

Product: Kubota BX25DLB-AU LA240A AU-SG BT602 Service Manual  
Full Download: <https://www.arepairmanual.com/downloads/kubota-bx25dlb-au-la240a-au-sg-bt602-service-manual/>

# WSM

---

WORKSHOP MANUAL  
**FRONT LOADER**

**LA344AU**

---

**Kubota**

Sample of manual. Download All 94 pages at:

<https://www.arepairmanual.com/downloads/kubota-bx25dlb-au-la240a-au-sg-bt602-service-manual/>

KiSC issued 02, 2018 A

## TO THE READER

This Workshop Manual tells the servicing personnel about the mechanism, servicing and maintenance of KUBOTA Front Loader *LA344AU*. It contains 4 parts: "Information", "General", "Mechanism" and "Servicing".

### INFORMATION

This section primarily contains information below.

- Safety First
- Safety Decal
- Specification
- Dimensions

### GENERAL

This section primarily contains information below.

- Loader Identification
- General Precautions
- Maintenance Check List
- Check and Maintenance

### 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.

### 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, 2018

© KUBOTA Corporation

# CONTENTS

## 1. INFORMATION

SAFETY FIRST.....	1-1
1. Before you start service.....	1-1
2. Start safely.....	1-1
3. Operate safely.....	1-2
4. Prevent a fire.....	1-2
5. Keep a good airflow in the work area.....	1-3
6. Discard fluids correctly.....	1-3
7. Prevent acid burns.....	1-3
8. Prepare for emergencies.....	1-3
SAFETY DECALS.....	1-5
1. Safety labels for loader.....	1-5
2. Care of danger, warning, and caution labels.....	1-8
TERMINOLOGY.....	1-9
1. Loader terminology.....	1-9
SPECIFICATIONS.....	1-11
1. Loader specifications.....	1-11
2. Bucket specifications.....	1-12
3. Dimensional specifications of loader.....	1-13
4. Operational specifications of loader.....	1-14

## 2. GENERAL

IDENTIFICATION.....	2-1
1. Checking loader identification.....	2-1
GENERAL PRECAUTIONS.....	2-3
LUBRICATING SYSTEM.....	2-5
1. Lubricants.....	2-5
TIGHTENING TORQUES.....	2-7
1. General use screws, bolts, and nuts.....	2-7
2. Stud bolts.....	2-7
3. American standard screws, bolts and nuts with UNC or UNF threads.....	2-8
4. Plugs and grease fittings.....	2-8
5. Hydraulic fittings.....	2-9
5.1 Adapters, elbows and others.....	2-9
MAINTENANCE CHECK LIST.....	2-11
1. Loader service intervals.....	2-11
CHECK AND MAINTENANCE.....	2-13
1. Lubricating loader.....	2-13
2. Re-tightening main frame bolt and nut.....	2-13
3. Daily checking the loader.....	2-13
4. Check points of every 50 hours.....	2-14
4.1 Checking torque of bolt and nut of main frame.....	2-14
5. Check points of every 100 hours.....	2-14
5.1 Checking spill guard function.....	2-14
SPECIAL TOOLS.....	2-17
1. Special tools for loader.....	2-17
1.1 Sliding jig and correcting jig.....	2-17

## 3. FRONT LOADER

MECHANISM.....	3-1
1. Hydraulic circuit for front loader.....	3-1
2. Front remote hydraulic control system (if equipped).....	3-3
2.1 Operating control lever.....	3-3
3. Boom cylinder and bucket cylinder.....	3-4
3.1 Structure of boom cylinder and bucket cylinder.....	3-4

4. One touch front loader .....	3-5
4.1 Outline of one touch front loader .....	3-5
5. One lever quick touch 4 lines coupler .....	3-5
5.1 Structure of one lever quick touch 4 lines coupler .....	3-5
6. Auto lock attachment and detachment .....	3-5
6.1 Outline of auto lock attachment and detachment .....	3-5
6.2 Function of auto lock attachment and detachment .....	3-6
7. Mechanical loader frame standing mechanism .....	3-6
7.1 Structure of mechanical loader frame standing mechanism .....	3-6
8. Spill guard system .....	3-7
8.1 Outline of spill guard .....	3-7
8.2 Structure of spill guard system .....	3-7
8.3 Spill guard linkage .....	3-7
8.3.1 Function of spill guard linkage .....	3-7
8.4 Spill guard valve .....	3-8
8.4.1 Structure of spill guard valve .....	3-8
8.4.2 Function of spill guard valve .....	3-9
9. 3rd function valve (If equipped) .....	3-19
9.1 Structure of 3rd function valve .....	3-19
9.2 Function of 3rd function valve .....	3-20
9.2.1 Activation switch in off position .....	3-20
9.2.2 Activation switch in on position .....	3-21
SERVICING .....	3-23
1. Troubleshooting for front loader .....	3-23
2. Tightening torques for front loader .....	3-26
3. Checking and adjusting .....	3-27
3.1 Loader stand .....	3-27
3.1.1 Adjusting height of loader stand .....	3-27
3.2 Front hydraulic valve main switch and relay .....	3-30
3.2.1 Checking front hydraulic valve main switch continuity .....	3-30
3.2.2 Checking connector voltage of front hydraulic valve main switch .....	3-31
3.2.3 Checking relay .....	3-31
3.3 Spill guard valve .....	3-31
3.3.1 Adjusting spill guard valve .....	3-31
3.4 3rd function solenoid valve .....	3-32
3.4.1 Checking 3rd function solenoid valve continuity .....	3-32
3.4.2 Checking connector voltage of 3rd function solenoid valve .....	3-33
4. Disassembling and assembling .....	3-33
4.1 Removing and attaching front loader .....	3-33
4.1.1 Removing loader .....	3-33
4.1.2 Installing loader .....	3-36
4.2 Bucket, boom and hydraulic cylinders .....	3-40
4.2.1 Attaching attachments .....	3-40
4.2.2 Removing attachments .....	3-42
4.2.3 Removing bucket cylinder .....	3-43
4.2.4 Removing boom cylinder and hydraulic tubes .....	3-43
4.2.5 Removing piston rod assembly .....	3-43
4.2.6 Removing cylinder head, piston and nut .....	3-44
4.2.7 Removing piston seal and O-ring .....	3-45
4.2.8 Installing O-ring and piston seal .....	3-45
4.3 Side frames, front guard and main frames .....	3-45
4.3.1 Removing side frames .....	3-45
4.3.2 Removing front guard .....	3-46
4.3.3 Removing main frames .....	3-46
4.4 Spill guard valve .....	3-46
4.4.1 Removing spill guard valve .....	3-46
4.5 Spill guard valve linkage .....	3-47
4.5.1 Removing boom lift cylinder R.H. ....	3-47

