(Starter Does Not Run)	● Battery discharged	Charge	G-25
	● Starter malfunctioning	Repair or replace	7-S18
	● Main switch malfunctioning	Replace	7-S6, 7
	● PTO switch defective	Replace	7-S10
	● Brake switch defective	Replace	7-S10
	● Seat switch defective	Replace	7-S11
	● Slow blow fuse blown	Replace	G-38
	● Wiring disconnected	Connect	—

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SPECIFICATIONS

Model			GR2100EC
Engine	Maker		KUBOTA
	Model		D782-E2-GX
	Type		Indirect injection. Vertical, water-cooled, 4-cycle diesel
	Number of cylinders		3
	Bore and stroke		67 x 73.6 mm (2.64 x 2.90 in.)
	Total displacement		778 cm^3 (47.46 cu.in.)
	Engine gross power (DIN)		15.6 kW (20.9 HP)
	Rated revolution		50 r/s [3000 min^{-1} (rpm)]
	Battery		51R (12 V, 450CCA)
	Starting system		Cell starter (with glow plug)
	Lubrication system		Forced lubrication by trochoidal pump
	Cooling system		Pressurized radiator, forced circulation with water pump
	Fuel		Diesel fuel No.2-D [above -10 °C(14 °F)], Diesel fuel No.1-D [below -10 °C (14 °F)]
Capacities	Fuel tank		18 L (4.8 U.S.gals, 4.0 lmp.gals)
	Engine crankcase (with filter)		2.8 L (2.96 U.S.qts., 2.46 lmp.qts.)
	Engine coolant (with recovery tank)		2.35 L (2.48 U.S.qts., 2.07 lmp.qts.)
	Transmission case		3.3 L (0.87 U.S.gals., 0.73 lmp.gals.)
	Front axle case		1.9 L (0.50 U.S.gals., 0.42 lmp.gals.)
Dimensions	Overall length (with grass catcher)		2540 mm (100.0 in.)
	Overall width		1280 mm (50.4 in.)
	Overall height		1230 mm (48.4 in.)
	Wheel base		1280 mm (50.4 in.)
	Tread	Front	825 mm (32.5 in.)
		Rear	800 mm (31.5 in.)
Weight (without mower and grass catcher)			360 kg (794 lbs)
Traveling system	Tires	Front	16 x 7.50 - 8, 4PR
		Rear	23 x 10.50 - 12, 4PR
	Steering		Full hydraulic power steering (Glide Steer)
	Transmission		Hydrostatic transmission
	Brake		Internal expanding brake
	Traveling speed	Forward	0.0 to 10.0 km/h (0.0 to 6.2 mph)
		Reverse	0.0 to 5.0 km/h (0.0 to 3.1 mph)
PTO system	Clutch		Mechanical wet multi discs
	PTO brake		Wet multi discs

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

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6. MAINTENANCE CHECK LIST

■ IMPORTANT

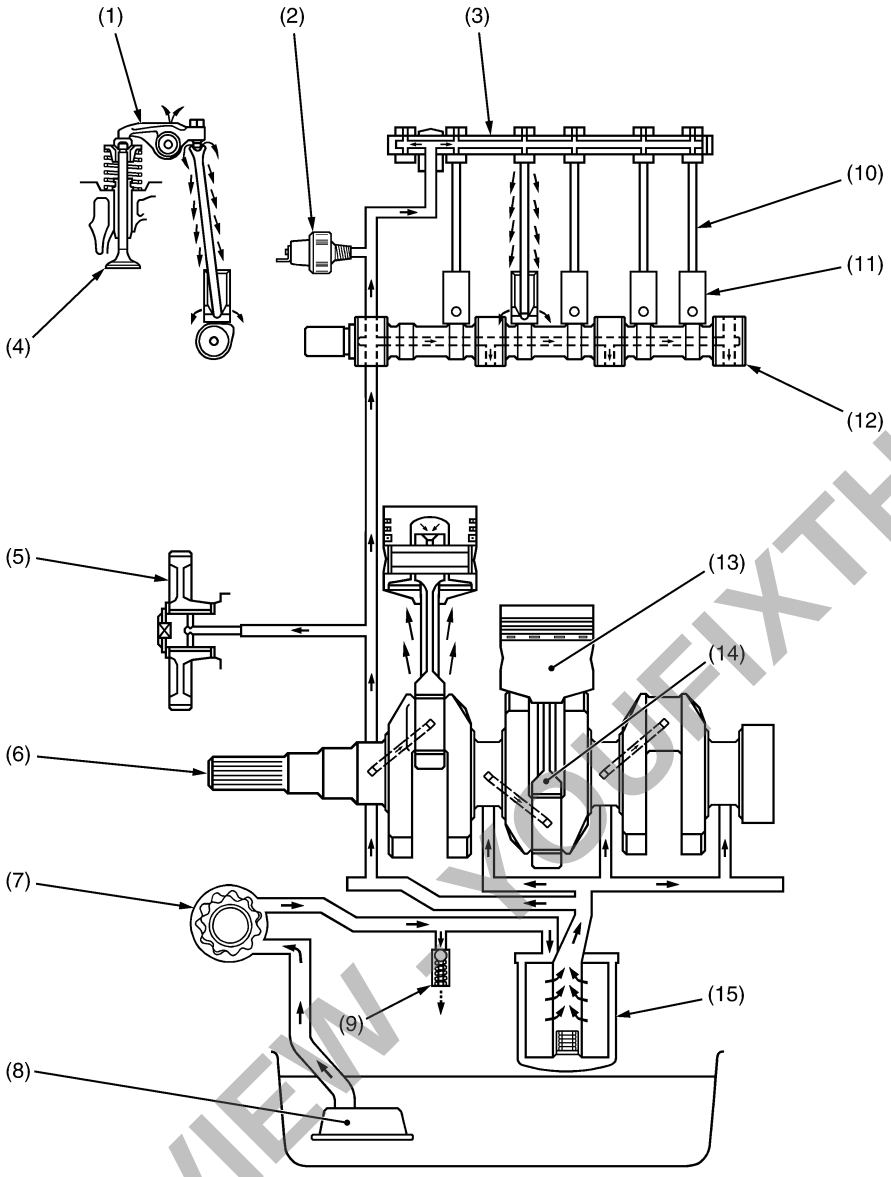
- **The jobs indicated by ★ must be done initially.**
- ***1 : This maintenance should be done daily more often in dusty conditions than in normal conditions. Suggested cleaning interval is every 100 hours in normal conditions.**

