WSM

WORKSHOP MANUAL

GR2100

Kubota

KiSC issued 08, 2010 A

TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of KUBOTA GR2100. It is divided into three parts, "General", "Mechanism" and "Servicing".

■ **General**

Information on the product identification, the general precautions, maintenance check list, check and maintenance and special tools are described.

■ **Mechanism**

Information on the construction and function are included. This part should be understood before proceeding with troubleshooting, disassembling and servicing.

■ **Servicing**

Information on the troubleshooting, servicing specification lists, tightening torque, checking and adjusting, disassembling and assembling, and servicing which cover procedures, precautions, factory specifications and allowable limits.

All information illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

The right is reserved to make changes in all information at any time without notice.

Due to covering many models of this manual, information or picture being used have not been specified as one model.

March 2007

KiSC issued 08, 2010 A

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.

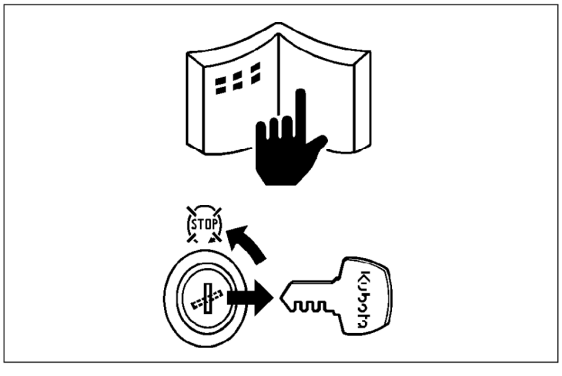
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

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.**

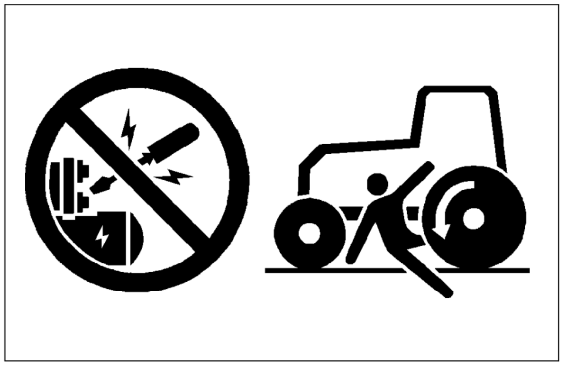
■ **IMPORTANT** : **Indicates that equipment or property damage could result if instructions are not followed.**

■ **NOTE** : **Gives helpful information.**



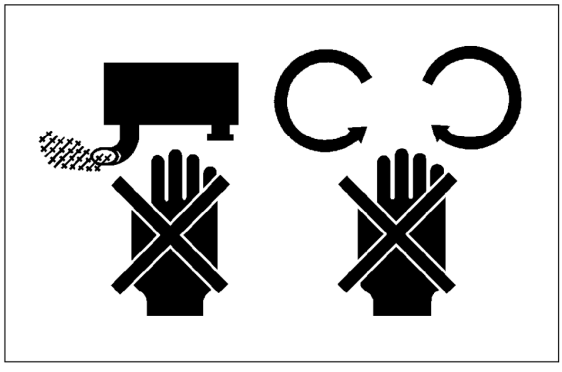
BEFORE SERVICING AND REPAIRING

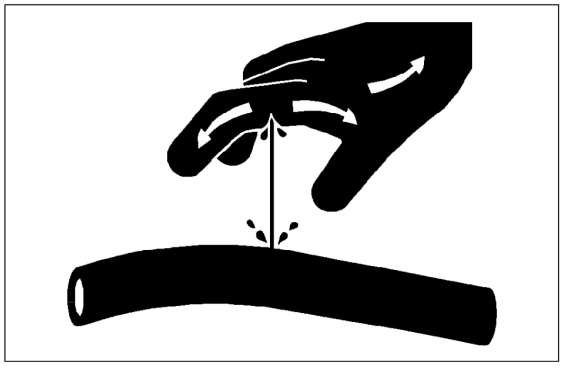
- Read all instructions and safety instructions in this manual and on your machine safety decals.
- Clean the work area and machine.
- Park the machine on a firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery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



SAFETY STARTING

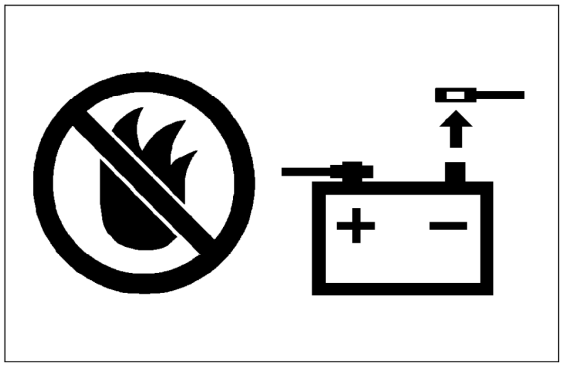
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine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





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.

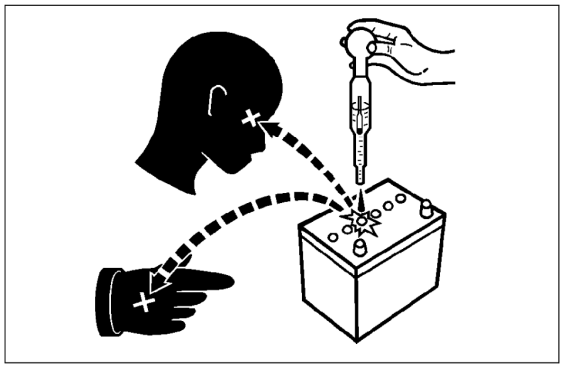


AVOID FIRES

- 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.