4.5.2 Removing hydraulic pipes bracket .....	3-47
4.5.3 Removing spill guard linkage .....	3-48
4.6 3rd function valve (If equipped) .....	3-49
4.6.1 Removing 3rd function valve .....	3-49
4.6.2 Removing hydraulic tubes of 3rd function .....	3-49
5. Servicing .....	3-50
5.1 Piston rod .....	3-50
5.1.1 Checking piston rod bend .....	3-50



# 1. INFORMATION

# 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, may result in minor or moderate injury.

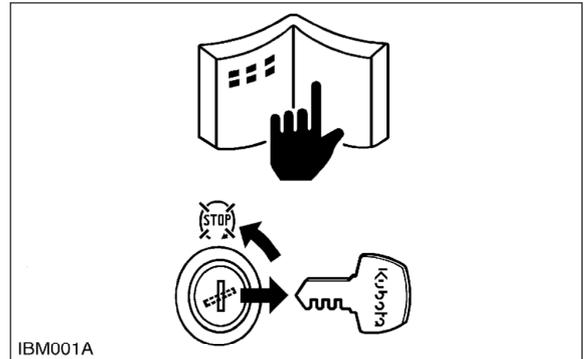
## ■ IMPORTANT

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

## ■ NOTE

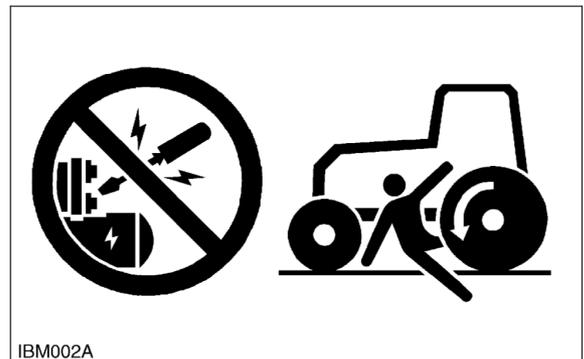
- Gives helpful information.

## 1. 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.

## 2. Start safely



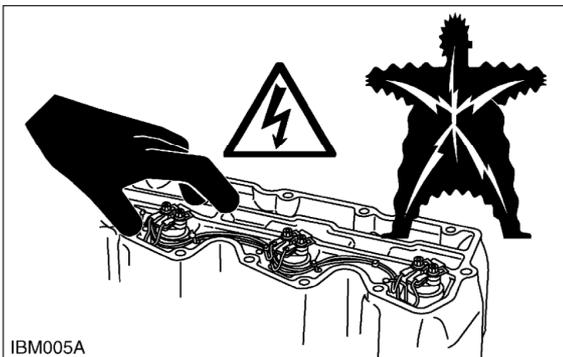
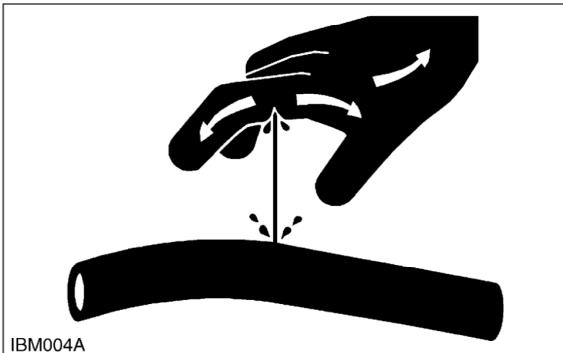
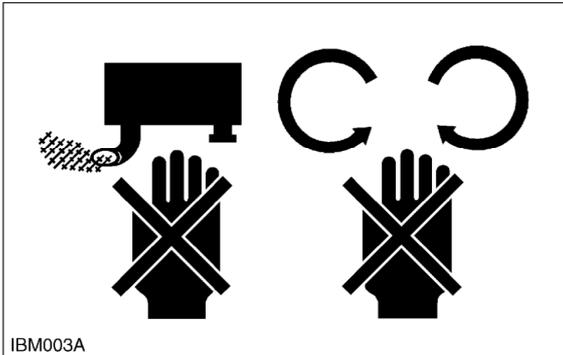
- Do not do the procedures below when you start the engine.
  1. Short across starter terminals.
  2. Bypass the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before you start the engine, make sure that all shift levers are in neutral positions or in disengaged positions.

