# WORKSHOP MANUAL TRACTOR, FRONT LOADER, BACKHOE, ROTARY MOWER

BX23S,LA340,BT603, RCK54D,RCK60D, RCK54,RCK60B

Kubota

# TO THE READER

This Workshop Manual tells the servicing personnel about the mechanism, servicing and maintenance of *BX23S*. It contains 4 parts: "Information", "General", "Mechanism", and "Servicing".

#### Information

This section primarily contains information below.

- Safety first
- · Safety decal
- Specifications
- Dimensions

#### 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.

#### 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.

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

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# 1. INFORMATION

# **SAFETY FIRST**

#### 1. 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.

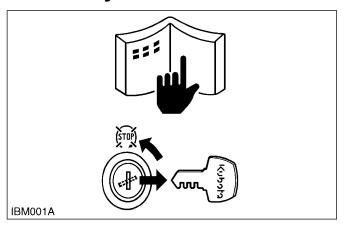
#### IMPORTANT

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

#### NOTE

· Gives helpful information.

#### 2. Before you start service



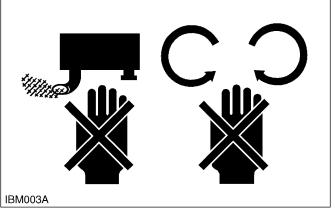
- Read all instructions and safety instructions in this manual and on your machine safety decals.
- · Clean the work area and machine.
- Park the machine on a stable and level ground, and set the parking brake.
- · Lower the implement to the ground.
- Stop the engine, then remove the key.
- · Disconnect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

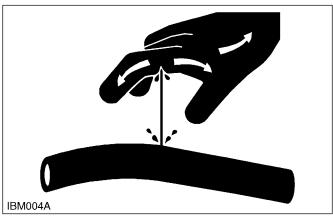
### 3. Start safely

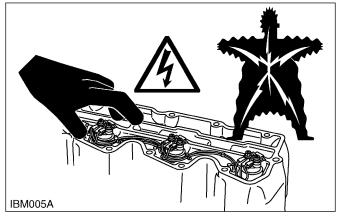


- Do not do the procedures below when you start the engine.
  - 1. Short across starter terminals.
  - 2. Bypass the safety start switch.
- Do not alter or remove any part of machine safety system
- Before you start the engine, make sure that all shift levers are in neutral positions or in disengaged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

## 4. 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

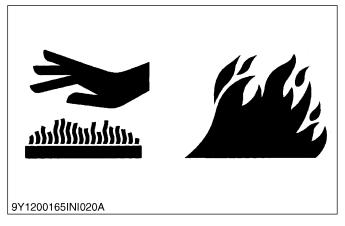
- loosen the cap to release the pressure before you remove it fully.
- Released fluid (fuel or hydraulic oil) under pressure can cause damage to the skin and cause serious injury. Release the pressure before you disconnect hydraulic or fuel lines. Tighten all connections before you apply the pressure.
- 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.

# 5. Protect against high pressure spray



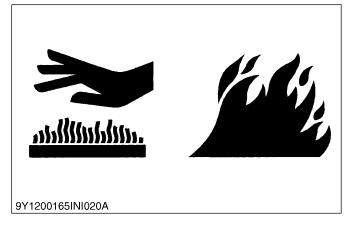
- Spray from high pressure nozzles can penetrate the skin and cause serious injury. Keep spray from contacting hands or body.
- If an accident occurs, see a doctor immediately.
   Any high pressure spray injected into the skin must be surgically removed within a few hours or gangrene may result.
  - Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.

#### 6. Avoid hot exhaust



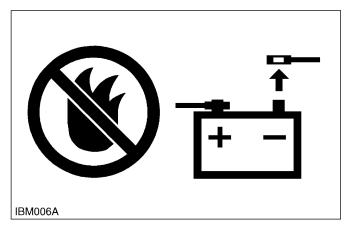
- Servicing machine or attachments with engine operating can result in serious personal injury. Avoid exposure and skin contact with hot exhaust gases and components.
- Exhaust parts and streams become very hot during operation. Exhaust gases and components reach temperatures hot enough to burn people, ignite, or melt common materials.

# 7. Exhaust filter cleaning



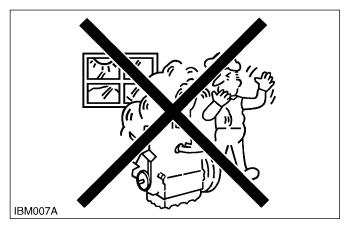
- Servicing machine or attachments during exhaust filter cleaning can result in serious personal injury.
   Avoid exposure and skin contact with hot exhaust gases and components.
- During auto or manual/stationary exhaust filter cleaning operations, the engine will operate at elevated idle and hot temperatures for an extended period of time. Exhaust gases and exhaust filter components reach temperatures hot enough to burn people, or ignite, or melt common materials.

