WSM

WORKSHOP MANUAL
KUBOTA EXCAVATOR

KX080-4

Kubota

KiSC issued 02, 2013 A

CONTENTS

TO THE READER

This Workshop Manual provides service personnel with information about the mechanisms, service and maintenance of the construction machinery. This Workshop Manual is divided into 3 sections, General, Mechanisms and Service.

■ **General**

This section contains information such as engine and equipment ID numbers, general precautions, maintenance schedules, inspections and maintenance items and special tools.

■ **Mechanisms**

This section describes the structure of mechanisms and explains their functions.Be sure that you fully understand this Mechanisms section prior to performing any service work, such as troubleshooting or when performing any disassembly or assembly work.

■ **Service**

This section contains information and procedures for performing maintenance on the backhoe, such as troubleshooting, service specification tables, torque specifications, items to be inspected and adjusted, disassembly and assembly procedures, as well as precautions, maintenance standard values and usage limits.

All of the illustrations, specifications and other information in this manual were created based on the latest model at the time of publication.

Please be aware that changes to the content may be made without prior notice.

■ **NOTE**

- **Corresponding model list**

Machine Model	Engine Model
KX080-4	V3307-CRS-T4

■ **IMPORTANT**

- **Refer to the information of the engine below.**
- Engine model : V2607-CR-E4B, V2607-CR-TE4B, V3307-CR-TE4B
- Web PDF-Code : No.9Y111-06740
- Hard Copy-Code : No.9Y121-06740
- CD-ROM-Code : No.9Y131-06740

January, 2013

INFORMATION

INFORMATION

CONTENTS

1. SAFETY FIRST

⚠ SAFETY FIRST

- **This "Safety Alert Symbol" is used in this manual and on labels on equipment to indicate important issues and warn of the danger of personal injury. Read and follow these warnings carefully.**
- **It is important that you thoroughly read these instructions and safety rules prior to working on the equipment and that you always follow them.**

⚠ DANGER
- **Indicates that failure to follow the warning will result in serious injury or death.**

⚠ WARNING
- **Indicates that failure to follow the warning may result in serious injury or death.**

⚠ CAUTION
- **Indicates that failure to follow the warning may result in injury.**

■ IMPORTANT
- **Indicates that failure to follow the warning may result in damage to or a breakdown of the equipment.**

■ NOTE
- **Indicates supplementary explanations that will be helpful when using the equipment.**

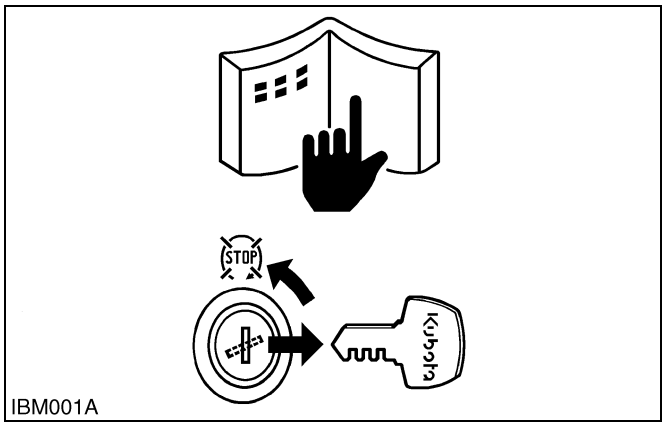
[NOTE]
- Indicates other supplementary information to take note of.

RY9212001INI0001US0

2. IN THE INTEREST OF WORK SAFETY

[1] WORKING SAFELY WITH THE EQUIPMENT MEANS ALWAYS FOLLOWING THESE INSTRUCTIONS:

(1) Precautions Before Working on the Mini-Excavator

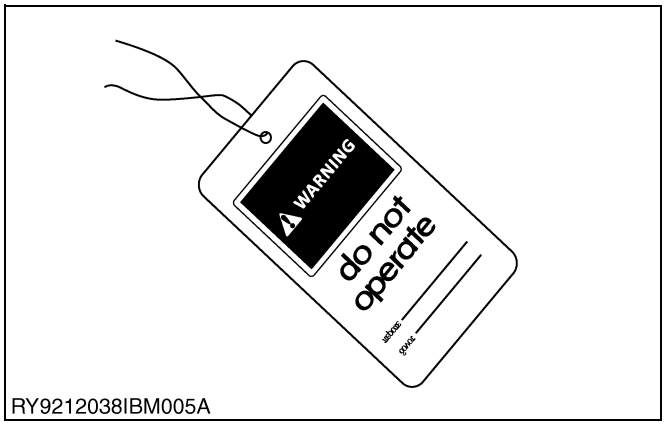


IBM001A

Before starting any service or maintenance work,

- Read all the general and safety instructions in this manual, as well as the decals on your equipment.
- Always stop the engine whenever you leave the driver's seat to inspect or clean the machine or its devices, or to inspect or adjust parts.
- Choose a safe spot for inspecting the equipment-on flat, hard ground.

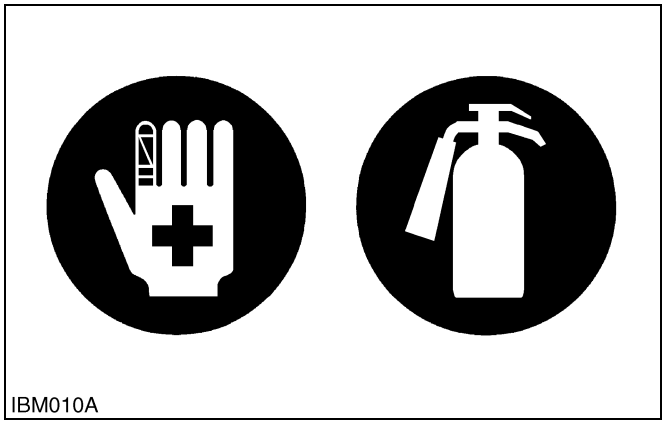
RY9212001INI0002US0



RY9212038IBM005A

- When performing maintenance on the equipment, hang the DO NOT OPERATE sign where it will be obvious from and around the driver's seat.
- When performing maintenance or repairs, always lower attachments to the ground, stop the engine and set the brake.
- When performing maintenance on the equipment, always disconnect the negative battery cable.
- Before using tools, make sure you understand how to use them correctly and use tools in good condition and of the right size for the job.

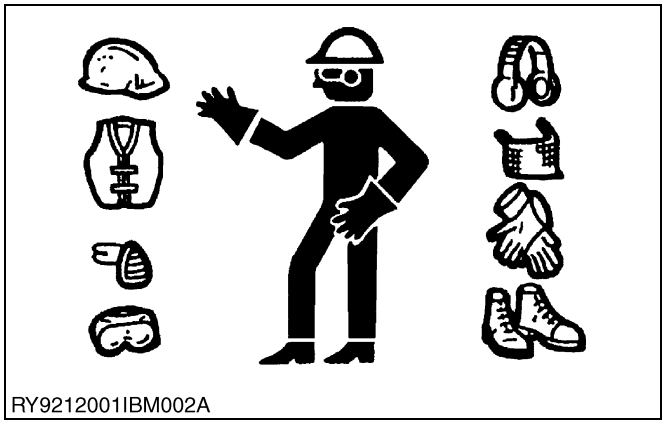
RY9212001INI0003US0


IBM010A

Be Ready for an Emergency

- Keep a first-aid kit and fire extinguisher close at hand so you can use it when needed.
- Keep emergency contact information for doctors, hospitals and ERs handy.

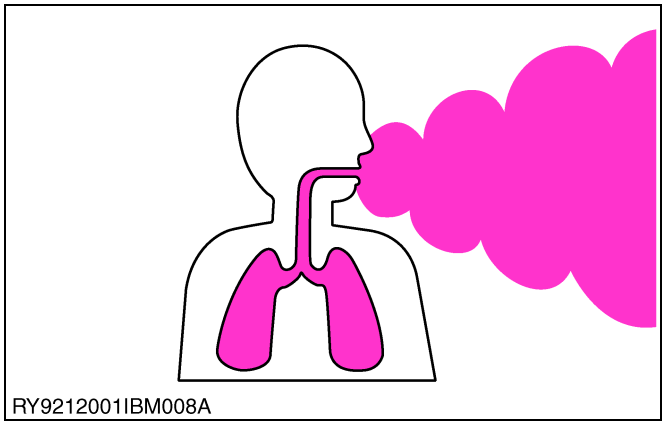
RY9212001INI0004US0


RY9212001IBM002A

- Wear clothes appropriate for working on equipment. Do not wear loose-fitting clothes as they may catch on the machine controls.
- When working on the equipment, use all safety gear, such as a helmet, safety glasses and shoes, that are required by law or regulation.
- Never perform maintenance while drowsy or under the influence of alcohol or drugs.

RY9212001INI0005US0

(2) Precautions Before Working on the Equipment



RY9212001IBM008A

- Stop the machine on a hard and level location and make sure the area around the machine is free of obstacles and hazardous materials. When parking the machine indoors, select a spot that can be properly ventilated.
- When performing work such as with a hammer, fragments may go flying, so make sure only authorized persons are around the machine.
- Before servicing the machine, clean it off so there is no mud, debris, oil or the like sticking to it.

RY9212001INI0006US0

RY9212001IBM003A

- Before getting on/off of the machine, clean off around the steps so there is no mud on them. Always give yourself 3-point support when getting on/off the machine.

CAUTION

- **3-point support means using both legs and one hand or both hands and one leg as you climb up/down.**

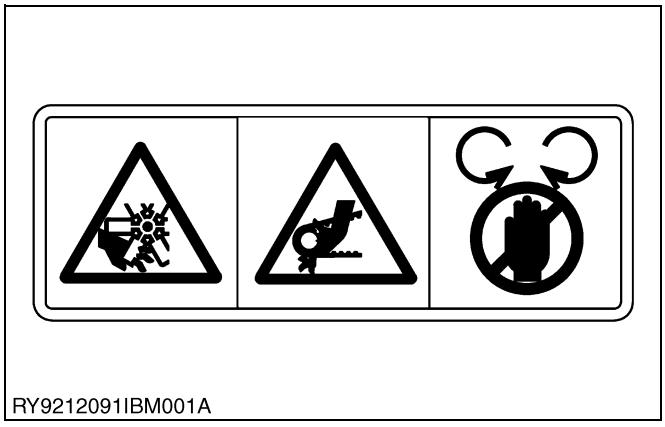
RY9212001INI0007US0

RY9212001IBM004A

Starting the Machine Safely

- Before starting the engine, always sit in the driver's seat and make sure the area is safe and clear.
- As it is dangerous, never start the engine from anywhere but the driver's seat.
- Always check and make sure control lever(s) are not engaged before starting the engine.
- Never start the engine by hot-wiring the starter circuit. This is not only dangerous, but may damage the machine.