VENTILATE WORK AREA

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

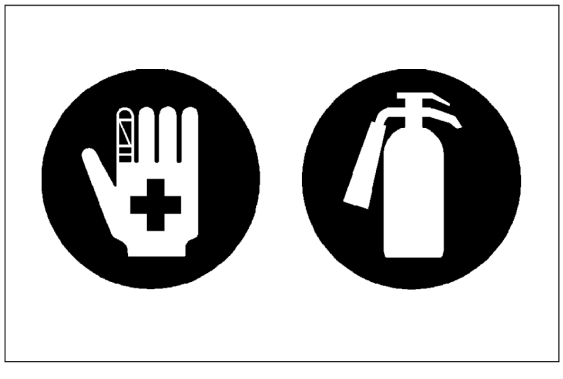


PREVENT ACID BURNS

- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and cause blindness if splashed into eyes. Keep electrolyte away from eyes, hands and clothing. If you spill electrolyte on yourself, flush with water, and get medical attention immediately.

DISPOSE OF FLUIDS PROPERLY

- Do not pour fluids into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, electrolyte and other harmful waste.



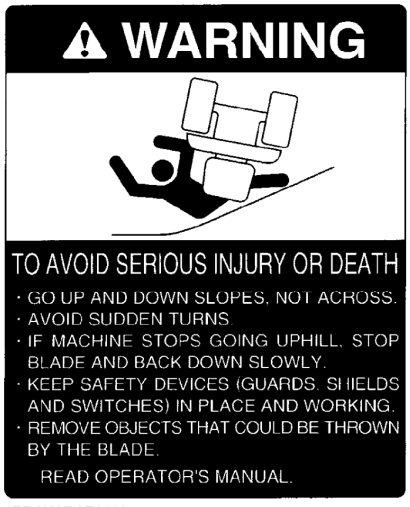
PREPARE FOR EMERGENCIES

- Keep a first aid kit and fire extinguisher handy at all times.
- Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

SAFETY DECALS

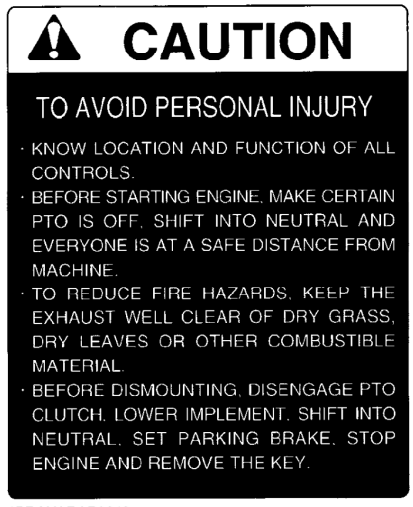
The following safety decals are installed on the machine. If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.

(1) Part No. K1122-6581-1



1BDAHADAP0200

(2) Part No. K1122-6582-1



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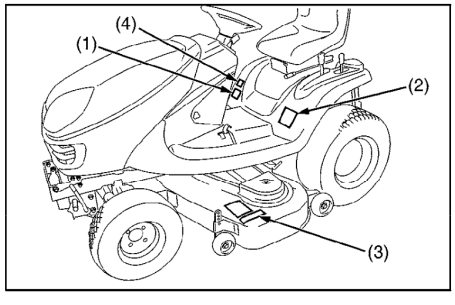


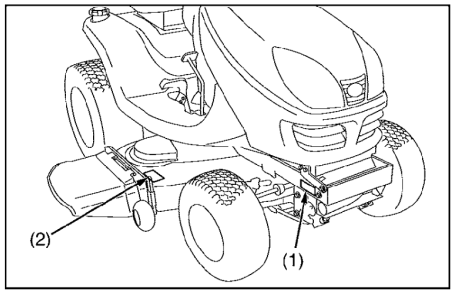
(3) Part No. K5617-7311-1

1BDABBSAP0030

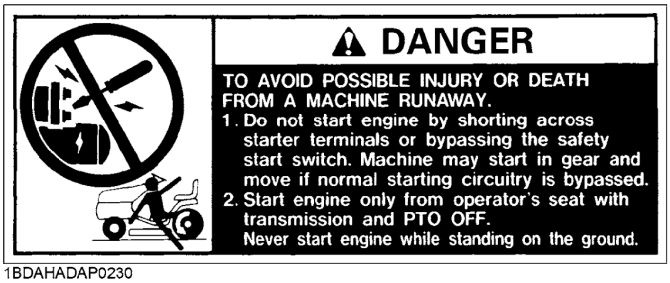
(4) Part No. K1122-6584-2

1BDAHADAP0220

3GLAAAFCP001A



(1) Part No. K1162-6583-1

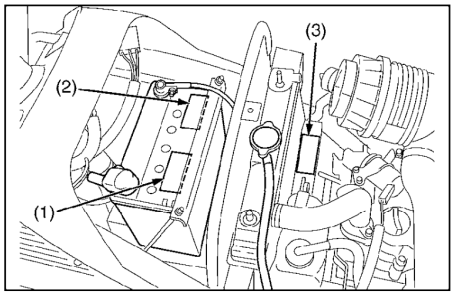


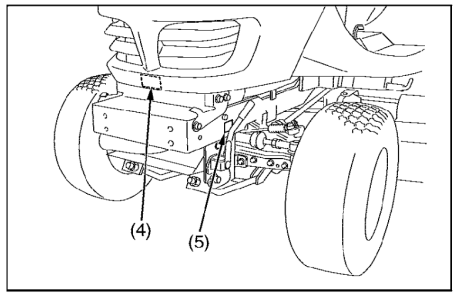
1BDAHADAP0230

(2) Part No. K5617-7312-1

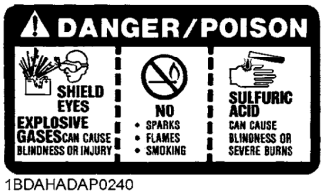
1BDABBSAP0020

3GLAAAFCP002A



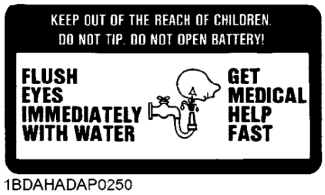


(1) Part No. K1211-6115-1



1BDAHADAP0240

(2) Part No. K1211-6116-1

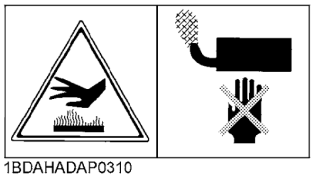


1BDAHADAP0250

(3) Part No. K1213-6586-1
Stay clear of engine fan and fan belt.