#### 8. Prevent a fire



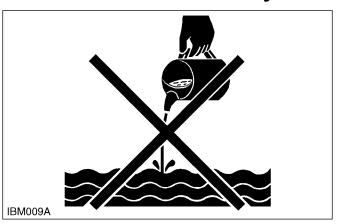
- Fuel is very flammable and explosive under some conditions. Do not smoke or let flames or sparks in your work area.
- To prevent sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- The battery gas can cause an explosion. Keep the sparks 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.

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



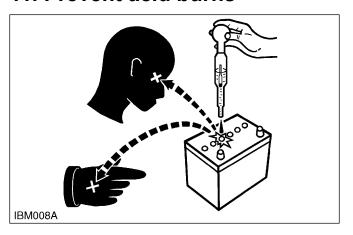
· If the engine is in operation, make sure that the area has good airflow. Do not operate the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

# 10. 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.

#### 11. 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.

# 12. Prepare for emergencies

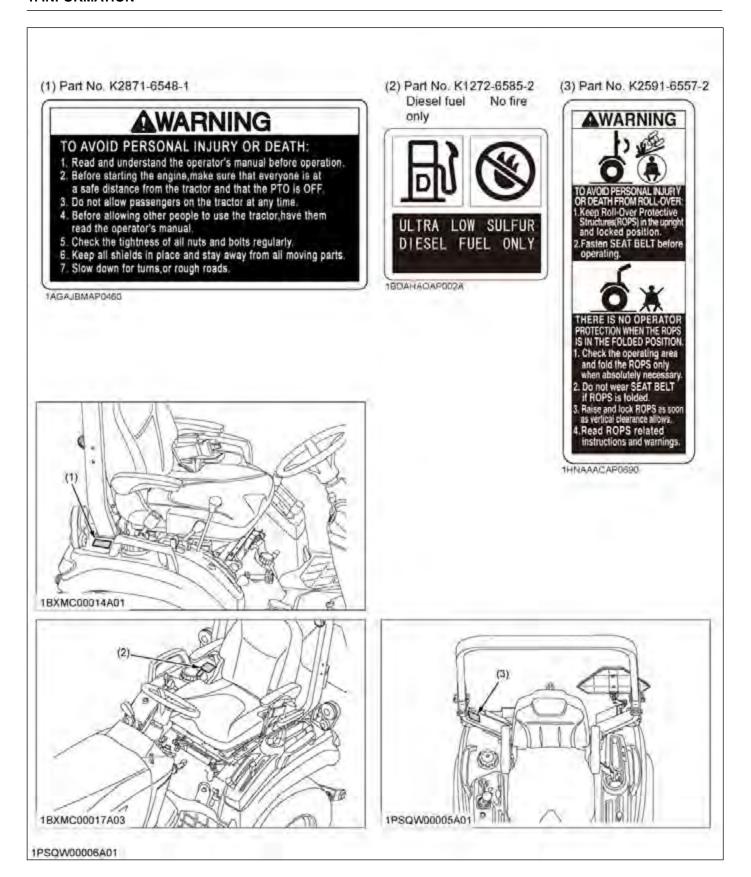


- Keep a first aid kit and fire extinguisher ready at all times
- Keep the emergency contact telephone numbers near your telephone at all times.

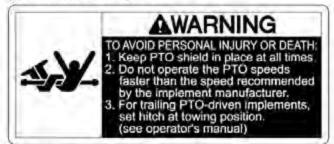
# **SAFETY LABEL**

# 1. Safety labels for BX tractor

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



(1) Part No. K2581-6554-1



1AGAJBMAP0470

(2) Part No. K2581-6555-1



1AGAJBMAP0480

(3) Part No. K2871-6556-1



TAGAJBMAP0490

(4) Part No. K2871-6552-2



1AGAUBMAP0500

(5) Part No. K2651-6568-1



1AYAACAAP1000

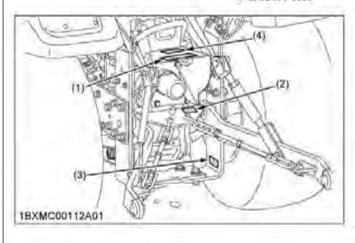
(6) Part No. K2871-6558-1

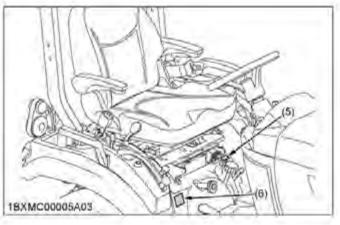


Read and understand the operator's manual

- On public roads use SMV emblem and hazard lights, if required by local traffic and safety regulations. Pull only from the hitch.
- Before diamounting lower the implement to the ground, set the parking brake, stop the engine and remove the key.
- Securely support tractor and implements before working underneath

1AGAJBMAP0530





#### (1) Part No. K2871-6541-1



## **A DANGER**

TO AVOID POSSIBLE INJURY OR DEATH FROM A MACHINE RUNAWAY:

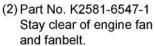
- Do not start engine by shorting across starter terminals or bypassing the safety start switch. Machine may start in gear and move if normal starting circuitry is bypassed.
- Start engine only from operator's seat with transmission and PTO off.
   Never start engine while standing on the ground.