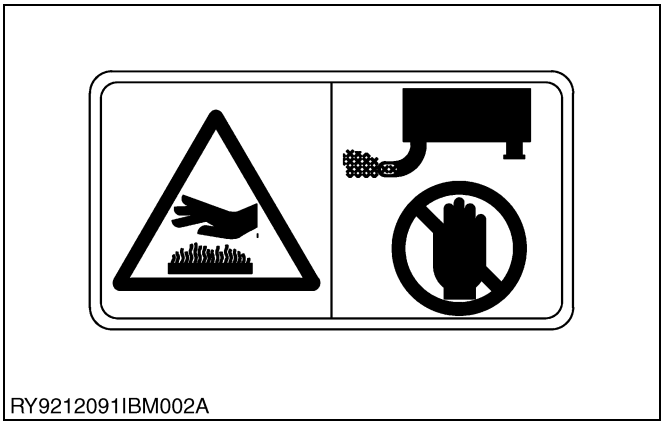
RY9212001INI0008US0



RY9212091IBM001A

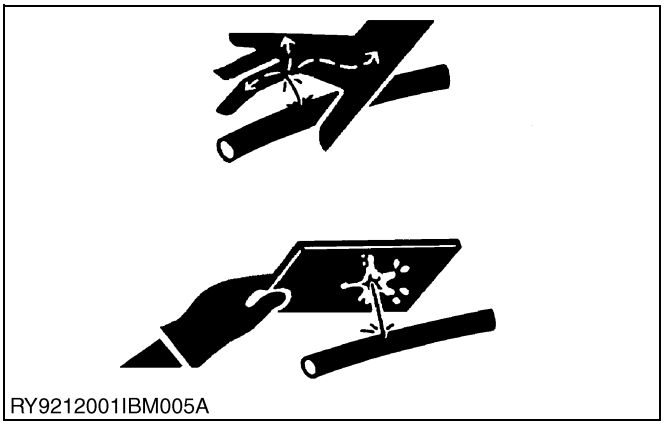
- Whenever it is necessary to open the engine covers or hood in order to service the machine, always prop them open.
- If it is absolutely necessary to run the engine while working on the machine, make sure you are clear of all rotating or moving parts. Also take care not to leave anything, such as tools or rags, near any moving parts.

RY9212001INI0009US0


RY9212091IBM002A

- The engine, muffler, radiator, hydraulic line, etc., have parts that remain very hot even after the engine has been stopped. Be sure to avoid these parts, as touching them can result in burns. Radiator coolant, hydraulic fluid and oil also remain hot. Therefore, do not attempt to remove caps and plugs, etc., before these fluids have sufficiently cooled.
- Make sure the coolant temperature has dropped sufficiently before opening the radiator cap. Also, since the inside of the radiator is pressurized, when removing the cap, first loosen it to release the pressure before removing the cap completely.

RY9212001INI0016US0


RY9212001IBM005A

- The pressure in the hydraulic circuit stays at pressure even after the engine stops. Before removing parts, such as hydraulic devices from the machine, first release the pressure. Please note that when releasing residual pressure, the machine itself and/or implements may move without warning, so be very careful when releasing the pressure.
- Oil gushing out under pressure is extremely dangerous as it may pierce your skin or your eyes. Similarly, oil leaking out of pinholes is not visible. So when checking for oil leaks, always wear safety glasses and gloves and use a piece of cardboard or a wood block to shield yourself from oil.

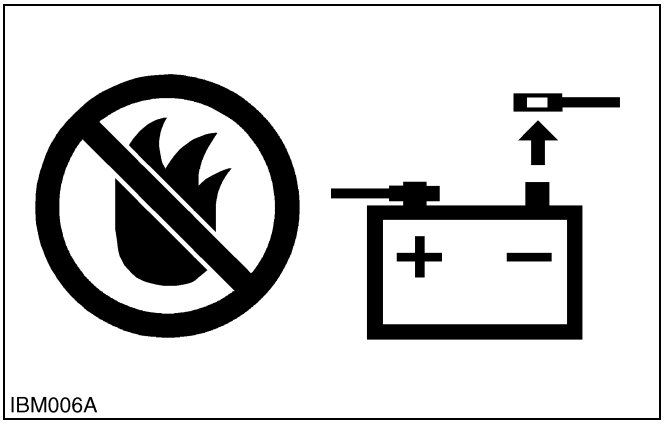
RY9212001INI0011US0

No Smoking or Open Flames while Fueling


RY9212001IBM006A

- Fuel is extremely flammable and dangerous. Never smoke near fuel. If fuel is spilled on the machine, its engine, or electrical parts, it may cause a fire. If fuel is spilled, wipe it all up immediately.
- Never smoke while filling the machine with fuel. And always tighten the fuel cap securely and wipe up any spilled fuel.

RY9212001INI0012US0


IBM006A

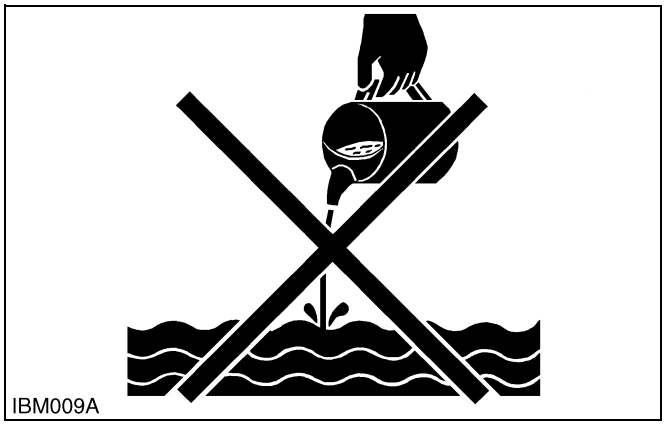
- Always wear safety glasses and gloves when handling the battery.
- The gas generated by the battery is flammable. Never weld or use tools like a grinder near the battery. And never smoke near it.
- When disconnecting the battery, always disconnect the negative cable first. When connecting the battery, always connect the positive cable first.

RY9212001INI0013US0


RY9212001IBM007A

- Grease is under high pressure inside the hydraulic cylinder. It is very dangerous to loosen a grease nipple quickly as it may shoot off. Always loosen grease nipples slowly.
- And never face a grease nipple while loosening it.

RY9212001INI0014US0


IBM009A

Dispose of Waste Fluids Properly

- Never dispose of waste fluids on the ground, in the gutter, a river, pond or lake. Always dispose of hazardous substances like waste oil, coolant and electrolytic fluid in accordance with the relevant environmental protection regulations.
- Keep the safety plates clean so they can be read. If a safety plate is damaged and comes off or becomes illegible, put a plate with the same warnings back in its place.

RY9212001INI0015US0

3. LABELS DISPLAYED TO PROMOTE WORK SAFETY

[1] LOCATIONS

(1)

⚠CAUTION

TO AVOID PERSONAL INJURY:

1. Read and understand operator's manual before attempting to start or operate the excavator. Read the manual of the attachment to do a correct operation safely when other attachments are installed instead of Kubota specified bucket.
2. Before starting engine, make sure all control levers are in neutral and the operating area is clear of all bystanders.
3. Never allow passengers on any part of the excavator while operating.
4. Know your work area before starting operation.
   - Check underground lines and cables.
   - Stay off slopes too steep for safe operation.
   - Check for hidden holes, obstacles or drop-offs and overhangs.
5. Make sure all shields are in place and securely fastened.
6. Before dismounting from the machine, lower all attachment to the ground, stop the engine and remove the key.
7. Damaged ROPS must be replaced, not repaired or revised.

IMPORTANT

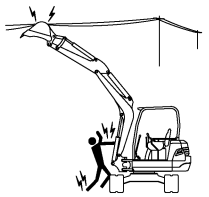
Never use boom, dipper, or bucket to hammer or beat sideways.

Excavator is not intended for these usages.

1BAAABSAP078E

(2)

⚠DANGER



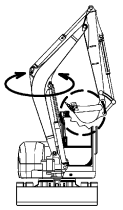
TO AVOID SERIOUS INJURY OR DEATH:

Check overhead clearance with electric wires.

1BAAACDAP243A

(3)

⚠WARNING



ATTACHMENT IMPACT HAZARD
KEEP ATTACHMENT AWAY FROM CAB AND MACHINE.
FAILURE TO DO SO MAY RESULT IN SEVERE INJURIES OR DEATH OR DAMAGE TO THE BOOMCYLINDER, HYDRAULIC HOSES OR THE CAB.

1BAAAARAP1000

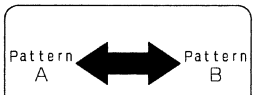
(4)

⚠WARNING

Operation of this equipment may create sparks that can start fires around dry vegetation.
A spark arrester may be required.
The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

1AGAIHFAP069A

(5)

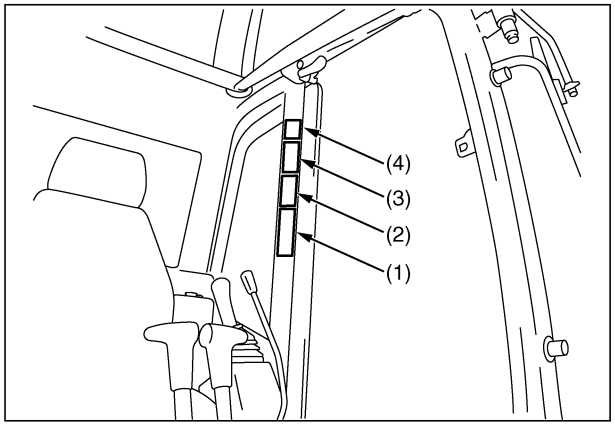


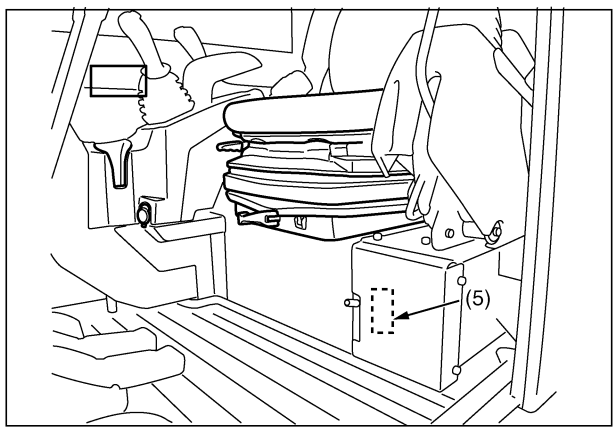
⚠CAUTION

TO AVOID PERSONAL INJULY:

1. Study control lever pattern A and pattern B. Then choose the one which is most familiar.
2. Position the pattern selector lever in either the left position (pattern A) or the right position (patter B).
3. Engage lever lock to prevent accidential pattern change.
4. Familiarize yourself with the pattern selected by operating slowly.