1BDABARAP113A

(4) Part No. K2561-6542-1
Do not touch surface like muffler, etc.

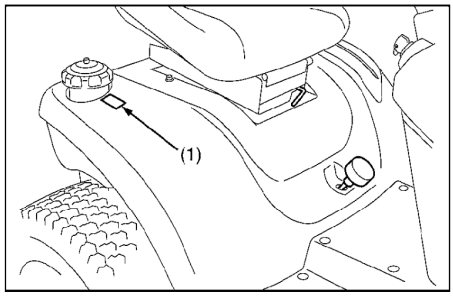


1BDAHADAP0310

(5) Part No. K2110-6573-1
HOT SURFACE
DO NOT TOUCH

1BDAHAAAP0320

3GLAAAHCP001A



(1) Part No. K1211-6585-1

Diesel fuel only No fire

1BDAHADAP0300

CARE OF DANGER, WARNING AND CAUTION LABELS

1. Keep danger, warning and caution labels clean and free from obstructing material.
2. Clean danger, warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing danger, warning and caution labels with new labels.
4. If a component with danger, warning or caution label (s) affixed is replaced with new part, make sure new label (s) is (are) attached in the same location (s) as the replaced component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressing any bubbles to outside edge.

3GLAAAI ICP002A

SPECIFICATIONS

Model			GR2100
Engine	Model		D782-E2-GX
	Type		Liquid-cooled Diesel
	Number of cylinders		3
	Bore and stroke		67 x 73.6 mm (2.64 x 2.90 in.)
	Total displacement		778 cm^3 (47.5 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		Electric starter with battery
	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 Imp.gals)
	Engine crankcase (with filter)		2.8 L (2.96 U.S.qts, 2.46 Imp.qts)
	Engine coolant (with recovery tank)		2.35 L (2.48 U.S.qts, 2.07 Imp.qts)
	Transmission case		3.4 L (0.90 U.S.gals, 0.75 Imp.gals)
	Front axle case		1.9 L (0.50 U.S.gals, 0.42 Imp.gals)
Dimensions	Overall length		1960 mm (77.2 in.)
	Overall width		1700 mm (66.9 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			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.

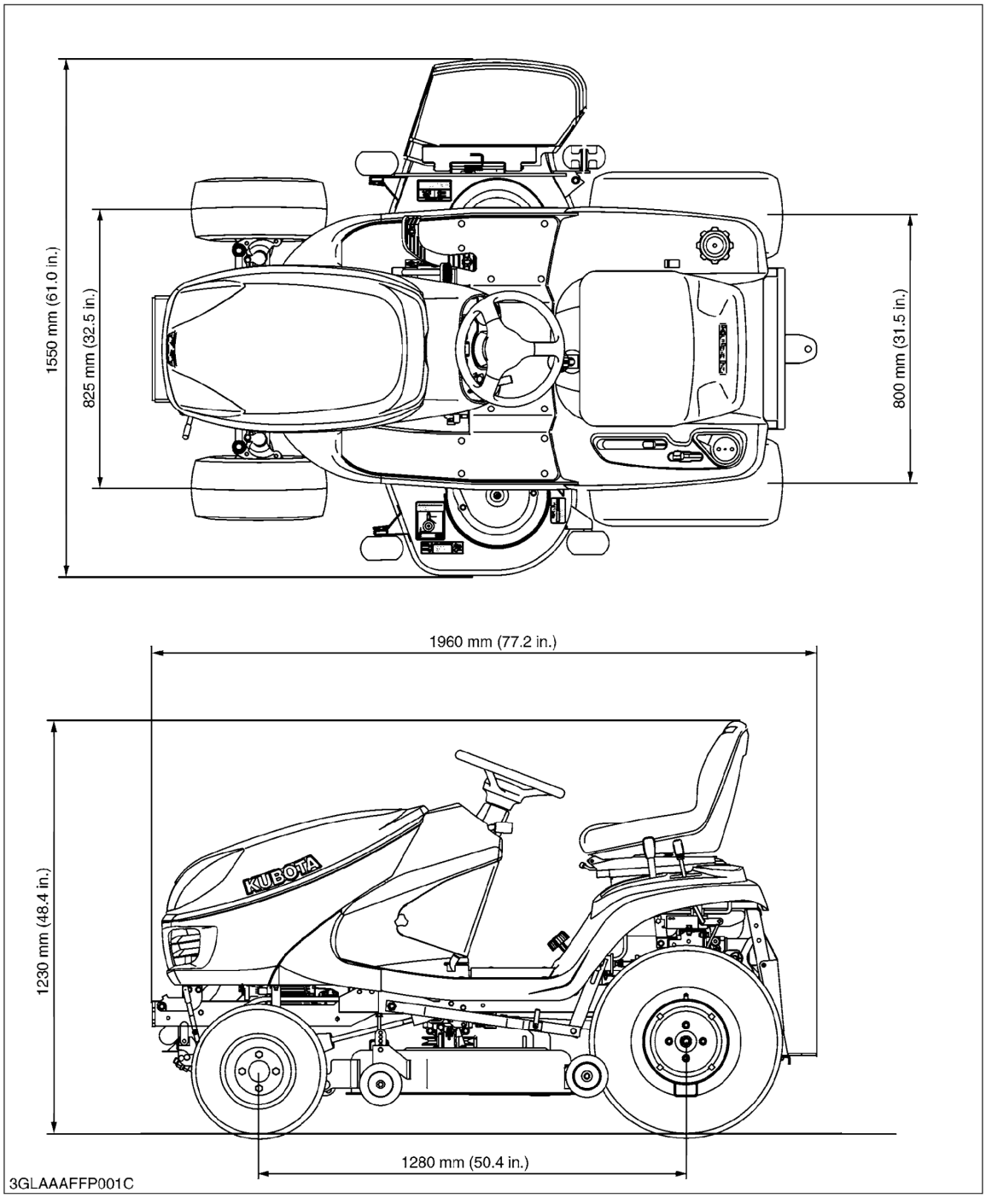
W1028280

Model			RCK48GR
Mower	Cutting width		1219 mm (48.0 in.)
	Cutting height		25 to 102 mm (1 to 4 in.)
	Adjustment of cutting height		Dial gauge
	Mounting method		Quick joint, Parallel linkage
	Weight (Approx.)		75 kg (165.3 lbs)
	Dimensions	Total length	900 mm (35.4 in.)
		Total width	1550 mm (61.0 in.)
		Total height	290 mm (11.4 in.)
	Discharge direction		Right
	Gear box oil		0.15 L (0.16 U.S.qts, 0.13 Imp.qts)

