WSM

WORKSHOP MANUAL

GR2120,GR2120-AU

Kubota

KiSC issued 03, 2022 A

TO THE READER

This Workshop Manual tells the servicing personnel about the mechanism, servicing and maintenance of the GR2120 and GR2120AU. It contains 4 parts: **"Information"**, **"General"**, **"Mechanism"** and **"Servicing"**.

■ **Information**

This section primarily contains information below.

- Safety First
- Safety Decal
- Specification
- Dimension

■ **General**

This section primarily contains information below.

- Engine Identification
- Model Identification
- General Precautions
- Maintenance Check List
- Check and Maintenance
- Special Tools

■ **Mechanism**

This section contains information on the structure and the function of the unit. Before you continue with the subsequent sections, make sure that you read this section.

Refer to the latest version of Workshop Manual (Code No. 9Y021-01870) for the diesel engine that this workshop manual does not include.

■ **Servicing**

This section primarily contains information below.

- Troubleshooting
- Servicing Specifications
- Tightening Torques
- Checking, Disassembling and Servicing

All illustrations, photographs and specifications contained in this manual are of the newest information available at the time of publication.

KUBOTA reserves the right to change all information at any time without notice.

Since this manual includes many models, information or illustrations and photographs can show more than one model.

February 2011

KiSC issued 03, 2022 A

Record of Revisions

For pdf, use search function {Search word} to find all the revised locations.

Last digit of the Code No.	Month of Revision	Main Revised Point and Corrective Measures {Search word}	Reference Page
2	2013.08	• Added Engine model D782-E4-GX-1 to the table. • Changed tire pressure specification • Added item [3] PISTON • Added the specification to Cam Height, Piston Ring Gap and Fan Belt tables. • Added the specification to Checking Fan, Drive Belt Tension, Cam Height and Piston Ring tables.	I-7 G-23, G-64 1-M2 1-S4 1-S13, 1-S42, 1-S45
3	2014.05	• Muffler cover added • Maintenance check list: Interval changed (Engine oil, Transmission fluid, Transmission strainer), name of safety device. • Some Caution symbols changed to Warning symbols.	1-S21 G-17 etc. G-19 etc.
4	2019.03	• Revised safety labels • Revised engine gross power specification	I-4 to I-6 I-7
5	2022.03	• Revised safety labels • Revised specifications • Revised dimensions • Revised identification • Revised lubricants, fuel and coolant • Revised maintenance checklist • Revised check and maintenance • Added HST neutral spring adjustment • Added wheels • Added torque for brake arm jam nut • Revised power steering pipe and lift cylinder hose torque • Added torque for HST cooling fan bolts and tie rod lock nut • Added power steering hose angle • Revised starter relay illustration • Revised tire inflation pressure • Added mower gearbox oil capacity • Added mower tension arm disassembly	I-4 to I-6 I-7 I-9 G-1 G-8 G-17 G-19 G-36, 2-S7 G-64 2-S5, 2-S19 2-S5, 2-S21 2-S5, 2-S23 4-S6, 5-S9 7-S10 8-S4 8-S9 8-S10

I INFORMATION

INFORMATION

CONTENTS

1. SAFETY FIRST

⚠ 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 try 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, could 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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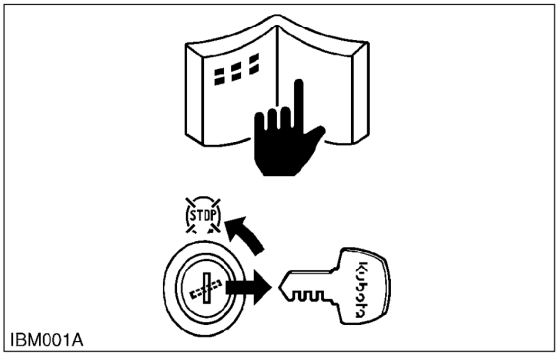

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BEFORE YOU START SERVICE

- 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 stable and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, then remove the key.
- Disconnect the battery negative cable.
- Hang a **"DO NOT OPERATE"** tag in the operator station.

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START SAFELY

- Do not do the procedures below when you start the engine.
  - short across starter terminals
  - bypass the safety start switch
- Do not alter or remove any part of machine safety system.
- Before you start the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Do not start the engine when you stay on the ground. Start the engine only from operator's seat.

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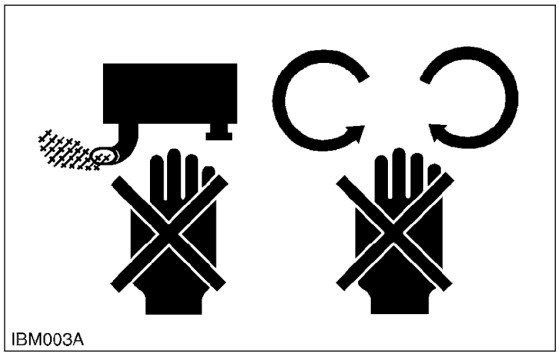
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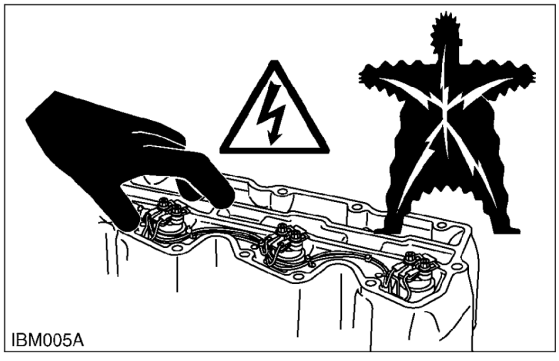
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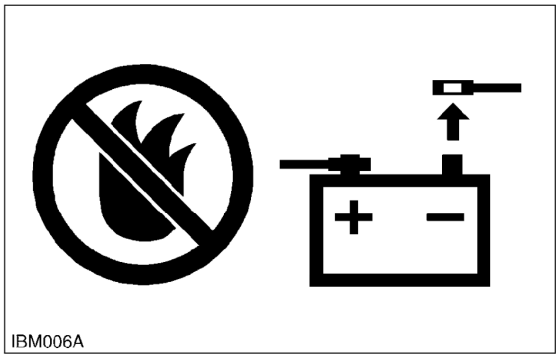
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OPERATE SAFELY

- Do not use the machine after you consume alcohol or medication or when you are tired.
- Put on applicable clothing and safety equipment.
- Use applicable tools only. Do not use alternative tools or parts.
- When 2 or more persons do servicing, make sure that you do it safely.
- Do not operate below the machine that only a jack holds. Always use a safety stand to hold the machine.
- Do not touch the hot parts or parts that turn when the engine operates.
- Do not remove the radiator cap when the engine operates, or immediately after it stops. If not, hot water can spout out from the radiator. Only remove the radiator cap when it is at a sufficiently low temperature to touch with bare hands. Slowly loosen the cap to release the pressure before you remove it fully.
- Released fluid (fuel or hydraulic oil) under pressure can cause damage to the skin and cause serious injury. Release the pressure before you disconnect hydraulic or fuel lines. Tighten all connections before you apply the pressure.
- Do not open a fuel system under high pressure. The fluid under high pressure that stays in fuel lines can cause serious injury. Do not disconnect or repair the fuel lines, sensors, or any other components between the fuel pump and injectors on engines with a common rail fuel system under high pressure.
- Put on an applicable ear protective device (earmuffs or earplugs) to prevent injury against loud noises.
- Be careful about electric shock. The engine generates a high voltage of more than DC100 V in the ECU and is applied to the injector.