1AGAJAXAP048E

(3) Part No. K2581-6543-1 Stay clear of engine fan and fanbelt.

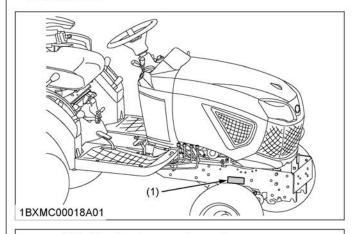


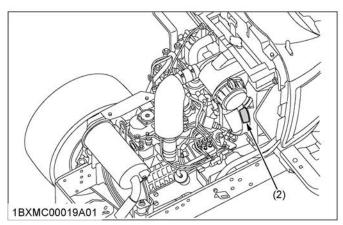
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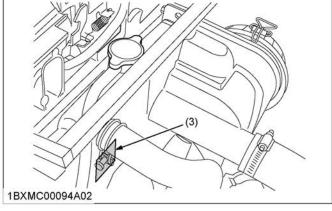




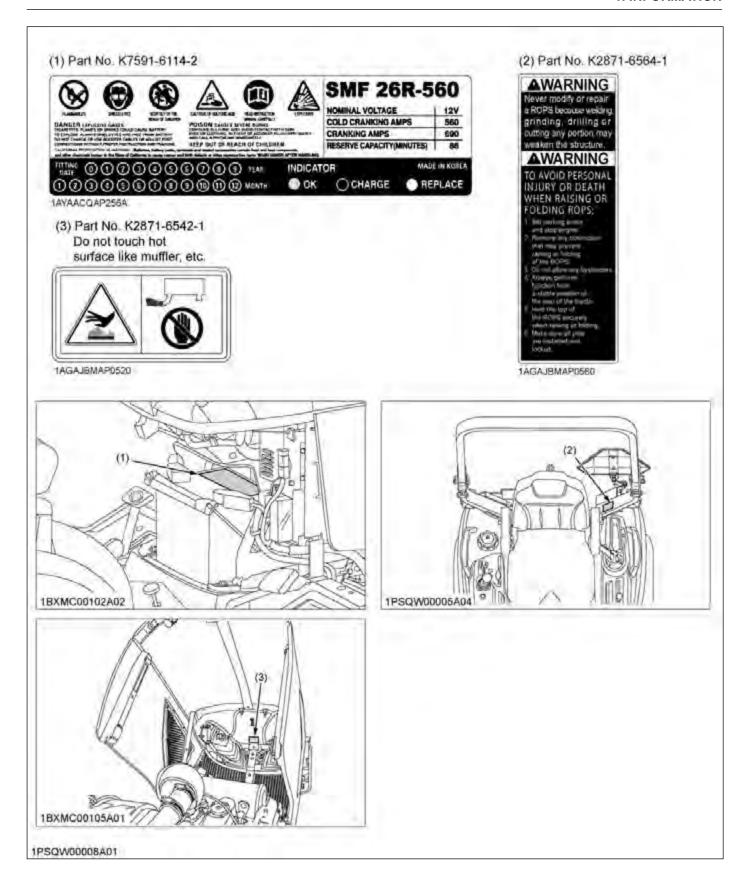
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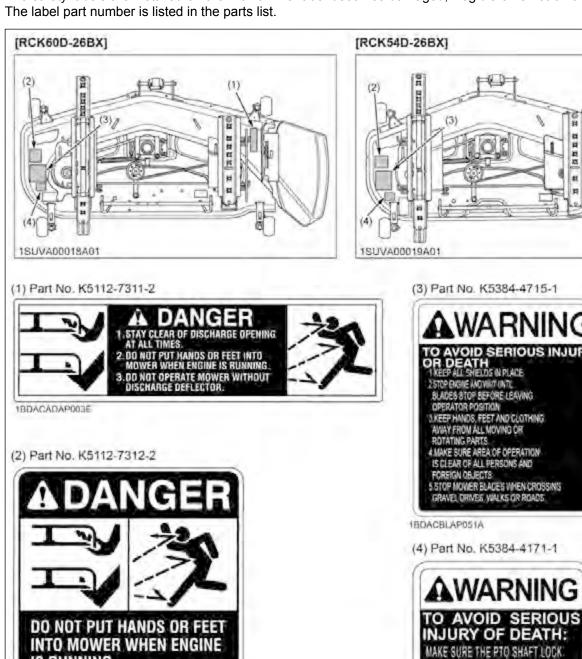


1PSQW00007A01



#### 2. Safety labels for mower

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



2LEOP00023A01enUS

IS RUNNING.