1BAAAAQAP0820

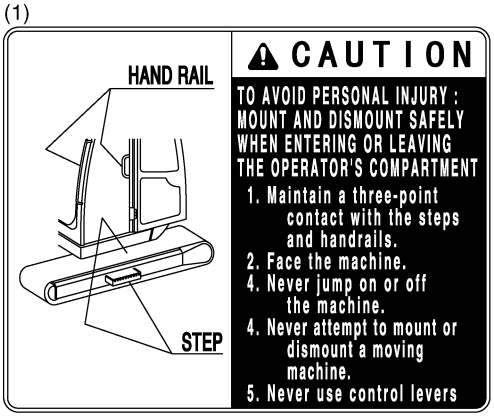




RY9212158ICI001A

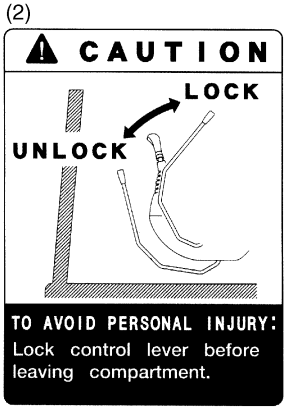
RY9212158INI0003US0

(1)



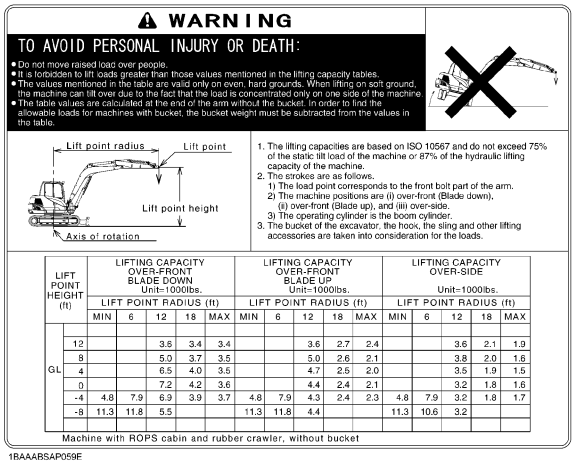
1BAAABBAP122E

(2)



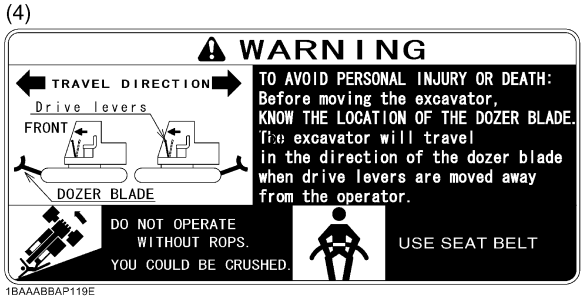
1BAAAARAP0450

(3)



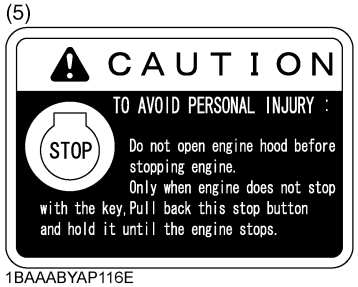
1BAAABSAP059E

(4)

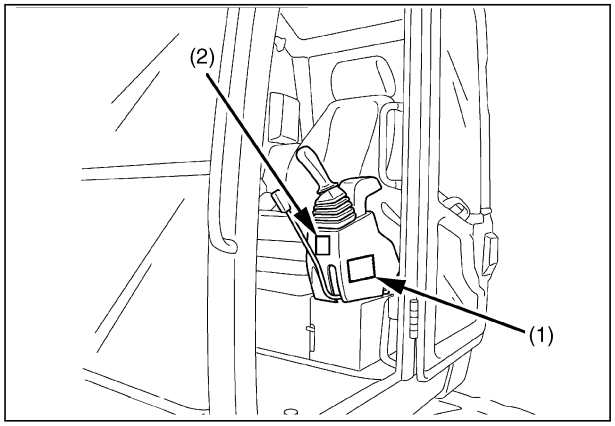


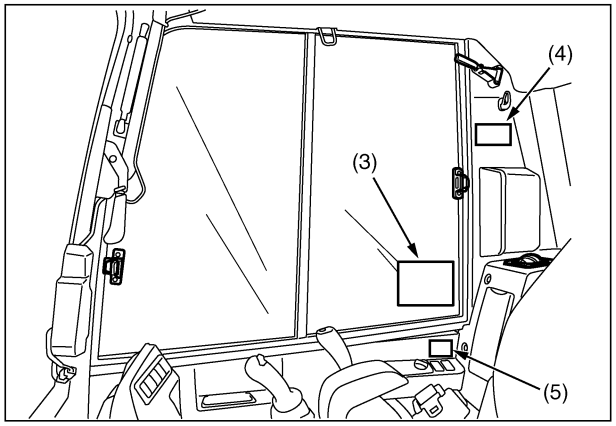
1BAAABBAP119E

(5)



1BAAABYAP116E

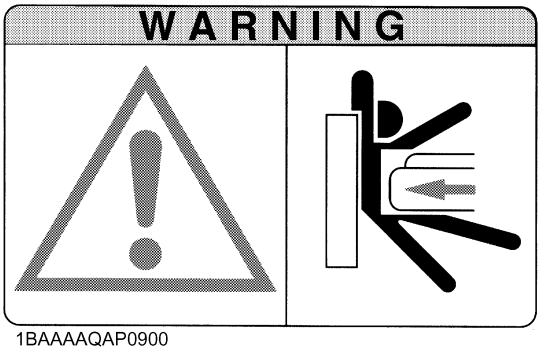




RY9212158ICI002A

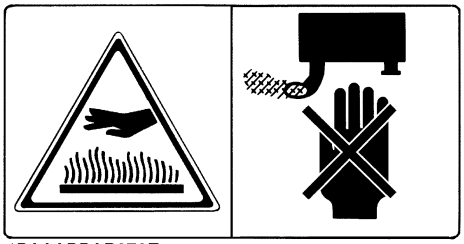
RY9212158INI0004US0

(1)
Do not allow any persons within the working range.



1BAAAAQAP0900

(2)
Do not touch hot parts such as exhaust etc.



1BAAABBAP073E

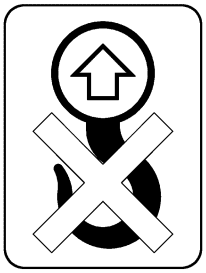
(3)

1BAAGAAAP0260

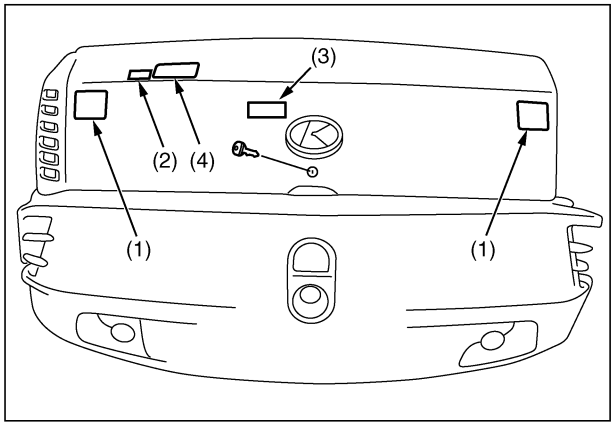
(4)

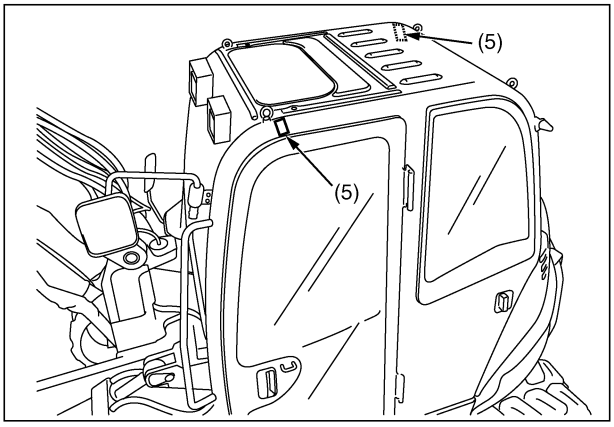
1BCAAAAAP2180

(5)



1BAABAUAP2720





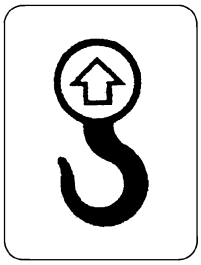
RY9212158ICI003A

RY9212158INI0005US0

(1) [Both sides]

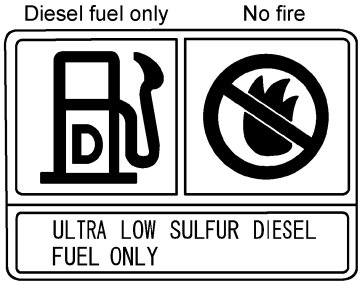
1BAAAAQAP0930

(2) [Both sides]



1BAAAAQAP0940

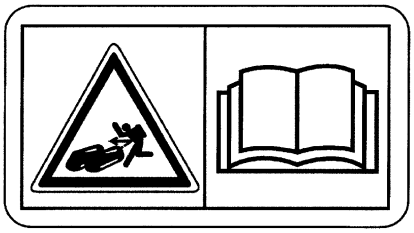
(3)