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PREVENT A FIRE

- Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.
- To prevent sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- The battery gas can cause an explosion. Keep the sparks and open flame away from the top of battery, especially when you charge the battery.
- Make sure that you do not spill fuel on the engine.

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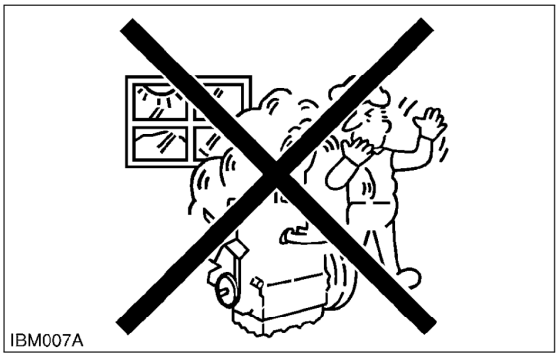
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KEEP A GOOD AIRFLOW IN THE WORK AREA

- If the engine is in operation, make sure that the area has good airflow. Do not operate the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

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DISCARD FLUIDS CORRECTLY

- Do not discard fluids on the ground, down the drain, into a stream, pond, or lake. Obey related environmental protection regulations when you discard oil, fuel, coolant, electrolyte and other dangerous waste.

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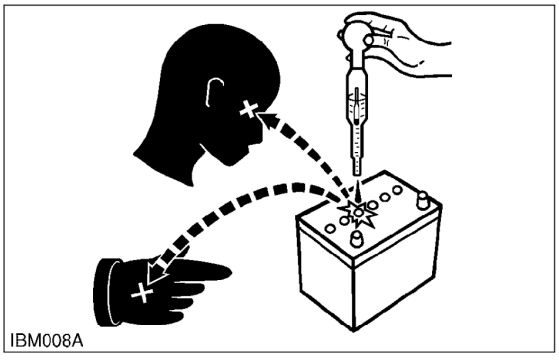
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PREVENT ACID BURNS

- Keep electrolyte away from your eyes, hands and clothing. Sulfuric acid in battery electrolyte is poisonous and it can burn your skin and clothing and cause blindness. If you spill electrolyte on yourself, clean yourself with water, and get medical aid immediately.

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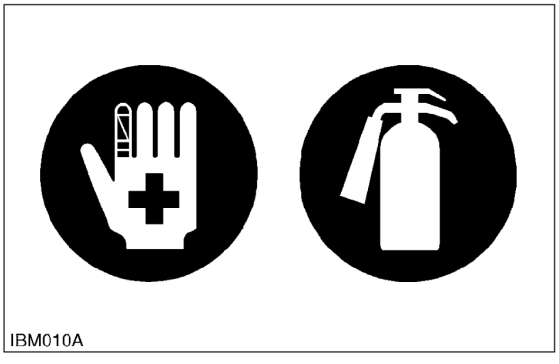
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PREPARE FOR EMERGENCIES

- Keep a first aid kit and fire extinguisher ready at all times.
- Keep the emergency contact telephone numbers near your telephone at all times.

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2. 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.

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(1) Part No. K1211-6581-1

1BDAHADAP0200

(2) Part No. K1122-6584-2

1BDAHADAP0220

(3) Part No. K5617-7312-1

1BDABBSAP0020

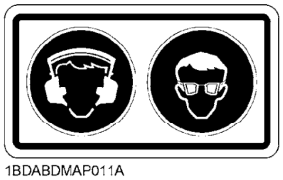
(4) Part No. K1162-6583-1

1BDAHADAP0230

(5) Part No. K2651-6568-1 [GR2120]

1AYAACAAP1000

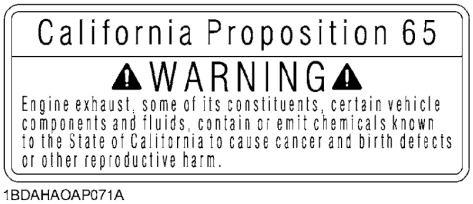
(6) Part No. K3284-6569-1 [GR2120AU]



- Use ear protection to avoid damage to hearing.
- Always wear protective glasses.

1BDABDMAP011A

(6) Part No. K1025-6595-1 [GR2120]



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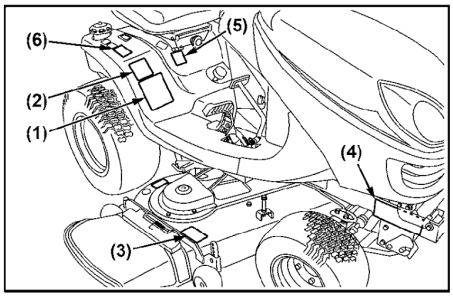

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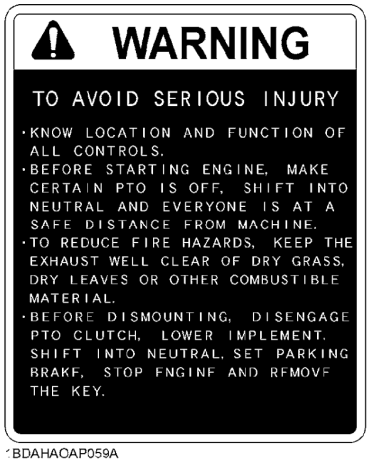
(1) Part No. K1270-6582-1



1BDAHAOAP059A

(2) Part No. K5617-7311-1

1BDABBSAP0030

(3) Part No. K1272-6558-1

Do not get your hands close to engine fan and fan belt.

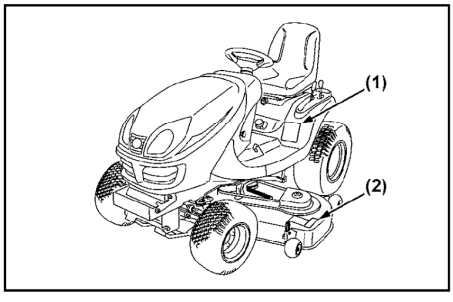
1BDABARAP113A

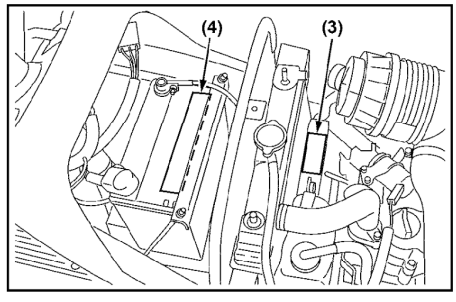
(4) Part No. K3181-6116-2

1BDAHAOAP072A

DANGER / POISON

- SHIELD EYES
  EXPLOSIVE GASES can cause blindness or injury.
- NO SPARKS / FLAMES / SMOKING
- SULFURIC ACID can cause blindness or severe burns.
- Flush eyes immediately with water.
- Get medical help fast.