IBDACADAP004E

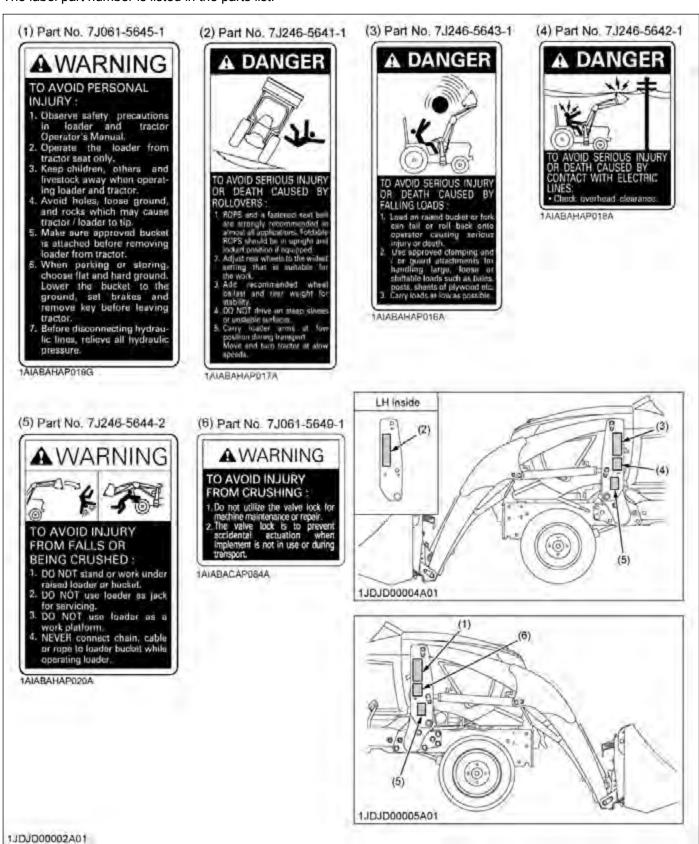
(YELLOW HANDLE; PUSH REARWARD) AND REAR DECK LOCK (PIN HANDLE:

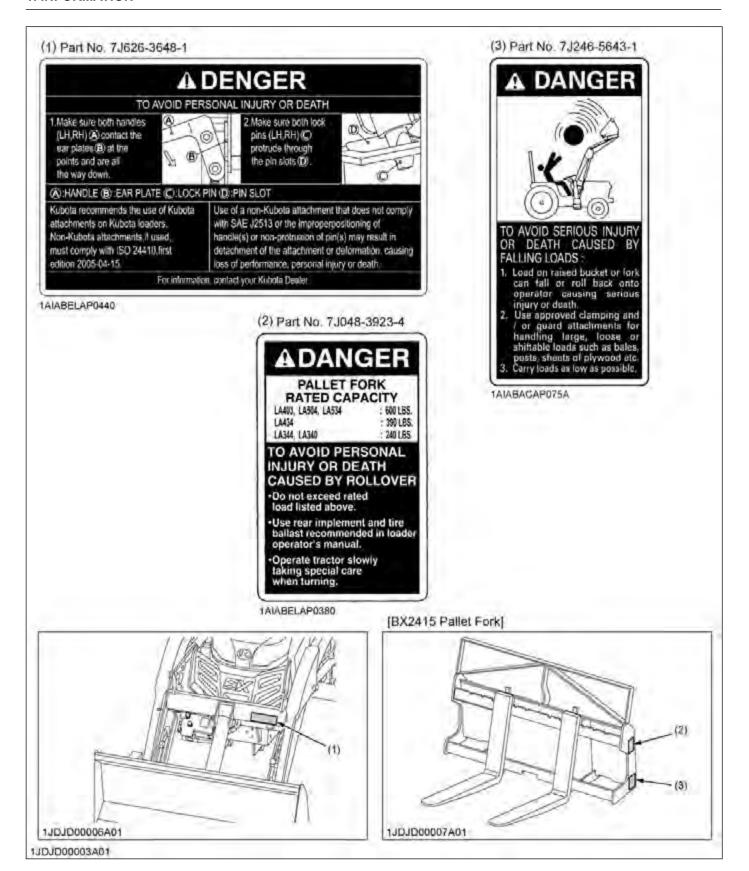
ROTATE COUNTER CLOCKWISE) LOCKING LEVERS ARE FULLY ENGAGED AND LOCKED BEFORE OPERATING THE MOWER DECK