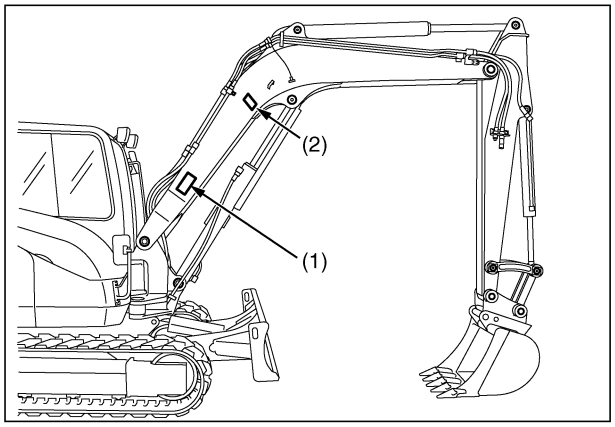
1BAAGAAAP1810

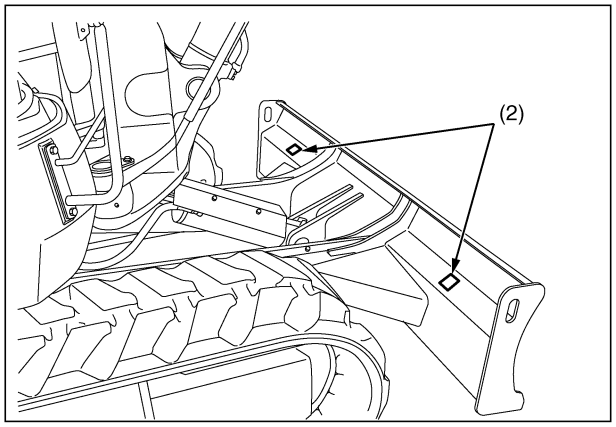
(4)

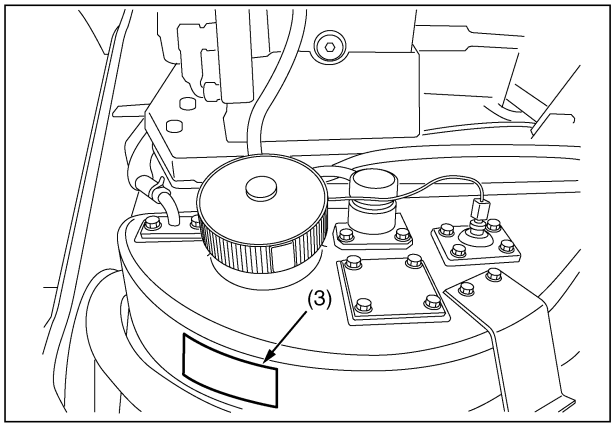
Do not loosen the grease nipple completely or too quickly.

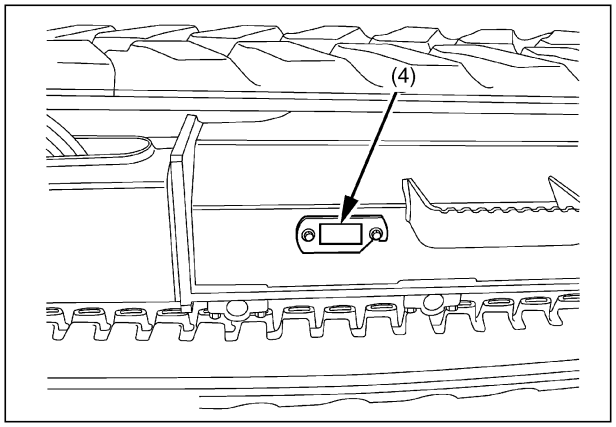


1BAABAMAP0010





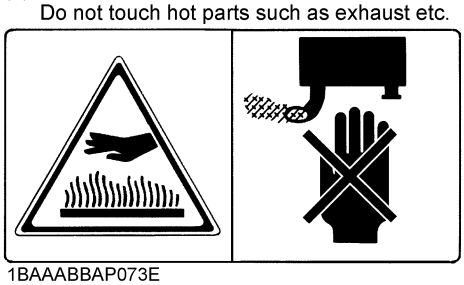




RY9212158ICI004A

RY9212158INI0006US0

(1)
Do not touch hot parts such as exhaust etc.

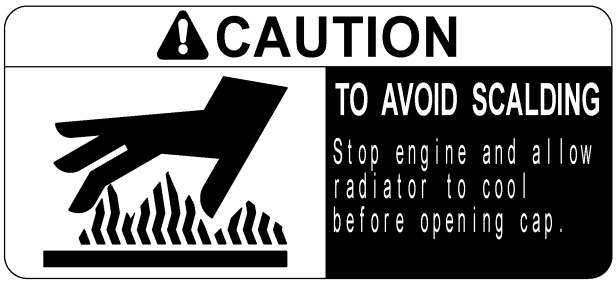


1BAAABBAP073E

(2)
Keep away from fan and fan bolt.

1BCAAAAAP073E

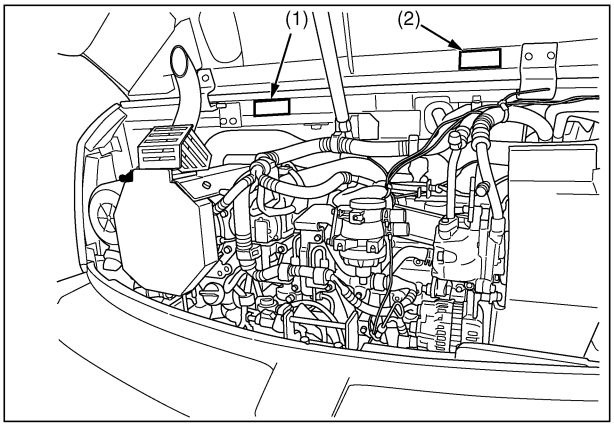
(3)

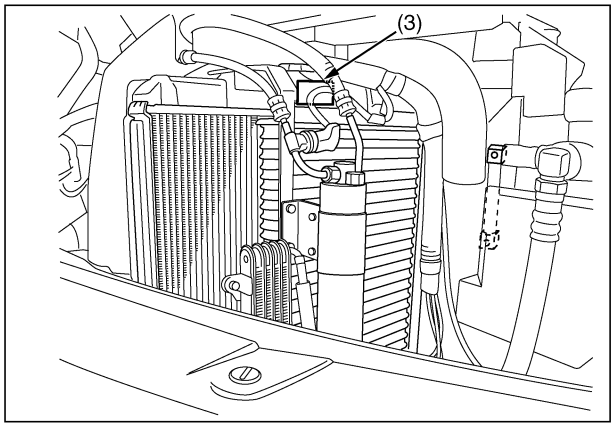


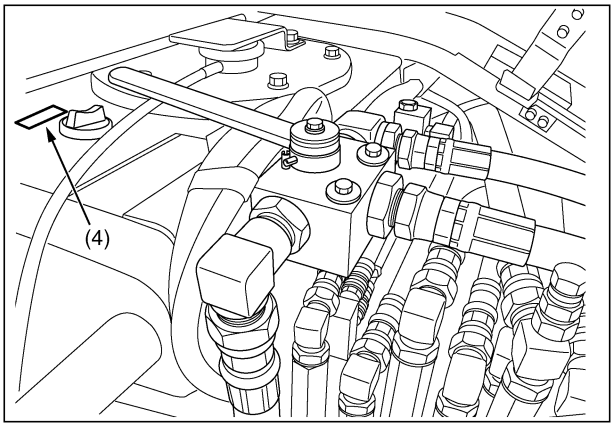
1BAAABDAP0790

(4)
Attention to the danger of burning.

1BAAABBAP1670



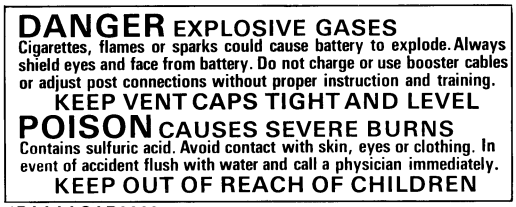




RY9212158ICI005A

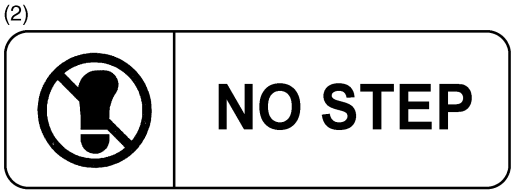
RY9212158INI0007US0

(1)



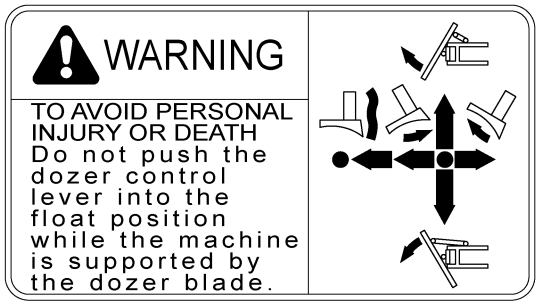
1BAAAAQAP0960

(2)