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

W1031306

DIMENSIONS


1550 mm (61.0 in.)
825 mm (32.5 in.)
800 mm (31.5 in.)
1960 mm (77.2 in.)
1230 mm (48.4 in.)
KUBOTA
1280 mm (50.4 in.)
3GLAAAFFP001C

G GENERAL

GENERAL

CONTENTS

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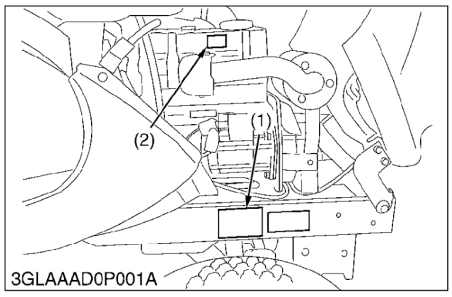
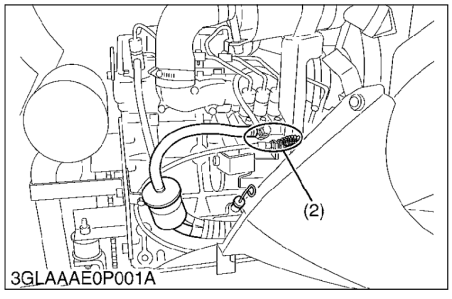
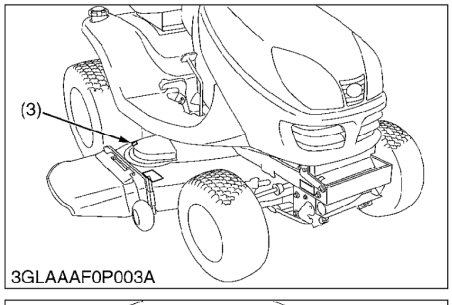
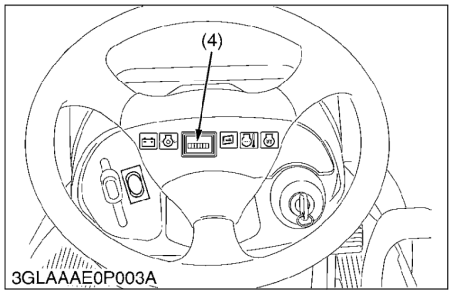
1. IDENTIFICATION







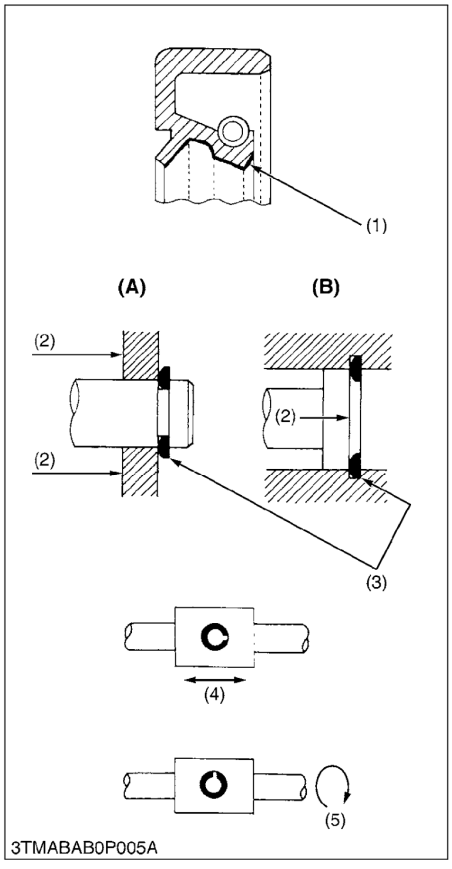


When contacting your local KUBOTA distributor, always specify engine serial number (2), machine serial number (1), mower serial number (3) and hour meter reading.

(1) Machine Serial Number
(2) Engine Serial Number
(3) Mower Serial Number
(4) Hour Meter

W1011650

2. GENERAL PRECAUTIONS



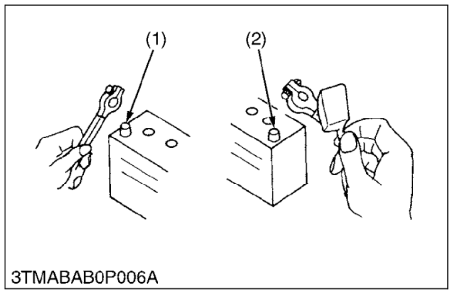
- During disassembly, carefully arrange removed parts in a clean area to prevent confusion later. Screws, bolts and nuts should be installed in their original position to prevent reassembly errors.
- When special tools are required, use KUBOTA genuine special tools. Special tools which are not frequently used should be made according to the drawings provided.
- Before disassembling or servicing electrical wires, always disconnect the ground cable from the battery first.
- Remove oil and dirt from parts before measuring.
- Use only KUBOTA genuine parts for parts replacement to maintain machine performance and to assure safety.
- Gaskets and O-rings must be replaced during reassembly. Apply grease to new O-rings or oil seals before assembling. See the figure left side.
- When reassembling external snap rings or internal snap rings, they must be positioned so that sharp edge faces against the direction from which a force is applied. See the figure left side.
- When inserting spring pins, their splits must face the direction from which a force is applied. See the figure left side.
- To prevent damage to the hydraulic system, use only specified fluid or equivalent.

(1) Grease
(2) Force
(3) Sharp Edge
(4) Axial Force
(5) Rotating Movement

(A) External Snap Ring
(B) Internal Snap Ring

W1011978

3. HANDLING PRECAUTIONS FOR ELECTRICAL PARTS AND WIRING



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To ensure safety and prevent damage to the machine and surrounding equipment, heed the following precautions in handling electrical parts and wiring.