1BDACAMAPOR5A

## 3. 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.





# 4. Safety labels for backhoe

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

#### DANGER, WARNING AND CAUTION LABELS OF THE BACKHOE

(1) Part No. 75597-7528-1



(2) Part No. 75595-7517-2



1HNAAACAP011E

(3) Part No. 75595-7524-2



1HNAAACAP012E

1HNAAACAP008E

(4) Part No. 7K501-7529-1

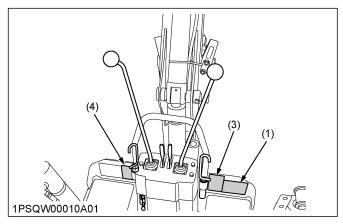


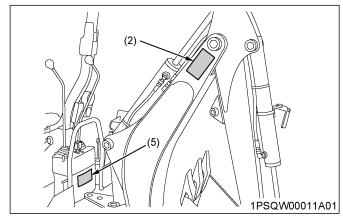
(5) Part No. 75597-7517-2



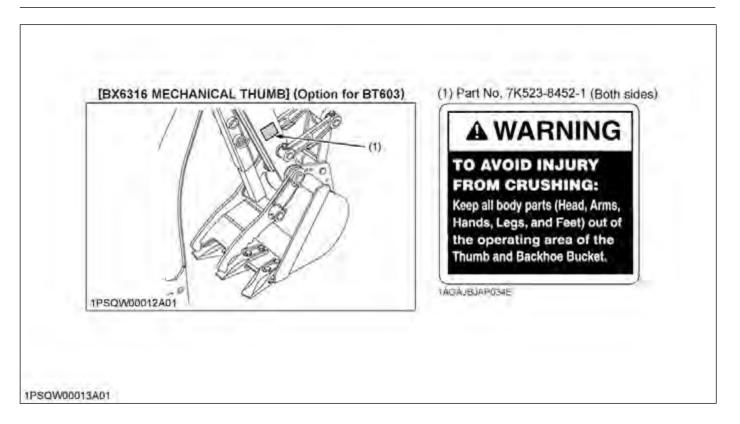
1HNAAACAP010E

1AJABAEAP028A





1PSQW00009A01



# **SPECIFICATIONS**

### 1. BX tractor specifications

Model			BX23S
PTO power*1			13.2 kW (17.7 HP)
	Maker		KUBOTA
	Model		D902
	Туре		Liquid-cooled, 4-cycle diesel
	Number of cylinders		3
	Bore and stroke		72.0 × 73.6 mm (2.83 × 2.90 in.)
	Total displacement		898 cm <sup>3</sup> (54.8 cu. in.)
Engine	Engine gross power*2		17.1 kW (23.0 HP)
	Rated revolution		55.0 to 58.3 r/s (3300 to 3500 rpm)
	Low idling revolution		1350 to 1550 rpm
	Maximum torque		56.1 N·m (41.4 lbf·ft)
	Battery		12 V, CCA: 560 A, RC: 86 min.
	Fuel		Diesel fuel No.1 [below -10 °C (14 °F)] Diesel fuel No.2 [above -10 °C (14 °F)]
	Fuel tank		25 L (6.6 U.S.gals.)
	Engine crankcase (with filter	er)	3.3 L (3.5 U.S.qts.)
Capacities	Engine coolant		3.1 L (3.3 U.S.qts.)
	Recovery tank		0.4 L (0.4 U.S.qts.)
	Transmission case		11.3 L (2.99 U.S.gals.)
	Overall length (without 3p)		2210 mm (87.01 in.)
	Overall length (with 3p)		2515 mm (99.02 in.)
	Overall width (Min. tread)		1145 mm (45.08 in.)
	Our wall be sinked	(with ROPS)	2190 mm (86.22 in.)
Dimensions	Overall height	(Top of seat)	1255 mm (49.41 in.)
	Wheel base		1400 mm (55.12 in.)
	Min. ground clearance		148 mm (5.83 in.)
	Tuesd	Front	930 mm (36.6 in.)
	Tread	Rear	820 mm (32.2 in.)
Weight (with ROPS)		725 kg (1600 lbs)	
Clutch		N/A	
	Tiro	Front: Turf/Bar/industrial	18 × 8.50-10
	Tire	Rear: Turf/Bar/industrial	26 × 12.00-12
Traveling system	Steering		Hydrostatic type power steering
	Transmission		Main: Hydrostatic transmission, High-Low gear shift (2 forward, 2 reverse)

(Continued)

#### 1. INFORMATION

	Model	BX23S	
Traveline	Brake		Wet disk type
Traveling system	Min. turning radius		2.3 m (7.5 ft)
	Hydraulic control system		Directional control, auto-return lever system
	Pump capacity		23.5 L/min. (6.21 gals/min)
	System pressure		12.3 to 12.8 MPa (126 to 130 kgf/cm <sup>2</sup> ) [1790 to 1850 psi]
	3-point hitch		SAE Category 1
Hydraulic unit	Man 1:4 fam *3	At lift points	5390 N (1212 lbs)
	Max. lift force*3	24 in. behind lift points	3040 N (680.4 lbs)
	Remote control valve cou-	System	2 valves
	pler (Rear: Option)	Coupler	ISO 7241-1 series A
	Remote control valve cou-	System	2 valves
	pler (Front: Option) Coupler (Fitting)	Coupler (Fitting)	ISO 7241-1 series B
	PTO shaft	SAE 1-3/8, 6 splines	
	Rear PTO	Revolution	STD (2500 rpm)
РТО	Mid PTO	PTO shaft	USA No. 5 (KUBOTA 10-tooth) involute spline
		Revolution	STD (2500 rpm)

<sup>\*1</sup> Manufacturer's estimate

<sup>\*2</sup> SAE J1995

<sup>\*3</sup> See and check "Implement limitation tables".