## 1. INFORMATION

## SAFETY FIRST 3. Operate safely

- Do not start the engine when you stay on the ground. Start the engine only from operator's seat.

## 3. Operate safely

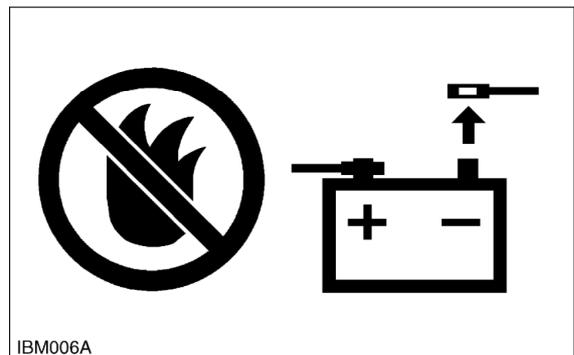


- Do not use the machine after you consume alcohol or medication or when you are tired.
- Put on applicable clothing and safety equipment.
- Use applicable tools only. Do not use alternative tools or parts.
- When 2 or more persons do servicing, make sure that you do it safely.
- Do not touch the hot 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.

## 4. 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.

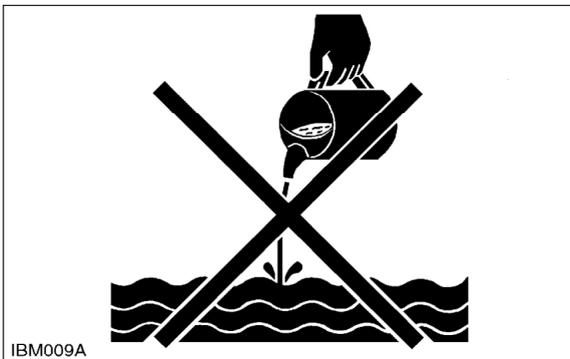
## 5. Keep a good airflow in the work area



IBM007A

- 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.

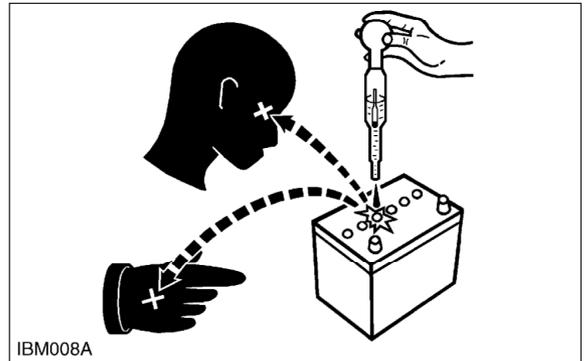
## 6. Discard fluids correctly



IBM009A

- 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.

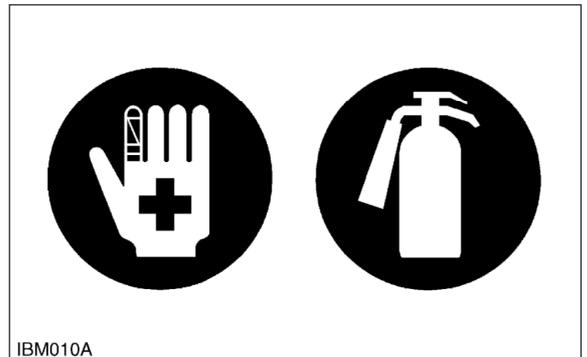
## 7. Prevent acid burns



IBM008A

- 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.

## 8. Prepare for emergencies



IBM010A

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

1. INFORMATION

---

# SAFETY DECALS

## 1. Safety labels for loader

The safety labels are installed on the loader. If a label becomes damaged, illegible or is not on the loader, replace it. The label part number is listed in the parts list.

1. INFORMATION

(1) Part No. 7J061-5645-1

**⚠ WARNING**

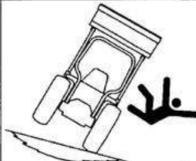
**TO AVOID PERSONAL INJURY :**

1. Observe safety precautions in loader and tractor Operator's Manual.
2. Operate the loader from tractor seat only.
3. Keep children, others and livestock away when operating loader and tractor.
4. Avoid holes, loose ground, and rocks which may cause tractor / loader to tip.
5. Make sure approved bucket is attached before removing loader from tractor.
6. When parking or storing, choose flat and hard ground. Lower the bucket to the ground, set brakes and remove key before leaving tractor.
7. Before disconnecting hydraulic lines, relieve all hydraulic pressure.

1AIABAHAP019G

(2) Part No. 7J246-5641-1

**⚠ DANGER**



**TO AVOID SERIOUS INJURY OR DEATH CAUSED BY ROLLOVERS :**

1. ROPS and a fastened seat belt are strongly recommended in almost all applications. Foldable ROPS should be in upright and locked position if equipped.
2. Adjust rear wheels to the widest setting that is suitable for the work.
3. Add recommended wheel ballast and rear weight for stability.
4. DO NOT drive on steep slopes or unstable surfaces.
5. Carry loader arms at low position during transport. Move and turn tractor at slow speeds.