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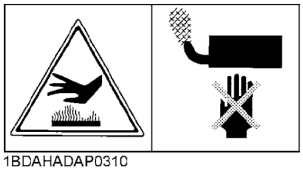
(1) Part No. K1252-6542-1

Do not touch hot surface like muffler, etc.



1BDAHADAP0310

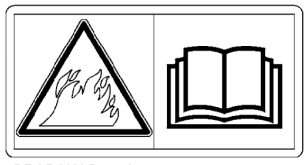
(2) Part No. K2110-6573-1

HOT SURFACE
DO NOT TOUCH

1BDAHAAAP0320

(3) Part No. K2054-6545-2

TO AVOID FIRE HAZARD:
Before operating the machine, clean inside of the hood and around the mower belt. Especially, dry grass and leaves around the exhaust manifold, the muffler or around the mower belt may ignite. After using, air-blowing and pressure-washing, make sure there is nothing flammable around the exhaust manifold, the muffler or around the mower belt. Grass, twigs, dirt or chaff in the hood may cause fire.



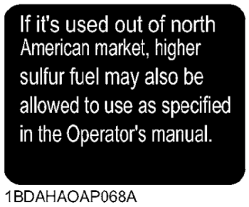
1BDABANAP226A

(4) Part No. K1272-6585-2

Diesel fuel only No fire

1BDAHAOAP002A

(5) Part No. K7724-6566-1 [GR2120AU]



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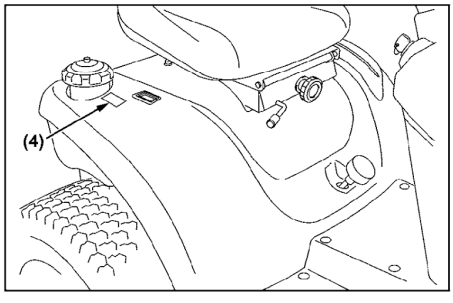
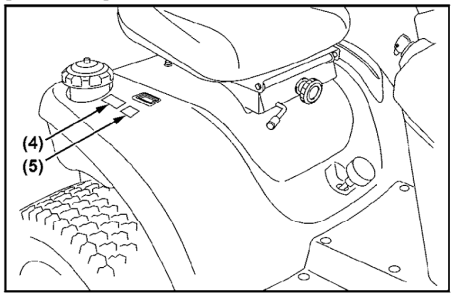
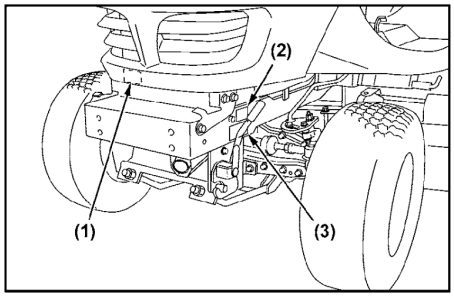
[GR2120]



[GR2120AU]





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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 and caution label(s) affixed is replace with new part, make sure new label(s) is(are) attached in the same locations(s) as the replace component.
5. Mount new danger, warning and caution labels by applying on a clean dry surface and pressure any bubbles to outside edge.

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3. SPECIFICATIONS

Model				GR2120	GR2120AU
Engine	Model			D782-E3-GX / D782-E4-GX-1	
	Type			Liquid-cooled Diesel	
	Total displacement			778 cm^3 (47.5 cu.in.)	
	Gross power			12.7kW (17.0 HP)*	
	Rated revolution			3000 min^{-1} (rpm)	
	Low idling revolution			1200 to 1350 min^{-1} (rpm)	
	No. of cylinders			3	
	Starter			Electric starter with battery	
	Battery			51R (12 V, 475CCA)	
	Fuel			Diesel fuel No.1 (below −10 °C (14 °F)) Diesel fuel No.2 (above −10 °C (14 °F))	
	Preheating system			Super glow	
	Engine stop			Key stop	
Capacity	Fuel tank			18 L (4.8 U.S.gals, 4.0 Imp.gals)	
	Engine oil			2.8 L (3.0 U.S.qts, 2.5 Imp.qts)	
	Radiator coolant			2.1 L (2.2 U.S.qts, 1.8 Imp.qts)	
	Hydrostatic transmission oil			3.3 L (3.5 U.S.qts, 2.9 Imp.qts)	
Machine	PTO			Shaft drive	
	PTO clutch			Hydraulic Wet Multi Discs	
	PTO brake			Wet Multi Discs	
	Tires	Front	Size	16 × 7.50 - 8	
			Type	Turf, Bar	Turf
		Rear	Size	23 × 10.50 - 12	
			Type	Turf, Bar	Turf
	Steering type			Full hydraulic power steering (Glide Steer)	
	Brake			Internal expanding brake	
	Travel speed control			Foot pedal	
	Transmission			Hydrostatic	
	Traveling speeds	Forward		0 to 10 km/h (0 to 6.2 mph)	
		Reverse		0 to 5 km/h (0 to 3.1 mph)	
Mower deck	Model			RCK48GR	RCK54GR / RCK48GR
Dimensions	Overall length			1990 mm (78.3 in.)	
	Overall width (with mower deck)			1550 mm (61.0 in.)	1700 mm (66.9 in.) / 1550 mm (61.0 in.)
	Overall height			1290 mm (50.8 in.)	
	Wheel base			1280 mm (50.4 in.)	
	Tread	Front		825 mm (32.5 in.)	
		Rear		820 mm (32.3 in.)	
	Weight (with mower deck)			435 kg (959 lbs)	440 kg (970 lbs) / 435 kg (959 lbs)
Grass catcher				Option	–

Model			RCK48GR	RCK54GR
Mower	Cutting width		1219 mm (48.0 in.)	1372 mm (54.0 in.)
	Cutting height		25 to 102 mm (1.0 to 4.0 in.)	
	Adjustment of cutting height		Dial gauge	
	Mounting method		Quick joint, Parallel linkage	
	Weight (Approx.)		75 kg (165.3 lbs)	80 kg (176.4 lbs)
	Dimensions	Total length	900 mm (35.4 in.)	905 mm (35.6 in.)
		Total width	1550 mm (61.0 in.)	1700 mm (66.9 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)	

(To be continued)

(Continued)