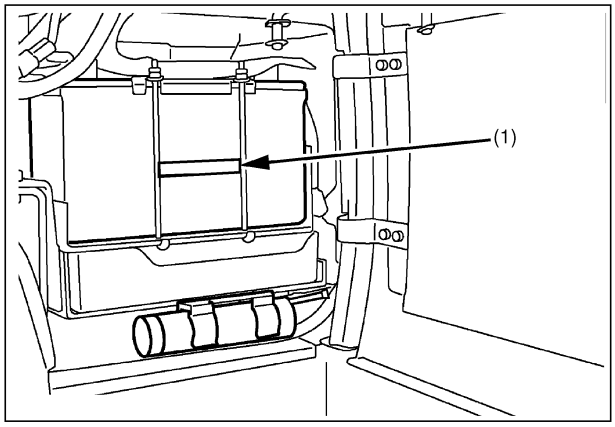


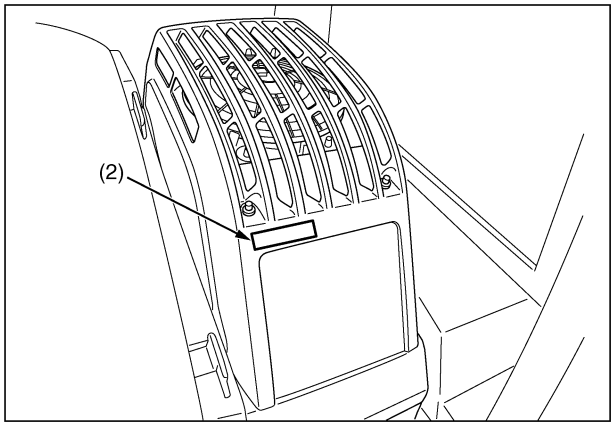
1BAAABDAP0780

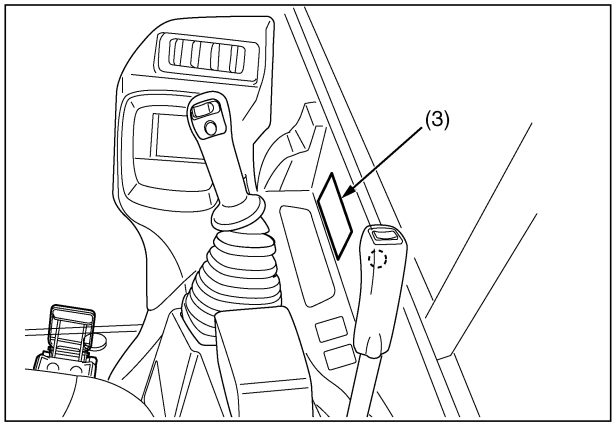
(3) [Angle blade type only]



1BAAGACAP072A







RY9212158ICI006A

RY9212158INI0008US0

[2] LABEL MAINTENANCE

Thoroughly Read, Understand and Follow Safety Precautions on Labels

- Always keep labels in a clean, undamaged state.
- If labels get dirty, wipe them off with soapy water and a soft cloth.
  If solvents such as paint thinner or engine oil are used, the text and or figures may fade away.
- When using a pressure washer to clean the equipment, do not spray any labels directly as doing so may make them peel off.
- If a label is damaged or lost, order a new one from your dealer and affix it as before.
- Before affixing a new label, completely wipe off any dirt or grime on the surface, allow it to dry and then affix in the same place.
- When replacing a part that has a label on it, replace the label at the same time.

RY9212001INI0018US0

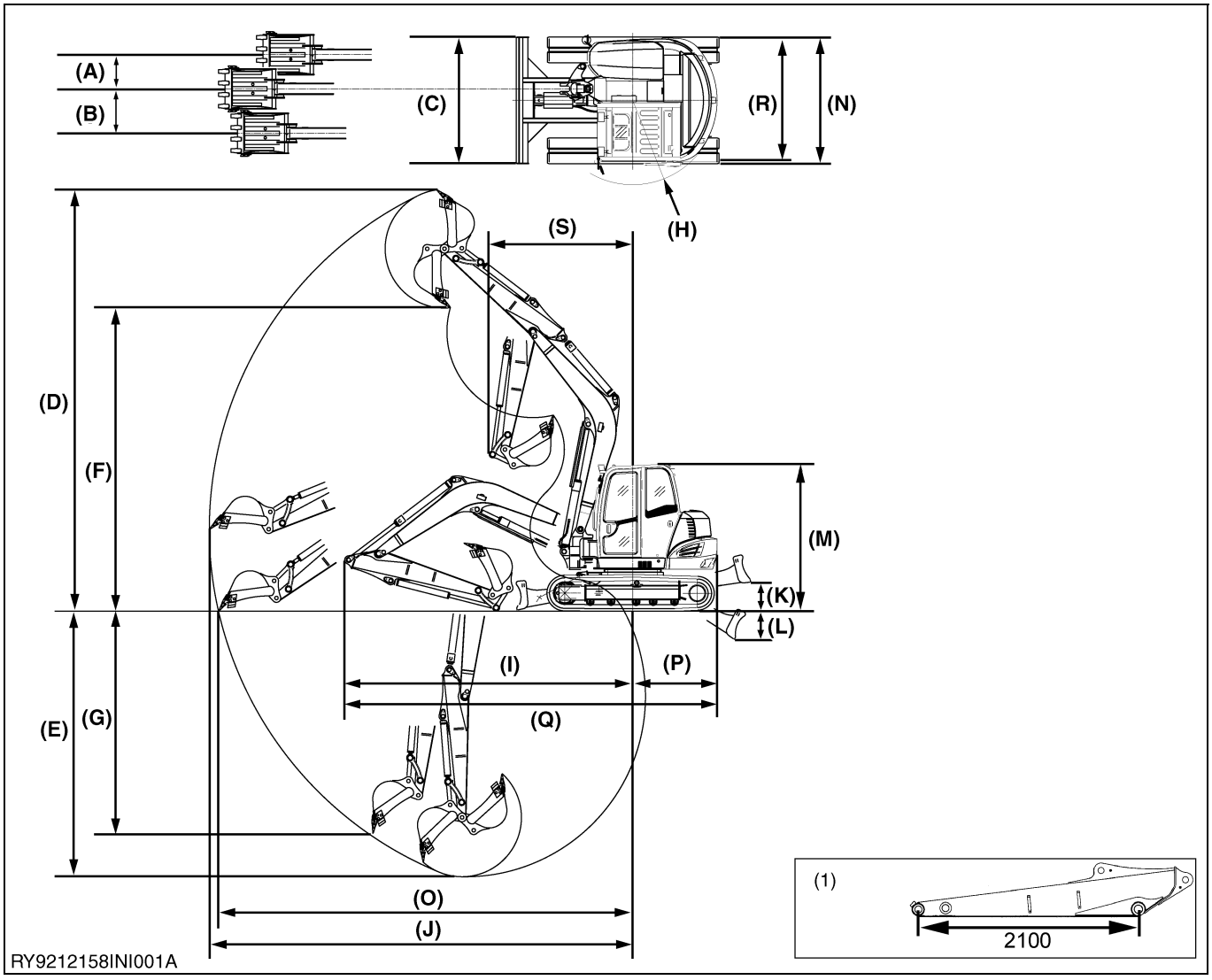
4. MAIN SPECIFICATIONS

<table>
<tr><td colspan="3"></td><td colspan="5">KUBOTA EXCAVATOR</td></tr>
<tr><td colspan="3">Model name</td><td colspan="5">KX080-4</td></tr>
<tr><td colspan="3">Type</td><td colspan="3">Cabin</td><td colspan="2">Angle Blade type Cabin</td></tr>
<tr><td colspan="3" rowspan="2">Operating weight
(including operator's weight)</td><td>Rubber tracks</td><td>Steel tracks (450 width)</td><td>Steel tracks (600 width)</td><td>Rubber tracks</td><td>Steel tracks (450 width)</td></tr>
<tr><td>8280 kg
18254 lbs</td><td>8330 kg
18364 lbs</td><td>8460 kg
18475 lbs</td><td>8630 kg
19026 lbs</td><td>8680 kg
19136 lbs</td></tr>
<tr><td rowspan="6">Engine</td><td colspan="2">Type</td><td colspan="5">Water cooled 4 cycle diesel engine with 4 cylinder</td></tr>
<tr><td colspan="2">Model name</td><td colspan="5">KUBOTA V3307-CRS-T4</td></tr>
<tr><td colspan="2">Total displacement</td><td colspan="5">3331 cc (203.3 cu.in.)</td></tr>
<tr><td rowspan="2">Engine power</td><td>SAE gross</td><td colspan="5">52.2 kW (70.0 Hp)</td></tr>
<tr><td>SAE net</td><td colspan="5">48.8 kW (65.5 Hp)</td></tr>
<tr><td colspan="2">Rated speed</td><td colspan="5">2000 rpm</td></tr>
<tr><td colspan="2">Low idling speed</td><td colspan="5">1000 rpm</td></tr>
<tr><td rowspan="5">Performance</td><td colspan="2">Unit swing speed</td><td colspan="5">9.5 rpm</td></tr>
<tr><td rowspan="2">Travel speed</td><td>Fast</td><td colspan="5">4.9 km / h (3.1 mph)</td></tr>
<tr><td>Slow</td><td colspan="5">2.7 km / h (1.7 mph)</td></tr>
<tr><td colspan="2">Ground pressure
(With operator)</td><td>36.0 kPa (0.367 kgf/cm^2) 5.22 psi</td><td>36.2 kPa (0.369 kgf/cm^2) 5.25 psi</td><td>27.6 kPa (0.281 kgf/cm$^{2)}$ 4.00 psi</td><td>37.5 kPa (0.382 kgf/cm^2) 5.44 psi</td><td>37.7 kPa (0.384 kgf/cm^2) 5.47 psi</td></tr>
<tr><td colspan="2">Climbing angle</td><td colspan="5">*36 % (20 deg)</td></tr>
<tr><td colspan="2">Angle in case of crossing slope</td><td colspan="5">*27 % (15 deg)</td></tr>
<tr><td rowspan="3">Blade</td><td colspan="2">Width x Height</td><td colspan="3">2200 x 500 mm
86.6 x 19.7 in.</td><td colspan="2">2200 x 510 mm
86.6 x 20.1 in.</td></tr>
<tr><td rowspan="2">Max swing</td><td>Left</td><td colspan="3">–</td><td colspan="2">0.44 rad (25 deg)</td></tr>
<tr><td>Right</td><td colspan="3">–</td><td colspan="2">0.44 rad (25 deg)</td></tr>
<tr><td colspan="2" rowspan="2">Boom swing angle</td><td>Left</td><td colspan="5">1.22 rad (70 deg)</td></tr>
<tr><td>Right</td><td colspan="5">1.05 rad (60 deg)</td></tr>
<tr><td rowspan="2">Pressure connection for attachments</td><td colspan="2">Max. displacement (Theoretical)</td><td colspan="5">100 L (26.4 U.S.gal) / min</td></tr>
<tr><td colspan="2">Max. pressure</td><td colspan="5">20.6 MPa
210 kgf/cm^2
2987 psi</td></tr>
<tr><td colspan="3">Fuel tank capacity</td><td colspan="5">115 L (30.4 U.S.gal)</td></tr>
</table>

■ **NOTE**
- **Above dimensions are based on the machine with KUBOTA original bucket and 2100 arm.**
- **Specifications subject to change without notice.**
- **With unloaded digging bucket.**
- **Firm compacted soil.**
- **Operators must exercise extra caution and follow instructions in the operator's manual.**
- **Worse condition or heavier attachment to the above will decrease climbing angle.**

RY9212158INI0001US0

5. DIMENSIONS



(1) Arm length (2100 Arm)

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
KX080-4	590 mm 23.2 in.	770 mm 30.3 in.	2200 mm 86.6 in.	7300 mm 287.4 in.	5250 mm 206.7 in.	4600 mm 181.1 in.	3850 mm 151.6 in.