1AIABAHAP017A

(3) Part No. 7J246-5643-1

**⚠ DANGER**



**TO AVOID SERIOUS INJURY OR DEATH CAUSED BY FALLING LOADS :**

1. Load on raised bucket or fork can fall or roll back onto operator causing serious injury or death.
2. Use approved clamping and / or guard attachments for handling large, loose or shiftable loads such as bales, posts, sheets of plywood etc.
3. Carry loads as low as possible.

1AIABAHAP016A

(4) Part No. 7J246-5642-1

**⚠ DANGER**



**TO AVOID SERIOUS INJURY OR DEATH CAUSED BY CONTACT WITH ELECTRIC LINES:**

- Check overhead clearance.

1AIABAHAP018A

(5) Part No. 7J246-5644-2

**⚠ WARNING**



**TO AVOID INJURY FROM FALLS OR BEING CRUSHED :**

1. DO NOT stand or work under raised loader or bucket.
2. DO NOT use loader as jack for servicing.
3. DO NOT use loader as a work platform.
4. NEVER connect chain, cable or rope to loader bucket while operating loader.

1AIABAHAP020A

(6) Part No. 7J061-5649-1

**⚠ WARNING**

**TO AVOID INJURY FROM CRUSHING :**

1. Do not utilize the valve lock for machine maintenance or repair.
2. The valve lock is to prevent accidental actuation when implement is not in use or during transport.

1AIABACAP084A

(7) Part No. 7J802-5848-3

**⚠ WARNING**

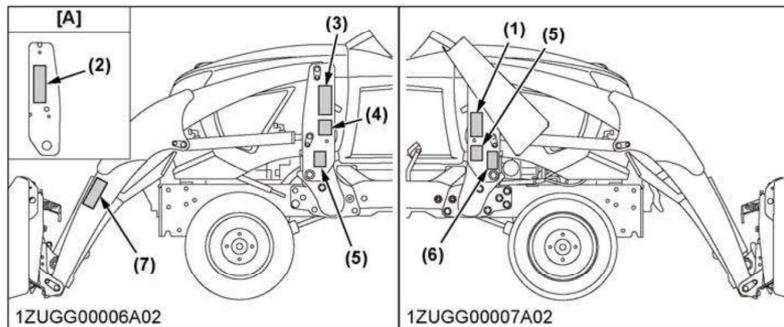


Install cylinder locks before performing maintenance under raised loader arms. Failure to comply could result in death or serious injury.

- Empty loader bucket and place in dump position, raise boom until boom lock channel can be positioned on cylinder rod, then stop engine.
- Pull pin and lower boom lock onto the cylinder rod, then insert pin into the hole of lower right corner of boom lock.
- Slowly lower boom until boom is stopped.

1HNADAAAP0120

1ZUGG00032A01



[A] LH inside

(1) Part No. 7J061-5649-1

**⚠ WARNING**

**TO AVOID INJURY FROM CRUSHING :**

1. Do not utilize the valve lock for machine maintenance or repair.
2. The valve lock is to prevent accidental actuation when implement is not in use or during transport.

1AIABACAP084A

(2) Part No. 7J802-5848-3

**⚠ WARNING**

Install cylinder locks before performing maintenance under raised loader arms. Failure to comply could result in death or serious injury.

- Empty loader bucket and place in dump position, raise boom until boom lock channel can be positioned on cylinder rod, then stop engine.
- Pull pin and lower boom lock onto the cylinder rod, then insert pin into the hole of lower right corner of boom lock.
- Slowly lower boom until boom is stopped.

1HNADAAAP0120

(3) Part No. 7J630-5637-1

Tractor Model: BX23S

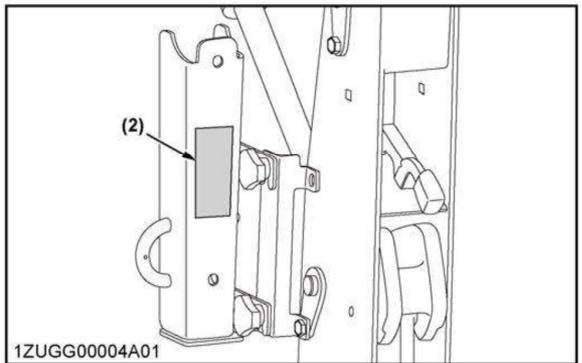
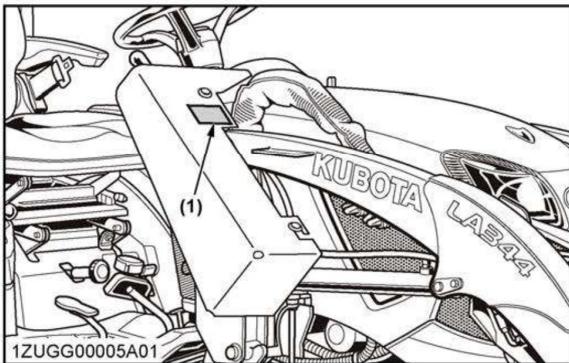
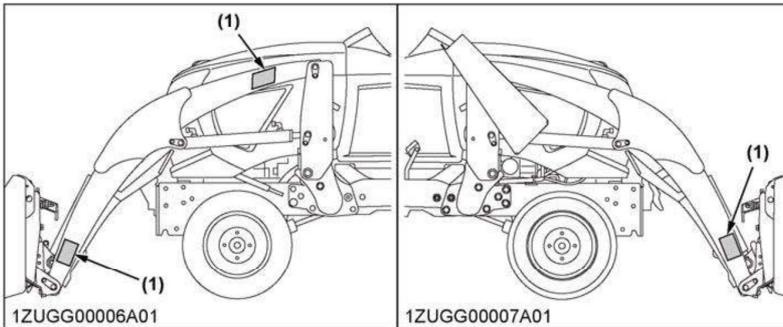
Rated Operating Load with Counterweight: 190kg  
with Backhoe :220kg  
Counterweight Required :170kg