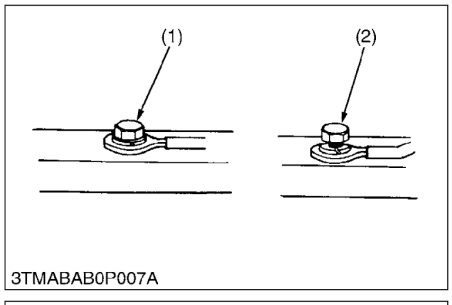
■ **IMPORTANT**

- **Check electrical wiring for damage and loosened connection every year. To this end, educate the customer to do his or her own check and at the same time recommend the dealer to perform periodic check for a fee.**
- **Do not attempt to modify or remodel any electrical parts and wiring.**
- **When removing the battery cables, disconnect the negative cable first. When installing the battery cables, connect the positive cable first.**

(1) Negative Terminal (2) Positive Terminal

W1012221

[1] WIRING



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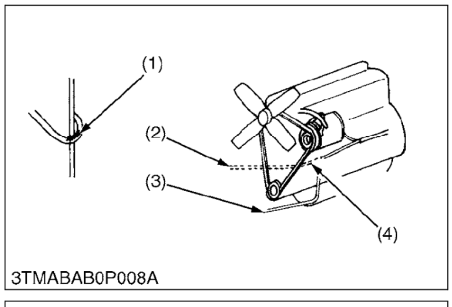
- Securely tighten wiring terminals.

(1) Correct (Securely Tighten) (2) Incorrect (Loosening Leads to Faulty Contact)

W1012391

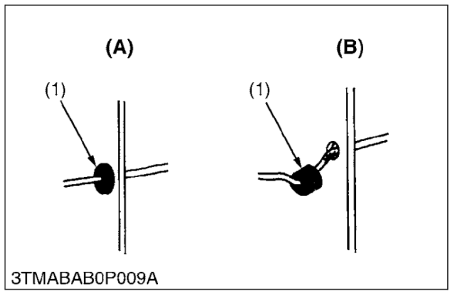


3TMABAB0P008A

- Do not let wiring contact dangerous part.

(1) Dangerous Part (3) Wiring (Correct)
(2) Wiring (Incorrect) (4) Dangerous Part

W1012525



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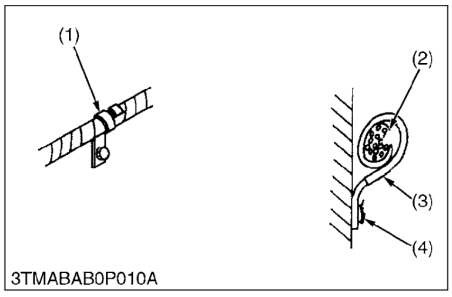
- Securely insert grommet.

(1) Grommet **(A) Correct** **(B) Incorrect**

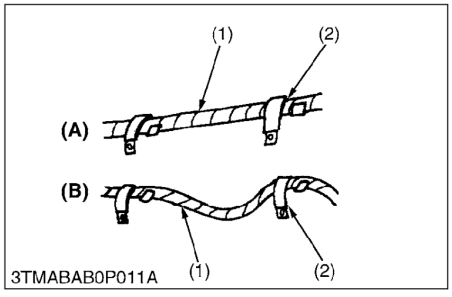
W1012644



- Securely clamp, being careful not to damage wiring.

(1) Clamp
•Wind Clamp Spirally
(2) Wire Harness
(3) Clamp
(4) Welding Dent

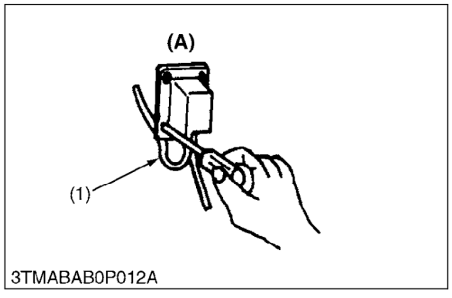
W1012764



- Clamp wiring so that there is no twist, unnecessary sag, or excessive tension, except for movable part, where sag be required.

(1) Wiring
(2) Clamp
(A) Correct
(B) Incorrect

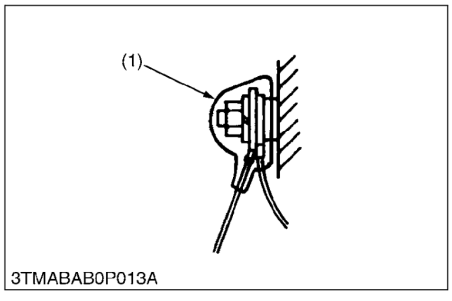
W1012924



- In installing a part, take care not to get wiring caught by it.

(1) Wiring
(A) Incorrect

W1013028

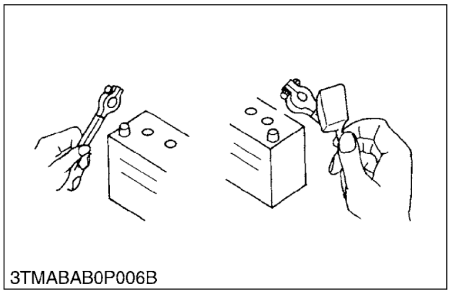


- After installing wiring, check protection of terminals and clamped condition of wiring, only connect battery.

(1) Cover
•Securely Install Cover

W1013126

[2] BATTERY


3TMABAB0P006B

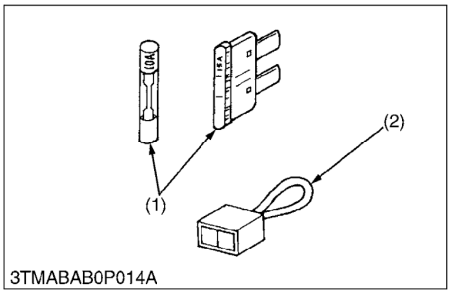
- Take care not to confuse positive and negative terminal posts.
- When removing battery cables, disconnect negative cable first. When installing battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After connecting cables to battery terminal posts, apply high temperature grease to them and securely install terminal covers on them.
- Do not allow dirt and dust to collect on battery.