■ **NOTE**

- ***Manufacture's estimate**
  ***The company reserves the right to change the specifications without notice.**
  ***Power (HP) specifications for individual gasoline/diesel engine models are rated pursuant to Society of Automobile Engineers (SAE) J1940 based on gross output testing performed in accordance with SAE J1995 without the air cleaner and muffler.**
  The engine output value indicated on the EPA exhaust gas label is the ISO 8178 net value without a cooling fan.
  GR2120/GR2120AU:12.5 kW

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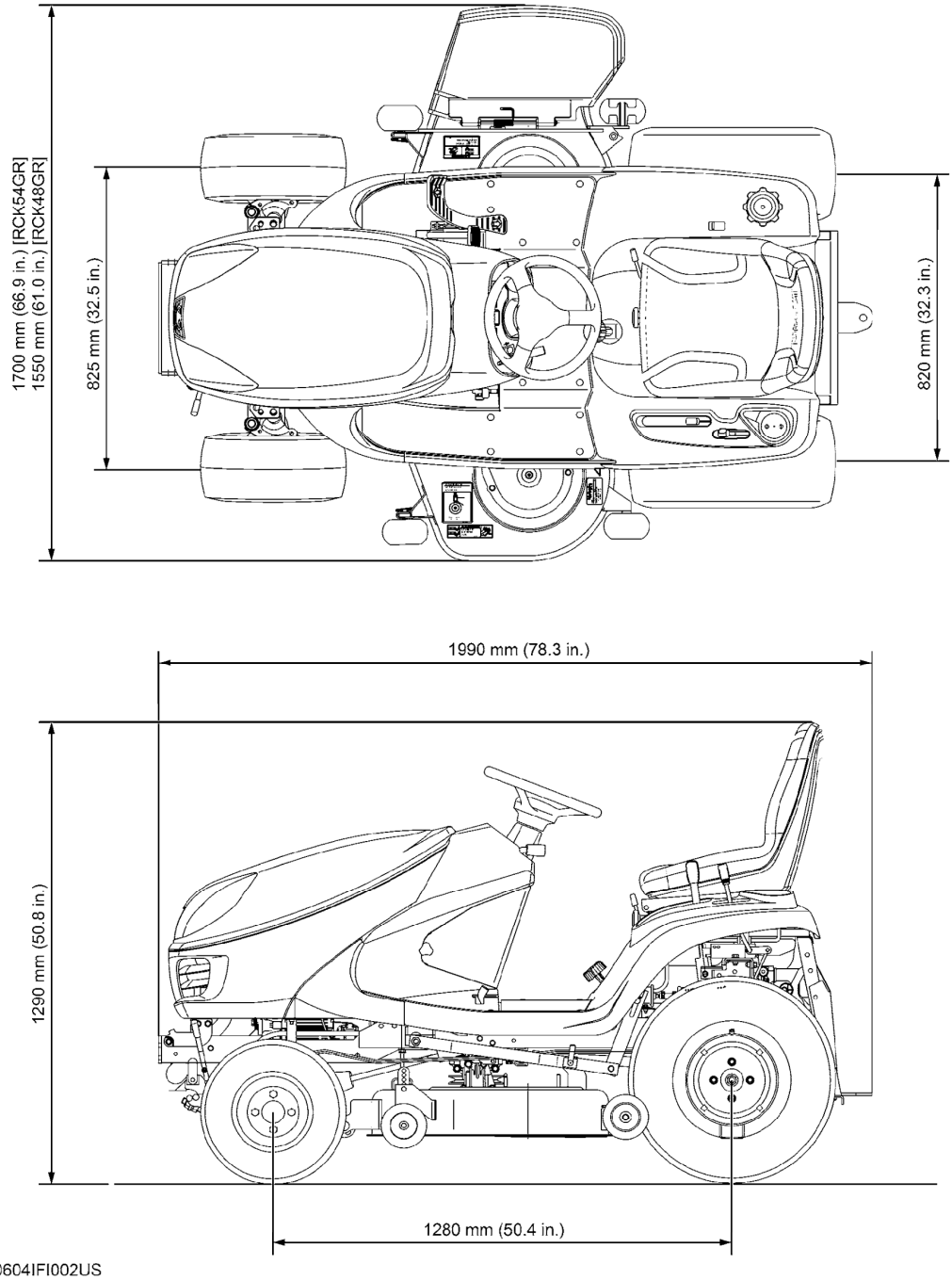
4. DIMENSIONS



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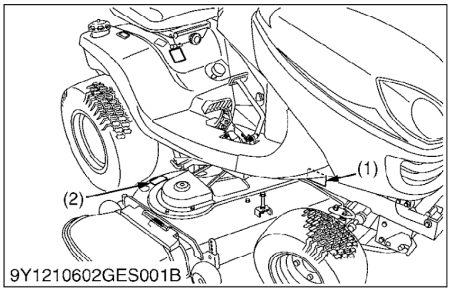
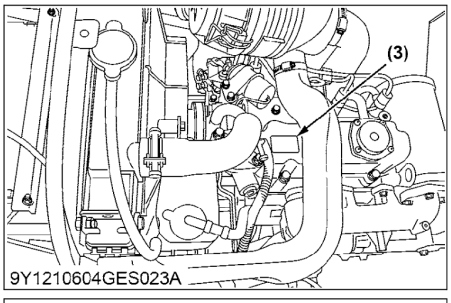
G GENERAL

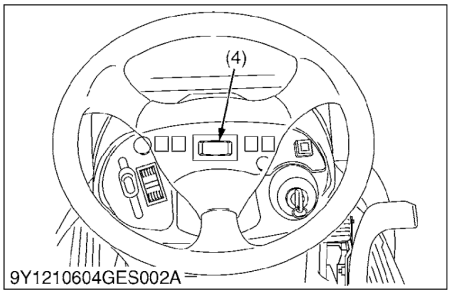
GENERAL

CONTENTS

1. IDENTIFICATION







When contacting your local KUBOTA distributor, always specify engine serial number (3), machine serial number (1), mower serial number (2) and hour meter (4) reading.

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

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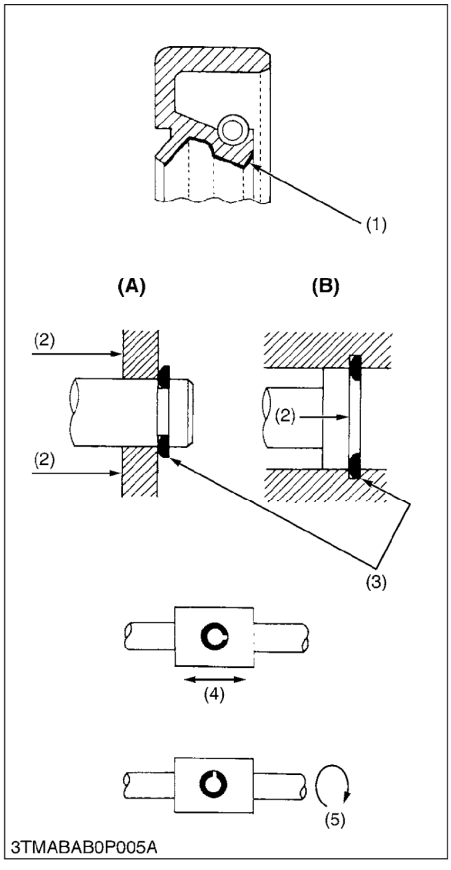
2. GENERAL PRECAUTIONS