Date of supply: / / 20

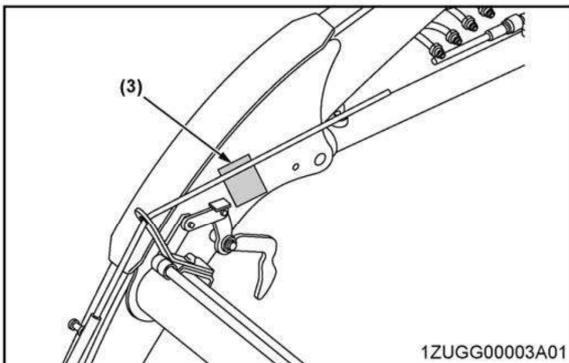
**⚠ WARNING**

- DO NOT EXCEED ROL.
- DO NOT OPERATE LOADER WITHOUT COUNTERWEIGHT.
- DO NOT EXCEED 10KM/H WHEN TRAVELLING WITH LOAD.
- ROL IS CALCULATED WITH STANDARD BUCKET. OPTIONAL ATTACHMENTS (4IN1 BUCKET ETC) WILL REDUCE THE ROL.

1AGAJBOAP007A



Boom RH inside



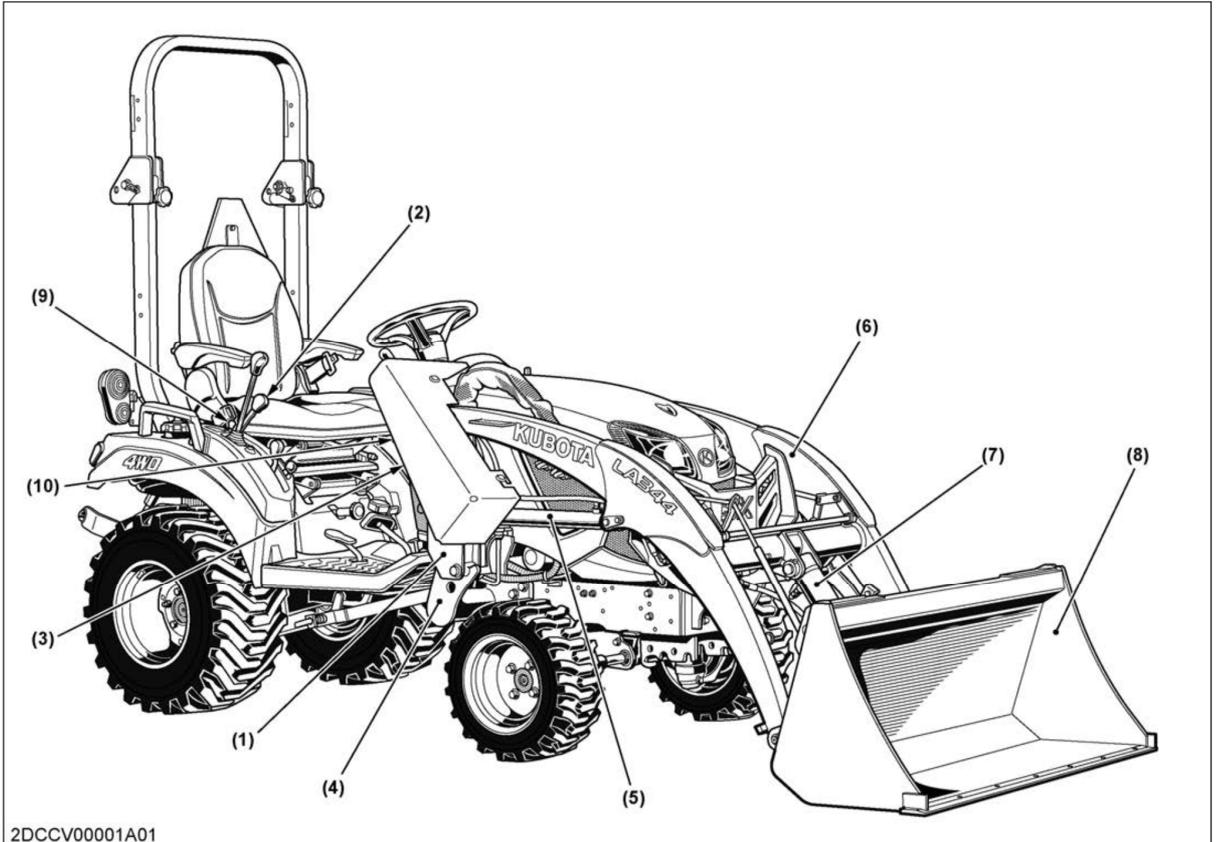
1ZUGG00002A01

## 2. Care of danger, warning, and caution labels

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

# TERMINOLOGY

## 1. Loader terminology



2DCCV00001A01

- |                             |                   |                     |                        |
|-----------------------------|-------------------|---------------------|------------------------|
| (1) Side frame              | (4) Main frame    | (7) Bucket cylinder | (10) Spill guard valve |
| (2) Hydraulic control lever | (5) Boom cylinder | (8) Bucket          |                        |
| (3) Mounting pin            | (6) Boom          | (9) Lock lever      |                        |