## 2. Mower specifications

Model		RCK60D-26BX	RCK54D-26BX	
Suitable tractor		BX23S		
Mounting mothed		Drive-over-quick-joint, parallel linkage		
Mounting method		Drive-over-susp	pended-linkage	
Adjustment of cutting	height	Dial g	auge	
Cutting width		1524 mm (60 in.)	1372 mm (54 in.)	
Cutting height		25 to 102 mm	(1.0 to 4.0 in.)	
	Mower	115 kg (250 lbs)	103 kg (227 lbs)	
Weight	Mower with frame link*1	134 kg (295 lbs)	122 kg (269 lbs)	
Blade spindle speed		44.1 r/s (2647 rpm)	49.5 r/s (2969 rpm)	
Blade tip velocity		72.5 m/s (14271 fpm)	73.8 m/s (14527 fpm)	
Blade length		523 mm (20.6 in.)	475 mm (18.7 in.)	
Number of blades		3		
	Overall length	1000 mm (39.4 in.)	928 mm (36.5 in.)	
Dimensions	Overall width	1930 mm (76.0 in.)	1780 mm (66.5 in.)	
Overall height (Min.)		281 mm (11.0 in.)		
Tire		Industrial, turf*2		

<sup>\*1</sup> Remove the frame link when rear attachment is on. Remove the frame link when snow attachment is on.

<sup>\*2</sup> Bar tires are prohibited from driving over mower deck.

## 3. Loader specifications

### 3.1 Loader specifications

Loader model		LA340 and LA340S
Tractor model		BX23S
Room audindor	Bore	40 mm (1.6 in.)
Boom cylinder	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)		217 kg (478 lbs)*1

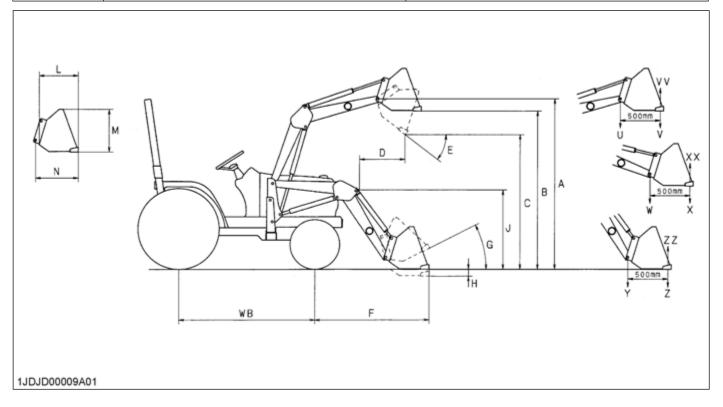
<sup>\*1</sup> Include the quick bucket 48 in.

### 3.2 Bucket specifications

Loader model		LA340	LA340S	
Model		Square 48 in.		
Туре		Rigid	Quick hitch	
Width		1219 mm	1219 mm (47.99 in.)	
Depth		491 mm (19.3 in.)	470 mm (18.5 in.)	
Height (M)		465 mm (18.3 in.)	523 mm (20.6 in.)	
Length (N)		538 mm (21.2 in.)	586 mm (23.1 in.)	
Struck		0.14 m <sup>3</sup> (4.9 cu.ft.)	0.13 m <sup>3</sup> (4.6 cu.ft.)	
Capacity Heaped		0.17 m <sup>3</sup> (6.0 cu.ft.)		
Weight		60 kg (130 lbs.)	56 kg (120 lbs.)	

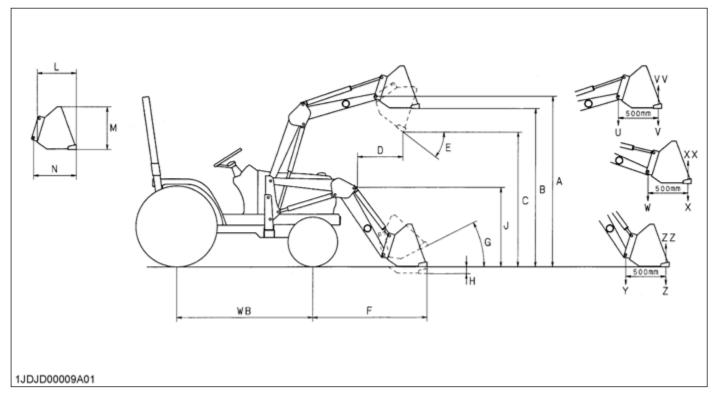
### 3.3 Dimensional specifications of loader