	(H)	(I)	(J)	(K)	(L)	(M)	(N)
KX080-4	1460 mm 57.5 in.	4990 mm 196.5 in.	7330 mm 288.6 in.	500 mm 19.7 in.	500 mm 19.7 in.	2540 mm 100.0 in.	2200 mm 86.6 in.

	(O)	(P)	(Q)	(R)	(S)
KX080-4	7170 mm 282.3 in.	1460 mm 57.5 in.	6450 mm 253.9 in.	2150 mm 84.6 in.	2490 mm 98.0 in.

- Above dimensions are based on the machine with KUBOTA original bucket.
- Above dimensions are based on the machine with rubber track.
- Specifications subject to change without notice.

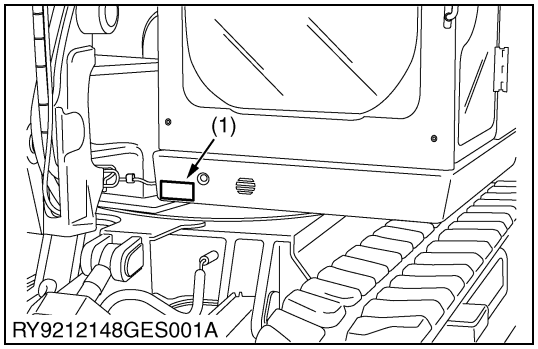
RY9212158INI0002US0

G GENERAL

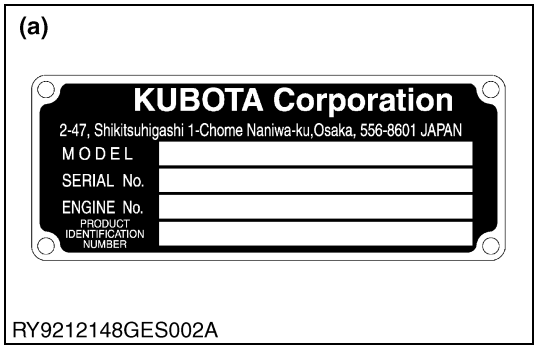
GENERAL

CONTENTS

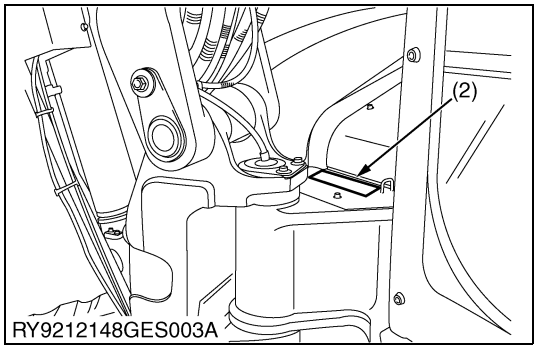
1. CHECKING EXCAVATOR IDENTIFICATION



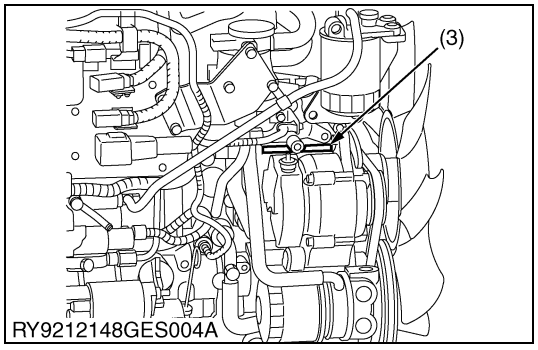
RY9212148GES001A



RY9212148GES002A



RY9212148GES003A



RY9212148GES004A

When consulting with your local KUBOTA dealer about this mini-excavator, please provide the model of the mini-excavator, its frame and engine numbers and the number of hours on the hour meter.

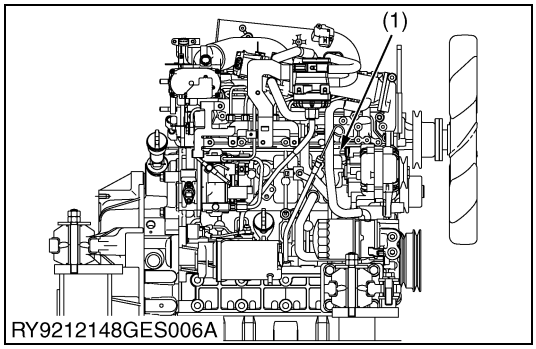
(1) Mini-excavator Nameplate (Model, frame number, engine number)
(2) Frame Number
(3) Engine Number

(a) Model Nameplate

RY9212148GEG0001US0

2. ENGINE IDENTIFICATION

[1] MODEL NAME AND SERIAL NUMBER



Be sure to check the engine nameplate and serial number when you wish to consult about the engine.

The model and serial number of the engine need to be checked prior to servicing the engine or replacing any of its parts.

■ **Engine Serial No.**

The engine serial number is the numerical ID of the engine and is printed after the engine's model number.

The year and month of manufacture are indicated as follows.

Engine Series

Number or Alphabet	Series	Number or Alphabet	Series
1	05 (include: WG)	6	GZ, OC, AC, EA, E
2	V3	7	03
3	08	8	07
4	SM (include: WG)	A	EA, RK
5	Air Cooled Gasoline	B	03 (KET Production)

Production Year

Alphabet or Number	Year	Alphabet or Number	Year
1	2001	F	2015
2	2002	G	2016
3	2003	H	2017
4	2004	J	2018
5	2005	K	2019
6	2006	L	2020
7	2007	M	2021
8	2008	N	2022
9	2009	P	2023
A	2010	R	2024
B	2011	S	2025
C	2012	T	2026
D	2013	V	2027
E	2014		

(1) Engine Model Name and Serial Number

(To be continued)

(Continued)

Production Month and Lot Number

Month	Engine Lot Number	
January	A0001 to A9999	from B0001
February	C0001 to C9999	from D0001
March	E0001 to E9999	from F0001
April	G0001 to G9999	from H0001
May	J0001 to J9999	from K0001
June	L0001 to L9999	from M0001
July	N0001 to N9999	from P0001
August	Q0001 to Q9999	from R0001
September	S0001 to S9999	from T0001
October	U0001 to U9999	from V0001
November	W0001 to W9999	from X0001
December	Y0001 to Y9999	from Z0001

* Alphabetical letters "I" and "O" are not used.

(a) (b)(c)(d) (e)
e.g. V2607 - 8 C L A001

(a) **V2607**: Engine Model Name
(b) **8**: Engine Series (07 series)
(c) **C**: Production Year (2012)
(d) **L**: Production Month (June)
(e) **A001**: Lot Number: (**0001 to 9999** or **A001 to Z999**)

RY9212148GEG0002US0

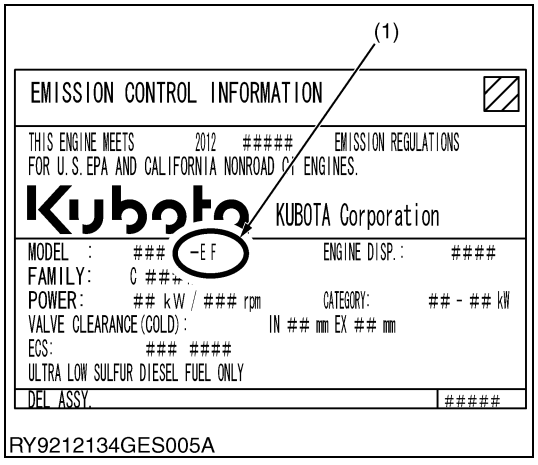
[2] E4B ENGINE

[Example: Engine Model Name V2607-CR-**TE4(C)B**-XXXX or V2607-CR-**TIE4(C)B**-XXXX]

The emission controls previously implemented in various countries to prevent air pollution will be stepped up as Nonroad Emission Standards continue to change. The timing or applicable date of the specific Nonroad Emission regulations depends on the engine output classification.

Over the past several years, KUBOTA has been supplying diesel engines that comply with regulations in the respective countries affected by Nonroad Emission regulations. For KUBOTA Engines, E4B will be the designation that identifies engine models affected by the next emission phase (See the table below).

When servicing or repairing ###-E4B series engines, use only replacement parts for that specific E4B engine, designated by the appropriate KUBOTA Parts List and perform all maintenance services listed in the appropriate KUBOTA Operator's Manual or in the appropriate KUBOTA Workshop Manual. Use of incorrect replacement parts or replacement parts from other emission level engines (for example: E3B engines), may result in emission levels out of compliance with the original E4B design and EPA or other applicable regulations.Please refer to the emission label located on the engine head cover to identify Output classification and Emission Control Information. E4B engines are identified with "EF" at the end of the Model designation, on the US EPA label. Please note: E4B is not marked on the engine.



RY9212134GES005A

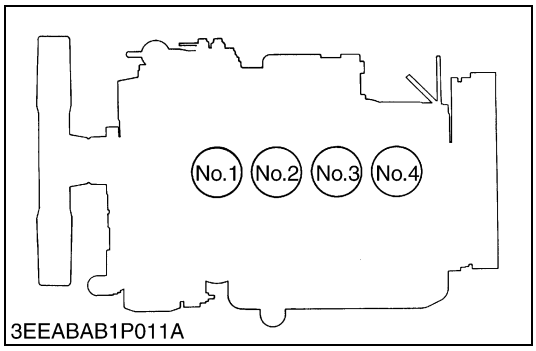
Category (1)	Engine output classification	EPA regulation
EF	Less than 19 kW	Tier 4
	From 19 to less than 56 kW	Interim Tier 4
	From 56 to less than 75 kW	Interim Tier 4
	From 75 to less than 130 kW	Interim Tier 4

■ **NOTE**

- **"E4B" engines are identified with "EF" at the end of the Model designation, on the US EPA label.**
  "E4B" designates some Interim Tier 4 / Tier 4 models, depending on engine output classification.