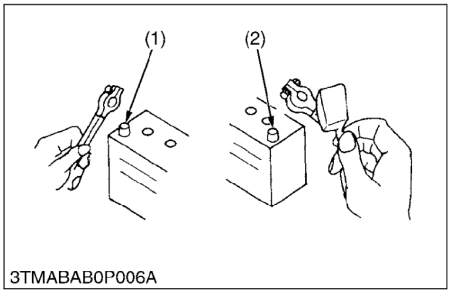
- When you disassemble, carefully put the parts in a clean area to make it easy to find the parts. You must install the screws, bolts and nuts in their initial position to prevent the reassembly errors.
- When it is necessary to use special tools, use KUBOTA special tools. Refer to the drawings when you make special tools that you do not use frequently.
- Before you disassemble or repair machine, make sure that you always disconnect the ground cable from the battery first.
- Remove oil and dirt from parts before you measure.
- Use KUBOTA genuine parts for replacement to keep the machine performance and to make sure of safety.
- You must replace the gaskets and O-rings when you assemble again. Apply grease **(1)** to new O-rings or oil seals before you assemble.
- When you assemble the external or internal circlips, make sure that the sharp edge **(3)** faces against the direction from which force **(2)** is applied.
- When inserting spring pins, their splits must face the direction from which a force is applied. See the figure on the left side.
- To prevent damage to the hydraulic system, use only specified fluid or equivalent.
- Clean the parts before you measure them.
- Tighten the fittings to the specified torque. Too much torque can cause damage to the hydraulic units or the fittings. Not sufficient torque can cause oil leakage.
- When you use a new hose or pipe, tighten the nuts to the specified torque. Then loosen (approx. by 45°) and let them be stable before you tighten to the specified torque (This is not applied to the parts with seal tape).
- When you remove the two ends of a pipe, remove the lower end first.
- Use two pliers in removal and installation. One to hold the stable side, and the other to turn the side you remove to prevent twists.
- Make sure that the sleeves of flared connectors and tapers of hoses are free of dust and scratches.
- After you tighten the fittings, clean the joint and apply the maximum operation pressure 2 to 3 times to check oil leakage.

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

(A) External Circlip
(B) Internal Circlip

WSM0000001GEG0106US0

3. HANDLING PRECAUTIONS FOR ELECTRICAL PARTS AND WIRING



3TMABAB0P006A

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

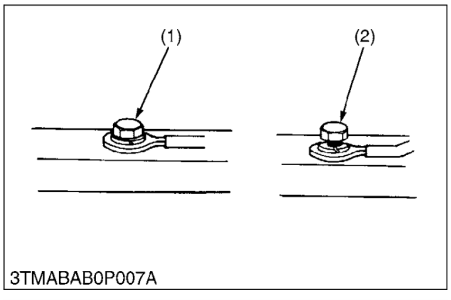
■ **IMPORTANT**

- **Check electrical wiring for damage and loosened connection every year.**
- **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

WSM000001GEG0062US0

[1] WIRING

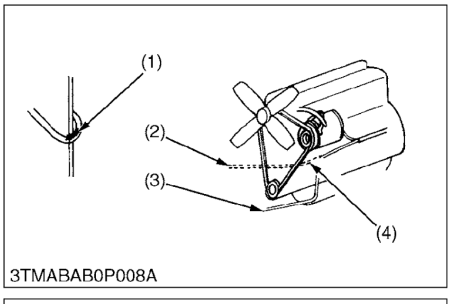


3TMABAB0P007A

- Securely tighten wiring terminals.

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

WSM000001GEG0063US0

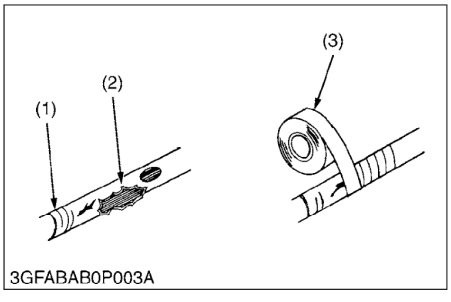


3TMABAB0P008A

- Do not let wiring contact dangerous part.

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

WSM000001GEG0064US0

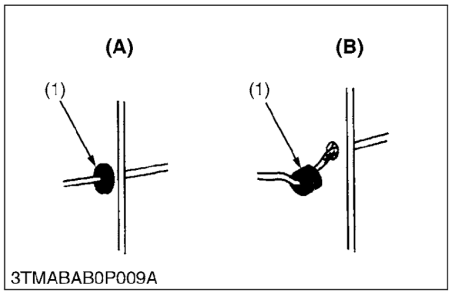


3GFABAB0P003A

- Repair or change torn or aged wiring immediately.

(1) Aged
(2) Torn
(3) Electrical Tape

WSM000001GEG0065US0



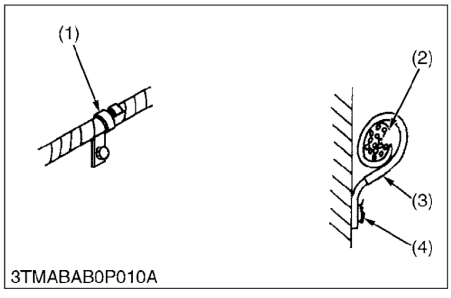
3TMABAB0P009A

- Securely insert grommet.

(1) Grommet

(A) Correct
(B) Incorrect

WSM000001GEG0066US0

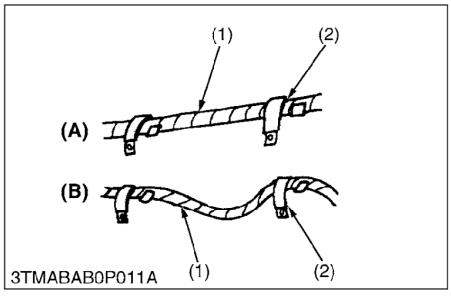


3TMABAB0P010A

- Securely clamp, being careful not to damage wiring.

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

WSM000001GEG0067US0



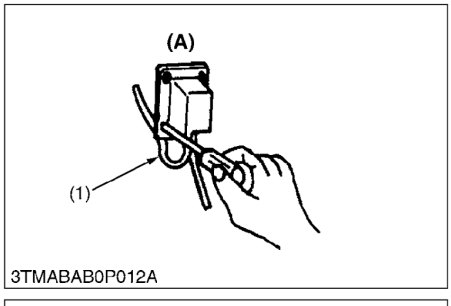
3TMABAB0P011A

- 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

WSM000001GEG0068US0



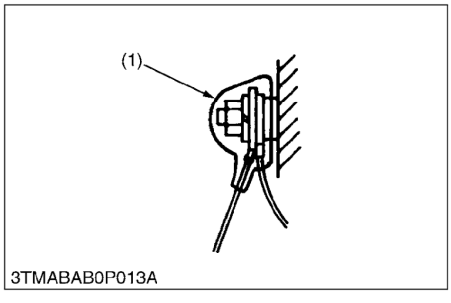
3TMABAB0P012A

- In installing a part, be careful not to get wiring caught by it.