	Loader model	LA340	LA340S
	Tractor model	В	X23S
Α	Max. lift height (to bucket pivot pin)	1804 mr	m (71.02 in.)
В	Max. lift height under level bucket	1662 mm (65.43 in.)	1664 mm (65.51 in.)
С	Clearance with bucket dumped	1323 mm (52.09 in.)	1288 mm (50.71 in.)
D	Reach at max. lift height (Dumping reach)	646 mm (25.4 in.)	677 mm (26.7 in.)
E	Max. dump angle	0.785	rad (45°)
F	Reach with bucket on ground	1392 mm (54.80 in.)	1438 mm (56.61 in.)
G	Bucket roll-back angle	0.51	rad (29°)
Н	Digging depth	125 mm (4.92 in.)	122 mm (4.80 in.)
J	Overall height in carrying position	990 mr	m (39.0 in.)

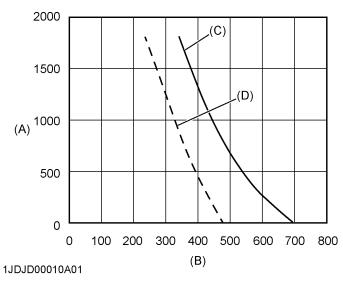


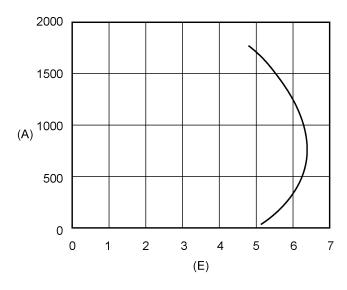
### 3.4 Operational specifications of loader

	Loader model	LA340	LA340S
	Tractor model	вх	23\$
U	Lift capacity (Bucket pivot pin, max. height)	335 kg (739 lbs)	278 kg (613 lbs)
V	Lift capacity (500 mm forward, max. height)	231 kg (509 lbs)	192 kg (423 lbs)
W	Lift capacity (Bucket pivot pin, 1500 mm height)	372 kg (820 lbs)	317 kg (699 lbs)
Х	Lift capacity (500 mm forward, 1500 mm height)	268 kg (591 lbs)	229 kg (505 lbs)
Y	Breakout force (Bucket pivot pin)	6258 N (1407 lbs)	5719 N (1286 lbs)
Z	Breakout force (500 mm forward)	4389 N (986.7 lbs)	4008 N (901.0 lbs)
VV	Bucket roll-back force at max. height	4731 N (1064 lbs)	4431 N (996.1 lbs)
XX	Bucket roll-back force at 1500 mm height	5557 N (1249 lbs)	5264 N (1183 lbs)
ZZ	Bucket roll-back force at ground level	5456 N (1227 lbs)	5195 N (1168 lbs)
Raising time		3.	3 s
Lowering time		2.	5 s
Bucket dumping time		2.	7 s
Bucket rollbac	k time	2.	3 s

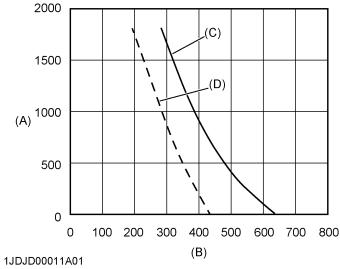


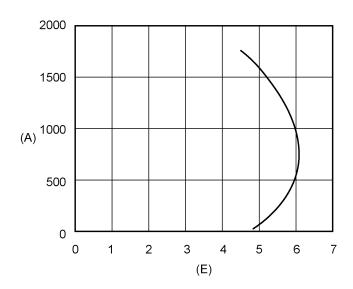
#### **LA340**





#### **LA340S**





- (A) Height (mm)
- (B) Lift capacity (kg)
- (C) At pivot pin
- (D) 500 mm forward of pivot pin
- (E) Rollback force (kN)

### 4. Backhoe specifications

### 4.1 Backhoe specifications

#### Digging force (Per SAE J49)

With bucket cylinder	8610 N (1936 lbs)
With dipperstick cylinder	5209 N (1171 lbs)

#### Cycle time (Seconds)

Boom cylinder, extend	4.5 s
Boom cylinder, retract	3.7 s
Swing cylinder, from 90 degrees to center	1.5 s
Dipperstick cylinder, extend	4.1 s
Dipperstick cylinder, retract	3.4 s
Bucket cylinder, extend	3.1 s
Bucket cylinder, retract	2.4 s
Stabilizer cylinder, max. height to ground	2.9 s
Stabilizer cylinder, ground to max. height	2.3 s

#### **Hydraulic cylinders**

	Boom	Dipperstick	Bucket	Stabilizer	Swing
Rod diameter	3.0 cm (1.2 in.)	2.5 cm (0.98 in.)	2.5 cm (0.98 in.)	2.5 cm (0.98 in.)	3.0 cm (1.2 in.)
Cylinder bore	6.5 cm (2.6 in.)	6.0 cm (2.4 in.)	5.0 cm (2.0 in.)	6.0 cm (2.4 in.)	6.0 cm (2.4 in.)