CAUTION

- **Take care not to let battery liquid spill on your skin and clothes. If contaminated, wash it off with water immediately.**
- **Before recharging the battery, remove it from the machine.**
- **Before recharging, remove cell caps.**
- **Do recharging in a well-ventilated place where there is no open flame nearby, as hydrogen gas and oxygen are formed.**

W1013215

[3] FUSE



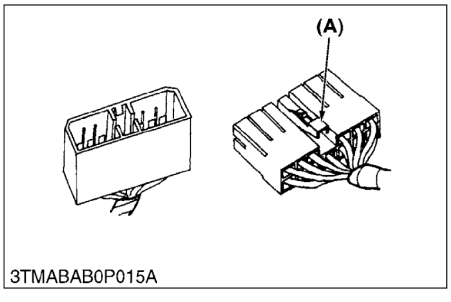
3TMABAB0P014A

- Use fuses with specified capacity.
  Neither too large or small capacity fuse is acceptable.
- Never use steel or copper wire in place of fuse.
- Do not install working light, radio set, etc. on machine which is not provided with reserve power supply.
- Do not install accessories if fuse capacity of reserve power supply is exceeded.

(1) Fuse (2) Fusible Link

W1013444

[4] CONNECTOR

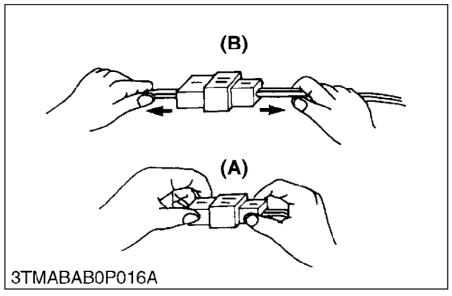


3TMABAB0P015A

- For connector with lock, push lock to separate.

(A) Push

W1013524

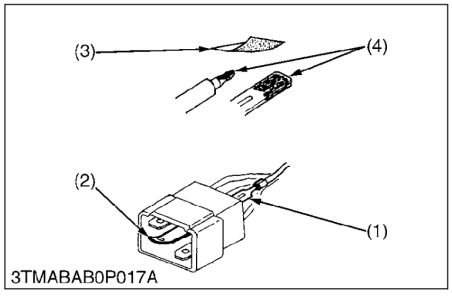


3TMABAB0P016A

- In separating connectors, do not pull wire harnesses.
- Hold connector bodies to separate.

(A) Correct **(B) Incorrect**

W1013712

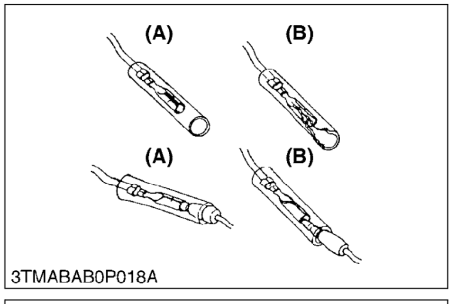


3TMABAB0P017A

- Use sandpaper to remove rust from terminals.
- Repair deformed terminal. Make certain there is no terminal being exposed or displaced.

(1) Exposed Terminal
(2) Deformed Terminal
(3) Sandpaper
(4) Rust

W1013819

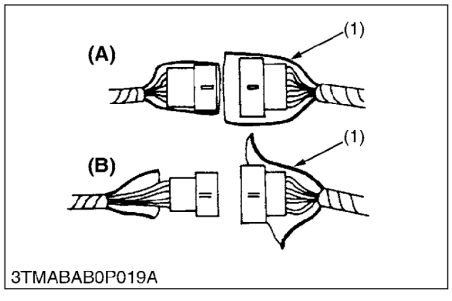


3TMABAB0P018A

- Make certain that there is no female connector being too open.

(A) Correct **(B) Incorrect**

W1013985



3TMABAB0P019A

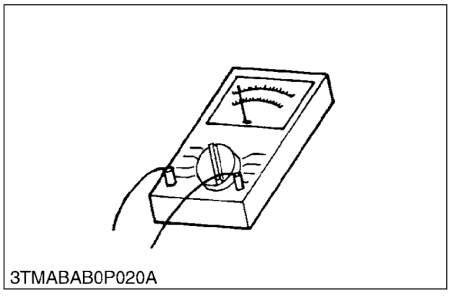
- Make certain plastic cover is large enough to cover whole connector.

(1) Cover

(A) Correct
(B) Incorrect

W1014110

[5] HANDLING OF CIRCUIT TESTER


3TMABAB0P020A

- Use tester correctly following manual provided with tester.
- Check for polarity and range.

W1014209

4. LUBRICANTS, FUEL AND COOLANT

No.	Place	Capacity	Lubricants, fuel and coolant
1	Fuel tank	18 L 4.8 U.S.gals 4.0 Imp.gals	No. 2-D diesel fuel No. 1-D diesel fuel if temperature is below -10 °C (14 °F)
2	Cooling system with recovery tank	2.35 L 2.48 U.S.qts 2.07 Imp.qts	Fresh clean water with anti-freeze
3	Engine crankcase	2.8 L 2.96 U.S.qts 2.46 Imp.qts	Engine oil: API service CD, CE or CF Below 0 °C (32 °F) : SAE10W, 10W-30 or 10W-40 0 to 25 °C (32 to 77 °F) : SAE20, 10W-30 or 10W-40 Above 25 °C (77 °F) : SAE30, 10W-30 or 10W-40
4	Transmission case	3.4 L 0.90 U.S.gals 0.75 Imp.gals	KUBOTA UDT or SUPER UDT fluid*
5	Front axle case	1.9 L 0.50 U.S.gals 0.42 Imp.gals	
6	Mower gear box	0.40 L 0.42 U.S.qts 0.35 Imp.qts	SAE90 gear oil (API service classification : more than GL-3)

* KUBOTA original transmission hydraulic fluid.