# SPECIFICATIONS

## 1. Loader specifications

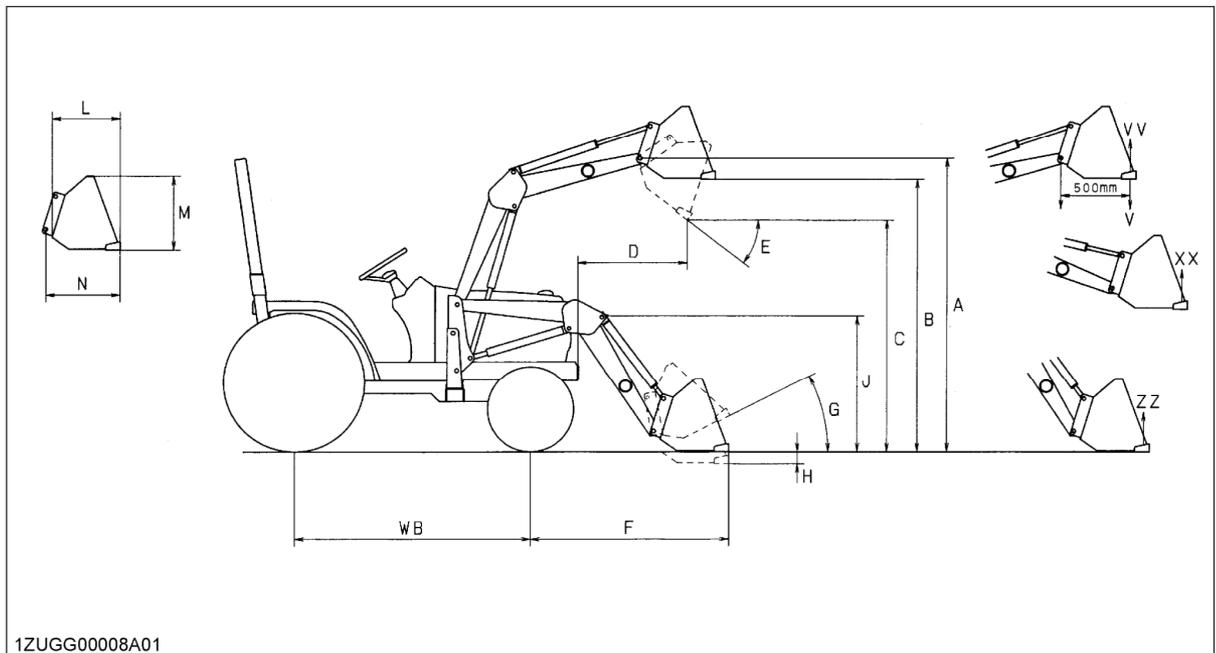
Loader model		LA344AU	
Tractor model		BX1880-AU	BX2380-AU, BX2680-AU
Wheel base (WB)		1400 mm (55.12 in.)	
Front wheels		16 × 7.5-8	18 × 8.5-10
Rear wheels		24 × 12-12	26 × 12-12
Boom cylinder	Bore	40 mm (1.6 in.)	
	Stroke	326 mm (12.8 in.)	
Bucket cylinder	Bore	65 mm (2.6 in.)	
	Stroke	196 mm (7.72 in.)	
Control valve		One detent float position, single bucket dump, power beyond circuit	
Rated flow		14 L/m (3.7 GPM)	
Maximum pressure		12.8 MPa (131 kg/cm <sup>2</sup> ) [1860 psi]	
Net weight (approximate)		180 kg (397 lbs)	

## 2. Bucket specifications

Loader model		LA344AU
Model		Square 48 in.
Width		1219 mm (47.99 in.)
Depth		491 mm (19.3 in.)
Height (M)		465 mm (18.3 in.)
Length (N)		538 mm (21.2 in.)
Capacity	Struck	0.14 m <sup>3</sup> (4.9 cu.ft.)
	Heaped	0.17 m <sup>3</sup> (6.0 cu.ft.)
Weight		60 kg (130 lbs.)