(1) Wiring

(A) Incorrect

WSM000001GEG0069US0



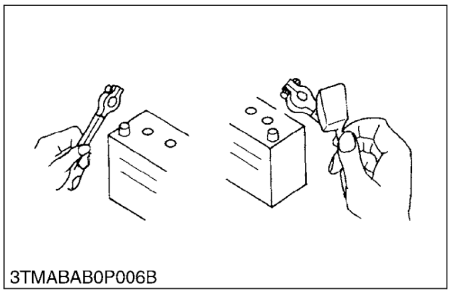
3TMABAB0P013A

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

(1) Cover
(Securely Install Cover)

WSM000001GEG0070US0

[2] BATTERY


3TMABAB0P006B

- Be careful not to confuse positive and negative terminal posts.
- When you remove battery cables, disconnect negative cable first. When you install battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After you connect 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.

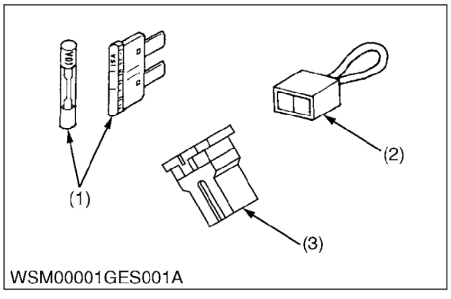
DANGER

To avoid serious injury or death:

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

WSM000001GEG0071US0

[3] FUSE



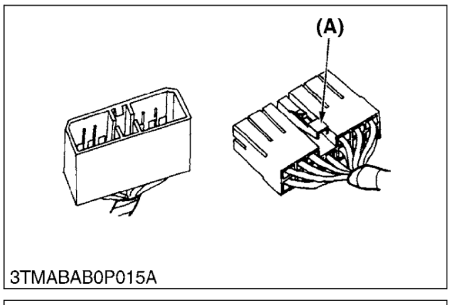
WSM00001GES001A

- Use fuses with specified capacity.
  Neither too large nor small capacity fuse is acceptable.
- Never use steel nor 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
(3) Slow Blow Fuse

WSM000001GEG0072US0

[4] CONNECTOR

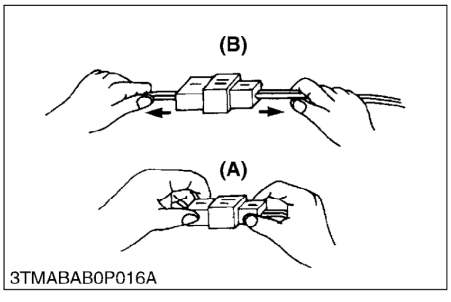


3TMABAB0P015A

- For connector with lock, push lock to separate.

(A) Push

WSM000001GEG0073US0

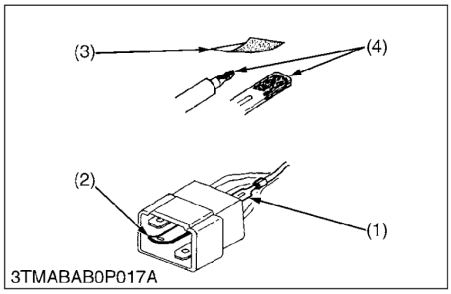


3TMABAB0P016A

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

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

WSM000001GEG0074US0

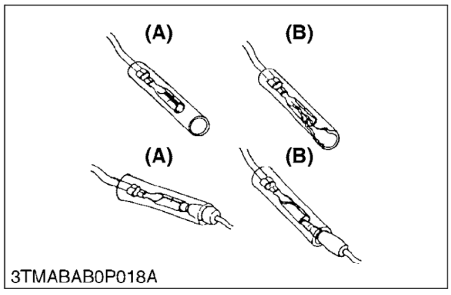


3TMABAB0P017A

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

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

WSM000001GEG0075US0

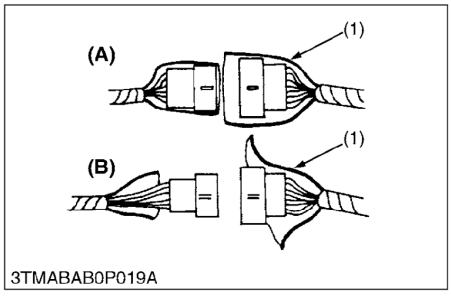


3TMABAB0P018A

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

(A) Correct
(B) Incorrect

WSM000001GEG0076US0



3TMABAB0P019A

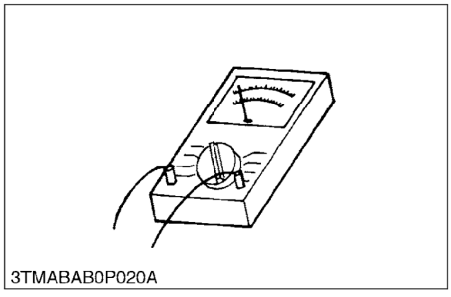
- Make sure that plastic cover is large enough to cover whole connector.

(1) Cover

(A) Correct
(B) Incorrect

WSM000001GEG0077US0

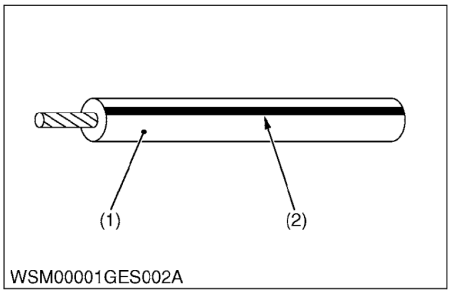
[5] HANDLING OF CIRCUIT TESTER


3TMABAB0P020A

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

WSM000001GEG0078US0

[6] COLOR OF WIRING



WSM00001GES002A

- Colors of wire are specified to the color codes.
- This symbol of "/" shows color with stripe (s).