Greasing				
No.	**Place**	**No. of greasing points**	**Capacity**	**Type of grease**
7	Engine transmission universal joint	1	Until grease overflows	SAE multi-purpose type grease
8	King pin	2		
9	Center pin	2		
10	Glide Steer bolt	2		
11	Glise Steer rear arm	2		
12	Speed change pedal shaft	–	Moderate amount	Engine oil
13	Mower link	–		
14	Seat adjuster	–		
15	Cable	–		
16	PTO lever	–		
17	Hydraulic lift lever	–		
[Mower]				
19	Spindle shafts	3	Until grease overflows	SAE multi-purpose type grease
20	Tension arm	2		
21	Mower universal joint	1	Moderate amount	Engine oil

5. TIGHTENING TORQUES

[1] GENERAL USE SCREWS, BOLT AND NUTS

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

Indication on top of bolt	⬡ 4 No-grade or 4T						⬡ 7 7T						⬡ 9 9T		
Material of bolt	SS400, S20C						S43C, S48C						SCr435, SCM435		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit / Diameter	N·m	kgf·m	lbf-ft	N·m	kgf·m	lbf-ft	N·m	kgf·m	lbf-ft	N·m	kgf·m	lbf-ft	N·m	kgf·m	lbf-ft
M6 (6 mm, 0.24 in.)	7.85 to 9.31	0.80 to 0.95	5.79 to 6.87	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	16.7 to 19.6	1.7 to 2.0	12.3 to 14.4	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	29.5 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.3 to 45.1	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.2 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5	60.9 to 70.6	6.2 to 7.2	44.9 to 52.0
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	–	–	–	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	103 to 117	10.5 to 12.0	76.0 to 86.7
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 (16 mm, 0.63 in.)	167 to 191	17.0 to 19.5	123 to 141	–	–	–	197 to 225	20.0 to 23.0	145 to 166	–	–	–	260 to 304	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	246 to 284	25.0 to 29.0	181 to 209	–	–	–	275 to 318	28.0 to 32.5	203 to 235	–	–	–	344 to 402	35.0 to 41.0	254 to 296
M20 (20 mm, 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	–	–	–	491 to 568	50.0 to 58.0	362 to 419

W1034542

[2] METRIC SCREWS, BOLTS AND NUTS

Grade	Property class 8.8 ⬡ 8.8			Property class 10.9 ⬡ 10.9		
Unit / Nominal Diameter	N·m	kgf·m	lbf-ft	N·m	kgf·m	lbf-ft
M 8	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
M 10	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
M 12	77.5 to 90.1	7.9 to 9.2	57.2 to 66.5	103.0 to 117.0	10.5 to 12.0	76.0 to 86.8
M 14	124.0 to 147.0	12.6 to 15.0	91.2 to 108.0	167.0 to 196.0	17.0 to 20.0	123.0 to 144.0
M 16	196.0 to 225.0	20.0 to 23.0	145.0 to 166.0	260.0 to 303.0	26.5 to 31.0	192.0 to 224.0

W1016172

[3] AMERICAN STANDARD SCREWS, BOLTS AND NUTS WITH UNC OR UNF THREADS

Grade	SAE GR.5			SAE GR.8		
Unit / Nominal Diameter	N·m	kgf·m	lbf-ft	N·m	kgf·m	lbf-ft
5/16	23.1 to 27.8	2.35 to 2.84	17.0 to 20.5	32.5 to 39.3	3.31 to 4.01	24.0 to 29.0
3/8	47.5 to 57.0	4.84 to 5.82	35.0 to 42.0	61.0 to 73.2	6.22 to 7.47	45.0 to 54.0
1/2	108.5 to 130.2	11.07 to 13.29	80.0 to 96.0	149.2 to 179.0	15.22 to 18.27	110.0 to 132.0
9/16	149.2 to 179.0	15.22 to 18.27	110.0 to 132.0	217.0 to 260.4	22.14 to 26.57	160.0 to 192.0
5/8	203.4 to 244.1	20.75 to 24.91	150.0 to 180.0	298.3 to 358.0	30.44 to 36.53	220.0 to 264.0

W1022485

[4] PLUGS

Shape	Size	Material of opponent part					
		Ordinariness			Aluminum		
		N·m	kgf·m	lbf-ft	N·m	kgf·m	lbf-ft
Tapered screw 	R1/8	12.7 to 21.6	1.3 to 2.2	9.4 to 15.9	12.7 to 19.6	1.3 to 2.0	9.4 to 15.4
	R1/4	24.5 to 44.1	2.5 to 4.5	18.1 to 32.5	24.5 to 34.3	2.5 to 3.5	18.1 to 25.4
	R3/8	49.0 to 88.3	5.0 to 9.0	36.2 to 65.1	49.0 to 58.8	5.0 to 6.0	36.2 to 43.4
	R1/2	58.8 to 107.9	6.0 to 11.0	43.4 to 79.6	58.8 to 78.5	6.0 to 8.0	43.4 to 57.9
Straight screw 	G1/4	24.5 to 34.3	2.5 to 3.5	18.1 to 25.3	–	–	–
	G3/8	61.8 to 82.4	6.3 to 8.4	45.6 to 60.8	–	–	–
	G1/2	49.0 to 88.3	5.0 to 9.0	36.2 to 65.1	–	–	–

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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.**
- **The items listed below (@ marked) are registered as emission related critical parts by KUBOTA in the U.S.EPA non-road emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the following instruction.**

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-28
2	Engine oil filter	Replace	★			☆				☆				☆	every 200 hr			G-31
3	Transmission and Front axle cases fluid	Change				★				☆				☆	every 200 hr			G-32, G-33
4	Transmission oil filter	Replace	★			☆				☆				☆	every 200 hr			G-33
5	Transmission strainer	Clean				★				☆				☆	every 200 hr			G-32
6	Front axle pivot	Adjust		★		☆				☆				☆	every 200 hr			G-35
7	Safety device	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr			G-20
8	Oiling	–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr			G-24
9	Greasing	–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr			G-23
10	Mower gear box oil	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr			G-22
		Change	☆		☆			☆			☆			☆	every 150 hr			G-30
11	Air cleaner element	Clean	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr	*1	@	G-22
		Replace													every 1 year			G-36
12	Battery condition	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 hr			G-26
13	Brake	Adjust		☆		☆		☆		☆		☆		☆	every 100 hr			G-29
14	Fan drive belt tension	Adjust		☆		☆		☆		☆		☆		☆	every 100 hr			G-30