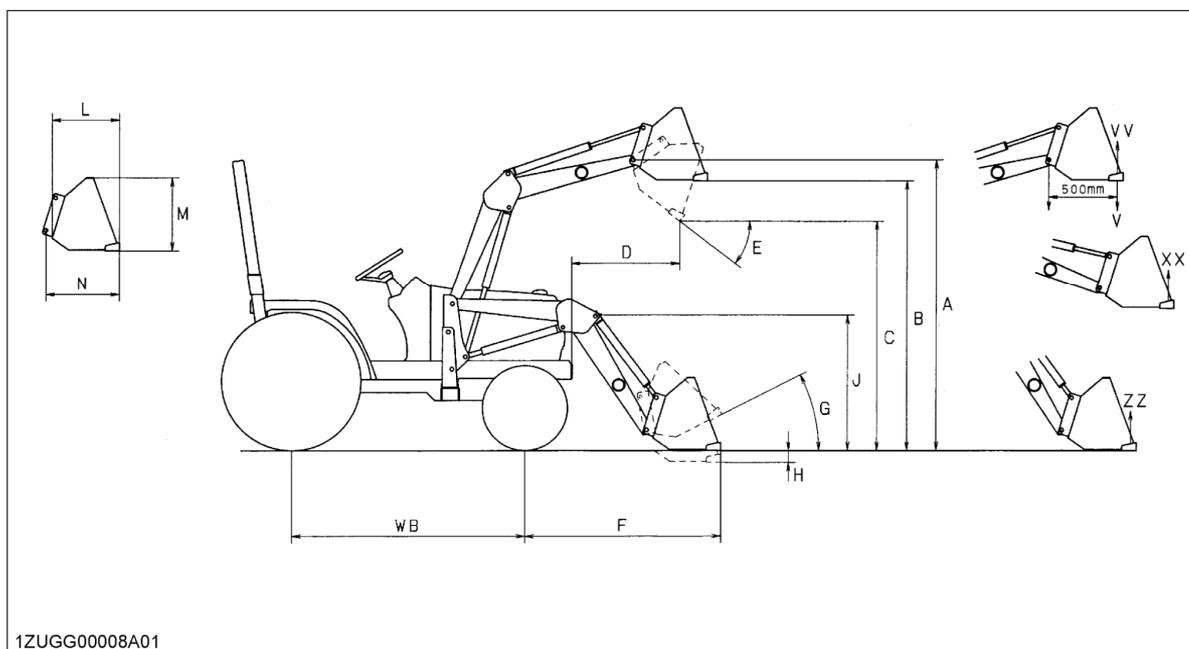
### 3. Dimensional specifications of loader

Loader model		LA344AU	
Tractor model		BX1880-AU	BX2380-AU, BX2680-AU
A	Maximum lift height (to bucket pivot pin)	1795 mm (70.7 in.)	1804 mm (71.0 in.)
B	Maximum lift height under level bucket	1652 mm (65.0 in.)	1662 mm (65.4 in.)
C	Clearance with bucket dumped	1316 mm (51.8 in.)	1323 mm (52.1 in.)
D	Reach at max. lift height (dumping reach)	642 mm (25.3 in.)	646 mm (25.4 in.)
E	Maximum dump angle	0.79 rad (45°)	
F	Reach with bucket on ground	1398 mm (55.0 in.)	1392 mm (54.8 in.)
G	Bucket roll-back angle	0.52 rad (30°)	0.51 rad (29°)
H	Digging depth	134 mm (5.3 in.)	125 mm (4.9 in.)
J	Overall height in carrying position	981 mm (38.6 in.)	990 mm (39.0 in.)



### 4. Operational specifications of loader

Loader model		LA344AU
Tractor model		BX1880-AU, BX2380-AU, BX2680-AU
V	Lift capacity (500 mm forward, max. height)	180 kg (509 lbs)
Y	Breakout force (Bucket pivot pin)	6258 N (1407 lbs)
VV	Bucket roll-back force at max. height	4731 N (1064 lbs)
XX	Bucket roll-back force at 1500 mm height	5557 N (1249 lbs)
ZZ	Bucket roll-back force at ground level	5456 N (1227 lbs)
Raising time		3.3 s
Lowering time		2.5 s
Bucket dumping time		2.7 s
Bucket rollback time		2.3 s

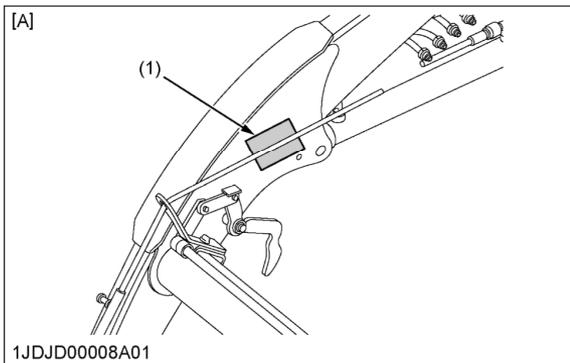
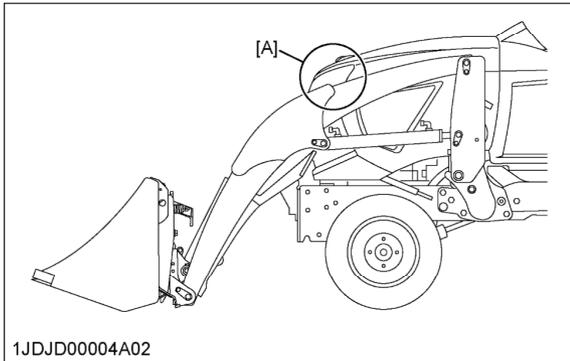


## **2. GENERAL**

# IDENTIFICATION

## 1. Checking loader identification

- When contacting your local Kubota distributor, always specify loader serial number.