(An example)

Red stripe on white color: W/R

Color of wiring	Color code
Black	B
Brown	Br
Green	G
Gray	Gy or Gr
Blue	L
Light Green	Lg
Orange	Or
Pink	P
Purple	Pu or V
Red	R
Sky Blue	Sb
White	W
Yellow	Y

(1) Wire Color (2) Stripe

WSM000001GEG0079US0

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	Coolant	2.1 L 2.2 U.S.qts 1.8 Imp.qts	Fresh clean water with anti-freeze
	Recovery tank	0.25 L 0.26 U.S.qts 0.22 Imp.qts	
3	Engine crankcase	2.8 L*1 3.0 U.S.qts 2.5 Imp.qts	**Engine oil** API Service Classification (See following "Engine Oil".) • Above 25 °C (77 °F): SAE30, SAE10W-30 or 15W-40 • 0 to 25 °C (32 to 77 °F) SAE20, SAE10W-30 or 15W-40 • Below 0 °C (32 °F) SAE10W, SAE10W-30 or 15W-40
4	Transmission case	3.3 L 3.5 U.S.qts 2.9 Imp.qts	KUBOTA SUPER UDT-2 fluid*2
5	Front axle case	1.9 L 2.0 U.S.qts 1.7 Imp.qts	
6	Mower gear box	0.15 L 0.16 U.S.qts 0.13 Imp.qts	

■ **NOTE**
- ***1 Oil amount when the oil level is at the upper level of the oil level gauge.**
- ***2 The product name of KUBOTA genuine UDT fluid may be different from that in the Operator's Manual depending on countries or territories.**

■ **NOTE**
- **Check the oil level of the transmission case with the mower lifted up.**

■ **IMPORTANT**
- **To prevent serious damage to hydraulic system, use only KUBOTA genuine fluid or its equivalent.**

Greasing				
No.	**Place**	**No. of greasing point**	**Capacity**	**Type of grease**
7	Engine transmission universal joint	2	Until grease overflows	Multipurpose EP2 Grease (NLGI Grade No.2)
8	Glide Steer link bolt	2		
9	Front axle (Center pin)	2		
10	Glide Steer rear arm	2		
11	Glide Steer arm	2		
12	Speed control pedal shaft	4	Moderate amount	Oil
13	Cruse control link	2		
14	PTO lever	1		
15	Hydraulic lift lever	1		
16	Seat adjuster	6		
17	Around the hole of the mower link	2		
18	Around the pin of the mower link	2		
19	Pivot of mower link	2		
20	Pivot of limit arm	2		
21	Front link	2		
22	Link fulcrum	2		
23	Throttle cable	2		
	[Mower]		Until grease overflows	Multipurpose EP2 Grease (NLGI Grade No.2)
24	Mower universal joint	1		
25	Spindle shafts	3		
26	Belt tension pivot	1		

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For North American Market

■ **NOTE**

Engine Oil

- **Oil used in the engine should have an American Petroleum Institute (API) service classification and Proper SAE Engine Oil according to the ambient temperatures as shown above:**
- **Refer to the following table for the suitable API classification engine oil according to the engine type (with internal EGR, external EGR or non-EGR) and the fuel.**

Fuel used	Engine oil classification (API classification)	
	Oil class of engines except external EGR	Oil class of engines with external EGR
Ultra Low Sulfur Fuel [< 0.0015 % (15 ppm)]	**CF**, **CF-4**, **CG-4**, **CH-4** or **CI-4**	**CF** or **CI-4** (Class CF-4, CG-4 and CH-4 engine oils cannot be used on EGR type engines)

EGR: Exhaust Gas Re-circulation

- **The CJ-4 engine oil is intended for DPF (Diesel Particulate Filter) type engines, and cannot be used on this machine.**

	except external EGR	with external EGR
Model	GR2120	—

Fuel

- **Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below −20 °C (−4 °F) or elevations above 1500 m (5000 ft).**
- **Diesel fuels specified to EN 590 or ASTM D975 are recommended.**
- **No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)**
- **Gasohol (up to 10 % ethyl alcohol, 90 % unleaded gasoline by volume) or Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blends (up to a maximum of 15 % MTBE by volume) are approved for the engine. Other gasoline/alcohol blends are not approved.**

Transmission Oil

- ***KUBOTA Super UDT-2 For an enhanced ownership experience, we highly recommend Super UDT-2 to be used instead of standard hydraulic/transmission fluid.**
  Super UDT-2 is a proprietary KUBOT formulation that deliveries superior performance and protection in all operating conditions.
  Regular UDT is also permitted for use in this machine.
- **Indicated capacities of water and oil are manufacturer's estimate.**

BIODIESEL FUEL (BDF)

B0-B20 Biodiesel fuels (BDF): mixed diesel fuels containing 20 % or less biodiesel can be utilized under the following conditions.

■ **IMPORTANT**

- **Refueling and handling fuel should be done with caution in order to avoid contact with the fuel and spillage that could create a potential environmental or fire hazard. Wear appropriate protective equipment when refueling.**

■ **Applicable BDF:**

1. Blended diesel fuels containing 6 % through 20 % BDF (B6 - B20) which comply with American Society for Testing and Materials (ASTM) D7467 Standard, as revised, can be used without adversely affecting the performance and durability of the engine and fuel system components.
2. Any mineral oil diesel fuel, if used, must conform to ASTM D975 (or the European EN590) Standard, as revised.
   B100 fuel used to make Biodiesel blended fuels must meet ASTM D6751 (or EN14214) Standard, as revised.
   The final blended fuel B20 must conform to ASTM D7467 Standard, as revised.
   Straight vegetable oil is NOT allowed in any blended fuel.
3. Allowable blended fuel is mineral oil diesel fuel blended with B100 (i.e. 100 % BDF).
   The blended fuel ratio shall be less than 20 % B100 and 80 % or more diesel fuel.
   The B100 source used for Biodiesel blends must be purchased from an accredited BQ-9000 marketer or producer.
   More information about qualified marketer(s) and producer(s) can be found at http://www.bq-9000.org.

■ **Preparation:**

1. Before using BDF concentrations greater than B5, you are advised to replace the engine oil, engine oil filter and fuel filter with new oil and filters. For replacement procedures, refer to the "MAINTENANCE" section.

■ **Product Warranty, Emission and Other Precautions:**

1. The engine emission control system was certified according to current regulations based on the use of non-BDF. When using BDF, the owner is advised to check applicable local and federal emission regulations and comply with all of them.
2. BDF may cause restricted or clogged fuel filters during cold weather conditions, resulting in the engine not operating properly.
3. BDF encourages the growth of microorganisms which may cause degradation of the fuel.
   This in turn may cause fuel line corrosion or reduce fuel filter flow earlier than expected.
4. BDF inherently absorbs moisture which may cause degradation of the fuel earlier than expected.
   To avoid this, drain the water separator and fuel filter port often.
5. Do not use Biodiesel concentrations higher than 20% (i.e. greater than B20).
   Engine performance and fuel consumption will be affected, and degradation of the fuel system components may occur.
6. Do not readjust the engine fuel control system as this will violate emission control levels for which the equipment was approved.
7. Compared with soybean-based and rapeseed-based feedstock, palm oil-based feedstock has a thicker consistency (i.e. higher viscosity) at lower temperatures.
   Consequently, fuel filter performance may be reduced, particularly during cold weather conditions.
8. The KUBOTA Warranty, as specified in the Owner's Warranty Information Guide, only covers defects in product materials and workmanship. Accordingly, any problems that may arise due to the use of poor quality fuels that fail to meet the above requirements, whether biodiesel or mineral oil based, are not covered by the KUBOTA Warranty.