RY9212148GEG0003US0

[3] CYLINDER NUMBER



3EEABAB1P011A

You can see the cylinder numbers of KUBOTA diesel engine in the figure.

The sequence of cylinder numbers is No.1, No.2, No.3 and No.4 and it starts from the gear case side.

RY9212134GEG0005US0

3. MUFFLER FULL ASSEMBLY IDENTIFICATION

[1] PART NUMBER AND SERIAL NUMBER

Diesel Particulate Filter (hereinafter referred to as the "DPF") Muffler Full Assembly Serial Number

The DPF muffler full assembly serial number is an identified number for the DPF muffler full assembly.

It shows the month and year of manufacture as below.

Year of manufacture

Alphabet or Number	Year	Alphabet or Number	Year
1	2001	F	2015
2	2002	G	2016
3	2003	H	2017
4	2004	J	2018
5	2005	K	2019
6	2006	L	2020
7	2007	M	2021
8	2008	N	2022
9	2009	P	2023
A	2010	R	2024
B	2011	S	2025
C	2012	T	2026
D	2013	V	2027
E	2014		

Month of manufacture

Month	DPF Muffler Full Assembly Lot Number	
January	A0001 to A9999	B0001 to BZ999
February	C0001 to C9999	D0001 to DZ999
March	E0001 to E9999	F0001 to FZ999
April	G0001 to G9999	H0001 to HZ999
May	J0001 to J9999	K0001 to KZ999
June	L0001 to L9999	M0001 to MZ999
July	N0001 to N9999	P0001 to PZ999
August	Q0001 to Q9999	R0001 to RZ999
September	S0001 to S9999	T0001 to TZ999
October	U0001 to U9999	V0001 to VZ999
November	W0001 to W9999	X0001 to XZ999
December	Y0001 to Y9999	Z0001 to ZZ999

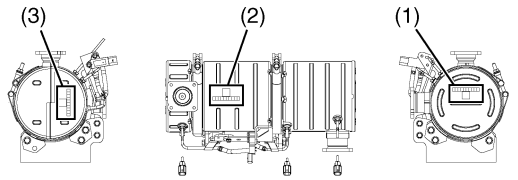
* Alphabetical letters "I" and "O" are not used.

(a)(b) (c)
e.g. C L 0019

(1) DPF Muffler Full Assembly Part Number and Serial Number

(a) Year: C indicates 2012
(b) Month: L or M indicates June
(c) Lot Number: (**0001 to 9999** or **A001 to Z999**)

RY9212148GEG0004US0



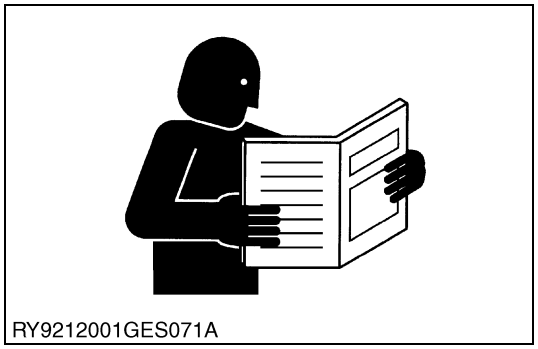
RY9212148GES007A

You must keep the records of the filter comp (DPF) part number and serial number before you remove the DPF for cleaning.

(1) Body (DPF Outlet) Part Number and Serial Number
(2) Filter Comp (DPF) Part Number and Serial Number
(3) Catalyst (DOC) Part Number and Serial Number

RY9212148GEG0005US0

4. GENERAL PRECAUTIONS


RY9212001GES071A

Whenever performing maintenance on the machine, always read the Safety Precautions in this manual and the Operator's Manual carefully, become familiar with them and perform the work safely.

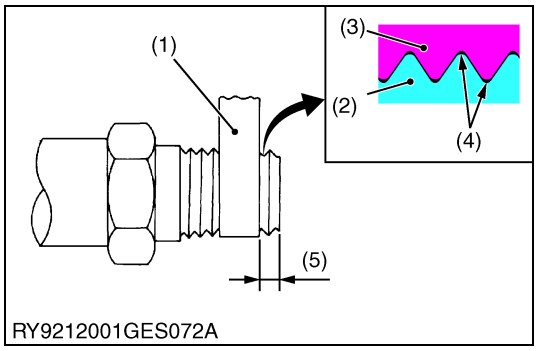
Before performing any maintenance on the machine, make sure it is sufficiently clean and choose a sufficiently clean location to perform any disassembly.

Before performing maintenance on the machine, always disconnect the negative battery cable first.

Whenever a special tool is required, use the special tool that KUBOTA recommends. Make any special tools that are not used very frequently according to the diagrams in this manual.

Always use genuine KUBOTA parts to maintain the performance and safety characteristics of the machine.

RY9212001GEG0011US0



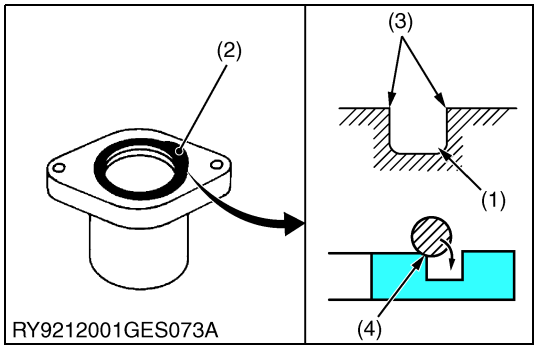
RY9212001GES072A

Plumber's Tape

- Wrap plumber's tape on the threads before tightening taper couplings. After wrapping (2 wraps) the plumber's tape, tighten to the specified torque. Once the coupling is tightened, do not loosen it as this will cause an oil leak.

(1) Plumber's Tape
(2) External Thread
(3) Internal Thread
(4) Gap
(5) Leave 1 to 2 Threads

RY9212001GEG0012US0



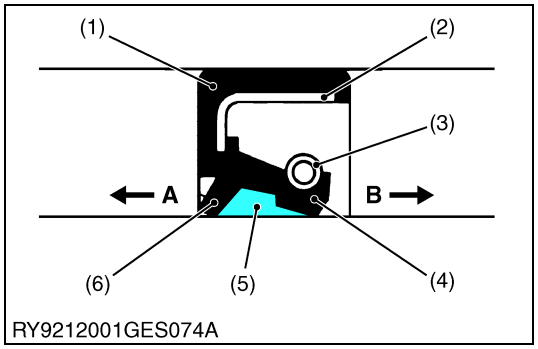
RY9212001GES073A

O-Ring

- Clean the groove the O-ring goes in and remove any burrs. Apply grease on the O-ring when inserting it in the groove. (Except floating seals)
- When putting the O-ring in the groove, be careful as it is easy at the very end to twist the O-ring against the inside of the groove. If it gets twisted, roll it gently with your fingertip to untwist it.

(1) O-Ring Groove
(2) O-Ring
(3) Check for Burrs
(4) If the Ring Touches This Corner, It Will Twist

RY9212001GEG0013US0



RY9212001GES074A

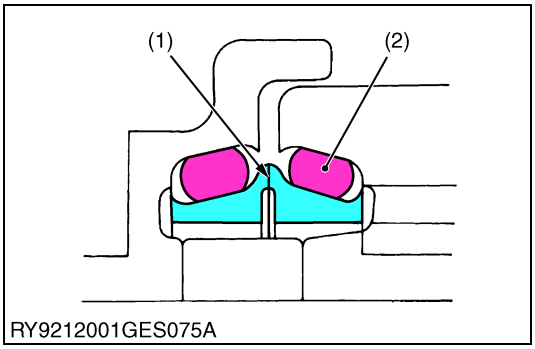
Oil Seal

- Do not face the lip of the oil seal in the wrong direction. Face the main lip toward the material to be sealed.
- After oil seals are replaced, apply grease to the moving parts around the lip to prevent the dry surfaces from wearing against each other when the engine is started. If the seal has a dust lip, fill the gap between the lips with grease.
- As a general rule, use a press to insert the oil seal in place. If that is not possible, use an appropriate tool to gently and evenly tap it into place, taking care that it does not go in at a slant. Press the seal all the way so it seats in the boss.

(1) Gasket
(2) Metal Ring
(3) Spring
(4) Main Lip
(5) Grease
(6) Dust Lip

A : Air (Outside)
B : Hydraulic Chamber (Inside)

RY9212001GEG0014US0



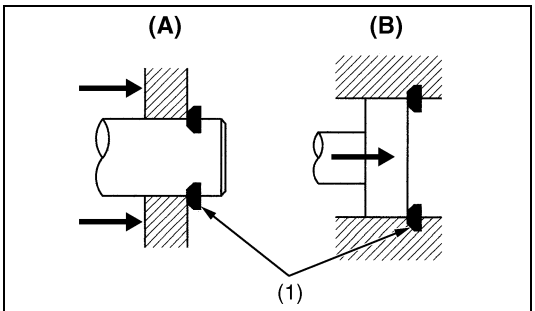
RY9212001GES075A

Floating Seal

- Be sure to wipe off any oil from the O-ring or surfaces that touch the O-ring. (For wheel motors, apply a light film)
- When putting an O-ring into a floating seal, make sure the O-ring does not twist.
- Apply a light film of oil to surrounding surfaces when working to get the floating seal with O-ring in place; take care that the surrounding surfaces, O-ring and housing are parallel with each other.
- After getting the seal in place, turn the engine over 2 or 3 revolutions, to both create a film of oil on surrounding surfaces and to properly seat the face of the seal.

(1) Surrounding Surfaces (2) O-Ring

RY9212001GEG0015US0



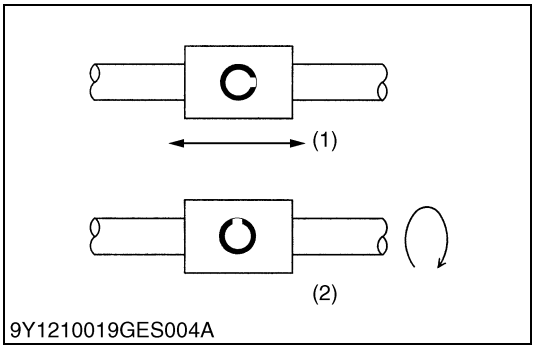
9Y1210019GES003A

Snap Ring Related

- When installing external or internal snap rings, orient them as shown in the diagram so the angled side faces the direction of force.