No.	Item / Period		Indication on hour meter (Hr)												After since	Important	Reference page
			50	100	150	200	250	300	350	400	450	500	550	600			
1	Engine oil	Change	★	☆		☆		☆		☆		☆		☆	every 100 hr		G-26
2	Engine oil filter	Replace	★			☆				☆				☆	every 200 hr		G-29
3	Transmission and Front axle cases fluid	Change				★				☆				☆	every 200 hr		G-30, G-32
4	Transmission oil filter	Replace	★			☆				☆				☆	every 200 hr		G-31
5	Transmission strainer	Clean				★				☆				☆	every 200 hr		G-31
6	Front axle pivot	Adjust		★		☆				☆				☆	every 200 hr		G-34
7	Safety device	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr		G-19
8	Oiling	-	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr		G-22
9	Greasing	-	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr		G-21
10	Mower gear box oil	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr		G-20
		Change	☆		☆			☆			☆			☆	every 150 hr		G-28
11	Air cleaner element	Clean	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr	*1	G-20
		Replace													every 1 year		G-35
12	Battery condition	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr		G-24
13	Brake	Adjust		☆		☆		☆		☆		☆		☆	every 100 hr		G-27
14	Fan drive belt tension	Adjust		☆		☆		☆		☆		☆		☆	every 100 hr		G-28
15	Fuel filter element	Check		☆		☆		☆		☆		☆		☆	every 100 hr		G-27
		Replace								☆					every 400 hr		G-34

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2. LUBRICATING SYSTEM



(1) Rocker Arm
(2) Oil Pressure Switch
(3) Rocker Arm Shaft
(4) Valve
(5) Idle Gear
(6) Crankshaft
(7) Oil Pump
(8) Oil Strainer
(9) Relief Valve
(10) Push Rod
(11) Tappet
(12) Camshaft
(13) Piston
(14) Connecting Rod
(15) Oil Filter Cartridge

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This engine's lubricating system consists of oil strainer (8), oil pump (7), relief valve (9), oil filter cartridge (15) and oil pressure switch (2).

The oil pump sucks lubricating oil from the oil pan through the oil strainer and the oil flows down to the filter cartridge, where it is further filtered. Then the oil is forced to crankshaft (6), connecting rods (14), idle gear (5), camshaft (12) and rocker arm shaft (3) to lubricate each part.

Some part of oil, splashed by the crankshaft or leaking and dropping from gaps of each part, lubricates these parts: piston (13), cylinders, small ends or connecting rods, tappets (11), push rods (10), inlet and exhaust valves (4) and timing gears.

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WSM

WORKSHOP MANUAL

GR2100EC

Kubota

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⚠ SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol" is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

⚠ DANGER
- **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

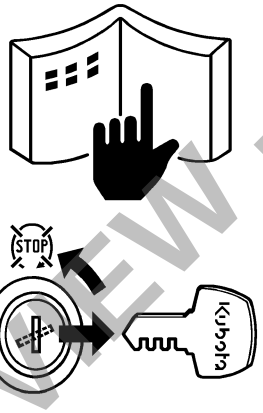
⚠ WARNING
- **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION
- **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

■ IMPORTANT
- **Indicates that equipment or property damage could result if instructions are not followed.**

■ NOTE
- **Gives helpful information.**

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BEFORE SERVICING AND REPAIRING

- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key
- Disconnect the battery negative cable
- Hang a **"DO NOT OPERATE"** tag in operator station.

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SAFETY STARTING

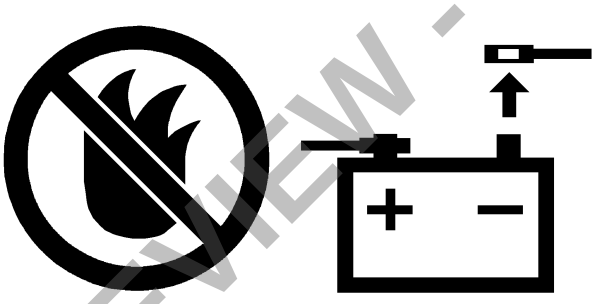
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine while standing on ground. Start the engine only from operator's seat.

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SAFETY WORKING

- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
- Do not touch the rotating or hot parts while the engine is running.
- Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
- Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.

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AVOID FIRES

- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
- Make sure that no fuel has been spilled on the engine.

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