W1035769

(Continued)

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				
15	Fuel filter element	Check		☆		☆		☆		☆		☆		☆	every 100 hr		@	G-29
		Replace								☆					every 400 hr			G-35
16	Fuel line	Check		☆		☆		☆		☆		☆		☆	every 100 hr		@	G-29
		Replace													every 2 years			G-39
17	Hydraulic hose	Check				☆				☆				☆	every 200 hr			G-35
		Replace													every 2 years			G-35
18	Radiator hose and clamp	Check				☆				☆				☆	every 200 hr			G-33
		Replace													every 2 years			G-39
19	Radiator core	Check				☆				☆				☆	every 200 hr			G-36
20	Radiator	Clean													every 1 year			G-36
21	Coolant	Change													every 1 year			G-36
22	Mower gear box oil seal	Replace													every 2 years			G-39
23	Fuel system	Bleed													Service as required			G-42
24	Fuse	Replace																G-39
25	Blade	Replace																G-41
26	Mower belt	Replace																G-42

W1045250

7. CHECK AND MAINTENANCE

CAUTION

- **Be sure to check and service the machine on a flat place with engine shut off, the parking brake on and chock the wheels.**

[1] DAILY CHECK

To prevent trouble from occurring, it is important to know the condition of the machine. Check the following items before starting.

Checking

- Check areas where previous trouble was experienced.
- Walk around the machine.

1. Tire pressure, wear and damage
2. Oil and water leak
3. Engine oil level
4. Transmission fluid level
5. Coolant level in the recovery tank
6. Damage of machine body, tightness of all bolts and nuts
7. Radiator screen
8. Panel screen
9. Brake play
10. Fuel level
11. Check air cleaner element

- Mower

1. Oil leak
2. Make sure blade cap screws are tight.
3. Blades for wear or damage.
4. Check all hardware.
5. Make sure all pins are in place.
6. Mower deck cleaning
7. Greasing

- While sitting in the operator's seat

1. Speed control pedal and brake pedal
2. Brake

- Turning the key switch "**ON**"

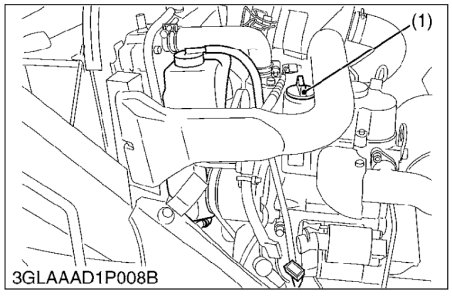
1. Performance of the easy checker light.

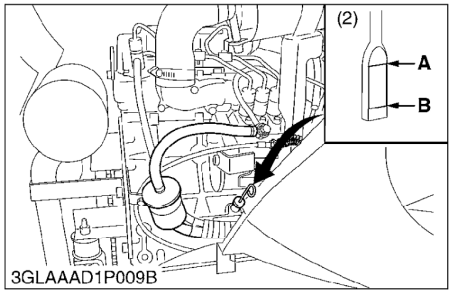
- Starting the engine

1. Color of the exhaust fumes
2. Safety start switch, seat safety control and another safety devices.
3. Check for abnormal noise and vibration.

- Others

1. Check the areas where previous troubles were experienced.





Checking Engine Oil Level

CAUTION

- **Always stop the engine and remove the key before checking oil.**

1. Check engine oil before starting and 5 minutes or more after the engine has stopped.
2. Wipe dipstick (2) area clean.
3. To check the oil level, remove the dipstick (2), wipe it clean, reinsert it, and draw it out again. Check to see that the oil level is between the two notches.
4. Add new oil to the prescribed level at the oil inlet (1) if necessary.
5. When using a different brand or viscosity oil from the previous one, remove all of the old oil and oil filter. Never mix two different types of oil.
6. Use the proper Engine Oil SAE according to the ambient temperatures. (Refer to "**4. LUBRICANTS, FUEL AND COOLANT**" at "**G. GENERAL**" section.)

(1) Engine Oil Inlet
(2) Oil Level Dipstick

A : Upper Level
B : Lower Level

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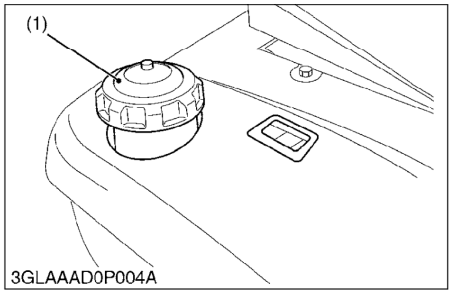

Checking Amount of Fuel and Refueling

CAUTION

- **Handle fuel carefully. If the engine is running, do not fill the fuel tank. If engine is hot, let engine cool several minutes before adding fuel.**
  Do not smoke while filling the fuel tank or servicing the fuel system. Fill fuel tank only to bottom of filler neck.

Check the fuel level. Take care that the fuel tank does not become empty.

Fuel tank capacity	18 L 4.8 U.S.gals 4.0 Imp.gals

IMPORTANT

- **Use Diesel Fuel Only.**

1. Use No.2-D diesel fuel.
2. Use No.1-D diesel fuel if the temperature is below -10 °C (14 °F).
3. Always use a strainer when refueling to prevent fuel injection pump contamination.

NOTE

- **No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service.**
  (SAE J313 JUN87)
  Grade of Diesel Fuel Oil according to ASTM D975

Flash point °C	Water and Sediment, volume %	Carbon Residue on, 10 percent Residuum %	Ash, weight %
Min	Max	Max	Max
52	0.05	0.35	0.01

Distillation Temperatures °C 90% Point		Kinematics Viscosity cSt or mm^2/S at 40 °C		Saybolt Viscosity, SUS at 100 °F	
Min	Max	Min	Max	Min	Max
282	338	1.9	4.1	32.6	40.1

Sulfur, weight	Copper strip Corrosion	Cetane Number
Max	Max	Min
0.50	No.3	40

(1) Fuel Cap

W1170461