(1) Position so the Angled Part Receives the Force
(A) External
(B) Internal

RY9212001GEG0016US0



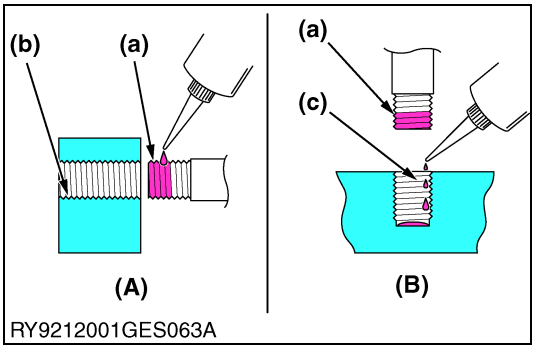
9Y1210019GES004A

Spring Pins

- When driving a spring pin, face the split in the direction that receives the force, as shown in the diagram.

(1) With Lateral Movement (2) With Rotational Movement

RY9212001GEG0017US0



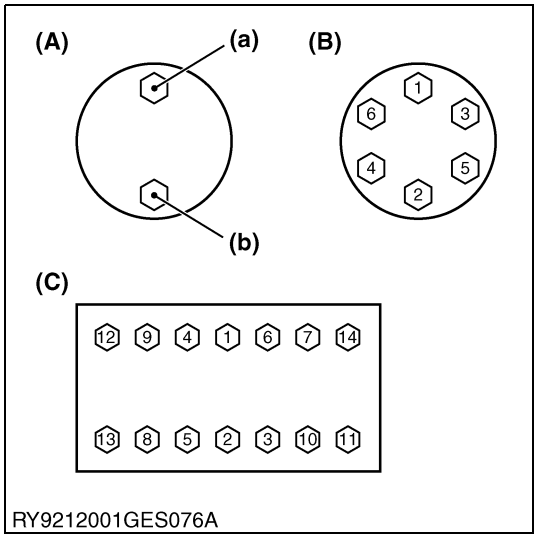
RY9212001GES063A

Adhesive

- Clean and dry the area where adhesive will be applied with a solvent so it is free of moisture, oil and dirt.
- Apply adhesive all around the threads of the bolt except the first set of threads at the tip and fill the grooves between the threads. If the threads or the grooves are large, adjust the amount of adhesive accordingly and apply it all around the bolt hole as well.

(A) Bolt Through-Hole (Nut)
(B) Pocket Bolt Hold (Capsule Shape, etc.)
(a) Apply Here
(b) Do Not Apply
(c) Drip On

RY9212001GEG0018US0



RY9212001GES076A

Tightening Bolts and Nuts

- Tighten bolts and nuts to their specified torque.
- Tighten nuts and bolts alternately top/bottom **(a) (b)**, left/right so the torque is distributed evenly.

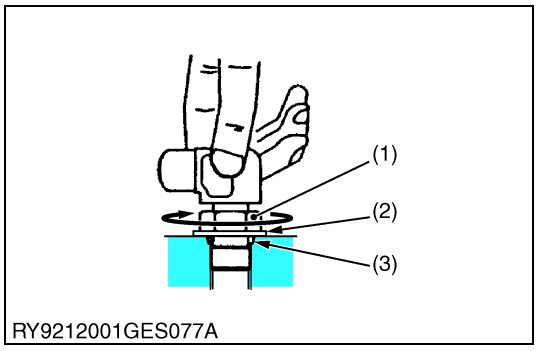
(A) Top/Bottom Alternately
(B) Across Diagonally
(C) Diagonally Across the Center

RY9212001GEG0019US0

Assembling Hydraulic Hoses

- Tighten to their specified torque.
- Before assembling, wipe the inside of metal fittings clean of any dirt.
- After assembly, put the fitting under normal pressure and check that it does not leak.

RY9212001GEG0020US0

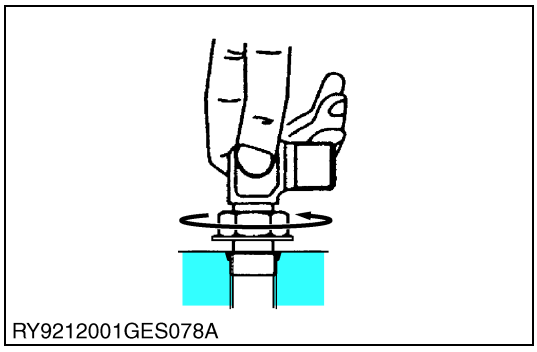


RY9212001GES077A

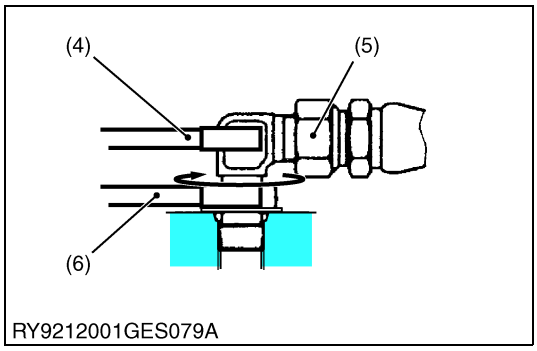
Elbow with Male Seat Assembly Procedure

When assembling an elbow with male seat, adhere to the following procedures to prevent deformation of O-rings and leaks.

1. Connecting to Valves
   - Clean the blow with male seat and the surface of the seal opposite and mount with the lock-nut on top.
   - Finger tighten till it touches the washer.


RY9212001GES078A

2. Positioning
   - Turn the mouth of the elbow back so it faces the right direction. (not back over 1 turn)

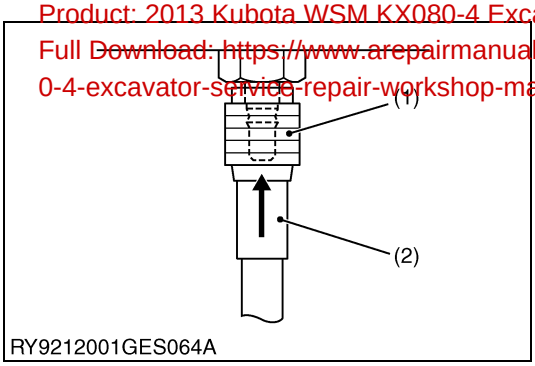


RY9212001GES079A

3. Fasten
   - Tighten the lock-nut to the specified torque with a wrench.

(1) Lock-Nut
(2) Washer
(3) Seal (O-Ring)
(4) Wrench for Holding
(5) Hose
(6) Torque Wrench for Tightening

RY9212001GEG0021US0



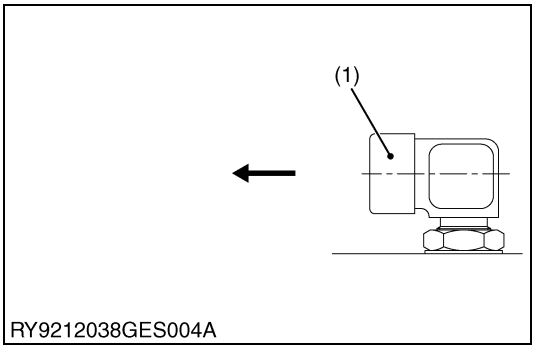
RY9212001GES064A

Installing and Removing Quick Couplings

- To remove a quick hose coupling, push the fitting (2) in the direction of the arrow and pull on the plastic part (1) in the opposite direction.
- To attach a quick coupler, push it in firmly in the direction of the arrow. Then check that it will not pull off.

(1) Plastic Part (2) Fitting

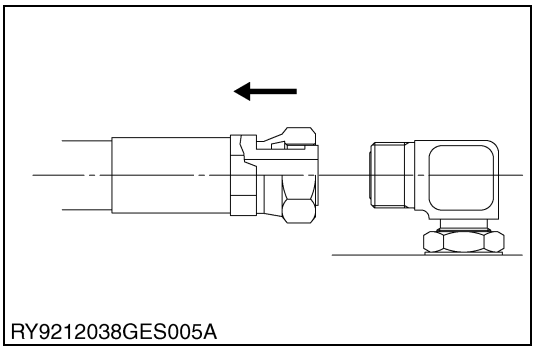
RY9212001GEG0022US0



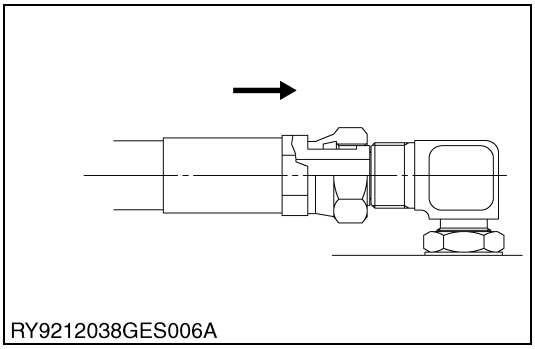
RY9212038GES004A

Connecting the face sealing (ORS) type hose

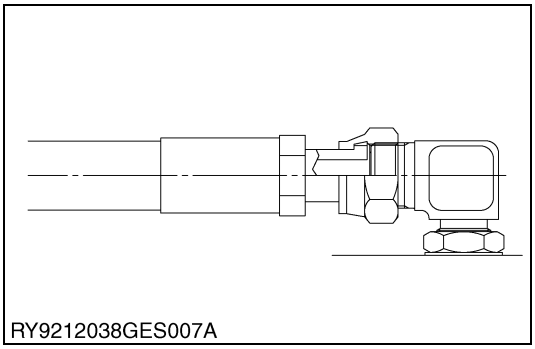
1. Remove the protective cap from the adapter and make sure the O-ring is installed in its groove. (If the O-ring is missing, fit the specified-size in position.)


RY9212038GES005A

2. Shift the hose's cap nut in the direction of arrow until the O-ring contact face stretched out of the cap nut.


RY9212038GES006A

3. Bring the hose's O-ring contact face in close contact with the joint's O-ring.
   Make sure they do not come off each other.


RY9212038GES007A

4. Tighten up the cap nut to the specified torque.

(1) Protective cap

RY9212038GEG0005US0