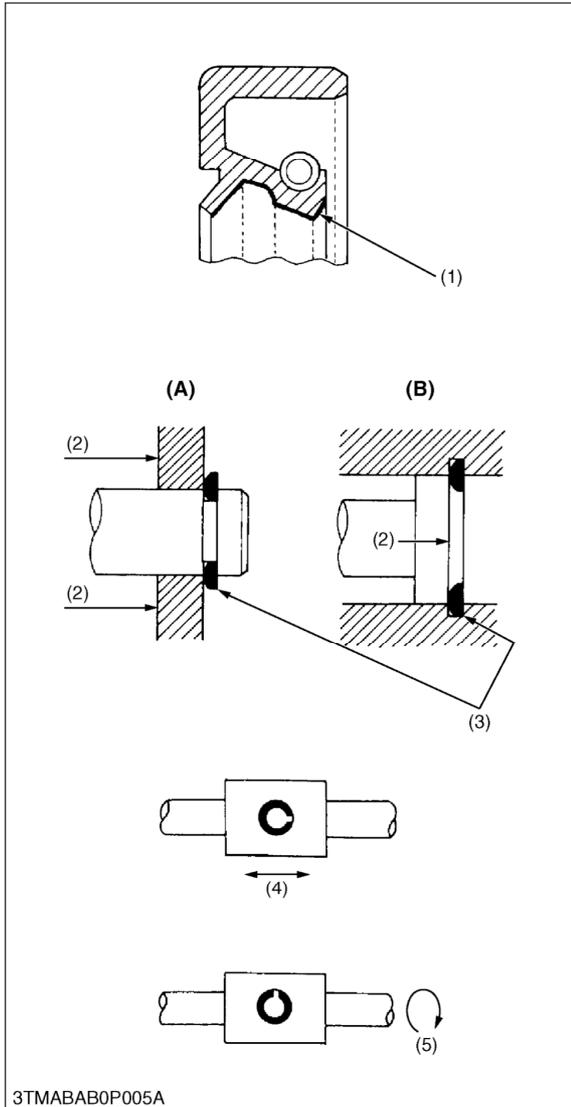


(1) Loader serial number

[A] Boom R.H. inside



# GENERAL PRECAUTIONS



3TMABAB0P005A

- (1) Grease
- (2) Force
- (3) Sharp edge
- (4) Axial force
- (5) Rotating movement
- (A) External circlip
- (B) Internal circlip

- 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.
- To prevent damage to the hydraulic system, use 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. Insufficient 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.

## 2. GENERAL

---

# LUBRICATING SYSTEM

## 1. Lubricants

To prevent serious damage to hydraulic systems, use only specified fluid or its equivalent.

Place	Capacity	Lubricants, type of grease
Transmission case	11.3 L 2.99 U.S.qts 2.5 Imp.qts	KUBOTA SUPER UDT fluid*
Grease fitting	Until grease overflows.	Moly Ep type grease**

\* KUBOTA original transmission hydraulic fluid

\*\* "Extreme pressure" and containing Molybdenum disulfide is recommended. This grease may specify "Moly Ep" on it's label.

**2. GENERAL**

---

# TIGHTENING TORQUES

## 1. General use screws, bolts, and nuts

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

Indication on top of bolt	 No-grade or 4T						 7T						 9T					
	 No-grade or 4T															 6T		
Indication on top of nut	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			

## 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	—	—	—

### 3. American standard screws, bolts and nuts with UNC or UNF threads

Grade	 SAE GR.5			 SAE GR.8		
	Unit	N · m	kgf · m	lbf · ft	N · m	kgf · m
1/4	11.7 to 15.7	1.20 to 1.60	8.63 to 11.5	16.3 to 19.7	1.67 to 2.00	12.0 to 14.6
5/16	23.1 to 27.7	2.36 to 2.82	17.0 to 20.5	33 to 39	3.4 to 3.9	25 to 28
3/8	48 to 56	4.9 to 5.7	36 to 41	61 to 73	6.3 to 7.4	45 to 53
1/2	110 to 130	11.3 to 13.2	81.2 to 95.8	150 to 178	15.3 to 18.1	111 to 131
9/16	150 to 178	15.3 to 18.1	111 to 131	217 to 260	22.2 to 26.5	160 to 191
5/8	204 to 244	20.8 to 24.8	151 to 179	299 to 357	30.5 to 36.4	221 to 263

### 4. Plugs and grease fittings

Shape	Size	Material of opponent part					
		Ordinariness			Aluminum		
		N · m	kgf · m	lbf · ft	N · m	kgf · m	lbf · ft
 Tapered screw	R1/8	13 to 21	1.3 to 2.2	9.4 to 15	13 to 19	1.3 to 2.0	9.4 to 14
	R1/4	25 to 44	2.5 to 4.5	18 to 32	25 to 34	2.5 to 3.5	18 to 25
	R3/8	49 to 88	5.0 to 9.0	37 to 65	49 to 58	5.0 to 6.0	37 to 43
	R1/2	58.9 to 107	6.00 to 11.0	43.4 to 79.5	59 to 78	6.0 to 8.0	44 to 57
 Straight screw	G1/4	25 to 34	2.5 to 3.5	18 to 25	—	—	—
	G3/8	62 to 82	6.3 to 8.4	46 to 60	—	—	—
	G1/2	49 to 88	5.0 to 9.0	37 to 65	—	—	—