#### **Bucket sizes**

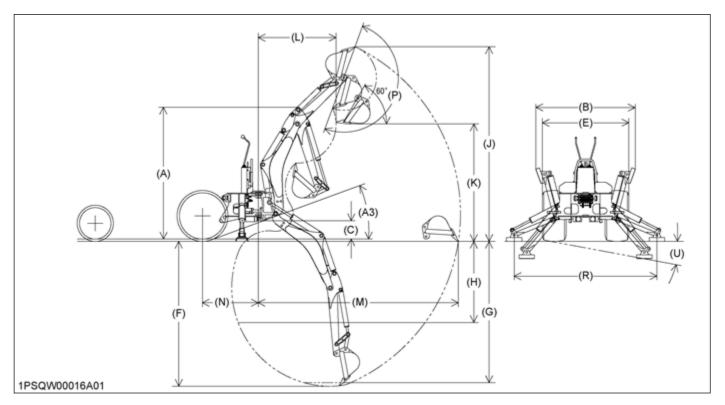
	Width	SAE truck capacity	SAE heaped capacity	Number of teeth	Weight
Trenching 8 in.	20.3 cm (7.99 in.)	0.009 m <sup>3</sup> (0.317 cu.ft.)	0.011 m <sup>3</sup> (0.388 cu.ft.)	2	10 kg (22 lbs)
Trenching 12 in.	30.5 cm (12.0 in.)	0.014 m <sup>3</sup> (0.494 cu.ft.)	0.020 m <sup>3</sup> (0.706 cu.ft.)	3	13 kg (29 lbs)
Trenching 16 in.	40.6 cm (16.0 in.)	0.020 m <sup>3</sup> (0.706 cu.ft.)	0.029 m <sup>3</sup> (1.024 cu.ft.)	3	16 kg (35 lbs)

### 4.2 Backhoe dimensions

	Model	BT603
(A)	Transport height	1719 mm (67.68 in.)
(B)	Stabilizer spread-transport	1296 mm (51.02 in.)
(C)	Ground clearance	240 mm (9.45 in.)
(E)	Overall width	1128 mm (44.41 in.)
(F)	Maximum digging depth	1889 mm (74.37 in.)
(G)	Digging depth, 2 ft. flat bottom	1842 mm (72.52 in.)
(H)	Digging depth, 8 ft. flat bottom	1059 mm (41.69 in.)
(J)	Operating height, fully raised	2539 mm (99.96 in.)
(K)	Loading height	1533 mm (60.35 in.)
(L)	Loading reach	1016 mm (40.00 in.)
(M)	Reach from swing pivot	2612 mm (102.8 in.)
(N)	Swing pivot to rear axle center line	726 mm (28.6 in.)
(P)	Bucket rotation	3.14 rad (180°)
(R)	Stabilizer spread-operating	1862 mm (73.31 in.)
(A3)	Angle of departure per SAE J1234	0.351 rad (20.1°)
(U)	Leveling angle	0.19 rad (11°)
Swing arc		2.44 rad (140°)

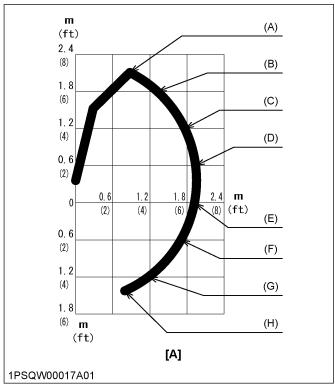
#### NOTE

• The specifications are taken with KUBOTA BX23S tractor. (Tire size: Front 18×8.5-10, Rear 26×12.00-12)



### 4.3 Backhoe lift capacity

The lift capacities shown are 87% of maximum lift force, according to SAE definition.



- [A] Rated lift capacity (over end)-kg (lbs)
- (A) 192 kg (423 lbs) (B) 212 kg (467 lbs)
- (C) 215 kg (474 lbs)
- (D) 209 kg (461 lbs) (E) 203 kg (448 lbs) (F) 201 kg (443 lbs)

- (G) 214 kg (472 lbs)
- (H) 262 kg (578 lbs)

# **TRAVELING SPEEDS**

Model		BX23S
Tire size (Rear)		26 × 12.00-12
Speed control pedal	Range gear shift lever	(At max. engine rpm)
Forward	Low	0 to 6.5 km/h 0 to 4.0 mph
	High	0 to 13.5 km/h 0 to 8.38 mph
Reverse	Low	0 to 5.0 km/h 0 to 3.1 mph
	High	0 to 10.5 km/h 0 to 6.52 mph

1. INFORMATION

# **DIMENSIONS**