■ **Routine handling:**

1. Avoid spilling BDF onto painted surfaces as this may damage the finish.
   If fuel is spilled immediately wipe clean and flush with soapy water to avoid permanent damage.
2. When using BDF, you are advised to maintain a full tank of fuel, especially overnight and during short term storage, to reduce condensation within the tank. Be sure to tighten the fuel cap after refueling to prevent moisture build up within the tank. Water in the Biodiesel mixture will damage fuel filters and may damage engine components.

(To be continued)

(Continued)

■ **Maintenance Requirements when using BDF B0 through B5:**

Follow the oil change intervals recommended by referring to the "MAINTENANCE" section. Extended oil change intervals may result in premature wear or engine damage.

■ **Maintenance Requirements when using BDF B6 through B20:**

The maintenance interval for fuel related parts changes.
See the table below for the new maintenance interval.

Items		Interval	Remarks
Fuel filter element	Replace	every 200 hrs	See "Replacing Fuel Filter"
Fuel line	Check	every 6 months	Replace if any deterioration (crack, hardening, scar or deformation) or damage occurred.
	Replace	every 2 years	See "Checking Fuel Line and Fuel Filter"

■ **Long Term Storage:**

1. BDF easily deteriorates due to oxygen, water, heat and foreign substances.
   Do not store B6 through B20 longer than 1 month and B5 longer than 3 months.
2. When using B6 through B20 and storing the machine longer than 1 month, drain the fuel from the tanks and replace with light mineral oil diesel fuel.
   Subsequently, run the engine at least 30 minutes to remove all of the Biodiesel from the fuel lines.
3. When using B5 fuel and storing machine longer than 3 months, drain the fuel from the tanks and replace with light mineral oil diesel fuel.
   Subsequently, run the engine at least 30 minutes to remove all of the Biodiesel from the fuel lines.

For other than North America market

■ **NOTE**

Engine Oil

- **Oil used in the engine should have an American Petroleum Institute (API) service classification and Proper SAE Engine Oil according to the ambient temperatures as shown above:**
- **With the emission control now in effect, the CF-4 and CG-4 lubricating oils have been developed for use of a low-sulfur fuel on on-road vehicle engines. When an off-road vehicle engine runs on a high-sulfur fuel, it is advisable to employ the "CF or better" lubricating oil with a high Total Base Number (TBN of 10 minimum).**
- **Refer to the following table for the suitable API classification engine oil according to the engine type (with internal EGR, external EGR or non-EGR) and the fuel (low-sulfur or high-sulfur fuel).**

Fuel used	Engine oil classification (API classification)	
	Oil class of engines except external EGR	Oil class of engines with external EGR
High Sulfur Fuel [≥ 0.05 % (500 ppm)]	**CF** (If the "CF-4, CG-4, CH-4, or CI-4" lubricating oil is used with a high-sulfur fuel, change the lubricating oil at shorter intervals. (approximately half))	—
Low Sulfur Fuel [< 0.05 % (500 ppm)] or Ultra Low Sulfur Fuel [< 0.0015 % (15 ppm)]	**CF**, **CF-4**, **CG-4**, **CH-4** or **CI-4**	**CF** or **CI-4** (Class CF-4, CG-4 and CH-4 engine oils cannot be used on EGR type engines)

EGR: Exhaust Gas Re-circulation

- **The CJ-4 engine oil is intended for DPF (Diesel Particulate Filter) type engines, and cannot be used on this machine.**

	except external EGR	with external EGR
Model	GR2120AU	—

Fuel

- **Cetane number of 45 minimum. Cetane number greater than 50 is preferred, especially for temperatures below −20 °C (−4 °F) or elevations above 1500 m (5000 ft).**
- **If diesel fuel with sulfur content greater than 0.5 % (5000 ppm) sulfur content in used, reduce the service interval for engine oil and filter by 50 %.**
- **NEVER use diesel fuel with sulfur content greater than 0.05 % (500 ppm) for EXTERNAL EGR type engine.**
- **DO NOT use diesel fuel with sulfur content greater than 1.0 % (10000 ppm).**
- **Diesel fuels specified to EN 590 or ASTM D975 are recommended.**
- **No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87)**
- **Gasohol (up to 10 % ethyl alcohol, 90 % unleaded gasoline by volume) or Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blends (up to a maximum of 15 % MTBE by volume) are approved for the engine. Other gasoline/alcohol blends are not approved.**

Transmission oil

- **The oil used to lubricate the transmission is also used as hydraulic fluid. To insure proper operation of the hydraulic system and to complete lubrication of the transmission, it is important that a multi-grade transmission fluid is used in this system. We recommend the use of KUBOTA UDT or SUPER UDT fluid for optimum protection and performance.**
  Do not mix different brands together.
- **Indicated capacities of water and oil are manufacturer's estimate.**

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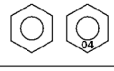
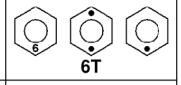
5. TIGHTENING TORQUES

[1] GENERAL USE SCREWS, BOLTS AND NUTS

Tighten screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual according to the table below.

Indication on top of bolt	 No-grade or 4T						 7T						 9T		
Indication on top of nut	 No-grade or 4T												 6T		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit	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	7.9 to 9.3	0.80 to 0.95	5.8 to 6.8	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.9 to 8.8	0.80 to 0.90	5.8 to 6.5	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8	18 to 20	1.8 to 2.1	13 to 15	17 to 19	1.7 to 2.0	13 to 14	24 to 27	2.4 to 2.8	18 to 20	18 to 20	1.8 to 2.1	13 to 15	30 to 34	3.0 to 3.5	22 to 25
M10	40 to 45	4.0 to 4.6	29 to 33	32 to 34	3.2 to 3.5	24 to 25	48 to 55	4.9 to 5.7	36 to 41	40 to 44	4.0 to 4.5	29 to 32	61 to 70	6.2 to 7.2	45 to 52
M12	63 to 72	6.4 to 7.4	47 to 53	–	–	–	78 to 90	7.9 to 9.2	58 to 66	63 to 72	6.4 to 7.4	47 to 53	103 to 117	10.5 to 12.0	76.0 to 86.7
M14	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	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	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	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

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[2] STUD BOLTS

Material of opponent part	Ordinariness			Aluminum		
Unit	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8	12 to 15	1.2 to 1.6	8.7 to 11	8.9 to 11	0.90 to 1.2	6.5 to 8.6
M10	25 to 31	2.5 to 3.2	18 to 23	20 to 25	2.0 to 2.6	15 to 18
M12	30 to 49	3.0 to 5.0	22 to 36	31	3.2	23
M14	62 to 73	6.3 to 7.5	46 to 54	–	–	–
M16	98.1 to 112	10.0 to 11.5	72.4 to 83.1	–	–	–
M18	172 to 201	17.5 to 20.5	127 to 148	–	–	–

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